

FINAL PLANS

NAME OF CONTRACTOR: _____
 DATE OF LETTING: _____
 DATE WORK BEGAN: _____
 DATE WORK COMPLETED: _____
 DATE WORK ACCEPTED: _____
 SUMMARY OF CHANGE ORDERS: _____

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

DESIGN JBD	FED RD. DIV.NO. 6	FEDERAL AID PROJECT NO. F 2022(180)		HIGHWAY NO. 428
GRAPHICS MAD	STATE	DISTRICT	COUNTY	SHEET NO. 1
CHECK JBD	TEXAS	DALLAS	DENTON	
CHECK AAC	CONTROL	SECTION	JOB	
	0817	01	027	

HIGHWAY FUNCTIONAL CLASSIFICATION = N/A
 DESIGN SPEEDS = 45 MPH
 ADT N/A

FEDERAL PROJECT

CSJ: 0817-01-027

FM 428

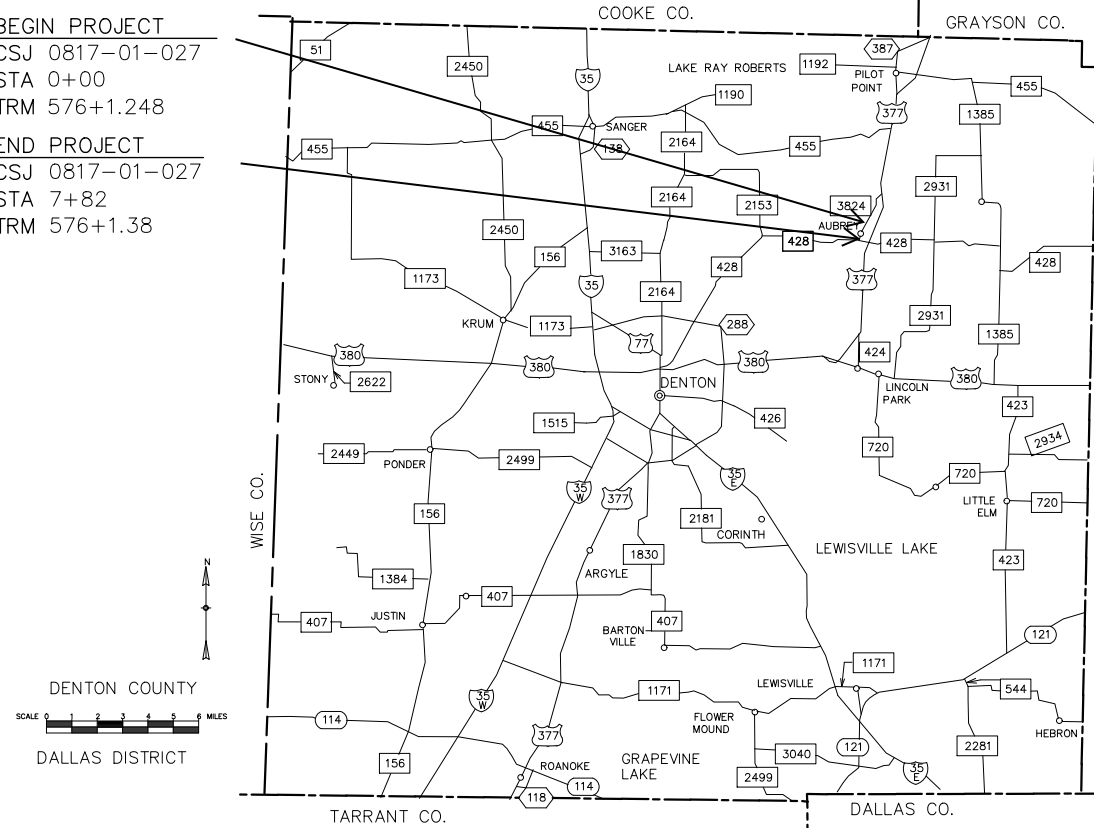
DENTON COUNTY

LIMITS: FROM SHERMAN DRIVE
TO PLUM STREET

TOTAL LENGTH OF PROJECT = $\left[\begin{array}{l} \text{ROADWAY} = 773.3 \text{ FT.} = .15 \text{ MI.} \\ \text{TOTAL} = 773.3 \text{ FT.} = .15 \text{ MI.} \end{array} \right]$

FOR THE CONSTRUCTION OF LANDSCAPE AND SCENIC ENHANCEMENT
 CONSISTING OF: CONSTRUCTION OF LANDSCAPES WORK CONSISTING OF
 PLANTING, IRRIGATION, PAVING, AND LIGHTING

BEGIN PROJECT
 CSJ 0817-01-027
 STA 0+00
 TRM 576+1.248
 END PROJECT
 CSJ 0817-01-027
 STA 7+82
 TRM 576+1.38



DENTON COUNTY
 SCALE 0 1 2 3 4 5 6 MILES
 DALLAS DISTRICT

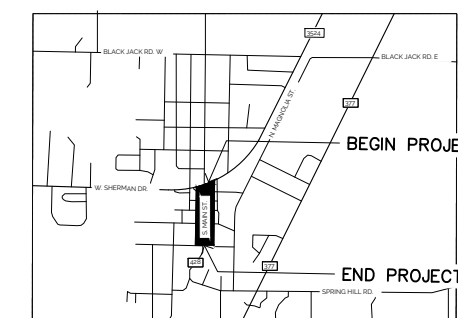
EQUATIONS: NONE
 EXCEPTIONS: NONE
 RAILROAD CROSSINGS: NONE

NOTE:

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



SUBMITTED FOR LETTING AUGUST 17, 2021
 JEREMY D. BLAD, R.L.A.
 CONSULTANT DESIGN LANDSCAPE ARCHITECTURE



PROJECT SITE ENLARGEMENT

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 8/30/2021
 DESIGNED BY: JEFFREY BUSH, P.E.
 DIRECTOR OF OPERATIONS

RECOMMENDED FOR LETTING: 8/30/2021
 DESIGNED BY: [Signature], P.E.
 DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING: 8/23/2021
 DESIGNED BY: [Signature], P.E.
 REGISTERED PROFESSIONAL ENGINEER

APPROVED FOR LETTING: 8/30/2021
 DESIGNED BY: [Signature], P.E.
 REGISTERED PROFESSIONAL ENGINEER

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____, P.E.
 Signature of Registrant & Date

INDEX OF SHEETS

SHEET DESCRIPTION

I. GENERAL

001 TITLE SHEET
 002 INDEX OF SHEETS
 003 PROJECT LAYOUT
 004,04A – 04B GENERAL NOTES
 005 – 05B ESTIMATE & QUANTITIES SHEET
 05B – 05C PROJECT QUANTITIES SUMMARY
 06 NOT USED

II. TRAFFIC CONTROL PLAN (STANDARD SHEETS)

*007– 018 BC (1) – 21 THRU (12) – 21
 *019 TCP(2–4) – 18

III. ENVIRONMENTAL ISSUES

020 ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
 021 STORM WATER POLLUTION PREVENTION PLAN (SW3P)
 022 SW3P SITE MAP
 *023 – 026 EC(1) – 16 & (9)–16

IV. LANDSCAPE ITEMS

027 – 030 PLANTING PLANS
 031 – 032 PLANTING DETAILS
 033 – 037 PLANTING AND ESTABLISHMENT
 038 NOT USED
 039 – 042 IRRIGATION PLANS
 043 – 047 IRRIGATION DETAILS
 048 – 050 HARDSCAPE PLANS
 051 HARDSCAPE DETAILS

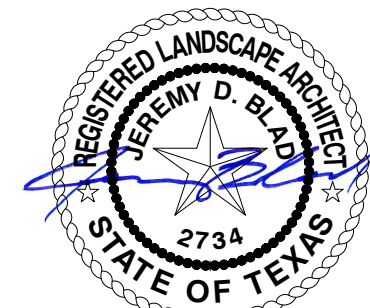
V. ELECTRICAL ITEMS

052 – 054 ELECTRICAL LIGHTING SITE PLAN
 055 ELECTRICAL SPECIFICATIONS
 *056 (ED(1)–14) ELECTRICAL DETAILS CONDUITS & NOTES
 *057 (ED(3)–14) ELECTRICAL DETAILS CONDUCTORS
 *058 (ED(4)–14) ELECTRICAL DETAILS GROUND BOXES
 *059 TS–FD–12

*THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME AND ARE APPLICABLE TO THIS PROJECT.

_____, PE _____ DATE

LANDSCAPE ARCHITECTS
 212 S. ELM ST. #120
 DENTON, TX 76201
 PH: (214) 597-1415
 WWW.VQ-DESIGN.COM

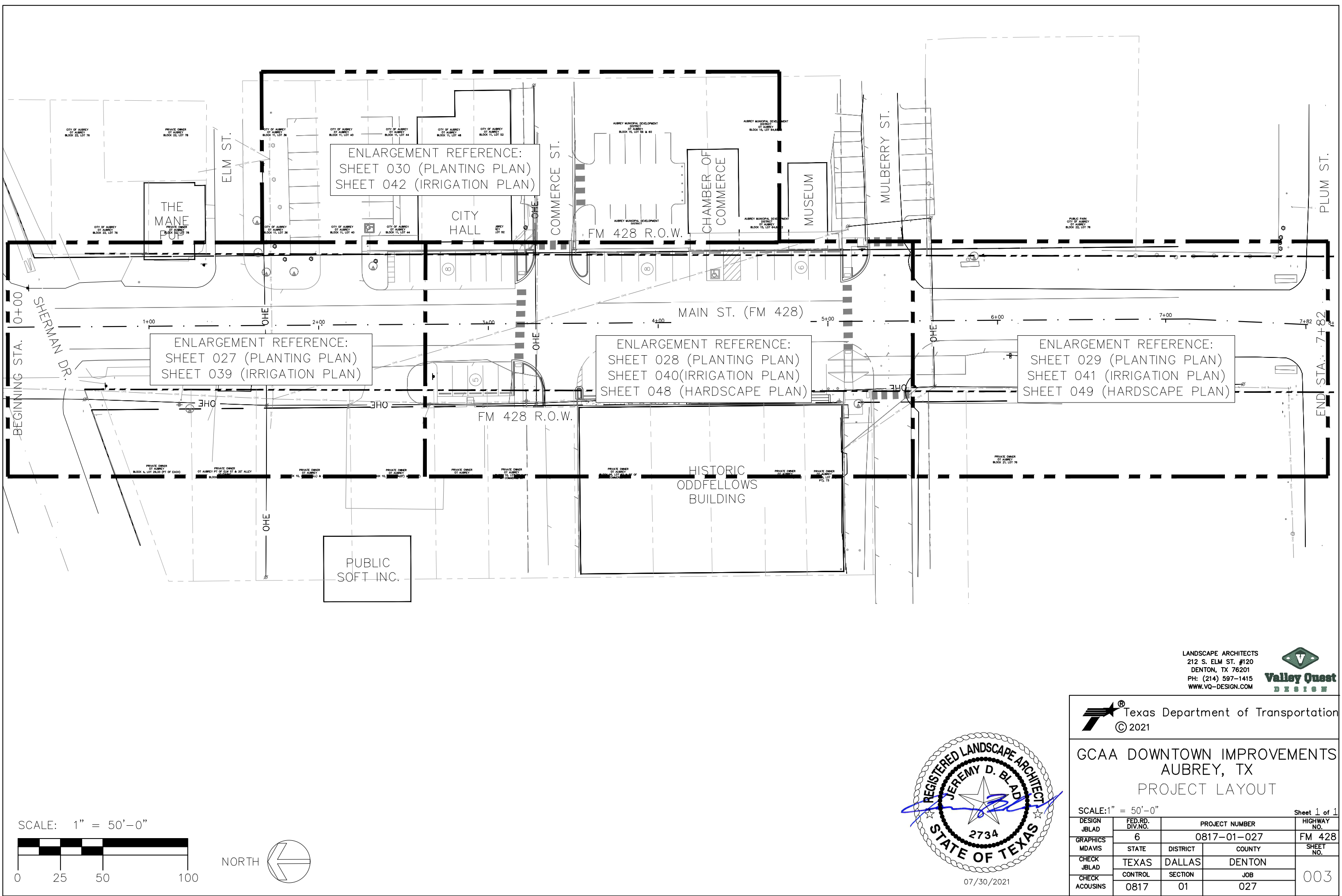
07/30/2021

 Texas Department of Transportation
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GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 INDEX OF SHEETS

SCALE:			Sheet 1 of 1
DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER 0817-01-027	HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE	DISTRICT	COUNTY
CHECK JBLAD	TEXAS	DALLAS	DENTON
CHECK ACOUSINS	CONTROL	SECTION	JOB
	0817	01	027

002



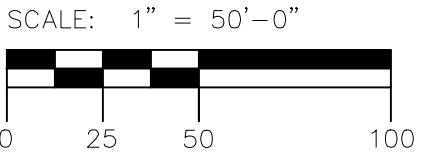
ENLARGEMENT REFERENCE:
SHEET 030 (PLANTING PLAN)
SHEET 042 (IRRIGATION PLAN)

ENLARGEMENT REFERENCE:
SHEET 027 (PLANTING PLAN)
SHEET 039 (IRRIGATION PLAN)

ENLARGEMENT REFERENCE:
SHEET 028 (PLANTING PLAN)
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SHEET 048 (HARDSCAPE PLAN)

ENLARGEMENT REFERENCE:
SHEET 029 (PLANTING PLAN)
SHEET 041 (IRRIGATION PLAN)
SHEET 049 (HARDSCAPE PLAN)

TEMPLATED REVISED: 10-23-02



07/30/2021

LANDSCAPE ARCHITECTS
212 S. ELM ST. #120
DENTON, TX 76201
PH: (214) 597-1415
WWW.VQ-DESIGN.COM



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GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
PROJECT LAYOUT

SCALE: 1" = 50'-0"				Sheet 1 of 1
DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 003
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	

CSJ: 0817 01 027

Sheet 004

County: Denton

Highway: FM 428

SPECIFICATION DATA

GENERAL

Table 2: Basis of Estimate for Permanent Construction				
Item	Description	Thickness	Rate	Quantity
162	Block Sod	N/A	See Specifications	875 SY

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 0.34 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required coordination with environmental resources agencies. There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

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

Travis Campbell Area Engineer 972.482.9535

Christopher P Rocha Assistant Area Engineer 940.323.1806

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Sheet 004

County: Denton

Highway: FM 428

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.

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

Item 5:

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6205) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Item 7:

Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Perform all electrical work in accordance with the National Electrical Code and Texas Department of Transportation Specifications.

Consult with appropriate electric company representatives according to their respective area to coordinate electrical services installations.

Holiday restrictions – the engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

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Sheet 004 A

County: Denton

Highway: FM 428

- New Year's Eve and Day (noon on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (noon on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (noon on Friday thru 10:00pm Monday)
- Independence Day (noon on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (noon on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (noon on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (noon on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

Item 8:

This Project will be a Standard Workweek

Meet weekly with the engineer to notify him or her of planned work for the upcoming week

Provide the engineer with a daily work schedule of planned work.

Item 100:

Do not remove the existing roadway small signs, delineators and object markers unless directed, during construction within the right of way. Small sign, delineator and object marker removals are subsidiary to this Item.

Remove concrete, asphalt and large stones or other hard materials, with particular emphasis on areas designated for irrigation lines and planting beds.

Remove existing trees as indicated on plans. Protect existing trees in R.O.W. indicated as remaining on the plans; prune as necessary or as directed.

The limits of preparing right of way will be measured from Sta. 0+00 to Sta. 7+73.3 along the centerline of construction.

Item 160:

Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:

Provide tickets representing quantity of compost delivered to site.

Item 170:

Install 4" bores under Main Street at locations noted on the Irrigation Plans prior to starting irrigation work. Ensure adequate space and access for electrical conduit is accounted for.

Item 192:

No planting shall occur between June 1st and September 15th without written approval from the Engineer.

General Notes

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Sheet 004 A

County: Denton

Highway: FM 428

Perform soil percolation test at least 24 hours prior to planting trees in plant pits. Excavate plant pit and fill entirely with water. Inspect planting pit within 24 hours to verify water has percolated into surrounding soil. In the event the water is present after 24 hours, contact Engineer before continuing tree planting in pits.

Prior to installing any plant material, ensure the irrigation system (if included in project) is pressurized up to the valves.

Begin the 90-day maintenance period only after all live plant material and functional irrigation systems have been installed as shown on plans.

Item 416:

Provide a minimum of one core per bent, regardless of placement method.

Item 500:

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

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.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs.

CSJ: 0817 01 027

Sheet 004 B

County: Denton

Highway: FM 428

Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Do not commence work on the road before sunrise. Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

Limit lane closures along FM 428 / South Main Street to the hours between 9:00 am and 3:30 pm. Work in other areas of the project is not restricted to this time frame.

Item 506:

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over low. The location(s) of washout area will be approved by the Engineer. When washout pit are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls"

CSJ: 0817 01 027

Sheet 004 B

County: Denton

Highway: FM 428

Item 528:

Existing concrete to be stripped, sand-blasted & stained to match new, proposed Colored Textured Concrete as indicated on the plans & details, at the locations annotated on the Hardscape Schedule Materials & Finishes.

Install mock-ups of Colored Textured Concrete for review and approval prior to final installation. Provide one mock-up each of existing and proposed conditions, at a minimum area of 15 square feet of each condition.

Concrete base for pavers is subsidiary to the Pavers item. Submit paver color choices for selection and individual paver unit samples (minimum 6) of selected color(s) for approval prior to installation. Install mock-up of Pavers installation for review and approval prior to final installation, at a minimum area of 20 square feet.

Item 618:

Refer to sheets 052, 053 and 054 for conduit routing including additions and modifications. Refer to sheet 054 for schedule with conduit linear feet totals. Also, see sheets 056, 057 and 058 for TxDot state standard sheets ED(1), ED(3) and ED(4) for additional conduit specification requirements.

Item 620:

Refer to sheets 052, 053 and 054 for electrical conductor requirements including additions and modifications. Refer to sheet 054 for schedule with conductor linear feet totals. Also, see sheets 056, 057 and 058 for TxDot state standard sheets ED(1), ED(3) and ED(4) for additional electrical conductor specification requirements.

Item 624:

Refer to sheets 052, 053 and 054 for electrical plans including ground box requirements. Also, see sheet 058 for TxDot state standard sheet ED(4) for ground box specifications

Item 1004

Reference Special Specification 1004 for "Tree Protection". Tree Protection Fencing to be installed in accordance with the plans.

Item 1005

Reference Special Specification 1005 for "Loose Aggregate for Groundcover". Loose Aggregate to be installed in accordance with the plans.

Item 1006

Reference Special Specification 1006 for "Landscape Soil Amendments". Landscape Soil Amendments to be installed in accordance with detail & plans. Type I, Type II, and Type III shall be applied to each planting bed at the specified application rate stated in plans.

Item 6000-6098:

See detail 2/053 on sheet 053 for existing electrical panel information. Also, see sheet 055 for panel schedule 'EXISTING PANEL A' for breaker requirements. Provide and install (1) new breakers within existing NEMA3R panel. Extend new conduit and conductors shown on plan sheet 052 and make connection to new breakers within existing panel A.098

General Notes



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0817-01-027

DISTRICT Dallas
HIGHWAY FM 428

COUNTY Denton

CONTROL SECTION JOB				0817-01-027		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00132843			
COUNTY				Denton			
HIGHWAY				FM 428			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6001	PREPARING ROW	AC	0.350		0.350	
	161-6018	COMPOST MANUF TOPSOIL	CY	24.000		24.000	
	162-6002	BLOCK SODDING	SY	875.000		875.000	
	170-6001	IRRIGATION SYSTEM	LS	1.000		1.000	
	192-6002	PLANT MATERIAL (1-GAL)	EA	1,273.000		1,273.000	
	192-6003	PLANT MATERIAL (3-GAL)	EA	369.000		369.000	
	192-6004	PLANT MATERIAL (5-GAL)	EA	37.000		37.000	
	192-6015	LANDSCAPE EDGE	LF	667.000		667.000	
	192-6016	PLANT BED PREPARATION	SY	1,027.000		1,027.000	
	192-6017	VEGETATION BARRIER	SY	302.000		302.000	
	192-6024	PLANT MATERIAL (30 GAL) (TREE)	EA	6.000		6.000	
	192-6046	PLANT MATERIAL (MIN 3" CAL) (B&B)	EA	12.000		12.000	
	192-6048	PLANT MATERIAL (MIN 4" CAL) (B&B)	EA	1.000		1.000	
	192-6097	CONC LNDSCP EDG (12 IN WIDTH)	LF	402.000		402.000	
	416-6088	DRILL SHAFT (RDWY ILL POLE) (24 IN)	LF	48.000		48.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.300		3.300	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	521.000		521.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	521.000		521.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	1,021.000		1,021.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	1,021.000		1,021.000	
	528-6002	COLORLED TEXTURED CONC (6")	SY	198.000		198.000	
	528-6004	LANDSCAPE PAVERS	SY	132.000		132.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	580.000		580.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	120.000		120.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	1,405.000		1,405.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	2,810.000		2,810.000	
	624-6001	GROUND BOX TY A (122311)	EA	2.000		2.000	
	1002-6002	LANDSCAPE AMENITY (TY 1)	EA	5.000		5.000	
	1002-6003	LANDSCAPE AMENITY (TY 2)	EA	3.000		3.000	
	1004-6002	TREE PROTECTION	AC	8.000		8.000	
	1005-6001	LOOSE AGGR FOR GROUND COVER (TYPE I)	CY	32.000		32.000	
	1006-6001	LANDSCAPE SOIL AMENDMENT (TYPE I)	SY	1,027.000		1,027.000	
	1006-6002	LANDSCAPE SOIL AMENDMENT (TYPE II)	SY	1,027.000		1,027.000	
	1006-6003	LANDSCAPE SOIL AMENDMENT (TYPE III)	SY	1,027.000		1,027.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

DISTRICT	COUNTY	CCSJ	SHEET
Dallas	Denton	0817-01-027	005



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0817-01-027

DISTRICT Dallas
HIGHWAY FM 428

COUNTY Denton

CONTROL SECTION JOB				0817-01-027		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00132843			
COUNTY				Denton			
HIGHWAY				FM 428			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

Location	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
	0170-6001	0192-6002	0192-6002	0192-6002	0192-6003	0192-6003	0192-6003	0192-6003	0192-6003	0192-6003	0192-6003	0192-6003	0192-6004
	(1 GAL)	(1 GAL)	(1 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(3 GAL)	(5 GAL)
	IRRIGATION SYSTEM	SNAKE HERB GROUNDCOVER	MEXICAN FEATHERGRASS GROUNDCOVER	LAMB'S EAR GROUNDCOVER	'MORNING LIGHT' MISCANTHUS GRASS	AUTUMN SAGE SHRUB	LITTLE BLUESTEM SHRUB	DWARF HAMELN GRASS	ROSE CREEK ABELIA SHRUB	RED YUCCA	COLOR GUARD YUCA	WHALE TALE AGAVE	GULF MUHLY SHRUB
	LS	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Planting Plan (Sheet 27)		162	307	215	21	14	57	96	12	21	12	9	24
Planting Plan (Sheet 28)		83	114	50	3	6	13	0	0	2	5	3	0
Planting Plan (Sheet 29)		158	111	65	12	7	17	25	5	18	0	11	13
TOTAL	1	411	532	330	36	27	87	121	17	41	17	23	37

SUMMARY OF PLANTING AND IRRIGATION ITEMS (CONTINUED)

Location	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
	0161 - 6018	0162-6002	0192-6016	192-6015	192-6017	0192-6024	0192-6046	0192-6048	0192-6097	1005-6001	1006-6001	1006-6001	1006-6001
						(30 GAL)	(3" CAL)	(4" CAL)					
	COMPOST MANUFACTURED TOPSOIL	BLOCK SODDING	PLANT BED PREPARATION	EDGING	VEGETATION BARRIER	CHASTE TREE	SHANTUNG MAPLE TREE	TEXAS RED OAK TREE	CONC LANDSCAPE EDGE (12")	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	LANDSCAPE SOIL AMENDMENT (TYPE 1)	LANDSCAPE SOIL AMENDMENT (TYPE 2)	LANDSCAPE SOIL AMENDMENT (TYPE 3)
	CY	SY	SY	LF	SY	EA	EA	EA	LF	CY	SY	SY	SY
Planting Plan (Sheet 27)	2	75	598	358	138	1	6	0	248	16.5	598	598	598
Planting Plan (Sheet 28)	1.4	51	183	148	62	2	4	0	0	4.25	183	183	183
Planting Plan (Sheet 29)	5	175	246	161	102	2	1	0	154	11.36	246	246	246
Planting Plan (Sheet 30)	16	574	0	0	0	1	2	1	0	0	0	0	0
TOTAL	24	875	1,027	667	302	6	12	1	402	32	1,027	1,027	1,027

SUMMARY OF HARDSCAPE ITEMS

Location	ITEM	ITEM
	0528-6002	0528-6004
	COLORED CONDITIONED CONCRETE	PAVERS
	SY	SY
Hardscape Plan (Sheet 51)	198	0
Hardscape Plan (Sheet 52)	0	132
TOTAL	198	132

SUMMARY OF SWDB ITEMS

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GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 QUANTITY SUMMARY SHEET

SCALE:			Sheet 1 of 2
DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER 0817-01-027	HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027
CHECK ACOUSINS			05B



07/30/2021

USER ID

SUMMARY OF SWPPP ITEMS

	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
	0506-6038	0506-6039	0506-6040	0506-6043	18	18
	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIOGRD EROSION CONTROL LOGS (8")(INSTALL)	BIOGRD EROSION CONTROL LOGS (REMOVE)	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT
Location	LF	LF	LF	LF	LS	LS
Erosion Control Plan (Sheet 22)	521	521	1021	1021	1	1
TOTAL	521	521	1021	1021	1	1

SUMMARY OF MISCELLANEOUS ITEMS

	ITEM	ITEM	ITEM	ITEM	ITEM
	100-6001	0500-6001	0502-6001	1004-6002	0476-6014
	PREP RIGHT OF WAY	MOBILIZATION	BARRICADES, SIGNS, & TRAFFIC HANDLING	TREE PROTECTION FENCING	JACK BOR OR TUN PIPE (24 IN)(RC)(CL III)
Location	AC	LS	MO	EA	LF
NA	0.35	1	1	8	138
TOTAL	0.35	1	1	8	138

SUMMARY OF ELECTRICAL ITEMS

	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
	0620-6009	0620-6010	0618-6023	0618-6024	0624-6001	1002 - 6002	1002 - 6003	0416-6088	6000-6098
	ELECTRICAL CONDUCTOR (No. 6) Bare	ELECTRICAL CONDUCTOR (No. 6) Insulated	CONDUIT (PVC) (SCH40)(2")	CONDUIT (PVC) (SCH40)(2")(BO RE)	GROUND BOX, TYPE A (122311)	LANDSCAPE AMENITY (TY 1)	LANDSCAPE AMENITY (TY 2)	DRILL SHAFT (RDWY ILL POLE) (24 IN)	INSTALL CIRCUIT BREAKER
Location	LF	LF	LF	LF	EA	EA	EA	LF	EA
Electrical Lighting Site Plan (Sheet 61-63)	1,405	2,810	580	120	2	5	3	48	1
TOTAL	1,405	2,810	580	120	2	5	3	48	1

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QUANTITY SUMMARY SHEET**



SCALE: Sheet 2 of 2

DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 05C
CHECK JBLAD	CONTROL	SECTION	JOB	
CHECK ACOUSINS	0817	01	027	

TEMPLATED REVISED: 10-23-02

DATE

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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).

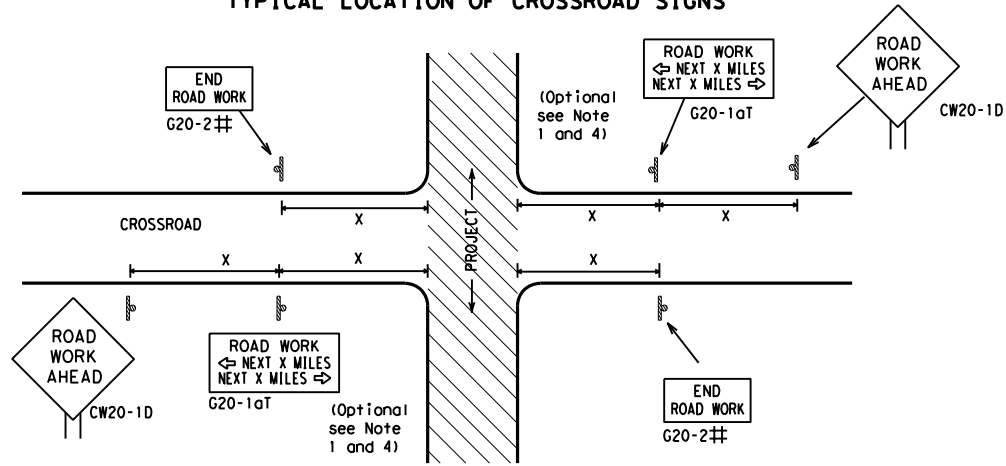
<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</p>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)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

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard															
<p>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</p> <p>BC (1) - 21</p>																	
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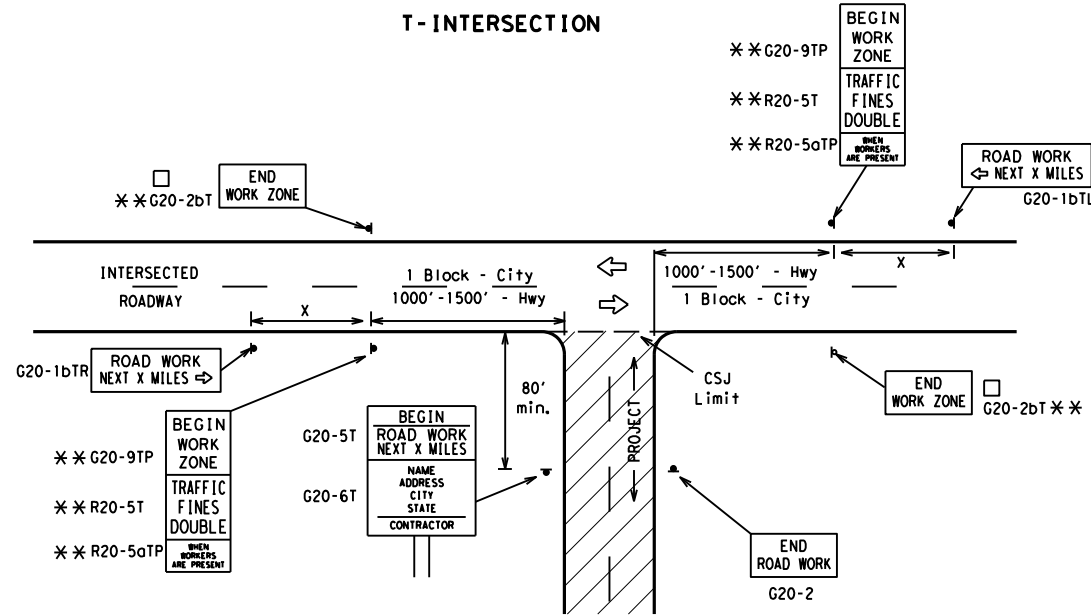
TYPICAL LOCATION OF CROSSROAD SIGNS



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}

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

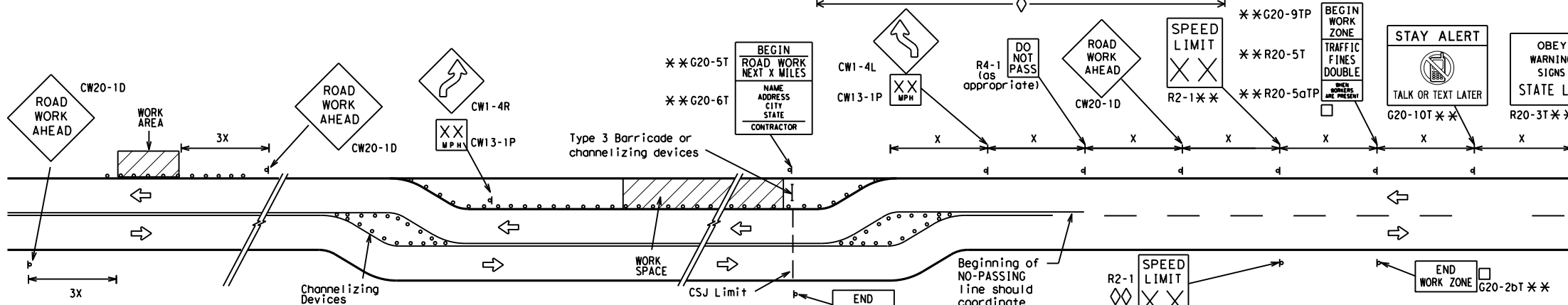
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

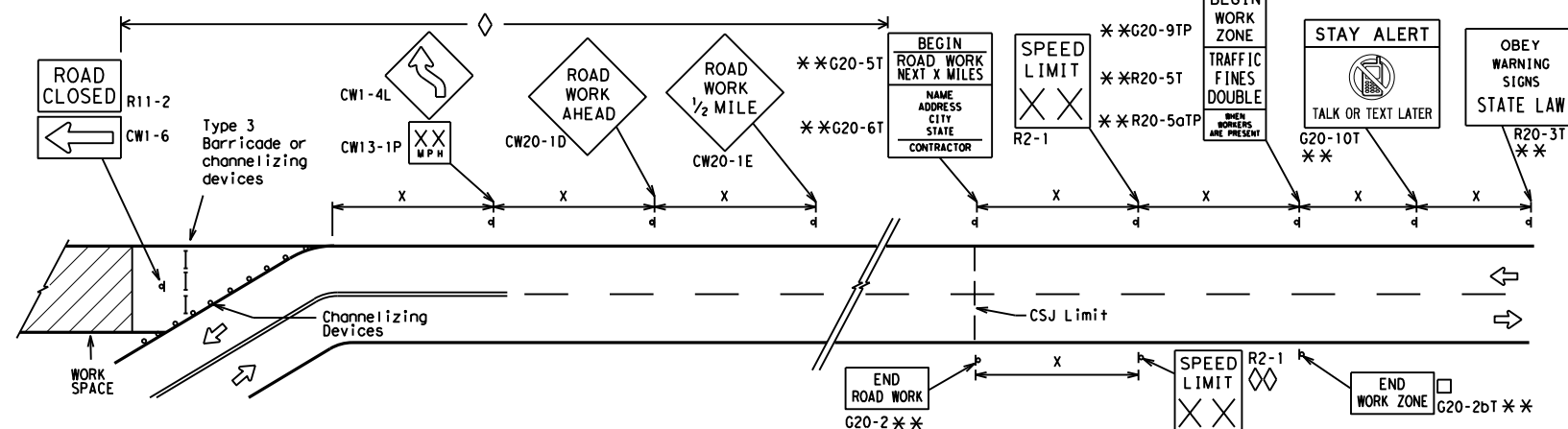
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
 - ** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
 - ◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
 - ◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC (2) - 21

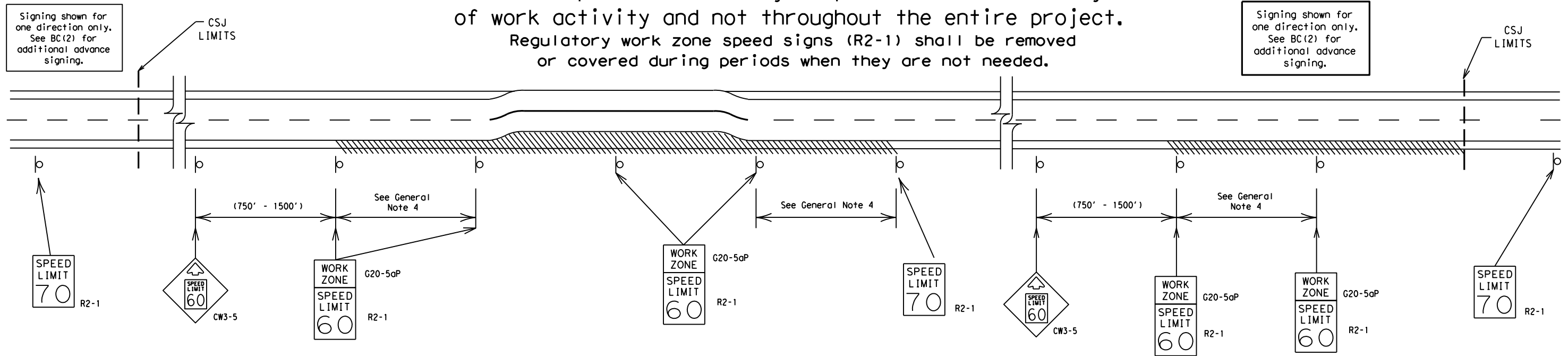
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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

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

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SHEET 3 OF 12



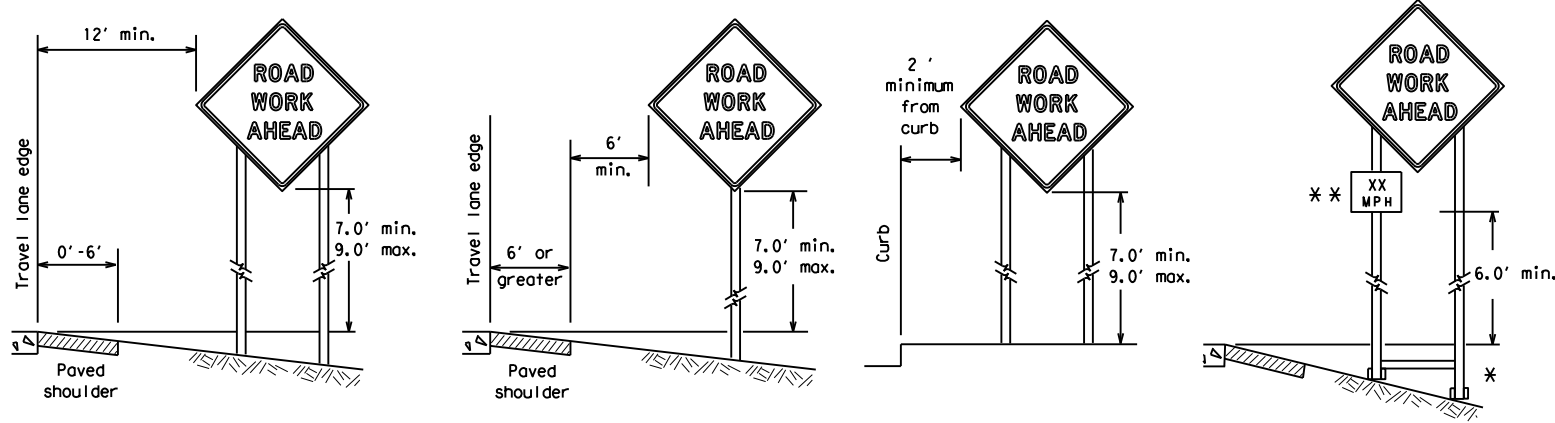
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0817	01	027	FM 428				
9-07	8-14	DIST		COUNTY	SHEET NO.				
7-13	5-21	18	DENTON		009				

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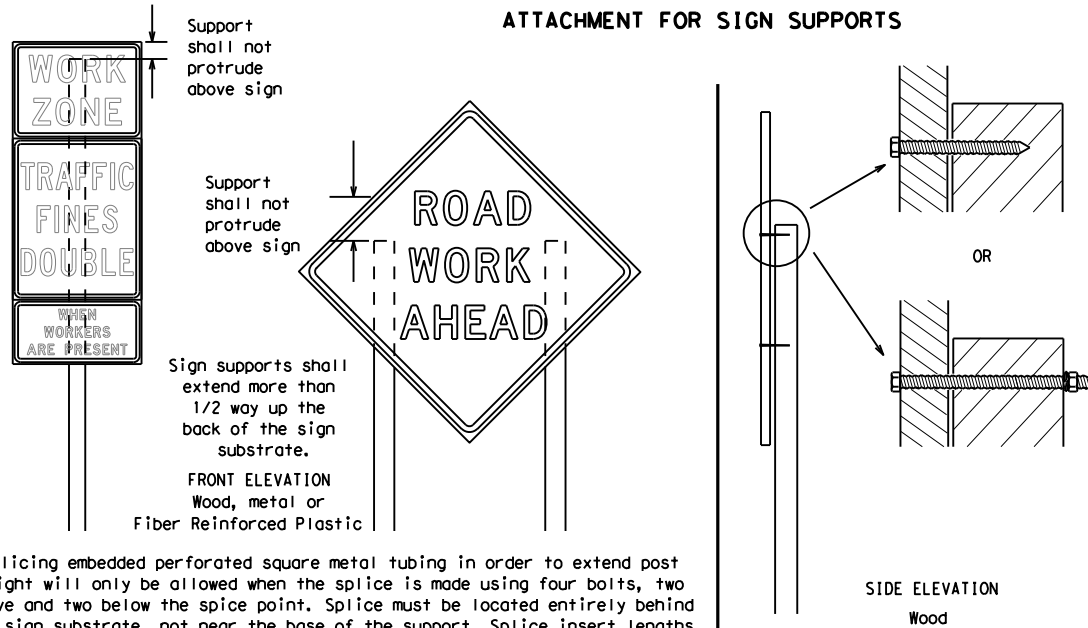
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



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

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

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

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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)

- 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.
 - Long-term stationary - work that occupies a location more than 3 days.
 - 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.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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

- 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

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- 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

- 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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- 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.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

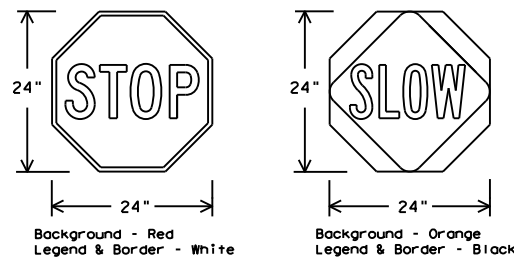
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- 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.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflectized when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 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

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

SHEET 4 OF 12



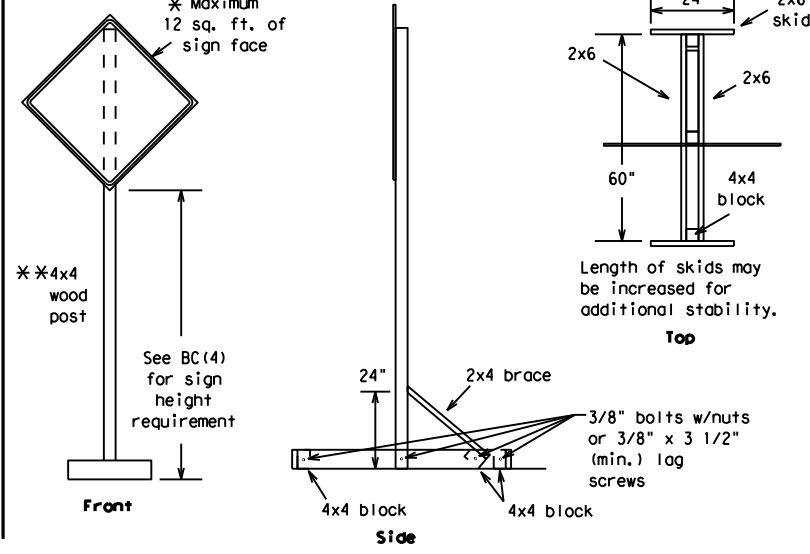
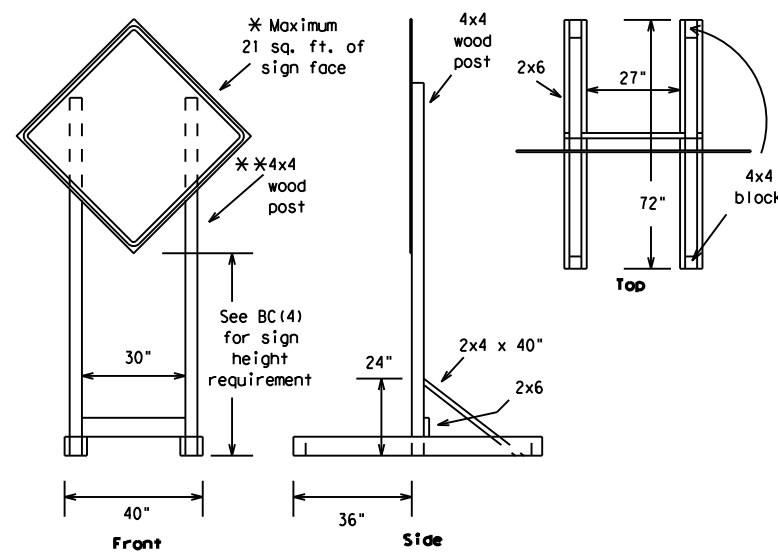
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT:		SECT:		JOB:		HIGHWAY:	
REVISIONS		0817	01	027		FM 428			
9-07	8-14	DIST:		COUNTY:		SHEET NO.:			
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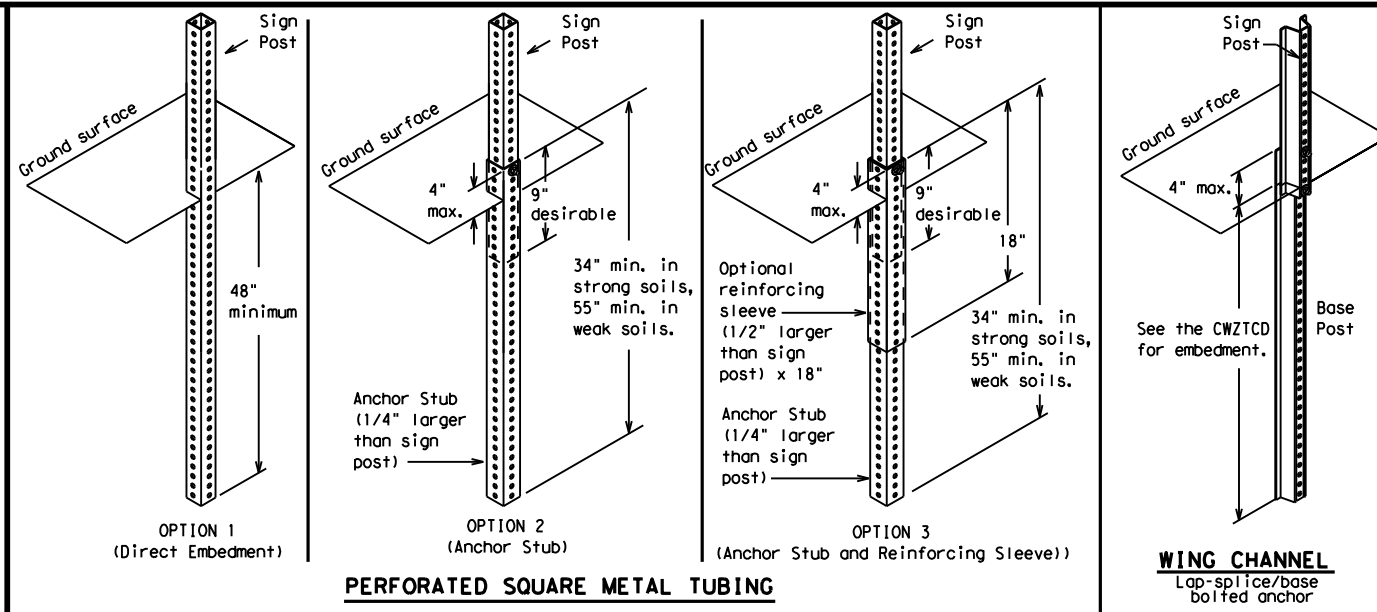
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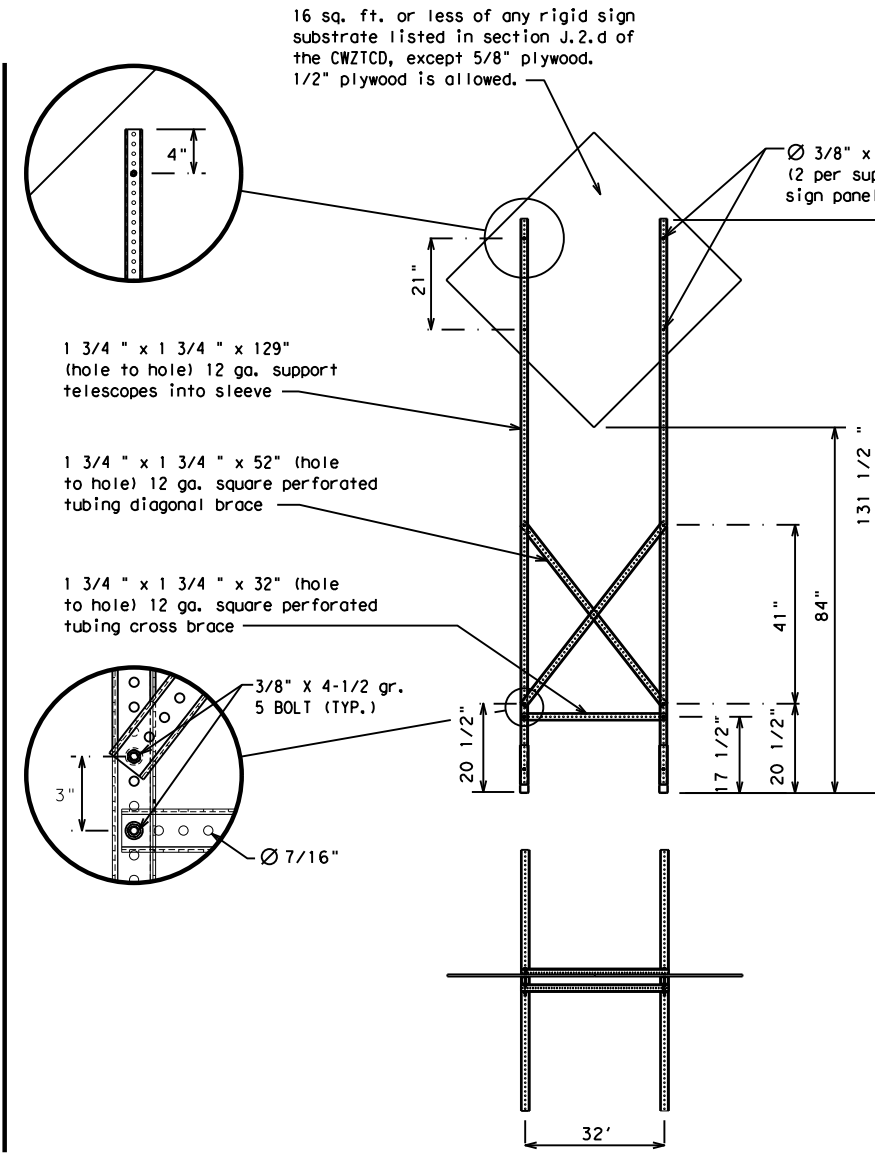
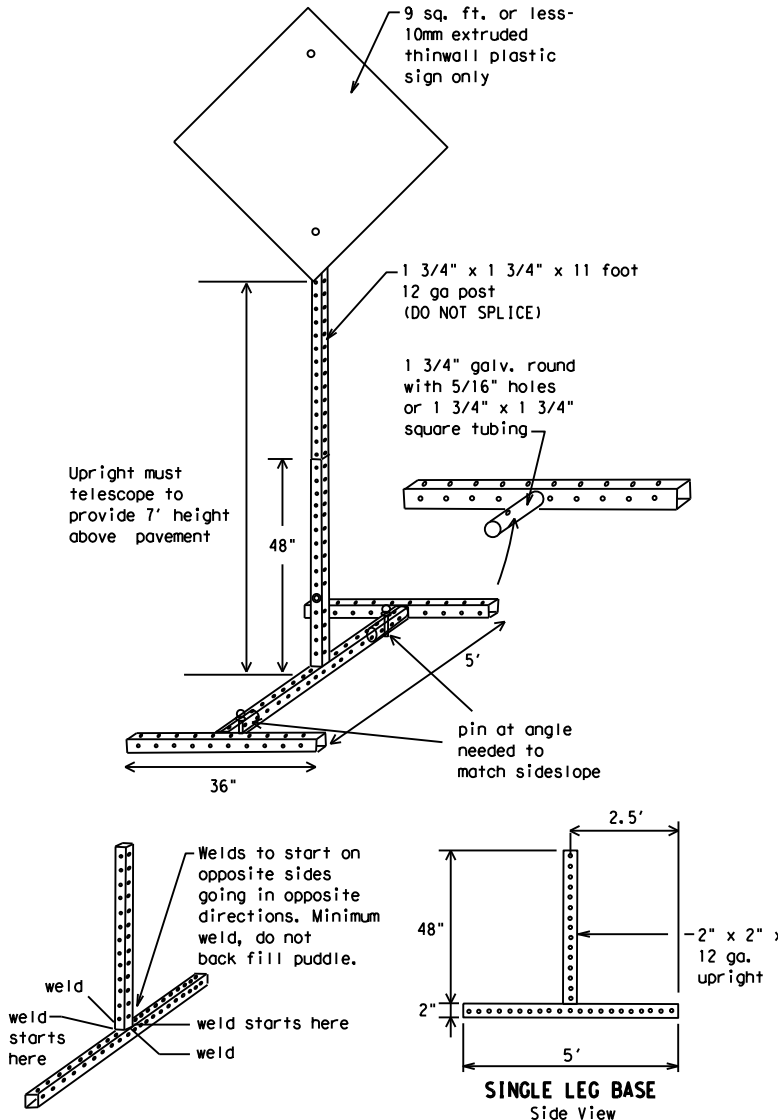
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

- * See BC(4) for definition of "Work Duration."
- ** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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© TxDOT	November 2002	CONT:	SECT:	JOB:	HIGHWAY:				
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7-13	5-21	18	DENTON	011					

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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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *
FORM X LINES RIGHT
USE XXXXX RD EXIT
USE EXIT I-XX NORTH
USE I-XX E TO I-XX N
WATCH FOR TRUCKS
EXPECT DELAYS
END SHOULDER USE
WATCH FOR WORKERS

Location List

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

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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

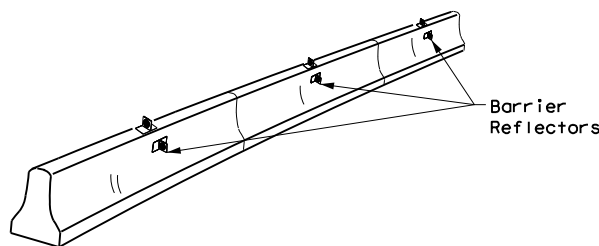
Roadway designation # IH-number, US-number, SH-number, FM-number

DATE: FILE:

<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
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9-07 8-14	DIST	COUNTY	SHEET NO.
7-13 5-21	18	DENTON	012

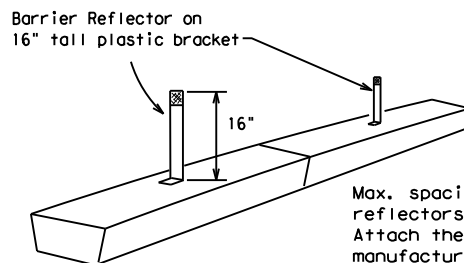
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



CONCRETE TRAFFIC BARRIER (CTB)

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

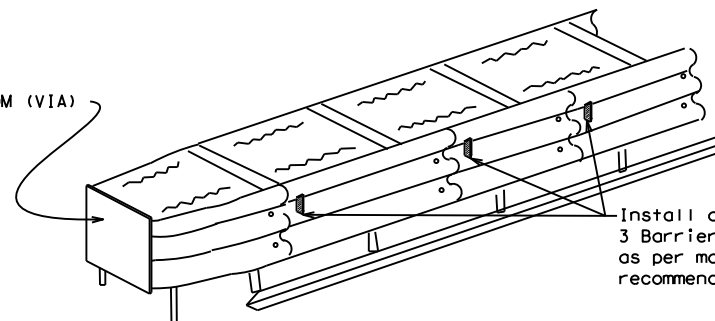


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

LOW PROFILE CONCRETE BARRIER (LPCB)



Install a minimum of 3 Barrier Reflectors as per manufacturer's recommendations.

DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

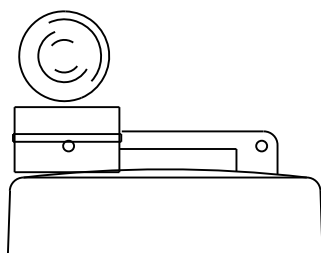
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

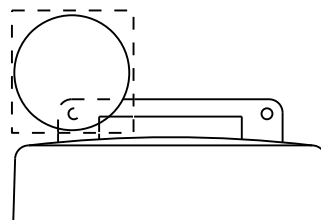
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



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

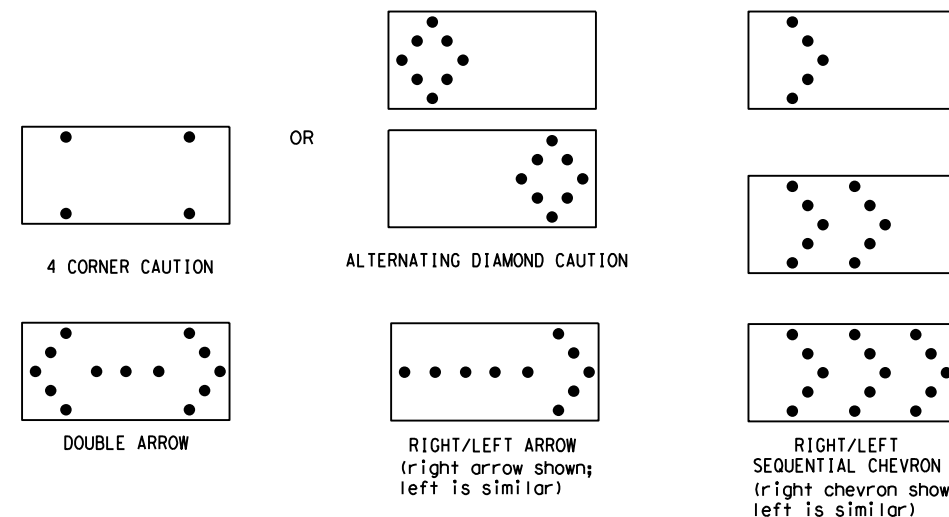


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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



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

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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



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

BC (7) -21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

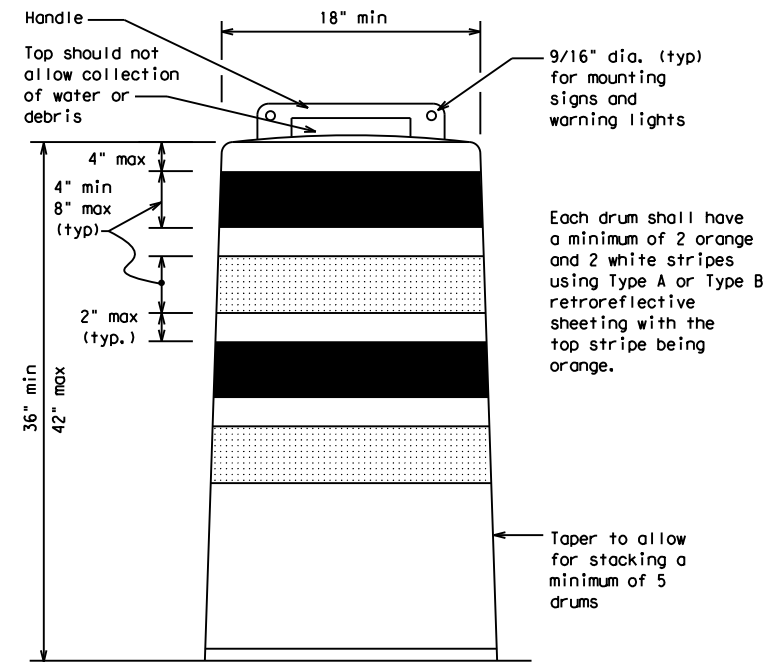
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

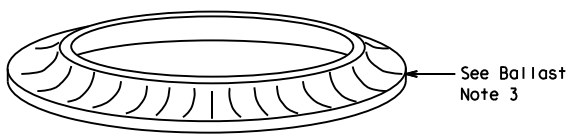
BALLAST

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

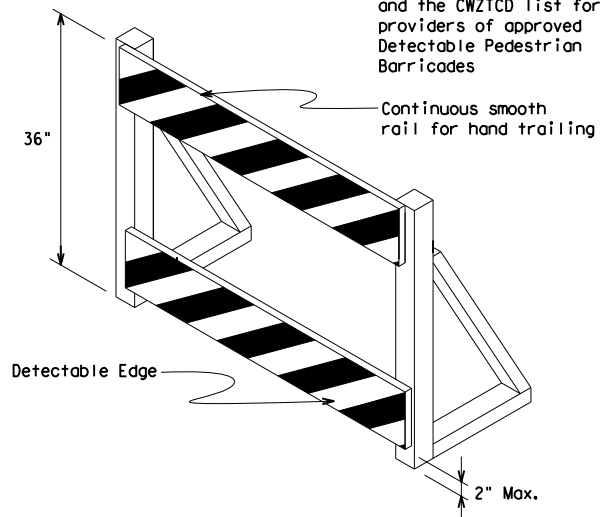


Each drum shall have a minimum of 2 orange and 2 white stripes using Type A or Type B retroreflective sheeting with the top stripe being orange.

Taper to allow for stacking a minimum of 5 drums

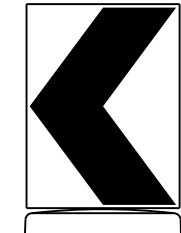


This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

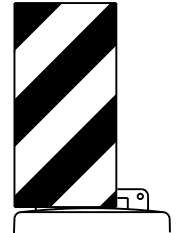


DETECTABLE PEDESTRIAN BARRICADES

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



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

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

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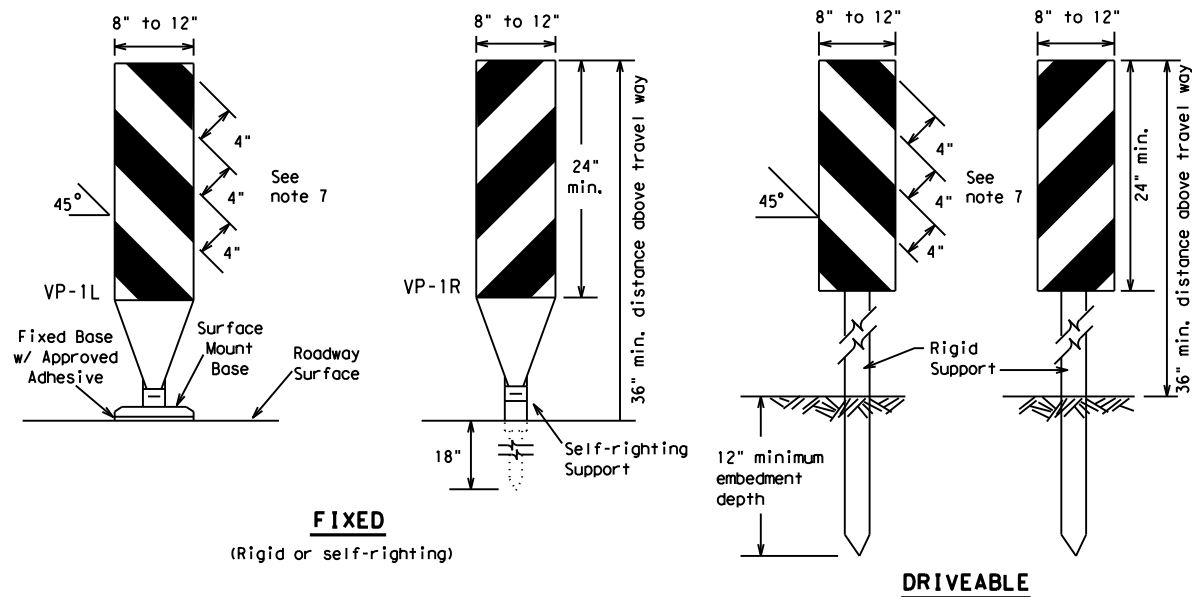


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8) - 21

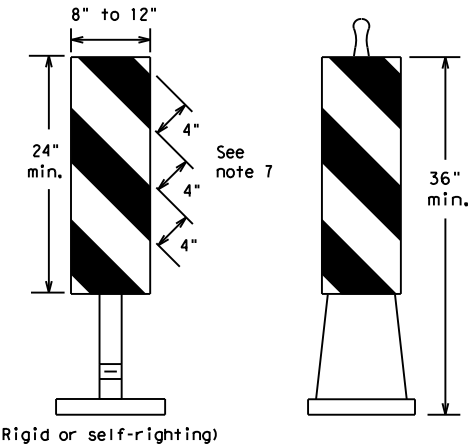
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FIXED
(Rigid or self-righting)

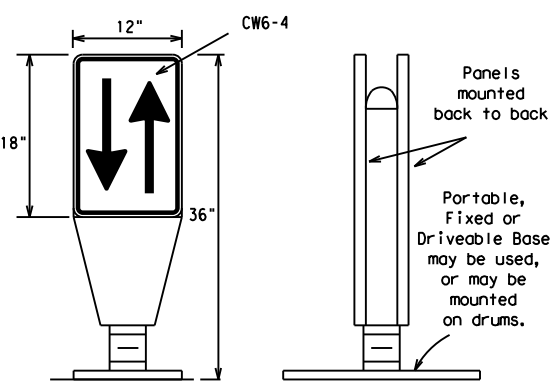
DRIVEABLE



PORTABLE

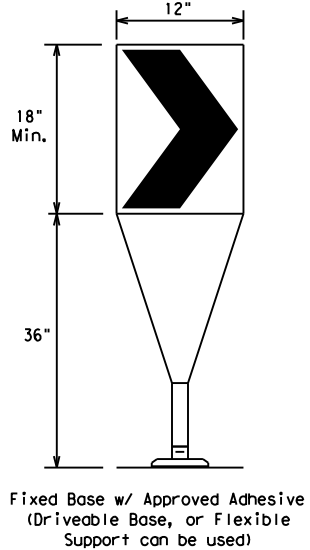
VERTICAL PANELS (VPs)

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



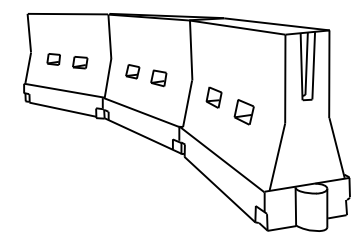
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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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.



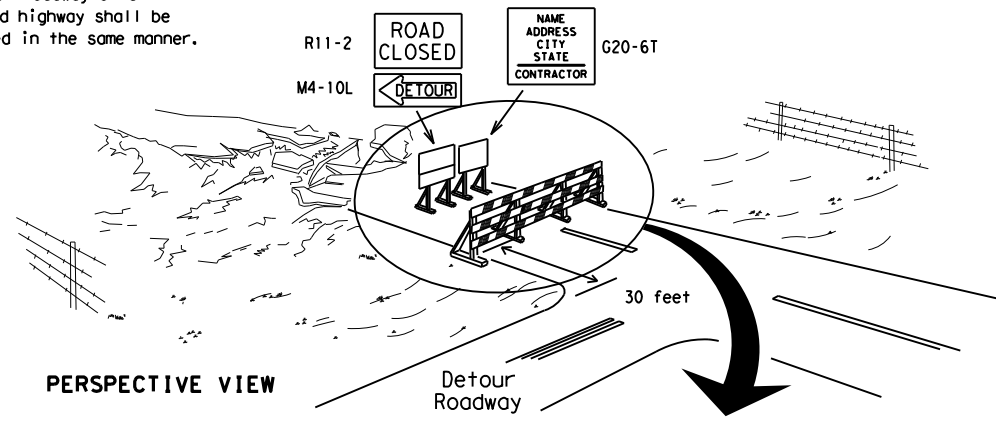
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

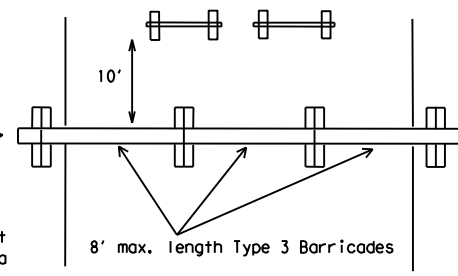
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

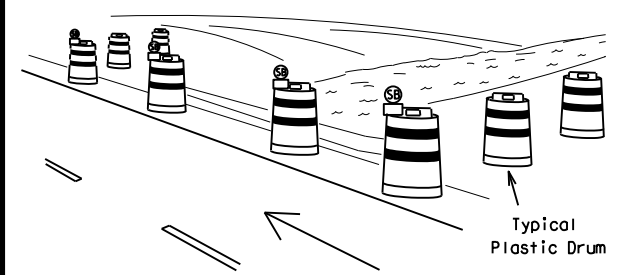
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



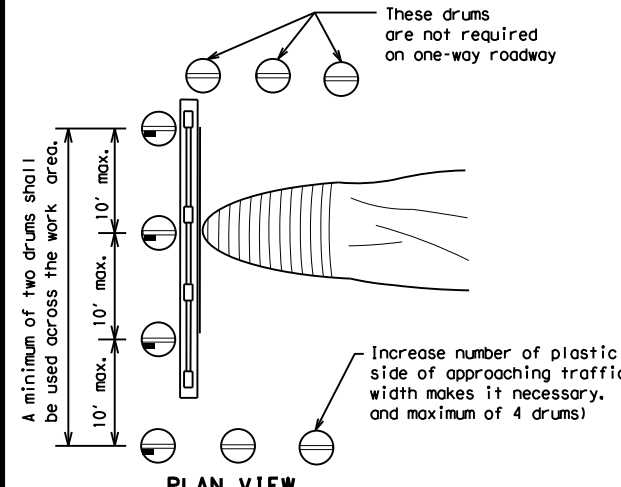
PLAN VIEW

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

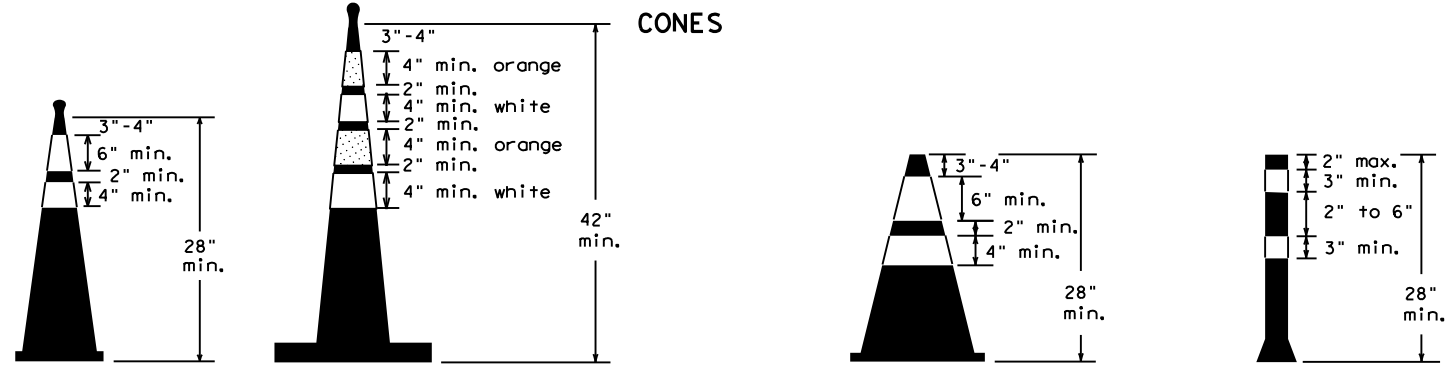


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

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

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

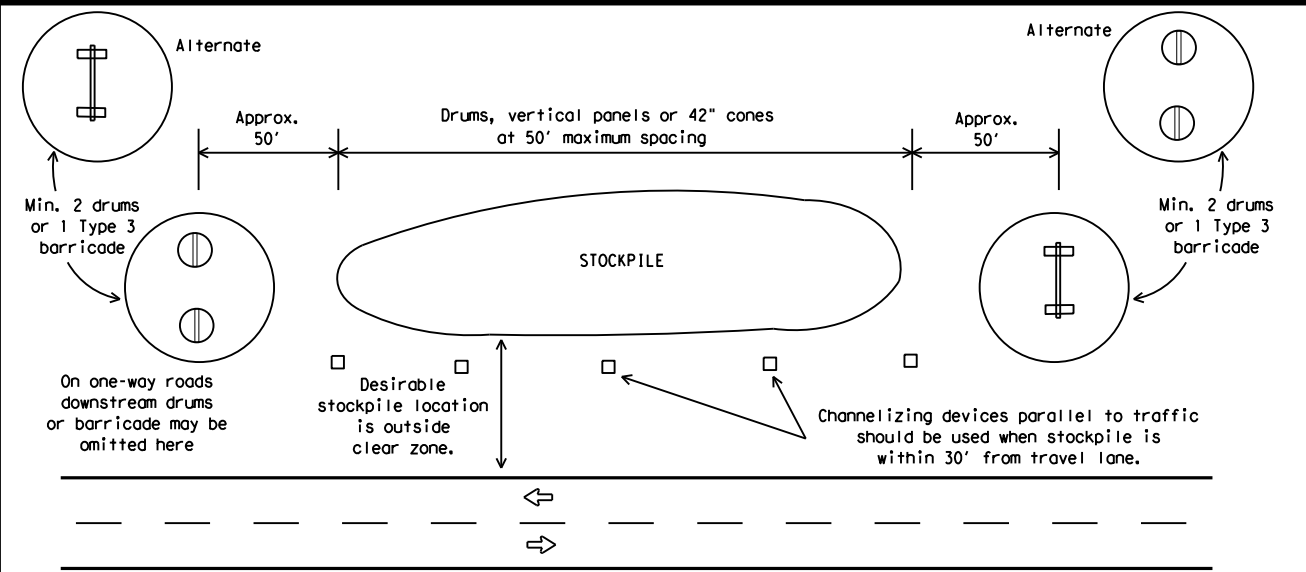


Two-Piece cones

One-Piece cones

Tubular Marker

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

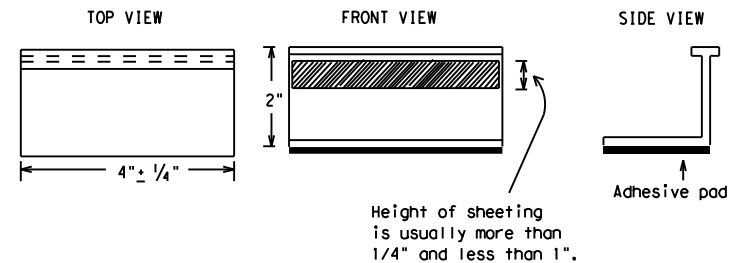
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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DATE:
FILE:

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

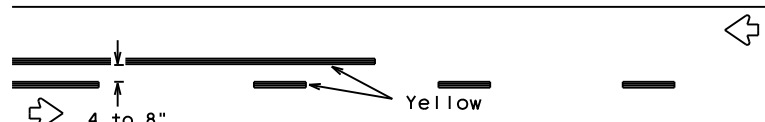
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-98	9-07	5-21		
1-02	7-13		027	FM 428
11-02	8-14			
	DIST	COUNTY	SHEET NO.	
	18	DENTON	017	

105

PAVEMENT MARKING PATTERNS

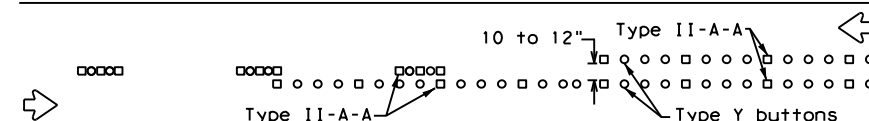


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

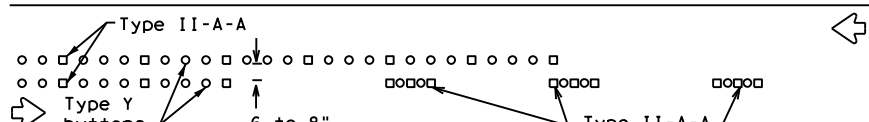


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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



RAISED PAVEMENT MARKERS - PATTERN A



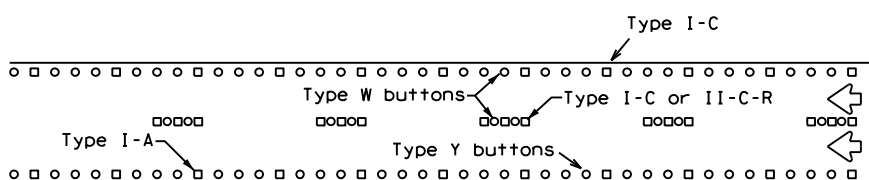
RAISED PAVEMENT MARKERS - PATTERN B

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



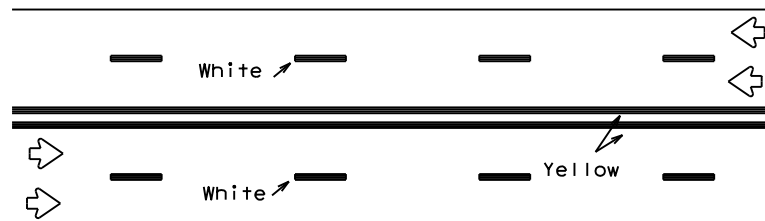
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



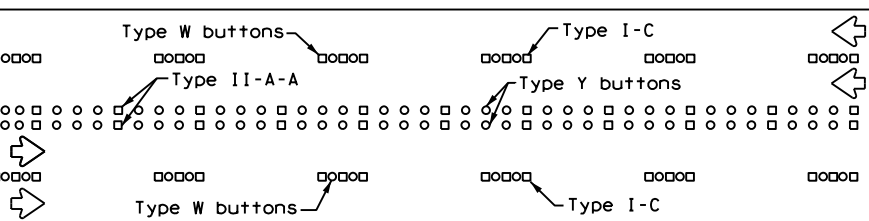
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



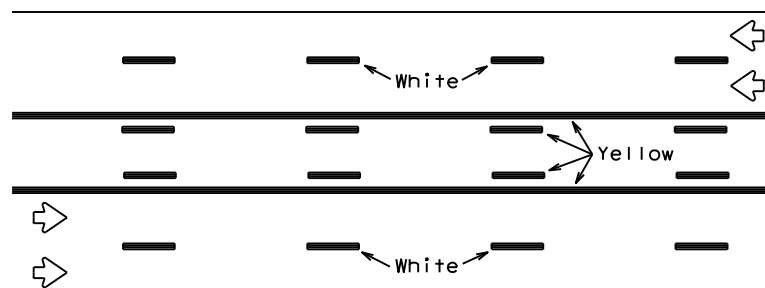
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



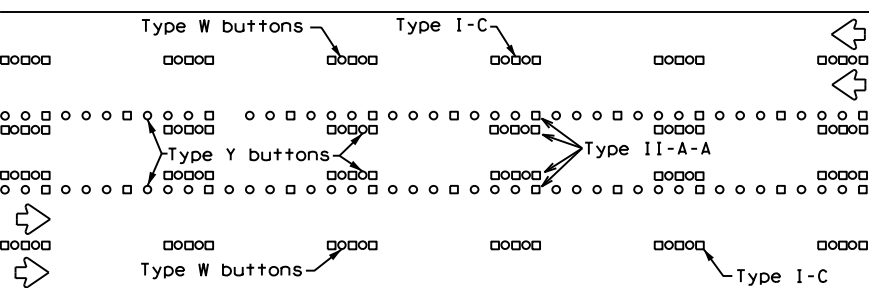
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

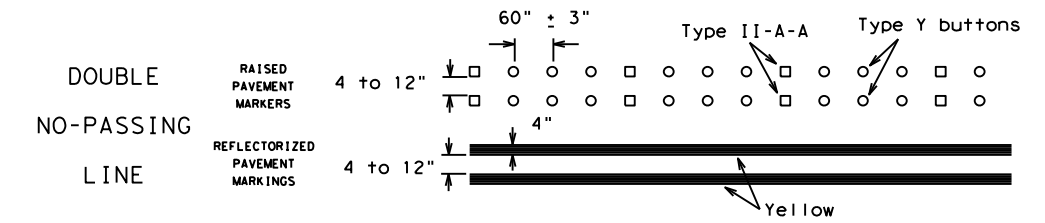
Prefabricated markings may be substituted for reflectORIZED pavement markings.



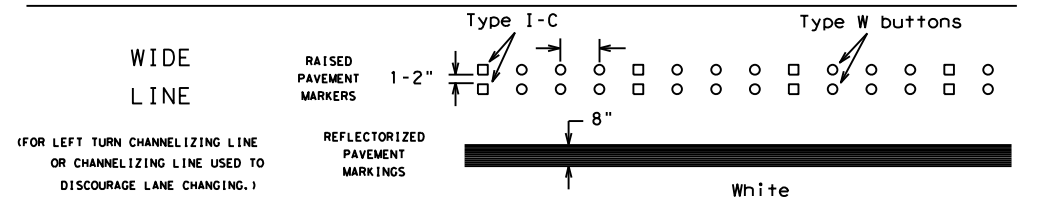
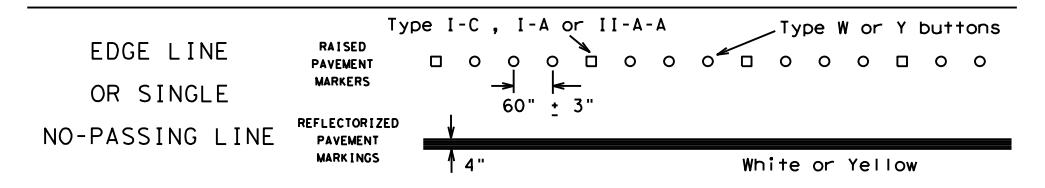
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

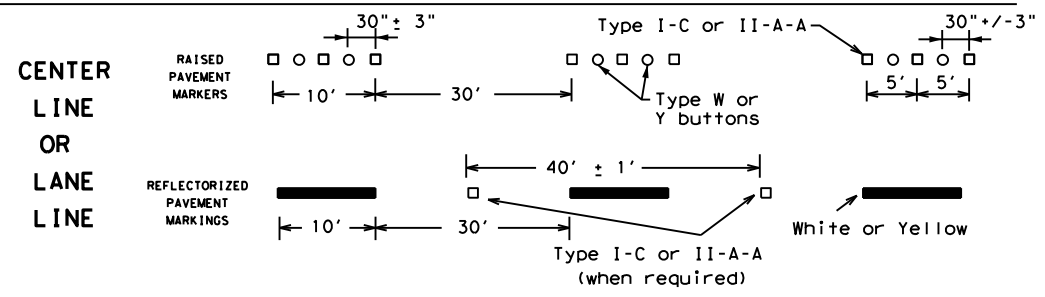
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



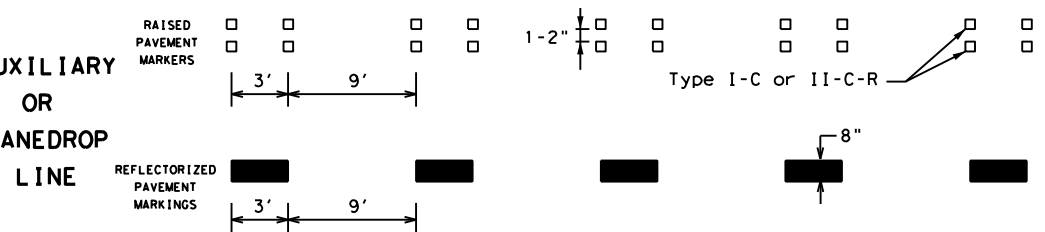
SOLID LINES



BROKEN LINES

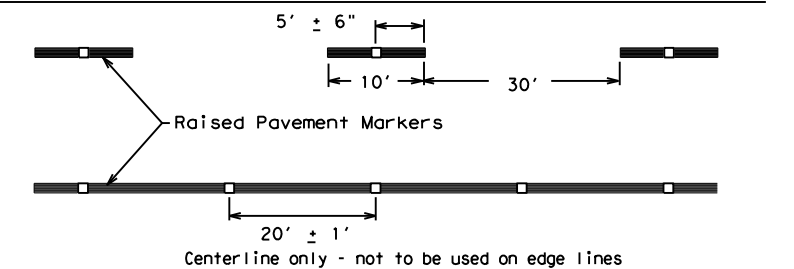


AUXILIARY OR LANEDROP LINE



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.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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."

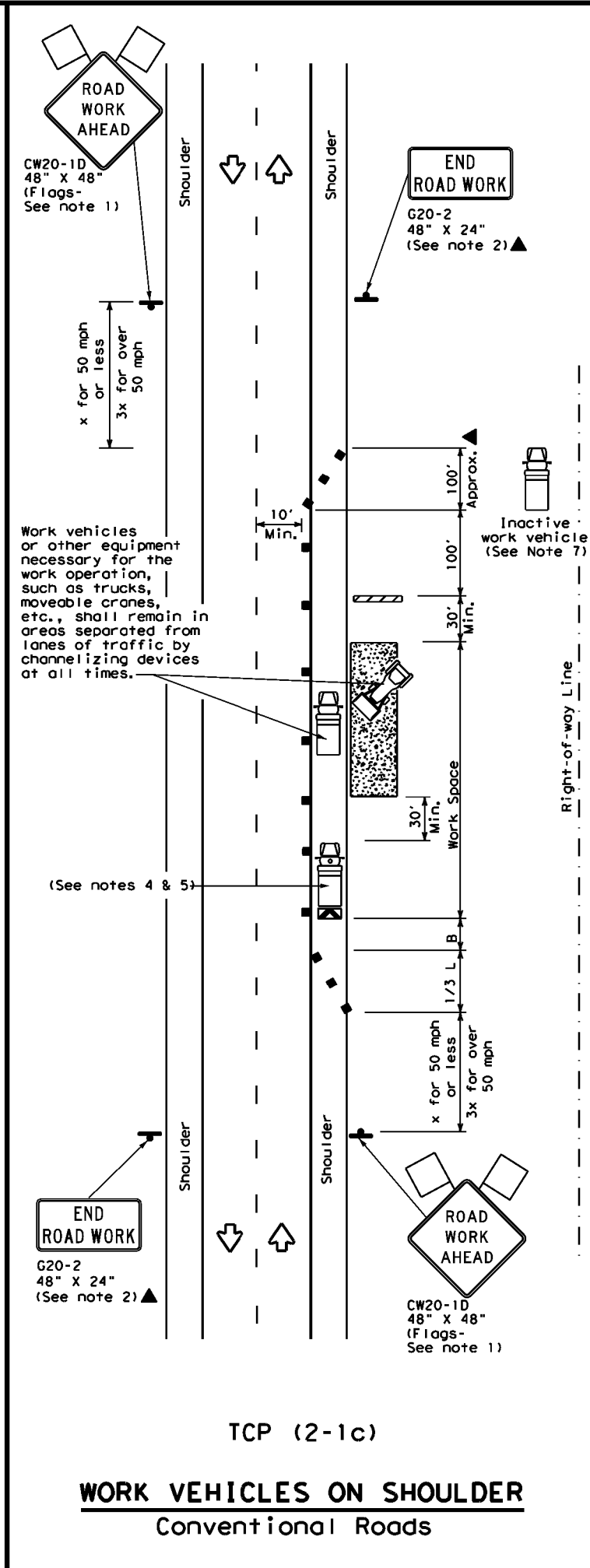
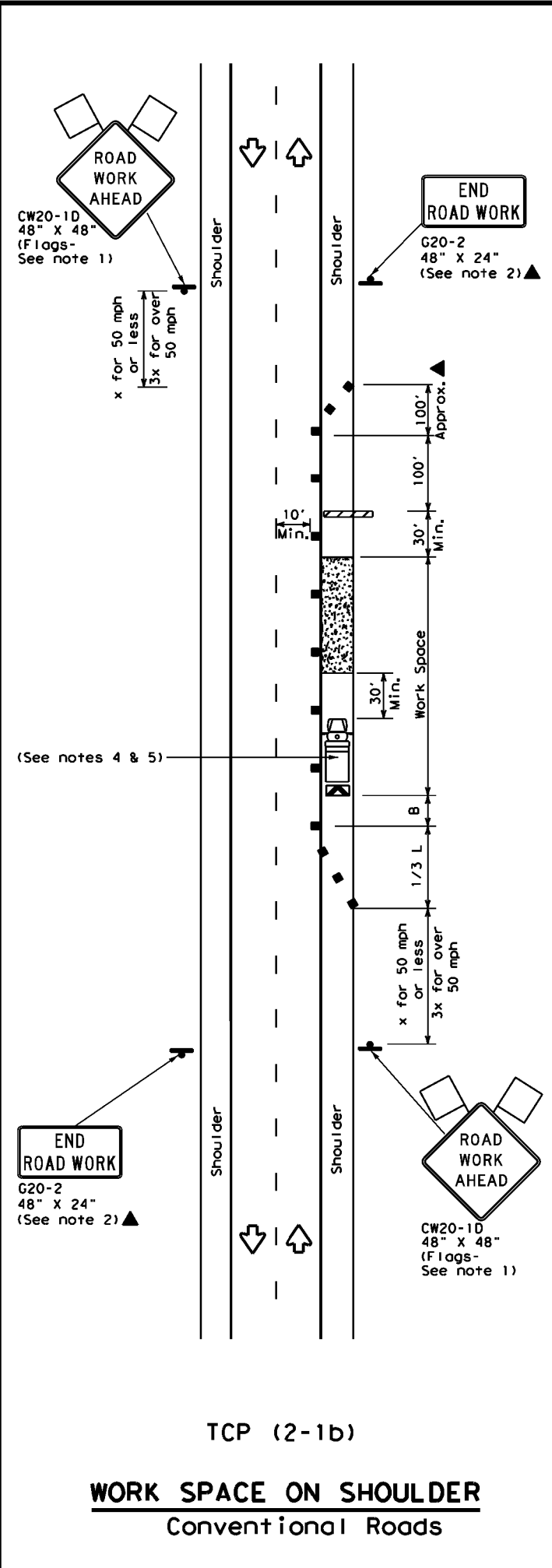
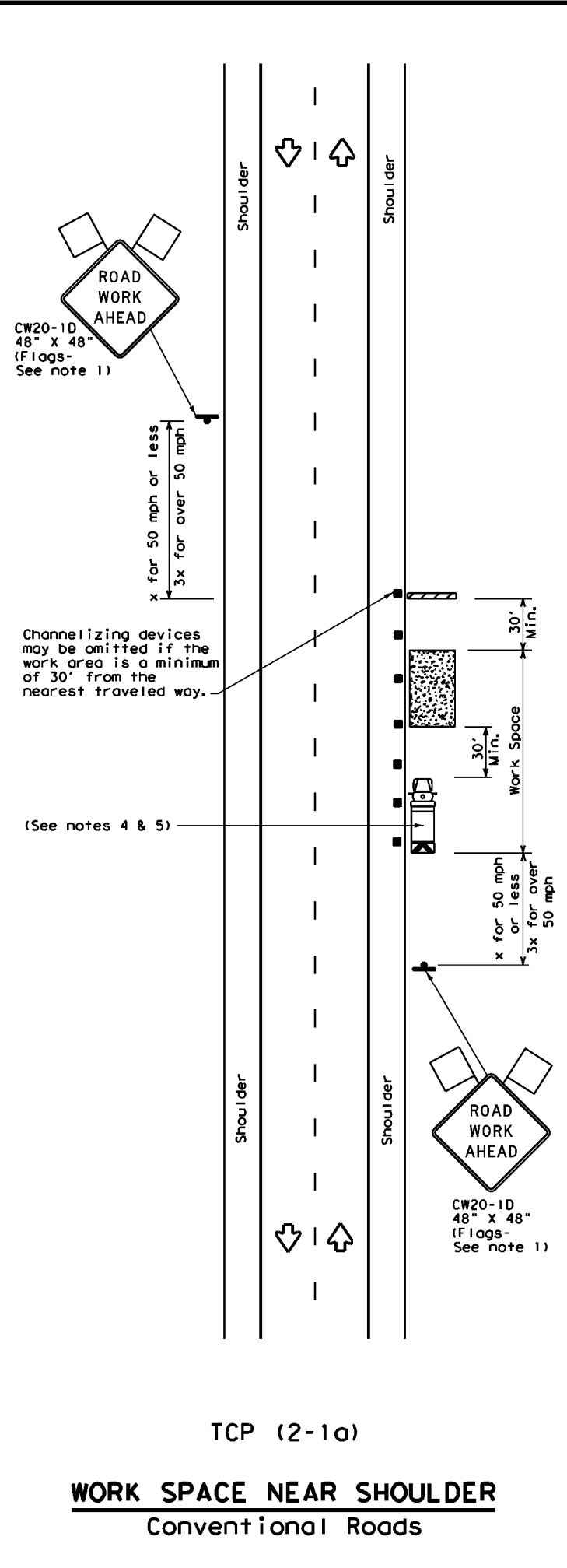
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0817	01	027	FM 428
1-97 9-07 5-21				
2-98 7-13	DIST	COUNTY	SHEET NO.	
11-02 8-14	18	DENTON	018	

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DATE: FILE:

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DATE:
FILE:



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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
 - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
 - 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.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN				
CONVENTIONAL ROAD				
SHOULDER WORK				
TCP (2-1) - 18				
FILE:	tcp2-1-18.dgn	DN:	CKI	DN:
© TxDOT	December 1985	CONT	SECT	JOB
REVISIONS		0817	01	027
2-94	4-98	DIST	COUNTY	SHEET NO.
8-95	2-12	18	DENTON	019
1-97	2-18			

Notes To Designer:

1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

Filed Out: xx/xx/xxxx
Prepared by: Name/Section

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I. STORMWATER POLLUTION PREVENTION PLAN-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 adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.

(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

Action Number:

- 1.
- 2.

No Action Required Required Action

Action Number:

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. No equipment is allowed in any stream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

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# 3(a)

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.

Action Number:

- 1.
- 2.

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 for applicable 401 General Conditions:
(Note: If CORP Permit not required, do not check boxes.)

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

III. CULTURAL RESOURCES

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

No Action Required Required Action

Action Number:

- 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 Number:

- 1.
- 2.

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

No Action Required Required Action

Action Number:

- 1.
- 2.

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

Special Note: The Migratory Bird Act of 1918 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 issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

BMP: Best Management Practice	SPOC: 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 Corp 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 Safety Data Sheets (SDS) 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 SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, 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, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation(s) or replacement(s) (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 Number:

- 1.
- 2.

VII. OTHER ENVIRONMENTAL ISSUES

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

No Action Required Required Action


Action Number:

- 1.
- 2.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation Dallas District			
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC) Sheet			
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 428
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Denton	
CONTROL	SECTION	JOB	SHEET NO.
0817	01	027	020

A. GENERAL SITE DATA

1. PROJECT LIMITS: FM 428 AT SOUTH MAIN STREET IN AUBREY

Begin Project Coordinates : PLUM STREET
End Project Coordinates : NORTH OF SHERMAN DRIVE (X =33.30451761 Y =-96.98624519)

2. PROJECT SITE MAPS:

- * Project Location Map: The Title Sheet
- * Drainage Patterns: SW3P Site Map (Sheet 022)
- * Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: None
- * Location of Erosion and Sediment Controls: SW3P Site Map (Sheet 022)
- * Surface Waters and Discharge Locations: None
- * Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (If PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference Item #10 below).

3. PROJECT DESCRIPTION:

PLANTING, IRRIGATION, PEDESTRIAN LIGHTING AND ENHANCEMENTS

4. MAJOR SOIL DISTURBING ACTIVITIES:

PAVEMENT ENHANCEMENTS, NEW PEDESTRIAN LIGHTING, PLANTING, AND IRRIGATION.

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

Gently sloping. Sandy clay soils. 100% coverage with maintained turf grass..

6. TOTAL PROJECT AREA: 3 Acres

7. TOTAL AREA TO BE DISTURBED: 0.34 Acres (11 %)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: 0.90
AFTER CONSTRUCTION: 0.90

9. NAME OF RECEIVING WATERS:

DRAINAGE TO AUBREY CREEK, WHICH FLOWS TO LEWISVILLE LAKE (SEGMENT 0823; NO WATER QUALITY IMPAIRMENTS)*

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, TxDOT will maintain a SW3P Binder at the project field office (If there is not a project field office, should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TCEQ Small Construction Site Notice, Contractor Certification of Compliance, SW3P Inspector Qualification Statements, Inspection and Maintenance Reports (Form 2118), EPIC Sheet, SW3P Sheet, Site Location Maps, Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, TxDOT will follow the actions listed in (10.A.) above with the addition of the following: Notice Of Intent (N.O.I.) and Fee Payment Form, TCEQ Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.

C. For projects disturbing less than one acre, actions described in (10.A.) and (10.B.) above are not required. Acreage is calculated by adding Total Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- TEMPORARY SEEDING
- MULCHING (Hay or Straw)
- BUFFER ZONES
- PLANTING
- SEEDING
- SODDING
- PRESERVATION OF NATURAL RESOURCES
- FLEXIBLE CHANNEL LINER
- RIGID CHANNEL LINER
- SOIL RETENTION BLANKET
- COMPOST MANUFACTURED TOPSOIL
- VERTICAL TRACKING
- OTHER:

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

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

NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.

3. STORM WATER MANAGEMENT:

A. Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

*See construction progress schedule for schedule and durations of relevant soil disturbance and stabilization activities.

1. Avoid storing portable sanitary units, concrete washouts or chemicals within 50 feet upgradient of a receiving water or drainage conveyance without adequate pollution controls.

2. Install SW3P control devices (BMPs) to protect stormwater drainage features, downslope perimeters, and active roadways prior to soil disturbance in their vicinity, per Erosion Control Plan as directed or authorized by landscape architect. Do not install the BMPs more than two weeks prior to the activities in their control area.

3. Where work has temporarily ceased in a disturbed area (i.e., will exceed 14 days before next soil disturbance activity or initiation of final stabilization measures), temporarily stabilize soils per TXR150000, with vertical tracking, temporary seeding and/or other soil cover, and velocity and downslope perimeter controls, as appropriate and/or as directed by landscape architect.

4. Stabilize re-vegetate disturbed soils in completed project areas as soon as practicable or as directed by landscape architect.

5. When construction activity is complete, project area is stabilized, and as directed or authorized by landscape architect, remove all temporary SW3P controls.

5. NON-STORM WATER DISCHARGES:

Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days. Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to timeframes described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.

2. INSPECTION:

A TxDOT Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the TxDOT Inspector and the Contractor, will be filed for each inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and Item 1 (Maintenance) above.

3. WASTE MATERIALS:

On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.

4. HAZARDOUS WASTE & SPILL REPORTING:

As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.

5. SANITARY WASTE:

Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.

6. CONSTRUCTION VEHICLE TRACKING:

On a regular basis, or as may be directed, dampen haul roads for dust control and stabilize construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways abutting or traversing the project site.

7. MANAGEMENT PRACTICES:

A. Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.

B. Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.

C. When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.

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

E. Procedures and/or practices should be taken to control dust.

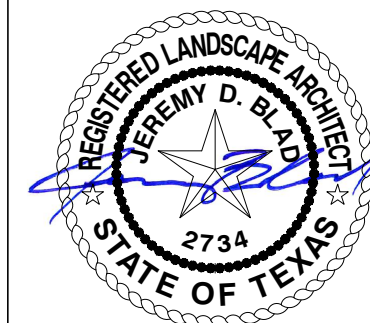
F. Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.

FILE NAME

DATE

DESIGNER

\$DATE\$
\$FILE\$

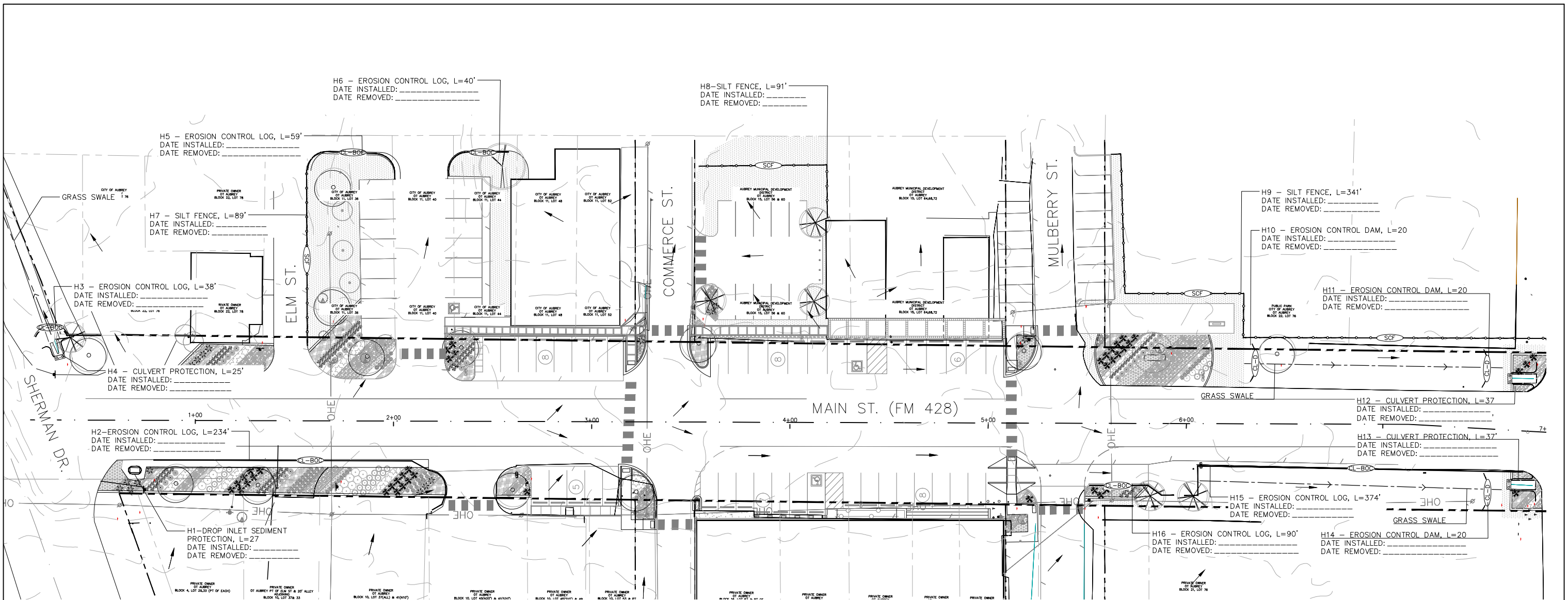


DALLAS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

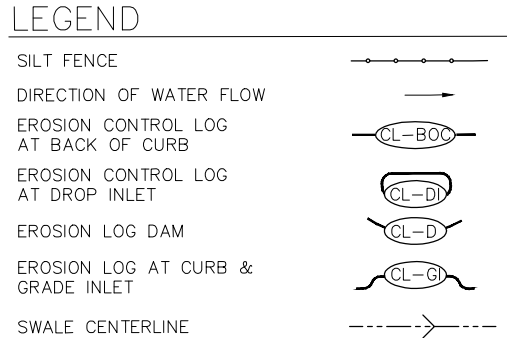
TEMPLATE REVISION DATE: 01/07/2015

DESIGN	FED.RD. DIV.NO.	PROJECT NUMBER		HIGHWAY NO.
JB	6	SEE TITLE SHEET		FM 428
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JB	TEXAS	DALLAS	DENTON	021
CHECK	AC	CONTROL	SECTION	
AC	0817	01	027	



BMP	DATE INSTALLED	DATE REMOVED	DATE DISTURBED	DATE STABILIZED
H1				
H2				
H3				
H4				
H5				
H6				
H7				
H8				
H9				
H10				
H11				
H12				
H13				
H14				
H15				
H16				

NOTE:
 ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION. IF THERE IS A CONFLICT, CONSULT WITH LANDSCAPE ARCHITECT/ENGINEER TO ADJUST THE PLANT OR IRRIGATION LOCATION

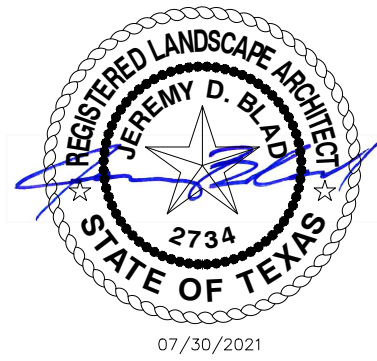
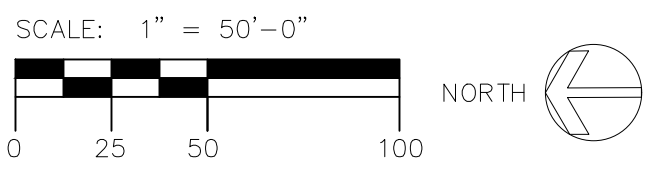


ESTIMATE OF EROSION CONTROL QUANTITIES

ITEM NO.	DESC.	DESCRIPTION	UNIT	TOTAL
506	6038	TEMP SEDIMENT CONT FENCE (SCF)(INSTALL)	LF	521
506	6039	TEMP SEDIMENT CONT FENCE (SCF)(REMOVE)	LF	521
506	6040	EROSION CONTROL LOGS (8")(INSTALL)	LF	1021
506	6041	EROSION CONTROL LOGS (8")(REMOVE)	LF	1021

NOTE:

- BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL-DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
- SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES
- MAINTAIN ACTIVE ROADWAYS, SIDEWALKS, AND ADJACENT PROPERTIES FREE OF PROJECT SEDIMENT, LOOSE MATERIALS, AND DEBRIS.



LANDSCAPE ARCHITECTS
 212 S. ELM ST. #120
 DENTON, TX 76201
 PH: (214) 597-1415
 WWW.VQ-DESIGN.COM

Texas Department of Transportation
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GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 SW3P SITE MAP

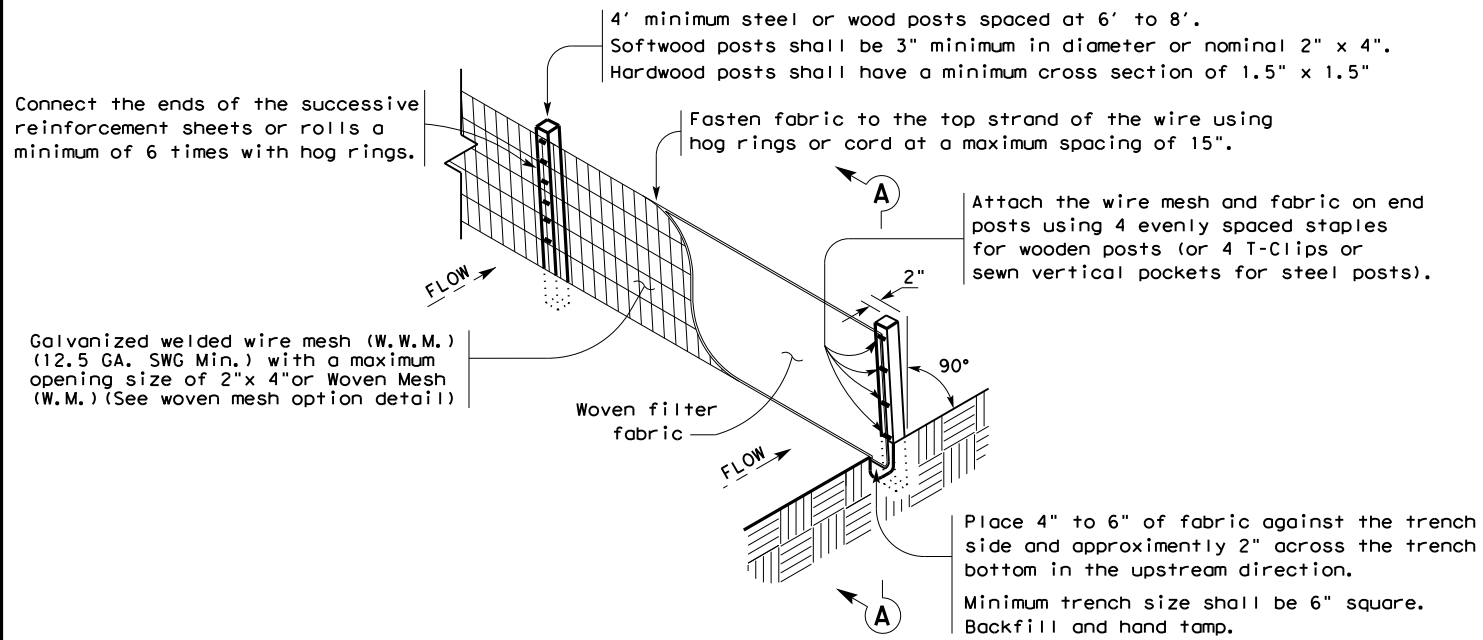
SCALE: 1" = 50'-0" Sheet 1 of 1

DESIGN	FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NO.
JBLAD	6	0817-01-027		FM 428
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JBLAD	TEXAS	DALLAS	DENTON	
CHECK	CONTROL	SECTION	JOB	
ACOUSINS	0817	01	027	022

TEMPLATED REVISED: 10-23-02

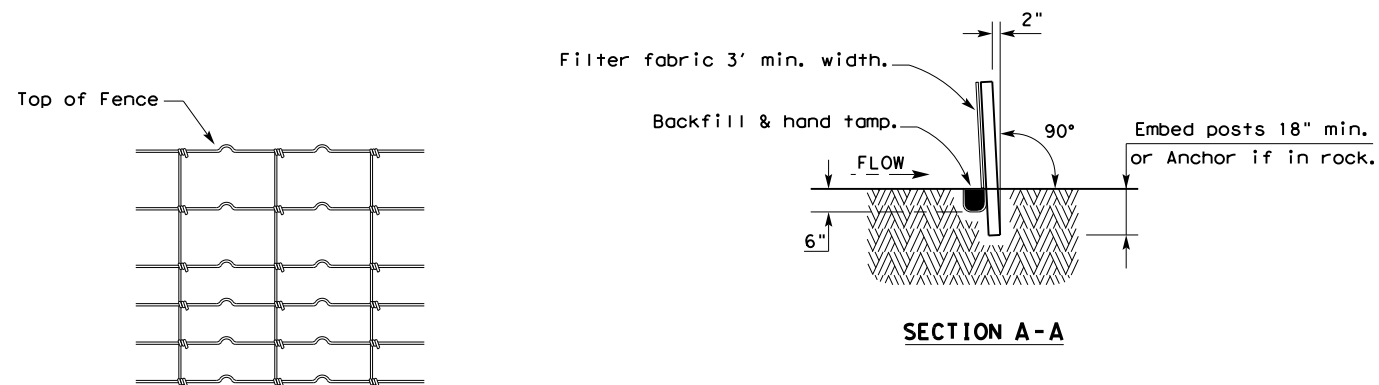
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DATE
FILE



TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

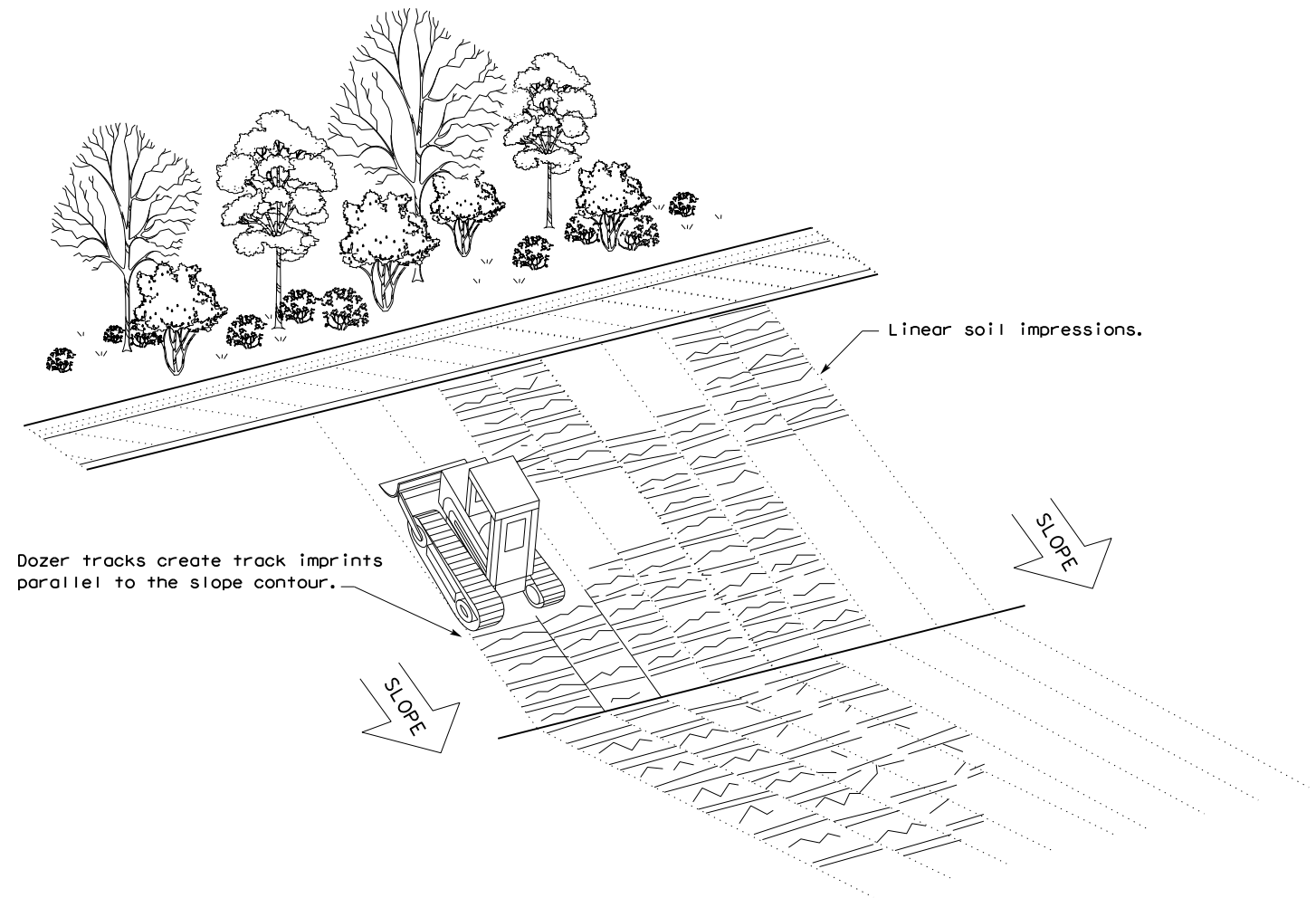
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

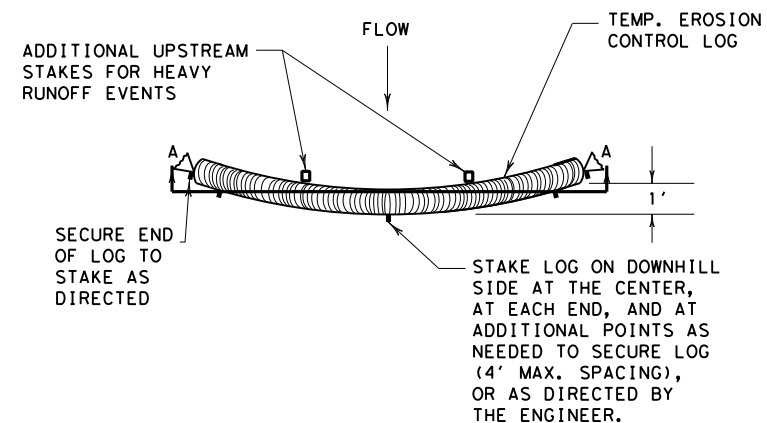
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum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



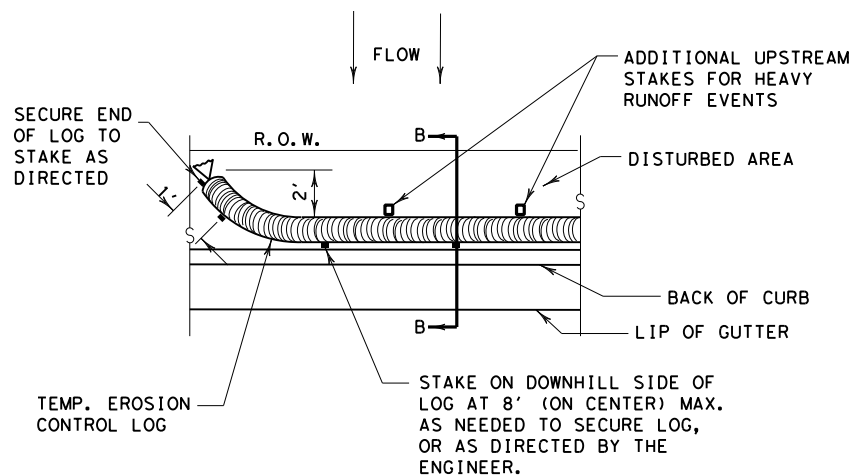
VERTICAL TRACKING

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1)-16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0817	01	027	FM 428	
	DIST	COUNTY		SHEET NO.	
	18	DENTON		023	

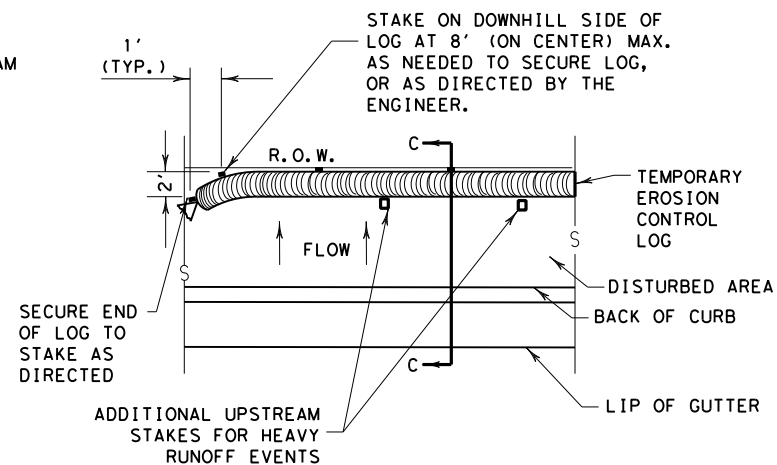
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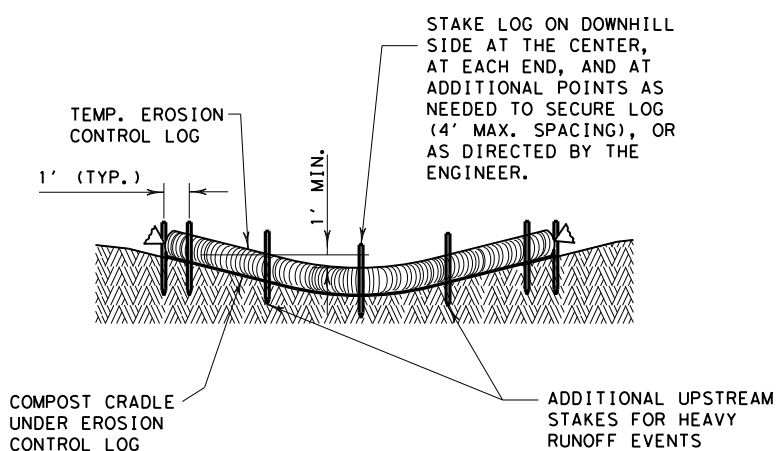
PLAN VIEW



PLAN VIEW



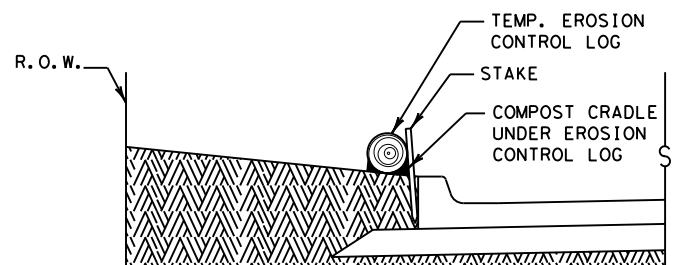
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

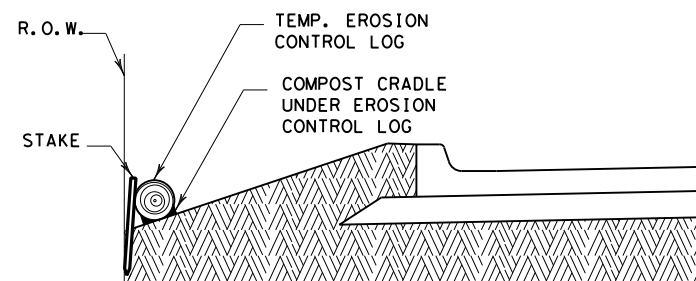
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

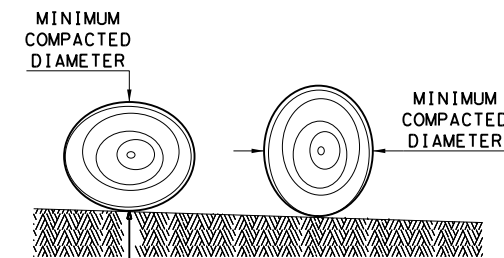
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

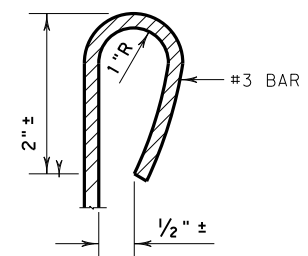
CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

LEGEND

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



REBAR STAKE DETAIL

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

GENERAL NOTES:

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

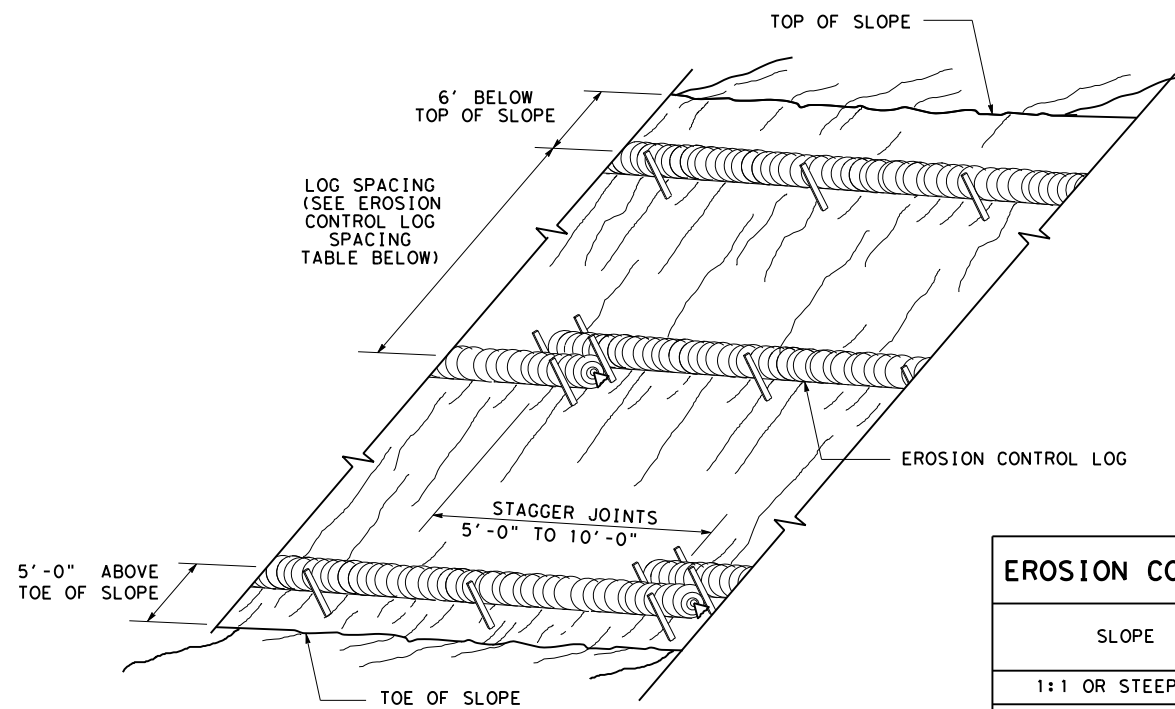
SHEET 1 OF 3

		<i>Design Division Standard</i>		
<p>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</p> <p>EROSION CONTROL LOG</p> <p>EC (9) - 16</p>				
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0817	01	027	FM 428
	DIST	COUNTY	SHEET NO.	
	18	DENTON	024	

DATE: FILE:

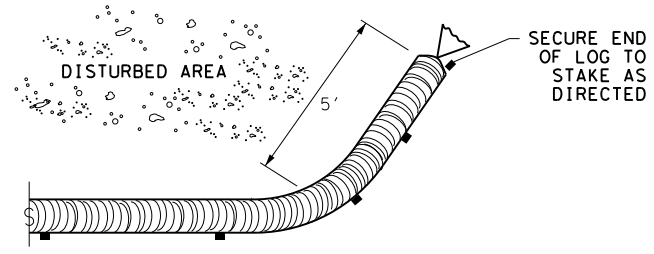
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FILE:



**EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING**

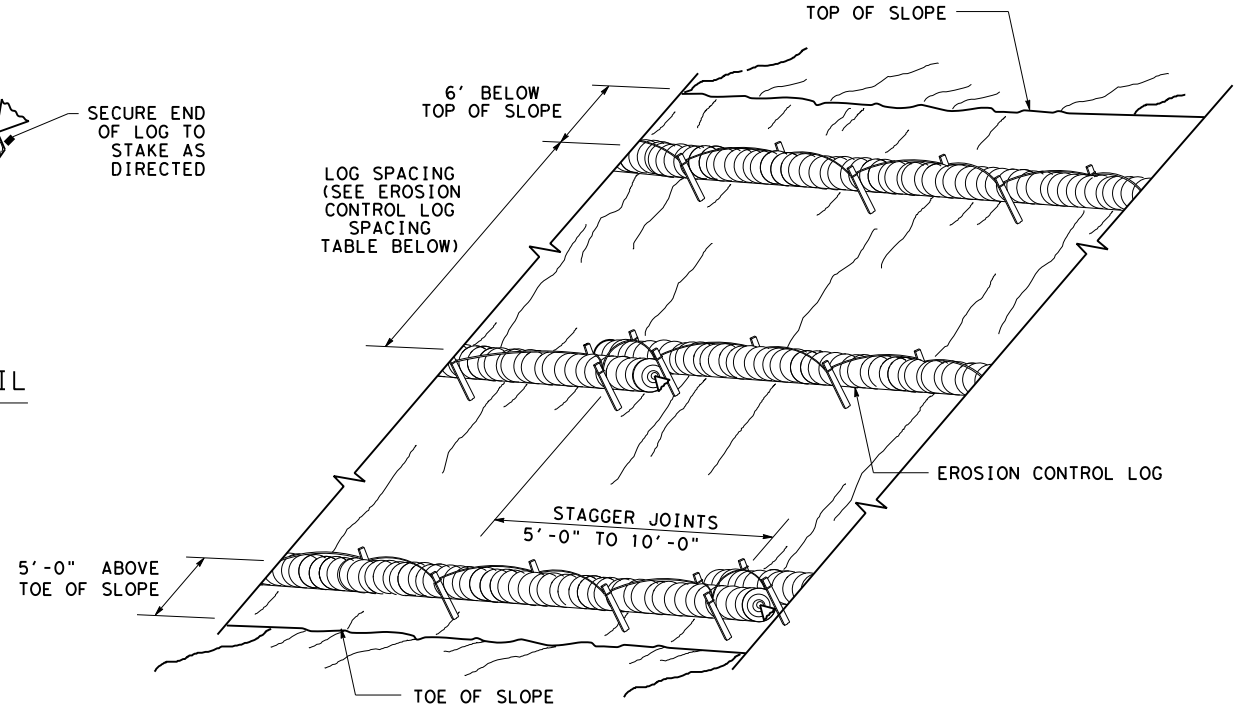
CL-SST



END SECTION RAP DETAIL

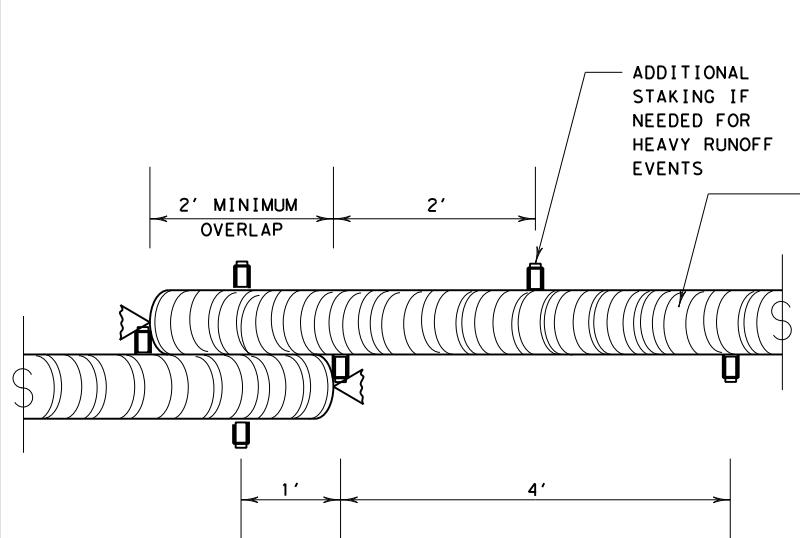
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

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



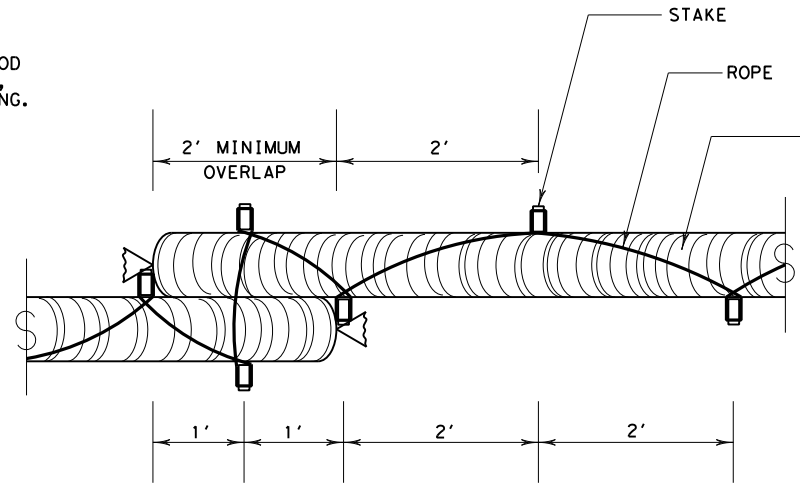
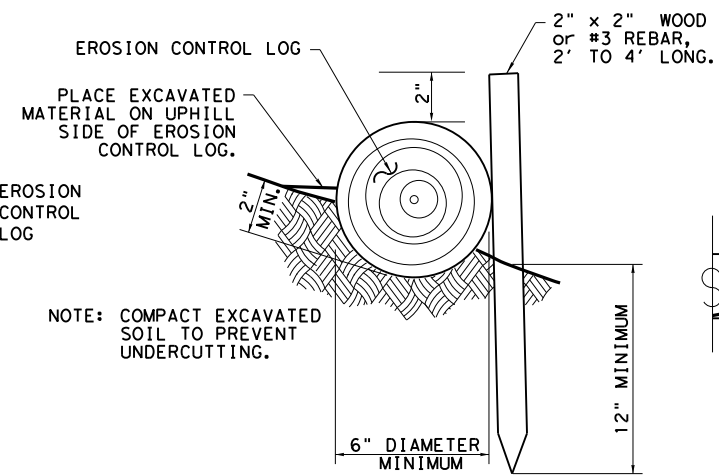
**EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING**

CL-SSL



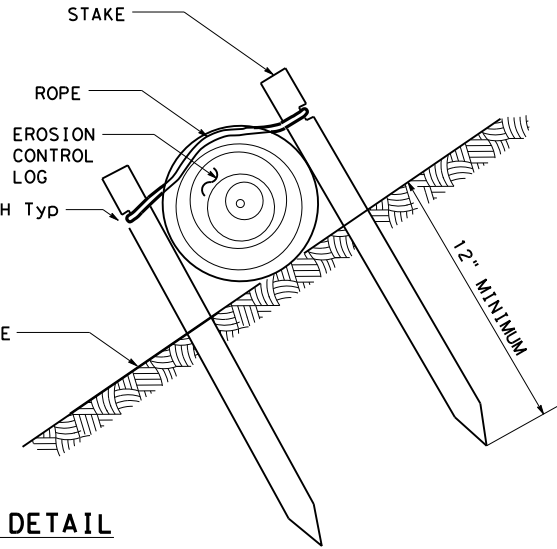
STAKE AND TRENCHING ANCHORING DETAIL

CL-SST



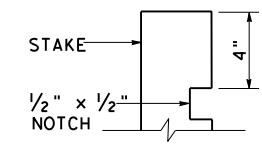
STAKE AND LASHING ANCHORING DETAIL

CL-SSL



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

TRENCH DEPTH TABLE

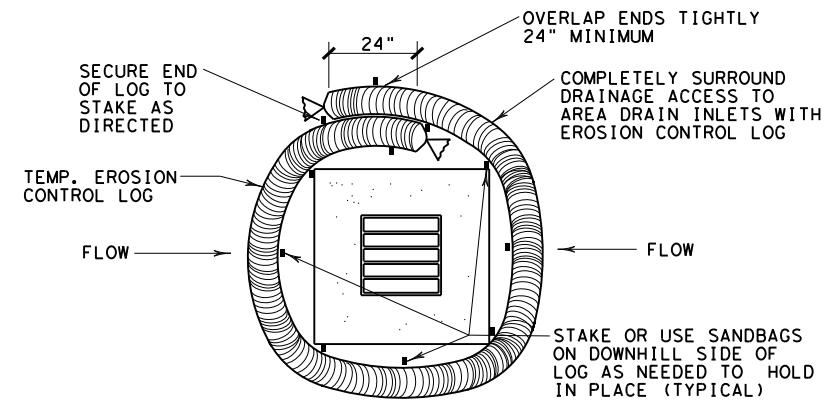


STAKE NOTCH DETAIL

SHEET 2 OF 3

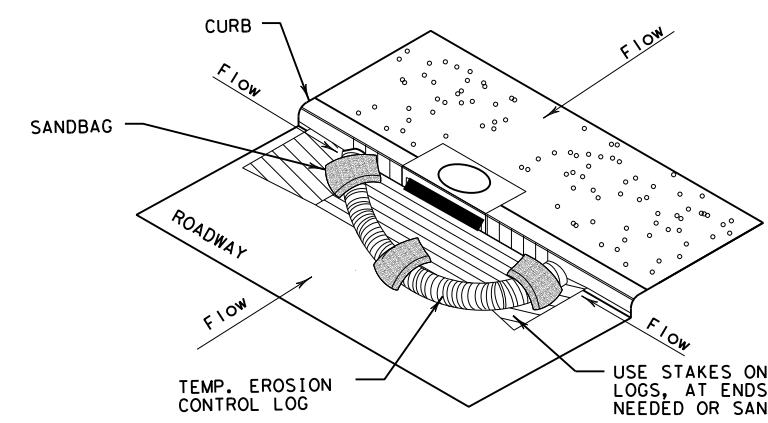
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0817	01	027
	DIST	COUNTY	SHEET NO.
	18	DENTON	025

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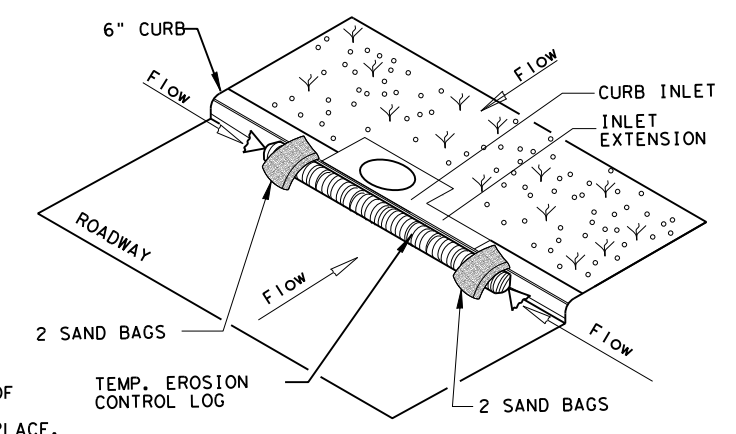
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

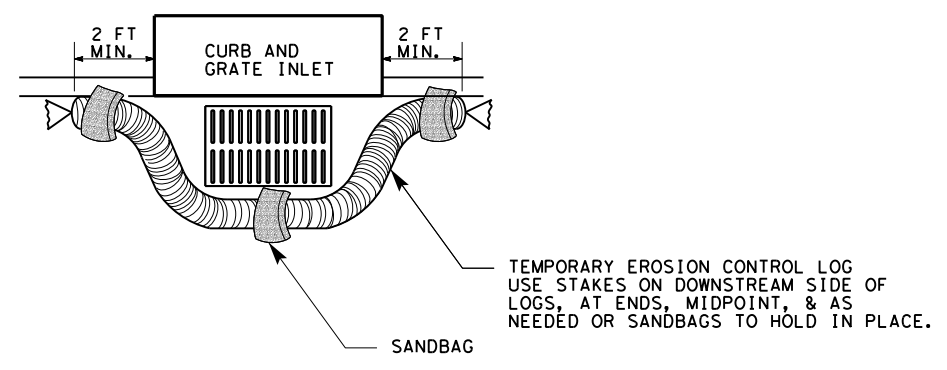
CL-CI



EROSION CONTROL LOG AT CURB INLET

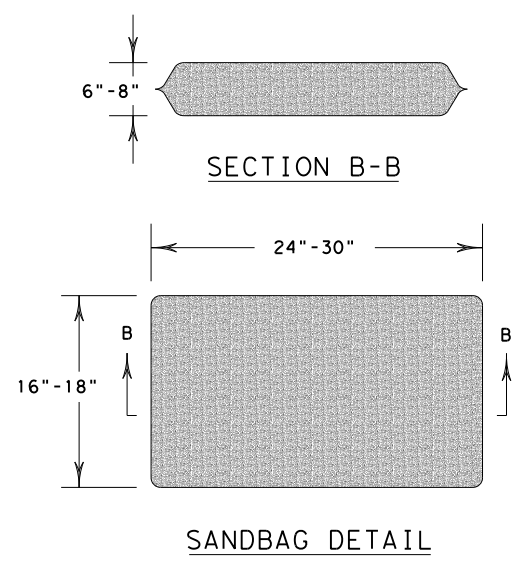
CL-CI

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



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

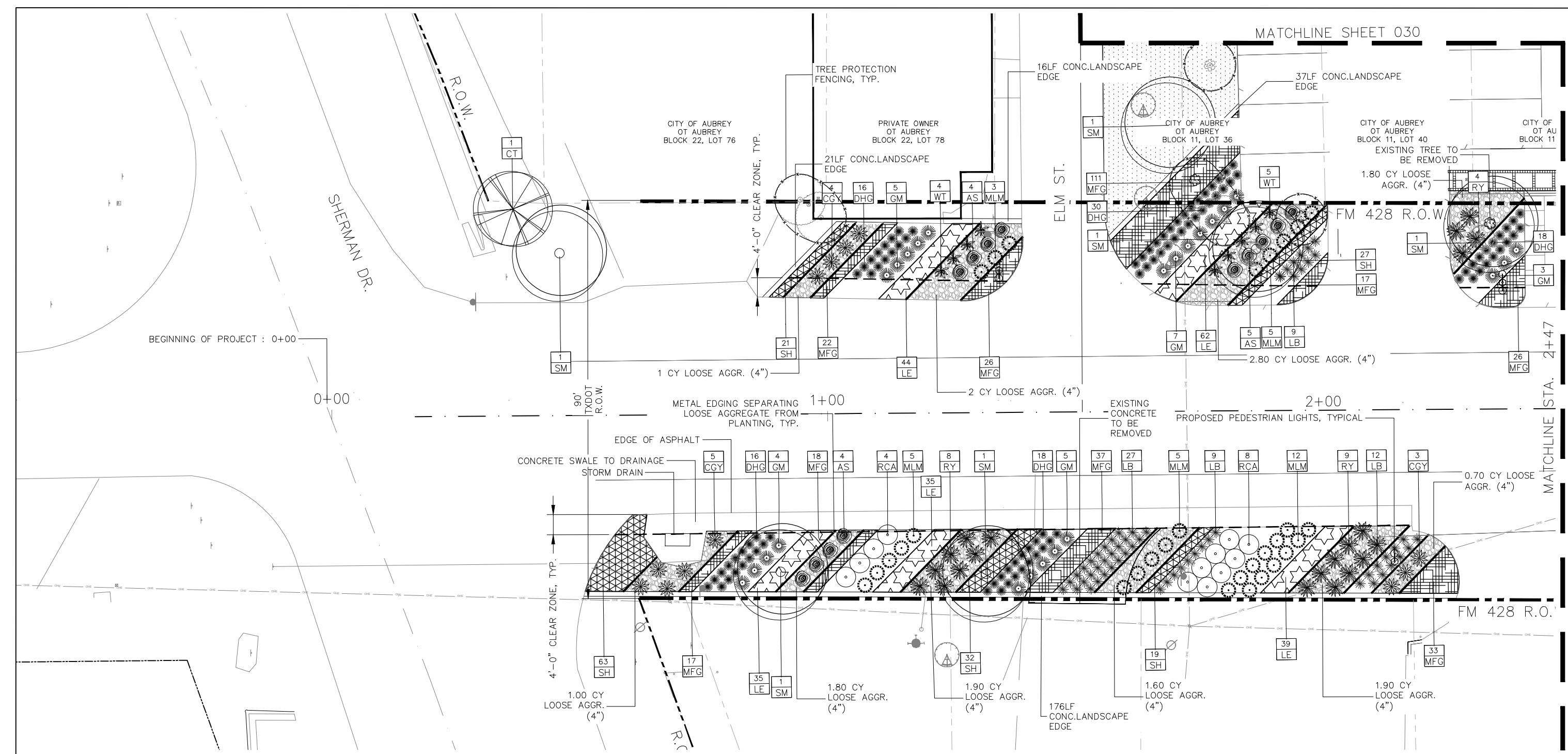


SHEET 3 OF 3

		<i>Design Division Standard</i>	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
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REVISIONS	0817	01	027
	DIST	COUNTY	SHEET NO.
	18	DENTON	026

DATE:
FILE:

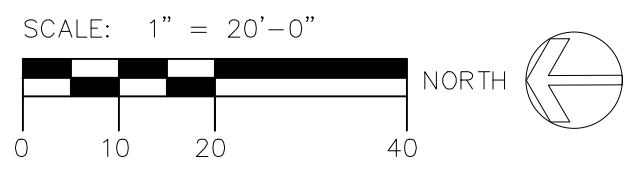
USER ID



NOTES

1) MAINTAIN 4' WIDE CLEAR ZONE BETWEEN FIRST ROW OF PLANTING AND THE PAVEMENT EDGE. PLACE MULCH IN CLEAR ZONE AREAS.

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION. IF THERE IS A CONFLICT, CONSULT WITH LANDSCAPE ARCHITECT/ENGINEER TO ADJUST THE PLANT OR IRRIGATION LOCATION



PLANT LEGEND

QUANTITY	SYMBOL	COMMON NAME	QUANTITY	SYMBOL	COMMON NAME
0	RO	TEXAS RED OAK	162	SH	SNAKE HERB
6	SM	SHANTUNG MAPLE	215	LE	LAMB'S EAR
1	CT	CHASTE TREE	307	MFG	MEXICAN FEATHER GRASS
12	CGY	COLOR GUARD YUCCA	702	SF	BERMUDA TURF SOD REPAIR
21	RY	RED YUCCA	16.5	CY	4" LOOSE AGGREGATE
9	WT	WHALE TALE AGAVE	-	-	TREE PROTECTION FENCE
57	LB	LITTLE BLUESTEM	-	-	METAL LANDSCAPE EDGING
98	DHG	DWARF HAMELN GRASS	-	-	PEDESTRIAN LIGHT
24	GM	GULF MUHLY	-	-	RIGHT OF WAY
30	MLM	MORNING LIGHT MISCANTHUS			
13	AS	AUTUMN SAGE			
12	RCA	ROSE CREEK ABELIA			

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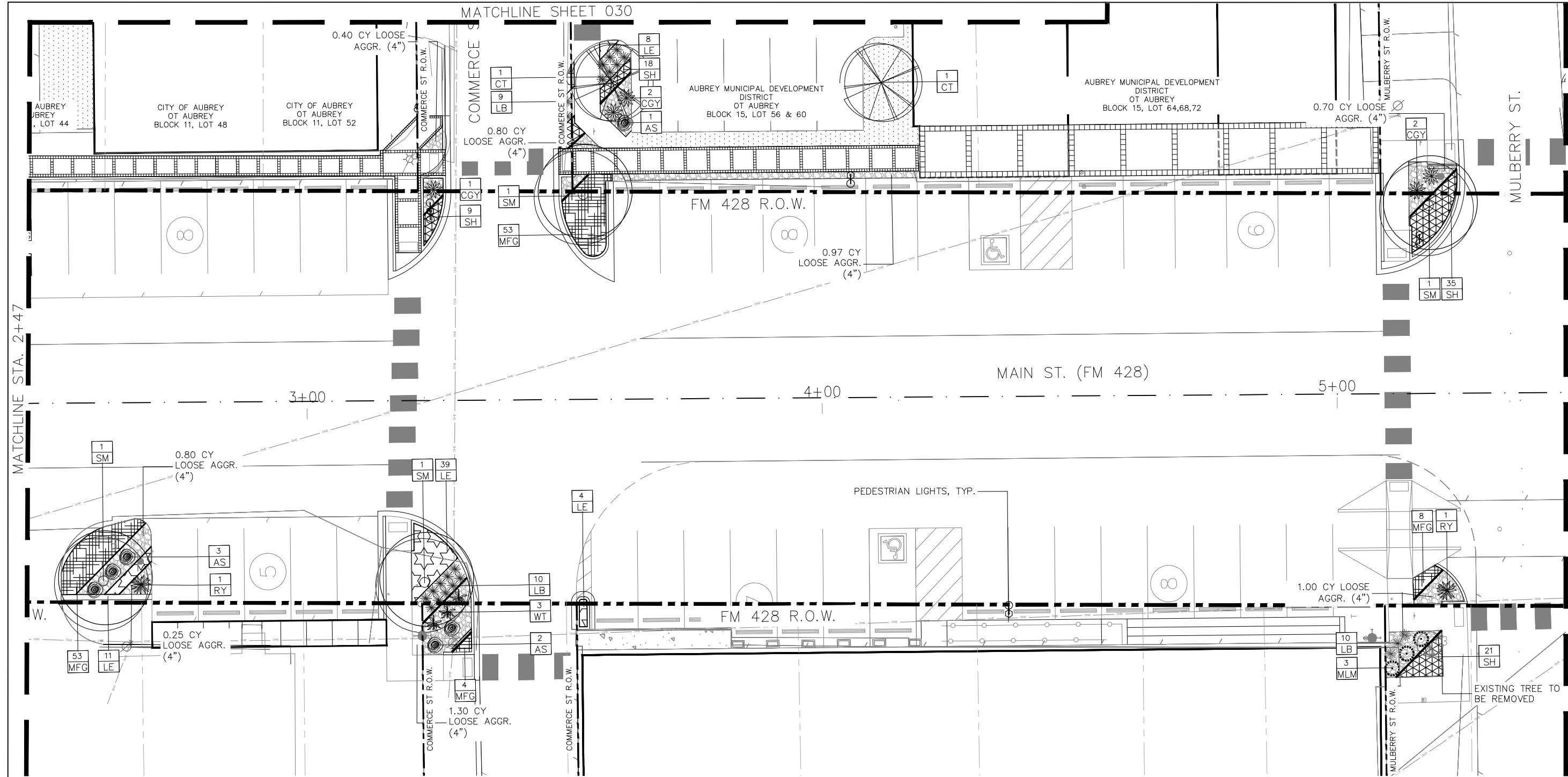
GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
PLANTING PLAN

SCALE: 1" = 20'-0" Sheet 1 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 027
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	
CHECK ACOUSINS				

TEMPLATED REVISED: 10-23-02

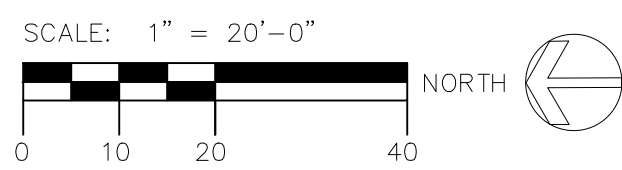
DATE



NOTES

1) MAINTAIN 4' WIDE CLEAR ZONE BETWEEN FIRST ROW OF PLANTING AND THE PAVEMENT EDGE. PLACE MULCH IN CLEAR ZONE AREAS.

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PLANT LEGEND

QUANTITY	SYMBOL	COMMON NAME	QUANTITY	SYMBOL	COMMON NAME
0	RO	TEXAS RED OAK	83	SH	SNAKE HERB
4	SM	SHANTUNG MAPLE	50	LE	LAMB'S EAR
2	CT	CHASTE TREE	114	MFG	MEXICAN FEATHER GRASS
5	CGY	COLOR GUARD YUCCA	215 SF	-	BERMUDA TURF SOD REPAIR
2	RY	RED YUCCA	4.25 CY	-	4" LOOSE AGGREGATE
3	WT	WHALE TALE AGAVE	-	-	TREE PROTECTION FENCE
13	LB	LITTLE BLUESTEM	-	-	METAL LANDSCAPE EDGING
0	DHG	DWARF HAMELN GRASS	-	-	PEDESTRIAN LIGHT
0	GM	GULF MUHLY	-	-	RIGHT OF WAY
3	MLM	MORNING LIGHT MISCANTHUS			
6	AS	AUTUMN SAGE			
0	RCA	ROSE CREEK ABELIA			

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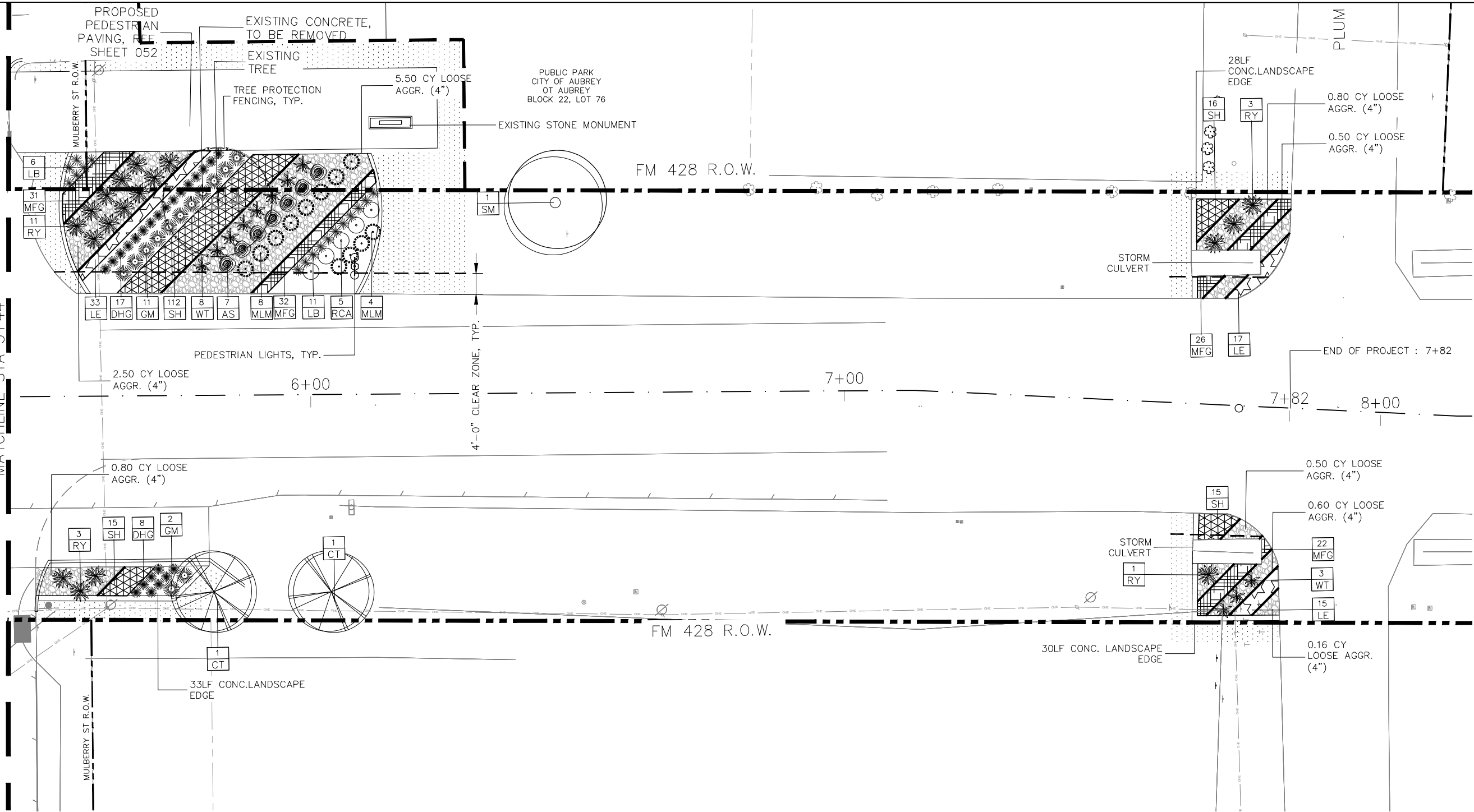
GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
PLANTING PLAN

SCALE: 1" = 20'-0" Sheet 2 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 028
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	
CHECK ACOUSINS				

USER ID

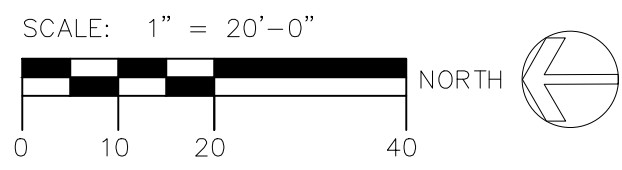
MATCHLINE STA 5+44



NOTES

1) MAINTAIN 4' WIDE CLEAR ZONE BETWEEN FIRST ROW OF PLANTING AND THE PAVEMENT EDGE. PLACE MULCH IN CLEAR ZONE AREAS.

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PLANT LEGEND

QUANTITY	SYMBOL	COMMON NAME	QUANTITY	SYMBOL	COMMON NAME
0	RO	EXISTING TREE TO REMAIN AND PROTECT TEXAS RED OAK	158	SH	SNAKE HERB
1	SM	SHANTUNG MAPLE	65	LE	LAMB'S EAR
2	CT	CHASTE TREE	111	MFG	MEXICAN FEATHER GRASS
0	CGY	COLOR GUARD YUCCA	924 SF	-	BERMUDA TURF SOD REPAIR
18	RY	RED YUCCA	11.36 CY	-	4" LOOSE AGGREGATE
11	WT	WHALE TALE AGAVE	-	-	TREE PROTECTION FENCE
17	LB	LITTLE BLUESTEM	-	-	METAL LANDSCAPE EDGING
25	DHG	DWARF HAMELN GRASS	-	-	PEDESTRIAN LIGHT
13	GM	GULF MUHLY	-	-	RIGHT OF WAY
4	MLM	MORNING LIGHT MISCANTHUS			
7	AS	AUTUMN SAGE			
5	RCA	ROSE CREEK ABELIA			



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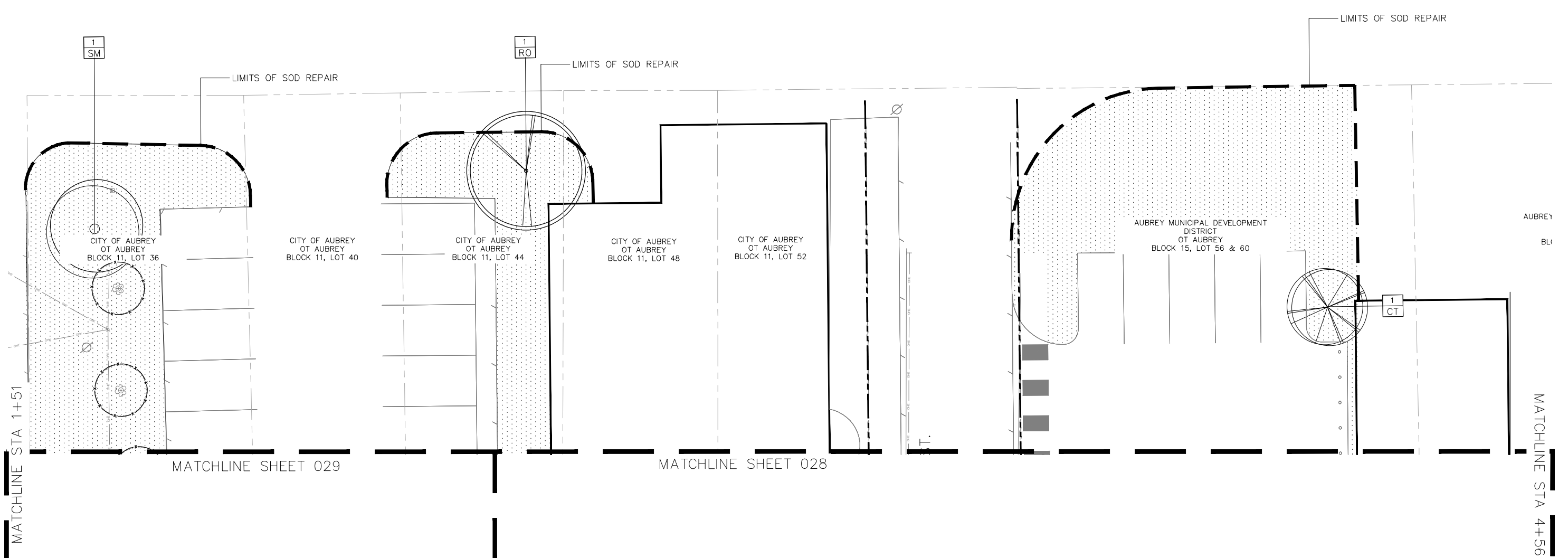
GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
PLANTING PLAN

SCALE: 1" = 20'-0" Sheet 3 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 029
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	

TEMPLATED REVISED: 10-23-02

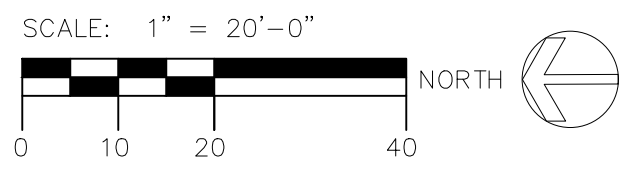
DATE



NOTES

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NOTE:
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PLANT LEGEND

QUANTITY	SYMBOL	COMMON NAME	QUANTITY	SYMBOL	COMMON NAME
1	RO	TEXAS RED OAK	0	SH	SNAKE HERB
1	SM	SHANTUNG MAPLE	0	LE	LAMB'S EAR
1	CT	CHASTE TREE	0	MFG	MEXICAN FEATHER GRASS
0	CGY	COLOR GUARD YUCCA	3,594 SF	-	BERMUDA TURF SOD REPAIR
0	RY	RED YUCCA	0 SY	-	4" LOOSE AGGREGATE
0	WT	WHALE TALE AGAVE	-	-	TREE PROTECTION FENCE
0	LB	LITTLE BLUESTEM	-	-	METAL LANDSCAPE EDGING
0	DHG	DWARF HAMELN GRASS	-	-	PEDESTRIAN LIGHT
0	GM	GULF MUHLY	-	-	RIGHT OF WAY
0	MLM	MORNING LIGHT MISCANTHUS			
0	AS	AUTUMN SAGE			
0	RCA	ROSE CREEK ABELIA			



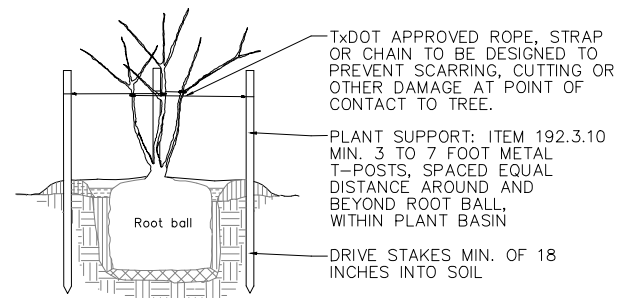
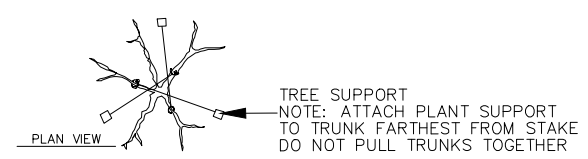
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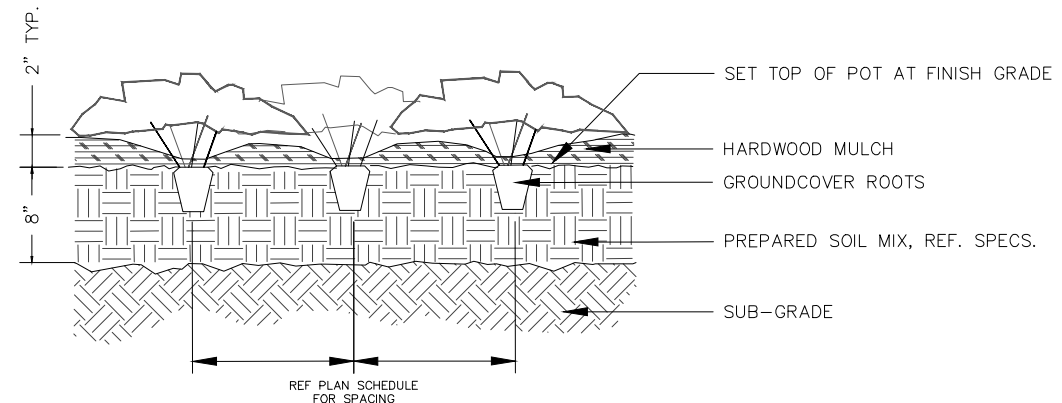
SCALE: 1" = 20'-0" Sheet 4 of 4

DESIGN	FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NO.
JBLAD	6	0817-01-027		FM 428
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MDAVS	TEXAS	DALLAS	DENTON	030
CHECK	CONTROL	SECTION	JOB	
JBLAD	0817	01	027	
CHECK				
ACOUSINS				



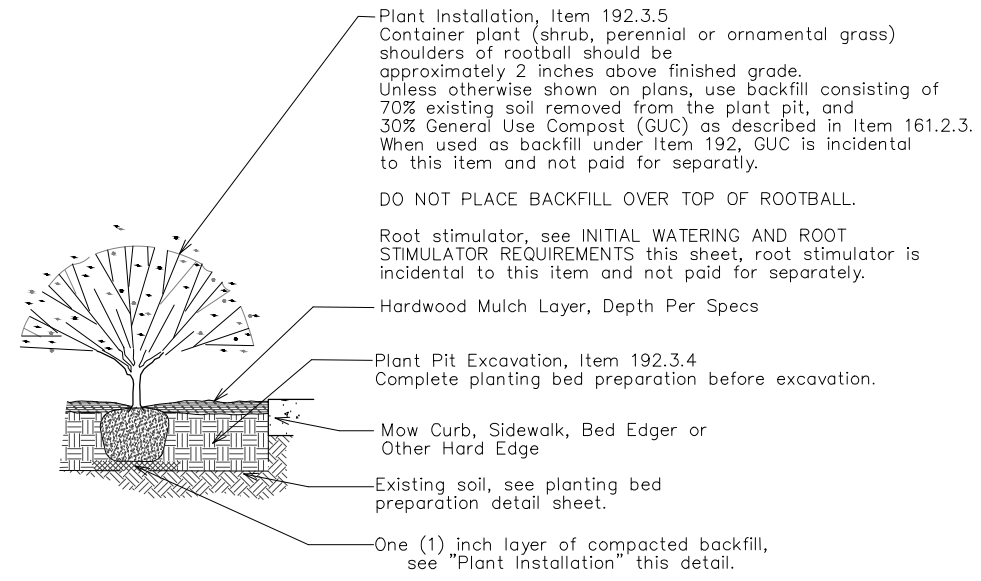
MULTI-STEM TREE PLANTING DETAIL

SCALE: 1/4" = 1'-0"



GROUNDCOVER PLANTING DETAIL

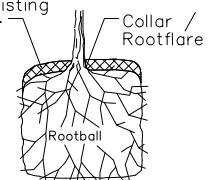
SCALE: 1" = 1'-0"



CONTAINER PLANTS (SHRUBS, DECORATIVE GRASSES, ETC.) DETAIL

SCALE: 1/2" = 1'-0"

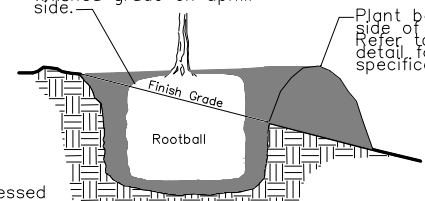
Carefully break/cultivate and remove excess soil on top of rootball exposing collar/rootflare and feeder roots. Check for and remove existing matted or spiraling roots.



Carefully remove from container. Check for tightly bound or compressed roots. Carefully pull roots away from the tight mass and spread prior to planting. Extremely woody compacted roots may require cutting to open root system.

PRIOR TO PLACING ROOTBALL IN HOLE

Item 192.3.4 Set tree plumb, downhill shoulder of rootball should be approx. 1 inch above finished grade on uphill side.



Plant basin on downhill side of tree only. Refer to tree planting detail for planting specifications.

FOR SLOPE PLANTING

1/2" RUBBER TUBING

EXTEND TUBING TO WITHIN 1" OF KNOT LOOP SHALL BE 3 X DIAM. OF TRUNK

Plant Support Installation, Item 192.3.10. Submit Plant support system detail to engineer for approval. Replace approved plant support system if fails or if causes any damage to plant material. Stake in the direction of the prevailing winds, multiple ties may be required.

Mulching, Item 192.3.14 Four (4) inch layer of Erosion Control Compost as described in Item 161.2.2. When used as mulch under Item 192, Erosion Control Compost is incidental to this item and not paid for separately unless Item 161-6009 is shown in the plans.

DO NOT PLACE EROSION CONTROL COMPOST OVER TOP OF ROOTBALL, EXPOSE ROOT FLARE PER DETAIL THIS SHEET.

Plant Basin Construction, Item 192.3.6

Plant Pit Excavation, Item 192.3.4 Complete planting bed preparation before excavation.

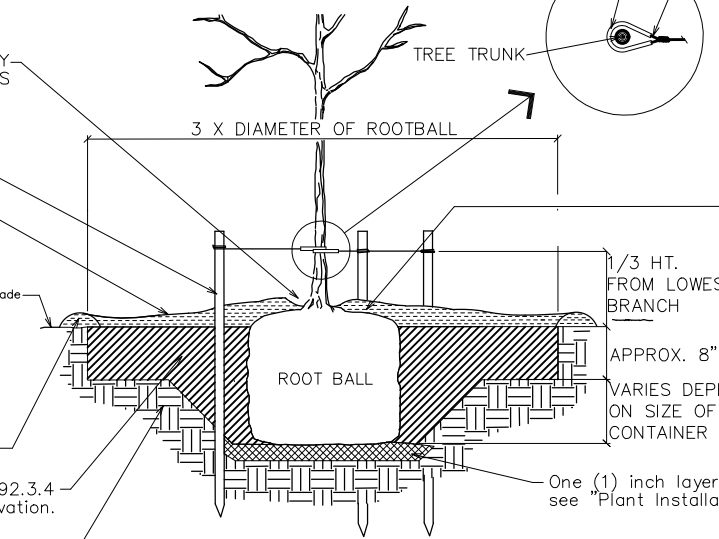
Existing soil, see planting bed preparation detail sheet.

TREE PLANTING AND STAKING

NTS

TREE PLANTING DETAIL

SCALE: 1/4" = 1'-0"



Plant Installation, Item 192.3.5 Set tree plumb, shoulders of rootball should be approximately 2 inches above finished grade. Unless otherwise shown on plans, use backfill consisting of 70% existing soil removed from the plant pit, and 30% General Use Compost (GUC) as described in Item 161.2. When used as backfill under Item 192, GUC is incidental to this item and not paid for separately.

DO NOT PLACE BACKFILL OVER TOP OF ROOTBALL.

Root stimulator, see INITIAL WATERING AND ROOT STIMULATOR REQUIREMENTS this sheet, root stimulator is incidental to this item and not paid for separately.

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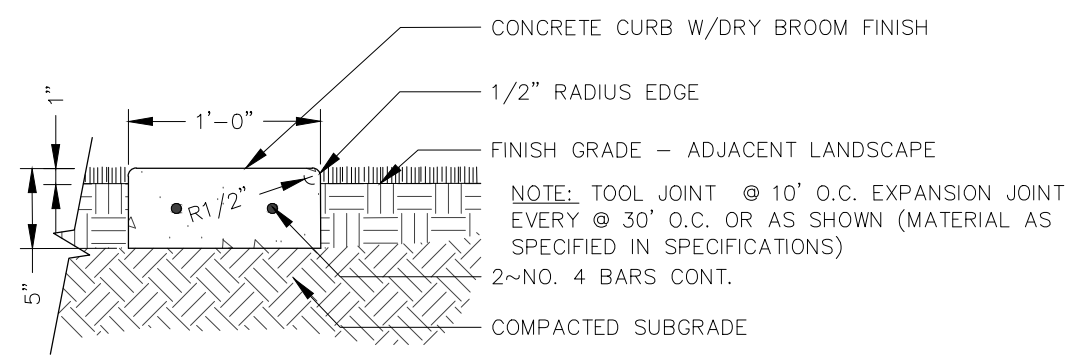
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PLANTING DETAILS

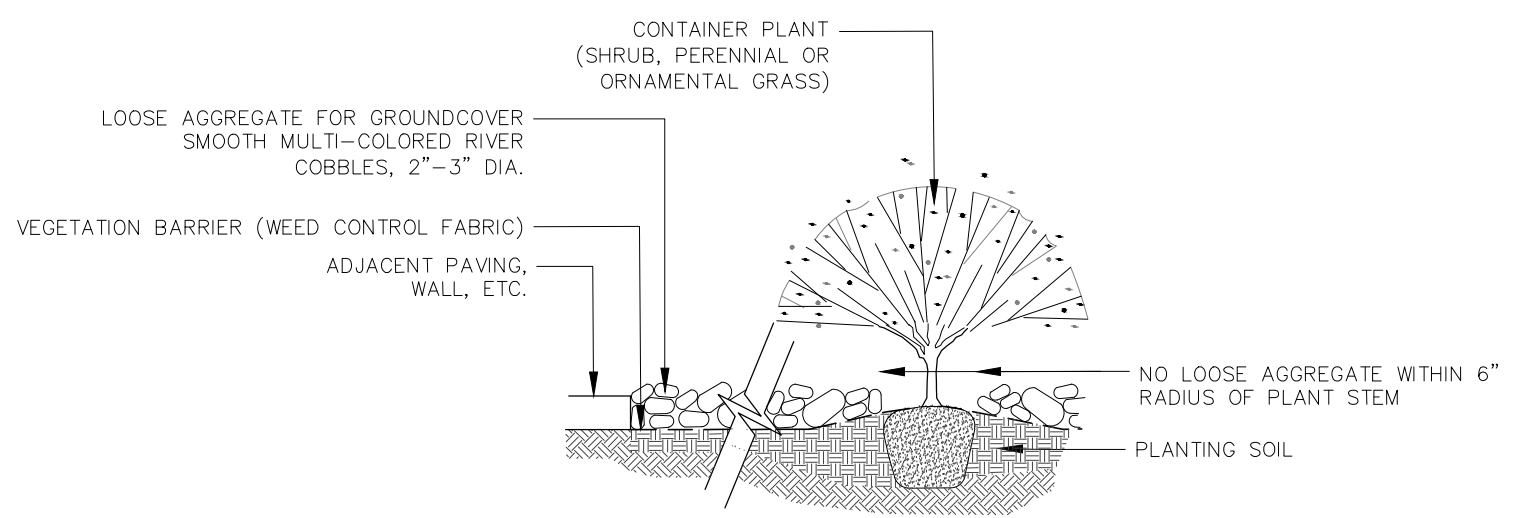
SCALE: N/A Sheet 1 of 2

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JBLAD	TEXAS	DALLAS	DENTON	031
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	

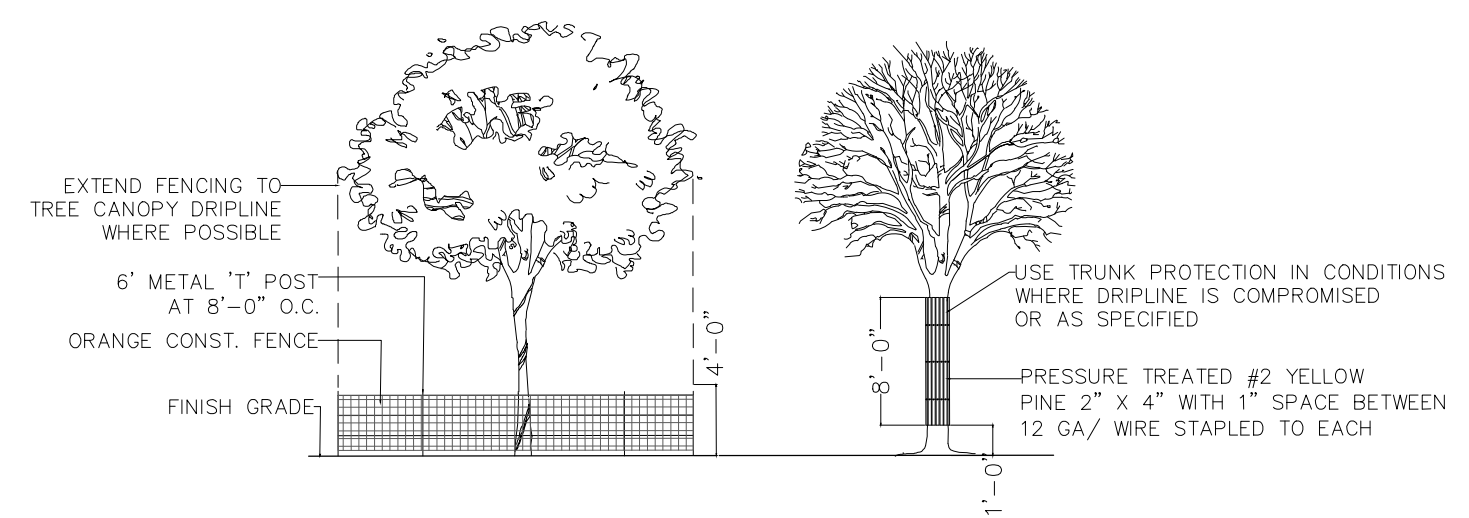




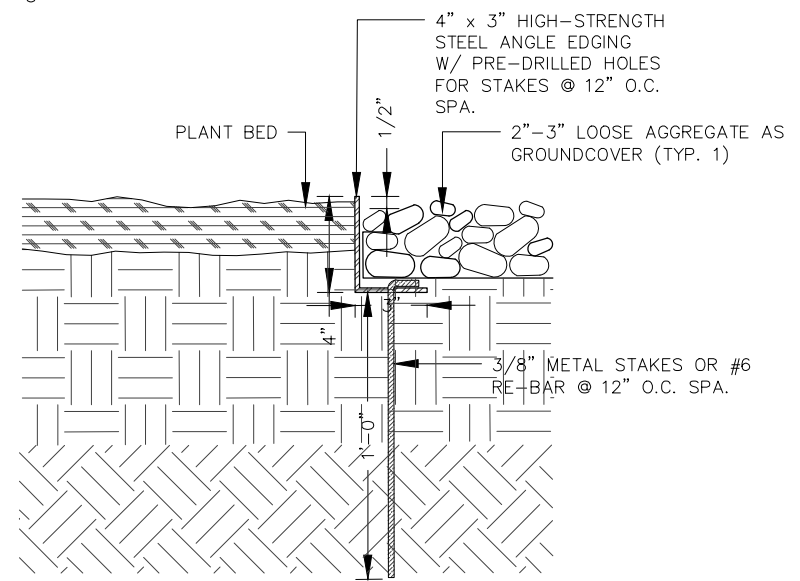
CONC. LANDSCAPE EDGE
SCALE: 1" = 1'-0"



LOOSE AGGREGATE AS GROUNDCOVER (4")
SCALE: 1/2" = 1'-0"



TREE PROTECTION FENCING
SCALE: 1-1/2" = 1'-0"



LOOSE AGGREGATE AT PLANTING BED
SCALE: 1 1/2" = 1'-0"

TEMPLATED REVISED: 10-23-02



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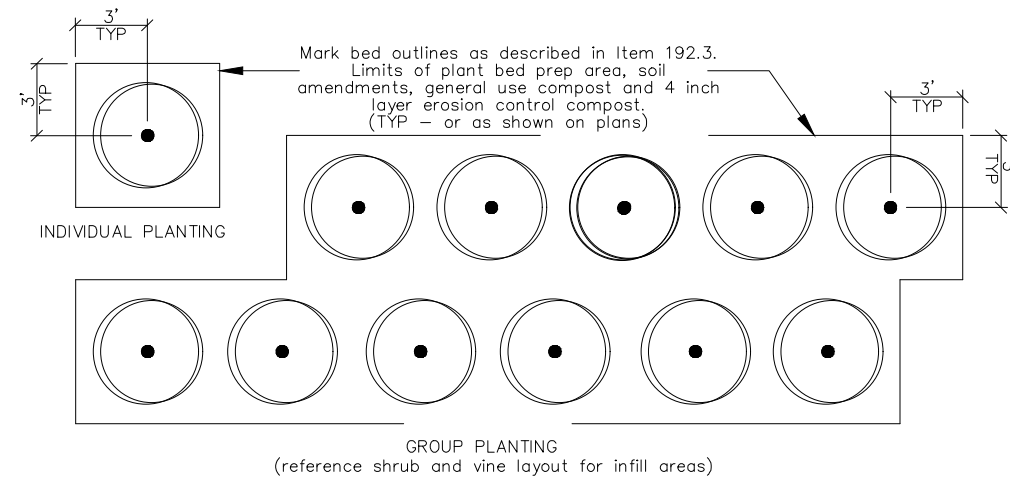


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AUBREY, TX
PLANTING DETAILS

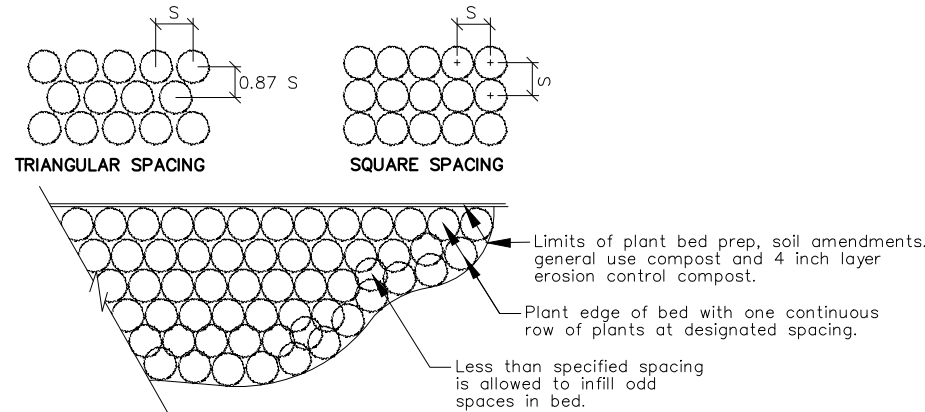
SCALE: N/A Sheet 2 of 2

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JBLAD	TEXAS	DALLAS	DENTON	032
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	



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

S= Spacing as indicated on the plans. Square or triangular spacing will be shown by the placement of the plants on the drawing and/or be called out in the plant label.



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

VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES

PHASE	ITEM DESCRIPTION	FREQUENCY	RATE / PLANT
Item 192.3 Construction	Item 192.3.7. Watering is incidental to Item 192 and is not paid for separately See Initial Watering note	Begin same day as planting then: 3 times per week with 1 day minimum between waterings See Initial Watering note	CNTR SIZE 30 GAL = 16 gallons 15 GAL = 10 gallons 5 GAL = 4 gallons 3 GAL = 2 gallons 1 GAL = 2 gallons
Item 192.3.15 Maintenance	Item 192.3.15.1. Watering is incidental to Item 192 and is not paid for separately	See Initial Watering note	(1/2 X plant CNTR gallon size per plant for sizes not shown, one (1) gallon minimum) See Initial Watering Note
Item 193 Landscape Establishment (When Shown In Plans)	Item 193.3.3. Watering is incidental to Item 193 and is not paid for separately	2 times per week with 2 days minimum between waterings	

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

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

PROVIDE MONTHLY METER READINGS OF WATER APPLIED (if applicable to project).

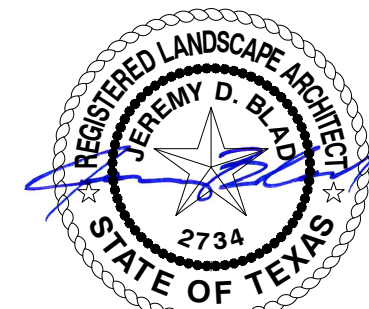
Prior to arrival at project or storage area, provide watering plan(s) of plants to be installed or stored. Watering plan(s) must be approved by engineer prior to delivery to project or storage area.

INITIAL WATERING AND ROOT STIMULATOR REQUIREMENTS

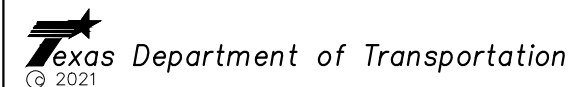
PHASE	Item 192.3 Construction. Initial watering.
ITEM DESCRIPTION	Item 192.3.5. Plant Installation. Root stimulator material is incidental to Item 192 and is not paid for separately.
MATERIALS and SOLUTION	Two (2) ounces of root stimulator concentrate per one (1) gallon water. Root stimulator must be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

GENERAL NOTES:

- Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements not shown.
- Reference Item 192.3, mark plant locations and bed outlines.
- Verify that all planting meets the following clear zone minimum distance requirements from the edge of the travel lane:
Trees: 32' unless protected by a barrier,
Shrubs: 16' unless protected by a barrier,
Groundcovers and vines: no minimum distance.
Engineer has final authority over all clear zone related issues.
- Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
- Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the contract. Remove stakes when directed by engineer.
- Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.



07/30/2021



PLANTING AND ESTABLISHMENT

SHEET 1 of 5

Details not to scale TREE & SHRUB

FILE:	FED DIV	STATE	PROJECT NUMBER	SHEET
	6	TEXAS	(SEE TITLE SHEET)	033
REVISIONS:	DIST	COUNTY	CONTROL SECT	JOB
FEB 2015 for 2014 specs	18	DENTON	0817 01	027

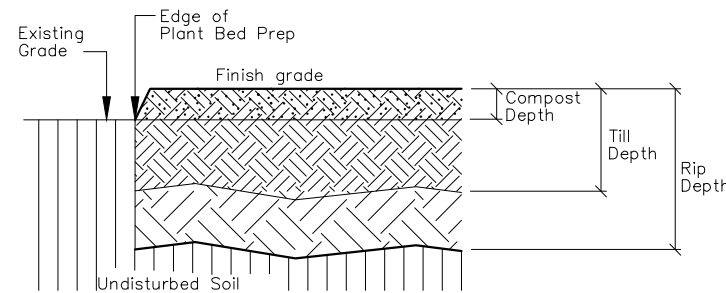
TYPE OF WORK

ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

			192-6066 PLANT BED PREP SY	Reference Item 161, 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Reference Special Specification Item 1006.	
		✓	161-6012 GENERAL USE COMPOST CY	APPLICATION RATE Item 161.2.3. General Use Compost. Apply 2 in. uniform layer over bed preparation area.	Item 161.2. Materials. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
		✓	1006-6001 LANDSCAPE SOIL AMENDMENT (TYPE I) SY	APPLICATION RATE Apply 0.30 lbs/SY. Each application is paid for separately. See timeline for multiple applications.	Use a non-chemical fertilizer with the following requirements: (1) Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2) Is registered with Texas State Chemist as a commercial fertilizer. (3) Meets USEPA guidelines for unrestricted use. (4) Derived from the following biological source: processed poultry manure. (5) Contains 3.0% nitrogen and 2.2% of nitrogen is water insoluble, 4% phosphate, 3% soluble potash, 10% calcium. (6) Use the following product or an approved equal: Plant Vigor 3-4-3 Plus 10% Calcium manufactured by Natural Resources Group, Inc., Tomball, Texas 800-279-9567.
		✓	1006-6002 LANDSCAPE SOIL AMENDMENT (TYPE II) SY	APPLICATION RATE Apply 0.25 lbs/SY.	Humate containing 2.25% iron in the raw material and greater than 45% humic acid, dextrose 2.5% to 5% on weight basis. Pelletized humate without added binders and pass #16 mesh. Use the following product or an approved equal: San Jacinto Humate, San Jacinto Environmental Supplies, 713-957-0909.
		✓	1006-6005 LANDSCAPE SOIL AMENDMENT (TYPE III) SY	APPLICATION RATE Apply 0.30 lbs/SY. Each application is paid for separately. See timeline for multiple applications.	Use a non-chemical fertilizer with the following requirements: (1) Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2) Is registered with Texas State Chemist as a commercial fertilizer. (3) Meets USEPA guidelines for unrestricted use. (4) Derived from the following biological source: worm castings. (5) Contains 0.02% humic acid derived from humate, 1.0% nitrogen and 0.9% of nitrogen is water insoluble, 0.5% phosphate, 0.2% soluble potash, 1.0% calcium, 0.02% iron. (6) Use the following product or an approved equal: Black Castings manufactured by Vermi-Technology Unlimited available from Earth's Outlet 866-504-1139.
		✓	ROTOR TILLING Incidental to Item 192 Plant Bed Preparation.	ROTOR TILL DEPTH After application of compost and amendments and rip/trench (when required), rotor till to a depth of 8 inches (+/- 2").	
		✓	HERBICIDE and MOWING Incidental to Item 192 Plant Bed Preparation. Scalp mow 15 days after final herbicide treatment.	APPLICATION RATE Prior to all other work, apply two applications of an approved herbicide with 15 days between the applications. Apply herbicide during weather conditions and at a rate per manufacturer's recommendations.	

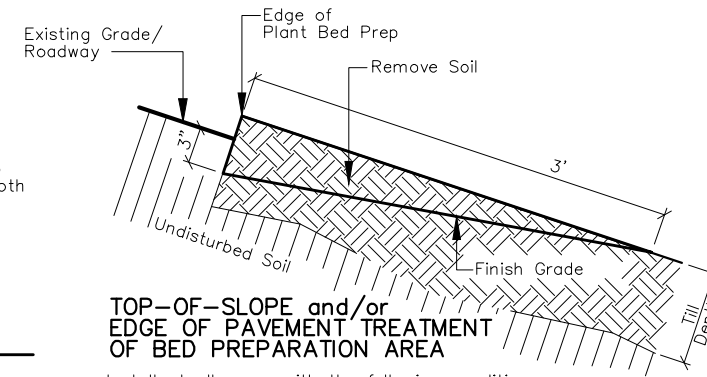
GENERAL BED PREPARATION NOTES:

- Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
- Reference Item 192.3 mark plant locations and bed outlines.
- Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
- Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4" wooden stake painted orange. Maintain the stakes in place for duration of the project. Remove stakes when directed by engineer.
- Repair any damage within right of way caused by contractor at no additional expense to the Department.
- Provide a 1000 SF "mock up" of soil amendment, general use compost, and bed preparation complete and in place within an approved area for approval by engineer.
- Pick-up litter prior to scalp mow and bed preparation.
- All concrete, steel, trash, and other debris uncovered during bed preparation work which the engineer determines as detrimental to the project will become the responsibility of the contractor and disposed of in an approved manner. Debris removal will occur daily and will be incidental to bed preparation and will not be paid for separately.
- Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
- Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
- Clean and clear bed prep areas and nearby inlets of existing tall vegetation and any piles or layers of dead grass and weeds caused by drought or mowing operations by others.



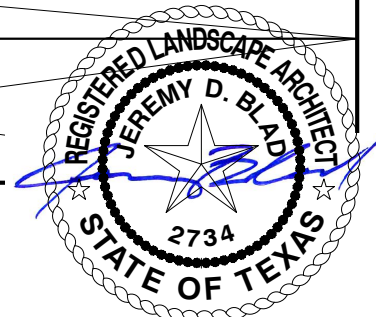
PLANTING BED PREPARATION SECTION

SEE ITEMS AND REQUIREMENTS THIS SHEET FOR DIMENSIONS, RATES, AND SPECIFICATIONS (See Top-of-Slope detail this sheet when applicable)

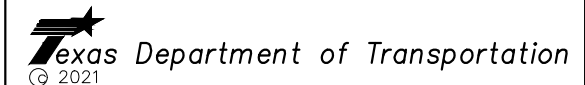


TOP-OF-SLOPE and/or EDGE OF PAVEMENT TREATMENT OF BED PREPARATION AREA

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



07/30/2021



PLANTING AND ESTABLISHMENT

SHEET 3 of 5

Details not to scale BED PREPARATION

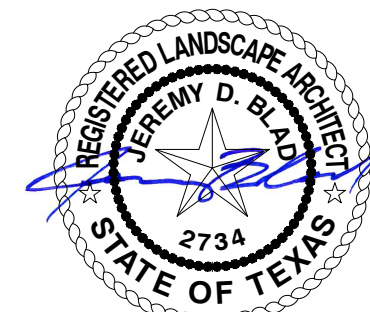
FILE:	FED DIV:	STATE:	PROJECT NUMBER:	SHEET:
	6	TEXAS	(SEE TITLE SHEET)	035
REVISIONS:	DIST:	COUNTY:	CONTROL:	SECT:
FEB 2015 for 2014 specs	18	DENTON	0817	01 027
				JOB:
				FM 428

PROJECT CONDITIONS DURING INSTALLATION AND SUSPENSION

During project installation and suspension periods, project site conditions are contractor's responsibility. Contractor will maintain project site conditions as shown on plans. All project site maintenance work is paid separately unless otherwise shown on plans. Reference pertinent items of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK	TIMELINE
WATERING(See PLANTING AND ESTABLISHMENT SHEET 1 of 6, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
MOWING, TRIMMING, AND EDGING (From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 6' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway). DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
PLANT BASIN, BED, AND WORKSITE MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.15.3) WEED CONTROL REQUIREMENT <input checked="" type="checkbox"/> See PLANTING AND ESTABLISHMENT SHEET 5 of 6 For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
PLANT SUPPORTS See PLANTING AND ESTABLISHMENT SHEET 3 of 6 For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
PRUNING	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
INSECT, DISEASE, AND ANIMAL INSPECTION AND TREATMENT (Exterminate all active ant colonies in bed preparation areas)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL (Not applicable)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
PLANT REPLACEMENT *	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
FERTILIZER	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.
IRRIGATION SYSTEM (Only when Item 170 Irrigation System or a temporary irrigation system is part of the contract, see IRRIGATION DETAILS AND MATERIALS SHEET 1 OF 3, GUARANTEE AND ACCEPTANCE)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 5 OF 5.

* Remove any materials damaged by actions described in Item 7.17. Removal and disposal of damaged materials is incidental to Item 192. Contractor may be reimbursed for plant replacement in accordance with Item 7.17.1. Theft is not a reimbursable repair.



07/30/2021



PLANTING AND ESTABLISHMENT
SHEET 4 of 5

PROJECT CONDITIONS

FILE:	FED DIV 6	STATE TEXAS	PROJECT NUMBER (SEE TITLE SHEET)	SHEET 036
REVISIONS: FEB 2015 for 2014 specs	DIST 1B	COUNTY DENTON	CONTROL 0817 SECT 01 JOB 027	HIGHWAY FM 428

ITEM 192 LANDSCAPE PLANTING MAINTENANCE REQUIREMENTS

After completion of the project installation, as shown in the plans and approved by the engineer, begin maintenance activities for a period of 90 calendar days as described in ITEM 192.3.15. Payment in accordance with ITEM 192.5. is subject to completion of all scheduled maintenance activities, timeline may also be suspended for failure to complete scheduled maintenance activities. All maintenance work is paid for separately unless otherwise shown on plans. Reference Item 170 and 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK	TIMELINE (Days)																	
	0		30				60				90							
	1 Thru 7	8 Thru 15	16 Thru 22	23 Thru 30	31 Thru 37	38 Thru 45	46 Thru 52	53 Thru 60	61 Thru 67	68 Thru 75	76 Thru 82	83 Thru 90						
192.3.15.1. WATERING(See PLANTING AND ESTABLISHMENT SHEET 1 OF 6, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
192.3.15.2. MOWING, TRIMMING, AND EDGING(From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 6' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway) DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE				✓				✓				✓						
192.3.15.3. PLANT BASIN, BED, AND WORKSITE MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.15.3)																		
WEED CONTROL REQUIREMENT																		
<input checked="" type="checkbox"/> Maintain weed-free per Item 192.3.15.3. Cord trimmers are not allowed. Replace damaged plants per Item 192.15.9. INVASIVE VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED.		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
<input type="checkbox"/> Maintain grasses and weeds at 24" maximum height. Eradicate all vines regardless of height, VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. Eradicate invasive shrubs and trees as directed. Method must be either a spot-treatment chemical application such as a wick applicator or manual hand pulling of weeds. Hand-pull previously treated dead plants over 24" tall.		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
192.3.15.4. PLANT SUPPORTS(Remove plant stakes and all appurtenances within last 10 days of this schedule unless this Item 192 maintenance period is followed by Item 193 establishment period, unless otherwise directed by engineer)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
192.3.15.5. PRUNING		✓				✓				✓								
192.3.15.6. INSECT, DESEASE, AND ANIMAL INSPECTION AND TREATMENT (Exterminate all active ant colonies in bed preparation areas)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
192.3.15.7. LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
192.3.15.8. TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL (Not applicable)																		
192.3.15.9. PLANT REPLACEMENT *				✓				✓				✓						
IRRIGATION SYSTEM (Only when Item 170 Irrigation System or a temporary irrigation system is part of the contract, see IRRIGATION DETAILS AND MATERIALS SHEET 1 OF 3, GUARANTEE AND ACCEPTANCE)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						

* Remove any materials damaged by actions described in Item 7.17. Removal and disposal of damaged materials is incidental to Item 192. Contractor may be reimbursed for plant replacement in accordance with Item 7.17.1. Theft is not a reimbursable repair.

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

- NOTES:
- Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
 - Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
 - Item 192 to end at 90 days.

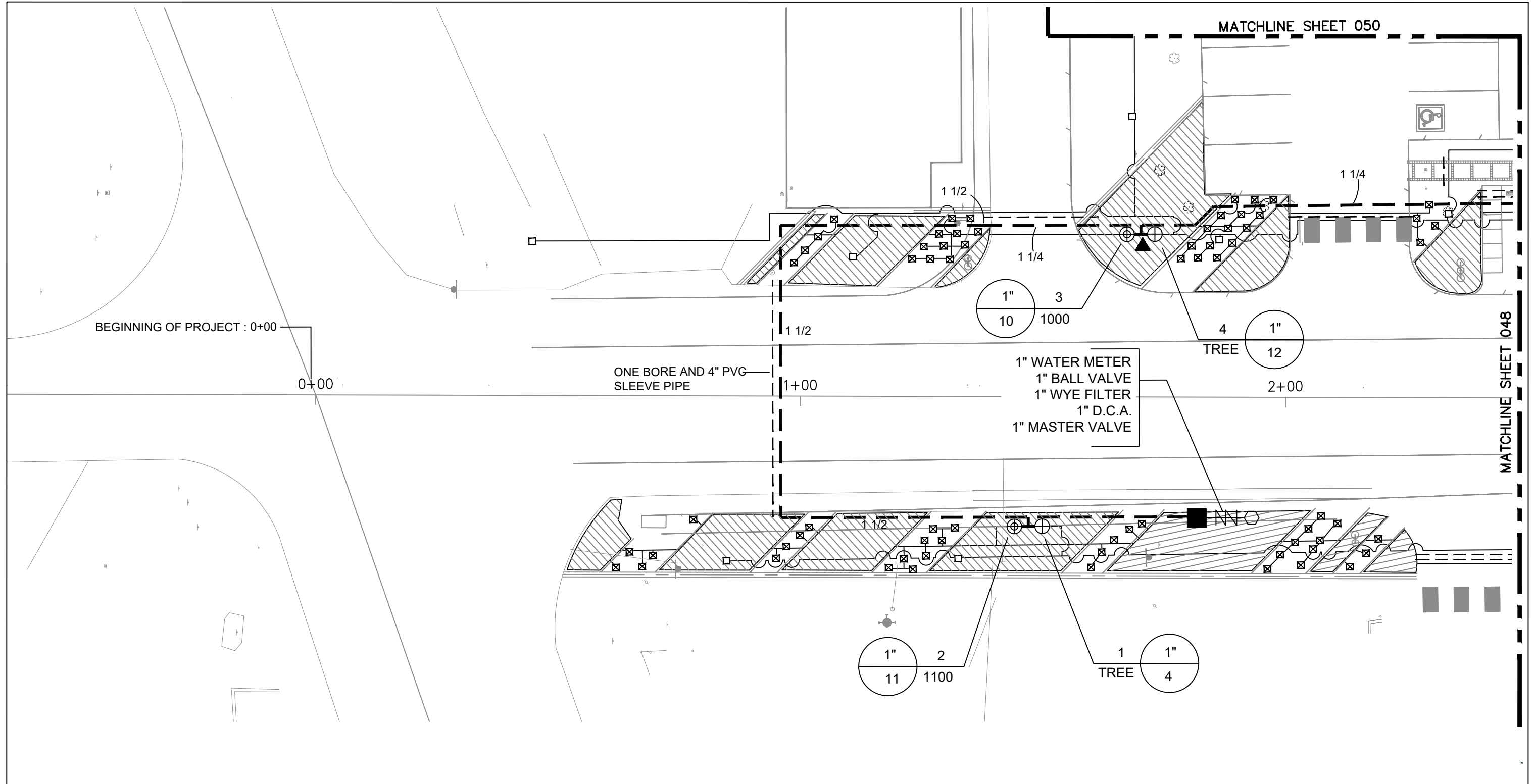


Texas Department of Transportation
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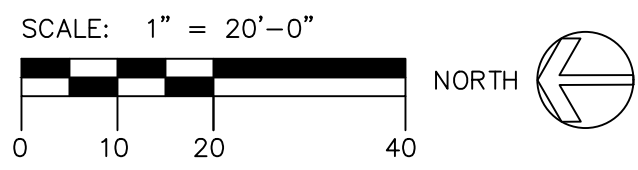
PLANTING AND ESTABLISHMENT
SHEET 5 OF 5

FILE:	FED DIV	STATE	PROJECT NUMBER	SHEET
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REVISIONS:	DIST	COUNTY	CONTROL	SECT
FEB 2015 for 2014 specs	1B	DENTON	0817	01
			JOB	HIGHWAY
			027	FM 428

USER ID



NOTE:
 ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION.



TEMPLATED REVISED: 10-23-02



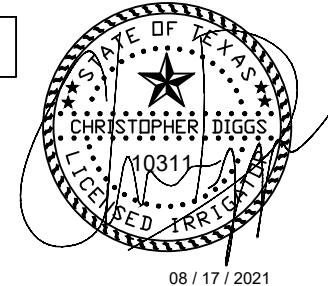
IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (MC-178) P.O. BOX 13097 T.C.E.Q.'S WEB SITE IS: WWW.TCEQ.STATE.TX.US

James Pole
 IRRIGATION CONSULTANTS

IRRIGATION DESIGN, CONSULTING, AND LANDSCAPE WATER MANAGEMENT

TEXAS L.L.C. #658
 100 N. LOCUST ST., SUITE 3
 DENTON, TEXAS 76201

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 FAX: 940.382.2475
 james@jamespoleirrigation.com



**GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 IRRIGATION PLAN**

SCALE: 1" = 20'-0" Sheet 1 of 9

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)			HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.	
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	039	
CHECK ACOUSINS	CONTROL	SECTION	JOB		
	0817	01	027		

DATE

USER ID

MATCHLINE SHEET 050

FM 428 R.O.W.

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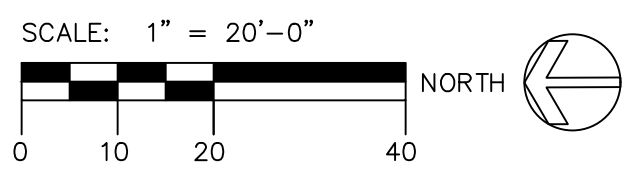
FM 428 R.O.W.

CONTROLLER

MATCHLINE SHEET 047

MATCHLINE SHEET 049

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TEMPLATED REVISED: 10-23-02



GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 IRRIGATION PLAN

SCALE: 1" = 20'-0" Sheet 2 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	040
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	



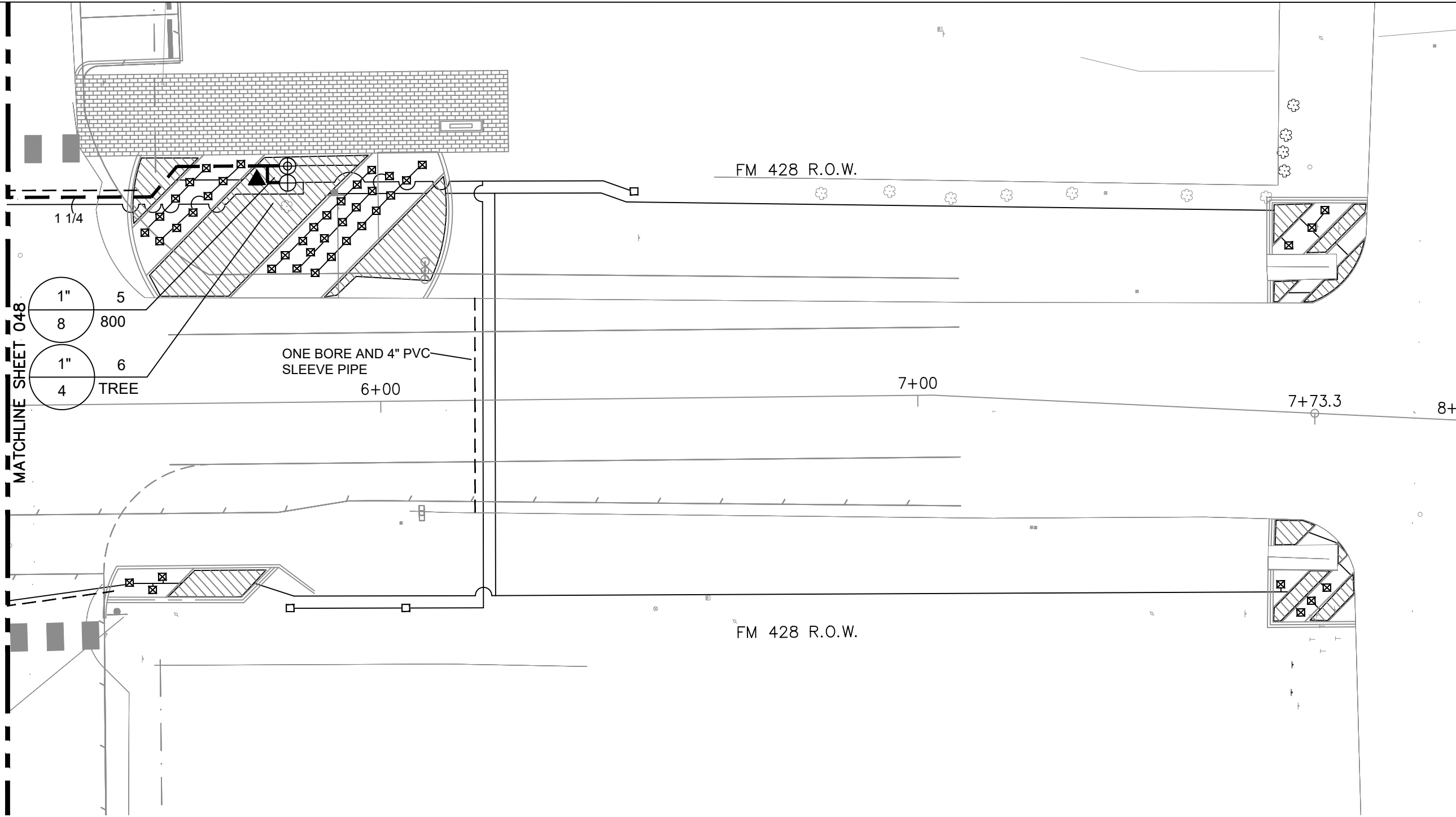
IRRIIGATION DESIGN, CONSULTING, AND
 LANDSCAPE WATER MANAGEMENT

TEXAS L.I.C. #658
 100 N. LOCUST ST., SUITE 3
 DENTON, TEXAS 76201

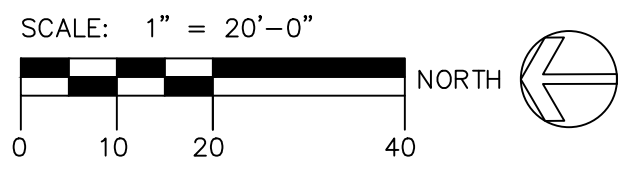
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 james@jamespoleirrigation.com

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TEMPLATED REVISED: 10-23-02

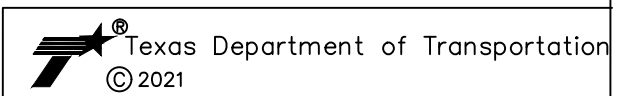
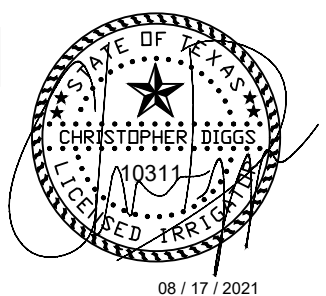


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 IRRIGATION CONSULTANTS

IRRIGATION DESIGN, CONSULTING, AND LANDSCAPE WATER MANAGEMENT

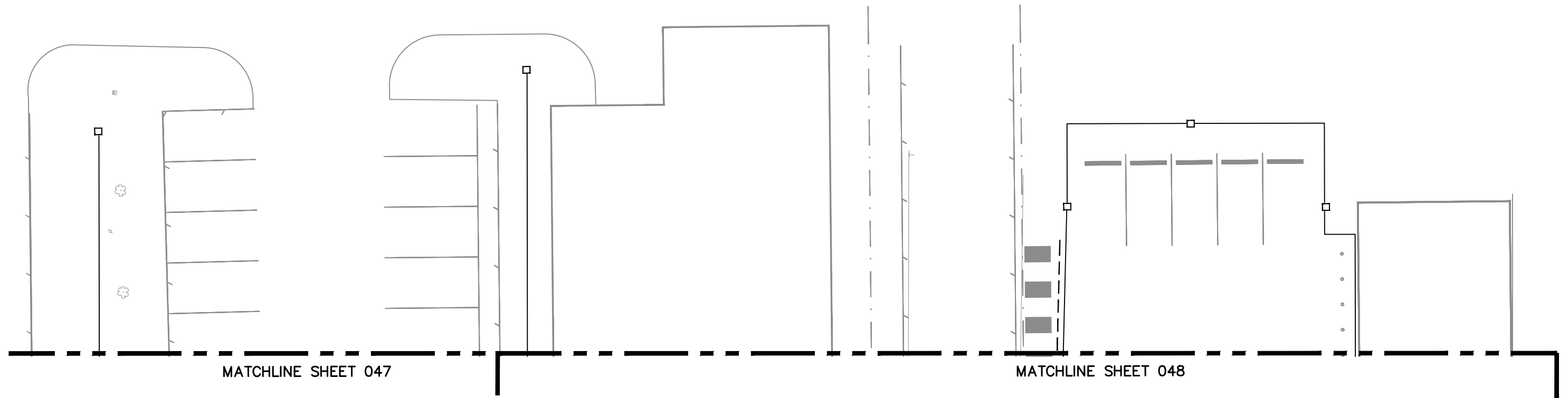
TEXAS L.I.C. #658 100 N. LOCUST ST., SUITE 3 DENTON, TEXAS 76201 PHONE: 940.243.2364 FAX: 940.382.2475 james@jamespoleirrigation.com



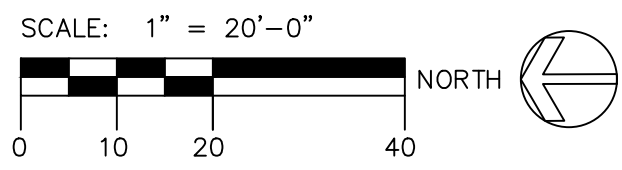
**GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 IRRIGATION PLAN**

SCALE: 1" = 20'-0" Sheet 3 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	041
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	



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TEMPLATED REVISED: 10-23-02

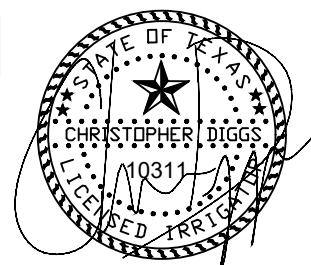


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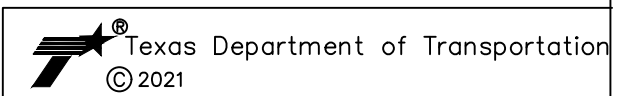
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08 / 17 / 2021



GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 IRRIGATION PLAN











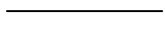
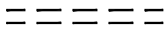

SCALE: 1" = 20'-0" Sheet 4 of 4

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	042
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	

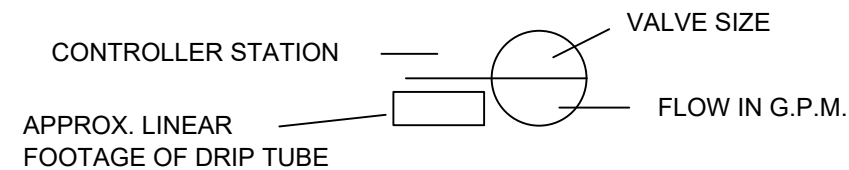
INSTALLATION NOTES

- COORDINATE IRRIGATION INSTALLATION WITH PLANTING PLAN AND SITE CONDITIONS TO PROVIDE COMPLETE COVERAGE WITH MINIMUM OVERSPRAY. THE IRRIGATION CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO ENSURE PROPER COVERAGE AT NO ADDITIONAL COST TO THE OWNER. THE IRRIGATION CONTRACTOR SHALL COMPLY WITH ALL LOCAL AND STATE MANDATED IRRIGATION ORDINANCES AND CODES, AND WILL SECURE ALL REQUIRED PERMITS. L.I.C. SHALL PAY ANY ASSOCIATED FEES UNLESS OTHERWISE NOTED. ALL LOCAL CODES SHALL PREVAIL OVER ANY DISCREPANCIES HEREIN AND SHALL BE ADDRESSED BEFORE ANY CONSTRUCTION BEGINS.
- NO MACHINE TRENCHING SHALL BE PERMITTED WITHIN THE ROOT ZONE OF EXISTING TREES. HAND-DIG ONLY, WITHIN THE ROOT ZONES OF EXISTING TREES. NO ROOTS OVER 1" DIAMETER SHALL BE CUT. STAKE ALL PROPOSED TRENCH ROUTES NEAR EXISTING TREES FOR APPROVAL BY THE LANDSCAPE ARCHITECT BEFORE DIGGING BEGINS.
- CONFIRM MINIMUM STATIC WATER PRESSURE OF 60 PSI AT THE HIGHEST ELEVATION OF THE SYSTEM LIMITS, AND MAXIMUM STATIC WATER PRESSURE OF 90 P.S.I. AT THE LOWEST ELEVATION OF THE SYSTEM LIMITS AT LEAST 7 DAYS BEFORE BEGINNING WORK. IF STATIC WATER PRESSURE IS OUTSIDE THE RANGE STATED ABOVE, DO NOT PROCEED UNTIL DIRECTED BY THE LANDSCAPE ARCHITECT.
- LATERAL PIPE SHALL BE INSTALLED AT A MINIMUM DEPTH OF 12 INCHES. MAINLINE PIPE AND WIRES SHALL BE INSTALLED AT A MINIMUM DEPTH OF 18 INCHES. NO MACHINE TRENCHING SHALL BE PERMITTED WITHIN EXISTING TREE ROOT ZONES. WHEN HAND - TRENCHING WITHIN EXISTING TREE ROOT ZONES, NO ROOTS LARGER THAN 1" DIAMETER SHALL BE CUT.
- UNSLEEVED PIPES MAY BE SHOWN UNDER PAVEMENT FOR GRAPHIC CLARITY ONLY. INSTALL THESE PIPES IN ADJACENT LANDSCAPED AREAS.
- ELECTRIC POWER SHALL BE PROVIDED WITHIN FIVE FEET OF CONTROLLER LOCATION BY GENERAL CONTRACTOR. L.I.C. TO PROVIDE FINAL HARD-WIRE TO CONTROLLER.
- 24 VOLT VALVE WIRE SHALL BE A MINIMUM OF #14 GAUGE, U.F. APPROVED FOR DIRECT BURIAL, SINGLE CONDUCTOR "IRRIGATION WIRE". WIRE SPLICES SHALL INCLUDE DBY CONNECTORS AS MANUFACTURED BY 3M COMPANY. ALL FIELD SPLICES SHALL BE LOCATED IN A ROUND VALVE BOX OF SUFFICIENT SIZE TO ALLOW INSPECTION.
- VALVE BOXES SHALL BE INSTALLED FLUSH WITH GRADE, SUPPORTED BY BRICKS IF NEEDED, WITH 3 INCHES OF CLEAN PEA GRAVEL LOCATED BELOW THE VALVE. USE 12" x 17" RECTANGULAR VALVE BOXES WITH PURPLE LID FOR QUICK COUPLING VALVES, AND 10" ROUND BOXES FOR ELECTRIC VALVES UNLESS NOTED OTHERWISE. D.C.A., WITH UPSTREAM BALL VALVE AND WYE FILTER SHALL BE BOXED AND LOCATED ACCORDING TO LOCAL CODE.
- USE RIGID SCH. 80 PVC SWING JOINT ASSEMBLIES TO CONNECT ALL QUICK COUPLERS.
- ALL SPRAY HEADS SHALL BE CONNECTED WITH A 12" MINIMUM LENGTH OF 1/2" FLEX PVC. THE FLEX PVC SHALL BE SOLVENT WELDED TO SCHEDULE 40 PVC FITTINGS WITH WELD-ON #795 SOLVENT AND #P-70 PRIMER.
- PROVIDE ONE QUICK COUPLER KEY WITH SWIVEL HOSE ELL FOR EVERY SIX Q.C. VALVES. (MINIMUM ONE SET).
- CONTRACTOR IS TO CONTACT APPROPRIATE AUTHORITIES AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
- THE PROPOSED LOCATIONS OF ALL ABOVE- GROUND EQUIPMENT INCLUDING BACKFLOW PREVENTORS, CONTROLLERS AND WEATHER SENSORS SHALL BE STAKED BY THE CONTRACTOR FOR APPROVAL BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE BEFORE THESE ITEMS ARE INSTALLED.
- ALL HEADS SHALL BE INSTALLED A MINIMUM OF 4" FROM PAVEMENT EDGES. (6" OR GREATER WHERE REQUIRED BY LOCAL CODE) FINAL HEAD ADJUSTMENTS BY THE CONTRACTOR SHALL INCLUDE THE ADDITION OF CHECK VALVES WHERE NEEDED TO PREVENT EXCESSIVE LOW HEAD DRAINAGE. THE CONTRACTOR SHALL BUDGET FOR, AND INSTALL CHECK VALVES FOR UP 10 % OF THE TOTAL NUMBER OF HEADS WHEN NEEDED, WITH NO ADDITIONAL COST TO THE OWNER.
- WHERE SHOWN ON THE PLANS, MASS SHRUB / GROUNDCOVER BEDS SHALL INCLUDE NETAFIM TECHLINE TLHCVXR SERIES DRIP TUBE WITH PRE-INSTALLED .55 GPH DRIP EMITTERS AT 12" INTERVALS (TLHCVXR5-12), INSTALLED IN CENTER-FED GRIDS WITH ROWS SPACED 18" APART. INDIVIDUAL DRIP TUBE RUNS SHALL NOT EXCEED 150 L.F. PVC LATERAL "TRUNK" LINES SHALL BE INSTALLED 10" DEEP. DRIP TUBE SHALL BE SET 2" BELOW FINISHED SOIL GRADE (NOT INCLUDING MULCH LAYER), SECURELY STAKED EVERY 18". NETAFIM #TL050MFV-1 FLUSH VALVES SHALL BE INSTALLED AT THE FARTHEST POINTS FROM THE ZONE VALVE. USE 17 MM BARBED FITTINGS FOR DRIP LINE CONNECTIONS, SET THE MAXIMUM OPERATING PRESSURE AT 30 PSI. TECHLINE CV SHALL BE INSTALLED PERPENDICULAR TO SLOPE FACE. INSTALL TLCV IN-LINE CHECK VALVES FOR EVERY 4.5 FEET OF DRIP LINE ELEVATION CHANGE WITHIN THE ZONE. USE NETAFIM STAPLES (#TLS6) TO SECURE TUBING EVERY 18" EACH DRIP ZONE SHALL INCLUDE ONE MAINTENANCE "FLAG" WHICH SHALL CONSIST OF A 12" POP-UP SPRAY HEAD AND COMPLETELY CLOSED SPRAY NOZZLE. THE POP-UP HEAD SHALL BE CONNECTED TO THE DRIP ZONE PIPE, SET FLUSH WITH GRADE, AND LOCATED AT THE FARTHEST DISTANCE FROM THE DRIP VALVE ASSEMBLY. INSTALL THE "FLAG" HEAD ADJACENT TO EDGING OR IN LOW PLANTINGS FOR EASE OF VIEWING. SPARSLEY SPACED, INDIVIDUAL SHRUB PLANTINGS MAY INCLUDE RAINBIRD #XBT-10 SINGLE-OUTLET EMITTERS OR RAINBIRD #XBT-10-6 MULTI-OUTLET EMITTERS INSTALLED AS DETAILED. PROVIDE MINIMUM TWO, 1 G.P.H. OUTLETS PER INDIVIDUAL SHRUB. SINGLE / MULTI-OUTLET EMITTERS MAY BE CONNECTED TO THE SAME DRIP ZONE VALVE WHICH SERVES ADJACENT DRIP TUBE GRIDS, UNLESS NOTED OTHERWISE.

PROPOSED EQUIPMENT

- HUNTER SINGLE / MULTI OUTLET (HEB-10-BR / MPE-10) POINT SOURCE DRIP EMITTERS. SEE INSTALLATION NOTE #15 REGARDING EMITTER LAYOUT AND CONNECTION TO DRIP VALVE ASSEMBLY
- HUNTER PROS-06-PRS30 SERIES POP UP SPRAY HEADS WITH HUNTER MSBN-50H STREAM BUBBLER NOZZLES. (TWO PER TREE)
-  NETAFIM TECHLINE TLHCVXR5-12 SERIES DRIP TUBE IN SHRUB BED INSTALLED AT 2" DEPTH SEE INSTALLATION NOTE #15 REGARDING DRIP TUBE LAYOUT IN SHRUB BEDS.
-  HUNTER ICV SERIES ELECTRIC REMOTE CONTROL, "TREE BUBBLER ZONE" VALVE
-  NETAFIM LVCZ SERIES DRIP VALVE ASSEMBLY WITH PSI REGULATOR AND 140 MESH FILTER
USE MODEL LVCZS8010075-LF FOR DRIP ZONES WITH .25 TO 4.4 GPM FLOW RATE
USE MODEL LVCZ10075-HFHP FOR DRIP ZONES WITH 4.5 TO 17.6 GPM FLOW RATE
USE MODEL LVCZ-150HP FOR DRIP ZONES WITH 11 TO 35 GPM FLOW RATE
-  HUNTER HQ-33DLRC-R QUICK COUPLING VALVE WITH LOCKING PURPLE COVER AND 3/4" PVC BALL VALVE
-  WILKINS 350 SERIES D.C.A. INSTALLED PER CITY CODE, WITH SAME SIZE WILKINS 850 SERIES BRONZE BALL VALVE AND WILKINS YB SERIES BRONZE WYE FILTER WITH 20 MESH STAINLESS STEEL SCREEN
-  LASCO "V101N" SERIES SCH. 80 PVC TRUE UNION BALL VALVE, MAINLINE SIZE
-  IRRIGATION WATER METER AND TAP, SIZE AS NOTED ON THE PLAN
-  HUNTER ACC2 SERIES AUTOMATIC CONTROLLER MODEL A2C-1200-M WITH WIRELESS SOLAR SYNC SENSOR
LOCATE SENSOR AS FIELD DIRECTED BY THE LANDSCAPE ARCHITECT
-  "MASTER" ELECTRIC VALVE
-  SCHEDULE 40 PVC MAINLINE PIPE
-  SCHEDULE 40 PVC LATERAL PIPE
-  TWO 4" CLASS 200 SLEEVE PIPES UNLESS NOTED OTHERWISE
-  ONE 4" AND ONE 2" CLASS 200 SLEEVE PIPES UNLESS NOTED OTHERWISE
(CONTRACTOR TO PROVIDE BORE FOR EXISTING PAVEMENT CROSSINGS)

L.I.C. SHALL SELECT SPRAY NOZZLES FOR "HEAD-TO-HEAD" COVERAGE, ADJUSTED FOR NO OVERSPRAY ONTO WALLS AND WALKS. NO OVERSPRAY INTO STREETS IS PERMITTED.



LATERAL PIPE SIZE CHART

LATERAL PIPE SHALL BE SIZED TO ALLOW A MAXIMUM FLOW VELOCITY OF FIVE FEET PER SECOND ACCORDING TO THE FOLLOWING CHART:

FLOW IN GPM	LATERL PIPE SIZE
UP TO 5 GPM	1/2" CLASS 315
6 - 10 GPM	3/4" CLASS 200
11 - 15 GPM	1" CLASS 200
16 - 28 GPM	1 1/4 CLASS 200
29 - 35 GPM	1 1/2" CLASS 200
36 - 54 GPM	2" CLASS 200



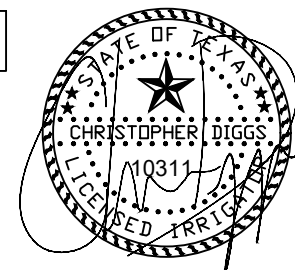
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GCAA DOWNTOWN IMPROVEMENTS AUBREY, TX IRRIGATION DETAILS

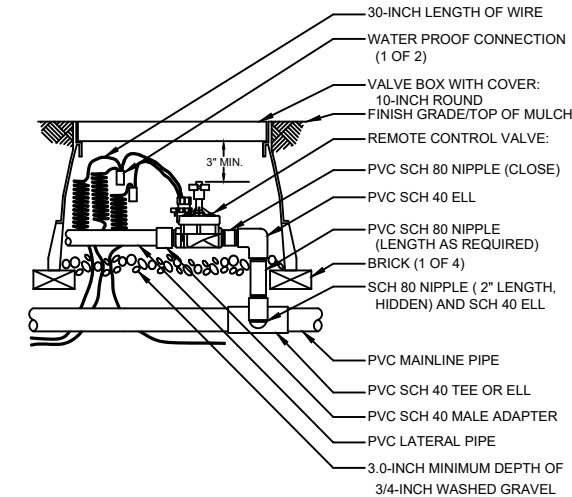
SCALE: N.T.S. Sheet 5 of 9

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	043
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	

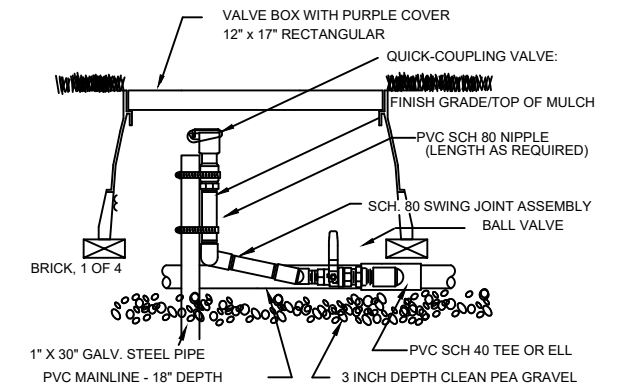
APPROX. QUANTITIES

ALL QUANTITIES SHALL INCLUDE FITTINGS, VALVE BOXES, ETC.

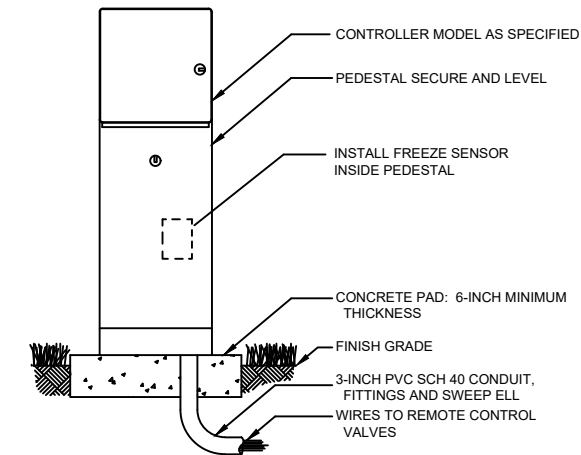
ITEM.	QUANTITY	L.F.
HUNTER PROS-06-PRS30 HEAD WITH HUNTER MSBN-50H NOZZLES.	42	
HUNTER SINGLE / MULTI OUTLET (HEB-10-BR / MPE-10) POINT SOURCE DRIP EMITTERS	130	
1" HUNTER DRIP VALVE ASSEMBLY	3	
1" HUNTER ICV SERIES ELECTRIC VALVE	3	
1" MASTER VALVE	1	
1" BALL VALVE	1	
1" WYE FILTER	1	
1" DOUBLE CHECK VALVE ASSEMBLY	1	
HUNTER ACC2 CONTROLLER #A2C-1200-M-ACC-PED WITH SOLAR SYNC SENSOR	1	
QUICK COUPLING VALVE WITH KEY	3	
1 1/4" CLASS 200 PVC MAINLINE PIPE		500
1 1/2" CLASS 200 PVC MAINLINE PIPE		240
NETAFIM TECHLINE TLHCVXR5-12 SERIES		2,900
#14 GAUGE CONTROL WIRE		5,700
1/2" CLASS #315 PVC LATERAL PIPE		
3/4" CLASS 200 PVC LATERAL PIPE		
1" CLASS #315 PVC LATERAL PIPE		
1 1/4" CLASS 200 PVC LATERAL PIPE		
BORES WHERE REQUIRED BY L.I.C.		
1" CLASS 200 PVC SLEEVE PIPE		
2" CLASS 200 PVC SLEEVE PIPE		
4" CLASS 200 PVC SLEEVE PIPE		



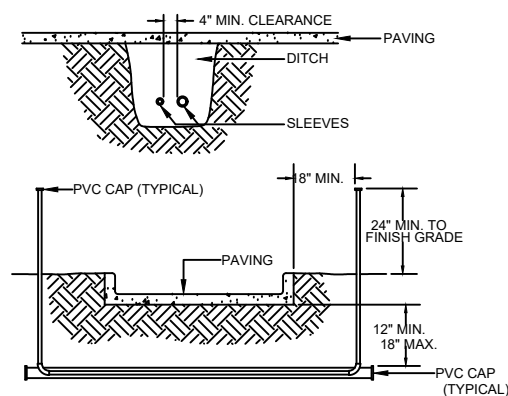
REMOTE CONTROL VALVE



QUICK COUPLER VALVE WITH PVC BALL VALVE

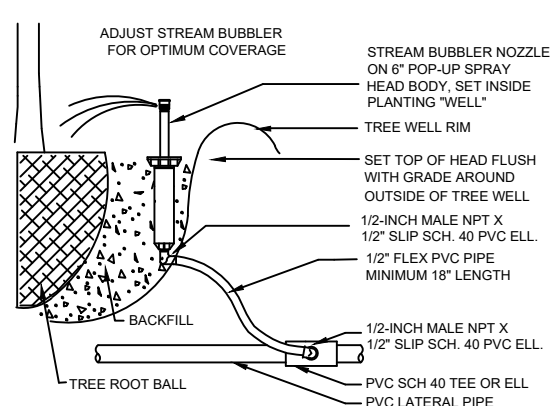


PEDESTAL MOUNT CONTROLLER



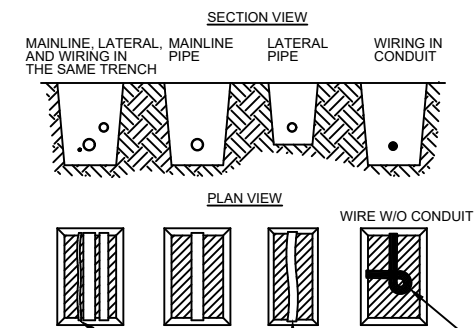
- NOTES:
 1. ALL PVC IRRIGATION SLEEVES TO BE CLASS 200 PIPE.
 2. ALL JOINTS TO BE SOLVENT WELDED AND WATERTIGHT.
 3. WHERE THERE IS MORE THAN ONE SLEEVE, EXTEND THE SMALLER SLEEVE TO 24-INCHES MINIMUM ABOVE FINISH GRADE.
 4. MECHANICALLY TAMP TO 95% PROCTOR.

SLEEVING



INCLUDE TWO BUBBLER HEADS, SET ON OPPOSITE SIDES OF ROOT BALL

TREE BUBBLER



- NOTES:
 1. SLEEVE BELOW ALL HARDSCAPE ELEMENTS WITH CLASS 200 PVC TWICE THE DIAMETER OF THE PIPE OR WIRE BUNDLE WITHIN.
 2. FOR PIPE AND WIRE BURIAL DEPTHS SEE SPECIFICATIONS.
- RUN WIRING BENEATH AND BESIDE MAINLINE. TAPE AND BUNDLE AT 10-FOOT INTERVALS.
 ALL SOLVENT WELD PLASTIC PIPING TO BE SNAKED IN TRENCH AS SHOWN.
 TIE A 24-INCH LOOP IN ALL WIRING AT CHANGES OF DIRECTION OF 30° OR GREATER. UNTIE AFTER ALL CONNECTIONS HAVE BEEN MADE.

TRENCH DETAIL

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 STATE OF TEXAS
 LICENSED IRRIGATOR
 CHRISTOPHER DIGGS
 10311
 08 / 17 / 2021

Texas Department of Transportation
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GCAA DOWNTOWN IMPROVEMENTS AUBREY, TX IRRIGATION DETAILS

SCALE: N.T.S. Sheet 6 of 9

DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER (SEE TITLE SHEET)			HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.	
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	044	
CHECK ACOUSINS	CONTROL	SECTION	JOB	0817 01 027	

TEMPLATED REVISED: 10-23-02

USER ID

TYPE OF WORK		REQUIREMENTS
	170-6001 IRRIGATION SYSTEM	FOR ALL IRRIGATION SYSTEM TYPES, THE DESIGN, FURNISH, INSTALLATION, REMOVAL, AND MAINTENANCE OF IRRIGATION SYSTEMS IS INCIDENTAL TO ITEM 170 AND WILL NOT BE PAID FOR SEPARATELY UNLESS OTHERWISE SHOWN.
	LS	
	✓	Furnish and install irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, plans, details, and notes.
		Design, furnish, and install irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, plans, details, and notes. Design is incidental to this item and not paid for separately.
		Design, furnish, install, and remove irrigation system in accordance with Item 170 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014, and notes. Power supply must not involve the purchase of electricity. Water distribution must utilize a drip system. Design and removal are incidental to this item and not paid for separately.
	✓	Provide shop drawings with layout, details, and specifications for approval prior to work.
	✓	Remove all above ground components at end of contract.
		Provide as-built drawings at completion of irrigation system. As-built drawings must be sealed by Licensed Irrigator. See additional notes this sheet for requirements.

IRRIGATION SYSTEM NOTES

GENERAL

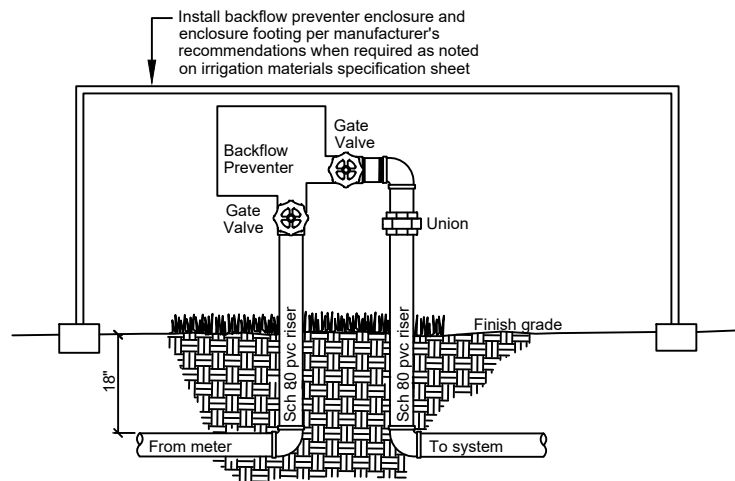
- Reference Item 170 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
- Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electrical, telephone, fiber optics, etc.
- Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of contract. Remove stakes as directed by engineer.
- The drawings are diagrammatic of the work to be performed. Changes may be required due to varying conditions or as directed by the engineer.
- Conduct a complete inventory and analysis of site conditions, incidental construction such as boring, mainline adjustment, sidewalk removal and replacement, utility adjustments, etc. will not be paid for separately unless shown on plans.
- See SHEET 053 for materials specifications, sizes, and requirements.
- Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

CONSTRUCTION METHODS

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

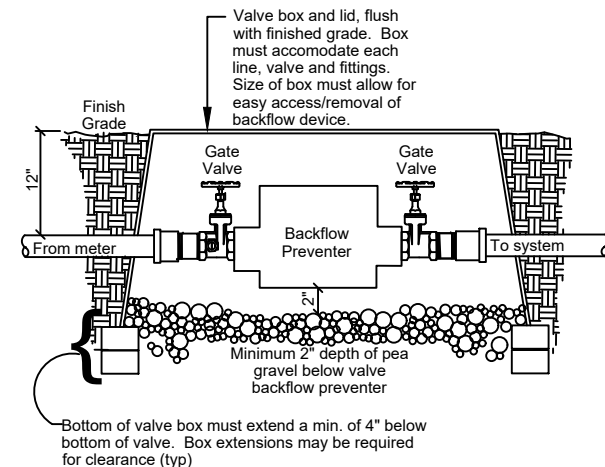
GUARANTEE AND ACCEPTANCE

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



BACKFLOW PREVENTER ABOVE GROUND INSTALLATION

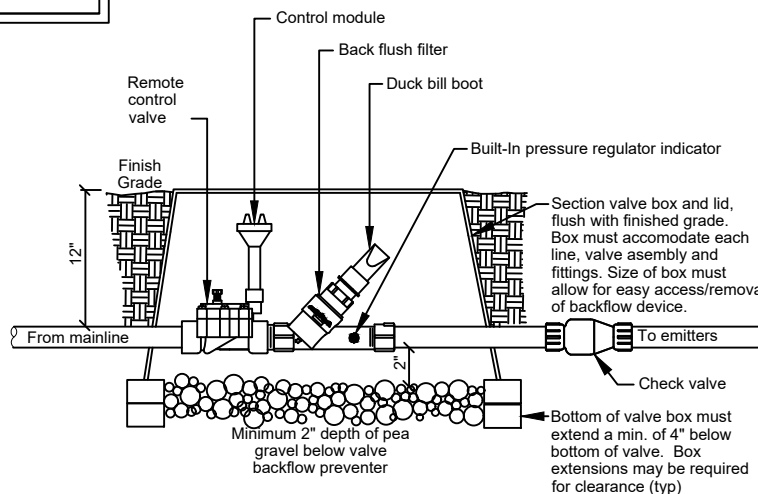
Type shall meet local code. Local code will have precedence over this detail.



BACKFLOW PREVENTER IN GROUND INSTALLATION

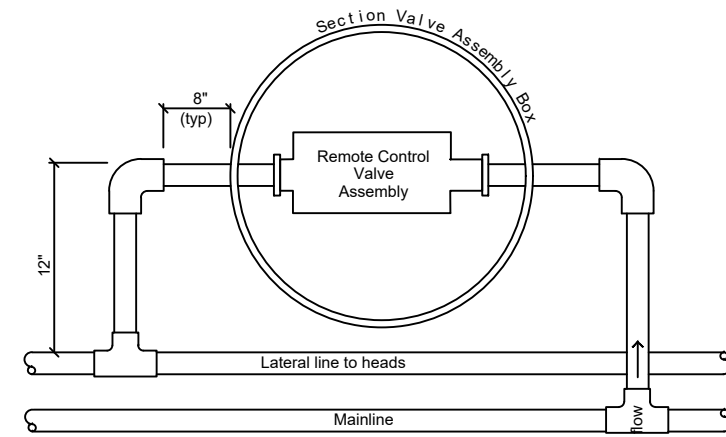
Type shall meet local code. Local code will have precedence over this detail.

OR



SECTION - PIPING TO/FROM REMOTE CONTROL VALVE ASSEMBLY

REMOTE CONTROL VALVE ASSEMBLY



PLAN - PIPING TO/FROM REMOTE CONTROL VALVE ASSEMBLY

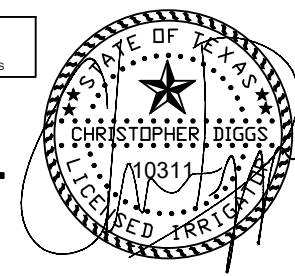
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08 / 17 / 2021



**GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
IRRIGATION DETAILS**

SCALE: N.T.S. Sheet 7 of 9

DESIGN	FED. RD. DIV. NO.	PROJECT NUMBER			HIGHWAY NO.
JBLAD	6	(SEE TITLE SHEET)			FM 428
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.	
JBLAD	TEXAS	DALLAS	DENTON	045	
CHECK	CONTROL	SECTION	JOB		
ACOUSINS	0817	01	027		

DATE

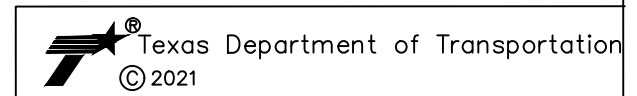
IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	REMARKS
TAP/METER	LOCAL CODE	1 1/2 inch minimum	LOCAL CODE MAY REQUIRE LARGER METER
BACKFLOW PREVENTER	APPROVED BY LOCAL CODE	1 inch	
BACKFLOW PREVENTER ENCLOSURE REQUIRED FOR THE FOLLOWING IRRIGATION SYSTEM TYPES: <input checked="" type="checkbox"/> TYPE I TYPE III <input type="checkbox"/> <input checked="" type="checkbox"/> TYPE II TYPE IV <input type="checkbox"/> Enclosure will be approved by the engineer. Enclosure will be manufactured specifically for purpose of protecting backflow preventor. Enclosure will be vandal-resistant, lockable with the ability to be anchored to the ground. Enclosure will be completely removable. Enclosure size will provide access and clearance on all sides of backflow preventer. Locking mechanism will be approved by the engineer. Provide locks and keys. All locks will use same keys unless otherwise directed by the engineer. Keys will match master key provided by engineer or landscape architect. Locks may be integrated into enclosure.	APPROVED BY ENGINEER	APPROVED BY ENGINEER	PROVIDE FOUR(4) KEYS TO ENGINEER IF ENCLOSURE IS REQUIRED
VALVE APPURTENANCES: INCLUDES: BACK FLUSH FILTER and PRESSURE REGULATOR CHECK VALVE DUCK BILL BOOT CLOSE NIPPLES (1")	NETAFIM LVCZ SERIES DRIP VALVE ASSEMBLY HUNTER ICV SERIES ELECTRIC REMOTE CONTROL,	1 inch	
HUNTER ACC2 SERIES AUTOMATIC CONTROLLER	A2C-1200-M		
BORING		SIZE NOTED ON PLANS	OVERCUTTING WILL NOT BE ALLOWED
PVC SCH 40 ENCASEMENT PIPE FOR SLEEVES AND BORES Pressure rated with slip type solvent welded joints		4 inch	REFERENCE ITEM 170.2.C
PVC SCH 80 above ground at backflow device		2 inch	PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE
PVC SCH 40 MAINLINE Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints		2 inch	
PVC SCH 40 LATERALS AND HEADERS		3/4 inch	
PVC SCH 80 ABOVE GROUND PIPE			PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE
BURIED RISERS AND SWING-JOINT COMPONENTS SCH 80			
PVC FITTINGS All fittings incorporated into system will be of the same type, size and class material as the pipe			
Dripline with COPPER SHIELD for Sub-Surface Irrigation	NETAFIM TECHLINE TLHCVR5-12	0.55 GAL./HR, 18 inch ROW SPACING	
DRIPLINE FITTINGS Use fittings specifically manufactured for all dripline connections, no bending/crimping allowed.			
CONTROL WIRE All low voltage control wire will be color coded. Wire sizes will conform to the controller manufacturer specifications for maximum distances for specific wire sizes. All wire will be specifically manufactured for direct burial. All wire connections and splices will be made in ground boxes. The splice will be completely waterproof and will be completely encapsulated within a King Safety Sealed Irrigation Connector/Splice enclosure or an approved equal			
SOLVENT CEMENT Solvent cement will be the type recommended by the pipe manufacturer			
VALVE BOXES Boxes for section valves, below-ground backflow preventors, and quick coupling valves will be as shown on detail sheet			
VALVE BOX RISERS			

IRRIGATION SYSTEM NOTES:

- Reference IRRIGATION DETAILS SHEETS 050 THRU 054 for details and requirements.
- Reference to manufacturer's trade name or catalog number is for the purpose of identification only, contractor is permitted to furnish like materials of other manufacturer's provided they are of equal quality and comply with specifications for this project.

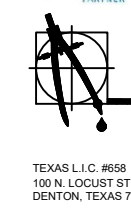
TEMPLATED REVISED: 10-23-02



**GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 IRRIGATION DETAILS**

SCALE: N.T.S. Sheet 8 of 9

DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	

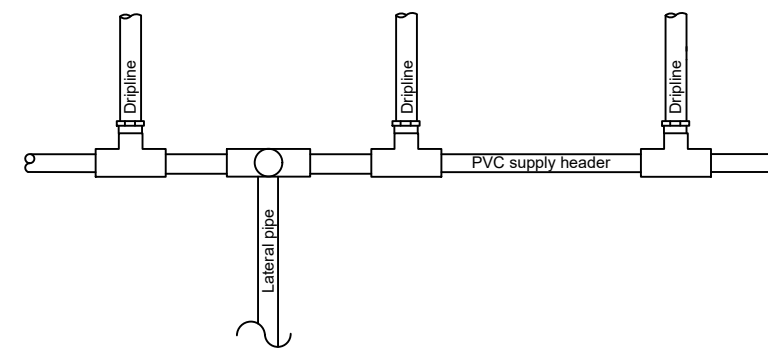
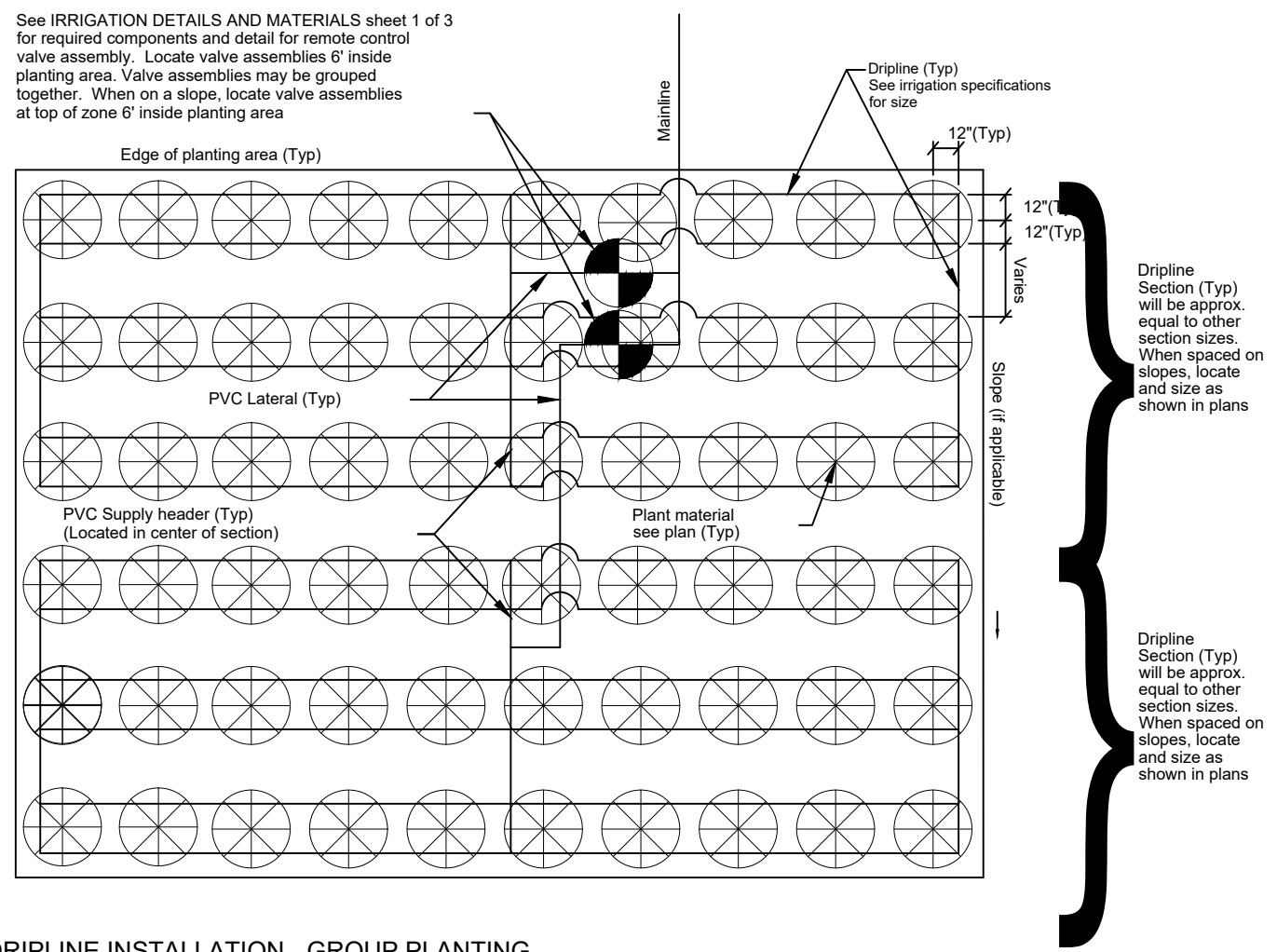


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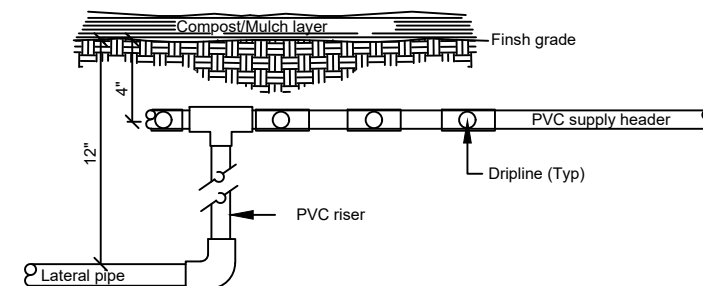


08 / 17 / 2021

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



PLAN - RISER/SUPPLY HEADER TO DRIP TUBING



SECTION - RISER/SUPPLY HEADER TO DRIP TUBING

DRIPLINE INSTALLATION - GROUP PLANTING

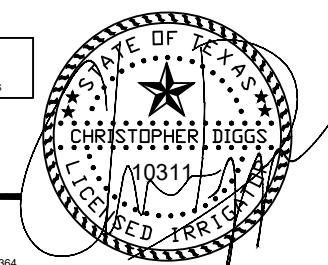
Note: When dripline sections are installed on slopes, schedule controller such that lower sections on slope are operating for shorter lengths of time. Contact engineer and landscape architect for setting length of timed dripline section operation. Total number of emitters and laterals will not allow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

TEMPLATED REVISED: 10-23-02

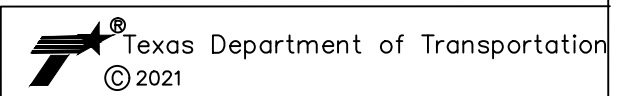


IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (MC-178) P.O. BOX 13097 T.C.E.Q.'S WEB SITE IS: WWW.TCEQ.STATE.TX.US

James Pole
IRRIGATION CONSULTANTS
IRRIGATION DESIGN, CONSULTING, AND LANDSCAPE WATER MANAGEMENT
TEXAS L.I.C. #658 100 N. LOCUST ST., SUITE 3 DENTON, TEXAS 76201
PHONE: 940.243.2364 FAX: 940.382.2475
james@jamespoleirrigation.com



08 / 17 / 2021



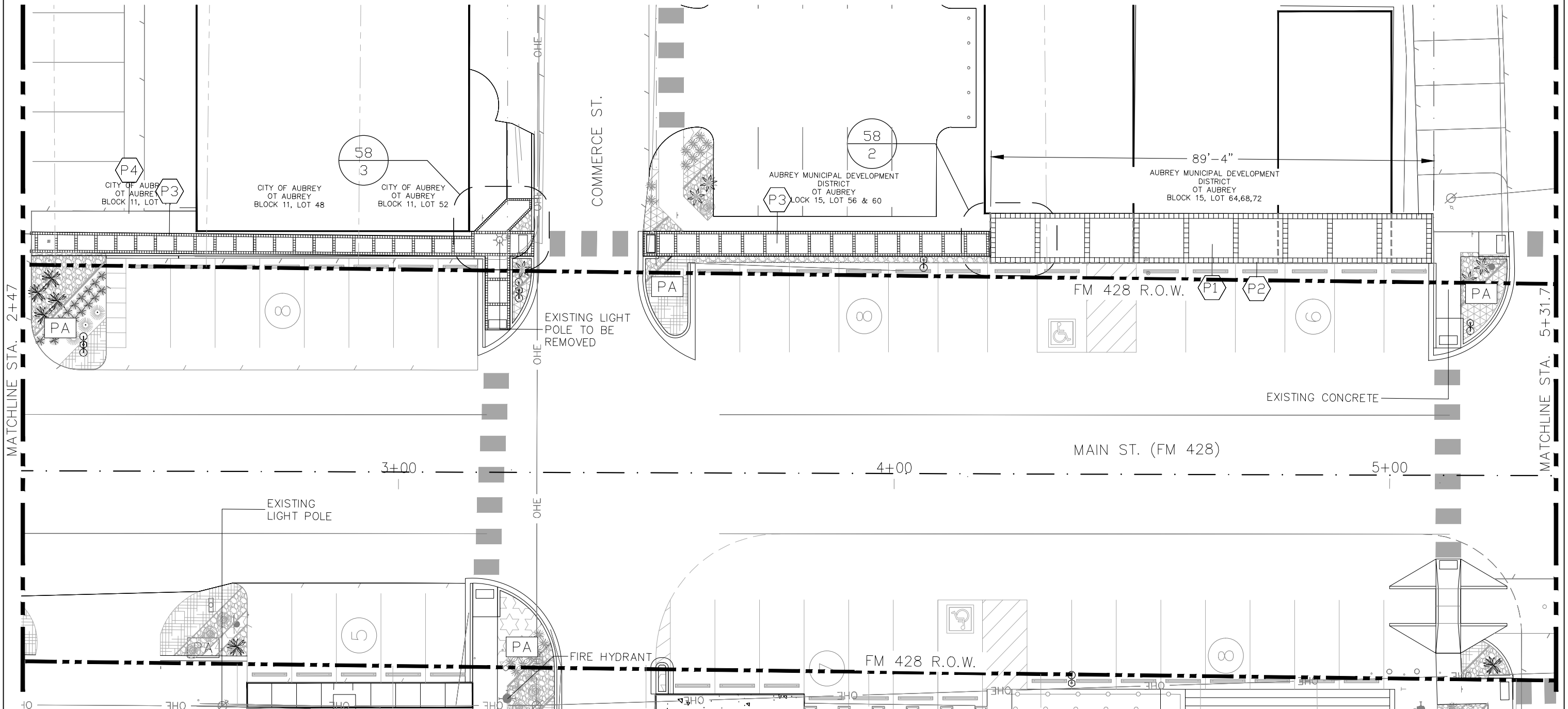
GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
IRRIGATION DETAILS

SCALE: N.T.S. Sheet 9 of 9

DESIGN JBLAD	FED.RD. DIV.NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS JBLAD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK ACOUSINS	TEXAS	DALLAS	DENTON	047
CHECK ACOUSINS	CONTROL	SECTION	JOB	
	0817	01	027	

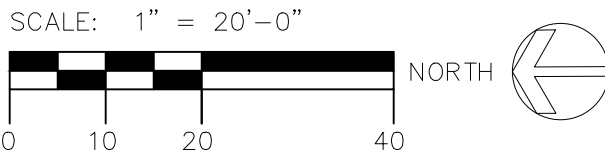
MATCHLINE STA. 2+47

MATCHLINE STA. 5+31.7



HARDSCAPE SCHEDULE MATERIALS & FINISHES				
SYM.	MATERIAL	MATERIAL / PRODUCT DESCRIPTION	PATTERN / FINISH /COLOR	DETAIL REF.
PAVING				
P1	STAINED PEDESTRIAN CONCRETE	NEW CONCRETE, PER STANDARD DETAILS	8' X 8' SQUARE PATTERN ; HEAVY SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-22 TAUPE	3 / 054
P2	STAINED PEDESTRIAN CONCRETE	NEW CONCRETE, PER STANDARD DETAILS	1' X 1' SOLIDER COURSE; LIGHT SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-12 BALKAN AMBER;	3 / 054
P3	STAINED COLORED TEXTURE CONCRETE	EXISTING CONCRETE TO BE STAINED	4' X 4' SQUARE PATTERN; HEAVY SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-22 TAUPE	-
P4	STAINED COLORED TEXTURE CONCRETE	EXISTING CONCRETE TO BE STAINED	6" X 6" SOLIDER COURSE; LIGHT SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-12 BALKAN AMBER	-

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION.



LEGEND
CONCRETE LANDSCAPE EDGE (12")

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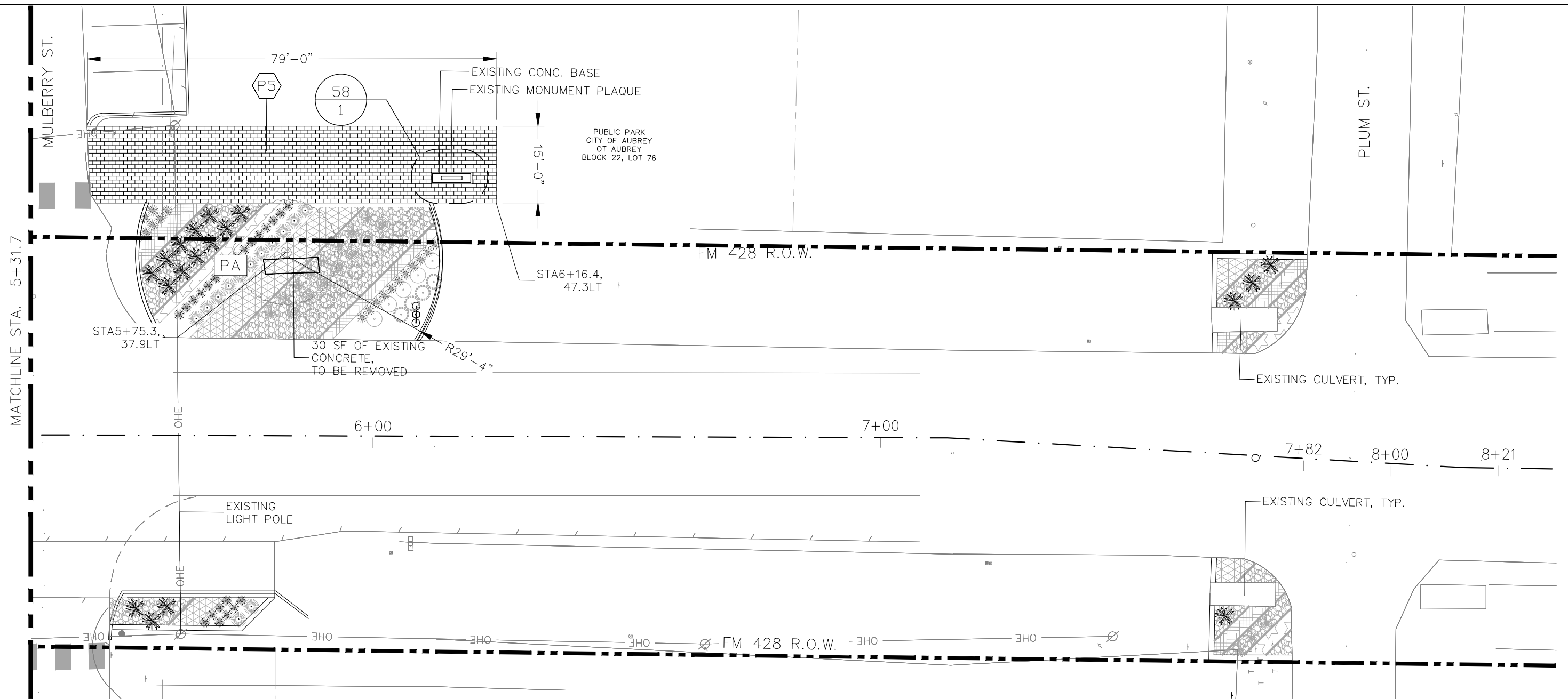
**GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
HARDSCAPE PLAN**

SCALE: 1" = 20'-0" Sheet 1 of 3

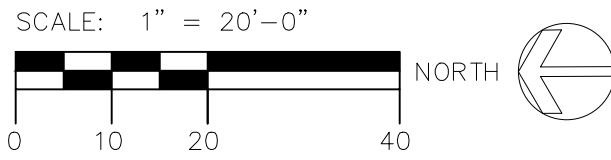
DESIGN JBLAD	FED. RD. DIV.NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 048
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	

TEMPLATED REVISED: 10-23-02

TEMPLATED REVISED: 10-23-02



NOTE:
 ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION.



HARDSCAPE SCHEDULE MATERIALS & FINISHES				
SYM.	MATERIAL	MATERIAL / PRODUCT DESCRIPTION	PATTERN / FINISH /COLOR	DETAIL REF.
PAVING				
P6	CONCRETE PAVERS	PAVESTONE, VERONA 9"x18", 8 CM	PATTERN: RUNNING BOND	1 / 054

LEGEND
 CONCRETE LANDSCAPE EDGE (12")



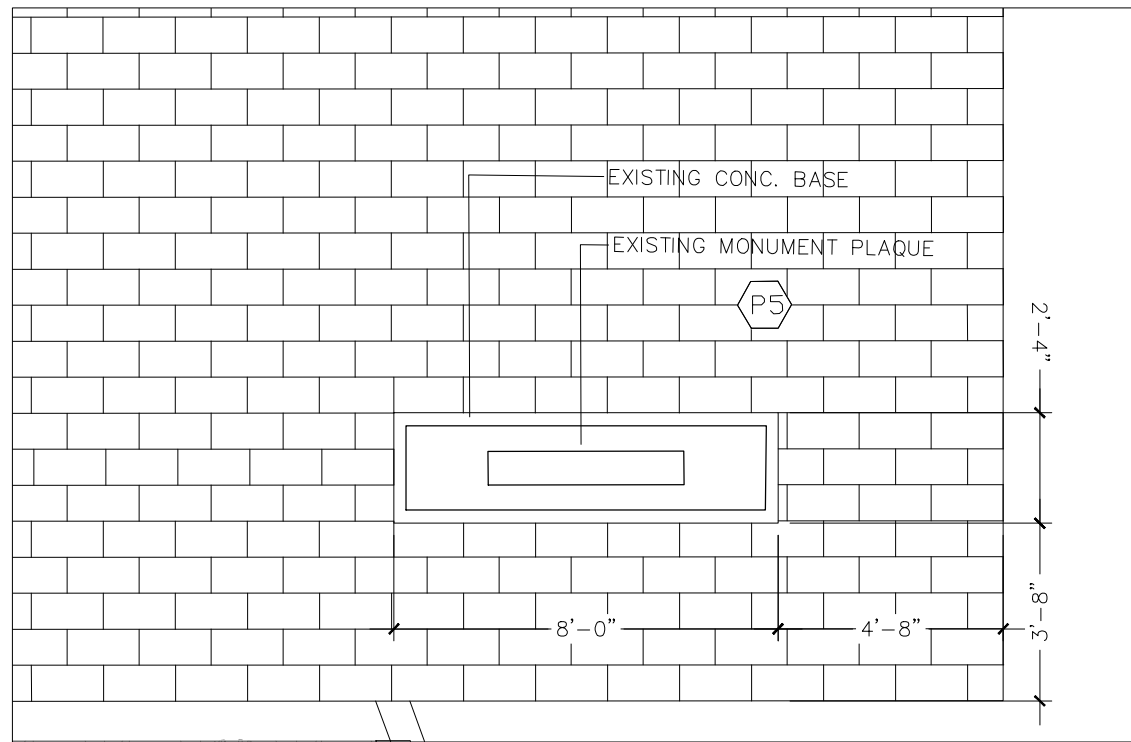
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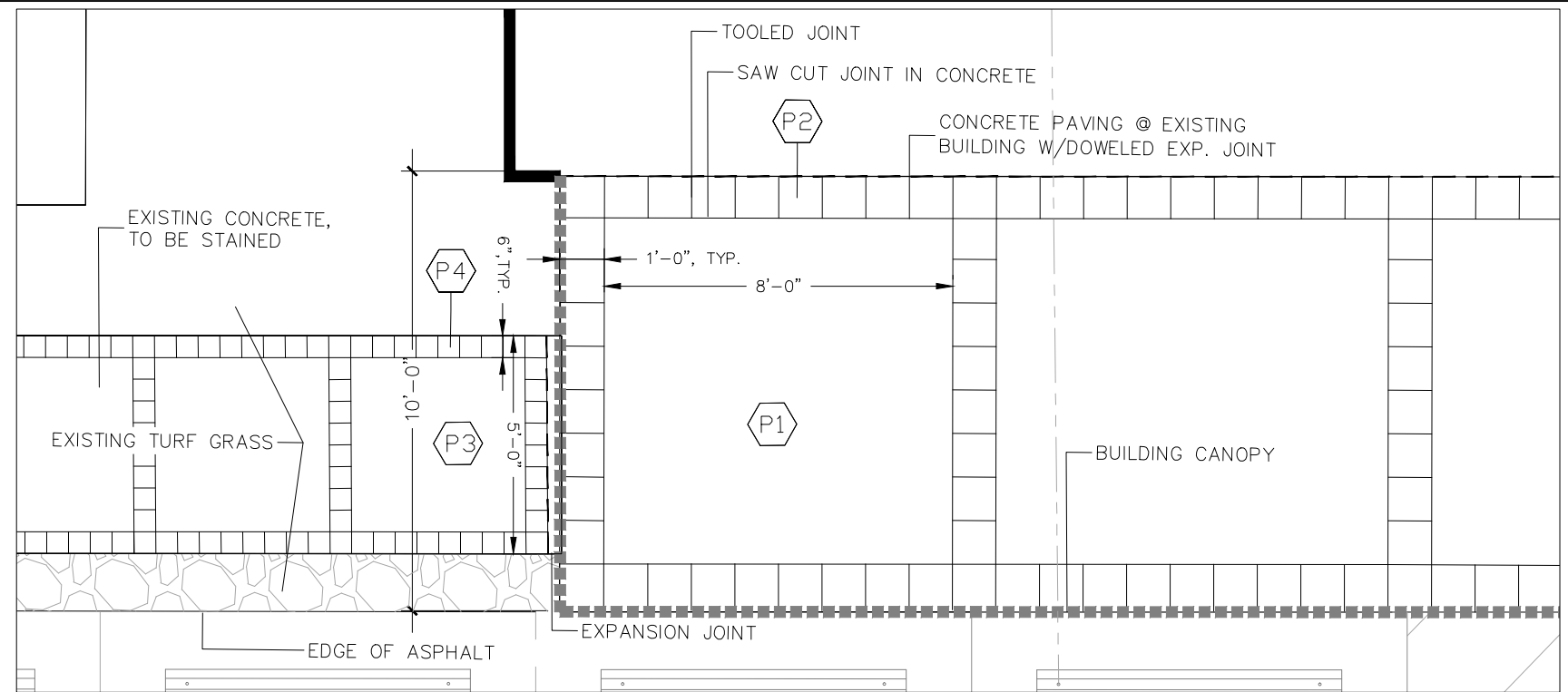
**GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX
 HARDSCAPE PLAN**

SCALE: 1" = 20'-0" Sheet 2 of 3

DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 049
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	



1. MONUMENT PAVING ENLARGEMENT
SCALE: 1" = 4'-0"



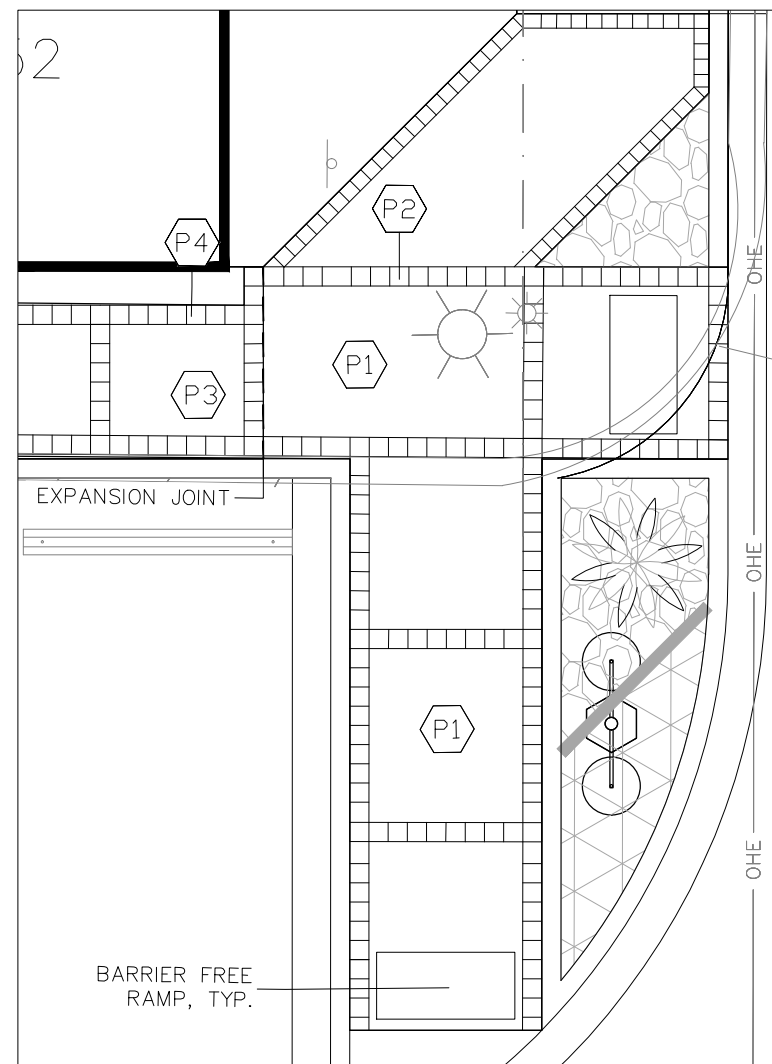
2. PAVING TRANSITION ENLARGEMENT
SCALE: 1" = 4'-0"

HARDSCAPE SCHEDULE MATERIALS & FINISHES				
SYM.	MATERIAL	MATERIAL / PRODUCT DESCRIPTION	PATTERN / FINISH /COLOR	DETAIL REF.
PAVING				
P1	STAINED PEDESTRIAN CONCRETE	NEW CONCRETE, PER STANDARD DETAILS	8' X 8' SQUARE PATTERN ; HEAVY SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-22 TAUPE	3 / 054
P2	STAINED PEDESTRIAN CONCRETE	NEW CONCRETE, PER STANDARD DETAILS	1' X 1' SOLIDER COURSE; LIGHT SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-12 BALKAN AMBER;	3 / 054
P3	STAINED COLORED TEXTURE CONCRETE	EXISTING CONCRETE TO BE STAINED	4' X 4' SQUARE PATTERN; HEAVY SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-22 TAUPE	-
P4	STAINED COLORED TEXTURE CONCRETE	EXISTING CONCRETE TO BE STAINED	6" X 6" SOLIDER COURSE; LIGHT SANDBLAST FINISH; BUTTERFIELD COLOR PERMA-CAST SIERRA STAIN, COLOR: BAS-12 BALKAN AMBER	-
P5	CONCRETE PAVERS	PAVESTONE, VERONA 9"x18", 8 CM	PATTERN: RUNNING BOND	1 / 054

LEGEND

CONCRETE LANDSCAPE EDGE (12")

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND SHOULD BE USED FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND CONTACT DIG TESS PRIOR TO ANY EXCAVATION.



3. PAVING ENLARGEMENT
SCALE: 1" = 5'-0"

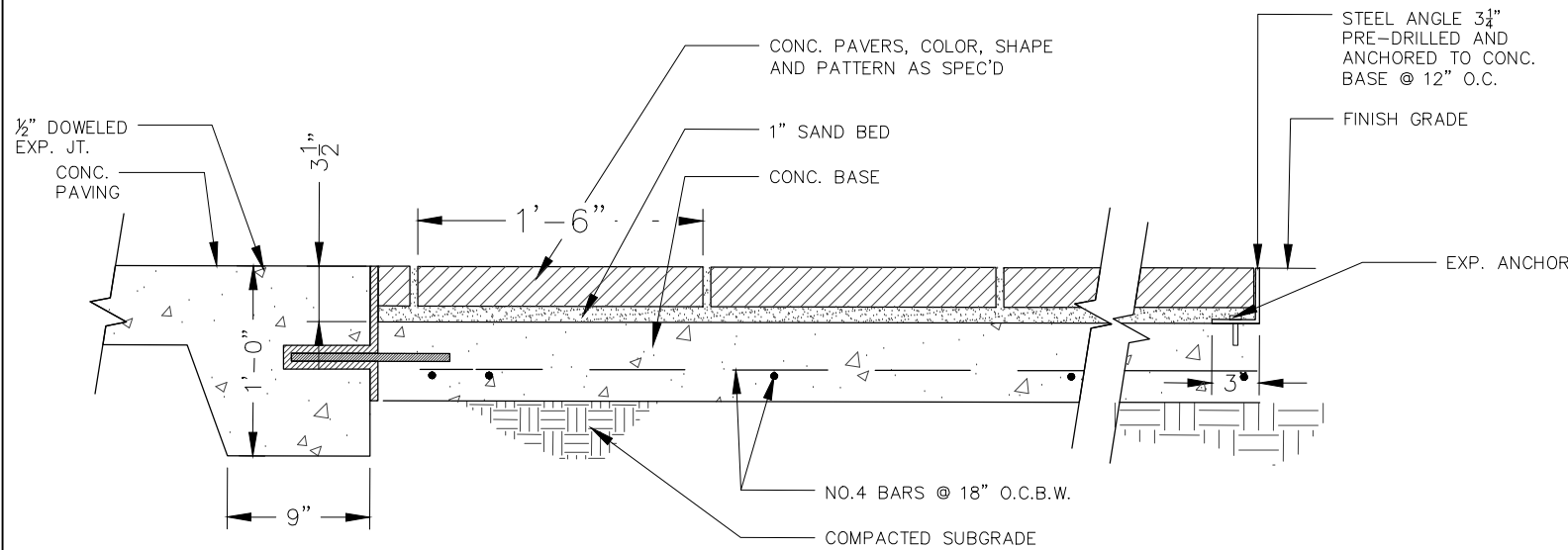


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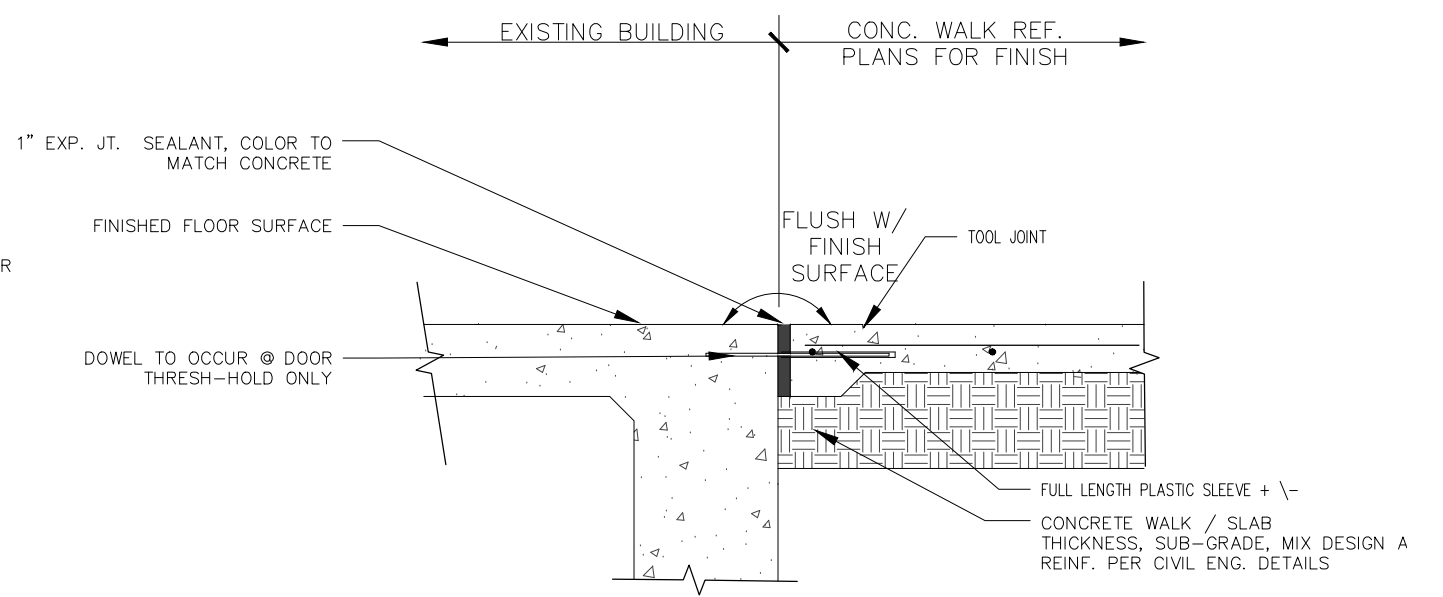
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HARDSCAPE ENLARGEMENT

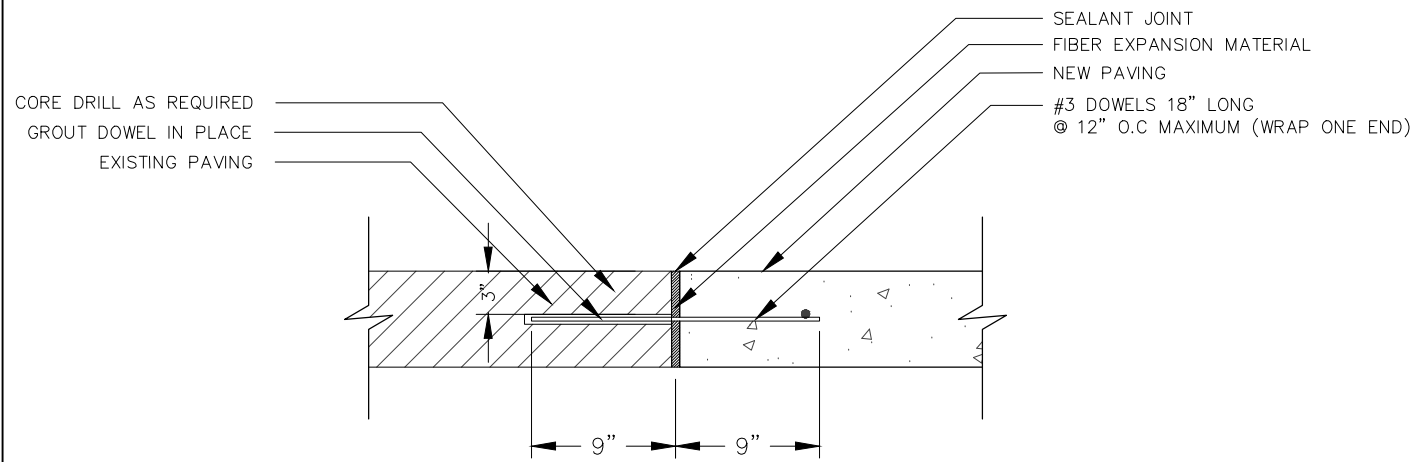
DESIGN JBLAD	FED. RD. DIV. NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 050
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	



CONCRETE PAVERS
SCALE: 1" = 1'-0"

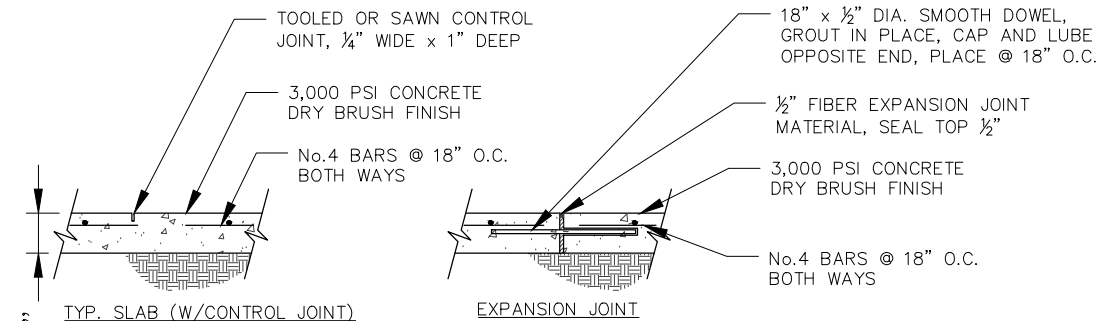


CONCRETE PAVING @ EXISTING BLDG.
SCALE: 3/4" = 1'-0"

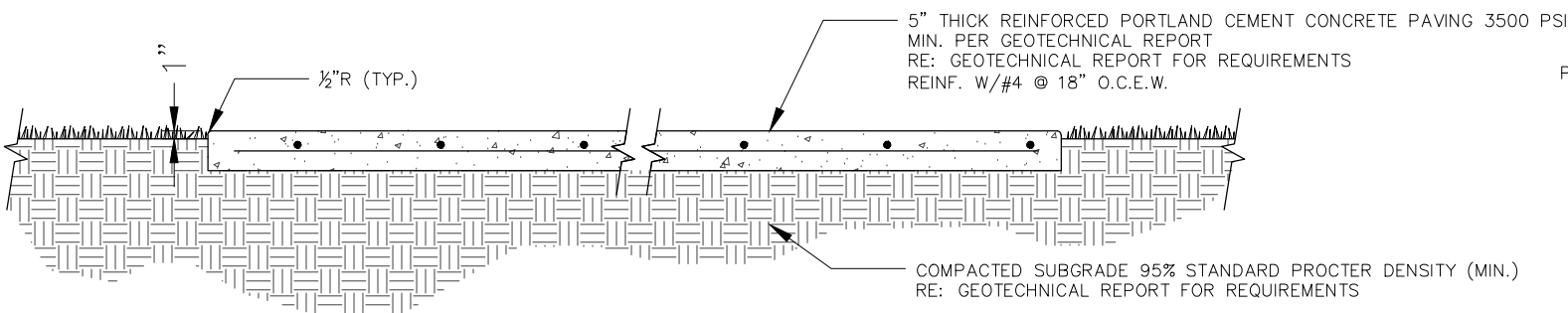


EXPANSION JOINT AT EXISTING PAVING
SCALE: 1" = 1'-0"

NOTE:
- SAWCUTS @ 4' PER PATTERN FOR 5' SIDEWALK OR 8' PER PATTERN FOR 10' SIDEWALK
- EXPANSION JOINTS @ 48' PER PATTERN SPECIFIED



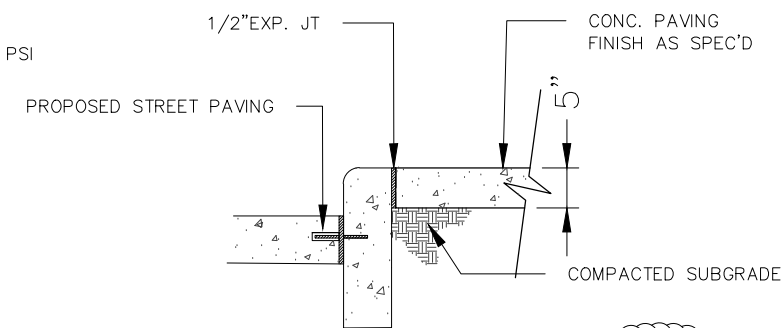
CONCRETE PAVING JOINTS
SCALE: 1/2" = 1'-0"



NON-VEHICULAR PAVING
SCALE: 1/2" = 1'-0"

- NOTE:**
- ALL SITE SIDEWALKS TO BE LIGHT DRY BROOM FINISH. RE: LAYOUT PLANS FOR ALTERNATIVE WALKWAY FINISHES.
 - NON-VEHICULAR PAVING TO INCLUDE ALL COSTS ASSOCIATED WITH JOINTING, SEALING, EXPANSION MATERIALS, CURING, REINFORCEMENT STEEL AND BARS, THICKEND EDGE, & ALL APPURTENANCES AS DETAILED IN THESE DRAWINGS.

SIDEWALK TO HAVE A MAX. 2% CROSS SLOPE AND LONGITUDINAL SLOPES THAT DO NOT EXCEED 4.9%



CONCRETE PAVING @ CURB.
SCALE: 1/2" = 1'-0"



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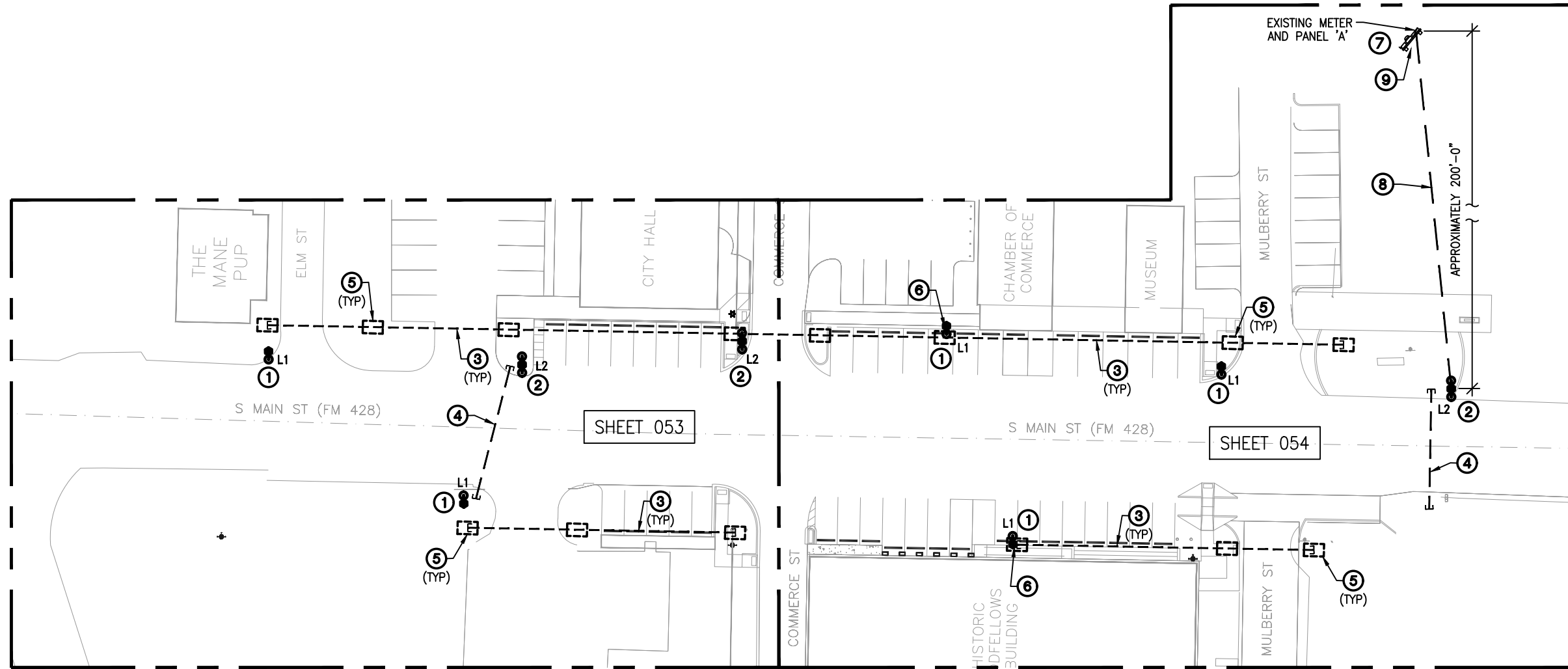
Valley Quest
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GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
HARDSCAPE DETAILS

DESIGN JBLAD	FED. RD. DIV.NO. 6	PROJECT NUMBER 0817-01-027		HIGHWAY NO. FM 428
GRAPHICS MDAVIS	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 051
CHECK JBLAD	CONTROL 0817	SECTION 01	JOB 027	

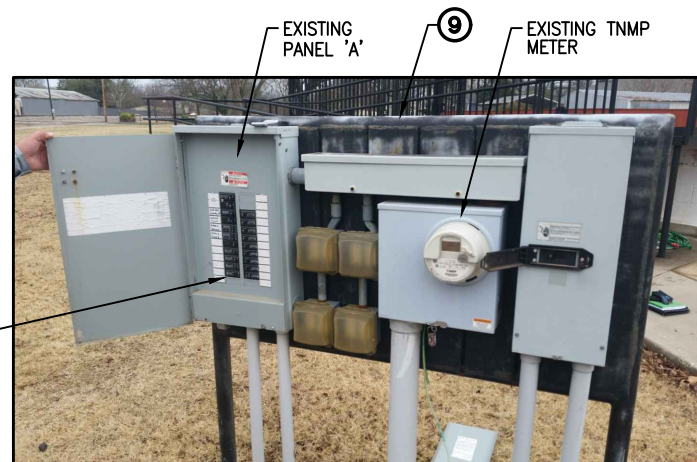
TEMPLATED REVISED: 10-23-02



1 ELECTRICAL LIGHTING - SITE PLAN
 1" = 50'-0"

SITE ELECTRICAL PLAN KEYED NOTES:

- ① 'L1', NEW 16'-0" POLE WITH LED FIXTURE AT 15'-0" WITH SHEPHERD'S CROOK ARM.
- ② 'L2', SAME AS 'L1' WITH TWIN FIXTURES AND ARMS.
- ③ EXISTING TRENCH AND CONDUITS INCLUDING 2" SCH. 80 CONDUIT FOR POWER TO NEW LIGHT POLES AND RECEPTACLES. REFER TO CIVIL STREETSCAPE PLANS SHEETS 13 AND 14 FOR EXISTING TRENCH AND CONDUIT ROUTING INCLUDING TRENCH AND CONDUIT DETAIL.
- ④ NEW 2" SCH 80 CONDUIT BORE FOR POWER. PARALLEL NEW BORE WITH BORE AND CONDUITS SHOWN ON IRRIGATION PLANS. PROVIDE NEW CONDUCTORS AS NOTED. NOTIFY ENGINEER IF A CONFLICT EXISTS.
- ⑤ EXISTING IRRIGATION VALVE BOX FOR ASSISTANCE WITH LOCATING EXISTING CONDUIT INSTALLED FOR FUTURE USE. REFER TO CIVIL CONDUIT PLANS SHEETS 13 AND 14 FOR EXACT LOCATIONS, SPECIFICATIONS AND INFORMATION.
- ⑥ COORDINATE FINAL POLE AND POLE BASE LOCATION IN FIELD WITH PARKING SPACES AND RAMPS. POLE MUST BE INSTALLED WITH BASE TO PROTECT POLE AND BASE FROM DAMAGE BY AUTOMOBILES AND TRAFFIC. POLE AND BASE MUST NOT OBSTRUCT PEDESTRIAN TRAFFIC FROM PARKING SPACES AND AT SIDEWALK.
- ⑦ EXISTING TNMP METER/MAIN AND EXISTING PANEL 'A'. SEE DETAIL THIS SHEET FOR ADDITIONAL EXISTING INFORMATION.
- ⑧ COORDINATE PROPOSED TRENCH AND CONDUIT LOCATION IN FIELD WITH CITY OFFICIAL, EXISTING UTILITIES, AND POWER OUTLETS WITHIN PARK. EXISTING UTILITIES MUST BE LOCATED AND MARKED PRIOR TO TRENCHING.
- ⑨ PROVIDE PHOTOCELL CONTROL OR ASTRONOMIC TIME CLOCK FOR NEW POLE LIGHTING POWER. COORDINATE LOCATION AND REQUIREMENTS INCLUDING ON/OFF TIMES WITH CITY OFFICIAL.



2 PHOTO OF EX. METER AND PANEL 'A'
 NOT TO SCALE

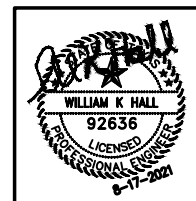
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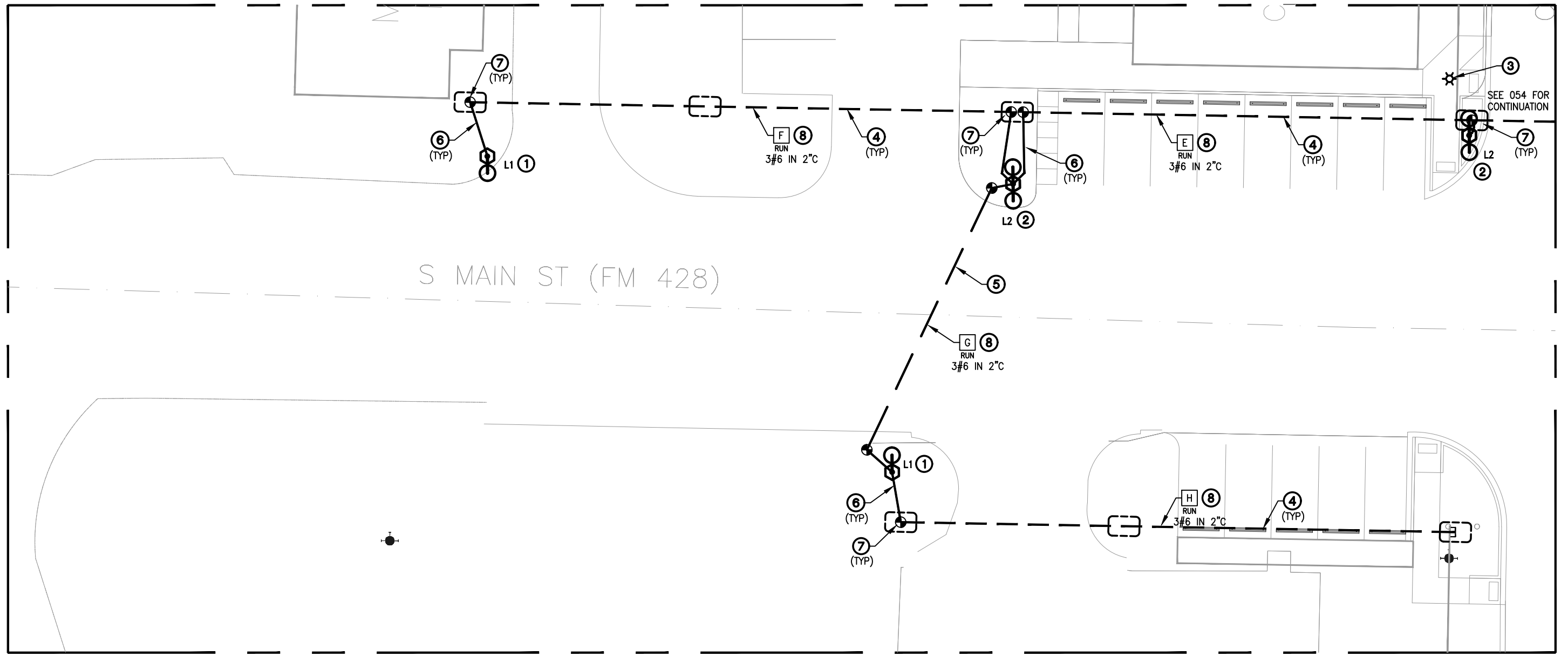
GCAA DOWNTOWN IMPROVEMENTS
AUBREY, TX
 ELECTRICAL LIGHTING SITE PLAN

SCALE: 1" = 50'-0" Sheet 1 of 7

DESIGN ARH	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS ARH	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 052
CHECK WKH	CONTROL 0817	SECTION 01	JOB 027	



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 LEWISVILLE, TEXAS 75057
 TEL: 214-681-2179
 TEXAS FIRM REGISTRATION #F-12258



ELECTRICAL GENERAL NOTES:

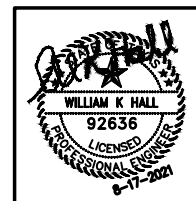
- CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL CONDITIONS AND IS RESPONSIBLE FOR REPORTING ANY CONFLICTS TO THE ARCHITECT PRIOR TO THE START OF WORK.
- "EXISTING" OR "VERIFY IN FIELD" MEANS THE CONTRACTOR IS TO CONFIRM THE ITEM SHOWN ON THE DRAWING EXISTS AND IS IN GOOD WORKING CONDITION. SHOULD THE CONTRACTOR FIND THE EQUIPMENT IS NOT AS SHOWN ON THESE DRAWINGS, IT IS TO BE INSTALLED AS REQUIRED TO PROVIDE THE OWNER WITH A FULLY FUNCTIONING SYSTEM AND AS REQUIRED BY ALL LOCAL CODES AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- THE CONTRACTOR SHALL PROVIDE A COMPLETE, USEABLE, AND OPERABLE SYSTEM IN ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS.
- ELECTRICAL CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL ELECTRICALLY ENERGIZED EQUIPMENT WHETHER FURNISHED BY CONTRACTOR OR OWNER AND SHALL MEET THE LATEST APPROVED NATIONAL ELECTRICAL CODE (N.E.C.) FOR THE AREA.
- CONTRACTOR SHALL COMPLY WITH THE LATEST APPROVED NATIONAL ELECTRICAL CODE AND OSHA'S FAULT PROTECTION STANDARD ON THE CONSTRUCTION SITE.
- CONTRACTOR SHALL REFER TO ELECTRICAL SPECIFICATIONS WITHIN THIS SUBMITTAL FOR ADDITIONAL REQUIREMENTS.
- VOLTAGE DROP THRU ALL CONDUCTORS SHALL NOT EXCEED THAT ALLOWED BY THE NEC. CONTRACTOR SHALL UPSIZE FEEDERS AND BRANCH CIRCUITS AS REQUIRED WHERE REQUIRED.

ELECTRICAL LIGHTING PLAN KEYED NOTES:

- 'L1', NEW 16'-0" POLE WITH LED FIXTURE AT 15'-0" WITH SHEPHERD'S CROOK ARM.
- 'L2', SAME AS 'L1' WITH TWIN FIXTURES AND ARMS.
- EXISTING POLE/GLOBE AND POWER CONDUCTORS TO BE REMOVED. DELIVER EXISTING POLE AND FIXTURE TO CITY OF AUBREY REPRESENTATIVE.
- EXISTING 2" SCH. 80 CONDUIT WITHIN EXISTING TRENCH. REFER TO CIVIL STREETSCAPE PLANS SHEETS 13 AND 14 FOR EXISTING TRENCH AND CONDUIT ROUTING INCLUDING TRENCH AND CONDUIT DETAIL. PROVIDE NEW CONDUCTORS NOTED. PROVIDE PULL STRINGS WHERE REQUIRED.
- NEW 2" SCH 80 CONDUIT BORE FOR POWER. PARALLEL NEW BORE WITH BORE AND CONDUITS SHOWN ON IRRIGATION PLANS. PROVIDE NEW CONDUCTORS AS NOTED. NOTIFY ENGINEER IF A CONFLICT EXISTS.
- NEW 2" SCH. 80 CONDUIT IN NEW TRENCH. EXTEND CONDUIT TO EXISTING 2" SCH. 80 CONDUIT IN BOX. EXTEND CONDUIT TO POLE FIXTURE BASE AND INSTALL NEW CONDUCTORS AS NOTED. CONNECT EQUIPMENT GROUNDING CONDUCTOR, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE REQUIREMENTS WITH POLE AND FIXTURE MANUFACTURER. NOTIFY ENGINEER IF A CONFLICT EXISTS.
- EXTEND NEW 2" SCH. 80 CONDUIT TO EXISTING PULL BOX. PROVIDE GROUND ROD, GROUNDING BUSHING AND/OR CLAMP AS REQUIRED PER TXDOT GROUND BOX REQUIREMENTS.
- RUN LENGTHS ARE BASED ON DISTANCE FROM LIGHT POLE BASE TO NEXT LIGHT POLE BASE. SEE SUMMARY OF CONDUIT AND CABLES SCHEDULE FOR ADDITIONAL INFORMATION.

1 ELECTRICAL LIGHTING - NORTH
 1" = 20'-0"

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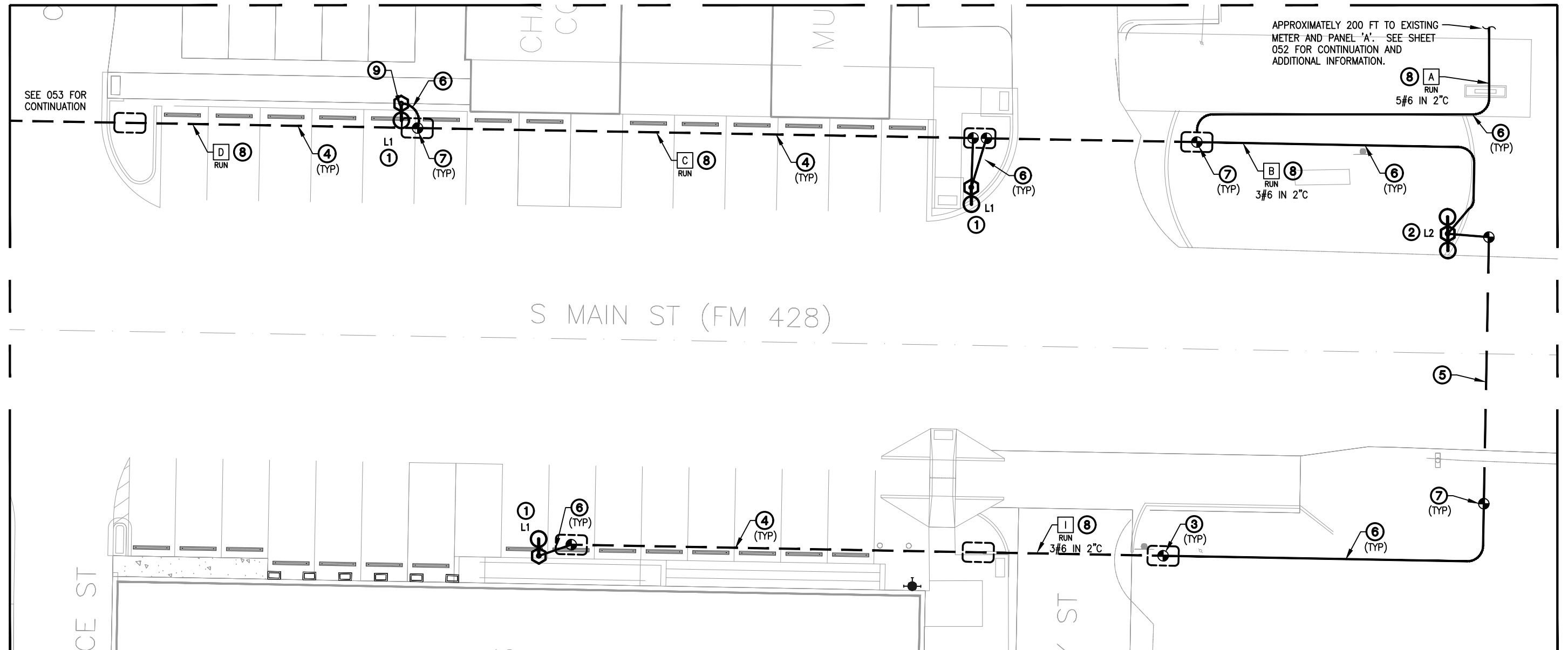
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**GCAA DOWNTOWN IMPROVEMENTS
 AUBREY, TX**

ELECTRICAL LIGHTING SITE PLAN - NORTH

SCALE: 1" = 20'-0" Sheet 2 of 7

DESIGN ARH	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS ARH	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON	SHEET NO. 053
CHECK WKH	CONTROL 0817	SECTION 01	JOB 027	



ELECTRICAL LIGHTING PLAN KEYED NOTES:

- ① 'L1', NEW 16'-0" POLE WITH LED FIXTURE AT 15'-0" WITH SHEPHERD'S CROOK ARM.
- ② 'L2', SAME AS 'L1' WITH TWIN FIXTURES AND ARMS.
- ③ EXISTING POLE/GLOBE AND POWER CONDUCTORS TO BE REMOVED. DELIVER EXISTING POLE AND FIXTURE TO CITY OF AUBREY REPRESENTATIVE.
- ④ EXISTING 2" SCH. 80 CONDUIT WITHIN EXISTING TRENCH. REFER TO CIVIL STREETScape PLANS SHEETS 13 AND 14 FOR EXISTING TRENCH AND CONDUIT ROUTING INCLUDING TRENCH AND CONDUIT DETAIL. PROVIDE NEW CONDUCTORS NOTED. PROVIDE PULL STRINGS WHERE REQUIRED.
- ⑤ NEW 2" SCH 80 CONDUIT BORE FOR POWER. PARALLEL NEW BORE WITH BORE AND CONDUITS SHOWN ON IRRIGATION PLANS. PROVIDE NEW CONDUCTORS AS NOTED. NOTIFY ENGINEER IF A CONFLICT EXISTS.
- ⑥ NEW 2" SCH. 80 CONDUIT IN NEW TRENCH. EXTEND CONDUIT TO EXISTING 2" SCH. 80 CONDUIT IN BOX. EXTEND CONDUIT TO POLE FIXTURE BASE AND INSTALL NEW CONDUCTORS AS NOTED. CONNECT EQUIPMENT GROUNDING CONDUCTOR, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE REQUIREMENTS WITH POLE AND FIXTURE MANUFACTURER. NOTIFY ENGINEER IF A CONFLICT EXISTS.
- ⑦ EXTEND NEW 2" SCH. 80 CONDUIT TO EXISTING PULL BOX. PROVIDE GROUND ROD, GROUNDING BUSHING AND/OR CLAMP AS REQUIRED PER TXDOT GROUND BOX REQUIREMENTS.
- ⑧ RUN LENGTHS ARE BASED ON DISTANCE FROM LIGHT POLE BASE TO NEXT LIGHT POLE BASE. SEE SUMMARY OF CONDUIT AND CABLES SCHEDULE FOR ADDITIONAL INFORMATION.
- ⑨ COORDINATE FINAL POLE AND POLE BASE LOCATION IN FIELD WITH PARKING SPACES, SIDEWALKS AND RAMPS. POLE AND BASE MUST BE INSTALLED TO PROTECT POLE AND BASE FROM DAMAGE BY AUTOMOBILES AND TRAFFIC. POLE AND BASE MUST NOT OBSTRUCT PEDESTRIAN TRAFFIC FROM PARKING SPACES AND AT SIDEWALK. VERIFY FINAL LOCATION WITH ARCHITECT AND CITY OFFICIAL PRIOR TO INSTALLATION.

① ELECTRICAL LIGHTING - SOUTH
 1" = 20'-0"

SUMMARY OF CONDUIT AND CABLES														
RUN NUMBER	CONDUIT STATUS	ITEM 618 SIZE/TYPE CONDUIT (FT) SCHEDULE 40			CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS			OPTICOM CABLE	ITEM 620 ELECTRICAL CONDUCTORS			LENGTH OF RUN	RUN NUMBER
		EXISTING PVC (TRENCH)	2" PVC (TRENCH)	2" PVC (BORE)		NO. 6 XHHW WIRE	NO. 6 BARE WIRE	NO. 8 XHHW WIRE (LUM)		VIVDS COAXIAL CABLE	2 COND. #12 AWG	10 COND. #14 AWG		
A			300		5	1							A	
B		45	90		2	1							B	
C		120	20		2	1							C	
D		100	20		2	1							D	
E		90	30		2	1							E	
F		110	40		2	1							F	
G			20	60	2	1							G	
H		120	20		--	--							H	
I		120	90	60	2	1							I	
TOTALS (LF)		705	580	120	2810	1405								

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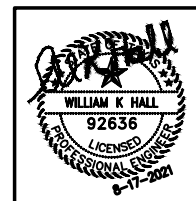
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 AUBREY, TX**

ELECTRICAL LIGHTING SITE PLAN - SOUTH

SCALE: 1" = 20'-0" Sheet 3 of 7

DESIGN ARH	FED. RD. DIV. NO. 6	PROJECT NUMBER (SEE TITLE SHEET)		HIGHWAY NO. FM 428
GRAPHICS ARH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK WKH	TEXAS	DALLAS	DENTON	054
CHECK WKH	CONTROL	SECTION	JOB	
	0817	01	027	



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 CONSULTING ENGINEERS
 359 LAKE PARK ROAD, SUITE #106
 LEWISVILLE, TEXAS 75057
 TEL: 214-681-2179
 TEXAS FIRM REGISTRATION #F-12258

VOLTAGE: 120/240 1Ø 3W		EXISTING PANEL 'A'										C : CONTINUOUS (125%)						
BUS: 200A		(SURFACE NEMA3R)										N : NON-CONTINUOUS (100%)						
MAINS: 200A MCB												K : KITCHEN EQUIPMENT (65%)						
AIC RATING: 10,000																		
CKT NO	TRIP	POLE	LOAD DESIGNATION			CONNECTED VA						LOAD DESIGNATION			TRIP	POLE	CKT NO	
			DESCRIPTION	(NOTE)	C	N	K	L1	L2	L1 L2	L1	L2	K	N				C
(A) 1	100		EX. MAIN DISCONNECT														2	
(A) 3		2															4	
(B) 5	50		EXISTING													20	1	6
(B) 7		2														20	1	8
(B) 9	20	1	EXISTING													20	1	10
(B) 11	20	1	EXISTING													20	1	12
(B) 13	20	1	EXISTING													20	1	14
(B) 15	20	1	EXISTING													20	1	16
(B) 17	20	1	EXISTING													20	1	18
(B) 19	20	1	EXISTING													20	1	20
(B) 21	20	1	EXISTING													20	1	22
(C) 23	20	1	NEW POLE LIGHTS	(3)					400				400		(3)	20	1	24
PHASE TOTALS						L1 = VERIFY			L2 = VERIFY			TOTAL CONNECTED VA			VERIFY			
PANEL NOTES: (1) PROVIDE REDUNDANT GROUNDING AS REQUIRED BY NFPA 99. (2) CIRCUIT CONTROLLED VIA TIME CLOCK OR PHOTOCCELL. PROVIDE ENCLOSURE NEAR PANEL. (3) PROVIDE " HACR " TYPE CIRCUIT BREAKER. (4) PROVIDE " GFI " TYPE CIRCUIT BREAKER. (5) PROVIDE BREAKER WITH LOCK-ON DEVICE (6) PROVIDE CIRCUIT WITH ISOLATED GROUND.												CONNECTED VA (CODE C)			VERIFY			
												CONNECTED VA (CODE N)			VERIFY			
												CONNECTED VA (CODE K)			VERIFY			
												PANEL CONNECTED KVA			VERIFY			
												PANEL DEMAND KVA			VERIFY			
												PANEL DEMAND AMPS			VERIFY			
												HIGH Ø AMPS W/LCL			VERIFY			

- (A) EXISTING MAIN BREAKER TO REMAIN.
- (B) EXISTING BRANCH CIRCUIT AND CIRCUIT BREAKER TO REMAIN.
- (C) PROVIDE NEW CIRCUIT BREAKER IN EXISTING SPACE AND CONNECT NEW BRANCH CIRCUIT.
- (D) EXISTING SPACE TO REMAIN.

LIGHT FIXTURE SCHEDULE

TYPE	SYMBOL	MOUNTING	QUANTITY	DESCRIPTION	LAMPS	WATTS	VOLTS
L1		POLE	5	1940 GLENVIEW SERIES DECORATIVE DOWNLIGHT WITH SPUN ALUMINUM SHADE/LENSE AND FROSTED SAG GLASS LENS, CHARLESTON POLE. STERNBERG: #1A-1940LED-5P GLENVIEW, ARM MOUNTED LAMP: #4ARC35T3-MDL03-FSG POLE: #3516P5-0.188/DBA/BKT	1-LED 3500K 5440 LUMENS	65W	120V
L2		POLE	3	SAME AS FIXTURE ABOVE 'L1' EXCEPT WITH TWIN ASSEMBLY. STERNBERG: #2A-1940LED-5P GLENVIEW, ARM MOUNTED LAMP: #4ARC35T3-MDL03-FSG POLE: #3516P5-0.188/DBA/BKT	2-LED 3500K 5440 LUMENS	(2) 65W	120V
L1 ALTERNATE		POLE	5	1940 GLENVIEW SERIES DECORATIVE DOWNLIGHT WITH SPUN ALUMINUM SHADE/LENSE AND FROSTED SAG GLASS LENS, CHARLESTON POLE. ANP: #LA405-3-P078LD4-D-T3-35K-PA1753, ARM MOUNTED LAMP: #P078LD4 POLE: #CB0101 (VERIFY WITH ARCHITECT)	1-LED 3500K 8464 LUMENS	80W	120V
L2 ALTERNATE		POLE	3	SAME AS FIXTURE ABOVE 'L1 ALTERNATE' EXCEPT WITH TWIN ASSEMBLY. ANP: #LA405-3-P078LD4-D-T3-35K-PA1753, ARM MOUNTED LAMP: #P078LD4 POLE: #CB0101 (VERIFY WITH ARCHITECT)	2-LED 3500K 8464 LUMENS	(2) 80W	120V

- NOTE: 1) CONTRACTOR MUST SUBMIT CATALOG INFORMATION FOR ALL LIGHTING FIXTURES AND POLES TO ARCHITECT AND OWNER FOR APPROVAL PRIOR TO ORDERING AND BEGINNING CONSTRUCTION.
- 2) VERIFY EXACT LOCATION, MOUNTING, AND METHOD OF INSTALLATION FOR ALL LIGHTING FIXTURES WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- 3) VERIFY ALL FIXTURE COLORS AND LAMP COLOR TEMPERATURE WITH ARCHITECT AND OWNER.

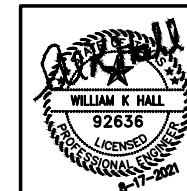
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Texas Department of Transportation
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GCAA DOWNTOWN IMPROVEMENTS AUBREY, TX

ELECTRICAL SPECIFICATIONS

DESIGN ARH	FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NO.
GRAPHICS ARH	6	(SEE TITLE SHEET)		FM 428
CHECK WKH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK WKH	TEXAS	DALLAS	DENTON	055
	CONTROL	SECTION	JOB	
	0817	01	027	



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DATE: FILE:

NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- 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.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- 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.
- 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.
- 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

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

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

- 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.
- 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.
- 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

- 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.
- 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.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- 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.
- 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."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- 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.
- 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.
- 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.
- 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.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- 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).
- 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.
- 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.

				Traffic Operations Division Standard	
<h1>ELECTRICAL DETAILS CONDUITS & NOTES</h1>					
<h2>ED(1) - 14</h2>					
FILE:	ed1-14.dgn	DW:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0817	01	027	FM 428
		DIST	COUNTY		SHEET NO.
		18	DENTON		056

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.

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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.

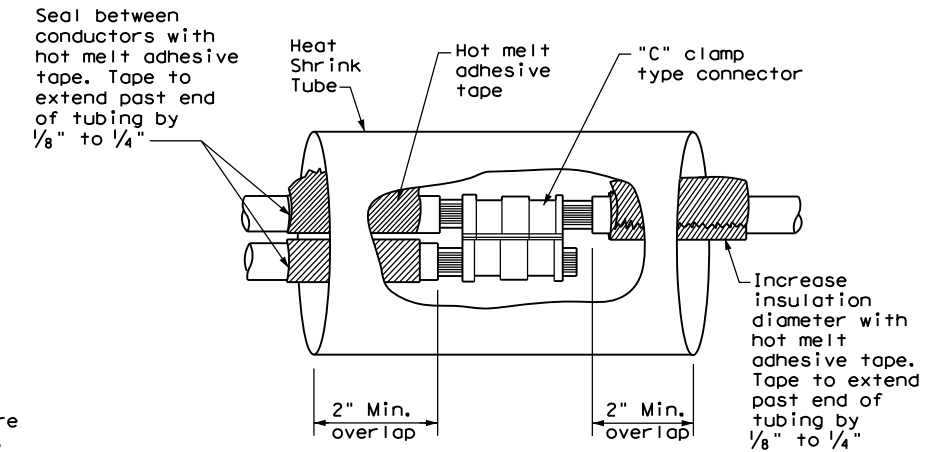
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

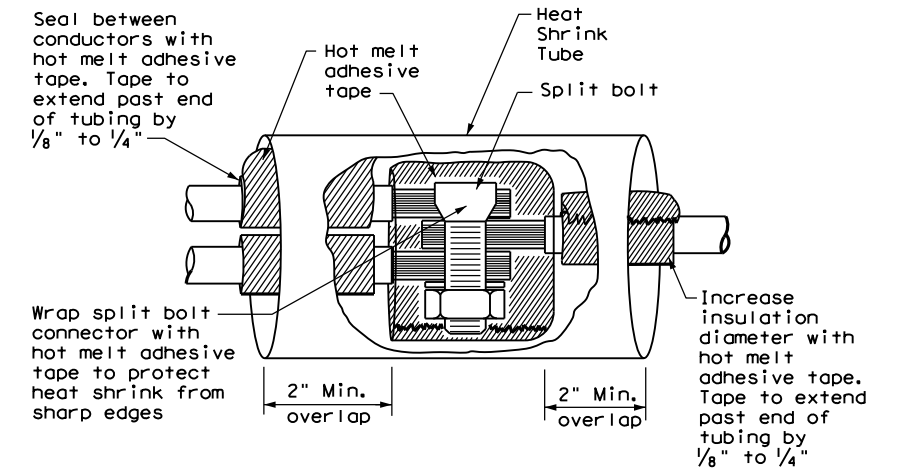
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

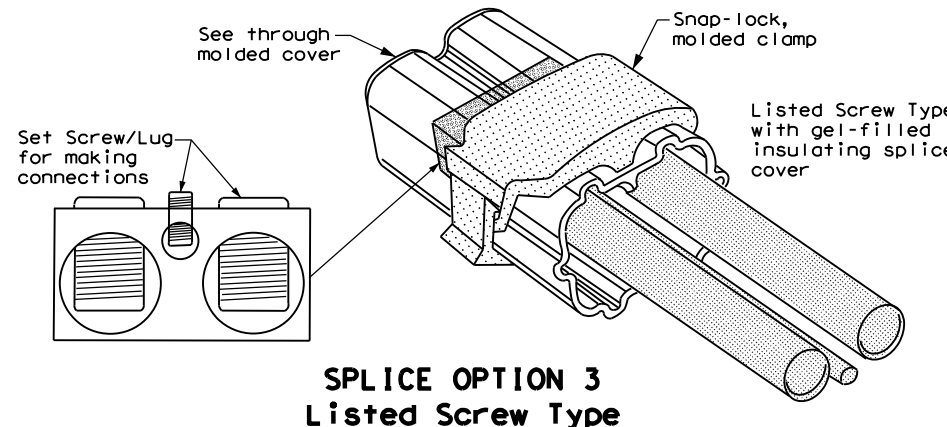
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, 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**

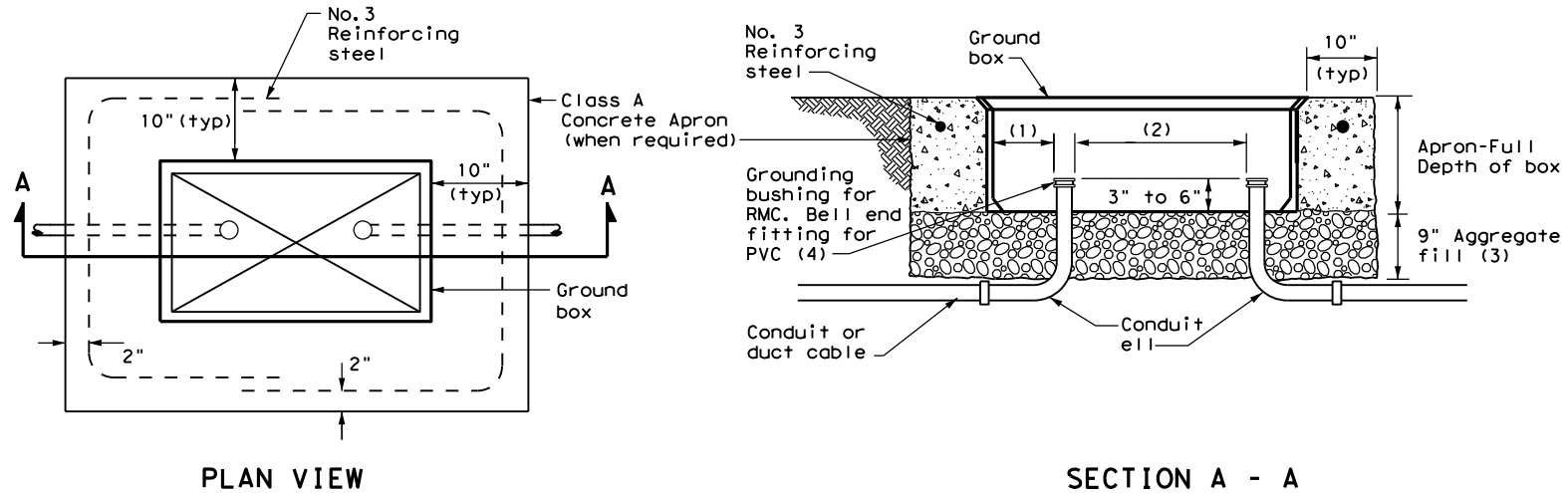


**SPLICE OPTION 3
Listed Screw Type**

			Traffic Operations Division Standard		
<h2>ELECTRICAL DETAILS CONDUCTORS</h2>					
<h3>ED(3) - 14</h3>					
FILE:	ed3-14.dgn	DW:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	SECT:	JOB:	HIGHWAY:
REVISIONS		0817	01	027	FM 428
		DIST:	COUNTY:	SHEET NO.	
		18	DENTON	057	

DATE:
FILE:

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APRON FOR GROUND BOX

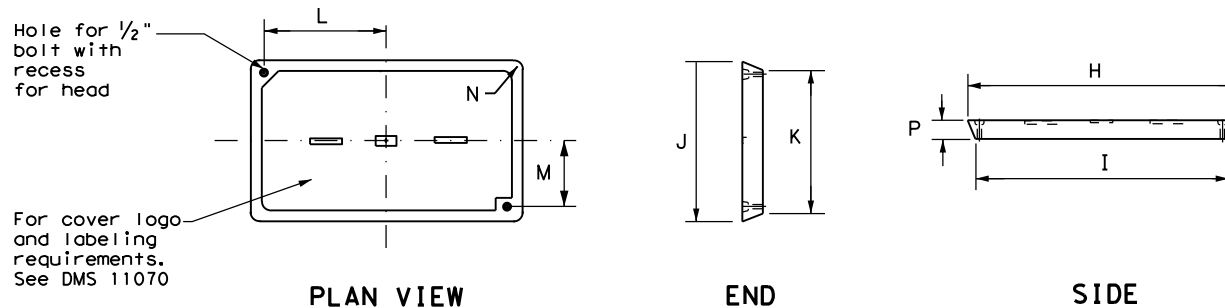
- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place 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



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.

DATE:
FILE:

				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS GROUND BOXES</h2>					
<h3>ED(4) - 14</h3>					
FILE:	ed4-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	SECT:	JOB:	HIGHWAY:
REVISIONS		0817	01	027	FM 428
		DIST:	COUNTY:		SHEET NO.
		18	DENTON		058

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DATE: FILE:

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)			FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft		SHEAR Kips
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	3/4"	36	12 3/4"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 1/2"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 3/4"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 1/4"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

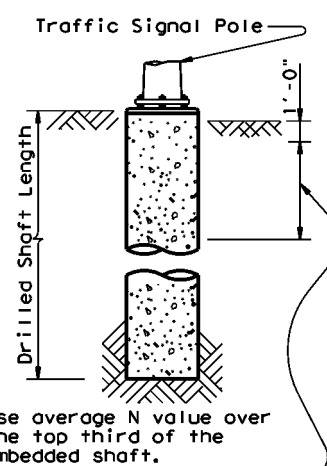
- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- Foundation Design Loads are the allowable moments and shears at the base of the structure.
- Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
- Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
L1	10	24-A	5	30ft				
L2	10	24-A	3	18ft				
TOTAL DRILLED SHAFT LENGTHS			48ft					

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

WIND SPEED	MAX SINGLE ARM LENGTH	FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
		80 MPH DESIGN	32'	48'	
80 MPH DESIGN	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' x 24'			
		28' x 28'			
		32' x 28'			
			32' x 32'		
			36' x 36'		
100 MPH DESIGN	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		40' x 36'		
			44' x 28'	44' x 36'	
					32' x 32'
					36' x 36'
					40' x 24'

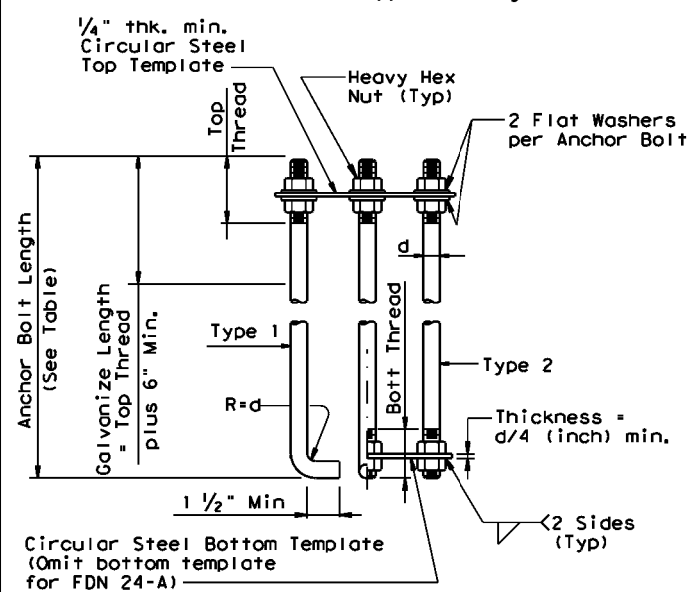


ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	—	12 3/4"	7 1/8"	5 3/8"
1 1/2"	3'-4"	6"	4"	17"	10"	7"
1 3/4"	3'-10"	7"	4 1/2"	19"	11 1/4"	7 3/4"
2"	4'-3"	8"	5"	21"	12 1/2"	8 1/2"
2 1/4"	4'-9"	9"	5 1/2"	23"	13 3/4"	9 1/4"

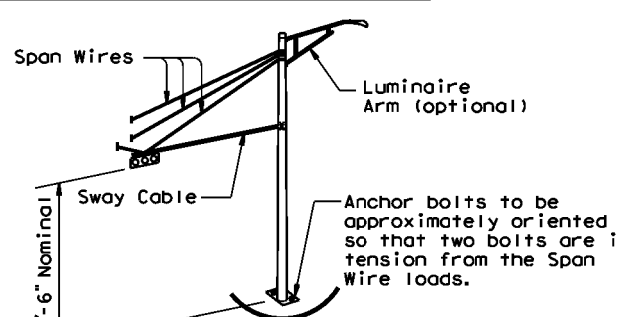
(7) Min dimensions given, longer bolts are acceptable.

- EXAMPLE:**
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
 - For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

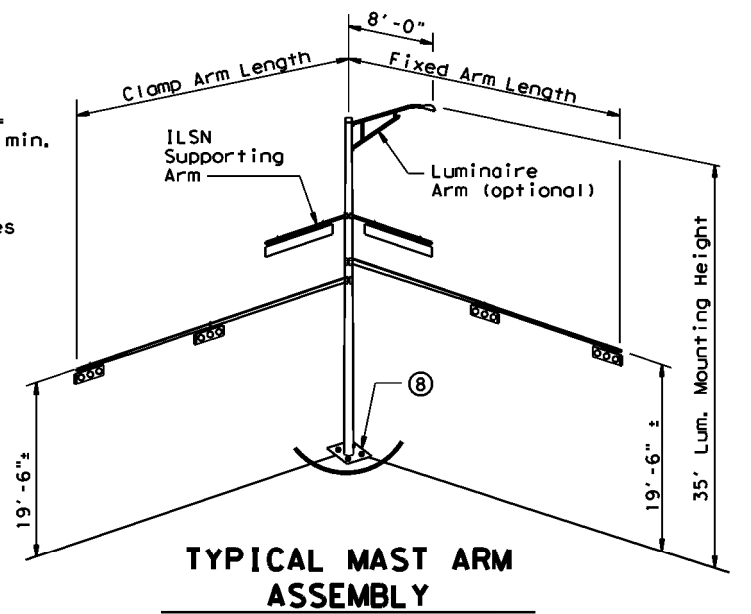


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2) ANCHOR BOLT ASSEMBLY

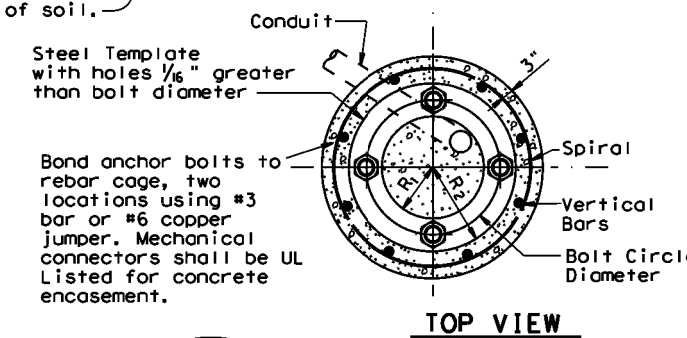
(8) Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



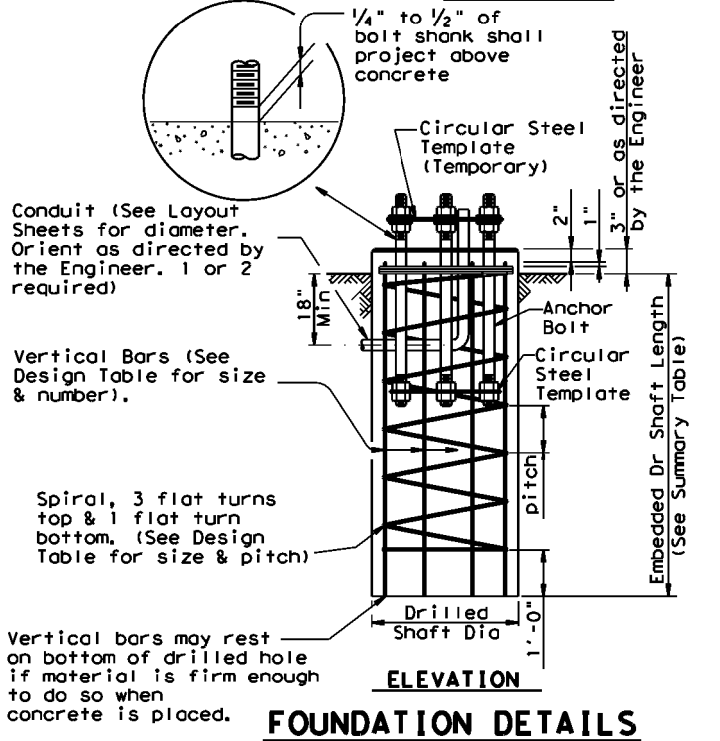
TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".



TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

© TxDOT August 1995		DN: MS	CK: JSY	DN: MAO/AMF	CK: JSY/TEB
5-96	11-92	CONT	SECT	JOB	HIGHWAY
		0817	01	027	FM 428
		DIST	COUNTY		SHEET NO.
		DAL	DENTON		059