FED.RD. DIV.NO.	FEDERAL AID or STATE PROJECT NO.		HIGHWAY NO.
6	27–12–166, ETC		IH 69
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	HOU	FORT BEND	001
CONTROL	SECTION	JOB	
0027	12	166, ETC	

ROADWAY CLASSIFICATION: N/A
DESIGN SPEED: N/A
ADT: REF TABLE

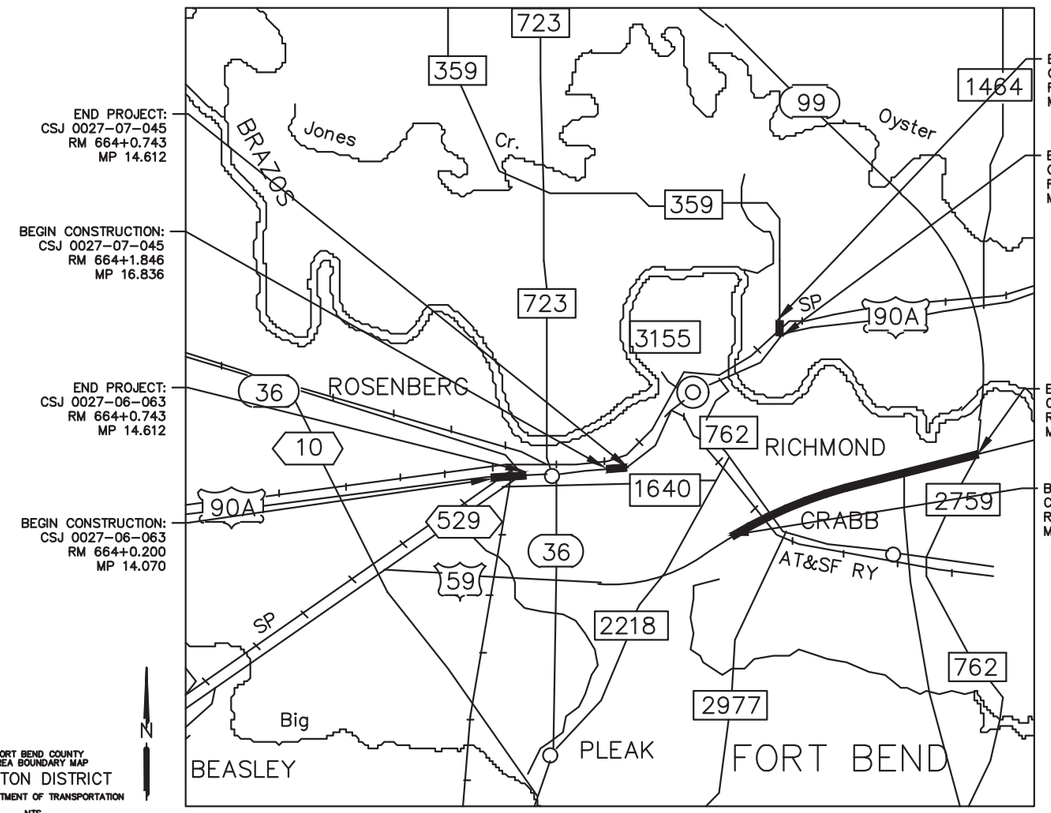
STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NUMBER: C 27–12–166, ETC
CSJ: 0027–12–166, ETC

COUNTY: FORT BEND
LIMITS: VARIOUS LOCATIONS, 500' WEST OF READING ROAD TO GREATWOOD PARKWAY

NET LENGTH OF PROJECT = 5.44 MILES
TYPE OF WORK: FOR THE CONSTRUCTION OF LANDSCAPE ENHANCEMENTS.
CONSISTING OF: LANDSCAPE DEVELOPMENT



FORT BEND COUNTY
AREA BOUNDARY MAP
HOUSTON DISTRICT
TEXAS DEPARTMENT OF TRANSPORTATION
NTS

CSJ	PROJECT NUMBER	HWY	LIMITS	LENGTH FT.	LENGTH MI.	ADT
0027-12-166	27-12-166	IH 69	0.094 MILES WEST OF READING RD TO GREATWOOD PARKWAY	24100	4.56	93095
0027-06-063	27-6-63	US 90A	0.037 MILES WEST OF RUDE ST TO FROST ST	2658	0.5	9190
0027-07-045	27-7-45	US 90A	AUSTIN STREET TO GEORGINA STREET	1024	0.19	16565
0543-02-079	543-2-79	FM 359	0.094 MILES NORTH OF BLAISDALE RD - 0.094 SOUTH OF BLAISDALE RD	1000	0.19	21091

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000–394)

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

SUBMITTED FOR LETTING 05, 31 2022
Mark C. Schlueter, P.E.
CONSULTANT DESIGN ENGINEER OR PROJECT MANAGER

TEXAS DEPARTMENT OF TRANSPORTATION

DocuSigned by: 6/9/2022
Vipinkumar Sumani, P.E.
199D0DCE0D5E40E...
PROJECT MANAGER

APPROVED 6/10/2022
DocuSigned by:
Larry W. Blackburn, P.E.
B9928A69E03E42F...
DIST. ENGINEER

COUNTY: FORTBEND PROJECT NO. C27–12–166
HWY NO: IH 69 LETTING DATE
DATE ACCEPTED: ___/___/___ ___/___/___

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DATE:

INDEX OF SHEETS

I. GENERAL

II. TRAFFIC CONTROL PLAN STANDARDS

III. MISC

IV. ENVIRONMENTAL ISSUES STANDARDS

The Standard sheets specifically identified above with a (*) have been selected by me, Mark C. Schluter, P.E.

STATE OF TEXAS
MARK C. SCHLUTER
53830
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MARK C. SCHLUTER, P.E. 53830 ON 05/31/2022. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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

INDEX OF SHEETS

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			002
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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General Notes:

General:

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

Carlos Zepeda, P.E., Fort Bend Area Engineer
Carlos.Zepeda@txdot.gov

Daniel Dvorak, P.E., Fort Bend Assistant Area Engineer
Daniel.Dvorak@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Contractor questions will be reviewed by the Area Engineer or Assistant Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Unless otherwise shown on the plans or otherwise directed, commence work after sunrise and ensure construction equipment is off the road by sunset.

Tolls incurred by the Contractor are incidental to the various bid items.

Procure permits and licenses, which are to be issued by the City, County, or Municipal Utility District.

GENERAL NOTES **Sheet 3**

County: FORT BEND **Control:** 0027-12-166, ETC.

Highway: IH 69

General: Site Management

Mow the grass and weeds within the project limits a maximum of 3 times a year as directed. This work is subsidiary to the various bid items.

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

General: Traffic Control and Construction

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Be aware that an operational Computerized Transportation Management System (CTMS) exists within the limits of this project and that the system must remain operational throughout construction. If the Contractor damages or causes damage to this system, repair such damage within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify the Director of Traffic Management Systems at 713-881-3283 within one hour of occurrence. Failure of the Contractor to repair damage to the main fiber optic cable and CCTV cable trunk lines, which convey all corridor information to TranStar, will result in the Contractor being billed for the full cost of emergency repairs.

At least 72 hours before starting work, make arrangements for locating existing Department-owned above ground and underground fiber optic, communications, power, illumination, and traffic signal cabling and conduit. Do this by calling the Department's Houston District Traffic Signal Operations Office at 713-802-5662, or by e-mailing the Department's Houston District

Traffic Signal Operations Office at HOU-LocateRequest@txdot.gov, to schedule marking of underground lines on the ground. Use caution if working in these areas to avoid damaging or interfering with existing facilities.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and Department's standard sheets.

Before beginning any underground work, notify the City of Houston's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

Item 7: Legal Relations and Responsibilities

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

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

Document and coordinate with the USACE, if required, before hauling any excavation from or hauling any embankment to a USACE permit area by either 1 or 2 below:

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.** Document both the Project Specific Locations (PSL) and their authorization. Maintain copies for review by the Department or any regulatory agency. When an

area within the project limits has been evaluated by the USACE as part of the permit process for this project:

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

2. **Contractor Materials from Areas Other than Previously Evaluated Areas.** Provide the Department with a copy of USACE coordination or approvals before initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
   a. The Item, "Embankment" used for temporary or permanent fill within a USACE permit area.
   b. Unsuitable excavation or excess excavation, "Waste" (under the Item, "Excavation"), that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is 1.06 acres. The disturbed area in this project, the project locations in the Contract, and Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer (to the appropriate MS4 operator when on an off-state system route) and to the local government that operates a separate storm drain system.

This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the Department's District Environmental Section for approval. Once the permit application is approved, the Department will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the Department's District Environmental Section.

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

The nesting / breeding season for migratory birds is February 15 through September 30.

Conduct any tree removal outside of the migratory bird nesting season. If this is not possible due to scheduling, then exercise caution to remove only those trees with no active nests. Do not destroy nests on structures or in trees within the project limits during the nesting / breeding season.

Take measures to prevent the building of nests on any structures or trees within the project limits throughout the duration of the construction if work / removal will be performed during the nesting / breeding season. This can be accomplished by application of bird repellent gel, netting by hand every 3 to 4 days, or any other non-threatening method approved by the Houston District Environmental Section. Obtain this approval well in advance of the planned use. Contact the Houston District Environmental Section at 713-802-5244. The cost of this work is subsidiary to the various bid items.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

Working days will be computed and charged based on a standard workweek in accordance with Section 8.3.1.4.

The Lane Closure Assessment Fee is $1000.00. This fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, “Barricades, Signs, and Traffic Handling.” The time increment for the Lane Closure Assessment fee for this project is one hour.

Item 161: Compost
Item 162: Sodding for Erosion Control
Item 164: Seeding for Erosion Control
Item 166: Fertilizer
Item 168: Vegetative Watering

Refer to the “Fertilizer, Seed, Sod, Straw, Compost, and Water” plan sheet for material specifications, application rates, and for watering requirements.

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Area Engineer and the Project Manager. Ensure this plan conforms to the latest “Texas Manual on Uniform Traffic Control Devices” and the latest Barricade and Construction (BC) Standard Sheets.

Submit changes to the traffic control plan to the Area Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest “Texas Manual on Uniform Traffic Control Devices” for typical construction layouts.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, “Barricades, Signs, and Traffic Handling.”

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Do not reduce the existing number of lanes open to traffic except as shown on the following time schedule:

One Lane Closure

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	9:00 AM – 3:00 PM	Not Permitted	5:00 AM – 9:00 PM 3:00 PM – 7:00 PM
Tuesday	9:00 AM – 3:00 PM	Not Permitted	5:00 AM – 9:00 PM 3:00 PM – 7:00 PM
Wednesday	9:00 AM – 3:00 PM	Not Permitted	5:00 AM – 9:00 PM 3:00 PM – 7:00 PM
Thursday	9:00 AM – 3:00 PM	Not Permitted	5:00 AM – 9:00 PM 3:00 PM – 7:00 PM
Friday	9:00 AM – 3:00 PM	Not Permitted	5:00 AM – 9:00 PM 3:00 PM – 7:00 PM
Saturday	*	Not Permitted	N/A
Sunday	*	Not Permitted	N/A

*As approved by Engineer

The above times are approved for the traffic control conditions listed. The Area Engineer may approve other closure times if traffic counts warrant. The Area Engineer may reduce the above times for special events.

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer. Before payment will be made, complete the "Daily Report on Law Enforcement Force Account Work" (Form 318), provided by the Department and submit daily invoices that agree with this form for any day during the month in which approved services were provided.

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

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

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

The use of hay bales is not permitted as Storm Water Pollution Prevention Plan (SWP3) measures.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is approximately one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

Use appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. Remove and dispose of materials in compliance with State and Federal laws.

Before starting construction, review with the Engineer the SWP3 used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SWP3.

Schedule the seeding or sodding work as soon as possible. The project schedule provides for a vegetation management plan.

Implement temporary and permanent erosion control measures to comply with the National Pollution Discharge Elimination System (NPDES) general permit under the Clean Water Act.

Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

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

A shadow vehicle with Truck Mounted Attenuators (TMAs) or Trailer Attenuators (TAs) is required as shown on the appropriate Traffic Control Plan (TCP) sheets. TMAs/TAs must meet the requirements of the Compliant Work Zone Traffic Control Device List.

Level 3 Compliant TMAs/TAs are required for this project.

A total of one (1) shadow vehicle with a TMA/TA is required for the work with the exception of Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

A total of three (3) shadow vehicles with a TMA/TA are required for Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0027-12-166 **DISTRICT** Houston **COUNTY** Fort Bend
HIGHWAY FM 359, IH 69, UA 90

													TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0027-06-063**		**0027-07-045**		**0027-12-166**		**0543-02-079**				
		PROJECT ID		**A00178402**		**A00178408**		**A00178333**		**A00178414**				
		COUNTY		**Fort Bend**		**Fort Bend**		**Fort Bend**		**Fort Bend**				
		HIGHWAY		**UA 90**		**UA 90**		**IH 69**		**FM 359**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	160-6005	FURNISHING AND PLACING TOPSOIL	CY					248.000		36.000			284.000	
	161-6009	EROSION CONTROL COMPOST	CY	75.300		33.400		900.000		27.600			1,036.300	
	161-6012	GENERAL USE COMPOST	CY	37.650		16.700		450.000		13.800			518.150	
	162-6002	BLOCK SODDING	SY					2,263.000		94.000			2,357.000	
	166-6001	FERTILIZER	AC					0.050		0.020			0.070	
	168-6001	VEGETATIVE WATERING	MG					56.500		2.500			59.000	
	170-6003	IRRIGATION SYSTEM (TY II)	LS			0.750		0.250					1.000	
	192-6024	PLANT MATERIAL (30 GAL) (TREE)	EA	20.000		24.000		448.000		54.000			546.000	
	192-6025	PLANT MATERIAL (45 GAL) (TREE)	EA					15.000					15.000	
	192-6026	PLANT MATERIAL (65 GAL) (TREE)	EA	149.000		51.000		232.000		8.000			440.000	
	192-6030	PLANT MATERIAL (3 GAL) (SHRUB)	EA					5,803.000					5,803.000	
	192-6032	PLANT MATERIAL (10 GAL) (SHRUB)	EA					46.000					46.000	
	192-6065	PLANT BED PREP (TYPE III)	SY	676.000		300.000		8,086.000		248.000			9,310.000	
	193-6002	PLANT MAINTENANCE	CYC					17.000					17.000	
	193-6007	IRRIGATION SYSTEM OPER AND MAINT	MO					18.000					18.000	
	432-6003	RIPRAP (CONC)(6 IN)	CY					29.650		7.500			37.150	
	500-6001	MOBILIZATION	LS					1.000					1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO					6.000					6.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	200.000		200.000		400.000		50.000			850.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	200.000		200.000		400.000		50.000			850.000	
	1005-6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	CY					18.250					18.250	
	1006-6001	LANDSCAPE SOIL AMENDMENT (TYPE I)	SY	676.000		300.000		8,086.000		248.000			9,310.000	
	1006-6002	LANDSCAPE SOIL AMENDMENT (TYPE II)	SY	676.000		300.000		8,086.000		248.000			9,310.000	
	1006-6003	LANDSCAPE SOIL AMENDMENT (TYPE III)	SY	169.000		75.000		695.000		62.000			1,001.000	
	1006-6004	LANDSCAPE SOIL AMENDMENT (TYPE IV)	SY	507.000		225.000		2,085.000		186.000			3,003.000	
	1006-6005	LANDSCAPE SOIL AMENDMENT (TYPE V)	SY	169.000		75.000		6,544.000		62.000			6,850.000	
	1022-6003	LANDSCAPE TREATMENT(TY 3)	EA					1.000					1.000	
	6185-6002	TMA (STATIONARY)	DAY					10.000					10.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY					50.000					50.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS					1.000					1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS					1.000					1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS					1.000					1.000	

SUMMARY OF ITEMS

	ITEM 160	ITEM 161		ITEM 162	ITEM 166	ITEM 168	ITEM 170	ITEM 192					
	6005	6009	6012	6002	6001	6001	6003	6024	6025	6026	6030	6032	6065
	FURNISHING AND PLACING TOPSOIL	EROSION CONTROL COMPOST	GENERAL USE COMPOST	BLOCK SODDING	FERTILIZER	VEGETATIVE WATERING	IRRIGATION SYSTEM (TY II)	PLANT MATERIAL (30 GAL) (TREE)	PLANT MATERIAL (45 GAL) (TREE)	PLANT MATERIAL (65 GAL) (TREE)	PLANT MATERIAL (3 GAL) (SHRUB)	PLANT MATERIAL (10 GAL) (SHRUB)	PLANT BED PREP (TYPE III)
LOCATION	CY	CY	CY	SY	AC	MG	LS	EA	EA	EA	EA	EA	SY
0027-06-063 (90A)	0	75.3	37.65	0	0	0	0	20	0	149	0	0	676
0027-07-045 (90A)	0	33.4	16.7	0	0	0	0.75	24	0	51	0	0	300
0027-12-166 (IH69)	248	900	450	2263	0.05	56.5	0.25	448	15	232	5803	46	8086
0543-02-079 (FM 359)	36	27.6	13.8	94	0.02	2.5	0	54	0	8	0	0	248
TOTAL	**284**	**1036.3**	**518.15**	**2357**	**0.07**	**59**	**1**	**546**	**15**	**440**	**5803**	**46**	**9310**

SUMMARY OF ITEMS

	ITEM 193		ITEM 432	ITEM 500	ITEM 502	ITEM 506		ITEM 1005	ITEM 1006				
	6002	6007	6003	6001	6001	6040	6043	6001	6001	6002	6003	6004	6005
	PLANT MAINTENANCE	IRRIGATION SYSTEM OPER AND MAINT	RIPRAP (CONC)(6IN)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	BIODEG EROSN CONT LOGS (INSTL)(8")	BIODEG EROSN CONT LOGS (REMOVE)(8")	LOOSE AGGR FOR GROUNDCOVER (TY 1)	LANDSCAPE SOIL AMENDMENT (TYPE I)	LANDSCAPE SOIL AMENDMENT (TYPE II)	LANDSCAPE SOIL AMENDMENT (TYPE III)	LANDSCAPE SOIL AMENDMENT (TYPE IV)	LANDSCAPE SOIL AMENDMENT (TYPE V)
LOCATION	CYC	MO	CY	LS	MO	LF	LF	CY	SY	SY	SY	SY	SY
0027-06-063 (90A)	17	18	0	1	6	200	200	0	676	676	169	507	169
0027-07-045 (90A)			0			200	200	0	300	300	75	225	75
0027-12-166 (IH69)			29.65			400	400	18.25	8086	8086	695	2085	6544
0543-02-079 (FM 359)			7.5			50	50	0	248	248	62	186	62
TOTAL	**17**	**18**	**37.15**	**1**	**6**	**850**	**850**	**18.25**	**9310**	**9310**	**1001**	**3003**	**6850**
											NOTE 1	**NOTE 1**	

SUMMARY OF ITEMS

	ITEM 1022	ITEM 6185	
	6003	6002	6005
	LANDSCAPE TREATMENT (TY 3)	TMA (STATIONARY)	TMA (MOBILE OPERATION)
LOCATION	EA	DAY	DAY
0027-06-063 (90A)	1	10	50
0027-07-045 (90A)			
0027-12-166 (IH69)			
0543-02-079 (FM 359)			
TOTAL	**1**	**10**	**50**

NOTE:

1. QUANTITY INCLUDES MULTIPLE APPLICATIONS (SEE PLANTING AND ESTABLISHMENT SHEETS)

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

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			005
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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BEGINNING OF PROJECT:

- INSTALL CONSTRUCTION BARRICADES AND PROJECT SIGNS AS PER BARRICADE AND CONSTRUCTION STANDARDS IN PLANS
- INSTALL SWP3 DEVICES AS NEEDED

ALL PHASES:

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

END OF PROJECT:

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

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MARK C. SCHLUTER, P.E. 53830 ON 05/31/2021. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

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TRAFFIC CONTROL PLAN PHASING NARRATIVE

2020 Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			006
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,etc	IH 69

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

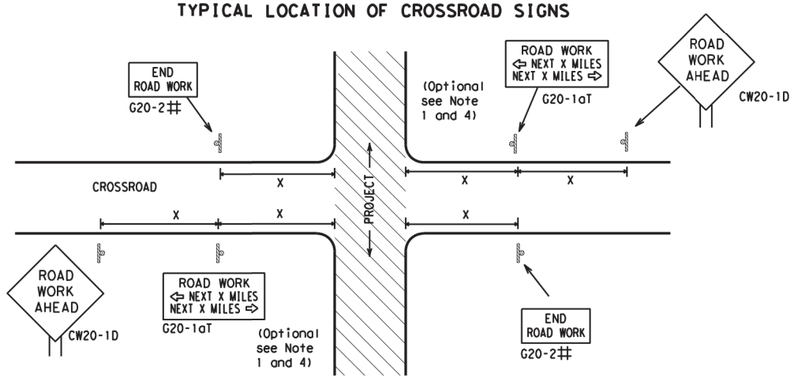
Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0027	12	166,etc	IH 69
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		007

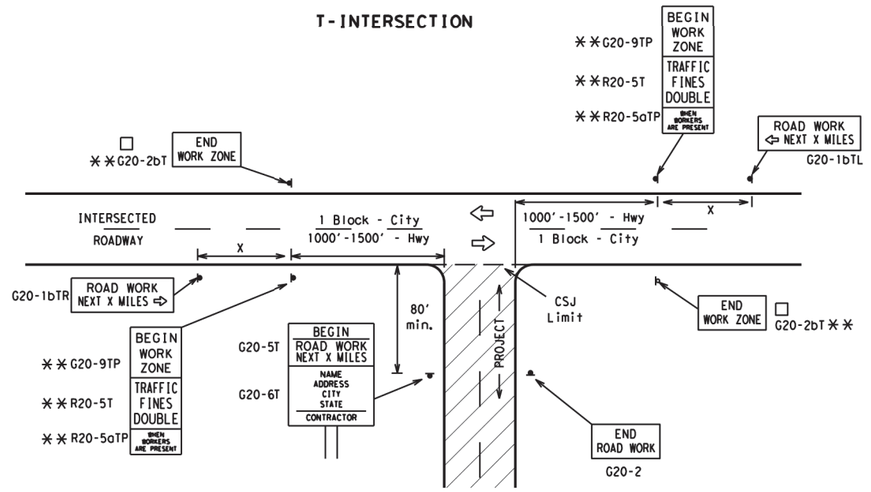
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

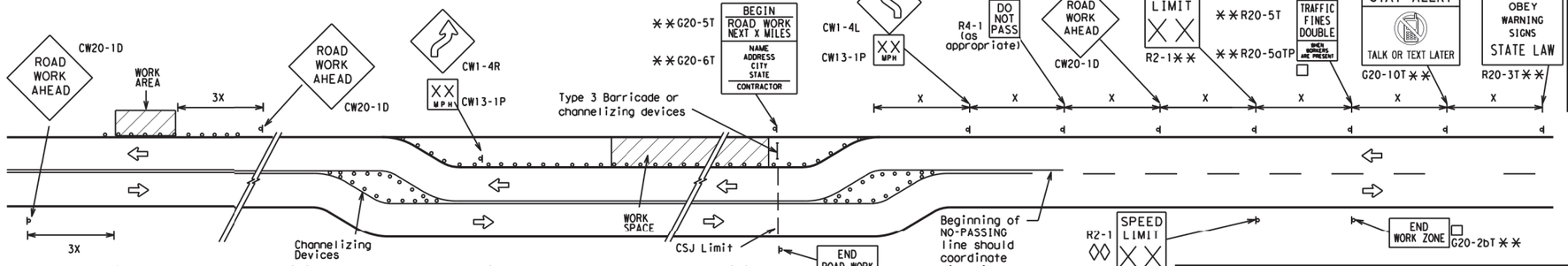
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

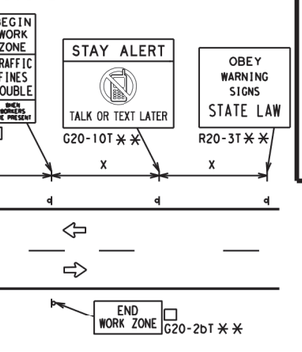
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

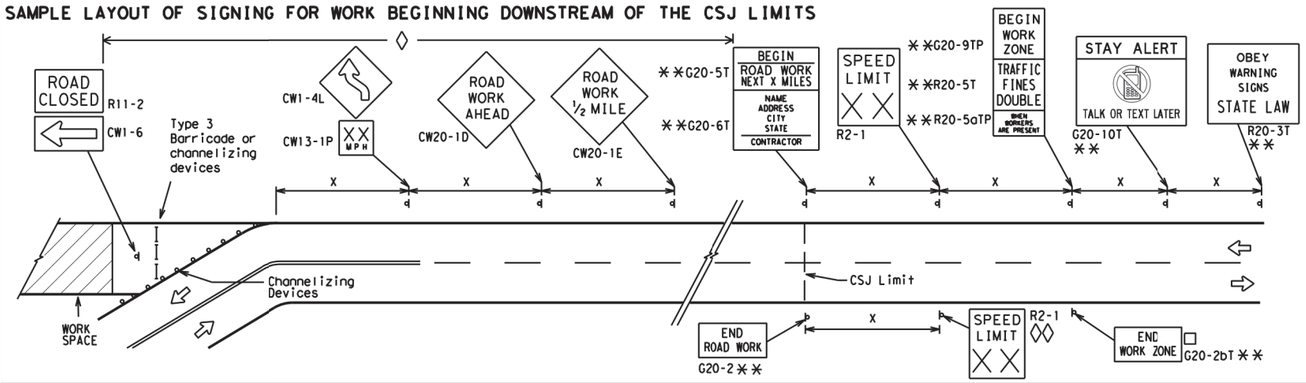


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

LEGEND

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

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
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REVISIONS	0027	12	166,etc	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		008

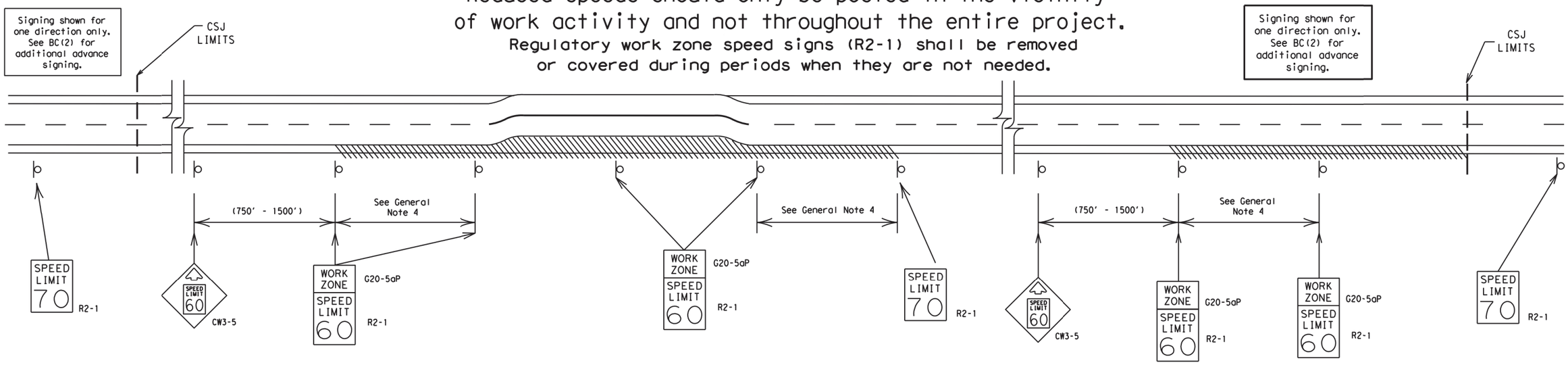
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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REVISIONS	0027	12	166,etc	IH 69
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7-13 5-21	HOU	FORT BEND		009

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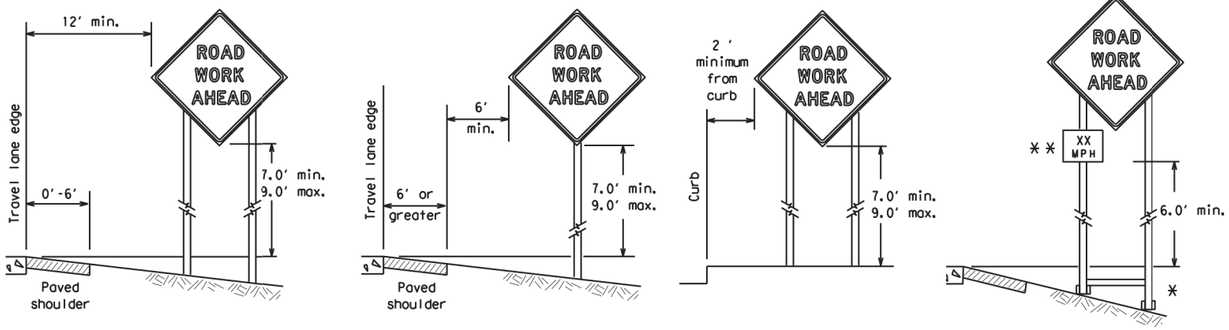
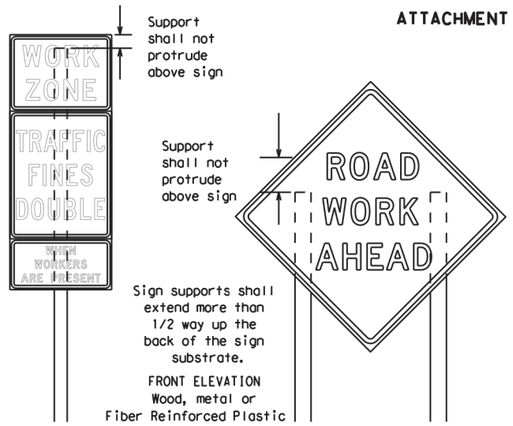
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

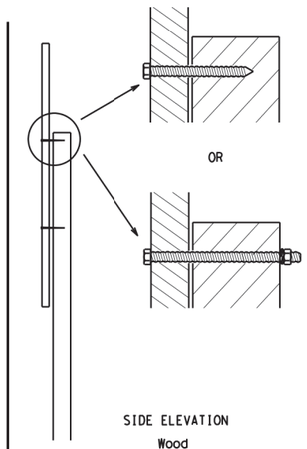


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





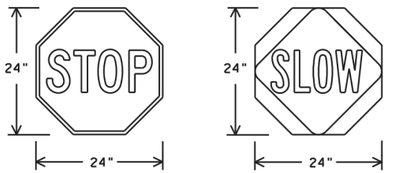
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	002712		166,etc	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
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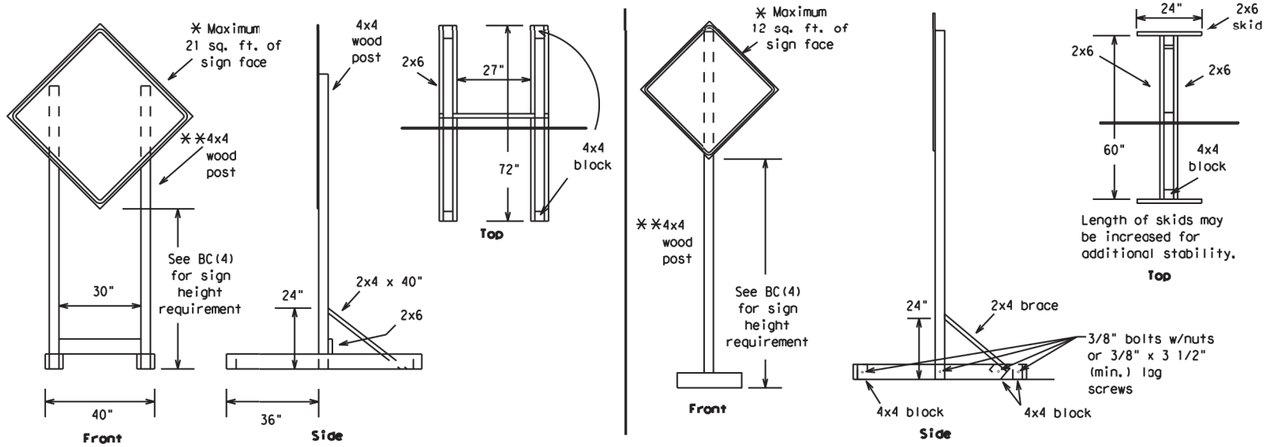
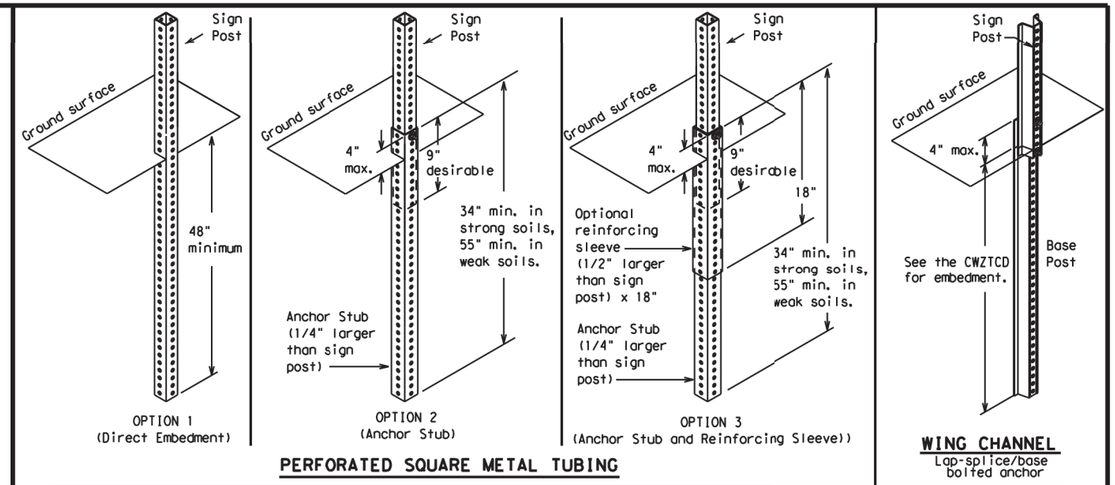


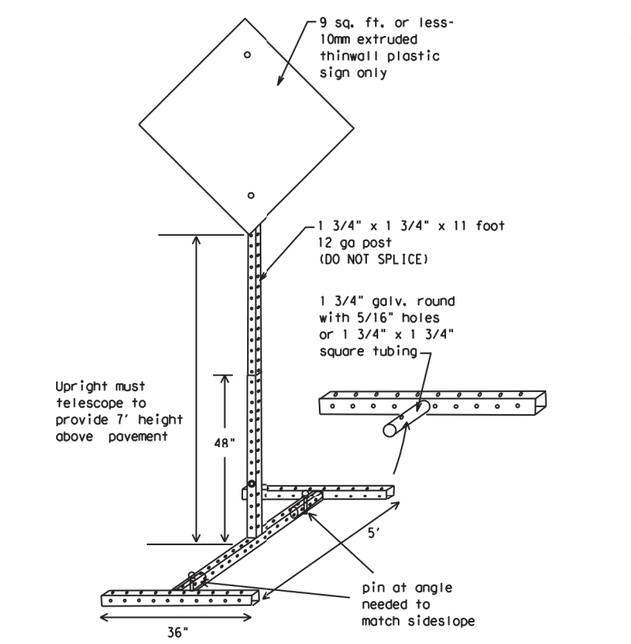
SKID MOUNTED WOOD SIGN SUPPORTS

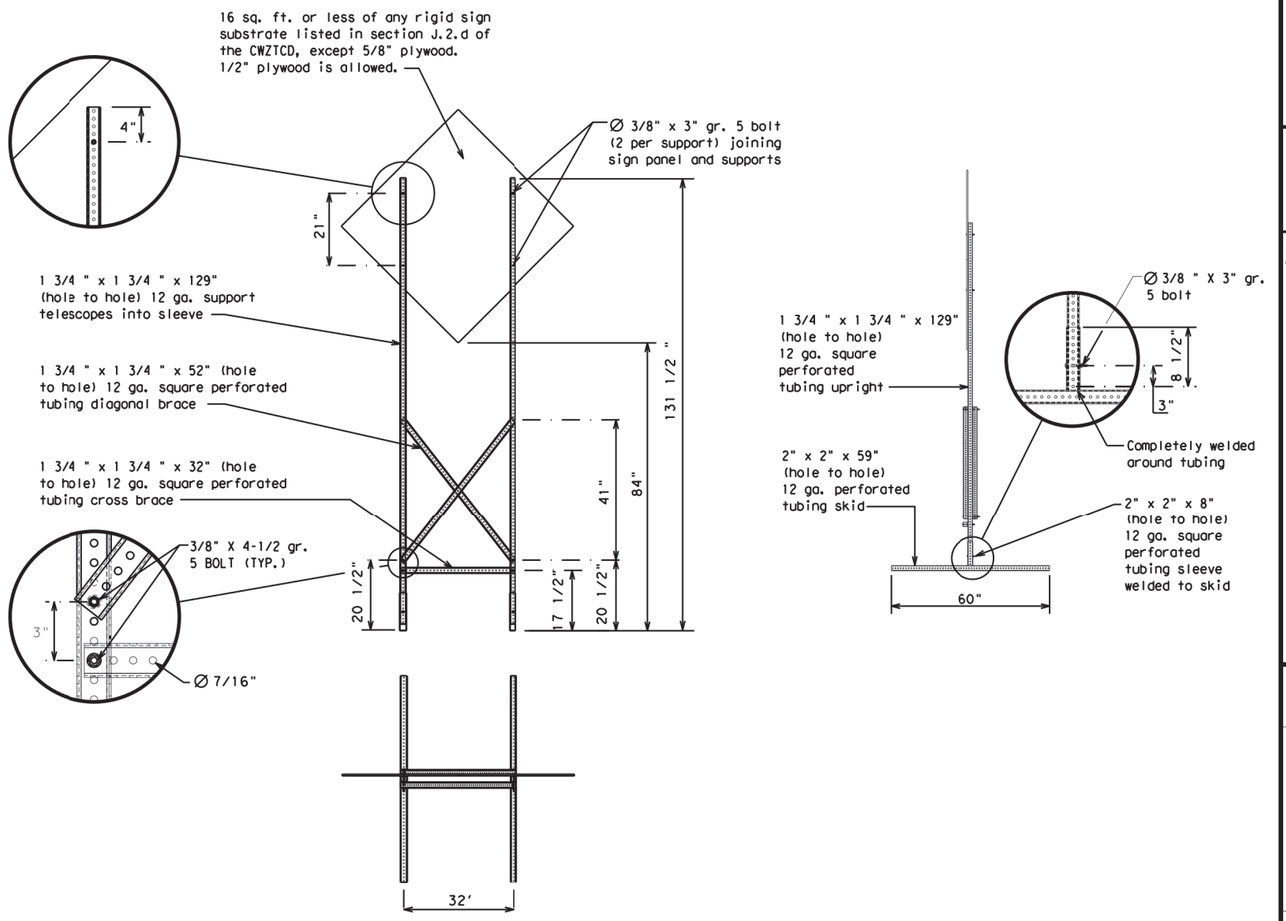
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
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DATE:
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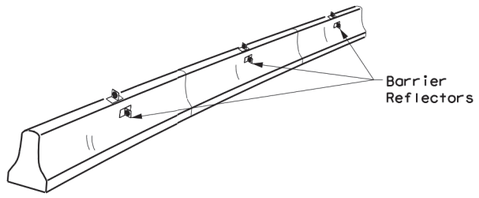
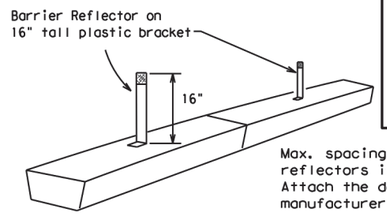
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



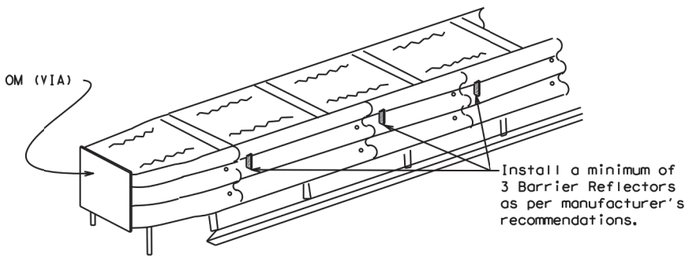
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

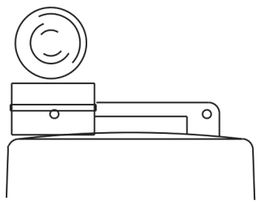
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

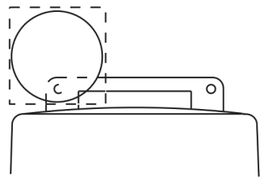
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this 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.



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

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.



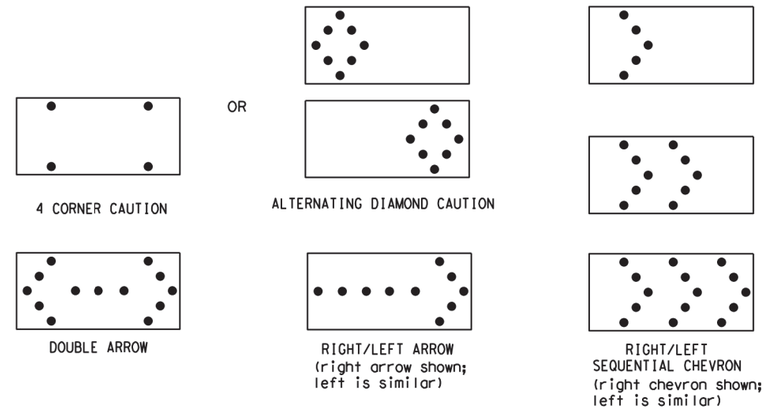
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	002	712	166,etc	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

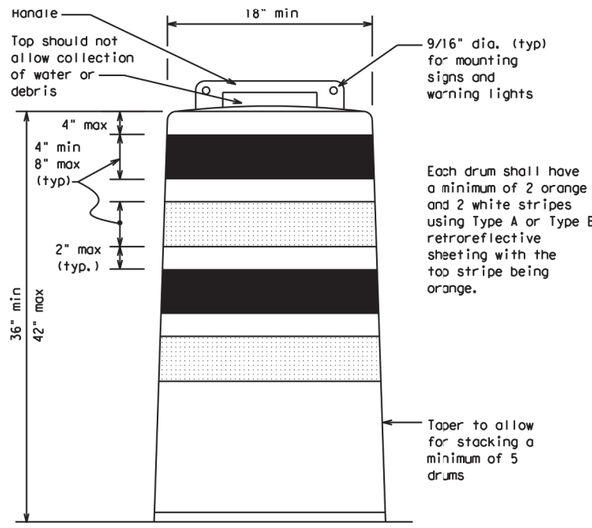
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

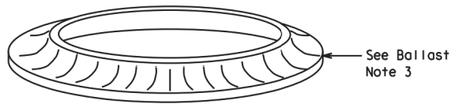
RETROREFLECTIVE SHEETING

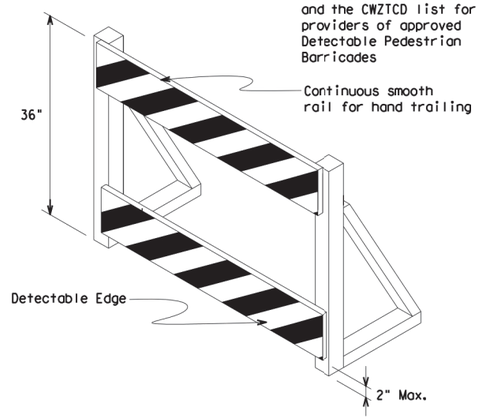
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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



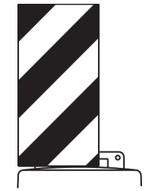




DETECTABLE PEDESTRIAN BARRICADES

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 instelled 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 ecch location called for in the plans.
8. R9-9, R9-10, R9-11 cnd R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	002712		166,etc	IH 69
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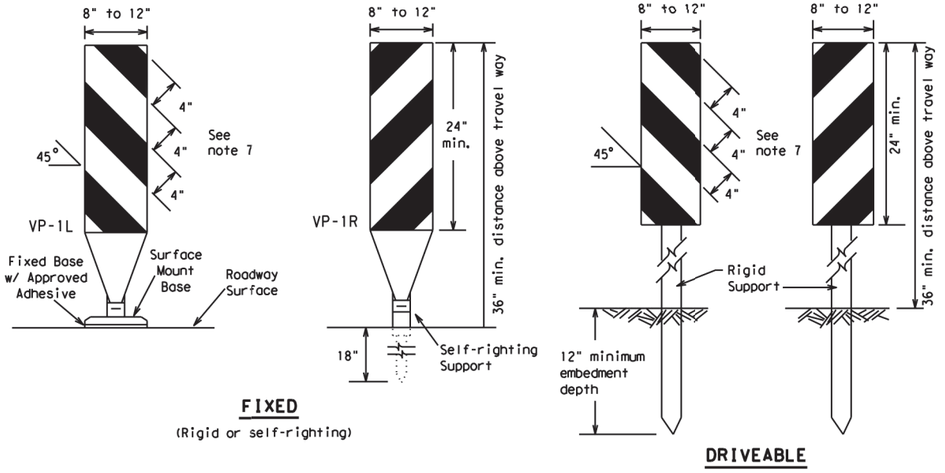
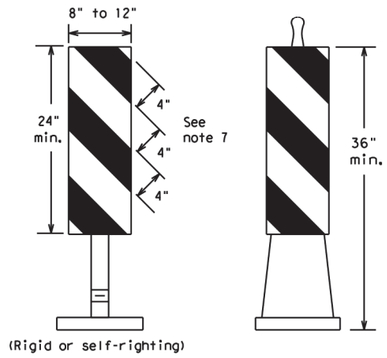


FIXED
(Rigid or self-righting)

DRIVEABLE

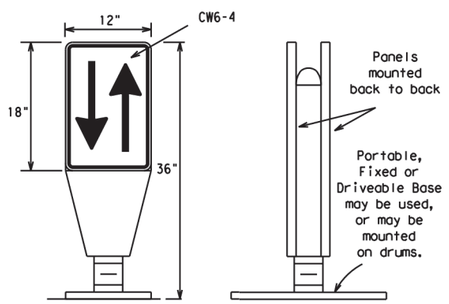


(Rigid or self-righting)

PORTABLE

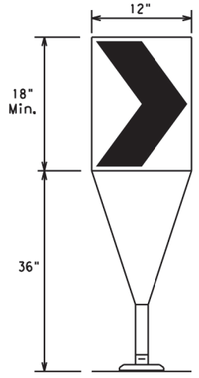
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



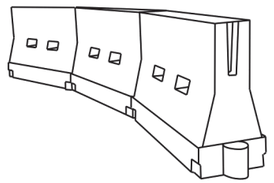
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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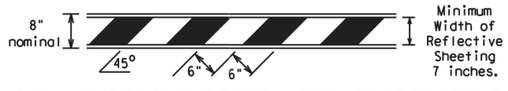
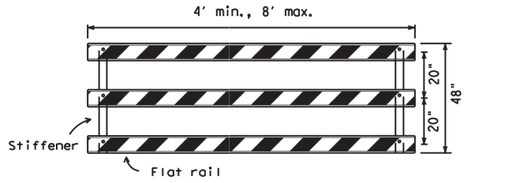
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



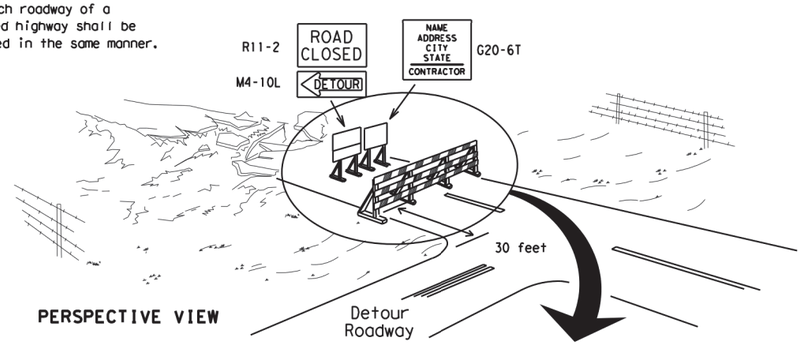
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

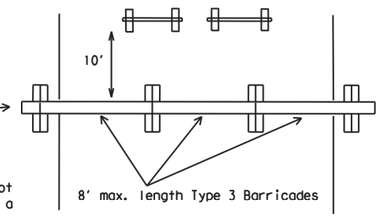
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

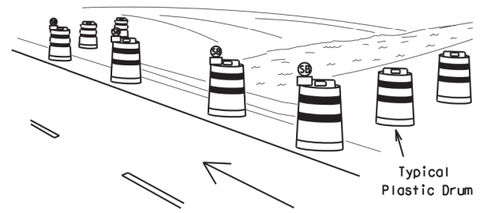
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

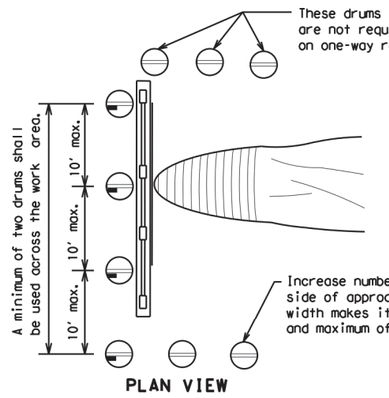
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

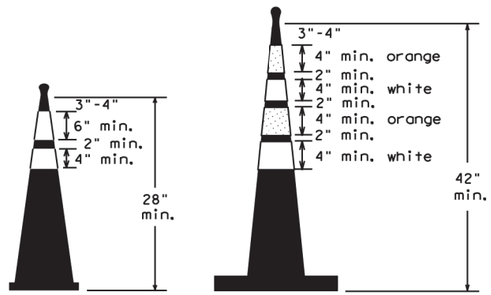
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



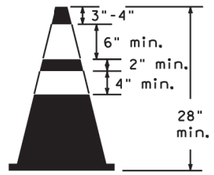
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

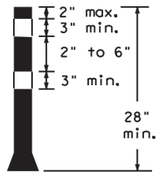
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

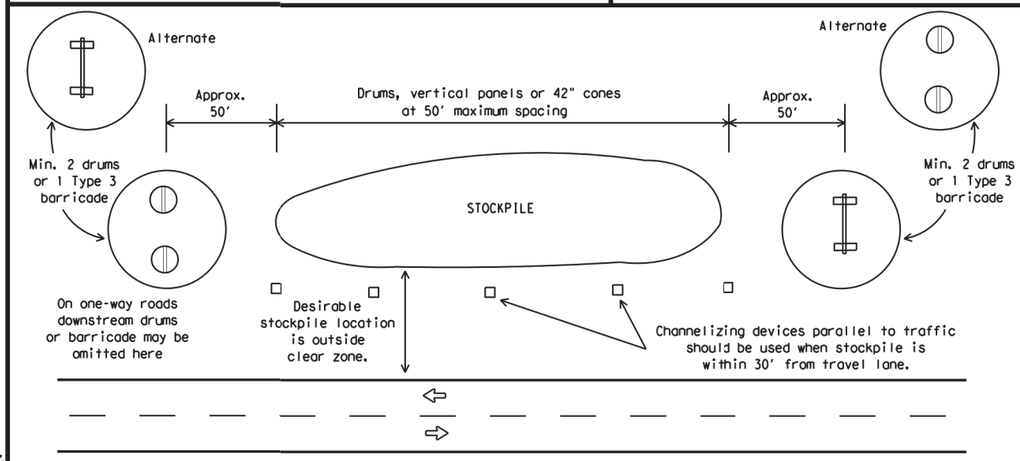


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		016

DATE:
FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

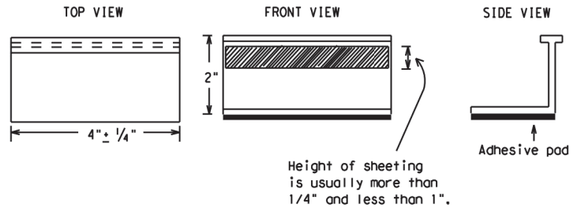
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

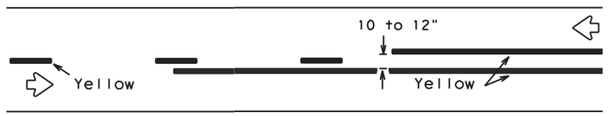
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

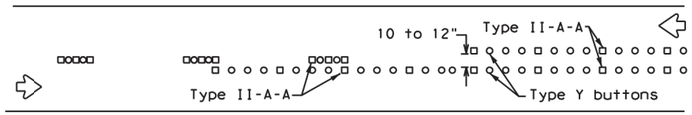
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	002712		166,etc	IH 69
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	HOU	FORT BEND		017
11-02 8-14				

DATE:
FILE:

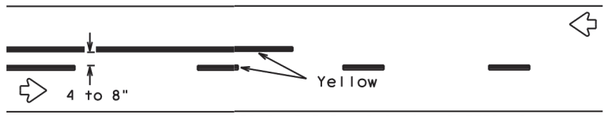
PAVEMENT MARKING PATTERNS



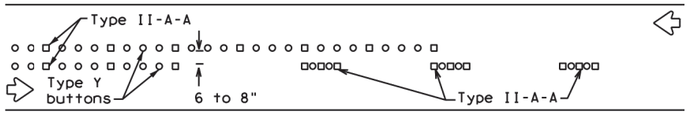
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



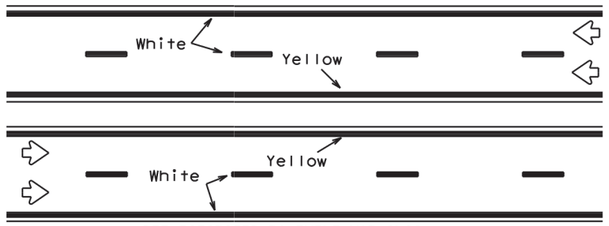
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



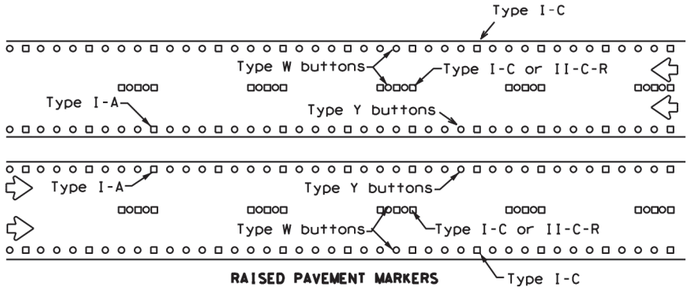
RAISED PAVEMENT MARKERS - PATTERN B

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



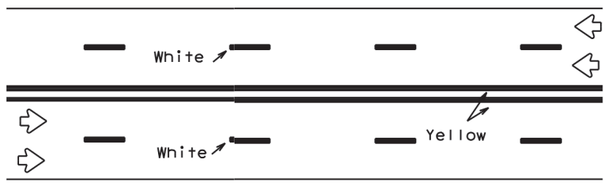
REFLECTORIZED PAVEMENT MARKINGS



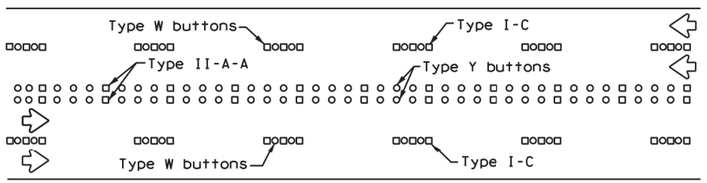
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



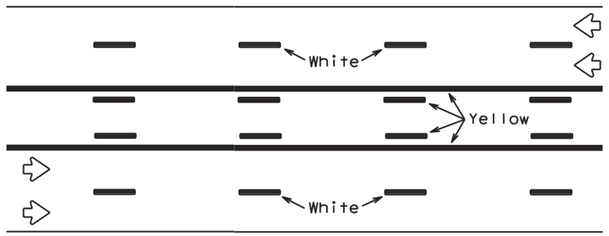
REFLECTORIZED PAVEMENT MARKINGS



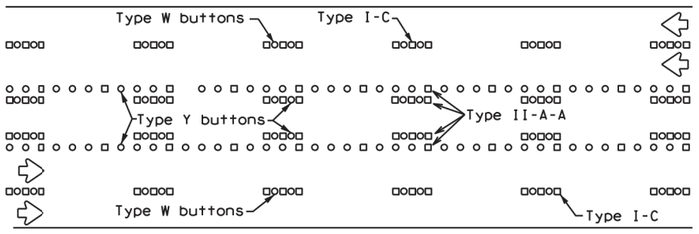
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

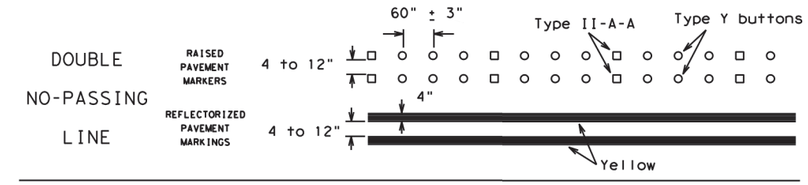
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

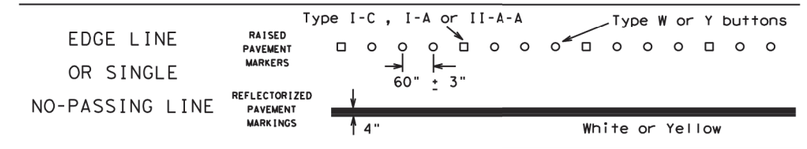
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

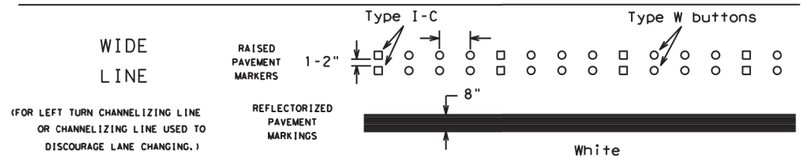


EDGE LINE OR SINGLE NO-PASSING LINE



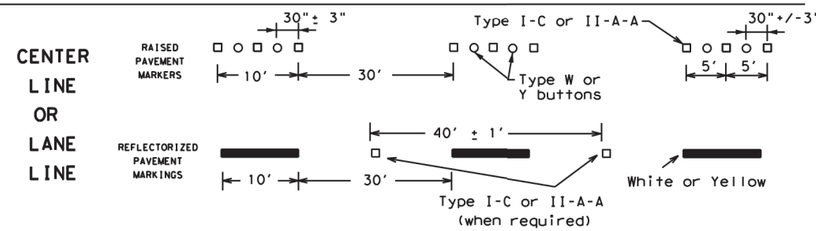
WIDE LINE

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

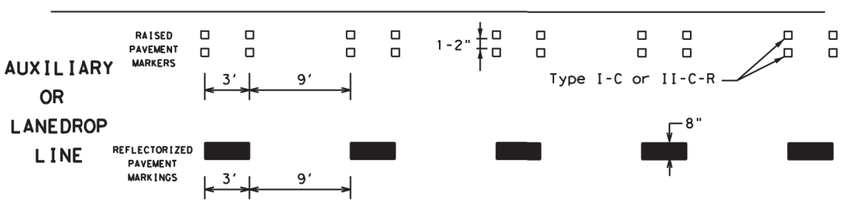


BROKEN LINES

CENTER LINE OR LANE LINE

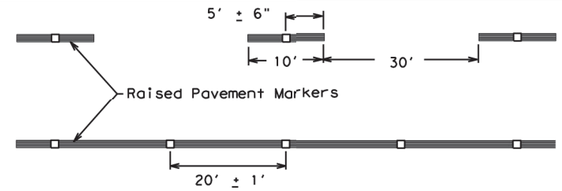


AUXILIARY OR LANEDROP LINE



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	002712	166,etc		IH 69
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		018

DATE:
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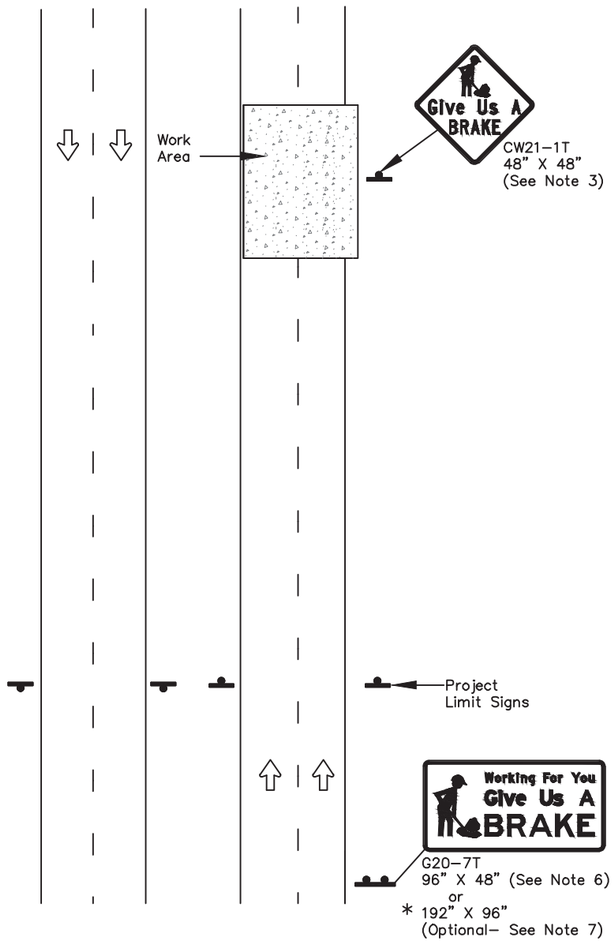
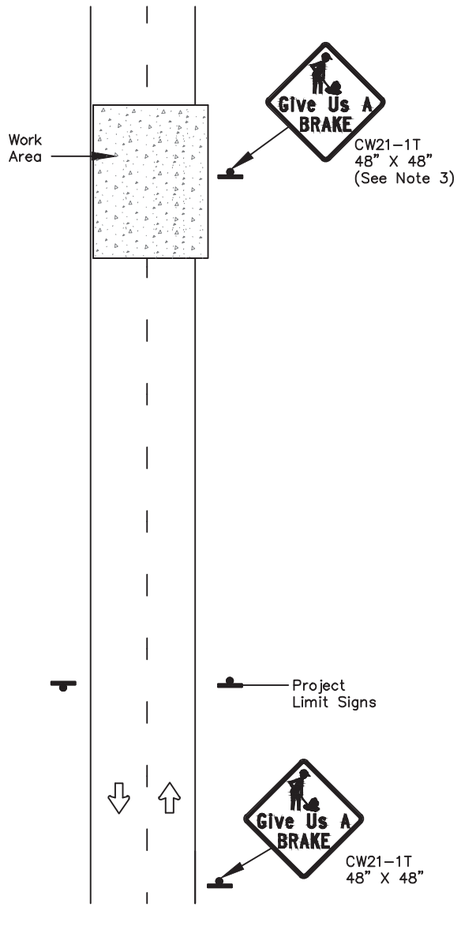


DIVIDED HIGHWAY



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.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20–7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20–7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	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

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	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
6–96 5–98 7–13	DIST	COUNTY		SHEET NO.
8–96 3–03	HOU	FORT BEND		019

116

DATE:
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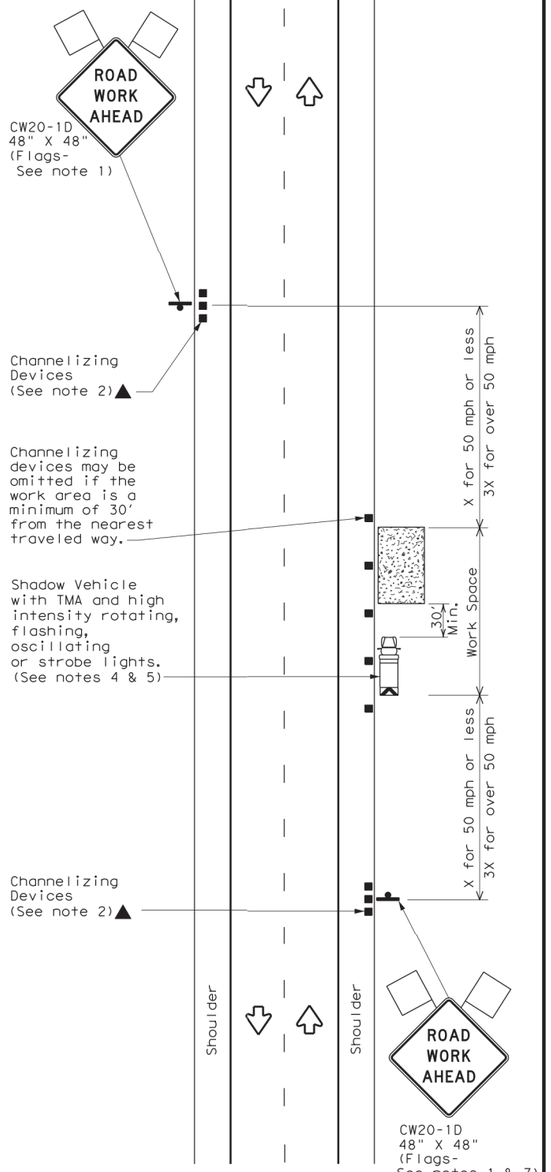
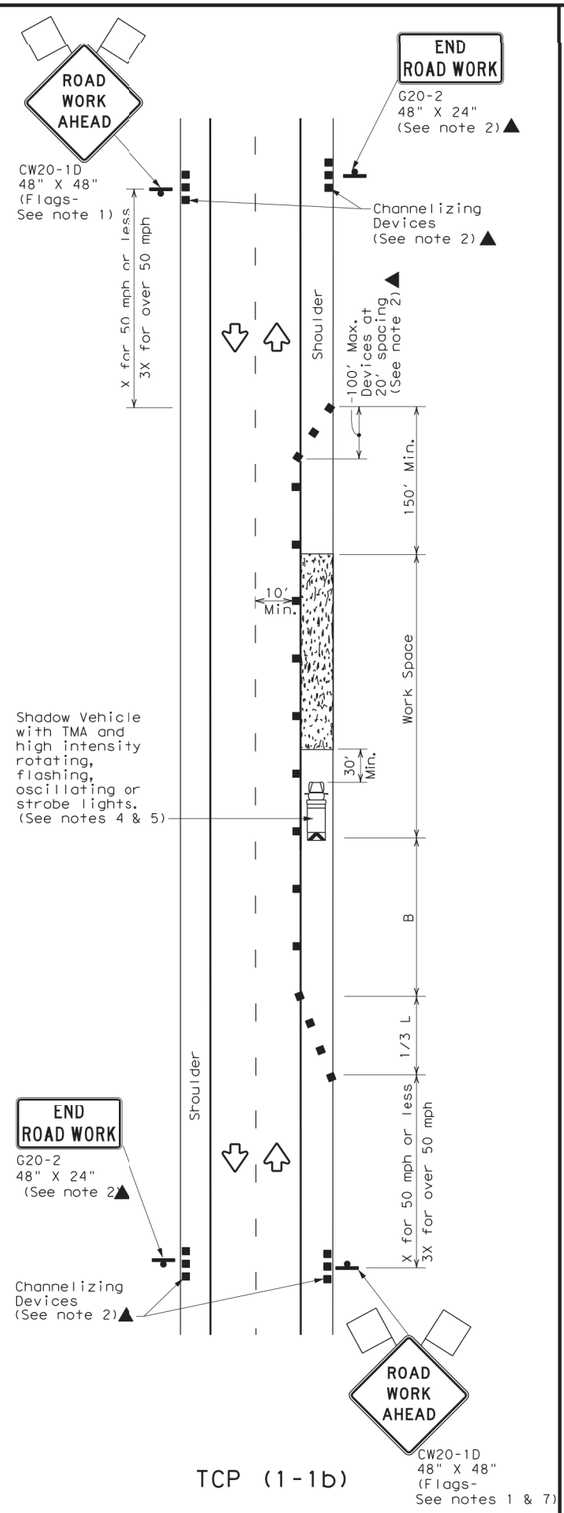


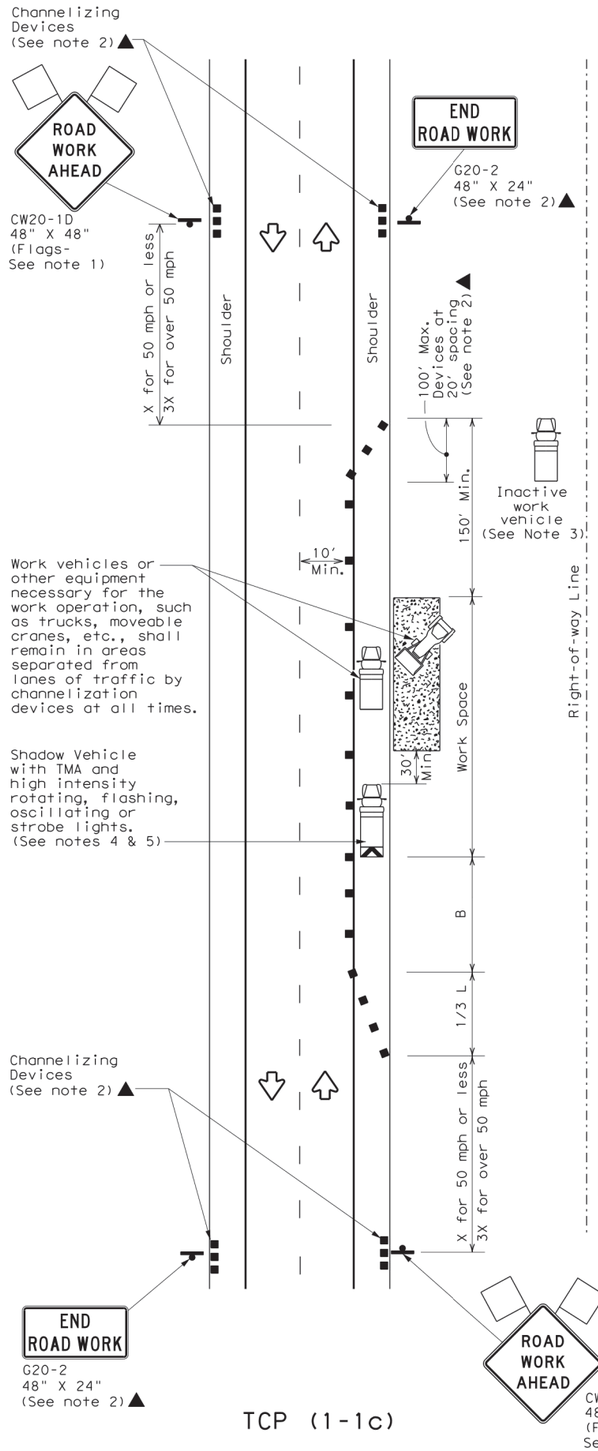
TCP (1-1a)

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

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

X 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.cgn	DN:	CK:	DW:	CK:
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REVISIONS	0027	12	166,etc	IH 69
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	FORT BEND		020
1-97 2-18				

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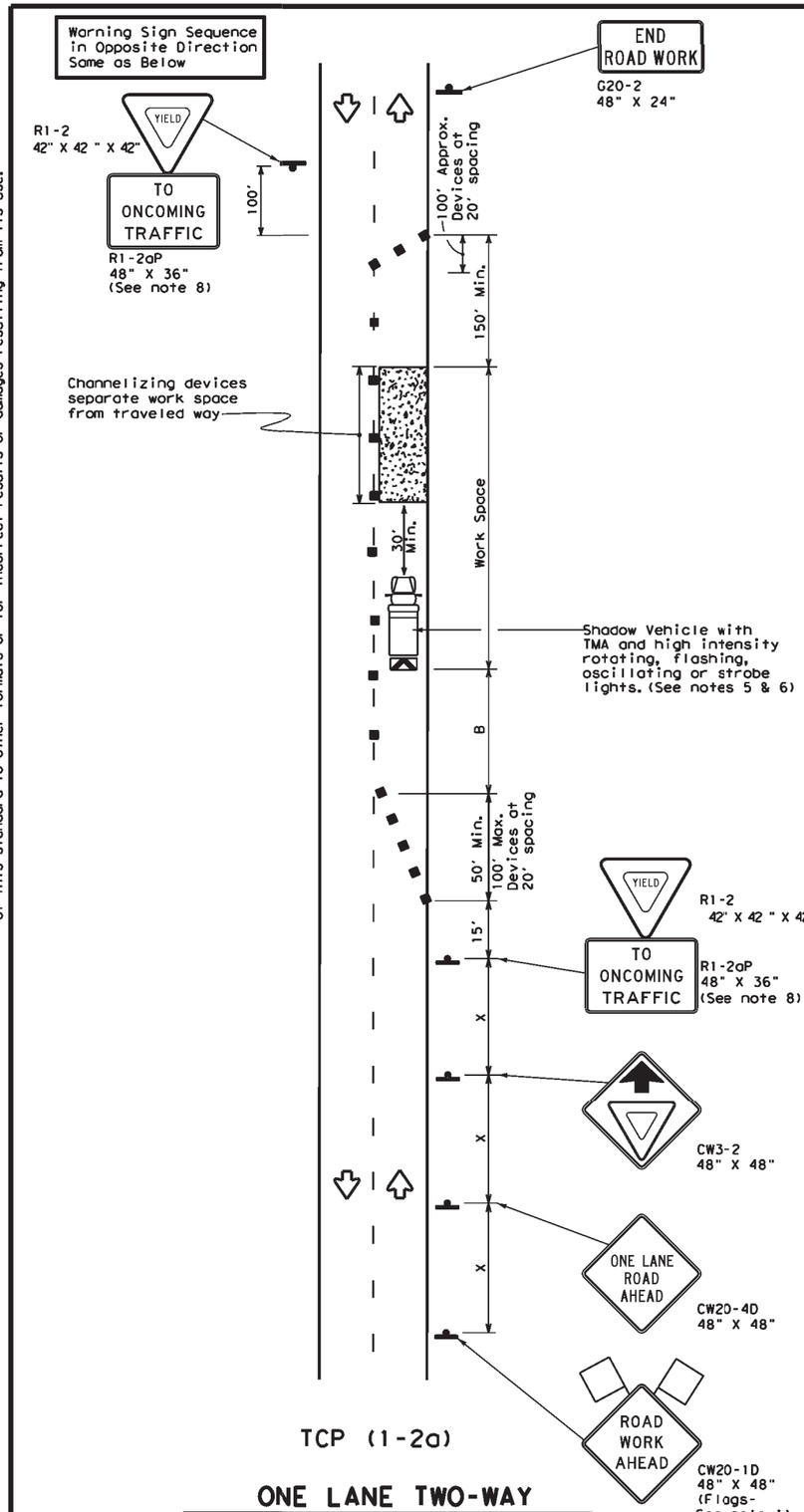
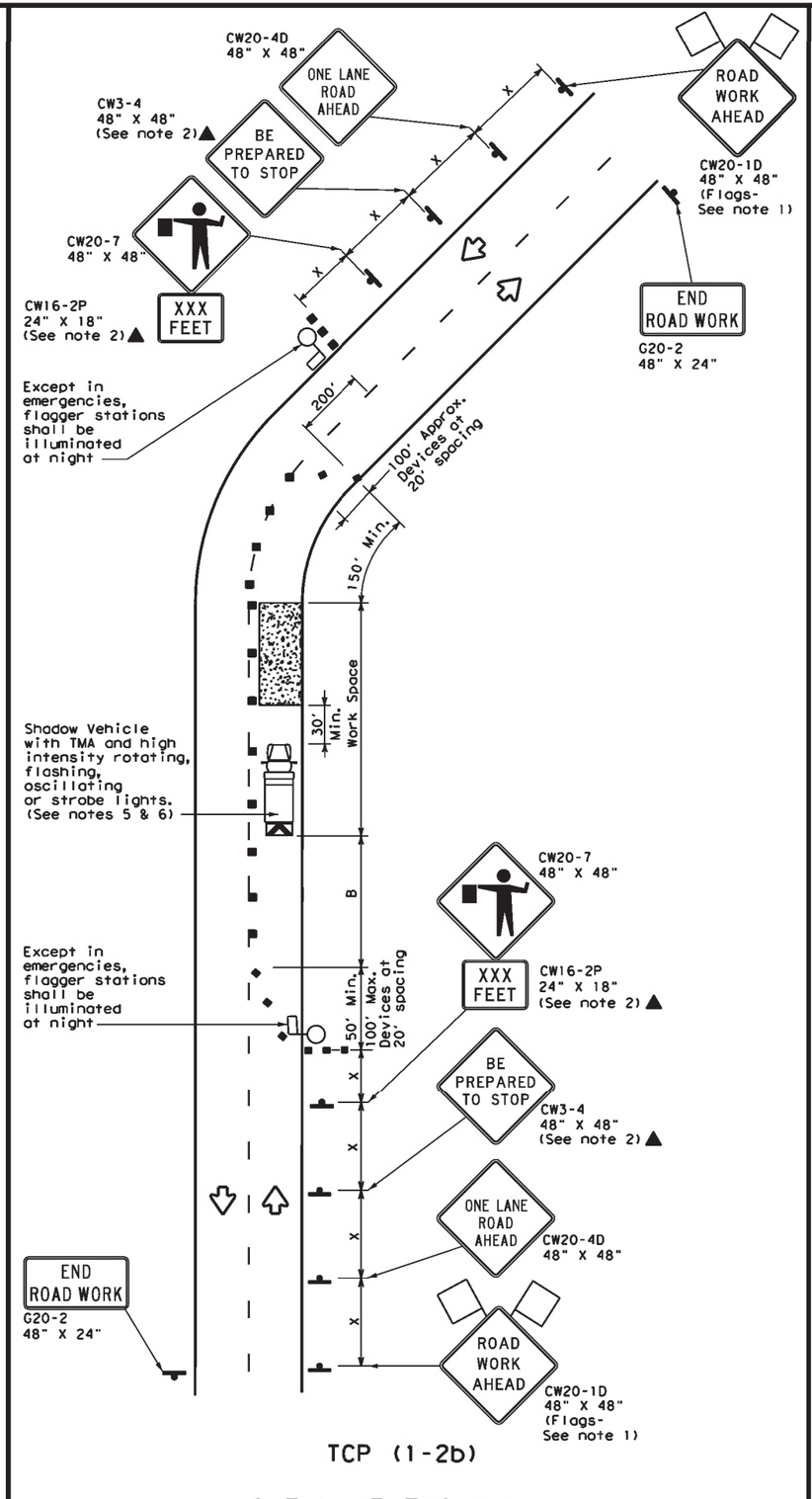


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

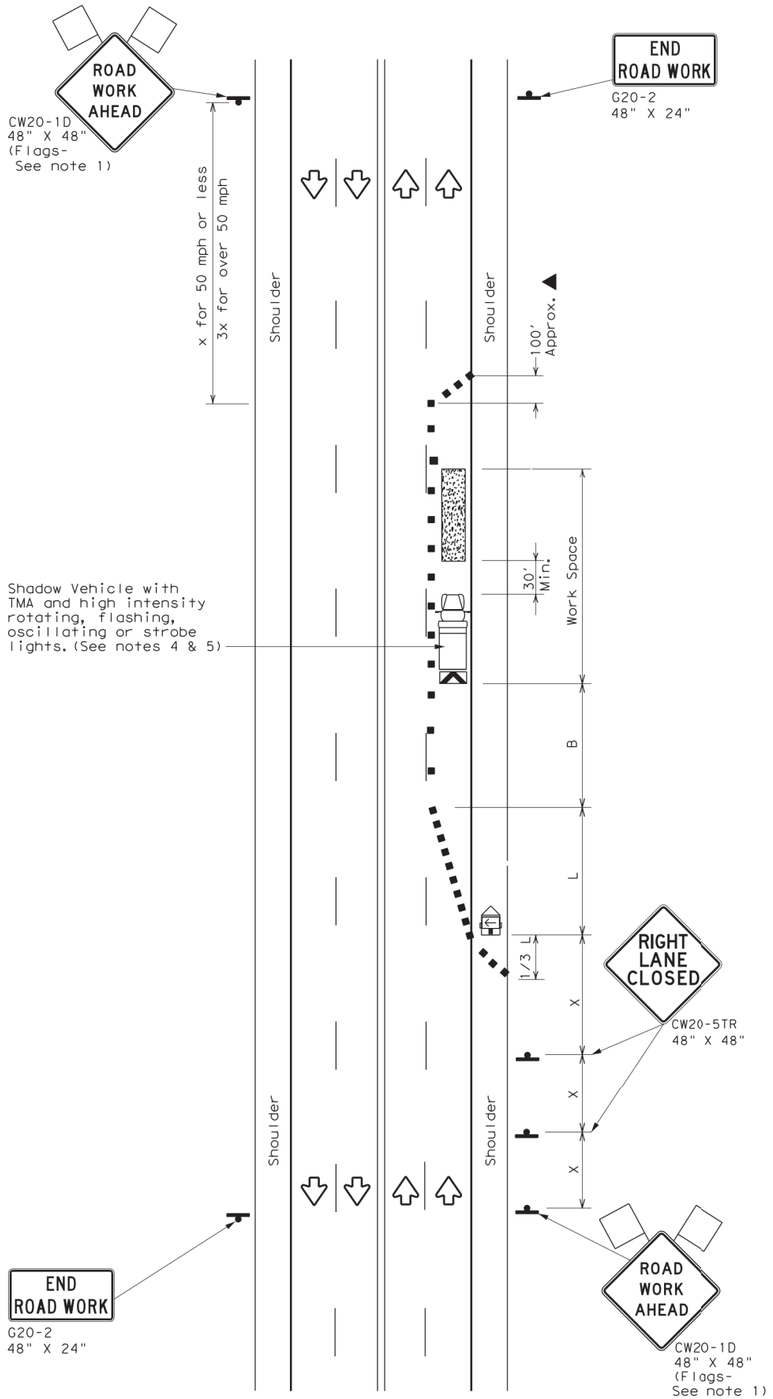
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

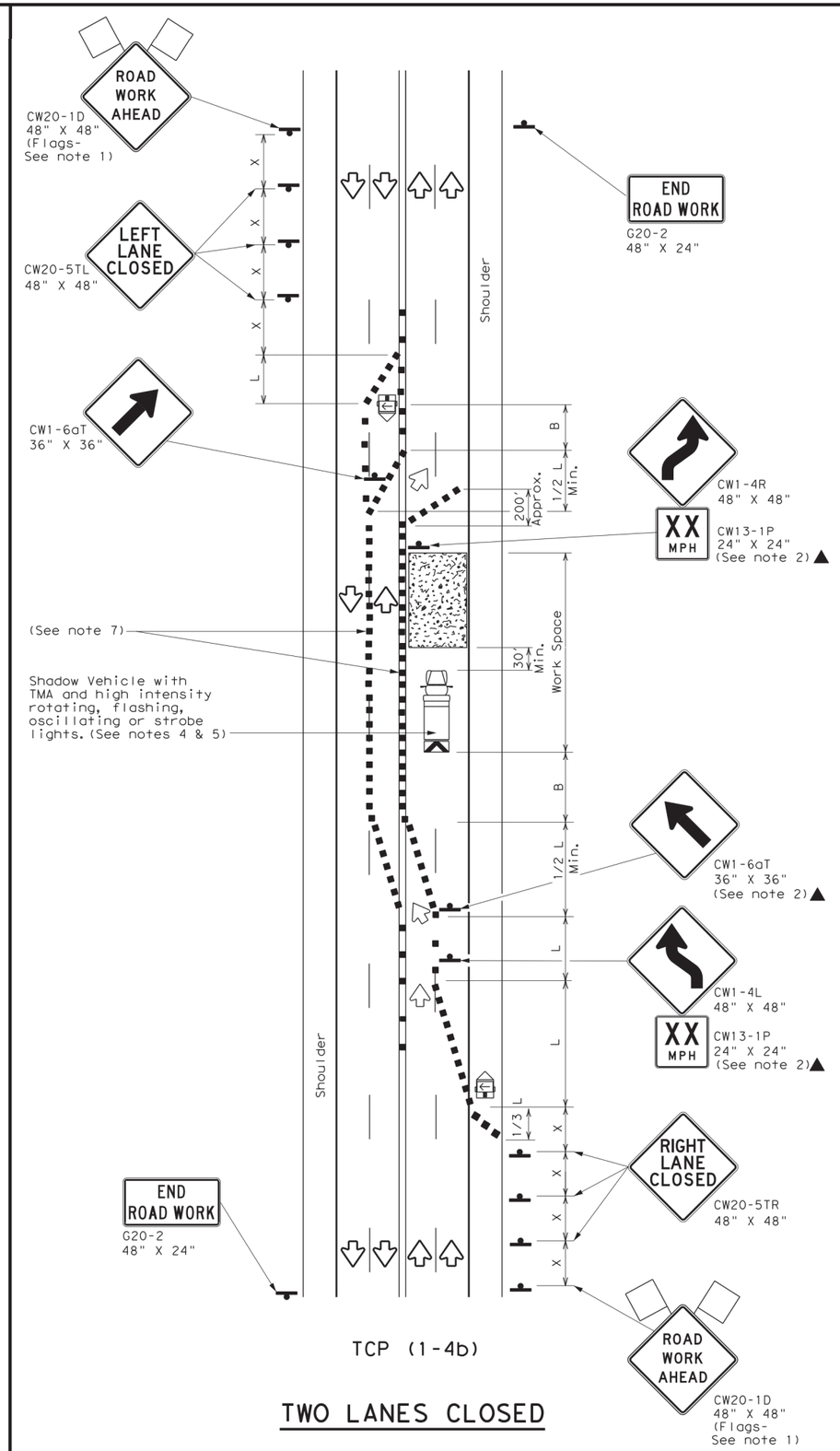
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12	HOU	FORT BEND		021
1-97 2-18				

DATE:
FILE:



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
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.

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	FORT BEND		022
1-97 2-18				

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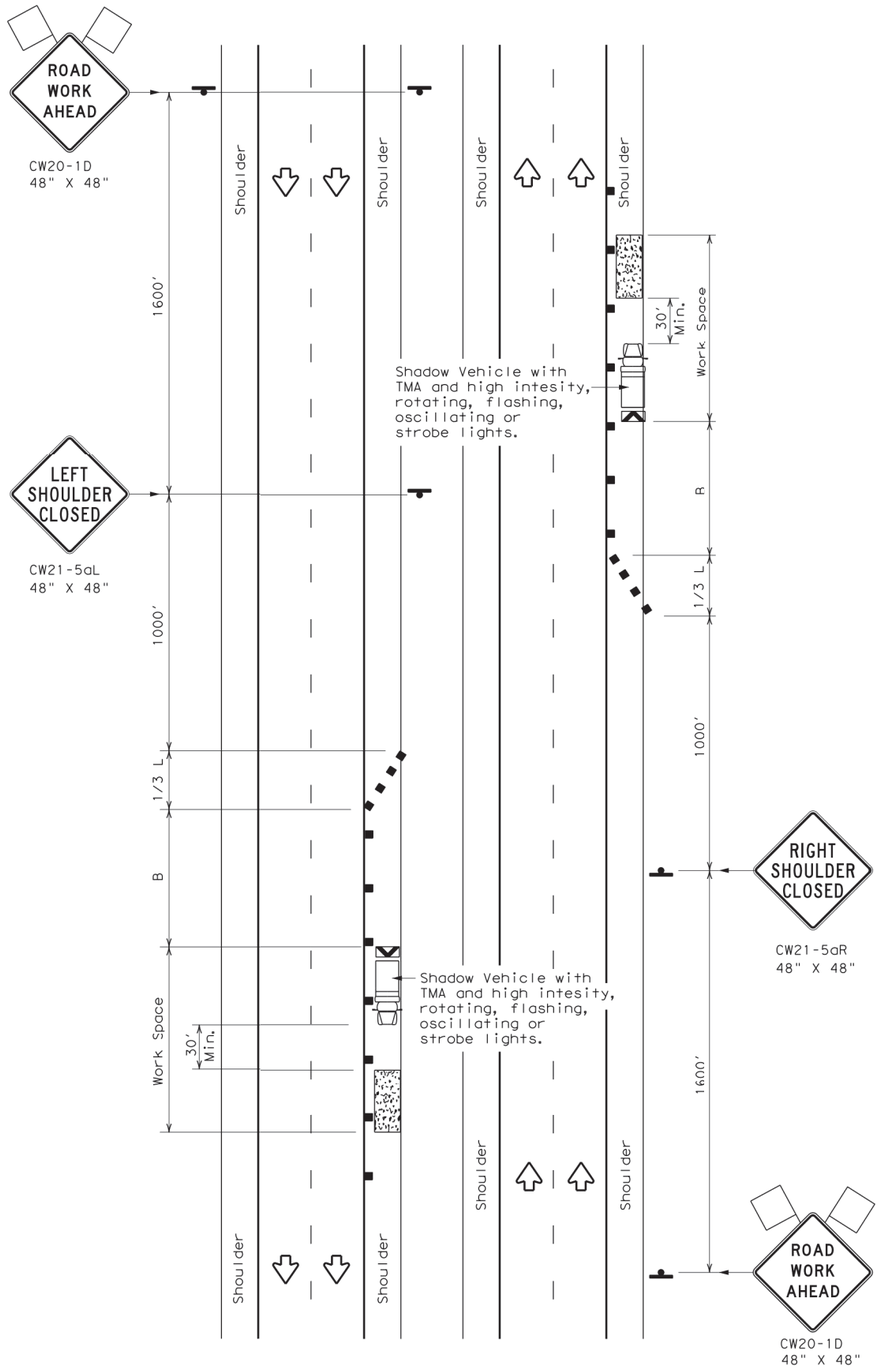
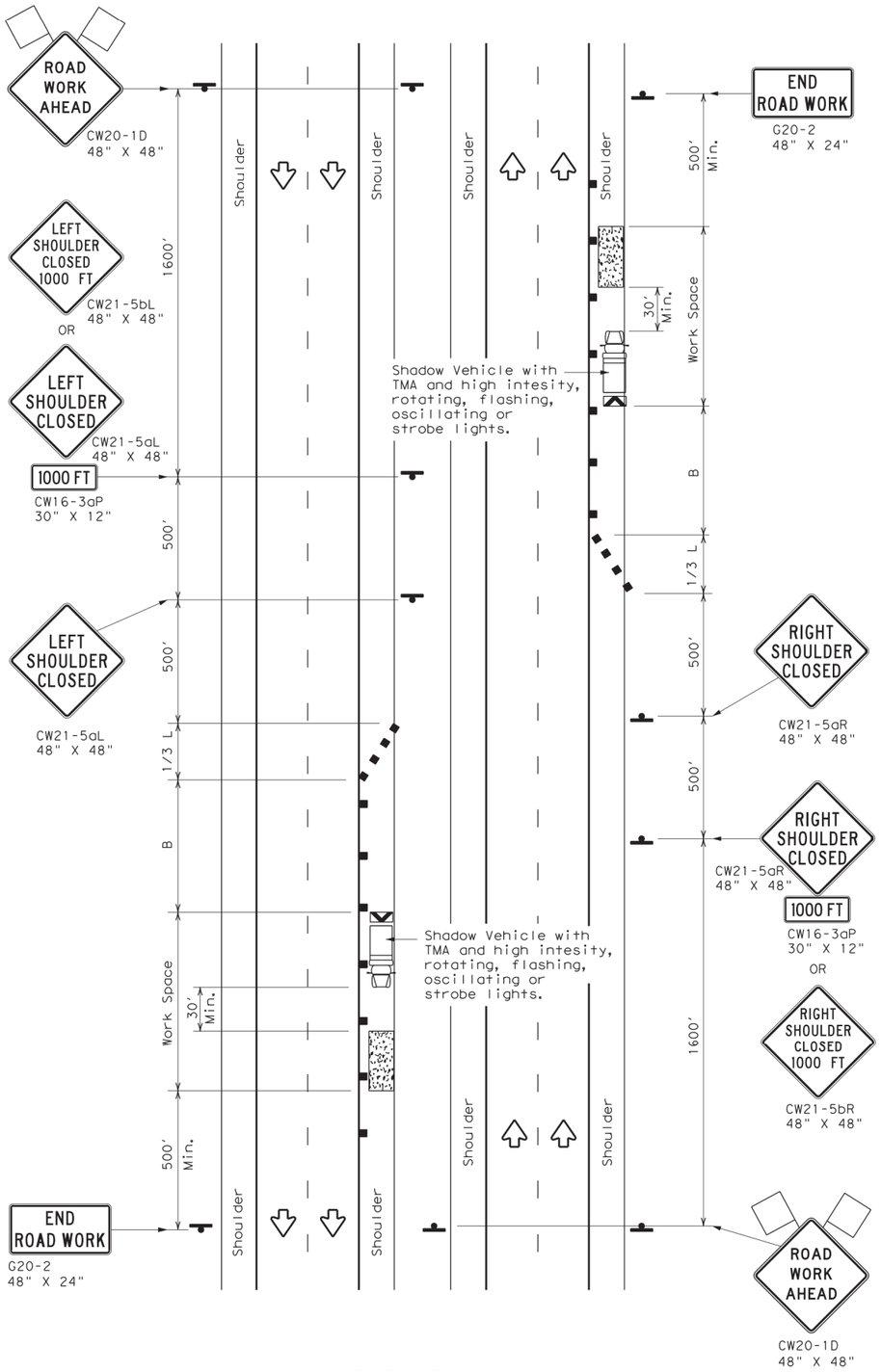
DATE:
FILE:



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

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

Texas Department of Transportation

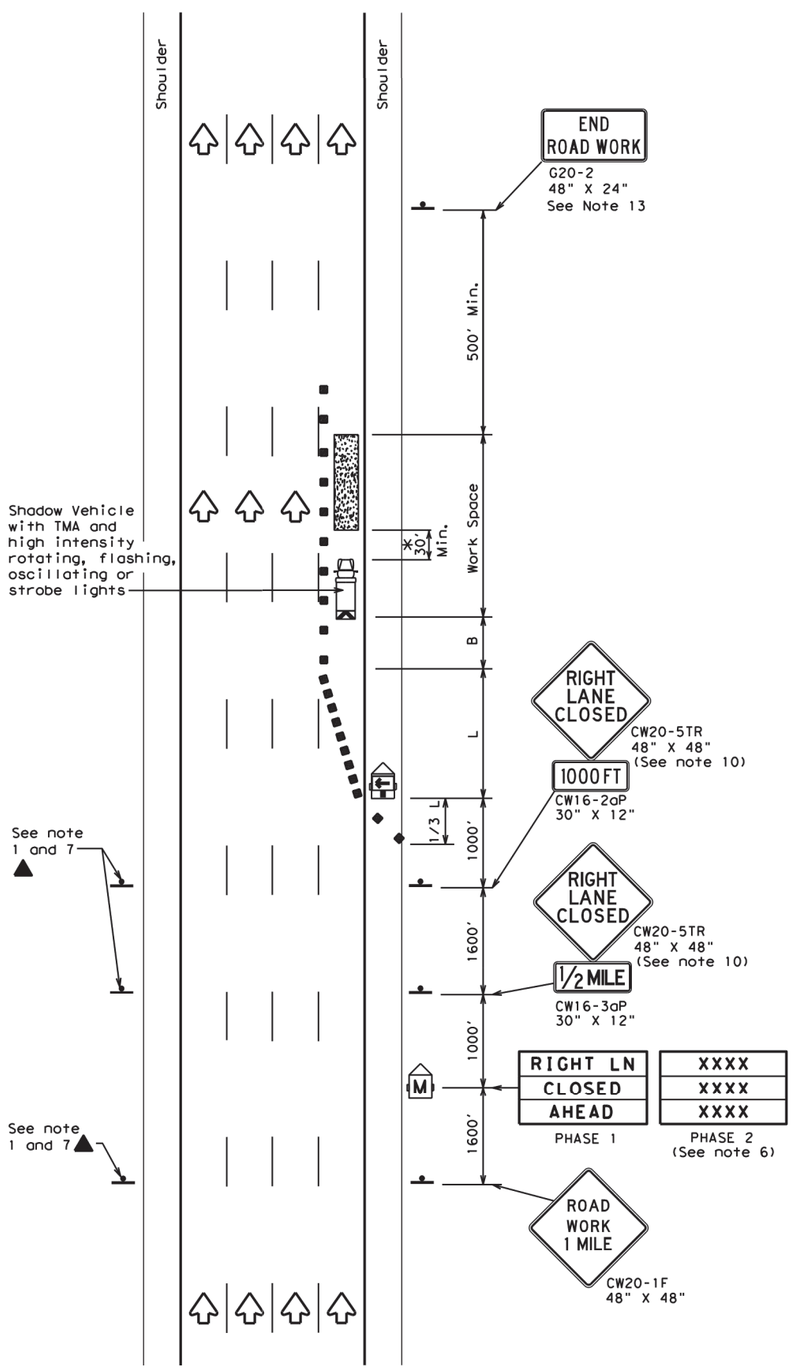
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

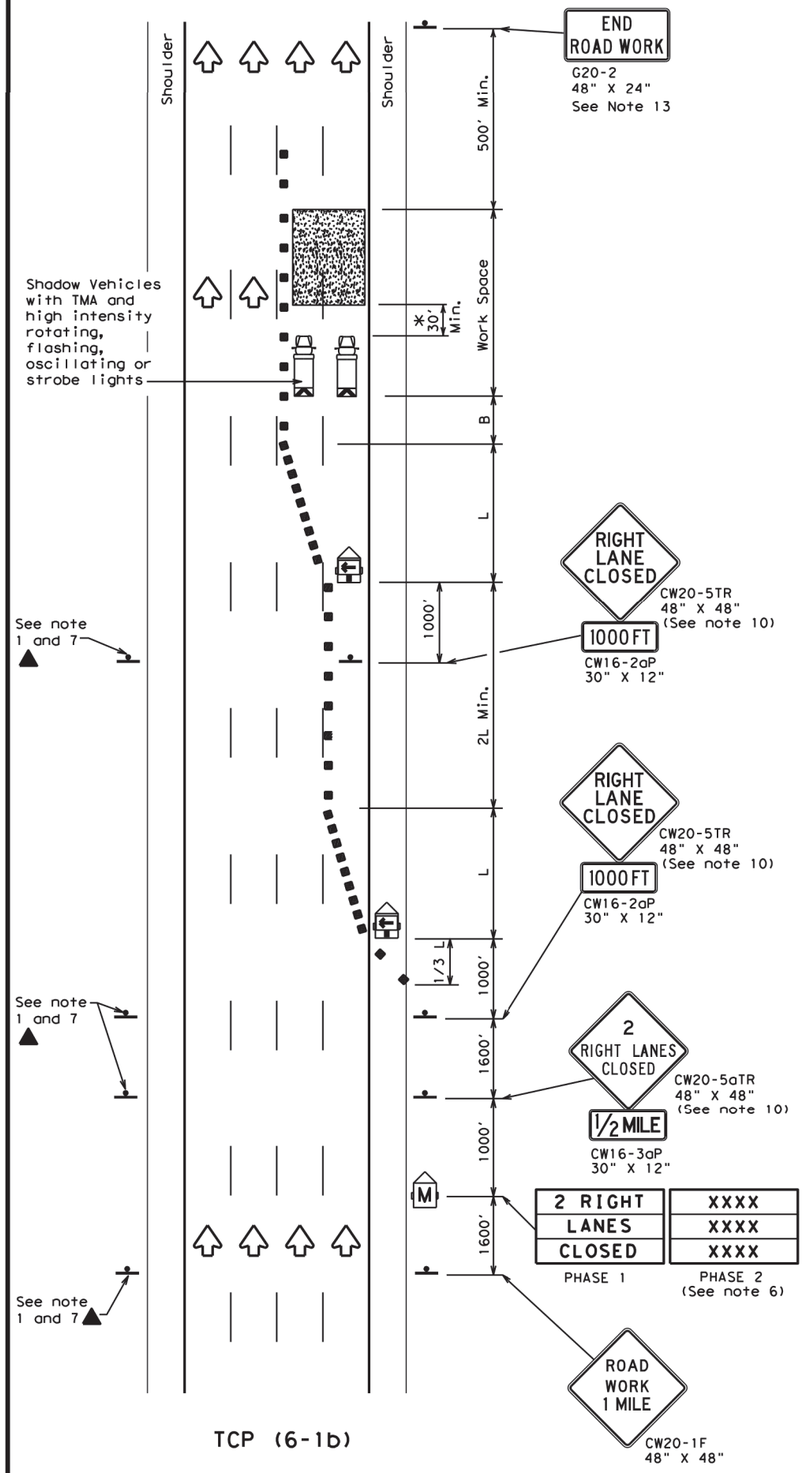
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
2-18	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		023

DATE:
FILE:



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

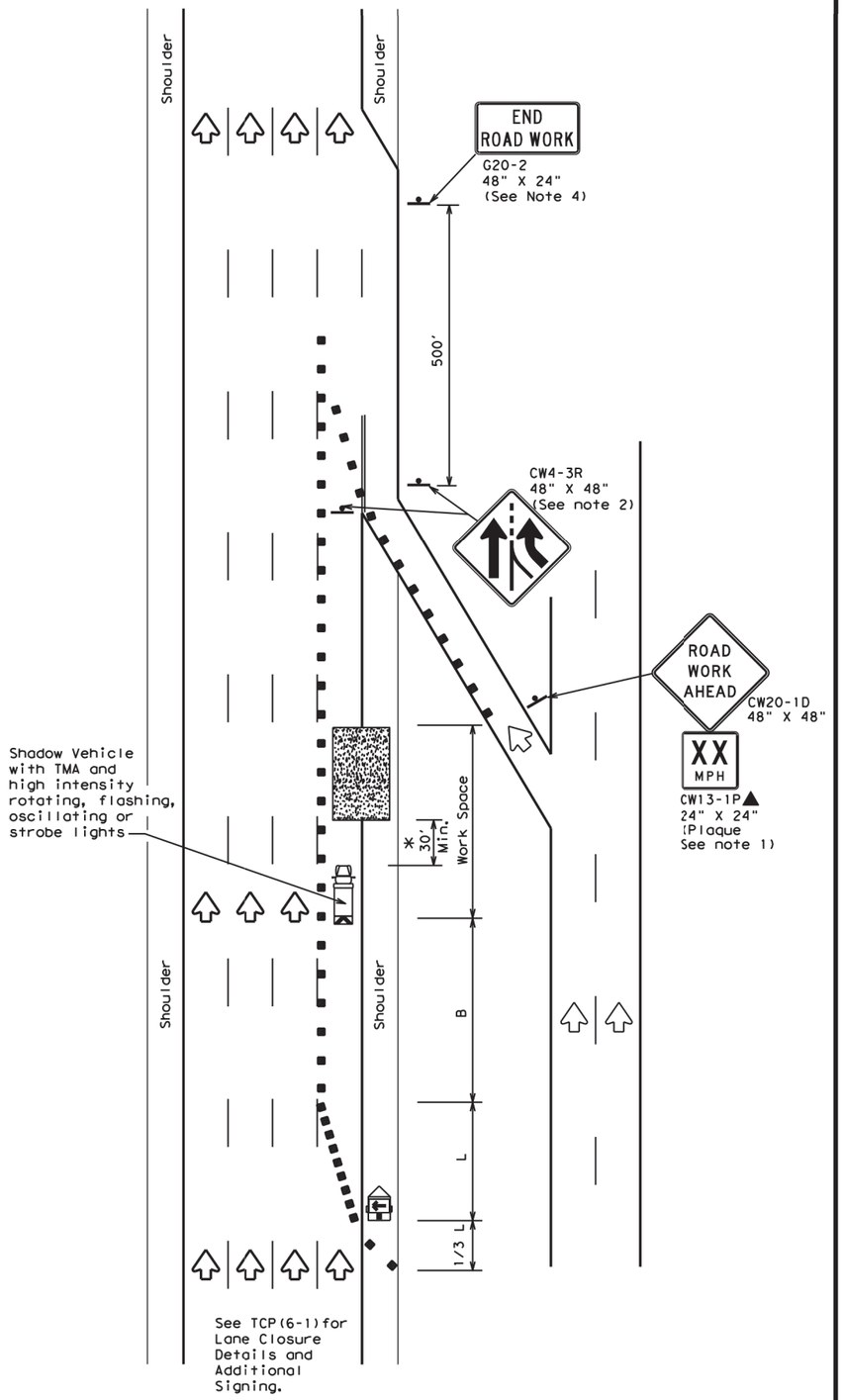
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

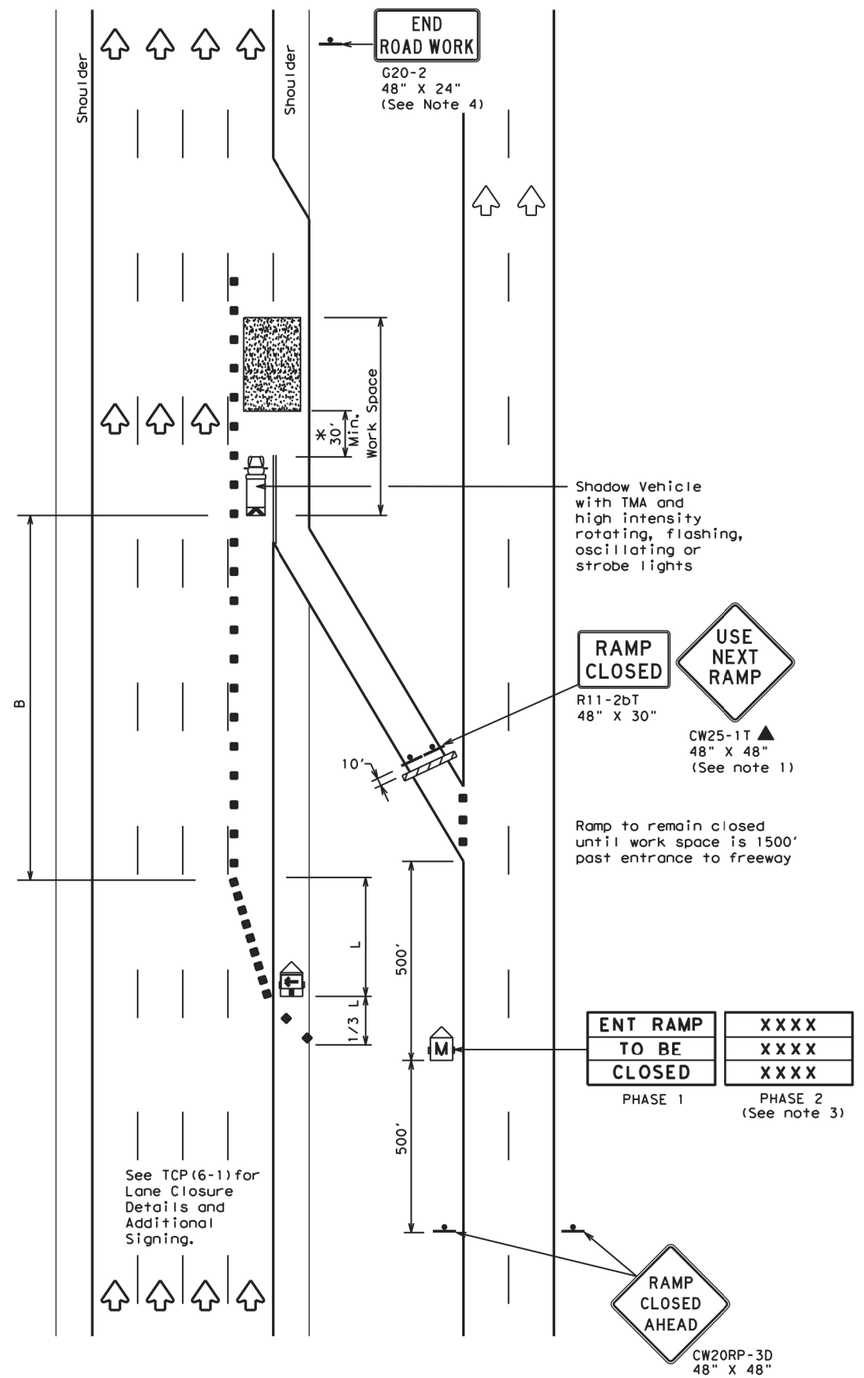
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0027	12	166,etc	IH 69
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		024

DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

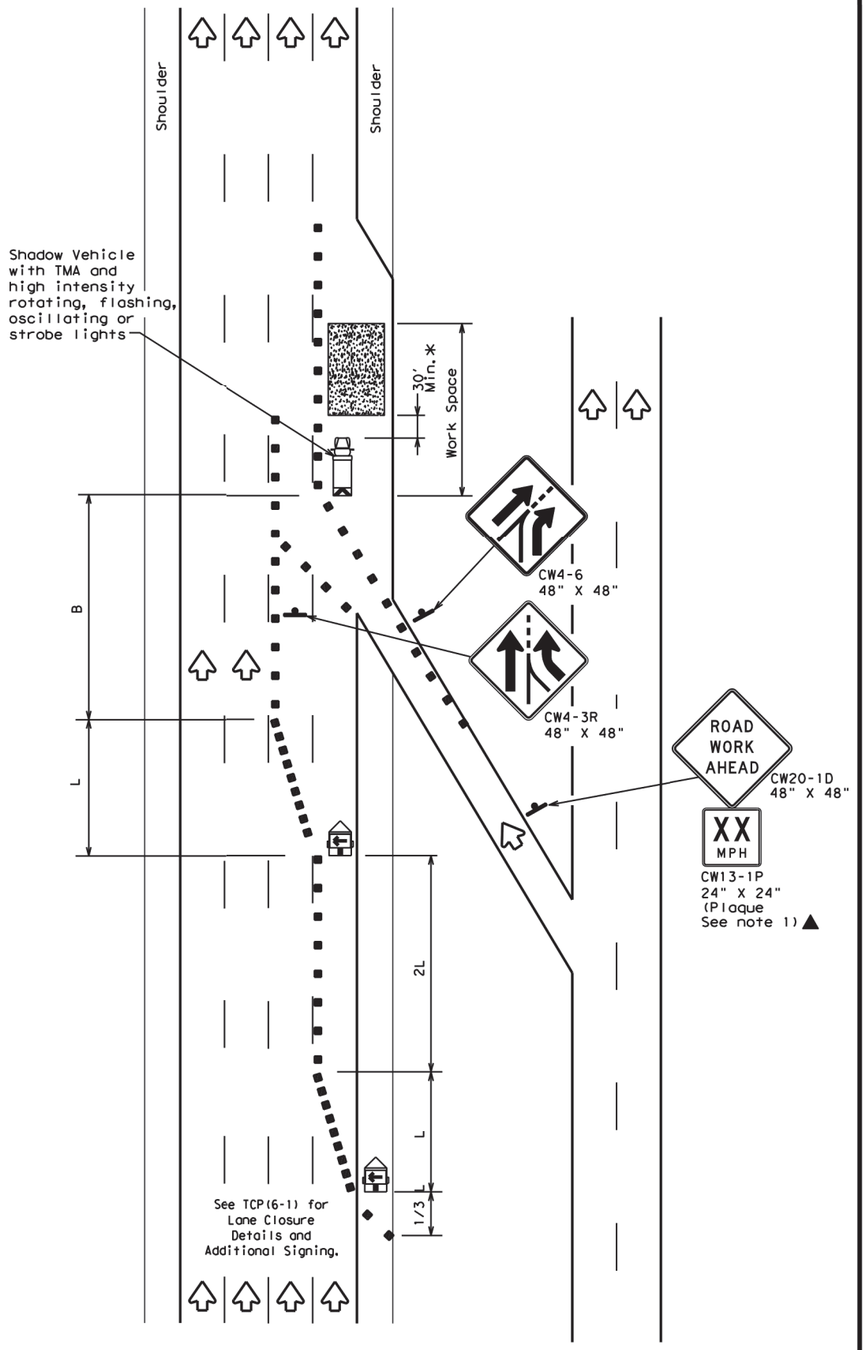
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

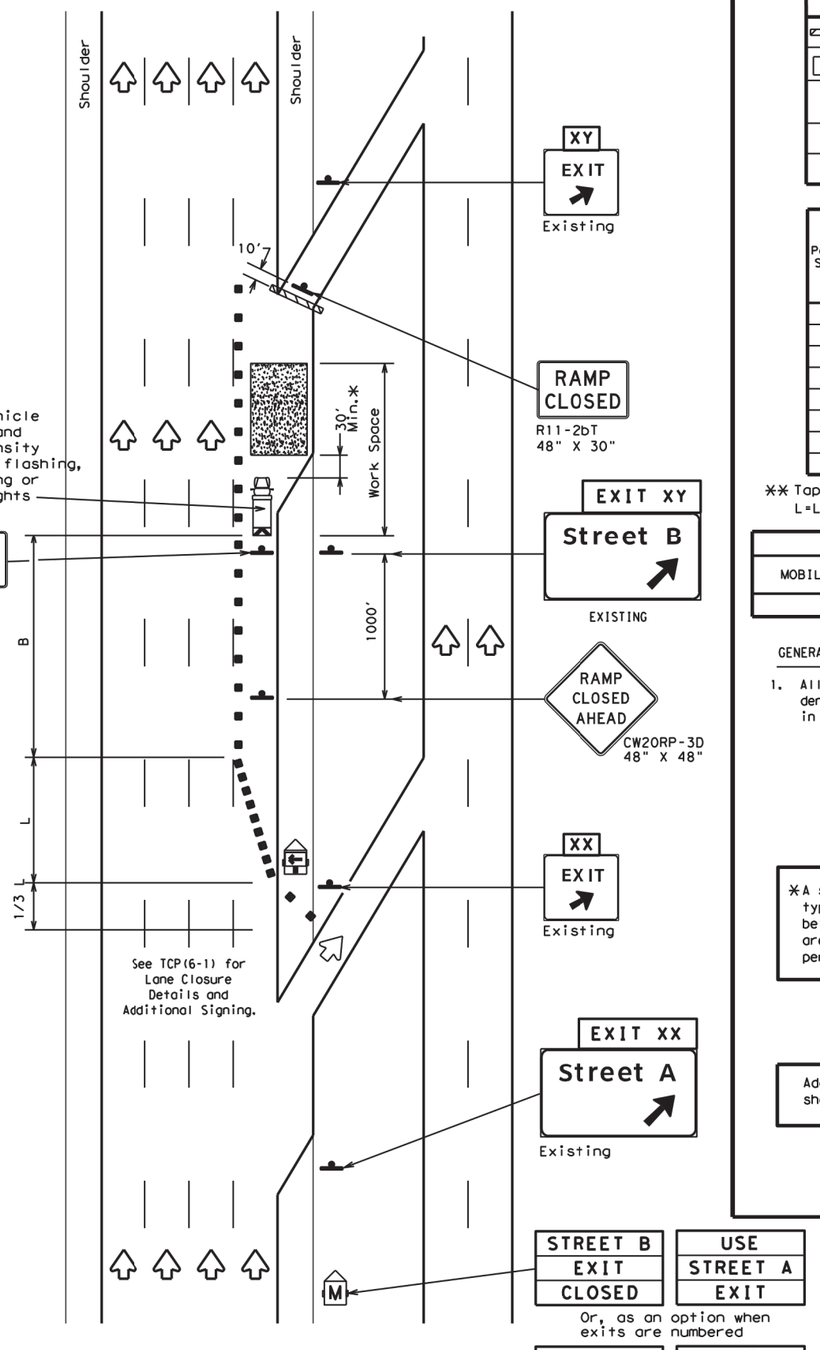
TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	FORT BEND		025



TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B	USE
EXIT	STREET A
CLOSED	EXIT

Or, as an option when exits are numbered

EXIT XY	USE
CLOSED	EXIT XX

Place 1 mile (approx.) in advance of Street A exit.

TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

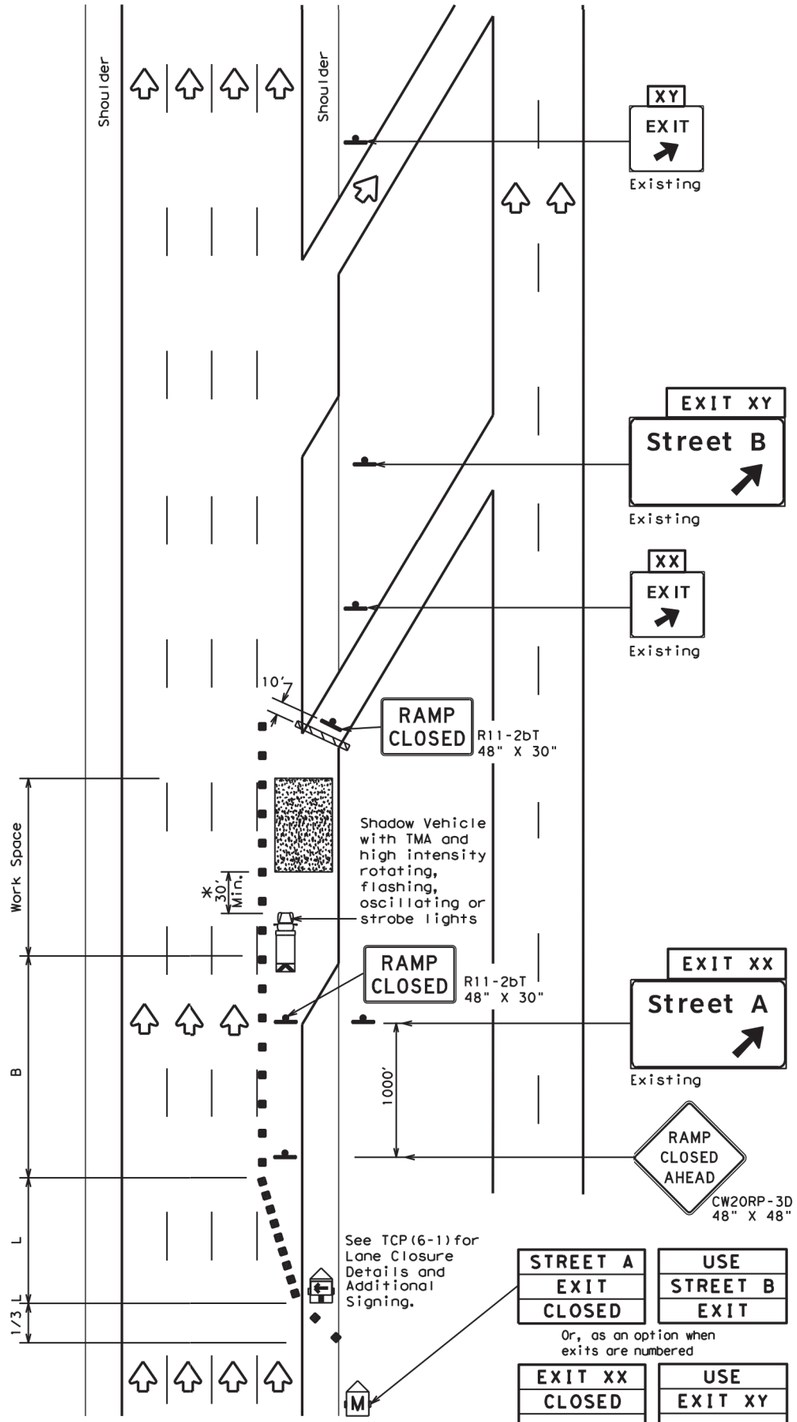
TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	FORT BEND		026

DATE:
FILE:

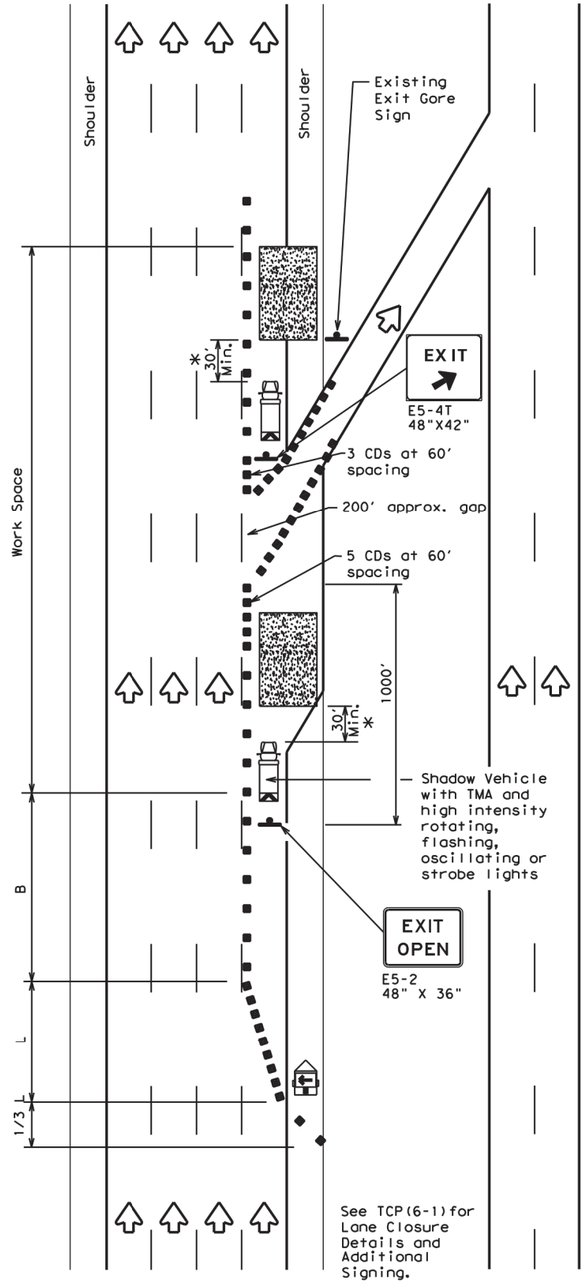
DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED

TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

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

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

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

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

GENERAL NOTES

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

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

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

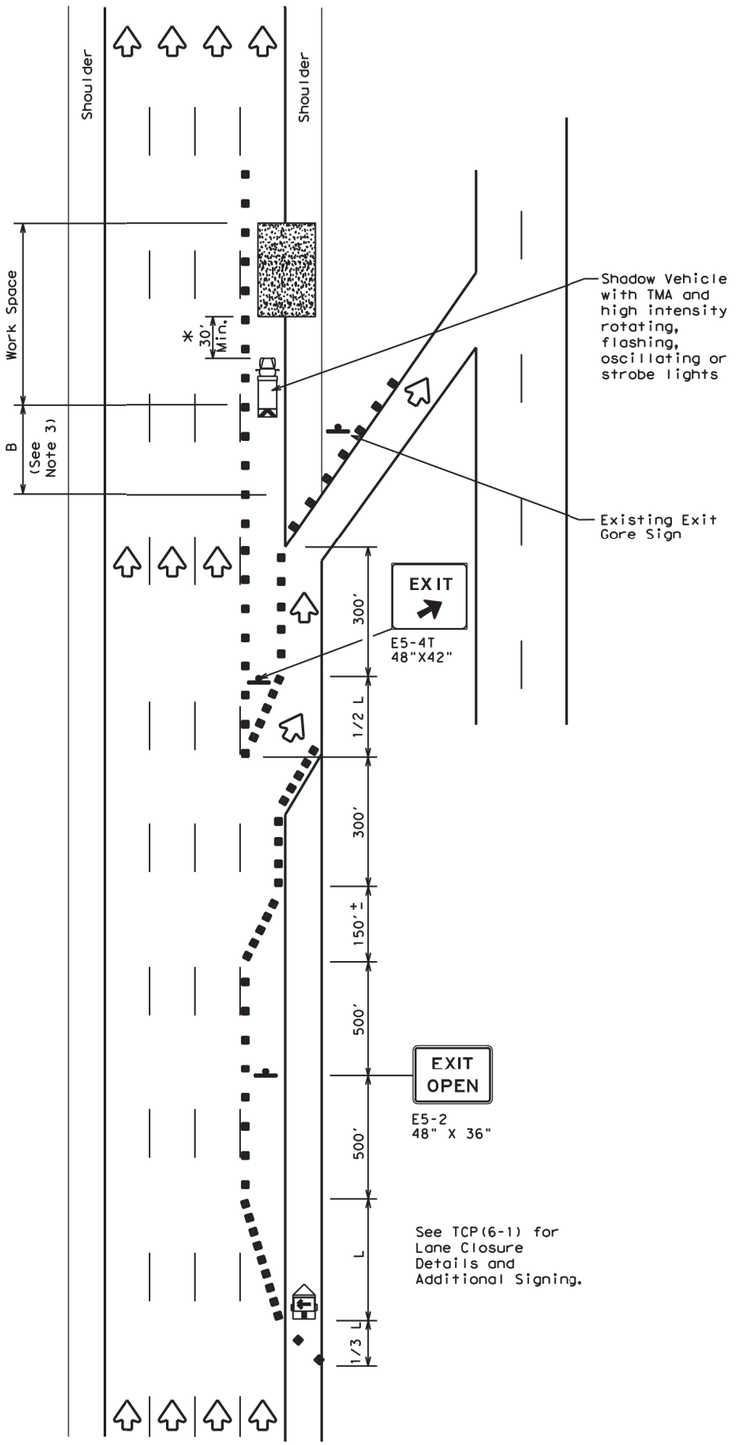
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

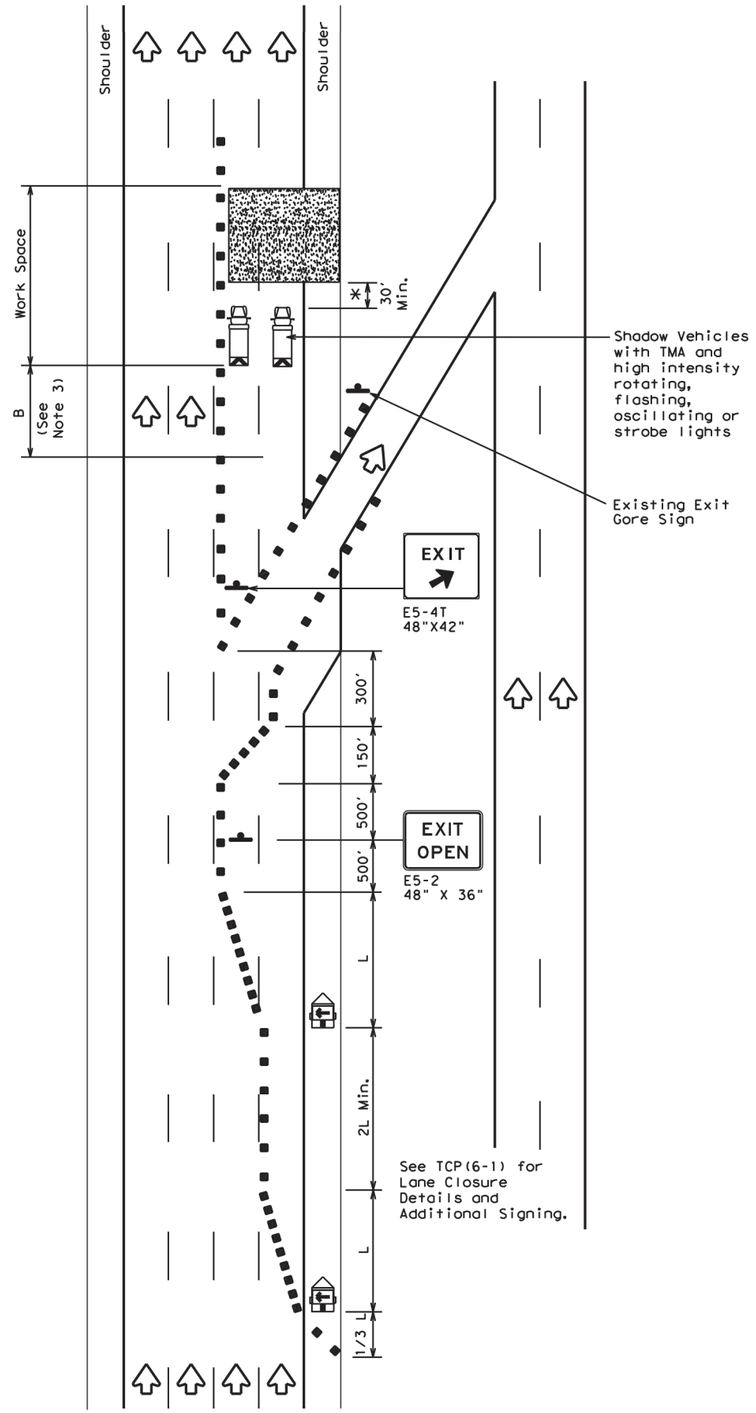
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	FORT BEND		027

DATE:
FILE:



TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

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

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

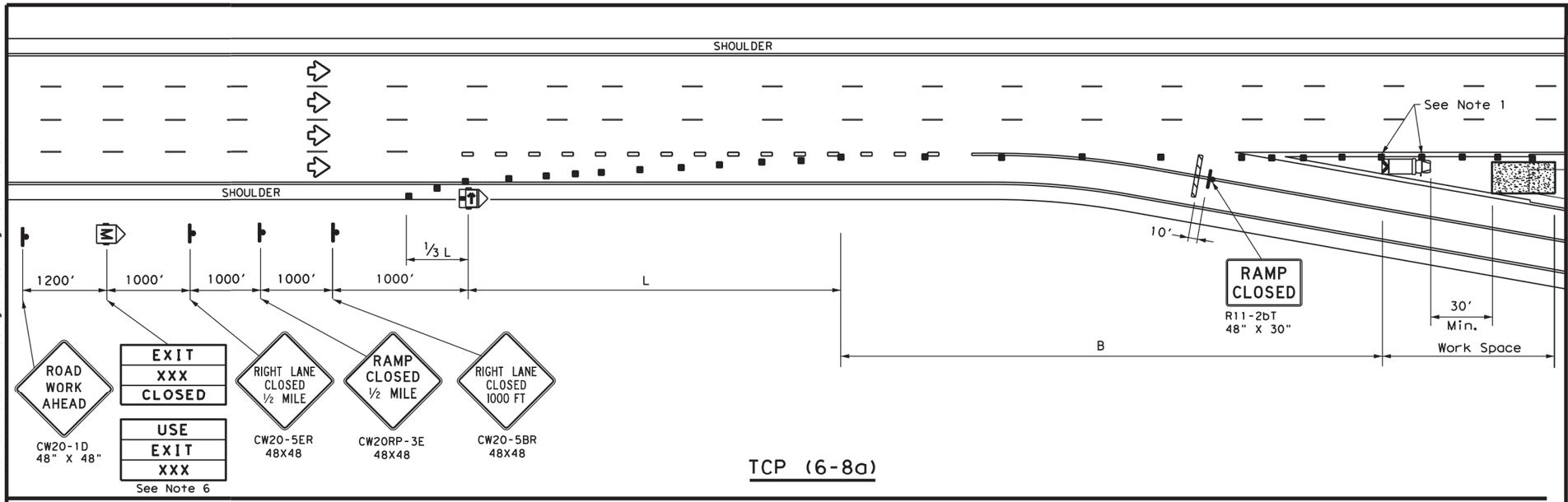
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

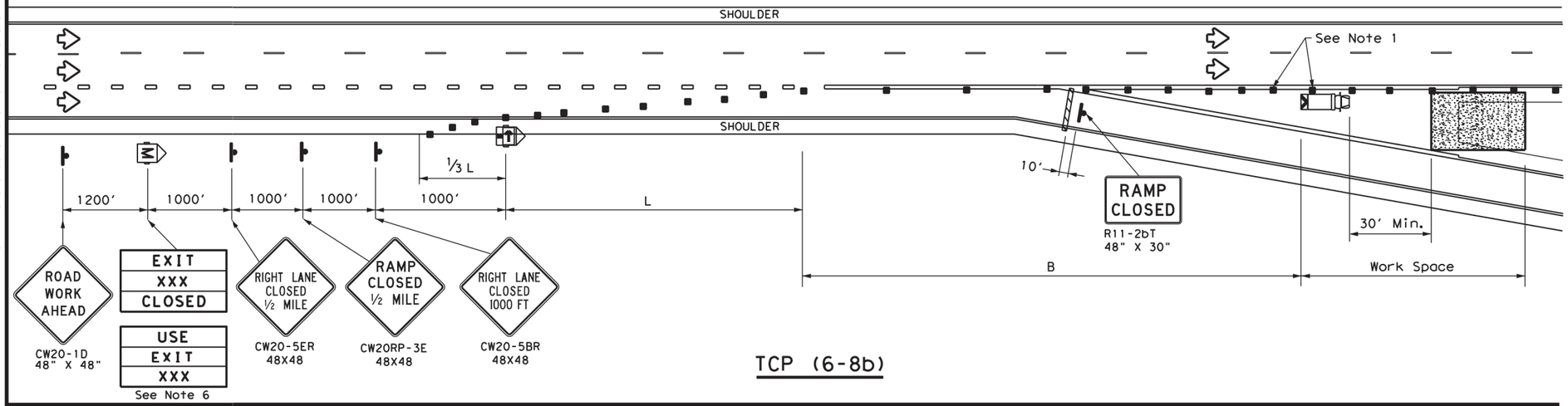
TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

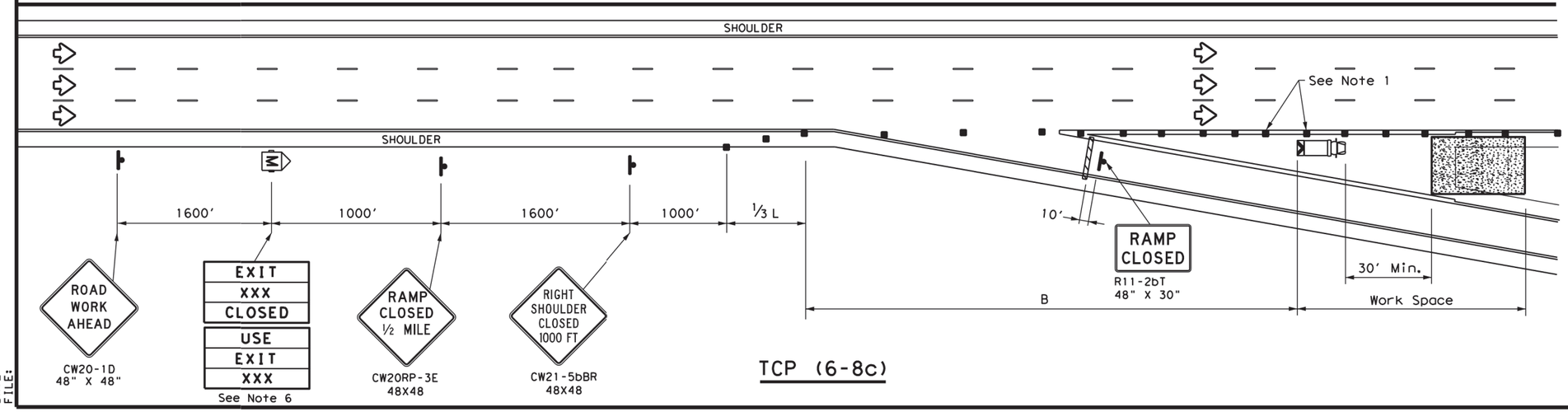
FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	FORT BEND		028



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

DATE:
FILE:

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	12	166,etc	IH 69
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		029

● = CONSTRUCTION PHASE (WORKING DAYS) FOR ITEMS 161, 164, 166, 168, 170, 192 and 1006 – WHEN SHOWN IN PLANS, SEE PLANS AND SPECIFICATIONS FOR REQUIREMENTS

2022 OCT	NOV	DEC	2023 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2024 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														
	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN			
	1022–6003 LANDSCAPE TREATMENT (TY 3) EA IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY	193–6002 PLANT MAINTENANCE –CYC– IH69/FM762 ONLY			
	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN	*** BEGIN			
	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY	193–6007 IRRIGATION SYSTEM OPERATION AND MAINTENANCE –MO– IH69/FM762 ONLY			

* 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.

** 161–6009 EROSION CONTROL COMPOST (ECC) – Apply one application of ECC to both existing (IH 69 @ FM 762) and new (all sites) plant basin and/or plant bed area (see PLANTING AND ESTABLISHMENT, Sheet 1 OF 8, TREE PLACEMENT WITHIN PLANTING BED PREP AREA, INDIVIDUAL PLANTING detail.

*** Each cycle / month must be 100% complete prior to beginning the next cycle / month. If all maintenance, as defined on PLANT MAINTENANCE SHEET 1 OF 1, is not 100% complete and approved within the allotted time shown on this sheet, that cycle / month payment may be adjusted accordingly. Any cycle / month not started and completed within allotted time will 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 and Landscape Architect 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 and Landscape Architect 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
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

SHEET 1 OF 1

PLANTING, MAINTENANCE AND ESTABLISHMENT TIMELINE

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			030
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,etc	IH 69

ITEM 1022–6003 LANDSCAPE TREATMENT (TYPE 3) – EA

AS SHOWN ON PLANTING AND MAINTENANCE TIMELINE SHEET

REQUIREMENTS FOR INITIAL MAINTENANCE OF EXISTING LANDSCAPE AREAS

GENERAL
1. Perform all requirements described on this sheet unless otherwise shown.
2. Work includes redefining all existing plant basin and/or plant bed areas within project limits in accordance with PLANTING AND ESTABLISHMENT, Sheet 1 OF 8, TREE PLACEMENT WITHIN PLANTING BED PREP AREA, INDIVIDUAL PLANTING detail:
3. Work will be limited to the redefined plant basin and/or plant bed areas.
4. Work includes removing trees and/or shrubs which may actually reduce the number of original plant basin and/or plant bed areas.
5. Work includes pruning and removal of plant material:
– Prune in accordance with ANSI A300.
– Remove plant material stumps to existing grade.
– Remove all plant debris from site.
– Do not prune or remove more plant material than what can be removed the same day unless otherwise approved by Engineer.
– Fill any holes from removal of dead plant material with topsoil, topsoil is incidental.
6. EACH INCLUDES COMPLETING THE SPECIFIED WORK FOR ALL LOCATIONS IDENTIFIED WITHIN THE PROJECT LIMITS ONCE.

PLANT BASIN and/or PLANT BED MAINTENANCE
7. Maintain and/or reshape plant basin and/or plant bed areas to conform to original installation (see PLANTING AND ESTABLISHMENT, Sheet 1 OF 8, TREE PLACEMENT WITHIN PLANTING BED PREP AREA, INDIVIDUAL PLANTING detail).
8. Chemically control weeds and undesirable grasses in plant basin and/or plant bed areas with ROUNDUP PROMAX.
– Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.

UNDESIRABLES
9. Chemically treat and remove all JOHNSON GRASS within redefined plant basin and/or plant bed areas with an approved herbicide.
– Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
– Do not remove undesirable plant until herbicide manufacturer's recommended time period for herbicide absorption.
– Repeat as required for complete kill.
– Herbicide is subsidiary to ITEM 193–6002.
10. Remove invasive and/or undesirable trees, shrubs and vines within redefined plant basin and/or plant bed areas.
Chemically treat stumps of cut invasive and/or undesirable plants with PATHFINDER II BASAL BARK HERBICIDE, or approved equal.
– Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
– Invasive and/or undesirable plants include but are not limited to: willow, tallow, baccharis, mulberry, trumpet vine, bind weed, japanese honeysuckle, morning glory, vetch, etc.
– Repeat stump treatment as necessary for complete kill.
– Herbicide is subsidiary to ITEM 193–6002.

HERBICIDE
11. Chemically treat all redefined plant basin and/or plant bed areas with an approved herbicide as needed to control weeds.
– Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
– Do not allow herbicide to come in contact with desirable vines, shrubs, or trees, including seedlings.
– Herbicide is subsidiary to ITEM 193–6002.

PRUNING AND REMOVALS
12. Prune all plants of any size, height, and diameter in the following conditions:
– Within sight clearance areas for traffic and signage, see PLANTING, ESTABLISHMENT AND MAINTENANCE sheets (pruning related to signage applies to both existing and any new signs installed for the duration of contract.
– With vertical clearance issues over any roadways and access routes (19' Min.), 8'– 10' width planting area perimeter (9' Min.) and sidewalks (9' Min.).
– Prune all sucker growth and/or new limbs to maintain clear trunk.
– Prune dead, dying or damaged branches/limbs (includes freeze and/or drought damage to any existing plant material).
13. Remove all plants of any size, height, and diameter not conforming to PLANTING, ESTABLISHMENT AND MAINTENANCE sheets, and:
– Remove dead, dying and non–viable plants with permanent structural damage.
– Remove invasive or undesirable plants as described on this sheet.
– Remove leaning trees more than Approx. 8" off center measured at a height of Approx. 5' (see leaning tree removal image this sheet).
– Remove any existing stumps to grade.
– Remove all vines from trees and shrubs.

STAKES AND STRAPS
14. Maintain existing stakes required to support plant material for duration of contract:
– Remove all existing stakes, straps, guy wires, cables, and tags from site at end of contract.

IRRIGATION SYSTEM(S)
15. Maintain existing irrigation system in accordance with original plans and specifications
– Replace all batteries at beginning and end of the contract
– Repair / Replace leaks, non–working components, missing groundbox lids, etc
– Provide as built plans of existing and repaired systems .

OTHER
16. Remove all litter and debris (rocks, tires, concrete, lumber, trash, bandit signs, etc.) located within plant basin and/or plant bed areas.
17. Treat all fire ant colonies within plant basin and/or plant bed areas.
18. Treat existing plants displaying evidence of insect, fungal, bacterial, or other negative indications
– use appropriate methods and products for treatments
19. Remove silt fence, erosion control logs, and staking associated with any planting area unless directed otherwise.
20. Access to some areas may be constrained. No additional compensation is allowed for limited access.
21. 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.
22. Any adjustments due to the failure to comply with plans and specifications shown will be at Contractor's expense.
23. District Landscape Architect or Vegetation Specialist must approve completed work prior to acceptance and payment.

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, Direct Connector, 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, ESTABLISHMENT AND MAINTENANCE LAYOUT, Sheet 3 of 4 for sight triangles)

LEANING TREE REMOVAL

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

NTS

LANDSCAPE
TREATMENT
(TY 3)

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			031
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,etc	IH 69

ITEM 193–6002 PLANT MAINTENANCE – CYC

AS SHOWN ON PLANTING AND MAINTENANCE TIMELINE SHEET

REQUIREMENTS FOR EXISTING LANDSCAPE AREAS

GENERAL
1. Perform all requirements described on this sheet unless otherwise shown.
2. Work includes redefining all existing plant basin and/or plant bed areas within project limits in accordance with PLANTING AND ESTABLISHMENT, Sheet 1 OF 8, TREE PLACEMENT WITHIN PLANTING BED PREP AREA, INDIVIDUAL PLANTING detail:
3. Work will be limited to the redefined plant basin and/or plant bed areas.
4. Work includes removing trees and/or shrubs which may actually reduce the number of original plant basin and/or plant bed areas.
5. Work includes pruning and removal of plant material:
   – Prune in accordance with ANSI A300.
   – Remove plant material stumps to existing grade.
   – Remove all plant debris from site.
   – Do not prune or remove more plant material than what can be removed the same day unless otherwise approved by Engineer.
   – Fill any holes from removal of dead plant material with topsoil, topsoil is incidental.
6. EACH CYCLE INCLUDES COMPLETING THE SPECIFIED WORK FOR ALL LOCATIONS IDENTIFIED WITHIN THE PROJECT LIMITS ONCE.

PLANT BASIN and/or PLANT BED MAINTENANCE
7. Maintain and/or reshape plant basin and/or plant bed areas to conform to original installation (see PLANTING AND ESTABLISHMENT, Sheet 1 OF 8, TREE PLACEMENT WITHIN PLANTING BED PREP AREA, INDIVIDUAL PLANTING detai).
8. Chemically control weeds and undesirable grasses in plant basin and/or plant bed areas with ROUNDUP PROMAX.
   – Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.

UNDESIRABLES
9. Chemically treat and remove all JOHNSON GRASS within redefined plant basin and/or plant bed areas with an approved herbicide.
   – Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
   – Do not remove undesirable plant until herbicide manufacturer's recommended time period for herbicide absorption.
   – Repeat as required for complete kill.
   – Herbicide is subsidiary to ITEM 193–6002.
10. Remove invasive and/or undesirable trees, shrubs and vines within redefined plant basin and/or plant bed areas.
    Chemically treat stumps of cut invasive and/or undesirable plants with PATHFINDER II BASAL BARK HERBICIDE, or approved equal.
   – Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
   – Invasive and/or undesirable plants include but are not limited to: willow, tallow, baccharis, mulberry, trumpet vine, bind weed, japanese honeysuckle, morning glory, vetch, etc.
   – Repeat stump treatment as necessary for complete kill.
   – Herbicide is subsidiary to ITEM 193–6002.

HERBICIDE
11. Chemically treat all redefined plant basin and/or plant bed areas with an approved herbicide as needed to control weeds.
   – Perform herbicide applications under supervision of STATE LICENSED APPLICATOR.
   – Do not allow herbicide to come in contact with desirable vines, shrubs, or trees, including seedlings.
   – Herbicide is subsidiary to ITEM 193–6002.

PRUNING AND REMOVALS
12. Prune all plants of any size, height, and diameter in the following conditions:
   – Within sight clearance areas for traffic and signage, see PLANTING, ESTABLPLANT AND MAINTENANCE sheets (pruning related to signage applies to both existing and any new signs installed for the duration of contract.
   – With vertical clearance issues over any roadways and access routes (19' Min.), 8'– 10' width planting area perimeter (9' Min.) and sidewalks (9' Min.).
   – Prune all sucker growth and/or new limbs to maintain clear trunk.
   – Prune dead, dying or damaged branches/limbs (includes freeze and/or drought damage to any existing plant materail).
13. Remove all plants of any size, height, and diameter not conforming to PLANTING, ESTABLISHMENT AND MAINTENANCE sheets, and:
   – Remove dead, dying and non–viable plants with permanent structural damage.
   – Remove invasive or undesirable plants as described on this sheet.
   – Remove leaning trees more than Approx. 8" off center measured at a height of Approx. 5' (see leaning tree removal image this sheet).
   – Remove any existing stumps to grade.
   – Remove all vines from trees and shrubs.

STAKES AND STRAPS
14. Maintain existing stakes required to support plant material for duration of contract:
   – Remove all existing stakes, straps, guy wires, cables, and tags from site at end of contract.

IRRIGATION SYSTEM(S)
15. Maintain existing irrigation system in accordance with original plans and specifications.
   – Replace all batteries at beginning and end of the contract
   – Repair / Replace leaks, non–working components, missing groundbox lids, etc
   – Provide as built plans of existing and repaired systems

OTHER
16. Remove all litter and debris (rocks, tires, concrete, lumber, trash, bandit signs, etc.) located within plant basin and/or plant bed areas.
17. Treat all fire ant colonies within plant basin and/or plant bed areas.
18. Treat existing plants displaying evidence of insect, fungal, bacterial, or other negative indications
   – use appropriate methods and products for treatments.
19. Remove silt fence, erosion control logs, and staking associated with any planting area unless directed otherwise.
20. Access to some areas may be constrained. No additional compensation is allowed for limited access.
21. 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.
22. Any adjustments due to the failure to comply with plans and specifications shown will be at Contractor's expense.
23. District Landscape Architect or Vegetation Specialist must approve completed work prior to acceptance and payment.

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, Direct Connector, 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, ESTABLISHMENT AND MAINTENANCE LAYOUT, Sheet 3 of 4 for sight triangles)

LEANING TREE REMOVAL

ITEM 193–6007 IRRIGATION SYSTEM OPER AND MAINT

GENERAL
1. MAINTAIN EXISTING IRRIGATION SYSTEMS DURING CONSTRUCTION PERIOD.
2. MAINTAIN EXISTING IRRIGATION SYSTEMS FOR DURATION OF CONTRACT.
3. REPAIR ALL LEAKS FROM METER TO EMISSION DEVICES.
4. REPLACE ALL BROKEN OR INOPERABLE COMPONENTS. SUBMIT SAMPLES FOR APPROVAL PRIOR TO WORK.
5. REPLACE ALL BATTERIES AT THE BEGINNING OF CONTRACT AND DURING LAST MONTH OF CONTRACT.
6. INVESTIGATE EXISTING SYSTEMS AND PROVIDE AS BUILT IRRIGATION SYSTEM PLANS, INCLUDING ADDED AREAS FOR NEW PLANTS.

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

NTS

PLANT MAINTENANCE

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			032
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,etc	IH 69

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

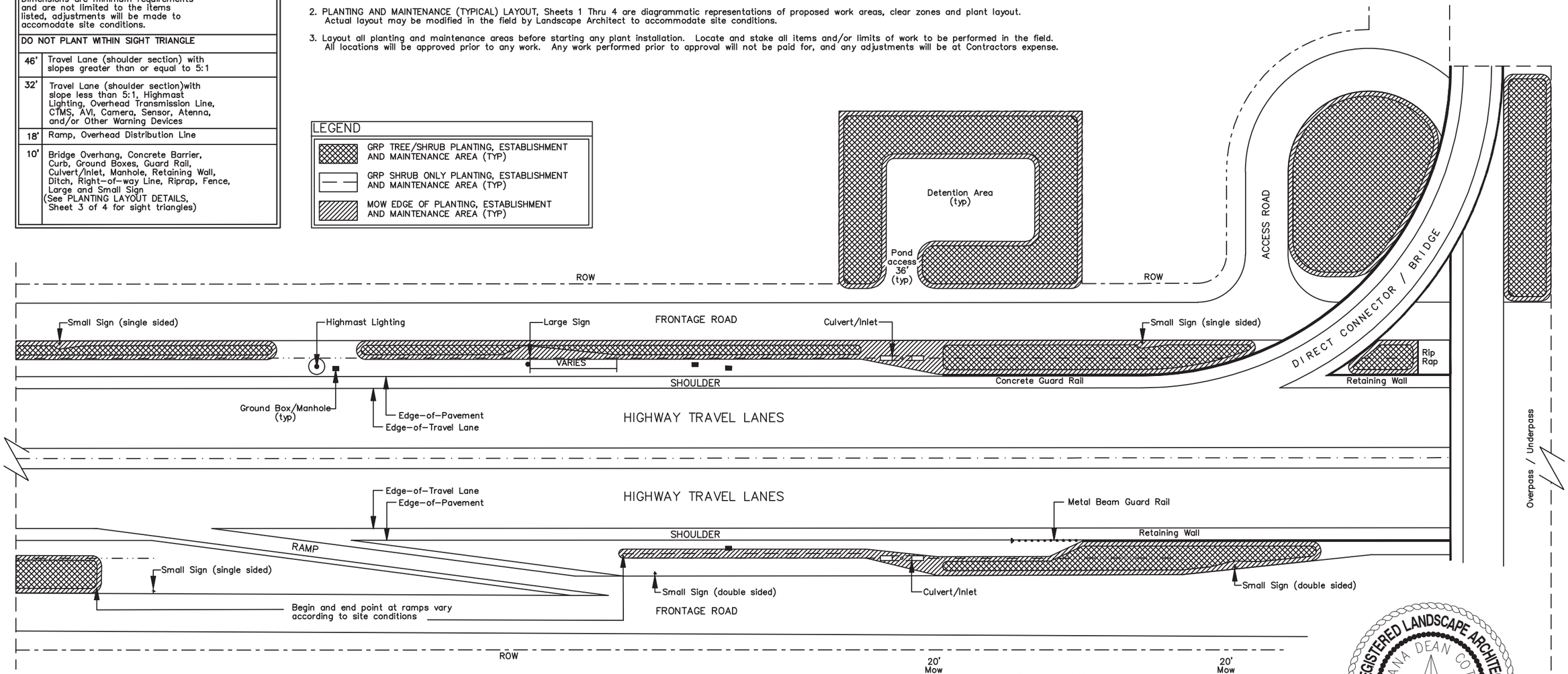
46'	Travel Lane (shoulder section) with slopes greater than or equal to 5:1
32'	Travel Lane (shoulder section)with slope less than 5:1, Highmast Lighting, Overhead Transmission Line, CTMS, AVI, Camera, Sensor, Atenna, and/or Other Warning Devices
18'	Ramp, Overhead Distribution Line
10'	Bridge Overhang, 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.

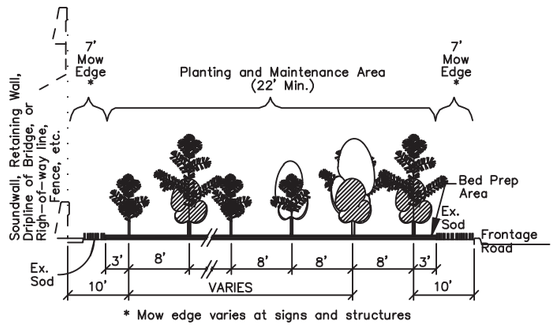
LEGEND

- 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)



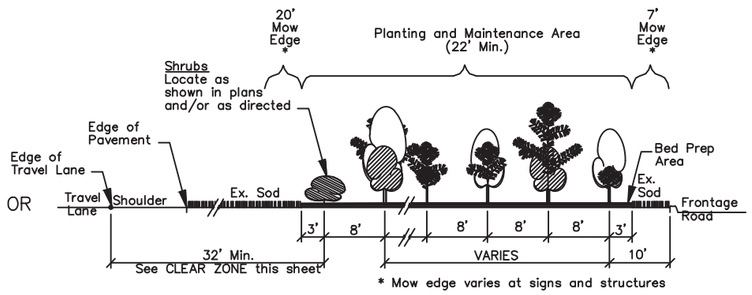
Roadway Planting and Maintenance Areas (Typ)

See CLEAR ZONE table this sheet for dimensions not shown.



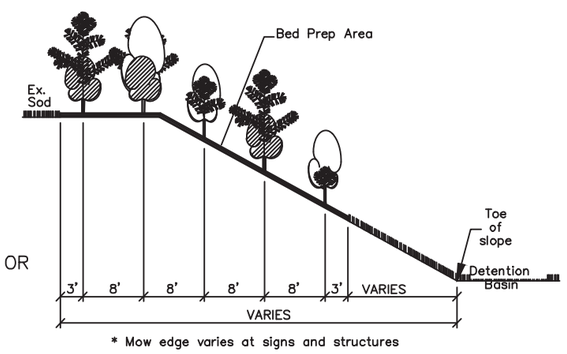
Typical Elevation

OR



Typical Elevation

OR



Typical Elevation

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

NTS

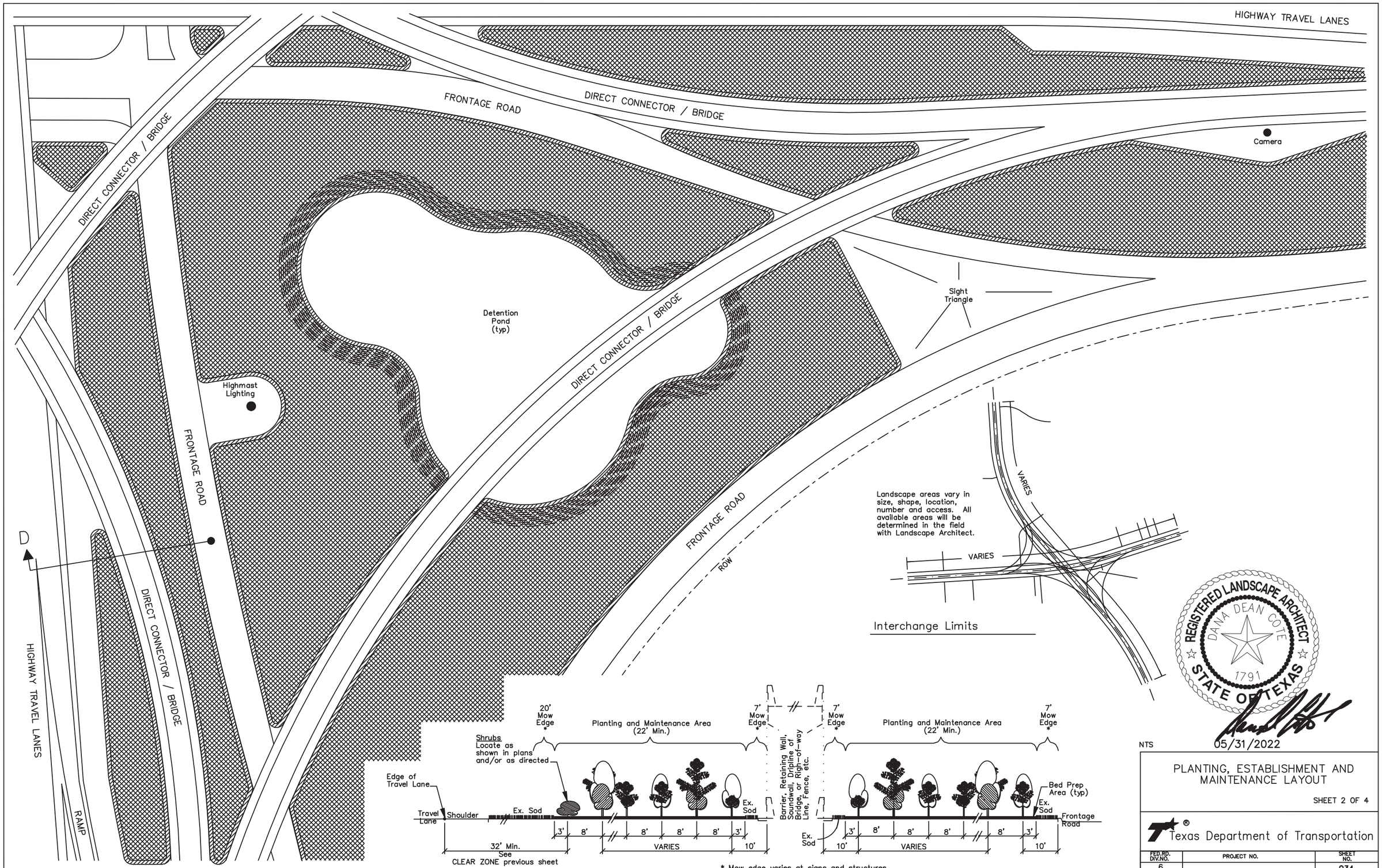
05/31/2022

PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 1 OF 4

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			033
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,ETC	IH 69



Interchange Limits

Interchange Planting and Maintenance Areas (Typ)

Interchange w/ Direct Connectors

* Mow edge varies at signs and structures

D Section

NTS

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT

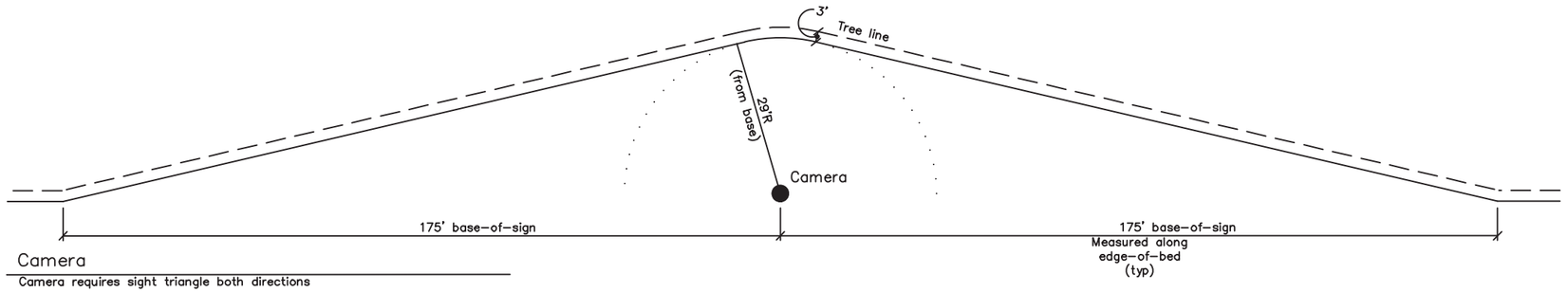
SHEET 2 OF 4

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			034
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,ETC	IH 69

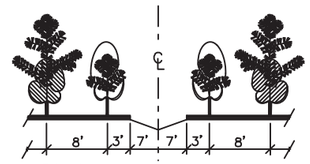
CLEAR ZONE / SIGHT DISTANCE REQUIREMENTS

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

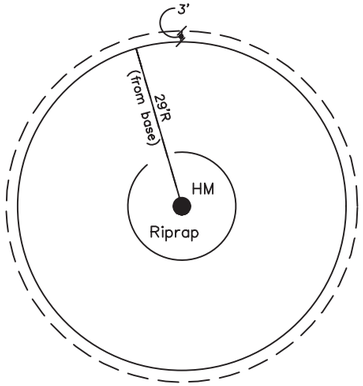


Camera

Camera requires sight triangle both directions

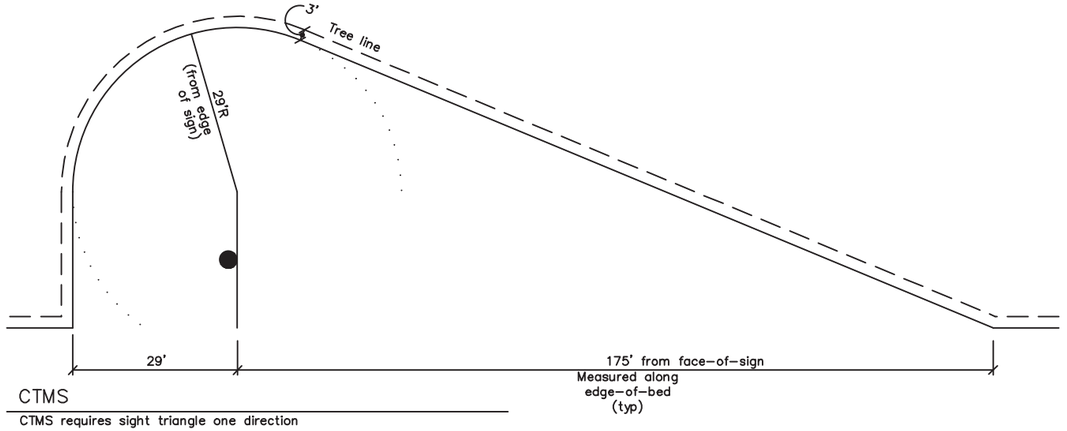


Ditch



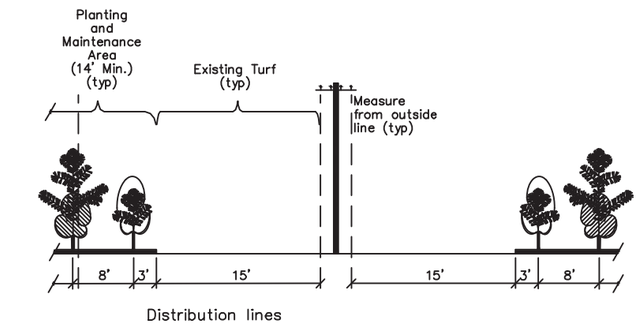
High Mast Lighting, etc.

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

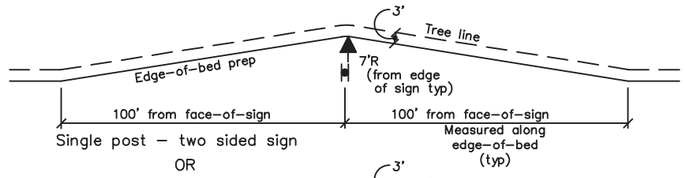


CTMS

CTMS requires sight triangle one direction

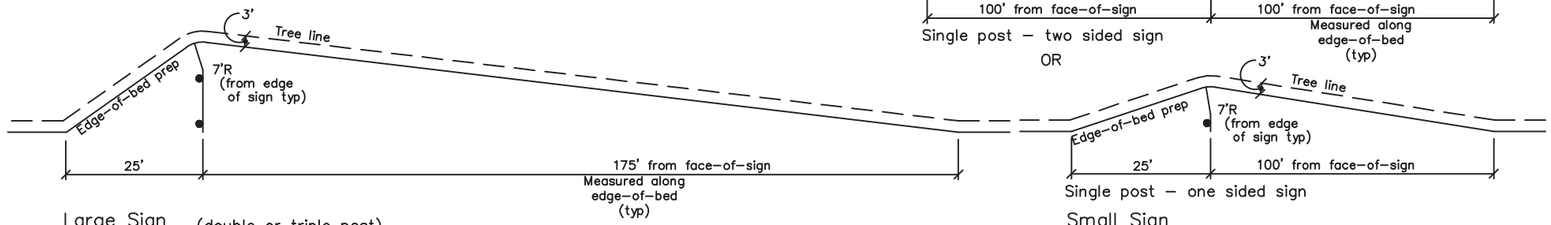


Distribution lines



Single post – two sided sign

OR



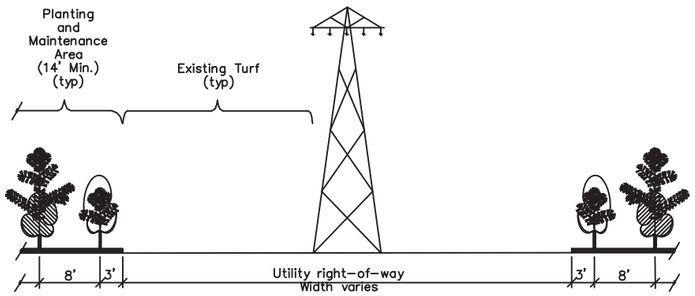
Large Sign (double or triple post)

Applies to ground mounted and structure mounted (rails, wall, columns, etc.) signs

Single post – one sided sign

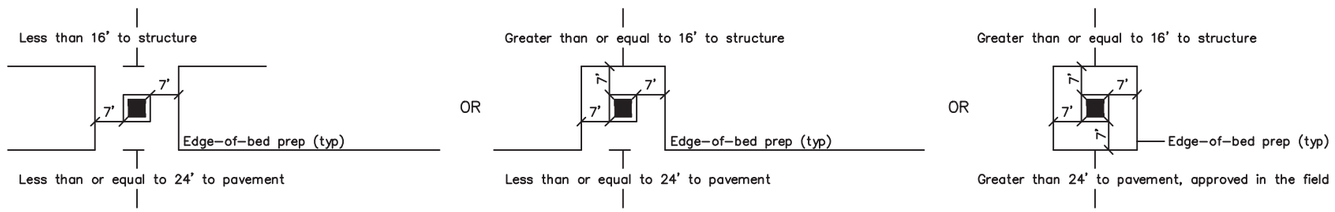
Small Sign

Applies to ground mounted and structure mounted (rails, wall, columns, etc.) signs



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

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COE
1791
STATE OF TEXAS

05/31/2021

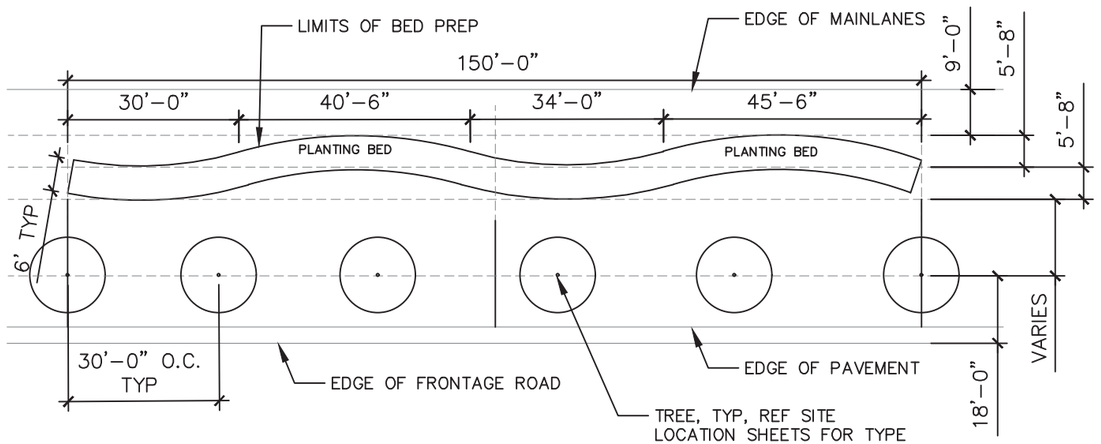
NTS

PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 3 OF 4

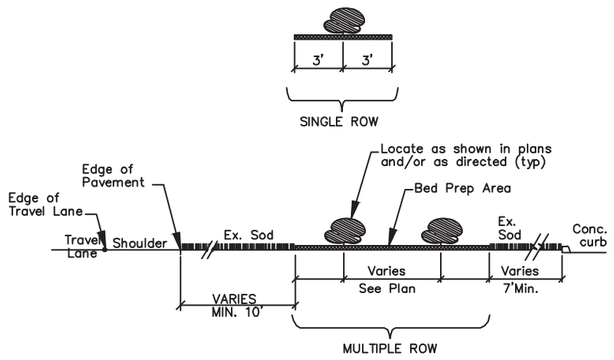
Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			035
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,ETC	IH 69



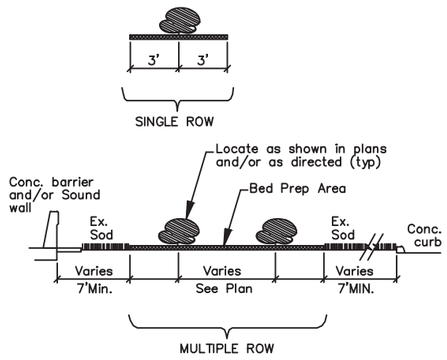
Shrub Planting – Curvilinear Plan

Reference plans for site application



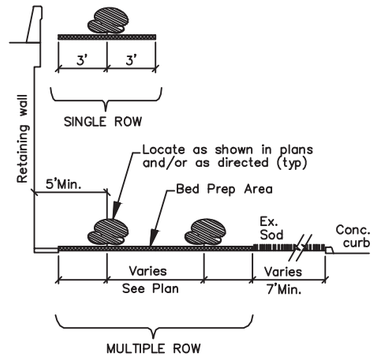
Shrub Planting Typical Elevation

Shoulder / Curb



Shrub Planting Typical Elevation

Barrier / Sound Wall / Curb



Shrub Planting Typical Elevation

Retaining Wall / Curb

NTS

05/31/2022

PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT

SHEET 4 OF 4

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			036
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,ETC	IH 69

GENERAL NOTE:
1. PLANTING PLAN LAYOUT IS A DIAGRAMMATIC REPRESENTATION OF PROPOSED WORK AREAS.
2. REFERENCE PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT SHEETS FOR LAYOUT DESCRIPTIONS, NOTATIONS, DIMENSIONS, DIAGRAMS AND INFORMATION NOT SHOWN HERE.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND STAKING LIMITS OF PLANTING IN ACCORDANCE WITH PLANS AND DETAILS.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND STAKING ALL UTILITIES, OFFSETS, STRUCTURES, ETC.
5. ADJUSTMENTS WILL BE MADE IN FIELD, AS DIRECTED BY ENGINEER, TO ACCOMMODATE SITE CONDITIONS.
6. ALL LOCATIONS WILL BE APPROVED BY ENGINEER PRIOR TO ANY BED PREPARATION WORK.

PLANTING NOTE:
1. REFERENCE SHEET 059 FOR PLANT DESCRIPTIONS, SIZES, AND NOTATIONS.
2. BED PREP LAYOUT IS INDIVIDUAL LAYOUT FOR ALL TREES UNLESS OTHERWISE SHOWN. SEE PLANTING AND ESTABLISHMENT SHEETS FOR LAYOUT REQUIREMENTS.

IRRIGATION NOTE:
1. NO PERMANENT IRRIGATION THIS SITE LOCATION
2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

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REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

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

FM359 SITE LOCATION

CSJ: 0543-02-079 SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			037
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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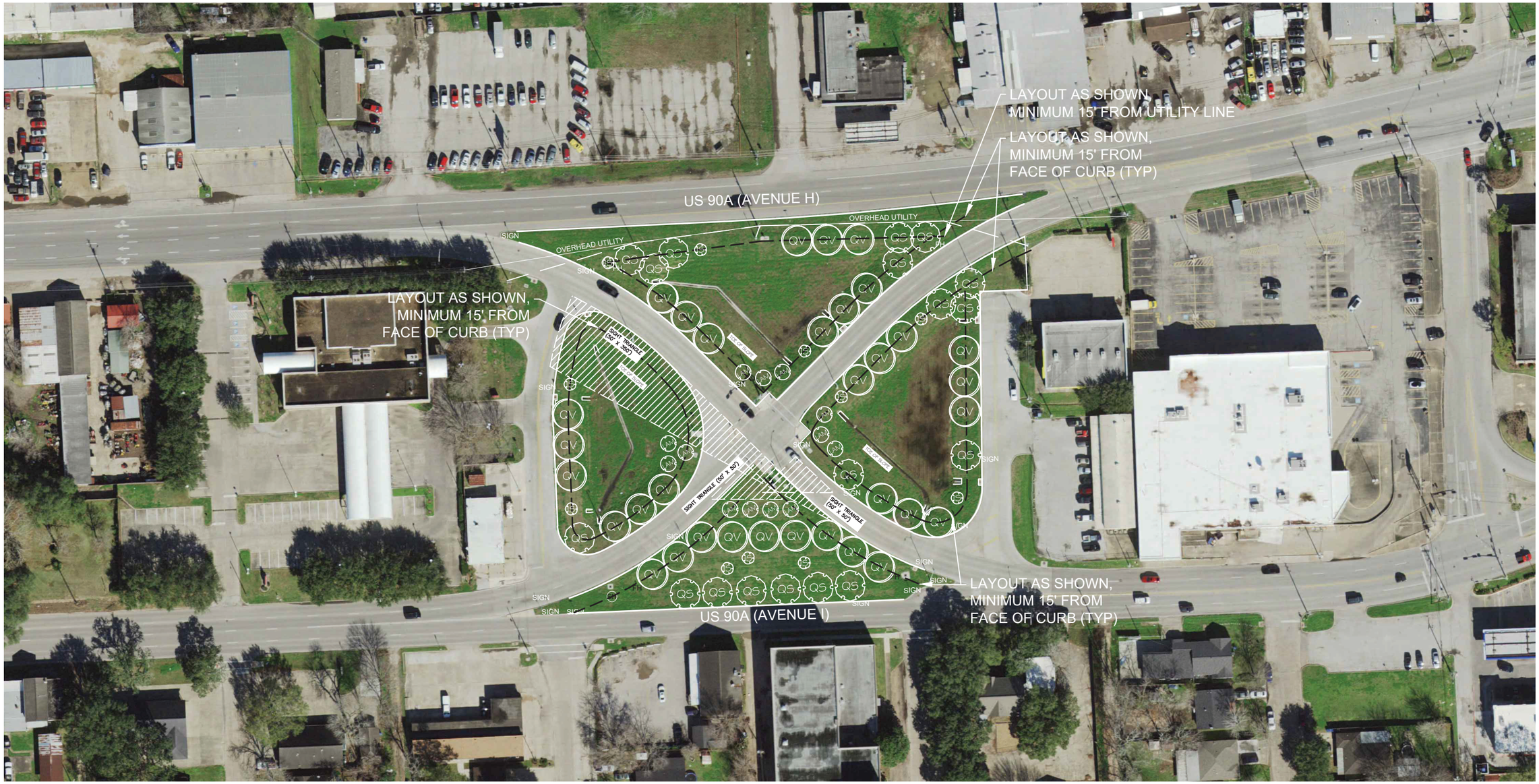

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1. PERMANENT IRRIGATION THIS SITE LOCATION
2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

90A SITE LOCATION

CSJ: 0027-07-045 SHEET 1 OF 1

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		038

STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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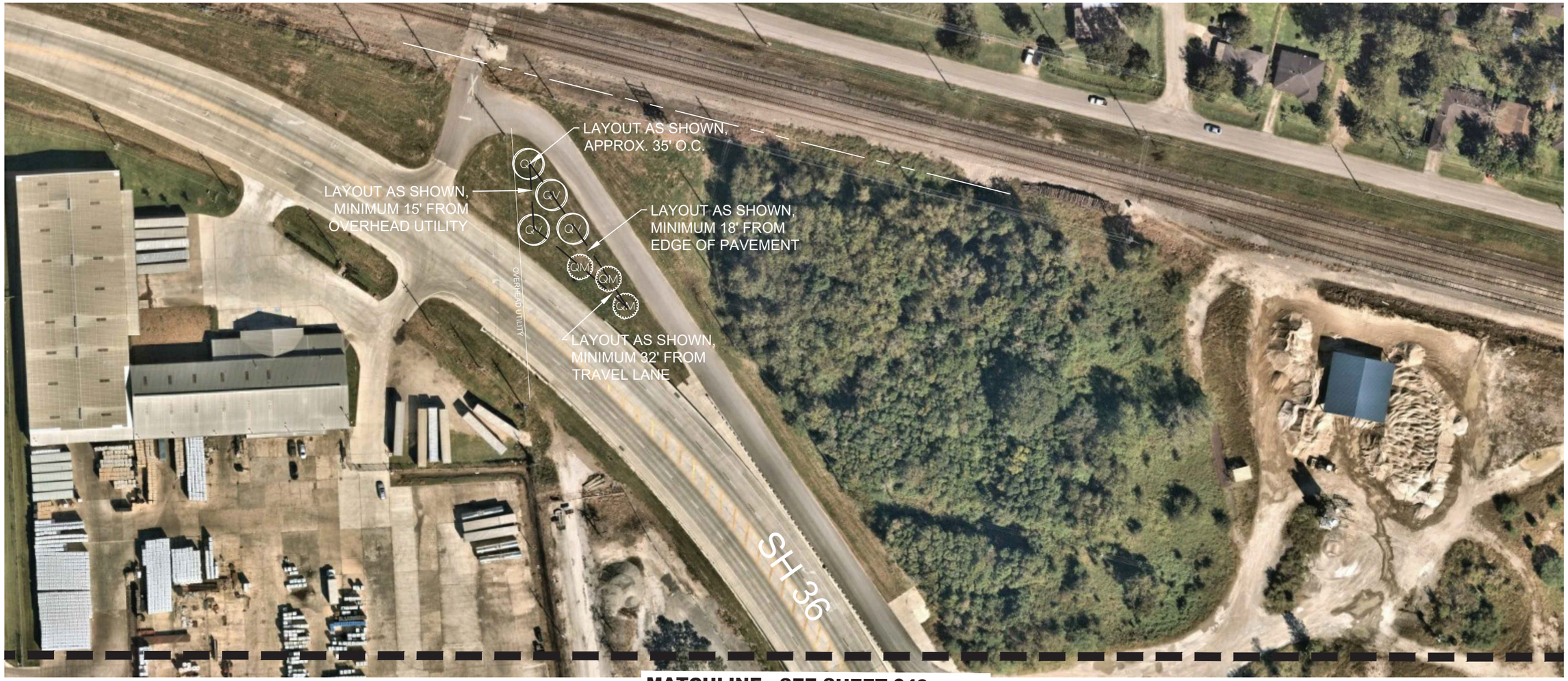

MATCHLINE - SEE SHEET 040

GENERAL NOTE:
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IRRIGATION NOTE:
1. NO PERMANENT IRRIGATION THIS SITE LOCATION
2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

90A SITE LOCATION

CSJ: 0027-06-063 SHEET 1 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			039
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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MATCHLINE - SEE SHEET 039

MATCHLINE - SEE SHEET 041

MATCHLINE - SEE SHEET 042

GENERAL NOTE:
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IRRIGATION NOTE:
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2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

90A SITE LOCATION

CSJ: 0027-06-063 SHEET 2 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			040
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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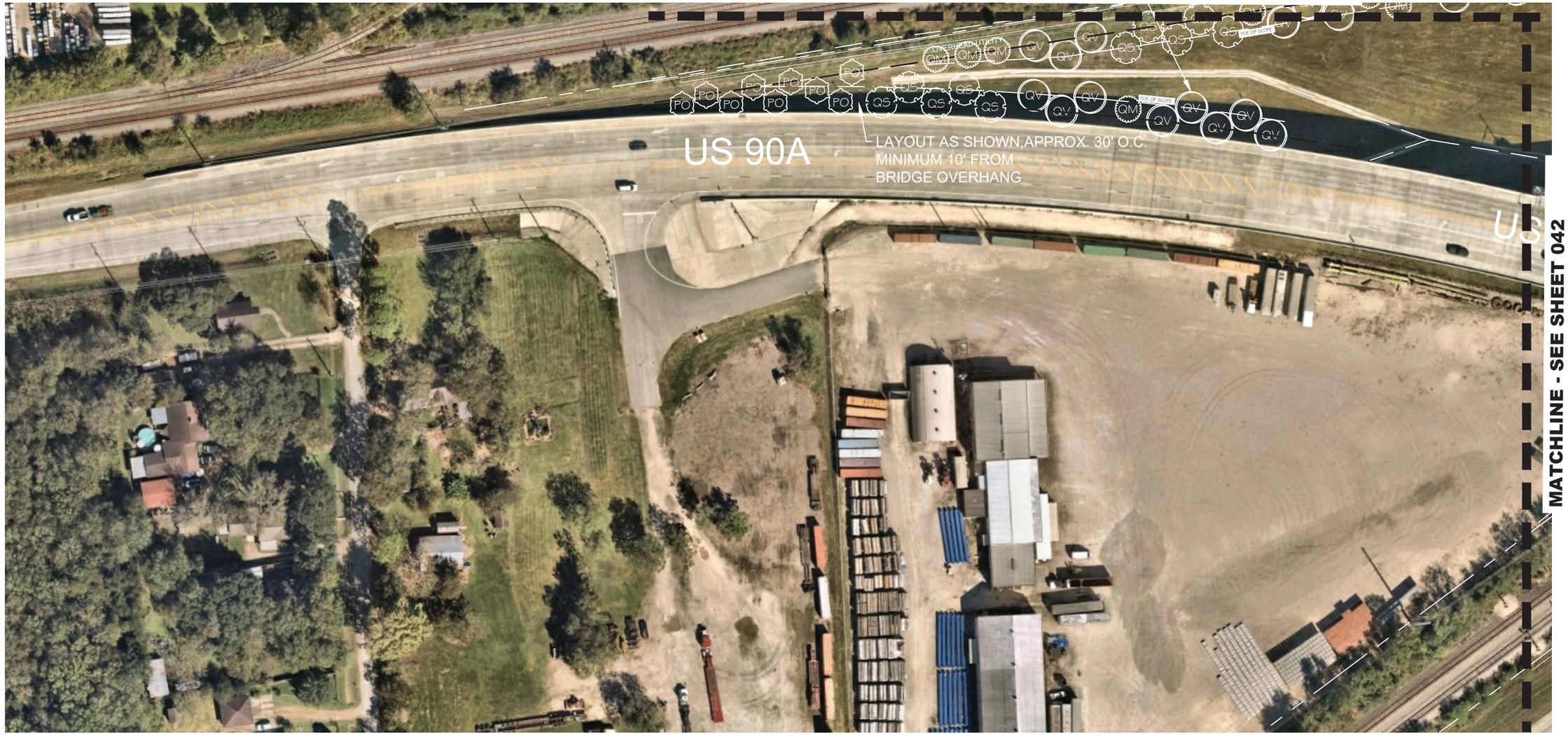
MATCHLINE - SEE SHEET 040



MATCHLINE - SEE SHEET 042

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3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

90A SITE LOCATION

CSJ: 0027-06-063 SHEET 3 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			041
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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08/14/2022 - 5:09PM
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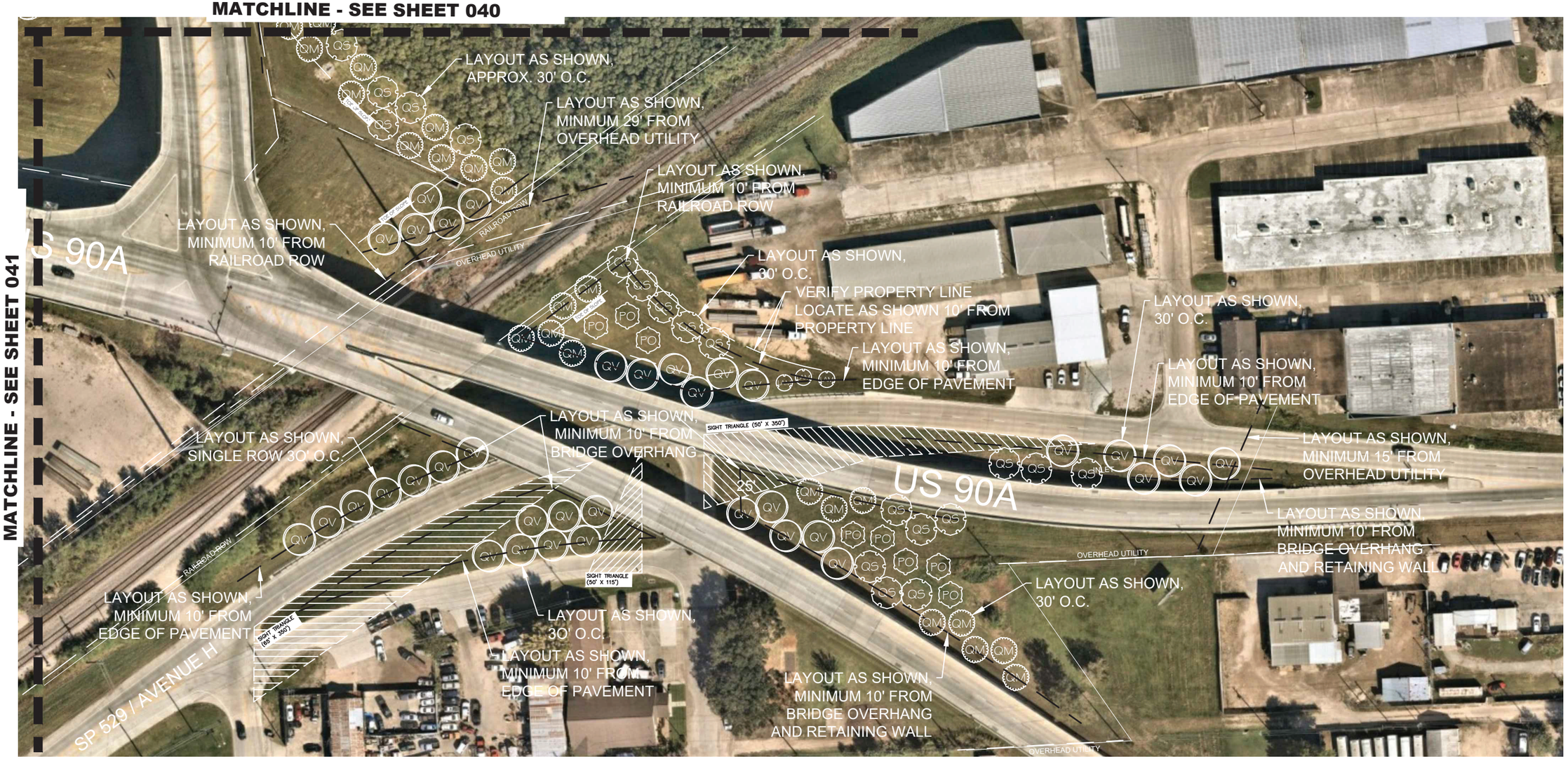

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3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

90A SITE LOCATION

CSJ: 0027-06-063 SHEET 4 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			042
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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IRRIGATION NOTE:
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2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

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

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 1 OF 13

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			043
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

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1791
STATE OF TEXAS
05/31/2022

Pacheco Koch
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Texas Department of Transportation

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 2 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			044
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

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1791
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05/31/2022

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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 3 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			045
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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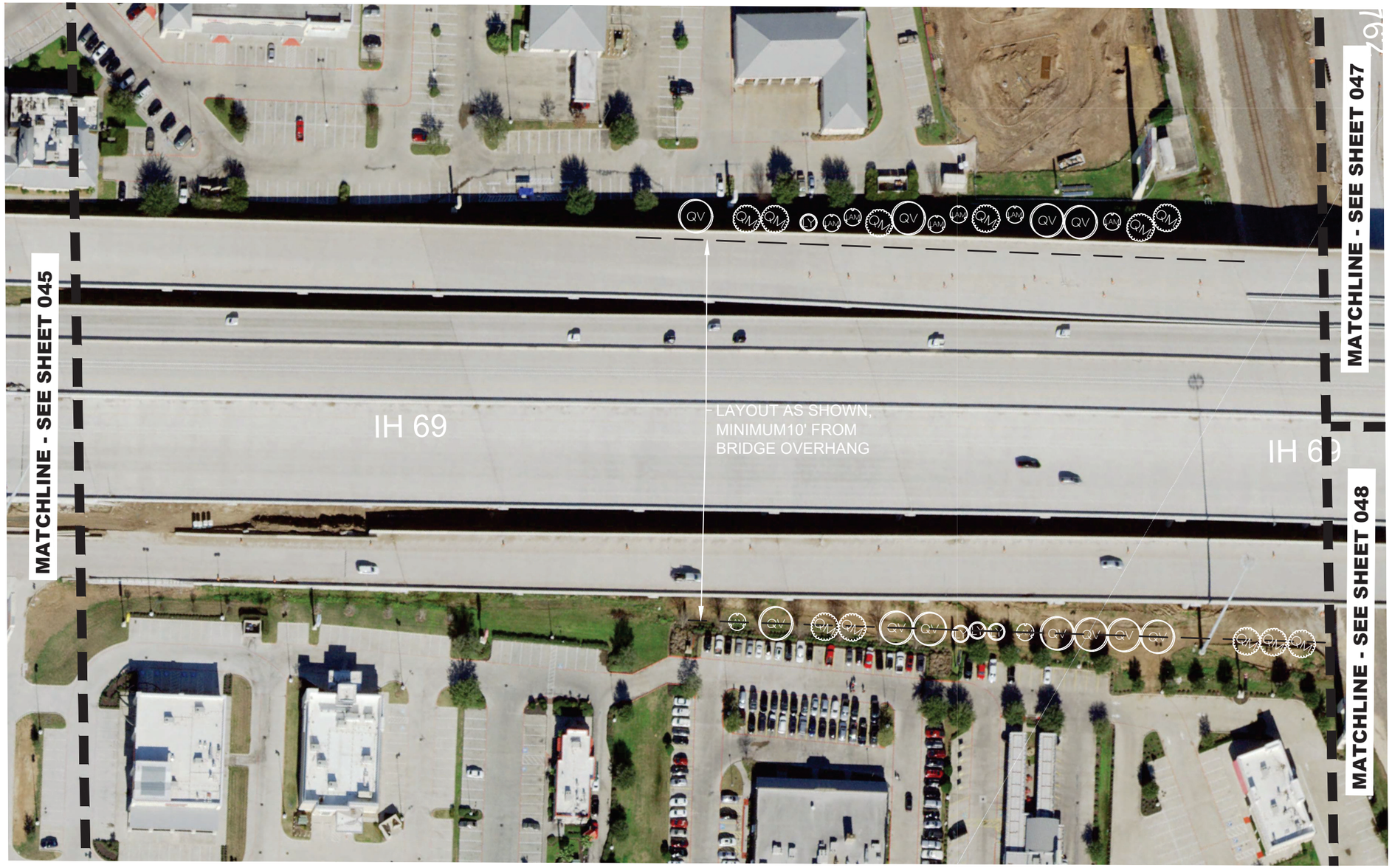

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STATE OF TEXAS
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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 4 OF 13

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			046
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

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2. EXISTING IRRIGATION SYSTEM TO BE EXPANDED TO INCORPORATE NEW PLANTING
3. EXISTING METERS TO REMAIN IN THE NAME OF THE ENTITY CURRENTLY RESPONSIBLE FOR WATER METERS
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5. REFERENCE SHEET 32, 63, 066 - 068

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REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
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05/31/2022

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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 5 OF 13

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			047
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

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MATCHLINE - SEE SHEET 047

MATCHLINE - SEE SHEET 046

IH 69

FM 762

SIGHT TRIANGLE (200' X 700')

SIGHT TRIANGLE (50' X 300')

SIGHT TRIANGLE (50' X 300')

LAYOUT AS SHOWN, MINIMUM18' FROM EDGE OF PAVEMENT

LAYOUT AS SHOWN, MINIMUM10' FROM EDGE OF SIDEWALK

LAYOUT AS SHOWN, MINIMUM 32' FROM TRAVEL LANE

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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 6 OF 13

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			048
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

Pacheco Koch
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Texas Department of Transportation

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 7 OF 13

FED. RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			049
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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Texas Department of Transportation

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 8 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		050

STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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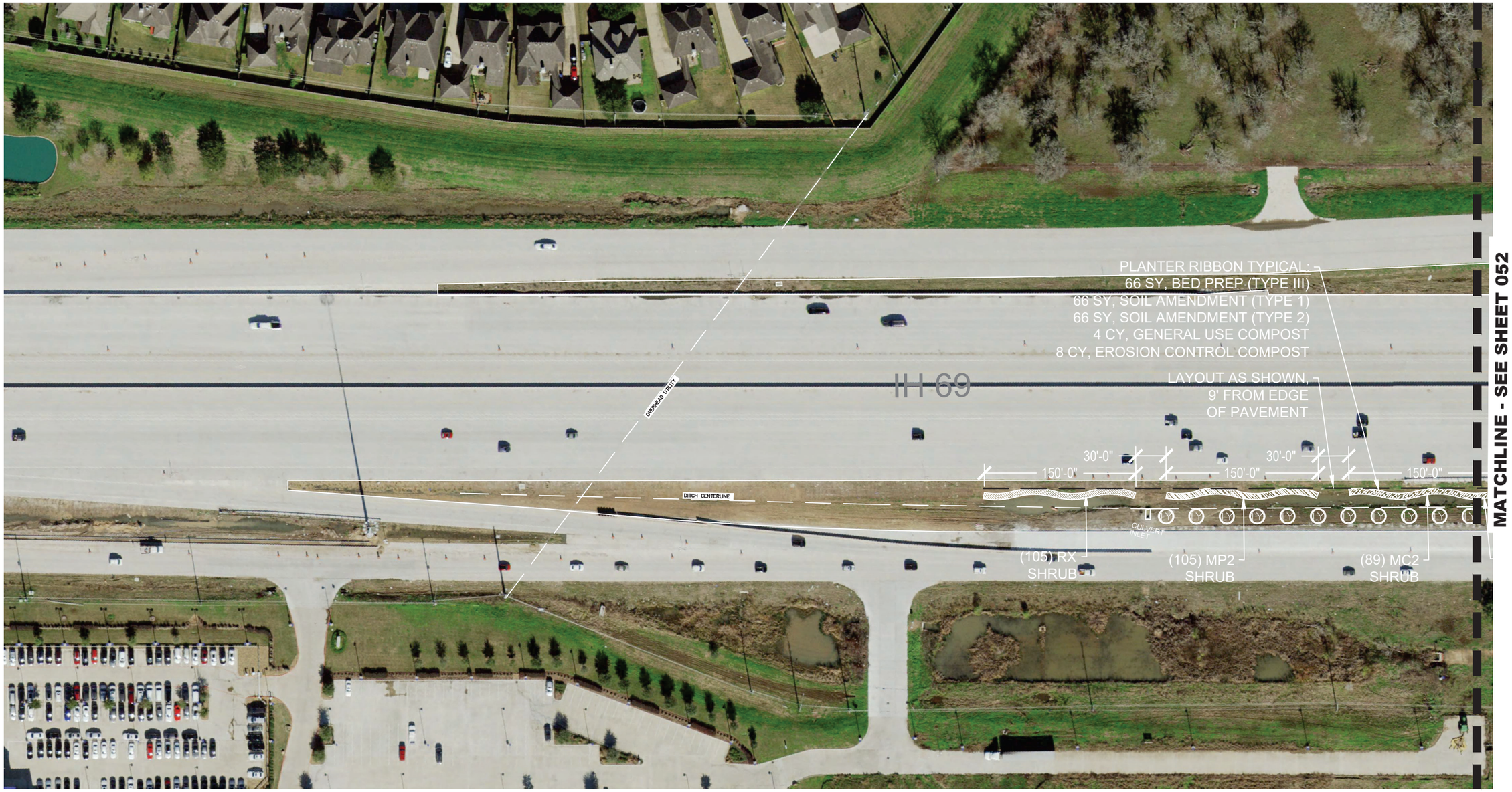

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IH 69 SITE LOCATION

CSJ: 0027-12-166 SHEET 9 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			051
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

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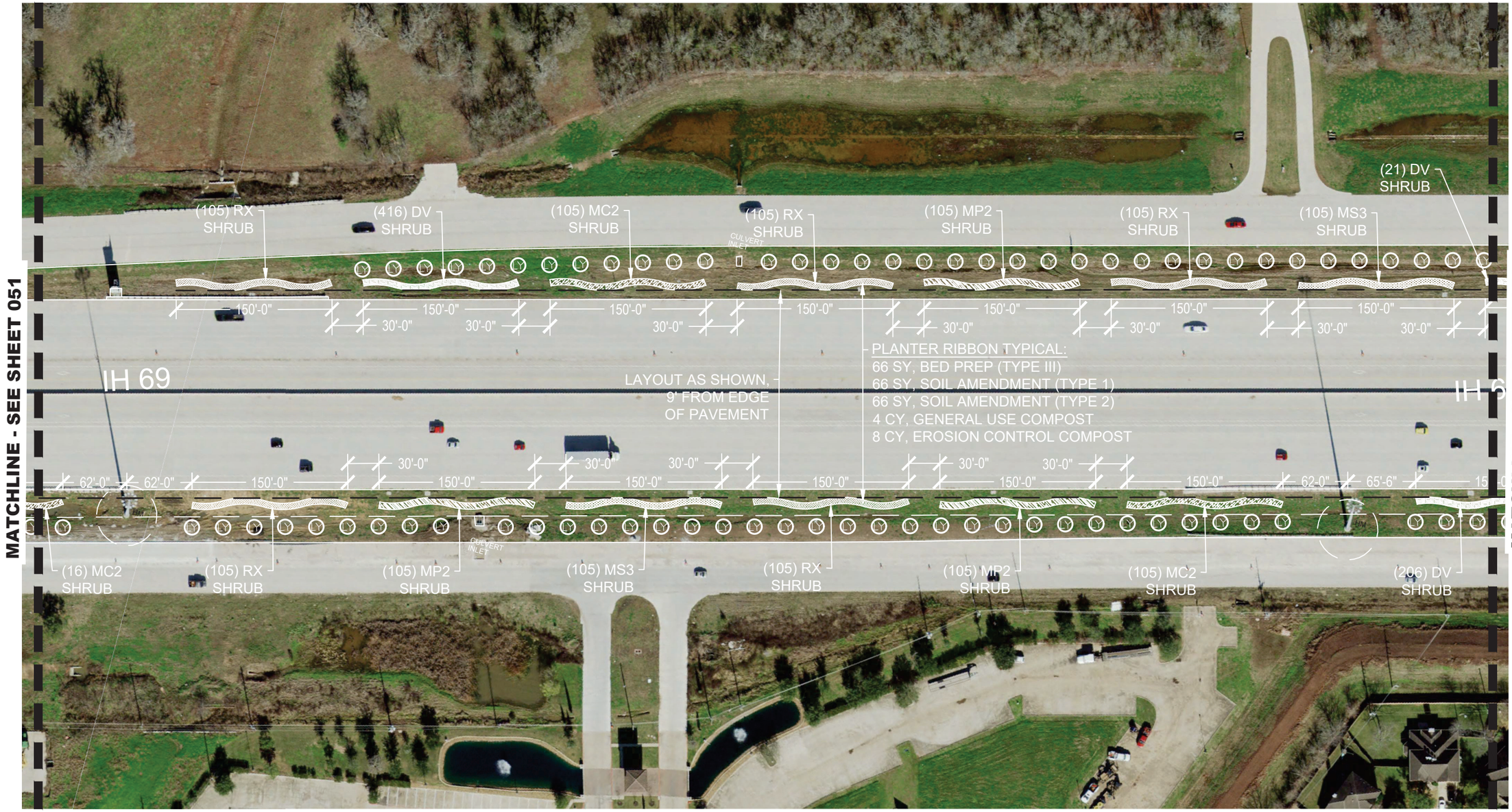

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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 10 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			052
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

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05/31/2022

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IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 11 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			053
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

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08/14/2022 - 5:14PM
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GENERAL NOTE:
1. PLANTING PLAN LAYOUT IS A DIAGRAMMATIC REPRESENTATION OF PROPOSED WORK AREAS.
2. REFERENCE PLANTING, ESTABLISHMENT AND MAINTENANCE LAYOUT SHEETS FOR LAYOUT DESCRIPTIONS, NOTATIONS, DIMENSIONS, DIAGRAMS AND INFORMATION NOT SHOWN HERE.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND STAKING LIMITS OF PLANTING IN ACCORDANCE WITH PLANS AND DETAILS.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND STAKING ALL UTILITIES, OFFSETS, STRUCTURES, ETC.
5. ADJUSTMENTS WILL BE MADE IN FIELD, AS DIRECTED BY ENGINEER, TO ACCOMMODATE SITE CONDITIONS.
6. ALL LOCATIONS WILL BE APPROVED BY ENGINEER PRIOR TO ANY BED PREPARATION WORK.

PLANTING NOTE:
1. REFERENCE SHEET 059 FOR PLANT DESCRIPTIONS, SIZES, AND NOTATIONS.
2. BED PREP LAYOUT IS INDIVIDUAL LAYOUT FOR ALL TREES UNLESS OTHERWISE SHOWN. SEE PLANTING AND ESTABLISHMENT SHEETS FOR LAYOUT REQUIREMENTS.

IRRIGATION NOTE:
1. NO PERMANENT IRRIGATION THIS SITE LOCATION
2. CONTRACTOR TO FOLLOW WATERING REQUIREMENTS ON PLANTING AND ESTABLISHMENT SHEETS
3. REFERENCE SHEET 066 - 068

0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS
05/31/2022

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.893.0103
TX REG. ENGINEERING FIRM F-469
TX REG. SURVEYING FIRM LS-10193805

Texas Department of Transportation

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 12 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			054
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO.
0027	12	166,ETC.	IH 69

MAY 2020

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GENERAL NOTE:

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0 50 100

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

Pacheco Koch
20329 STATE HIGHWAY 249, STE. 350
HOUSTON, TX 77070 281.883.0103
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Texas Department of Transportation

IH69 SITE LOCATION

CSJ: 0027-12-166 SHEET 13 OF 13

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			055
STATE	DISTRICT	COUNTY	
TEXAS	HOU	FORT BEND	
CONTROL	SECTION	JOB	HIGHWAY NO
0027	12	166,ETC.	IH 69

MAY 2020

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TYPE OF WORK — ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

SODDING	PERMANENT SEEDING	TEMPORARY SEEDING	Reference Item 161, 162, 164, 166, 168 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. Use latest Houston District, Special Provisions for those items indicated.		
	✓		161–6017 COMPOST MANUF TOPSOIL (BIP)(4") SY	APPLICATION RATE Item 161.2.1. Compost Manufactured Topsoil (CMT)	Item 161.2. Materials. Submit quality control (QC) documentation to the Engineer. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days per STA requirements). Lab analysis performed by an STA–certified lab must be dated within 30 days before delivery of the compost.
✓			162–6002 BLOCK SODDING SY	GRASS SPECIES Item 162.2. Materials. Common Bermuda (Cynodon Dactylon)	Item 162.2.1. Block Sod. Use block palletized or roll type sod. REMOVE PLASTIC BACKING FROM ROLL TYPE SOD. Place sod within 48 hours of delivery to site. No exceptions. Place sod with joints alternating on each row to prevent continuous joint lines. Peg sod as needed with wood pegs to hold sod in place. Pegging sod is subsidiary to Item 162.
	✓		164–6066 DRILL SEEDING(PERM)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Hulled – Bermudagrass (Cynodon dactylon) – 40.0 lbs PLS/acre; Foxtail Millet (Setaria italica) – 34.0 lbs PLS/acre; Green Sprangletop (Leptochloa dubia) – 4.0 lbs PLS/acre; Sideoats Grama (Bouteloua curtipendula) – 3.2 lbs PLS/acre; Little Bluestem (Schizachyrium scoparium) – 1.4 lbs PLS/acre November, December, January, February,: Unhulled – Bermudagrass (Cynodon dactylon)– 40.0 lbs PLS/acre; Oats (Avena sativa) – 72.0 lbs PLS/acre; Green Sprangletop (Leptochloa dubia) – 4.0 lbs PLS/acre; Sideoats Grama (Bouteloua curtipendula) – 3.2 lbs PLS/acre; Little Bluestem (Schizachyrium scoparium) – 1.4 lbs PLS/acre	PLS (Pure Live Seed) Provide documentation of PLS requirements per Item 164.2.1. CONSTRUCTION. Cultivate the area to a depth of 4 inches before placing the seed unless otherwise directed. When performing permanent seeding after an established temporary seeding, cultivate the seedbed to a depth of 4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans. Drill Seeding. Plant seed or seed mixture uniformly over the area shown on the plans at a depth of 1/4 to 1/3 inch using a cultipacker(turfgrass) type seeder. Plant seed along the contour of the slopes. Use broadcast seeding method where site conditions prevent drill seeding method. Broadcast Seeding. Distribute the dry seed or dry seed mixture uniformly over the areas shown on the plans using hand or mechanical distribution on top of soil.
	✓		164–6052 BROADCAST SEED(PERM)(SPECIAL MIX) SY Item 164.1. Description Provide and install seeding as shown on District Standard		
		✓	164–6051 DRILL SEED(TEMP)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Foxtail Millet (Setaria italica) – 34.0 lbs PLS/acre November, December, January, February,: Oats (Avena sativa – 72.0 lbs PLS/acre	
		✓	164–6009 BROADCAST SEED(TEMP)(WARM) SY Item 164.1. Description Provide and install seeding as shown on District Standard		
	✓	✓	162–6003 STRAW OR HAY MULCH SY	APPLICATION RATE Immediately after planting the seed or seed mixture, apply straw or hay mulch uniformly over the seeded area. Apply straw or hay mulch at 2 tons per acre. Use tacking agent with straw or hay mulch as described on this sheet.	Use straw or hay mulch in conformance with Article 162.2.5, "Mulch." Use biodegradable tacking agents only applied at a rate in accordance with manufacturer's recommendations. Use the following products or an approved equal(see note this sheet): Conweb/Contac Guar Gum, Profile Products Corporation, (307) 655–9565, Ramtec/Procol/Viscol Guar Gum, Ramtec Corporation, (800) 366–1180
✓	✓	✓	166–6001 FERTILIZER AC Item 166.2. Materials Use fertilizer as shown on District Standard	APPLICATION RATE Deliver and evenly distribute fertilizer at a rate of 4000 lbs/acre.	Use a NON–CHEMICAL fertilizer which meets all the following criteria: (1) BRAND NAME must be registered with the Texas State Chemist as a commercial fertilizer. (2) Meets USEPA guidelines for unrestricted use. (3) Derived from biological sources such as, but not limited to: sewage sludge, manures, vegetation, etc. (4) In granular form and essentially dust free. Submit proof of registration and nutrient source to Engineer. Use the following products or an approved equal(see note this sheet): Sigma, SIGMA AgriScience, 281–851–6749 Sustanite–standard grade, Automation Nation, Inc., 713–675–4999 Milorganite, MMSD, 800–287–9645 Agricultural Organic P/L, Ag Org, INC., 713–523–4396
✓	✓	✓	168–6001 VEGETATIVE WATERING MG	APPLICATION RATE Item 168.3 Construction. 6000 gallons/acre per working day X 20 consecutive working days = 120,000 gallons total/acre	Begin watering immediately after installation of seed or sod. Replace, fertilize, and water any seed or sod in poor condition due to the failure to apply the specified amount of water within the time allowed at no expense to the Department.

SEQUENCE OF WORK

BLOCK SOD	PERMANENT SEEDING	TEMPORARY SEEDING
1.FERTILIZER 2.CULTIVATE SOIL (ITEM 162.3) 3.SOD 4.VEGETATIVE WATERING	1.FERTILIZER 2.COMPOST MANUFACTURED TOPSOIL 3.CULTIVATE SOIL (ITEMS 164.3 AND 161.3.1) 4.PERMANENT SEEDING 5.STRAW OR HAY MULCH 6.VEGETATIVE WATERING	1.FERTILIZER 2.CULTIVATE SOIL (PER ITEM 164.3) 3.TEMPORARY SEEDING 4.STRAW OR HAY MULCH 5.VEGETATIVE WATERING

Texas Department of Transportation

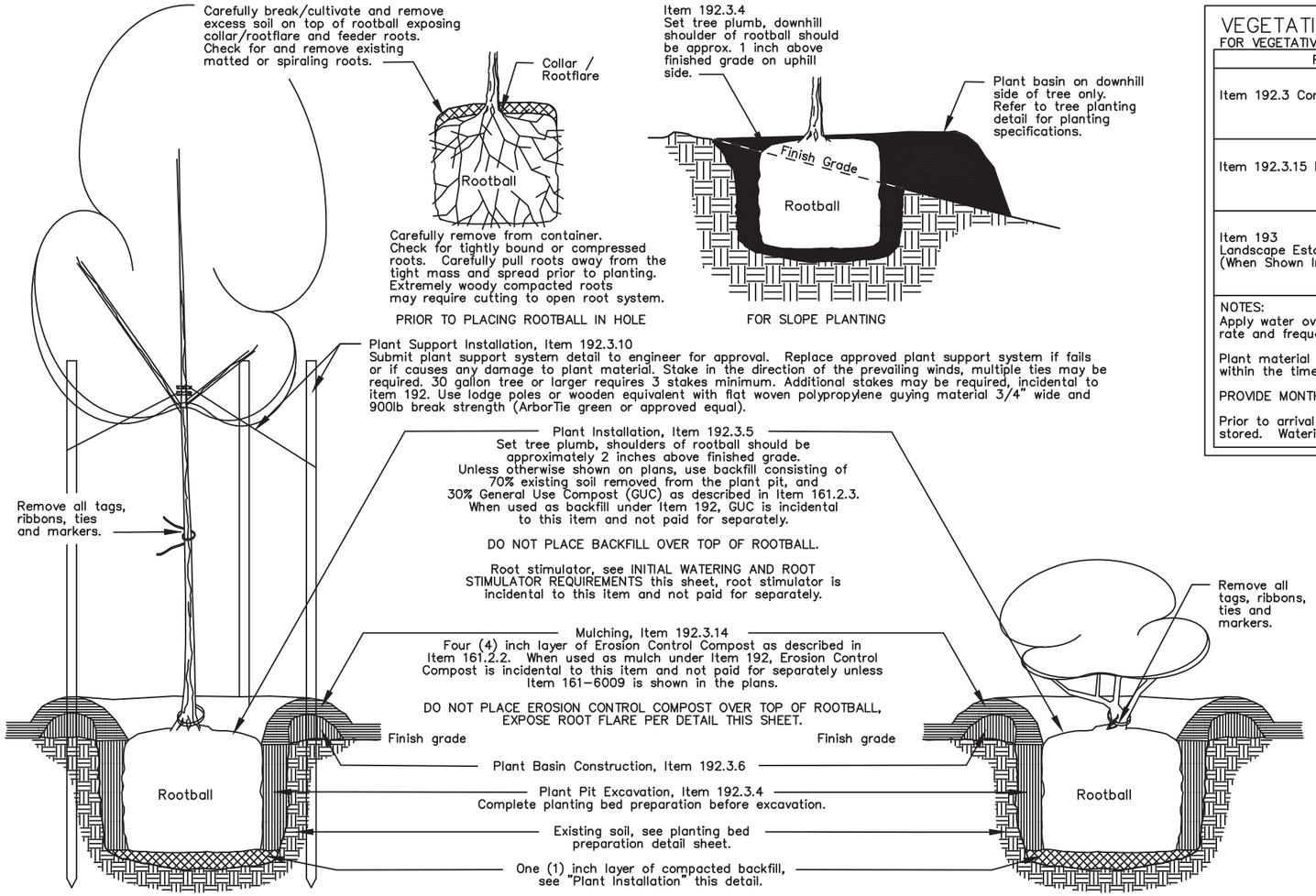
HOUSTON DISTRICT

FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER

SHEET 1 OF 1

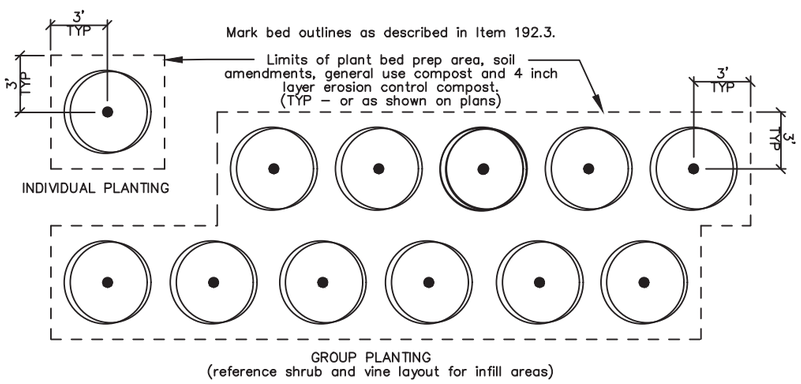
REVISIONS	FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
10/2014 UPDATED TO 2014 SPECS 3/2015 MINOR CORRECTIONS	OCT 2014	6	TEXAS				056
	ORIGINAL:	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
		HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K–1



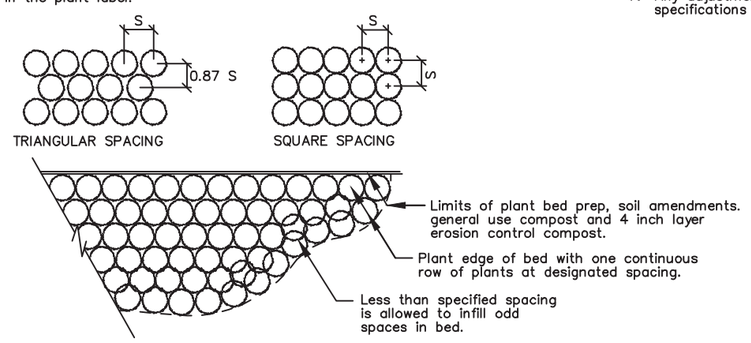
TREE PLANTING DETAIL

FOR PALM TREE PLANTING DETAIL SEE PLANTING AND ESTABLISHMENT SHEET 2 of 8



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

SHRUB AND VINE PLANTING DETAIL



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

VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES

FOR VEGETATIVE WATERING FOR PALMS ONLY SEE PLANTING AND ESTABLISHMENT SHEET 2 of 8

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 30 GAL = 16 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.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

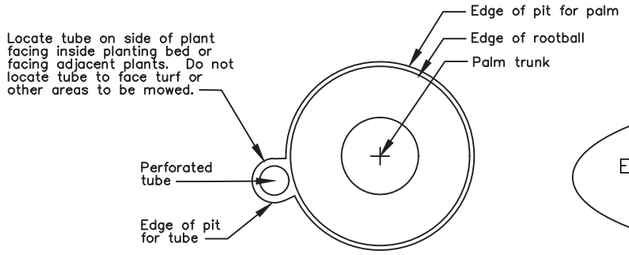
SHEET 1 of 8

Details not to scale

TREE & SHRUB

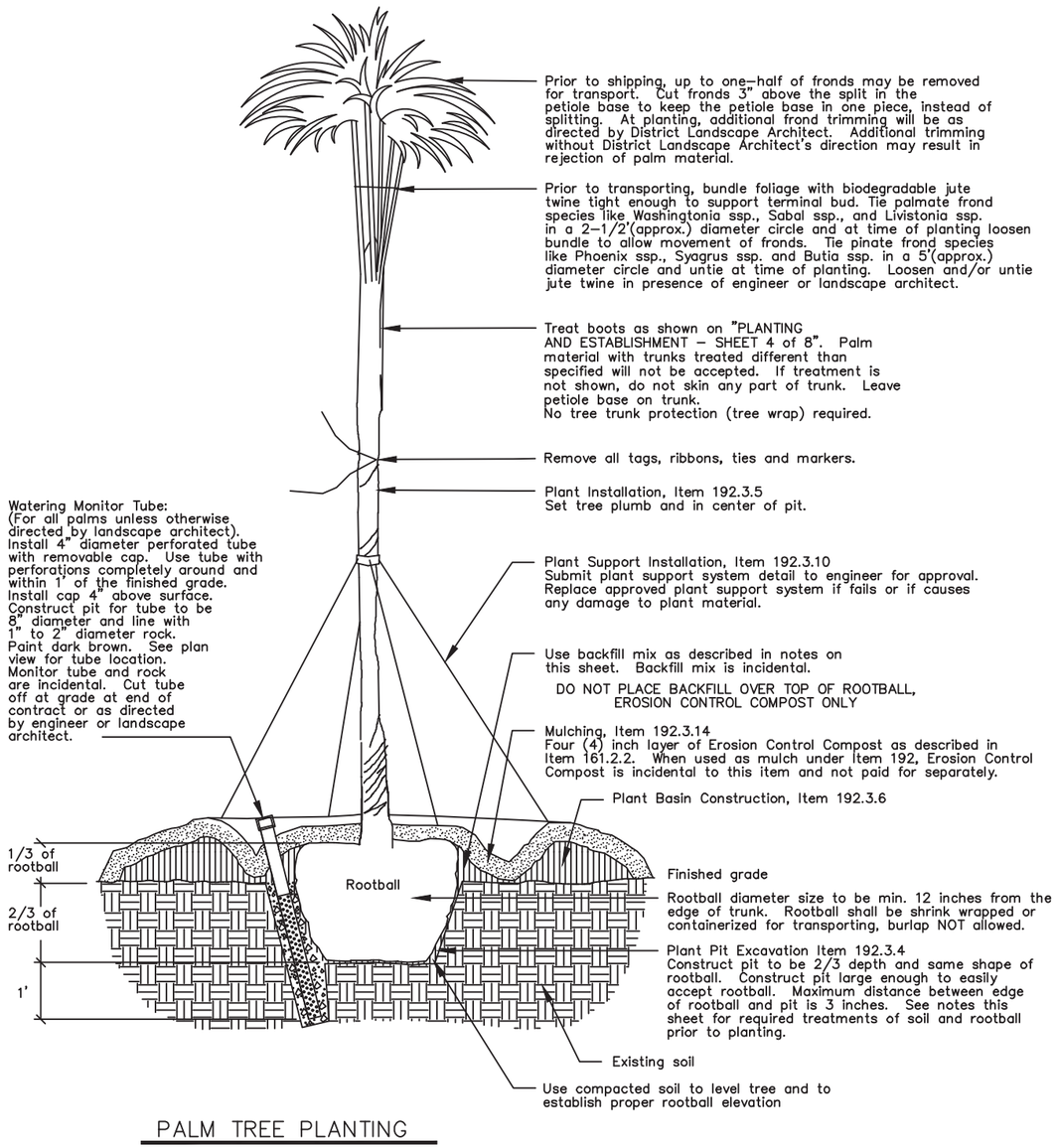
FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				057
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K-4



PLAN VIEW
PALM TREE AND PERFORATED TUBE

IF PALM MATERIAL FALLS TO THE GROUND DURING DELIVERY, CONSTRUCTION, ESTABLISHMENT, OR MAINTENANCE, IT IMMEDIATELY BECOMES THE PROPERTY OF THE CONTRACTOR AND MUST BE REPLACED AT CONTRACTOR'S EXPENSE.



PALM TREE PLANTING

VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY

PHASE	ITEM DESCRIPTION	FREQUENCY AND RATE
Item 192.3 Construction	Item 192.3.7. Watering is incidental to Item 192 and is not paid for separately	Maintain the root ball and surrounding backfill evenly moist, but never saturated. See notes this schedule. Submit watering schedule to engineer for approval prior to installation.
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.	

NOTES:

Apply water over the rootball within the tree well only. Adjust rate and frequency to meet site conditions and/or weather as approved or directed by engineer.

Monitor watering to maintain rootball and surrounding backfill evenly moist, but not saturated. Inspect monitor tubes and pump out standing water. Daily inspection and pumping is required when rootball is over-saturated by rain, run-off, watering or other events.

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.

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 19.3, 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. Roadway edges shown on the plans are to be considered the edge of travel lane unless labeled otherwise.
5. 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.
6. Repair and/or replace any damaged underground conduits and utilities at contractor's expense.
7. 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.
8. Repair and/or replace any damaged structures, pavement, riprap, equipment, materials, slopes, vegetation, and surfaces at contractor's expense.

PALM TREATMENTS, APPLICATIONS, AND SPECIALIST NOTES:

9. Treatments to plant material to ensure health and quality of plant from disease, stress, insects, or other detrimental impacts are incidental.
10. Applications of fertilizers, vitamins and hormones are incidental.
11. Multiple treatments and applications are incidental.
12. Required soil tests are incidental.
13. Palm specialists are incidental. Submit qualifications of palm specialist at preconstruction meeting for approval by engineer.

REQUIREMENTS PRIOR TO PLANTING:

14. Test pH of soil after bed preparation work is completed. Collect soil sample 18" below final surface. Provide results to landscape architect and palm specialist. Provide comments and recommendations from palm specialist to landscape architect. Desired soil pH is between 6.5 and 6.8. When soil pH is high, incorporate an approved aluminum sulphate into soil as recommended by manufacturer and pH test. Additional applications and pH testing may be required to adjust pH before and after planting.
15. Provide documentation from palm specialist verifying palm species, condition and health of all palm materials to engineer.
* 16. Spray foliage with an approved anti-desiccant.
17. Maintain rootball, trunk, and frond moisture conditions during transportation and storage activities.
* 18. Apply an approved soil fungicide to entire rootball.
19. For further information on identifying insects, diseases, and nutritional problems, the palm specialist will be contacted.

REQUIREMENTS AT TIME OF PLANTING:

* 20. Apply an approved aluminum based foliar fungicide to tops and bottoms of fronds and bud.
* 21. After fungicide has dried, apply an approved insecticide to the fronds and trunk.
* 22. After insecticide has dried, apply an approved anti-desiccant to the fronds and trunk.
23. Test soil for pH level and treat as specified in previous notes on this sheet.
* 24. Incorporate "Palm Saver" or an approved equal palm fertilizer into the backfill around the rootball.
25. When backfilling around rootball, work backfill equally around rootball in 6" lifts to eliminate air pockets.
* 26. Soak each lift up to finish grade using an approved liquid form of vitamins and hormones specifically for palms diluted with water at a ratio recommended by manufacturer. Use a liquid which contains but is not limited to Mg and Mn.
27. Use backfill consisting of the following: 70% existing soil removed from the plant pit and 15% Erosion Control Compost as described in Item 161.2.2 Compost and 15% rock limited to 1 inch to 1-1/2 inch. Work backfill equally around the rootball as described in previous notes on this sheet. Rock and compost are incidental.
28. Use Erosion Control Compost for surface application for palm planting as described in Item 161.2.2 Compost. Compost for surface application for palm planting is incidental.
29. Maintain soil moisture conditions as specified in watering schedule on this sheet.

REQUIREMENTS AFTER PLANTING:

30. Every 4 months, test soil for pH level and treat as specified in previous notes on this sheet. Provide the pH soil test report shall be provided to Landscape Architect and Palm Specialist in order to determine type and amount of fertilizer.
* 31. Fertilize palms every 4 months with a combination of "Palm Saver", K and Mg in liquid form with granular form of K and Mg sulfates.
32. Apply all granular palm fertilizers by drilling 10" into soil around rootball.
* 33. Application of fertilizers and micronutrients may be adjusted according to soil and palm conditions.
34. Maintain watering and soil moisture conditions as specified on this sheet.
35. For further recommendations for treatment of insects, diseases, and nutritional problems, contact palm specialist.
36. At anytime remove any/all dead fronds as directed.

* Complete this work in the presence of the engineer.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

SHEET 2 of 8

Details not to scale

PALM TREE

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				058
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K-4

SPECIFICATIONS (PLANT MATERIAL MUST CONFORM TO ALL SPECIFICAT					MINIMUM SPECIFICATIONS				
Abbr	**Botanical Name**	**Common Name**	**Color**	**Qty**	**Root Cond**	**Caliper**	**Height**	**Spread**	**Remarks**
TREES									
CI	CARYA ILLINOINENSIS	PECAN	N/A	3	65 GAL	2"	8'	4'	SINGLE , STRAIGHT LEADER, MATCHING, FULL
QM	QUERCUS MACROCARPA	BURR OAK	N/A	71		3"	12'	6"	
QS	QUERCUS SHUMARDI	SHUMARD OAK	N/A	65					
QV	QUERCUS VIRGINIANA	LIVE OAK	N/A	301					
			TOTAL	**440**					
TD	TAXODIUM DISTCHUM	BALD CYPRESS	N/A	15	45 GAL	2.5"	8'	3.5'	SINGLE, STRAIGHT LEADER, MATCHING, FULL
			TOTAL	**15**					
IS	ILEX X ATTENUATA 'SAVANNAH'	SAVANNAH HOLLY	N/A	57	30 GAL	2"	6'	2'	SINGLE, STRAIGHT LEADER, MATCHING, FULL, LIMBS TO GROUND
MG	MAGNOLIA GRANDIFLORA	SOUTHERN MAGNOLIA	WHITE	20		2"	7'	3'	
ML	MAGNOLIA GRANDIFLORA 'LITTLE GEM'	LITTLE GEM MAGNOLIA	WHITE	18		2"	6'	2'	
PT	PINUS TAEDA	LOBLOLLY PINE	N/A	41		2"	7'	3'	SINGLE , STRAIGHT LEADER, MATCHING, FULL
PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	N/A	39		2"	8'	3'	
UC	ULMUS CRASSIFOLIA	CEDAR ELM	N/A	13		2"	7'	3'	
LAM	LAGERSTROMIA X 'MUSKOGEE'	MUSKOGEE CREPE MYRTLE	PURPLE	54		1.5"-2" average	6'	5'	MULTI-TRUNK, 3 CANES, MATCHING, FULL
LY	LAGERSTROMIA X 'YUMA'	YUMA CRAPE MYRTLE	PINK	304					
			TOTAL	**546**					
SHRUBS									
IV3	ILEX VOMITORIA	YAUPON HOLLY	N/A	23	10 GAL		24"	24"	SHRUB FORM, FULL, MATCHING
MC	MORELLA CERIFERA	DWARF WAX MYRTLE	N/A	23					
			TOTAL	**46**					
DV	DIANELLA CAERULEA 'VARIEGATA'	VARIEGATED FLAX LILY	N/A	1664	3 GAL		6"	6"	FULL, MATCHING
DB2	DIETES BICOLOR	FORTNIGHT LILY	PURPLE	274					
HP3	HESPERALOE PARVIFLORA	RED YUCCA	RED	366			12"	12"	
LG2	LOROPETALLUM CHINENSIS	CHINESE FRINGE FLOWER	PINK	244					
MS3	MISCANTHUS SINENSIS 'ADAGIO'	ADAGIO GRASS	N/A	420					
MC2	MUHLENBERGIA CAPILLARRIS	PINK MUHLY GRASS	N/A	735					
MP2	MYRICA PUSILLA	DWARF WAX MYRTLE	N/A	840					
RX	ROSA X KNOCKOUT	KNOCKUT ROSE	RED	1260					
			TOTAL	**5803**					

*

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.
12. Refer to the plans, details and specifications for information and requirements associated with plant material not shown.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT
SHEET 3 of 8

PLANT SPECIFICATIONS

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				059
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

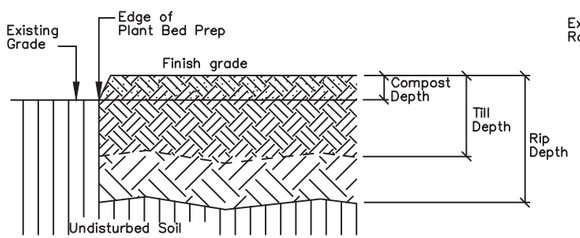
TYPE OF WORK

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 5 of 8 For Requirements	
				1006–6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY	See PLANTING AND ESTABLISHMENT SHEET 5 of 8 For Requirements	
✓	✓	✓	✓	1006–6005 LANDSCAPE SOIL AMENDMENT (TYPE V) 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: 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.	

GENERAL BED PREPARATION NOTES:

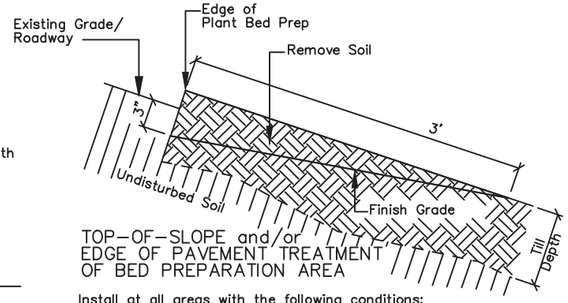
1. Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
2. Reference Item 192.3 mark plant locations and bed outlines.
3. Locate and stake all underground conduits 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.



PLANTING BED PREPARATION SECTION

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

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



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.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

SHEET 4 of 8

Details not to scale

BED PREPARATION

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				060
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

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

Texas Department of Transportation
HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

SHEET 5 of 8

Details not to scale

COMPOST TEA/EXTRACT

FILE:	FED DIV	STATE	PROJECT NUMBER				SHEET
	6	TEXAS					061
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB		HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC		IH 69

STD K–4

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 2 of 8 VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
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 SHEET 7 OF 8.
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 7 of 8 For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
PLANT SUPPORTS See PLANTING AND ESTABLISHMENT SHEET 5 of 8 For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
PRUNING (Includes palm plant material and dead, diseased, or damaged palm fronds.)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
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 SHEET 7 OF 8.
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 SHEET 7 OF 8.
TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL (Not applicable)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
PLANT REPLACEMENT *	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
1006–6004 SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
1006–6005 SOIL AMENDMENT (TYPE V) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
FERTILIZER (Only when Item 192 Palm Material is part of the contract, see PLANTING AND ESTABLISHMENT SHEET 2 of 8, REQUIREMENTS AFTER PLANTING)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.
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)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 8.

* 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.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

SHEET 6 of 8

PROJECT CONDITIONS

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				062
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K–4

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 8, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES) and/or (See PLANTING AND ESTABLISHMENT SHEET 2 of 8 VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
192.3.15.2. 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				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
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)				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.–6002 PLANT MAINTENANCE * (LOCATION: IH69/FM762, EXISTING LANDSCAPE)				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.–6007 IRRIGATION SYSTEM OPER MAINT * (LOCATION: IH69/FM762, EXISTING LANDSCAPE)				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
1006–6004 SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)				AFTER FIRST FOLIAR APPLICATION AS DESCRIBED ON PREVIOUS SHEET, APPLY SECOND FOLIAR 120 CALENDAR DAY AFTER FIRST FOLIAR, THEN APPLY THIRD FOLIAR 180 CALENDAR DAYS AFTER SECOND FOLIAR (ONLY USE THIS SCHEDULE IF WITHIN CONTRACT TIME).																																												
1006–6005 SOIL AMENDMENT (TYPE V) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)	✓																																												✓			
FERTILIZER (Only when Item 192 Palm Material is part of the contract, see PLANTING AND ESTABLISHMENT SHEET 2 of 8, REQUIREMENTS AFTER PLANTING)																✓																✓																✓
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.
Contract er 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.

Texas Department of Transportation

HOUSTON DISTRICT

PLANTING AND ESTABLISHMENT

SHEET 7 of 8

MAINTENANCE

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				063
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K–4

ITEM 193 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.

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

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 (Only when Item 192 Palm Material is part of the contract, see PLANTING AND ESTABLISHMENT SHEET 2 of 8, REQUIREMENTS AFTER PLANTING)																✓																✓																✓
193.3.1.4. WEED CONTROL REQUIREMENT ☐ ☑	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) ☐ 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 *				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓				✓
193.3.3.	VEGETATIVE WATERING (See PLANTING AND ESTABLISHMENT SHEET 1 of 8, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES) and/or (See PLANTING AND ESTABLISHMENT SHEET 2 of 8 VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
193.3.4.	IRRIGATION SYSTEM OPERATION AND MAINTENANCE		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
1006–6004	SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)				SEE PREVIOUS SHEET FOR FOLIAR APPLICATION SCHEDULE.																																												
1006–6005	SOIL AMENDMENT (TYPE V) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)																																									✓							
	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)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

* 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.

Texas Department of Transportation

HOUSTON DISTRICT

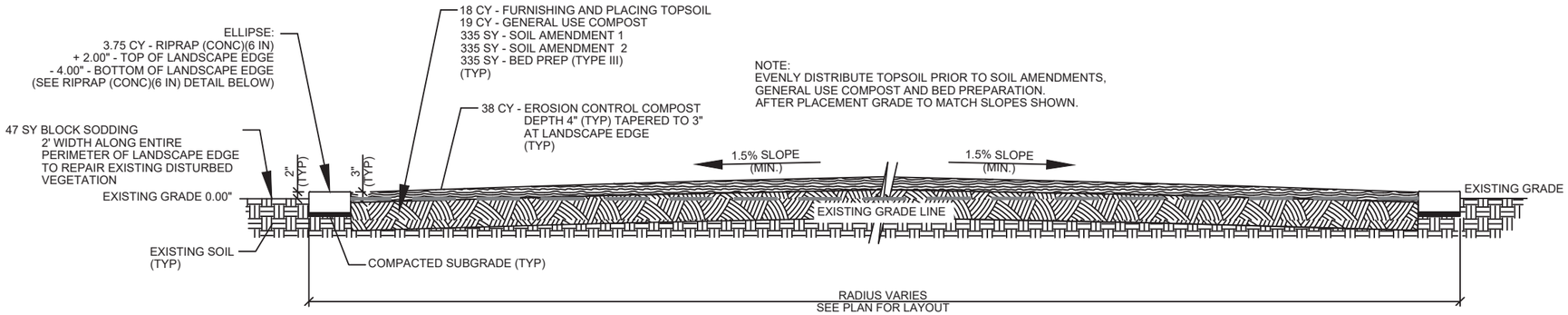
PLANTING AND ESTABLISHMENT

SHEET 8 of 8

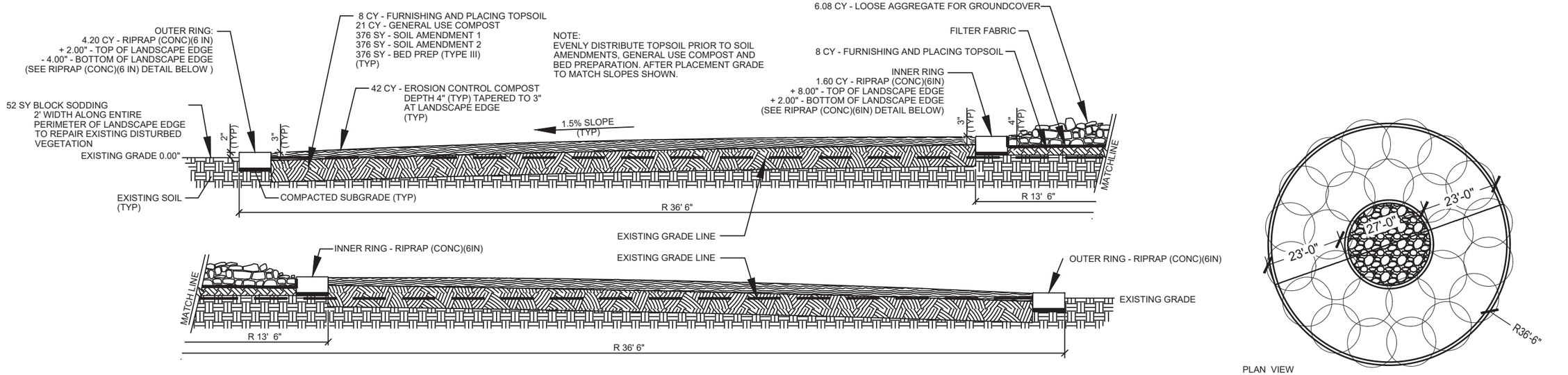
ESTABLISHMENT

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				064
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K–4



PLANTING AREA A – 432 6003 RIPRAP (CONC)(6IN) AS LANDSCAPE EDGE



PLANTING AREA B – 432 6003 RIPRAP (CONC)(6IN) AS LANDSCAPE EDGE

(WILLIAMS WAY BLVD / RICHMOND PRKY and SH 99 locations)

Item 432–6003 RIPRAP (CONC) (6IN)

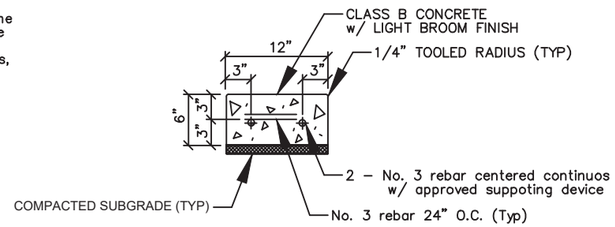
GENERAL NOTES:
1. Reference Item 420 Concrete Substructures of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
   NOTE: Item 420 references several other standard specifications required as part of this Item (ex: ASTM and DMS).
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 construction period of the contract. Remove stakes when directed by Engineer.
4. Repair and/or replacement of any damaged underground conduits or utilities, structures, pavement, riprap, equipment, materials, slopes, vegetation, surfaces, etc. at no expense to the Department.

MATERIALS:
1. Use "Class B" concrete for riprap (conc)(6in) shown in detail.

CONSTRUCTION METHODS:
1. Locate and stake all items and/or limits of riprap (conc)(6in) and related work in the field. Receive approval from Engineer prior to continuing.

Item 1005–6001 LOOSE AGGREGATE FOR GROUNDCOVER (TYPE I) CY

GENERAL NOTES:
1. Placed in field as shown on plans.
2. 3" – 5" crushed concrete.
3. Filter fabric shall be used under loose aggregate type 1, filter fabric is incidental to this item and not paid for separately.
4. Submit samples of aggregate and fabric to district landscape architect for approval prior to any work.



432 6003 RIPRAP (CONC) (6 IN)

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

NTS

LANDSCAPE EDGE DETAILS

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			065
STATE	DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	12	166,etc	IH 69

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

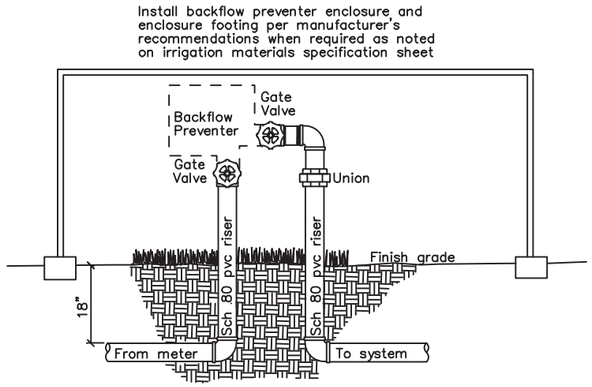
1. Reference Item 170 of the Texas Standard Specifications for Construction and Maintenance of Highways,Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
2. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS 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 diagrammatic 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.
9. Existing operating meters remain responsibility of others.
10. Existing non–operating meters will be placed in name of contractor for duration of contract. all costs, fees, permits, inspections, and billing costs are responsibility of contractor and are incidental and will not be paid separately.

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

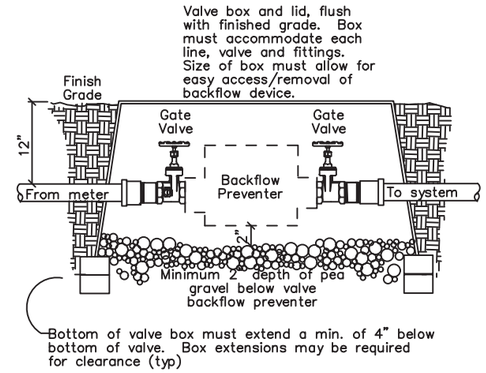
1. Maintenance period. Inspect irrigation system concurrently with, and subject to the same maintenance requirement period under Items 192 and 193. During the installation and maintenance period perform the following activities as a minimum and to the satisfaction of the engineer: A)Install and maintain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

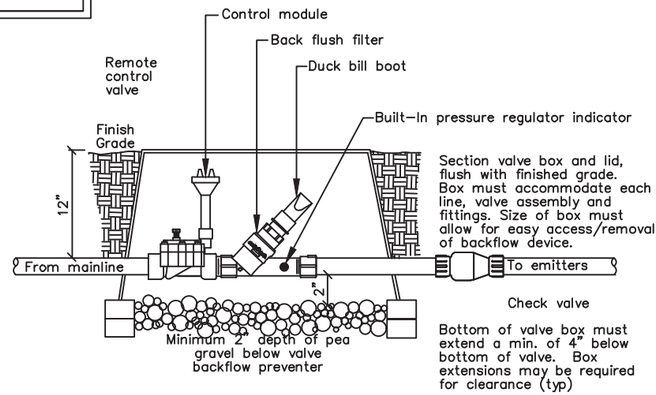
Type shall meet local code. Local code will have precedence over this detail.

OR

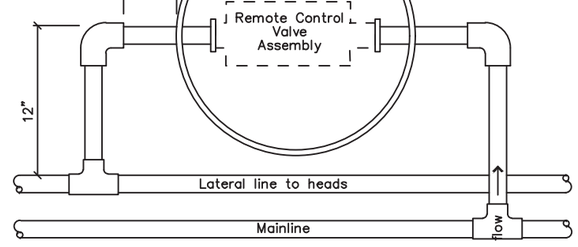


BACKFLOW PREVENTER IN GROUND INSTALLATION

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

05/31/2022

Texas Department of Transportation

HOUSTON DISTRICT

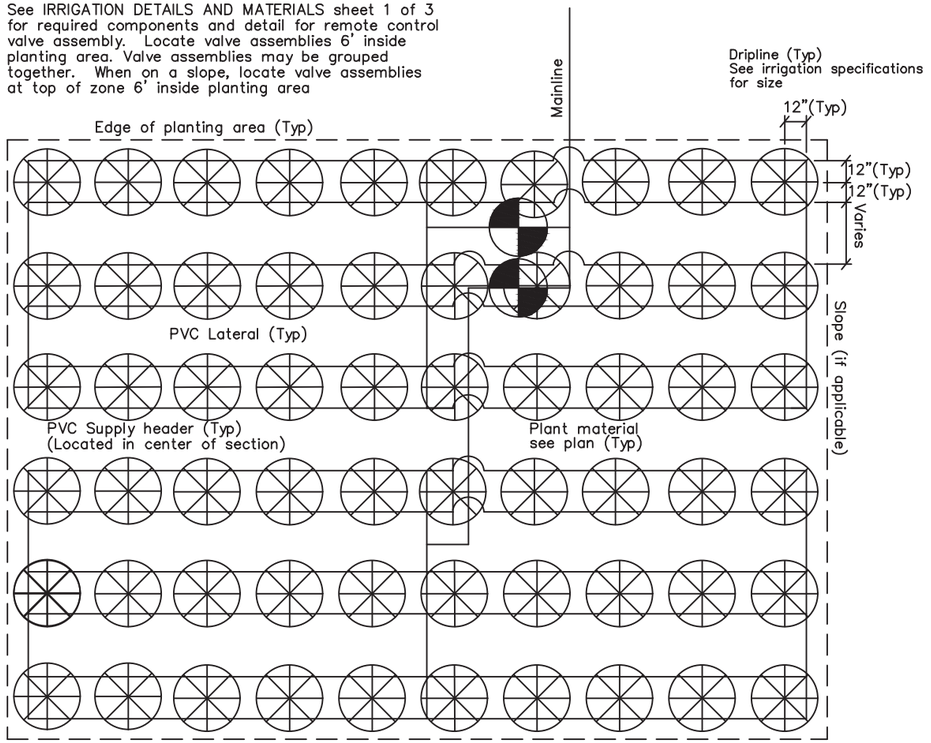
IRRIGATION DETAILS AND MATERIALS (MODIFIED) SHEET 1 OF 3

Details not to scale

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				066
REVISED: FEB 2015 for 2014 specs.	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

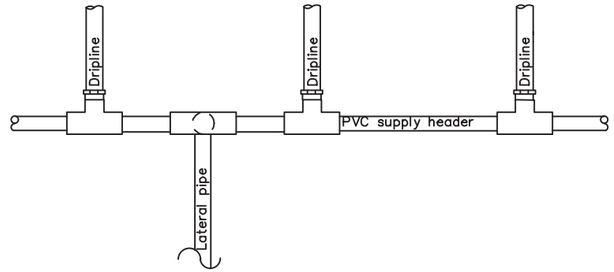
STD K–5

See IRRIGATION DETAILS AND MATERIALS sheet 1 of 3 for required components and detail for remote control valve assembly. Locate valve assemblies 6' inside planting area. Valve assemblies may be grouped together. When on a slope, locate valve assemblies at top of zone 6' inside planting area

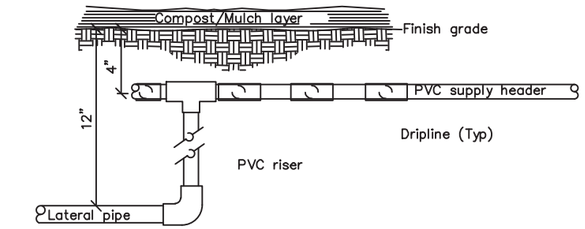


Dripline Section (Typ) will be approx. equal to other section sizes. When spaced on slopes, locate and size as shown in plans

Dripline Section (Typ) will be approx. equal to other section sizes. When spaced on slopes, locate and size as shown in plans



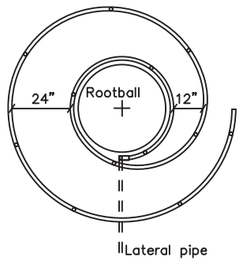
PLAN – RISER/SUPPLY HEADER TO DRIP TUBING



SECTION – RISER/SUPPLY HEADER TO DRIP TUBING

DRIPLINE INSTALLATION – GROUP PLANTING

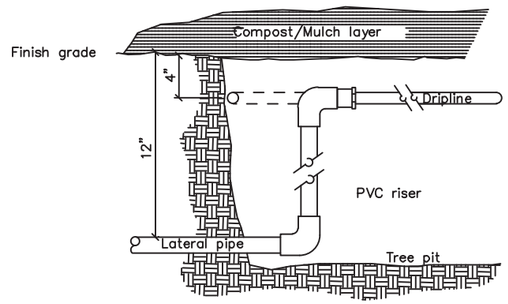
Note: When dripline sections are installed on slopes, schedule controller such that lower sections on slope are operating for shorter lengths of time. Contact engineer and landscape architect for setting length of timed dripline section operation. Total number of emitters and laterals will not allow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



Install dripline as one piece spiralled around rootball with dimensions shown. Inner ring of drip tubing at edge of rootball may be wrapped around rootball

End cap (Typ)

Dripline length will be long enough to have minimum 12 emitters



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

05/31/2022

Texas Department of Transportation

HOUSTON DISTRICT

IRRIGATION DETAILS AND MATERIALS (MODIFIED)

SHEET 2 OF 3

Details not to scale

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				067
REVISED: FEB 2015 for 2014 specs.	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	REMARKS
TAP/METER	LOCAL CODE	SUBMIT SIZE FOR APPROVAL	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 I ☒ ☐ 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")	MATCH EXISTING IRRIGATION SYSTEM		
CONTROL VALVE Battery powered valve.	MATCH EXISTING IRRIGATION SYSTEM		
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.
3. Submit all material information to TxDOT Landscape Architect for approval prior to procurement and work.

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

Texas Department of Transportation

IRRIGATION DETAILS
AND MATERIALS
(MODIFIED)

SHEET 3 OF 3

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				068
REVISED: FEB 2015 for 2014 specs.	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HOU	FORTBEND	0027	12	166, ETC	IH 69

STD K–5

SITE DESCRIPTION

PROJECT LIMITS: Various locations from 500' West of Reading Road to Greatwood Parkway.

PROJECT DESCRIPTION: For the construction of landscape and scenic enhancements, consisting of landscape development.

MAJOR SOIL DISTURBING ACTIVITIES: Placing concrete riprap as landscape edge, plant bed preparation (soil amendments and general use compost), installing irrigation system, placing plant material and erosion control compost.

TOTAL PROJECT AREA: 1.60 AC

TOTAL AREA TO BE DISTURBED: 1.60 AC

WEIGHTED RUNOFF COEFFICIENT: (AFTER CONSTRUCTION): Runoff coefficient will remain the same.

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: The existing soils consist of clay and clay loam present to a depth of 2 feet at the surface.

NAME OF RECEIVING WATERS: Brazos River, Rabbs Bayou

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

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

OTHER:

STRUCTURAL PRACTICES:

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

OTHER:

NARRATIVE – SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES: N/A

STORM WATER MANAGEMENT:

Construction storm water management:
Any sediment control devices in addition to the existing storm water management controls will be installed before construction begins.
Storm water drainage will be provided by the existing systems.

Post construction storm water management:
No additional storm water control devices will remain after this work is completed.

OTHER EROSION AND SEDIMENT CONTROLS:

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

INSPECTION: All inspections will be performed by a TxDOT inspector per one of the options below as directed by the Area Engineer
1. At least every 7 calendar days
2. At least every 14 days or after 0.5 inches or more of rainfall
An inspection and maintenance report should be made for each inspection. Based on the inspection results, the controls shall be revised according to the inspection report.

WASTE MATERIALS: The dumpster used to store all waste material will meet all state and local city solid waste management regulations. All trash and construction debris will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation and the trash will be hauled to a local dump. No construction waste material will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): In the event of a spill which may be considered hazardous, the Houston District Safety Office shall be contacted immediately at 713–802–5962.

SANITARY WASTE: All Sanitary Waste will be collected from the portable units as necessary or as required by local regulations by a licensed sanitary waste management contractor.

OFFSITE VEHICLE TRACKING:

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

OTHER:

REMARKS: Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the sediment that may enter receiving waterways. Disposal areas shall not be located in any waterway, waterbody or streambed. Construction staging areas and vehicle maintenance areas shall be constructed by the contractor in a manner which minimizes the runoff of all pollutants. All waterways shall be cleared as soon as practical of temporary embankments, temporary bridges, matting, falsework, piling, debris, and other obstructions placed during construction operations that are not part of the finished work.

REGISTERED LANDSCAPE ARCHITECT
DANA DEAN COTE
1791
STATE OF TEXAS

05/31/2022

Texas Department of Transportation
Houston District

TxDOT STORM WATER POLLUTION PREVENTION PLAN

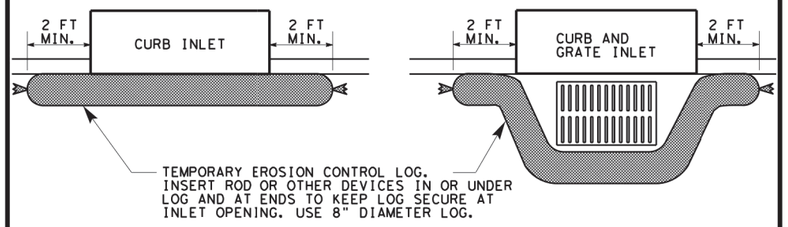
SWP3

FILE: STDG1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
©TxDOT JANUARY 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		069
9/2010 INSPECTION NOTE 9/2013 INSPECTION NOTE 11/2013 SWSP TO SWP3 03/2015 2014 SPECS	COUNTY		CONTROL / SECT / JOB	HIGHWAY
	FORTBEND		0027 / 12 / 166	IH 69

STD G-1

CURB INLETS
8" DIAMETER LOGS

ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8")



MATERIAL REQUIREMENTS

FILL:

Use 100% shredded mulch or other non-compost biodegradable material as fill for logs.
No compost or fines.

DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

LOG MESH:
Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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).

Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

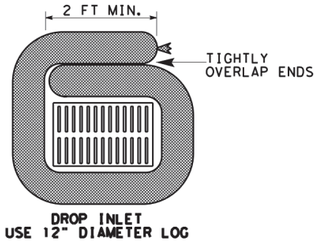
The trap should be cleaned when the capacity has been reduced by 1/2 or the sediment has accumulated to a depth of 1', whichever is less.

REQUIRED ITEMS:

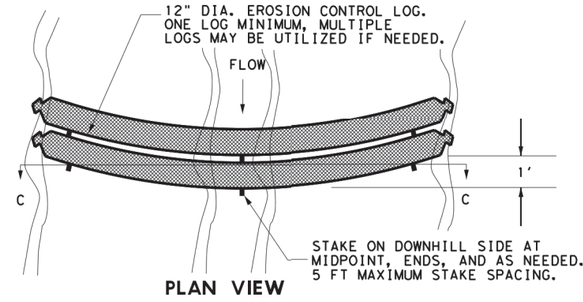
- ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8") LF
- ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL) (12") LF
- ITEM 506-6043 BIODEG EROSN CONT LOGS (REMOVE) LF

DROP INLETS AND OTHER LOCATIONS
12" DIAMETER LOGS

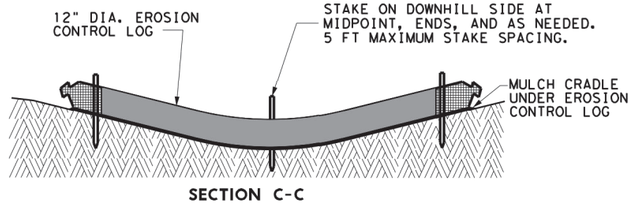
ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL)(12")



DROP INLETS

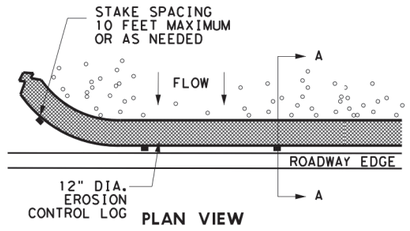


PLAN VIEW

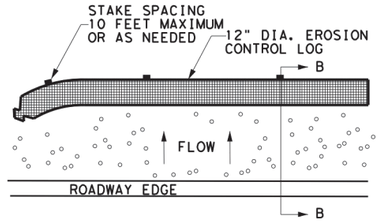


SECTION C-C

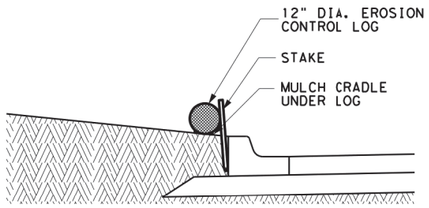
DRAINAGE SWALE OR DITCH



PLAN VIEW

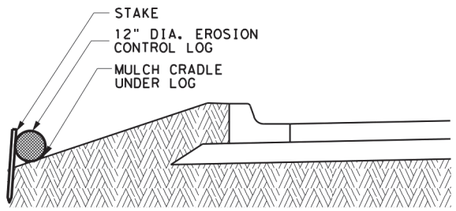


PLAN VIEW



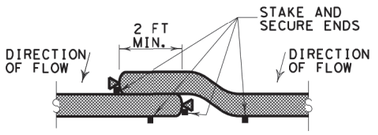
SECTION A-A

SLOPE TO ROADWAY EDGE

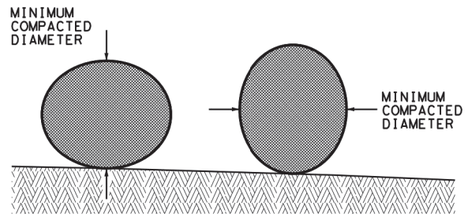


SECTION B-B

SLOPE AWAY FROM ROADWAY EDGE



END OF LOG OVERLAP



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation
Houston District

EROSION CONTROL LOG

ECL-12

FILE: STDG4a.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot			
©TxDOT 2014	DISTRICT	FED REG	PROJECT NUMBER				SHEET
REVISIONS 3/15 MINOR CORRECTIONS	HOU	6					070
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	FORT BEND		0027	12	166	IH 69	

STD G-4A

I. STORMWATER POLLUTION PREVENTION

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is 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. Refer to Storm Water Pollution Prevention Plan (SWP3) Houston District standard plan.

No Additional Comments

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Army Corps (USACE) Permit Required

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set. The USACE general conditions are in the "General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) with a Pre-Construction Notification (PCN). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set. The USACE general conditions are in the "General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Individual Permit (IP). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set.

☐ Work would be authorized by the United States Army Corps of Engineers (USACE) permit. The project specific permit issued by the USACE will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Coast Guard (USCG) Coordination Required

☐ United States Coast Guard (USCG) Permit

☐ United States Coast Guard (USCG) Exemption

No Additional Comments

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 area and contact the Engineer immediately.

No Additional Comments

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

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

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document "Avoiding Migratory Birds and Handling Potential Violations" found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

No Additional Comments

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor's degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.

No Additional Comments

VII. OTHER ENVIRONMENTAL ISSUES

Comments:

DATE: Jan 24, 2022
FILE:

Version 2.1

Texas Department of Transportation

TxDOT Houston District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: EPIC Sheet.dgn	DN:		CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB		HIGHWAY
REVISIONS	0027	12	166		169
UPDATED section V. text and added definition (10/17) ADDED USCG and USACE notes in Section VII (04/18)	DIST	COUNTY			SHEET NO.
	12	Fort Bend			071