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SEE SHEET 2 FOR INDEX OF SHEETS

FEDERAL AID PROJECT NO.			
C 924 -6 -689			
CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		1

DESIGN SPEED = N/A
A.D.T. (2020)= N/A
A.D.T. (2040)= N/A

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE AID PROJECT NO. C 924 -6 -689

US 54
EL PASO COUNTY

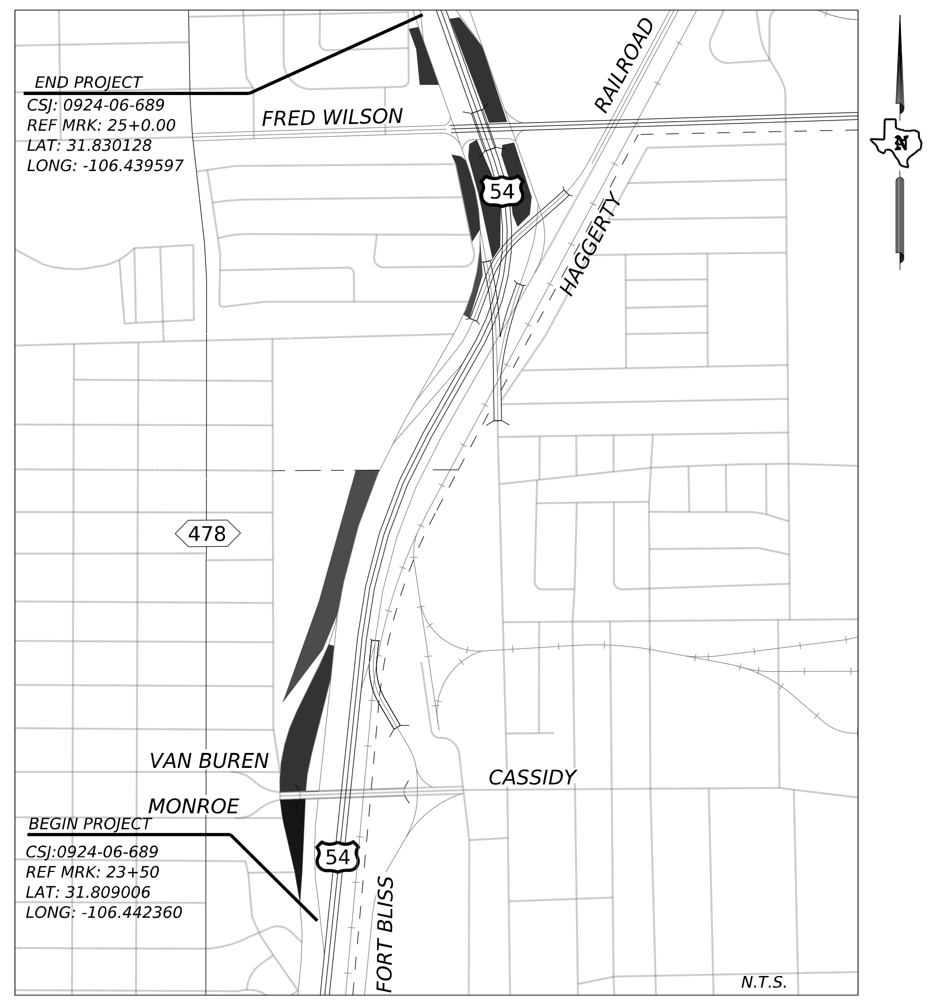
NET LENGTH OF ROADWAY = 8,078.40 FT.= 1.53 MI.
NET LENGTH OF BRIDGE = 00.00 FT.= 0.00 MI.
NET LENGTH OF PROJECT = 8,078.40 FT.= 1.53 MI.

LIMITS: EL PASO COUNTYWIDE

FOR THE CONSTRUCTION OF LANDSCAPE & SCENIC ENHANCEMENT

CONSISTING OF DESERT VEGETATIVE LANDSCAPE, GROUND COVER, IRRIGATION SYSTEM AND

MAINTENANCE CYCLE



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

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE
TDLR INSPECTION: NOT REQUIRED

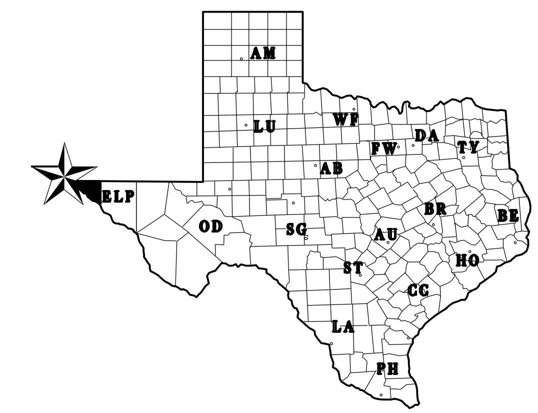
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS. (SP000---008)

FINAL PLANS

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

______ 20 ______

______
AREA ENGINEER



KEY TO COUNTIES

Texas Department of Transportation

RECOMMENDED FOR LETTING: 5/5/2023
DocuSigned by:
Eduardo Perales, P.E.
27?C69DAB5F7426
SAFETY REVIEW COMMITTE CHAIRMAN

RECOMMENDED FOR LETTING: 5/5/2023
DocuSigned by:
L. Raul Ortega Jr., P.E.
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 5/6/2023
DocuSigned by:
P.E.
7A68C5EA0D94496
DISTRICT ENGINEER

DATE: 5/5/2023 9:25:25 AM
FILE: pw://txdot.projectwiseonline.com:TXDOT5/Documents/24 - ELP/Design Projects/092406689/4 - Design/Plan Set/1. General/US 54 TITLESHT.dgn

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3-5	PROJECT LAYOUT SHEETS
6, 6A-6D	GENERAL NOTES
7	ESTIMATE & QUANTITY
8	SUMMARY OF QUANTITIES
9	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
	TRAFFIC CONTROL PLAN STANDARDS
# 10-21	BC (1)-21 THRU BC (12)-21
# 22	TCP (1-1)-18
# 23	TCP (1-5)-18
# 24	WZ (BRK)-13
	LANDSCAPE
25	PLANT, MAINTENANCE AND ESTABLISHMENT TIMELINE
26-29	PLANTING ESTABLISHMENT AND MAINTENANCE LAYOUT
30	LANDSCAPE TREATMENT (TY I)
31-40	US 54 PLANTING PLAN
	DETAILS
41-47	PLANTING AND ESTABLISHMENT
48-50	IRRIGATION DETAILS AND MATERIALS
51	IRRIGATION SYSTEM OPER AND MAINT
	ENVIRONMENTAL
52-53	STORMWATER POLLUTION PREVENTION PLAN (SWP3)
54-62	SWP3 PLAN LAYOUT
# 63	EC (1)-16
# 64-66	EC (9)-16

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

STATE OF TEXAS
ANTONIO SANTANA
93727
LICENSED
PROFESSIONAL ENGINEER

Antonio Santana PE

5/31/2023

Texas Department of Transportation

US 54

GENERAL
INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		2

CK:
DW:
CK:
DW:

DATE: 5/31/2023 11:50:42 AM
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PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

PROJECT LAYOUT

SHEET 1 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		003
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023

MATCHLINE - SEE SHEET 003

MATCHLINE - SEE SHEET 049

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
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©2023

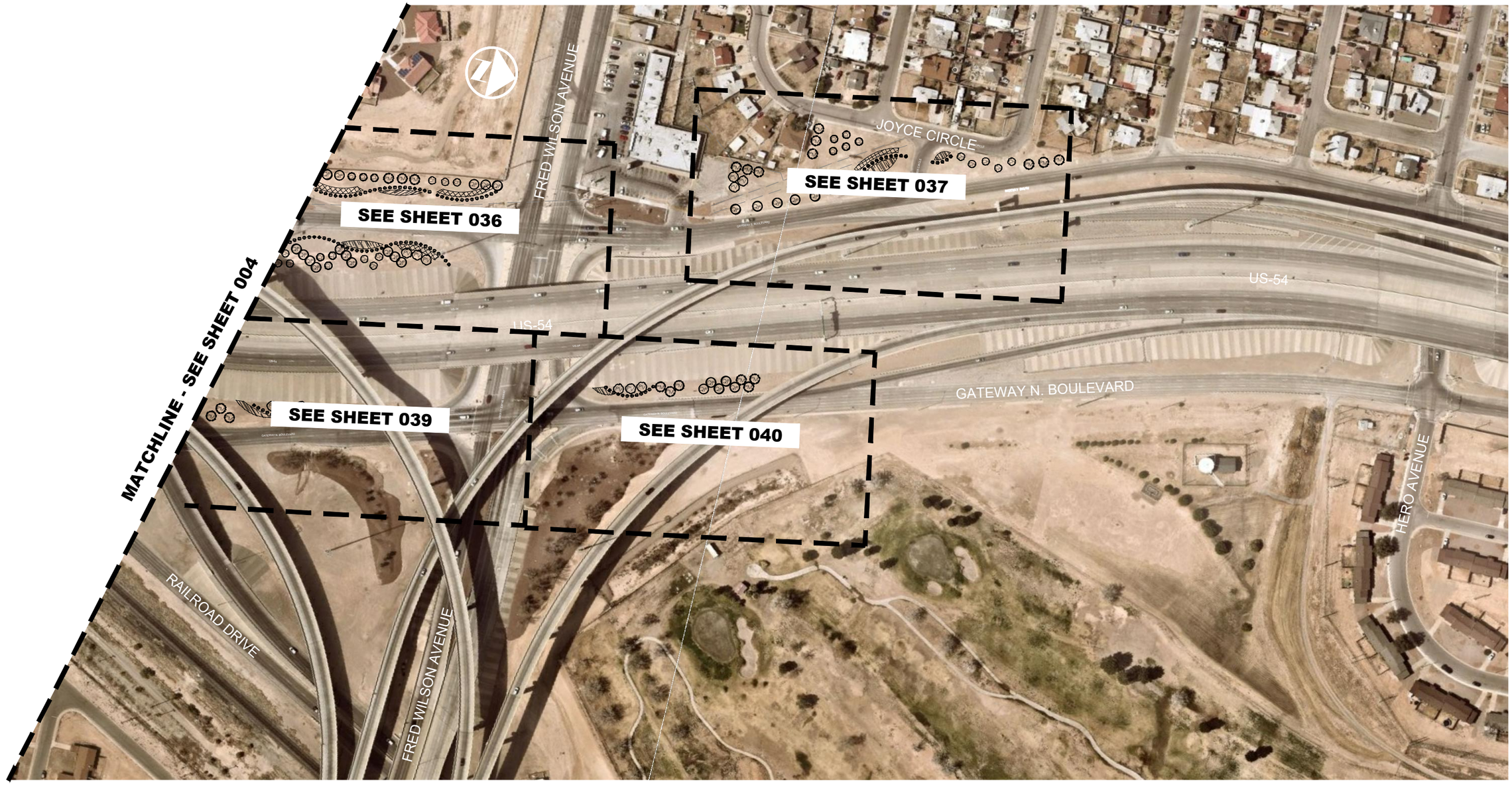
Texas Department of Transportation

PROJECT LAYOUT

SHEET 2 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		004
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023



PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.583.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

PROJECT LAYOUT

SHEET 3 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		005
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023

General Requirements

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

General Project Description: For the construction of landscape improvements within TxDOT right of way at selected locations along the frontage roads on US 54 (Patriot Freeway), El Paso TX.

Inform the Engineer and the respective utility companies, when it becomes apparent that the utility lines will interfere with the work in progress.

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

West Area Office:

Jonathan Concha, P.E.	**Aldo Madrid, P.E.**	**Monica Ruiz, P.E.**
West El Paso Area Engineer	**Director of Construction**	**District Construction Engineer**
Jonathan.Concha@txdot.gov	Aldo.Madrid@txdot.gov	Monica.Ruiz@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 4 – Scope of Work

This contract consists of vegetative landscape at areas along the frontage roads on US 54 to include the following scope of work:

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

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

Maintain all Contract items until final acceptance of the project.

Item 5 – Control of Work

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

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

Protect from damage and destruction all areas of the right of way, which are not included in the actual limits of the proposed construction areas. Exercise care to prevent damage to trees, vegetation, irrigation system and other natural features. Protect trees, shrubs, and other landscape features from abuse, marring, or damage within the actual construction and/or fenced protection areas designated for preservation.

Restore any area disturbed or damaged to a condition “as good as” or “better than” prior to start of construction operation. This work will be at the Contractor’s expense.

Item 7 – Legal Relations and Responsibilities

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

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

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

No significant traffic generator events identified.

Item 8 – Prosecution and Progress

Working days will be calculated in accordance with Section 8.3.1., “**Standard Workweek**.”

Create and maintain a Bart Chart schedule.

Submit baseline schedule and obtain approval prior to beginning construction. The monthly progress payment will be held if the monthly update is not submitted.

Provide a Project Schedule Summary Report on a monthly basis along with the monthly progress schedule.

Item 9 – Measurement and Payment

Monthly progress payments will be made for items of work completed by the 27th day of each month. Any work completed after the 27th will be included for payment in the subsequent monthly progress payment.

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

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" WEB-BASED (Course #133119) which can be found online at the following site: https://www.nhi.fhwa.dot.gov/

Certificates of completion should be available to all who finish the course. These should be kept by the officers in order 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 170 – Irrigation System

For area to install a new irrigation system

Install a drip system and new irrigation components in the areas where the irrigation system is required. Special care should be taken to protect existing plant roots. All work, materials, and labor required for connection are subsidiary to this Item.

Contact the El Paso Water Utilities or corresponding municipality to coordinate and verify water meter locations prior to installation. Contractor shall obtain all required permits and licenses and pay applicable fees for tapping into City main line. Contractor shall pay for the water meter, and necessary fees required for installation and operation of the proposed irrigation system.

Drawings on 11x17 plan sheets submitted by the Contractor must be sealed by a licensed professional engineer for approval by the department. Show all system changes, rerouting of main and lateral lines, size of water meters installed along with the location address and meter number.

Provide Schedule 80 PVC rated for direct sunlight exposure for all above ground pipe including risers and swing-joint components.

Install irrigation system using the bore method when crossing existing roadways and driveways as directed. All bores are subsidiary to this Item.

Measure pressure on outflow side of meter and provide information to the Engineer to verify system function.

Provide all manufacturer literature and warranty documents for the irrigation system components to the Engineer for literature on future maintenance. Provide instructions covering full operation, care, and maintenance of the equipment, including a schedule showing length of time each valve is to be open to provide determined amount of water. Instruct designated personnel of proper operation of the system. This work is subsidiary to this Item.

For existing Irrigation system adjustment and repair

Damaged or broken back-flow preventer, control valves, pvc, fittings, etc., incorporated into the system shall be of the same type and class material as the existing irrigation system and regularly manufactured parts or an approved equal (valves, backflow preventer, reducers, bushings, and other appurtenances).

Furnish manufacturer specifications for approval prior to beginning work.

Item 192 – Landscape Planting

Protect newly graded areas from traffic and erosion.

Plant material, quality, size, and condition at nursery and when delivered at job site will be in accordance with American Standard for Nursery Stock, current edition, as published by The American Association of Nurserymen and the Texas Association of Nurserymen requirements.

Plant material substitutions are not allowed without the written permission of the Engineer. Requests for substitutions shall be submitted no later than 2 weeks prior to the initiation of work.

Remove nursery tags after acceptance of planted material at site.

Notify the Engineer when plant material is available for inspection at the nursery prior to delivery and before and after planting at the job site.

The Engineer shall be the judge of the quality and acceptability of all plant materials. All rejected material will be immediately removed from the site and replaced with acceptable materials as specified under this Item at no additional cost to the Department.

Provide plant material that has a uniform shape around its complete circumference. Plant material with irregular branching patterns or with branching patterns more highly developed on one side than the other sides are not acceptable.

Container-grown plant material shall be established in its delivery container no less than six months but not more than two years. Root-bound material shall not be accepted.

A minimum 30 mm woven polypropylene vegetative barrier shall be placed under loose aggregate, as shown on the plans.

At the end of the 90-day maintenance period of Item 192, and prior to beginning Item 193, “Plant Establishment,” replace all dead or damaged plants that are considered unacceptable, as directed. Item 193 will begin after all work is complete and in-place, and all punch list items have been corrected, as directed, and approved.

Prior to construction, meet with Engineer in the field to flag existing trees designated in the plans to remain for identification and treat as described below.

Existing plant material damaged during construction activities will be replaced with a similar type and size of plant at no additional cost to the Department.

Unless specifically noted on the plans, provide single-trunk trees that are straight, free of “dog-legs,” “crooks,” “y-crotches,” or other disfiguring shapes, and that the central leader has not been pruned. Trees with double leaders are not acceptable unless specified as multi-trunked.

Provide tree material that has a solid ball of earth and is held in place securely by burlap and a stout twine or rope. Broken or loose balls will be rejected.

Remove all protective material such as burlap, strings, wire, etc. before placing plant in plant pits and completion of all planting work.

Item 193 – Landscape Establishment

In addition to the maintenance activities listed under this item; removal of liter, debris, and other operations will be necessary for the health of the planted stock and the general appearance of the landscaped areas.

Contractor shall protect the plant material from damage including, but not limited to: overwatering, lack of watering, root rot, apparent maintenance neglect, erosion of rock, and disease.

Contractor shall only apply herbicide to weeds and undesirable vegetation as directed.

Apply fertilizer uniformly to all plants during the maintenance period and as indicated on the schedule chart on the “Planting and Establishment” sheets.

Vegetative Watering: Adjust water during heavy rainfall and monsoon season. Water frequency to be adjusted as needed for desert and cactus plants to avoid root rot and excessive watering for desert plants.

Irrigation system to be inspected once a month for high or low water pressure to include valves, water meter functions, backflow preventer and leaks. Inspect all valves, pipes, connection points, check for broken, clogged, or missing drip emitters, and sunken heads that have dipped below ground. Inspection include but not limited to check for broken pipes or fittings above or below ground.

Contractor to inform the Area Office on any failure that requires water shut off. Inform Area Office when vandalism of irrigation system is apparent to take the necessary action to replace parts or repair system. Leaks, broken pipes, fittings, missing valves, or any items that impedes proper irrigation system function shall be repaired or replaced in a timely manner or as directed.

It is the Contractor’s responsibility to repair or replace parts or components of the system due to contractor’s actions or neglect.

Irrigations system new parts replacement and repair shall be performed as per Item 193.3.4

Item 502 – Barricades, Signs, and Traffic Handling

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

Lane/Shoulder closure shall be limited to **one** segment adjacent to landscaping area at a time, or as directed by the Engineer. Adjacent work areas that cause TCP overlap must be approved by the Engineer.

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

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

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

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

Traffic control closures shall be set up from **9:00 AM** to **4:00 PM** or as directed by the Engineer.

Ramp coming out of Sheridan Road northbound will require coordination with Fort Bliss. Access to all side streets must remain open unless otherwise directed by the Engineer.

Table 1

Contractor Responsible Person and Alternate

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCS	Traffic Control Supervisor	2 days	
National Highway Institute	133112 133113	Design and Operation of Work Zone Traffic Control Work Zone Traffic Control for Maintenance Operations	1 day 1 day	Both courses are required to meet minimum required training.
Texas Engineering Extension Services	133112A	Design and Operation of Work Zone Traffic Control	3 days	
University of Texas Arlington Division for Enterprise Development	WKZ421	Traffic Control Supervisor	16 hours	Contact UTA for training needs.

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

Table 2

Other Work Zone Personnel

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCT	Traffic Control Technician	1 day	
Texas Engineering Extension Services	HWS002	Work Zone Traffic Control	16 hours	Identical to HWS-410. Counts for 3 years CRP requirement.
National Highway Institute	133116	Maintenance of Traffic for Technicians	5 hours	Web based
National Highway Institute	134109-I	Maintenance Training Series: Basics of Work Zone Traffic Control	1 hour	Free, Web based
University of Texas at Arlington, Division for Enterprise Development	WKZ100	Work Zone Safety: Temporary Traffic Control	4 hours	Note name change. Free, Web based
TxDOT/AGC Joint Development	N/A	Safe Workers Awareness Highway Construction Work Zone Hazards	16 minutes 18 minutes	Videos available through AGC of Texas offices. English & Spanish
AGC America	N/A	Highway Work Zone Safety Training	1 day	
Texas Engineering Extension Service	HWS400	Temporary Traffic Control Worker	4 hours	Contact TEEX, if interested in course
TxDOT/AGC Joint Development	N/A	Work Zone Fundamentals	10 minutes	Videos available through ACT of Texas offices. English & Spanish

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed

training must be equivalent to the Department approved training shown in Table 2. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

Provide access to intersecting side roads and driveways at all times, unless otherwise directed. Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Place and maintain sufficient additional warning signs, beacons, delineators, and barricades to warn and guide the public of all hazards in the construction zone limits at all times, and as directed. Use flashing arrow boards on all tapers for each lane closure.

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

Remove or cover signs that do not apply to current conditions at the end of each day's work. Repair or replace all signs damaged by the public or due to weather events.

All project signs shall be maintained free of litter, debris, or sediment build up at the base supports. This work is subsidiary to this item of work.

Safety Contingency

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

Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls

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

The approximate disturbed area for this project is **1.0** acres. Establish the authorization requirements for Storm Water Discharges for soil disturbed area in this project, all project locations in the Contract, and Contractor Project Specific Locations (PSLs), within one mile of the project limits. Both the Department and the Contractor shall obtain an authorization to discharge storm water from TCEQ for the construction activities shown on the plans. Obtain required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off right of way.

Best Method Practices (BMP's) may be adjusted to meet field conditions, or as directed. The Engineer will verify all locations prior to placement of BMPs. Maintain and properly place the erosion control measures to prevent storm water pollution to the Waters of the United States, as directed. Within the

project limits, keep all inlets functional as long as possible to accept storm water as part of the Storm Water Pollution Prevention Plan (SWP3), as directed.

Grading operations will be limited to the catch point of the proposed cross-section. Preserve any vegetation outside these limits.

Item 1006 Landscape Soil Amendment

Soil to be amended at with the method and scheduled times shown on "Planting and Establishment" sheets.

Landscape Soil Amendment Types III and IV for SY equals treatment for each tree or plant/shrub receiving foliar treatment or spray as shown on sheet 4 of 7 of the "Planting and Establishment" sheets.

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

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

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

In addition to the shadow vehicles with Truck Mounted Attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 1 additional shadow vehicle(s) with TMA for TCP (1-1 and 1-5)18 as detailed on General Note 5 of this standard sheet.

Therefore, 2 total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

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

Basis of Estimate for Stationary TMAs				
		TMA(Stationary)		
Phase	Standard	Required	Additional	TOTAL
N/A	TCP(1)18	1	1	2

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0924-06-689 **DISTRICT** El Paso **COUNTY** El Paso
HIGHWAY Various

			CONTROL SECTION JOB		**0924-06-689**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00193479**		
			COUNTY		**El Paso**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	161-6009	EROSION CONTROL COMPOST	CY	436.000		436.000	
	161-6012	GENERAL USE COMPOST	CY	240.000		240.000	
	170-6003	IRRIGATION SYSTEM (TY II)	LS	1.000		1.000	
	192-6025	PLANT MATERIAL (45 GAL) (TREE)	EA	210.000		210.000	
	192-6030	PLANT MATERIAL (3 GAL) (SHRUB)	EA	3,734.000		3,734.000	
	192-6033	PLANT MATERIAL (15 GAL) (SHRUB)	EA	437.000		437.000	
	192-6064	PLANT BED PREP (TYPE II)	SY	3,929.000		3,929.000	
	193-6001	PLANT MAINTENANCE	MO	12.000		12.000	
	193-6007	IRRIGATION SYSTEM OPER AND MAINT	MO	24.000		24.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		7.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	8,561.000		8,561.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	8,561.000		8,561.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	290.000		290.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	290.000		290.000	
	1006-6001	LANDSCAPE SOIL AMENDMENT (TYPE I)	SY	3,929.000		3,929.000	
	1006-6002	LANDSCAPE SOIL AMENDMENT (TYPE II)	SY	3,929.000		3,929.000	
	1006-6003	LANDSCAPE SOIL AMENDMENT (TYPE III)	SY	210.000		210.000	
	1006-6004	LANDSCAPE SOIL AMENDMENT (TYPE IV)	SY	1,050.000		1,050.000	
	1006-6005	LANDSCAPE SOIL AMENDMENT (TYPE V)	SY	4,381.000		4,381.000	
	1022-6001	LANDSCAPE TREATMENT(TY 1)	EA	1.000		1.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000		20.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF GENERAL ITEMS			
LOCATION	500	502	6185
	6001	6001	6002
	LS	MO	DAY
	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	TMA (STATIONARY)
US 54 PLANTING PLAN SHEET 1 OF 10	1	7	20
US 54 PLANTING PLAN SHEET 2 OF 10			
US 54 PLANTING PLAN SHEET 3 OF 10			
US 54 PLANTING PLAN SHEET 4 OF 10			
US 54 PLANTING PLAN SHEET 5 OF 10			
US 54 PLANTING PLAN SHEET 6 OF 10			
US 54 PLANTING PLAN SHEET 7 OF 10			
US 54 PLANTING PLAN SHEET 8 OF 10			
US 54 PLANTING PLAN SHEET 9 OF 10			
US 54 PLANTING PLAN SHEET 10 OF 10			
GENERAL	1	7	20

SUMMARY OF EROSION CONTROL ITEMS				
LOCATION	506	506	506	506
	6038	6039	6041	6043
	TEMP SEDMT FENCE (INSTALL)	TEMP SEDMT FENCE (REMOVE)	BIODEG EROSION CONT LOGS (INSTL)(12")	BIODEG EROSION CONT LOGS (REMOVE)
	LF	LF	LF	LF
PLAN SHEET 1 OF 9	1326	1326	44	44
PLAN SHEET 2 OF 9	1697	1697	44	44
PLAN SHEET 3 OF 9	1118	1118		
PLAN SHEET 4 OF 9	572	572		
PLAN SHEET 5 OF 9	394	394	22	22
PLAN SHEET 6 OF 9	947	947	66	66
PLAN SHEET 7 OF 9	1325	1325	48	48
PLAN SHEET 8 OF 9	792	792	44	44
PLAN SHEET 9 OF 9	390	390	22	22
TOTAL	8,561	8,561	290	290

SUMMARY OF LANDSCAPE ITEMS													
LOCATION	161	161	192				193	1006					1022
	6009	6012	6025	6030	6033	6064	6001	6001	6002	6003	6004	6005	6001
	EROSION CONTROL COMPOST	GENERAL USE COMPOST	PLANT MATERIAL (45GAL)(TREE)	PLANT MATERIAL (3GAL)(SHRUB)	PLANT MATERIAL (15GAL)(SHRUB)	PLANT BED PREP (TYPE II)	PLANT MAINTENANCE	LANDSCAPE SOIL AMMENDMENT (TYPE I)	LANDSCAPE SOIL AMMENDMENT (TYPE II)	LANDSCAPE SOIL AMMENDMENT (TYPE III)	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	LANDSCAPE SOIL AMMENDMENT (TYPE V)	LANDSCAPE TREATMENT (TY I)
	CY	CY	EA	EA	EA	SY	MO	SY	SY	SY	SY	SY	EA
US 54 PLANTING PLAN SHEET 1 OF 10	61	30	29	467	53	548	12	548	548	29	145	549	0.5
US 54 PLANTING PLAN SHEET 2 OF 10	81	41	29	715	90	732		732	732	29	145	834	0.5
US 54 PLANTING PLAN SHEET 3 OF 10	65	32	18	630	79	586		586	586	18	90	727	0
US 54 PLANTING PLAN SHEET 4 OF 10	38	41	18	309	52	344		344	344	18	90	379	0
US 54 PLANTING PLAN SHEET 5 OF 10	9	5	15	0	12	81		81	81	15	75	27	0
US 54 PLANTING PLAN SHEET 6 OF 10	91	46	40	721	79	823		823	823	40	200	840	0
US 54 PLANTING PLAN SHEET 7 OF 10	48	24	30	453	32	434		434	434	30	150	515	0
US 54 PLANTING PLAN SHEET 8 OF 10	15	8	11	160	15	139		139	139	11	55	186	0
US 54 PLANTING PLAN SHEET 9 OF 10	14	7	6	194	13	130		130	130	6	30	213	0
US 54 PLANTING PLAN SHEET 10 OF 10	13	6	14	85	12	113		113	113	14	70	111	0
TOTAL	436	240	210	3,734	437	3,929	12	3,929	3,929	210	1,050	4,381	1

SUMMARY OF IRRIGATION ITEMS		
LOCATION	170	193
	6002	6007
	IRRIGATION SYSTEM (TYP II)	IRRIG SYSTEM OPER AND MAINT
	LS	MO
US 54 PLANTING PLAN SHEET 1 OF 10	0.1	24
US 54 PLANTING PLAN SHEET 2 OF 10	0.1	
US 54 PLANTING PLAN SHEET 3 OF 10	0.1	
US 54 PLANTING PLAN SHEET 4 OF 10	0.1	
US 54 PLANTING PLAN SHEET 5 OF 10	0.1	
US 54 PLANTING PLAN SHEET 6 OF 10	0.1	
US 54 PLANTING PLAN SHEET 7 OF 10	0.1	
US 54 PLANTING PLAN SHEET 8 OF 10	0.1	
US 54 PLANTING PLAN SHEET 9 OF 10	0.1	
US 54 PLANTING PLAN SHEET 10 OF 10	0.1	
TOTAL	1	24

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		008
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

DATE: 5/8/2023
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/24 - ELP/Design Projects/092406689/4 - Design/Plan Set/1. General/EPIC.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

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

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1. PROJECT LOCATIONS DO NOT HAVE EXISTING VEGETATION. PROPOSED LANDSCAPING WILL INCLUDE VEGETATION.
2.
3.
4.

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	ELP	EL PASO		9
01-23-2015 SECTION 1 (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

DATE: 5/8/2023 10:12:11 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/24 - ELP/Design Projects/092406689/4 - Design/Plan Set/8. Traffic/bc-21.dgn

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	0924	06	689	US 54
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	ELP	EL PASO		10
5-10 5-21				

DATE: 5/8/2023 10:12:14 AM
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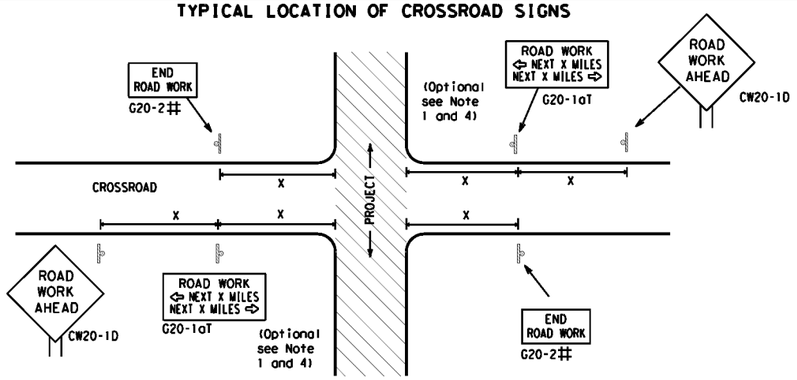
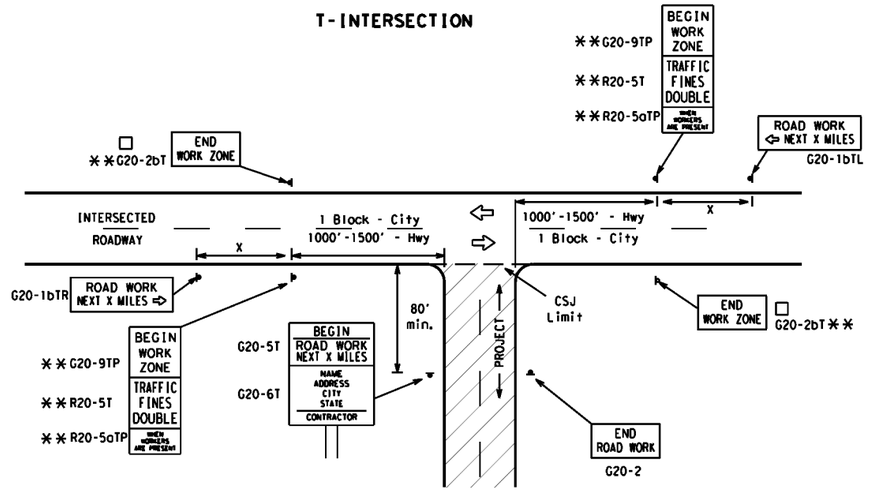
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

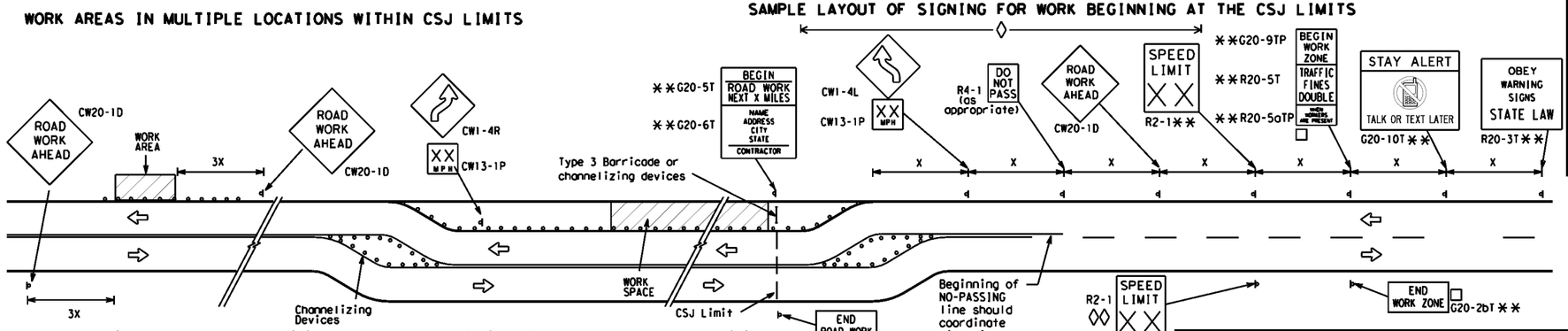
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

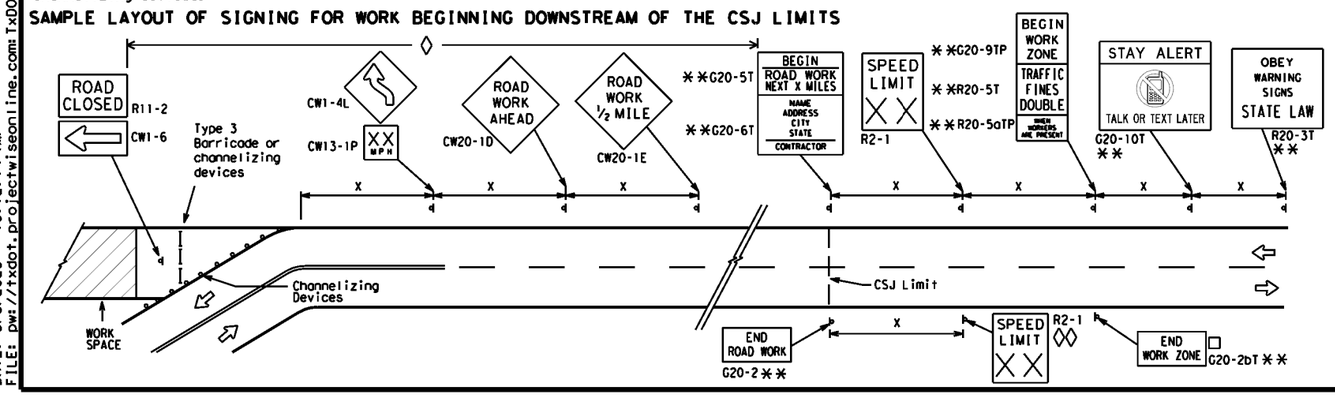
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		11

DATE: 5/8/2023 10:12:16 AM
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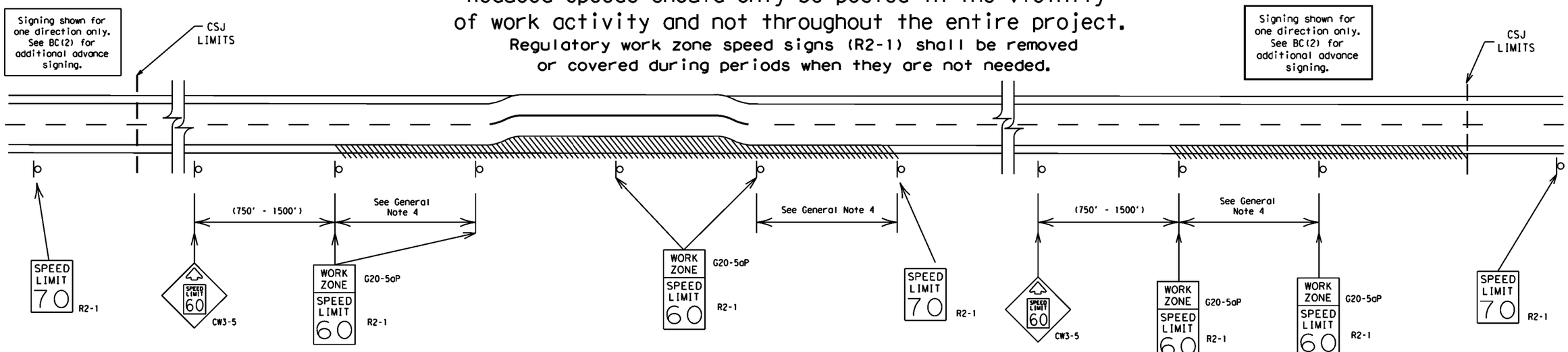
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

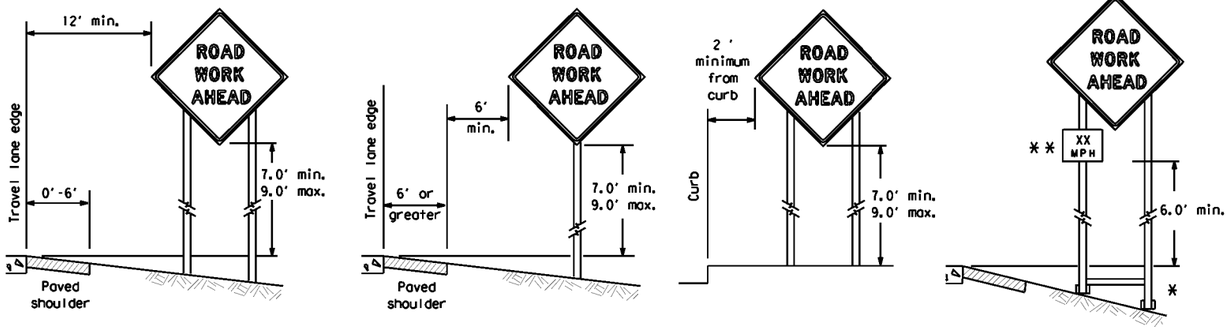
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		12

DATE: 5/8/2023 10:12:19 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/24 - ELP/Design Projects/092406694/4 - Design/Plan Set/8. Traffic/bc-21.dgn

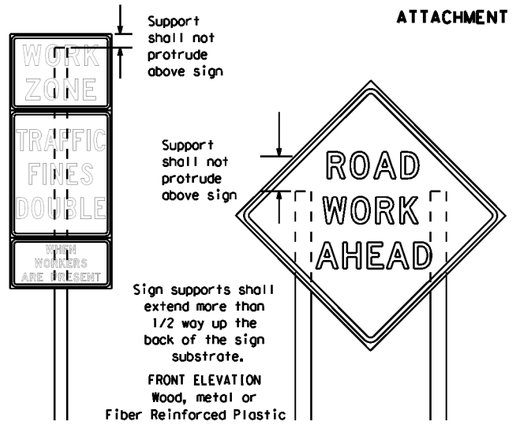
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

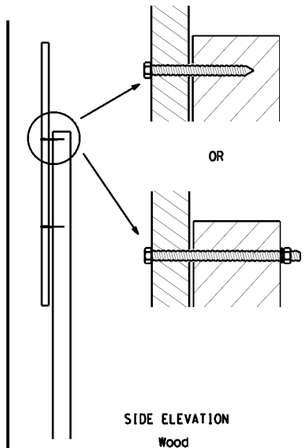


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





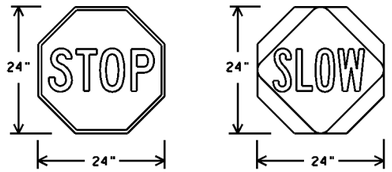
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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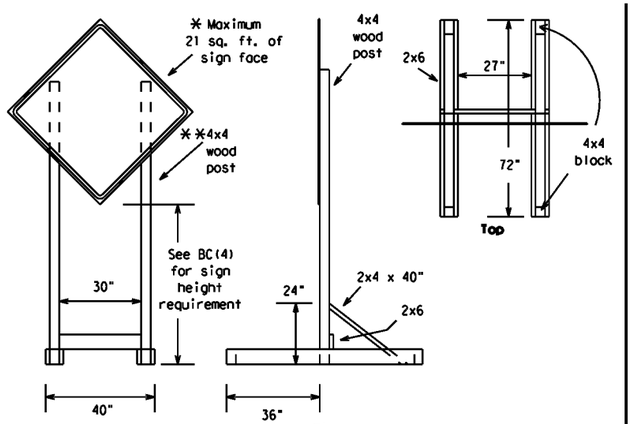
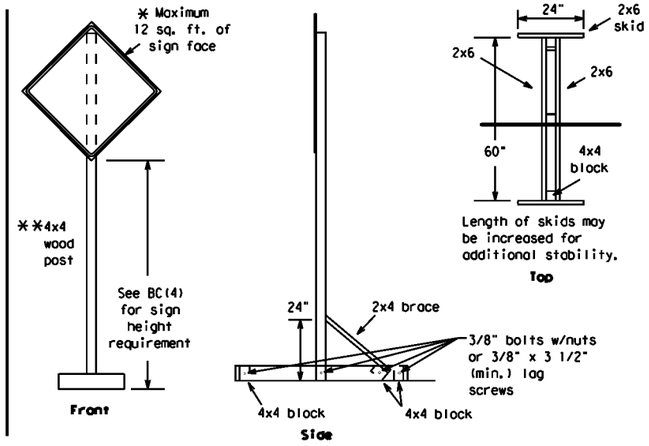
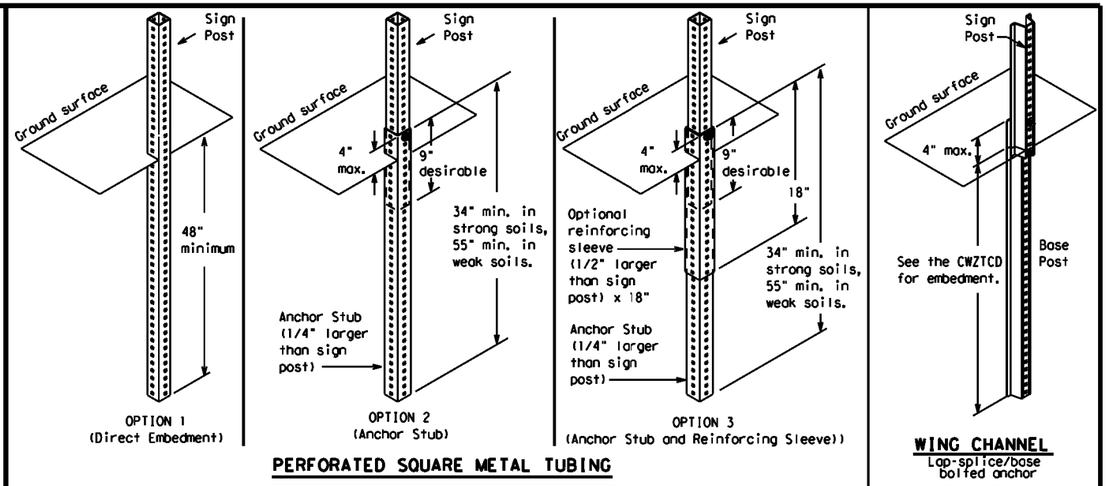




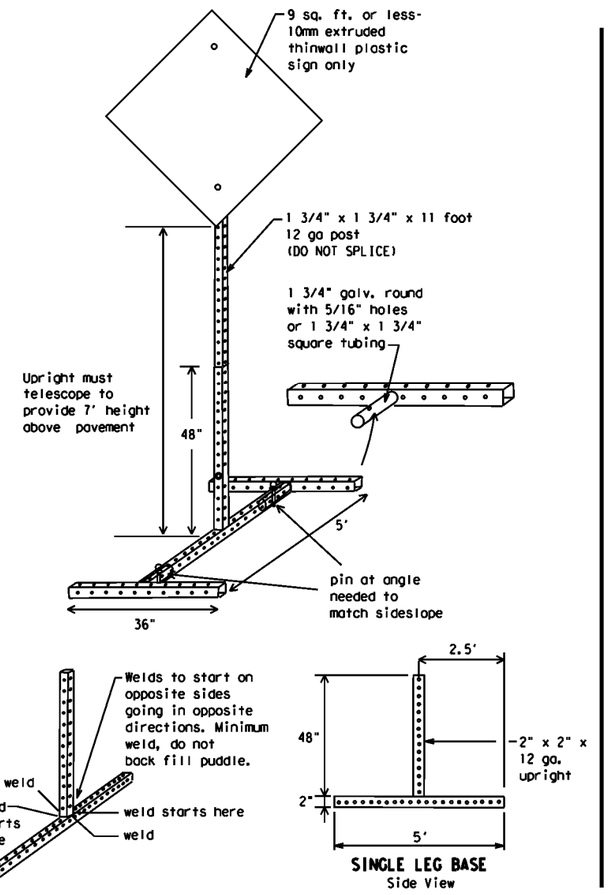
SKID MOUNTED WOOD SIGN SUPPORTS

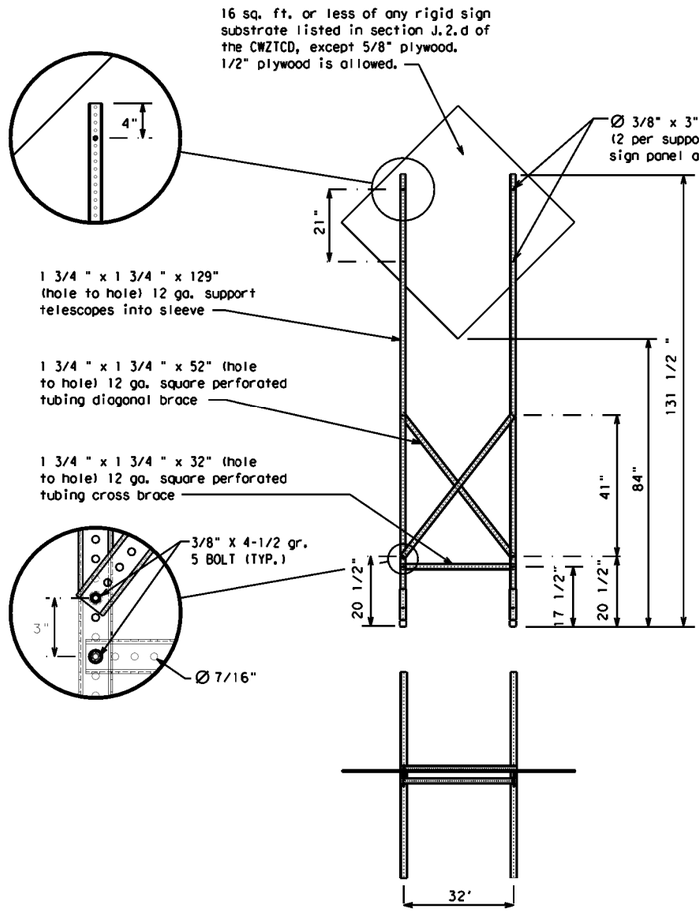
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

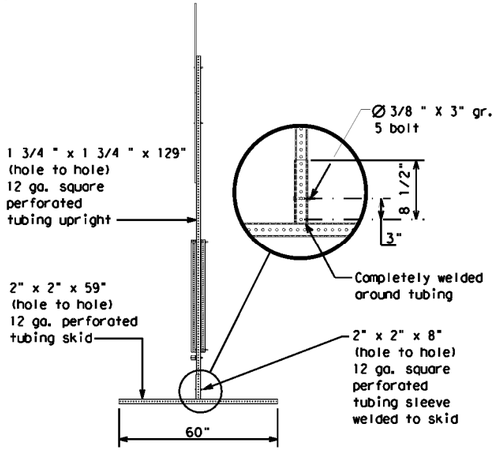


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		15

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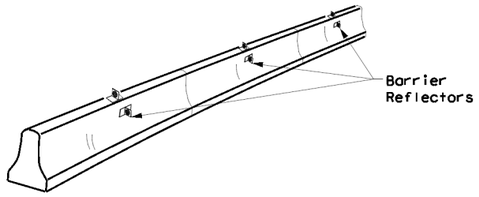
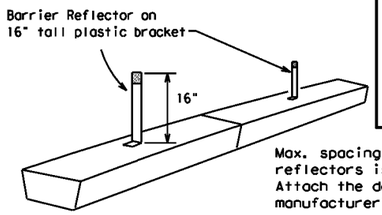
DATE: 5/8/2023 10:12:27 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/24 - ELP/Design Projects/092406694/4 - Design/Plan Set/8. Traffic/bc-21.dgn

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



CONCRETE TRAFFIC BARRIER (CTB)

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

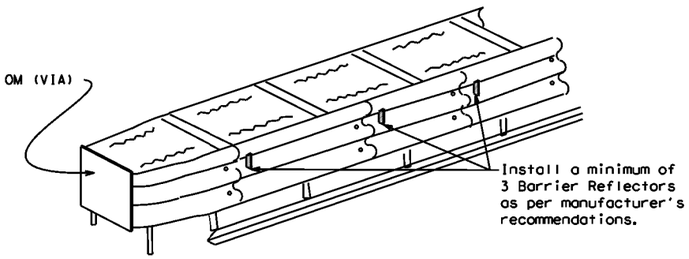


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) 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)

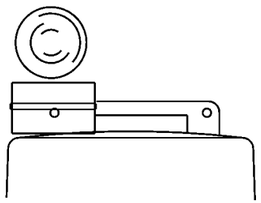


DELINEATION OF END TREATMENTS

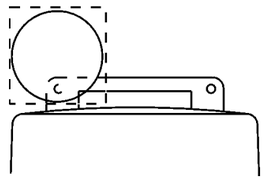
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

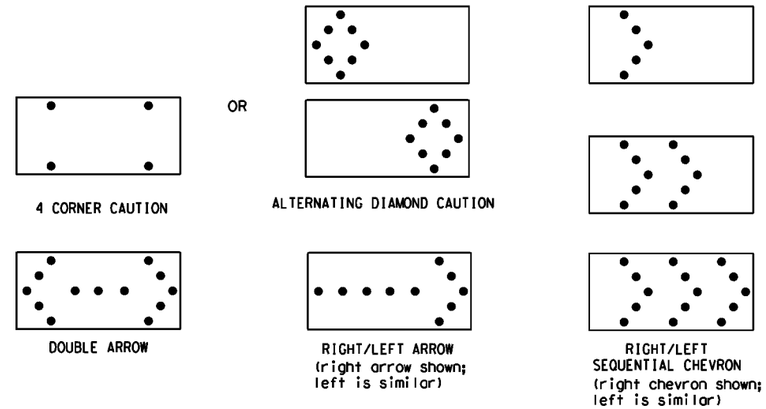
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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:



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

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

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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is on 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	0924	06	689	US 54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		16

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

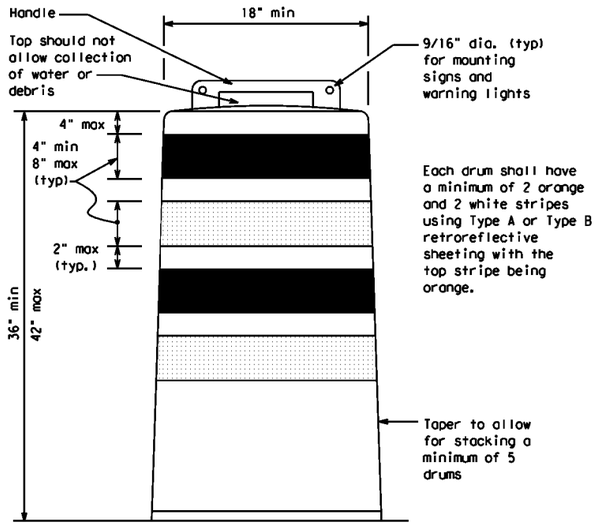
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

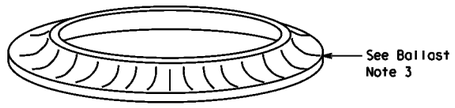
RETROREFLECTIVE SHEETING

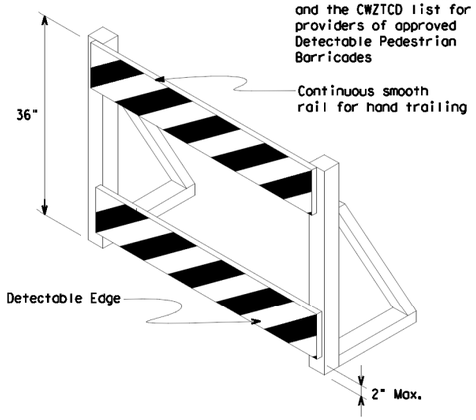
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

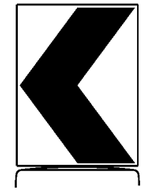




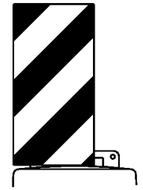


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ELP	EL PASO		17
7-13				

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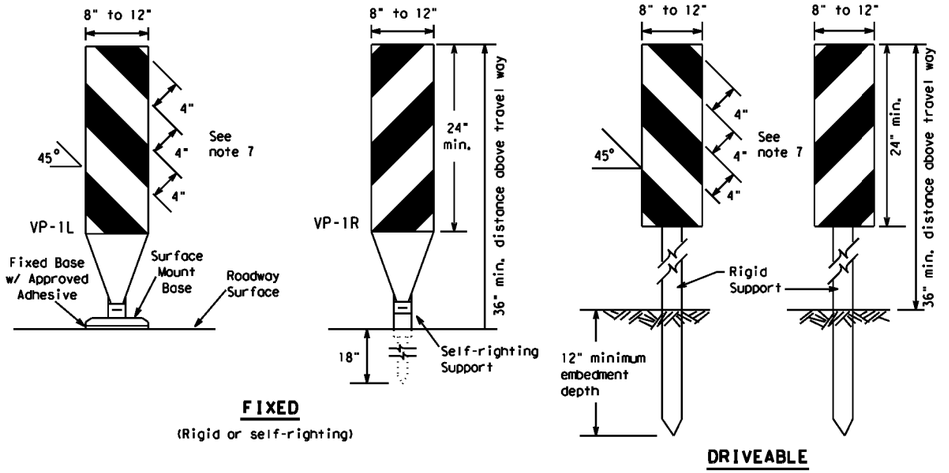
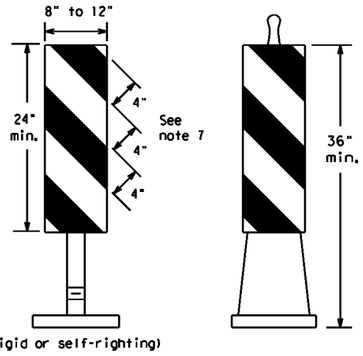


FIXED
(Rigid or self-righting)

DRIVEABLE

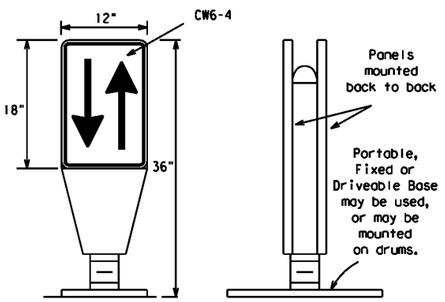


(Rigid or self-righting)

PORTABLE

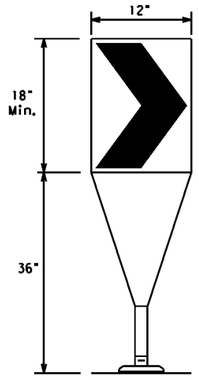
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



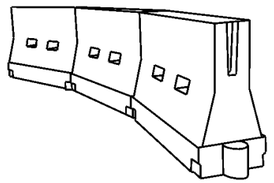
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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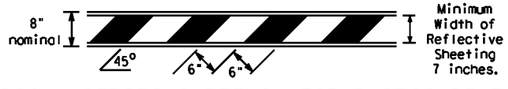
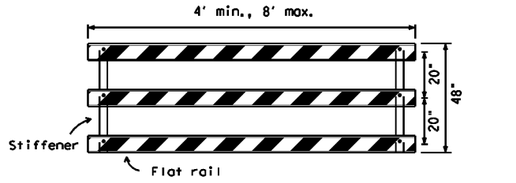
TYPE 3 BARRICADES

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 stocked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



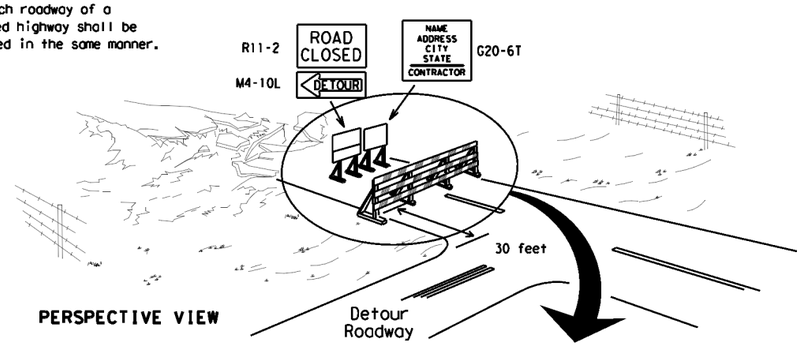
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

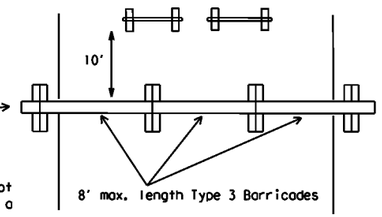
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

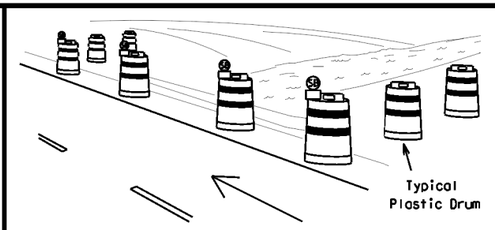
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

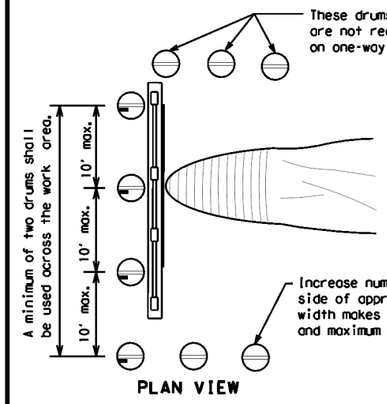
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

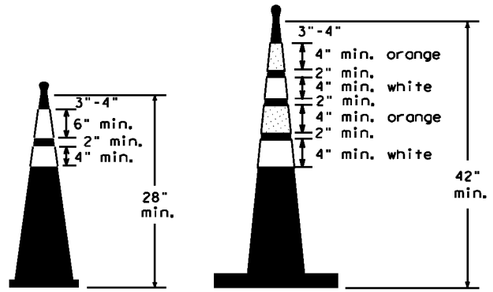
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

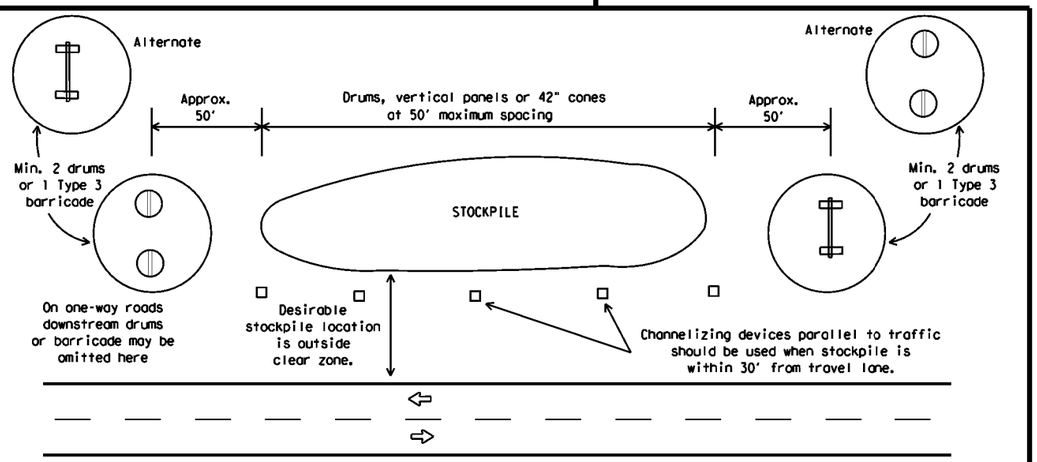
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

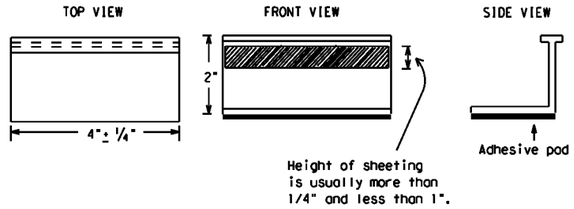
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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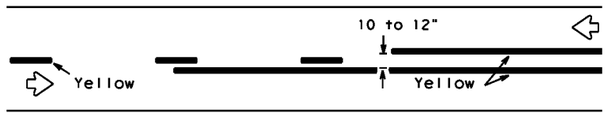
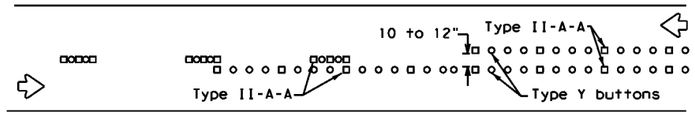
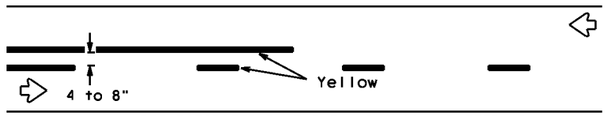
PAVEMENT MARKING PATTERNS



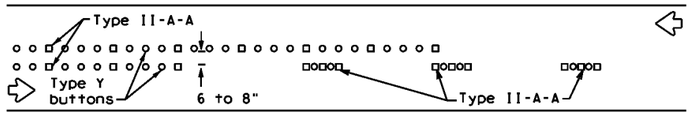
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



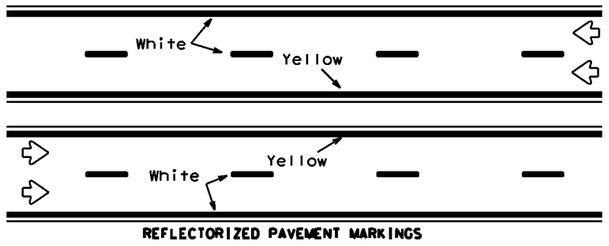
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



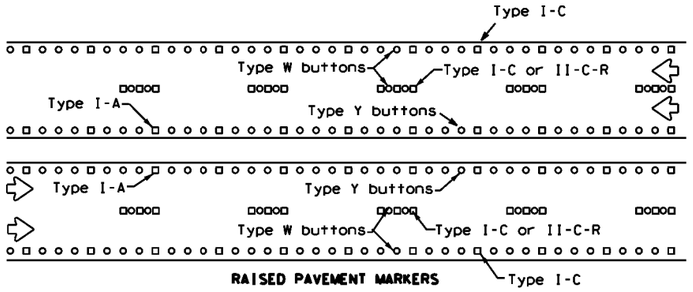
RAISED PAVEMENT MARKERS - PATTERN B

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

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



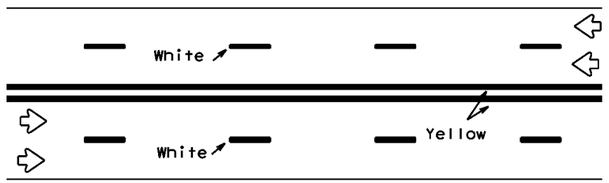
REFLECTORIZED PAVEMENT MARKINGS



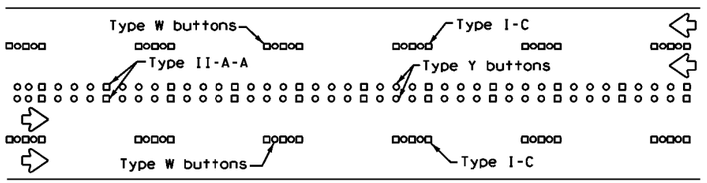
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



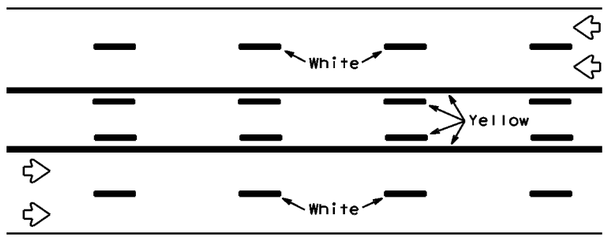
REFLECTORIZED PAVEMENT MARKINGS



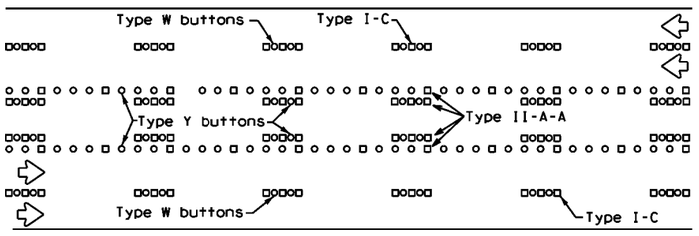
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

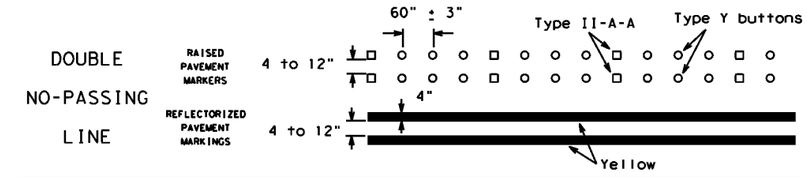
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

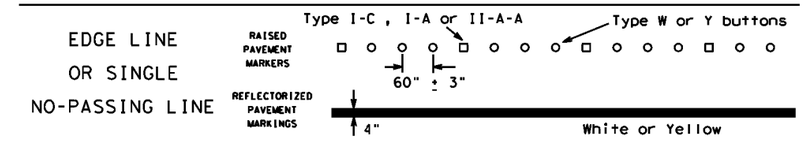
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

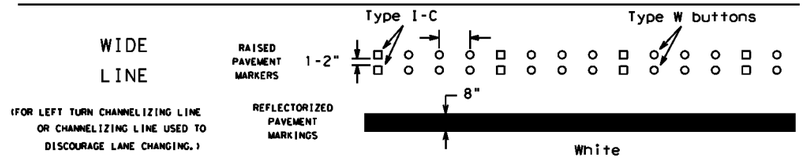


EDGE LINE OR SINGLE NO-PASSING LINE



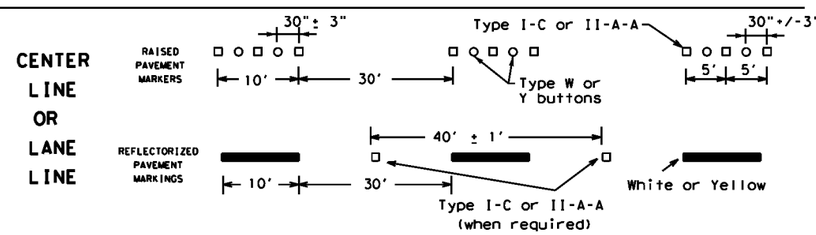
WIDE LINE

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

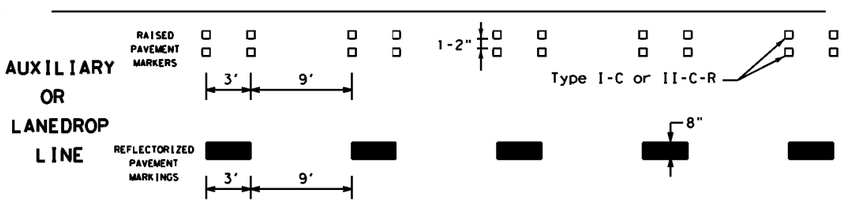


BROKEN LINES

CENTER LINE OR LANE LINE

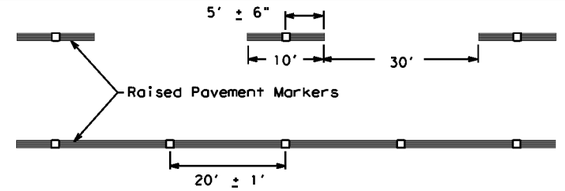


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

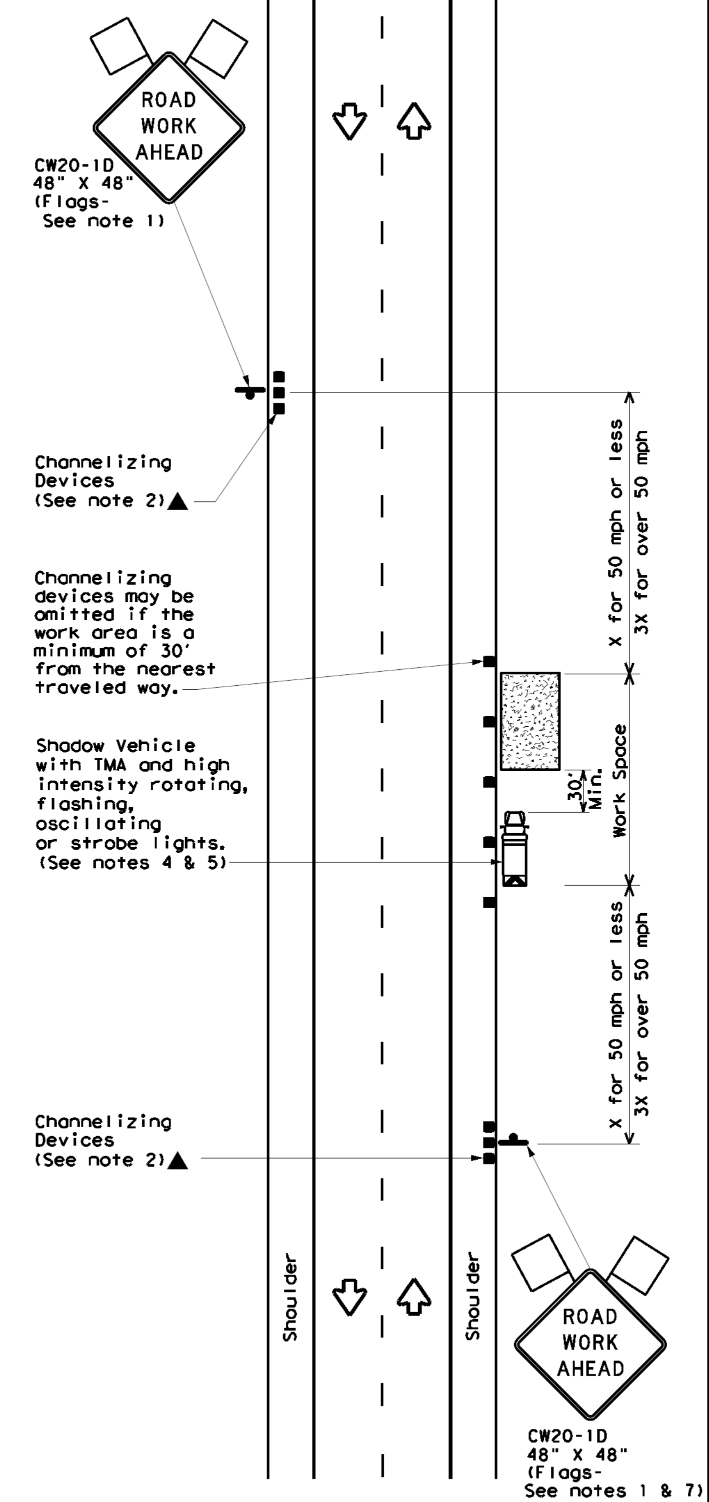
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

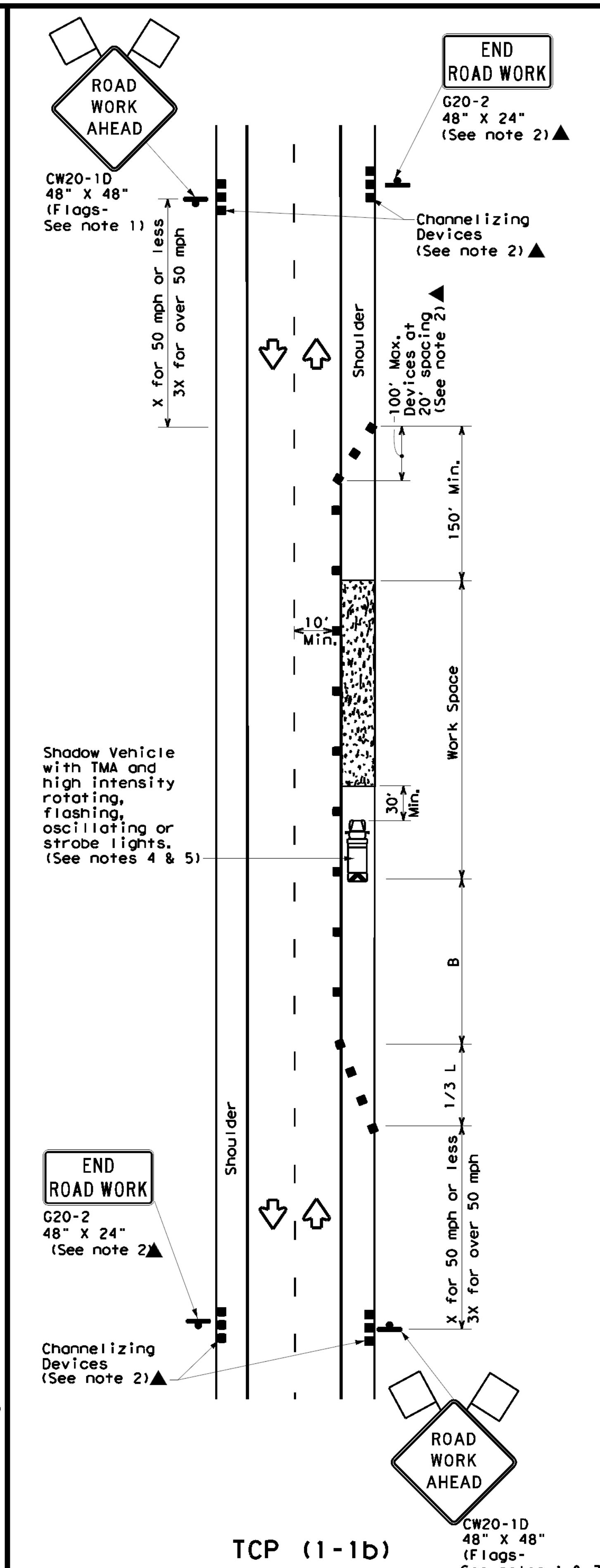
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0924	06	689	US 54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		21



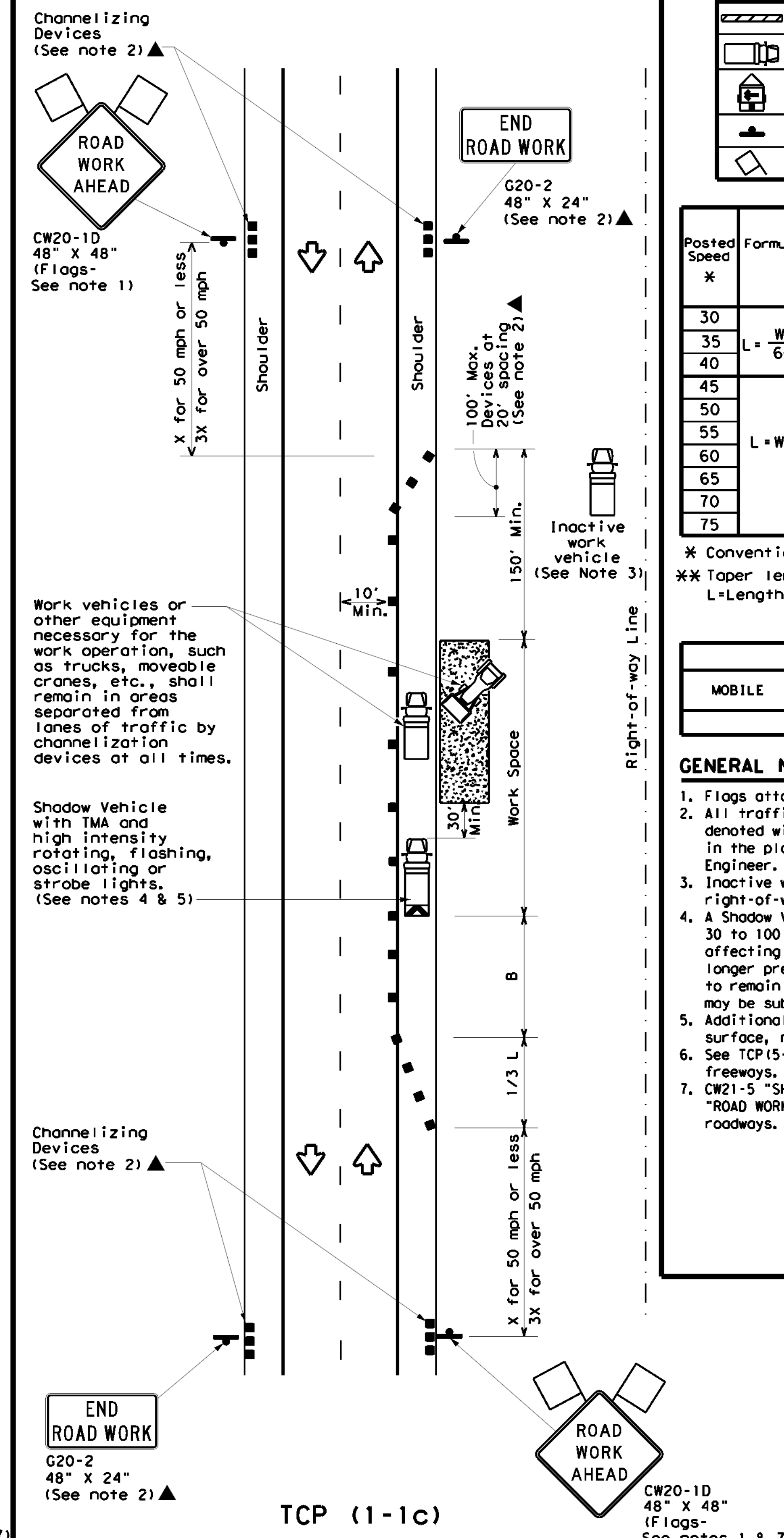
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. 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 wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. 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

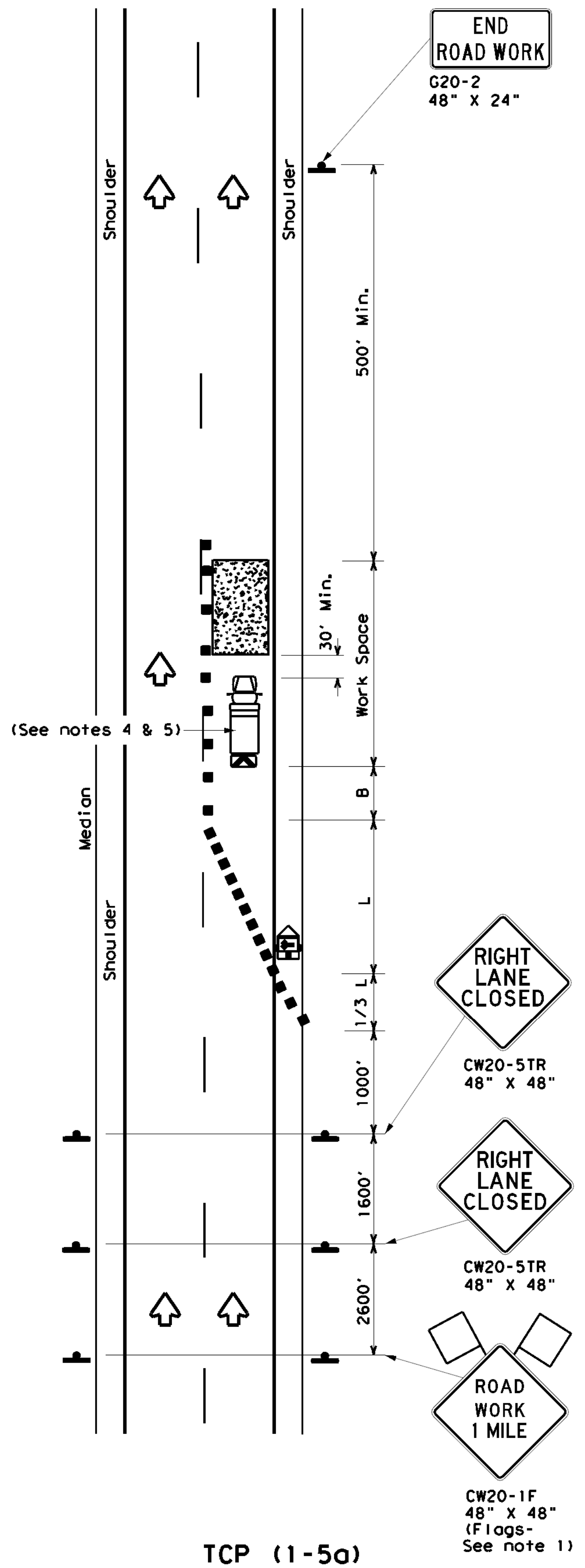
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

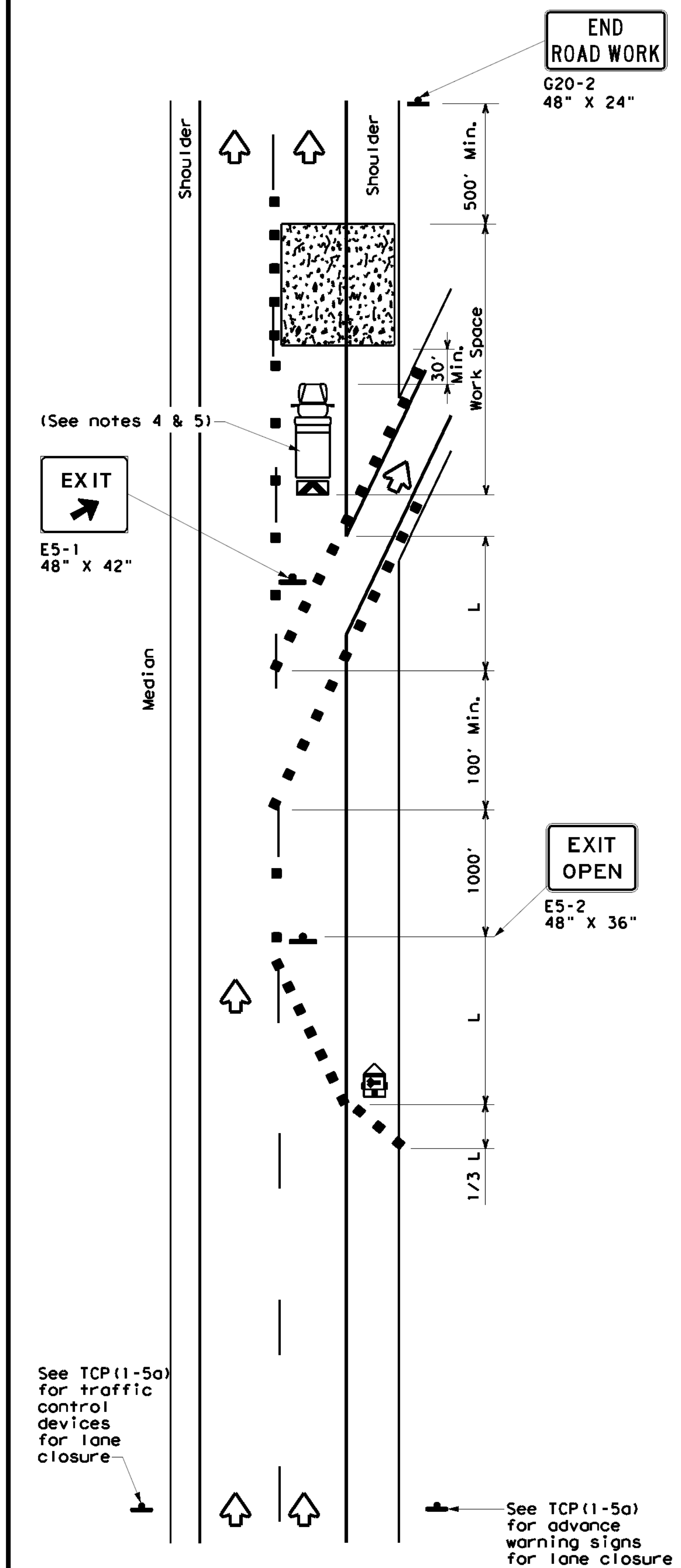
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
2-94 4-98 / 8-95 2-12 / 1-97 2-18	DIST		COUNTY	SHEET NO.
	ELP		EL PASO	22

151



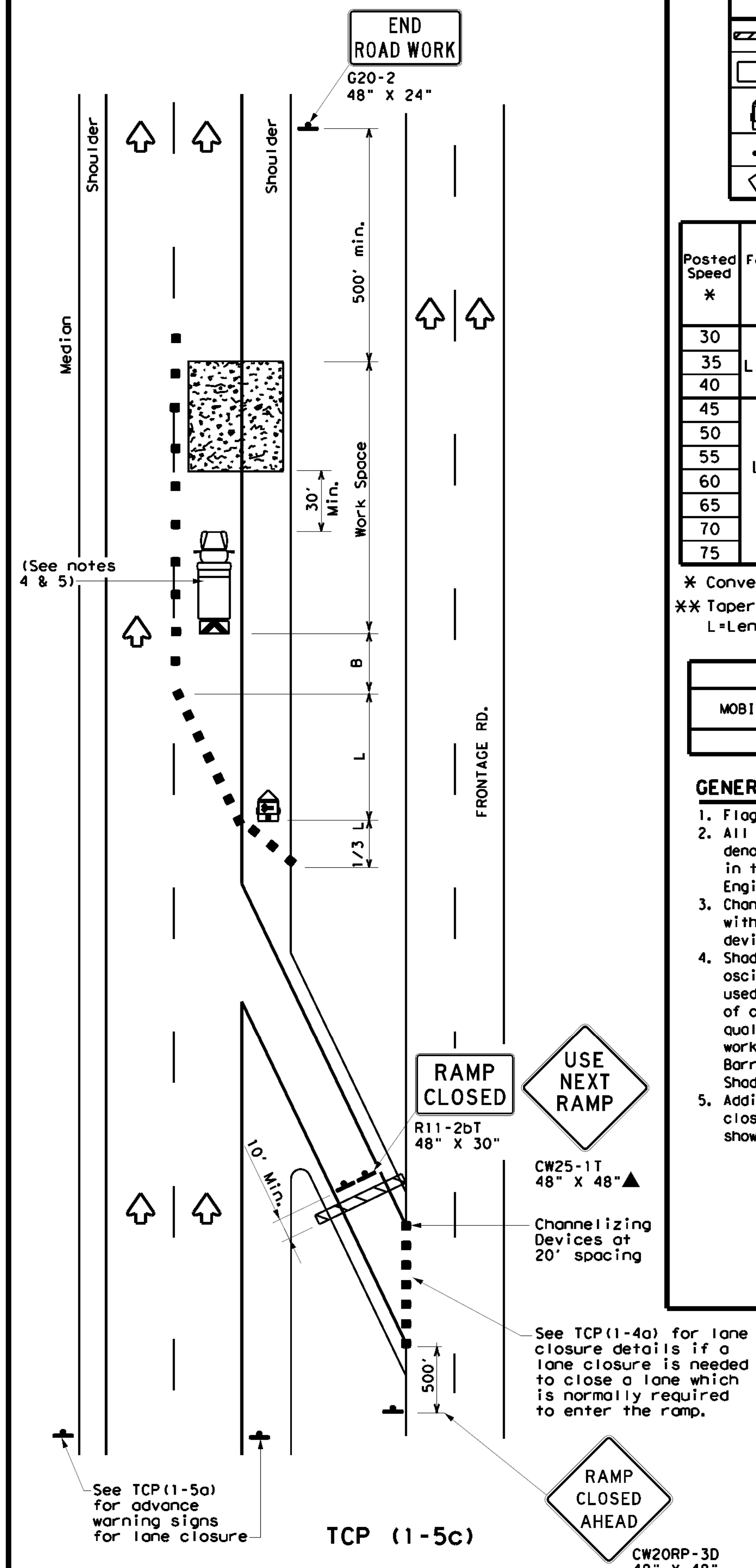
TCP (1-5a)

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		Portable Changeable Message Sign (PCMS)	
Sign		Traffic Flow	
Flag		Flagger	

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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 0924	SECT 06	JOB 689	HIGHWAY US 54
REVISIONS 2-18	DIST ELP		COUNTY EL PASO	SHEET NO. 23

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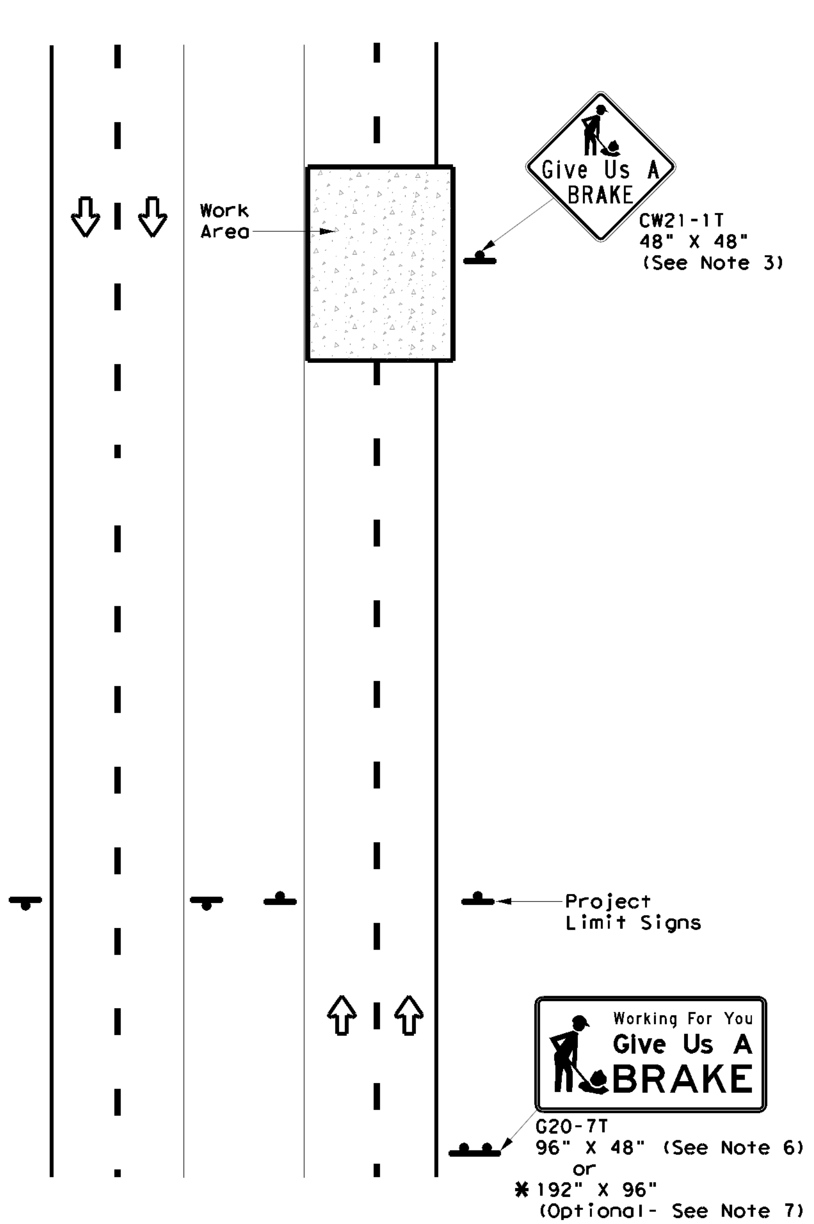
SUMMARY OF LARGE SIGNS									
BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL Size	(LF) ①	(LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T		192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

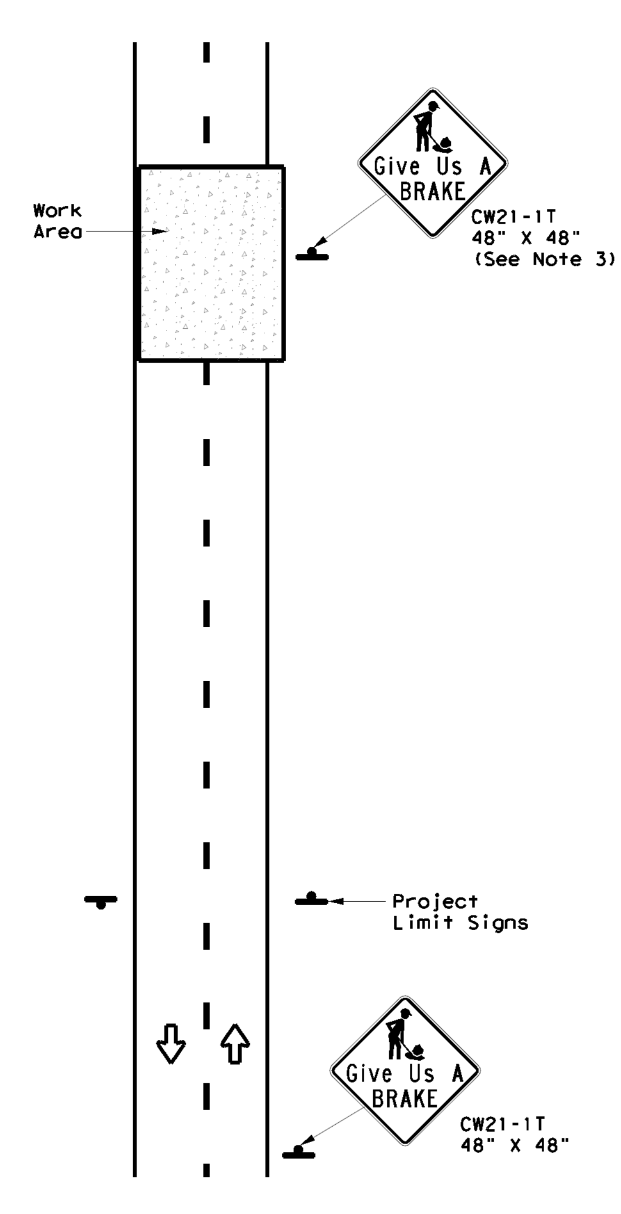
LEGEND	
(symbol)	Sign
(symbol)	Large Sign
(symbol)	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM



DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

✱ When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   - Item 636 - Aluminum Signs
   - Item 647 - Large Roadside Sign Supports and Assemblies.
   - Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation — Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT 0924	SECT 06	JOB 689	HIGHWAY US 54
REVISIONS 6-96 5-98 7-13 8-96 3-03	DIST ELP	COUNTY EL PASO		SHEET NO. 24

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● = CONSTRUCTION PHASE (WORKING DAYS) FOR ITEMS 161, 168, 170, 192, 506, 1006 AND 1022 – WHEN SHOWN IN PLANS, SEE PLANS AND SPECIFICATIONS FOR REQUIREMENTS.

2023	2024							2025												2026												2027						
		AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
		●	●	●	●	●	●	●	* SPECIAL PROVISION 192–001 12–MONTH MAINTENANCE/WARRANTY PERIOD FOR ITEM 192 PLANT MATERIAL SEE "PLANTING AND ESTABLISHMENT" SHEETS FOR REQUIREMENTS											** ITEM 193–6001 SEE "PLANTING AND ESTABLISHMENT" SHEETS FOR REQUIREMENTS																	
									ITEM 193–6007 IRRIGATION SYSTEM OPER AND MAINT																														
		ITEM 1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV)							✓				✓						✓						✓						✓								

* Start time for SP 192–001 will be adjusted to match end of CONSTRUCTION PHASE to avoid any break in maintenance and/or establishment of plant material. All other items of work will remain as scheduled.

** Each month must be 100% complete prior to beginning the next month. If all maintenance, as defined on PLANTING AND ESTABLISHMENT SHEETS, is not 100% complete and approved within the allotted time shown on this sheet, that monthly payment may be adjusted accordingly. Any month maintenance not started and completed within allotted time may be forfeited.

NOTES:
1. TIMELINE IS FOR CONTRACTOR'S INFORMATION ONLY, ACTUAL DATES MAY CHANGE AS DIRECTED.
2. SEE "PLANTING AND ESTABLISHMENT" SHEETS FOR ADDITIONAL REQUIREMENTS AND INFORMATION NOT SHOWN ON THIS SHEET.
3. CONTRACTOR WILL PROVIDE ENGINEER SUFFICIENT TIME TO REVIEW AND APPROVE ALL PROPOSED WORK LOCATIONS AND ITEMS PRIOR TO INSTALLATION. WORK COMPLETED PRIOR TO APPROVAL WILL NOT BE PAID FOR.
4. REFERENCE ITEM 5.10, INSPECTION OR LACK OF INSPECTION WILL NOT RELIEVE THE CONTRACTOR FROM OBLIGATION TO PROVIDE MATERIALS OR PERFORM THE WORK IN ACCORDANCE WITH THE CONTRACT.
5. AT ANY TIME DURING CONTRACT, THE ENGINEER MAY REMOVE INSTALLED ITEMS IN ORDER TO INSPECT COVERED WORK AND MATERIALS. CONTRACTOR IS RESPONSIBLE FOR RE–INSTALLING REMOVED ITEMS PER DETAILS. RE–INSTALLING INSPECTED ITEMS IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05–05–2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F–459
TX REG. SURVEYING FIRM LS–10193805

Texas Department of Transportation

PLANT, MAINTENANCE AND ESTABLISHMENT TIMELINE

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		025
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO.
0924	06	689	US 54

CLEAR ZONE (Tree Setbacks)

Dimensions are minimum requirements and are not limited to the items listed, adjustments will be made to accomodate site conditions.

DO NOT PLANT WITHIN SIGHT TRIANGLE

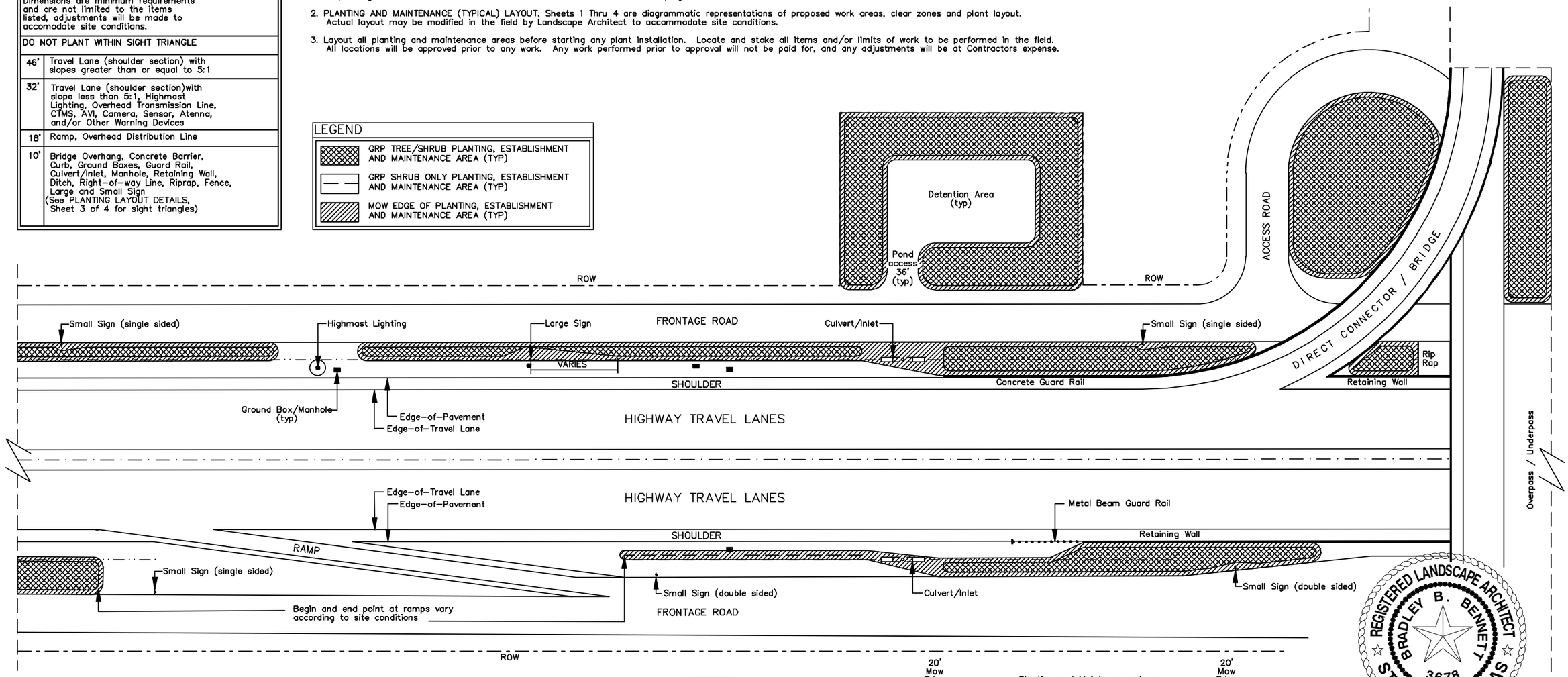
46'	Travel Lane (shoulder section) with slopes greater than or equal to 5:1
32'	Travel Lane (shoulder section)with slope less than 5:1, Highmast Lighting, Overhead Transmission Line, CTMS, AVI, Camera, Sensor, Atenna, and/or Other Warning Devices
18'	Ramp, Overhead Distribution Line
10'	Bridge Overhang, Concrete Barrier, Curb, Ground Boxes, Guard Rail, Culvert/Inlet, Manhole, Retaining Wall, Ditch, Right-of-way Line, Riprap, Fence, Large and Small Sign (See PLANTING LAYOUT DETAILS, Sheet 3 of 4 for sight triangles)

NOTES:

1. All planting and maintenance areas will be located within the limits of the project.
2. PLANTING AND MAINTENANCE (TYPICAL) LAYOUT, Sheets 1 Thru 4 are diagrammatic representations of proposed work areas, clear zones and plant layout. Actual layout may be modified in the field by Landscape Architect to accommodate site conditions.
3. Layout all planting and maintenance areas before starting any plant installation. Locate and stake all items and/or limits of work to be performed in the field. All locations will be approved prior to any work. Any work performed prior to approval will not be paid for, and any adjustments will be at Contractors expense.

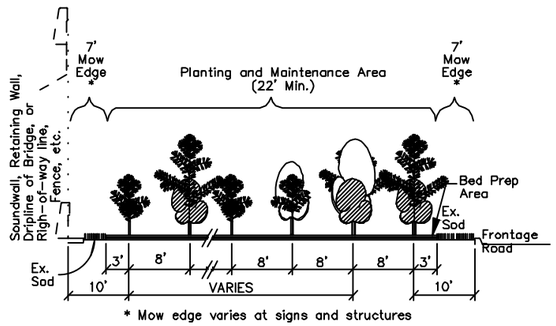
LEGEND

- GRP TREE/SHRUB PLANTING, ESTABLISHMENT AND MAINTENANCE AREA (TYP)
- GRP SHRUB ONLY PLANTING, ESTABLISHMENT AND MAINTENANCE AREA (TYP)
- MOW EDGE OF PLANTING, ESTABLISHMENT AND MAINTENANCE AREA (TYP)



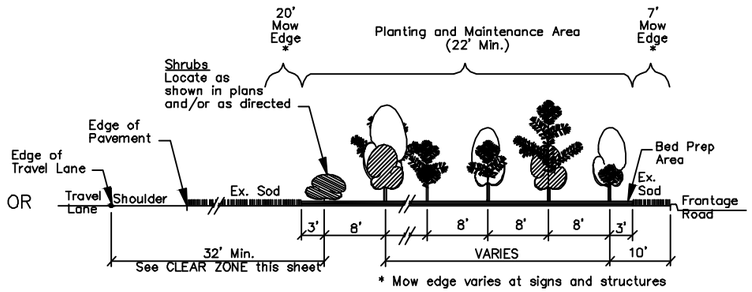
Roadway Planting and Maintenance Areas (Typ)

See CLEAR ZONE table this sheet for dimensions not shown.



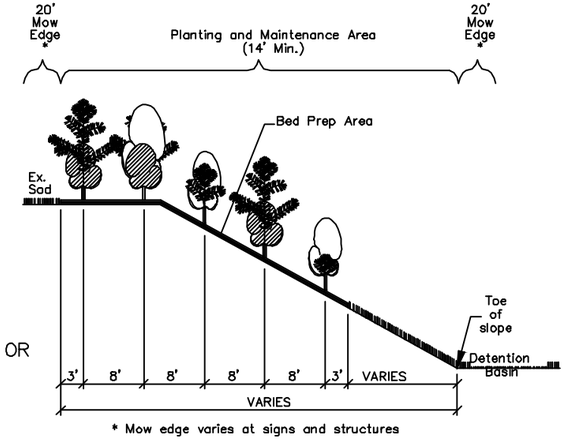
Typical Elevation

OR



Typical Elevation

OR



Typical Elevation

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

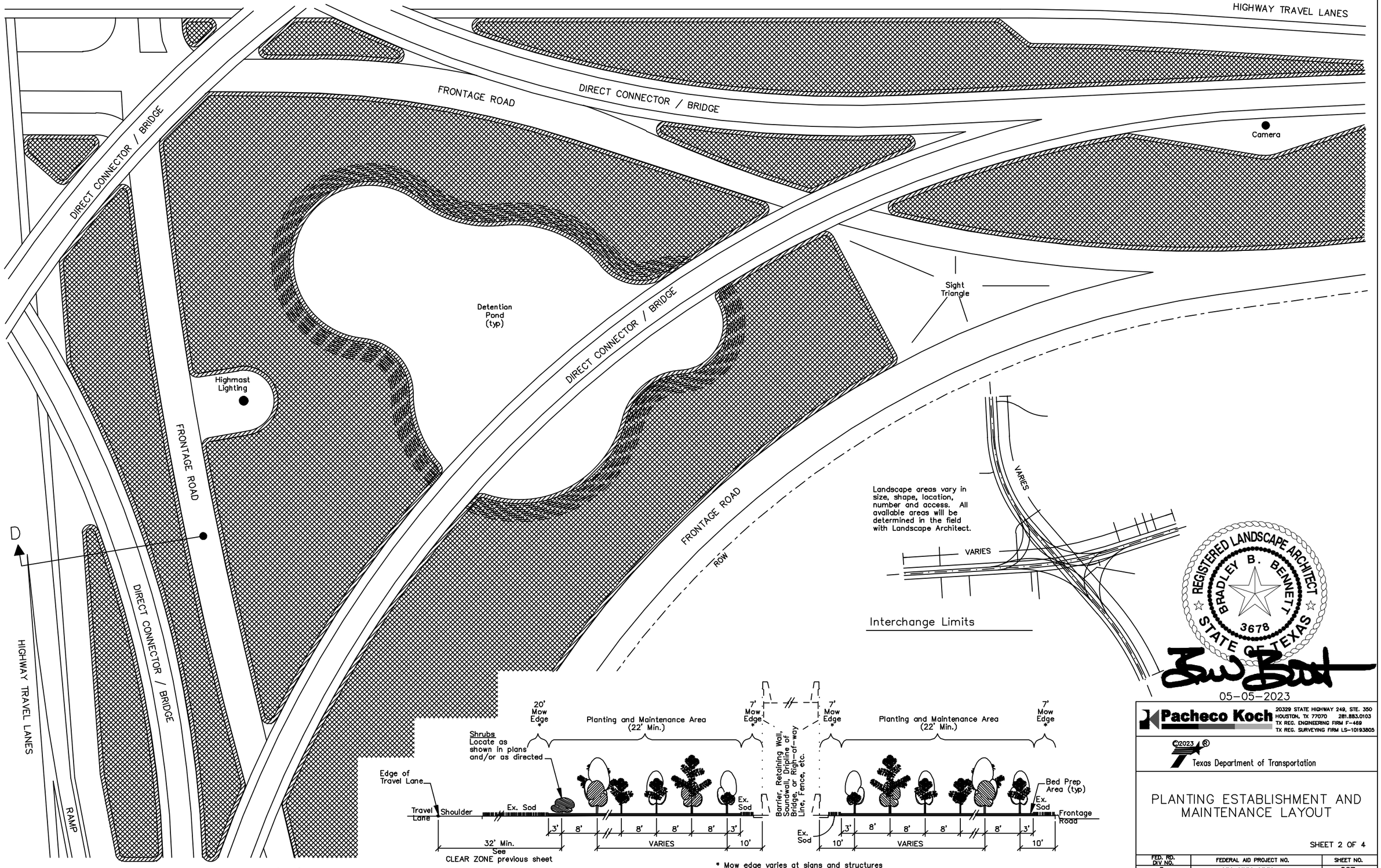
Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

PLANTING ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 1 OF 4

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		026
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54



Interchange Limits

Interchange Planting and Maintenance Areas (Typ)

Interchange w/ Direct Connectors

D Section

* Mow edge varies at signs and structures

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

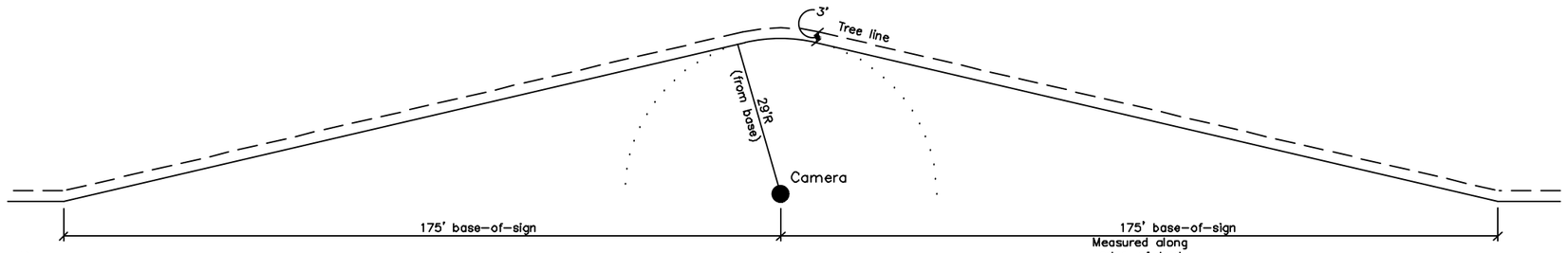
PLANTING ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 2 OF 4

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		027
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

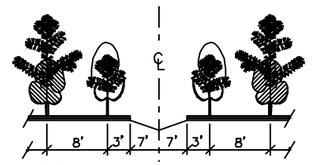
CLEAR ZONE / SIGHT DISTANCE REQUIREMENTS

Dimensions are minimum requirements and are not limited to the items shown, adjustments will be made to accomodate site conditions

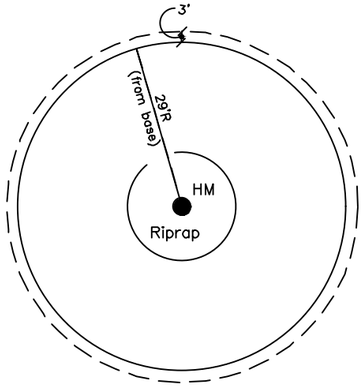


Camera

Camera requires sight triangle both directions

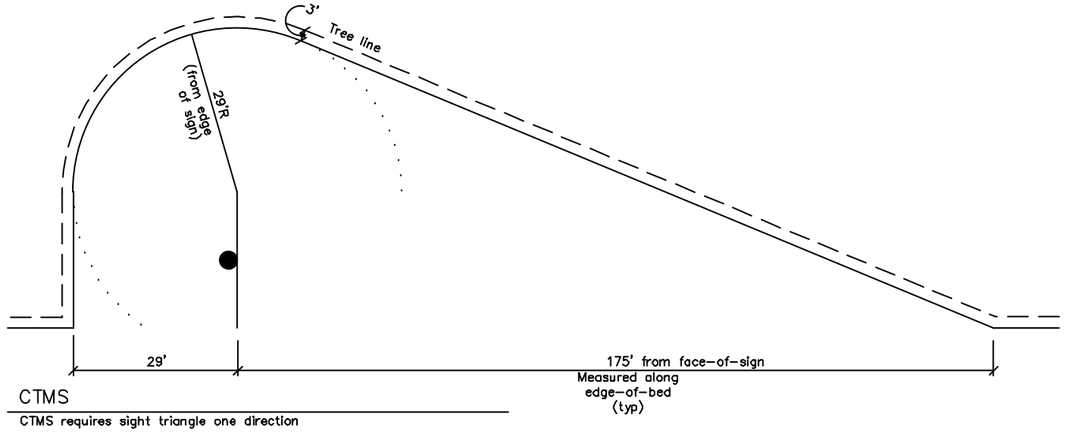


Ditch



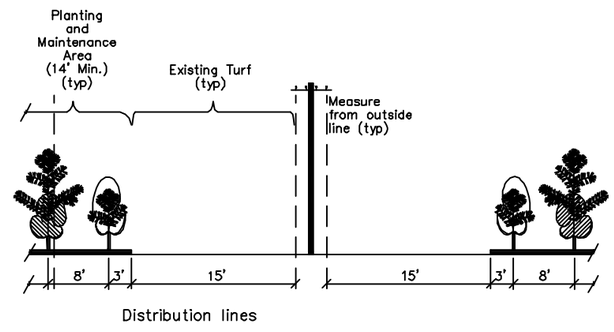
High Mast Lighting, etc.

High mast lighting, sensors, antennas, etc. require full or partial circle depending on location and access required – access will be determined in the field

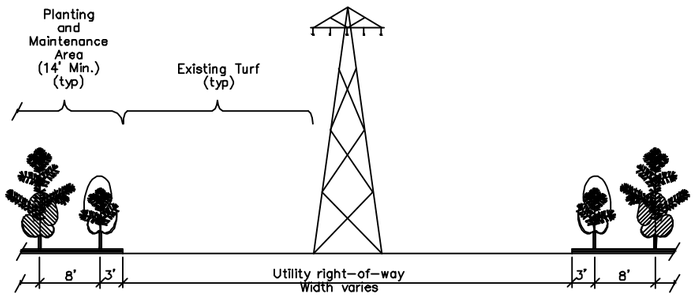


CTMS

CTMS requires sight triangle one direction



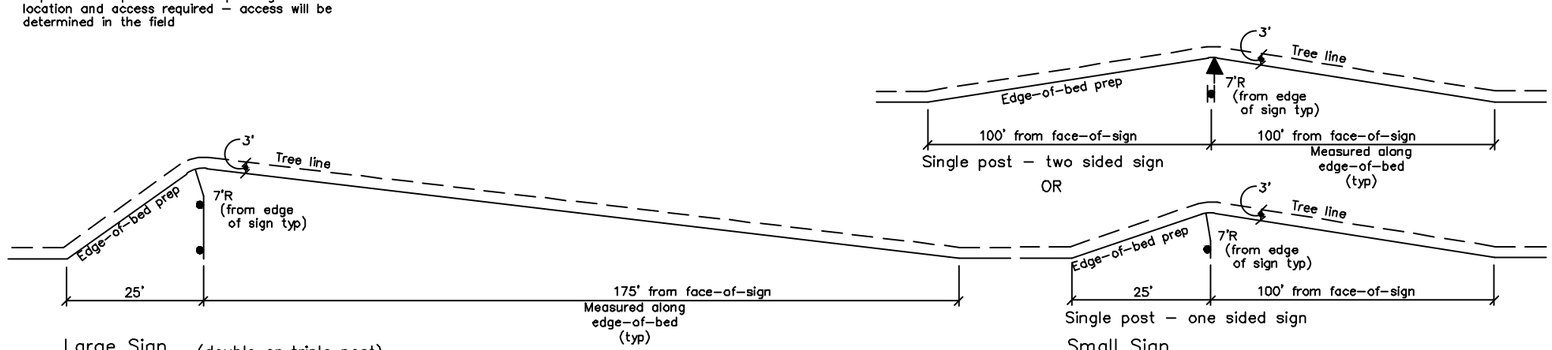
Distribution lines

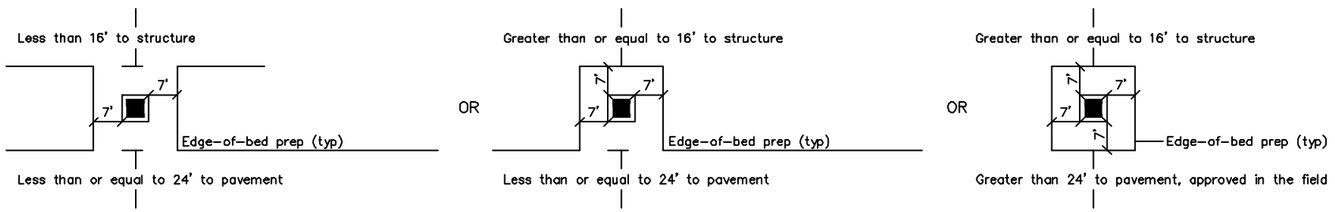


Transmission lines

(Very high overhead power lines supported by large towers)

Overhead Lines





Ground Box, Inlet, Manhole, etc.

Include any riprap as part of structure

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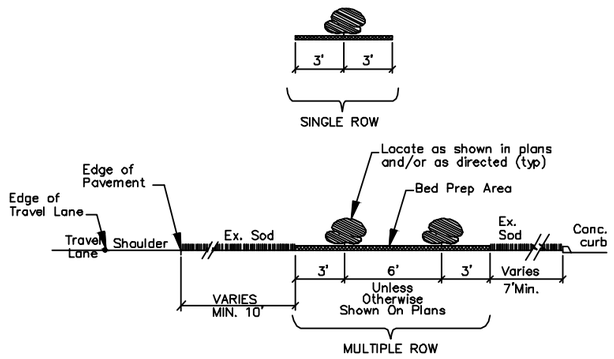
PLANTING ESTABLISHMENT AND MAINTENANCE LAYOUT

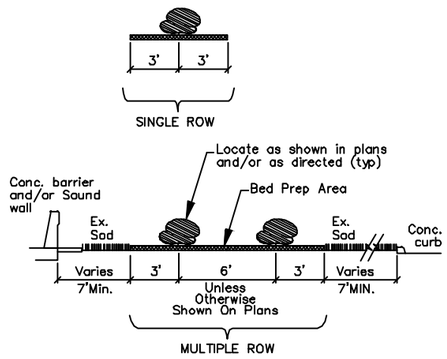
SHEET 3 OF 4

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		028
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54



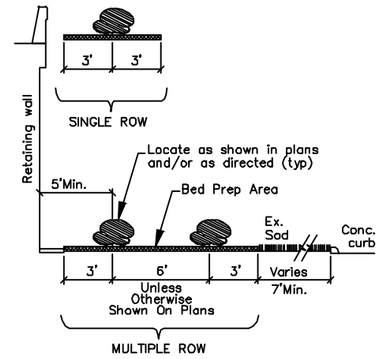
Shrub Planting Typical Elevation

Shoulder / Curb



Shrub Planting Typical Elevation

Barrier / Sound Wall / Curb



Shrub Planting Typical Elevation

Retaining Wall / Curb

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PLANTING ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 4 OF 4

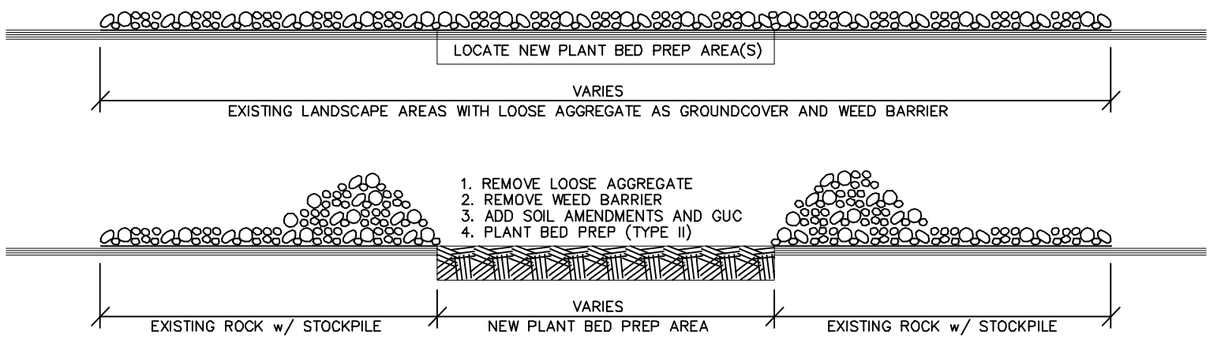
FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		029
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

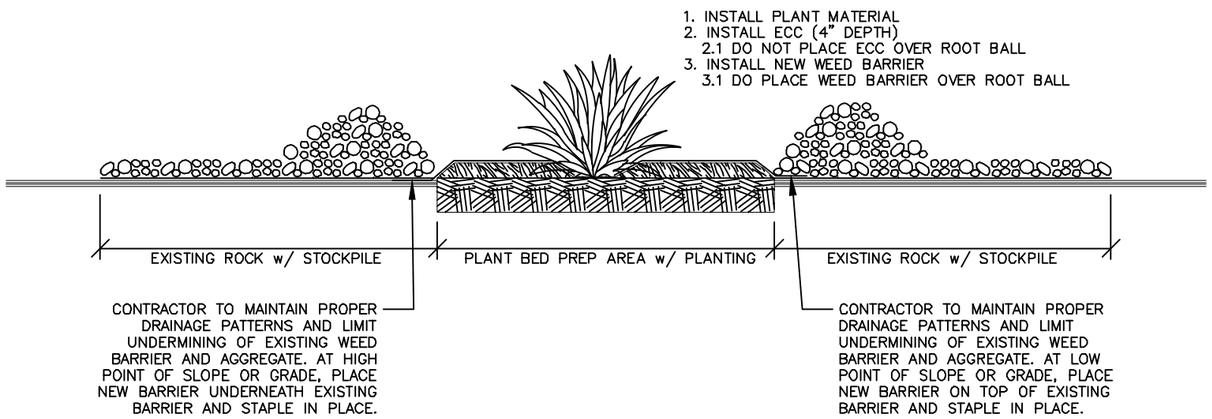
ITEM 1022–6001 LANDSCAPE TREATMENT (TY 1) – EA

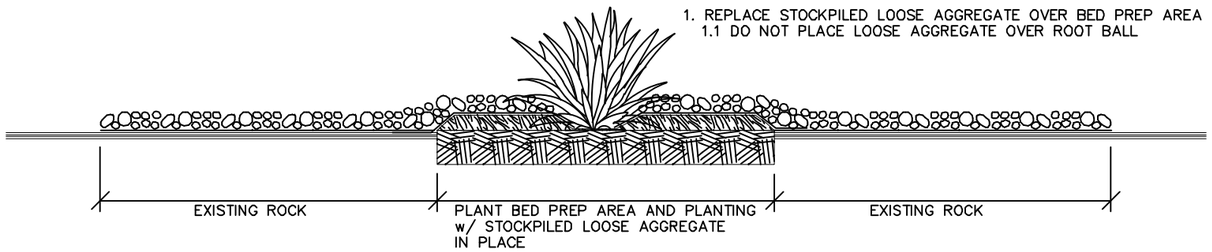
REQUIREMENTS FOR REMOVING AND REPLACING EXISTING LOOSE AGGREGATE AS GROUND COVER AND ASSOCIATED WEED BARRIER.

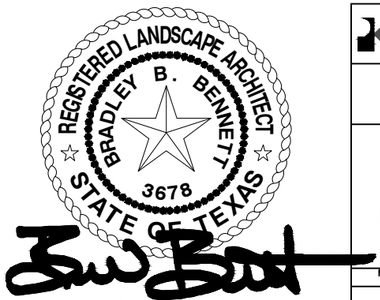
GENERAL:
1. Perform all requirements described on this sheet unless otherwise shown or as directed by the engineer.
2. All descriptions, notes, items, and notations in relation to the work performed to this item are incidental to pay item 1022–6001.
3. Each treatment includes completing the specified work for all new planting locations identified in plans with existing loose aggregate as ground cover one time.
4. Reference Item 5.10 Inspection of the Texas Standard Specifications for construction and maintenance of highways, streets, and bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with plans and specifications will be replaced and/or reworked until in compliance with no additional compensation.
5. Any adjustments due to the failure to comply with plans and specifications shown will be at Contractor's expense.
6. Engineer must approve completed work prior to acceptance and payment.

SCOPE OF WORK:
7. Locate new planting areas identified in plans with loose aggregate as ground cover.
8. Remove loose aggregate and associated weed barrier from proposed planting areas to accommodate plant bed preparation operations.
9. Upon completion of plant bed preparation and subsequent planting install new weed barrier over exposed plant bed preparation areas, overlapping seams appropriately to avoid undermining by flowing waster.
10. With weed barrier in place replace the removed existing loose aggregate to its original location.
11. Contractor to maintain original design and intent of existing aggregate layout.









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LANDSCAPE TREATMENT (TY I)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		030
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO.
0924	06	689	US 54

NOTES
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- ADJUSTMENTS WILL BE MADE TO ACCOMMODATE SITE CONDITIONS.
- ALL LOCATIONS WILL BE APPROVED PRIOR TO ANY ADDITIONAL WORK.
- CONTRACTOR TO REFERENCE PLANTING AND ESTABLISHMENT, IRRIGATION DETAILS AND LANDSCAPE TREATMENT TY 1 SHEETS FOR ADDITIONAL INFORMATION.

PLANT SCHEDULE

QF	ESCARPMENT OAK	AG	CENTURY AGAVE (AG)
PM	MESQUITE	DW	GREY DESERT SPOON (DW)
PV	PALO VERDE	LC	TEXAS SAGE (LC)
CL	DESERT WILLOW	HP	RED YUCCA (HP)
CH	CHITALPA	SR	CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	61	CY
161-6012	GENERAL USE COMPOST	30	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	29	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	467	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	53	EA
192-6064	PLANT BED PREP (TYPE II)	548	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	548	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	548	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	29	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	145	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	549	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0.5	EA

1022-6001 LANDSCAPE TREATMENT (TY 1)
- AT THIS LOCATION

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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US 54
PLANTING PLAN

SHEET 1 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		031
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0924	06	689	US 54

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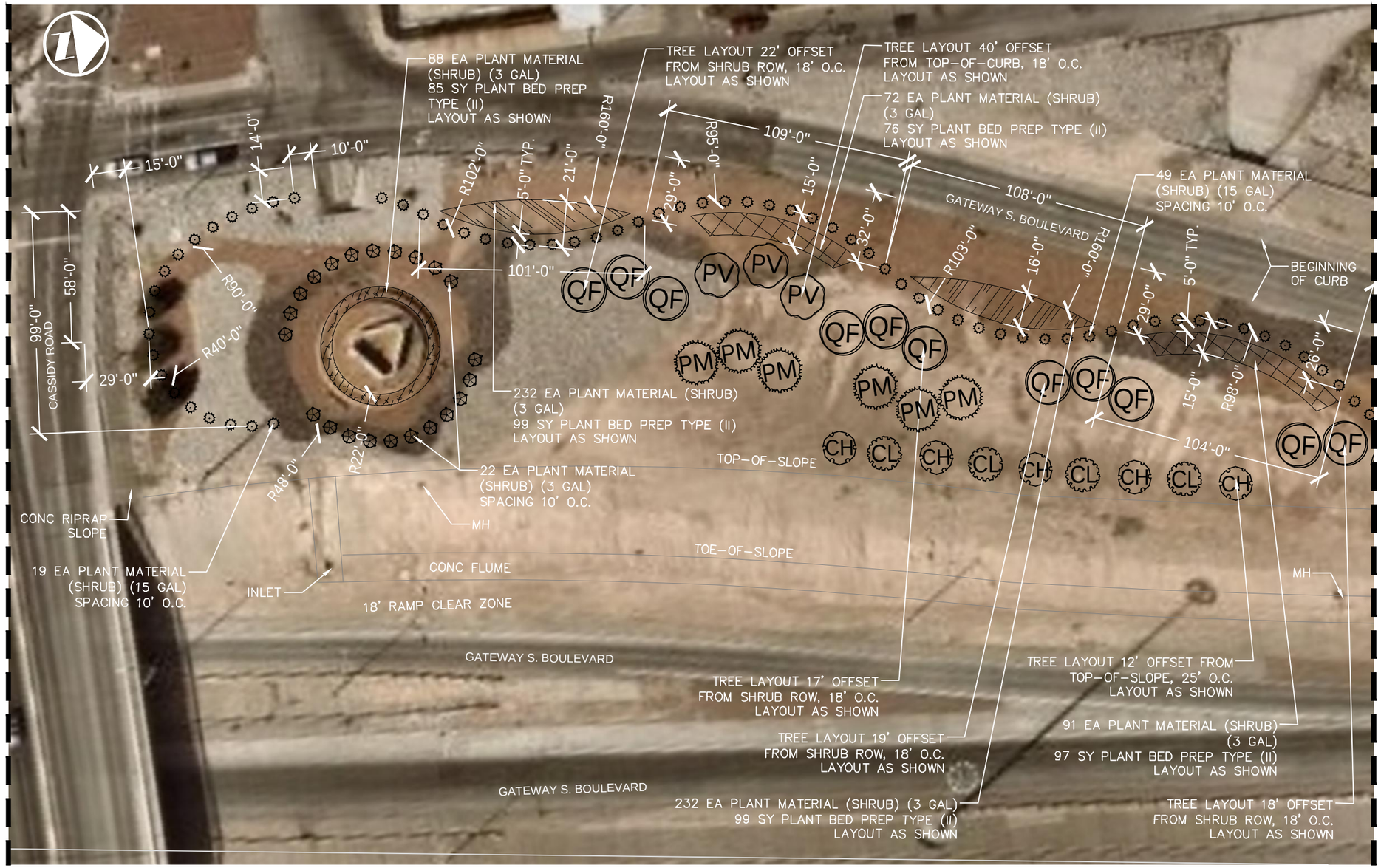

NOTES
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PLANT SCHEDULE

QF ESCARPMENT OAK	CENTURY AGAVE (AG)
PM MESQUITE	GREY DESERT SPOON (DW)
PV PALO VERDE	TEXAS SAGE (LC)
CL DESERT WILLOW	RED YUCCA (HP)
CH CHITALPA	CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	81	CY
161-6012	GENERAL USE COMPOST	41	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	29	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	715	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	90	EA
192-6064	PLANT BED PREP (TYPE II)	732	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	732	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	732	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	29	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	145	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	834	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0.5	EA

1022-6001 LANDSCAPE TREATMENT (TY 1)
- AT THIS LOCATION

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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PLANTING PLAN

SHEET 2 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		032
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

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PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	65	CY
161-6012	GENERAL USE COMPOST	32	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	18	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	630	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	79	EA
192-6064	PLANT BED PREP (TYPE II)	586	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	586	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	586	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	18	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	90	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	727	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	1	EA

1022-6001 LANDSCAPE TREATMENT (TY 1)
- AT THIS LOCATION

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
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STATE OF TEXAS

05-05-2023

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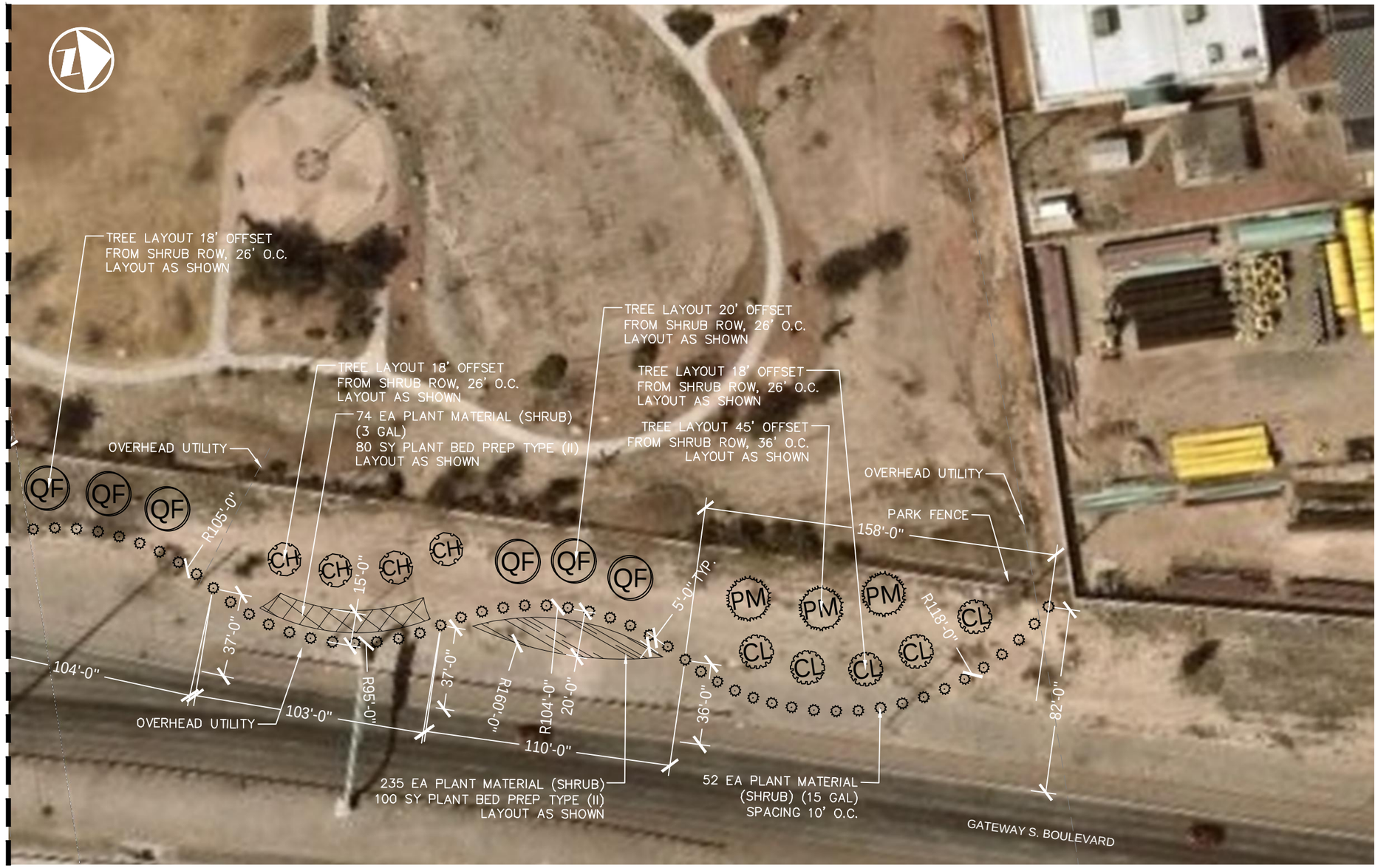
US 54
PLANTING PLAN

SHEET 3 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		033
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023



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PLANT SCHEDULE

QF	ESCARPMENT OAK	AG	CENTURY AGAVE (AG)
PM	MESQUITE	DW	GREY DESERT SPOON (DW)
PV	PALO VERDE	LC	TEXAS SAGE (LC)
CL	DESERT WILLOW	HP	RED YUCCA (HP)
CH	CHITALPA	SR	CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	38	CY
161-6012	GENERAL USE COMPOST	19	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	18	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	309	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	52	EA
192-6064	PLANT BED PREP (TYPE II)	344	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	344	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	344	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	18	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	90	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	379	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
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STATE OF TEXAS

05-05-2023

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US 54
PLANTING PLAN

SHEET 4 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		034
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

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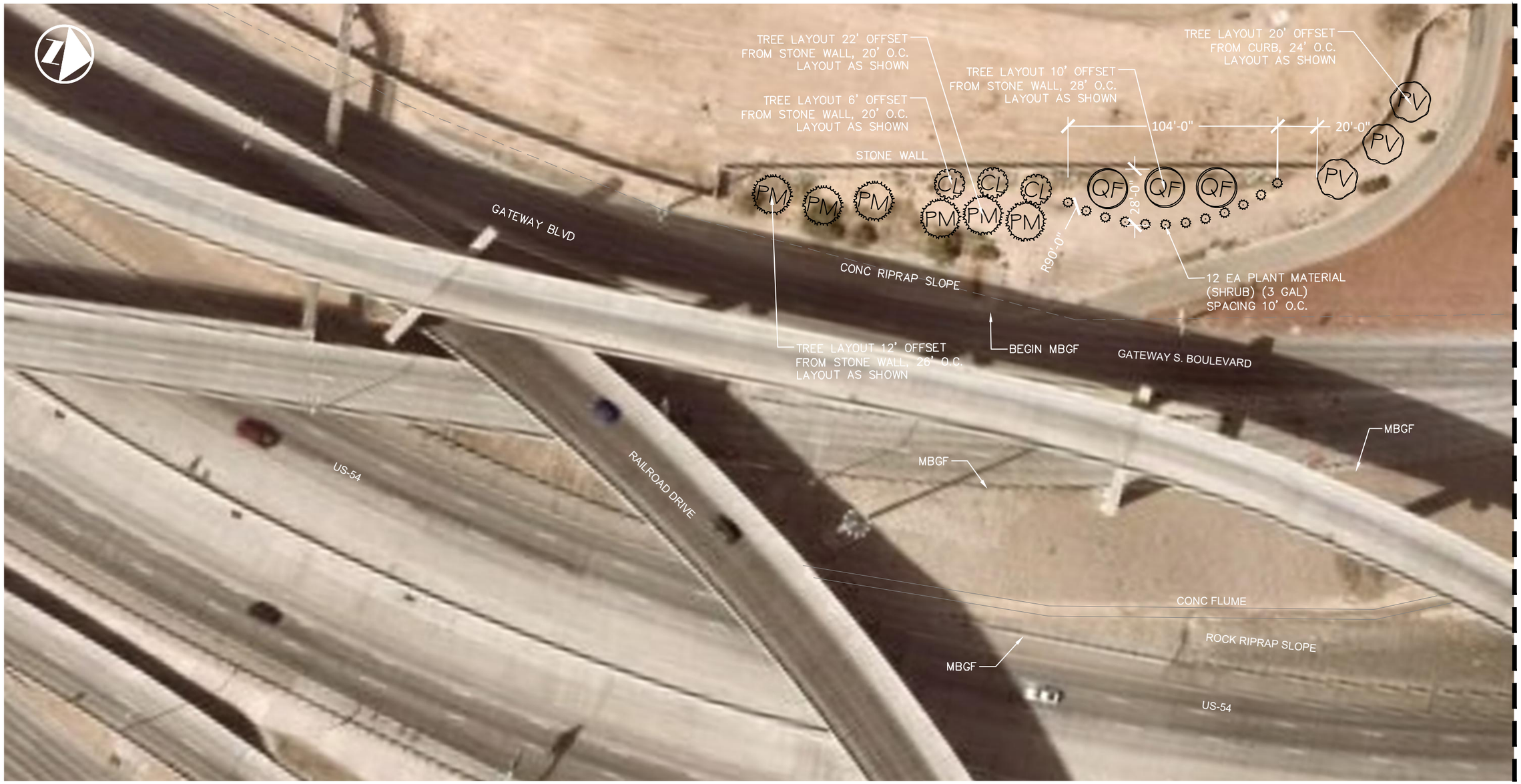

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PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
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ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	9	CY
161-6012	GENERAL USE COMPOST	5	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	15	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	0	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	12	EA
192-6064	PLANT BED PREP (TYPE II)	81	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	81	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	81	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	15	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	75	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	27	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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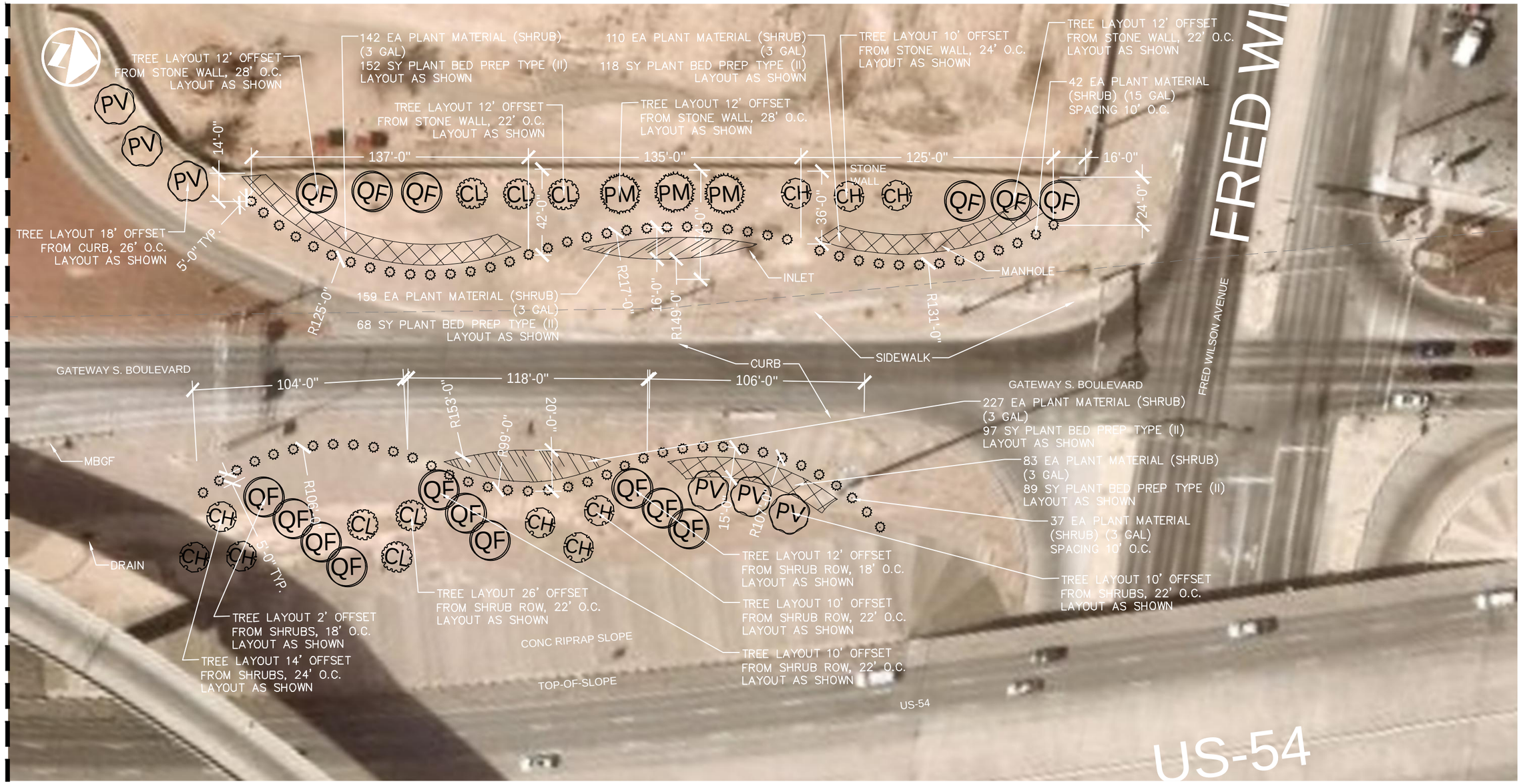
US 54
PLANTING PLAN

SHEET 5 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		035
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023



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PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
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ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	91	CY
161-6012	GENERAL USE COMPOST	46	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	40	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	721	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	79	EA
192-6064	PLANT BED PREP (TYPE II)	823	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	823	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	823	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	40	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	200	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	840	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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US 54
PLANTING PLAN

SHEET 6 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		036
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023

NOTES
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- CONTRACTOR IS RESPONSIBLE FOR LOCATING AND STAKING LIMITS OF EACH WORK AREA AS MAY BE REQUIRED IN ACCORDANCE WITH PLANS.
- ADJUSTMENTS WILL BE MADE TO ACCOMMODATE SITE CONDITIONS.
- ALL LOCATIONS WILL BE APPROVED PRIOR TO ANY ADDITIONAL WORK.
- CONTRACTOR TO REFERENCE PLANTING AND ESTABLISHMENT, IRRIGATION DETAILS AND LANDSCAPE TREATMENT TY 1 SHEETS FOR ADDITIONAL INFORMATION.

PLANT SCHEDULE

QF ESCARPMENT OAK	CENTURY AGAVE (AG)
PM MESQUITE	GREY DESERT SPOON (DW)
PV PALO VERDE	TEXAS SAGE (LC)
CL DESERT WILLOW	RED YUCCA (HP)
CH CHITALPA	CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	48	CY
161-6012	GENERAL USE COMPOST	24	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	30	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	453	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	32	EA
192-6064	PLANT BED PREP (TYPE II)	434	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	434	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	434	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	30	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	150	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	515	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

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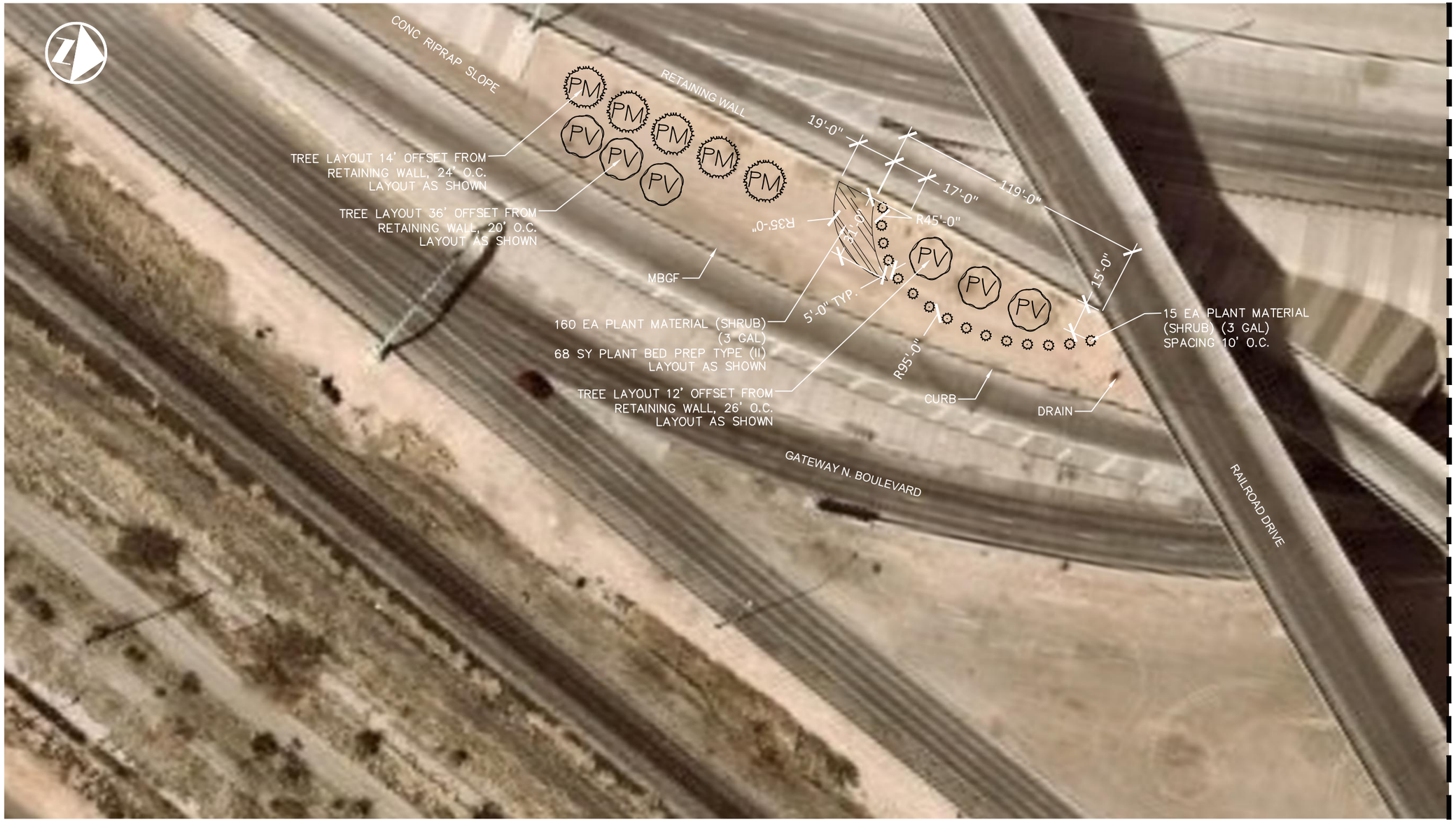
US 54
PLANTING PLAN

SHEET 7 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		037
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023



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PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	15	CY
161-6012	GENERAL USE COMPOST	8	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	11	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	160	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	15	EA
192-6064	PLANT BED PREP (TYPE II)	139	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	139	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	139	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	11	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	55	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	186	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
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US 54
PLANTING PLAN

SHEET 8 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		038
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023

NOTES
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PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	14	CY
161-6012	GENERAL USE COMPOST	7	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	6	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	194	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	13	EA
192-6064	PLANT BED PREP (TYPE II)	130	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	130	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	130	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	6	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	30	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	213	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
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US 54
PLANTING PLAN

SHEET 9 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		039
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

APRIL 2023

MATCHLINE - SEE SHEET 039

NOTES
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- CONTRACTOR TO REFERENCE PLANTING AND ESTABLISHMENT, IRRIGATION DETAILS AND LANDSCAPE TREATMENT TY 1 SHEETS FOR ADDITIONAL INFORMATION.

PLANT SCHEDULE

QF	ESCARPMENT OAK		CENTURY AGAVE (AG)
PM	MESQUITE		GREY DESERT SPOON (DW)
PV	PALO VERDE		TEXAS SAGE (LC)
CL	DESERT WILLOW		RED YUCCA (HP)
CH	CHITALPA		CREEPING ROSEMARY (SR)

NOTE
- ALL PROPOSED PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM (TY II)
- CONTRACTOR TO COORDINATE WITH ENGINEER ON ALL ITEMS PERTAINING TO THIS ITEM.

ESTIMATED SHEET QUATITY

ITEM	DESCRIPTION	QTY	UNIT
161-6009	EROSION CONTROL COMPOST	13	CY
161-6012	GENERAL USE COMPOST	6	CY
192-6025	PLANT MATERIAL (45GAL) (TREE)	14	EA
192-6030	PLANT MATERIAL (3 GAL)(SHRUB)	85	EA
192-6033	PLANT MATERIAL (15 GAL)(SHRUB)	12	EA
192-6064	PLANT BED PREP (TYPE II)	113	SY
1006-6001	LANDSCAPE SOIL AMMENDMENT (TYPE I)	113	SY
1006-6002	LANDSCAPE SOIL AMMENDMENT (TYPE II)	113	SY
1006-6003	LANDSCAPE SOIL AMMENDMENT (TYPE III)	14	SY
1006-6004	LANDSCAPE SOIL AMMENDMENT (TYPE IV)	70	SY
1006-6005	LANDSCAPE SOIL AMMENDMENT (TYPE V)	111	SY
1022-6001	LANDSCAPE TREATMENT (TY 1)	0	EA

PLANS NTS

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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HOUSTON, TX 77070 281.883.0103
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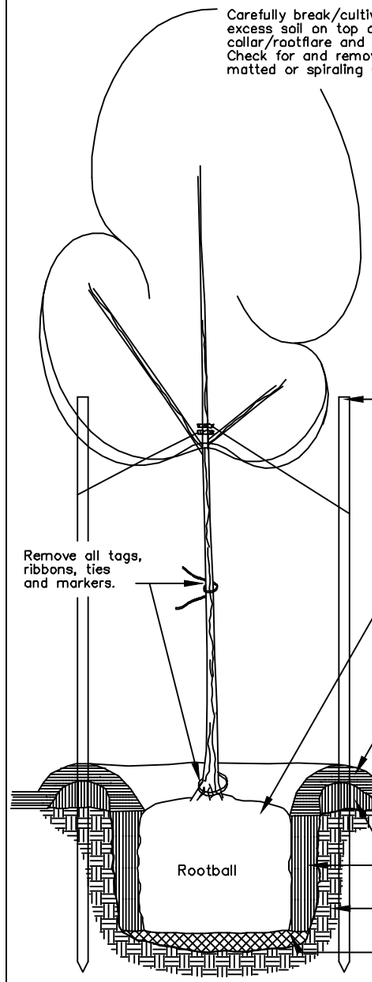
PROJECT LAYOUT

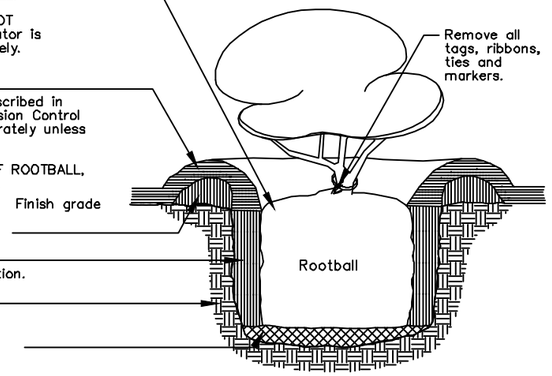
SHEET 10 OF 10

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		040
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

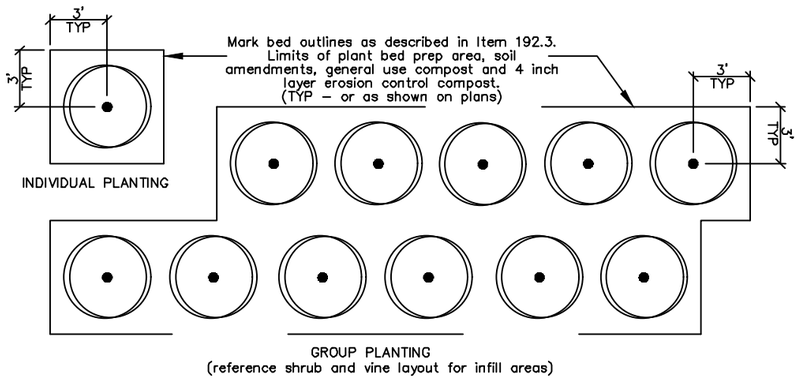
APRIL 2023



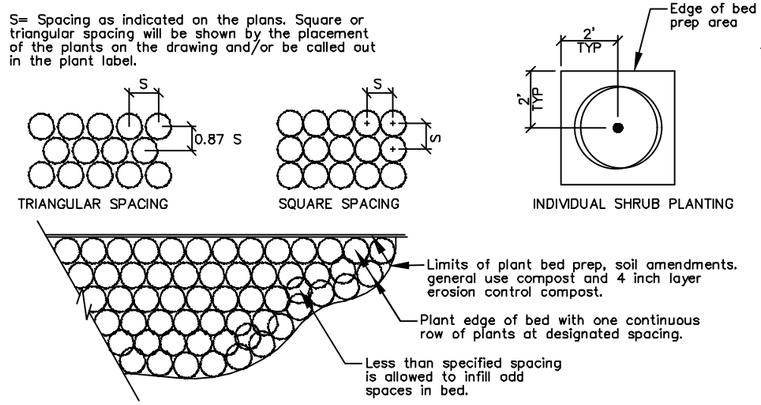
TREE PLANTING DETAIL



SHRUB PLANTING DETAIL



TREE PLACEMENT WITHIN PLANTING BED PREP AREA, LAYOUT AND SPACING SHOWN ON PLANS



SHRUB PLACEMENT WITHIN PLANTING BED PREP AREA LAYOUT AND SPACING SHOWN ON PLANS

VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES

PHASE	ITEM DESCRIPTION	FREQUENCY	RATE / PLANT
Item 192.3 Construction	Item 192.3.7. Watering is incidental to Item 192 and is not paid for separately See Initial Watering note	Begin same day as planting then: 3 times per week with 1 day minimum between waterings See Initial Watering note	CNTR SIZE / WATER QTY 45 GAL = 20 gallons 15 GAL = 10 gallons 5 GAL = 4 gallons 3 GAL = 2 gallons 1 GAL = 2 gallons (1/2 X plant CNTR gallon size per plant for sizes not shown, one (1) gallon minimum) See Initial Watering Note
Item 192.3.15 Maintenance	Item 192.3.15.1. Watering is incidental to Item 192 and is not paid for separately		
Item 193 Landscape Establishment (When Shown In Plans)	Item 193.3.3. Watering is incidental to Item 193 and is not paid for separately	2 times per week with 2 days minimum between waterings	

NOTES:
Apply water over the rootball within the tree well only, unless otherwise shown on plans. Adjust rate and frequency to meet site conditions and weather as approved or directed by engineer.

Plant material in poor condition due to the failure to apply the specified amount of water within the time allowed or overwatering will be replaced at contractor's expense.

PROVIDE MONTHLY METER READINGS OF WATER APPLIED.

Prior to arrival at project or storage area, provide watering plan(s) of plants to be installed or stored. Watering plan(s) must be approved by engineer prior to delivery to project or storage area.

INITIAL WATERING AND ROOT STIMULATOR REQUIREMENTS

PHASE	Item 192.3 Construction. Initial watering.
ITEM DESCRIPTION	Item 192.3.5. Plant Installation. Root stimulator material is incidental to Item 192 and is not paid for separately.
MATERIALS and SOLUTION	Two (2) ounces of root stimulator concentrate per one (1) gallon water. Root stimulator must be commercially available and labeled as an all organic/non-chemical liquid concentrate Bio-Stimulant and Root Stimulator. Use the following product or an approved equal: Super Seaweed, San Jacinto Environmental Supplies, 713-957-0909.
FREQUENCY and RATE	At the time of planting, provide initial watering at rate shown in Vegetative Watering Schedule this sheet. Use root stimulator solution for initial watering.

GENERAL 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 not shown.
2. Reference Item 192.3, mark plant locations and bed outlines.
3. Verify that all planting meets the following clear zone minimum distance requirements from the edge of the travel lane: Trees: 32' unless protected by a barrier, Shrubs: 16' unless protected by a barrier, Groundcovers and vines: no minimum distance. Engineer has final authority over all clear zone related issues.
4. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
5. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the contract. Remove stakes when directed by engineer.
6. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
7. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense. Do not water plants when rainfall is apparent or during the Monsoon season or after rainfall. do not maintain soild humid or wet as root rot may develop causing the cacti or desert plants to rot, wilt or die.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

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Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 1 OF 7

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		041
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

PLANT SPECIFICATIONS (PLANT MATERIAL MUST CONFORM TO ALL SPECIFICATIONS)(MINIMUM SPECIFICATIONS PROVIDED BELOW)									
Abbr	**Botanical Name**	**Common Name**	**Color**	**Qty**	**Root Cond**	**Caliper**	**Height**	**Spread**	**Remarks**
TREES									
QF	QUERCUS FUSIFORMIS	ESCARPMENT OAK	N/A	57	45 GAL	2"	8'	5'	STRAIGHT LEADER/TRUNK, FULL BRANCHING, SPECIMEN QUALITY
PM	PROSOPIS	MESQUITE	N/A	45					
PV	PARKINSONIA FLORIDA	PALO VERDE	N/A	41					
CL	CHILOPSIS LINEARIS	DESERT WILLOW	N/A	20					
CH	CHITALPA TASHKENTENSIS	CHITALPA	N/A	28					
			TOTAL	**191**					
SHRUBS									
AG	AGAVE AMERICANA	CENTURY AGAVE	WHITE	29	15 GAL (SHRUB)	NA	7'	3'	FULL, SPECIMEN QUALITY, MATCHING, ROT AND FUNGAL FREE
DW	DASYLIRION WHEELERI	GREY DESERT SPOON	PINK	428					
			TOTAL	**457**					
SHRUBS									
LC	LEUCOPHYLLUM CANDIDUM	TEXAS SAGE	N/A	934	3 GAL (SHRUB)	NA	18"	18"	FULL BRANCHING, SPECIMEN QUALITY, MATCHING
HP	HESPERALOE PARVIFLORA	RED YUCCA	N/A	6820					
SR	SALVIA ROSMARINUS PROSTRATUS	CREEPING ROSEMARY	N/A	176					
			TOTAL	**7930**					

*

1. All plant material must be specimen quality, GRADE A material.
2. Trunks must be self-supporting (able to hold itself upright and straight without bamboo or other supports). Trunks must be straight, strong and appropriate caliper for plant height (root to shoot ratio).
3. Trees with extra height not appropriate for root mass, as determined by Landscape Architect, will be rejected.
4. Branching must be appropriately dense with leaves/needles. Branching with "lion tail" attributes (leaves and needles only on the ends of limbs) will be rejected.
5. Root flares must be exposed. Trees grown too deep in containers will be rejected.

PLANT SPECIFICATION NOTES:

1. Reference Item 5.10 INSPECTION of the Texas Standard Specifications for Construction of Highways, Streets and Bridges 2014. Inspection or lack of inspection will not relieve the contractor from obligation to provide materials or perform the work in accordance with the contract.
2. Reference Item 192 of the Texas Standard Specifications for Construction of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown.
3. All plants must be nursery grown in containers unless otherwise shown on plans.
4. Provide photographs of plant material when requested by engineer and landscape architect.
5. REJECTION OF PLANTS. Reference Item 192.2 for rejection of plants and unacceptable characteristics.
6. MEASURING CALIPER. Reference Item 192.2 and ANSI Z60.1, Section 1.2.1, American Standard For Nursery Stock, for caliper measuring procedures. Caliper measurement shall be taken 6 inches above the soil line for container grown stock less than 4.5 inches in caliper. If caliper measured at 6 inches is 4.5 inches or more, caliper shall be measured at 12 inches above ground level, soil line, or root flare as appropriate.
7. ROOT BALL DEPTH. Reference ANSI Z60.1, Section 1.5.3 for rootball depth measurement procedures. Depth of root ball is measured from the top of the ball, which in all cases shall begin in the root flare.
8. HANDLING AND CARE. Properly handle and maintain plants during delivery, handling, storage, and planting. The engineer and landscape architect may inspect any phase of work and may reject any plant material improperly handled and/or maintained.
9. DELIVERY NOTICE. Reference Item 192.3.2 plant delivery. Provide 48 hour notice of proposed plant material delivery prior to arrival at project or storage area.
10. DELIVERY TICKETS. For each plant material shipment, provide invoice showing the number, size, and name (common and botanical) of each of the species of plant material.
11. WATERING PLAN(S). Prior to arrival at project or storage area, provide watering plan(s) of plants to be installed or stored. Watering plan(s) must be approved by engineer and landscape architect prior to delivery to project or storage area.

05-05-2023

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Texas Department of Transportation

PLANTING AND ESTABLISHMENT

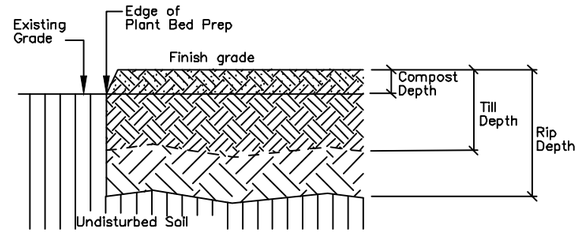
SHEET 2 OF 7

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		042
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

TYPE OF WORK

ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

192-6063 PLANT BED PREP (TYPE I) SY	192-6064 PLANT BED PREP (TYPE II) SY	192-6065 PLANT BED PREP (TYPE III) SY	192-6066 PLANT BED PREP (TYPE IV) SY	Reference Item 161, 192 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. Reference Special Specification Item 1006.		
	✓			161-6012 GENERAL USE COMPOST CY	APPLICATION RATE Item 161.2.3. General Use Compost. Apply 2 in. uniform layer over bed preparation area.	Item 161.2. Materials. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
	✓			1006-6001 LANDSCAPE SOIL AMENDMENT (TYPE I) SY	APPLICATION RATE Apply 0.30 lbs/SY. Each application is paid for separately. See timeline for multiple applications.	Use a non-chemical fertilizer with the following requirements: (1)Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2)Is registered with Texas State Chemist as a commercial fertilizer. (3)Meets USEPA guidelines for unrestricted use. (4)Derived from the following biological source: processed poultry manure. (5)Contains 3.0% nitrogen and 2.2% of nitrogen is water insoluble, 4% phosphate, 3% soluble potash, 10% calcium. (6)Use the following product or an approved equal: Plant Vigor 3-4-3 Plus 10% Calcium manufactured by Natural Resources Group, Inc., Tomball, Texas 800-279-9567.
	✓			1006-6002 LANDSCAPE SOIL AMENDMENT (TYPE II) SY	APPLICATION RATE Apply 0.25 lbs/SY.	Humate containing 2.25% iron in the raw material and greater than 45% humic acid, dextrose 2.5% to 5% on weight basis. Pelletized humate without added binders and pass #16 mesh. Use the following product or an approved equal: San Jacinto Humate, San Jacinto Environmental Supplies, 713-957-0909.
	✓			1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY	See PLANTING AND ESTABLISHMENT SHEET For Requirements	
				1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY	See PLANTING AND ESTABLISHMENT SHEET For Requirements	
	✓			1006-6005 LANDSCAPE SOIL AMENDMENT (TYPE V) SY	APPLICATION RATE Apply 0.30 lbs/SY. Apply to each plant pit at planting.	Use a non-chemical fertilizer with the following requirements: (1)Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2)Is registered with Texas State Chemist as a commercial fertilizer. (3)Meets USEPA guidelines for unrestricted use. (4)Derived from the following biological source: worm castings. (5)Contains 0.02% humic acid derived from humate, 1.0% nitrogen and 0.9% of nitrogen is water insoluble, 0.5% phosphate, 0.2% soluble potash, 1.0% calcium, 0.02% iron. (6)Use the following product or an approved equal: Black Castings manufactured by Vermi-Technology Unlimited available from Earth's Outlet 866-504-1139.
				RIPPING/TRENCHING Incidental to Item 192 Plant Bed Preparation.	RIP/TRENCH DEPTH Rip/Trench to a depth of 18 inches (+/- 2"). Distance between each rip/trench is 24 inches.	
	✓			ROTOR TILLING Incidental to Item 192 Plant Bed Preparation.	ROTOR TILL DEPTH After application of compost and amendments and rip/trench (when required), rotor till to a depth of 8 inches (+/- 2").	
				HERBICIDE and MOWING Incidental to Item 192 Plant Bed Preparation. Scalp mow 15 days after final herbicide treatment.	APPLICATION RATE Prior to all other work, apply two applications of an approved herbicide with 15 days between the applications. Apply herbicide during weather conditions and at a rate per manufacturer's recommendations.	



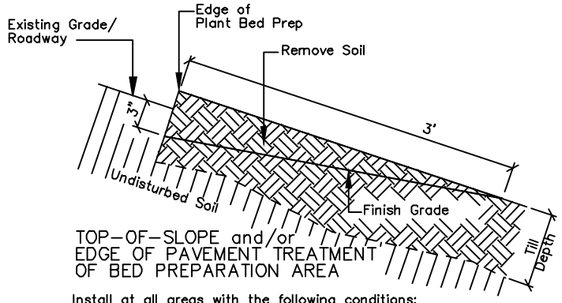
PLANTING BED PREPARATION SECTION

SEE ITEMS AND REQUIREMENTS THIS SHEET FOR DIMENSIONS, RATES, AND SPECIFICATIONS

(See Top-of-Slope detail this sheet when applicable)

GENERAL BED PREPARATION 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 not shown.
2. Reference Item 192.3 mark plant locations and bed outlines.
3. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
4. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the project. Remove stakes when directed by engineer.
5. Repair any damage within right of way caused by contractor at no additional expense to the Department.
6. Provide a 1000 SF "mock up" of soil amendment, general use compost, and bed preparation complete and in place within an approved area for approval by engineer.
7. Pick-up litter prior to scalp mow and bed preparation.
8. All concrete, steel, trash, and other debris uncovered during bed preparation work which the engineer determines as detrimental to the project will become the responsibility of the contractor and disposed of in an approved manner. Debris removal will occur daily and will be incidental to bed preparation and will not be paid for separately.
9. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
10. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
11. Clean and clear bed prep areas and nearby inlets of existing tall vegetation and any piles or layers of dead grass and weeds caused by drought or mowing operations by others.



TOP-OF-SLOPE and/or EDGE OF PAVEMENT TREATMENT OF BED PREPARATION AREA

Install at all areas with the following conditions:
Within the bed preparation areas at top-of-slope (adjacent to shoulder sections and areas with slotted barrier/curb) and/or at edge of roadway, remove tilled or untilled (TYPE IV) soil as shown. Evenly distribute removed soil in a thin layer over adjacent existing tilled or untilled (TYPE IV) soil being careful not to create a mound. This work is incidental to Item 192 Plant Bed Prep Preparation.

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 3 OF 7

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		043
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

USE COMPOST TEA OR EXTRACT AS SHOWN ON THIS SHEET

COMPOST EXTRACT

ITEM 1006–6003 LANDSCAPE SOIL AMENDMENT (TYPE III) and
ITEM 1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) requirements.

MATERIALS REQUIREMENTS

Compost for use in liquid compost/extract must contain the following (per gram dry weight of compost):
1. Test within range of Soil Food Web standards using a full bio–assay to include the following:
   a) 15–25 micrograms of active bacteria,
   b) 100– 3000 micrograms total bacterial biomass,
   c) 15–25 micrograms active fungal biomass,
   d) 100–300 micrograms total fungal biomass,
   e) 10,000 each of flagellates and amoebae,
   f) 20–100 ciliates, and
   g) 20 to 30 beneficial nematodes.
2. Meet the Solvita Compost Maturity test of 6.0 or higher.

Liquid compost/extract must contain the following (per gram dry weight):
1. 150–3000 micrograms total bacterial biomass,
2. 2–20 micrograms total fungal biomass,
3. 1000 each of flagellates and amoebae,
4. 20–50 ciliates, and
5. 2–10 beneficial nematodes.

Liquid compost must be verified, with time and date, for content to have minimum activity and meet minimum standards as specified above using a 100x and 400x microscope with camera attachment by a Soil Foodweb Certified Advisor or their representative. This verification must be within 30 minutes of material leaving premises on the day of manufacture. Picture will be kept on file for each 500 gallons manufactured.

Liquid compost/extract additives include the following:
1. Mycorrhizal fungi endo/ecto blend sourced with a minimum potency of 100,000 propagules per pound with NO Tricoderma included in the innoculum.
2. Humate, low sodium, naturally processed 70% humate that has been liquefied to 12% humic–fulvic as available from Mesa Verde Resources at 877–418–8776 or approved equal.
3. Fulvic acid derived from natural shale ore as available from Sustainable Growth Texas at 936–232–5738 or approved equal.
4. Soluble kelp seaweed, dehydrated liquid extract made from the seaplant Ascophyllum nodosom as available from Sustainable Growth Texas at 936–232–5738, or approved equal.
5. Naturally derived blackstrap non–sulfured molasses (for foliar application only).

Liquid compost/extract with additives solution must sit on air for 3–4 hours and monitored every 1/2 hour with a Dissolved Oxygen Meter to assure the material does not drop below 6ppm oxygen content during full activation period.

EQUIPMENT REQUIREMENTS

For each batch use a delivery tank verified for overall cleanliness, to be free of residue, soil, compost or stains. Tank shall then be rinsed with clean non–chlorinated or non–chloramines treated well water before filling with Liquid Compost. All equipment used for application of liquid compost must have never been used or will not be used with any non organic conventional inorganic fertilizers or chemical herbicides or pesticides, owner must submit written verification to this.

Tank shall be equipped with two, 2 inch quick coupler type fittings capable of coupling, without leaks. All lines and fittings should have quick couplers at every junction. Ninety (90) degree bend fittings should be avoided for quick clean out and verification of cleanliness.

Delivery tank must be equipped with an operating circulation pump of a low velocity, high volume pump of diaphragm or centrifugal design.

Injectors capable of penetrating four (4) inches into soil and/or root balls as manufactured by LESCO Deeproot Feeder at 713–466–6730 or approved equal.

Delivery tank must be equipped with an operating aeration system.

Dissolved oxygen meter.

TRANSPORT, STORAGE AND APPLICATION REQUIREMENTS

Liquid compost/extract with additives solution must be circulated for five (5) minutes per five hundred (500) gallons of material every three (3) hours. Liquid compost/extract with additives solution must be continuously aerated from time of manufacture through complete application. All solution must be applied within 24 hours, or new material must be sourced. Materials not applied within 24 hours is not allowed.

CONSTRUCTION METHODS AND APPLICATION RATES

1006–6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY
Installation date: Install root injection 14 calendar days minimum to 30 calendar days maximum after plant installation.
Limits: Each injected tree and woody shrub equals one square yard of Landscape Soil Amendment (Type III).
Inject 1/2 gallon liquid compost/extract with additives solution four (4) inches into the root zone and/or rootball of each tree and woody shrub only. Mix additives with liquid compost/extract using the following rates:
1. Mycorrhizal fungi endo/ecto blend: 30 lbs per 500 gallons of liquid compost/extract,
2. Humate: 30 lbs per 500 gallons of liquid compost/extract,
3. Fulvic acid: 32 oz per 500 gallons of liquid compost/extract,
4. Soluble kelp seaweed: 2 lbs per 500 gallons of liquid compost/extract.

1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY
Installation date: Install first foliar application 30 calendar days minimum to 60 calendars days maximum after root injection described on this sheet. Additional foliar applications as described on following sheets.
Limits/measurement: Each SY of foliar spray equals each tree or woody shrub. Spray foliar application over all trees and woody shrubs.
Solution must be sprayed targeting the full surface of the plant including leaves (top and bottom), limbs and trunk.
Spray foliar application at the following rates:
1. Liquid compost/extract: 500 gallons per acre,
2. Humate: 2 lbs per acre,
3. Fulvic acid: 32 oz per acre,
4. Soluble kelp seaweed: 2 lbs per acre,
5. Blackstrap molasses: 16 oz per acre.

Soil Foodweb Certified Advisor:

Sustainable Growth Texas
103 Sherbrook Circle
Conroe, TX 77385
936–232–5738
sustainablegrowthtexas.com

Soil Foodweb Oregon, LLC
728 SW Wake Robin Ave.
Corvallis, Oregon 97333–1612
541–752–5066
soilfoodweb.com

Soil Foodweb New York, Inc.
555–7 Hallock Ave.
Port Jefferson Station, NY 11776
631–474–8848
soilfoodwebny.com

COMPOST TEA

ITEM 1006–6003 LANDSCAPE SOIL AMENDMENT (TYPE III) and
ITEM 1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) requirements.

MATERIALS REQUIREMENTS

Compost for use in liquid compost tea must contain the following (per gram dry weight of compost):
Test within range of Soil Food Web standards using a full bio–assay to include the following:
   a) 15–25 micrograms of active bacteria,
   b) 100– 300 micrograms total bacterial biomass,
   c) 15–25 micrograms active fungal biomass,
   d) 100–300 micrograms total fungal biomass,
   e) 10,000 each of flagellates and amoebae,
   f) Less than 50 ciliates, and
   g) No root feeding nematodes present.

Actively aerated compost tea must contain the following per milliliter as applied (measured after having passed through the actual application apparatus):
1. Meet the minimum desired ranges by Soil Food Web for:
   a. Active bacteria 10–150
   b. Total bacteria 150–3000
   c. Active Fungi 2–10
   d. Total Fungi 2–20
   e. Flagellages and amoebae 2000 combined
   f. Ciliates 50 or less
   g. No root feeding nematodes present

Tea is to be tested from application device a minimum once per month during each application cycle. Each batch of actively aerated compost tea must be qualitatively assessed using light microscope methods as established by Soil Food Web. Photographs of microscopy must be kept on file with a qualitative assay report.

If the following additives are used in tea brewing to meet the minimum biological standards, the additives must meet these standards.
   a) Fish Hydrolysate – certified organic manufacturers documentation verifying no oil extraction has occurred.
   b) Kelp – must be certified organic soluble extract.
   c) Humic Acid – certified organic water extracted.
   d) Molasses – certified organic blackstrap molasses.

Actively aerated compost tea must maintain dissolved oxygen level above 6 mg/l until application. Use a dissolved oxygen meter to monitor.

EQUIPMENT REQUIREMENTS

For each batch use a delivery tank verified for overall cleanliness, to be free of residue, soil, compost or stains. Tank shall then be rinsed with clean non–chlorinated or non–chloramines treated well water before filling with Liquid Compost Tea. All equipment used for application of liquid compost must have never been used or will not be used with any non organic conventional inorganic fertilizers or chemical herbicides or pesticides, owner must submit written verification to this nature.

Application pump must be high volume (greater than 3.0 gpm) and low pressure (less than 60 psi). Application pump must be a diaphragm type pump. Foliar application device must be capable of adequately covering front and backs of leaves. Foliar application device shall be Gunjet AA18–AL or approved equal.

Delivery tank must be equipped with an operating aeration system capable of maintaining 6 mg/l oxygen content.

Injectors capable of penetrating four (4) inches into soil and/or root balls as manufactured by LESCO Deeproot Feeder at 713–466–6730 or approved equal.

Dissolved oxygen meter.

TRANSPORT, STORAGE AND APPLICATION REQUIREMENTS

Actively aerated compost tea must be continuously aerated from time of manufacture through complete application. Materials not applied within 24 hours are not allowed.

CONSTRUCTION METHODS AND APPLICATION RATES

1006–6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY
Installation date: Install root injection 14 calendar days minimum to 30 calendar days maximum after plant installation.
Limits: Each injected tree and woody shrub equals one square yard of Landscape Soil Amendment (Type III).
Inject 1/2 gallon liquid compost tea with additives solution four (4) inches into the root zone and/or rootball of each tree and woody shrub only. Mix additives with compost tea using the following rates:
1. 8 ox/ Fish Hydrolysate per gallon.

1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY
Installation date: Install first foliar application 30 calendar days minimum to 60 calendar maximum after root injection described on this sheet. Additional foliar applications as described on following sheets.
Limits/measurement: Each SY of foliar spray equals each tree or woody shrub. Spray foliar application over all trees and woody shrubs.
Solution must be sprayed targeting the full surface of the plant including leaves (top and bottom), limbs and trunk.
Spray foliar application at the following rate:
1. Liquid compost tea: 500 gallons per acre.

Soil Foodweb Certified Advisor:

Sustainable Growth Texas
103 Sherbrook Circle
Conroe, TX 77385
936–232–5738
sustainablegrowthtexas.com

Soil Foodweb New York, Inc.
555–7 Hallock Ave.
Port Jefferson Station, NY 11776
631–474–8848
soilfoodwebny.com

Soil Foodweb Oregon, LLC
728 SW Wake Robin Ave.
Corvallis, Oregon 97333–1612
541–752–5066
oregonfoodweb.com

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05–05–2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F–469
TX REG. SURVEYING FIRM LS–10193805

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 4 OF 7

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		044
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

PROJECT CONDITIONS DURING INSTALLATION AND SUSPENSION

During project installation and suspension periods, project site conditions are contractor's responsibility. Contractor will maintain project site conditions as shown on plans.
All project site maintenance work is incidental and is not paid for separately unless otherwise shown on plans.
Reference pertinent items 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.
Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK	TIMELINE
BEGINNING OF PROJECT CONSTRUCTION OR SUSPENSION	END OF CONSTRUCTION/INSTALLATION
WATERING (See PLANTING AND ESTABLISHMENT SHEET 1 of 8, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES) and/or (See PLANTING AND ESTABLISHMENT SHEET VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
MOWING, TRIMMING, AND EDGING (From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 6' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway) DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
PLANT BASIN, BED, AND WORKSITE MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.15.3) WEED CONTROL REQUIREMENT ☑ See PLANTING AND ESTABLISHMENT SHEET For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
PLANT SUPPORTS See PLANTING AND ESTABLISHMENT SHEET For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
PRUNING (Includes palm plant material and dead, diseased, or damaged palm fronds.)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
INSECT, DISEASE, AND ANIMAL INSPECTION AND TREATMENT (Exterminate all active ant colonies in bed preparation areas)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL (Not applicable)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
PLANT REPLACEMENT *	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
1006-6004 SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
1006-6005 SOIL AMENDMENT (TYPE V) (PLANTING AND ESTABLISHMENT SHEETS each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
FERTILIZER (Only when Item 192 Palm Material is part of the contract, see PLANTING AND ESTABLISHMENT SHEETS, REQUIREMENTS AFTER PLANTING)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS
IRRIGATION SYSTEM (Only when Item 170 Irrigation System or a temporary irrigation system is part of the contract, see IRRIGATION DETAILS AND MATERIALS SHEETS, GUARANTEE AND ACCEPTANCE)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEETS

* Remove any materials damaged by actions described in Item 7.18.1.
Removal and disposal of damaged materials is incidental to Item 192.
Contractor may be reimbursed for plant replacement in accordance with Item 7.18.1.
Theft is not a reimbursable repair.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		045
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

ITEM 192 LANDSCAPE PLANTING MAINTENANCE REQUIREMENTS

After completion of the project installation, as shown in the plans and approved by the engineer, begin maintenance activities for a period of 365 calendar days as described in Special Provision 192–001.
Payment in accordance with Special Provision 192–001 is subject to completion of all scheduled maintenance activities, timeline may also be suspended for failure to complete scheduled maintenance activities.
All maintenance work is incidental and is not paid for separately unless otherwise shown on plans.
Reference Item 170 and 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 and Special Specification 1006 for specifications, dimensions, volumes and measurements that are not shown.
Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

TIMELINE (Days)

0 30 60 90 120 150 180 210 240 270 300 330 365

DESCRIPTION OF WORK	1 Thru 7	8 Thru 15	16 Thru 22	23 Thru 30	31 Thru 37	38 Thru 45	46 Thru 52	53 Thru 60	61 Thru 67	68 Thru 75	76 Thru 82	83 Thru 90	91 Thru 97	98 Thru 105	106 Thru 112	113 Thru 120	121 Thru 127	128 Thru 135	136 Thru 142	143 Thru 150	151 Thru 157	158 Thru 165	166 Thru 172	173 Thru 180	181 Thru 187	188 Thru 195	196 Thru 202	203 Thru 210	211 Thru 217	218 Thru 225	226 Thru 232	233 Thru 240	241 Thru 247	248 Thru 255	256 Thru 262	263 Thru 270	271 Thru 277	278 Thru 285	286 Thru 292	293 Thru 300	301 Thru 307	308 Thru 315	316 Thru 322	323 Thru 330	331 Thru 338	339 Thru 346	347 Thru 354	355 Thru 365
192.3.15.1. WATERING (See PLANTING AND ESTABLISHMENT SHEET 1 of 7, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
192.3.15.2. MOWING, TRIMMING, AND EDGING																																																
192.3.15.3. PLANT BASIN, BED, AND WORKSITE MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.0.3) WEED CONTROL REQUIREMENT ☑ Maintain weed–free per Item 192.3.15.3. Cord trimmers are not allowed. Replace damaged plants per Item 192.15.9. INVASIVE VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. ☐ Maintain grasses and weeds at 24" maximum height. Eradicate all vines regardless of height, VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. Eradicate invasive shrubs and trees as directed. Method must be either a spot–treatment chemical application such as a wick applicator or manual hand pulling of weeds. Hand–pull previously treated dead plants over 24" tall.		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
192.3.15.4. PLANT SUPPORTS (Remove plant stakes and all appurtenances within last 10 days of this schedule unless this Item 192 maintenance period is followed by Item 193 establishment period, unless otherwise directed by engineer)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
192.3.15.5. PRUNING (Includes palm plant material and dead, diseased, or damaged palm fronds.)		✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓		
192.3.15.6. INSECT, DISEASE, AND ANIMAL INSPECTION AND TREATMENT (Exterminate all active ant colonies in bed preparation areas)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
192.3.15.7. LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
192.3.15.8. TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL																																																
192.3.15.9. PLANT REPLACEMENT * (See Special Provision 192–001)				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
1006–6004 SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 3 of 7, each application will be paid for separately)					SEE PLANT, MAINTENANCE AND ESTABLISHMENT TIMELINE FOR SCHEDULE.																																											
IRRIGATION SYSTEM (Only when Item 170 Irrigation System or a temporary irrigation system is part of the contract, see IRRIGATION DETAILS AND MATERIALS SHEET 1 OF 3, GUARANTEE AND ACCEPTANCE)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

* Remove any materials damaged by actions described in Item 7.18.1.
Removal and disposal of damaged materials is incidental to Item 192.
Contractor may be reimbursed for plant replacement in accordance with Item 7.18.1.
Theft is not a reimbursable repair.

✓ = Work required during defined period of timeline.
All work must be completed for entire project.

NOTES:
1. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
2. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05–05–2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F–469
TX REG. SURVEYING FIRM LS–10193805

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 6 OF 7

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		046
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

ITEM 193–6001 LANDSCAPE ESTABLISHMENT REQUIREMENTS

After completion of the Item 192 maintenance period, as shown in the plans and approved by the engineer, begin Item 193 establishment activities and continue for the duration of time shown in 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 separately in accordance with Item 193 unless otherwise shown on plans.
Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK

TIMELINE (Days) – (1 – 365 = Month 1 thru 12
366 – 726 = Month 13 thru 24)

0(366) 30(396) 60(426) 90(456) 120(486) 150(516) 180(546) 210(576) 240(606) 270(636) 300(666) 330(696) 365

Item	Description of Work	1 Thru 7	8 Thru 15	16 Thru 22	23 Thru 30	31 Thru 37	38 Thru 45	46 Thru 52	53 Thru 60	61 Thru 67	68 Thru 75	76 Thru 82	83 Thru 90	91 Thru 97	98 Thru 105	106 Thru 112	113 Thru 120	121 Thru 127	128 Thru 135	136 Thru 142	143 Thru 150	151 Thru 157	158 Thru 165	166 Thru 172	173 Thru 180	181 Thru 187	188 Thru 195	196 Thru 202	203 Thru 210	211 Thru 217	218 Thru 225	226 Thru 232	233 Thru 240	241 Thru 247	248 Thru 255	256 Thru 262	263 Thru 270	271 Thru 277	278 Thru 285	286 Thru 292	293 Thru 300	301 Thru 307	308 Thru 315	316 Thru 322	323 Thru 330	331 Thru 338	339 Thru 346	347 Thru 354	355 Thru 365
193.3.1.1.	PRUNING (Includes palm plant material and dead, diseased, or damaged palm fronds.)				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.3.1.2.	INSECT, DISEASE, AND ANIMAL CONTROL (Exterminate all active ant colonies in bed preparation areas)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
193.3.1.3.	FERTILIZATION																																																
193.3.1.4.	MULCHING, PLANT BASIN, AND PLANT BED MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected below, maintain per Item 193.3.1.4) WEED CONTROL REQUIREMENT ☑ Maintain weed-free per Item 193.3.1.4. Cord trimmers are not allowed. Replace damaged plants per Item 193.3.2. INVASIVE VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. ☐ Maintain grasses and weeds at 24" maximum height. Eradicate all vines regardless of height, VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. Eradicate invasive shrubs and trees as directed. Method must be either a spot-treatment chemical application such as a wick applicator or manual hand pulling of weeds. Hand-pull previously treated dead plants over 24" tall.		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
193.3.1.5.	MOWING, TRIMMING, AND EDGING (From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 20' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway) DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.3.1.6.	STAKING, GUYING, AND BRACING OF PLANTS (Remove plant stakes and all appurtenances within last 30 days of this schedule, unless otherwise directed by engineer)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
193.3.2.	PLANT REPLACEMENT *				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.3.4.	IRRIGATION SYSTEM OPERATION AND MAINTENANCE		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
1006–6004	SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 3 of 7, each application will be paid for separately)					SEE PLANT, MAINTENANCE AND ESTABLISHMENT TIMELINE FOR SCHEDULE.																																											
	LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter. Litter and debris collection and disposal is subsidiary to ITEM 193–6001 and not paid for separately).		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

* Remove any materials damaged by actions described in Item 7.18.1.
Removal and disposal of damaged materials is incidental to Item 193.

✓ = Work required during defined period of timeline.
All work must be completed for entire project.

NOTES:
1. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
2. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05–05–2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

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PLANTING AND ESTABLISHMENT

SHEET 7 OF 7

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		047
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

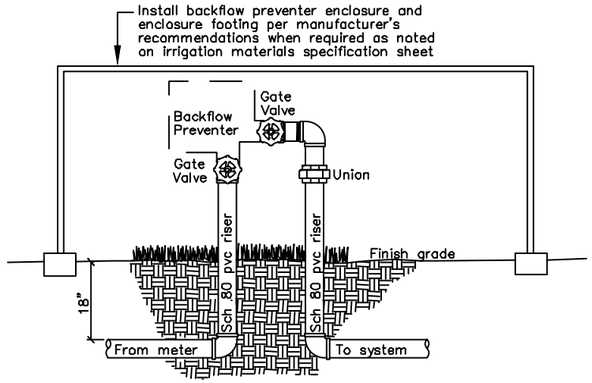
TYPE OF WORK				REQUIREMENTS
170–6002 IRRIGATION SYSTEM (TY I) LS	170–6003 IRRIGATION SYSTEM (TY II) LS	170–6004 IRRIGATION SYSTEM (TY III) LS	170–6005 IRRIGATION SYSTEM (TY IV) LS	FOR ALL IRRIGATION SYSTEM TYPES, THE DESIGN, FURNISH, INSTALLATION, REMOVAL, AND MAINTENANCE OF IRRIGATION SYSTEMS IS INCIDENTAL TO ITEM 170 AND WILL NOT BE PAID FOR SEPARATELY UNLESS OTHERWISE SHOWN.
				Furnish and install irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, plans, details, and notes.
	✓			Design, furnish, and install irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, plans, details, and notes. Design is incidental to this item and not paid for separately.
				Design, furnish, install, and remove irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, and notes. Power supply must not involve the purchase of electricity. Water distribution must utilize a drip system. Design and removal are incidental to this item and not paid for separately.
	✓			Provide shop drawings with layout, details, and specifications for approval prior to work.
				Remove all above ground components at end of contract.
	✓			Provide as–built drawings at completion of irrigation system. As–built drawings must be sealed by Licensed Irrigator. See additional notes this sheet for requirements.

IRRIGATION SYSTEM NOTES

GENERAL
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 not shown.
2. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electrical, telephone, fiber optics, etc.
3. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of contract. Remove stakes as directed by engineer.
4. The drawings are diagramatic of the work to be performed. Changes may be required due to varying conditions or as directed by the engineer.
5. Conduct a complete inventory and analysis of site conditions, incidental construction such as boring, mainline adjustment, sidewalk removal and replacement, utility adjustments, etc. will not be paid for separately unless shown on plans.
6. See IRRIGATION DETAILS AND MATERIALS SHEET 3 of 3 for materials specifications, sizes, and requirements.
7. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
8. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

CONSTRUCTION METHODS
1. Locate and stake irrigation system and related work in the field. Locate all irrigation valves, mainlines, dripline, etc., for approval by the engineer prior to installation. Any adjustments to work performed prior to approval will be incidental.
2. Obtain all permits, licenses, tests, and approvals. Pay any fees and deposits and install or arrange for all water meters and taps for installation and operation as applicable. Deposits will not be refunded by TxDOT.
3. Install water meter(s). WATER METERS WILL BE PLACED IN NAME OF THE CONTRACTOR THROUGHOUT ENTIRE CONTRACT. The contractor will pay for monthly water charges. Ensure water meter(s) remain operational and turned on for duration of the contract. Upon completion of the contract transfer water meter(s) into name of entity provided by the engineer.
4. Install backflow preventer(s). BACKFLOW PREVENTERS WILL BE PLACED IN NAME OF THE CONTRACTOR THROUGHOUT ENTIRE CONTRACT. Pay all charges, fees, tests, and coordination for any backflow preventer(s) testing at installation or annual inspection required by local entity for duration of the contract. Upon completion of the contract transfer backflow preventer(s) into name of entity provided by the engineer.
5. Excavation and Trenching Item 170.3.2. Exercise care when excavating near trees. No mechanical trenching is permitted below the canopy of existing trees. Adjust trench path, bore, and/or excavate by hand to avoid damage to existing tree root system. Keep trench bottom clean and smooth with all organic debris and sharp objects removed.
6. Boring Item 170.3.3. Stake boring and sleeve locations for engineer's approval. Bore pit will be minimum of 5 feet from edge of base material or pavement unless otherwise approved by engineer. The size of the bore will not exceed the diameter of the encasement by more than 1 inch. Cover or fill bore pit during non–scheduled work hours.
7. Encasement 170.3.5 Depth is minimum 36 inches below roadway pavement surface. All encasement is continuous and will extend the full width of the pavement and 5' on each side thereof. Encasement is incidental to irrigation system. Install encasement same day as boring.
8. Pipe and Valve Assembly 170.3.6. Do not install pipe when air temperature is below 40 degrees fahrenheit. Cut pipe in a manner that will ensure a square cut. Remove burs prior to installation for a clean, smooth unobstructed flow. Install pipe to an even grade and support pipe continuously on bottom of trench. Snake pipe in trench to allow for contraction and expansion.
9. Sprinkler Heads and Drip Tubing 170.3.7. See note 10 before installing dripline.
10. Closing and Flushing of PVC Pipe 170.3.10. Thoroughly flush all water lines before installing dripline.
11. Hydrostatic Tests 170.3.11. Engineer must be present.
12. Backfill and Compaction 170.3.12. Backfill to correct soil settlement is incidental.

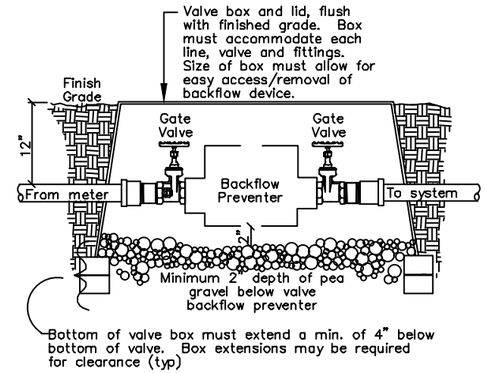
GUARANTEE AND ACCEPTANCE
1. Maintenance period. Inspect irrigation system concurrently with, and subject to the same maintenance requirement period under Items 192 and 193. During the installation and maintenance period perform the following activities as a minimum and to the satisfaction of the engineer:
   A)Install and maintain the controller program to ensure the proper distribution of water (includes replacement of any batteries).
   B)Inspect, repair, and/or replace any equipment that is found defective, damaged or stolen.
   C)Make any adjustments that may become necessary to ensure the proper delivery of water to the plant material.
2. As–built drawings. Furnish the engineer a set of as–built drawings on reproducible 11x17 sheets upon completion of the installation of the irrigation system. The as–built drawings will be verified that they are a true record of the project conditions. Show all valve locations on drawings by triangulation from a fixed object. Show actual location of main and lateral lines from a fixed object. As–built drawings must be sealed by Licensed Irrigator.
3. Operating and maintenance data. Provide instructions covering full operation, care and maintenance of the equipment, including a schedule showing time each valve is open to provide determined amount of water, and instruct personnel designated by engineer in proper operation of the system.



BACKFLOW PREVENTER ABOVE GROUND INSTALLATION

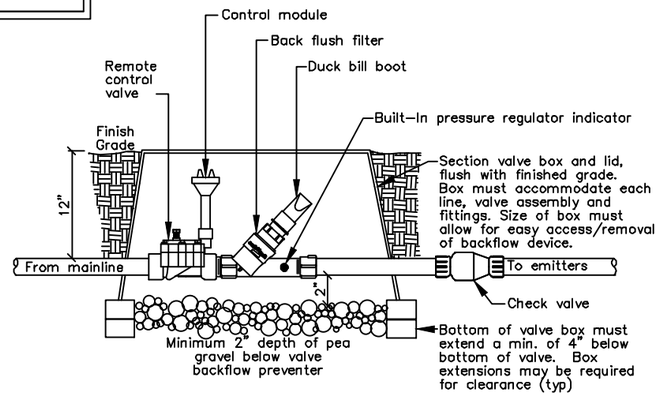
Type shall meet local code. Local code will have precedence over this detail.

OR

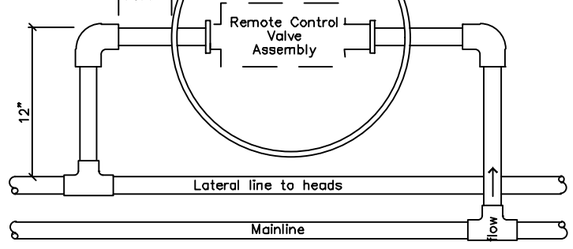


BACKFLOW PREVENTER IN GROUND INSTALLATION

Type shall meet local code. Local code will have precedence over this detail.

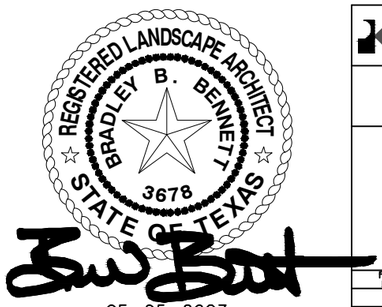


SECTION – PIPING TO/FROM REMOTE CONTROL VALVE ASSEMBLY



PLAN – PIPING TO/FROM REMOTE CONTROL VALVE ASSEMBLY

REMOTE CONTROL VALVE ASSEMBLY



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Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.583.0103
TX REG. ENGINEERING FIRM F–469
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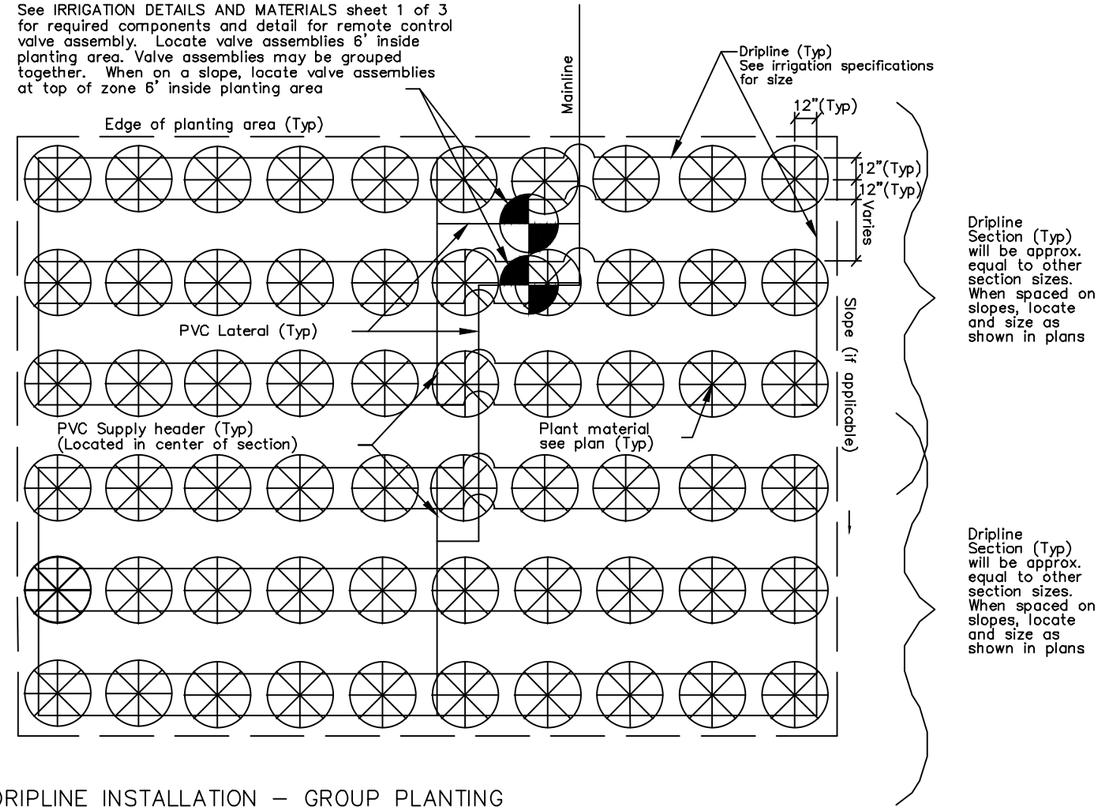
IRRIGATION DETAILS AND MATERIALS

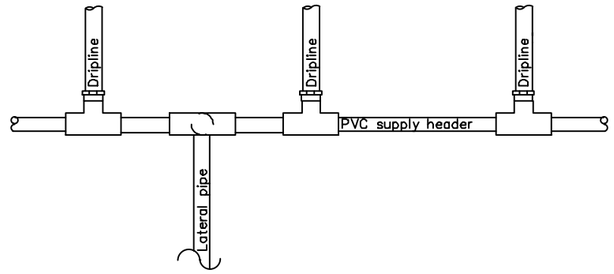
SHEET 1 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX–XXX–XXX		048
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO.
0924	06	689	US 54

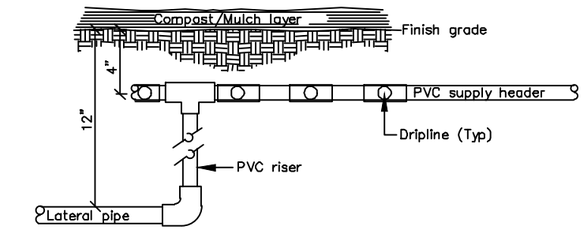


DRIPLINE INSTALLATION – GROUP PLANTING

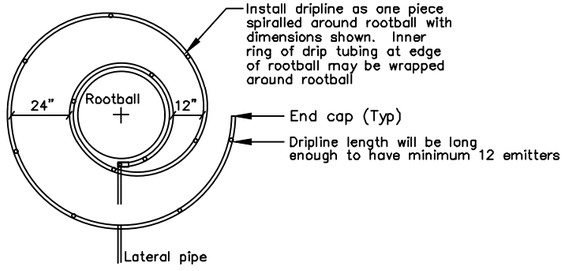
Note: When dripline sections are installed on slopes, schedule controller such that lower sections on slope are operating for shorter lengths of time. Contact engineer and landscape architect for setting length of timed dripline section operation. Total number of emitters and laterals will not allow for section GPM (gallons per minute) to exceed 20 GPM



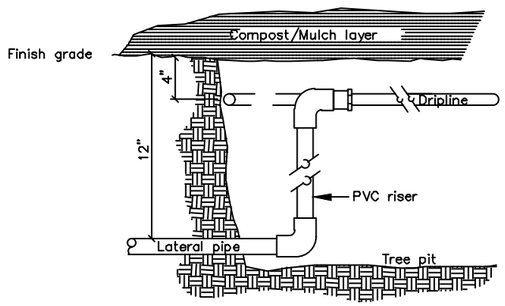
PLAN – RISER/SUPPLY HEADER TO DRIP TUBING



SECTION – RISER/SUPPLY HEADER TO DRIP TUBING



PLAN – RISER TO DRIPLINE IN TREE PIT



SECTION – RISER TO DRIPLINE IN TREE PIT

DRIPLINE INSTALLATION – INDIVIDUAL PLANTING

Note: Total number of emitters and laterals will not allow for section GPM (gallons per minute) to exceed 20 GPM

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Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
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IRRIGATION DETAILS AND MATERIALS

SHEET 2 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		049
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	REMARKS
TAP/METER	LOCAL CODE	1 1/2 inch minimum	LOCAL CODE MAY REQUIRE LARGER METER
BACKFLOW PREVENTER	APPROVED BY LOCAL CODE	1 inch	
BACKFLOW PREVENTER ENCLOSURE REQUIRED FOR THE FOLLOWING IRRIGATION SYSTEM TYPES: TYPE II Enclosure will be approved by the Engineer. Enclosure will be manufactured specifically for purpose of protecting backflow preventor. Enclosure will be vandal-resistant, lockable with the ability to be anchored to the ground. Enclosure will be completely removable. Enclosure size will provide access and clearance on all sides of backflow preventer. Locking mechanism will be approved by the Engineer. Provide locks and keys. All locks will use same keys unless otherwise directed by the Engineer. Keys will match master key provided by Engineer or Landscape Architect. Locks may be integrated into enclosure.	APPROVED BY ENGINEER	APPROVED BY ENGINEER	PROVIDE FOUR(4) KEYS TO ENGINEER IF ENCLOSURE IS REQUIRED
VALVE APPURTENANCES: INCLUDES: BACK FLUSH FILTER and PRESSURE REGULATOR CHECK VALVE DUCK BILL BOOT CLOSE NIPPLES (1")	RAINBIRD XCZ-100-PRF-BF RAINBIRD PRF 100 BFF RAINBIRD CV100 RAINBIRD DBB	1 inch	
NELSON CONTROL VALVE WITH CONTROL MODULE Programmable actuator with lithium battery	NELSON 8015 ACTUATOR, LITHIUM BATTERY, VALVE		
BORING		4 inch	OVERCUTTING WILL NOT BE ALLOWED
PVC SCH 40 ENCASEMENT PIPE FOR SLEEVES AND BORES Pressure rated with slip type solvent welded joints		4 inch	REFERENCE ITEM 170.2.3
PVC SCH 80 above ground at backflow device		2 inch	PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE
PVC SCH 40 MAINLINE Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints		2 inch	
PVC SCH 40 LATERALS AND HEADERS		3/4 inch	
PVC SCH 80 ABOVE GROUND PIPE			PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE
BURIED RISERS AND SWING-JOINT COMPONENTS SCH 80			
PVC FITTINGS All fittings incorporated into system will be of the same type, size and class material as the pipe			
Dripline with COPPER SHIELD for Sub-Surface Irrigation	RAINBIRD DRIPLINE XFS-06-24	0.6 GAL./HR, 24 inch DRIPPER SPACING	
DRIPLINE FITTINGS Use fittings specifically manufactured for all dripline connections, no bending/crimping allowed.			
CONTROL WIRE All low voltage control wire will be color coded. Wire sizes will conform to the controller manufacturer specifications for maximum distances for specific wire sizes. All wire will be specifically manufactured for direct burial. All wire connections and splices will be made in ground boxes. The splice will be completely waterproof and will be completely encapsulated within a King Safety Sealed Irrigation Connector/Splice enclosure or an approved equal			
SOLVENT CEMENT Solvent cement will be the type recommended by the pipe manufacturer			
VALVE BOXES Boxes for section valves, below-ground backflow preventers, and quick coupling valves will be as shown on detail sheet			
VALVE BOX RISERS			

IRRIGATION SYSTEM NOTES:
1. Reference IRRIGATION DETAILS AND MATERIALS sheets 1,2 and 3 for details and requirements.
2. Reference to manufacturer's trade name or catalog number is for the purpose of identification only, Contractor is permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

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Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
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IRRIGATION DETAILS AND MATERIALS

SHEET 3 OF 3

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		050
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

ITEM 193-6007 IRRIGATION SYSTEM OPER AND MAINT - MO

***
BEGIN

193-6007 IRRIGATION SYSTEM OPER AND MAINT -MO- ALL LOCATIONS	As shown on PLANTING, MAINTENANCE AND ESTABLISHMENT TIMELINE

REQUIREMENTS FOR EXISTING AND NEW IRRIGATION SYSTEMS WITHIN LIMITS OF PROJECT.

GENERAL
1. Perform all requirements described on this sheet unless otherwise shown.
2. Reference ITEM 193 Irrigation System Operation and Maintenance of the TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES 2014.
3. At any time during the contract, materials and/or work performed not in accordance with plans and specifications will be replaced and/or reworked until in compliance with no additional compensation.
4. Any adjustments due to the failure to comply with plans and specifications shown will be at Contractor's expense.

IRRIGATION SYSTEM(S)
5. Maintain existing and new irrigation system(s) for duration of contract in accordance with ITEM 193.3.4 and 193.4.
6. In addition to general requirements perform the following:
   a) Repair all leaks from meter to emission devices.
   b) Replace all broken or inoperable components in accordance with original and/or new plans and specifications, submit samples for approval prior to work.
   c) Replace all batteries at the beginning of contract and during last month of contract.
   d) Investigate existing systems and provide as built irrigation system plans, including added areas for new plants.

PAYMENT
7. Each MO includes completing the specified work for all locations within TxDOT ROW of the project limits.
8. District Landscape Architect or Vegetation Specialist must approve completed work prior to acceptance and payment.

REGISTERED LANDSCAPE ARCHITECT
BRADLEY B. BENNETT
3678
STATE OF TEXAS

05-05-2023

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
TX REG. ENGINEERING FIRM F-469
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IRRIGATION SYSTEM OPER AND MAINT

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	XX-XXX-XXX		051
STATE	DISTRICT	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO
0924	06	689	US 54

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0924-06-689

1.2 PROJECT LIMITS:
From: US 54 AND CASSIDY

To: US 54 AND FRED WILSON AVE

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 31.809006 ,(Long) -106.442360

END: (Lat) 31.830128 ,(Long) -106.439597

1.4 TOTAL PROJECT AREA (Acres): 0.453

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0

1.6 NATURE OF CONSTRUCTION ACTIVITY:
CONSTRUCTION OF LANDSCAPE & SCENIC ENHANCEMENT CONSISTING OF DESERT VEGETATIVE LANDSCAPE, GROUND COVER, IRRIGATION SYSTEM & MAINTENANCE CYCLE

1.7 MAJOR SOIL TYPES:

Soil Type	Description
DCB	DELNORTE CANUTIO ASSOCIATION, INDULATING
DCD	DELNORTE CANUTIO ASSOCIATION HILLY
TBB	TURNEY-BERINO ASSOCIATION, INDULATING

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.)

- ☒ Mobilization
- ☒ Install sediment and erosion controls
- ☐ Blade existing topsoil into windrows, prep ROW, clear and grub
- ☐ Remove existing pavement
- ☐ Grading operations, excavation, and embankment
- ☐ Excavate and prepare subgrade for proposed pavement widening
- ☐ Remove existing culverts, safety end treatments (SETs)
- ☐ 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
- ☐ Revegetation of unpaved areas
- ☒ Achieve site stabilization and remove sediment and erosion control measures
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody

* 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: _____

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			52
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	EL PASO	
CONT.	SECT.	JOB	HIGHWAY NO.
0924	06	689	US 54

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

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

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ 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
N/A		

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
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☐ 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
N/A		

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

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

2.9 MAINTENANCE:

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

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

Texas Department of Transportation

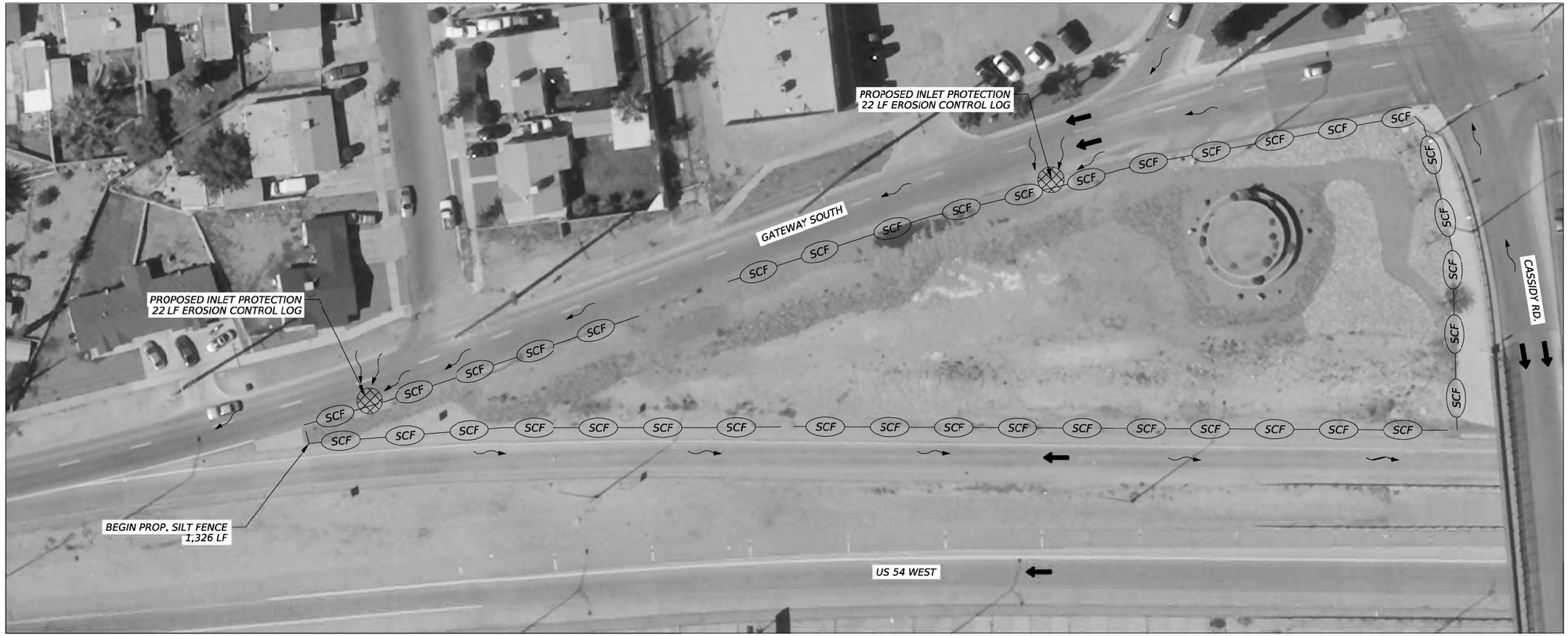
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			53
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	EL PASO	
CONT.	SECT.	JOB	HIGHWAY NO.
0924	06	689	US 54

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW



SWP3 QUANTITY (SHEET 1 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1326
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1326
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	44
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	44

STATE OF TEXAS
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93727
LICENSED PROFESSIONAL ENGINEER

Antonio Santana, PE

05-08-2023

N.T.S.

Texas Department of Transportation

US 54

SWP3 PLAN LAYOUT

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		54

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DATE: 5/8/2023 3:06:06 PM
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DW:
CK:
DW:

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SILT FENCE (SCF)
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 2 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1697
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1697
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	44
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	44

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SWP3 PLAN LAYOUT

SHEET 2 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		55

DATE: 5/8/2023 11:25:03 AM
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DW:

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 3 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1118
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1118

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SWP3 PLAN LAYOUT

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		56

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NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 4 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	572
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	572

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SWP3 PLAN LAYOUT

SHEET 4 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		57

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 5 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	394
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	394
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	22
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	22

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SWP3 Plan Layout

SHEET 5 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		58

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NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

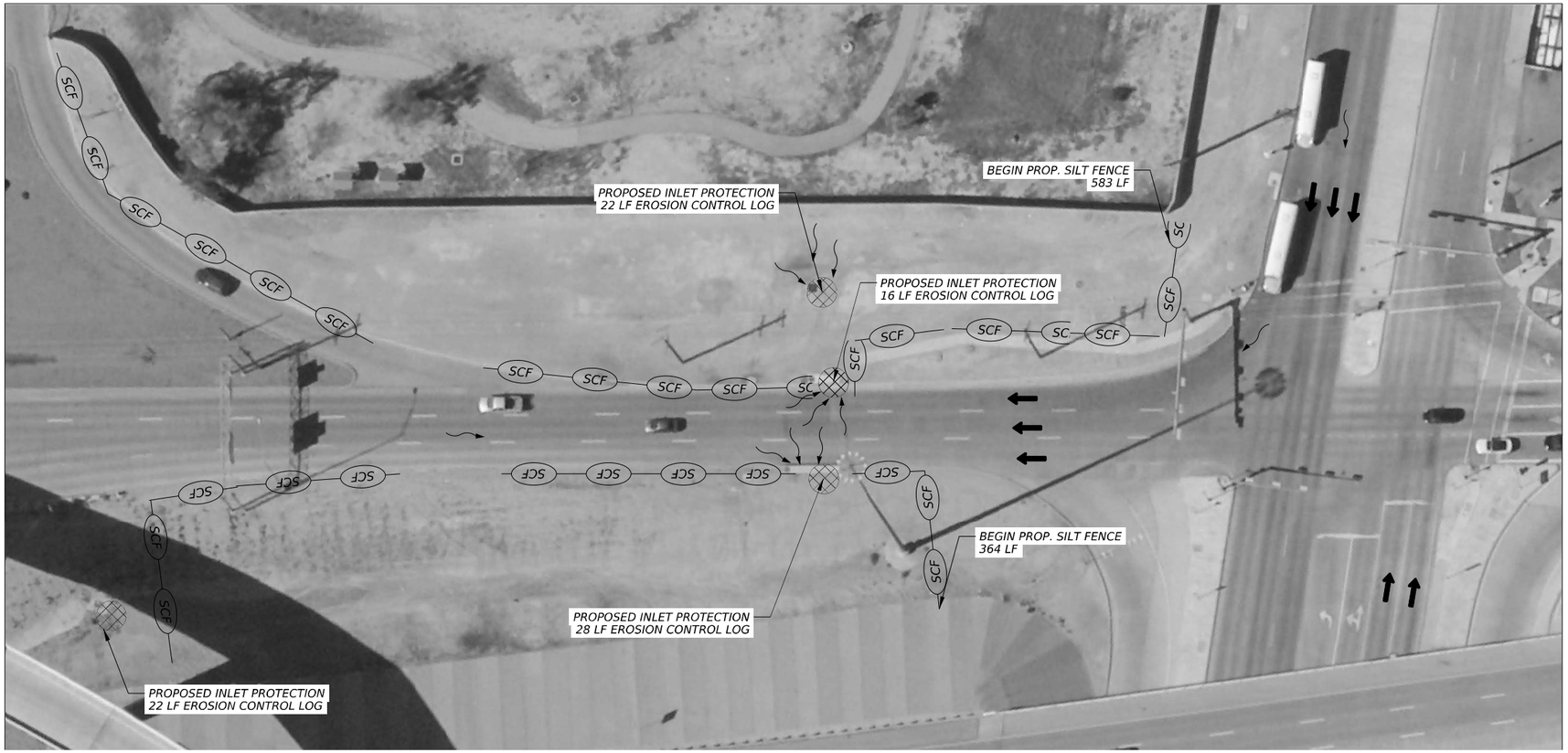
LEGEND

INLET PROTECTION

SCF — SILT FENCE

TRAFFIC FLOW DIRECTION

DIRECTION OF FLOW



SWP3 QUANTITY (SHEET 6 OF 9)				
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506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	947
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	88
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	88

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Texas Department of Transportation

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SWP3 PLAN LAYOUT

SHEET 6 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		59

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NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 7 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1325
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1325
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	70
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	70

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US 54

SWP3 PLAN LAYOUT

 SHEET 7 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		60

DATE: 5/8/2023 2:57:25 PM
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DW:

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 8 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	792
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	792
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	44
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	44

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SWP3 PLAN LAYOUT

SHEET 8 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		61

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DW:
CK:

NOTES:

1. SEDIMENT CONTROL ITEMS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY THE ENGINEER.

LEGEND

- INLET PROTECTION
- SCF — SILT FENCE
- TRAFFIC FLOW DIRECTION
- DIRECTION OF FLOW

SWP3 QUANTITY (SHEET 9 OF 9)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	390
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	390
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	22
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	22

STATE OF TEXAS
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93727
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05-08-2023

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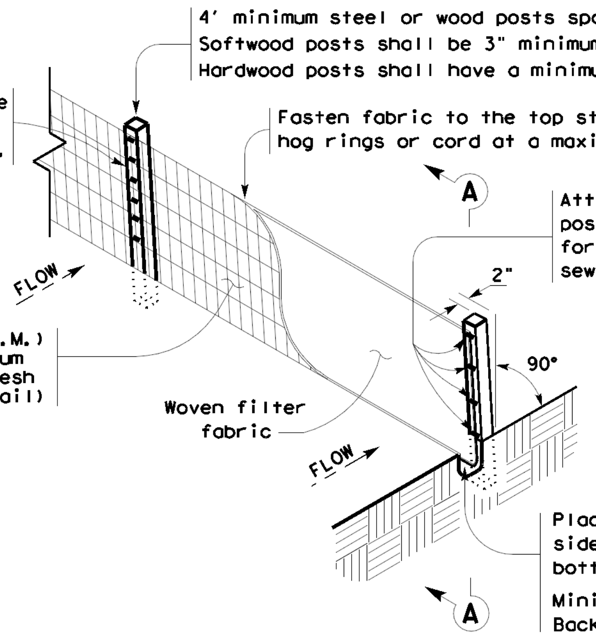
Texas Department of Transportation

US 54

SWP3 PLAN LAYOUT

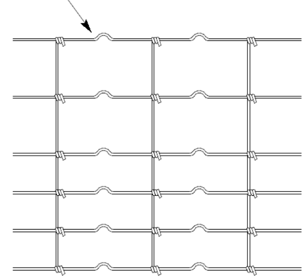
SHEET 9 OF 9

CONT	SECT	JOB	HIGHWAY
0924	06	689	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		62



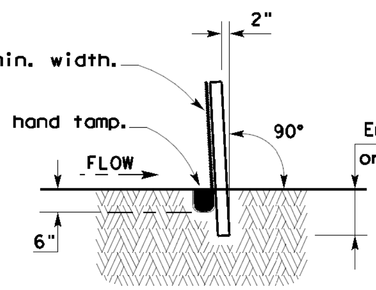
TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

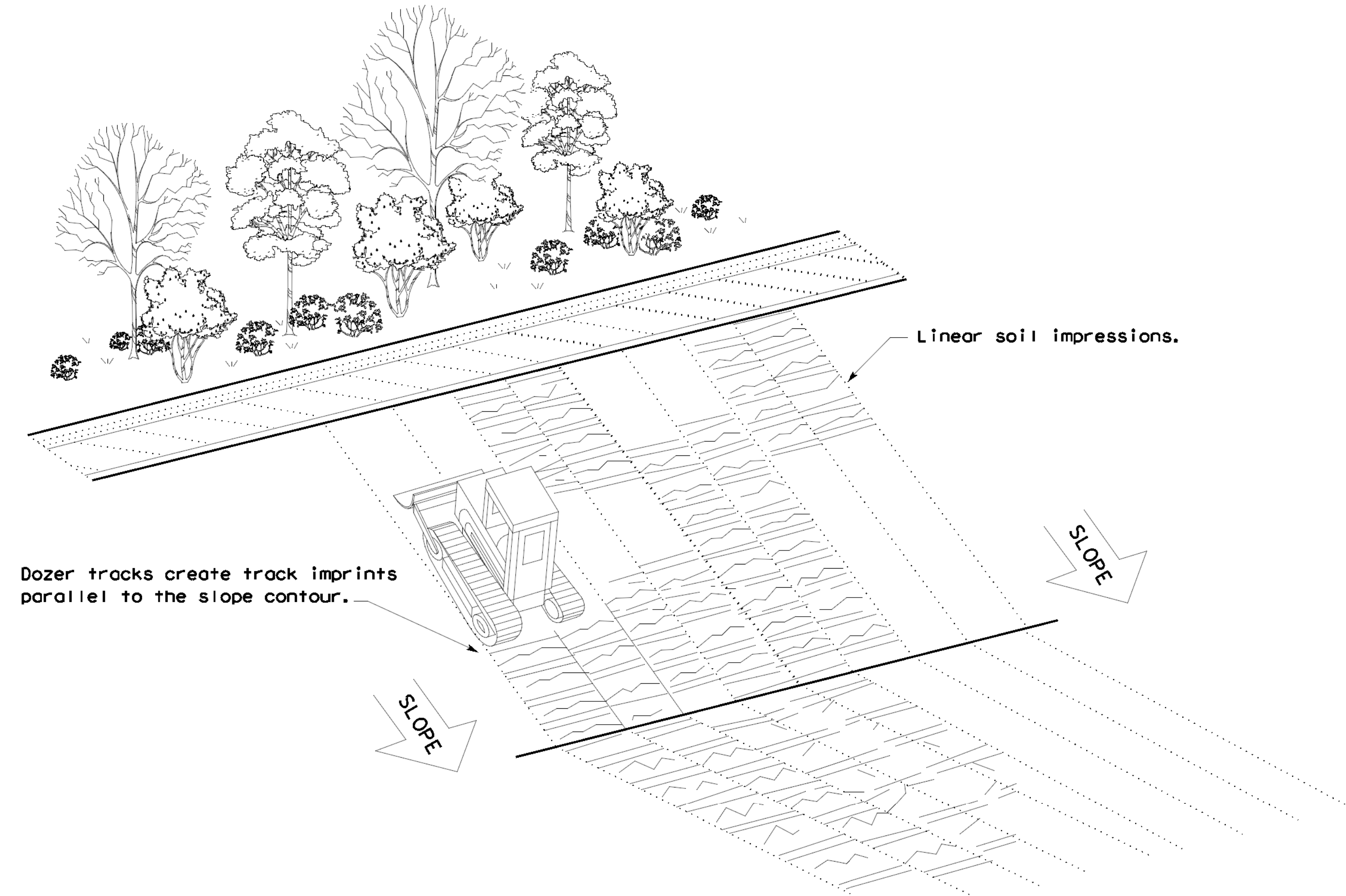
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

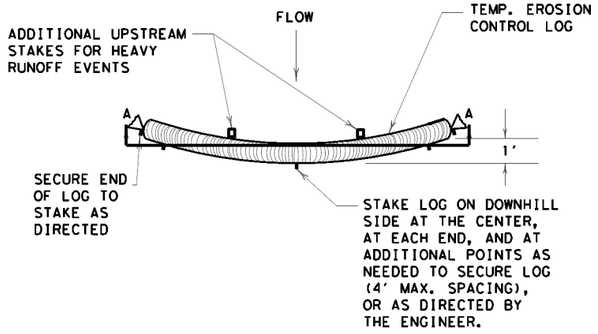
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

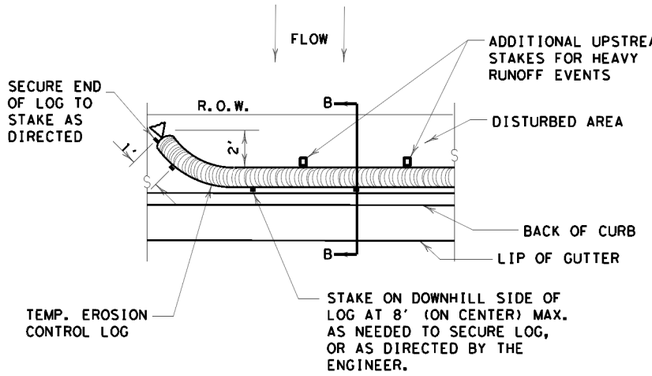
FENCE & VERTICAL TRACKING

EC(1)-16

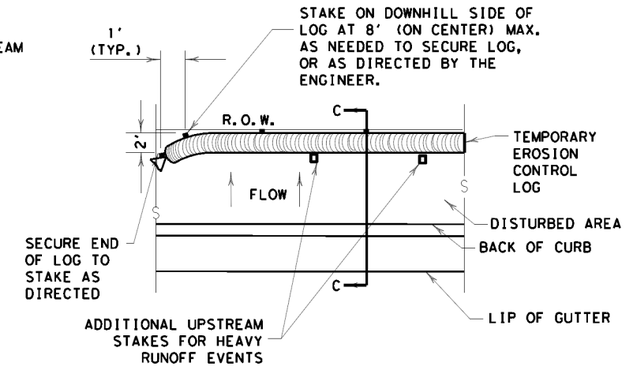
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0924	06	689	US 54
	DIST		COUNTY	SHEET NO.
	ELP		EL PASO	63



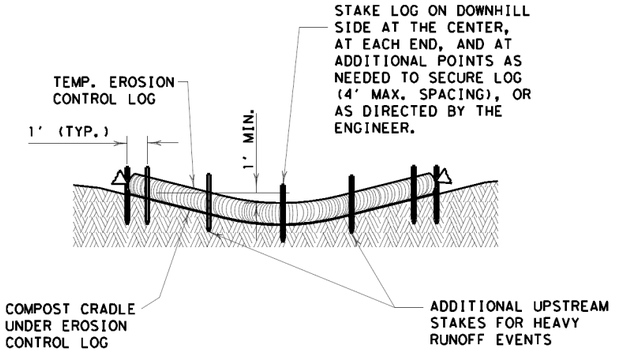
PLAN VIEW



PLAN VIEW



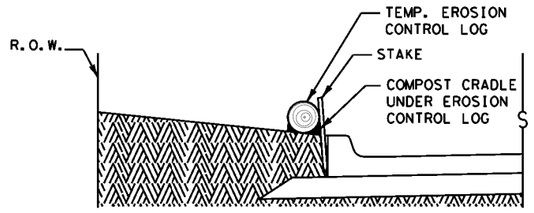
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

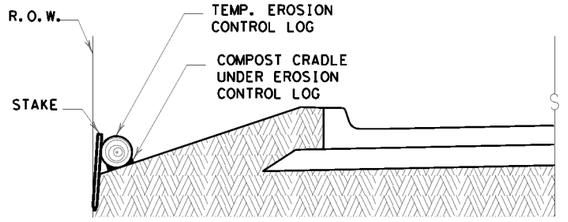
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

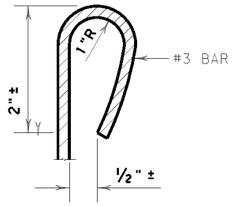
CL-BOC



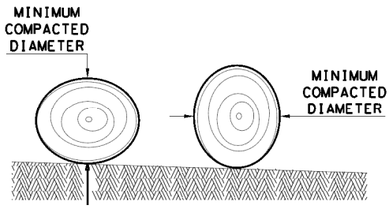
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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.

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

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.

SHEET 1 OF 3

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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			
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REVISIONS	0924	06	689	US 54			
	DIST	COUNTY		SHEET NO.			
	ELP	EL PASO		64			

DATE: 5/8/2023
FILE: dwr://txdot.projectwiseonline.com:TxDOT5/Documents/24 - ELP/Design Projects/0924066894 - Design/Plan Set/9. Environmental/ec916.dgn

DATE: 5/8/2023
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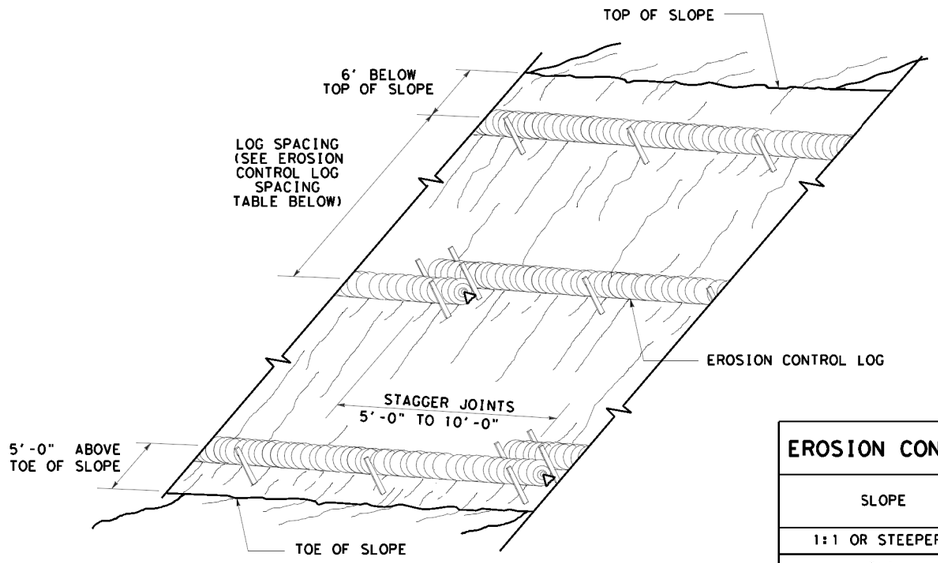
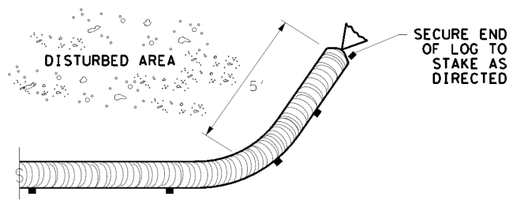


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

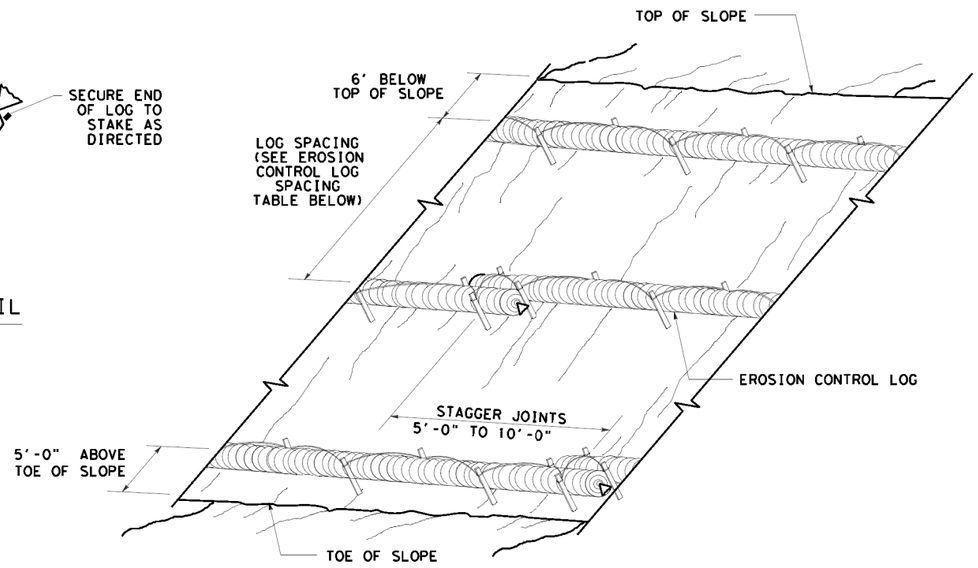
CL-SST



END SECTION RAP DETAIL

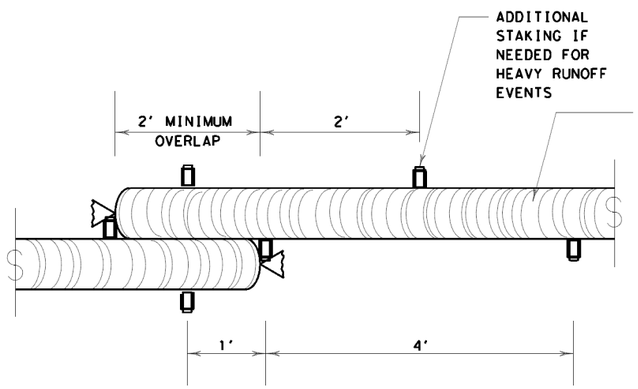
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

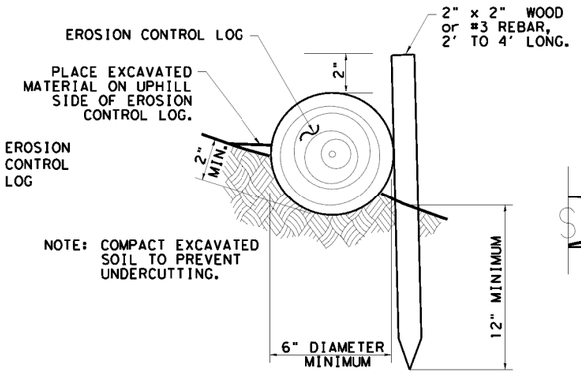
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

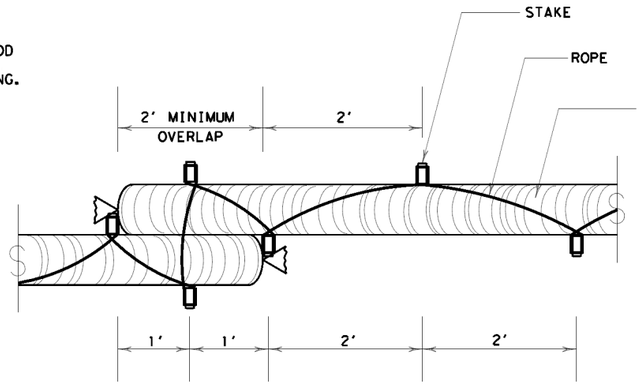


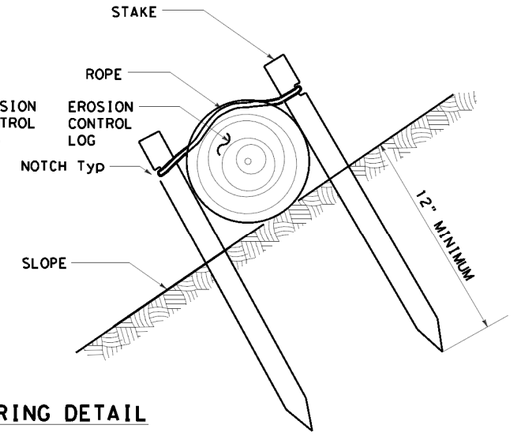


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

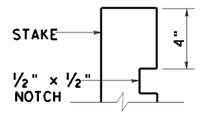
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





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

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	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		65

DATE: 5/8/2023
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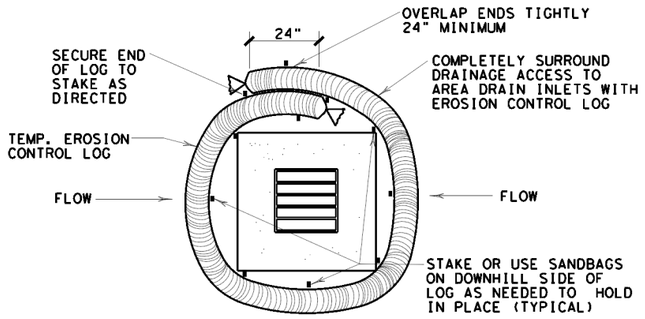
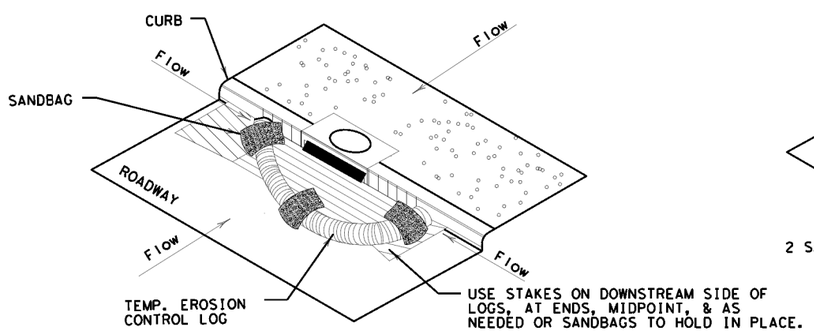


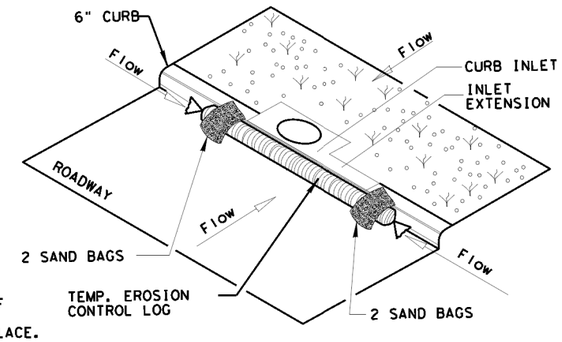
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

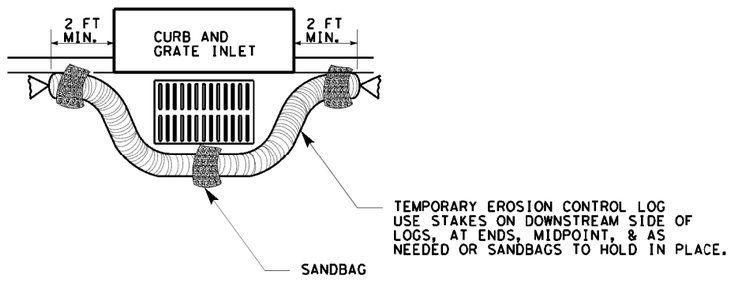
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

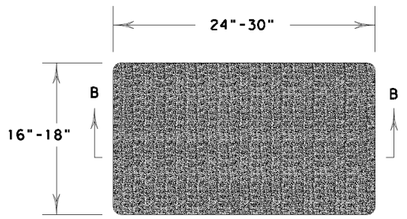
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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

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