FHWA TEXAS DIVISION			SHEET NO.
			1
STATE	DISTRICT	COUNTY	
TEXAS	CRP	ARANSAS	
CONTROL	SECTION	JOB	HIGHWAY NO.
0916	38	015	VAR.

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT.: F 2022(379)

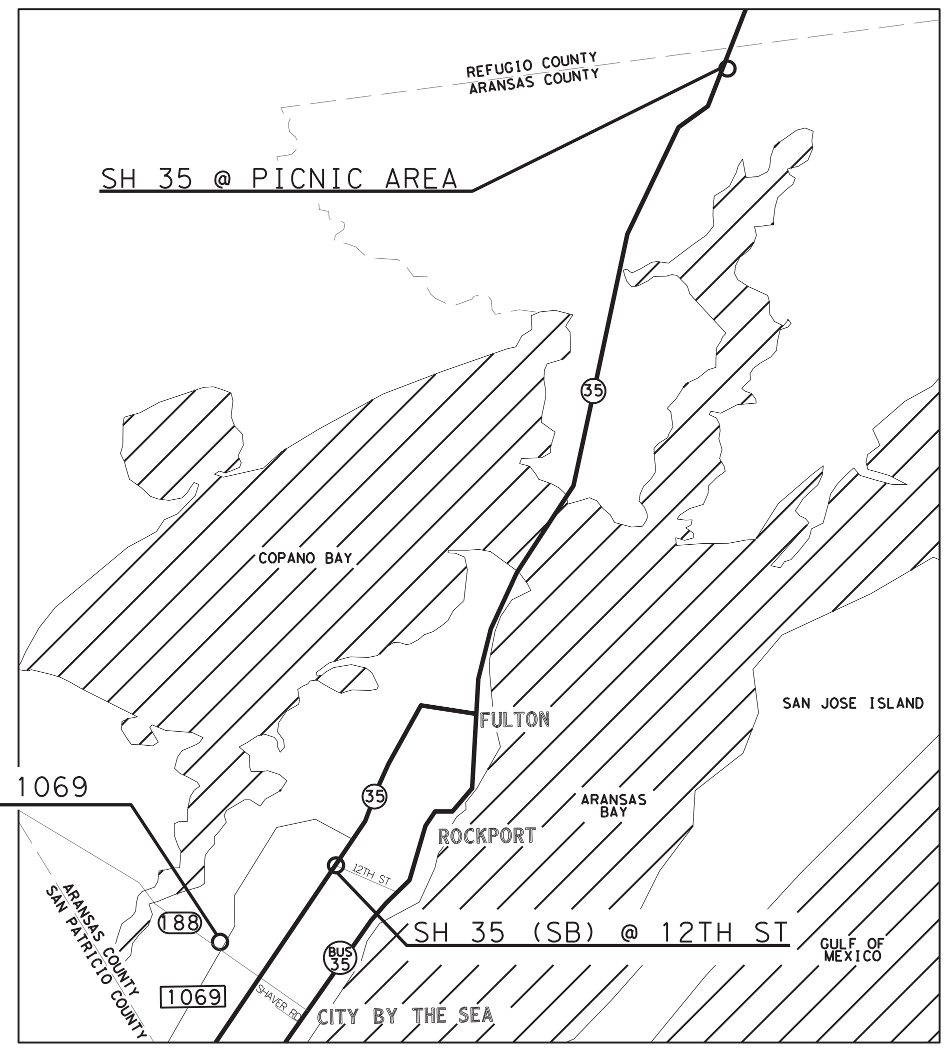
VARIOUS LOCATIONS
ARANSAS COUNTY

LIMITS: At Various Locations in Aransas County

Installation of trail markers. roadways include FM 1069, SH 35.

INDEX OF SHEETS

SH 188 @ FM 1069



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

SCALE: 1 : 50,000

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

FINAL PLANS

LETTING DATE: ____________

DATE CONTRACTOR BEGAN WORK: ____________

DATE WORK WAS COMPLETED & ACCEPTED: ____________

FINAL CONTRACT COST: $ ____________

CONTRACTOR : ____________

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

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

DocuSigned by:
Jennifer Loa
0C3EE8BC0417449...
R.L.A. 11/15/2021
DATE

STATE OF TEXAS
GREG JONES
99401
LICENSED
PROFESSIONAL ENGINEER

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

DocuSigned by:
Greg Jones
CE208F8BC5604A4...
P.E. 11/15/2021
DATE

STATE OF TEXAS
ROBERTO G. ISASSI
111493
LICENSED
PROFESSIONAL ENGINEER

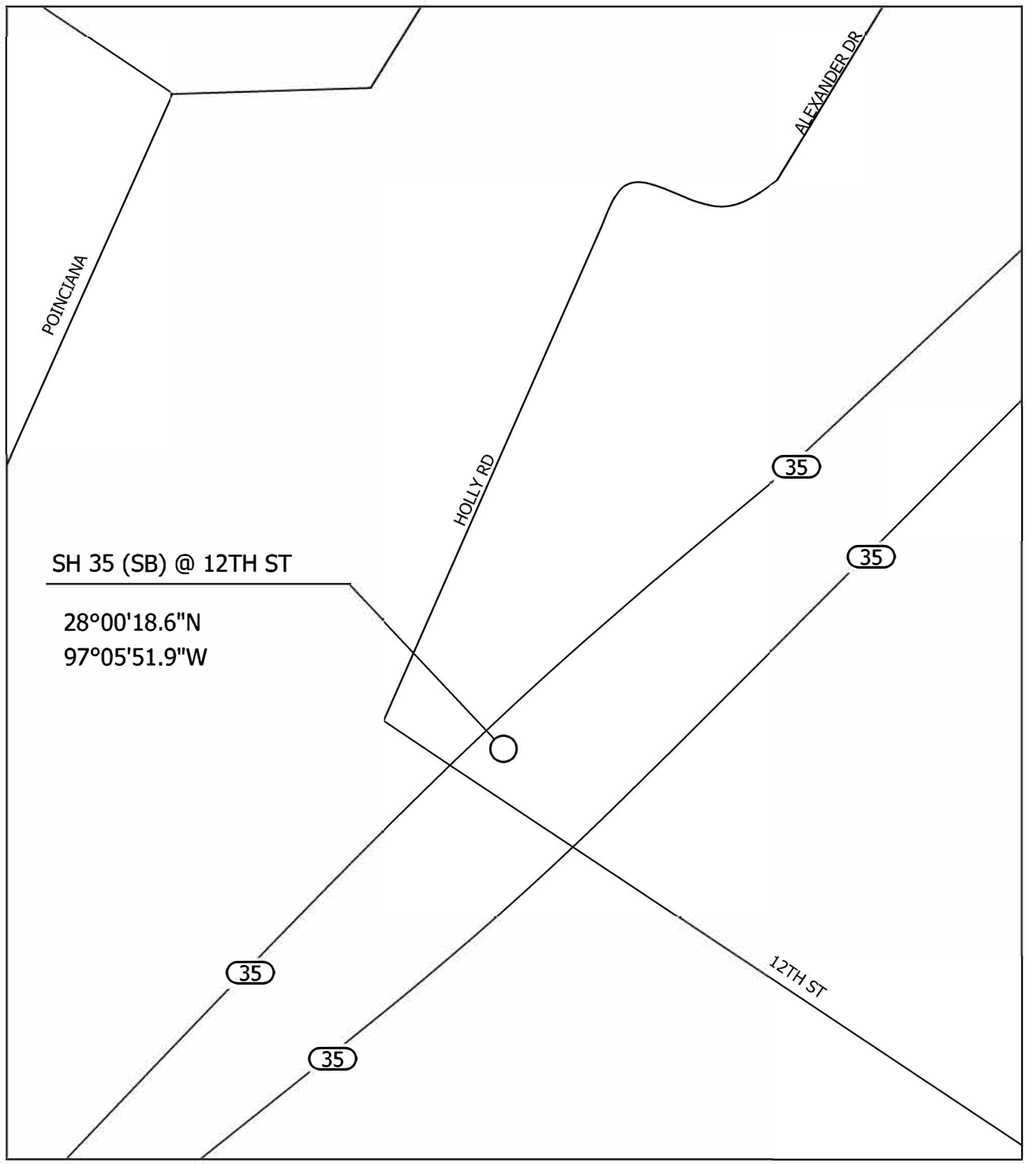
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A ### HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

DocuSigned by:
Roberto G. Isassi, P.E.
83BE36365A0B423...
P.E. 11/12/2021
DATE

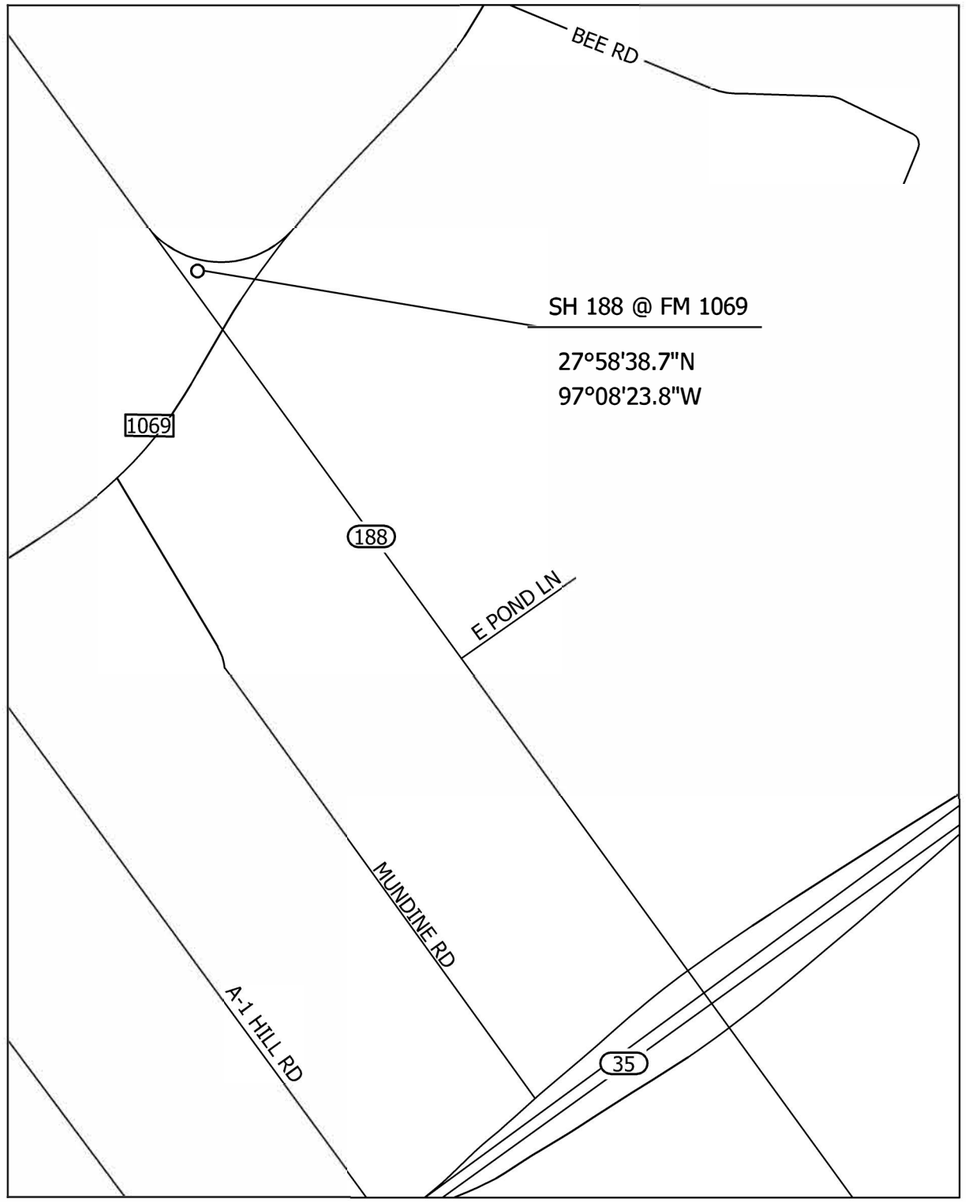
©2021 ® Texas Department of Transportation

RECOMMENDED FOR LETTING: 12/2/2021
DocuSigned by:
Paula Sales-Evans, P.E.
5975...
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 12/2/2021
DocuSigned by:
Valente Olivarez
303F64E8A9B44E0...
DISTRICT ENGINEER



1 **SH 35 (SB) @ 12TH ST**
SCALE: 1 : 500



2 **SH 188 @ FM1069**
SCALE: 1 : 1000

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

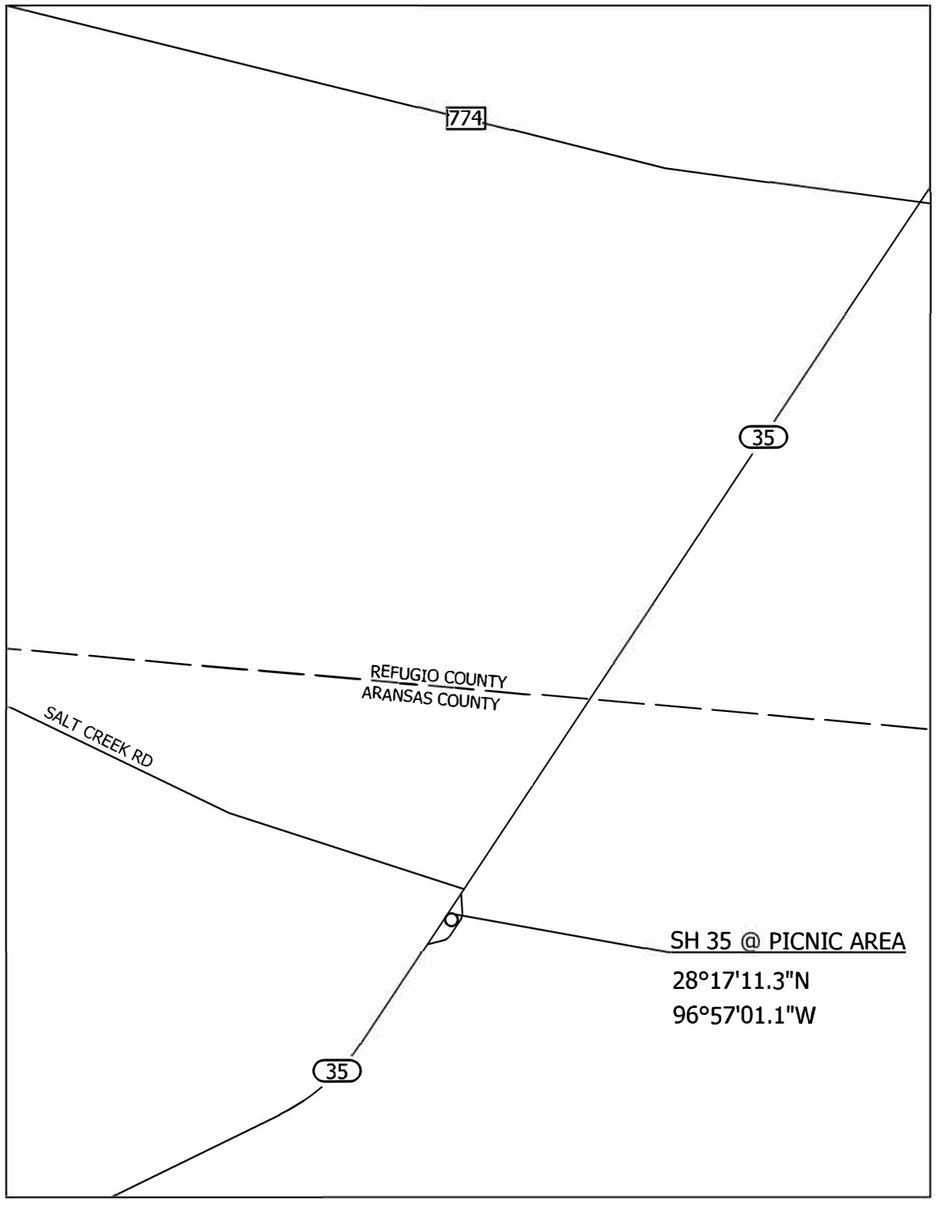
11/12/2021

PROJECT LOCATION MAP

SHEET 1 OF 2

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		2



3 **SH 35 @ PICNIC AREA**
SCALE: 1 : 2500

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

PROJECT LOCATION MAP

SHEET 2 OF 2

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		3

GENERAL NOTES:

Find, for your information and convenience, tools such as forms, software, materials, and various other information provided by the Department at https://www.txdot.gov/business.html. Please note that these tools are updated periodically and your attention is directed to the latest edition.

In the event of a called evacuation, emergencies, impending adverse weather or as directed, do not perform any work without written authorization. The District reserves the right to suspend all work in support of evacuations or emergencies occurring from other parts of the state. Any work performed, other than work directed by the Department, is unauthorized work in accordance with Item 5.

Sweep, clean and remove any construction waste, surplus materials or debris from the roadway and right of way at the end of each day unless otherwise approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

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

Robert Isassi, P.E.	Robert.Isassi@txdot.gov
Eric Martinez, P.E.	Eric.Martinez@txdot.gov

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

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

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

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

ITEM 2

It is recommended that prospective bidders examine the specified work locations with the Engineer to view the nature of the work, the need for close coordination with the various utilities, traffic control considerations, and other factors influencing the prosecution of the work.

County: Aransas **Control: 0916-38-015**

Highway: Various

ITEM 5

Field verify all dimensions and notify Engineer prior to initiating any work.

Verify the locations of utilities, underground or overhead, shown within the limits of the right-of-way. Adhere to OSHA Standards when working within the vicinity of overhead power lines. Coordinate with the utility companies and notify the Engineer of any possible conflicts. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The 811 call services for a utility location does not include TxDOT facilities. Provide notification to the District Traffic Signal Shop by email at CRP_Utility_Locate@txdot.gov or call 361-739-6044 when planning, drilling, or excavating in areas where existing TxDOT underground utilities exist. Visual evidence of TxDOT underground utilities in the area include illumination poles, ground boxes, flashing beacons, traffic signals, etc. This notification must be provided 48 hours in advance of performing the work, but no earlier than 72 business hours before the work will commence. Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work.

Notify the Engineer immediately of utility conflicts in accordance with Item 5.6. Refer to Item 4.5 for consideration of differing site conditions.

The responsibility for the construction surveying on this contract will be in accordance with Item 5.9.3, "Method C".

ITEM 7

The work performed for Item 7.2.4, "Public Safety and Convenience" will not be measured or paid for directly, but will be subsidiary to pertinent Items.

When working at street, farm-to-market, state highway, and county road intersections, schedule work to minimize intersection closures. During nonworking hours, all public road intersections will be open to the traveling public.

The total disturbed area for this project is .05 acres. The disturbed area in this project, all 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.

GENERAL NOTES

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIOUS
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	ARANSAS	
CONTROL	SECTION	JOB	
0916	38	015	4

The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer.

Establish uniform perennial vegetative coverage with a density of at least 70% of the native background vegetative cover to achieve final stabilization.

No significant traffic generator events identified.

ITEM 8

Prepare the progress schedule using the Critical Path Method (CPM). Submit (2) two 11" x 17" hard copies and an electronic file of the original or updated progress schedule. Submit the original progress schedule seven (7) days before the Preconstruction Conference.

Submit an updated progress schedule as directed to show proposed major changes, changes affecting compliance with the contract requirements, or changes affecting the critical path/controlling item of work.

Working days will be computed and charged in accordance with Article 8.3.1.1, "Five-Day Workweek". (For Item 8.3.1.1.)

Lane closures are not permitted Monday through Friday before 9AM or after 4PM unless approved.

Nighttime work is allowable if approved by the Engineer.
Notify the Engineer at least 48 hours in advance of weekend or nighttime work.

ITEM 9

Monthly progress payments will be made for items of work completed by the 28th day of each month. Any work completed after the 28th will be included for payment in the subsequent monthly progress estimate.

Submit signed request for compensation of material-on-hand (MOH), including any requests from subcontractors, suppliers, or fabricators for MOH, at least two (2) working days prior to the end of the month on the Departments approved forms.

County: Aransas **Control: 0916-38-015**

Highway: Various

ITEM 100

Coordinate all right of way preparation activities with the project's Storm Water Pollution Prevention Plan (SWP3) and Environmental Permit Issues, and Commitments Sheet (EPIC) or as approved.

ITEM 132

Use embankment material with a plasticity index (PI) ranging from 10 to 40. Blend or treat approved materials to achieve the desired PI and pulverize the material so that 100% passes the 3 inch sieve. Retest materials as borrow sources change or when the material changes significantly. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Obtain approval to incorporate existing salvaged asphaltic surface and flexible base materials in the surface layer. If approved, incorporate existing materials no larger than 2 inches in the surface layer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The estimated quantities for embankments adjacent to culverts and bridges were calculated using the average-end-area method.

ITEM 168

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in-place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require to continue watering as specified for a period not to exceed 30 days.

The Basis of Estimate below establishes the approximate quantity of water required to complete the 90-day watering cycle:

Rate	Water (Gal/Acre/Day)	Area (Acre)	Total Gallons (Min)
0.25 inch/week	1961	1	88,245

GENERAL NOTES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIOUS
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	ARANSAS	
CONTROL	SECTION	JOB	
0916	38	015	4A

ITEM 192

Locate all underground utilities and conduits prior to digging.

The Engineer may make adjustments to the plant and planting bed locations to meet field conditions. These changes are considered incidental and there will be no additional compensation.

Do not work subsoil for planting operations when moisture content is so great that excessive compaction will occur, or when subsoil is so dry that the clods will not break readily. Apply water if necessary. These conditions will be determined by the Engineer as planting operations begin.

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

Remove undesirable vegetation from work zone, as directed. This work is incidental and will be considered subsidiary to Item 192.

If requested, provide tree or plant photos that show that the materials provided will meet minimum measurements and size specifications. Submit one photo per size and item. Photo will be used as the standard for all sizes.

Provide Compost that meets specifications under Item 161. Ensure that mulch and compost is free of visible debris and unsuitable materials.

Prior to backfilling bed areas, conduct water percolation tests, as shown in the plans. Contact Landscape Architect if excavated bed areas do not drain efficiently.

Water all plants within the same day of installation. Thoroughly soak root balls of large plants and trees. Set base of plant pit so that top of root ball is set slightly above grade and will not settle below grade. If top of root ball settles below grade, plant must be replanted at proper depth or replaced, without additional compensation.

Stake trees for support during the same day as planted. Trees that cannot stand erect without plant supports will be rejected. Ensure trees and tall shrubs remain plumb and straight for all given conditions throughout the contract period. Staking method must allow trunk to sway with the wind while remaining plumb.

Maintenance and 90-Day Warranty.

County: Aransas **Control: 0916-38-015**

Highway: Various

Maintain all plants in a healthy, growing condition. Replace dead or severely damaged plants as directed.

Keep project area clean and remove all litter. Remove all trimmings and debris from project site.

Keep planting beds free of weeds and undesirable species. Do not use string trimmers or spray herbicide in planting beds or tree watering basins. Spraying herbicide is not allowed. Apply herbicide by a wicking method, only. A wicking method consists of a wick or rope soaked in herbicide attached to a handle. The wetted wick is used to wipe or brush herbicide over the weed. Do not allow herbicide to contact planted vegetation, contaminate the soil, or contact bodies of water.

Use Glysophate, (Round-Up or approved equal), in a wicking method for weed control after plants have been installed. Follow manufacturer's directions and use properly licensed personnel.

Mow a five (5) foot border around each planting bed. Mow turf to a height of four (4) inches.

Remove litter from area before mowing. Mow according to the following schedule:

Mow every two weeks from March 1 to October 31.
Mow once a month from November 1 to February 28.

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

ITEM 193

Perform monthly maintenance (Item 193-6001) after the maintenance phase of Item 192 is complete according to the plan requirements for new plants and planting bed areas.

ITEM 432

Saw cut the existing riprap to ensure a neat transverse and/or longitudinal line to assure a smooth tie-in with new riprap. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items. Reinforce concrete riprap with flat sheets of welded wire fabric or with No. 3 reinforcing bars spaced at a maximum of 12 inch in each direction.

GENERAL NOTES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIOUS
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	ARANSAS	
CONTROL	SECTION	JOB	
0916	38	015	4B

ITEM 502

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

Designate in writing a Contractor Responsible Person (CRP) for implementing, maintaining, and reviewing environmental requirements. Do not discharge onto the ground or surface waters any pollutants such as chemicals, raw sewage, fuels, lubricants, coolants, hydraulic fluids, bitumen, or any other petroleum product.

Operate and maintain equipment on site in a manner as to prevent actual or potential water pollution. Manage, control and dispose of litter on site such that no adverse impacts to water quality occur. Prevent dust from creating a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. Wash out concrete trucks in approved contained areas. Use appropriate contrail to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel water (i.e. dewatering.) Prevent discharges that would contribute to a violation of Edwards Aquifer Rules, water quality standards, the impairment of listed water body, or other state or federal law.

ITEM 618

Seal all conduits terminating in ground boxes and pole foundations with a sealant made of polyurethane or equivalent that will cure in the presence of moisture. Ensure sealant is suitable for sealing ends with electrical conductor extending past the ends of the conduit. Inject the sealant a minimum of 3 inches and a maximum of 5 inches into the conduit.

Provide rigid metal conduit (RMC) elbows for all underground conduit bends of 45 degrees or more, including bends into ground boxes. Provide a polyvinyl chloride conduit (PVC) elbow in lieu of a RMC elbow for conduit 1 inch or larger. Ensure the elbow is the same schedule rating as the conduit to which it is connected.

Bond the RMC to the grounding conductor with grounding type bushings when the RMC is exposed or extends into the ground box.

County: Aransas **Control: 0916-38-015**

Highway: Various

Provide a flat, high tensile strength polyester fiber pull tape in each conduit to pull conductors.

Provide wide sweep conduit elbows.

Jacking of conduit will not be permitted.

All conduit runs under existing pavement or existing driveways shall be bored. Where boring is required, it shall be placed at a minimum depth of 3.5 feet from proposed grade.

ITEM 620

Grounding conductors that share the same conduit, junction box, ground box, or structure shall be bonded together at every accessible point in accordance with the current National Electrical Code and TxDOT requirements. Provide cable with green color insulation.

Ensure all grounding conductors size 8AWG and larger are stranded, except for the grounding electrode conductor that terminates at meter enclosure, which will be a solid conductor.

ITEM 624

Aggregate fill shall consist of ¾ inch up to 2 inch course aggregate. Ensure aggregate is in place prior to setting box and conduits shall be capped.

ITEM 628

Provide a meter box for all electrical services.

ITEM 6185

A minimum of 2 TMAS will be required. However, additional units may be necessary depending on the work in progress

Provide manufacturer's curb weight or certified scales weight ticket to the Engineer for approval.

GENERAL NOTES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			VARIOUS
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	ARANSAS	
CONTROL	SECTION	JOB	
0916	38	015	4C

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0916-38-015 **DISTRICT** Corpus Christi **COUNTY** Aransas
HIGHWAY Various

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0916-38-015**			
		PROJECT ID		**A00182658**			
		COUNTY		**Aransas**			
		HIGHWAY		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	104.000		104.000	
	168-6001	VEGETATIVE WATERING	MG	146.000		146.000	
	192-6003	PLANT MATERIAL (3-GAL)	EA	674.000		674.000	
	192-6013	MULCH	SY	200.000		200.000	
	192-6014	PLANT SOIL MIX	CY	68.000		68.000	
	193-6001	PLANT MAINTENANCE	MO	9.000		9.000	
	432-6003	RIPRAP (CONC)(6 IN)	CY	2.100		2.100	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	300.000		300.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	300.000		300.000	
	618-6016	CONDT (PVC) (SCH 40) (1")	LF	125.000		125.000	
	618-6017	CONDT (PVC) (SCH 40) (1") (BORE)	LF	75.000		75.000	
	620-6005	ELEC CONDR (NO.10) BARE	LF	200.000		200.000	
	620-6006	ELEC CONDR (NO.10) INSULATED	LF	400.000		400.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	3.000		3.000	
	740-6004	ANTI - GRAFFITI COATING(PERMNENT-TY II)	SF	276.000		276.000	
	1002-6002	LANDSCAPE AMENITY (TY 1)	EA	3.000		3.000	
	1002-6003	LANDSCAPE AMENITY (TY 2)	EA	6.000		6.000	
	1002-6004	LANDSCAPE AMENITY (TY 3)	EA	3.000		3.000	
	6063-6007	SPS-INS (40W) 960W (500AH) 2X50A(1)	EA	3.000		3.000	
	6185-6002	TMA (STATIONARY)	DAY	25.000		25.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

	132 6005	168 6001	192 6003	192 6013	192 6014	193 6001	432 6003	506 6040	506 6043	618 6016	618 6017
DESCRIPTION	EMBANKMENT (FINAL)(ORD COMP)(TY C)	VEGETATIVE WATERING	PLANT MATERIAL (3-GAL)	MULCH	PLANT SOIL MIX	PLANT MAINTENANCE	RIPRAP (CONC) (6 IN)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)	CONDT (PVC) (SCH 40) (1")	CONDT (PVC) (SCH 40) (1") (BORE)
LOCATION	CY	MG	EA	SY	CY	MO	CY	LF	LF	LF	LF
SH 35 (SB) @ 12TH ST							0.7			25	75
SH 188 @ FM 1069	52	73	337	100	34		0.7			50	
SH35 @ PICNIC AREA	52	73	337	100	34		0.7			50	
						9		300	300		
PROJECT TOTALS	**104**	**146**	**674**	**200**	**68**	**9**	**2.1**	**300**	**300**	**125**	**75**

	620 6005	620 6006	624 6002	740 6004	1002 6002	1002 6003	1002 6004	6063 6007	6185 6002
DESCRIPTION	ELEC CONDR (NO. 10) BARE	ELEC CONDR (NO. 10) INSULATED	GROUND BOX TY A (122311)W/APRON	ANTI - GRAFFITI COATING(PERMNENT- TY II)	LANDSCAPE AMENITY (TY 1)	LANDSCAPE AMENITY (TY 2)	LANDSCAPE AMENITY (TY 3)	SPS-INS (40W) 960W (500AH) 2X50A(1)	TMA (STATIONARY)
LOCATION	LF	LF	EA	SF	EA	EA	EA	EA	DAY
SH 35 (SB) @ 12TH ST	100	200	1	92	1	2	1	1	
SH 188 @ FM 1069	50	100	1	92	1	2	1	1	
SH35 @ PICNIC AREA	50	100	1	92	1	2	1	1	
									25
PROJECT TOTALS	**200**	**400**	**3**	**276**	**3**	**6**	**3**	**3**	**25**

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/18/2021

QUANTITY SUMMARY

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	CRP	ARANSAS	0916	38	015	6

DATE: 11/18/2021
FILE: T:\DES\LND\Projects\CRP\Aransas County GCAA\DGN\plan Sheets\General\Qty Summary Sheet - dgn

GENERAL NOTES FOR THE CONSTRUCTION SEQUENCE

1. ALL BEGINNING AND ENDING BARRICADES AND SIGNS ARE TO REMAIN IN PLACE FOR THE DURATION OF THE PROJECT.

2. ALL SIGNS, BARRICADES AND PAVEMENT MARKINGS SHALL CONFORM WITH THE BC STANDARD SHEETS, TCP SHEETS, AND THE LATEST EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

3. CW20-1D, G20-2 & EITHER G20-1bTL OR G20-1bTR SIGNS WILL BE REQUIRED AT ALL PUBLIC ROADS, AND INTERSECTION WITHIN THE LIMITS. (G20-2) SIGNS MAY BE MOUNTED ON THE BACK OF CW20-1D, SEE BC(2)-14.

4. THE CONTRACTOR SHALL PROVIDE FOR SAFE AND CONVENIENT INGRESS AND EGRESS TO ABUTTING PROPERTY HIGHWAY, PUBLIC ROAD, AND STREET CROSSINGS FOR ALL VEHICLES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL CROSSINGS IN A SAFE AND PASSABLE CONDITION.

5. FOR SPACING OF SIGNS AND BARRICADES SEE "BC" & "TCP" STANDARD SHEETS OR AS DIRECTED BY THE ENGINEER.

6. THE CONTRACTOR MAY BE REQUIRED TO FURNISH ADDITIONAL BARRICADES, SIGNS, AND WARNING LIGHTS TO MAINTAIN TRAFFIC AND PROMOTE MOTORIST SAFETY. ANY SUCH ADDITIONAL SIGNS AND BARRICADES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

7. ALL SIGNS SHALL BE NEW OR FRESHLY PAINTED, AND KEPT CLEAN FOR THE DURATION OF THE PROJECT.

8. ALL TRAFFIC BARRELS & EDGE LINE CHANNELIZERS SHALL BE USED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S RECOMMENDATIONS AND SHALL HAVE A 7" PRISMATIC REFLECTOR UNIT, AS APPROVED BY THE ENGINEER. ALL MATERIALS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

9. SIGNS, PAVEMENT MARKINGS, CHANNELIZING DEVICES, AND OTHER TRAFFIC CONTROL DEVICES THAT ARE INCONSISTENT WITH INTENDED TRAVEL PATHS THROUGH THE PROJECT AREA SHALL BE REMOVED IMMEDIATELY. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

10. ALL TRAFFIC CONTROL DEVICES SHALL BE REMOVED WHEN NO LONGER NEEDED. WHEN WORK IS SUSPENDED FOR SHORT TIME PERIOD, ADVANCED WARNING SIGNS THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED FROM THE PROJECT AREA.

11. ALL SPEED LIMIT SIGNS FOR REDUCED SPEED WILL BE CONSIDERED PART OF THE TRAFFIC CONTROL AND BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEM

12. THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN AND/OR SEQUENCE OF CONSTRUCTION, IN ADVANCE AND IN WRITING, SUBJECT TO THE APPROVAL OF THE ENGINEER. REFER TO ITEM 502.2 "CONSTRUCTION".

PROPOSED SEQUENCE OF CONSTRUCTION

1. PLACE THE FOLLOWING ADVANCE WARNING SIGNS IN ACCORDANCE WITH BC(2)-14: R20-3T, G20-10T, G20-9TP, R20-5T, R20-5aTP, CW20-1D, G20-5T, G20-6T, G20-2bT , G20-2, G20-5aP, G20-1bTR, AND G20-1bTL.

2. PLACE SW3P EROSION CONTROL MEASURES IN ACCORDANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN SHEET AND APPLICABLE STANDARDS.

3. CONSTRUCT THE EARTHWORK BERMS AND PLANTING BEDS AS SHOWN ON THE PLANTING BED DETAIL SHEETS. INSTALL TRAIL MARKERS; CONDUIT, SERVICE WIRING AND IN-GROUND LIGHTS; AND ANTI-GRAFFITI COATING FOR TRAIL MARKERS AS SHOWN ON THE LAYOUT SHEETS. INSTALL PLANT MATERIAL, MULCH, AND PERFORM VEGETATIVE WATERING.

4. PERFORM FINAL CLEAN-UP OF THE PROJECT.

5. MAINTAN PLANT MATERIAL FOR THREE (3) MONTHS AFTER INSTALLATION (ITEM 192). CONTINUE MAINTENANCE THROUGH NINE (9) MONTH ESTABLISHMENT PERIOD (ITEM 193).

STATE OF TEXAS
ROBERTO G. ISASSI
111493
LICENSED
PROFESSIONAL ENGINEER

DocuSigned by:
Roberto G. Isassi, P.E.
83BE36365A0B423...

11/12/2021

SEQUENCE OF CONSTRUCTION

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER				HIGHWAY
	SEE TITLE SHEET				VAR.
DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
CRP	ARANSAS	0916	38	015	7

DATE: 10/26/2021
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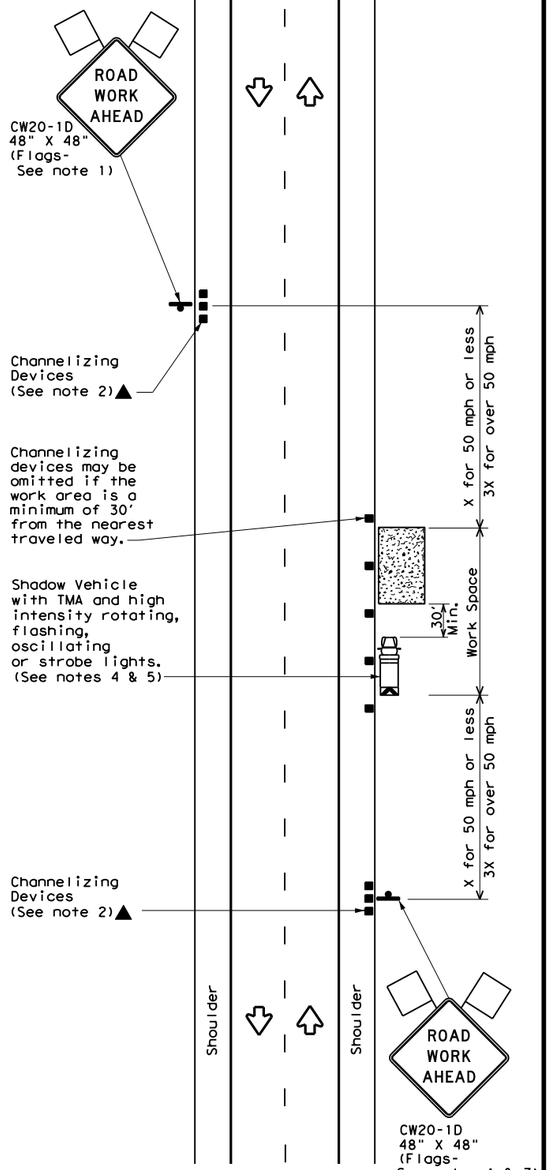
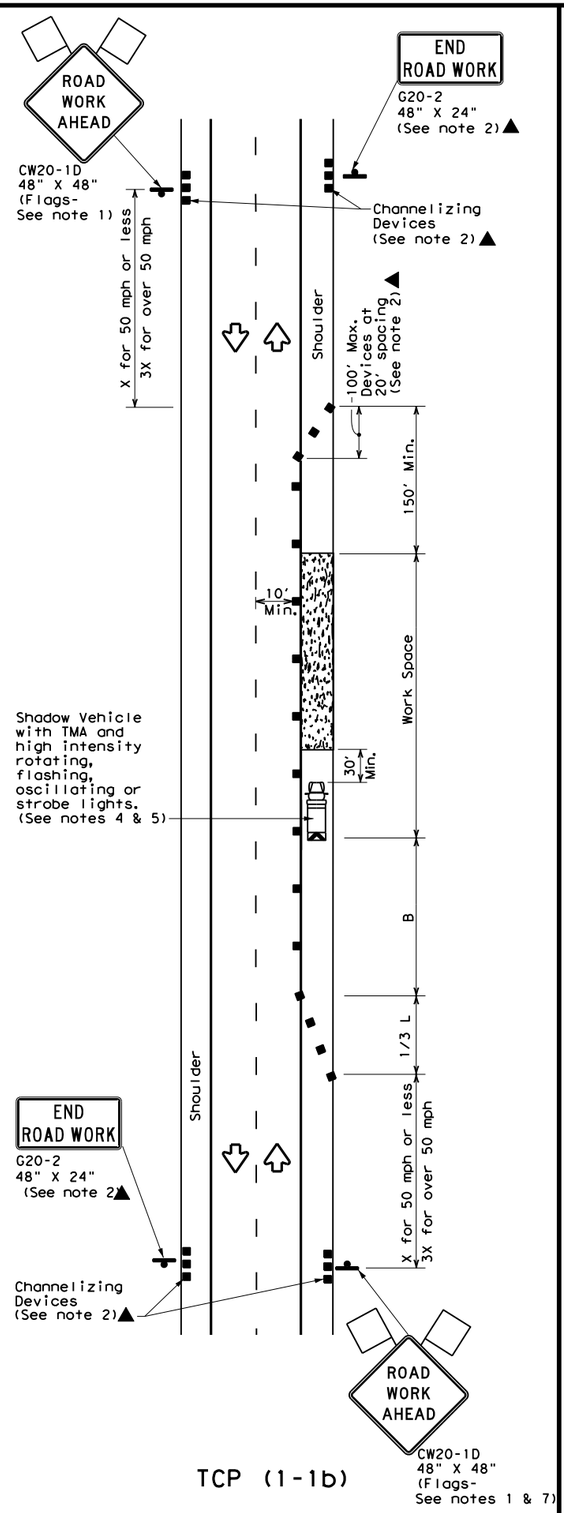


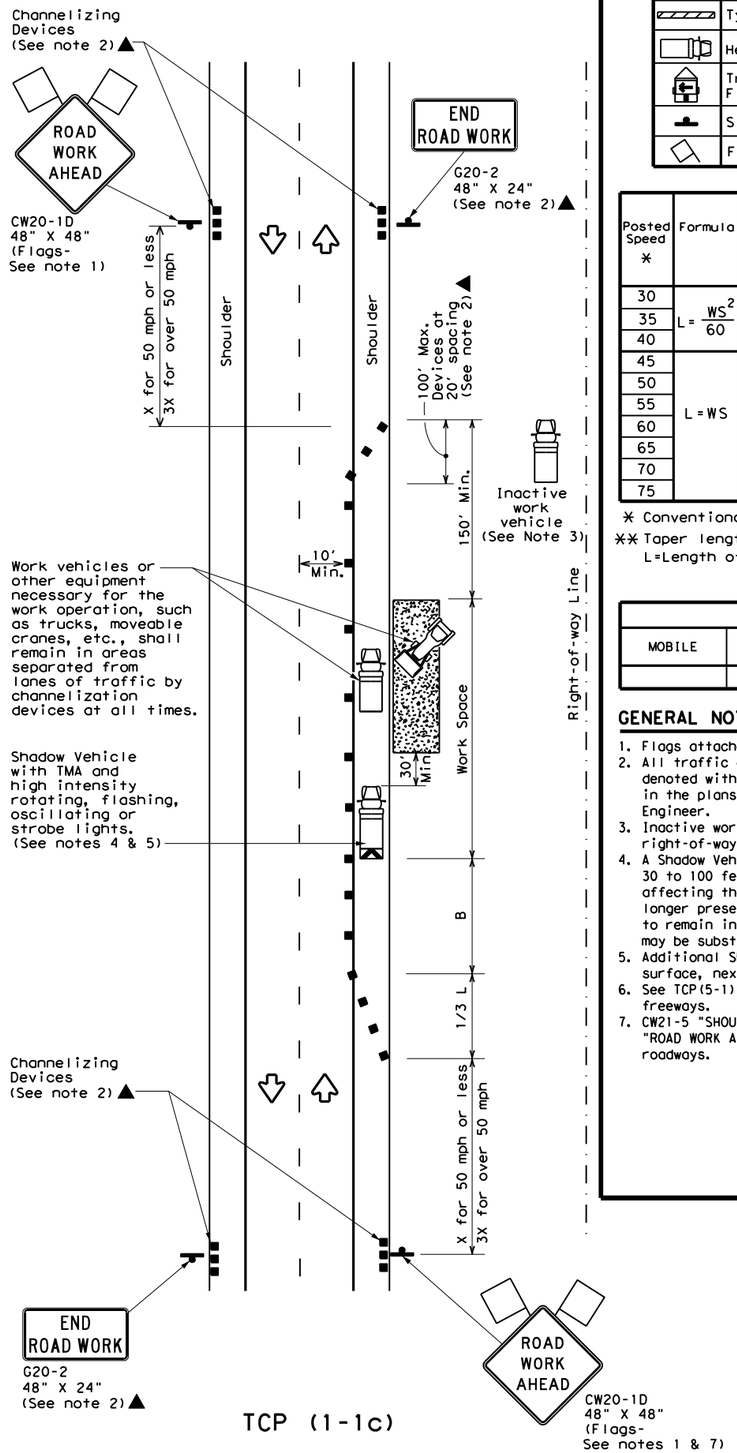
TCP (1-1a)

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'

* 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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	0916	38	015	VAR.
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	CRP	ARANSAS		8

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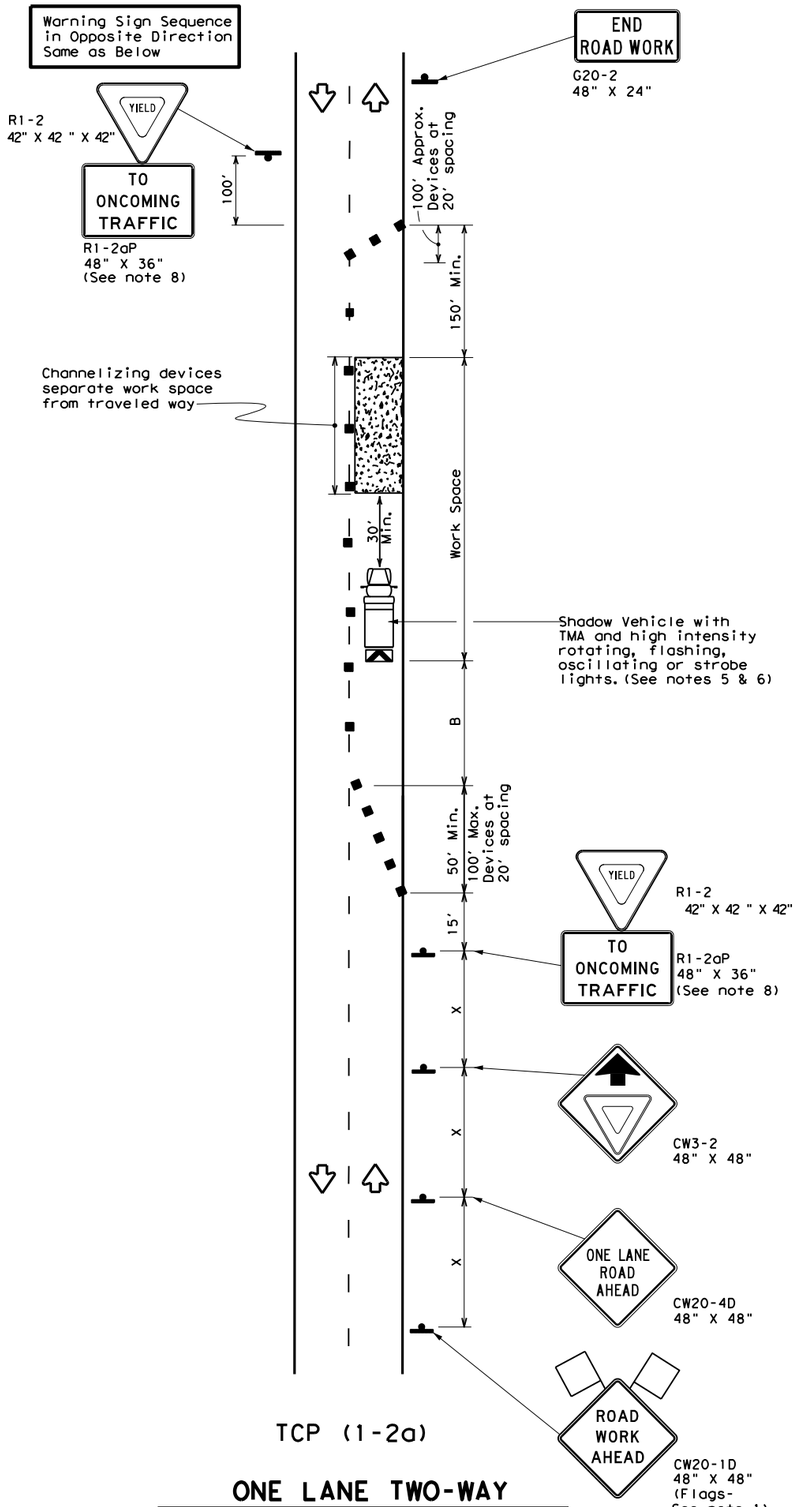
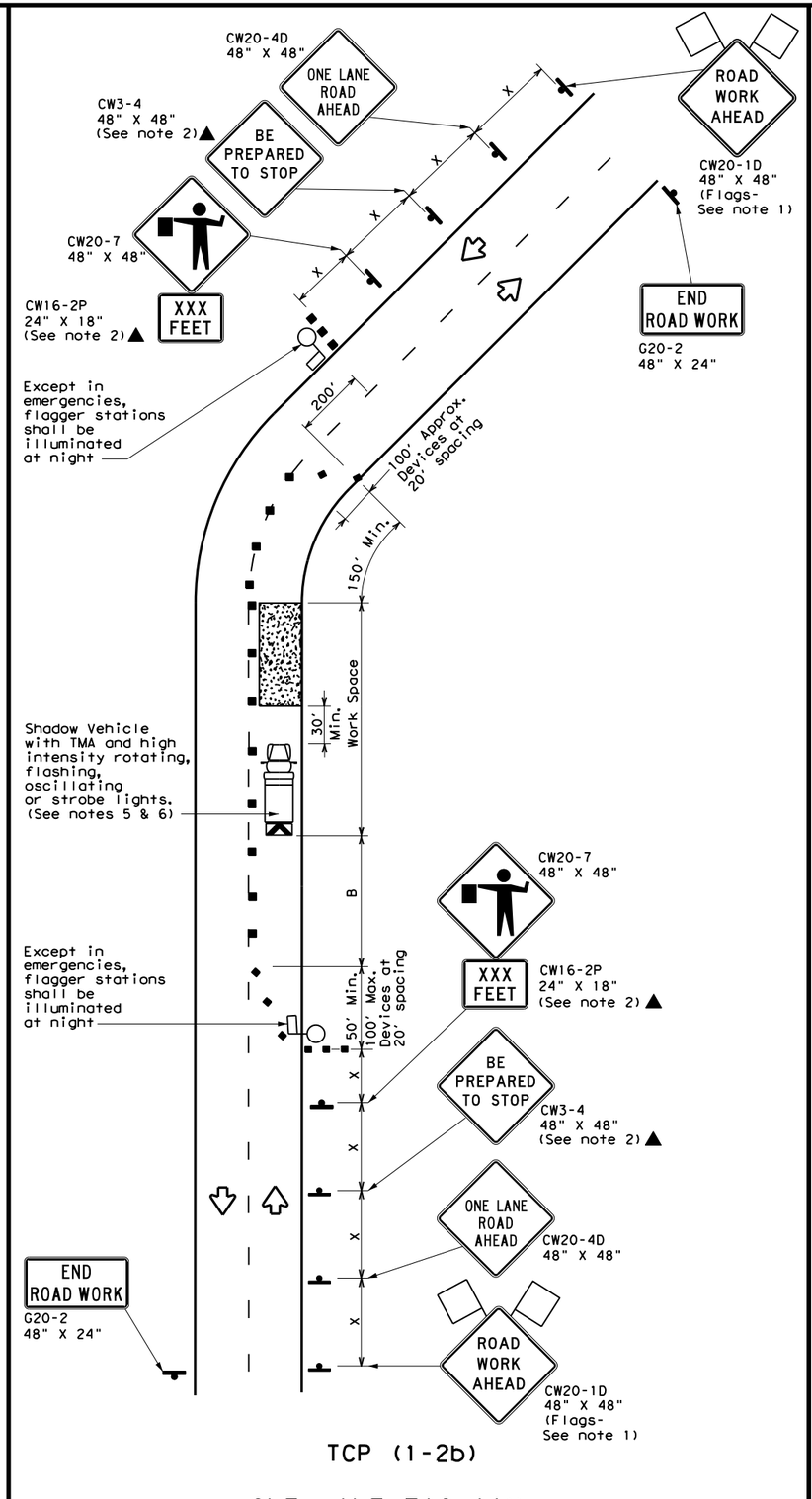


TCP (1-2a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		9

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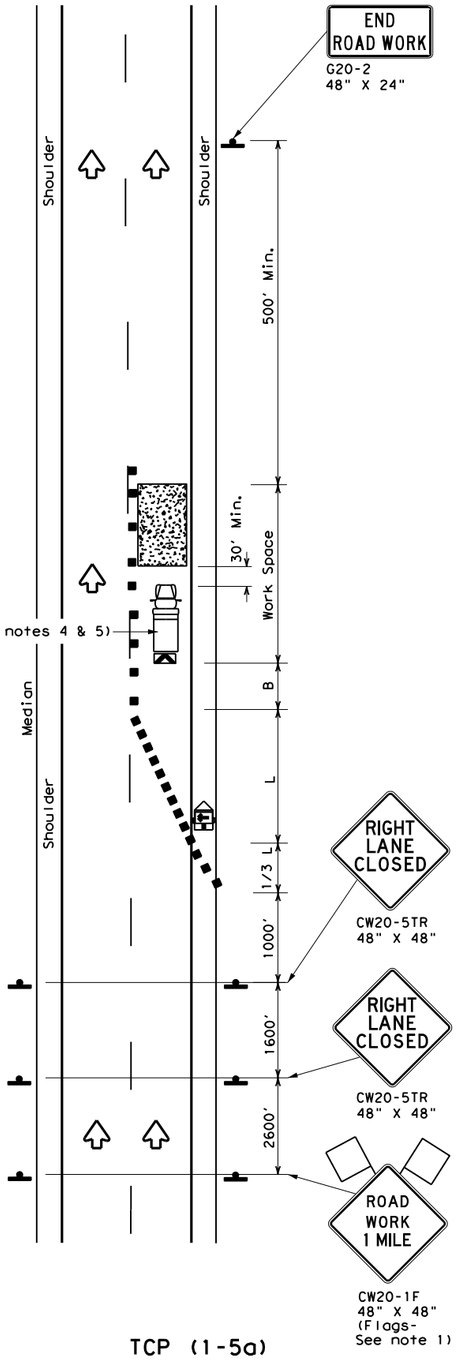
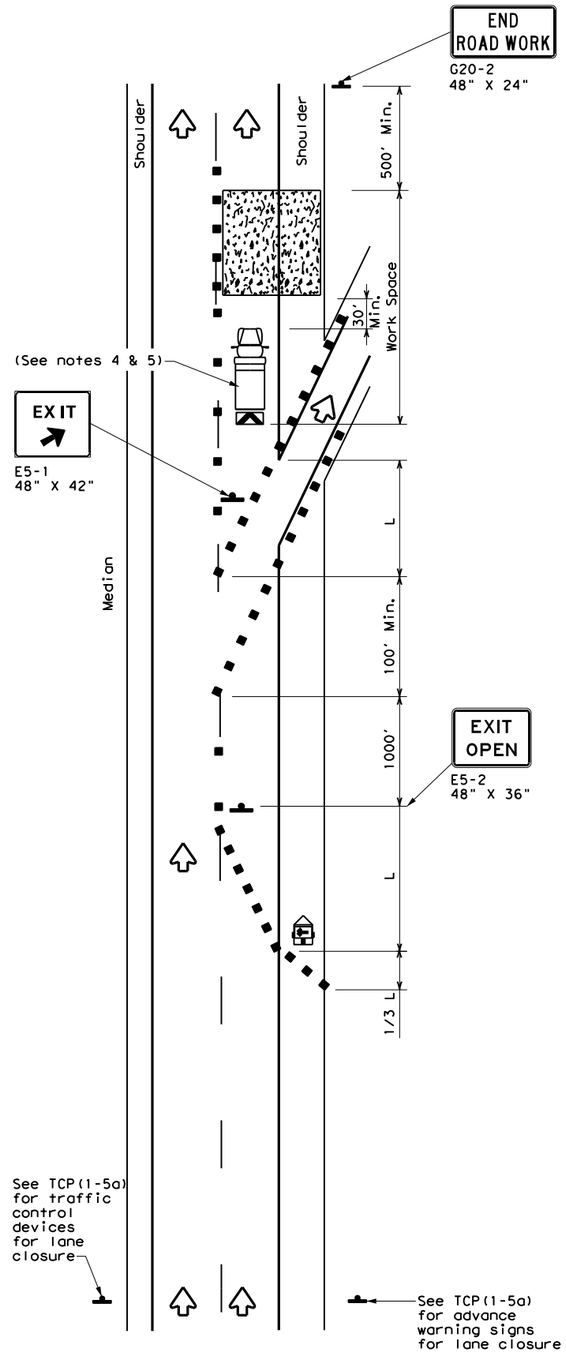


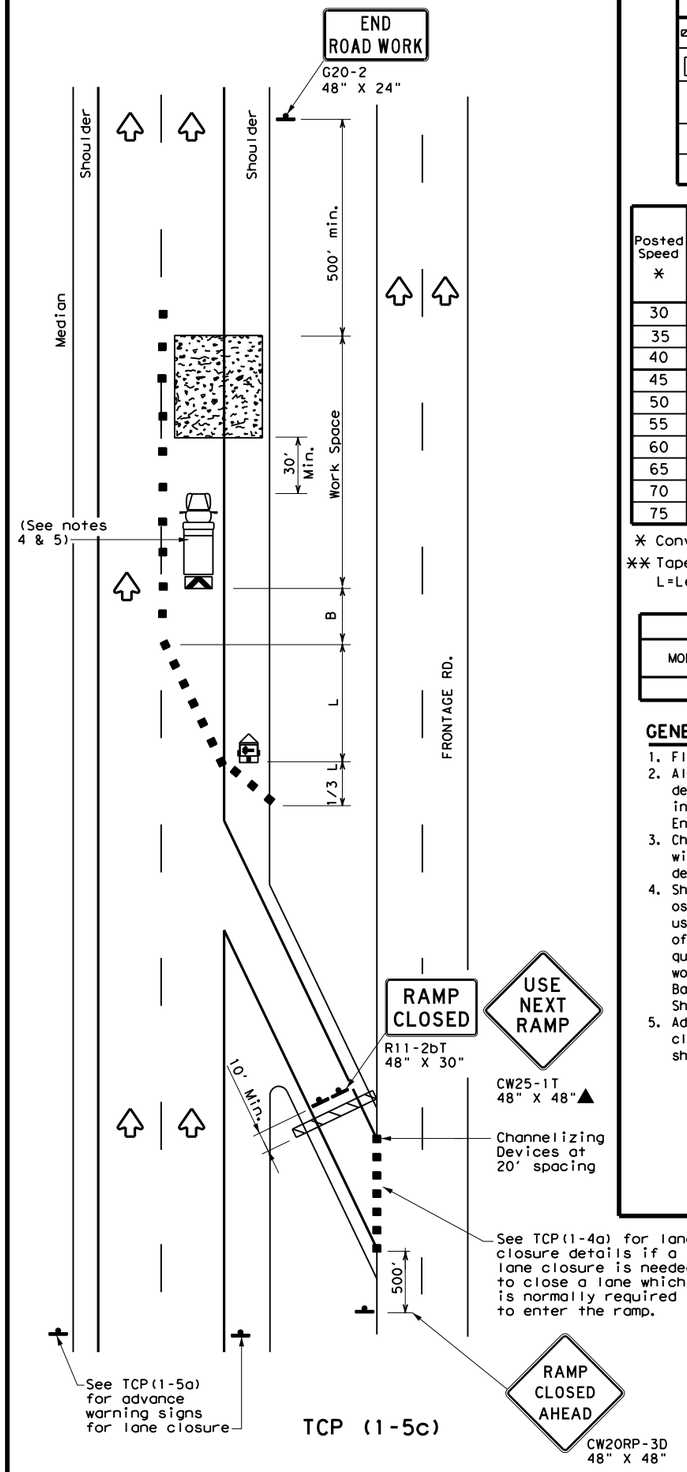
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		10

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0916	38	015	VAR.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	CRP	ARANSAS		11
5-10 5-21				

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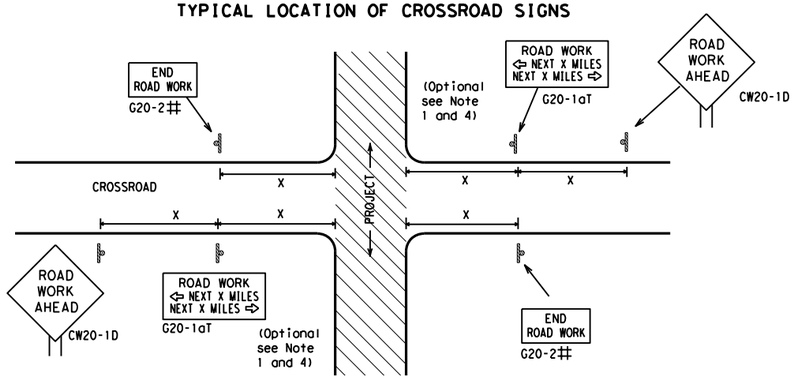
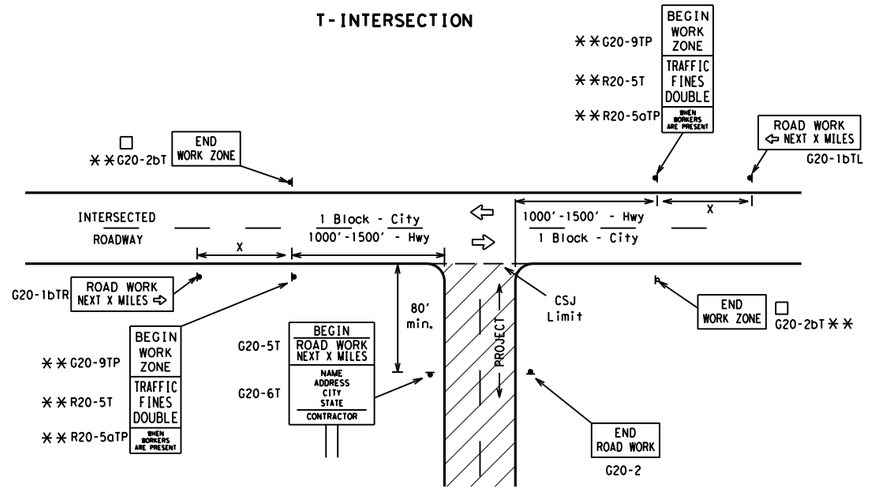
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

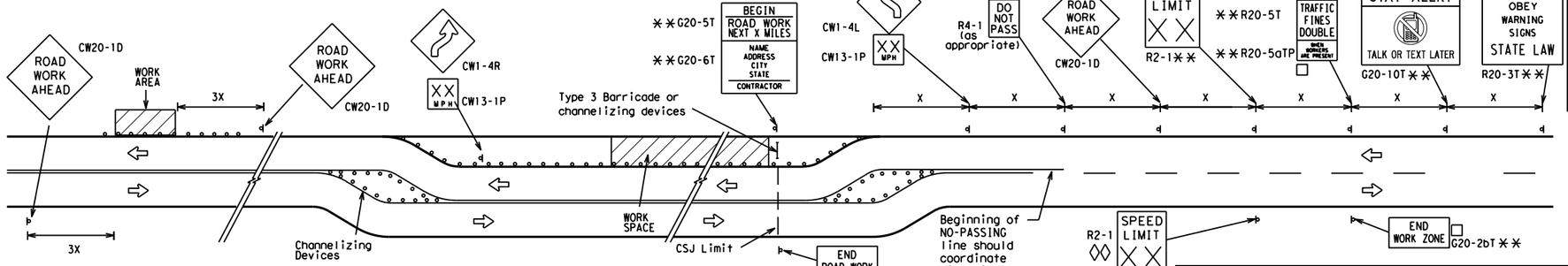
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

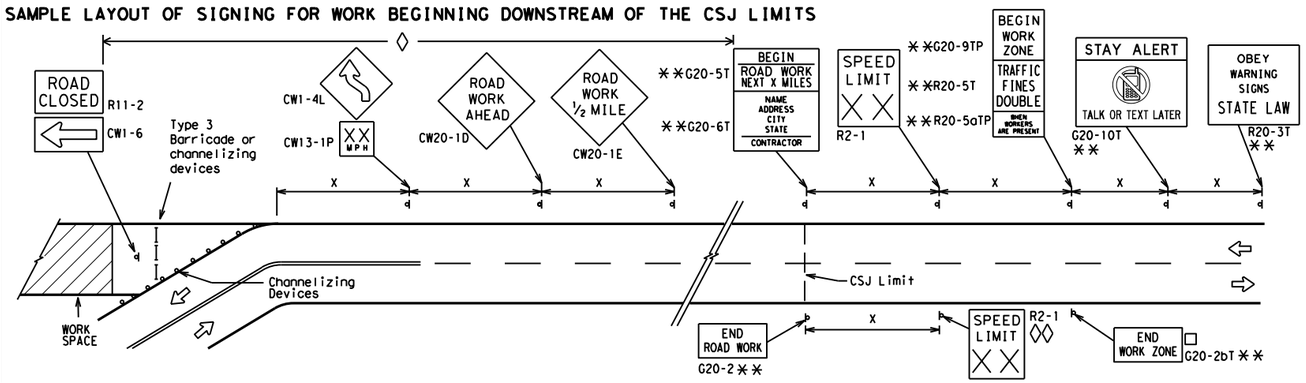
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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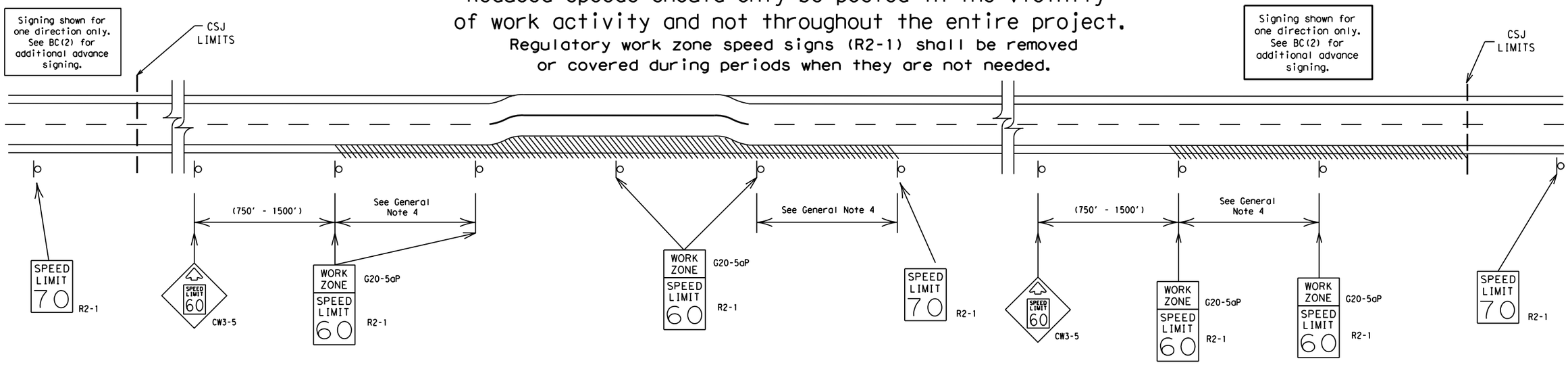
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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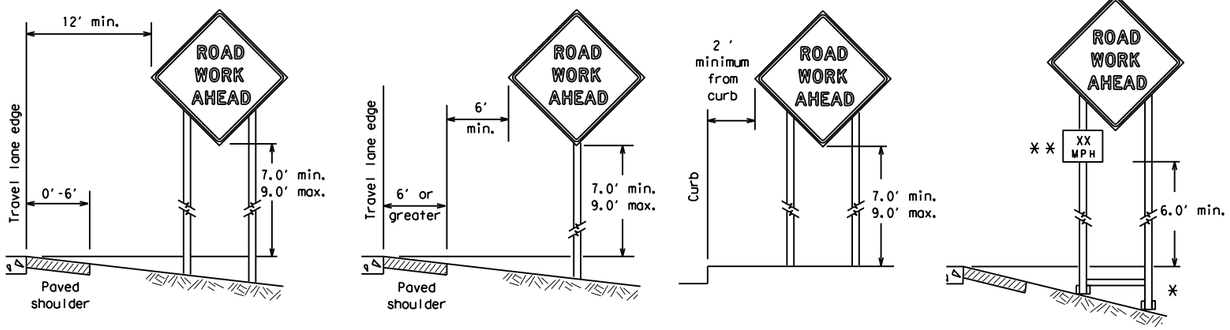
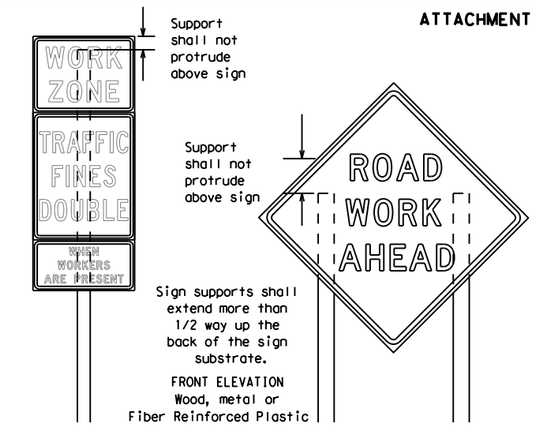
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

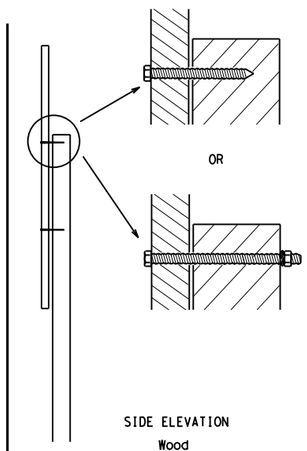


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





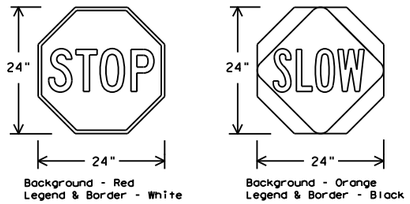
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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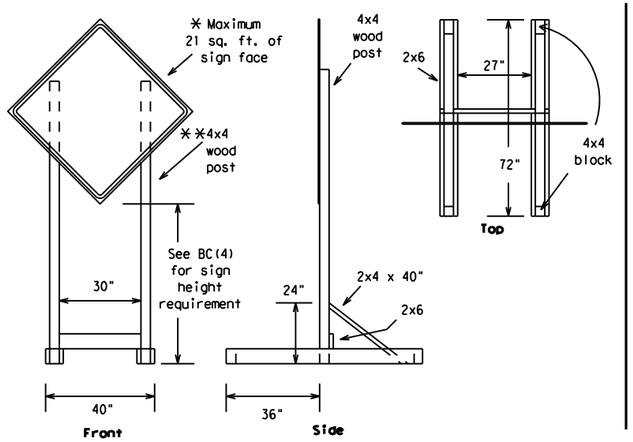
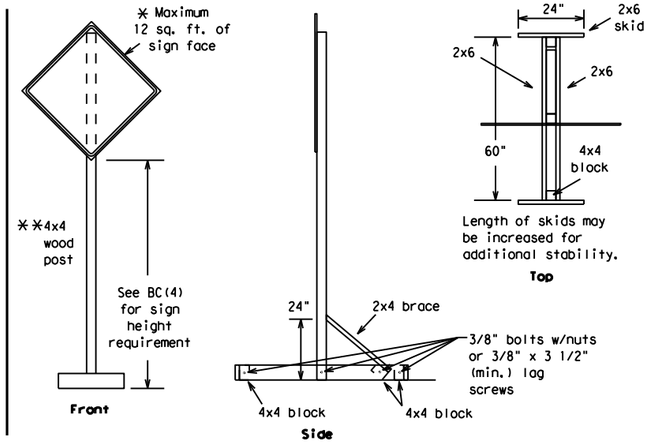
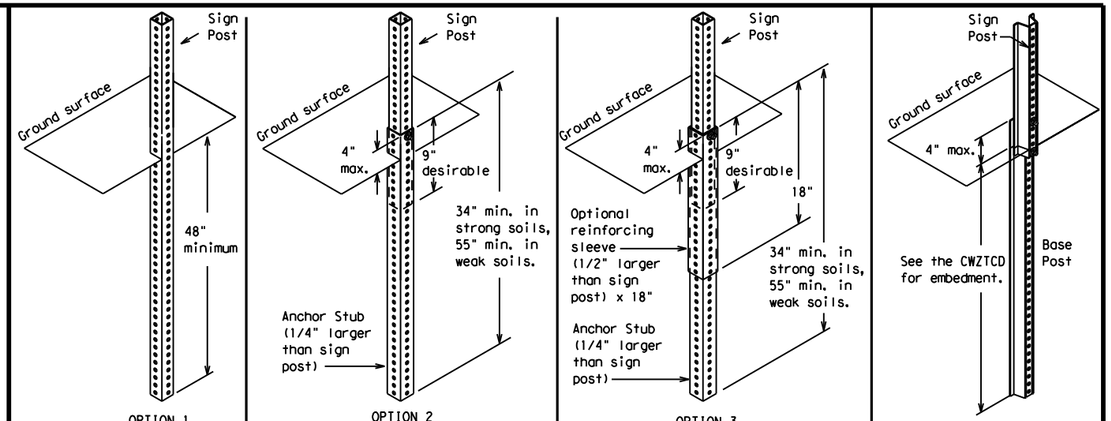




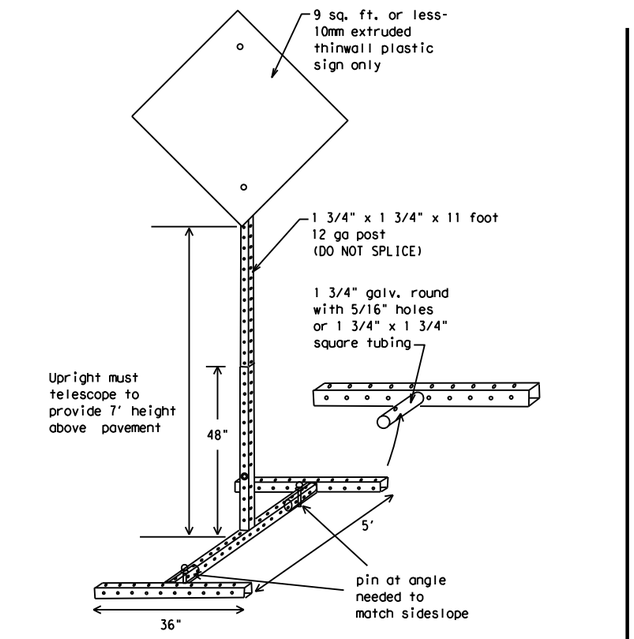
SKID MOUNTED WOOD SIGN SUPPORTS

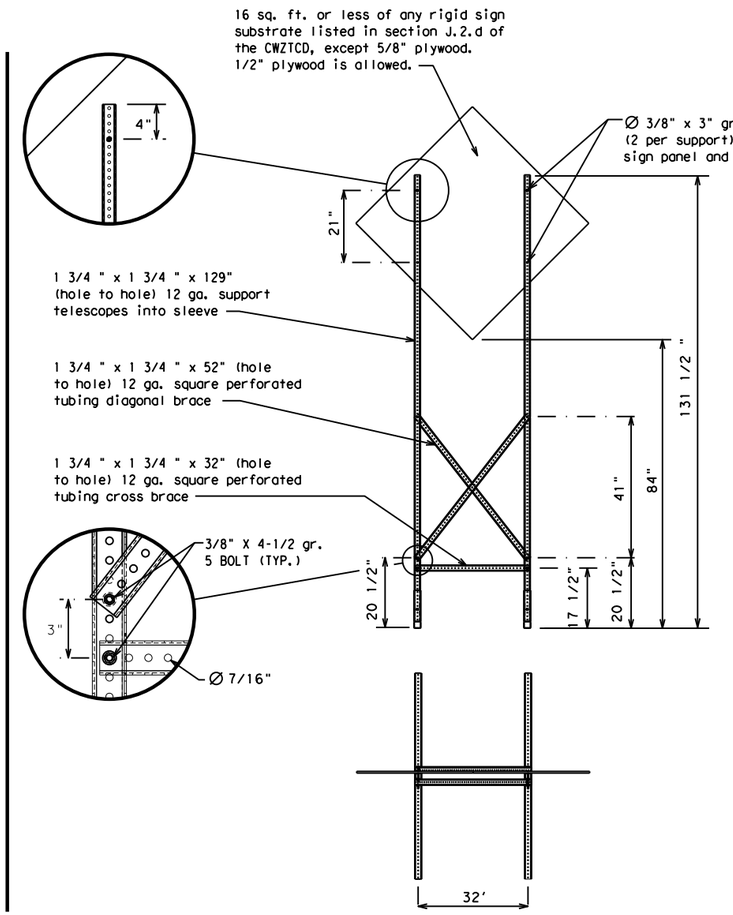
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

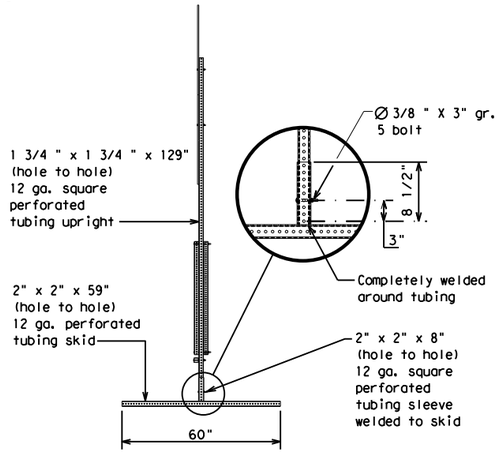


GROUND MOUNTED SIGN SUPPORTS

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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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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
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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0916	38	015	VAR.
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7-13 5-21	CRP	ARANSAS		16

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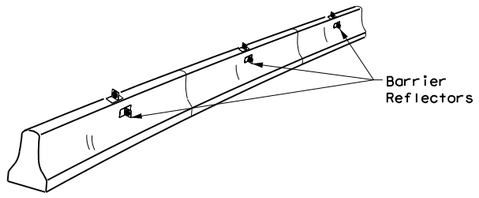
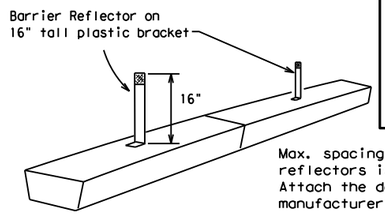
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

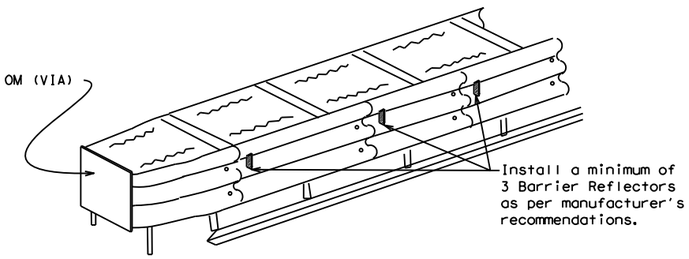


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

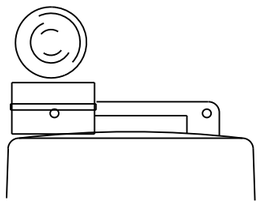


DELINEATION OF END TREATMENTS

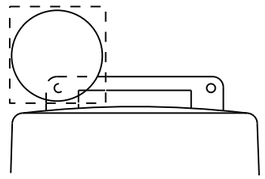
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the 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



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

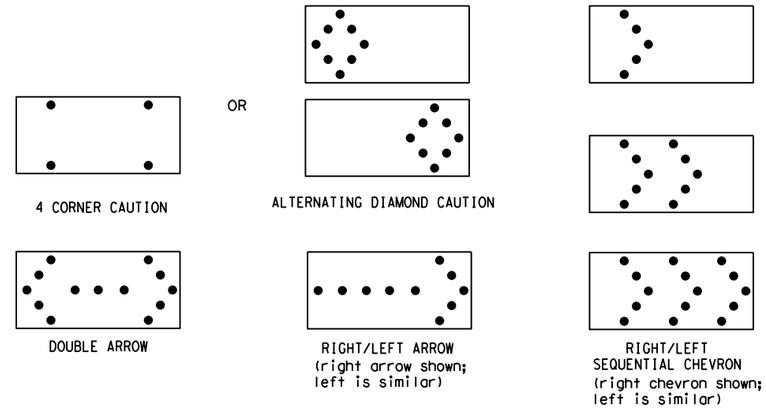
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

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

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

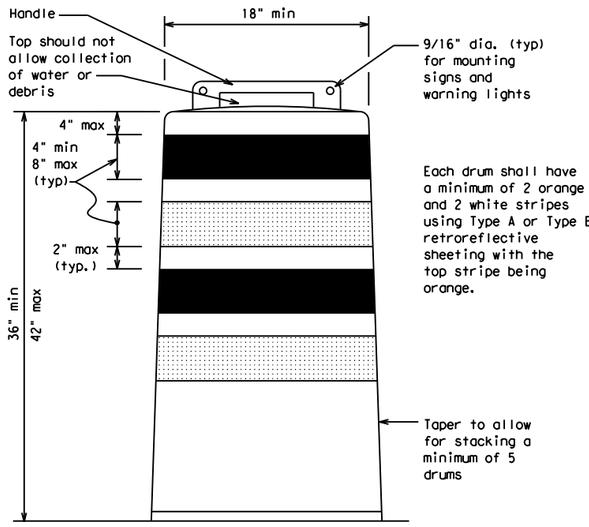
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

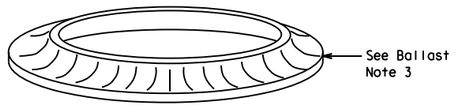
RETROREFLECTIVE SHEETING

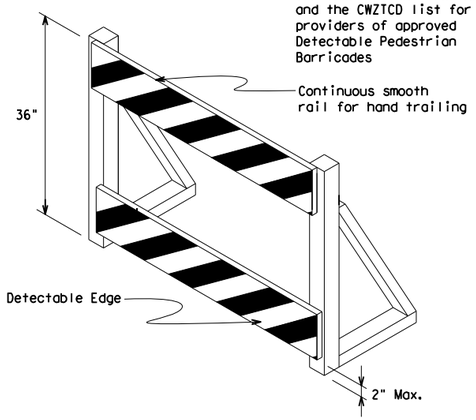
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

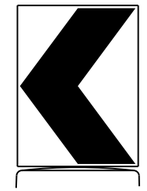




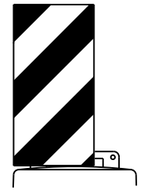


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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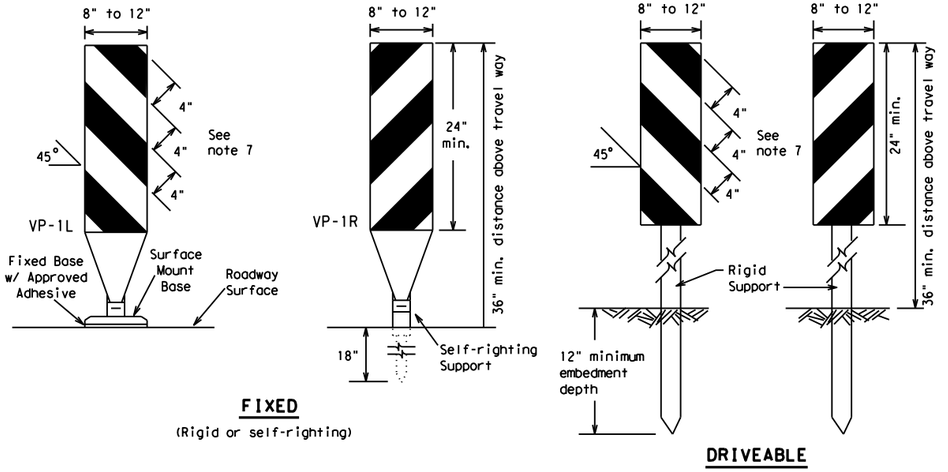
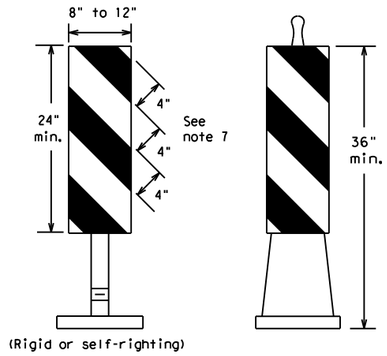


FIXED
(Rigid or self-righting)

DRIVEABLE

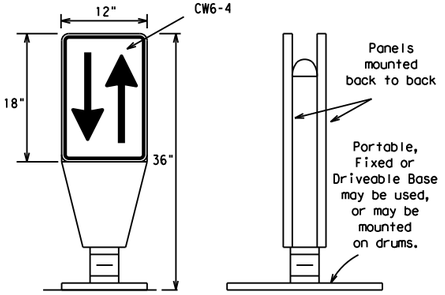


(Rigid or self-righting)

PORTABLE

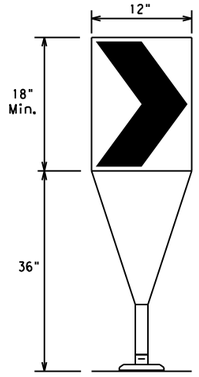
VERTICAL PANELS (VPs)

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.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

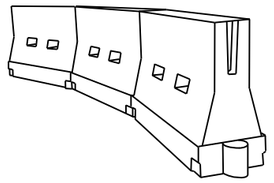
1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The 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.



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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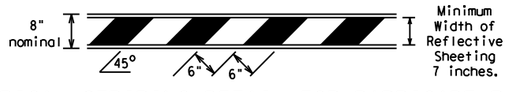
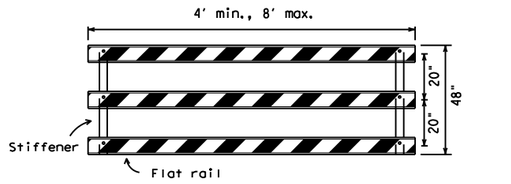
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



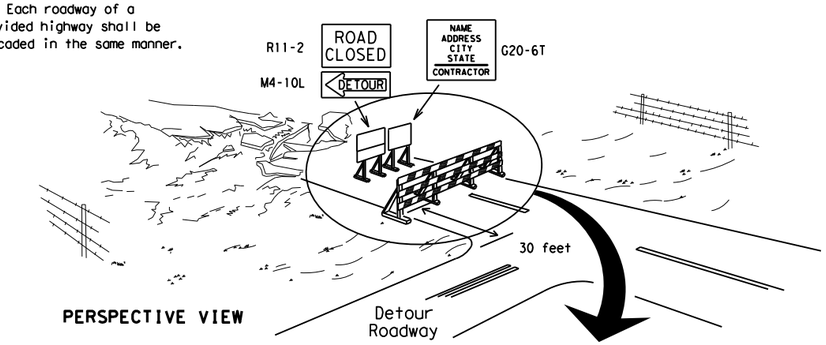
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

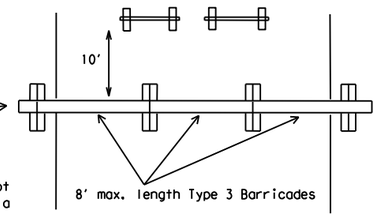
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

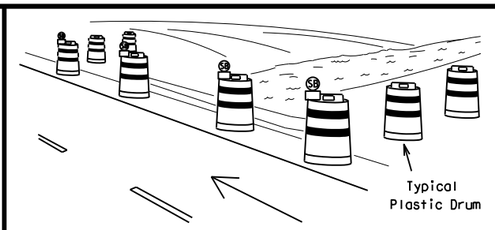
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

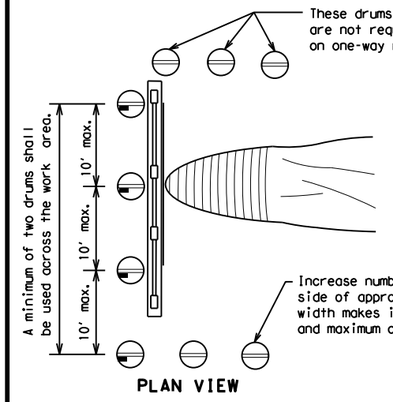
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

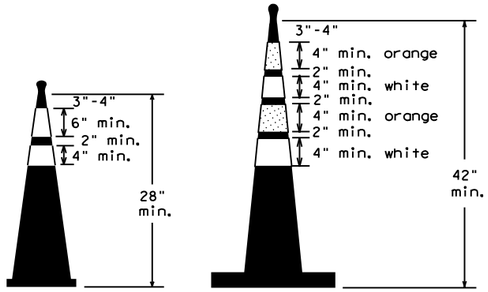
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

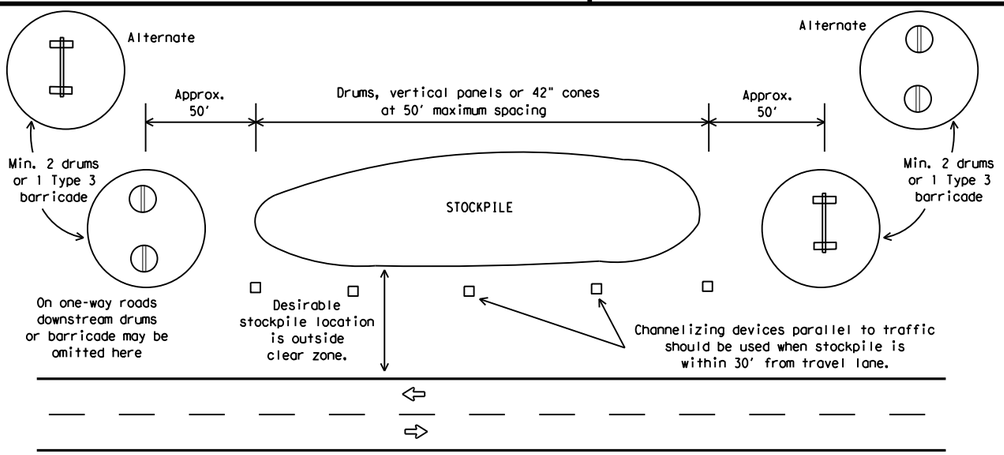
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

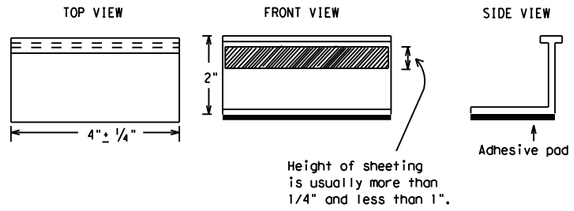
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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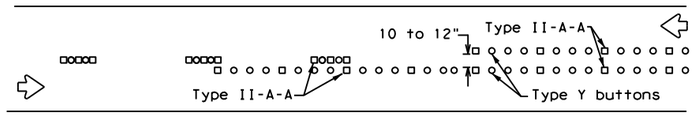
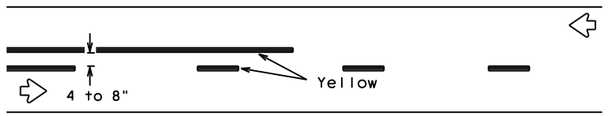
PAVEMENT MARKING PATTERNS

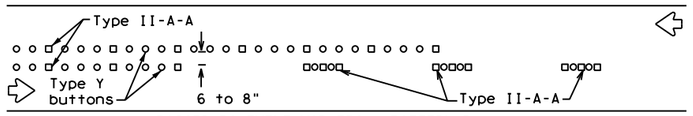
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



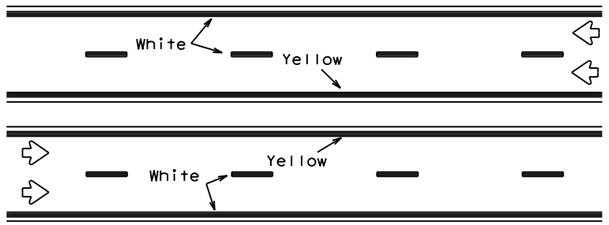
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



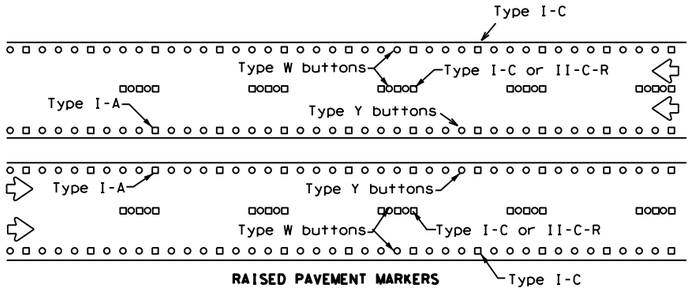
RAISED PAVEMENT MARKERS - PATTERN B

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

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



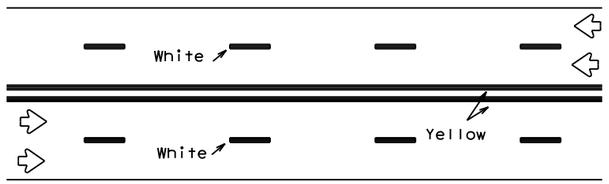
REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



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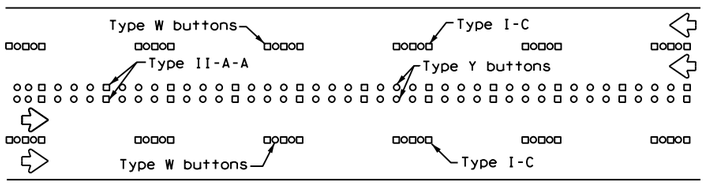
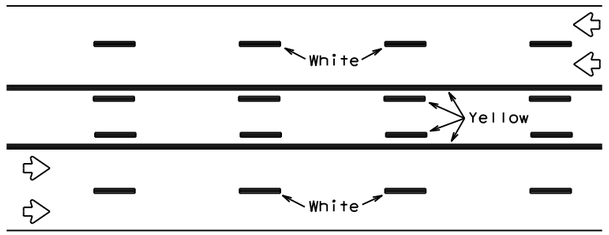


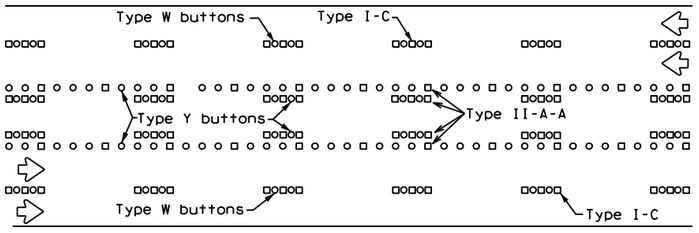
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

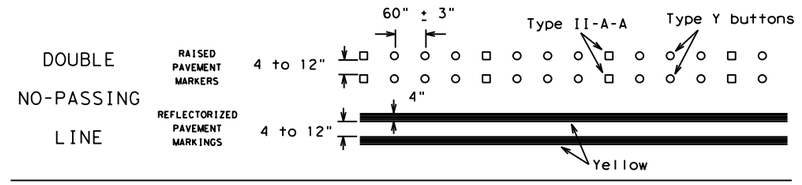
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

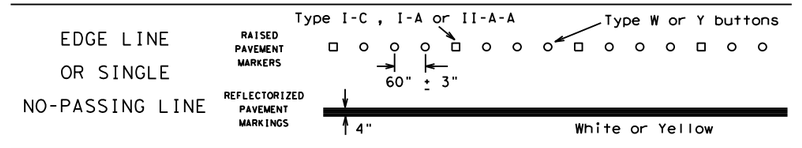
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

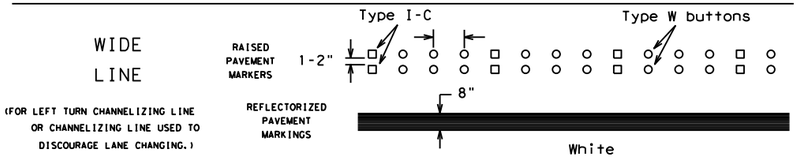


EDGE LINE OR SINGLE NO-PASSING LINE



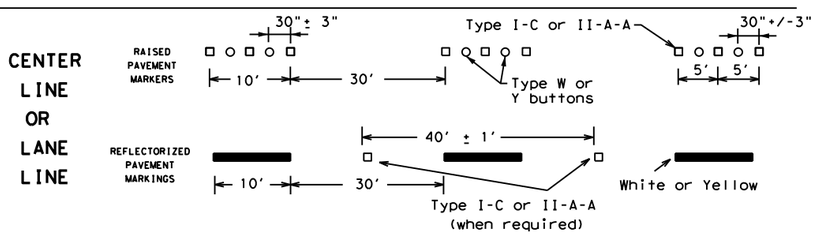
WIDE LINE

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

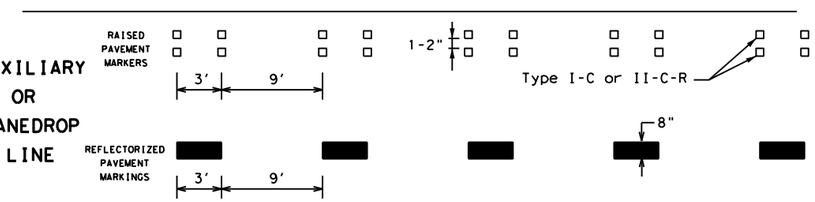


BROKEN LINES

CENTER LINE OR LANE LINE

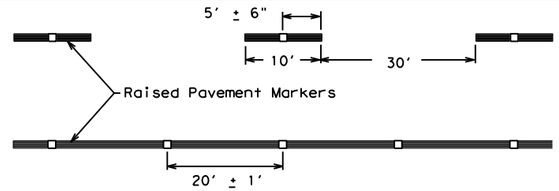


AUXILIARY OR LANEDROP LINE



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

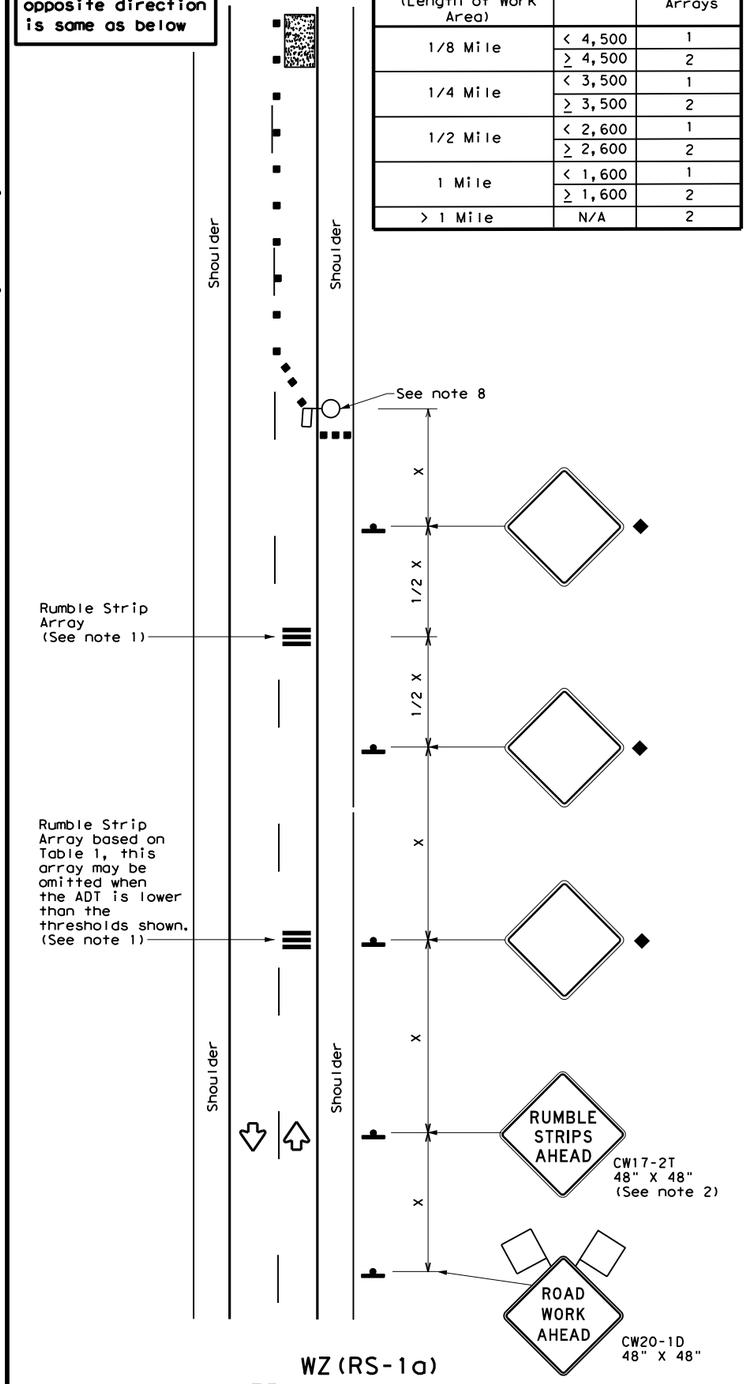
BC(12)-21

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	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		22

DATE:
FILE:

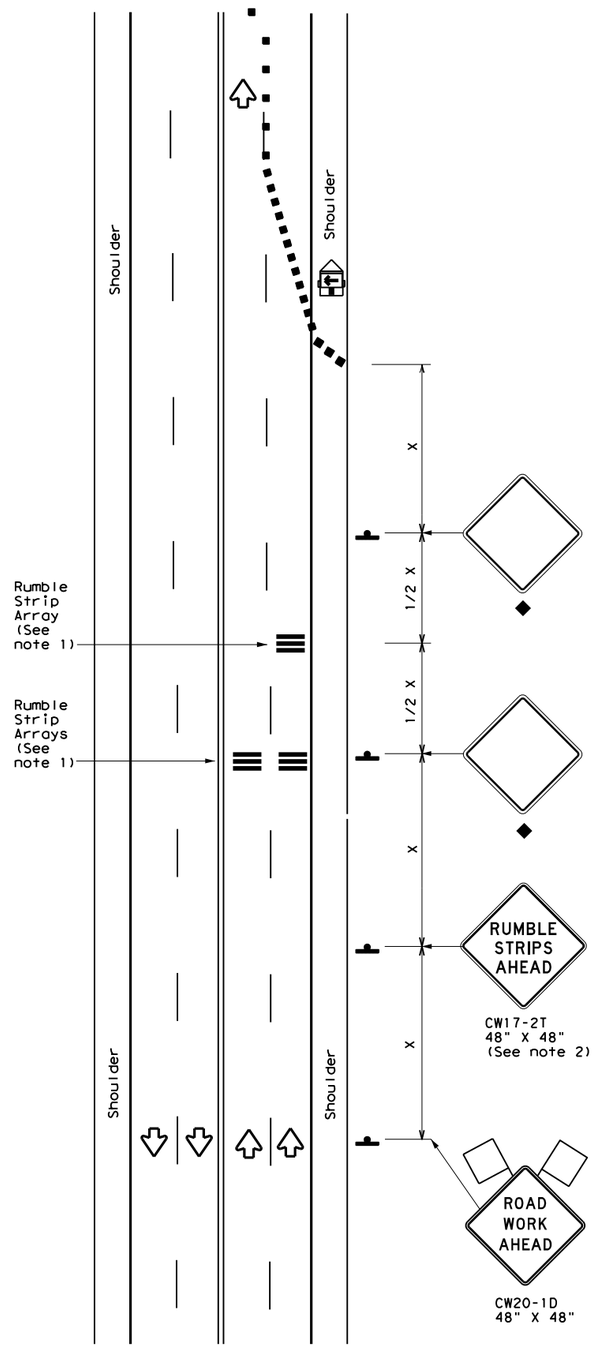
Warning sign and rumble strip sequence in opposite direction is same as below

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

◆ **Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.**

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0916	38	015	VAR.
2-14	DIST	COUNTY		SHEET NO.
4-16	CRP	NUECES		23

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
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		DIST	COUNTY		SHEET NO.
		CRP	ARANSAS		24

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

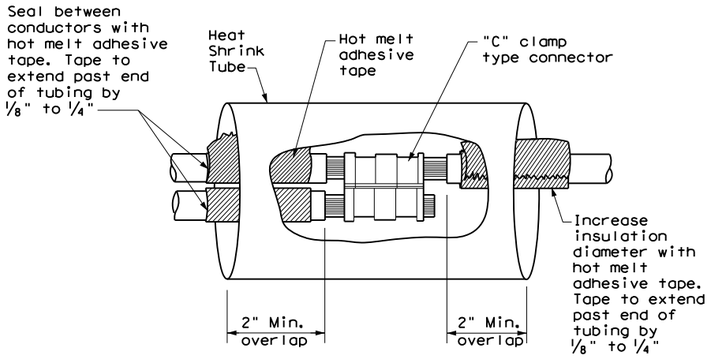
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type

SPLICE OPTION 2
Split Bolt Type

SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE:	ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0916	38	015	VAR.
		DIST	COUNTY		SHEET NO.
		CRP	ARANSAS		25

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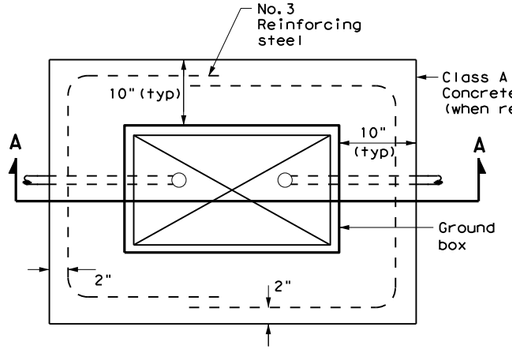
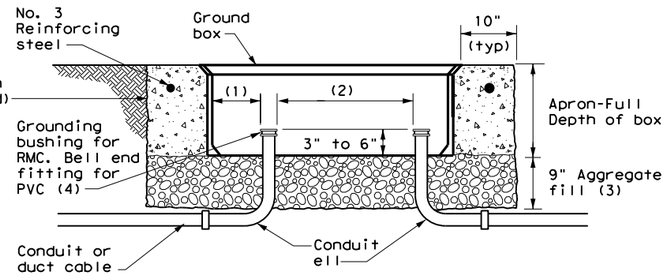


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

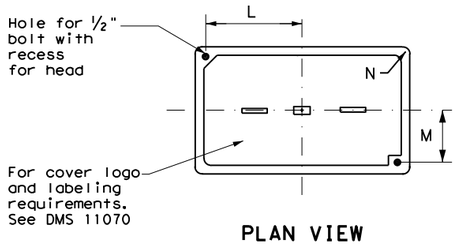
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

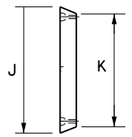
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



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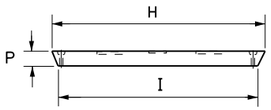

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		26

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

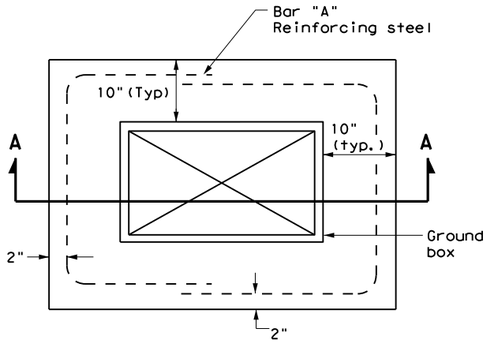
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

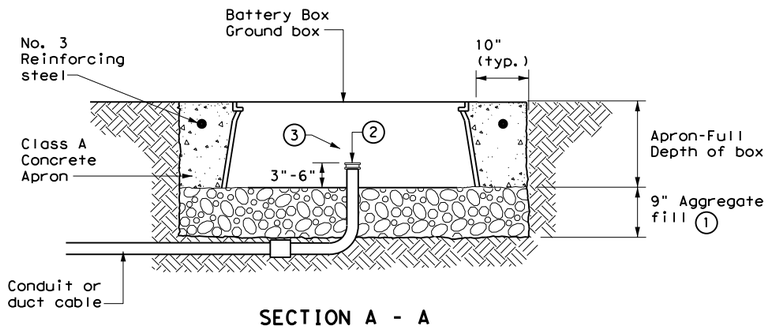
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



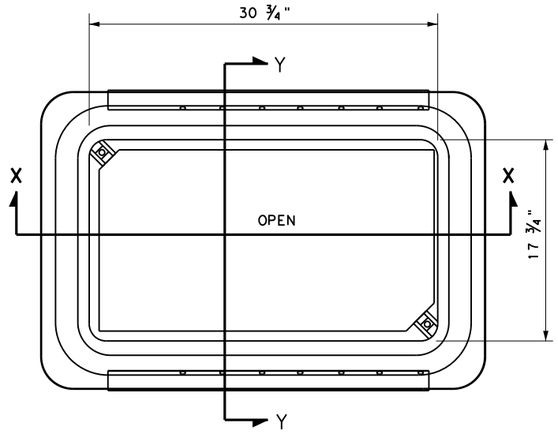
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

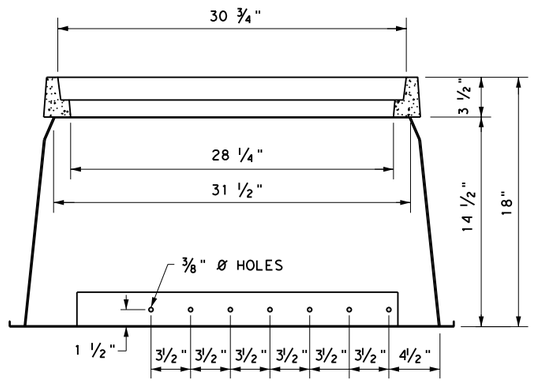
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

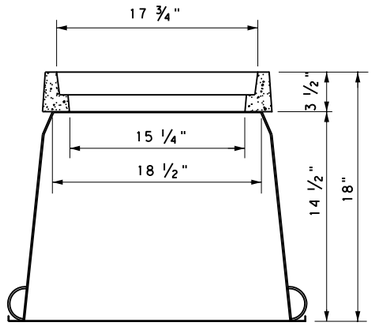
(3) Install all conduits in a neat and workmanlike manner.



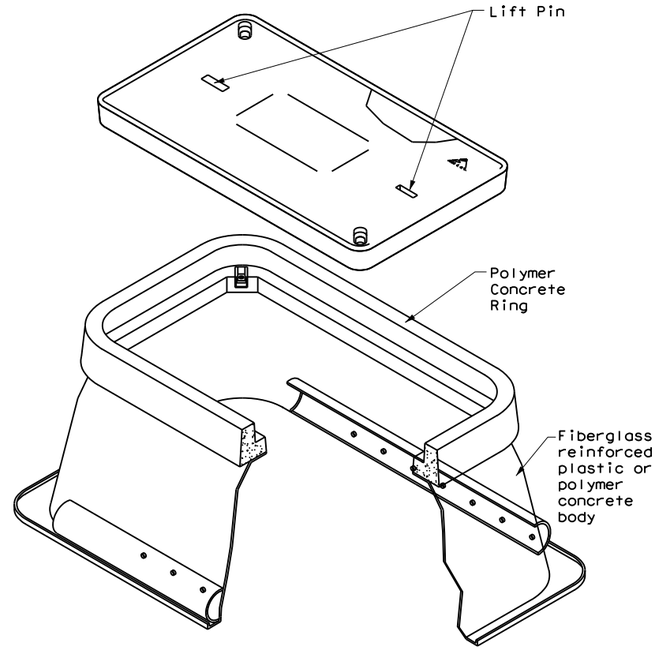
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX GROUND BOXES

ED(12)-14

FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	CRP	ARANSAS		27

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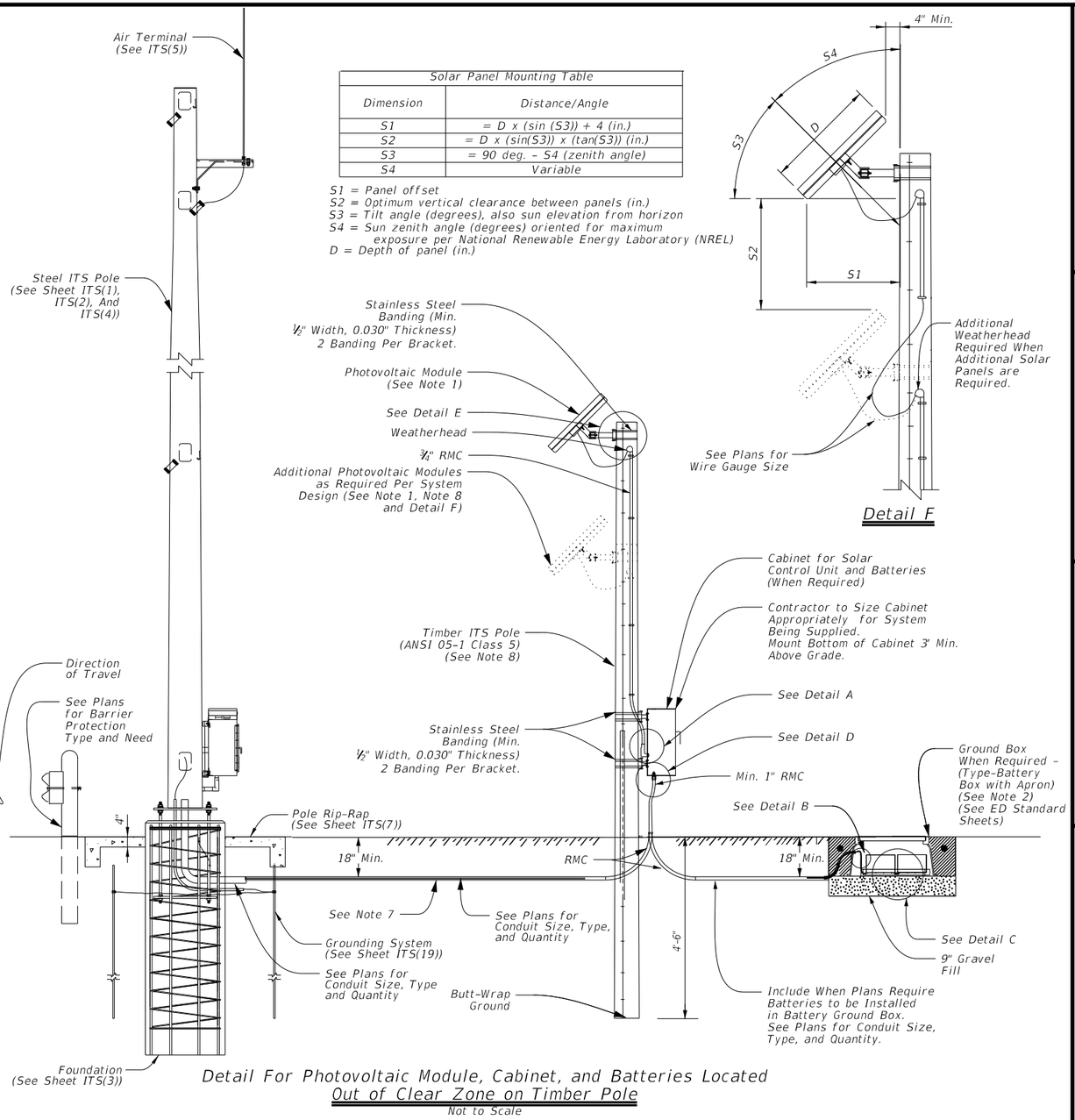


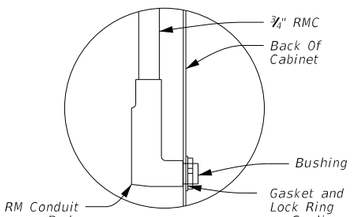
Detail For Photovoltaic Module, Cabinet, and Batteries Located Out of Clear Zone on Timber Pole

Not to Scale

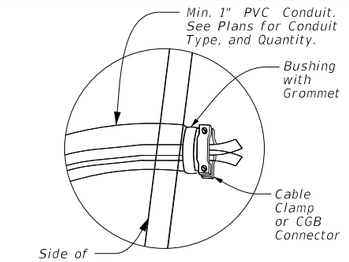
Solar Panel Mounting Table	
Dimension	Distance/Angle
S1	= D x (sin (S3)) + 4 (in.)
S2	= D x (sin(S3)) x (tan(S3)) (in.)
S3	= 90 deg. - S4 (zenith angle)
S4	Variable

S1 = Panel offset
S2 = Optimum vertical clearance between panels (in.)
S3 = Tilt angle (degrees), also sun elevation from horizon
S4 = Sun zenith angle (degrees) oriented for maximum exposure per National Renewable Energy Laboratory (NREL)
D = Depth of panel (in.)

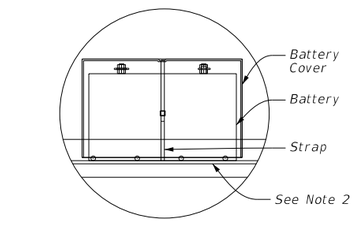
Detail F



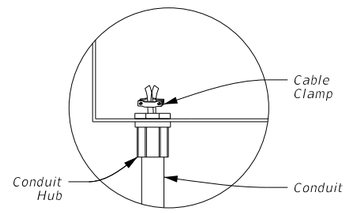
Detail A



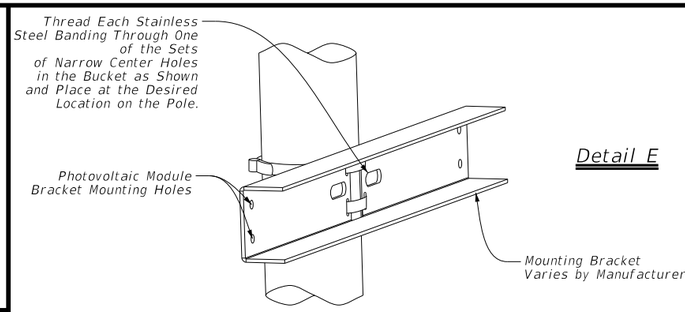
Detail B



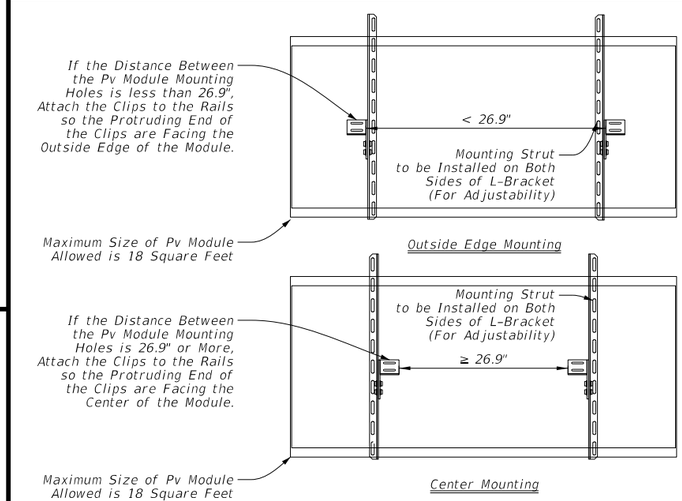
Detail C



Detail D



Detail E



Detail G

Explanation of ITS Solar Power System Descriptive Code

SPS X_1 (X_2W) X_3W (X_4AH) X_5xX_6A (X_7)

- X_1 — Construction Application: INS = Install; REM = Remove; REL = Relocate
- X_2 — Total System Load Capacity (Watts)
- X_3 — Total Solar Panel Capacity (Watts)
- X_4 — Total Battery Capacity (Amp Hours)
- X_5 — No. of Charge Controllers (EA) x
- X_6 — Amperage Capacity of Each (Amps)
- X_7 — Cabinet Installation Type: 1 = ITS Pole Mounted Cabinet (Type 1, 2, or 3); 2 = Manufacturer Supplied on Pedestal Pole; 3 = Manufacturer Supplied on Timber Pole

Example: SPS INS (60W) 1440W (750AH) 3x50A (1)

General Notes:

1. Orient photovoltaic module for optimum exposure to sunlight (face to the south) per National Renewable Energy Laboratory (NREL) guidelines. Prior to installation, check the location to ensure there is no overhead obstruction that would block the Photovoltaic Module from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
2. When required for batteries to be installed in a battery ground box, place the batteries on a 3/16" thick plastic sheet and connect batteries together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16" thick plastic sheet will be subsidiary to Special Specification "ITS Solar Power System."
3. When required for batteries to be installed in an pole mounted cabinet, wire batteries according to manufacturer's recommendations. Provide the number of batteries as required by the manufacturer. Stack the batteries in the cabinet on shelves with 1" vertical separation.
4. See Electrical Details (ED) standard sheets for additional requirements regarding the installation of ground boxes/battery boxes, and conduit.
5. Use materials specifically designed for attaching cabinets, photovoltaic modules, etc., to poles.
6. See Special Specification "ITS Solar Power System" for further requirements.
7. See plans for electrical conductor circuit size from solar cabinet to ITS pole mounted cabinet. Circuit to be designed based off of ITS equipment design load and allowable 5% voltage drop over distance from the solar assembly to ITS cabinet.
8. Provide 20' or 40' in length ANSI 05-1 Class 5 timber poles treated per Item 627, "Treated Timber Poles". Install pole as shown or at the edge of the Right of Way. If more than two photovoltaic modules are needed provide the taller timber pole. Timber pole will be subsidiary to Special Specification "ITS Solar Power System."
9. Use materials specifically designed for attaching cabinets, photovoltaic modules, etc., to poles.
10. See sheets ITS(1), ITS(2), and ITS(4) "ITS Pole Details" for further information regarding the steel ITS pole assembly.
11. Pv = Photovoltaic
12. Use hardware specifically designed for attaching equipment (i.e., cabinet, photovoltaic module, etc.) to pole as recommended by equipment manufacturer. Provide mounting details for approval.

Texas Department of Transportation

Traffic Operations Division Standard

ITS SOLAR POWER SYSTEM WOOD POLE MOUNTING DETAILS

ITS(26)-15

FILE: its(26)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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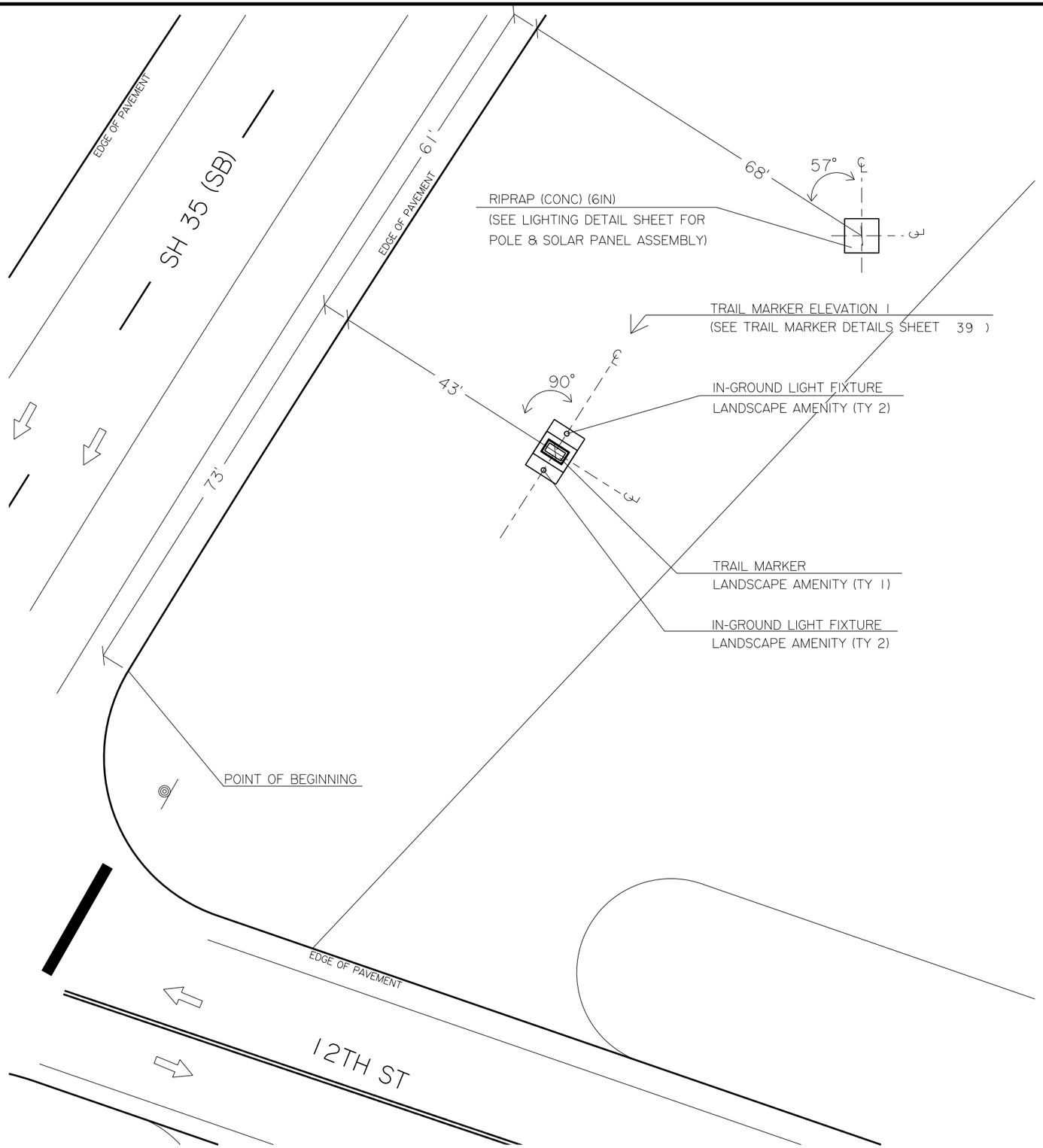
REVISIONS	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		28



LEGEND:

EXISTING SIGN

NOTES:

1. LOCATE EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. ALL DIMENSIONS ARE TO BE FROM THE EDGE OF PAVEMENT OR BACK OF CURB UNLESS OTHERWISE NOTED.
3. SEE TRAIL MARKER DETAILS SHEET 42 FOR:
   - ITEM 1002 6002 LANDSCAPE AMENITY (TY 1)
   CAST STONE A & B DESIGN AND SPECIFICATION AT THIS LOCATION.
4. SEE LIGHTING DETAILS SHEET FOR:
   - ITEM 1002 6003 LANDSCAPE AMENITY (TY 2)
   IN-GROUND LIGHT FIXTURE DETAIL AND SEPECIFICATION

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

N

0 10 20

SCALE: 1" = 20'-0"

SH 35 (SB) @ 12TH
LAYOUT PLAN

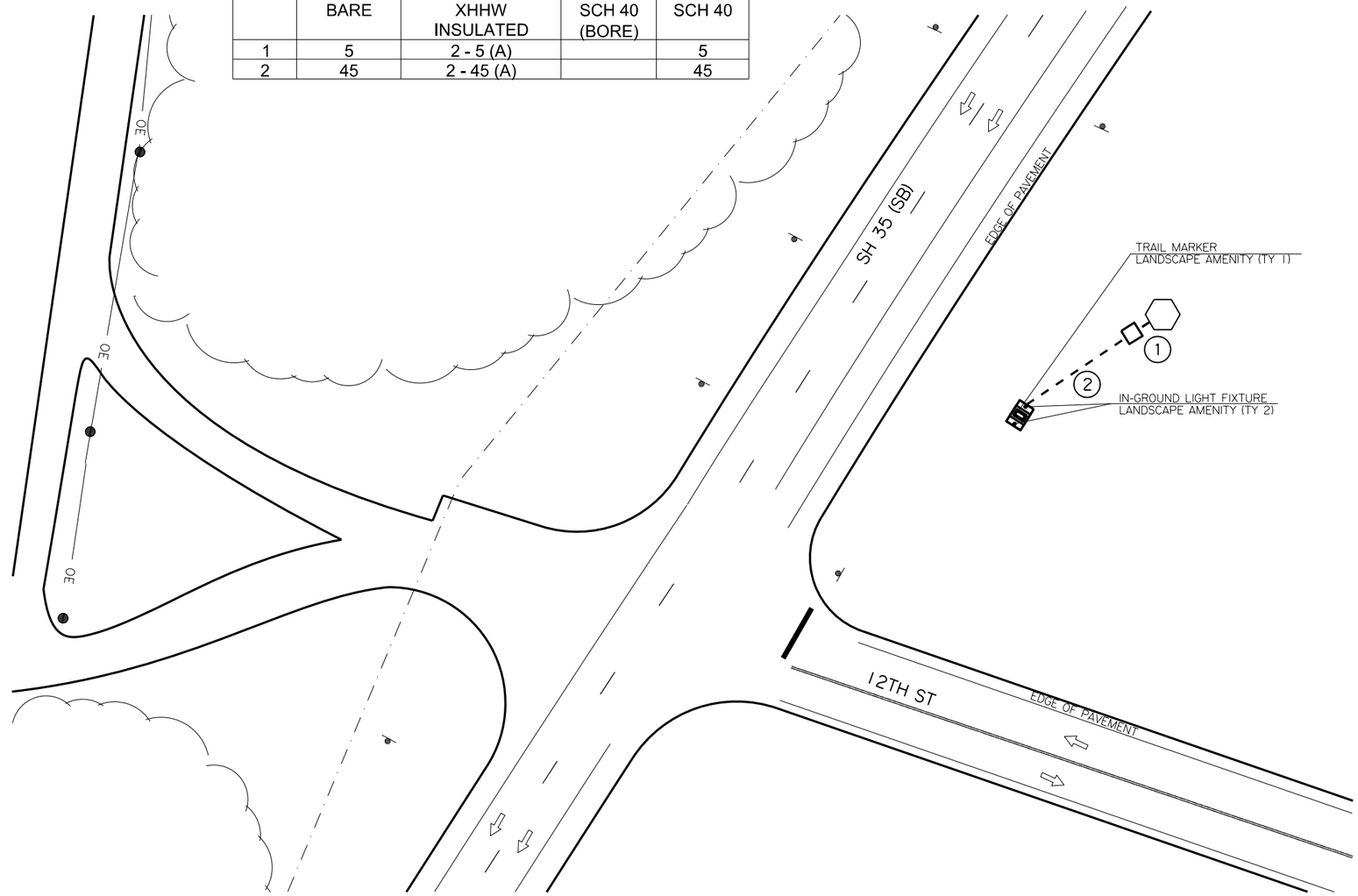
Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	29

DATE: 11/12/2021
FILE: T:\DES\LAND\Projects\CRP\Aransas County (CCAA)\Design sheets\SH 35 @ 12th- Layout Sheet .dgn

CONDUIT AND CONDUCTOR RUNS

RUN NO.	GROUND LENGTH (FEET) #10 BARE	CONDUCTOR NO. AND LENGTH (FEET) #10 XHHW INSULATED	CONDUIT (FEET) 1 IN. PVC SCH 40 (BORE)	CONDUIT (FEET) 1 IN. PVC SCH 40
1	5	2 - 5 (A)		5
2	45	2 - 45 (A)		45



N

LEGEND:

- APPARENT ROW
- OE — OVERHEAD ELECTRIC
- APPARENT ROW
- EXISTING SIGN
- UTILITY POLE
- EXISTING TREES
- IN-GRADE LIGHT FIXTURE
- SOLAR POWER SYSTEM
- CONDUIT AND CONDUCTOR (TRENCHED)
- CONDUIT AND CONDUCTOR (BORED)
- (1) CONDUIT RUN NUMBER
- GROUND BOX TY A (122311) W/APRON

NOTES:

1. LOCATE EXISTING UTILTIES BEFORE BEGINING CONSTRUCTION.
2. SEE LIGHT FIXTURE SCHEDULE FOR IN-GRADE LIGHTS.
3. CONNECT IN-GROUND LIGHTING TO SOLAR POWER SYSTEM WITH PHOTOCELL CONTROL TO COME ON AT NIGHT.
4. RUN LIGHTING CIRCUIT FOR ILLUMINATION OF ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
5. SEE SHEET 46 FOR LIGHTING DETAILS.
6. AIM IN-GROUND LIGHTS SO MAIN BEAM OF LIGHT IS TOWARD ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
7. PROVIDE AND INSTALL SOLAR POWER SYSTEM WITH 5 DAYS OF AUTONOMY AND A DESIGN LOAD OF 40 WATTS AS SPECIFIED IN SPECIAL SPECIFICATION 6063, "ITS SOLAR POWER SYSTEM."
8. INSTALL SOLAR POWER SYSTEM ON AN ALUMINUM POLE WITH A FINISHED HEIGHT ABOVE GROUND OF 8 FEET. SEE ITEM 1002-6004 LANDSCAPE AMENITY (TY 3) AND DETAILS ON SHEET 46 .
9. INSTALL SOLAR POWER SYSTEM AT LEAST 10 FEET HORIZONTALLY FROM CENTER LINE OF ELECTRIC UTILITY DISTRIBUTION LINES AND POLES IF PRESENT. VERIFY LOCATION WITH ENGINEER BEFORE PLACEMENT.

STATE OF TEXAS
GREG JONES
99401
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Greg Jones
CE208F8BC5604A4...
11/18/2021

LIGHT FIXTURE SCHEDULE

DESCRIPTION	MANUFACTURER / CATALOG NUMBER	LAMPS WATTS	LAMPS TYPE	VOLTAGE	MOUNTING
In -Grade Color: Cast, Bronze, Eyeball Style, 360 Degree Rotation, 30 degree Tilt	Kim LTV82EB-WW-12L-3K-UV	16	LED	120V	Ground

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
1002 6003	LANDSCAPE AMENITY (TY 2)	EA	2
1002 6004	LANDSCAPE AMENITY (TY 3)	EA	1
0432 6001	RIPRAP (CONC)(6 IN)	CY	0.7
618 6016	CONDT (PVC) (SCH 40) (1")	LF	50
620 6005	ELEC CONDR (NO.10) BARE	LF	50
620 6006	ELEC CONDR (NO.10) INSULATED	LF	100
624 6002	GROUND BOX TY A (122311)W/APRON	EA	1
6063 6007	SPS-INS (40W) 960W (500AH) 2X50A(1)	EA	1

0 25 50
SCALE: 1" = 50'-0"

SH 35 (SB) @ 12TH
LIGHTING PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	CRP	ARANSAS	0916	38	015	30

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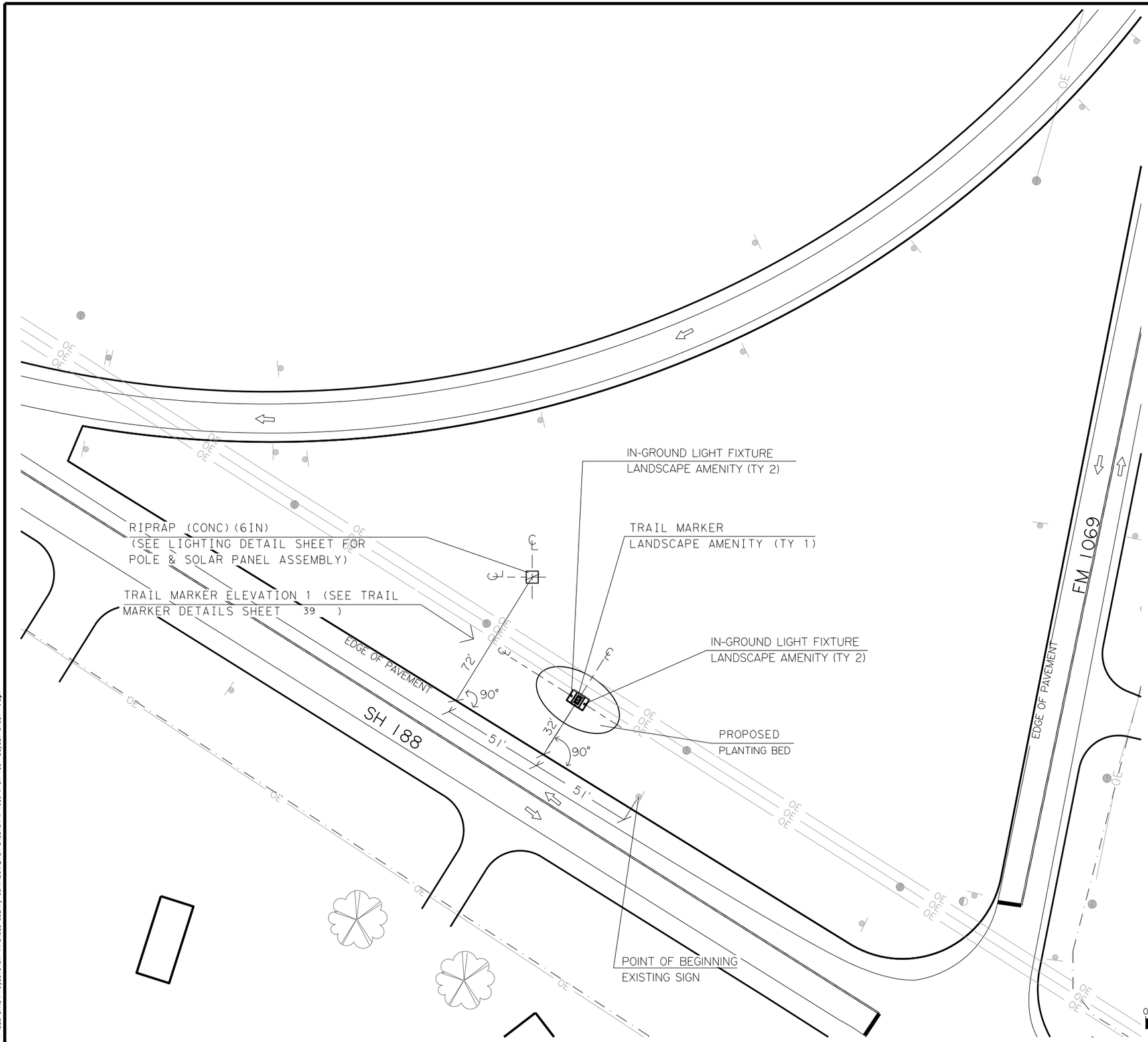

LEGEND:

- APPARENT ROW
- OE — OVERHEAD ELECTRIC
- EXISTING SIGN
- UTILITY POLE
- LIGHT POLE
- EXISTING TREES

NOTES:

1. LOCATE EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. ALL DIMENSIONS ARE TAKEN FROM THE EDGE OF PAVEMENT OR BACK OF CURB UNLESS OTHERWISE NOTED.
3. THE CENTERLINE OF ITEM 1002-6002 LANDSCAPE AMENITY (TY 1) IS MEASURED 18' (MIN.) FROM THE OUTTERMOST OVERHEAD ELECTRIC LINE.
4. SEE PLANTING BED DETAIL SHEETS FOR:
   -TYPICAL PLANTING BED LAYOUT PLAN
   -TYPICAL PLANTING BED GRADING PLAN
5. SEE TRAIL MARKER DETAILS SHEET **43** FOR:
   CAST STONE A & B DESIGN AND SPECIFICATION AT THIS LOCATION.
6. SEE LIGHTING DETAILS SHEET FOR :
   -ITEM 1002-6003 LANDSCAPE AMENITY (TY 2) IN-GROUND LIGHTING FIXTURE DETAIL AND SPECIFICATION

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

SH 188 @ FM 1069
LAYOUT PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	31

DATE: 11/12/2021
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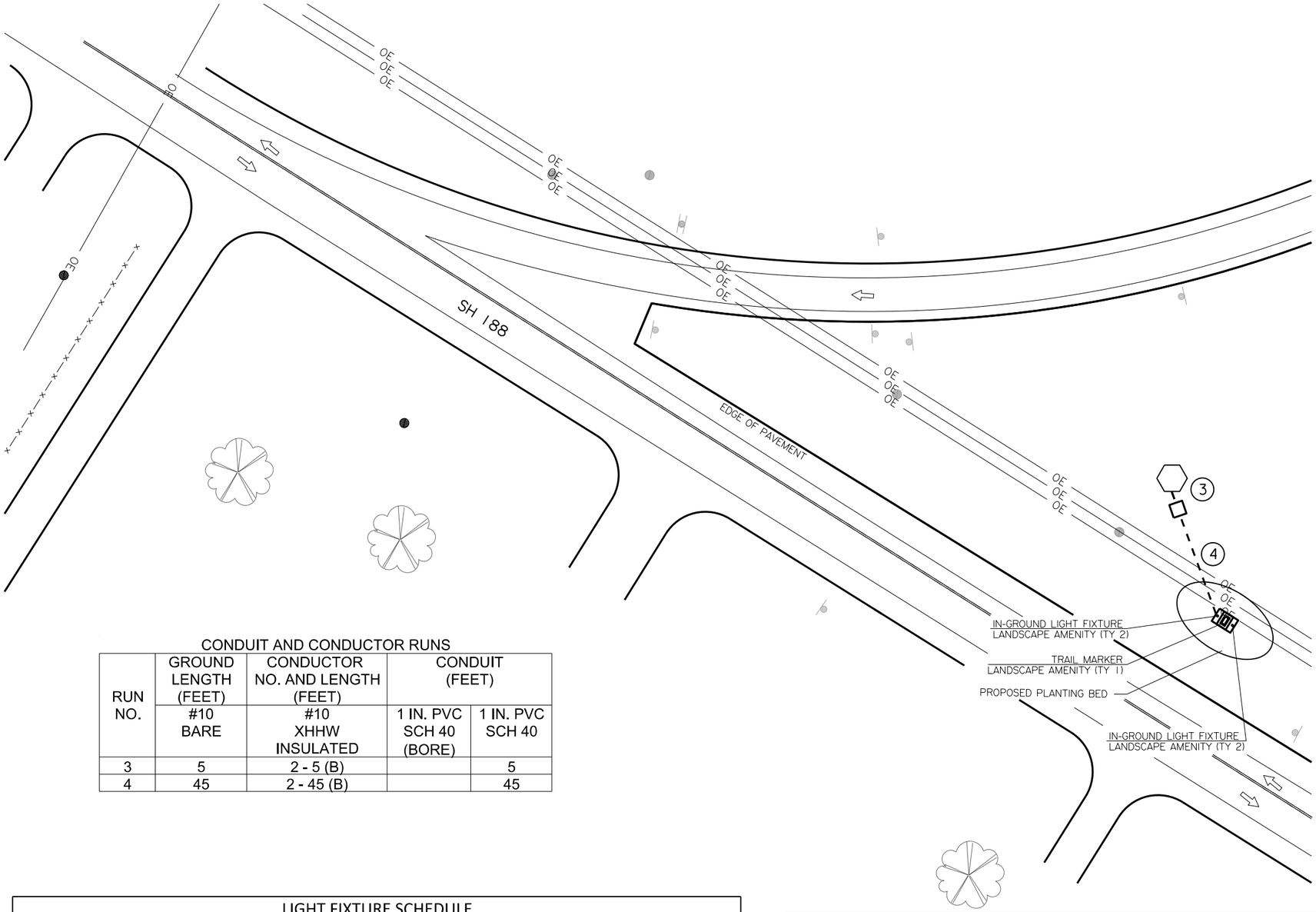

LEGEND:

- APPARENT ROW
- OE — OVERHEAD ELECTRIC
- APPARENT ROW
- EXISTING SIGN
- UTILITY POLE
- EXISTING TREES
- IN-GRADE LIGHT FIXTURE
- SOLAR POWER SYSTEM
- CONDUIT AND CONDUCTOR (TRENCHED)
- CONDUIT AND CONDUCTOR (BORED)
- (1) CONDUIT RUN NUMBER
- GROUND BOX TY A (122311) W/APRON

NOTES:

1. LOCATE EXISTING UTILTIES BEFORE BEGINING CONSTRUCTION.
2. SEE LIGHT FIXTURE SCHEDULE FOR IN-GRADE LIGHTS.
3. CONNECT IN-GROUND LIGHTING TO SOLAR POWER SYSTEM WITH PHOTOCELL CONTROL TO COME ON AT NIGHT.
4. RUN LIGHTING CIRCUIT FOR ILLUMINATION OF ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
5. SEE SHEET 46 FOR LIGHTING DETAILS.
6. AIM IN-GROUND LIGHTS SO MAIN BEAM OF LIGHT IS TOWARD ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
7. PROVIDE AND INSTALL SOLAR POWER SYSTEM WITH 5 DAYS OF AUTONOMY AND A DESIGN LOAD OF 40 WATTS AS SPECIFIED IN SPECIAL SPECIFICATION 6063, "ITS SOLAR POWER SYSTEM."
8. INSTALL SOLAR POWER SYSTEM ON AN ALUMINUM POLE WITH A FINISHED HEIGHT ABOVE GROUND OF 8 FEET. SEE ITEM 1002-6004 LANDSCAPE AMENITY (TY 3) AND DETAILS ON SHEET 46 .
9. INSTALL SOLAR POWER SYSTEM AT LEAST 10 FEET HORIZONTALLY FROM CENTER LINE OF ELECTRIC UTILITY DISTRIBUTION LINES AND POLES IF PRESENT. VERIFY LOCATION WITH ENGINEER BEFORE PLACEMENT.

CONDUIT AND CONDUCTOR RUNS

RUN NO.	GROUND LENGTH (FEET)	CONDUCTOR NO. AND LENGTH (FEET)	CONDUIT (FEET)	
	#10 BARE	#10 XHHW INSULATED	1 IN. PVC SCH 40 (BORE)	1 IN. PVC SCH 40
3	5	2 - 5 (B)		5
4	45	2 - 45 (B)		45

LIGHT FIXTURE SCHEDULE

DESCRIPTION	MANUFACTURER / CATALOG NUMBER	LAMPS WATTS	LAMPS TYPE	VOLTAGE	MOUNTING
In -Grade Color: Cast, Bronze, Eyeball Style, 360 Degree Rotation, 30 degree Tilt	Kim LTV82EB-WW-12L-3K-UV	16	LED	120V	Ground

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
1002 6003	LANDSCAPE AMENITY (TY 2)	EA	2
1002 6004	LANDSCAPE AMENITY (TY 3)	EA	1
0432 6001	RIPRAP (CONC)(6 IN)	CY	0.7
618 6016	CONDT (PVC) (SCH 40) (1")	LF	50
620 6005	ELEC CONDR (NO.10) BARE	LF	50
620 6006	ELEC CONDR (NO.10) INSULATED	LF	100
624 6002	GROUND BOX TY A (122311)W/APRON	EA	1
6063 6007	SPS-INS (40W) 960W (500AH) 2X50A(1)	EA	1

0 25 50

SCALE: 1" = 50'-0"

STATE OF TEXAS
GREG JONES
99401
LICENSED
PROFESSIONAL ENGINEER

DocuSigned by:
Greg Jones
CE208F8BC5604A4...
11/18/2021

SH 188 @ FM 1069
LIGHTING PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	CRP	ARANSAS	0916	38	015	32

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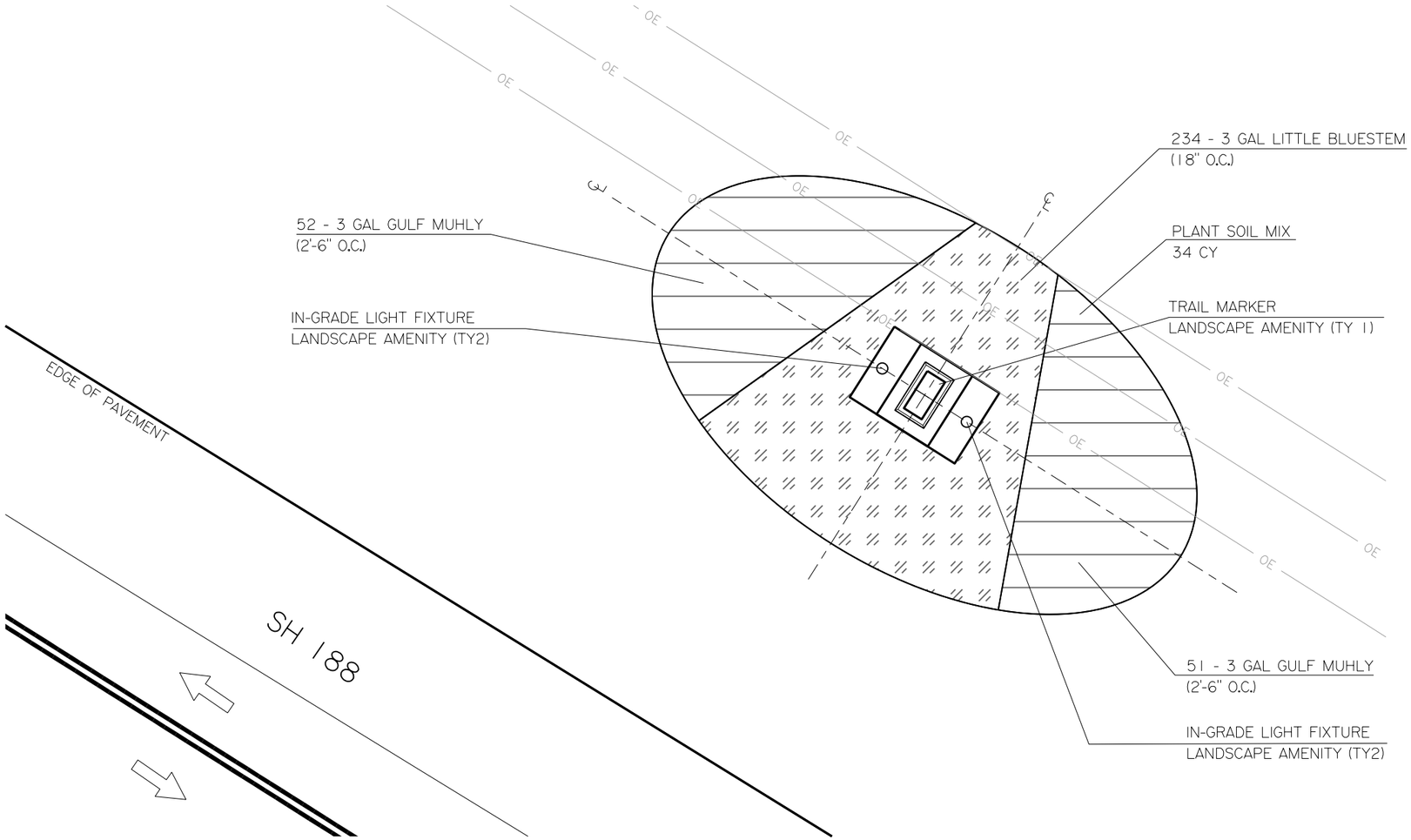


LEGEND:

- OE — OVERHEAD ELECTRIC
- GULF MUHLY
- LITTLE BLUESTEM

NOTES:

1. LOCATE EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. SEE LAYOUT PLAN SHEET 31 FOR LOCATION OF LANDSCAPE AMENITY (TY 1) AND PLANTING BED.
3. SEE PLANTING BED DETAIL SHEETS FOR:
   -TYPICAL PLANTING BED LAYOUT PLAN
   -TYPICAL PLANTING BED GRADING PLAN
4. SEE TRAIL MARKER DETAILS SHEET FOR SPECIFICATIONS:
   - ITEM 1002 6002 LANDSCAPE AMENITY (TY 1)
5. SEE LIGHTING DETAIL SHEET FOR SPECIFICATIONS:
   - ITEM 1002 6003 LANDSCAPE AMENITY (TY 2)

Item	Common Name	Botanical Name	Quantity	Size	Spacing
0192-6003	Little Bluestem	Schizachyrium scoparium	234	3 GAL.	18" O.C.
	Gulf Muhly	Muhlenbergia capillaris	103	3 GAL.	2'-6" O.C.
		Total	**337**		

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

N

0 5 10

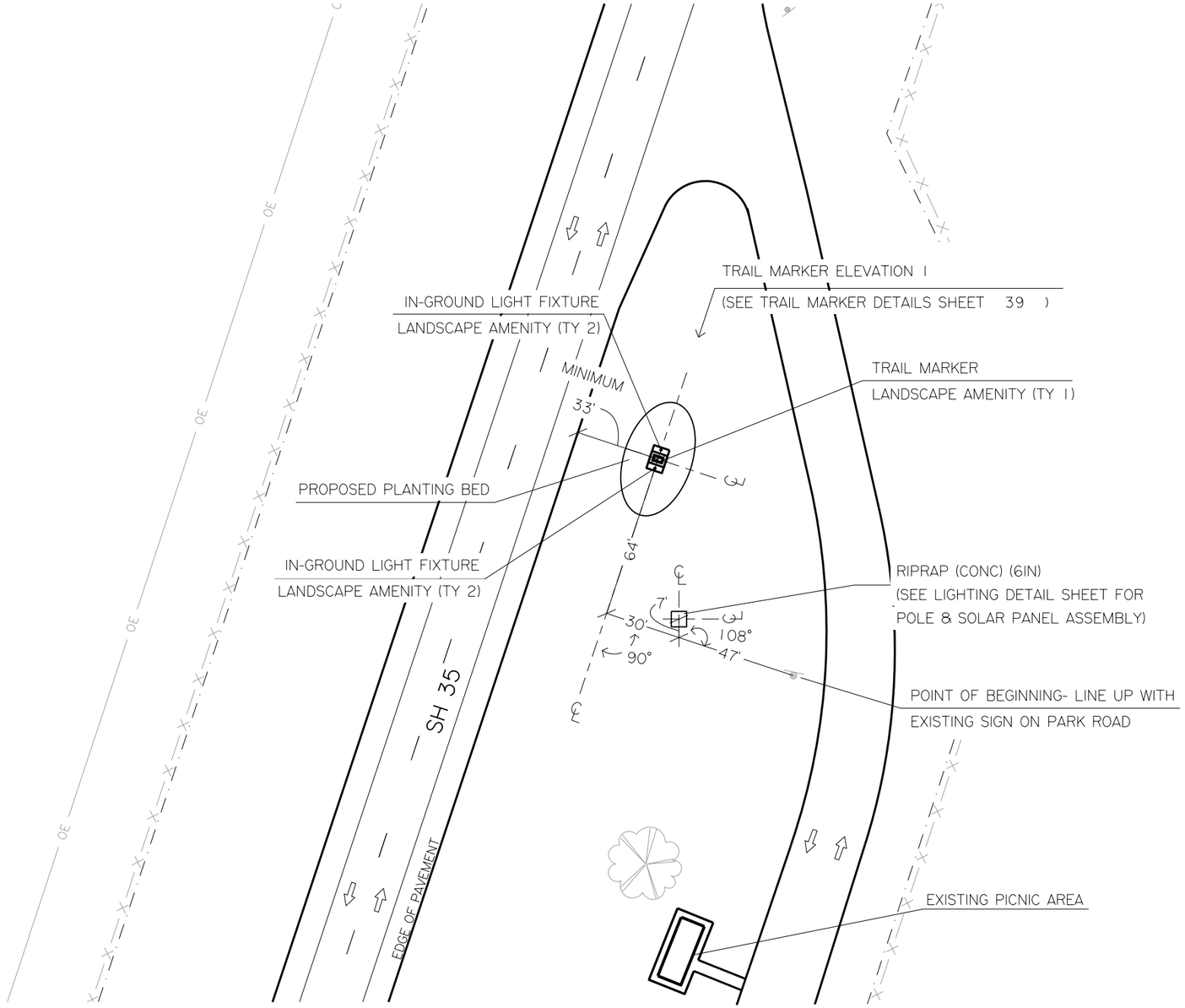
SCALE: 1" = 10'-0"

SH 188 @ FM 1069
PLANTING PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	33

DATE: 10/26/2021
FILE: T:\DES\LAND\Projects\CRP\Aransas County (CAA\DGN\plan sheets\FM 1069 @ SH 188- Landscape Sheet .dgn



LEGEND:

- APPARENT ROW
- FENCE
- OE OVERHEAD ELECTRIC
- EXISTING SIGN
- EXISTING TREES

NOTES:

1. LOCATE EXISTING UTILTIES BEFORE BEGINNING CONSTRUCTION.
2. ALL DIMENSIONS ARE TAKEN FROM THE EDGE OF PAVEMENT OR BACK OF CURB UNLESS OTHERWISE NOTED.
3. SEE PLANTING BED DETAIL SHEETS FOR:
   -TYPICAL PLANTING BED LAYOUT PLAN
   -TYPICAL PLANTING BED GRADING PLAN
4. SEE TRAIL MARKER DETAILS SHEET 44 FOR CAST STONE A & B DESIGN AND SPECIFICATION AT THIS LOCATION.
5. SEE LIGHTING DETAIL SHEET FOR:
   - ITEM 1002 6003 LANDSCAPE AMENITY (TY 2) IN-GROUND LIGHT FIXTURE DETAIL AND SPECIFICATION

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

SH 35 @ PICNIC AREA
LAYOUT PLAN

N

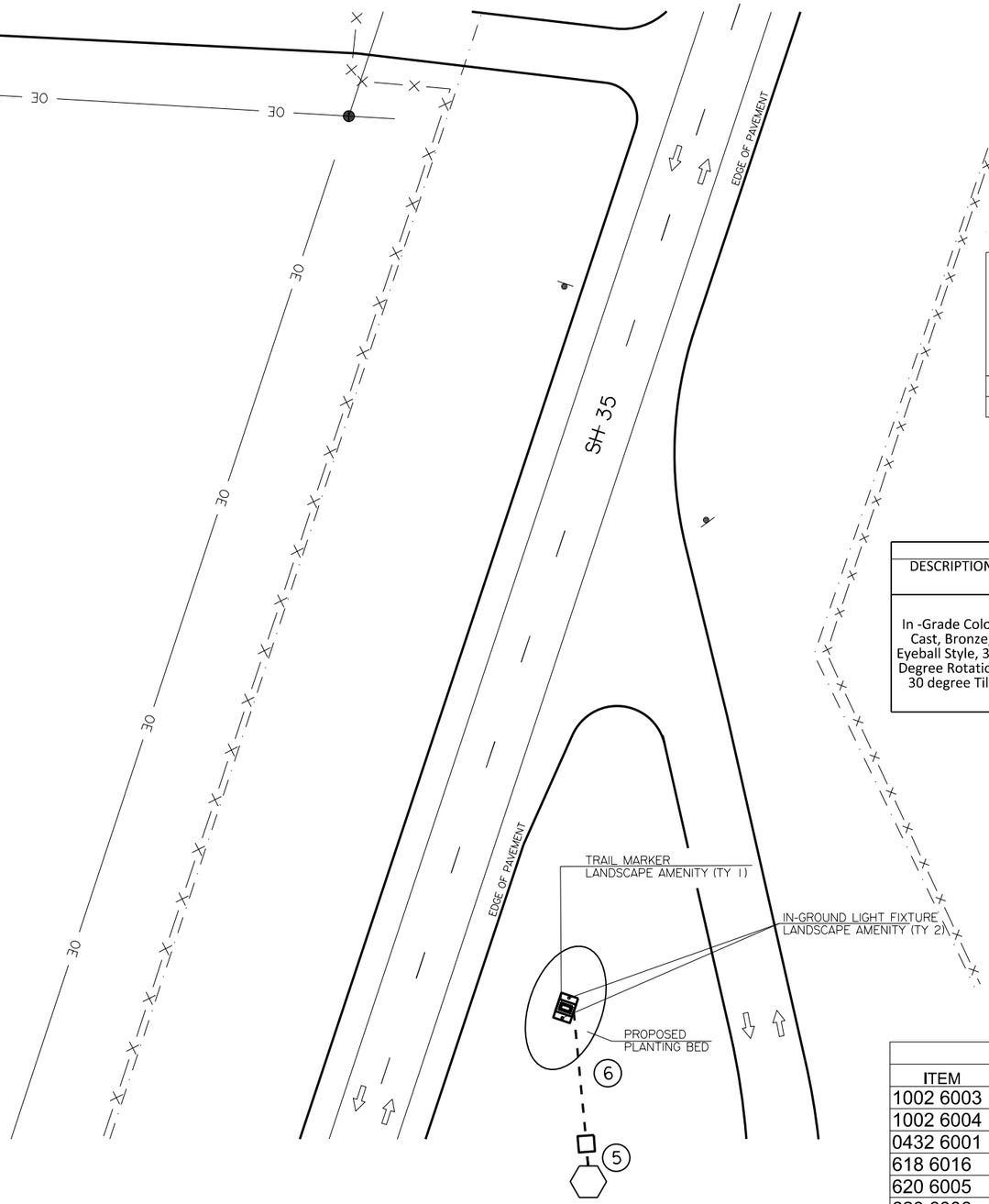
0 25 50

SCALE: 1" = 50-0"

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	34

DATE: 11/12/2021
FILE: T:\DES*LAND\Projects\CRP\Aransas County (CCAA)\Design sheets\Picnic Area- Layout Sheet - dgn



LEGEND:

- APPARENT ROW
- OE — OVERHEAD ELECTRIC
- APPARENT ROW
- EXISTING SIGN
- UTILITY POLE
- IN-GRADE LIGHT FIXTURE
- SOLAR POWER SYSTEM
- CONDUIT AND CONDUCTOR (TRENCHED)
- CONDUIT AND CONDUCTOR (BORED)
- CONDUIT RUN NUMBER
- GROUND BOX TY A (122311) W/APRON

CONDUIT AND CONDUCTOR RUNS

RUN NO.	GROUND LENGTH (FEET)	CONDUCTOR NO. AND LENGTH (FEET)	CONDUIT (FEET)	
	#10 BARE	#10 XHHW INSULATED	1 IN. PVC SCH 40 (BORE)	1 IN. PVC SCH 40
5	5	2 - 5 (C)		5
6	45	2 - 45 (C)		45

LIGHT FIXTURE SCHEDULE

DESCRIPTION	MANUFACTURER / CATALOG NUMBER	LAMPS WATTS	LAMPS TYPE	VOLTAGE	MOUNTING
In -Grade Color: Cast, Bronze, Eyeball Style, 360 Degree Rotation, 30 degree Tilt	Kim LTV82EB-WW-12L-3K-UV	16	LED	120V	Ground

NOTES:

1. LOCATE EXISTING UTILTIES BEFORE BEGINING CONSTRUCTION.
2. SEE LIGHT FIXTURE SCHEDULE FOR IN-GRADE LIGHTS.
3. CONNECT IN-GROUND LIGHTING TO SOLAR POWER SYSTEM WITH PHOTOCELL CONTROL TO COME ON AT NIGHT.
4. RUN LIGHTING CIRCUIT FOR ILLUMINATION OF ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
5. SEE SHEET 46 FOR LIGHTING DETAILS.
6. AIM IN-GROUND LIGHTS SO MAIN BEAM OF LIGHT IS TOWARD ITEM 1002-6002 LANDSCAPE AMENITY (TY 1).
7. PROVIDE AND INSTALL SOLAR POWER SYSTEM WITH 5 DAYS OF AUTONOMY AND A DESIGN LOAD OF 40 WATTS AS SPECIFIED IN SPECIAL SPECIFICATION 6063, "ITS SOLAR POWER SYSTEM."
8. INSTALL SOLAR POWER SYSTEM ON AN ALUMINUM POLE WITH A FINISHED HEIGHT ABOVE GROUND OF 8 FEET. SEE ITEM 1002-6004 LANDSCAPE AMENITY (TY 3) AND DETAILS ON SHEET46 .
9. INSTALL SOLAR POWER SYSTEM AT LEAST 10 FEET HORIZONTALLY FROM CENTER LINE OF ELECTRIC UTILITY DISTRIBUTION LINES AND POLES IF PRESENT. VERIFY LOCATION WITH ENGINEER BEFORE PLACEMENT.

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
1002 6003	LANDSCAPE AMENITY (TY 2)	EA	2
1002 6004	LANDSCAPE AMENITY (TY 3)	EA	1
0432 6001	RIPRAP (CONC)(6 IN)	CY	0.7
618 6016	CONDT (PVC) (SCH 40) (1")	LF	50
620 6005	ELEC CONDR (NO.10) BARE	LF	50
620 6006	ELEC CONDR (NO.10) INSULATED	LF	100
624 6002	GROUND BOX TY A (122311)W/APRON	EA	1
6063 6007	SPS-INS (40W) 960W (500AH) 2X50A(1)	EA	1

0 25 50

SCALE: 1" = 50'-0"

STATE OF TEXAS
GREG JONES
99401
LICENSED
PROFESSIONAL ENGINEER

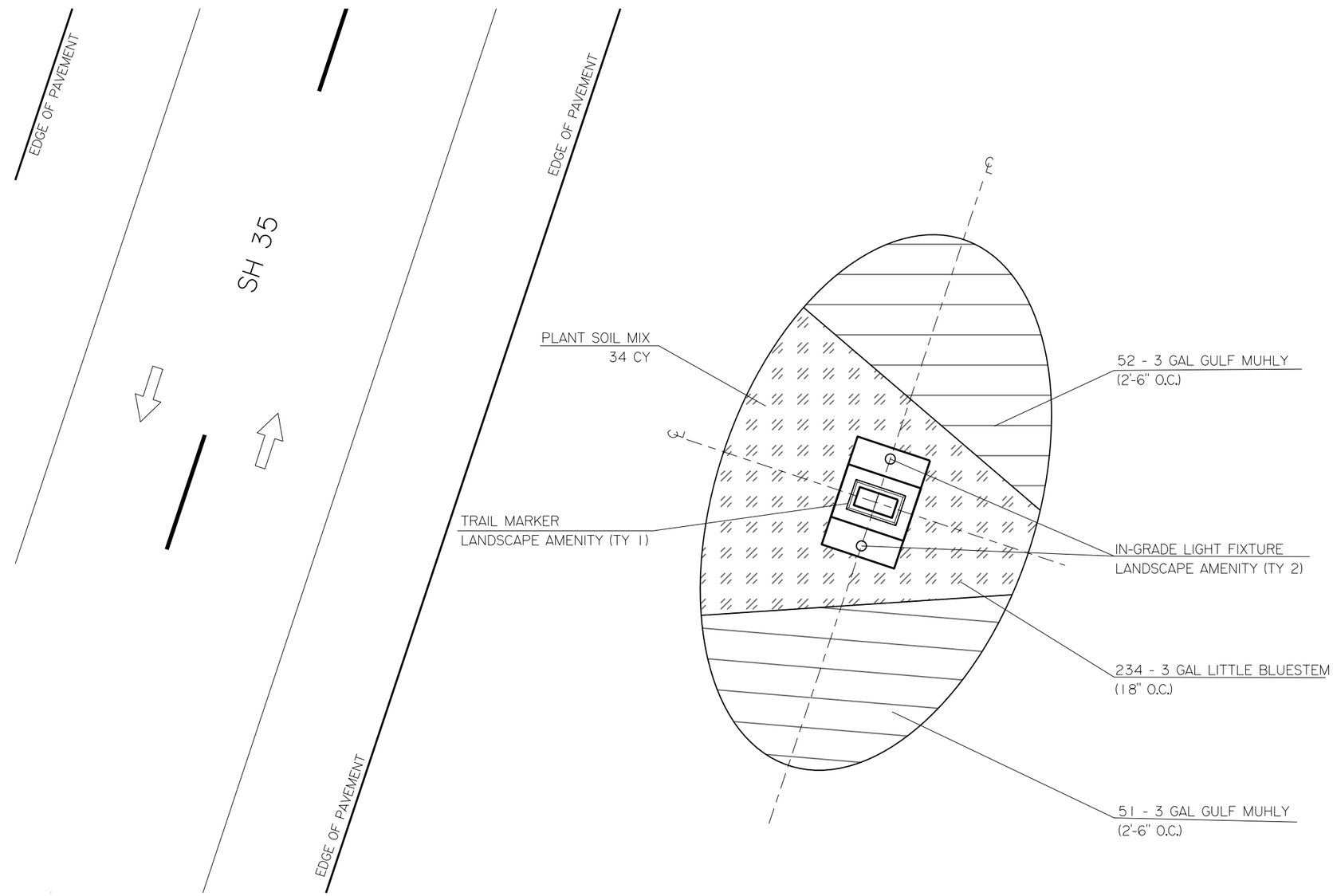
DocuSigned by:
Greg Jones
CE208F8BC5604A4...
11/18/2021

SH 35 @ PICNIC AREA
LIGHTING PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	CRP	ARANSAS	0916	38	015	35

DATE: 11/18/2021
FILE: T:\DES\LAND\Projects\CRP\Aransas County GCAA\06\plan sheets\0_SH 35 @ Picnic Area.dgn



LEGEND:

GULF MUHLY

LITTLE BLUESTEM

NOTES:

1. LOCATE EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. SEE LAYOUT PLAN SHEET 34 FOR LOCATION OF LANDSCAPE AMENITY (TY 1) AND PLANTING BED.
3. SEE PLANTING BED DETAIL SHEETS FOR:
   -TYPICAL PLANTING BED LAYOUT PLAN
   -TYPICAL PLANTING BED GRADING PLAN
4. SEE TRAIL MARKER DETAILS SHEETS FOR SPECIFICATIONS:
   - ITEM 1002 6002 LANDSCAPE AMENITY (TY 1)
5. SEE LIGHTING DETAIL SHEET FOR SPECIFICATIONS:
   - ITEM 1002 6003 LANDSCAPE AMENITY (TY 2)

Item	Common Name	Botanical Name	Quantity	Size	Spacing
0192-6003	Little Bluestem	Schizachyrium scoparium	234	3 GAL.	18" O.C.
	Gulf Muhly	Muhlenbergia capillaris	103	3 GAL.	2'-6" O.C.
		Total	**337**		

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

SCALE: 1" = 10'-0"

SH 35 @ PICNIC AREA
PLANTING PLAN

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER				HIGHWAY
	SEE TITLE SHEET				VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	36

DATE: 10/26/2021
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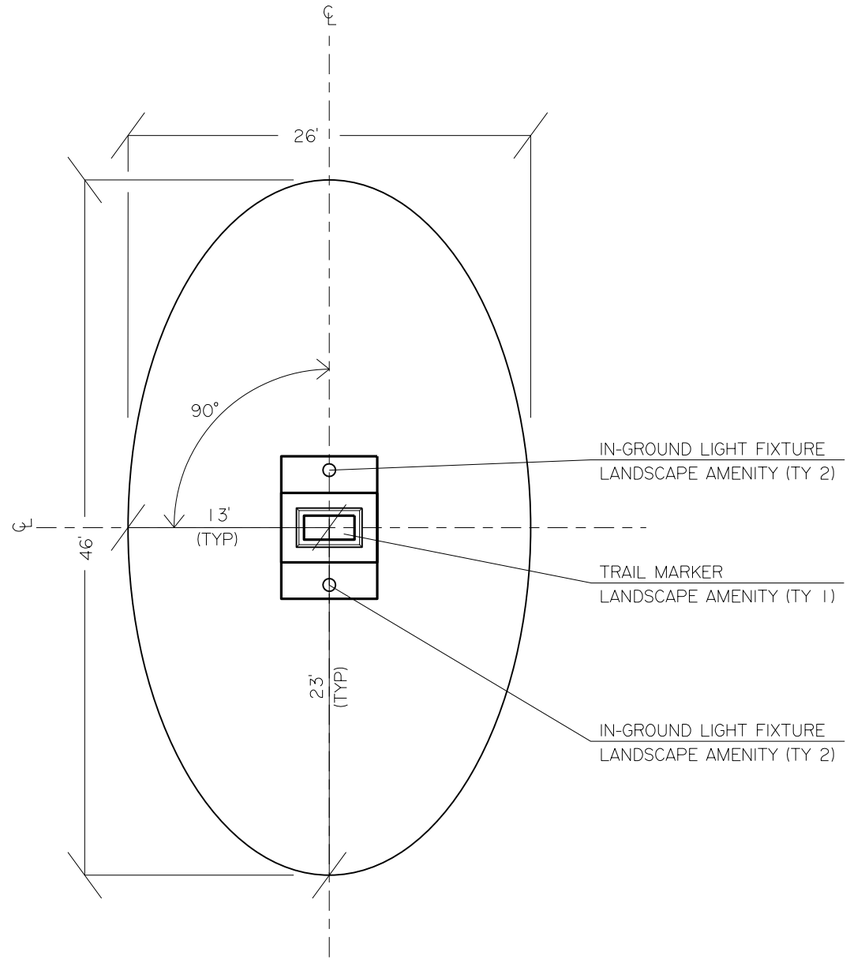

TYPICAL LAYOUT PLAN

SCALE: 1"= 10'-0"

NOTES:

1. LOCATE EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION..
2. SEE LAYOUT PLAN SHEETS FOR LOCATION OF PLANTING BED AT:
   - SH 188 @ FM 1069
   - SH 35 @ PICNIC AREA
3. SEE TRAIL MARKER DETAILS SHEETS FOR SPECIFICATIONS:
   - ITEM 1002 6002 LANDSCAPE AMENITY (TY 1)
4. SEE LIGHTING DETAILS FOR SPECIFICATIONS :
   - ITEM 1002 6003 LANDSCAPE AMENITY (TY 2)

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

PLANTING BED DETAILS

(1 of 2)

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER				HIGHWAY
	SEE TITLE SHEET				VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	37

DATE: 10/26/2021
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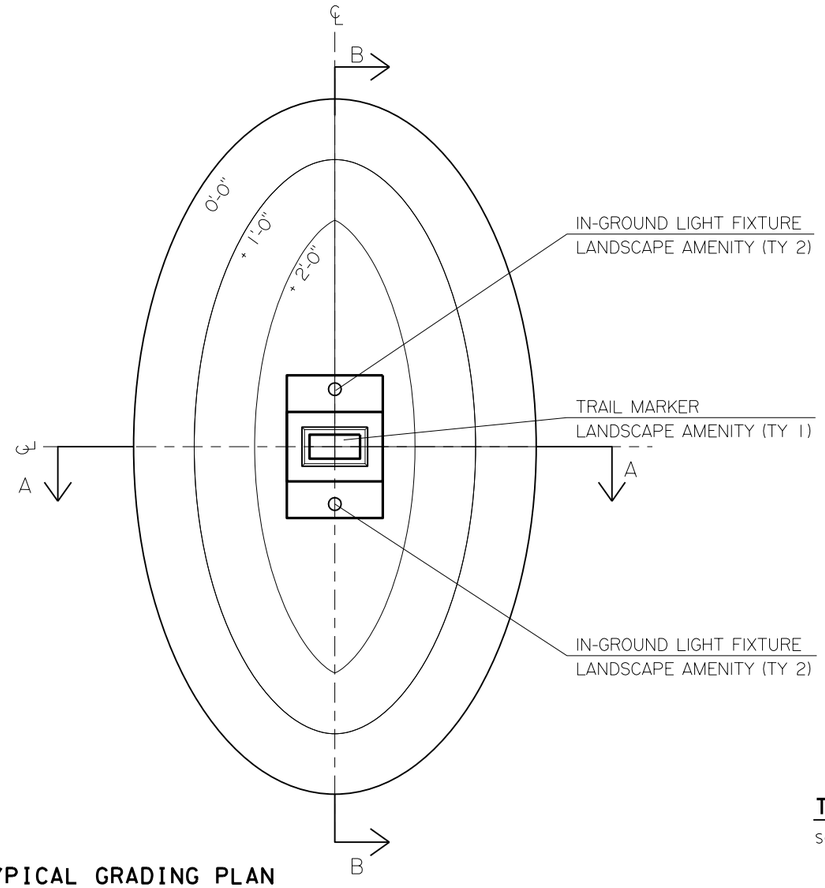
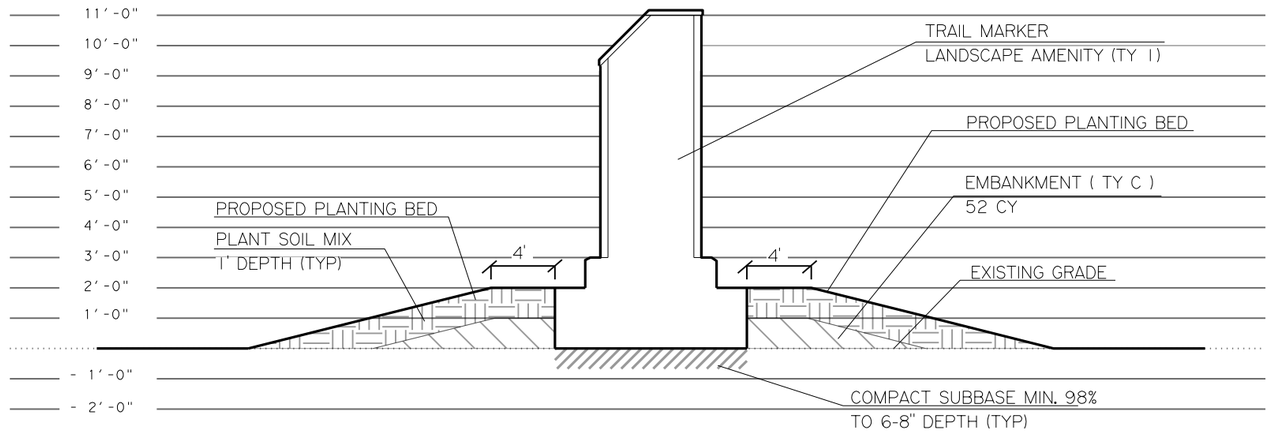


TYPICAL GRADING PLAN

SCALE: 1"= 10'-0"

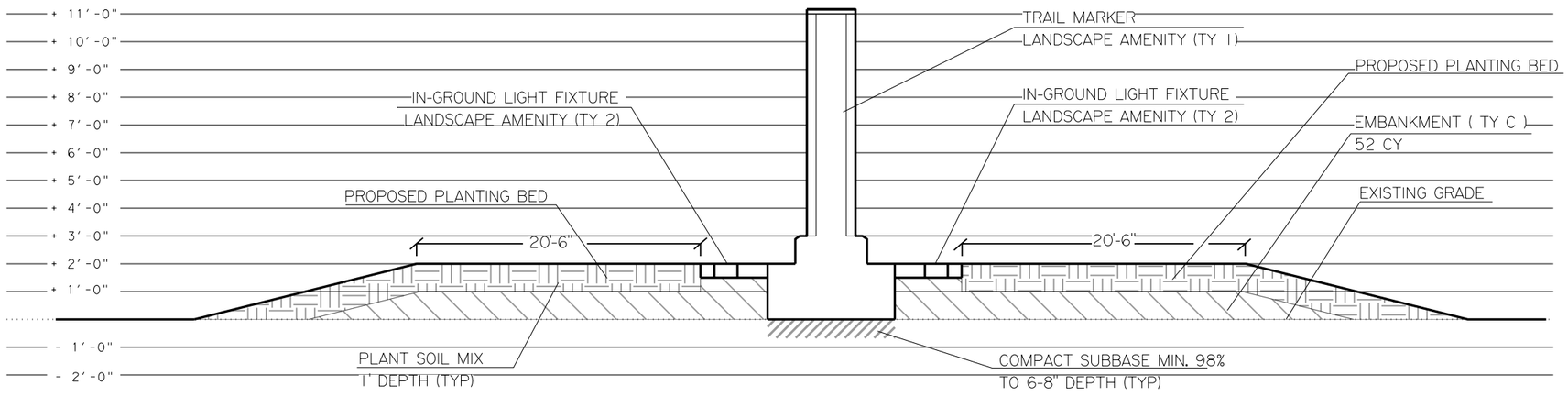
NOTES:

1. SEE TRAIL MARKER DETAILS SHEETS FOR DETAILS AND SPECIFICATIONS:
   -ITEM 1002 6002 LANDSCAPE AMENITY (TY 1)
2. SEE LIGHTING DETAILS SHEET FOR DETAILS AND SPECIFICATIONS:
   -ITEM 1002 6003 LANDSCAPE AMENITY (TY 2)
3. EMBANKMENT FOR PROPOSED PLANTING BED MATCH SELECT FILL UNDER ITEM 423.
4. SEE LAYOUT PLAN SHEETS FOR LOCATION OF TYPICAL PLANTING BED AT:
   -SH 188 @ FM 1069
   -SH 35 @ PICNIC AREA



TYPICAL SECTION A-A

SCALE: 1"= 5'-0"



TYPICAL SECTION B-B

SCALE: 1"= 5'-0"

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

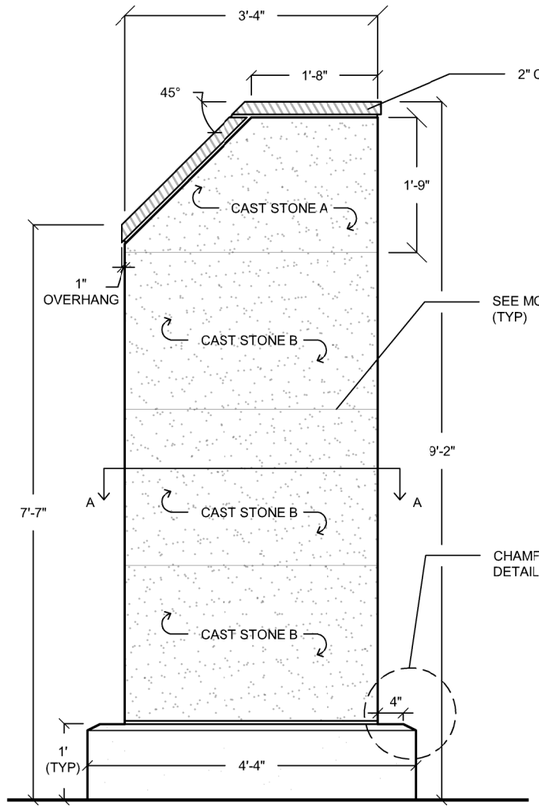
PLANTING BED DETAILS

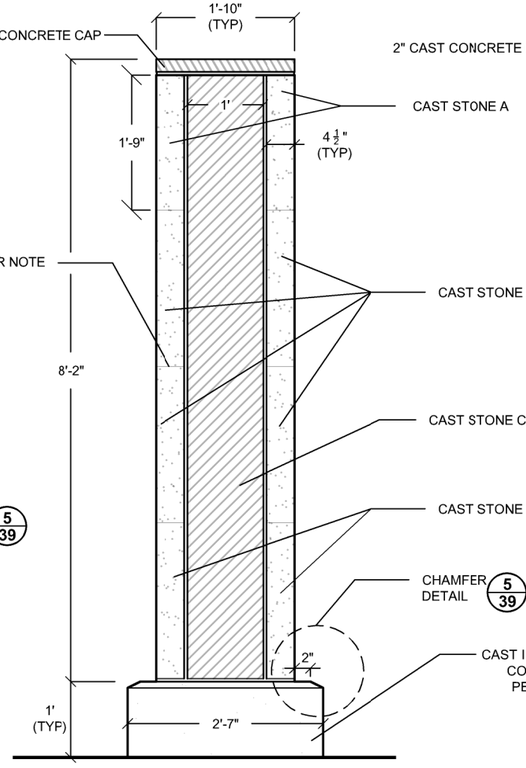
(2 of 2)

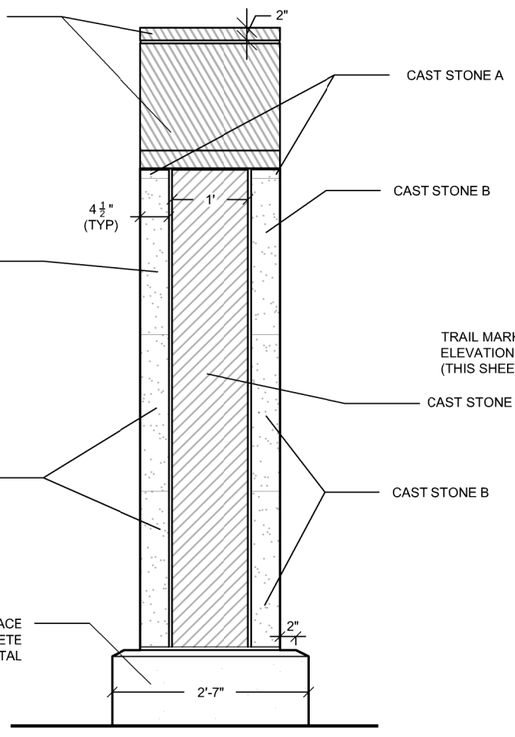
Texas Department of Transportation
Design Division (Landscape Architecture)

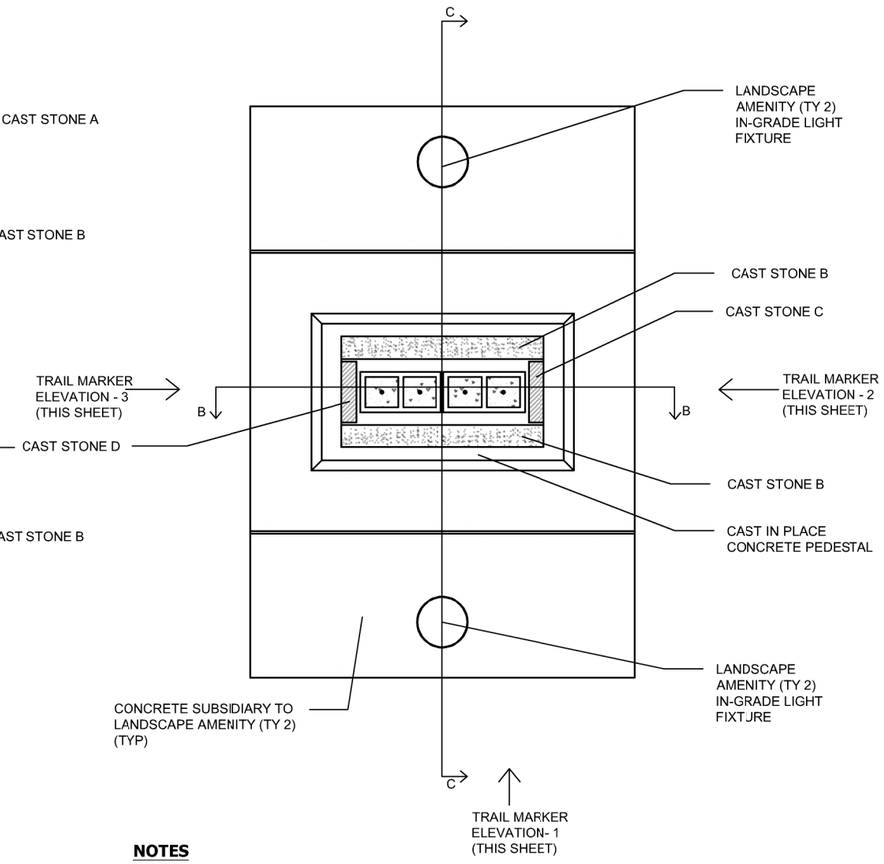
REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	38

DATE: 10/26/2021
FILE: T:\DES\LAND\Projects\CRP\Aransas County GCAA\GDN\plan sheets\Misc and Landscape Details\Planting Bed Details.dgn









1/39 TRAIL MARKER ELEVATION- 1

SCALE: $\frac{1}{2}$ " = 1'

2/39 TRAIL MARKER ELEVATION - 2

SCALE: $\frac{1}{2}$" = 1'

3/39 TRAIL MARKER ELEVATION - 3

SCALE: $\frac{1}{2}$" = 1'

NOTES

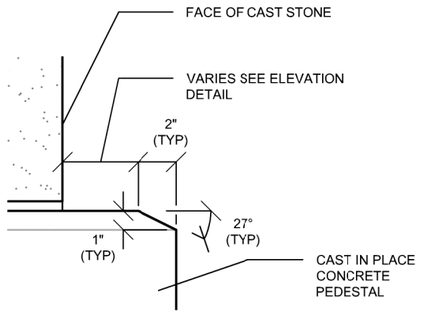
1. SEE TRAIL MARKER DETAILS SHEET 2 OF 7 FOR SECTION DETAILS.
2. SEE LIGHTING DETAIL SHEET FOR LANDSCAPE AMENITY (TY 2) DETAILS AND SPECIFICATIONS.

4/39 TRAIL MARKER SECTION A - A

SCALE: 1:30

GENERAL NOTES

1. SEE LAYOUT SHEETS FOR TRAIL MARKER LOCATIONS.
2. MORTAR TO BE $\frac{3}{8}$ " (TYPICAL).
3. SEE TRAIL MARKER DETAIL SHEET 3 OF 7 FOR DIMENSIONS OF 'CAST STONE A, B, C & D' .
4. 'CAST STONE A & B' DESIGN IS DEPENDENT ON LOCATION. SEE LAYOUT SHEETS FOR 'CAST STONE A & B' DESIGN FOR EACH LOCATION.
5. SEE TRAIL MARKER DETAIL SHEETS 42 - 44 FOR 'CAST STONE A & B' ELEVATION, TYPICAL SECTIONS AND SCHEDULE OF MATERIALS AND FINISHES CHART FOR EACH DESIGN.
6. SEE TRAIL MARKER DETAIL SHEET 7 OF 7 FOR 'CAST STONE C' AND 'CAST STONE D' LETTER LAYOUT.
8. SEE TRAIL MARKER DETAIL SHEET 7 OF 7 FOR SCHEDULE OF MATERIAL AND FINISHES CHART FOR PAINT COLORS FOR 'CAST STONE A, B, C & D', CONCRETE CAP STONES, AND CAST IN PLACE PEDESTAL.
9. SUBMIT SAMPLES OF PAINT AND SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT AND ENGINEER.



5/39 CHAMFER DETAIL

SCALE: 1 $\frac{1}{2}$ " = 1'

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

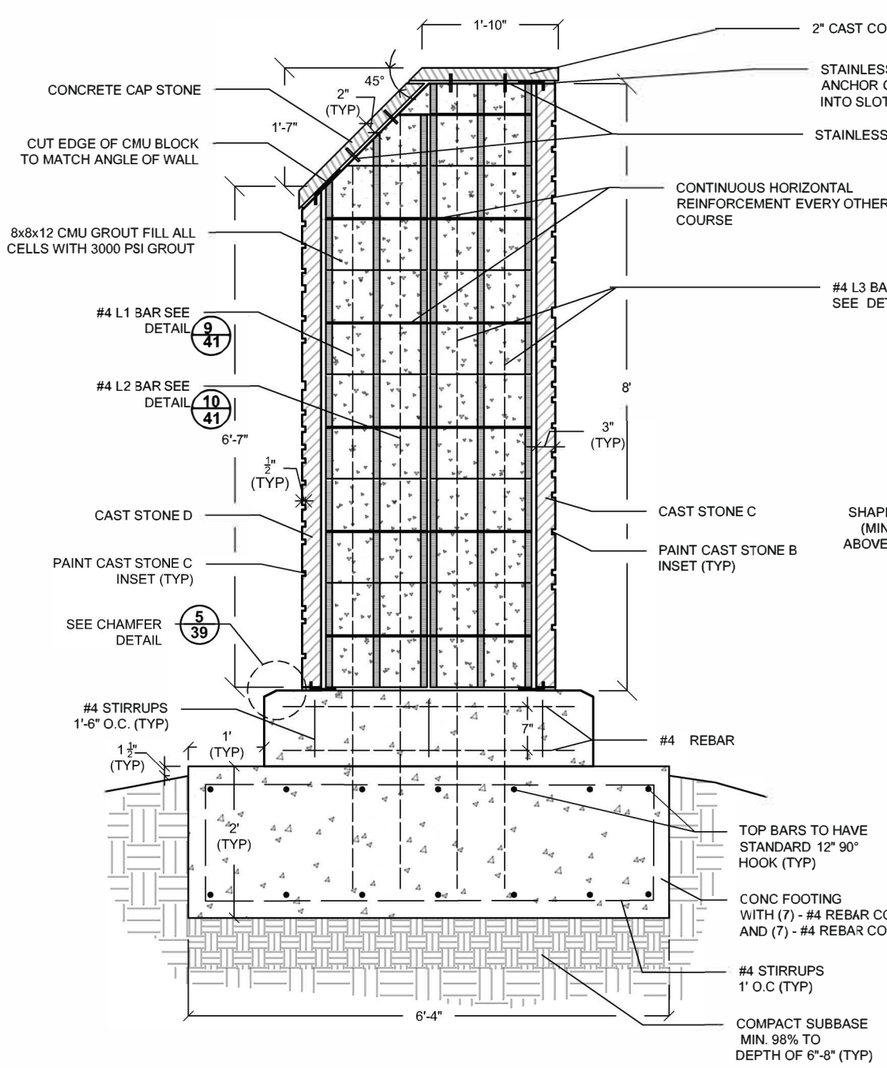
11/12/2021

TRAIL MARKER DETAILS

SHEET 1 OF 7

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		39

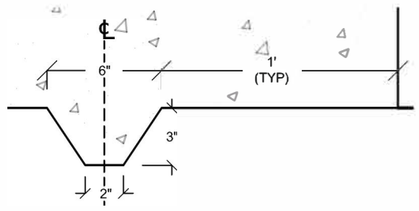


6/40 TRAIL MARKER SECTION B-B

SCALE: 1/2 " = 1'

7/40 TRAIL MARKER SECTION C-C

SCALE: 1/2" = 1'



NOTE

1. CONSTRUCTION JOINT OPTIONAL.

8/40 KEY SECTION (TYP)

SCALE: 1 1/2 " = 1'

GENERAL NOTES

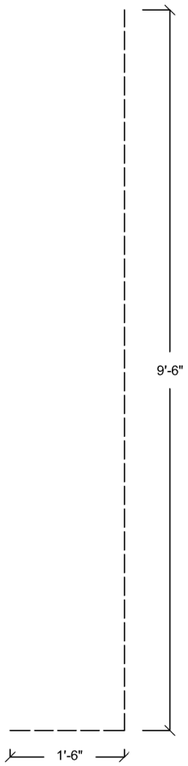
1. SEE LAYOUT PLAN SHEETS FOR TRAIL MARKER LOCATIONS.
2. FOR TRAIL MARKERS LOCATED WITHIN PLANTING BEDS GRADE THE BED TO DRAIN AWAY FROM THE TRAIL MARKER.
3. ALL EXCAVATION IS SUPPLEMENTAL TO THE TRAIL MARKER ITEM.
4. MORTAR TO BE 3/8 " (TYPICAL).
5. 3" MINIMUM COVER FOR REBAR IN TRAIL MARKER FOOTING.
6. SEE TRAIL MARKER DETAIL SHEET 7 OF 7 FOR 'CAST STONE C' AND 'CAST STONE D' LETTER LAYOUT AND DETAILS.
7. 'CAST STONE A & B' DESIGN IS DEPENDENT ON LOCATION. SEE LAYOUT SHEETS FOR 'CAST STONE A & B' DESIGN FOR EACH LOCATION.
8. SEE TRAIL MARKER DETAIL SHEET 7 OF 7 FOR SCHEDULE OF MATERIAL AND FINISHES CHART FOR PAINT COLORS.
9. SUBMIT SHOP DRAWINGS FOR APPROVAL BY ENGINEER.

TRAIL MARKER DETAILS

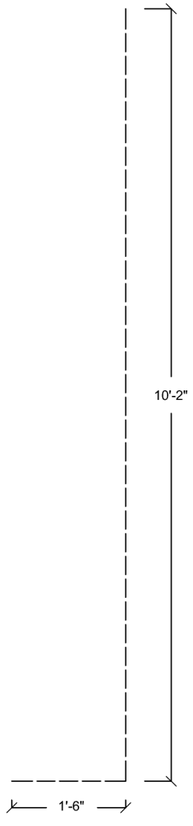
SHEET 2 OF 7

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

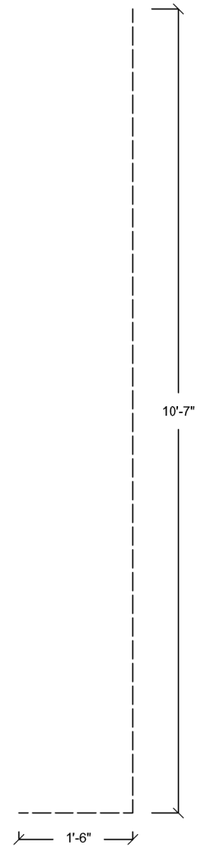
REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		40



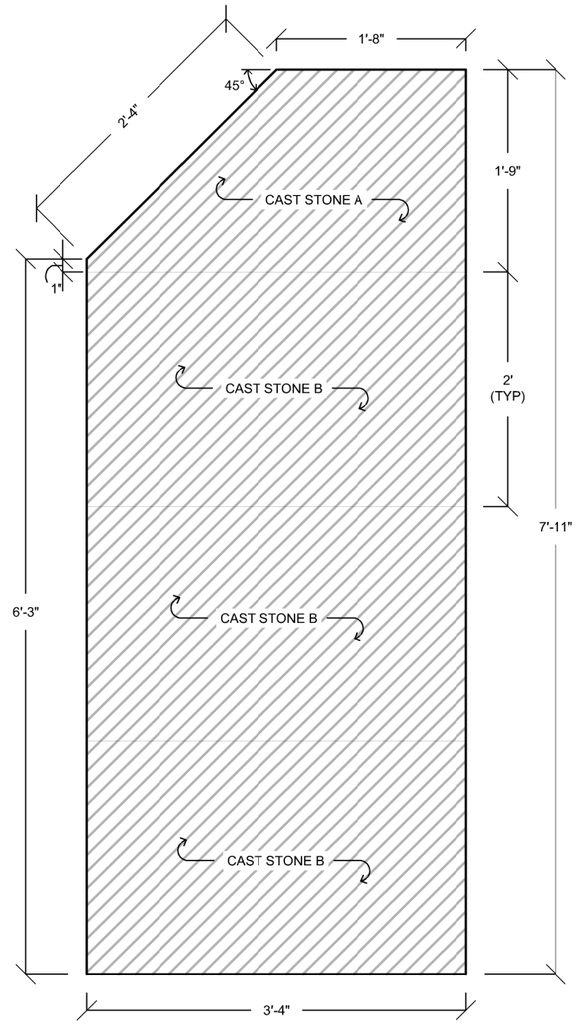
9/41 #4 L1 BAR
SCALE: $\frac{1}{2}$" = 1'



10/41 #4 L2 BAR
SCALE: $\frac{1}{2}$" = 1'

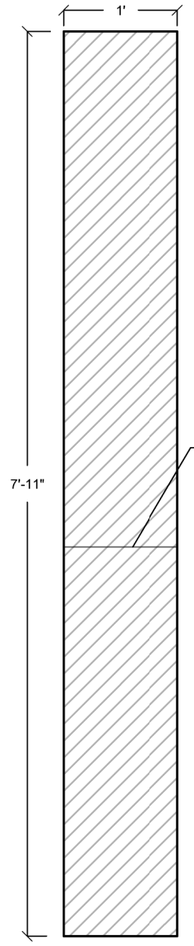


11/41 #4 L3 BAR
SCALE: $\frac{1}{2}$" = 1'

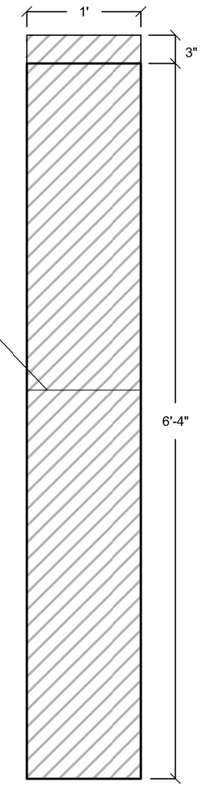


NOTE
1. CAST STONE A & B MAY BE FORMED AS ONE COMPLETE CAST STONE PIECE.

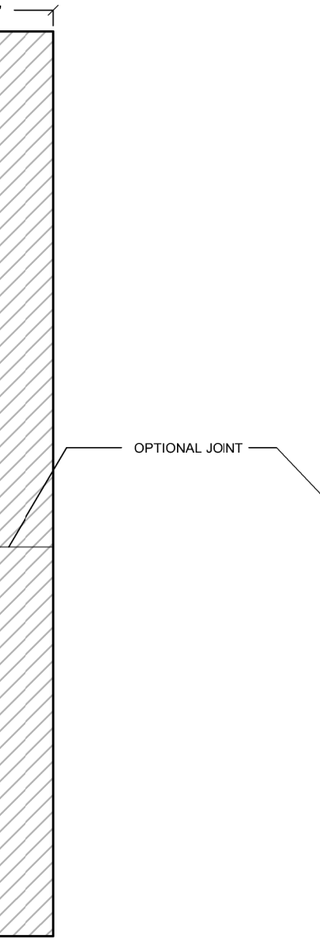
12/41 CAST STONE A & B
SCALE: $\frac{1}{2}$" = 1'



13/41 CAST STONE C
SCALE: $\frac{3}{4}$" = 1'



14/41 CAST STONE D
SCALE: $\frac{3}{4}$" = 1'



GENERAL NOTES

1. SEE TRAIL MARKER DETAIL SHEET 2 OF 7 FOR LOCATION OF L1, L2, AND L3 #4 BAR.
2. 3" MINIMUM COVER FOR REBAR IN TRAIL MARKER FOOTING.
3. ALTERNATE DIRECTION OF L BARS IN FOOTING.
4. SUBMIT SHOP DRAWINGS FOR APPROVAL BY ENGINEER.

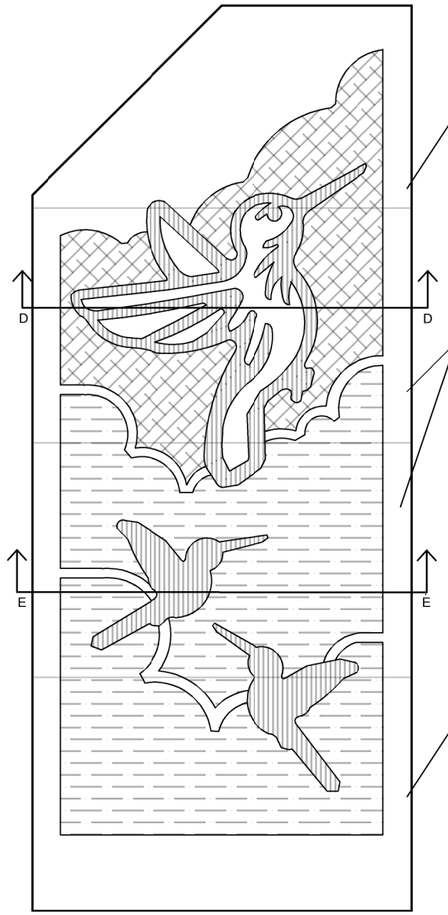
11/12/2021

TRAIL MARKER DETAILS

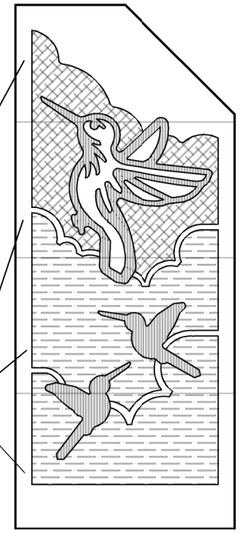
SHEET 3 OF 7

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		41

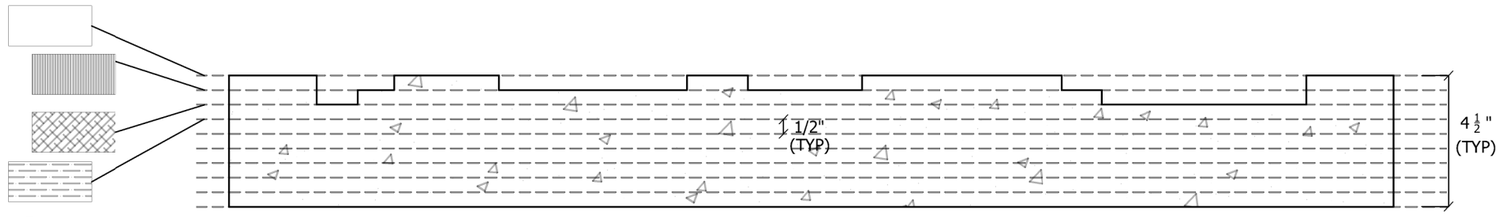


FRONT ELEVATION
SCALE: $\frac{3}{4}$ " = 1'

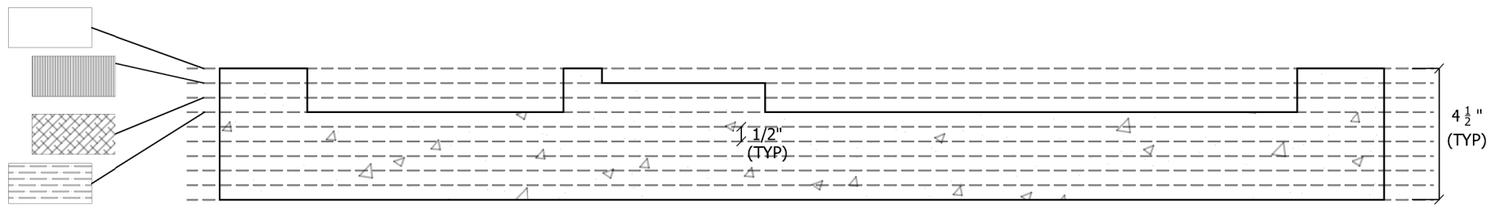


BACK ELEVATION
SCALE: NOT TO SCALE

SCHEDULE OF MATERIALS AND FINISHES			
1002-6001 LANDSCAPE AMENITY (TY 1) - TRAIL MARKER			
DESCRIPTION	**SPECIFICATION/ FINISH**	**HATCH LEGEND**	**EXAMPLE OR EQUAL**
CAST STONE A & B PAINT	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Turkish Coffee" SW6076 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Sky Fall" SW9049 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Espalier" SW6734 EXTERIOR PAINT OR APPROVED EQUAL
0704-6005	ANTI-GRAFFITI COATING (PERMANENT TY III)		
SUBMIT PRODUCT CUT SHEETS AND PAINT SAMPLES FOR APPROVAL BY LANDSCAPE ARCHITECT			



16/42 TYPICAL SECTION D - D
NOT TO SCALE



17/42 TYPICAL SECTION E - E
NOT TO SCALE

15/42 CAST STONE A & B ELEVATION- 'HUMMINGBIRD'

GENERAL NOTES

1. SEE LAYOUT PLAN SHEET 29 FOR CAST STONE A & B DESIGN LOCATION.
3. 'SEE TRAIL MARKER SHEET 3 OF 7 FOR DIMENSIONS OF 'CAST STONE A & B'.
4. DESIGN SHOULD CONTINUE BETWEEN THE CAST STONES WITHOUT BORDERS.
5. ALL SURFACES IN THE DESIGN TO BE SMOOTH.
6. USE A $\frac{1}{4}$" RADIUS ON ALL 90° CORNERS OF THE DESIGN.
7. ALL DESIGNS ARE TO BE THREE DIMENSIONAL AS PER TYPICAL SECTIONS.
8. ALL DESIGNS ARE SUBSIDIARY TO ITEM 1002 LANDSCAPE AMENITY (TY 1).
9. MORTAR TO BE $\frac{3}{8}$" (TYPICAL).
10. SUBMIT SAMPLES OF PAINT AND SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT.
11. A DRAWING FILE OF THE CAST STONE A & B DESIGNS WILL BE PROVIDED TO THE CONTRACTOR AT THEIR REQUEST.

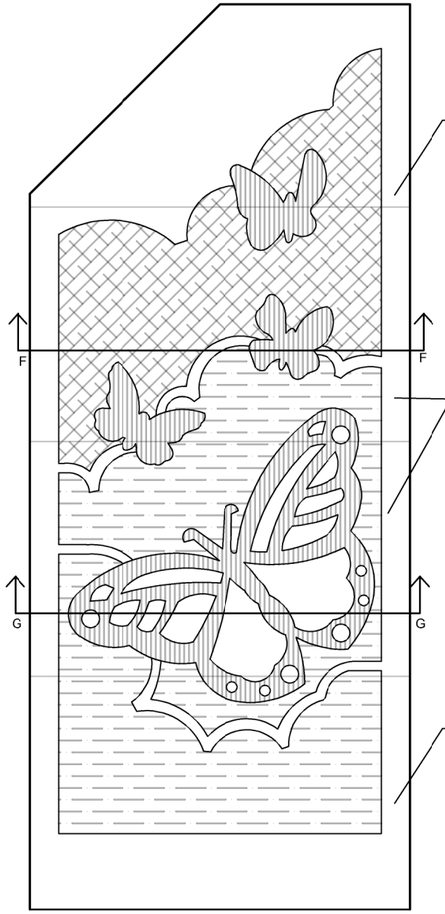
11/12/2021

TRAIL MARKER DETAILS

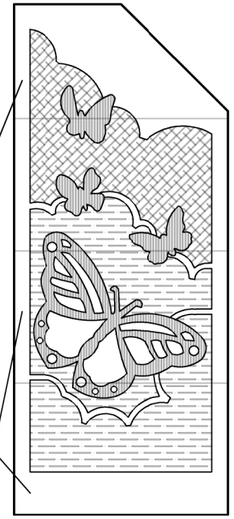
SHEET 4 OF 7

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		42



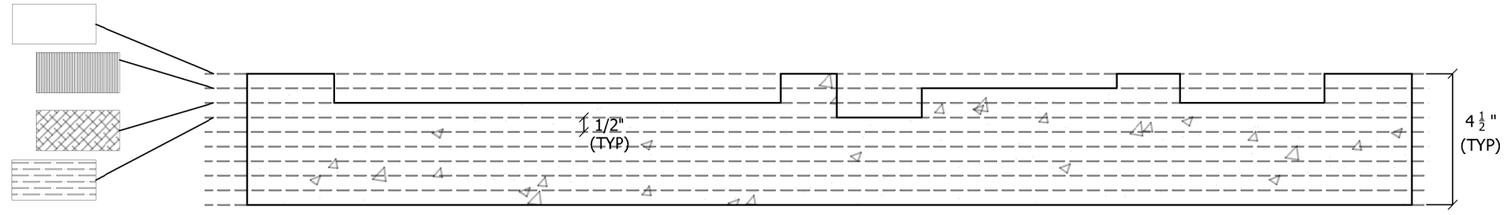
FRONT ELEVATION
SCALE: $\frac{3}{4}$" = 1'



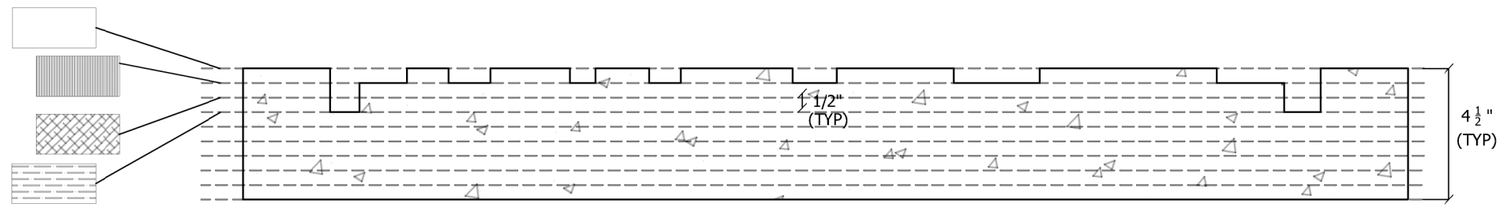
BACK ELEVATION
SCALE: NOT TO SCALE

18 / 43 CAST STONE A & B ELEVATION - 'BUTTERFLY'

SCHEDULE OF MATERIALS AND FINISHES			
1002-6001 LANDSCAPE AMENITY (TY 1) - TRAIL MARKER			
DESCRIPTION	**SPECIFICATION/ FINISH**	**HATCH LEGEND**	**EXAMPLE OR EQUAL**
CAST STONE A & B PAINT	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Turkish Coffee" SW6076 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Sky Fall" SW9049 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Espalier" SW6734 EXTERIOR PAINT OR APPROVED EQUAL
0704-6005	ANTI-GRAFFITI COATING (PERMANENT TY III)		
SUBMIT PRODUCT CUT SHEETS AND PAINT SAMPLES FOR APPROVAL BY LANDSCAPE ARCHITECT			



19 / 43 TYPICAL SECTION F - F
NOT TO SCALE



20 / 43 TYPICAL SECTION G - G
NOT TO SCALE

GENERAL NOTES

1. SEE LAYOUT PLAN SHEET 31 FOR CAST STONE A & B DESIGN LOCATION.
3. "SEE TRAIL MARKER SHEET 3 OF 7 FOR DIMENSIONS OF 'CAST STONE A & B'.
4. DESIGN SHOULD CONTINUE BETWEEN THE CAST STONES WITHOUT BORDERS.
5. ALL SURFACES IN THE DESIGN TO BE SMOOTH.
6. USE A $\frac{1}{4}$" RADIUS ON ALL 90° CORNERS OF THE DESIGN.
7. ALL DESIGNS ARE TO BE THREE DIMENSIONAL AS PER TYPICAL SECTIONS.
8. ALL DESIGNS ARE SUBSIDIARY TO ITEM 1002 LANDSCAPE AMENITY (TY 1).
9. MORTAR TO BE $\frac{3}{8}$" (TYPICAL).
10. SUBMIT SAMPLES OF PAINT AND SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT.
11. A DRAWING FILE OF THE CAST STONE A & B DESIGNS WILL BE PROVIDED TO THE CONTRACTOR AT THEIR REQUEST.

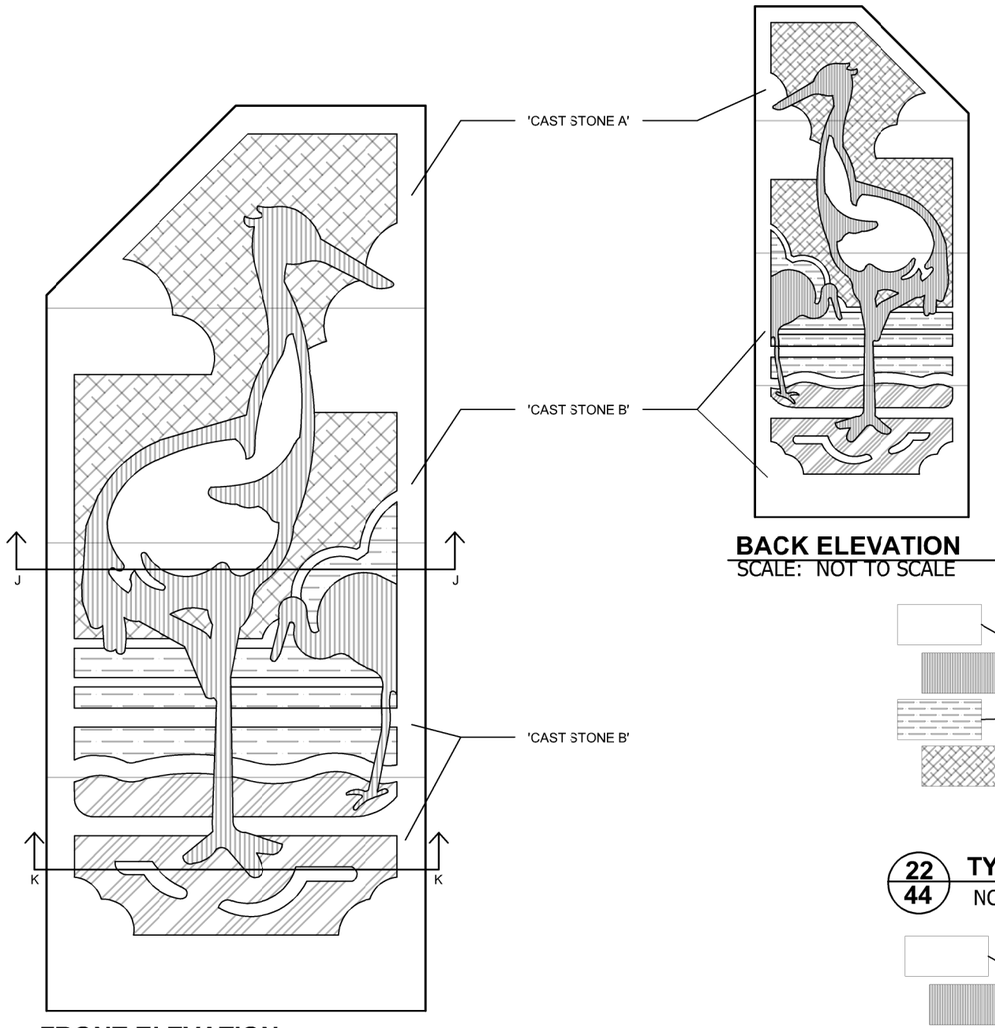
11/12/2021

TRAIL MARKER DETAILS

SHEET 5 OF 7

Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		43

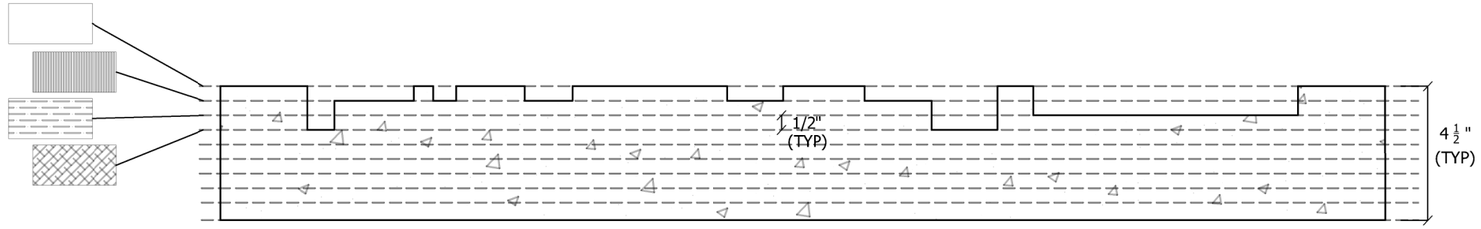


FRONT ELEVATION
SCALE: $\frac{3}{4}$ " = 1'

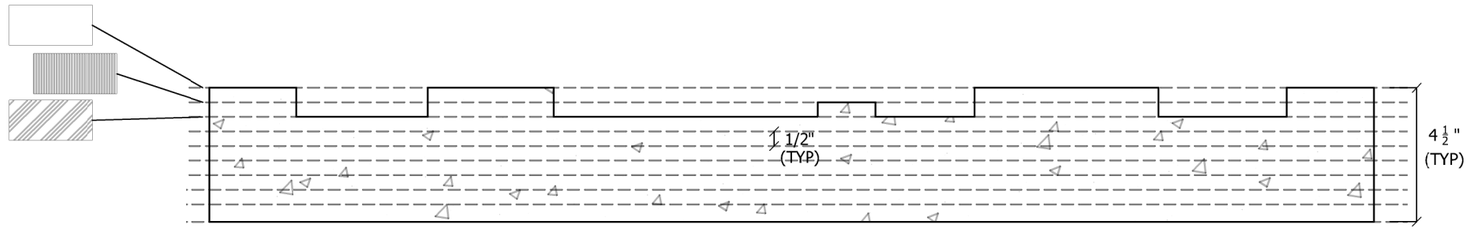
21/44 CAST STONE A & B ELEVATION - 'CRANE'

BACK ELEVATION
SCALE: NOT TO SCALE

SCHEDULE OF MATERIALS AND FINISHES			
1002-6001 LANDSCAPE AMENITY (TY 1) - TRAIL MARKER			
DESCRIPTION	**SPECIFICATION/ FINISH**	**HATCH LEGEND**	**EXAMPLE OR EQUAL**
CAST STONE A & B PAINT	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Turkish Coffee" SW6076 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Sky Fall" SW9049 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Espalier" SW6734 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Blue Chip" SW6959 EXTERIOR PAINT OR APPROVED EQUAL
0704-6005	ANTI-GRAFFITI COATING (PERMANENT TY III)		
SUBMIT PRODUCT CUT SHEETS AND PAINT SAMPLES FOR APPROVAL BY LANDSCAPE ARCHITECT			



22/44 TYPICAL SECTION J - J
NOT TO SCALE



23/44 TYPICAL SECTION K - K
NOT TO SCALE

GENERAL NOTES

1. SEE LAYOUT PLAN SHEET 34 FOR CAST STONE A & B DESIGN LOCATION.
3. 'SEE TRAIL MARKER SHEET 3 OF 7 FOR DIMENSIONS OF 'CAST STONE A & B'.
4. DESIGN SHOULD CONTINUE BETWEEN THE CAST STONES WITHOUT BORDERS.
5. ALL SURFACES IN THE DESIGN TO BE SMOOTH.
6. USE A $\frac{1}{4}$" RADIUS ON ALL 90° CORNERS OF THE DESIGN.
7. ALL DESIGNS ARE TO BE THREE DIMENSIONAL AS PER TYPICAL SECTIONS.
8. ALL DESIGNS ARE SUBSIDIARY TO ITEM 1002 LANDSCAPE AMENITY (TY 1).
9. MORTAR TO BE $\frac{3}{8}$" (TYPICAL).
10. SUBMIT SAMPLES OF PAINT AND SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT.
11. A DRAWING FILE OF THE CAST STONE A & B DESIGNS WILL BE PROVIDED TO THE CONTRACTOR AT THEIR REQUEST.

11/12/2021

TRAIL MARKER DETAILS

SHEET 6 OF 7

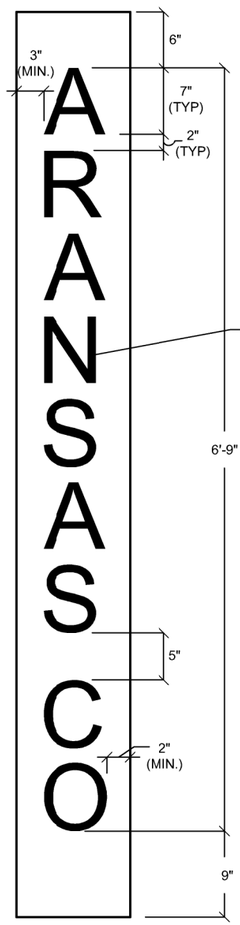
Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		44

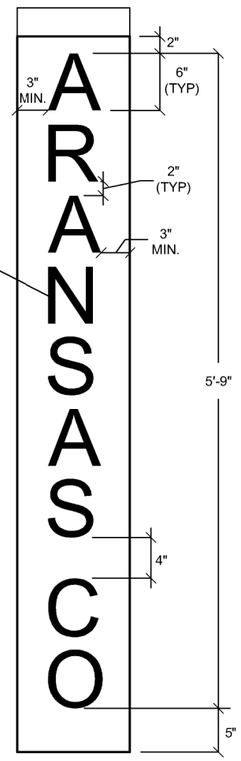
GENERAL NOTES

1. SEE LAYOUT PLANS FOR PRE-CAST DESIGN LOCATIONS.
2. ALL SURFACES IN THE DESIGN ARE SMOOTH.
3. ALL DESIGNS ARE SUBSIDIARY TO ITEM 1002 LANDSCAPE AMENITY (TY 1).
4. SUBMIT SAMPLES OF PAINT AND SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT AND ENGINEER.
5. A DRAWING FILE OF CAST STONE PANELS A, B, C, & D. WILL BE PROVIDED TO THE CONTRACTOR AT THEIR REQUEST.

SCHEDULE OF MATERIALS AND FINISHES			
1002-6001 LANDSCAPE AMENITY (TY 1) - TRAIL MARKER			
DESCRIPTION	**SPECIFICATION/ FINISH**	**HATCH LEGEND**	**EXAMPLE OR EQUAL**
CAST STONE C & D INSET PAINT	EXTERIOR PAINT		"Turkish Coffee" SW6076 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE C & D PAINT	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Turkish Coffee" SW6076 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Sky Fall" SW9049 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Espalier" SW6734 EXTERIOR PAINT OR APPROVED EQUAL
CAST STONE A & B PAINT	EXTERIOR PAINT		"Blue Chip" SW6959 EXTERIOR PAINT OR APPROVED EQUAL
CAST CONCRETE CAP	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
CAST IN PLACE CONCRETE PEDESTAL	EXTERIOR PAINT		"Downy" SW7002 EXTERIOR PAINT OR APPROVED EQUAL
0704-6005	ANTI-GRAFFITI COATING (PERMANENT TY III)		
SUBMIT PRODUCT CUT SHEETS AND PAINT SAMPLES FOR APPROVAL BY LANDSCAPE ARCHITECT			



24/45 **CAST STONE C - LETTER LAYOUT**
SCALE: $\frac{3}{4}$" = 1'



25/45 **CAST STONE D - LETTER LAYOUT**
SCALE: $\frac{3}{4}$" = 1'

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

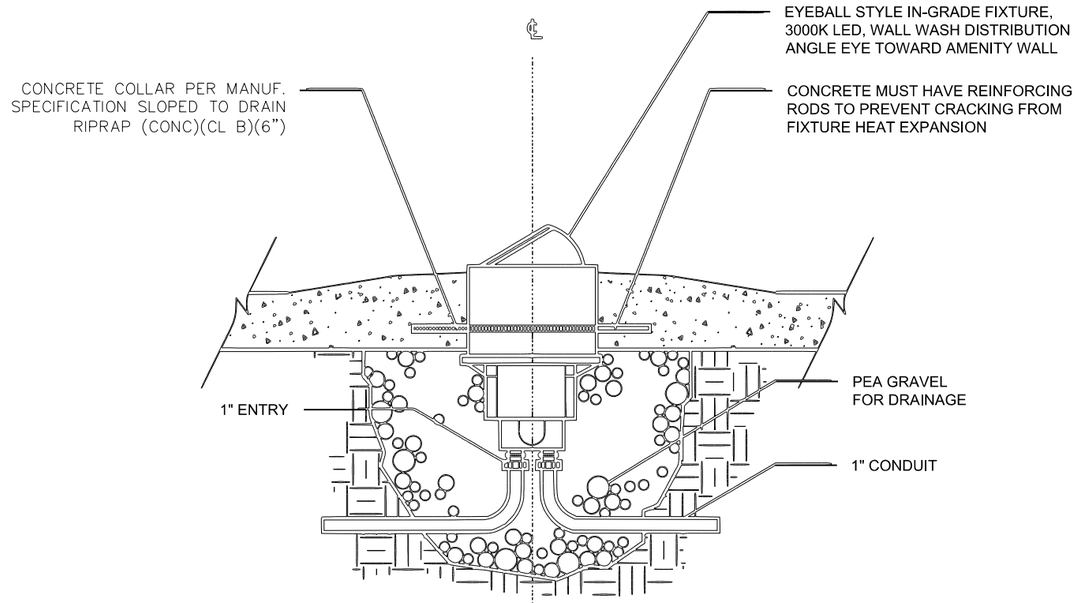
11/12/2021

TRAIL MARKER DETAILS

SHEET 7 OF 7

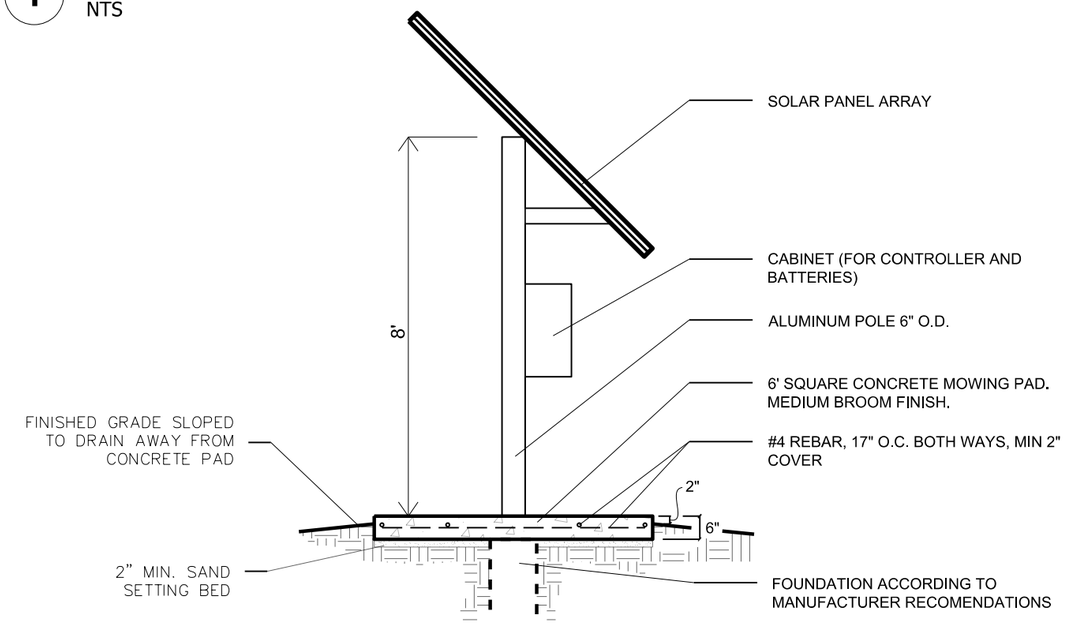
Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		45



1 IN-GRADE LIGHT FIXTURE - LANDSCAPE AMENITY (TY 2)

NTS



NOTE: SUBMIT PROPOSED POLE FOR APPROVAL BY ENGINEER. MOUNT CABINET (FOR CONTROLLER AND BATTERIES) AND SOLAR PANEL ARRAY ACCORDING TO MANUFACTURER RECOMENDATIONS.

2 SOLAR PANEL POLE - LANDSCAPE AMENITY (TY 3)

NTS

Landscape amenity Ty 2 - In-grade light fixture specifications

1. Provide electronic submittal of the complete fixture to the Engineer at the project address. Obtain the Engineer's approval on the submittals before beginning work.
2. In-grade lighting design is based on KIM LTV82EB fixture. Provide this or an equivalent fixture according to the following specifications:
   A. In-grade, eyeball style fixture with 360 degree rotation, optics at 30 degree tilt with plus or minus 15 degrees of adjustment.
   B. Wall wash distribution with LED optics at 3000k nominal color temperature, 1013 absolute lumens, 16 watts. If a submitted equivalent fixture provides lower lumens, submit for approval a computer simulation showing the expected luminance on the face of the landscape amenity (TY 1) in foot-candles.
   C. Provide fixture that operates at 120V.
   D. Ensure fixture is UL listed for wet recessed locations. Ensure optic assembly is sealed and rated IP68.
   E. Provide means to adjust aiming and dimming of optics remotely with a wireless device.
   F. Ensure eyeball, retainer ring, and exposed housing materials are cast bronze, lense is 3#16" tempered glass; and underground housing is high temperature UV resistant thermal plastic.
   G. Provide fixture wiring compartment with at least two 1" NPT conduit entries.
3. Install and locate in-grade light fixtures as shown on the plans and as directed by the Engineer. Arrange conduits to drain away from the in-grade fixtures. Aim the fixtures at night in the presence of the Engineer to optimally illuminate the architectural features.
4. Landscape Amenity TY 2 includes furnishing, installing, testing, and aiming luminaries, drivers, LEDs, internal conductors, connections, and concrete around fixtures; system performance testing; and equipment, labor, tools and incidentals.
5. See Lighting Fixture Schedule.

Landscape Amenity Ty 3 - Solar Panel Pole Specifications

1. Provide and install aluminum pole, riprap, foundation, brackets, anchor bolts, cabinet, and all hardware, labor, and amenities necessary to support Solar Power System as shown in the detail. Riprap will be paid for under Item 432.
2. Submit details of support system for approval before installation. Verify location with the engineer before installation.

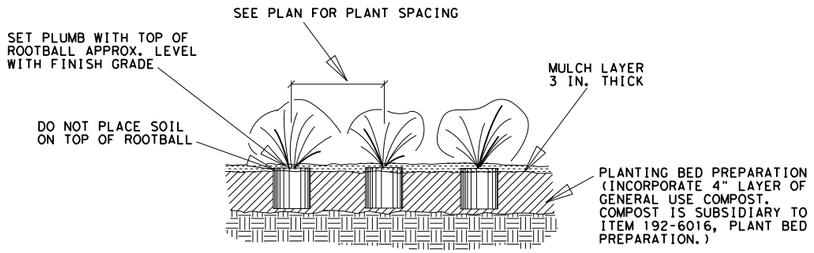
STATE OF TEXAS
GREG JONES
99401
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Greg Jones
CE208F8BC5604A4...
11/18/2021

LIGHTING DETAILS

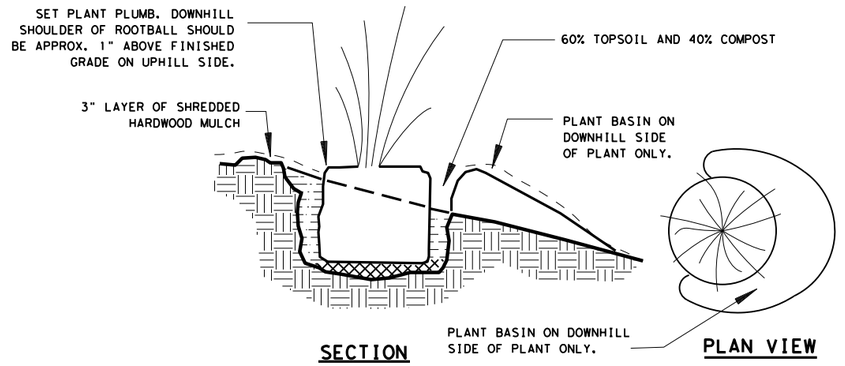
2021 Texas Department of Transportation
DESIGN DIVISION (LANDSCAPE ARCHITECTURE)

REVISIONS	CONT	SECT	JOB	HIGHWAY
	0916	38	015	VAR.
	DIST	COUNTY		SHEET NO.
	CRP	ARANSAS		46



GRASS PLANTING IN MASS BEDS

NTS



GRASS PLANTING ON SLOPES

NTS

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 THAT HAVE BEEN MODIFIED OR NOT SHOWN.
2. PROVIDE PLANTS NURSERY-GROWN IN CONTAINERS.
3. REJECTION OF PLANTS IN ACCORDANCE WITH ITEM 192.2.2.
4. STAKE LOCATION OF TREES IN THE FIELD IN ACCORDANCE WITH ITEM 192.3.3.
5. PROVIDE FOR THE SAFE TRANSPORTATION OF PLANTS TO THE PROJECT SITE AND THE CONDITION OF PLANTS UPON ARRIVAL.
6. DO NOT STORE PLANT MATERIAL ON HARD SURFACES OR LEAVE EXPOSED TO THE SUN.
7. PROTECT THE PLANT ROOT BALLS AND WATER REGULARLY UNTIL PLANTING.
8. IF PLANTS ARE LEFT IN STORAGE OVER THE WEEKEND OR HOLIDAY, PROVIDE A MEANS OF PERIODICALLY WATERING AND INSPECTION OF CONTAINER MOISTURE.
9. PROVIDE PLANTS THAT ARE HARDY, SYMMETRICAL, TIGHT KNIT, AND SO TRAINED OR FAVORED IN DEVELOPMENT AND APPEARANCE AS TO BE SUPERIOR IN FORM, NUMBER OF BRANCHES, AND COMPACTNESS. PLANTS SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED, DENSELY FOLIATED WHEN IN LEAF, AND SHALL HAVE HEALTHY, WELL DEVELOPED ROOT SYSTEMS.
10. ALL GRASS PLANTINGS ARE TO BE MULCHED AFTER PLANTING TO THE DEPTH INDICATED IN THE DETAILS. PROVIDE SHREDDED HARDWOOD MULCH WITH A MINIMUM 3/8 " (NOT OVER 25% BY VOLUME) OF FINE PARTICLES AND DUST. PROVIDE MULCH FREE OF ANY PLASTIC, GLASS, METALS AND OTHER CONTAMINANTS (STICKS, STONES, CLAY, OR OTHER FOREIGN MATTER).

PLANTING BED PREPARATION

PERFORM PLANTING BED OPERATIONS IN THE FOLLOWING ORDER:

1. STAKE BED PREPARATION AREAS OR OTHERWISE DESIGNATE THE PROPER LOCATIONS ACCORDING TO THE PLANS. OBTAIN APPROVAL OF FINAL LOCATIONS BEFORE CONTINUING WORK UNDER THIS ITEM.
2. AFTER UNDERGROUND UTILITIES ARE LOCATED AND MARKED, TILL THE BED PREPARATION AREAS TO A DEPTH OF TWELVE (12) INCHES. TAKE SPECIAL PRECAUTION TO AVOID ANY UNDERGROUND UTILITIES WITHIN THE PROJECT AREAS AND DO NOT ALTER EXISTING DRAINAGE PATTERNS.
3. ADD 12" PLANT SOIL MIX.
4. TILL/DISC SOIL TO A SMOOTH CONSISTENCY TO A DEPTH OF TWELVE (12) INCHES.
5. AFTER PLANTING MULCH BEDS WITH SHREDDED HARDWOOD BARK MULCH TO A DEPTH OF 3".

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

LANDSCAPE DETAILS

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	16	ARANSAS	0916	38	015	47

DATE: 11/4/2021
FILE: T:\DESIGN\Projects\CRP\Aransas County GCAA\DGN\plan sheets\Misc and Landscape Details\planting details.dgn

PLANT SPECIFICATIONS

ITEM	Common Name	Botanical Name	Size	Height/ Spread	Spacing	Quantity	Notes
0192-6003	Little Bluestem	Schizachyrium scoparium	3 GAL.	6" / 6" MIN.	18" O.C.	468	NURSERY GROWN IN CONTAINERS
	Gulf Muhly	Muhlenbergia capillaris	3 GAL.	12"/ 12" MIN.	2'-6" O.C.	206	NURSERY GROWN IN CONTAINERS
					TOTAL:	**674**	

VEGETATIVE WATERING SCHEDULE FOR:

ITEM DESCRIPTION	PHASE	FREQUENCY	RATE
ORNAMENTAL GRASSES	Construction/installation operations, Item 192.3	Same day as planting and 2 times per week with 2 days minimum between waterings	2 times plant container gallon size per plant
	90-day Maintenance period, Item 192.3		
	9 month Establishment period, Item 193	APR through OCT- 2 times per week with 2 day min. between waterings NOV through MAR- 1 time per week	1 times plant container gallon size per plant

NOTES:

Provide water necessary to meet the quality and schedule shown above. Construction/installation operations & 90-day Maintenance period water required is subsidiary to Item 192 and will not be paid for separately.

Water required for 270-day (9 month) establishment period is subsidiary to Item 193.

Rate and frequency may be adjusted to meet site conditions and weather as approved or directed by engineer.

Refer to Item 168.2 for water quality information.

At the time of installation all plants are to be watered manually the same day as planting at a rate and frequency shown above.

Stressed plant material will be rejected according to Item 192.2.2 and replaced.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

LANDSCAPE SPECIFICATIONS

Texas Department of Transportation
Design Division (Landscape Architecture)

REVISIONS	PROJECT NUMBER					HIGHWAY
	SEE TITLE SHEET					VAR.
	DISTRICT	COUNTY	CONTROL	SECT	JOB	SHEET NO.
	CRP	ARANSAS	0916	38	015	48

DATE: 10/26/2021
FILE: T:\DES\LAND\Projects\CRP\Aransas County GCAA\GDN\plan sheets\Misc and Landscape Details\planting details.dgn

SITE DESCRIPTION

PROJECT LIMITS: *AT VARIOUS LOCATIONS IN ARANSAS COUNTY.*

PROJECT DESCRIPTION:

INSTALLATION OF TRAIL MARKERS. ROADWAYS TO INCLUDE FM 1069, SH 35.

MAJOR SOIL DISTURBING ACTIVITIES:

INSTALLATION OF MULTIPLE TRAIL MARKERS, LIGHTING FOR THE TRAIL MARKERS, FOOTINGS, AND BERMS.

TOTAL PROJECT AREA: *.05 acres*

TOTAL AREA TO BE DISTURBED: *.05 acres*

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): *0.2*

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

SH 35 (SB) @ 12TH ST: Galveston-Mustang complex 0-3% slopes. Thick and uniformly established grasses mainly (90%).

SH 188 @ FM 1069: Galveston-Mustang complex 0-3% slopes. Thin and patchy established grasses mainly (90%).

SH 35@ PICNIC AREA: Raymondville clay loam and Victine clay loam 0-1% slopes. Thick and uniformly established grasses mainly (90%).

NAME OF RECEIVING WATERS:

SH 35 (SB) @ 12TH ST: Storm sewers and swales leading to Aransas Bay (Segment 2471OW).

SH 188 @ FM 1069: Storm sewers and swales leading to Aransas Bay (Segment 2471OW).

SH 35 @ PICNIC AREA: Salt Creek leading to Charles Bay (Segment 2473OW) then Aransas Bay (Segment 2471OW).

IMPACTS TO ENDANGERED SPECIES OR HABITAT: *There will be no impacts to endangered species or habitat by the permitted storm water discharges.*

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

___ TEMPORARY SEEDING
___ PERMANENT SEEDING
P MULCHING
___ SOIL RETENTION BLANKET
___ BUFFER ZONES
P PRESERVATION OF NATURAL RESOURCES

LEGEND:
T- TEMPORARY
P- PERMANENT

GENERAL :

Disturbed areas on which construction activity has ceased (temporarily or permanently) shall be stabilized within 14 days unless activities are scheduled to resume or be performed within 21 days.

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
___ STORM OUTLET STRUCTURES
___ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES
___ CONCRETE RIPRAP
T BIODEGRADABLE EROSION CONTROL LOGS

LEGEND:
T- TEMPORARY
P- PERMANENT

OTHER :

STORM WATER MANAGEMENT :

Biogradable erosion control logs shall be placed in position before construction begins on the project. Storm water drainage will be provided by existing curb and gutter / curb inlets, which will carry the water within the R.O.W. into existing storm sewer.

POST-CONSTRUCTION STORM WATER MANAGEMENT :

Upon completion of the planting operations, remove erosion control logs installed during contract, clean compost may be distributed in turf areas at a depth not to exceed 1/2".

OTHER 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 areas adjacent to creeks and drainageways shall have priority.*

INSPECTION: *An inspection will be performed by a TxDOT inspector every 7 calendar days. An inspection and Maintenance Report will be made per each inspection, and controls shall be revised as indicated by this inspection report.*

WASTE MATERIALS: *All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all State & local city solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulations and the trash will be hauled to to a local dump. No construction waste material will be buried on site or any other unauthorized site. Washout areas shall be restored upon project completion.*

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): *At a minimum, any products in the following categories are considered to be hazardous: paints, acids for cleaning masonry surfaces, cleaning solvents, asphalt products, chemical additives for soil stabilization, or concrete curing compounds and additives. In the event of a spill which may be hazardous, the spill coordinator shall be contacted immediately (1-800-633-9363). Clean up procedures shall be clearly posted as well as names of spill response personnel. Hazardous materials shall be handled in accordance with applicable federal, state, county, city and Texas Water Commission rules.*

SANITARY WASTE: *All sanitary waste will be collected from the portable units as necessary; or as required by local regulation, by a licensed sanitary waste management contractor, in accordance with all state laws and Texas Water Commission rules.*

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

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: *Portable Sanitary Waste Units*

REMARKS: *Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.*

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

All waterways shall be cleared of temporary embankment, temporary matting, false work, or other obstructions placed during construction operations that are not part of the finished work. No construction waste will be allowed to be buried within the limits of the right of way.

REGISTERED LANDSCAPE ARCHITECT
JENNIFER N. LOA
3475
STATE OF TEXAS

11/12/2021

Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		49
STATE	STATE DISTRICT	COUNTY	
TEXAS	CRP	ARANSAS	
CONT.	SECT.	JOB	HIGHWAY NO.
0916	38	015	VAR.

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DATE: $DATE$
FILE: $FILE$

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

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

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

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

☐ No Action Required ☒ Required Action

Action No.

1. The Federal Migratory Bird Treaty Act (MBTA) states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit. In accordance with the regulation, the Contractor will avoid disturbing, destroying, removing, or relocating active nests found in trees, culverts, bridges, on the ground, etc. Typical breeding season occurs from March through August; therefore, tree trimming and other activities that may disturb breeding birds should be done in the non-breeding season (September-February), when possible. If work must be performed during the breeding season, the Contractor shall have a qualified biologist conduct a survey of the right of way to determine if bird nests are present. In the event that active nests are encountered on-site during construction, the Contractor shall notify the Engineer and measures shall be taken to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the MBTA. Phasing of work during construction may be necessary to stay in compliance with the MBTA. The Contractor can discuss other preventative measures with the Project Engineer and/or District Environmental Staff.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

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

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

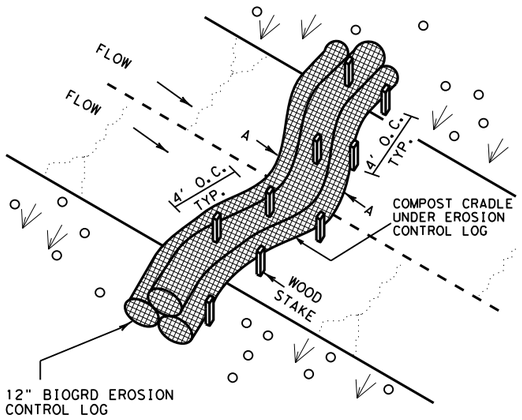
3.

Texas Department of Transportation — Design Division Standard

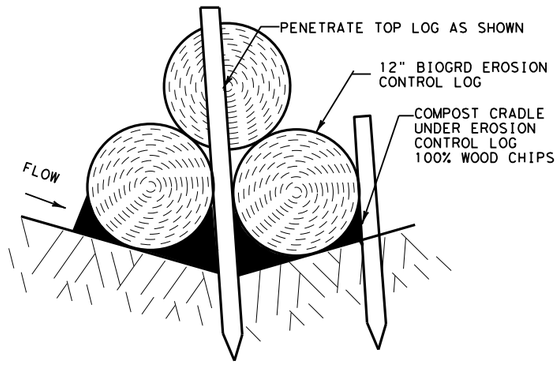
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS)	0916	38	015	VAR.	
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	CRP	ARANSAS		50	

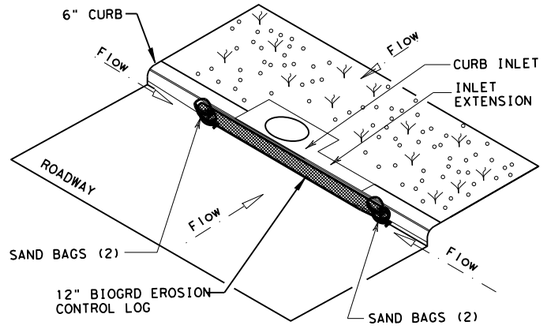


DITCH LINE SEDIMENT TRAP
NTS



SECTION A-A

DITCH LINE SEDIMENT TRAP A-A
NTS



CURB INLET SEDIMENT TRAP
NTS

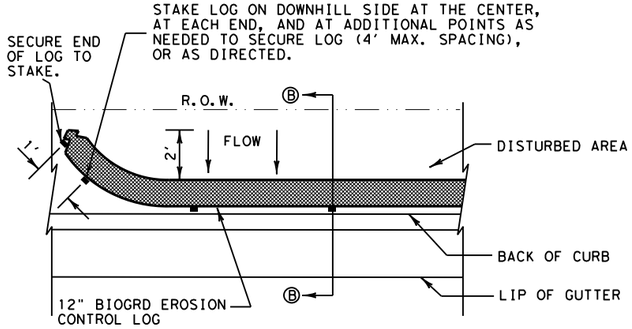
SEDIMENT TRAP USAGE GUIDELINES

A sediment trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

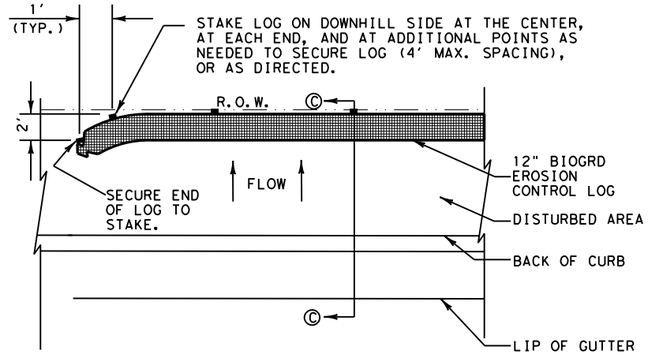
Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1,800 CF/Acre (0.5" over the drainage area).

Sediment traps should be placed in the following locations:
1. Immediately preceding drain inlets
2. Just before the drainage enters a water course
3. Just before the drainage leaves the Right Of Way
4. Just before the drainage leaves the construction limits where drainage flows away from the project

The trap should be cleaned when the capacity has been reduced by half or the sediment has accumulated to a depth of 1', whichever is less. Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



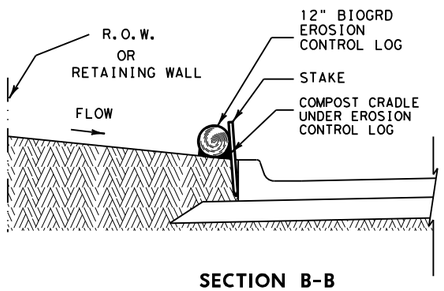
PLAN VIEW
NTS



PLAN VIEW
NTS

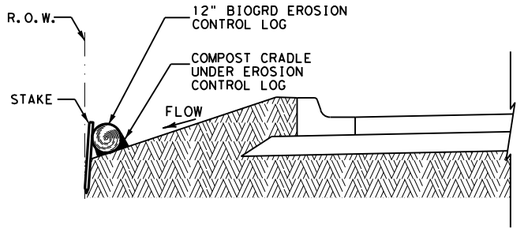
GENERAL NOTES

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" x 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. COMPOST CRADLE MATERIAL IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
6. SANDBAGS SHALL BE SUBSIDIARY TO ITEM 506 BIODEGRADABLE EROSION CONTROL LOGS.



SECTION B-B

BACK OF CURB SEDIMENT TRAP
NTS



SECTION C-C

RIGHT-OF-WAY SEDIMENT TRAP
NTS

Texas Department of Transportation

BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

CORPUS CHRISTI DISTRICT STANDARD — SHEET 1 OF 2

FILE: crp-becl.dgn	DN: TxDOT	CK:	DW: CAF	CK: PWS	STD:	
ORIG DATE: MAY 2008	DIST	FED REG	FEDERAL AID PROJECT #			SHEET
REVISIONS PJA 5/2015	CRP	6	SEE TITLE SHEET			51
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ARANSAS		0916	38	015	VAR.

LEVELS DISPLAYED
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49 50 51 52 53 54 55 56 57 58 59 60 61 62

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LEVELS DISPLAYED

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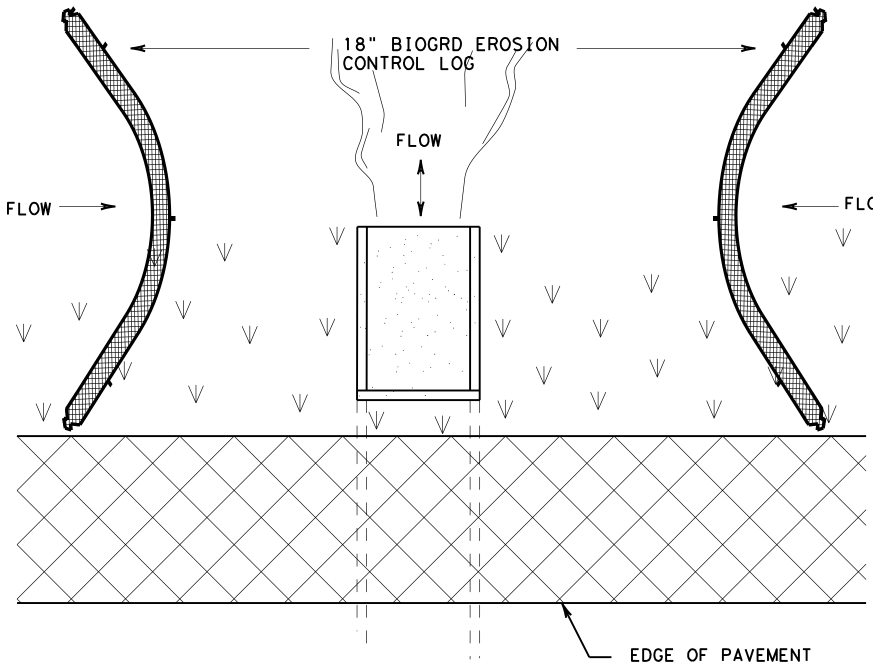

AT CULVERT ENDS
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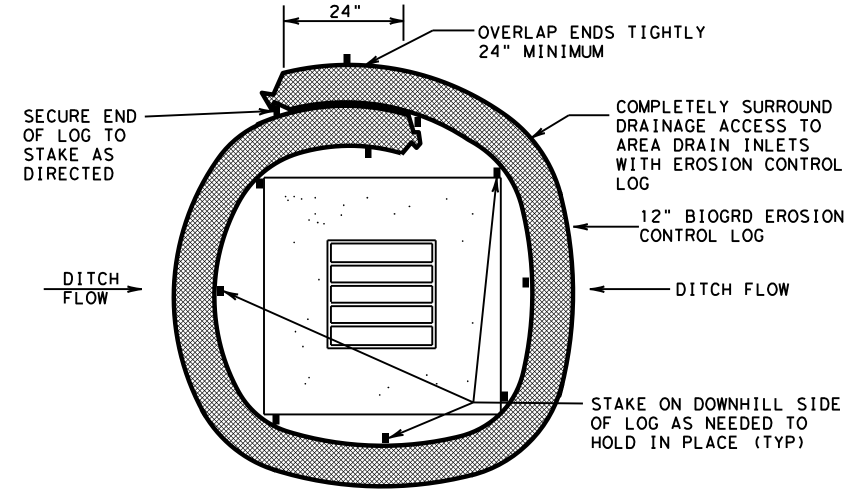
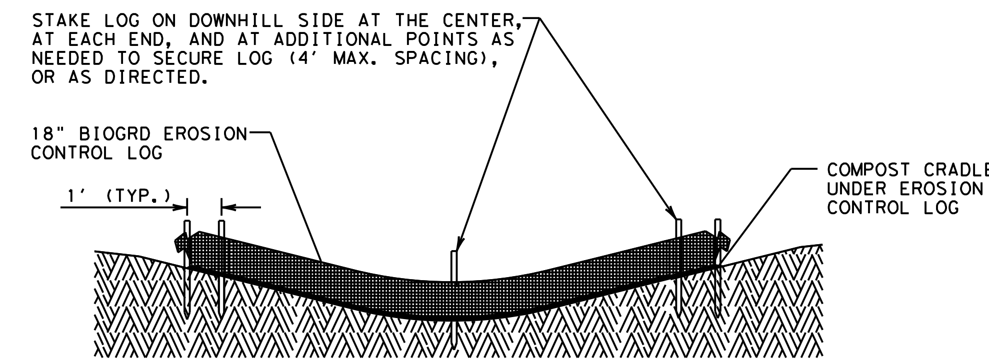
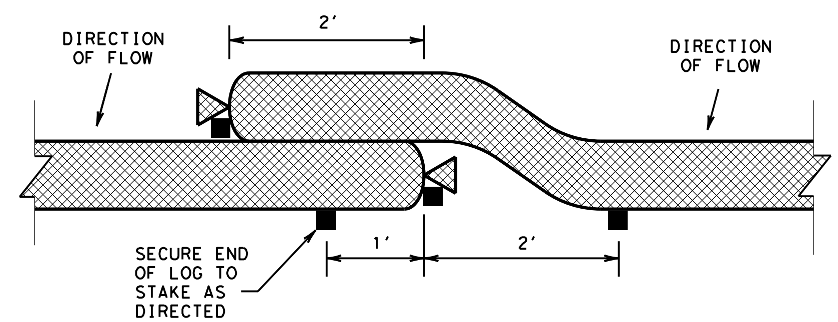


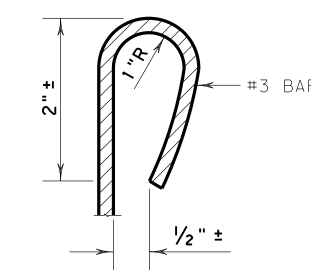
AT DROP INLETS
NTS



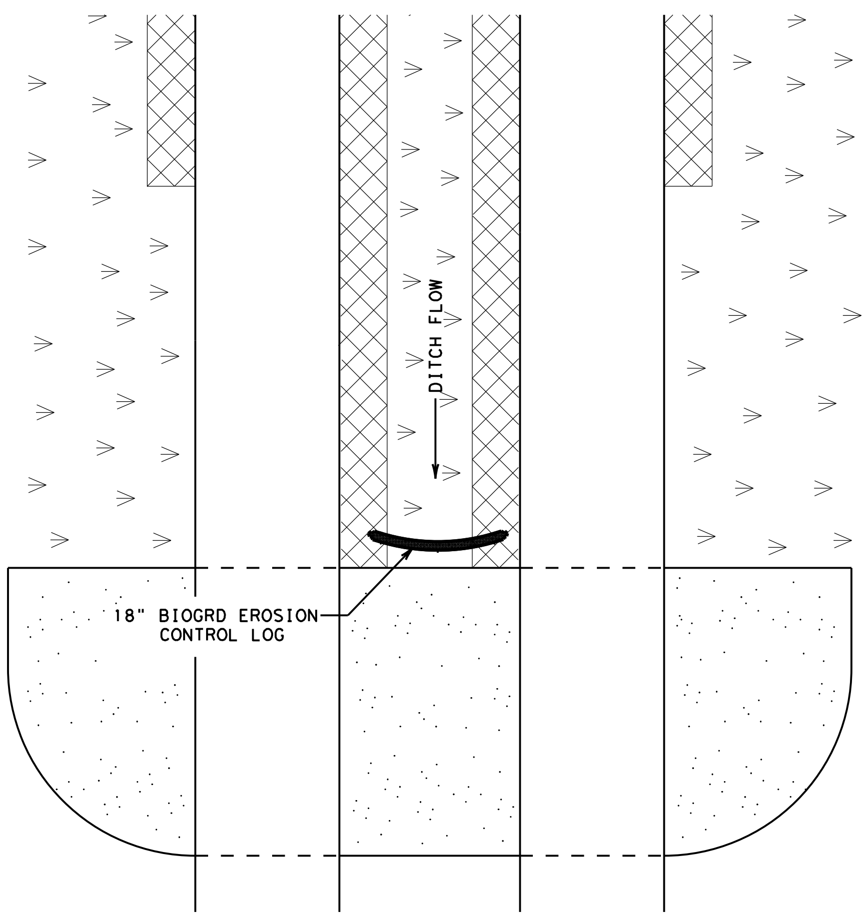
EROSION CONTROL LOG ELEVATION
NTS



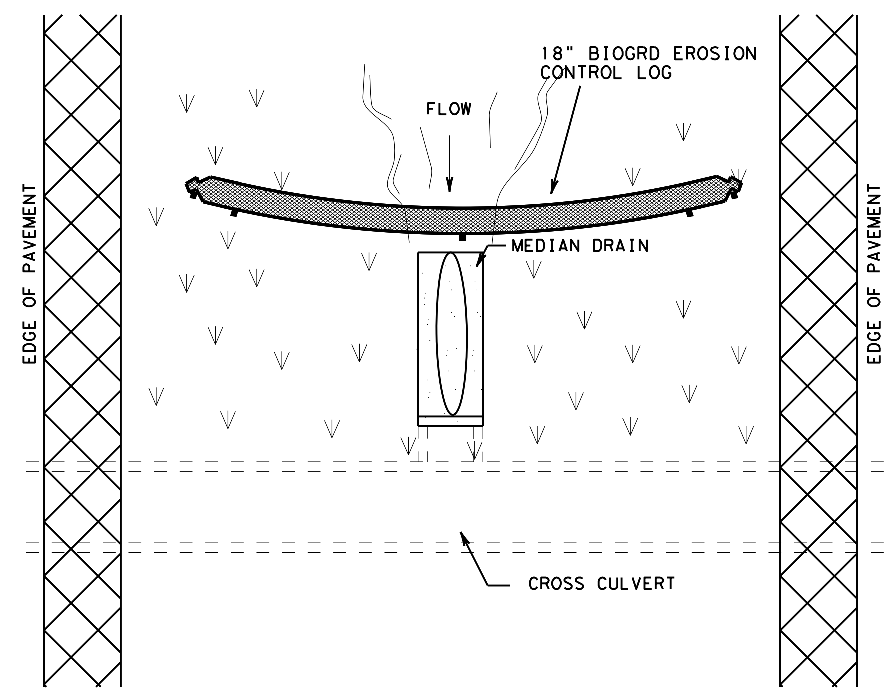
LAP DETAIL
NTS



REBAR STAKE DETAIL
NTS



AT BRIDGE MEDIAN
NTS



AT MEDIAN DRAINS
NTS

LEGEND

DISTURBED AREA

EXISTING VEGETATION

Texas Department of Transportation

BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

CORPUS CHRISTI DISTRICT STANDARD — SHEET 2 OF 2

FILE: crp-becl.dgn	DN: TxDOT	CK:	DW: CAF	CK: PWS	STD:
ORIG DATE: MAY 2008	DIST	FED REG	FEDERAL AID PROJECT ⊕		SHEET
REVISIONS PJA 5/2015	CRP	6	SEE TITLE SHEET		52
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ARANSAS	0916	38	015	VAR.