FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP 2023(558)HES		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUAUDALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	10	097	FM 78

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO. STP 2023(558)HES
CSJ: 0025-10-097

GUADALUPE
FM 78

LIMITS FROM: FLEMING ST
TO: 200' EAST OF 8TH ST

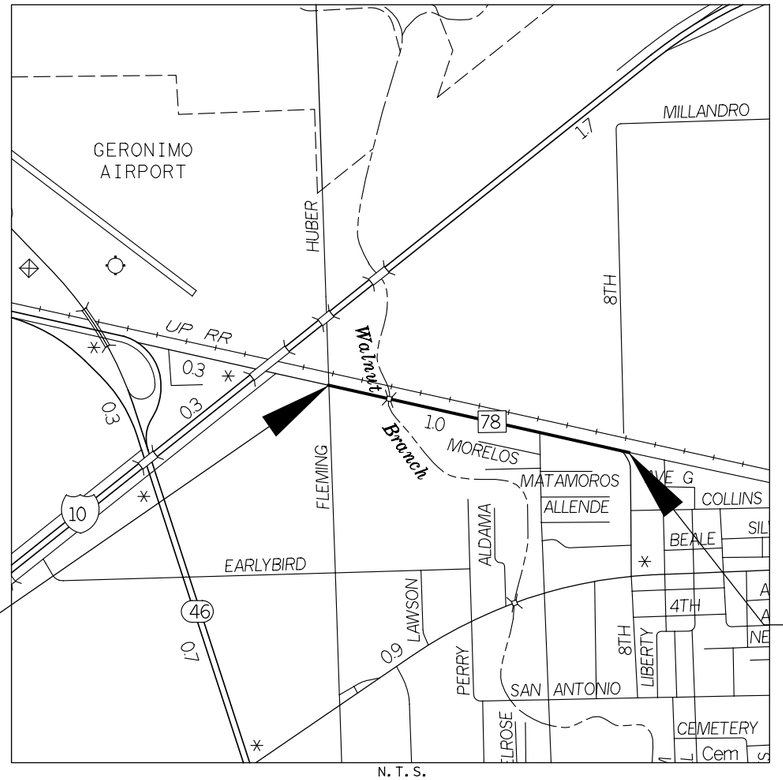
NET LENGTH OF ROADWAY = 3597 FT = 0.681 MI
NET LENGTH OF BRIDGE = 80 FT = 0.015 MI
NET LENGTH OF PROJECT = 3677 FT = 0.696 MI

DESIGN SPEED (FM 78) = 40 MPH
DESIGN SPEED (INT. STREETS) = 30 MPH
AREA OF DISTURBED SOIL = 3.65 AC
ADT:
5,900 - (2024)
8,500 - (2044)

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

FOR WORK CONSISTING OF WIDEN TO INSTALL CONTINOUS TURN LANE, CONSTRUCT PAVED SHOULDERS



N.T.S.

BEGIN PROJECT
BEGIN CSJ: 0025-10-097
STA 58+23.00

END PROJECT
END CSJ: 0025-10-097
STA 95+00.00

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022)

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 1/30/2023
DocuSigned by: Roger J. Collat, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 1/30/2023
DocuSigned by: Clayton Kipps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

REVIEWED FOR LETTING 1/30/2023
DocuSigned by: JC Rogers, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 1/30/2023
DocuSigned by: Gina E. Gallegos, P.E.
DISTRICT ENGINEER

FILE LOCATION
http://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4	EXISTING TYPICAL SECTIONS
5	PROPOSED TYPICAL SECTIONS
6 - 6F	GENERAL NOTES
7 - 7A	ESTIMATE & QUANTITIY
8	SUMMARY OF TCP
9	SUMMARY OF EARTHWORK
10	SUMMARY OF ROADWAY & SW3P
11	SUMMARY OF DRIVEWAYS
12	SIGNING, PAVEMENT MARKINGS AND DELINEATION SUMMARY
13 - 14	SUMMARY OF SMALL SIGNS
	TRAFFIC CONTROL PLAN
15	TRAFFIC CONTROL PLAN SEQUENCE OF WORK
16	SCHEDULE OF BARRICADES & ADVANCED WARNING DEVICES
17	TRAFFIC CONTROL PLAN DETOUR LAYOUT PH II & PH III
18	TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE IA
19 - 20	TRAFFIC CONTROL PLAN PHASE IA
21	TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE IB
22 - 23	TRAFFIC CONTROL PLAN PHASE IB
24	TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE II
25 - 27	TRAFFIC CONTROL PLAN PHASE II
28	TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE III
29 - 31	TRAFFIC CONTROL PLAN PHASE III
32	TRAFFIC CONTROL PLAN MISCELLANEOUS DETAILS (SIDE STREET/DRIVEWAY HALF SECTION W/FLAGGERS)
33	TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET
	TRAFFIC CONTROL PLAN STANDARDS
34 - 45	BC(1)-21 THRU BC(12)-21
46	WZ(STPM)-13
47	WZ(UL)-13
48	WZ(BRK)-13
49	TCP(1-2)-18
50	TCP(2-2)-18
51	TCP(2-3)-18
52	TCP(3-3)-14
	ROADWAY DETAILS
53 - 54	HORIZONTAL AND VERTICAL CONTROL
55 - 57	HORIZONTAL ALIGNMENT DATA
58 - 61	PLAN AND PROFILE
62 - 67	DRIVEWAYS PLAN & PROFILE
68	FLEXIBLE PAVEMENT STRUCTURE REPAIR DETAIL
	ROADWAY STANDARDS
69	DRIVEWAY DETAILS (SAN ANTONIO DISTRICT STANDARDS)
	DRAINAGE SHEETS
70 - 72	DRAINAGE AREA MAP
73	DITCH HORIZONTAL ALIGNMENT DATA
74	DITCH HYDRAULIC CALCULATIONS
	SIGNING AND PAVEMENT MARKINGS
75 - 76	SIGNING & PAVEMENT MARKINGS LAYOUT
	SIGNING AND PAVEMENT MARKING STANDARDS
77 - 78	PM(1)-22 THRU PM(2)-22
79	SMD(GEN)-08
80 - 82	SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08
83 - 84	TSR(3)-13 THRU TSR(4)-13
	STORMWATER POLLUTION AND PREVENTION PLAN
85 - 86	STORM WATER POLLUTION PREVENTION PLAN (SW3P)
87	EPIC
	STORMWATER POLLUTION AND PREVENTION PLAN STANDARDS
88	EC(1)-16
89	EC(2)-16
90	EC(3)-16
	UTILITIES
91 - 95	EXISTING UTILITY LAYOUTS

NOTE: THE STANDARD SHEETS IDENTIFIED HAVE BEEN SPECIFICALLY SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

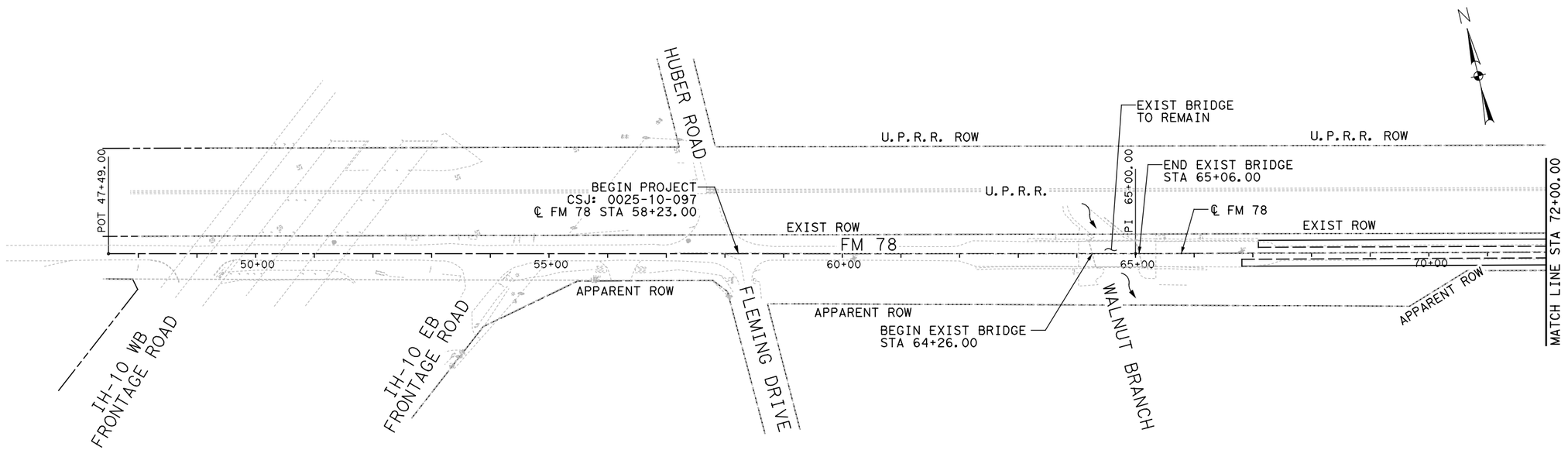
HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

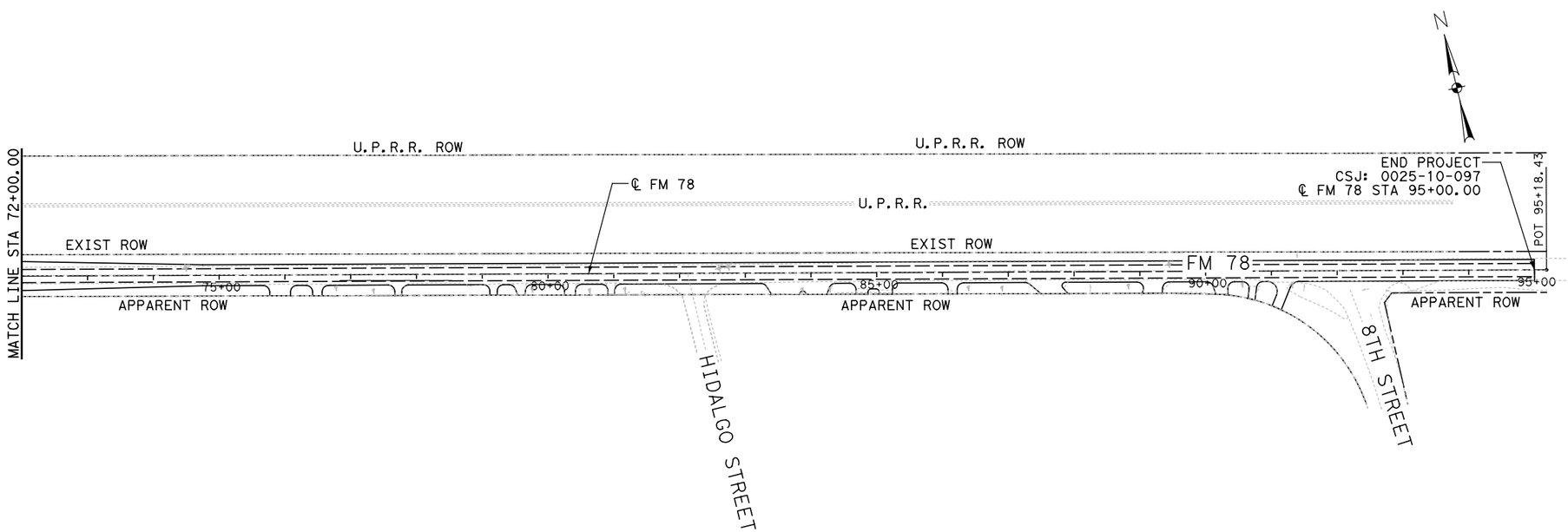
FM 78:0025-10-097:SFT

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		2
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78





0 100 200 300

HORIZ SCALE IN FEET
SCALE: HOR: 1"=200'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

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FM 78: 0025-10-097: SFT

PROJECT LAYOUT

SCALE: H: 200 SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		3
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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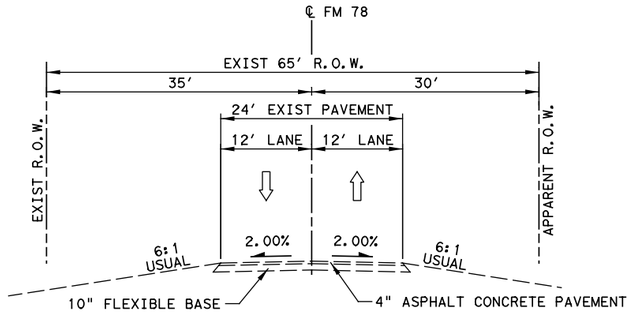
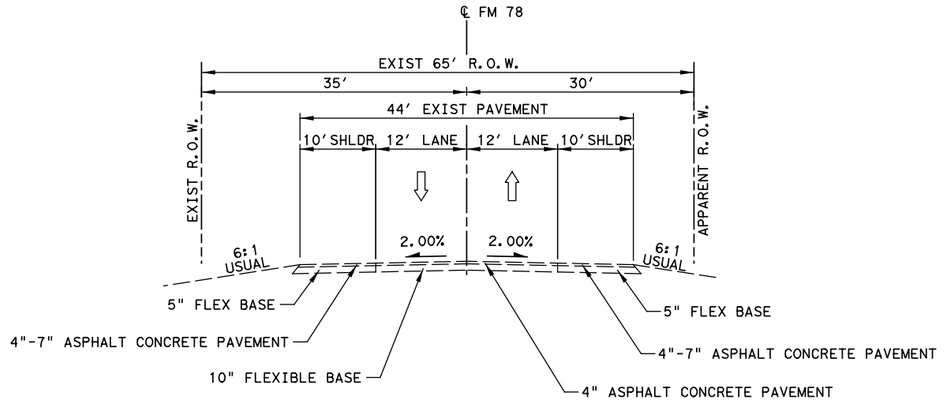


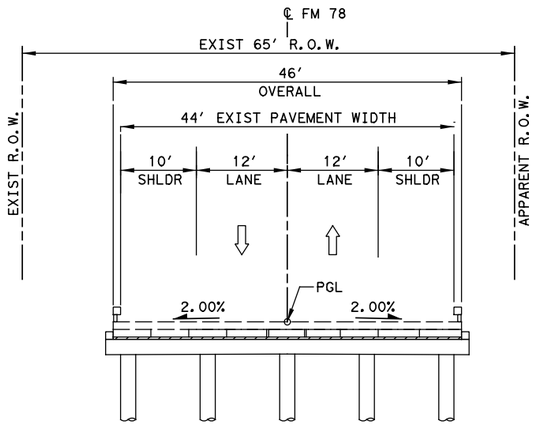
FM 78 EXISTING TYPICAL SECTION

STA 58+71.00 TO STA 62+22.00
STA 67+00.00 TO STA 95+00.00



FM 78 EXISTING TYPICAL SECTION

STA 62+22.00 TO STA 64+26.00
STA 65+06.00 TO STA 67+00.00



FM 78 EXISTING BRIDGE TYPICAL SECTION

STA 64+26.00 TO STA 65+06.00

NOTES:

1. EXISTING TYPICAL SECTIONS WERE DEVELOPED USING RECORD PLANS AND SURVEY DATA
2. CROSS SLOPE SHOWN ON TYPICAL SECTIONS IS USUAL, ACTUAL SLOPE VARIES AT LOCATIONS
3. GEOMETRY OF ROADWAY SECTIONS AND DITCHES IS APPROXIMATE AND IS SHOWN FOR INFORMATION ONLY
4. THE EXISTING PAVEMENT THICKNESS SHOWN ON THE PLANS ARE AVERAGE THICKNESS FOR THE CONTRACTORS INFORMATION ONLY. THE ACTUAL PAVEMENT THICKNESSES MAY VARY AT SECTIONS

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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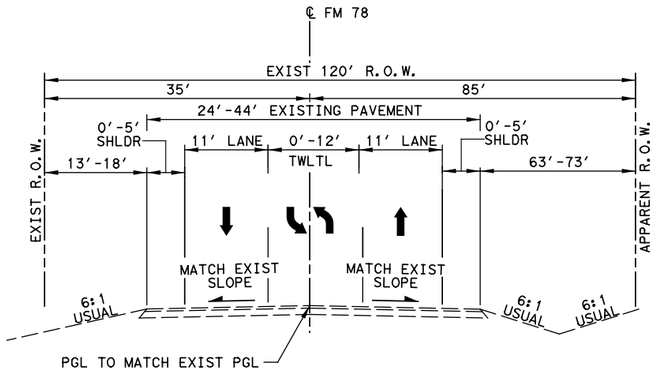
EXISTING TYPICAL SECTIONS

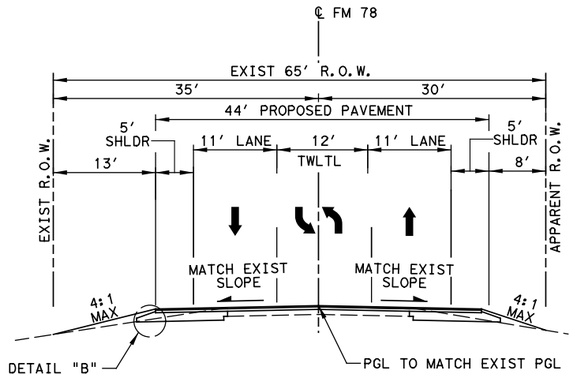
SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		4
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



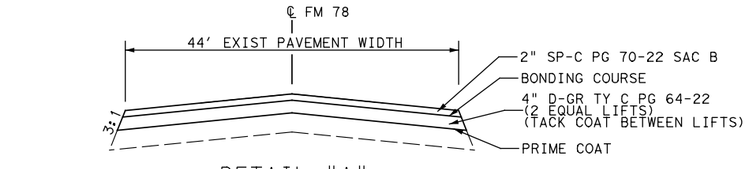
FM 78 PROPOSED TYPICAL SECTION

STA 62+25.00 TO STA 64+26.00

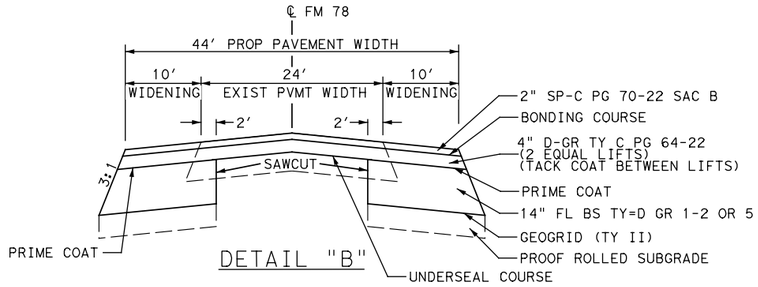


FM 78 PROPOSED TYPICAL SECTION

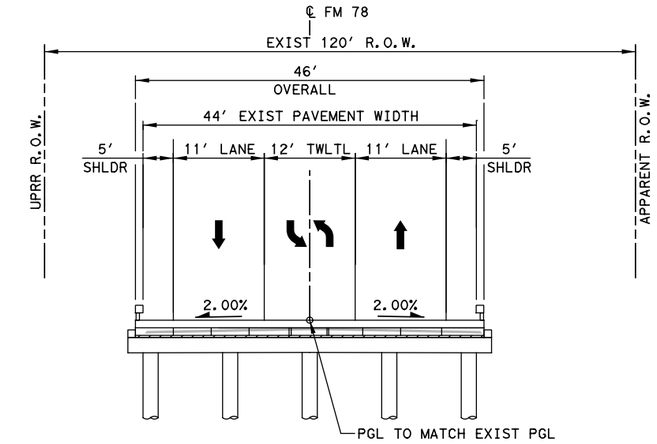
STA 67+00.00 TO STA 72+05.00



DETAIL "A"

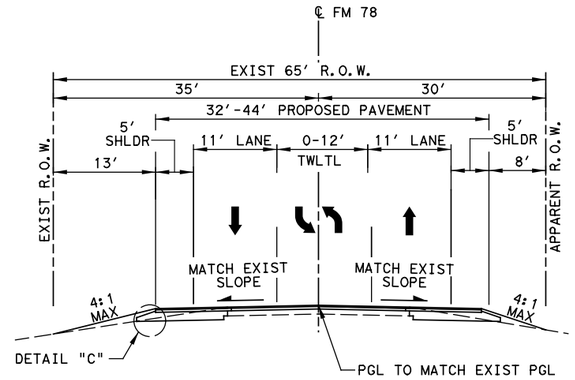


DETAIL "B"



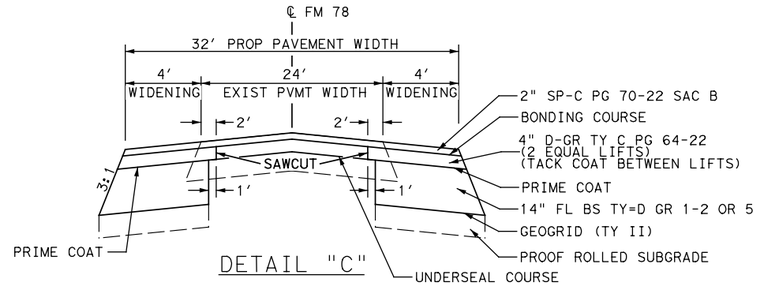
FM 78 PROPOSED TYPICAL SECTION

(EXISTING BRIDGE TO REMAIN)
STA 64+26.00 TO STA 65+35.00

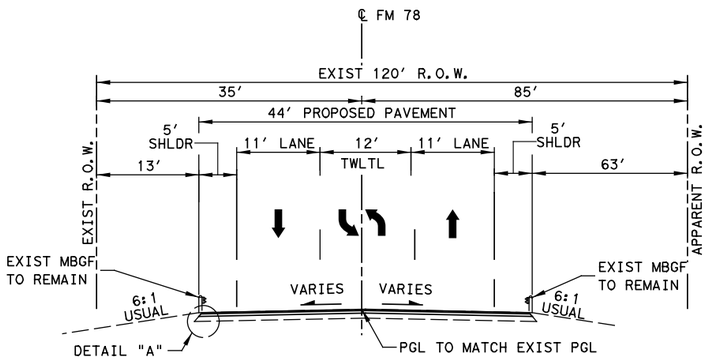


FM 78 PROPOSED TYPICAL SECTION

STA 72+05.00 TO STA 74+75.00

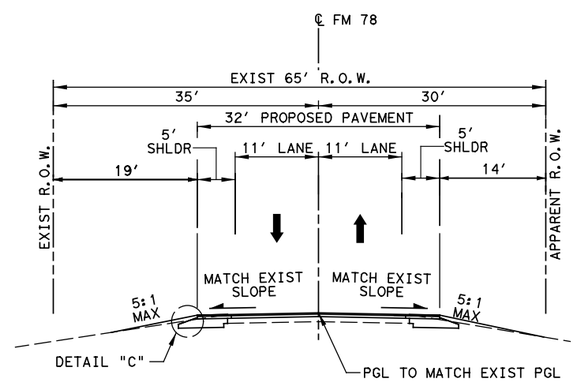


DETAIL "C"



FM 78 PROPOSED TYPICAL SECTION

STA 65+35.00 TO STA 67+00.00



FM 78 PROPOSED TYPICAL SECTION

STA 74+75.00 TO STA 95+00.00

NOTES:

1. PROPOSED TYPICALS MAY VARY WHEN TRANSITIONING TO/FROM EXISTING SECTIONS OF PAVEMENT TO PROPOSED SECTIONS OF PAVEMENT. REFER TO ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL DETAILS.
2. CROSS SLOPES SHOWN ARE USUAL. REFER TO THE ROADWAY P&P SHEETS FOR ADDITIONAL DETAILS ON CROSS SLOPES.
3. REFER TO THE PAVEMENT MARKING LAYOUT SHEETS FOR LANE TRANSITIONS AT INTERSECTIONS.
4. SAWCUT SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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PROPOSED TYPICAL SECTIONS

SCALE: NTS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		5
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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**********GENERAL NOTES**********
2014 Specification Book

========== Basis of Estimate ==========

Item	Description	Area	Rate/Area	Quant-Unit
168-6001	Vegetative Watering	11,516 SY	16.1 GAL/SY	186 MG
310-6027	Prime Coat (MC-30 or AE-P)	5,390 SY	0.2 GAL/SY	1,078 GAL

Item	Description	Depth	Area	Quant-Unit
247-6475	FL BS (CIP)(TY D GR 1-2, OR 5)	14”	6,136 SY	2,387 CY

========== Asphalt Concrete Pavement ==========

Type	Location	Depth	Rate/Area	Quant-Tons
SP-C (SAC-B PG70-22)	Main Rdwy	2”	115 LB/11,800 SY	1,357 TON
TY-C	Main Rdwy	6”	115 LB/ 7,018 SY	2,316 TON

========== Surface Treatment Data ==========

Item	Description	Area	Rate	Quant-Unit
3082-6001	Tack Coat	7,200 SY	0.10 GAL/SY	720 GAL
3084-6001	Bonding Course	11,958 SY	0.12 GAL/SY	1,435 GAL
3085-6001	Membrane Underseal	6,190 SY	0.20 GAL/SY	1,238 GAL

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

City of San Antonio: (210) 207-8642
City of New Braunfels: (830) 221-4049

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

Hurricane Evacuation

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

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

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

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

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of

excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

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

Contractor questions on this project are to be addressed to the following individual(s):
Will Lockett, Will.Lockett@txdot.gov
Ismael Solalinde, Ismael.Solalinde@txdot.gov

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

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

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

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

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

Prevention of Migratory Bird Nesting

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

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow

nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

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

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

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

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

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

Steel Wrapped or Asbestos Utility Lines:

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

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

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

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

--Item 7--
The project's total disturbed area is 3.65 acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

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

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

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

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Critical Path Method (CPM) schedule.

The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2 .

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

Control: 0025-10-097

County: Guadalupe

Highway: FM 78

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

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

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

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

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

--Item 100--
100-1 Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

Removal and disposal of existing abandoned utilities that were unable to be identified before letting required to support this project's construction shall be performed under the overall Preparing Right of Way. If you are uncertain whether the utility is active, contact the District Utility Section.

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during “Broadcast Seeding” operations, provided each component is applied at the specified rate.

--Item 166--
Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--
There is no minimum PI requirement for this project.

--Item 316--
Asphalt season will be year-round but meet temperature limitations specified in the standard specifications for Item 316.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.

--Item 320--
Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

When placing Item 346 mixtures, use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV’s remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

--Item 354--
Retain planed material.

Take precaution to avoid damage to existing bridge decks and armor joints. Repair any damage to the bridge decks and/or armor joints as approved. This work will not be paid directly but will be performed at the Contractor’s expense.

--Item 421--
Use an automated ticket that contains the same information as shown in the standard specification. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer’s Office (outside the San Antonio area) to inform TxDOT of scheduled structural concrete batching. The Engineer may suspend concrete operations if ticket information is incomplete/incorrect.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

The curing facilities and strength testing equipment is not required for this project.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

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

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking

corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

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

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

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

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

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

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

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9:00 AM and 4:00 PM, and at least one lane must remain open at all times.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions: Daylight hours (9AM to 4PM), Monday through Friday.

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Friday, April 7 for Easter Weekend

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.
Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

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

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

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

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

--Item 510--
The length of the one-way traffic control section is limited to 1.0 miles.

For Pilot Car Method, additional flaggers other than the 2 required on each approach, when directed by the Engineer, will be measured by the Flagger Control Method. This may involve stationing additional flaggers at all intersections, public driveways, and commercial driveways as determined by the Engineer.

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

--Item 585--
Use Surface Test Type B, pay adjustment schedule 2 to evaluate ride quality of travel lanes.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.

--Item 666--
Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 730--
Mow full-width and hand trim the right of way, including newly seeded or sodded areas, when vegetation reaches a height of 16" or when directed. Removal of brush sprouts growing within guardrail, concrete barriers or at other locations where mowing or hand trimming is done within the limits of construction is required and subsidiary to this item. Mowing may be required more often in newly sodded or seeded areas than in other parts of the project because of the supplemental irrigation these areas receive and the resulting weed growth. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect soil retention blankets or mulches that have been applied. Work performed under this item does not replace the mowing required when placing permanent seeding in an area that has established temporary seeding as described in Article 164.3, Construction.

--Item 734--
Perform Litter Removal once a month or as directed by the Engineer.

--Item 3076 & 3077--

1. Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

2. Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

3. Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

4. Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.

5. Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

6. No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 3084 & 3085 --
The minimum application rates are listed in Table UC/BC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC/BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

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

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0025-10-097 **DISTRICT** San Antonio **COUNTY** Guadalupe
HIGHWAY FM 78

			CONTROL SECTION JOB		**0025-10-097**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00177217**		
			COUNTY		**Guadalupe**		
			HIGHWAY		**FM 78**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	30.000		30.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	123.000		123.000	
	105-6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	717.000		717.000	
	110-6001	EXCAVATION (ROADWAY)	CY	2,576.000		2,576.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	130.000		130.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	11,516.000		11,516.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	11,516.000		11,516.000	
	164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	11,516.000		11,516.000	
	168-6001	VEGETATIVE WATERING	MG	186.000		186.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	11,516.000		11,516.000	
	216-6001	PROOF ROLLING	HR	5.000		5.000	
	247-6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	2,387.000		2,387.000	
	310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	1,078.000		1,078.000	
	351-6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	5,101.000		5,101.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	11,617.000		11,617.000	
	354-6049	PLANE ASPH CONC PAV (6")	SY	1,489.000		1,489.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	50.000		50.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	50.000		50.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	156.000		156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	156.000		156.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	5,084.000		5,084.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	5,084.000		5,084.000	
	530-6004	DRIVEWAYS (CONC)	SY	123.000		123.000	
	530-6019	DRIVEWAYS (ACP)(TYPE 1)	SY	717.000		717.000	
	560-6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	12.000		12.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	8.000		8.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	8.000		8.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	12,400.000		12,400.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	12,400.000		12,400.000	
	666-6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	2.000		2.000	
	666-6224	PAVEMENT SEALER 4"	LF	5,563.000		5,563.000	
	666-6225	PAVEMENT SEALER 6"	LF	6,313.000		6,313.000	
	666-6233	PAVEMENT SEALER (MED NOSE)	EA	2.000		2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0025-10-097 **DISTRICT** San Antonio **COUNTY** Guadalupe
HIGHWAY FM 78

			CONTROL SECTION JOB		**0025-10-097**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00177217**		
			COUNTY		**Guadalupe**		
			HIGHWAY		**FM 78**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	6,313.000		6,313.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	860.000		860.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	4,703.000		4,703.000	
	672-6007	REFL PAV MRKR TY I-C	EA	46.000		46.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	87.000		87.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,000.000		1,000.000	
	3062-6001	TACK COAT	GAL	720.000		720.000	
	3076-6015	D-GR HMA TY-C PG64-22	TON	2,316.000		2,316.000	
	3077-6023	SP MIXESSP-CSAC-B PG70-22	TON	1,357.000		1,357.000	
	3084-6001	BONDING COURSE	GAL	1,435.000		1,435.000	
	3085-6001	UNDERSEAL COURSE	GAL	1,238.000		1,238.000	
	5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	7,219.000		7,219.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	76.000		76.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	104.000		104.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SHEET	LOCATION	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING	662 6063 WK ZN PAV MRK REMOV (W)4"(SLD)	662 6095 WK ZN PAV MRK REMOV (Y)4"(SLD)	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)	6185 6003 TMA (MOBILE OPERATION)
		MO	LF	LF	EA	DAY	HR
TRAFFIC CONTROL PLAN SHEETS							
19	TCP PHASE 1A		2,400	2,400		12	
20	TCP PHASE 1A		500	500			
22	TCP PHASE 1B		2,400	2,400			
23	TCP PHASE 1B		500	500			
25	TCP PHASE 2		400	400		37	
26	TCP PHASE 2		2,400	2,400			
27	TCP PHASE 2		500	500			
29	TCP PHASE 3		400	400		27	
30	TCP PHASE 3		2,400	2,400			
31	TCP PHASE 3		500	500			
	TCP PHASE 4						104
PROJECT TOTALS		6	12,400	12,400	2	76	104

NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

FM 78:0025-10-097:SFT

SUMMARY OF TCP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		8
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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FM 78	STATION QUANTITIES			
Station	EXCAVATION		EMBANKMENT	
	Area	Volume	Area	Volume
67+00.0000 R1	41.1	76.0	11.0	20.0
68+00.0000 R1	30.2	132.0	9.2	37.0
69+00.0000 R1	28.6	109.0	7.0	30.0
70+00.0000 R1	28.7	106.0	1.6	16.0
71+00.0000 R1	34.6	117.0	1.4	6.0
72+00.0000 R1	35.2	129.0	1.4	5.0
73+00.0000 R1	33.5	127.0	0.9	4.0
74+00.0000 R1	28.3	114.0	1.5	4.0
75+00.0000 R1	20.4	90.0	0.1	3.0
76+00.0000 R1	21.2	77.0	0.2	1.0
77+00.0000 R1	21.4	79.0	0.1	0.0
78+00.0000 R1	21.3	79.0	0.0	0.0
79+00.0000 R1	21.5	79.0	0.0	0.0
80+00.0000 R1	21.5	80.0	0.1	0.0
81+00.0000 R1	21.1	79.0	0.1	0.0
82+00.0000 R1	21.2	78.0	0.2	1.0
83+00.0000 R1	21.0	78.0	0.0	0.0
84+00.0000 R1	21.4	78.0	0.1	0.0
85+00.0000 R1	21.3	79.0	0.3	1.0
86+00.0000 R1	20.8	78.0	0.3	1.0
87+00.0000 R1	20.8	77.0	0.1	1.0
88+00.0000 R1	21.2	78.0	0.1	0.0
89+00.0000 R1	20.9	78.0	0.0	0.0
90+00.0000 R1	21.2	78.0	0.0	0.0
91+00.0000 R1	21.9	80.0	0.0	0.0
92+00.0000 R1	21.7	81.0	0.0	0.0
93+00.0000 R1	21.6	80.0	0.0	0.0
94+00.0000 R1	21.4	80.0	0.0	0.0
95+00.0000 R1	21.5	80.0	0.0	0.0

TOTALS: (CY)	2576		130

GRAND TOTAL	
110 6001	132 6003
EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (COMP) (TY B)
CY	CY
2576	130

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SUMMARY OF EARTHWORK

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		9
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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SHEET	LOCATION	161 6017 COMPOST MANUF TOPSOIL (4")	164 6035 DRILL SEEDING (PERM) (RURAL) (CLAY)	164 6051 DRILL SEED (TEMP) (WARM OR COOL)	168 6001 VEGETATIVE WATERING	169 6001 SOIL RETENTION BLANKETS (CL 1) (TY A)	216 6001 PROOF ROLLING	247 6475 FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	310 6027 PRIME COAT (MC-30 OR AE-P)	351 6002 FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	354 6045 PLANE ASPH CONC PAV (2")	354 6049 PLANE ASPH CONC PAV (6")	506 6002 ROCK FILTER DAMS (INSTALL) (TY 2)	506 6011 ROCK FILTER DAMS (REMOVE)
		SY	SY	SY	MG	SY	HR	CY	GAL	SY	SY	SY	LF	LF
ROADWAY PLAN AND PROFILE SHEETS														
58	ROADWAY PLAN AND PROFILE													
59	ROADWAY PLAN AND PROFILE	5,812	5,812	5,812	94.00	5,812	2	1,031	528	878	4,861	1,489	50	50
60	ROADWAY PLAN AND PROFILE	3,570	3,570	3,570	57.00	3,570	2	856	347	2,667	4,267			
61	ROADWAY PLAN AND PROFILE	2,134	2,134	2,134	35.00	2,134	1	500	203	1,556	2,489			
PROJECT TOTALS		11,516	11,516	11,516	186	11,516	5	2,387	1,078	5,101	11,617	1,489	50	50

SHEET	LOCATION	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	506 6024 CONSTRUCTION EXITS (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	560 6001 MAILBOX INSTALL-S (TWG-POST) TY 1	677 6001 ELIM EXT PAV MRK & MRKS (4")	3062 6001 TACK COAT	3076 6015 D-GR HMA TY-C PG64-22	3077 6023 SP MIXES SP-C SAC-B PG70-22	3084 6001 BONDING COURSE	3085 6001 UNDERSEAL COURSE	5001 6002 GEOGRID BASE REINFORCEMENT (TY II)
		SY	SY	LF	LF	EA	LF	GAL	TON	TON	GAL	GAL	SY
ROADWAY PLAN AND PROFILE SHEETS													
58	ROADWAY PLAN AND PROFILE						600						
59	ROADWAY PLAN AND PROFILE	78	78	1,630	1,630		400	424	1,375	567	598	308	2,996
60	ROADWAY PLAN AND PROFILE	78	78	2,143	2,143	9		187	594	499	528	587	2,667
61	ROADWAY PLAN AND PROFILE			1,311	1,311	3		109	347	291	309	343	1,556
PROJECT TOTALS		156	156	5,084	5,084	12	1,000	720	2,316	1,357	1,435	1,238	7,219

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SUMMARY OF ROADWAY & SW3P

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		10
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

DRIVEWAY ID	104 6017	105 6046	530 6004	530 6019
	REMOVING CONC (DRIVEWAYS)	REMOVING STAB BASE & ASPH PAV (0"-10")	DRIVEWAYS (CONC)	DRIVEWAYS (ACP) (TYPE I)
	SY	SY	SY	SY
1		60		60
2		30		30
3		24		24
4		25		25
5		30		30
6	35		35	
7		23		23
8		95		95
9		72		72
10		45		45
11		48		48
12		31		31
13		86		86
14		61		61
15	50		50	
16	38		38	
17		87		87
PROJECT TOTALS	123	717	123	717

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SUMMARY OF DRIVEWAYS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		11
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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SIGNING, PAVEMENT MARKINGS AND DELINEATION SUMMARY

PLAN SHEET NO.	STATION TO STATION	0644 6001	0644 6004	0644 6044	0644 6076	0666 6156	0666 6224	0666 6225	0666 6233	0666 6309	0666 6312	0666 6315	0672 6007	0672 6009
		IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TYS80(1) SB(U)	REMOVE SM RD SN SUP&AM	REFL PAV MRK TY I(Y)(MED NOSE) (100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 6"	PAVEMENT SEALER (MED NOSE)	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
		EA	EA	EA	EA	EA	LF	LF	EA	LF	LF	LF	EA	EA
FM 78														
75	62+25 TO 72+00	4			4	1	2632	1951	1	1951	380	2252	32	38
76	72+00 TO 95+00	4	2	2	4	1	2931	4362	1	4362	480	2451	14	49
PROJECT TOTALS		8	2	2	8	2	5563	6313	2	6313	860	4703	46	87

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TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TEDSI
TBPE F-1640

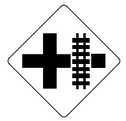
FM 78: 0025-10-097: SFT
SIGNING, PAVEMENT MARKINGS AND DELINEATION SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	See Title Sheet		12
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1												
		M3-1		24"x12"								
	1	M1-6F		24"x24"	✓		10BWG	1	SA	P		
		D10-7aT		3"x10"								
	2 3	I-3		30"x18"	✓		10BWG	1	SA	P		
	4	W10-2R		24"x24"	✓		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

FM 78:0025-10-097:SFT
SUMMARY OF SMALL SIGNS

SOSS SHEET 1 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	GUADALUPE		13

18

DATE:1/18/2023
FILE:pw:\\hal1ff-pw.bentley.com:hal1ff-pw-01\Documents\34832.G00 FM*78\900 SUBCONSULTANTS\TEDS\CADD\Sheets\SPM\FM 78-SIGNS SUMS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
2												
	1	R2-1	SPEED LIMIT 50	36"x48"	✓		10BWG	1	SA	T		
	2	W1-7T		96"x36"	✓		S80	1	SA	U	BM	
	3	M1-6F W1-7	FARM 78 ROAD	24"x24" 24"x12"	✓		10BWG	1	SA	P		
	4	M1-6F M5-IR	FARM 78 ROAD	24"x24" 24"x12"	✓		10BWG	1	SA	P		
	5	R2-1	SPEED LIMIT 50	36"x48"	✓		10BWG	1	SA	T		
	6	X-M4-4 M1-6F W1-6R	TRUCK FARM 78 ROAD	24"x8" 24"x24" 24"x12"	✓		10BWG	1	SA	P		
	7	W1-7T		96"x36"	✓		S80	1	SA	U	BM	
	8	M1-6F W1-7	FARM 78 ROAD	24"x24" 24"x12"	✓		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

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NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation — Traffic Operations Division Standard

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SUMMARY OF SMALL SIGNS

SOSS SHEET 2 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	GUADALUPE		14

18

DATE:1/18/2023
FILE:pw:\\halff-pw.bentley.com:halff-pw-01\Documents\34832.G00 FM*78\900 SUBCONSULTANTS\TEDSI\CADD\Sheets\SPM\FM 78-SIGNS SUMS.dgn

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

1. THIS PROJECT WILL BE CONSTRUCTED IN (4) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
2. PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.
3. PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
4. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES.
5. CONTRACTOR IS NOT PERMITTED TO WORK IN AREAS WITH ONGOING UTILITY RELOCATION OR ROW ACQUISITION.
6. A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE I (FLEXIBLE PAVEMENT STRUCTURE REPAIR)

THE INTENT OF THIS PHASE IS TO PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR ON THE EASTBOUND AND WESTBOUND LANES.

PHASE IA

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES, TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE WITHIN ONE WORKDAY. THE LIMITS OF THE OPERATION MUST BE COMPLETED BY THE TIME SPECIFIED AND GRADES RESTORED TO PREVENT A DROP OFF CONDITION ADJACENT TO THE TRAVEL LANE AT THE END OF EACH WORKDWAY. BOTH LANES OF TRAFFIC MUST BE REOPENED AT THE CONCLUSION OF EACH WORKDAY.
3. SHIFT TRAFFIC TO THE WESTBOUND LANE AND PLACE VERTICAL PANELS AS SHOWN ON TCP LAYOUTS UTILIZING TCP (2-2)-18 AND (2-3)-18.
4. UTILIZE TCP (2-2)-18 WITH FLAGGERS TO MAINTAIN ONE-LANE TWO-WAY TRAFFIC CONROL.
5. PERFORM 6" FLEXIBLE PAVEMENT STRUCTURE REPAIR FROM STA 72+05.00 TO STA 95+00 IN THE EASTBOUND DIRECTION.
6. INSTALL TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS.

PHASE IB

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES, TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE WITHIN ONE WORKDAY. THE LIMITS OF THE OPERATION MUST BE COMPLETED BY THE TIME SPECIFIED AND GRADES RESTORED TO PREVENT A DROP OFF CONDITION ADJACENT TO THE TRAVEL LANE AT THE END OF EACH WORKDWAY. BOTH LANES OF TRAFFIC MUST BE REOPENED AT THE CONCLUSION OF EACH WORKDAY.
3. SHIFT TRAFFIC TO EASTBOUND LANE AND RELOCATE VERTICAL PANELS AS SHOWN ON TCP LAYOUTS UTILIZING TCP (2-2)-18 AND (2-3)-18.
4. UTILIZE TCP (2-2)-18 WITH FLAGGERS TO MAINTAIN ONE-LANE TWO-WAY TRAFFIC CONROL.
5. PERFORM 6" FLEXIBLE PAVEMENT STRUCTURE REPAIR FROM STA 72+05.00 TO STA 95+00 IN THE WESTBOUND DIRECTION.
5. INSTALL TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS.

PHASE II (EASTBOUND PAVEMENT RECONSTRUCTION AND WIDENING)

THE INTENT OF THIS PHASE IS TO RECONSTRUCT THE EXISTING PAVEMENT AND WIDEN THE EASTBOUND SIDE OF THE ROADWAY.

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES, TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS INCLUDING THE WESTBOUND DETOUR.
2. SHIFT TRAFFIC AND PLACE PLASTIC DRUMS AS SHOWN ON TCP LAYOUTS UTILIZING TCP (2-2)-18, TCP (2-3)-18, AND TCP MISCELLANEOUS DETAILS (SIDE STREET/DRIVEWAY HALF-SECTION WITH FLAGGERS).
3. PLANE 6" DEPTH FROM STA 67+00.00 TO STA 72+05.00 IN THE EASTBOUND DIRECTION PER THE LIMITS SHOWN IN THE PLANS.
4. SAWCUT EXISTING PAVEMENT AND EXCAVATE ROADWAY.
5. PREPARE SUBGRADE FOR WIDENING.
6. CONSTRUCT GEOGRID, FLEX BASE, PLACE PRIME COAT, AND TWO 3" LIFTS OF HMA TY C. ADDITIONAL 2" OF HMA TY C CONSTRUCTED TO MATCH EXISTING PAVEMENT SURFACE. 2" HMA TY C SURFACE TO BE PLANED IN PHASE IV. PLACE TACK COAT BETWEEN LIFTS OF HMA TY C.

PHASE III (WESTBOUND PAVEMENT RECONSTRUCTION AND WIDENING)

THE INTENT OF THIS PHASE IS TO RECONSTRUCT THE EXISTING PAVEMENT AND WIDEN THE WESTBOUND SIDE OF THE ROADWAY.

NOTE: CONTRACTOR SHALL CONTACT THE AT&T REPRESENTATIVE LISTED BELOW TWO WEEKS PRIOR TO BEGINNING THIS WORK TO ALLOW AT&T TO ADJUST MANHOLE LIDS TO PROPOSED PAVEMENT GRADES:

REAGAN HUMPHRIES
AT&T CONSTRUCTION COORDINATOR
Rh5898@att.com
(210) 289-7057

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES, TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS. THIS WORK IS TO BE COMPLETED UNDER THE WESTBOUND DETOUR IMPLEMENTED IN THE PREVIOUS PHASE.
2. SHIFT TRAFFIC AND PLACE PLASTIC DRUMS AS SHOWN ON TCP LAYOUTS UTILIZING TCP (2-2)-18 AND TCP (2-3)-18.
3. PLANE 6" DEPTH FROM STA 67+00.00 TO STA 72+05.00 IN THE WESTBOUND DIRECTION PER THE LIMITS SHOWN IN THE PLANS.
4. SAWCUT EXISTING PAVEMENT AND EXCAVATE ROADWAY.
5. PREPARE SUBGRADE FOR WIDENING.
6. CONSTRUCT GEOGRID, FLEX BASE, PLACE PRIME COAT, AND TWO 3" LIFTS OF HMA TY C. ADDITIONAL 2" OF HMA TY C CONSTRUCTED TO MATCH EXISTING PAVEMENT SURFACE. 2" HMA TY C SURFACE TO BE PLANED IN PHASE IV. PLACE TACK COAT BETWEEN LIFTS OF HMA TY C.

PHASE IV (PLANING, FINAL SURFACE AND CLEAN-UP)

THE INTENT OF THIS PHASE IS TO PLANE THE EXISTING 2" SURFACE, INSTALL THE FINAL PAVEMENT SURFACE AND INSTALL ALL PERMANENT SIGNING AND PAVEMENT MARKINGS.

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL DEVICES, TEMPORARY PAVEMENT MARKINGS AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE WITHIN ONE WORKDAY. THE LIMITS OF THE OPERATION MUST BE COMPLETED BY THE TIME SPECIFIED AND BOTH LANES OF TRAFFIC MUST BE REOPENED AT THE CONCLUSION OF EACH WORKDAY.
3. UTILIZE TCP (2-2)-18 WITH FLAGGERS TO MAINTAIN ONE-LANE TWO-WAY TRAFFIC CONROL.
4. PLANE 2" SURFACE IN THE WESTBOUND DIRECTION.
5. PLACE UNDERSEAL AND SP-C IN THE WESTBOUND DIRECTION.
6. PLACE TEMPORARY PAVEMENT MARKINGS
7. PLANE 2" SURFACE IN THE EASTBOUND DIRECTION.
8. PLACE UNDERSEAL AND SP-C IN THE EASTBOUND DIRECTION.
9. UTILIZE TCP (3-3)-14 TO MAINTAIN ONE-LANE TWO-WAY TRAFFIC CONTROL.
10. PLACE FINAL PAVEMENT MARKINGS.
11. INSTALL SIGNS AND DELINEATION.
12. PLACE TOPSOIL AND DRILL SEED.
13. FINAL CLEAN-UP.
14. REMOVE BARRICADES AND ADVANCE WANRING SIGNS ONLY AFTER PROJECT HAS BEEN ACCEPTED AS COMPLETE BY THE ENGINEER.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

THE SEAL ORIGINALLY APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOHNNY L. CLAYTON, P.E. #107215 ON 1/25/2023 . ALTERATION OF A PREVIOUSLY SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 100 NE INTERSTATE 410 LOOP, SUITE 200, SAN ANTONIO, TEXAS 78216, TBPE FIRM #F-312

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TEL (210) 798-1895 FIRM #F-312

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TRAFFIC CONTROL PLAN SEQUENCE OF WORK

SHEET 1 OF 1

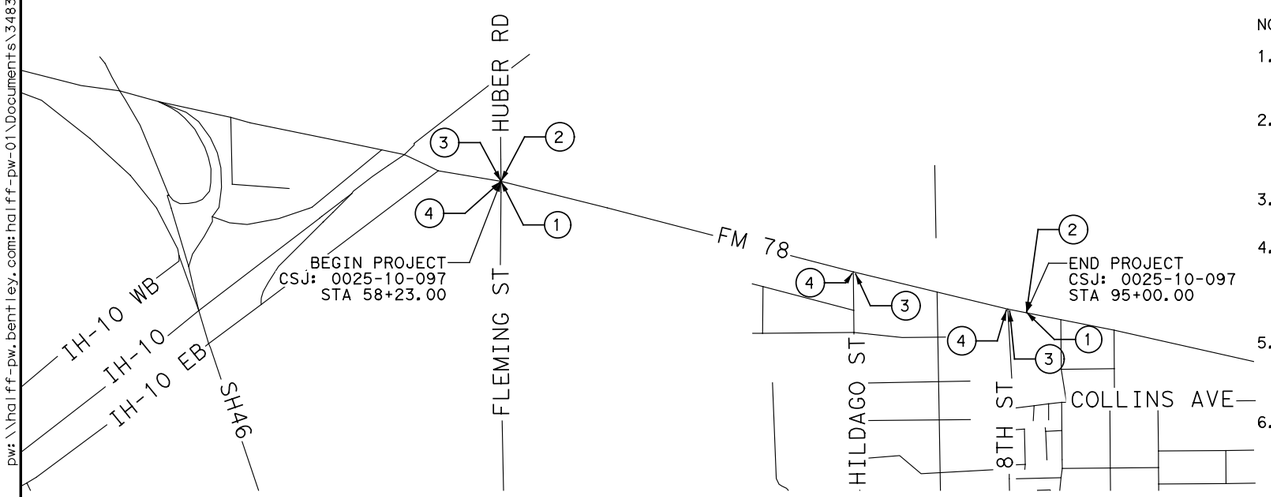
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		15
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

LOCATION	G20-1aT	G20-1bTL	G20-1bTR	G20-2	G20-5aP	G20-5T	G20-6T	G20-10T	M4-8a	M4-9TR	M4-9TL	M4-9S	M4-12T
①					X	X	X	X					
②				X									
③	X	X	X										
④				X									
⑤								X	X	X	X	X	X

LOCATION	R4-1	R11-2	R20-3T	R20-5aTP	R20-5T	CW3-4	CW8-8	CW8-9aT	CW8-11	CW8-12	CW13-1P	CW16-2P	CW20-1D
①	X		X	X	X						X	X	X
②													
③													X
④													
⑤	X	X	X	X	X	X	X	X	X	X	X	X	X

LOCATION	CW20-7	CW20-8T	CW21-2	CW21-3D	CW21-10aT	OPPOSING TRAFFIC LANE DIVIDER	PLASTIC DRUM	TY III BARRICADE	PORTABLE CHANGEABLE MESSAGE SIGN	TRAILER MOUNTED FLASHING	TRUCK MOUNTED ATTENUATOR
①					X						
②											
③											
④											
⑤	X	X	X	X		X	X	X	X	X	X

① LOCATION 1 TO BE PLACED AT BEGINNING OF PROJECT
② LOCATION 2 TO BE PLACED AT THE END OF THE PROJECT
③ LOCATION 3 TO BE PLACED AT THE BEGINNING OF THE SIDE STREETS
④ LOCATION 4 TO BE PLACED AT THE END OF THE SIDE STREETS
⑤ LOCATION 5 TO BE USED THROUGHOUT AS DIRECTED BY THE ENGINEER



NOTES:

1. REFER TO STANDARDS "BC", "TCP", AND "WZ" STANDARDS FOR PLACEMENT OF ADVANCE WARNING SIGNS, BARRICADES, AND OTHER TRAFFIC CONTROL DEVICES.
2. BARRICADES ARE NOT TO BE USED AS A SIGN SUPPORT. SUPPORTS FOR SIGNS SHALL BE TEMPORARY, FIXED OR PORTABLE SIGN SUPPORTS, AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH THE "BC" STANDARD SHEETS AND THE TEXAS MUTCD.
3. THE DISTANCE PLAQUE IN FEET OR MILES, MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
4. ALL CONSTRUCTION TRAFFIC IS TO BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELLING PUBLIC. AT TIMES WHEN IT IS NECESSARY FOR CONSTRUCTION EQUIPMENT OR TRUCKS TO STOP, UNLOAD, OR CROSS ROADWAYS UNDER TRAFFIC, WARNING SIGNS AND FLAGGER SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT TRAVELING PUBLIC.
5. BARRICADES AND WARNING SIGNS SHOWN ON THIS SHEET ARE MINIMAL WORK ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. MAY BE REQUIRED IN ACCORDANCE WITH "TCP" SHEETS, TXDOT STANDARDS, AND TEXAS MUTCD.
6. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" SIGN MUST BE USED WITH THE "BE PREPARED TO STOP" SIGN.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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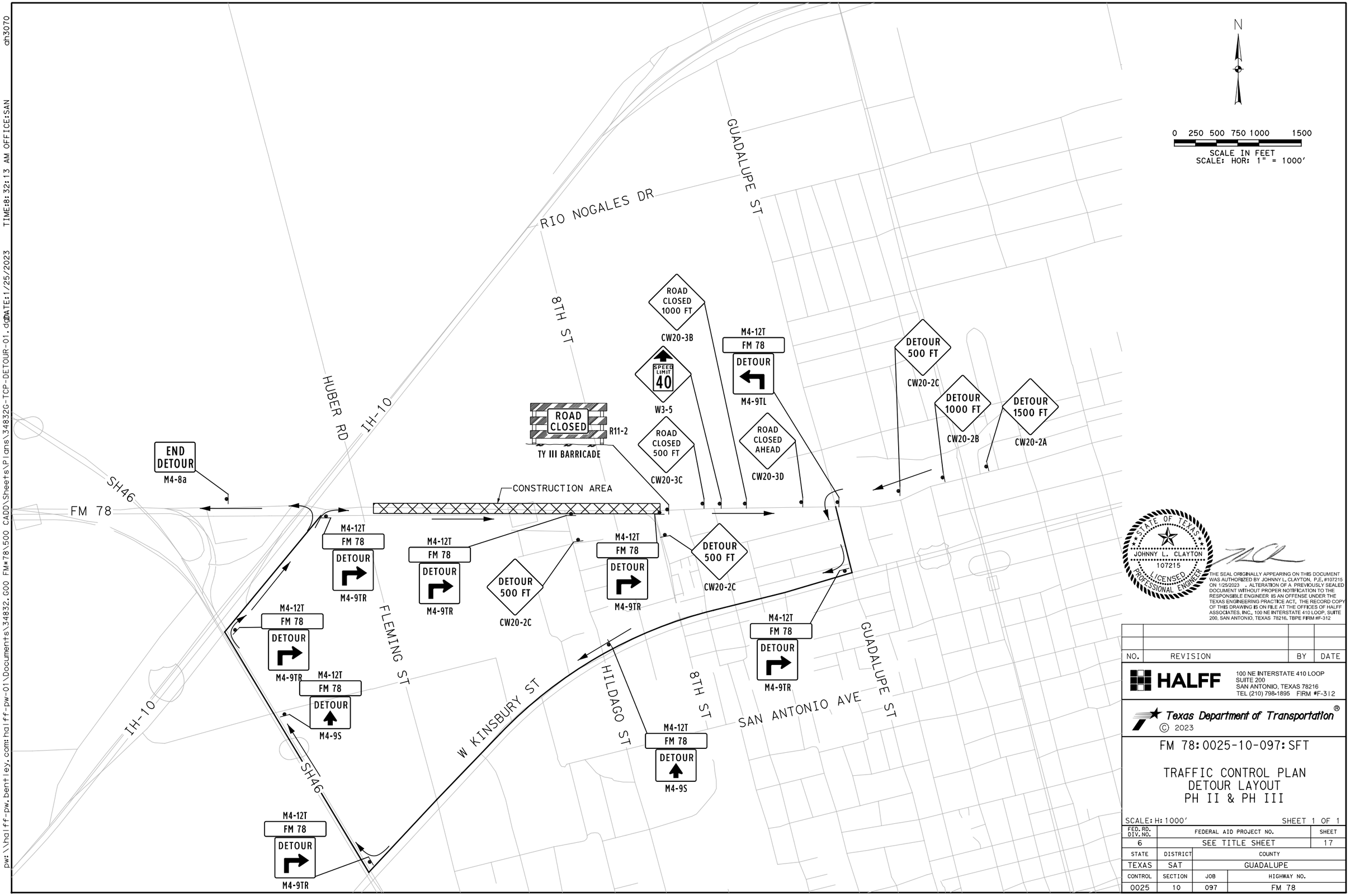
FM 78: 0025-10-097: SFT

SCHEDULE OF BARRICADES & ADVANCED WARNING DEVICES

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		16
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



NO.	REVISION	BY	DATE

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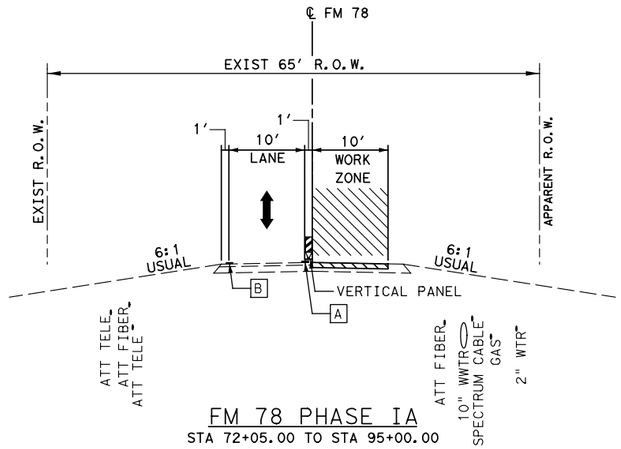
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

FM 78: 0025-10-097: SFT

TRAFFIC CONTROL PLAN
DETOUR LAYOUT
PH II & PH III

SCALE: H: 1000' SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		17
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



FM 78 PHASE IA

STA 72+05.00 TO STA 95+00.00

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM
- A — WK ZN PAV MRK (Y) 4" (SLD) DBL
- B — WK ZN PAV MRK (W) 4" (SLD)

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE IA

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		18
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

TXDOT*MON*PENTABLE.tbl
DATE:1/25/2023 TIME:8:32:17 AM OFFICE:SAN dn3070
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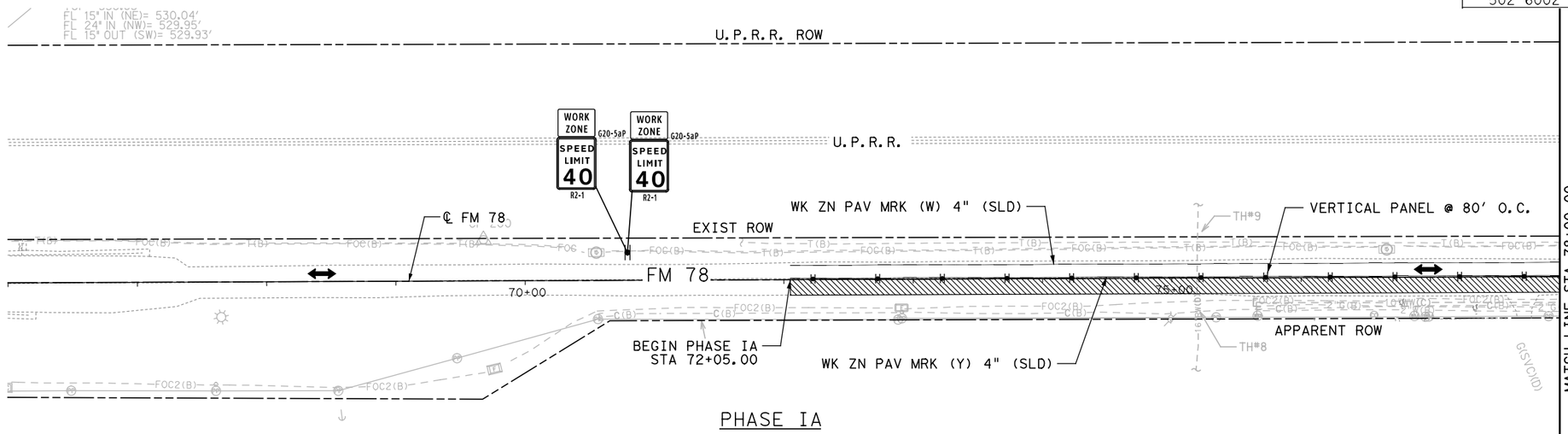
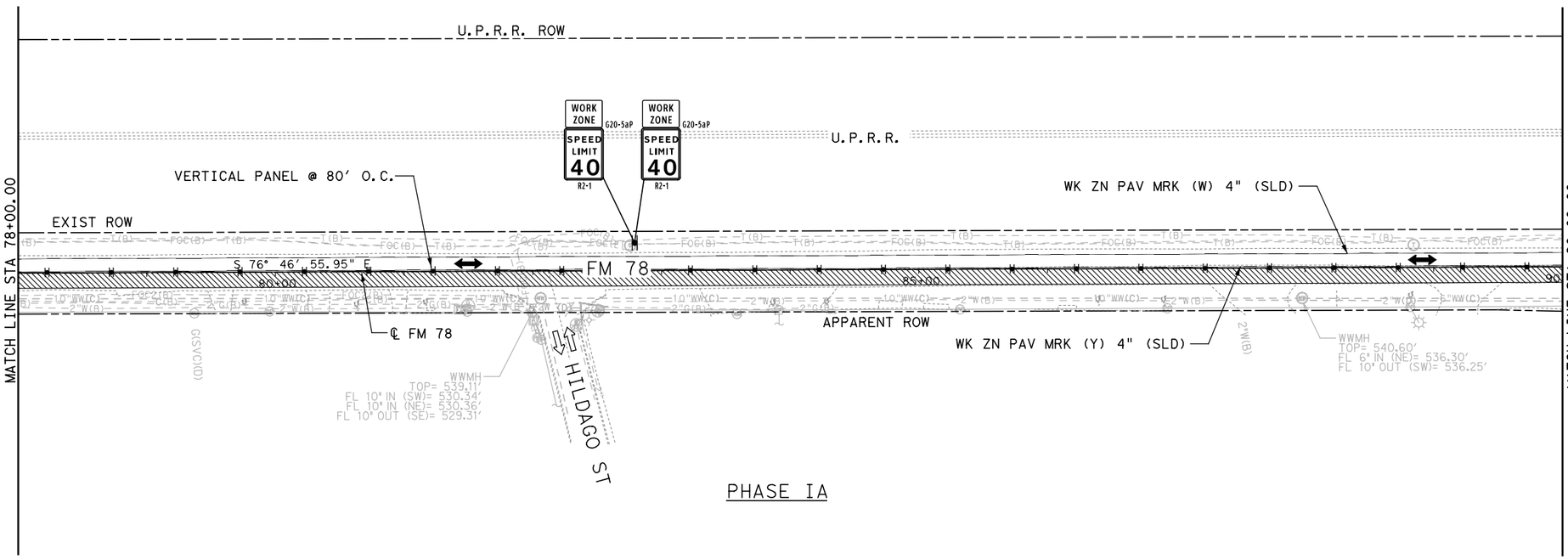
PDF*Mono*MidWT.plt

ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
502 6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	
502 6002	BARR, SIGNS, TRAFFIC HANDLING ADD ALT	MO	172





LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE IA

SCALE: 1:100 SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		19
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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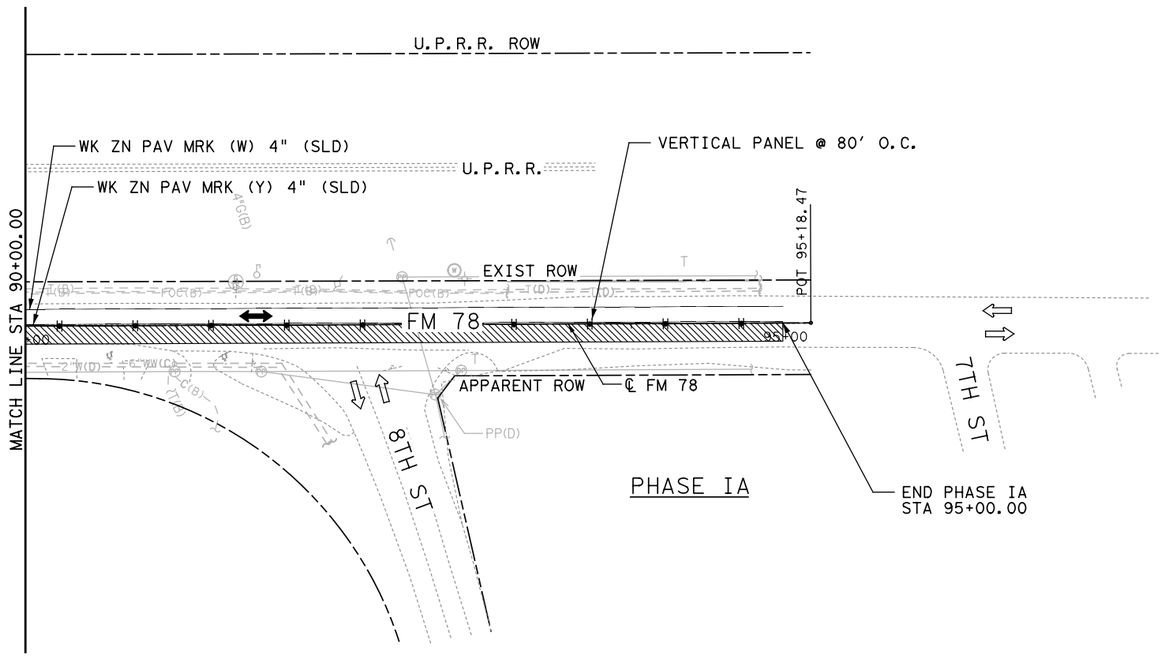

	ESTIMATED QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	500
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	500

N

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE IA

SCALE: 1:100 SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		20
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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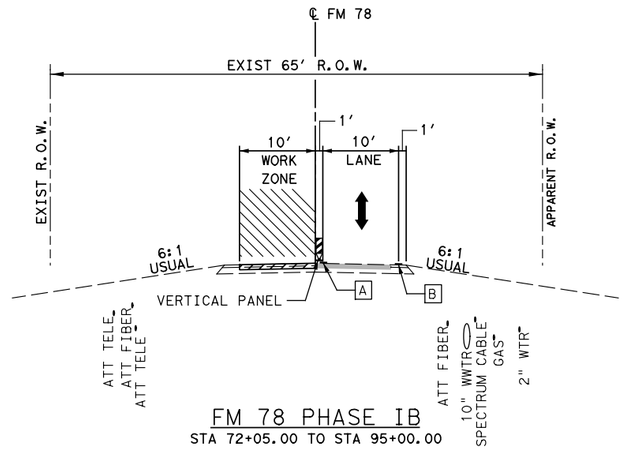

FM 78 PHASE IB

STA 72+05.00 TO STA 95+00.00

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM
- A — WK ZN PAV MRK (Y) 4" (SLD) DBL
- B — WK ZN PAV MRK (W) 4" (SLD)

STATE OF TEXAS
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FM 78:0025-10-097:SFT

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE IB

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		21
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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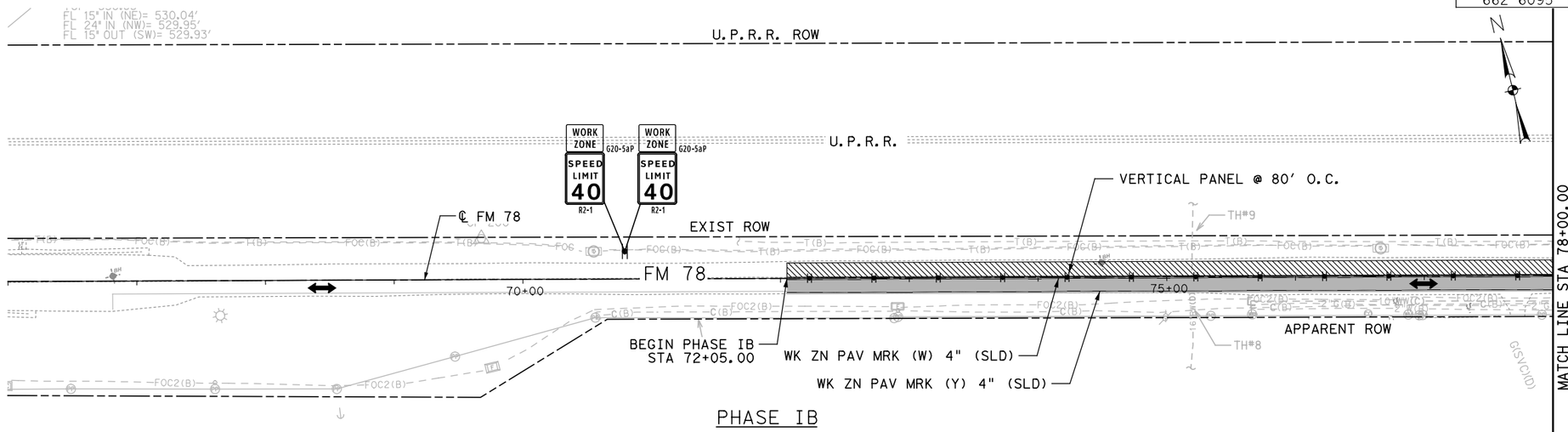
ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2400
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2400



PHASE IB

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
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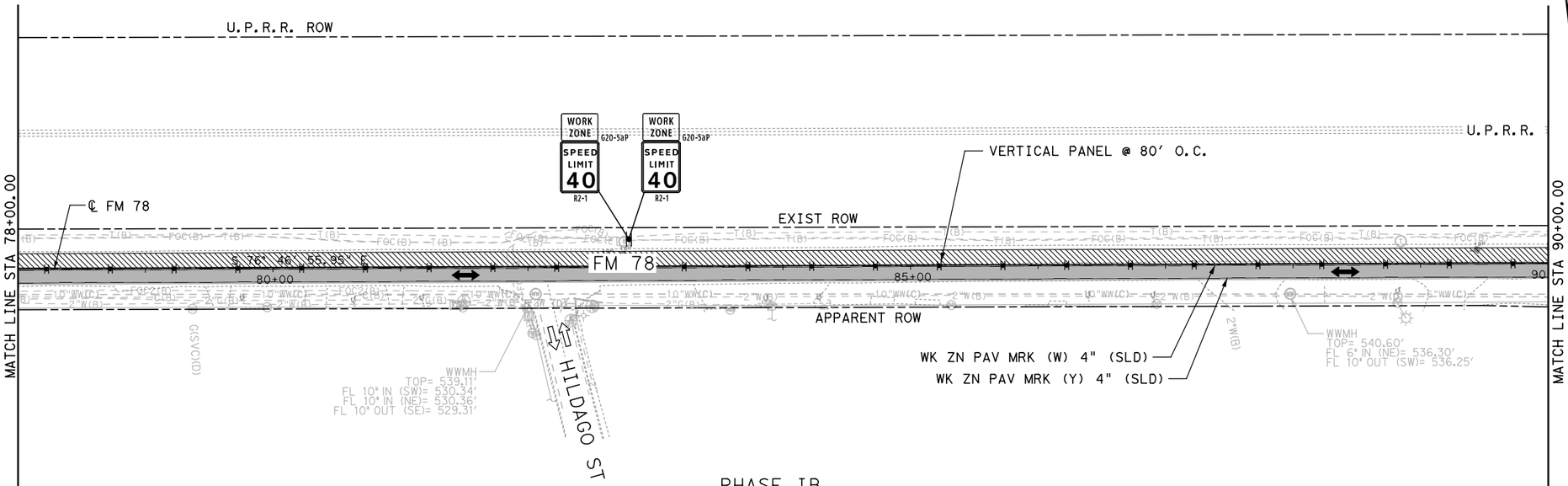
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM



PHASE IB

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE IB

SCALE: 1:100 SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		22
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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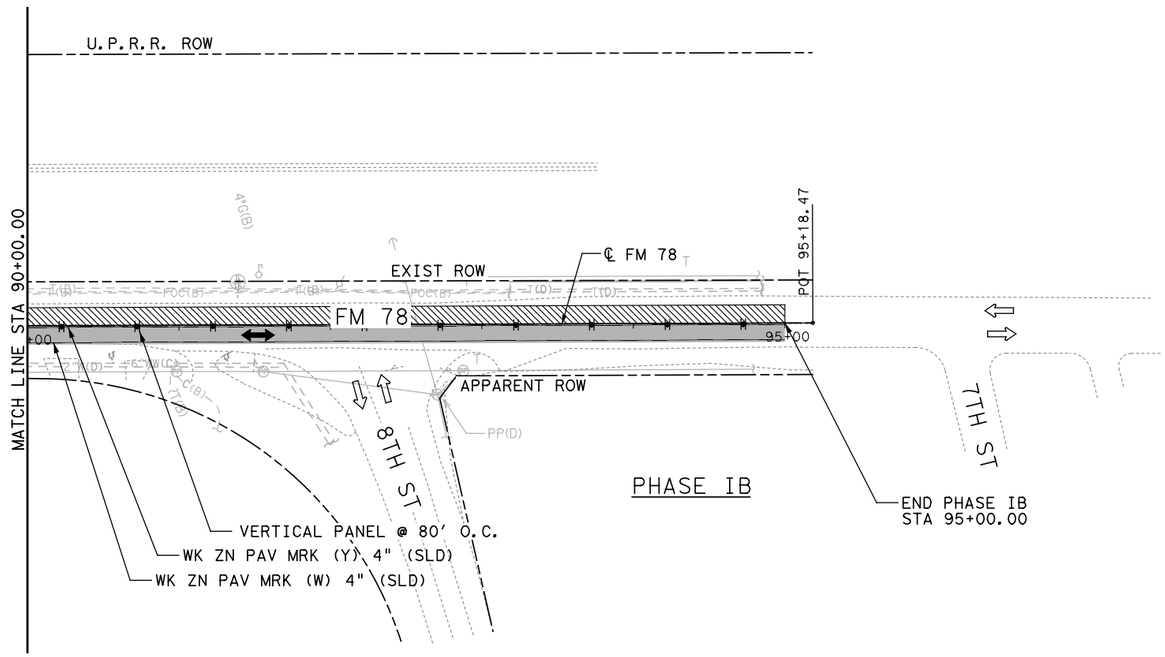

	ESTIMATED QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	500
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	500

N

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

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TRAFFIC CONTROL PLAN
PHASE IB

SCALE: 1:100 SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		23
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

TXDOT*MON*PENTABLE.tbl DATE:1/25/2023 TIME:8:32:40 AM OFFICE:SAN dn3070
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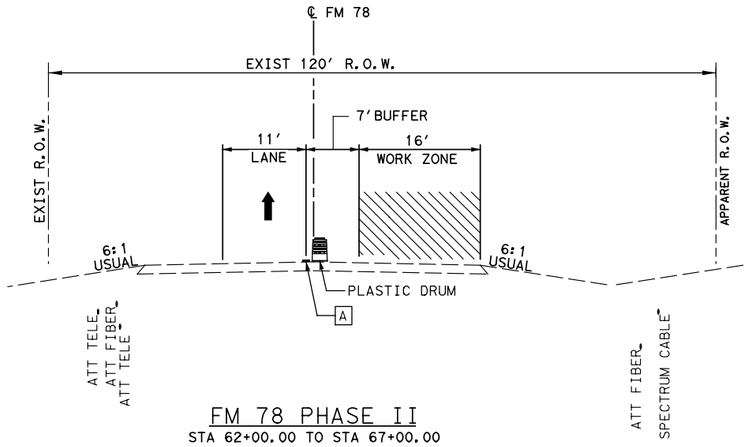
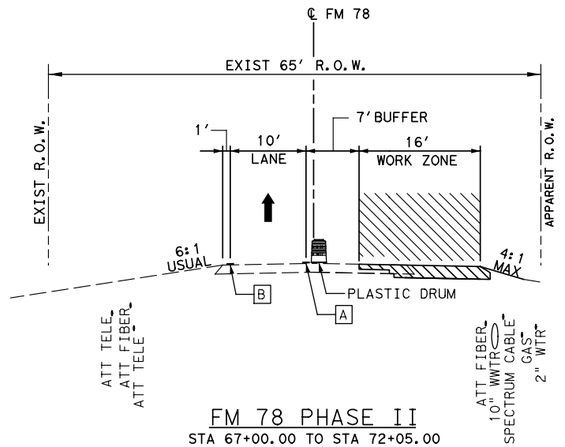


FM 78 PHASE II
STA 62+00.00 TO STA 67+00.00



FM 78 PHASE II
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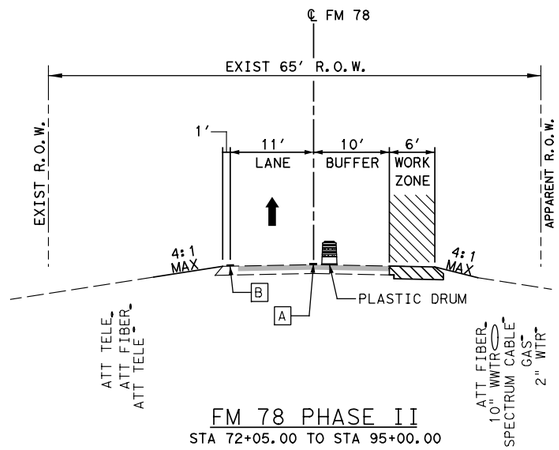

FM 78 PHASE II
STA 72+05.00 TO STA 95+00.00

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM
- A — WK ZN PAV MRK (Y) 4" (SLD) DBL
- B — WK ZN PAV MRK (W) 4" (SLD)

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

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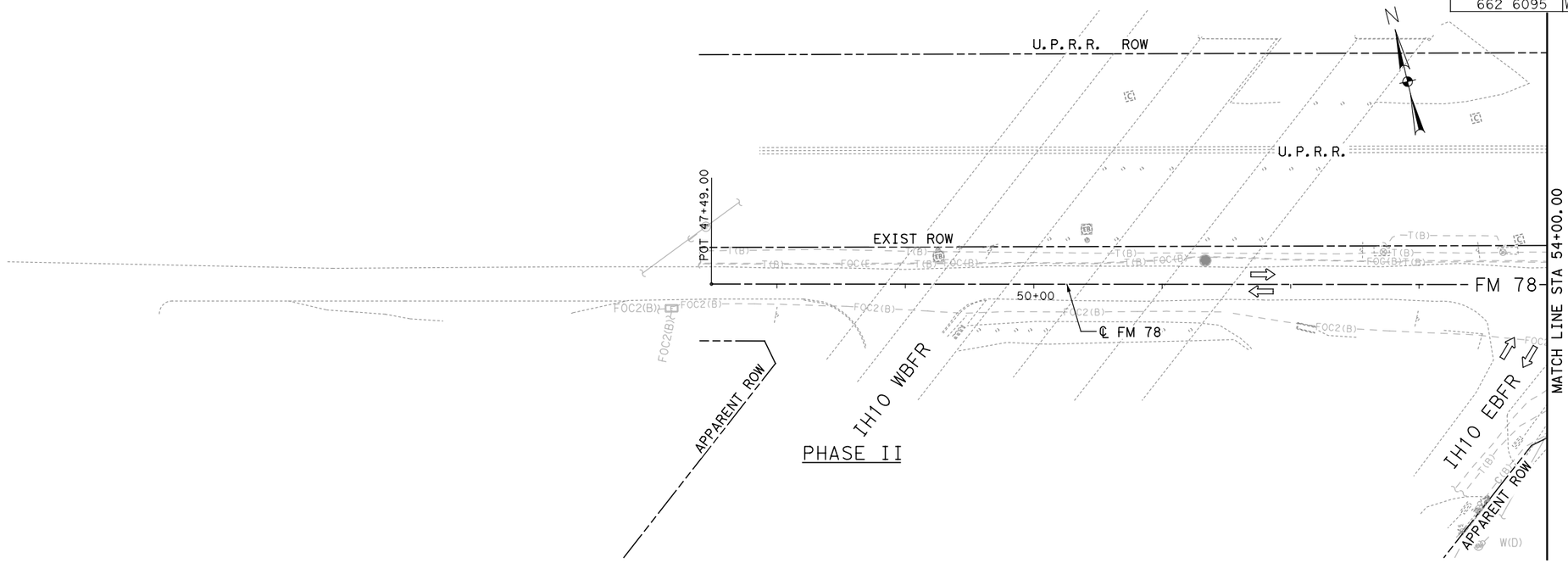
FM 78:0025-10-097:SFT

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE II

SCALE: NTS SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		24
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	400
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	400

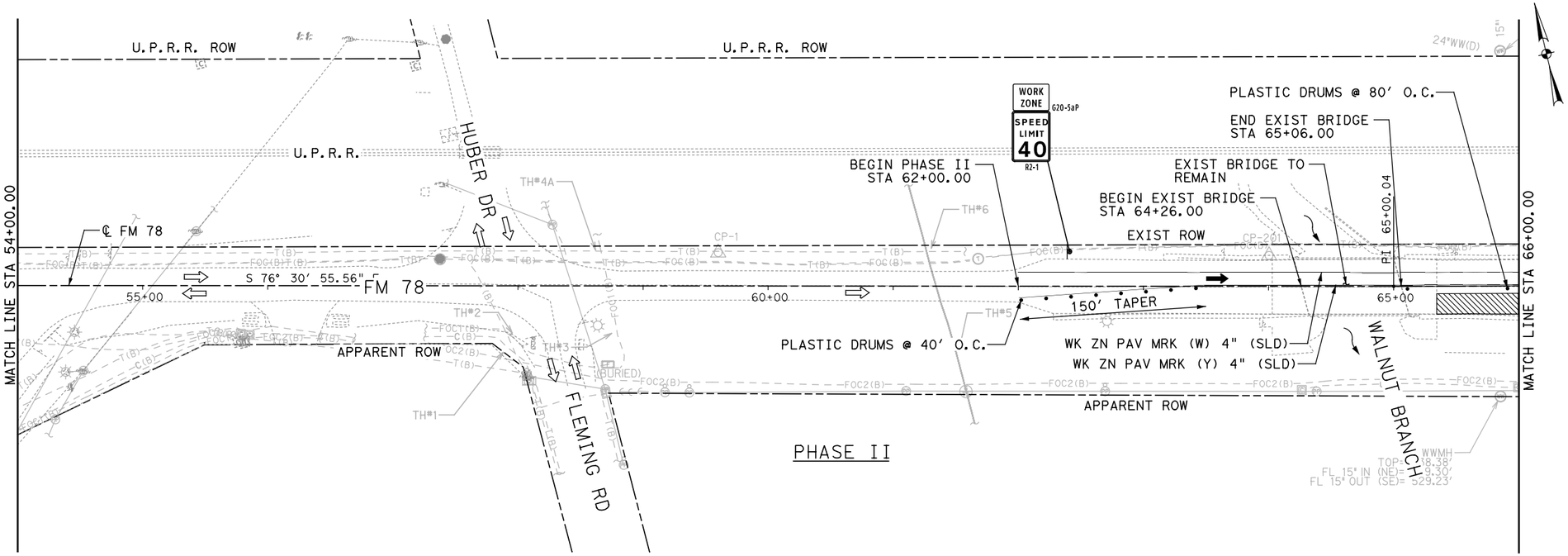


LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

NOTES:

1. SEE DETOUR LAYOUT FOR ADDITONAL SIGNAGE.



0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

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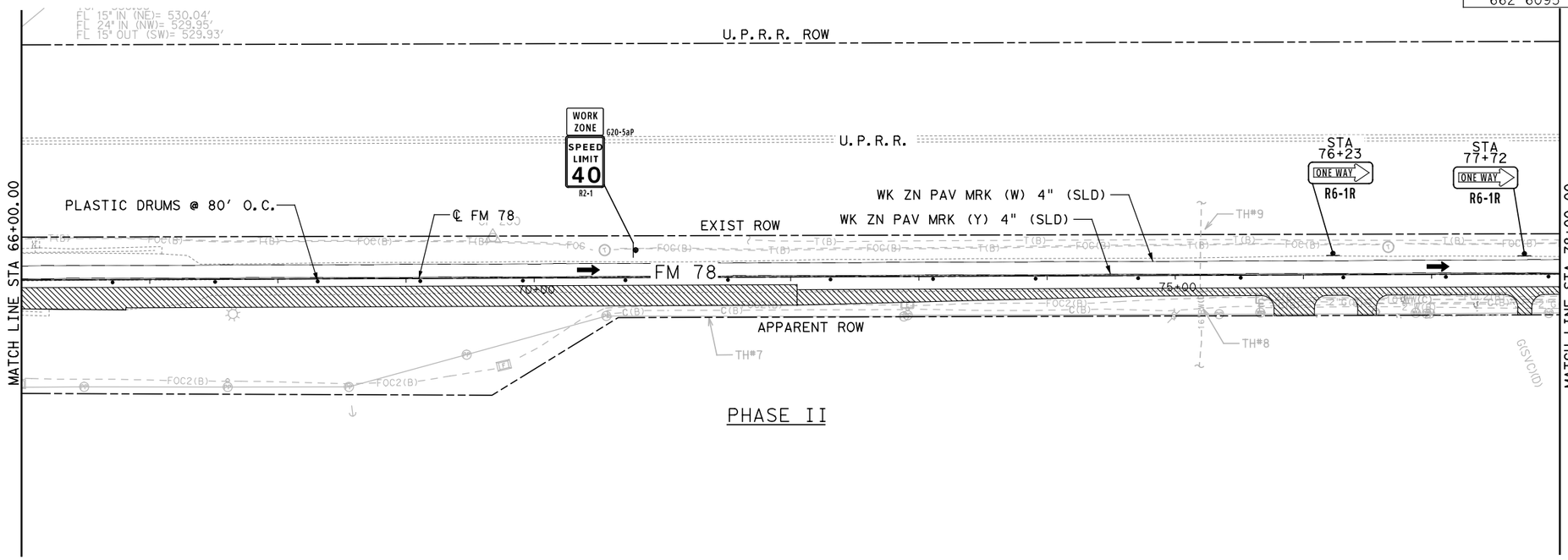
TRAFFIC CONTROL PLAN
PHASE II

SCALE: 1:100 SHEET 1 OF 3

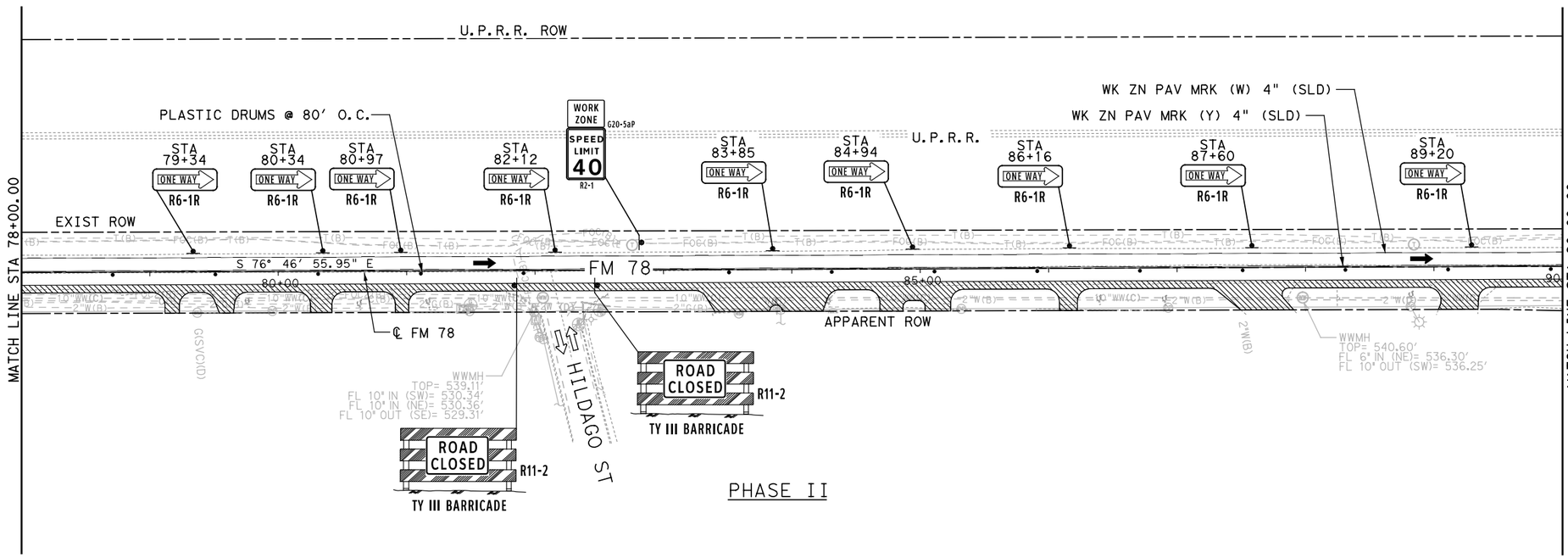
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		25
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2400
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2400



NOTES:

1. SEE DETOUR LAYOUT FOR ADDITONAL SIGNAGE.



LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE II

SCALE: 1:100 SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		26
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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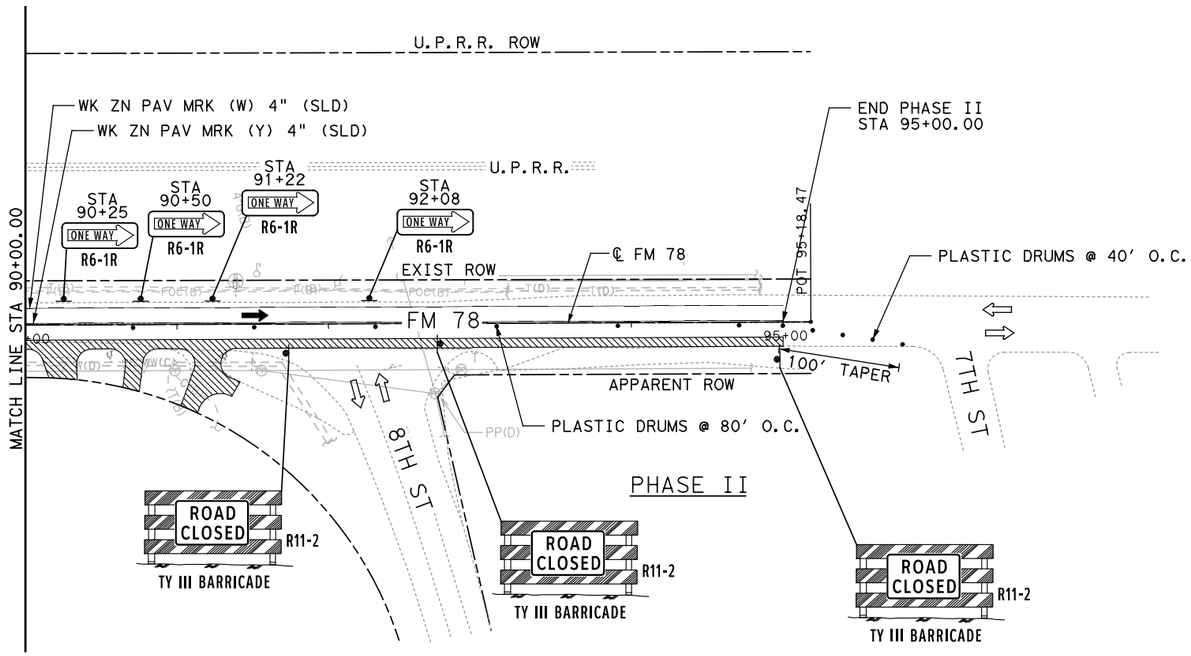

	ESTIMATED QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	500
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	500

N

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

NOTES:

1. SEE DETOUR LAYOUT FOR ADDITONAL SIGNAGE.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE II

SCALE: 1:100 SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		27
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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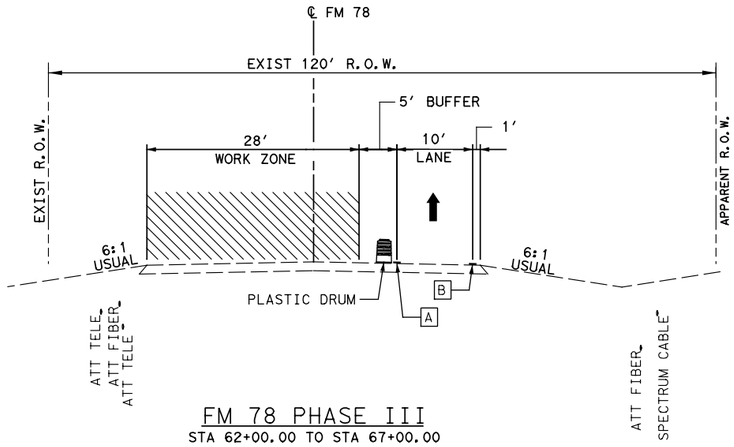
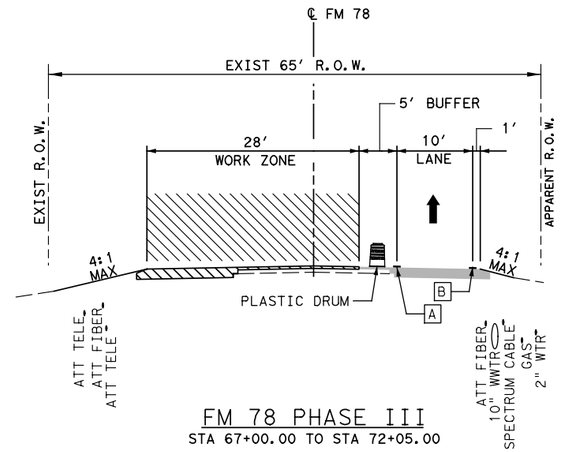
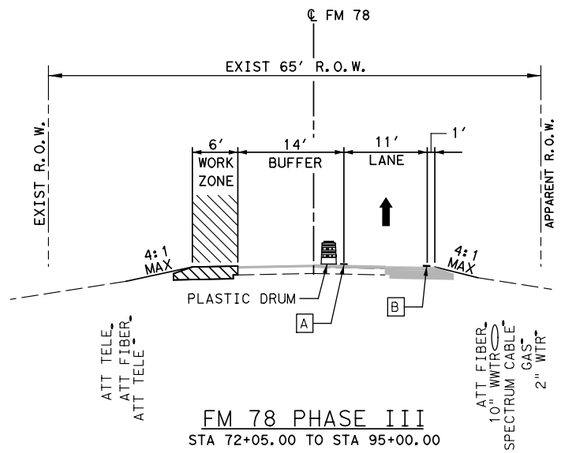


FM 78 PHASE III
STA 62+00.00 TO STA 67+00.00



FM 78 PHASE III
STA 67+00.00 TO STA 72+05.00



FM 78 PHASE III
STA 72+05.00 TO STA 95+00.00

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM
- A — WK ZN PAV MRK (Y) 4" (SLD) DBL
- B — WK ZN PAV MRK (W) 4" (SLD)

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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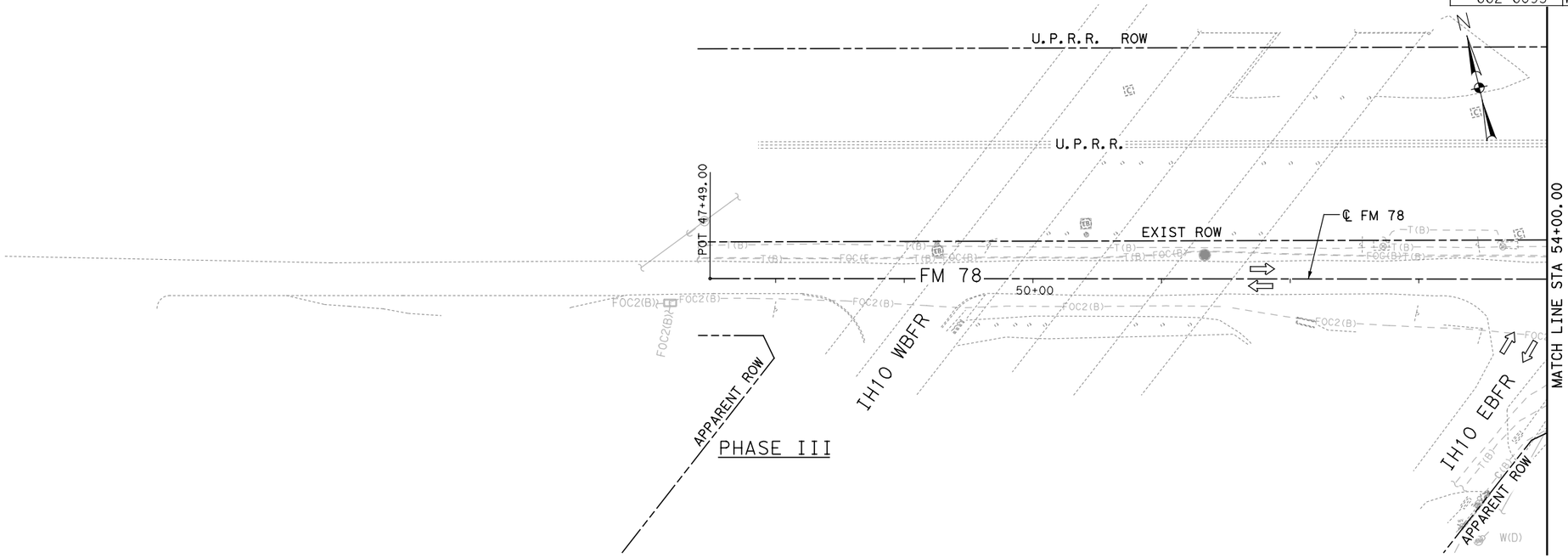
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE III

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		28
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	400
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	400

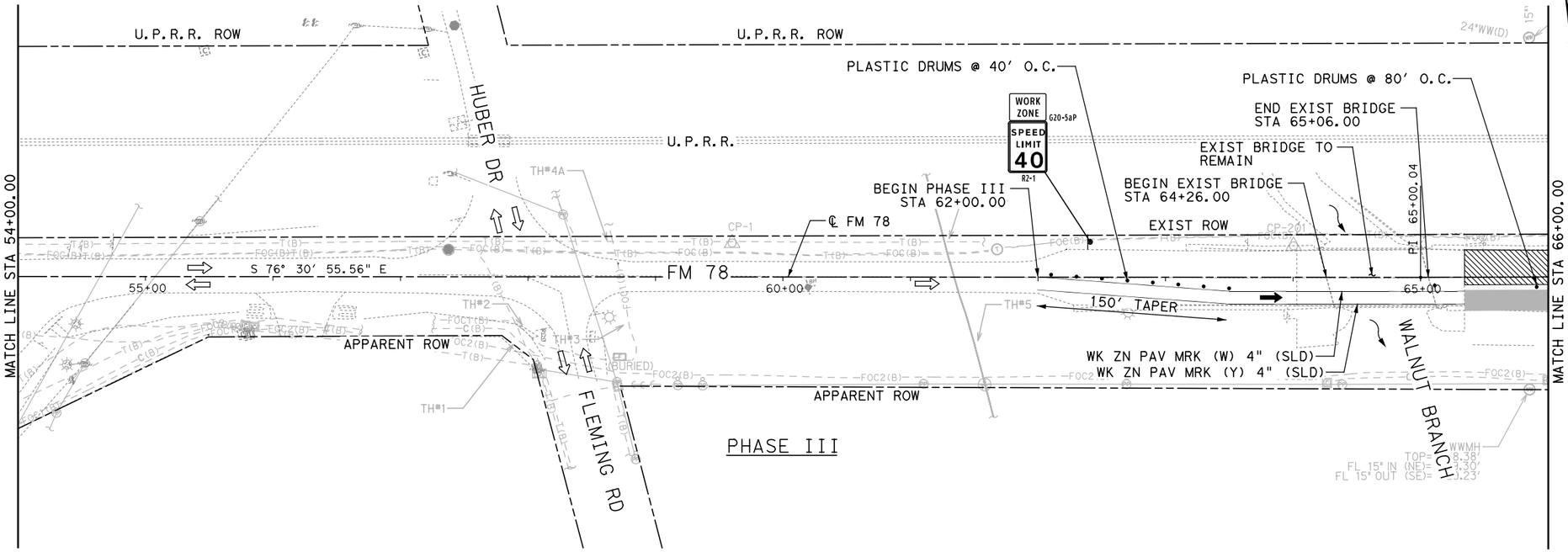


LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

NOTES:

1. SEE DETOUR LAYOUT FOR ADDITONAL SIGNAGE.



0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

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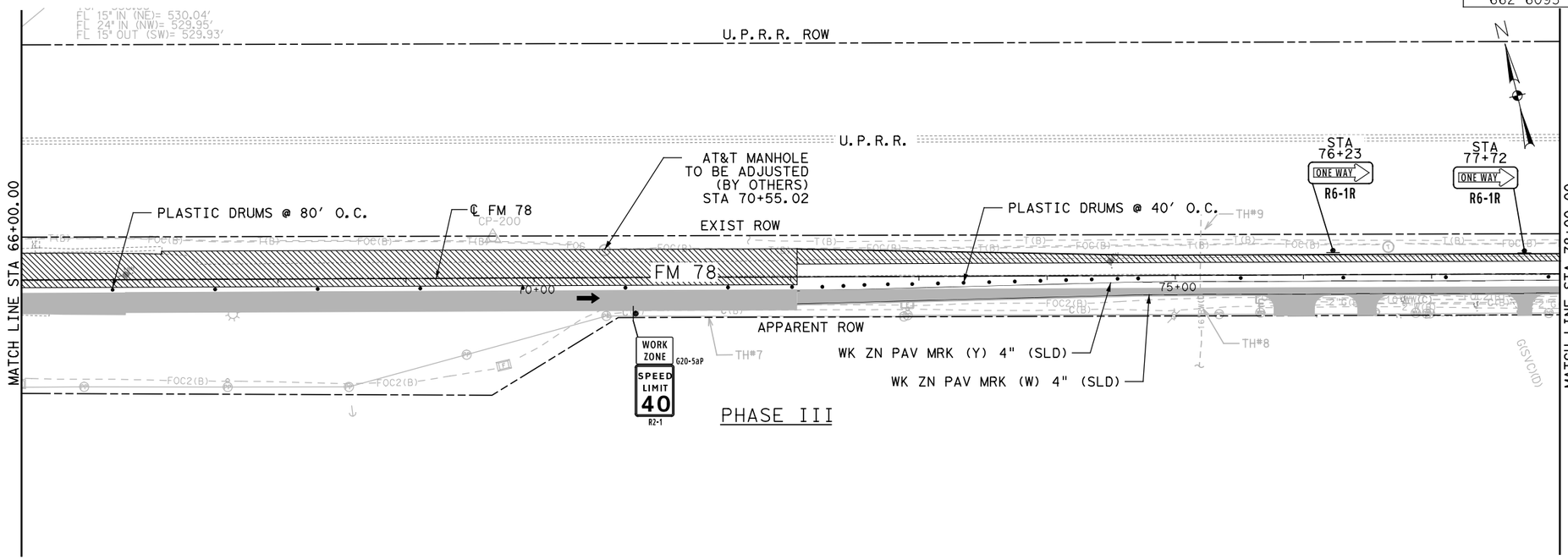
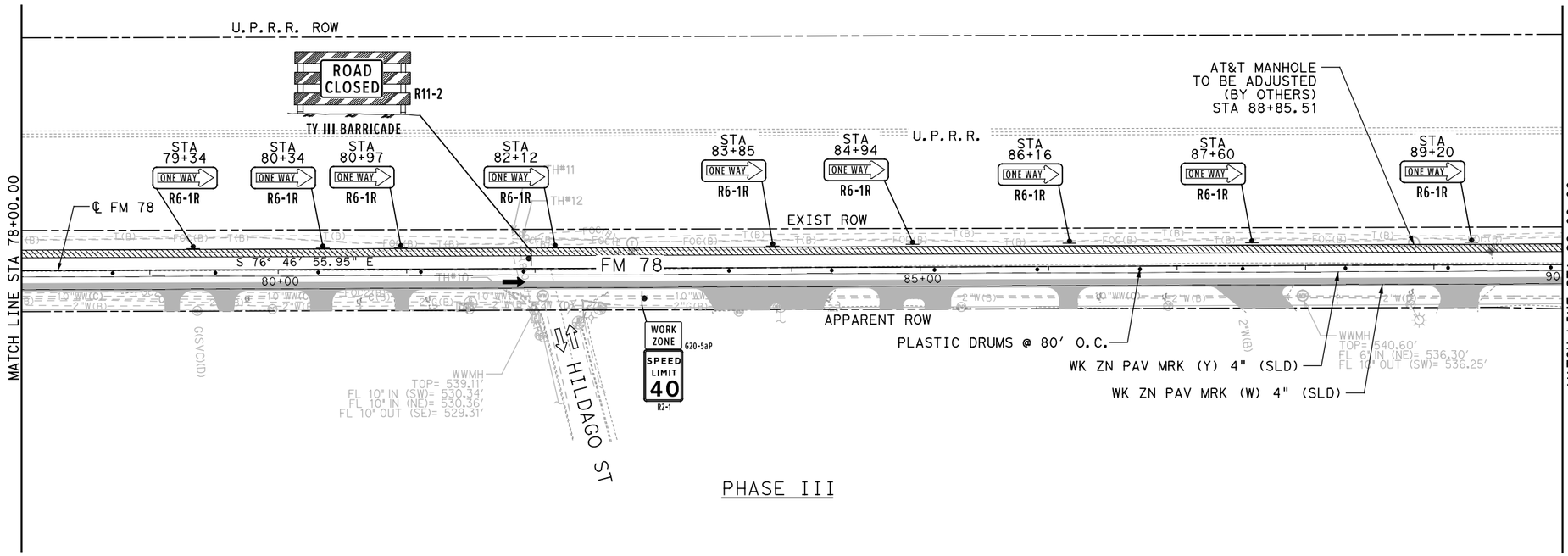
FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE III

SCALE: 1:100 SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		29
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2400
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2400





LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

NOTES:

1. SEE DETOUR LAYOUT FOR ADDITONAL SIGNAGE.

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

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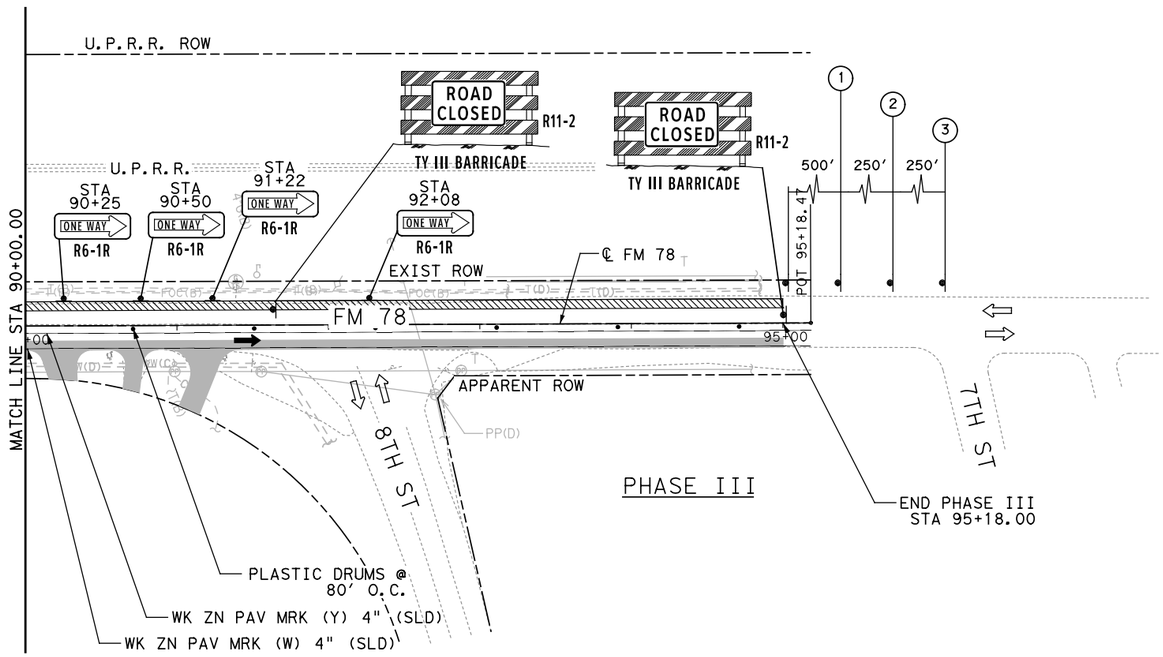
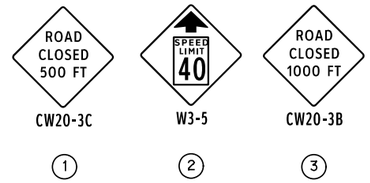
TRAFFIC CONTROL PLAN
PHASE III

SCALE: 1:100 SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		30
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78





	ESTIMATED QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	500
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	500

LEGEND:

- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- VERTICAL PANEL
- PLASTIC DRUM

NOTES:

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SCALE IN FEET
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FM 78:0025-10-097:SFT
TRAFFIC CONTROL PLAN
PHASE III

SCALE: 1:100 SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		31
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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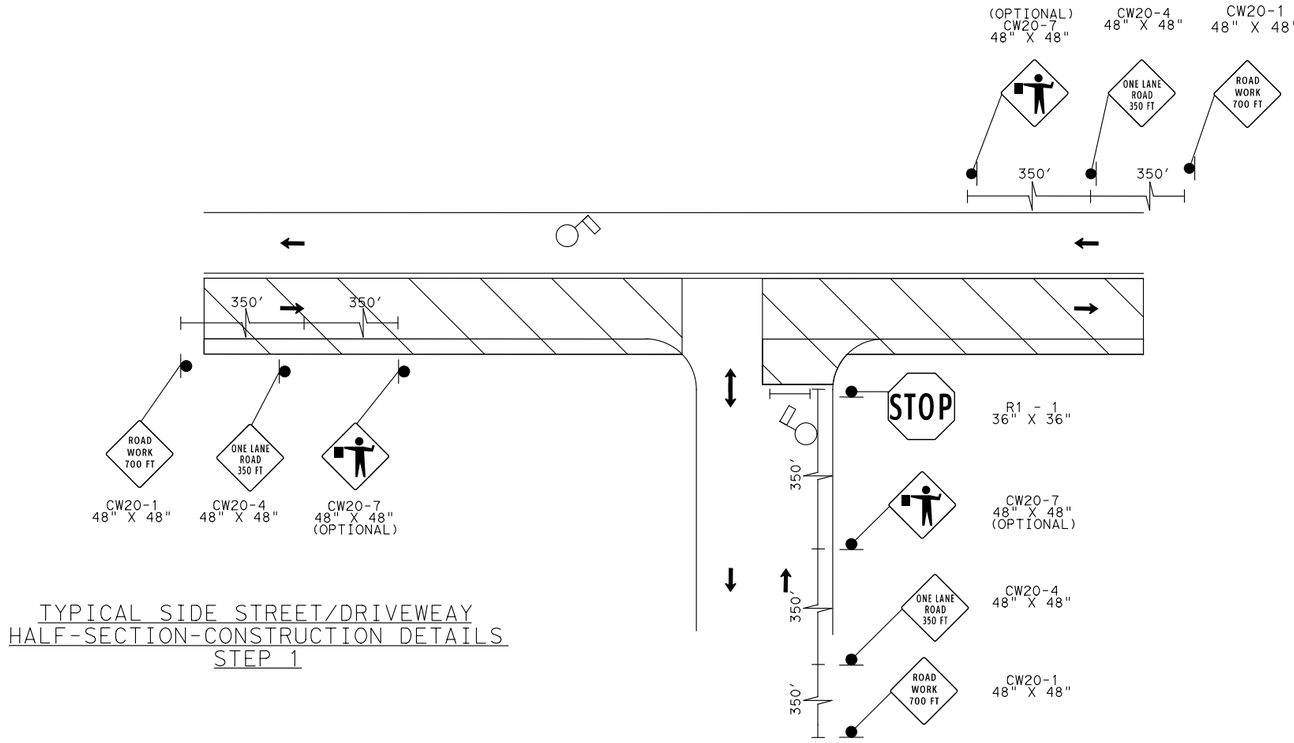
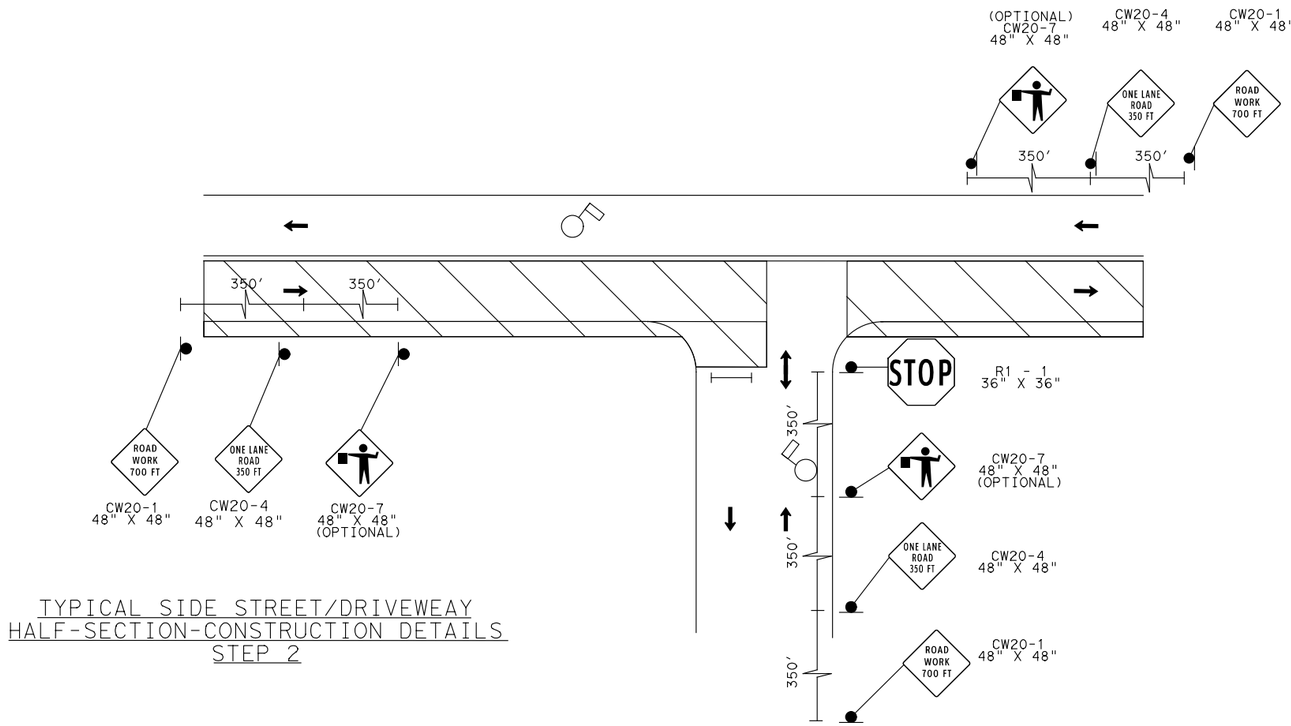


TYPICAL SIDE STREET/DRIVEWEAY
HALF-SECTION-CONSTRUCTION DETAILS
STEP 1



TYPICAL SIDE STREET/DRIVEWEAY
HALF-SECTION-CONSTRUCTION DETAILS
STEP 2

LEGEND:

- CONSTRUCTION THIS PHASE
- FLAGMAN LOCATION
- SIGN POST
- TYPE 3 BARRICADE
- TRAFFIC FLOW ARROW OR DETOUR ROUTE

NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL STREET AND DRIVEWAY CLOSURES PRIOR TO COMMENCEMENT OF CONSTRUCTION. PROPERTIES WITH MORE THAN ONE DRIVEWAY SHALL BE RECONSTRUCTED ONE DRIVEWAY AT A TIME BEFORE PROCEDING TO THE SECOND DRIVEWAY. CROSS STREETS OR DRIVEWAYS WITH ONE DRIVEWAY ACCESS SHALL BE RECONSTRUCTED IN HALF WIDTHS UNLESS ARRANGEMENTS HAVE BEEN MADE WITH THE OWNER. SIDE STREET/DRIVEWAY HALF WIDTH CONSTRUCTION SHALL BE CONDUCTED DURING OFFPEAK, WEEKEND, NIGHT CLOSURES, OR AS APPROVED BY THE ENGINEER.
2. EXPERIENCED FLAGGERS TO BE USED TO DIRECT TRAFFIC DURING INTERSECTION CONSTRUCTION.
3. CHANNELIZING DEVICES SHALL BE SPACED PER BARRICADE CONSTRUCTION STANDARDS, UNLESS OTHERWISE SHOWN ON PLANS.
4. SEE ADVANCED WARNING SIGNS LAYOUT FOR ADDITIONAL INFORMATION.
5. REFER TO BARRICADE CONSTRUCTION STANDARDS FOR MINIMUM SPACING OF CONSTRUCTION WARNING AND CROSS STREET SIGNS.

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TRAFFIC CONTROL PLAN MISCELLANEOUS DETAILS (SIDE STREET/DRIVEWAY HALF-SECTION WITH FLAGGERS)

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		32
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET SHEET NUMBER	FURNISH TMA/TA EA	RELOCATE/REUSE TMA/TA EA	TOTAL TMA/TA PER SET UP EA	DURATION OF TMA/TA SET UP DAYS PER TMA/TA USE	6185 6002 TMA (STATIONARY) DAY	6185 6003 TMA (MOBILE OPERATION) HR
ALL	I	TCP (2-2) - 18 & TCP (2-3) - 18	1		1	12	12	
ALL	II	TCP (2-2) - 18 & TCP (2-3) - 18		1	1	37	37	
ALL	III	TCP (2-2) - 18 & TCP (2-3) - 18		1	1	27	27	
ALL	IV	FINAL OVERLAY AND STRIPING						
		TCP (1-2) - 18 & TCP (3-3) - 14		1	1	104		104
TOTALS			1				76	104

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0025	10	097	FM 78
	DIST	COUNTY		
	SAN	GUADALUPE		
	FEDERAL AID PROJECT			SHEET NO.
	SEE TITLE SHEET			33

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0025	10	097	FM 78
	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		34

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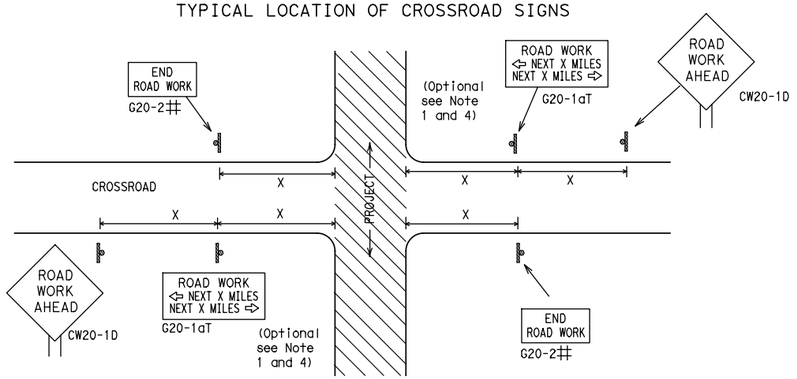
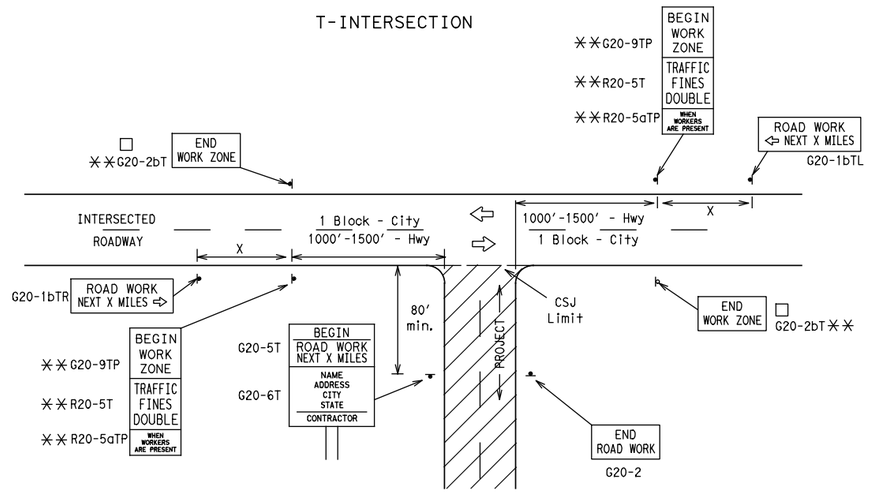
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

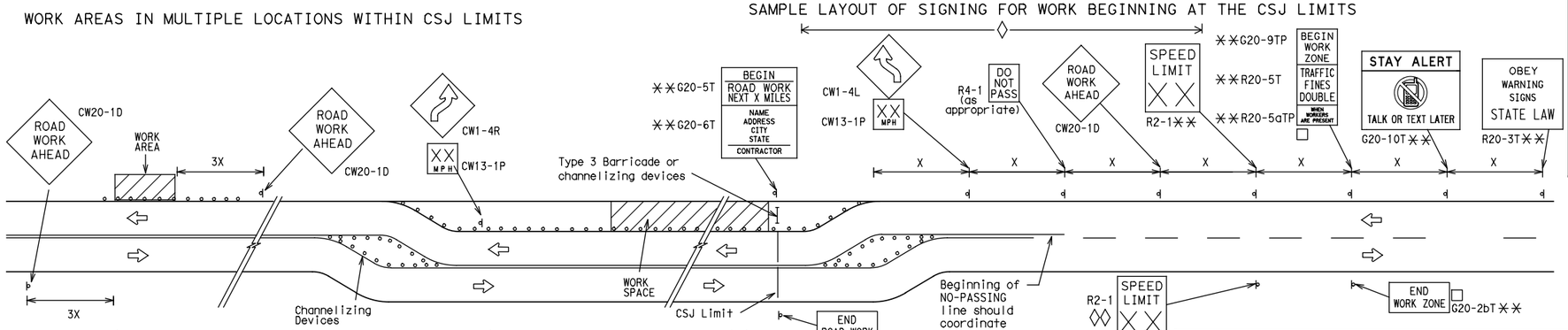
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

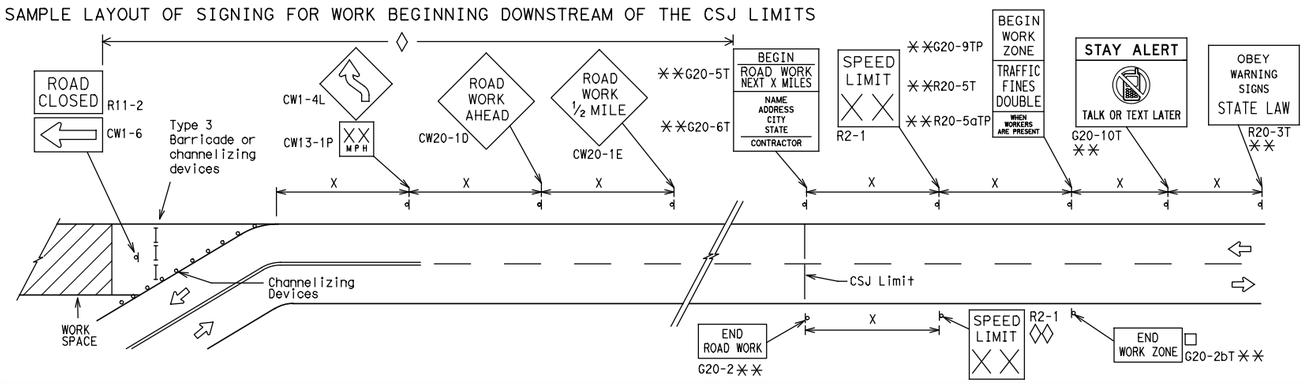
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	GUADALUPE		35

DATE: 1/25/2023 8:33:32 AM
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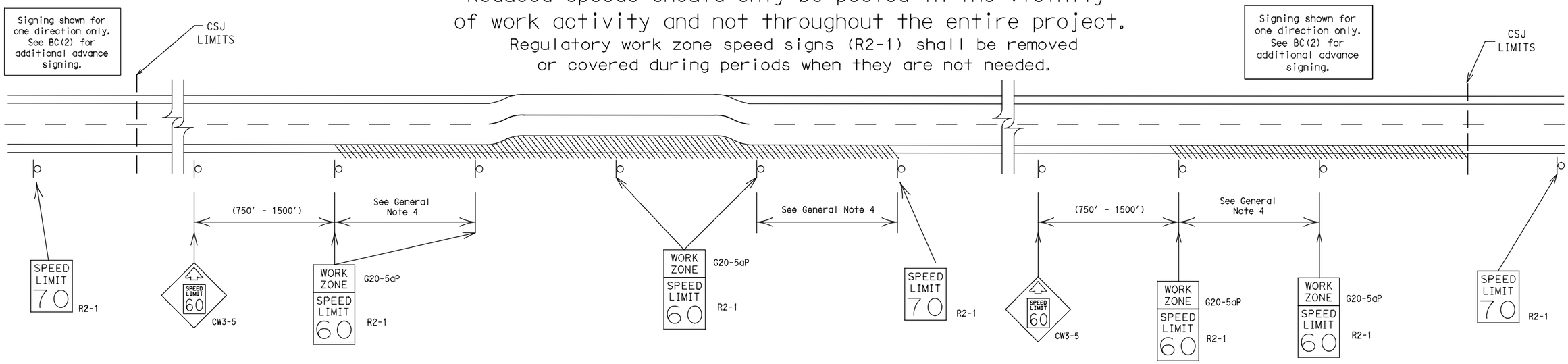
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		36

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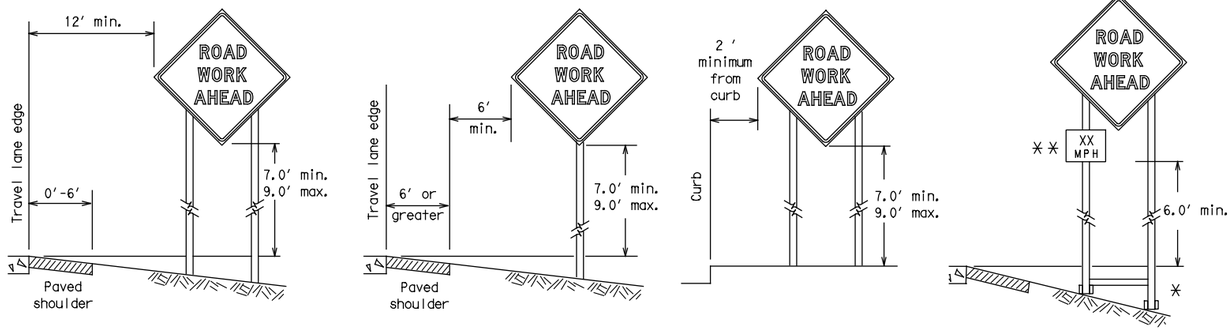
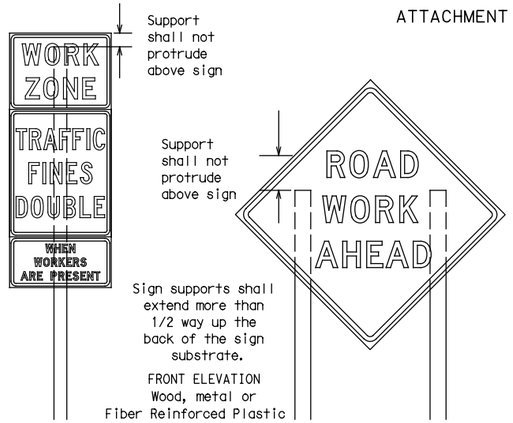
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

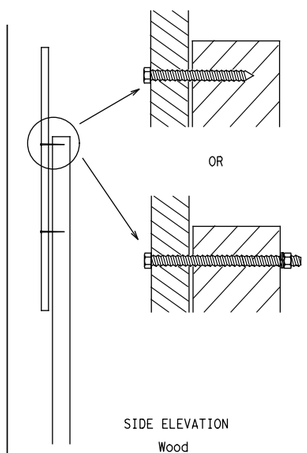


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





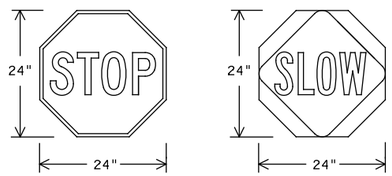
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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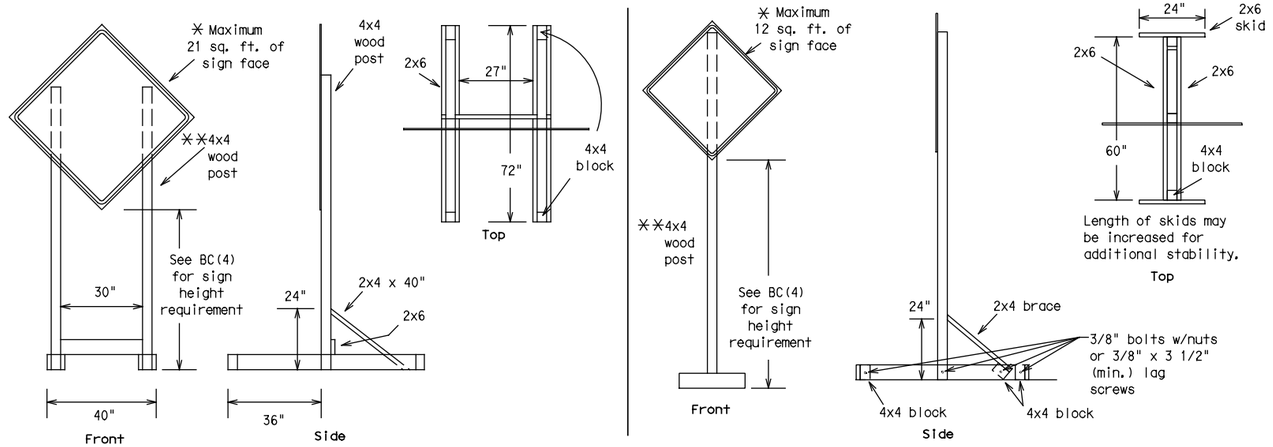
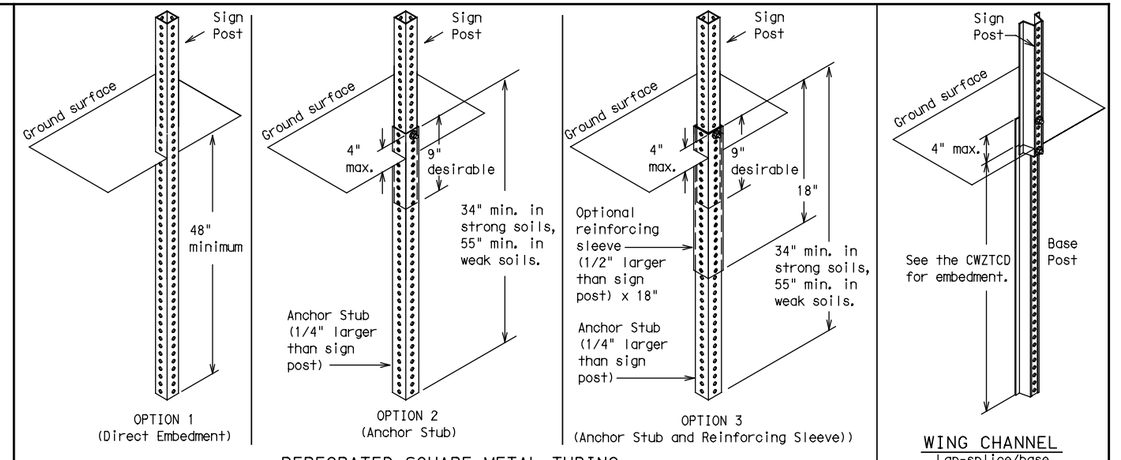


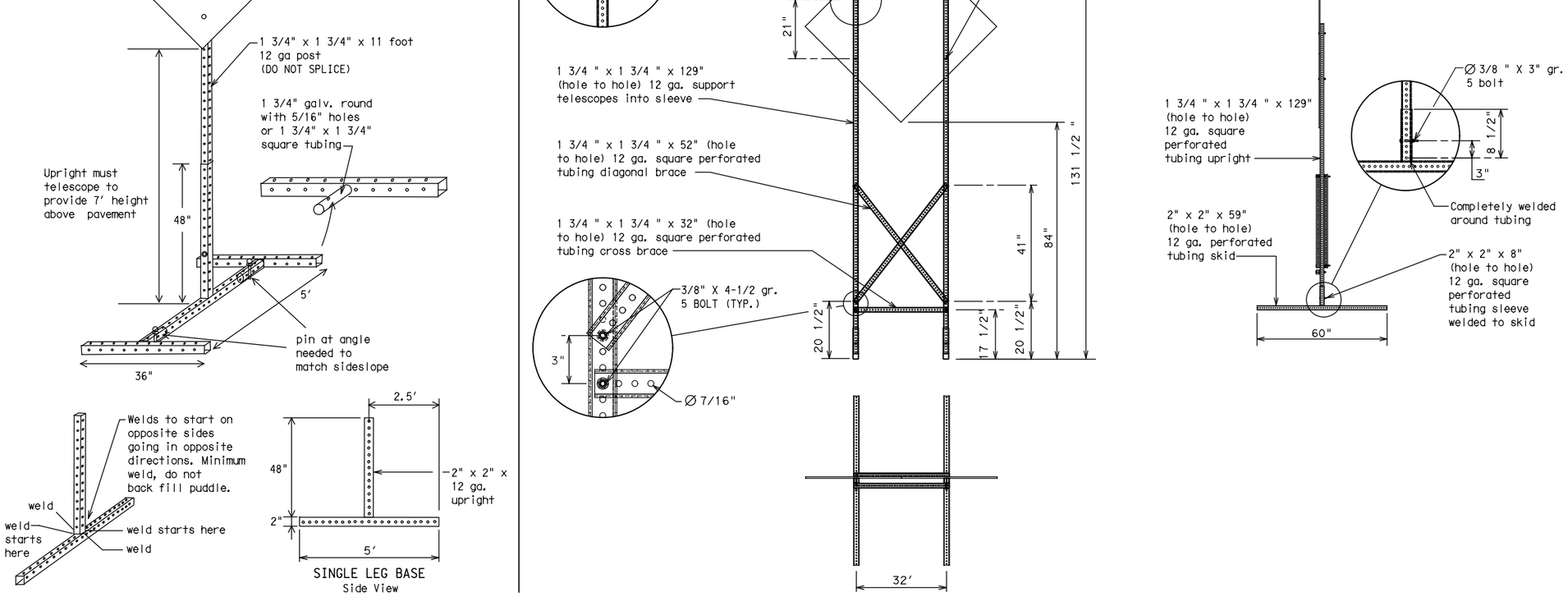
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	GUADALUPE		39

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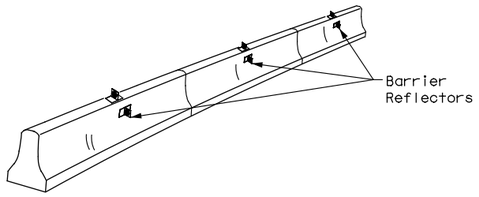
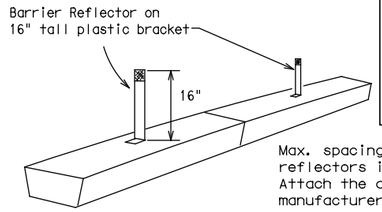
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



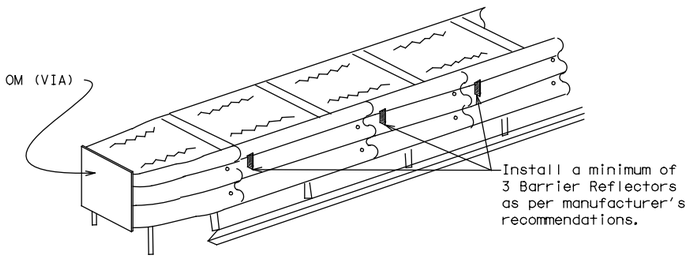
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

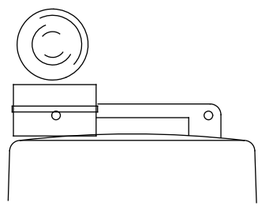
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

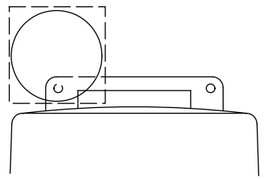
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this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



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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



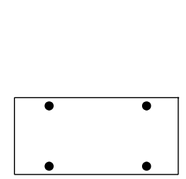
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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

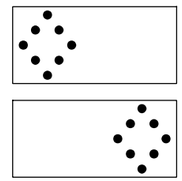
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

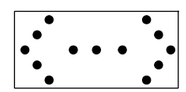


4 CORNER CAUTION

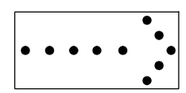
OR



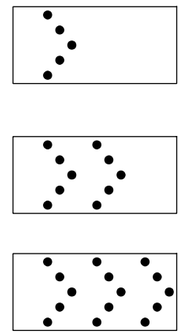
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	GUADALUPE		40

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

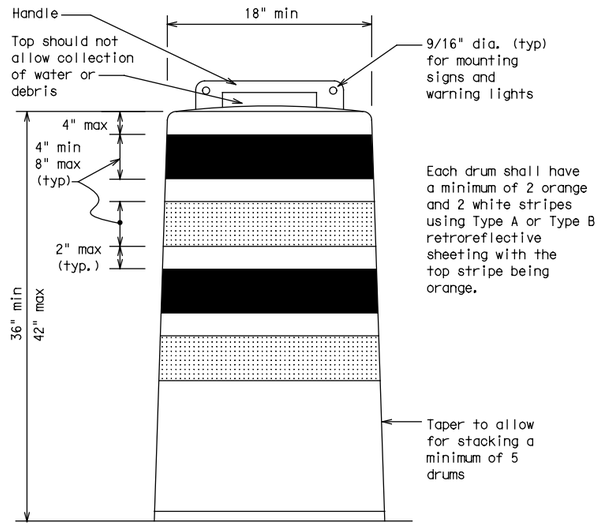
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

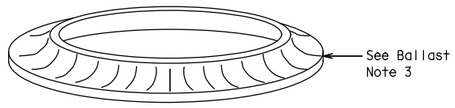
RETROREFLECTIVE SHEETING

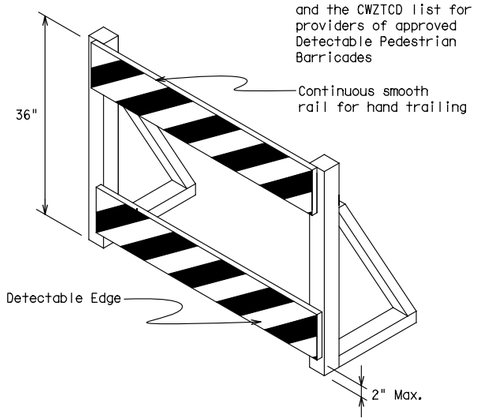
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

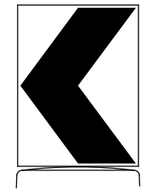




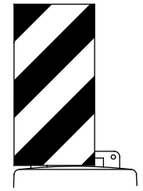


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

.

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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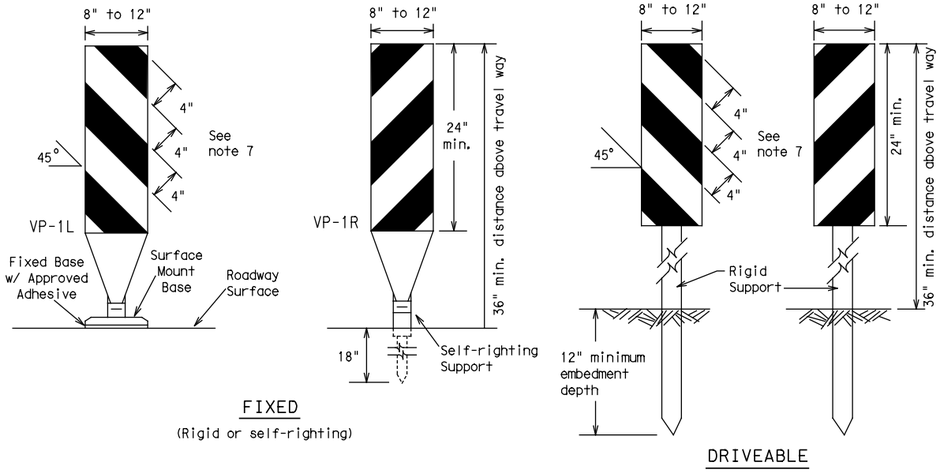
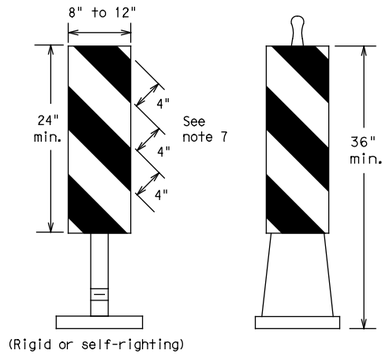


FIXED
(Rigid or self-righting)

DRIVEABLE

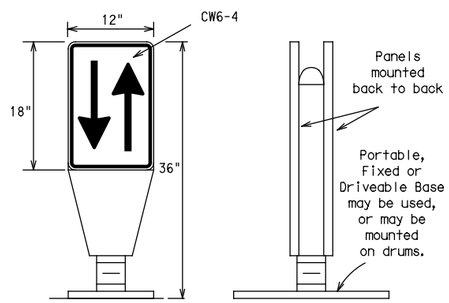


(Rigid or self-righting)

PORTABLE

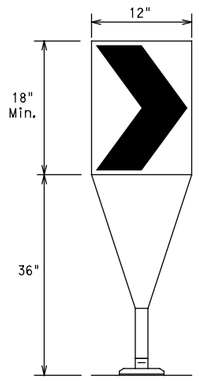
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



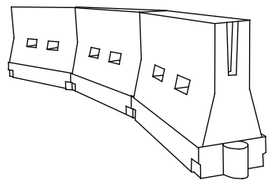
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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7-13 5-21	SAN	GUADALUPE		42

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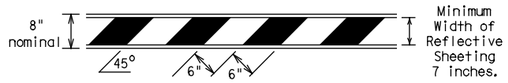
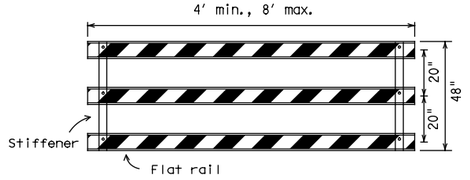
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



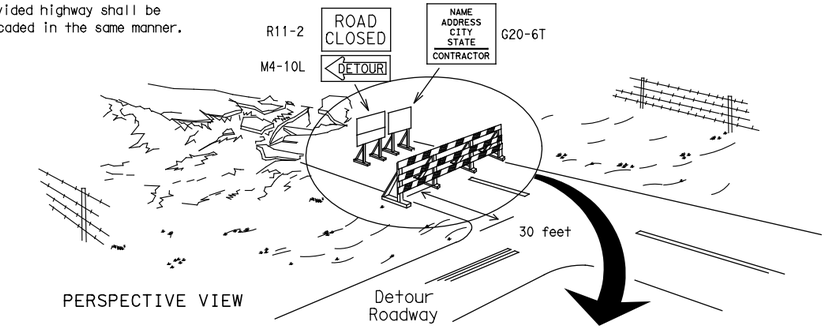
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

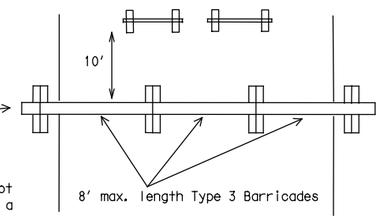
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

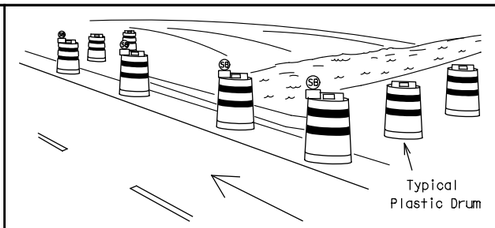
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

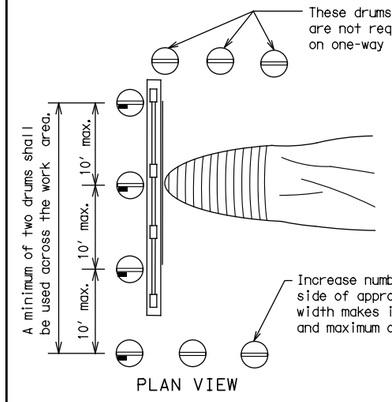
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

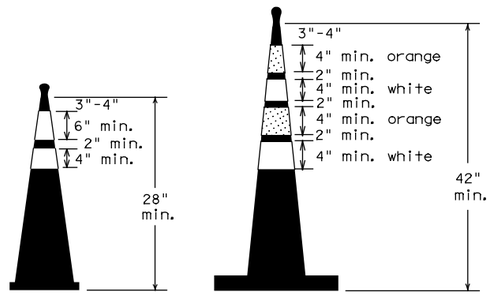
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



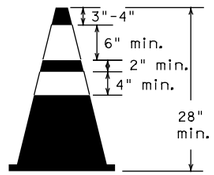
PLAN VIEW

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

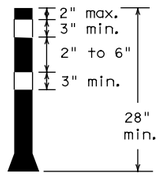
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

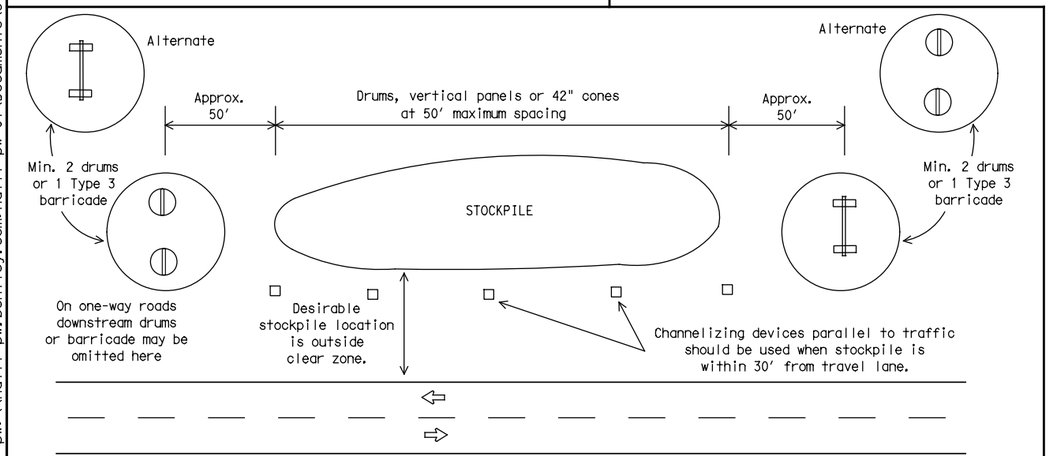


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

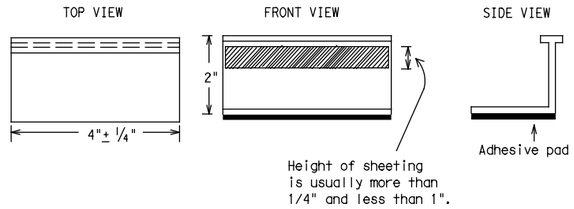
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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11-02 8-14	SAN	GUADALUPE		44

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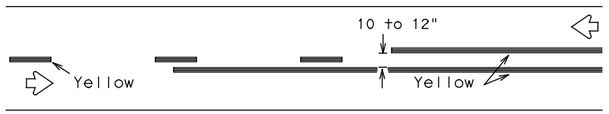
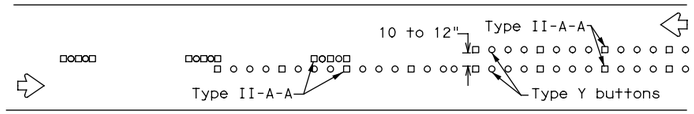
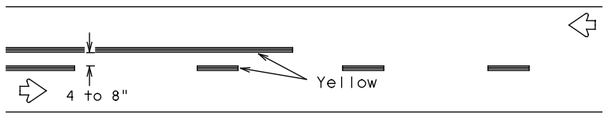
PAVEMENT MARKING PATTERNS



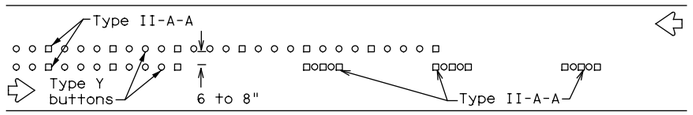
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



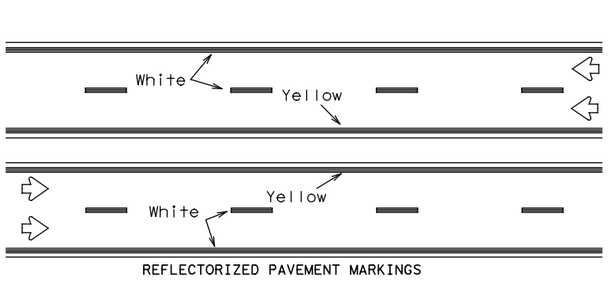
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



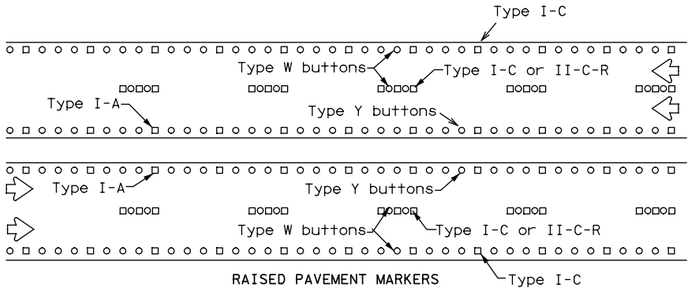
RAISED PAVEMENT MARKERS - PATTERN B

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

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



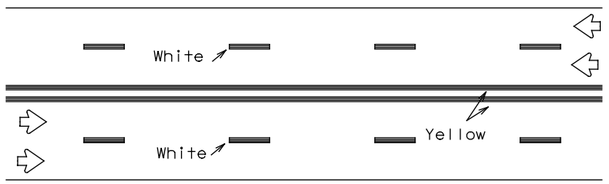
REFLECTORIZED PAVEMENT MARKINGS



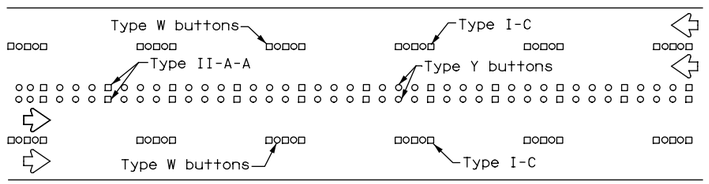
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



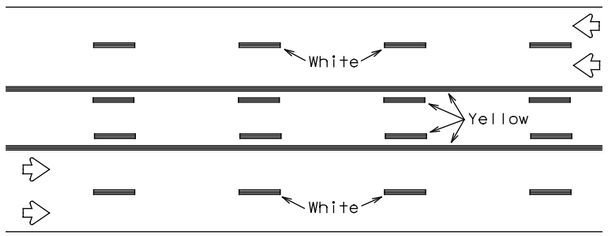
REFLECTORIZED PAVEMENT MARKINGS



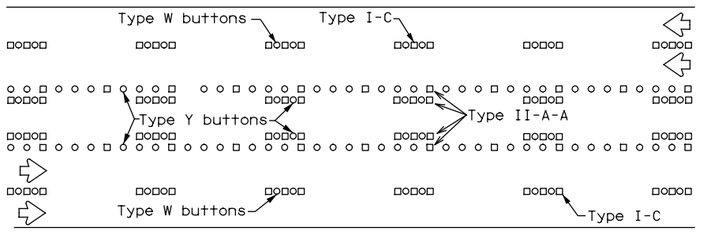
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



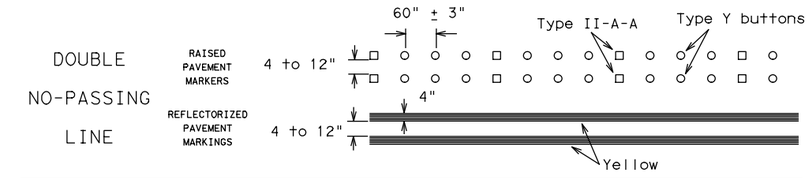
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

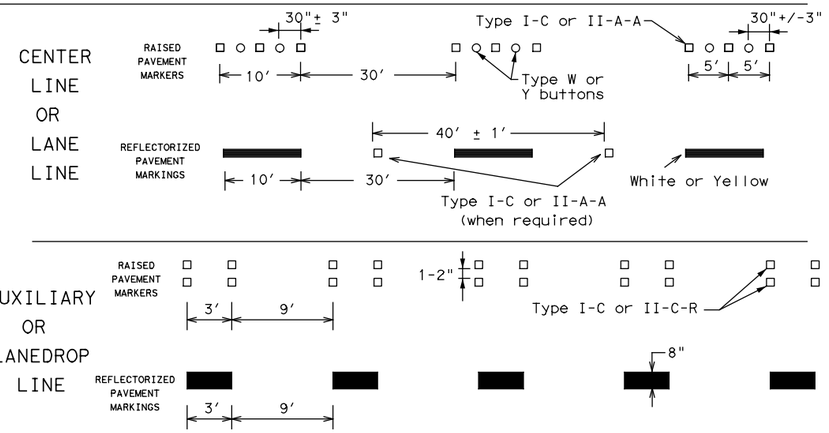
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

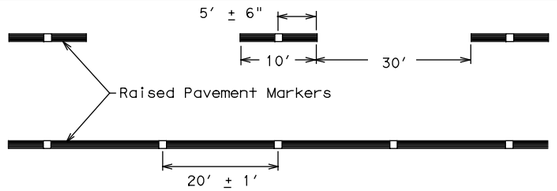


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0025	10	097	FM 78
	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		45

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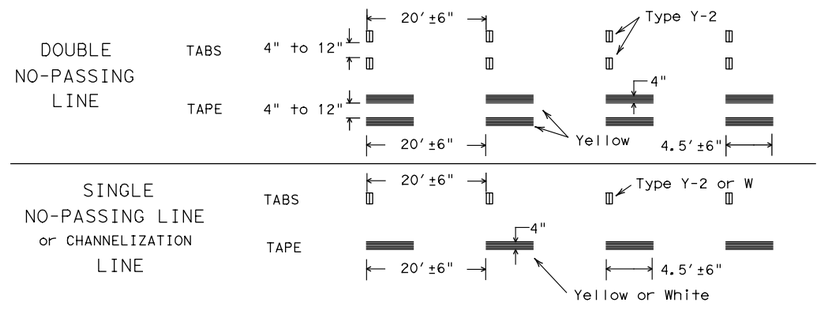
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



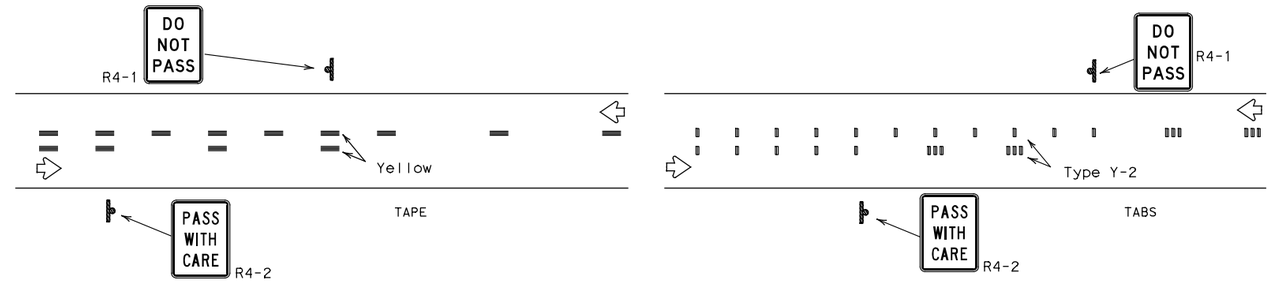
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

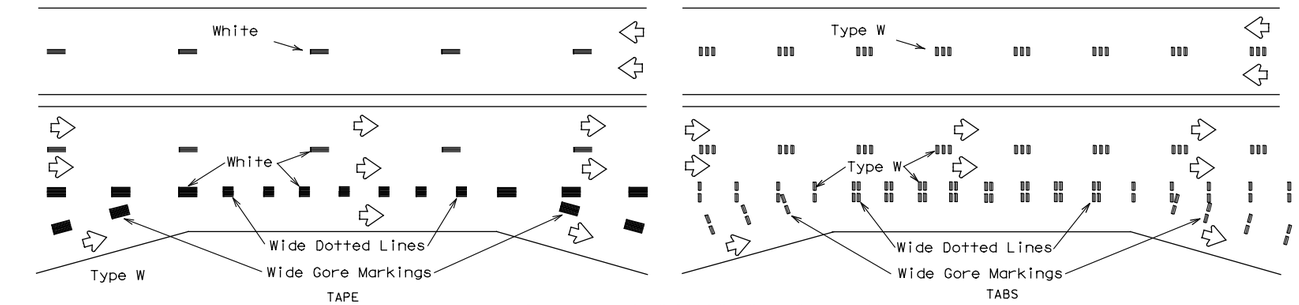
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

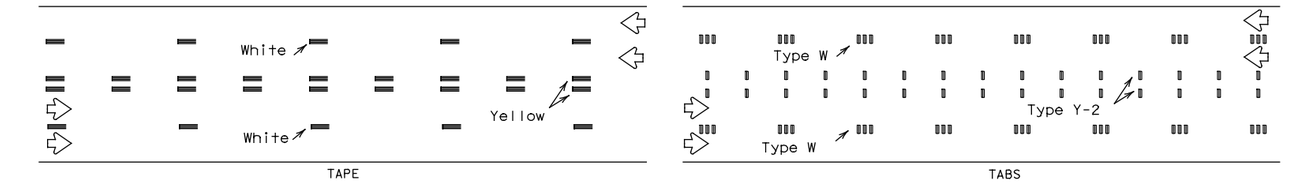
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



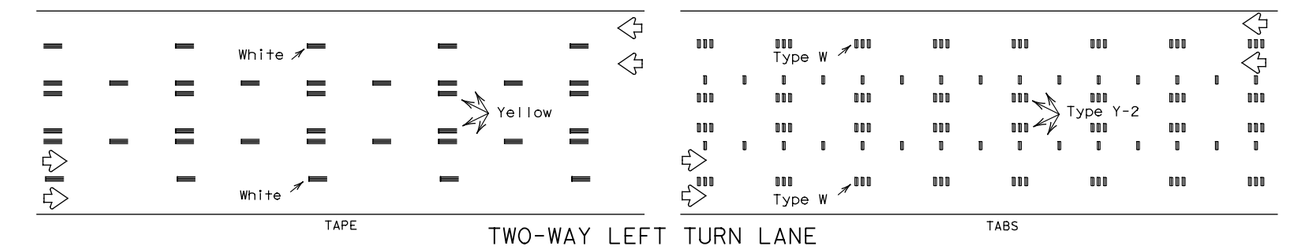
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



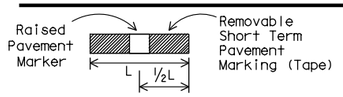
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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3-03		SAN	GUADALUPE		46
7-13					

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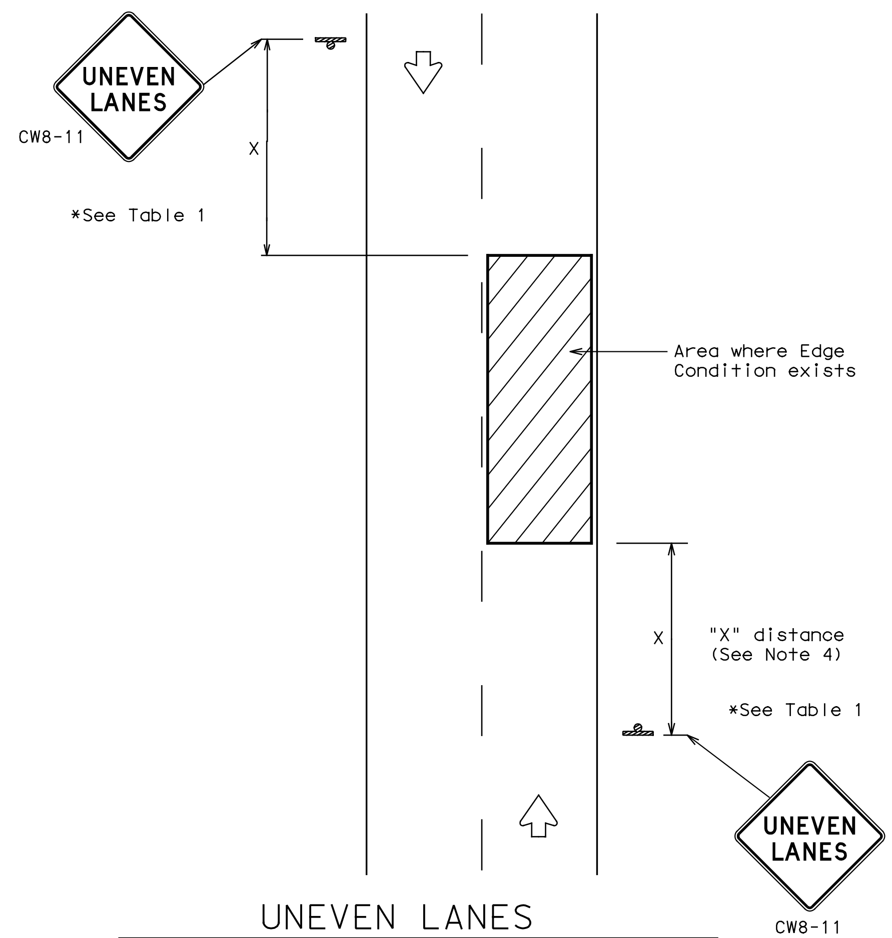
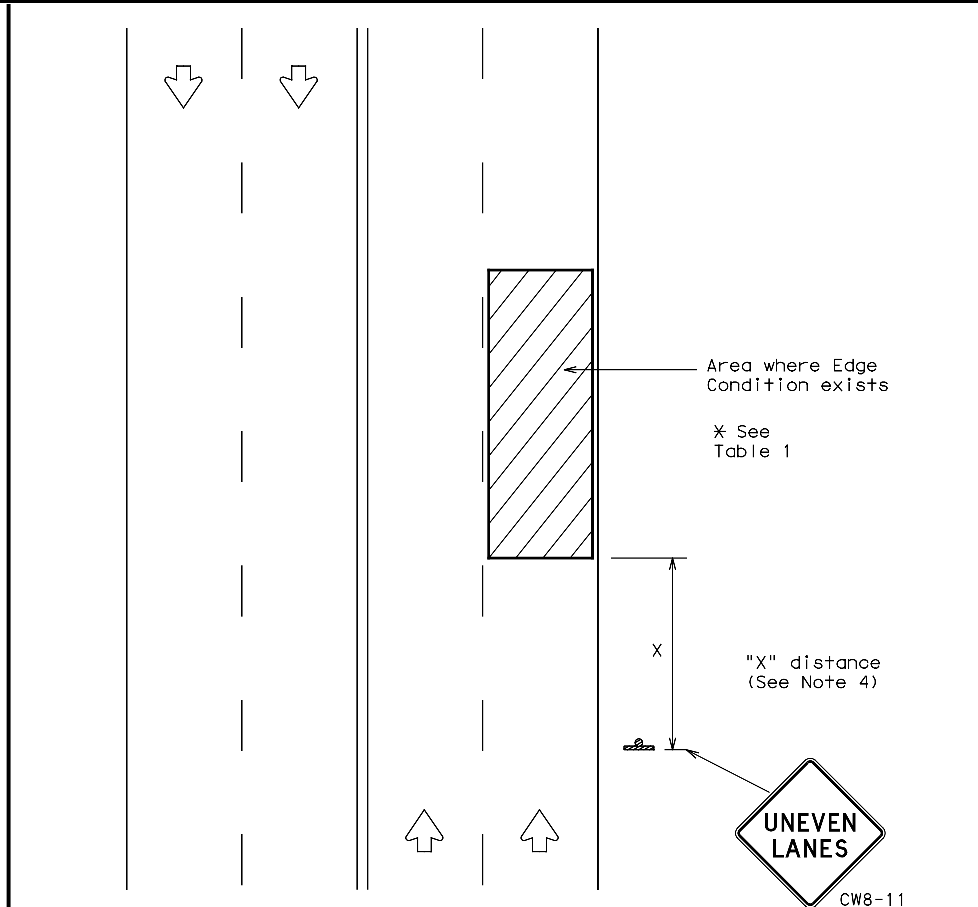


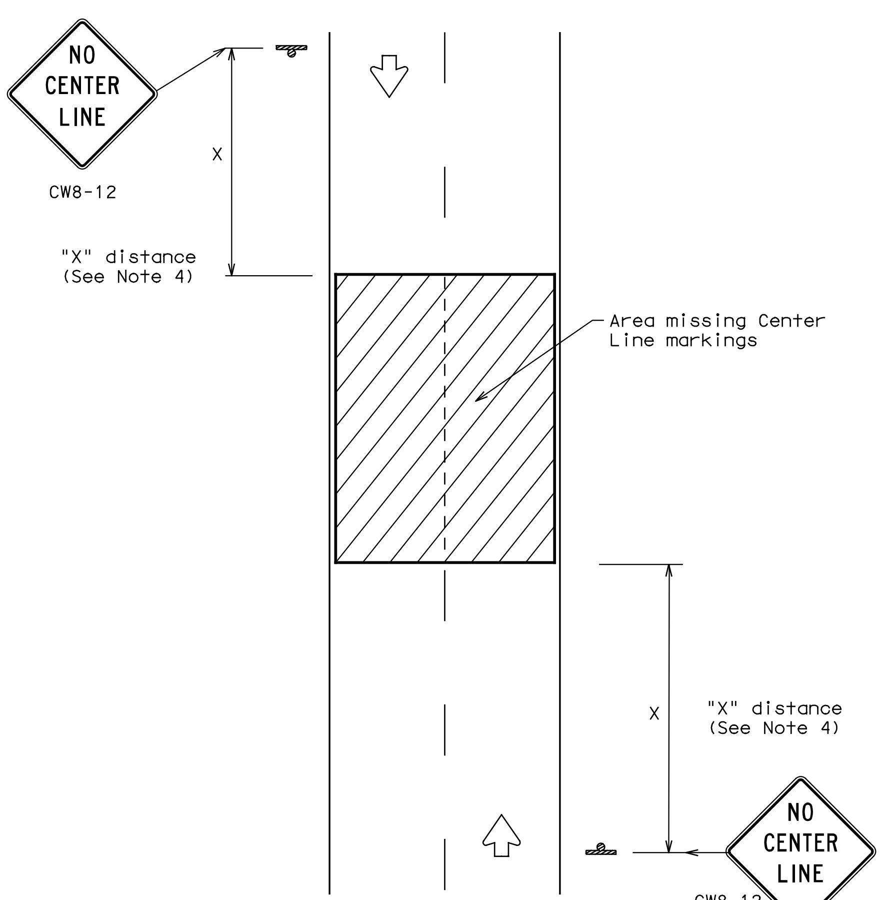
UNEVEN LANES

TWO LANE CONVENTIONAL ROAD



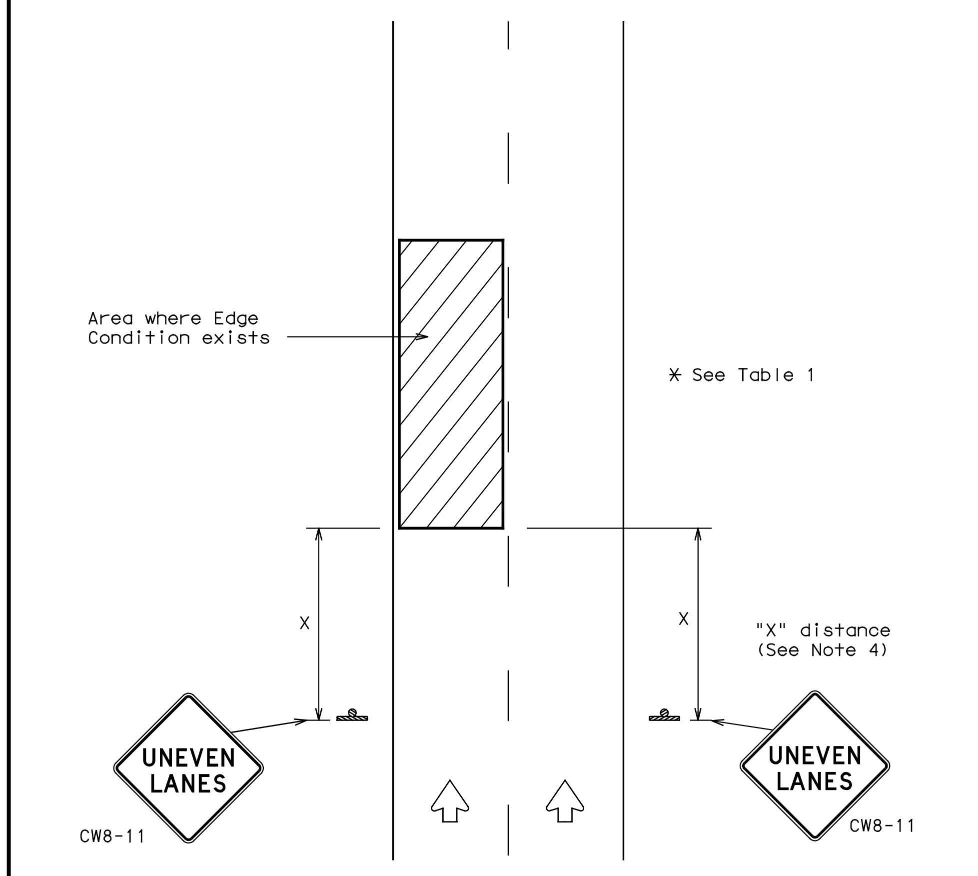
UNEVEN LANES

FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE

TWO LANE CONVENTIONAL ROAD



UNEVEN LANES

DIVIDED ROADWAY

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① (D)	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② (>3, 1, D)	Less than or equal to 3"	Sign: CW8-11
③ (0" to 3/4", D, 12") Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation — Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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1-97 3-03	SAN		GUADALUPE	47

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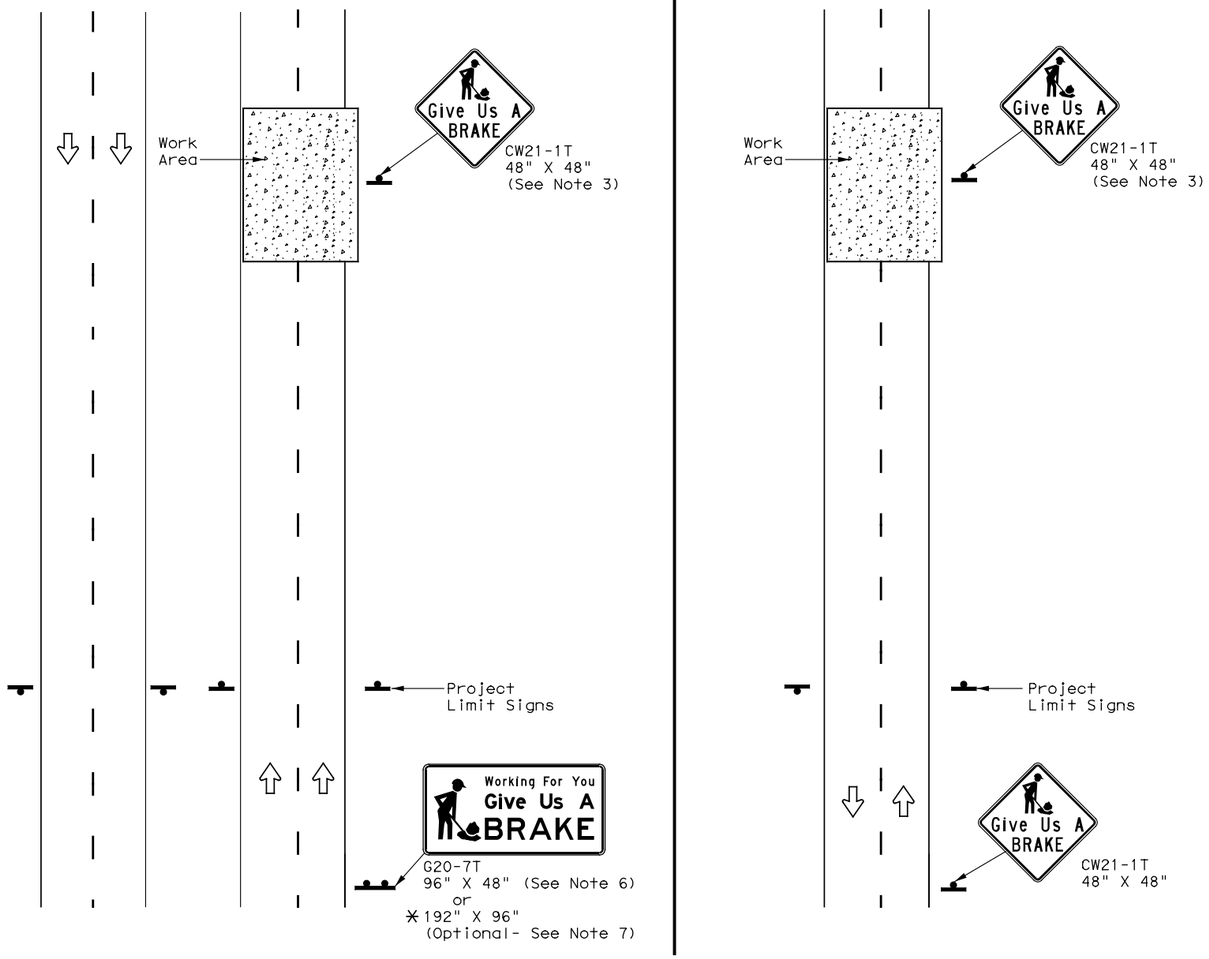

DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	SAN	GUADALUPE		48

116

DATE: 1/25/2023 8:33:51 AM
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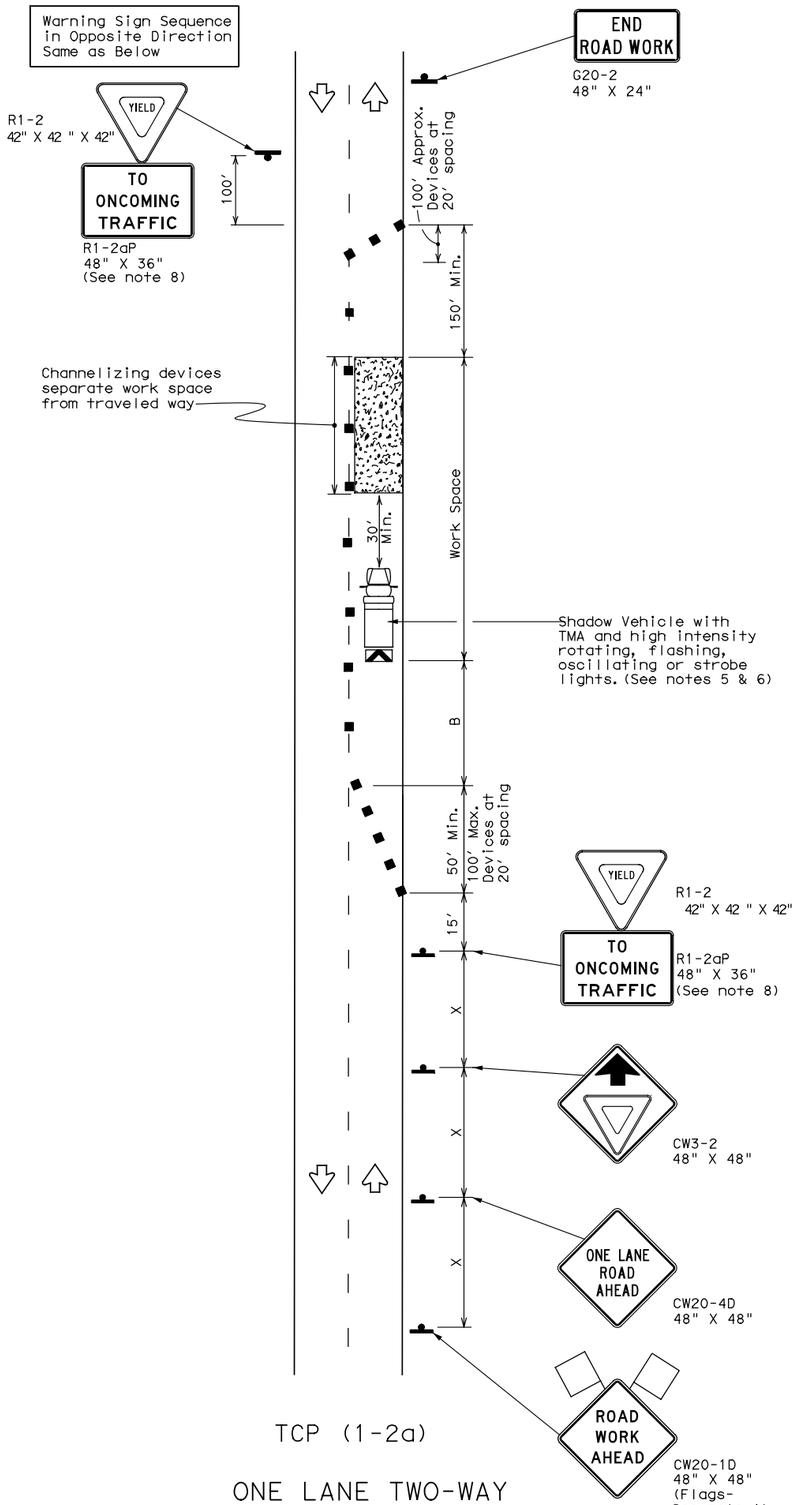
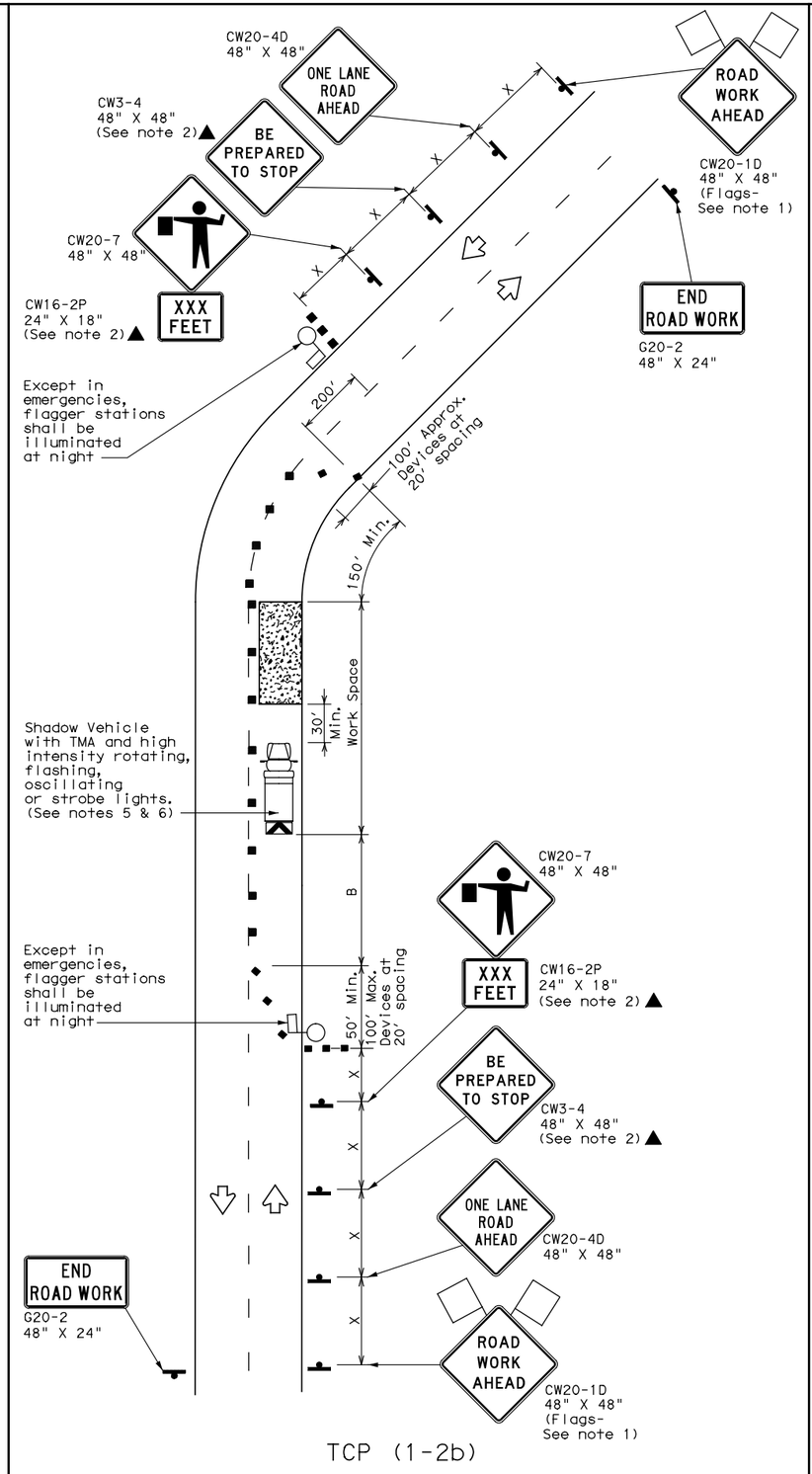


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0025	10	097	FM 78
	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		49

DATE: 1/25/2023 8:33:54 AM
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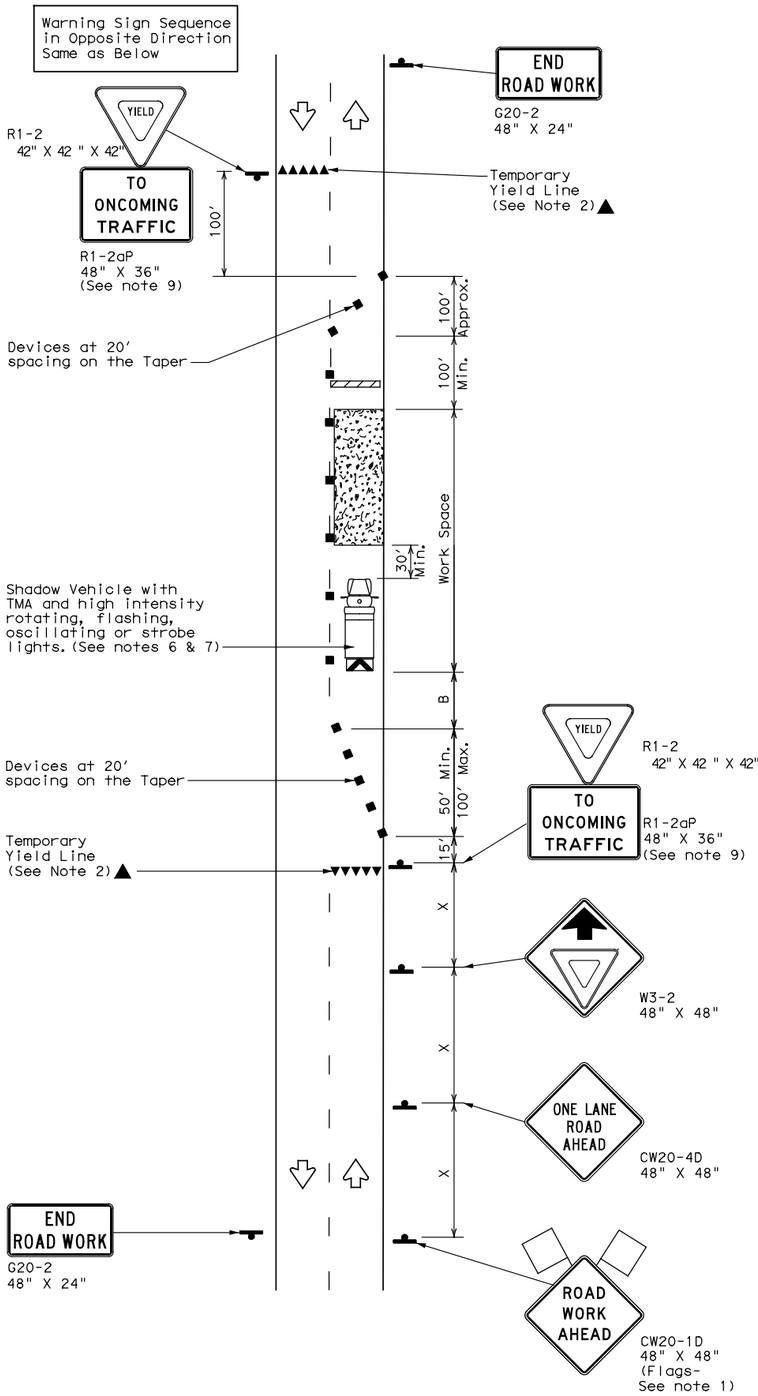
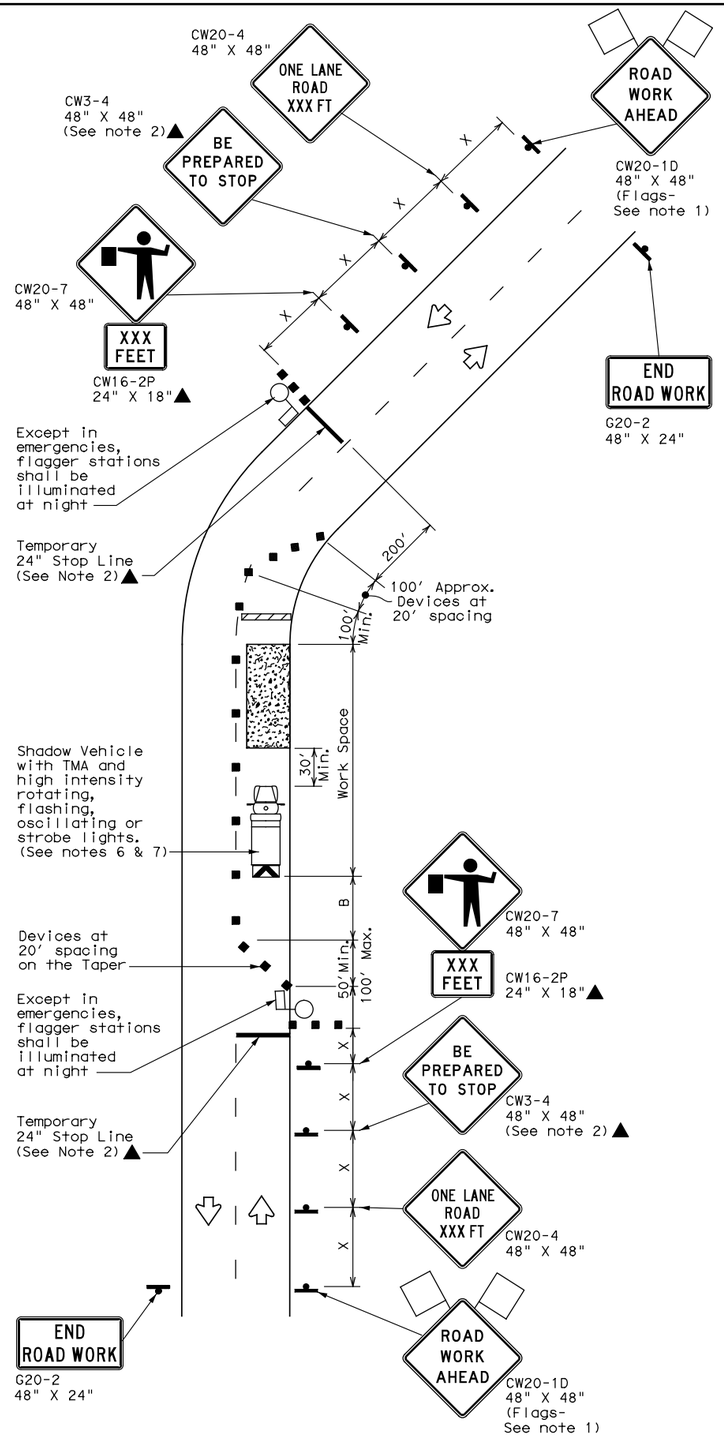


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0025	10	097	FM 78
	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		50

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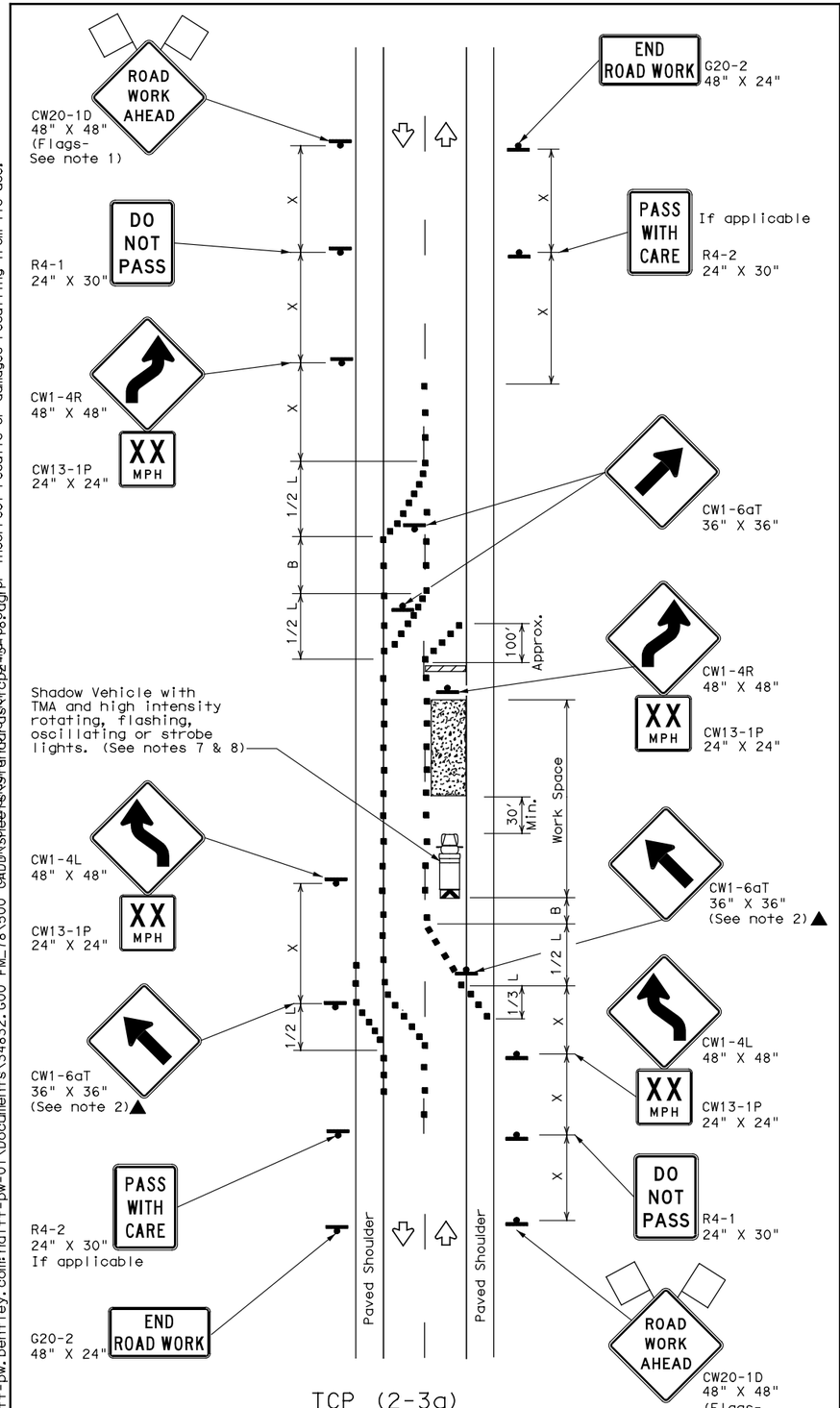
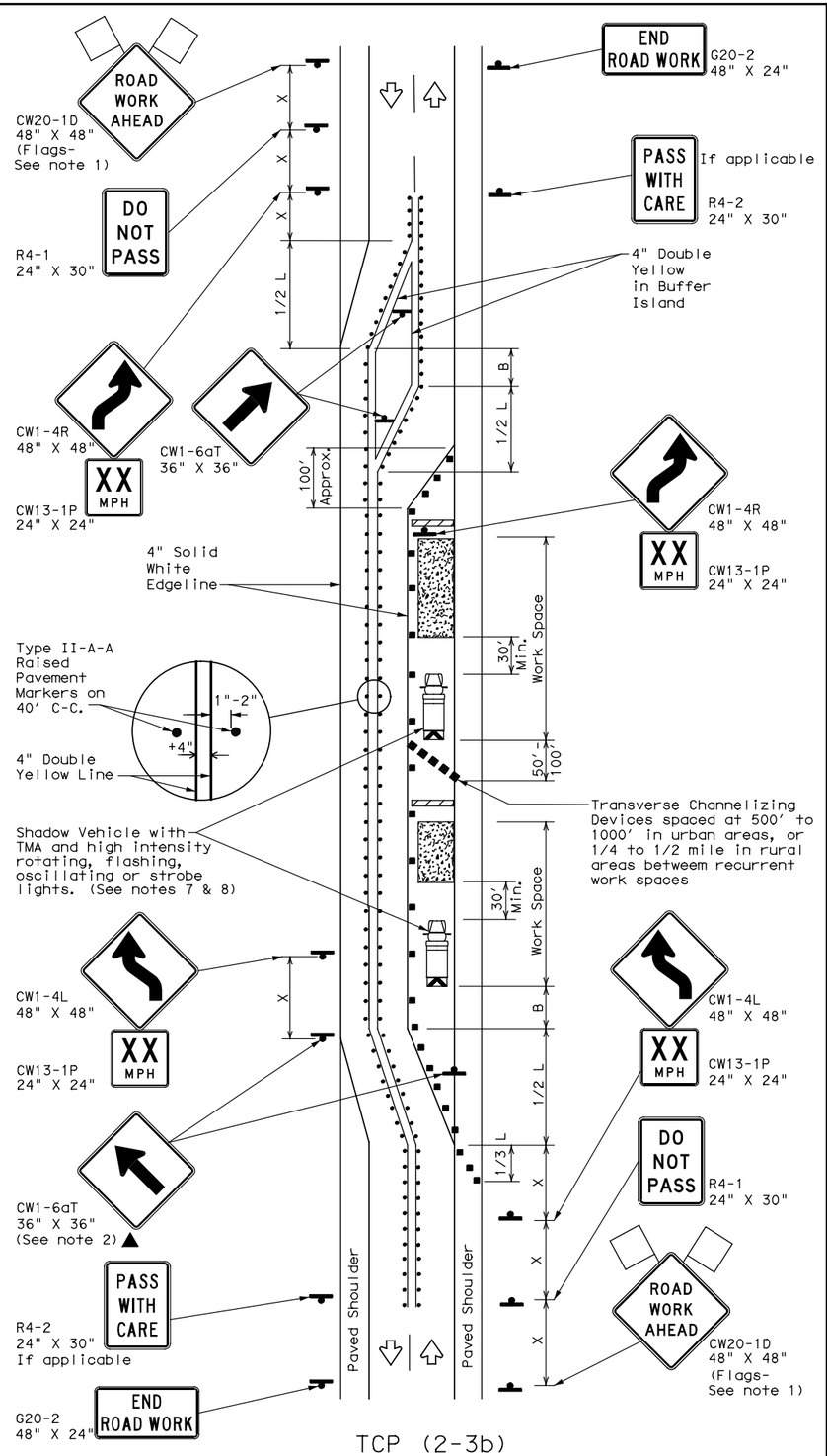


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

* Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	SAN	GUADALUPE		51
4-98 2-18				

163

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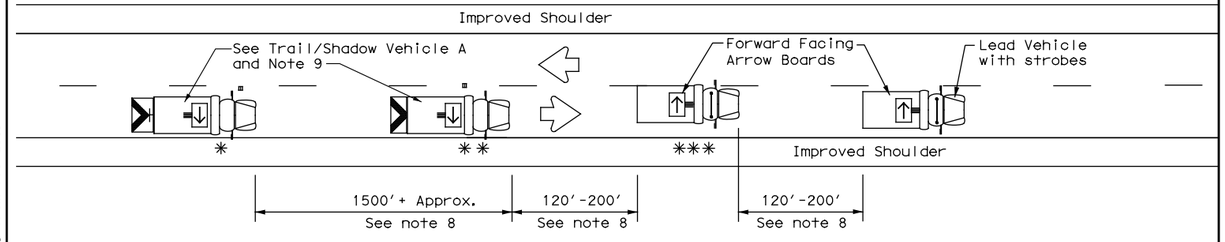
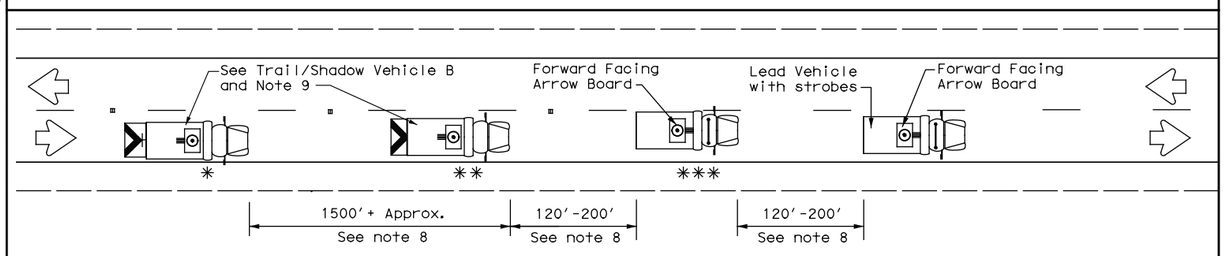


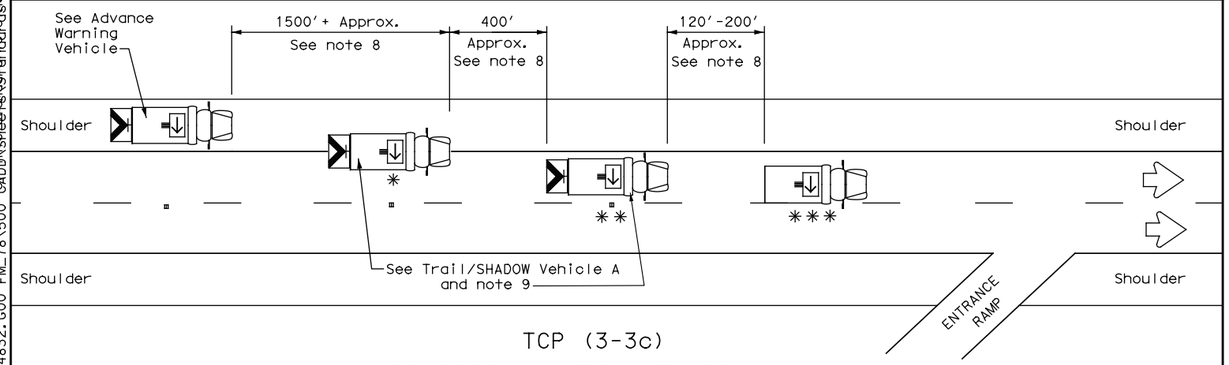
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



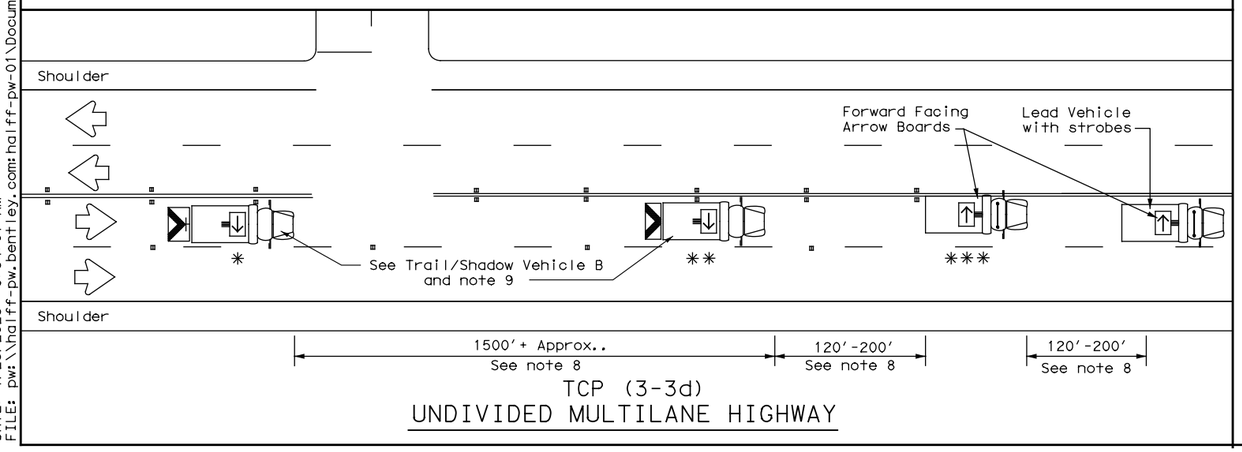
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



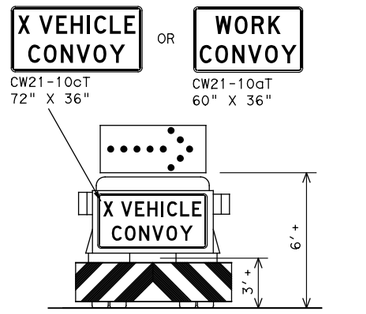
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



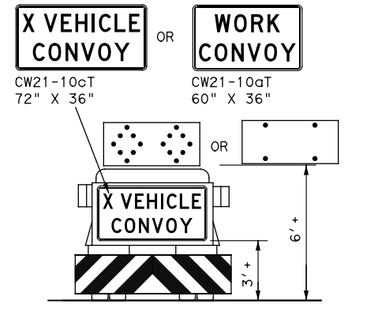
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



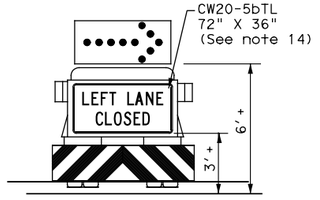
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

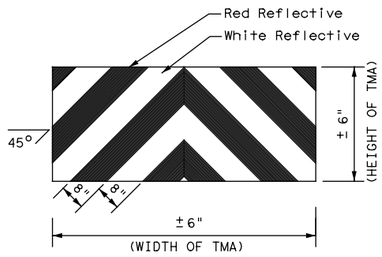


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

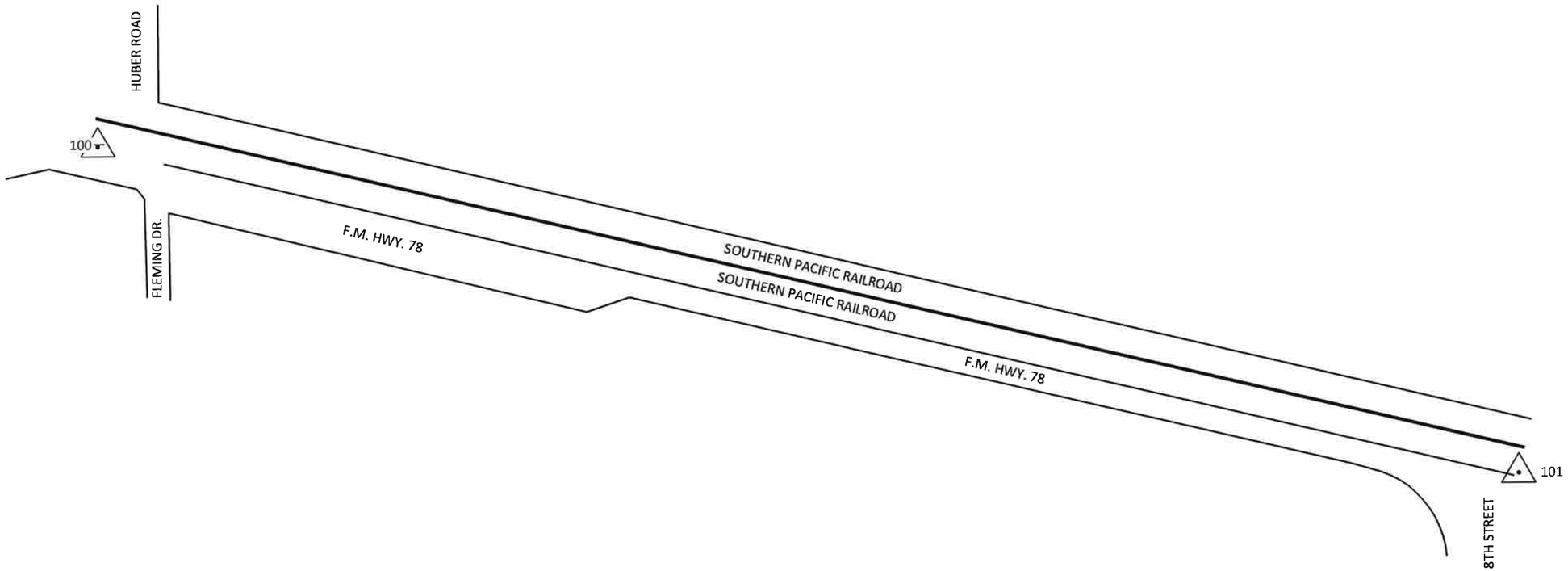
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

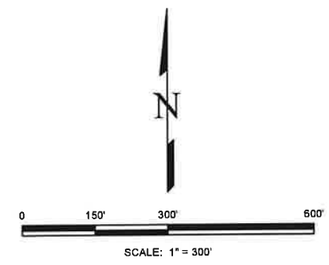
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	SAN	GUADALUPE		52
1-97 7-14				

177



CONTROL POINT SURFACE CORRDINATES				
POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	13764516.1400	2290730.5150	539.589	1/2" IRON ROD W/CAP STAMPED "HALFF"
101	13763665.0000	2294349.9920	544.754	1/2" IRON ROD W/CAP STAMPED "HALFF"



NOTES:

1. BASIS OF BEARING IS THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NAD 83 (2011). ALL COORDINATES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00016.
2. UNITS: U.S. SURVEY FEET
3. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, GEOID 18.
4. FIELD SURVEYS WERE CONDUCTED APRIL-MAY 2022.

LEGEND

△ = SET 1/2" IRON ROD W/CAP STAMPED "HALFF" UNLESS NOTED OTHERWISE.

⊡ = ALUMINUM DISK STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" SET IN CONCRETE

SURVEYOR'S CERTIFICATION:

James W Russell — 5/13/22

JAMES W. RUSSELL — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 4230

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

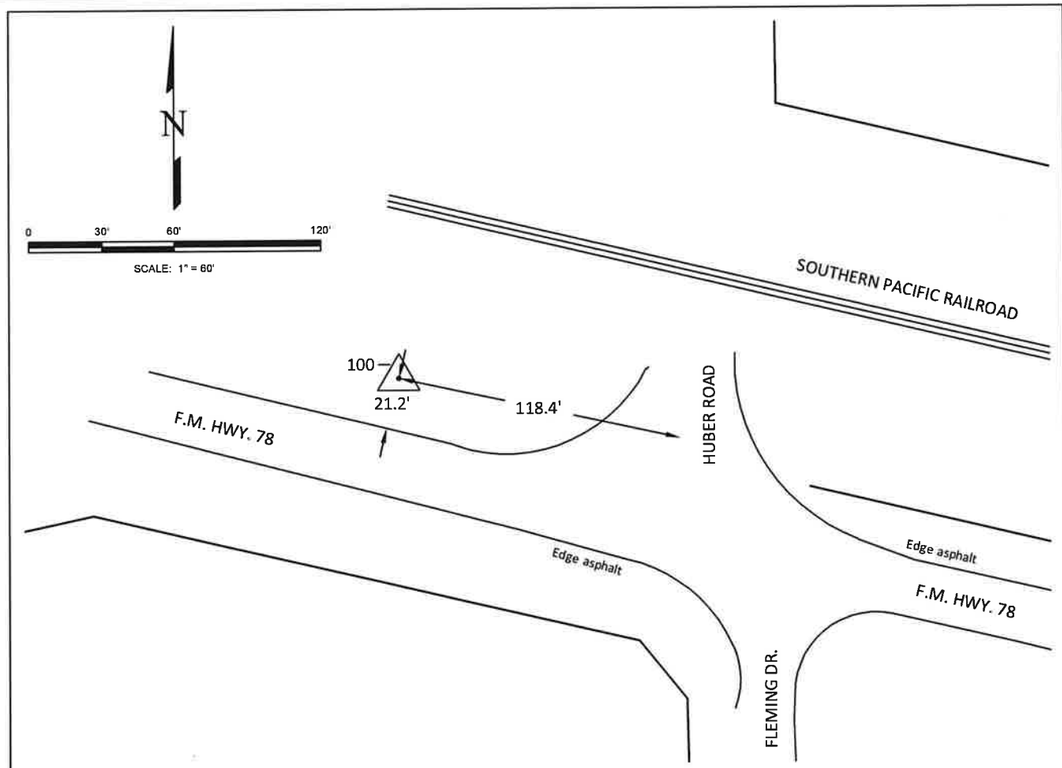
Texas Department of Transportation ®

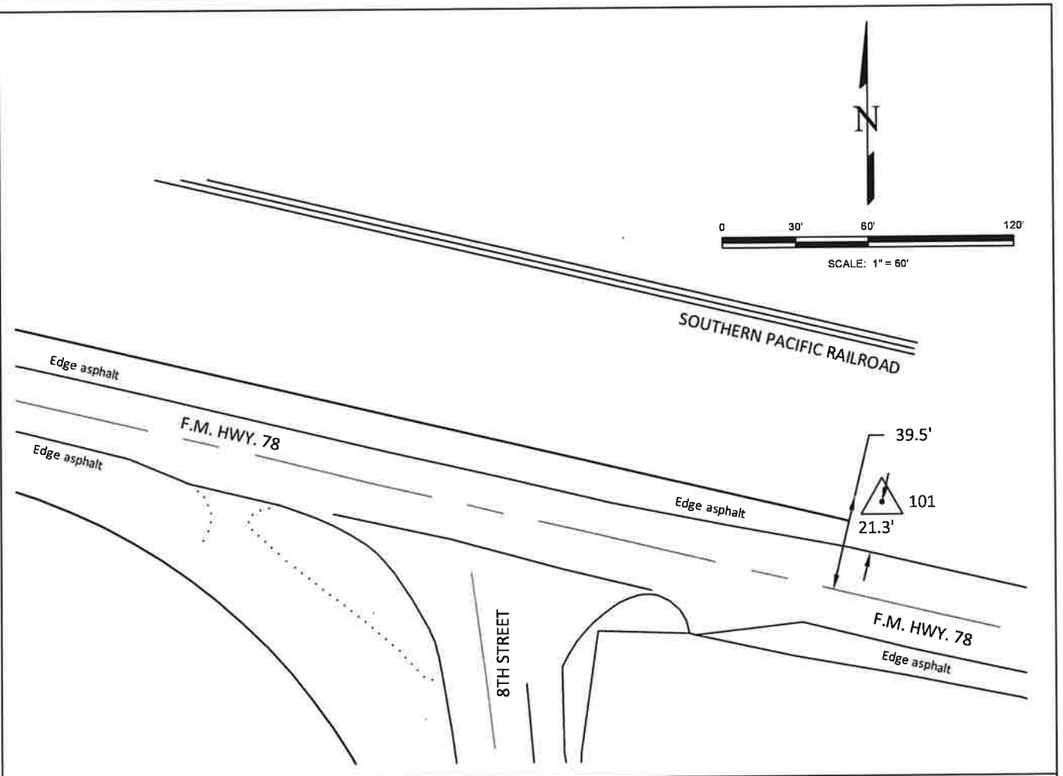
FM 78: 0025-10-097: SFT

HORIZONTAL & VERTICAL CONTROL

SCALE: 1" = 300 FT. SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		53
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78





CONTROL POINT 100 IS LOCATED IN THE NORTHERLY RIGHT-OF-WAY OF F.M. HWY. 78, +/- 118.4'NORTHWESTERLY OF THE HUBER ROAD AND F.M. HWY. 78 INTERSECTION, +/- 21.2' FROM THE NORTHERLY EDGE OF PAVEMENT.	CONTROL POINT 101 IS LOCATED IN THE NORTHERLY RIGHT-OF-WAY OF F.M. HWY. 78, +/- 161.6' NORTHEASTERLY FROM THE F.M. HWY. 78 AND 8TH STREET INTERSECTION, +/- 39.5' NORTH OF F.M. HWY. 78 CENTER OF PAVEMENT, +/- 21.3' FROM THE NORTHERLY EDGE OF PAVEMENT.

NOTES:

1. BASIS OF BEARING IS THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NAD 83 (2011). ALL COORDINATES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00016.
2. UNITS: U.S. SURVEY FEET
3. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, GEOID 18.
4. FIELD SURVEYS WERE CONDUCTED APRIL-MAY 2022.

LEGEND

△ = SET 1/2" IRON ROD W/CAP STAMPED "HALFF" UNLESS NOTED OTHERWISE.

⊡ = ALUMINUM DISK STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" SET IN CONCRETE

SURVEYOR'S CERTIFICATION:

STATE OF TEXAS
REGISTERED
JAMES W. RUSSELL
4230
PROFESSIONAL
LAND SURVEYOR

James W Russell — 5/13/22

JAMES W. RUSSELL — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 4230

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100 NE INTERSTATE 410 LOOP
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SAN ANTONIO, TEXAS 78216
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FM 78: 0025-10-097: SFT

HORIZONTAL & VERTICAL CONTROL

SCALE: 1" = 300 FT. SHEET 2 OF 2

FED RD. DIV NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		54
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

℄ FM 78

Beginning chain FM78 description
Feature: Geom_Centerline

Point FM781	N	13,764,692.914 E	2,289,837.812 Sta	47+49.00
Course from FM781 to FM783 S 76° 30′ 55.56" E Dist 1,751.039				
Point FM783	N	13,764,284.600 E	2,291,540.580 Sta	65+00.04
Course from FM783 to FM784 S 76° 46′ 55.95" E Dist 3,018.429				
Point FM784	N	13,763,594.427 E	2,294,479.044 Sta	95+18.47

Ending chain FM78 description

℄ HIDALGO STREET

Beginning chain HILDAGO_ALGN description
Feature: Geom_Centerline

Point 5	N	13,763,893.128 E	2,293,207.301 Sta	10+00.00
Course from 5 to 6 S 0° 01′ 37.88" W Dist 150.000				
Point 6	N	13,763,743.128 E	2,293,207.230 Sta	11+50.00

Ending chain HILDAGO_ALGN description

℄ 8TH STREET

Beginning chain 8TH_ALGN description
Feature: Geom_Centerline

Point 7	N	13,763,665.352 E	2,294,177.076 Sta	10+00.00
Course from 7 to PC 8TH_ALGN_3 S 7° 47′ 33.29" E Dist 63.548				

Curve Data

Curve 8TH_ALGN_3					
P.I. Station	10+99.64	N	13,763,566.634	E	2,294,190.586
Delta =	3° 26′ 42.93" (RT)				
Degree =	4° 46′ 28.73"				
Tangent =	36.090				
Length =	72.157				
Radius =	1,200.000				
External =	0.543				
Long Chord =	72.146				
Mid. Ord. =	0.542				
P.C. Station	10+63.55	N	13,763,602.390	E	2,294,185.693
P.T. Station	11+35.71	N	13,763,530.648	E	2,294,193.322
C.C.		N	13,763,439.686	E	2,292,996.774
Back = S	7° 47′ 33.29" E				
Ahead = S	4° 20′ 50.36" E				
Chord Bear = S	6° 04′ 11.82" E				

Course from PT 8TH_ALGN_3 to 8 S 4° 20′ 50.36" E Dist 83.128

Point 8	N	13,763,447.760 E	2,294,199.623 Sta	12+18.83

Ending chain 8TH_ALGN description

℄ DRW_01

Beginning chain DRW_01 description
Feature: Geom_Centerline

Point 27	N	13,764,034.736 E	2,292,604.397 Sta	10+00.00
Course from 27 to 28 S 13° 26′ 53.56" W Dist 50.000				
Point 28	N	13,763,986.107 E	2,292,592.769 Sta	10+50.00

Ending chain DRW_01 description

℄ DRW_02

Beginning chain DRW_02 description
Feature: Geom_Centerline

Point 99	N	13,764,021.769 E	2,292,659.602 Sta	10+00.00
Course from 99 to 100 S 13° 26′ 53.56" W Dist 50.000				
Point 100	N	13,763,973.140 E	2,292,647.974 Sta	10+50.00

Ending chain DRW_02 description

℄ DRW_03

Beginning chain DRW_03 description
Feature: Geom_Centerline

Point 101	N	13,763,993.623 E	2,292,779.438 Sta	10+00.00
Course from 101 to 102 S 13° 26′ 53.56" W Dist 50.000				
Point 102	N	13,763,944.994 E	2,292,767.809 Sta	10+50.00

Ending chain DRW_03 description

℄ DRW_04

Beginning chain DRW_04 description
Feature: Geom_Centerline

Point 103	N	13,763,960.509 E	2,292,920.422 Sta	10+00.00
Course from 103 to 104 S 13° 26′ 53.56" W Dist 50.000				
Point 104	N	13,763,911.880 E	2,292,908.794 Sta	10+50.00

Ending chain DRW_04 description

℄ DRW_05

Beginning chain DRW_05 description
Feature: Geom_Centerline

Point 105	N	13,763,950.846 E	2,292,961.564 Sta	10+00.00
Course from 105 to 106 S 13° 26′ 53.56" W Dist 50.000				
Point 106	N	13,763,902.217 E	2,292,949.936 Sta	10+50.00

Ending chain DRW_05 description

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

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TEL (210) 798-1895 FIRM #F-312

Texas Department of Transportation®

FM 78: 0025-10-097: SFT

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		55
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

℄ DRW_06

Beginning chain DRW_06 description
Feature: Geom_Centerline

Point 121	N	13,763,933.982	E	2,293,033.364 Sta	10+00.00

Course from 121 to 122 S 13° 26′ 53.56" W Dist 50.000

Point 122	N	13,763,885.353	E	2,293,021.735 Sta	10+50.00

Ending chain DRW_06 description

℄ DRW_07

Beginning chain DRW_07 description
Feature: Geom_Centerline

Point 119	N	13,763,919.582	E	2,293,094.673 Sta	10+00.00

Course from 119 to 120 S 13° 26′ 53.56" W Dist 50.000

Point 120	N	13,763,870.953	E	2,293,083.045 Sta	10+50.00

Ending chain DRW_07 description

℄ DRW_08

Beginning chain DRW_08 description
Feature: Geom_Centerline

Point 111	N	13,763,859.011	E	2,293,352.559 Sta	10+00.00

Course from 111 to 112 S 13° 26′ 53.56" W Dist 50.000

Point 112	N	13,763,810.382	E	2,293,340.931 Sta	10+50.00

Ending chain DRW_08 description

℄ DRW_09

Beginning chain DRW_09 description
Feature: Geom_Centerline

Point 79	N	13,763,848.246	E	2,293,398.392 Sta	10+00.00

Course from 79 to 80 S 13° 26′ 53.56" W Dist 50.000

Point 80	N	13,763,799.617	E	2,293,386.764 Sta	10+50.00

Ending chain DRW_09 description

℄ DRW_10

Beginning chain DRW_10 description
Feature: Geom_Centerline

Point 123	N	13,763,832.431	E	2,293,465.722 Sta	10+00.00

Course from 123 to 124 S 13° 26′ 53.56" W Dist 50.000

Point 124	N	13,763,783.802	E	2,293,454.094 Sta	10+50.00

Ending chain DRW_10 description

℄ DRW_11

Beginning chain DRW_11 description
Feature: Geom_Centerline

Point 51	N	13,763,824.153	E	2,293,500.967 Sta	10+00.00

Course from 51 to 52 S 13° 26′ 53.56" W Dist 50.000

Point 52	N	13,763,775.524	E	2,293,489.338 Sta	10+50.00

Ending chain DRW_11 description

℄ DRW_12

Beginning chain DRW_12 description
Feature: Geom_Centerline

Point 53	N	13,763,800.915	E	2,293,599.907 Sta	10+00.00

Course from 53 to 54 S 13° 26′ 53.56" W Dist 50.000

Point 54	N	13,763,752.286	E	2,293,588.278 Sta	10+50.00

Ending chain DRW_12 description

℄ DRW_13

Beginning chain DRW_13 description
Feature: Geom_Centerline

Point 115	N	13,763,767.902	E	2,293,740.460 Sta	10+00.00

Course from 115 to PC DRW_13_3 S 13° 13′ 04.05" W Dist 17.455

Curve Data

Curve DRW_13_3					
P.I. Station		10+24.52	N	13,763,744.033	E 2,293,734.854
Delta	=	50° 26′ 03.54"	(LT)		
Degree	=	381° 58′ 18.71"			
Tangent	=	7.064			
Length	=	13.204			
Radius	=	15.000			
External	=	1.580			
Long Chord	=	12.782			
Mid. Ord.	=	1.430			
P.C. Station		10+17.45	N	13,763,750.910	E 2,293,736.469
P.T. Station		10+30.66	N	13,763,738.408	E 2,293,739.127
C.C.			N	13,763,747.480	E 2,293,751.072
Back	= S	13° 13′ 04.05" W			
Ahead	= S	37° 12′ 59.50" E			
Chord Bear	= S	11° 59′ 57.73" E			

Course from PT DRW_13_3 to 116 S 37° 12′ 59.49" E Dist 6.407

Point 116	N	13,763,733.306	E	2,293,743.002 Sta	10+37.07

Ending chain DRW_13 description

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107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

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TEL (210) 798-1895 FIRM #F-312

Texas Department of Transportation®

FM 78:0025-10-097:SFT

HORIZONTAL ALIGNMENT DATA

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		56
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

℄ DRW_14

Beginning chain DRW_14 description
Feature: Geom_Centerline

Point 77	N	13,763,731.517	E	2,293,895.373	Sta 10+00.00
Course from 77 to 78 S 13° 26′ 53.56" W Dist 33.250					
Point 78	N	13,763,699.178	E	2,293,887.640	Sta 10+33.25

Ending chain DRW_14 description

℄ DRW_15

Beginning chain DRW_15 description
Feature: Geom_Centerline

Point 67	N	13,763,707.287	E	2,293,998.533	Sta 10+00.00
Course from 67 to 68 S 13° 26′ 53.56" W Dist 50.000					
Point 68	N	13,763,658.658	E	2,293,986.905	Sta 10+50.00

Ending chain DRW_15 description

℄ DRW_16

Beginning chain DRW_16 description
Feature: Geom_Centerline

Point 125	N	13,763,695.833	E	2,294,047.299	Sta 10+00.00
Course from 125 to 126 S 20° 24′ 33.29" W Dist 50.000					
Point 126	N	13,763,648.972	E	2,294,029.863	Sta 10+50.00

Ending chain DRW_16 description

℄ DRW_17

Beginning chain DRW_17 description
Feature: Geom_Centerline

Point 81	N	13,763,685.427	E	2,294,091.603	Sta 10+00.00
Course from 81 to 82 S 13° 26′ 53.56" W Dist 40.000					
Point 82	N	13,763,646.524	E	2,294,082.301	Sta 10+40.00

Ending chain DRW_17 description

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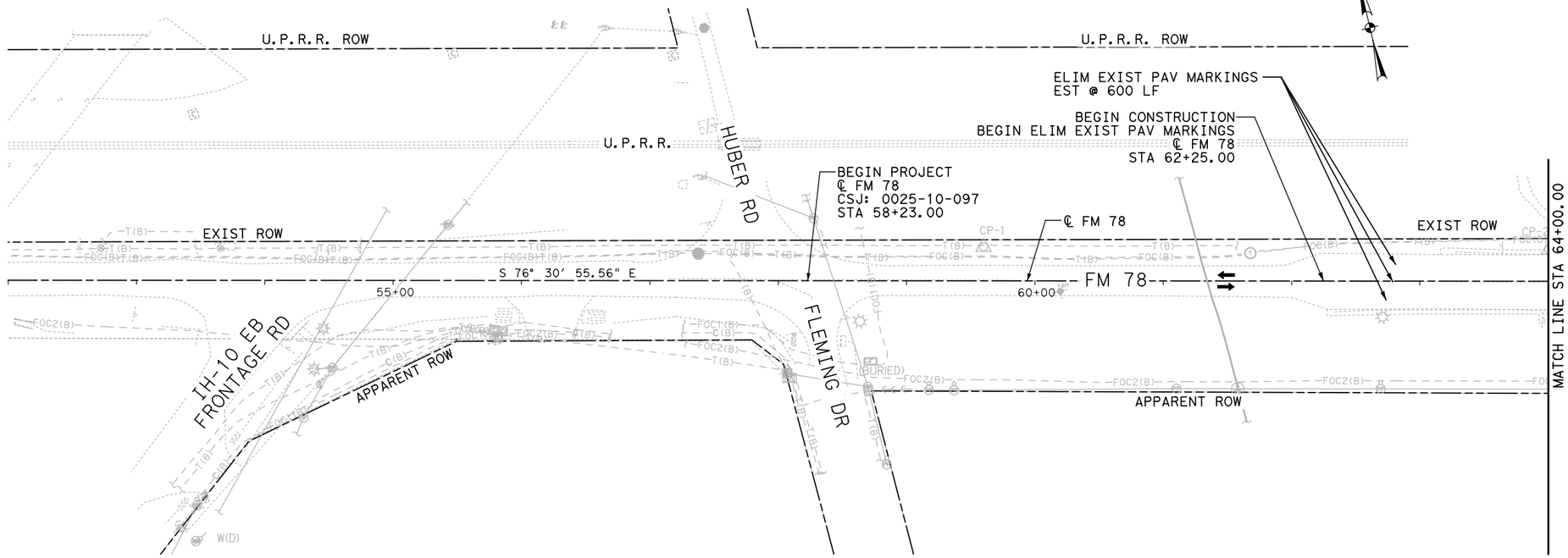
HORIZONTAL ALIGNMENT DATA

SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		57
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

	ESTIMATED QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	QTY
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	600



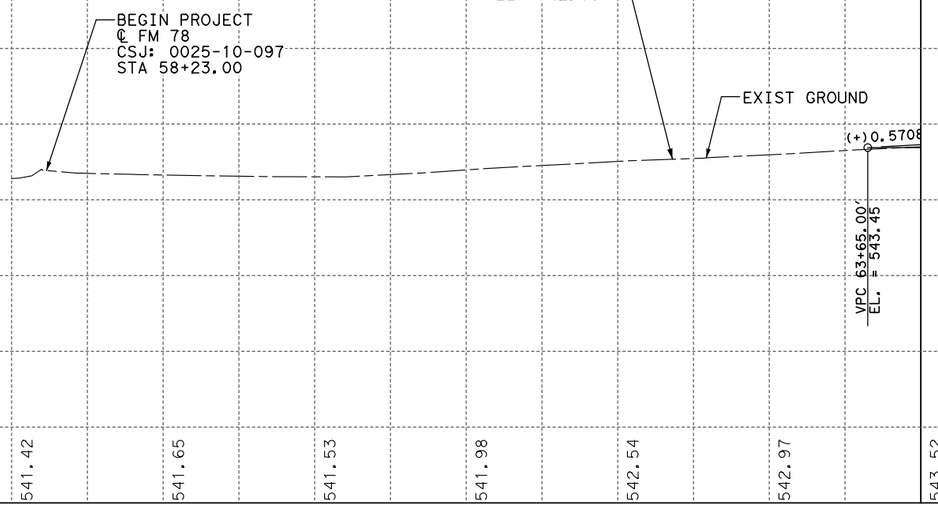
LEGEND:

- EXIST ROW/UPRR ROW
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC
- SAWCUT LINE
- 6" PVMT REPAIR
- WIDENING SECTION
- DRILL SEEDING
- SILT CONTROL FENCE
- ROCK FILTER DAM
- (XX) DRIVEWAY NUMBER
- EXIST TELEPHONE LINE
- EXIST FIBER OPTIC LINE
- EXIST CABLE TV LINE
- EXIST WATER LINE
- EXIST WASTEWATER LINE
- EXIST GAS LINE
- EXIST UNDERGROUND ELECTRIC LINE
- EXIST OVERHEAD UTILITY LINE

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'
VER: 1" = 10'

GENERAL NOTES:

1. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR BASELINE GEOMETRY OF MAINLANES AND CROSS STREETS.
2. REFER TO DRIVEWAY AND INTERSECTING STREET PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND LOCATING ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR ANY DAMAGES CAUSED BY THE CONSTRUCTION OPERATIONS TO EXISTING UTILITIES.
4. REFER TO TYPICAL SECTIONS AND MISCELLANEOUS ROADWAY DETAILS FOR DIMENSIONS OF PAVEMENT WIDENING AND ADDITIONAL INFORMATION.
5. THE PROFILE GRADE IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
6. REFER TO SUMMARY OF DRIVEWAY FOR ADDITIONAL DRIVEWAY AND DRIVEWAY CULVERT INFORMATION.
7. REFER TO DITCH HYDRAULIC CALCULATIONS FOR ADDITIONAL DITCH INFORMATION.



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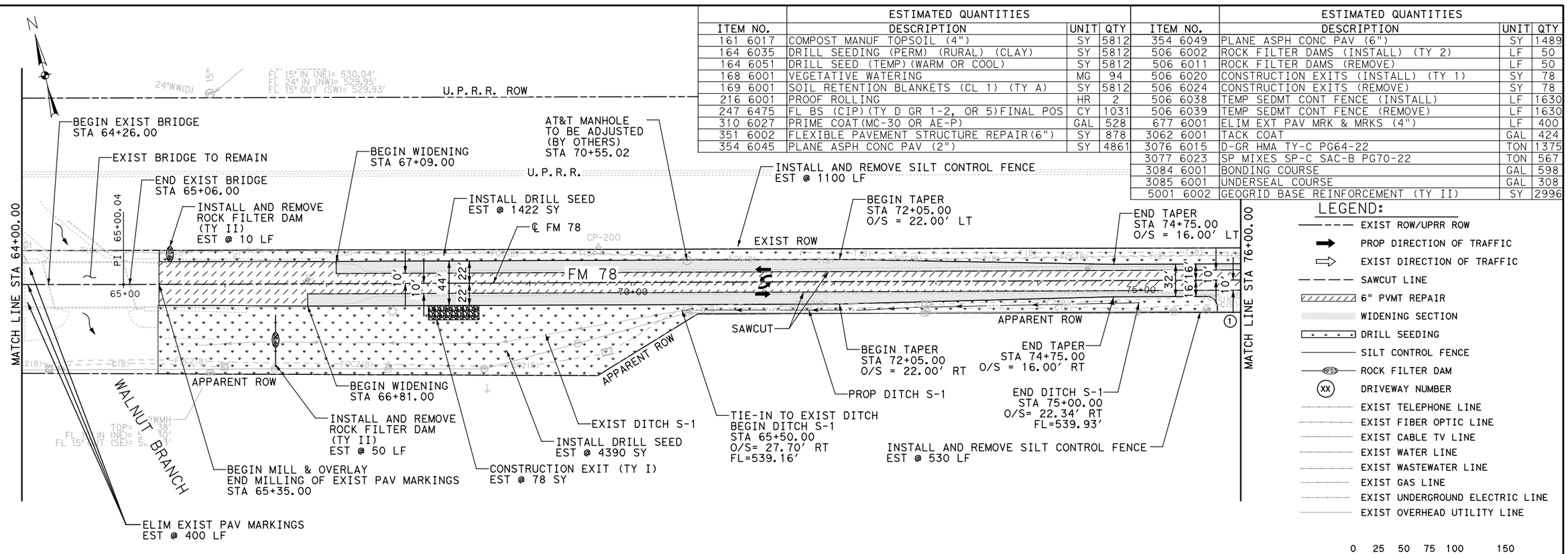
PLAN AND PROFILE

SCALE: 1"=100'H, 1'=10'V SHEET 1 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		58
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES				ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY	ITEM NO.	DESCRIPTION	UNIT	QTY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	5812	354 6049	PLANE ASPH CONC PAV (6")	SY	1489
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	5812	506 6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	50
164 6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	5812	506 6011	ROCK FILTER DAMS (REMOVE)	LF	50
168 6001	VEGETATIVE WATERING	MG	94	506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78
169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	5812	506 6024	CONSTRUCTION EXITS (REMOVE)	SY	78
216 6001	PROOF ROLLING	HR	2	506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1630
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	1031	506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1630
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	528	677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	400
351 6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	878	3062 6001	TACK COAT	GAL	424
354 6045	PLANE ASPH CONC PAV (2")	SY	4861	3076 6015	D-GR HMA TY-C PG64-22	TON	1375
				3077 6023	SP MIXES SP-C SAC-B PG70-22	TON	567
				3084 6001	BONDING COURSE	GAL	598
				3085 6001	UNDERSEAL COURSE	GAL	308
				5001 6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2996



LEGEND:

- EXIST ROW/UPRR ROW
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC
- SAWCUT LINE
- 6" PVMT REPAIR
- WIDENING SECTION
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- (XX) DRIVEWAY NUMBER
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- EXIST WATER LINE
- EXIST WASTEWATER LINE
- EXIST GAS LINE
- EXIST UNDERGROUND ELECTRIC LINE
- EXIST OVERHEAD UTILITY LINE

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SCALE IN FEET
SCALE: HOR: 1" = 100'
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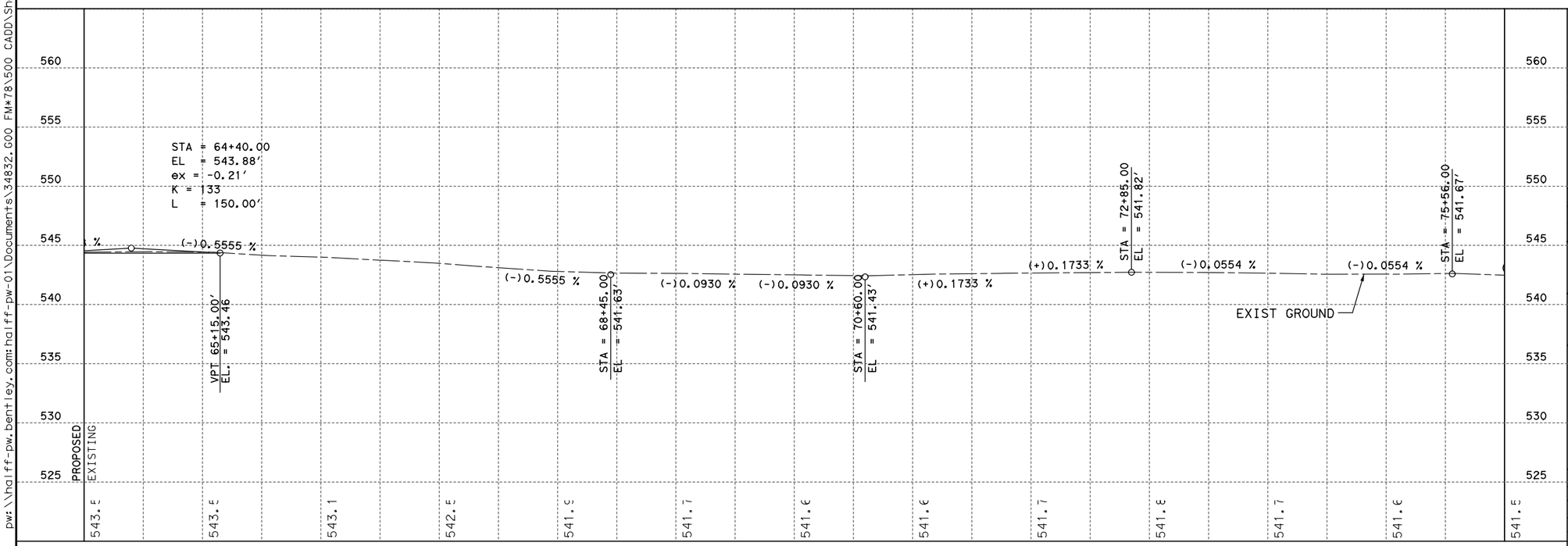

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TEL (210) 798-1895 FIRM #F-312

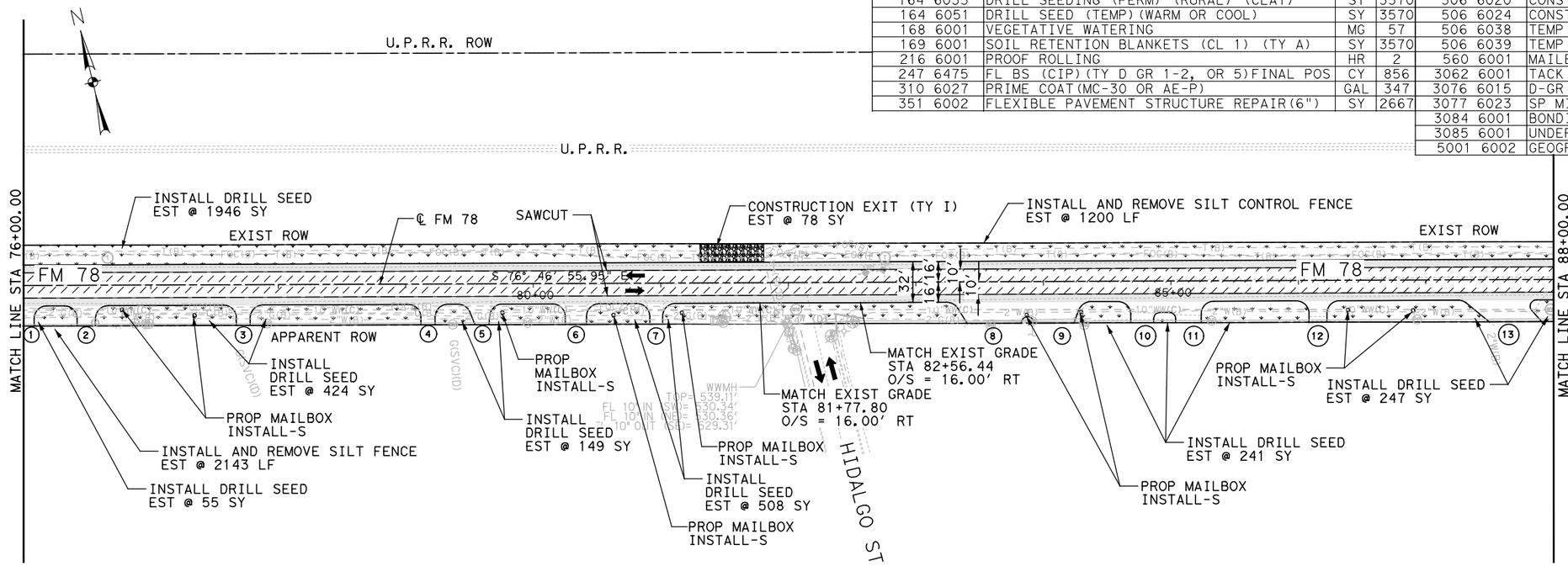
FM 78: 0025-10-097: SFT

PLAN AND PROFILE

SCALE: 1"=100'H, 1"=10'V SHEET 2 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		59
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES				ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY	ITEM NO.	DESCRIPTION	UNIT	QTY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	3570	354 6045	PLANE ASPH CONC PAV (2")	SY	4267
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	3570	506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78
164 6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	3570	506 6024	CONSTRUCTION EXITS (REMOVE)	SY	78
168 6001	VEGETATIVE WATERING	MG	57	506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2143
169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	3570	506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2143
216 6001	PROOF ROLLING	HR	2	560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	9
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	856	3062 6001	TACK COAT	GAL	187
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	347	3076 6015	D-GR HMA TY-C PG64-22	TON	594
351 6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	2667	3077 6023	SP MIXES SP-C SAC-B PG70-22	TON	499
				3084 6001	BONDING COURSE	GAL	528
				3085 6001	UNDERSEAL COURSE	GAL	587
				5001 6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2667

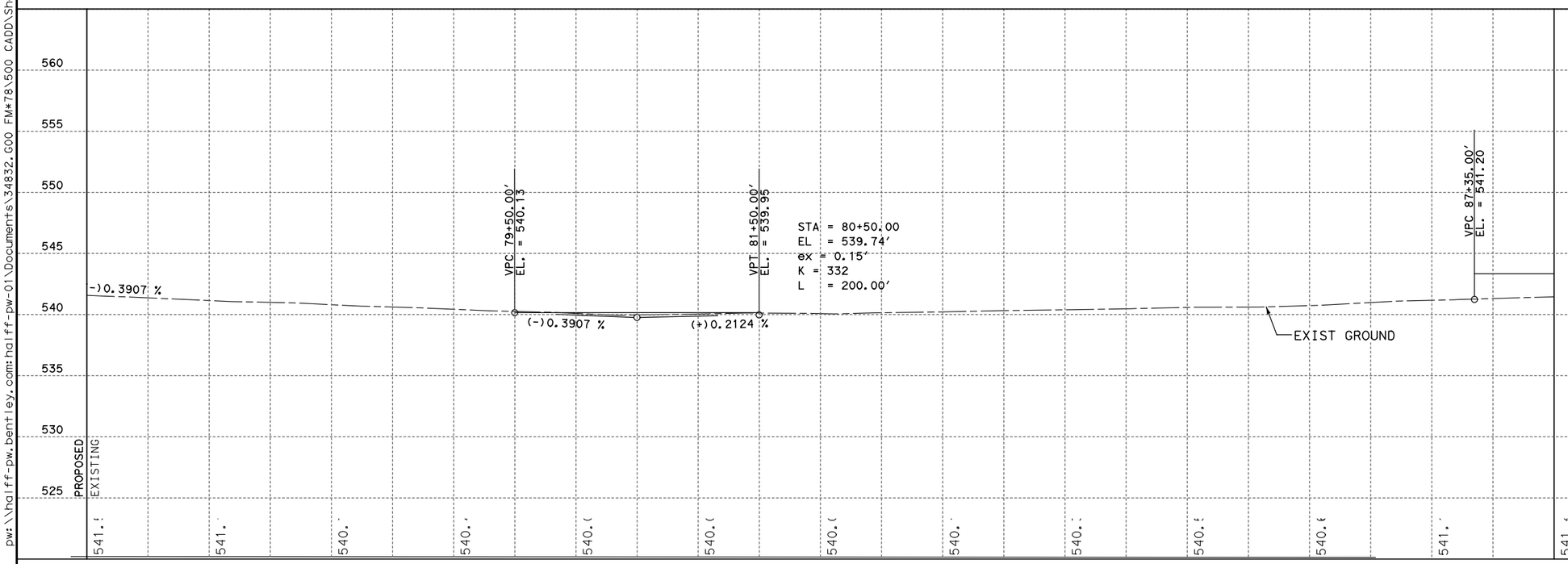


LEGEND:

- EXIST ROW/UPRR ROW
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC
- SAWCUT LINE
- 6" PVMT REPAIR
- WIDENING SECTION
- DRILL SEEDING
- SILT CONTROL FENCE
- ROCK FILTER DAM
- (XX) DRIVEWAY NUMBER
- EXIST TELEPHONE LINE
- EXIST FIBER OPTIC LINE
- EXIST CABLE TV LINE
- EXIST WATER LINE
- EXIST WASTEWATER LINE
- EXIST GAS LINE
- EXIST UNDERGROUND ELECTRIC LINE
- EXIST OVERHEAD UTILITY LINE

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'
VER: 1" = 10'



STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

Texas Department of Transportation®

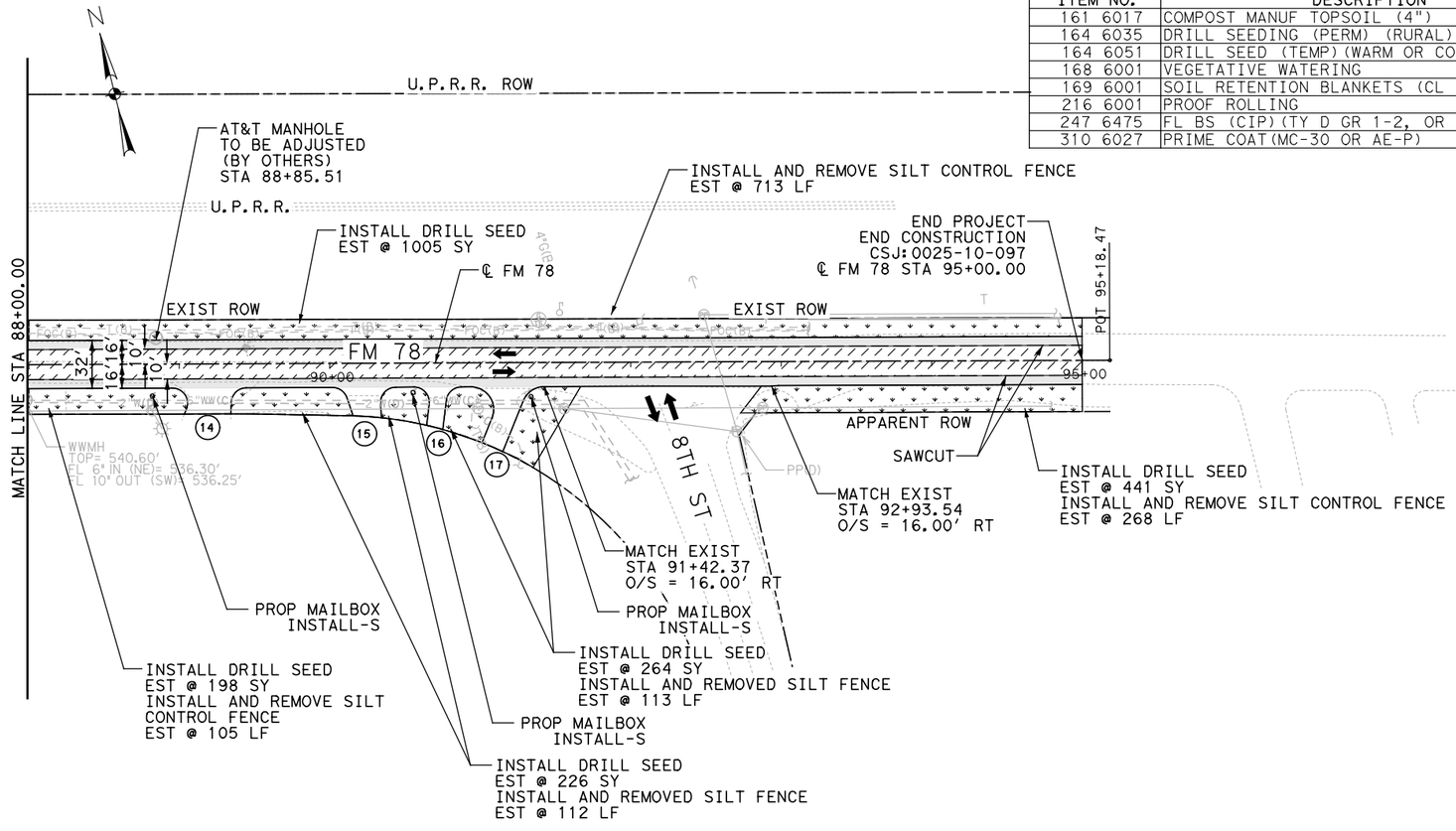
FM 78: 0025-10-097: SFT

PLAN AND PROFILE

SCALE: 1"=100'H, 1"=10'V SHEET 3 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		60
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

ESTIMATED QUANTITIES				ESTIMATED QUANTITIES			
ITEM NO.	DESCRIPTION	UNIT	QTY	ITEM NO.	DESCRIPTION	UNIT	QTY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	2134	351 6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	1556
164 6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	2134	354 6045	PLANE ASPH CONC PAV (2")	SY	2489
164 6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	2134	506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1311
168 6001	VEGETATIVE WATERING	MG	35	506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1311
169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	2134	560 6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	3
216 6001	PROOF ROLLING	HR	1	3062 6001	TACK COAT	GAL	109
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	500	3076 6015	D-GR HMA TY-C PG64-22	TON	347
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	203	3077 6023	SP MIXES SP-C SAC-B PG70-22	TON	291
				3084 6001	BONDING COURSE	GAL	309
				3085 6001	UNDERSEAL COURSE	GAL	343
				5001 6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1556

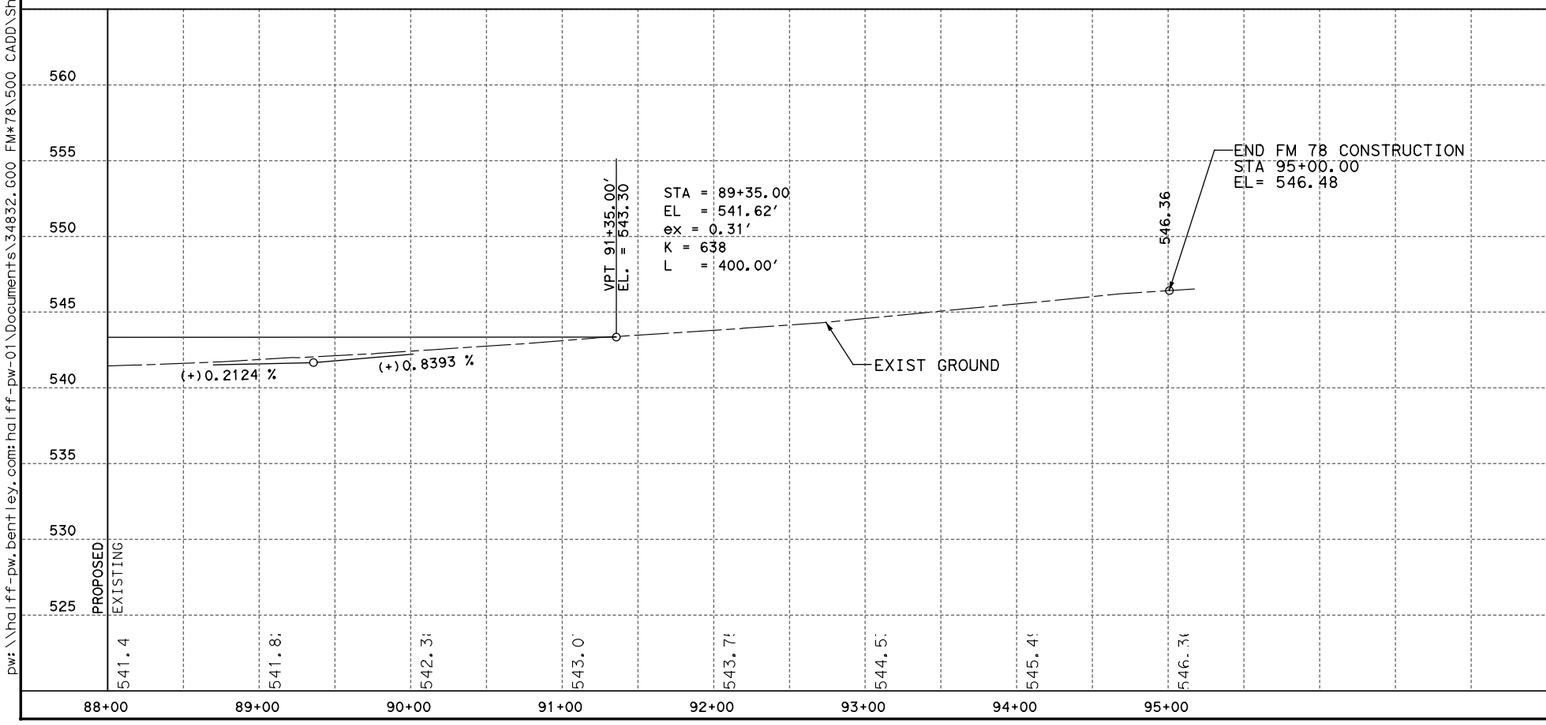


LEGEND:

- EXIST ROW/UPRR ROW
- PROP DIRECTION OF TRAFFIC
- EXIST DIRECTION OF TRAFFIC
- SAWCUT LINE
- 6" PVMT REPAIR
- WIDENING SECTION
- DRILL SEEDING
- SILT CONTROL FENCE
- ROCK FILTER DAM
- (XX) DRIVEWAY NUMBER
- EXIST TELEPHONE LINE
- EXIST FIBER OPTIC LINE
- EXIST CABLE TV LINE
- EXIST WATER LINE
- EXIST WASTEWATER LINE
- EXIST GAS LINE
- EXIST UNDERGROUND ELECTRIC LINE
- EXIST OVERHEAD UTILITY LINE

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'
VER: 1" = 10'



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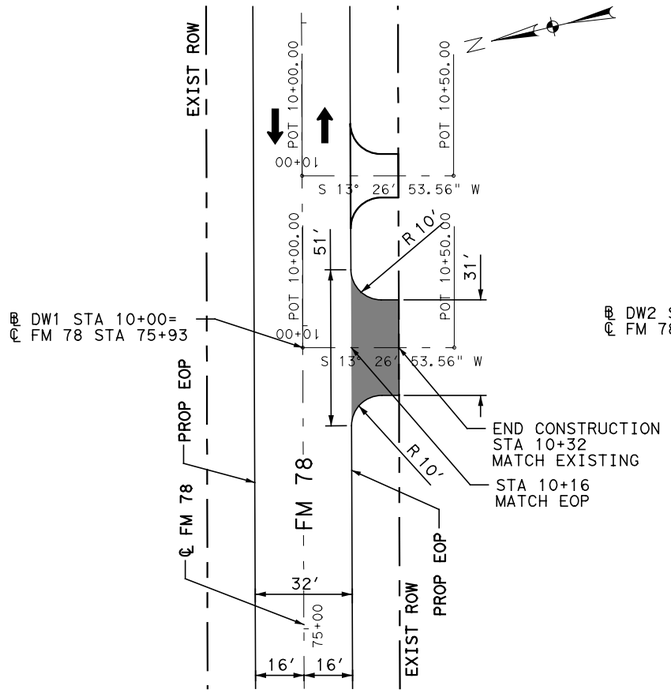
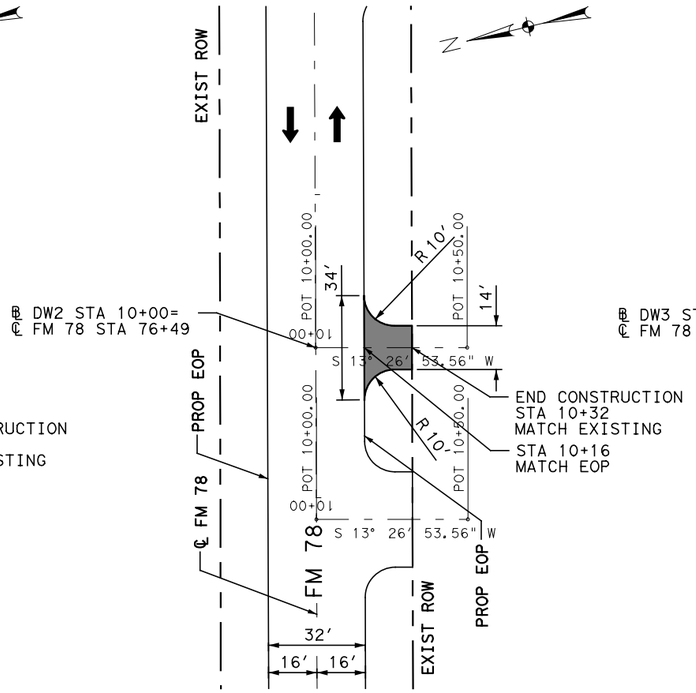
PLAN AND PROFILE

SCALE: 1"=100'H, 1"=10'V SHEET 4 OF 4

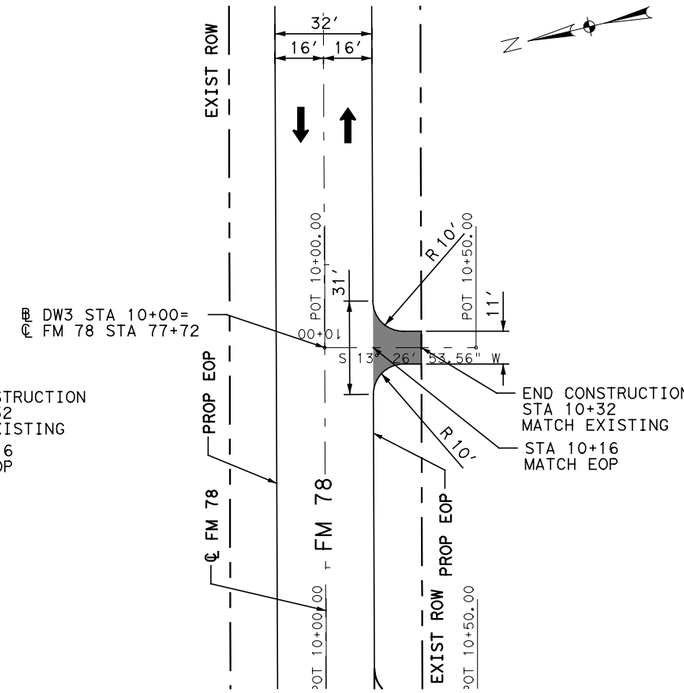
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		61
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 1



DRIVEWAY 2



DRIVEWAY 3

LEGEND

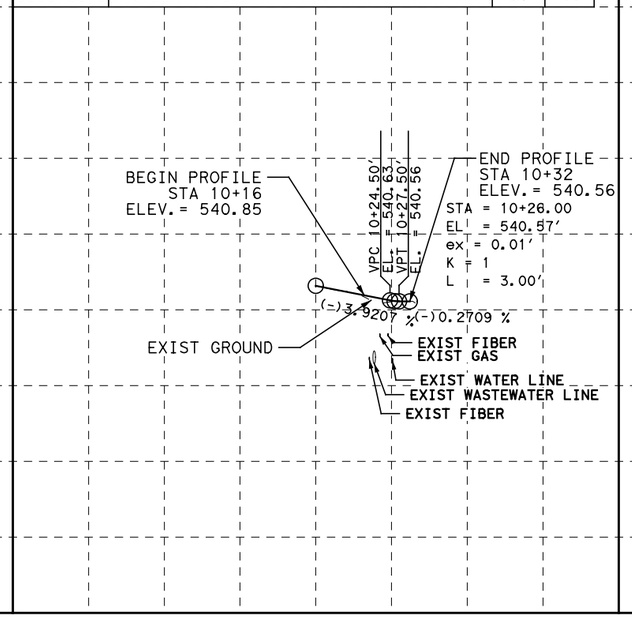
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

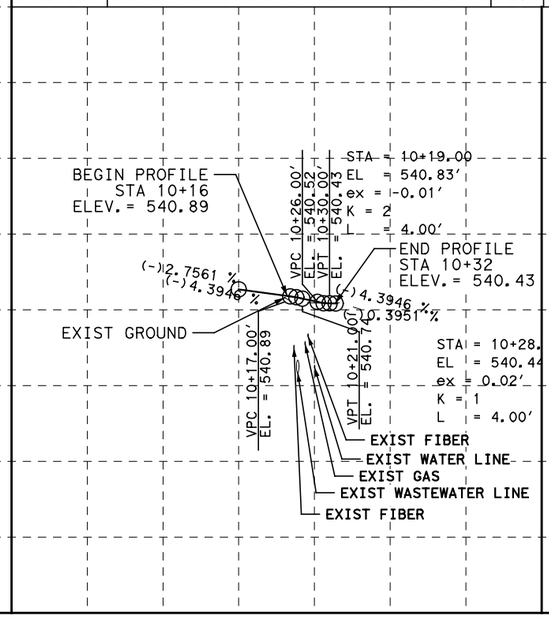
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50'
VER: 1" = 10'

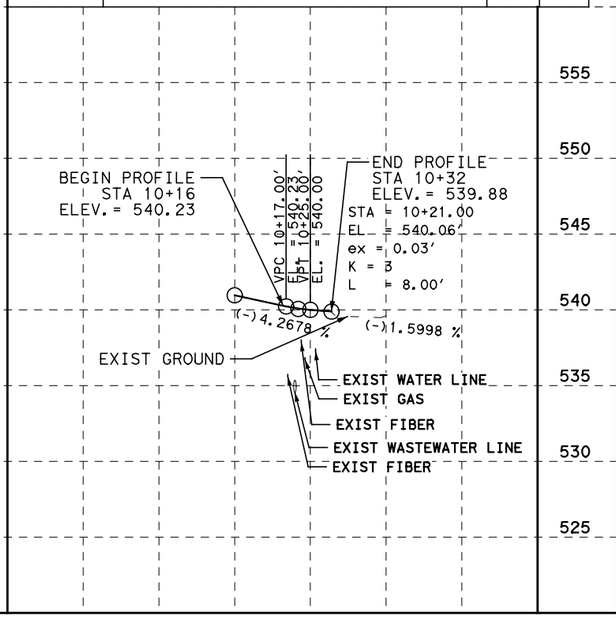
ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	60
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	60



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	30
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	30



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	24
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	24



NO.	REVISION	BY	DATE

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TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
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TBPE F-1640

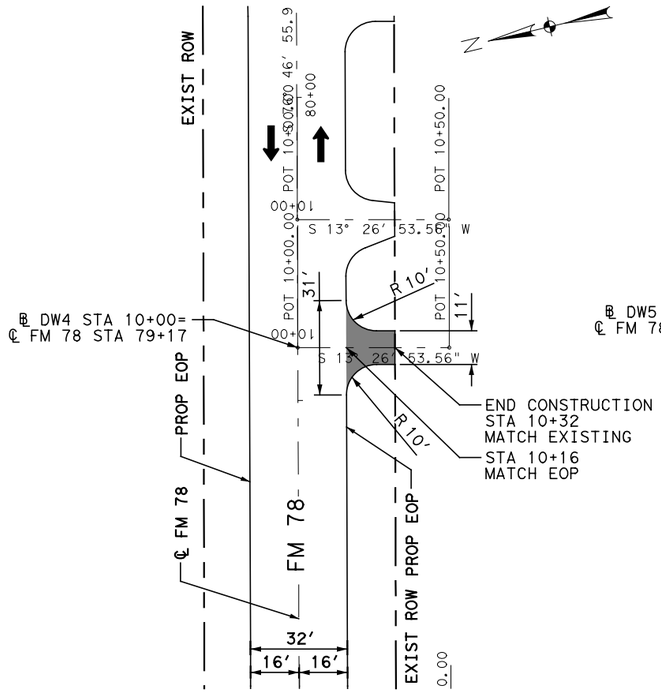
FM 78: 0025-10-097: SFT
DRIVEWAYS
PLAN & PROFILE

SHEET 1 OF 6

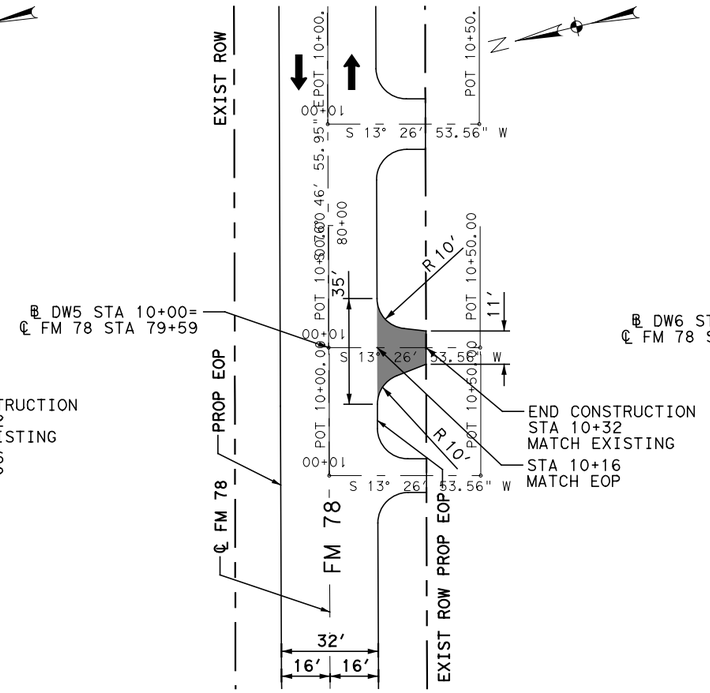
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	62

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

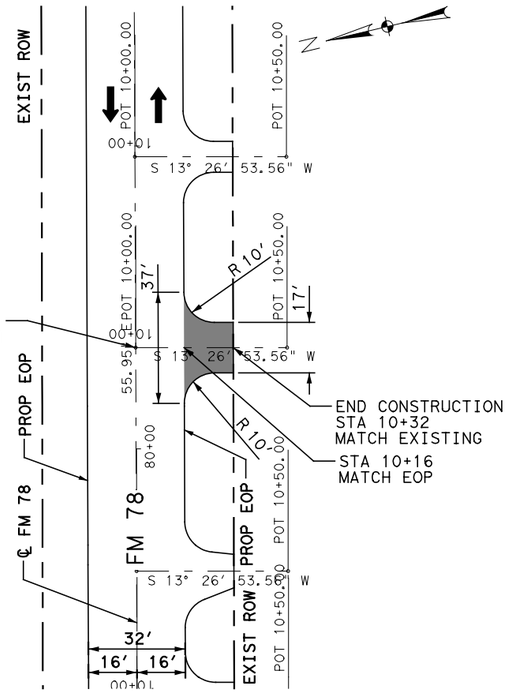
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 4



DRIVEWAY 5



DRIVEWAY 6

LEGEND

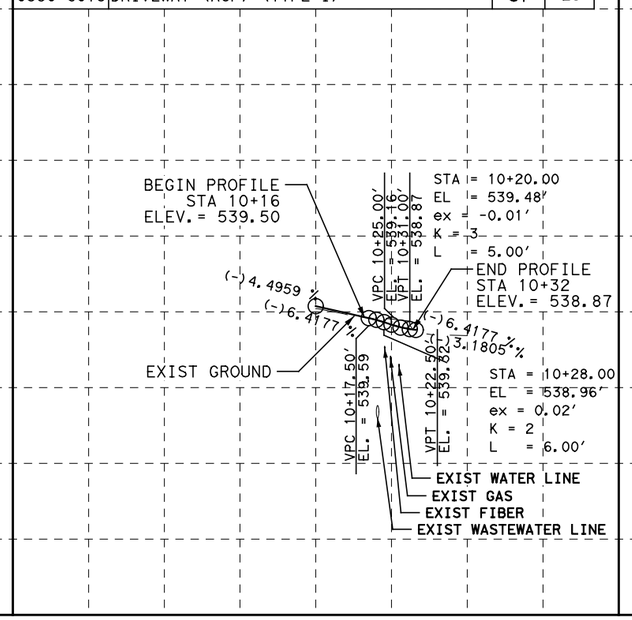
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

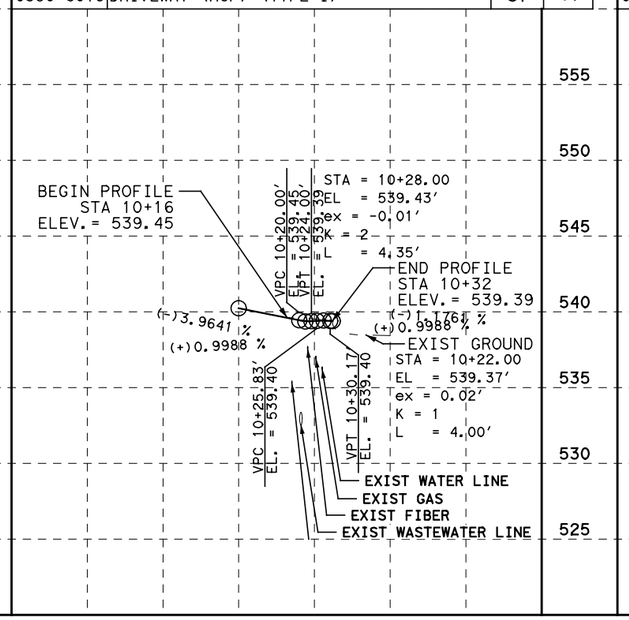
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50'
VER: 1" = 10'

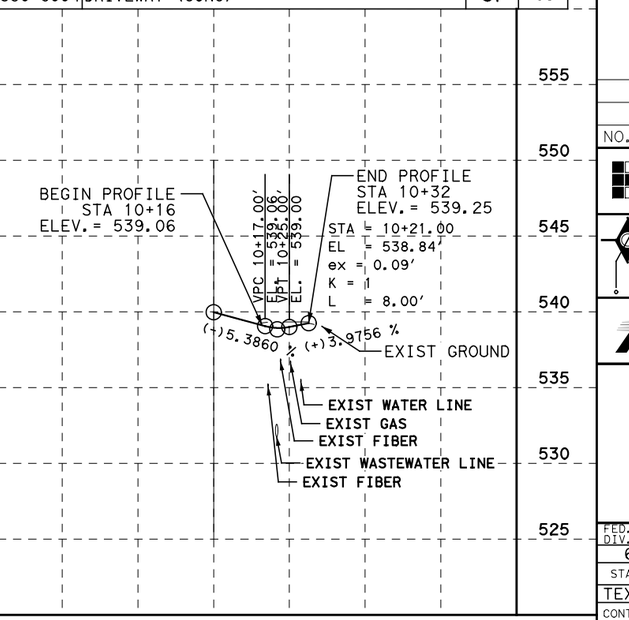
ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	25
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	25



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	30
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	30



ITEM	DESCRIPTION	UNIT	QTY
0104 6017	REMOVING CONC (DRIVEWAYS)	SY	35
0530 6004	DRIVEWAY (CONC)	SY	35



NO.	REVISION	BY	DATE

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TEDSI INFRASTRUCTURE GROUP
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1201 Interstate Highway 2
Mission, Texas 78572
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TEDSI TBPE F-1640

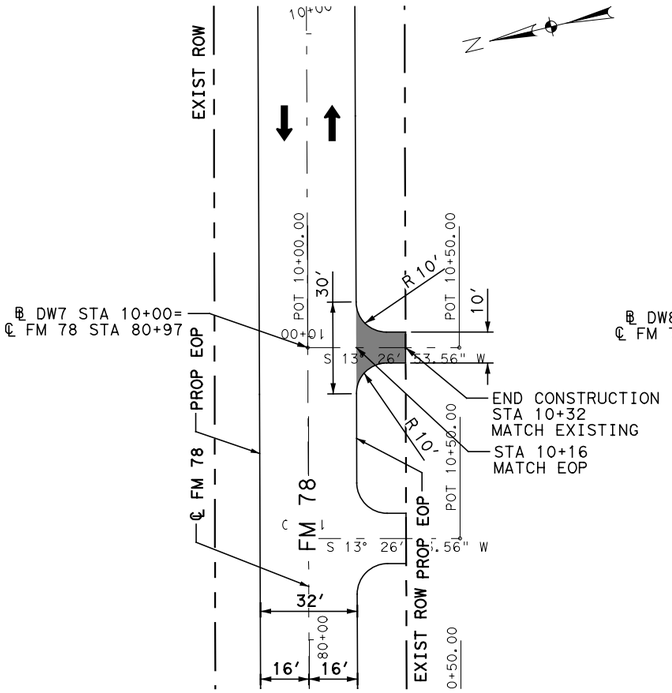
FM 78: 0025-10-097: SFT
DRIVEWAYS
PLAN & PROFILE

SHEET 2 OF 6

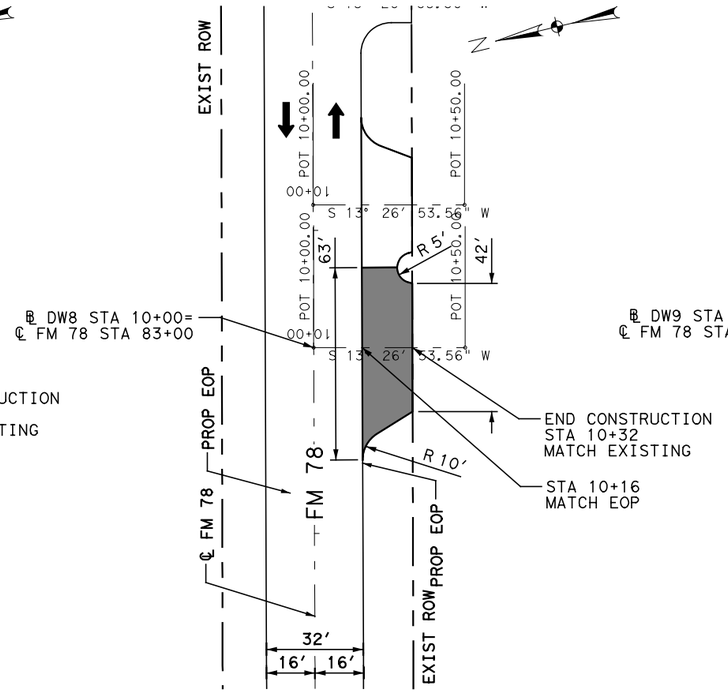
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	63

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

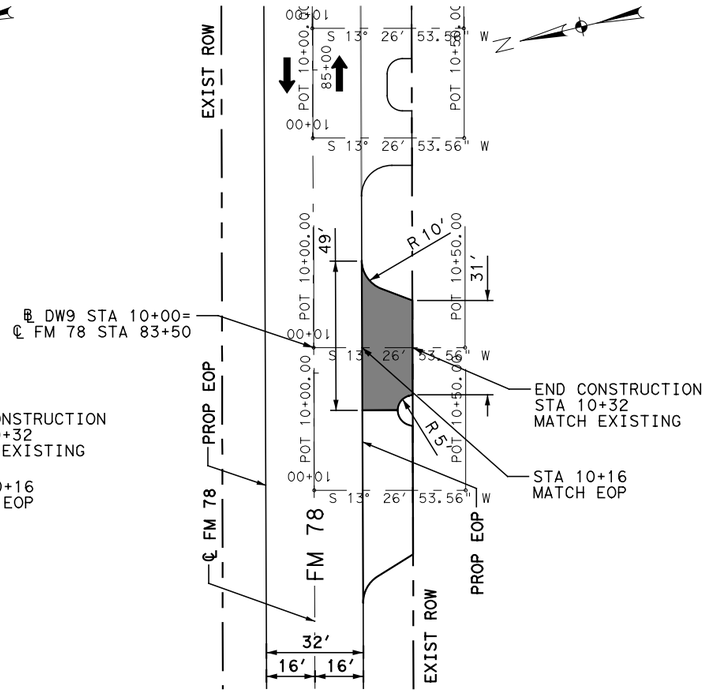
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 7



DRIVEWAY 8



DRIVEWAY 9

LEGEND

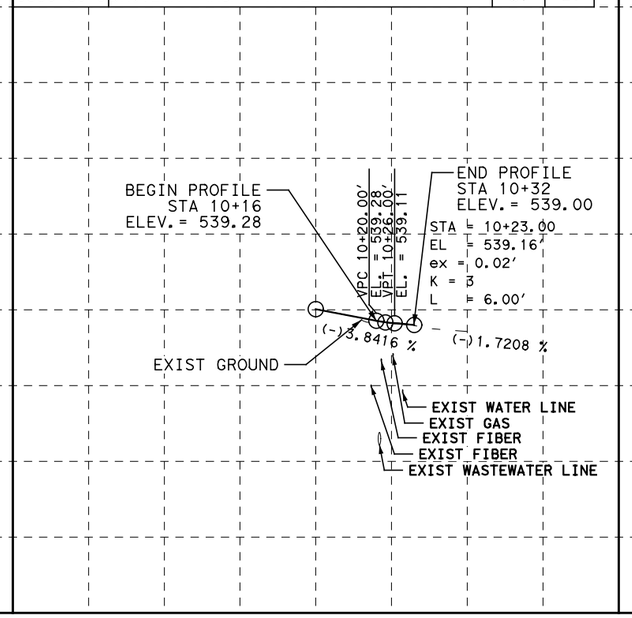
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

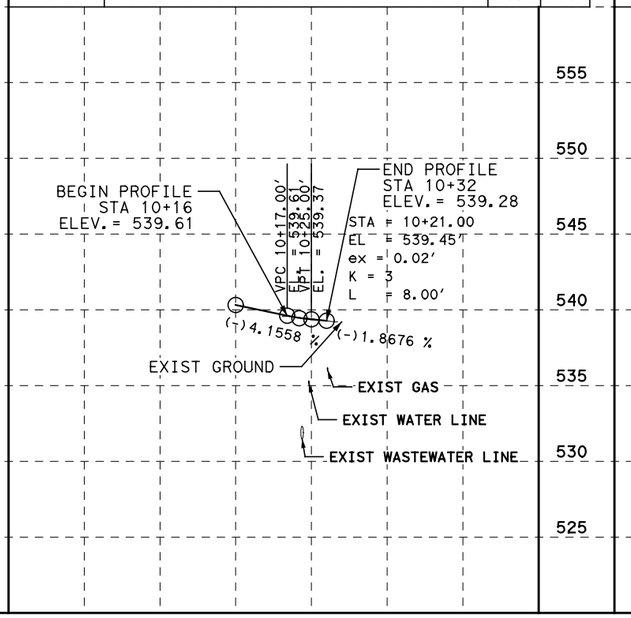
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50′
VER: 1" = 10′

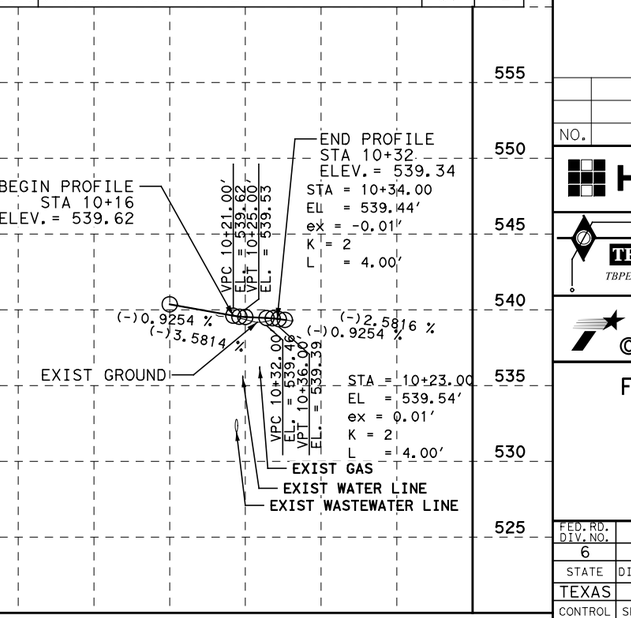
ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	23
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	23



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	95
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	95



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	72
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	72



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Mission, Texas 78572
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TEDSI
TBPE F-1640

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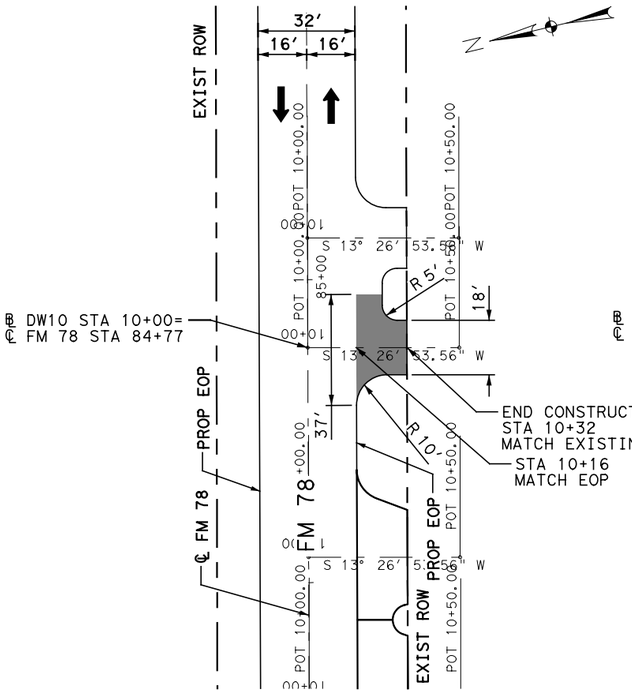
DRIVEWAYS
PLAN & PROFILE

SHEET 3 OF 6

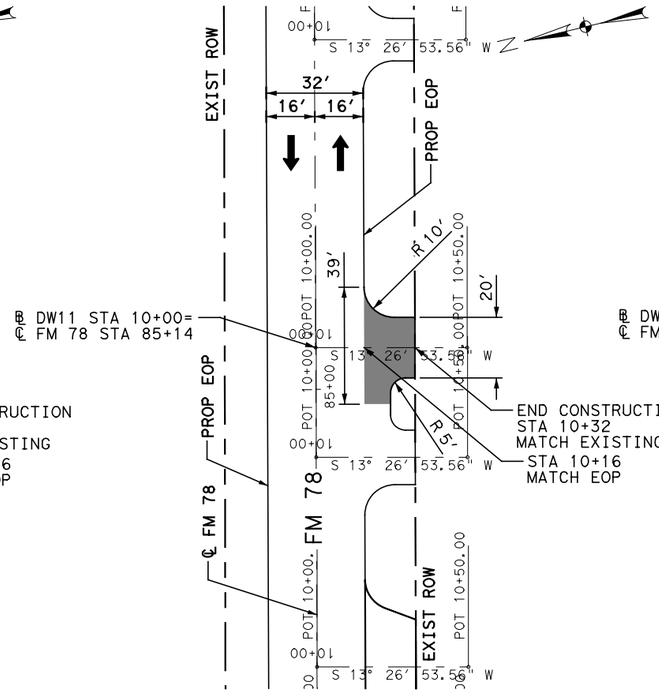
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	64

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

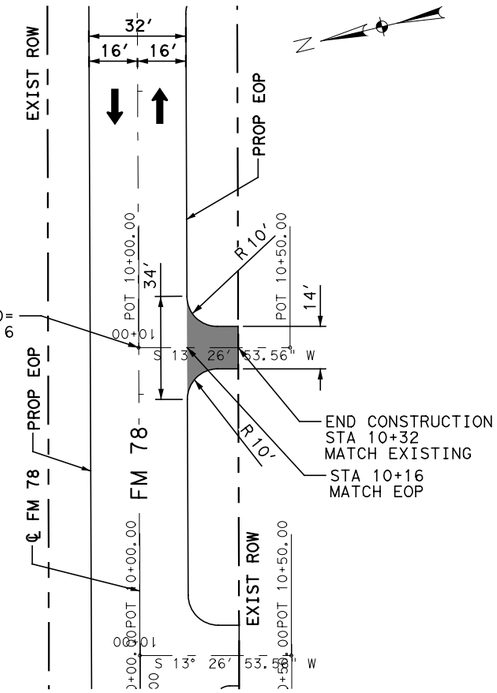
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 10



DRIVEWAY 11



DRIVEWAY 12

LEGEND

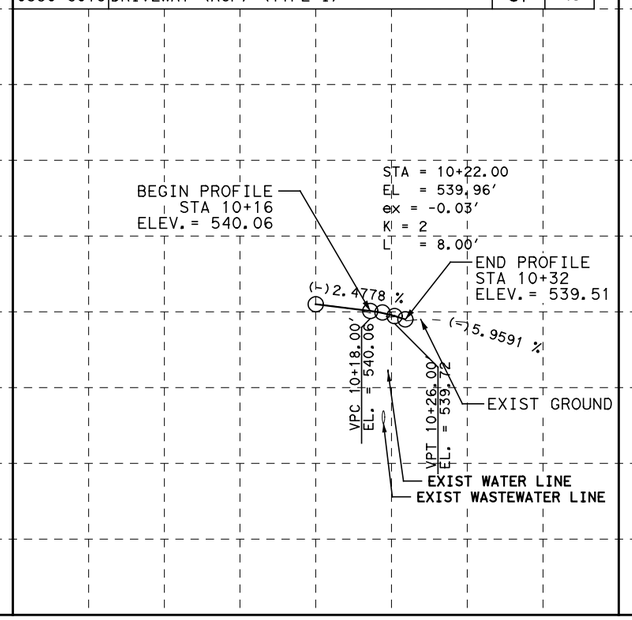
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

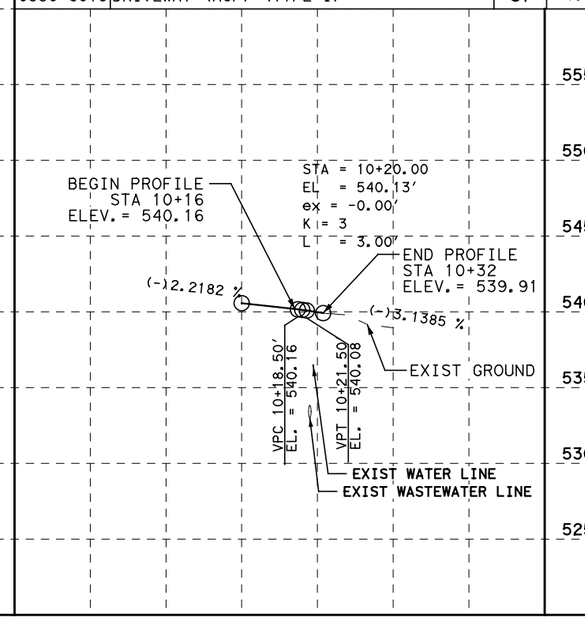
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50′
VER: 1" = 10′

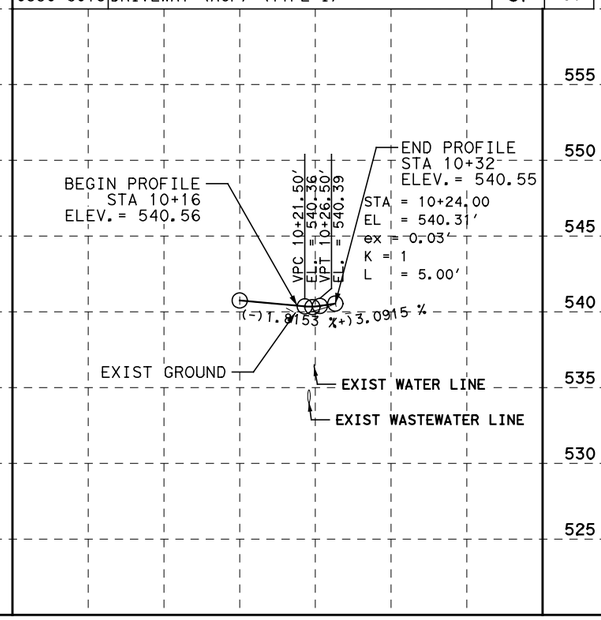
ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	45
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	45



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	48
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	48



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	31
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	31



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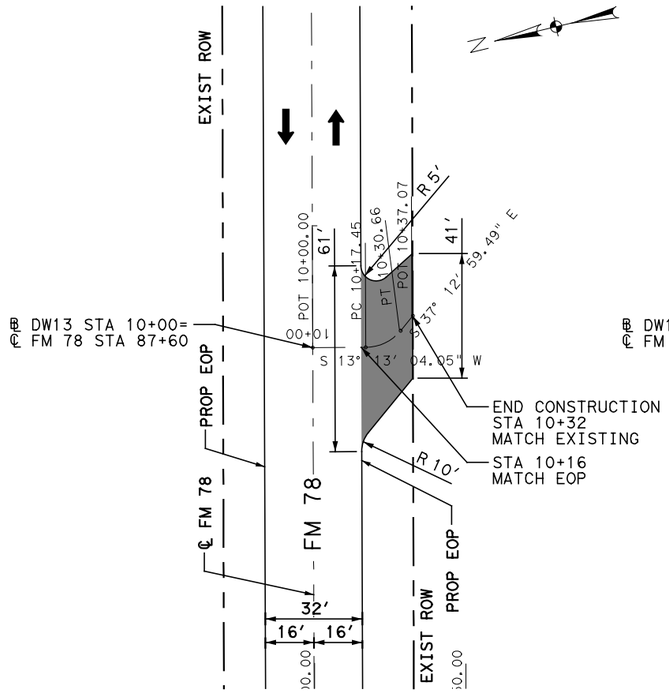
FM 78: 0025-10-097: SFT
DRIVEWAYS
PLAN & PROFILE

SHEET 4 OF 6

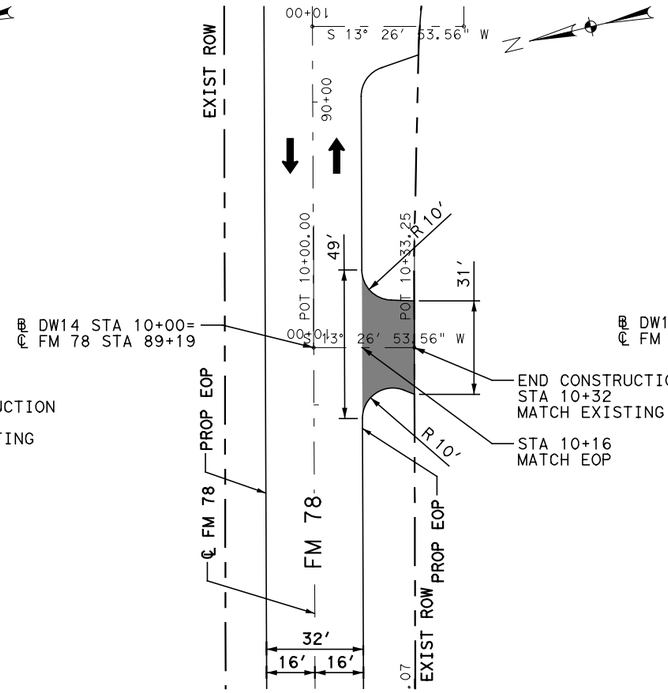
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	65

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

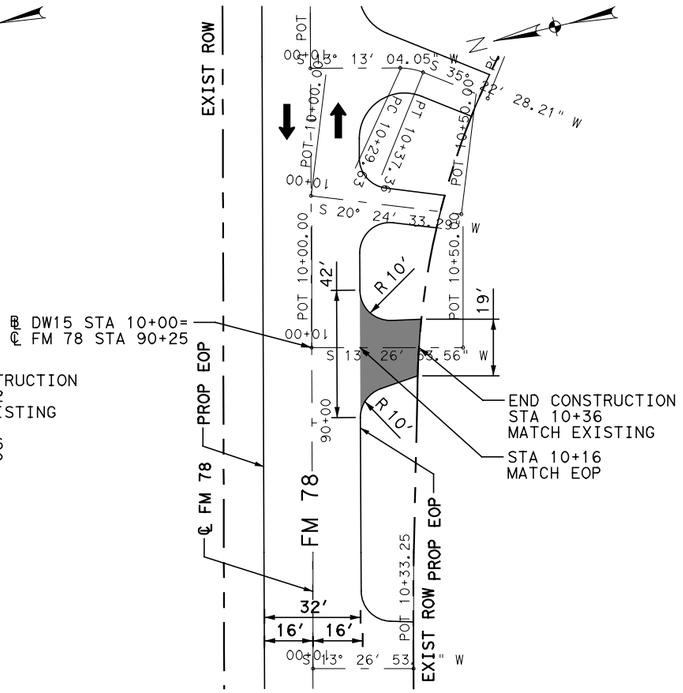
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 13



DRIVEWAY 14



DRIVEWAY 15

LEGEND

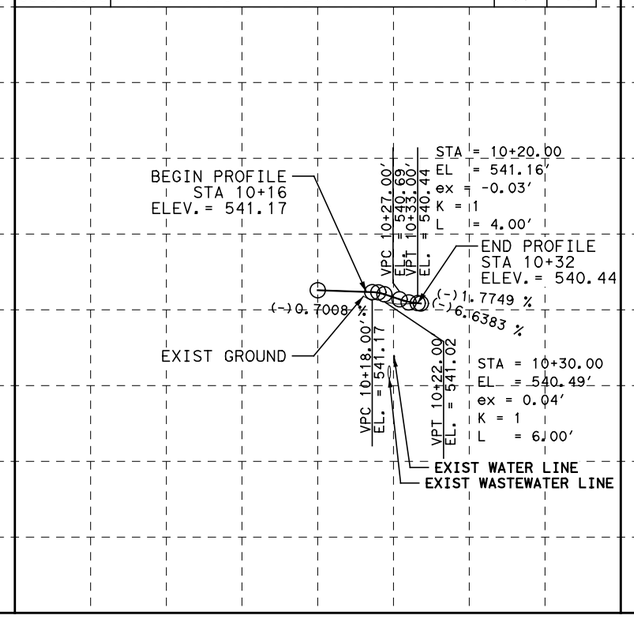
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

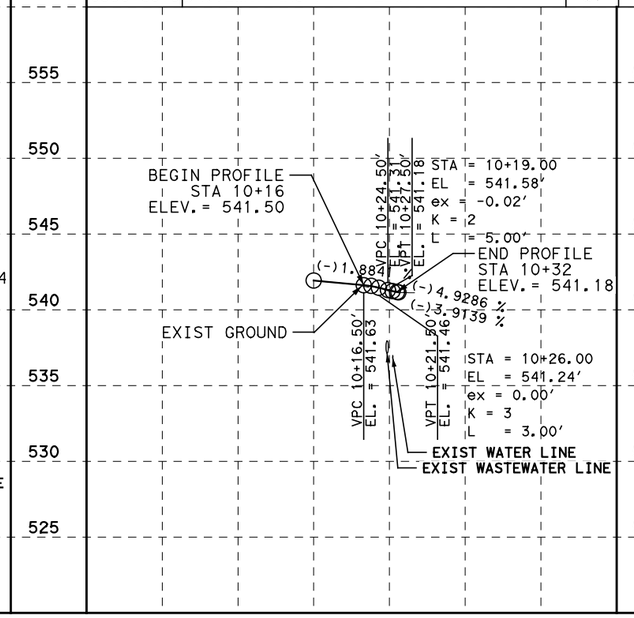
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50'
VER: 1" = 10'

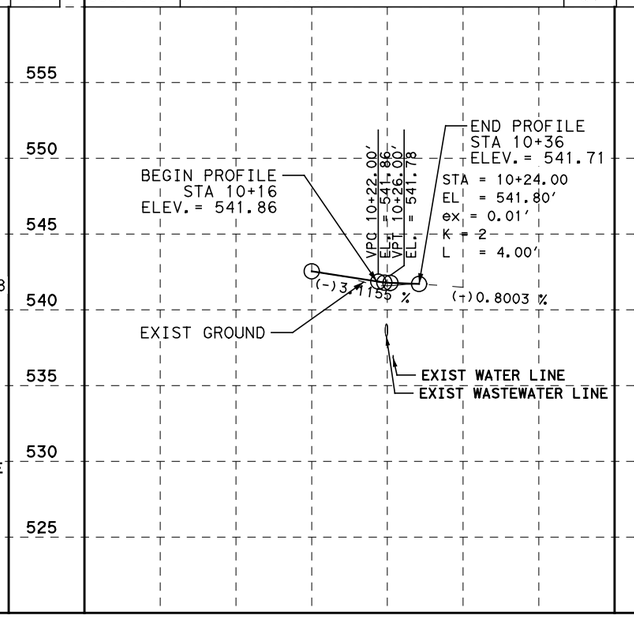
ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	86
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	86



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	61
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	61



ITEM	DESCRIPTION	UNIT	QTY
0104 6017	REMOVING CONC (DRIVEWAYS)	SY	50
0530 6004	DRIVEWAY (CONC)	SY	50



NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TBPE F-1640

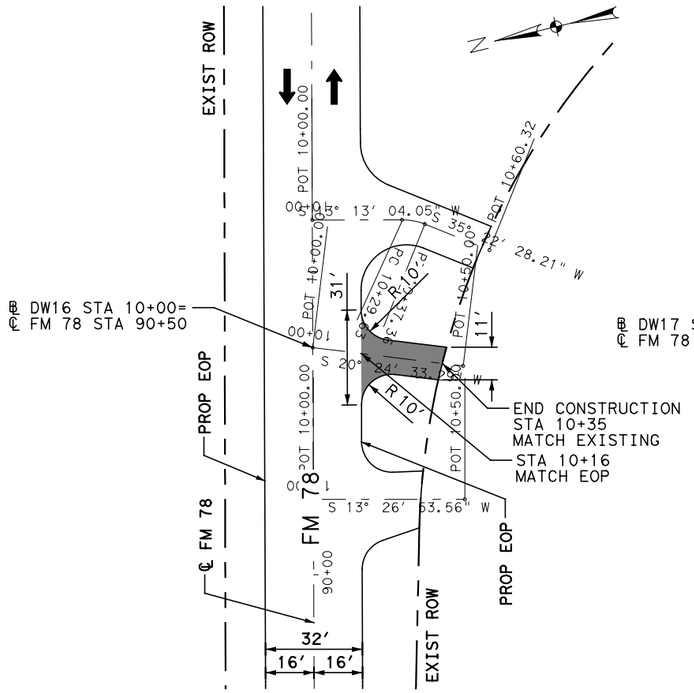
FM 78: 0025-10-097: SFT
DRIVEWAYS
PLAN & PROFILE

SHEET 5 OF 6

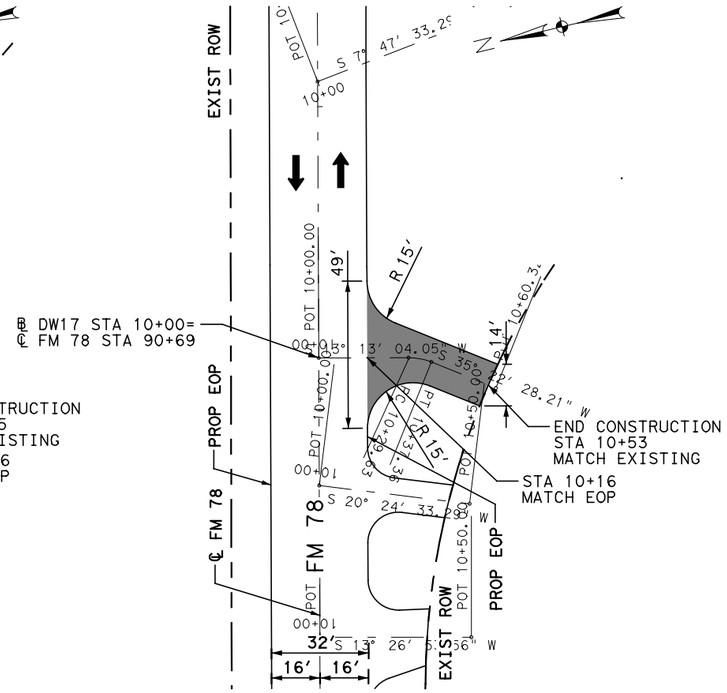
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	66

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



DRIVEWAY 16



DRIVEWAY 17

LEGEND

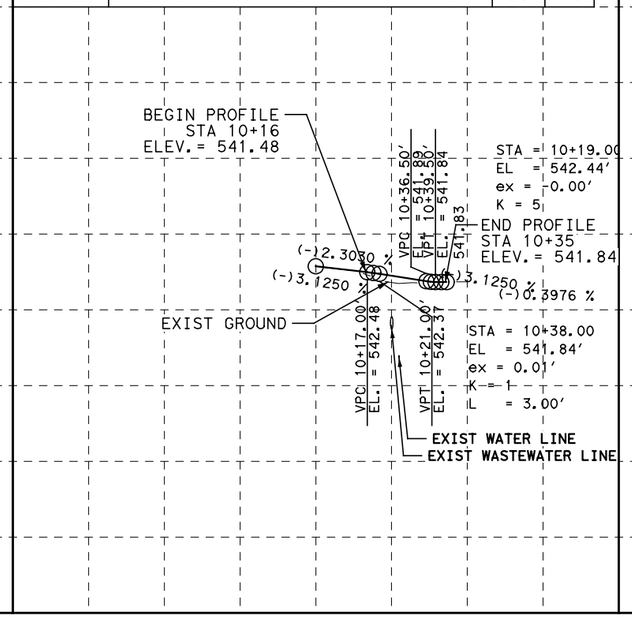
EXISTING ROW

DIRECTION OF TRAFFIC FLOW

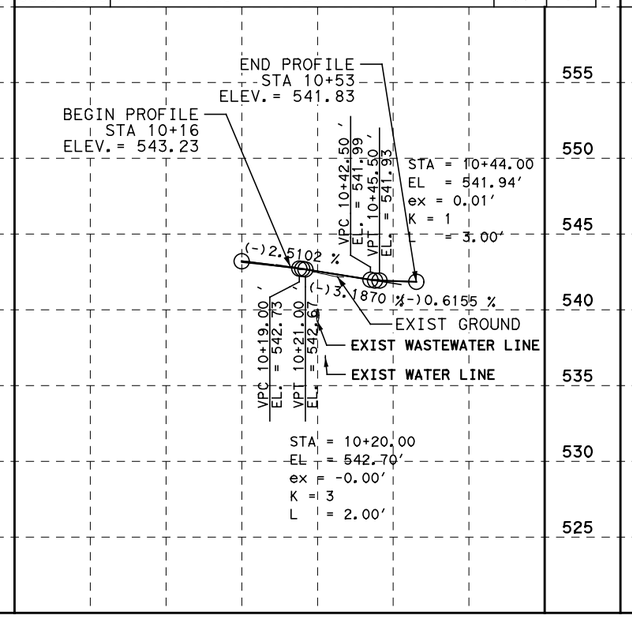
0 25 50 75

SCALE IN FEET
SCALE: HOR: 1" = 50'
VER: 1" = 10'

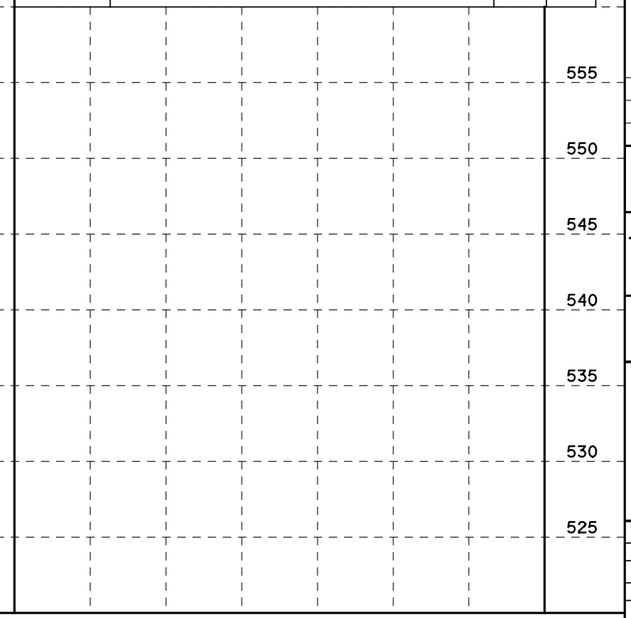
ITEM	DESCRIPTION	UNIT	QTY
0104 6017	REMOVING CONC (DRIVEWAYS)	SY	38
0530 6004	DRIVEWAY (CONC)	SY	38



ITEM	DESCRIPTION	UNIT	QTY
0105 6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	87
0530 6019	DRIVEWAY (ACP) (TYPE I)	SY	87



ITEM	DESCRIPTION	UNIT	QTY
		SY	
		SY	



NO.	REVISION	BY	DATE

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TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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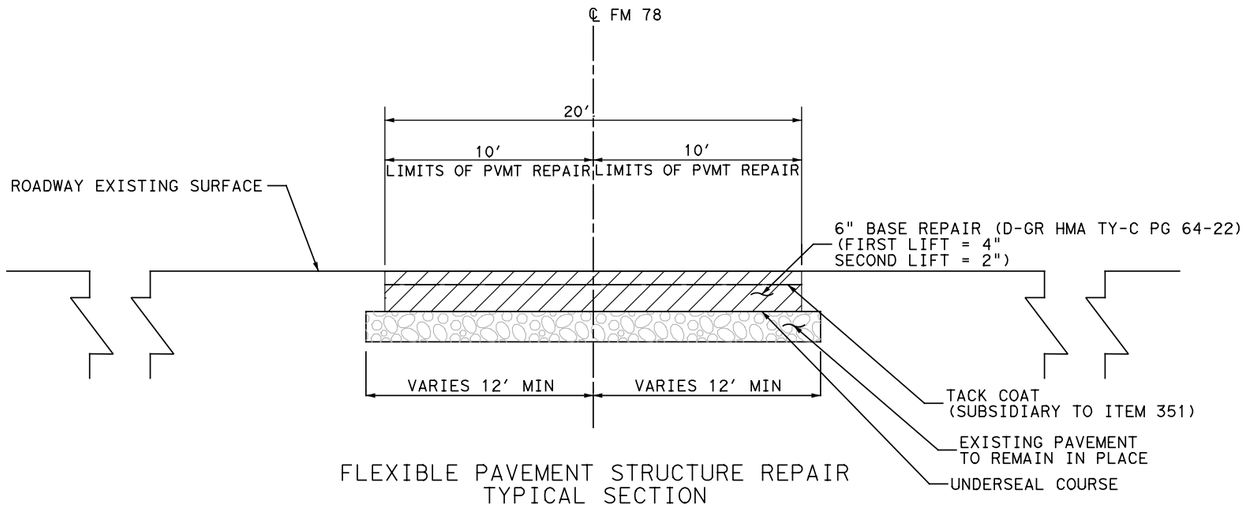
Mission, Texas 78572
(956) 424-7898
TEDSI
TBPE F-1640

FM 78: 0025-10-097: SFT
DRIVEWAYS
PLAN & PROFILE

SHEET 6 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET
6	See Title Sheet	67

STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



FLEXIBLE PAVEMENT STRUCTURE REPAIR
TYPICAL SECTION

NOTES:

TACK COAT REQUIRED BETWEEN LIFTS OF HMA (SUBSIDIARY TO ITEM 351).

THE TYPICAL REPAIR DIMENSION SHALL BE A MINIMUM WIDTH OF 10 FT AND A MINIMUM LENGTH OF 20 FT. THESE DIMENSIONS MAY DIFFER BASED UPON THE AREA THAT IS IN NEED OF REPAIR.

THE USE OF A ROTOMILL WILL BE USED FOR THE REMOVAL OF THE EXISTING PAVEMENT STRUCTURE AND SHALL BE SUBSIDIARY TO ITEM 351, "FLEXIBLE PAVEMENT STRUCTURE REPAIR."

ACP (TY C) (BASE) SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO ITEM 351.

THE REPAIR LOCATIONS AND THE SIZE OF EACH LOCATION IS SUBJECT TO CHANGE AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

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100 NE INTERSTATE 410 LOOP
SUITE 200
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FM 78:0025-10-097:SFT

FLEXIBLE PAVEMENT
STRUCTURE DETAIL

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		68
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

TXDOT*MON*PENTABLE.tbl
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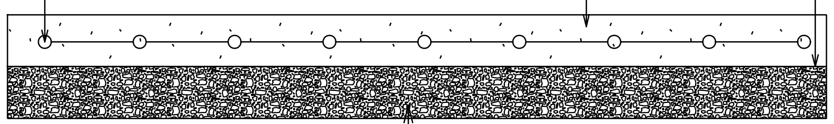
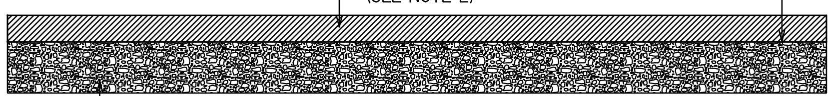
PDF*Mono*MidWT.plt

WELDED WIRE REINFORECEMENT (WWR) AS 6x6 - D10xD10
OR
#4 REBAR REINFORCEMENT AT 12"x12" SPACING
(SEE NOTE 5)



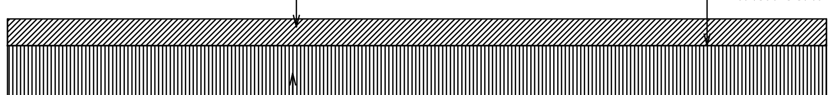
TYPICAL CONCRETE DRIVEWAY

* NOTE: STEEL SHALL BE CENTERED VERTICALLY IN CONCRETE.
PAID AS 'DRIVEWAYS CONC (HES)' OR 'DRIVEWAYS (CONC)'



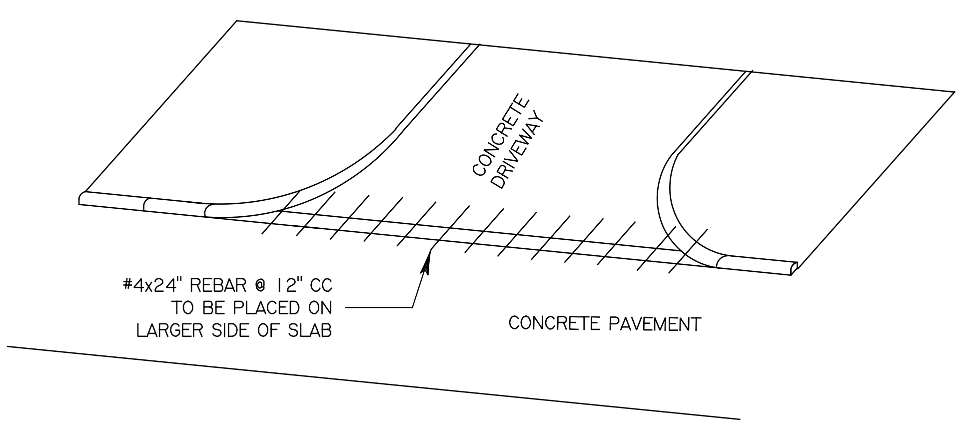
TYPICAL ROADWAY DRIVEWAY (TYPE 1)

PAID AS DRIVEWAYS ACP (TYPE 1)

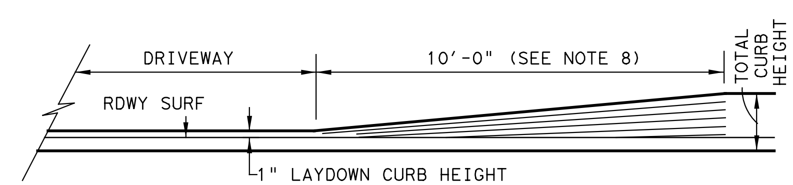


TYPICAL ROADWAY DRIVEWAY (TYPE 2)

PAID AS DRIVEWAYS ACP (TYPE 2)



TIE BAR PLACEMENT WITH CRCP



LAYDOWN CURB AT DRIVEWAYS DETAIL

NOTES:

1. USE CLASS A CONCRETE UNLESS OTHERWISE NOTED.
2. DENSE GRADED HMA MAY BE USED WHEN APPROVED BY THE ENGINEER IF THE ROADWAY SURFACE COURSE IS A PERFORMANCE MIX.
3. REFER TO PLAN SHEETS FOR GEOMETRIC DESIGN DETAILS.
4. FOR CONCRETE DRIVEWAYS, PROVIDE EXPANSION JOINT 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT.
5. FIBER REINFORCEMNT IS NOT ALLOWED.
6. MACHINE LAID HMA IS REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OF GRADE IN ACCORDANCE WITH ITEM 247. FLEXIBLE BASE COMPRESSIVE STRENGTHS ARE WAIVED. BASE IS SUBSIDIARY TO THE ITEM.
8. WHERE SIDEWALK IS PRESENT, SLOPE AND LENGTH OF CURB TRANSITION SHOULD MATCH THE SIDEWALK AND MEET ADA REQUIREMENTS.
9. IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE THE IMPACT TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.

Texas Department of Transportation
San Antonio District

DRIVEWAY DETAILS

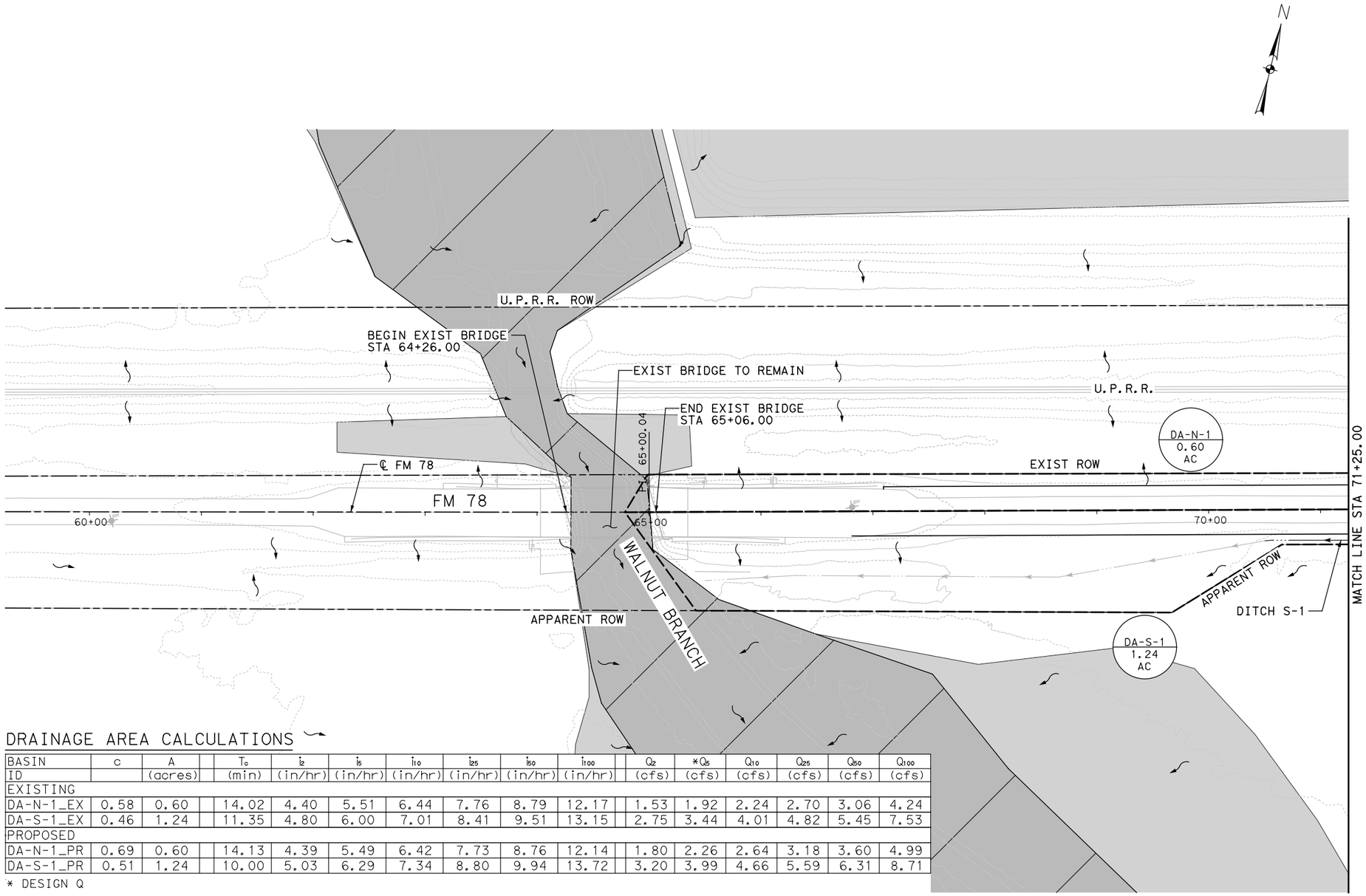
San Antonio District Standard
Sheet (1 of 1)

T:Engdata/Standards/Drivewaydetails.dgn
ORIGINAL DRAWING DATE: 8/1/2020
REVISIONS

PREPARED BY AND FOR USE OF TxDoT.

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
TX	6	SEE TITLE SHEET			69
COUNTY		CONTROL	SECTION	JOB	HIGHWAY
GUADALUPE		0025	10	097	FM 78

1/25/2023 10:09 AM



LEGEND:

- INTERIOR DRAINAGE AREA
- EXISTING CONTOUR
- DITCH FLOWLINE
- DIRECTION OF FLOW
- EFFECTIVE ZONE AE SFHA
- EFFECTIVE ZONE A SFHA
- DA-N-1 / 2.98 AC — DRAINAGE AREA ID

NOTES:

1. HYDROLOGY DETERMINED USING RATIONAL METHOD.
2. INITIAL COORDINATION TO INFORM THE GUADALUPE COUNTY FLOODPLAIN ADMINISTRATOR OF THE PROJECT COMPLETED ON OCTOBER 27, 2022.

0 25 50 75 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

DRAINAGE AREA CALCULATIONS

BASIN ID	C	A (acres)		T_c (min)	i_2 (in/hr)	i_5 (in/hr)	i_{10} (in/hr)	i_{25} (in/hr)	i_{50} (in/hr)	i_{100} (in/hr)		Q_2 (cfs)	*Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
EXISTING																	
DA-N-1_EX	0.58	0.60		14.02	4.40	5.51	6.44	7.76	8.79	12.17		1.53	1.92	2.24	2.70	3.06	4.24
DA-S-1_EX	0.46	1.24		11.35	4.80	6.00	7.01	8.41	9.51	13.15		2.75	3.44	4.01	4.82	5.45	7.53
PROPOSED																	
DA-N-1_PR	0.69	0.60		14.13	4.39	5.49	6.42	7.73	8.76	12.14		1.80	2.26	2.64	3.18	3.60	4.99
DA-S-1_PR	0.51	1.24		10.00	5.03	6.29	7.34	8.80	9.94	13.72		3.20	3.99	4.66	5.59	6.31	8.71

* DESIGN Q

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

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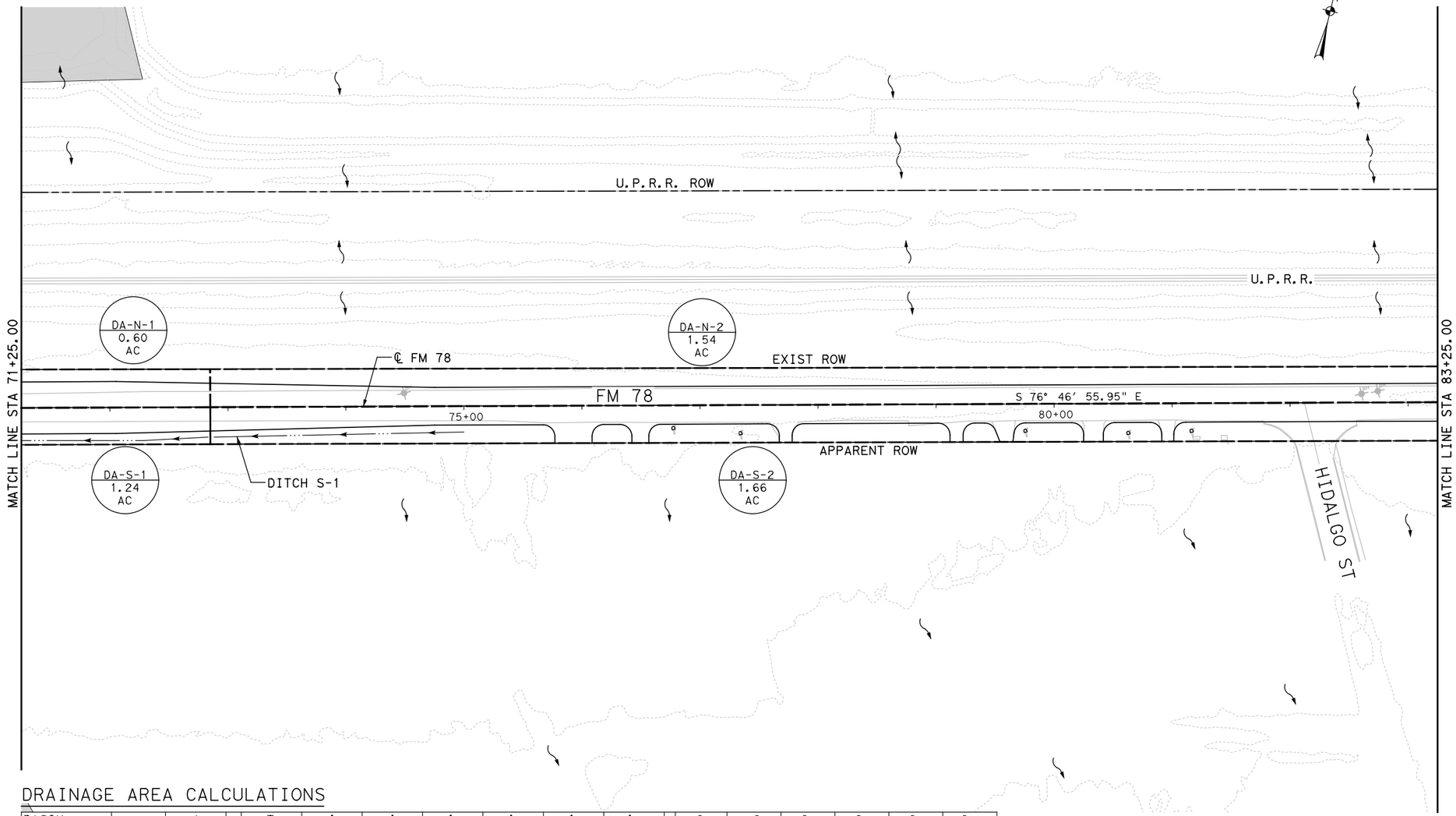
DRAINAGE AREA MAP

SCALE: 1"=100' SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		70
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



LEGEND:

- INTERIOR DRAINAGE AREA
- EXISTING CONTOUR
- DITCH FLOWLINE
- DIRECTION OF FLOW
- EFFECTIVE ZONE AE SFHA
- EFFECTIVE ZONE A SFHA
- DA-N-1 / 2.98 AC — DRAINAGE AREA ID

NOTES:

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0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100′

DRAINAGE AREA CALCULATIONS

BASIN ID	C	A (acres)		T_c (min)	i_2 (in/hr)	i_5 (in/hr)	i_{10} (in/hr)	i_{25} (in/hr)	i_{50} (in/hr)	i_{100} (in/hr)		Q_2 (cfs)	*Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
EXISTING																	
DA-N-1_EX	0.58	0.60		14.02	4.40	5.51	6.44	7.76	8.79	12.17		1.53	1.92	2.24	2.70	3.06	4.24
DA-N-2_EX	0.59	1.54		14.69	4.31	5.40	6.32	7.61	8.62	11.96		3.91	4.90	5.74	6.91	7.83	10.85
DA-S-1_EX	0.46	1.24		11.35	4.80	6.00	7.01	8.41	9.51	13.15		2.75	3.44	4.01	4.82	5.45	7.53
DA-S-2_EX	0.56	1.66		14.20	4.38	5.48	6.41	7.72	8.74	12.12		4.09	5.13	6.00	7.22	8.18	11.33
PROPOSED																	
DA-N-1_PR	0.69	0.60		14.13	4.39	5.49	6.42	7.73	8.76	12.14		1.80	2.26	2.64	3.18	3.60	4.99
DA-N-2_PR	0.62	1.54		14.75	4.30	5.39	6.31	7.60	8.61	11.94		4.11	5.14	6.02	7.25	8.21	11.38
DA-S-1_PR	0.51	1.24		10.00	5.03	6.29	7.34	8.80	9.94	13.72		3.20	3.99	4.66	5.59	6.31	8.71
DA-S-2_PR	0.60	1.66		14.26	4.37	5.47	6.40	7.71	8.73	12.10		4.35	5.45	6.38	7.68	8.69	12.05

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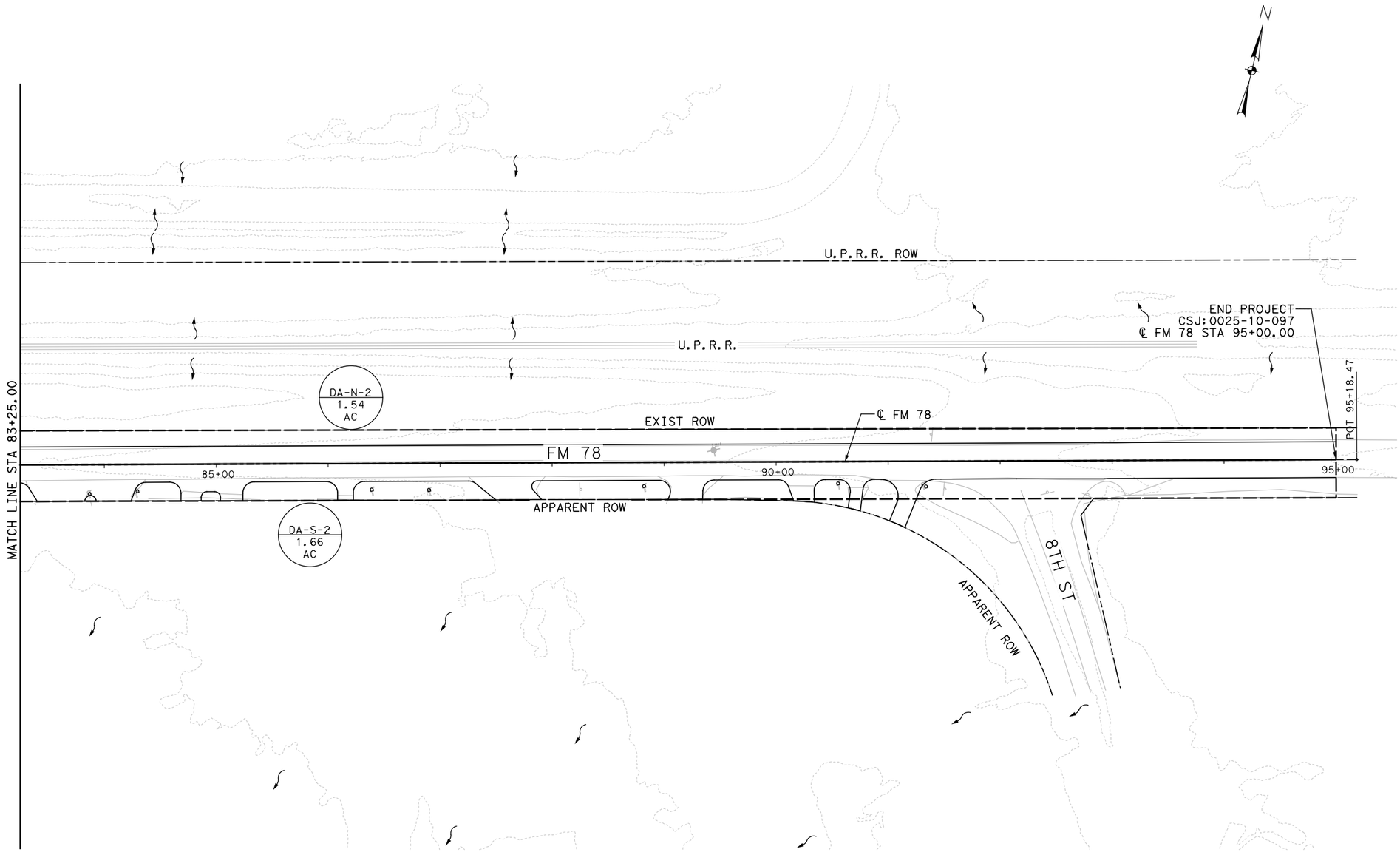
DRAINAGE AREA MAP

SCALE: 1"=100′ SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET
6	SEE TITLE SHEET	71

STATE	DISTRICT	COUNTY
TEXAS	SAT	GUADALUPE

CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78



LEGEND:

- INTERIOR DRAINAGE AREA
- EXISTING CONTOUR
- DITCH FLOWLINE
- DIRECTION OF FLOW
- EFFECTIVE ZONE AE SFHA
- EFFECTIVE ZONE A SFHA
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0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

DRAINAGE AREA CALCULATIONS

BASIN ID	C	A (acres)		T_c (min)	i_2 (in/hr)	i_5 (in/hr)	i_{10} (in/hr)	i_{25} (in/hr)	i_{50} (in/hr)	i_{100} (in/hr)		Q_2 (cfs)	$*Q_5$ (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
EXISTING																	
DA-N-2_EX	0.59	1.54		14.69	4.31	5.40	6.32	7.61	8.62	11.96		3.91	4.90	5.74	6.91	7.83	10.85
DA-S-2_EX	0.56	1.66		14.20	4.38	5.48	6.41	7.72	8.74	12.12		4.09	5.13	6.00	7.22	8.18	11.33
PROPOSED																	
DA-N-2_PR	0.62	1.54		14.75	4.30	5.39	6.31	7.60	8.61	11.94		4.11	5.14	6.02	7.25	8.21	11.38
DA-S-2_PR	0.60	1.66		14.26	4.37	5.47	6.40	7.71	8.73	12.10		4.35	5.45	6.38	7.68	8.69	12.05

* DESIGN Q

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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TEL (210) 798-1895 FIRM #F-312

FM 78: 0025-10-097: SFT

DRAINAGE AREA MAP

SCALE: 1"=100' SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		72
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

TXDOT*MON*PENTABLE.tbl DATE:1/25/2023 TIME:10:43:54 AMOFFICE:SAN dh3070
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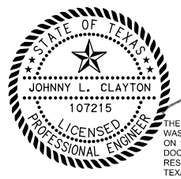
℄ DITCH S-1

Beginning chain S_1 description
Feature: Grade_DitchLine

Point 207	N	13,764,145.315 E	2,291,998.469 Sta	10+00.00
Course from 207 to 208 S 79° 26′ 40.62" E Dist 78.296				
Point 208	N	13,764,130.972 E	2,292,075.441 Sta	10+78.30
Course from 208 to 209 S 76° 32′ 17.91" E Dist 172.647				
Point 209	N	13,764,090.781 E	2,292,243.344 Sta	12+50.94
Course from 209 to 210 S 79° 30′ 13.33" E Dist 54.698				
Point 210	N	13,764,080.816 E	2,292,297.127 Sta	13+05.64

Ending chain S_1 description



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SUITE 200
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TEL (210) 798-1895 FIRM #F-312

FM 78:0025-10-097:SFT

DITCH
HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		73
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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TXDOT*MON*PENTABLE.tbl
DATE:1/25/2023 TIME:8:34:55 AM OFFICE:SAN dh3070

DITCH-S-1																			
FM 725 STATION	OFFSET	FLOWLINE ELEVATION	TOP OF DITCH	SLOPE	BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE	DEPTH	MANNING'S	DITCH MATERIAL	AREA	P	R	DESIGN Q	V	$SHEAR_{AVG}$	WSEL	FREEBOARD	REMARKS
			(ft)	(%)	(ft)	(x:1)	(x:1)	(ft)	"n"		(sf)	(ft)	(ft)	(cfs)	(ft/sec)	(lb/sf)	(ft)	(ft)	
65+50	50.22	537.89	540.40	0.58%	0.00	10.0	9.2	2.51	0.035	GRASS	60.48	48.45	1.25	3.99	1.37	0.10	538.44	1.96	
66+00	54.73	537.60	538.15	0.58%	0.00	5.5	56.3	0.55	0.035	GRASS	9.34	34.02	0.27	3.99	1.02	0.06	537.96	0.19	
67+00	46.62	537.81	538.17	0.21%	0.00	4.9	683.0	0.36	0.035	GRASS	44.33	246.99	0.18	3.99	0.38	0.01	537.98	0.18	
68+00	40.47	538.32	538.45	0.51%	0.00	8.6	643.0	0.13	0.035	GRASS	5.51	84.72	0.06	1.01	0.38	0.01	538.41	0.04	
69+00	37.28	538.88	539.01	0.56%	0.00	9.7	274.0	0.13	0.035	GRASS	2.40	36.89	0.06	1.01	0.49	0.02	539.00	0.01	
70+00	27.70	539.16	540.02	0.28%	0.00	3.0	3.0	0.86	0.035	GRASS	2.22	5.44	0.41	1.01	0.96	0.05	539.75	0.27	
71+00	27.74	539.25	540.31	0.09%	0.00	3.0	3.0	1.06	0.035	GRASS	3.37	6.70	0.50	1.01	0.63	0.02	539.98	0.33	
72+00	27.69	539.49	540.53	0.24%	0.00	3.0	3.0	1.04	0.035	GRASS	3.24	6.58	0.49	1.01	0.91	0.04	540.10	0.43	
73+00	27.34	539.67	540.65	0.18%	0.00	3.5	3.5	0.98	0.035	GRASS	3.36	7.13	0.47	1.01	0.79	0.03	540.27	0.38	
74+00	24.62	539.80	540.72	0.13%	0.00	4.0	8.0	0.92	0.035	GRASS	5.08	11.21	0.45	1.01	0.62	0.02	540.32	0.40	
75+00	22.34	539.93	540.48	0.13%	0.00	4.0	28.0	0.55	0.035	GRASS	4.84	17.68	0.27	1.01	0.49	0.01	540.29	0.19	

NOTES:

1. HYDROLOGY DETERMINED USING RATIONAL METHOD.
2. DITCH HYDRAULICS CALCULATED IN 100 FT INTERVALS.
3. SEE CROSS SECTION SHEETS FOR ADDITIONAL INFORMATION.
4. DITCHES DESIGN TO CONTAIN Q5.
5. UTILIZING NATIVE GRASS MIXTURE (RETARDANT CLASS B) THAT CAN TOLERATE SHEAR STRESS UP TO 2.10 LB/SQFT.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

THE SEAL ORIGINALLY APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOHNNY L. CLAYTON, P.E. #107215 ON 1/25/2023 . ALTERATION OF A PREVIOUSLY SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 100 NE INTERSTATE 410 LOOP, SUITE 200, SAN ANTONIO, TEXAS 78216, TBPE FIRM #F-312

NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

FM 78:0025-10-097:SFT

DITCH HYDRAULIC CALCULATIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		74
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

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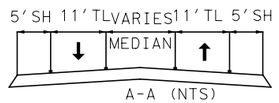
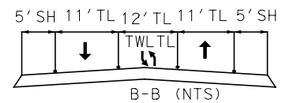
pw:\\halff-pw.bentley.com:halff-pw-01\Documents\34832.000 FM*78\500 CADD\Sheets\Plans\34832G-DITCH-CALCS-01.dgn
DATE:1/25/2023 TIME:8:34:59 AM OFFICE:SAN
TXDOT*MON*PENTABLE.tbl
dh3070

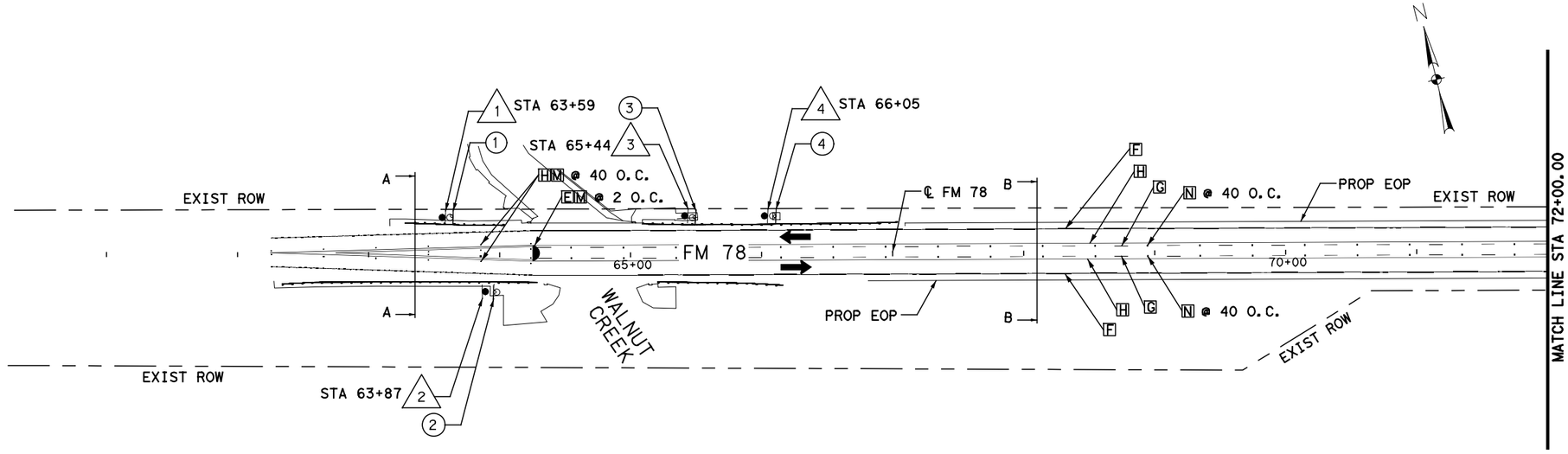
	ESTIMATED QUANTITIES SPM 1			
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4
	0644 6076	REMOVE SM RD SN SUP&AM	EA	4
E	0666 6156	REFL PAV MRK TY I(Y)(MED NOSE)	EA	1
	0666 6224	PAVEMENT SEALER 4"	LF	2632
	0666 6225	PAVEMENT SEALER 6"	LF	1951
	0666 6233	PAVEMENT SEALER (MED NOSE)	EA	1
F	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)	LF	1951
G	0666 6312	RE PM W/RET REQ TY I (Y)4"(BRK)	LF	380
H	0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)	LF	2252
M	0672 6007	REFL PAV MRKR TY I-C	EA	32
N	0672 6009	REFL PAV MRKR TY II-A-A	EA	38

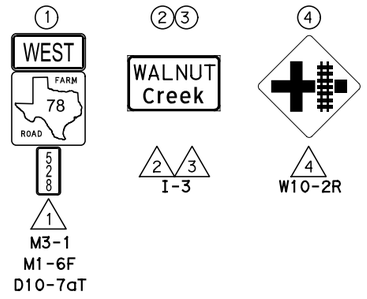


A-A (NTS)



B-B (NTS)





SIGNING LEGEND:

- (#) EXISTING SIGNS TO BE REMOVED
- (#) PROPOSED SIGNS
- DIRECTION OF TRAFFIC FLOW
- OBJECT MARKER (OM-2Z)

0 25 50 75 100 150

SCALE IN FEET
SCALE: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

NAME 1/18/2023 DATE

NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

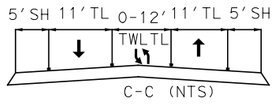
TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
TEDSI
TBPE F-1640
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898

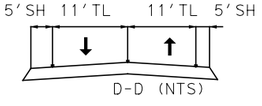
FM 78: 0025-10-097: SFT

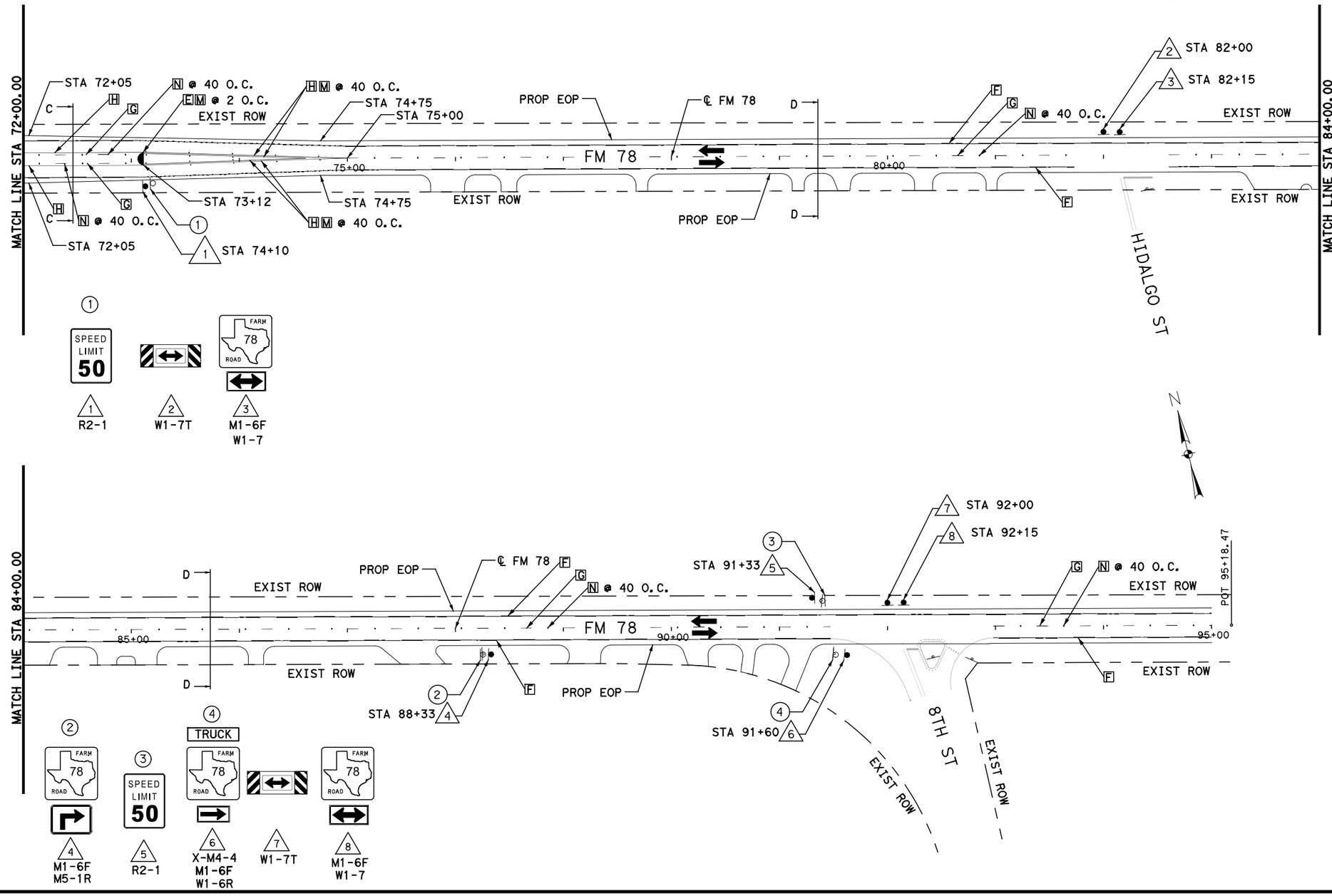
SIGNING & PAVEMENT MARKINGS LAYOUT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	See Title Sheet		75
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

	ESTIMATED QUANTITIES SPM 2			
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
	0644 6044	IN SM RD SN SUP&AM TYS80(1) SB(U)	EA	2
	0644 6076	REMOVE SM RD SN SUP&AM	EA	4
E	0666 6156	REFL PAV MRK TY I(Y)(MED NOSE)	EA	1
	0666 6224	PAVEMENT SEALER 4"	LF	2931
	0666 6225	PAVEMENT SEALER 6"	LF	4362
	0666 6233	PAVEMENT SEALER (MED NOSE)	EA	1
F	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)	LF	4362
G	0666 6312	RE PM W/RET REQ TY I (Y)4"(BRK)	LF	480
H	0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)	LF	2451
M	0672 6007	REFL PAV MRKR TY I-C	EA	14
N	0672 6009	REFL PAV MRKR TY II-A-A	EA	49







SIGNING LEGEND:

- (#) EXISTING SIGNS TO BE REMOVED
- △ # PROPOSED SIGNS
- DIRECTION OF TRAFFIC FLOW
- OBJECT MARKER (OM-2Z)

0 25 50 75 100 150

SCALE IN FEET
SCALE: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED
PROFESSIONAL ENGINEER

NAME 1/18/2023 DATE

NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TEDSI TBPE F-1640

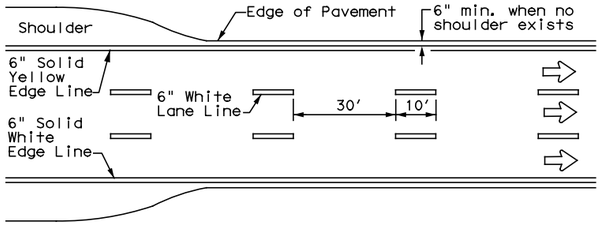
FM 78: 0025-10-097: SFT

SIGNING & PAVEMENT MARKINGS LAYOUT

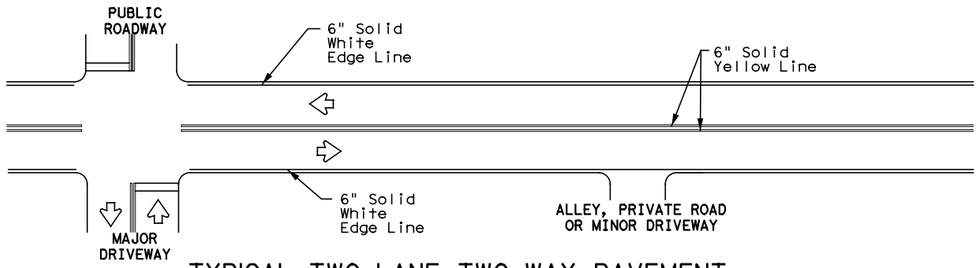
SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	See Title Sheet		76
STATE	DISTRICT	COUNTY	
TEXAS	SAT	GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	10	097	FM 78

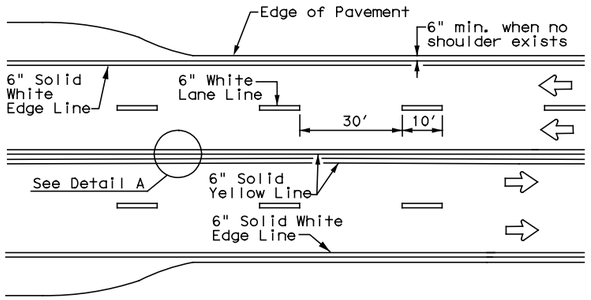
DATE:
FILE:

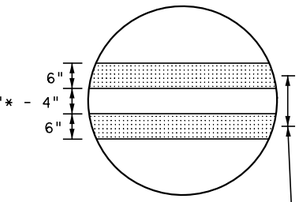


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

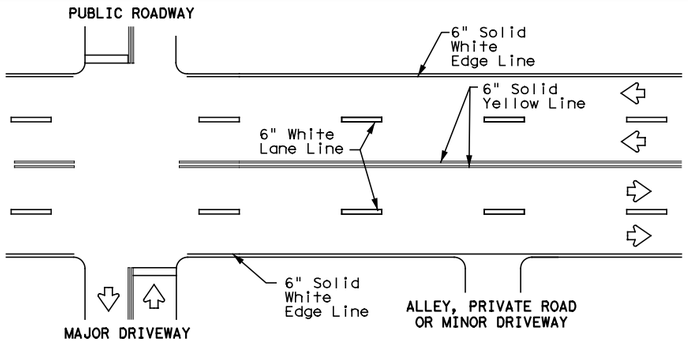




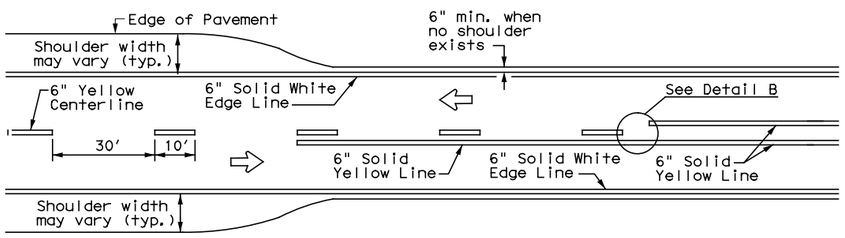
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

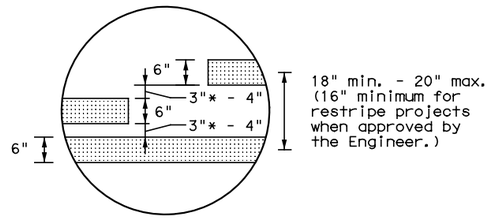
** 8" minimum for restripe projects when approved by the Engineer.



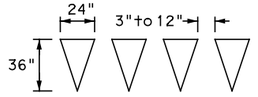
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

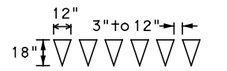


* 2" minimum for restripe projects when approved by the Engineer.

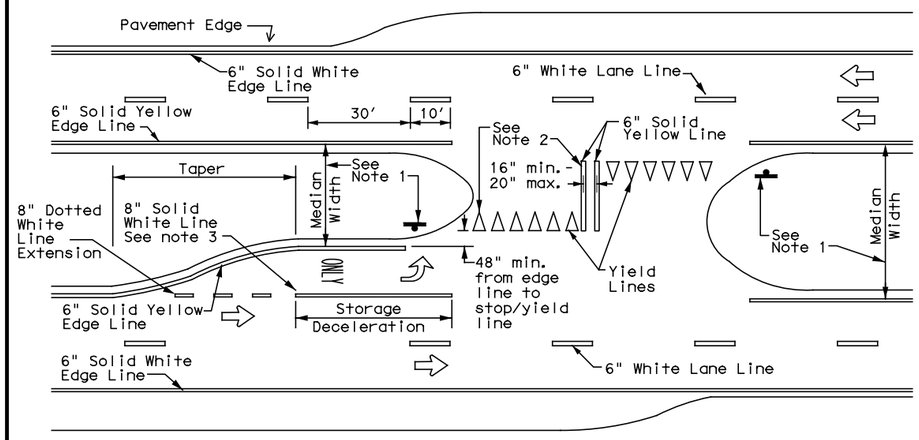


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

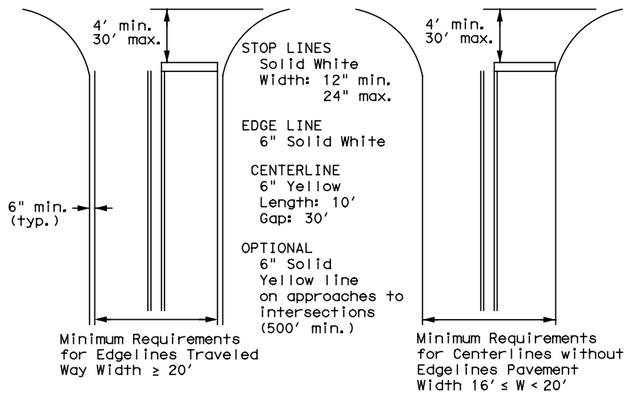
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

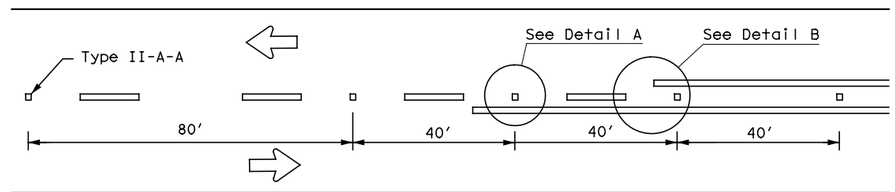
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

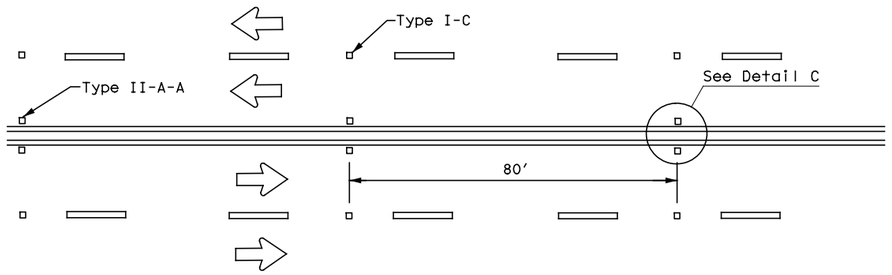
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	DIST	COUNTY		SHEET NO. 77

22A

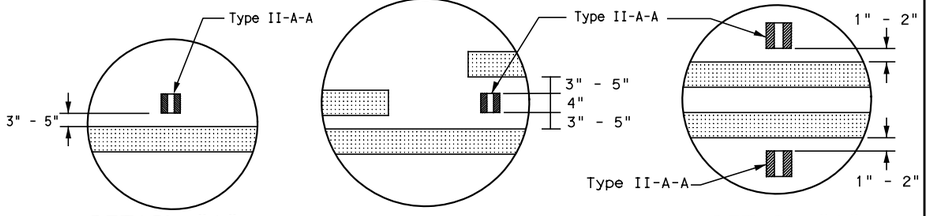
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

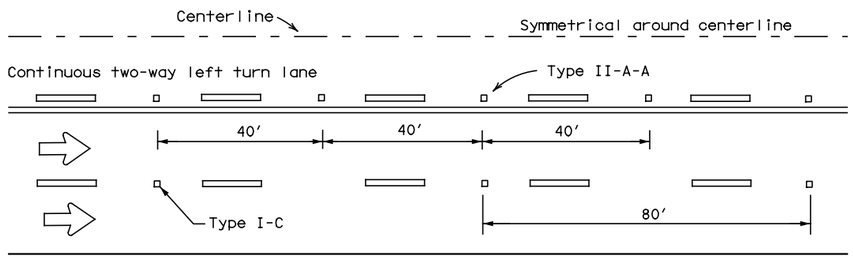


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

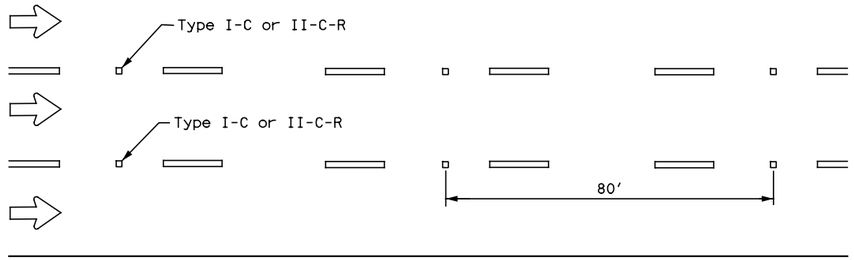


CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



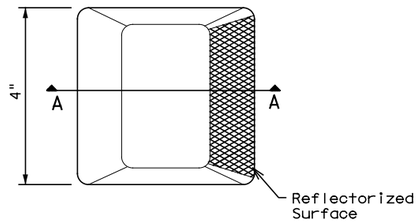
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

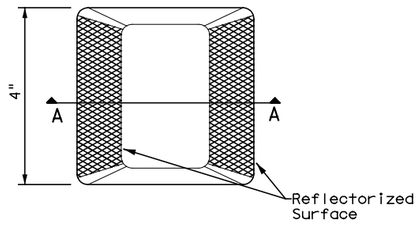
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

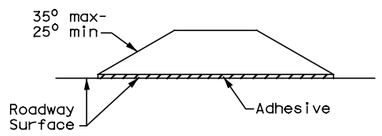
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

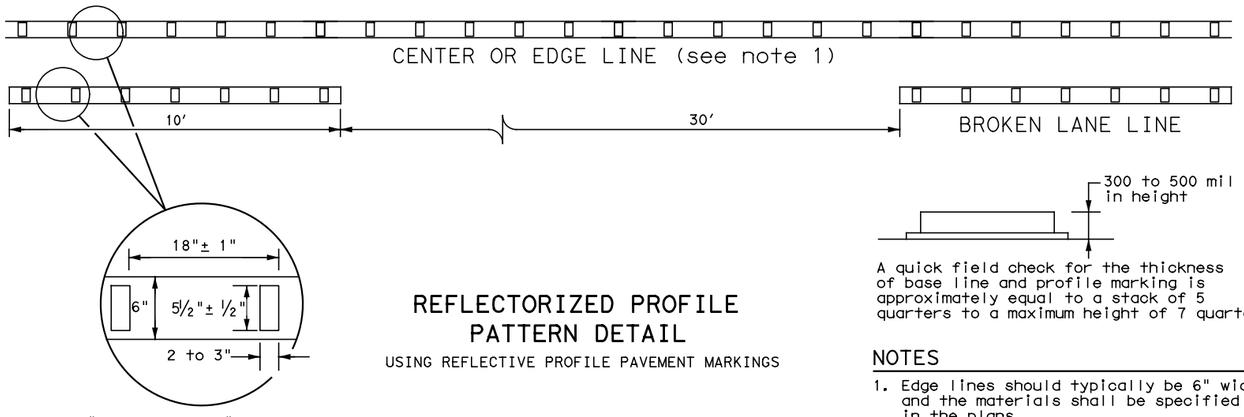


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE
OR 6" LANE LINE

REFLECTORIZED PROFILE
PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	DIST	COUNTY		SHEET NO. 78

22B

DATE:
FILE:

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

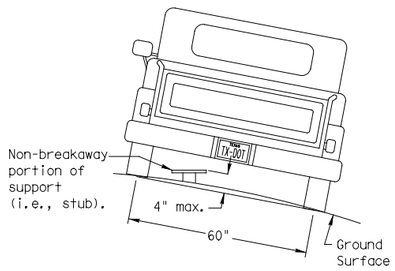
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

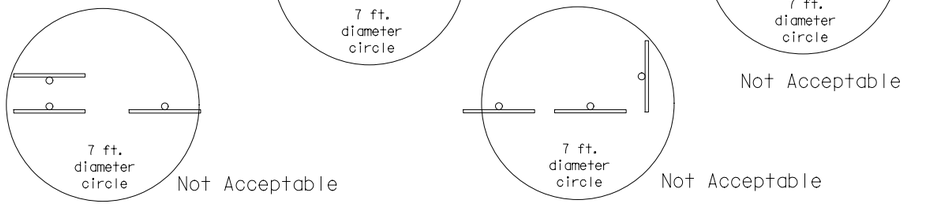
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



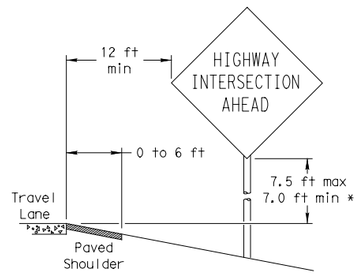
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



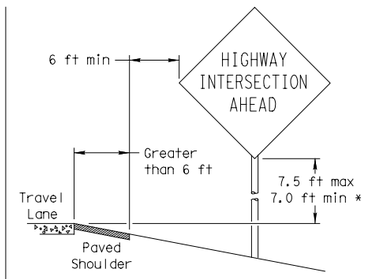
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

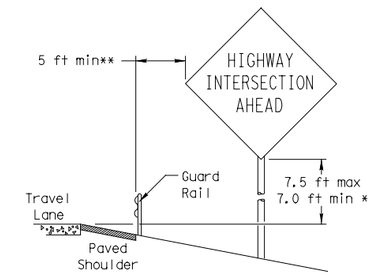
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



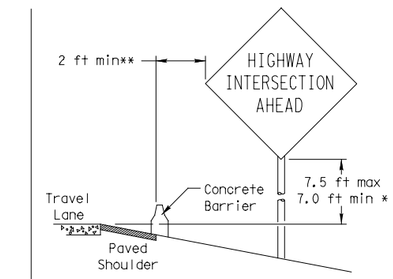
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



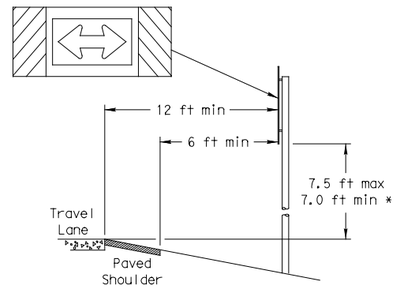
BEHIND GUARDRAIL



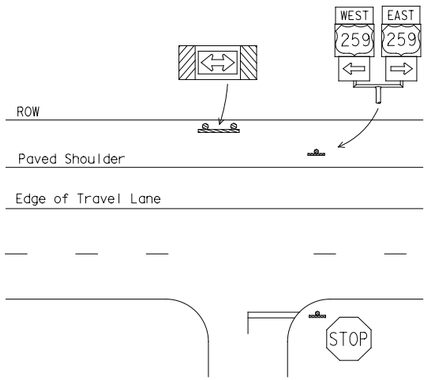
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

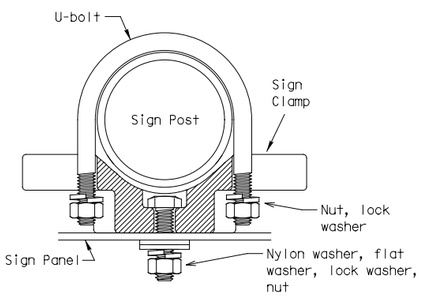
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

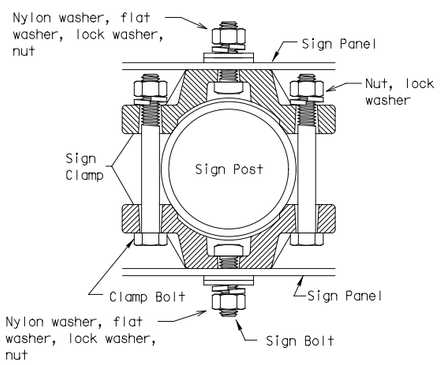


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

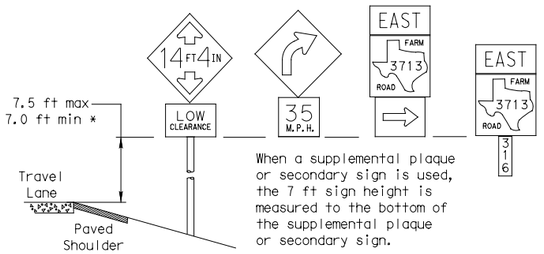
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



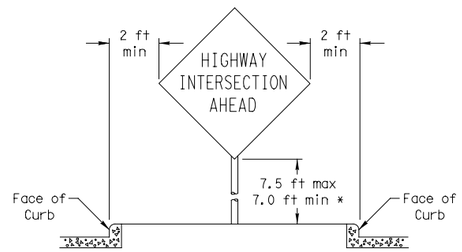
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



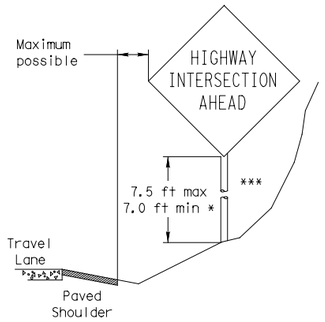
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

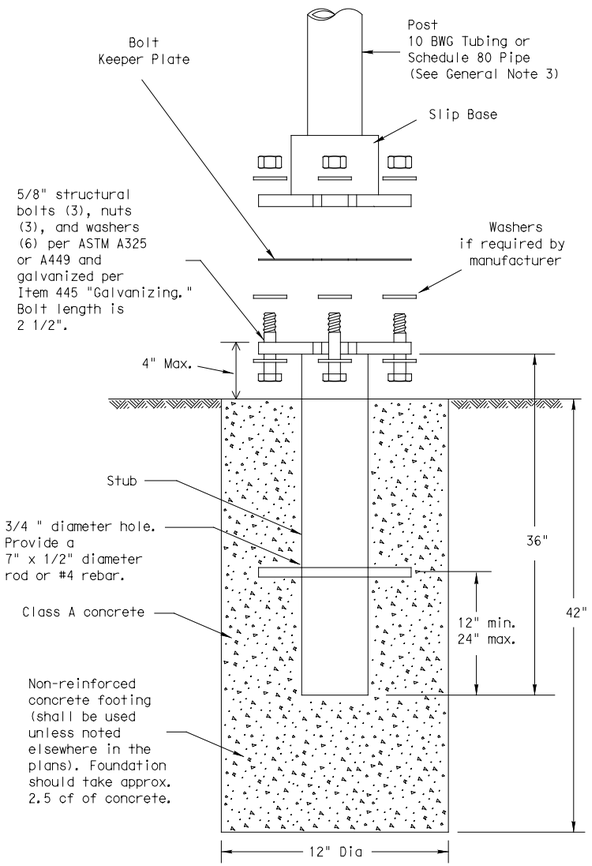
REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0025	10	097	FM 78
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		79

26A

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

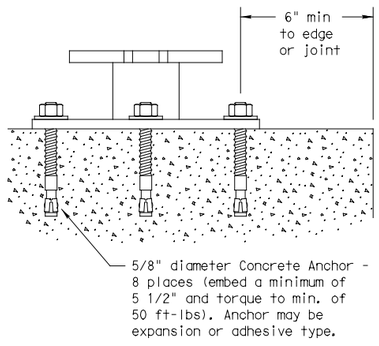
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   21% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0025	10	097	FM 78
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		80

REVISIONS
9-08

DATE:
FILE:

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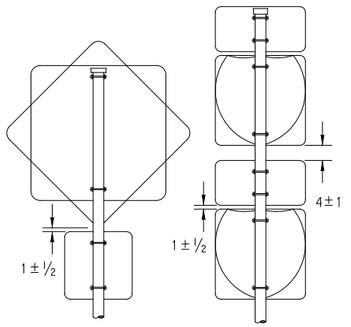
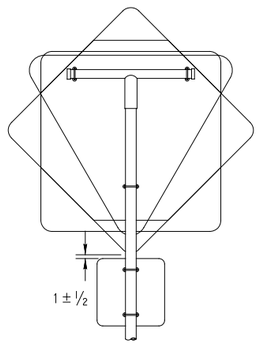
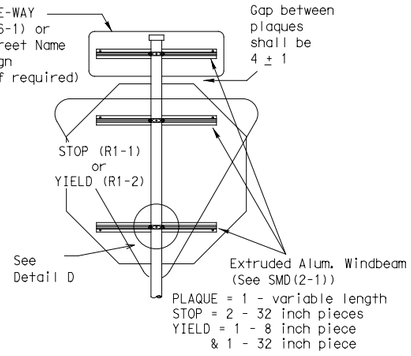


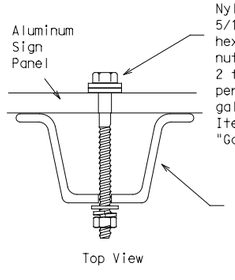
SM RD SGN ASSM TY XXXXX(1)XX(P)



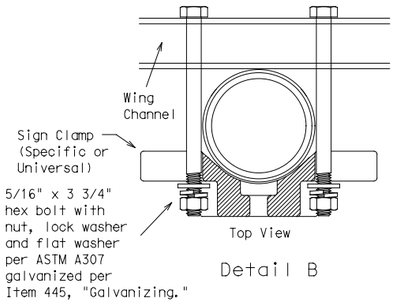
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



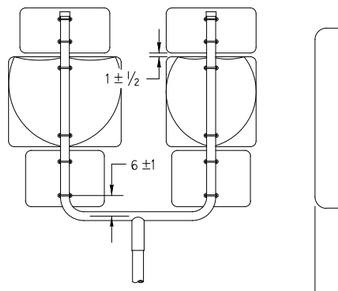
Detail B

GENERAL NOTES:

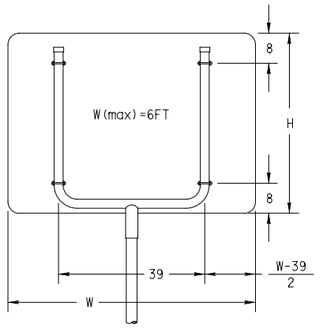
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

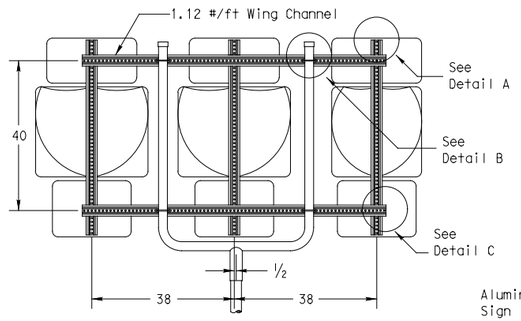
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



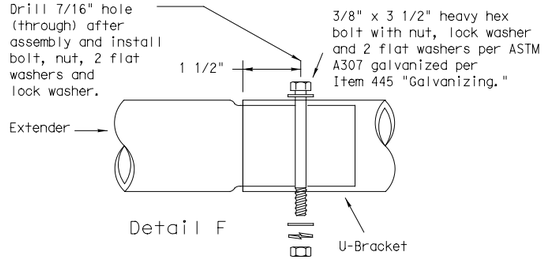
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

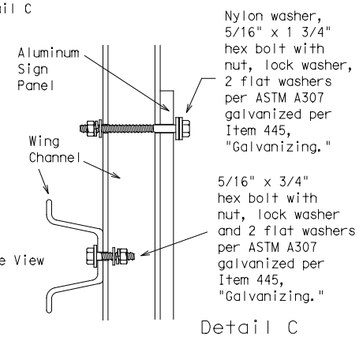


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

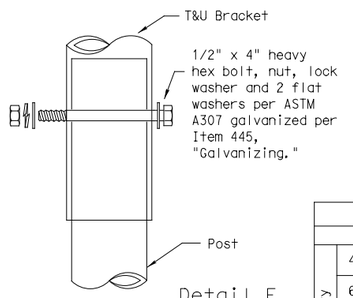


Detail F

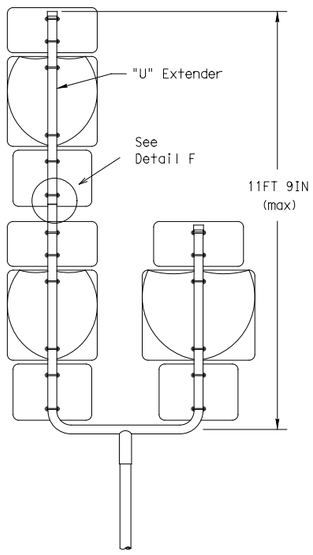
Splices shall only be allowed behind the sign substrate.



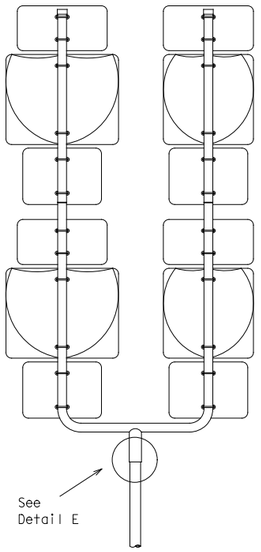
Detail C



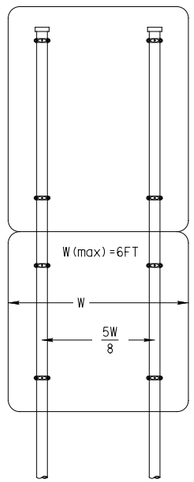
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

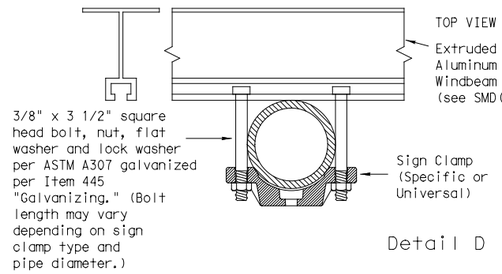


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

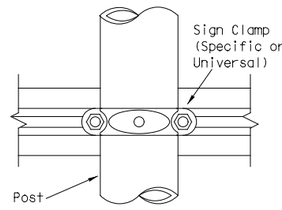


SM RD SGN ASSYM TY XXXXX(2)XX(P)

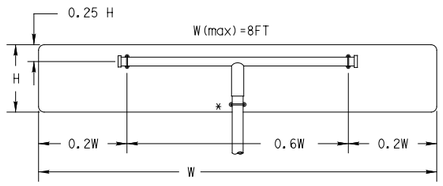
SIDE VIEW



Detail D



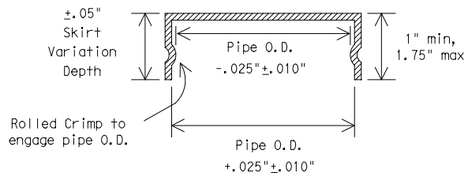
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

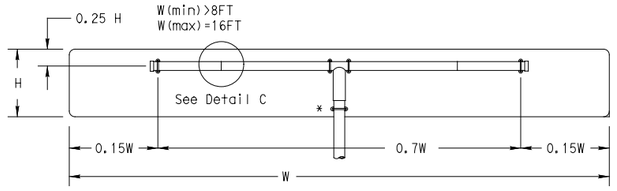
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0025	10	097	FM 78
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		81

9-08 REVISIONS

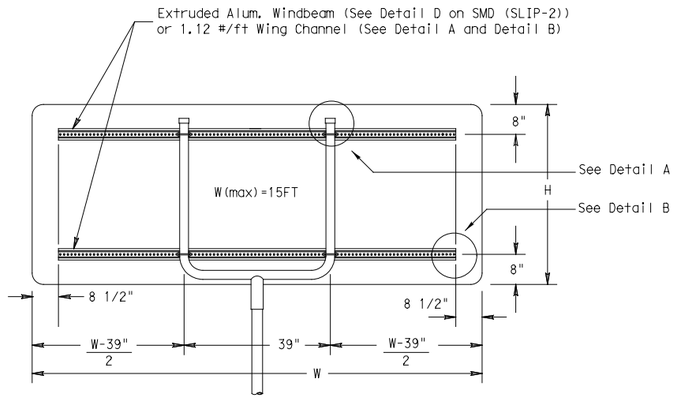
26C

DATE:
FILE:

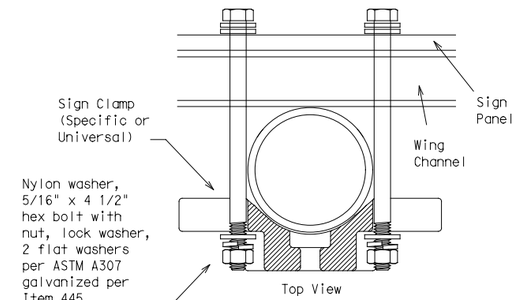
DATE:
FILE:



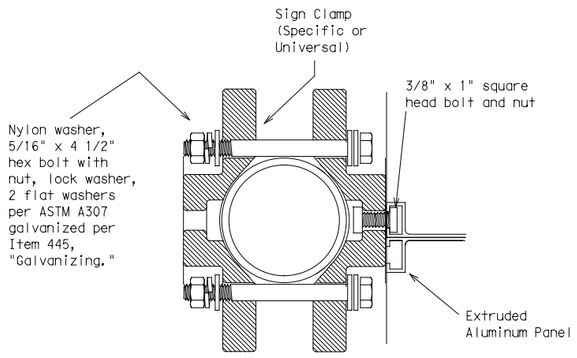
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



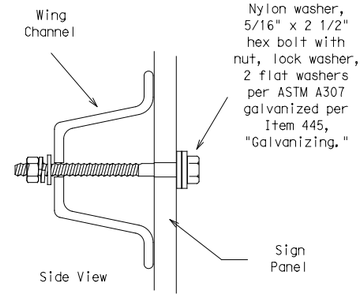
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



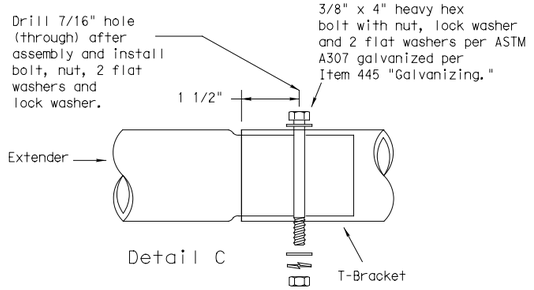
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

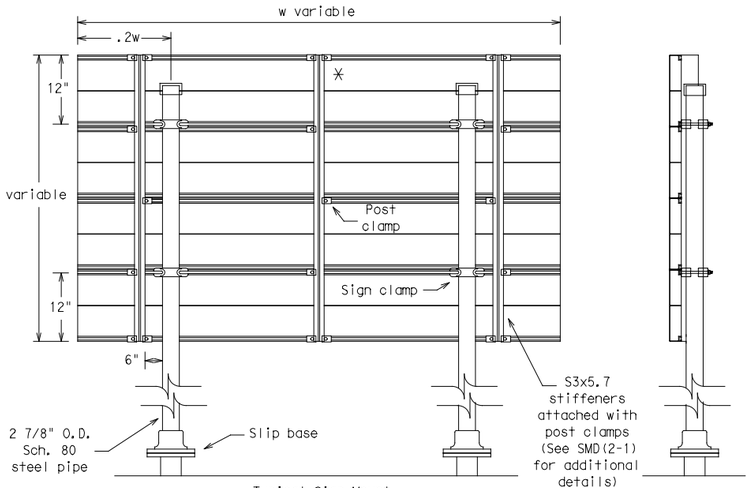


Detail B



Detail C

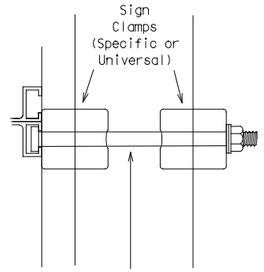
Splices shall only be allowed behind the sign substrate.



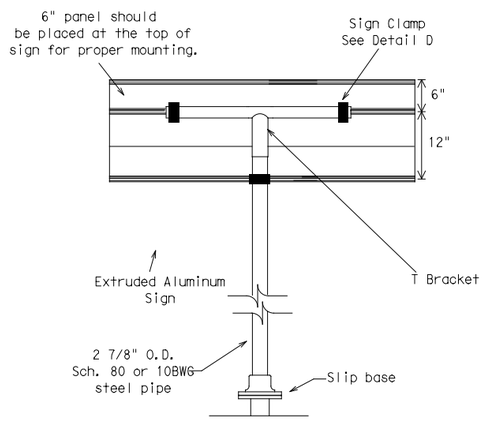
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

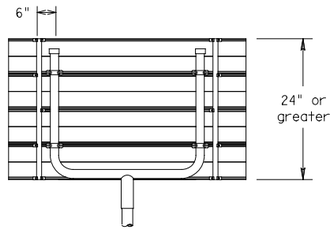
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

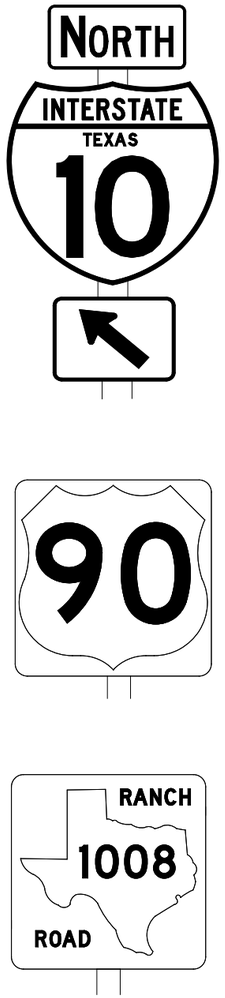
CONT	SECT	JOB	HIGHWAY
0025	10	097	FM 78
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		82

26D

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

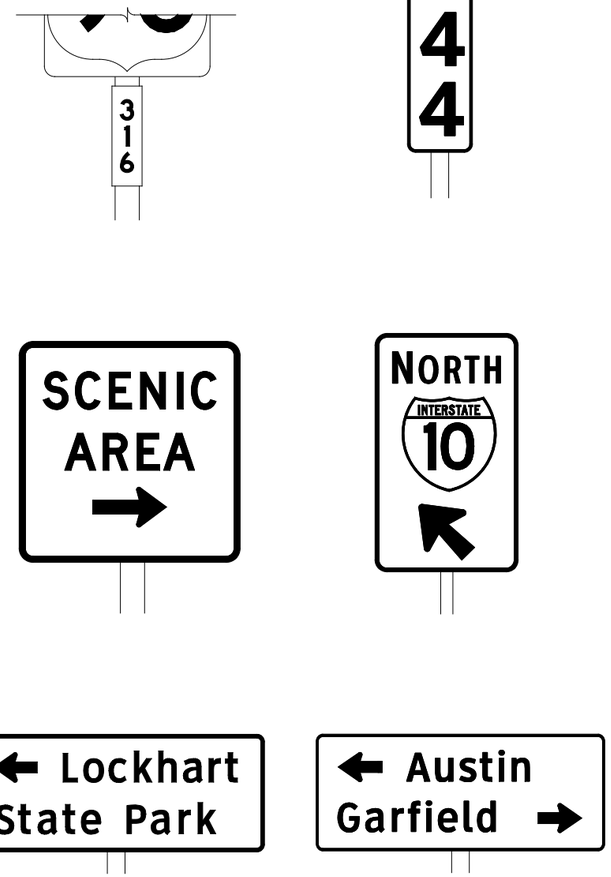
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

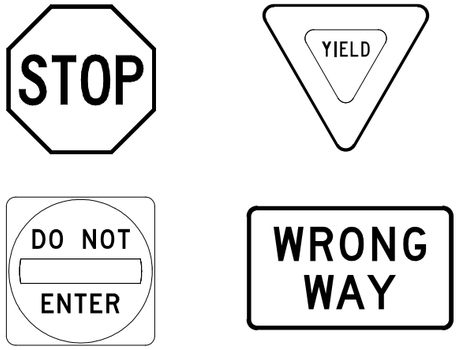
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	GUADALUPE		83

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

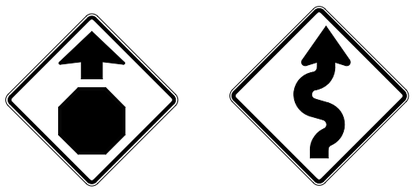
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	GUADALUPE		84

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ 0025-10-097

1.2 PROJECT LIMITS:
From: FLEMING ST.

To: 200' EAST OF 8TH ST.

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29°35'10.40" ,(Long) 97°59'05.36"

END: (Lat) 29°35'3.23" ,(Long) 97°58'31.76"

1.4 TOTAL PROJECT AREA (Acres): 4.90

1.5 TOTAL AREA TO BE DISTURBED (Acres): 3.65

1.6 NATURE OF CONSTRUCTION ACTIVITY:
WIDENING TO INSTALL CONTINUOS TURN LANE, CONSTRUCT PAVED SHOULDERS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CLAY, SAND, AND GRAVEL	CH, CL, GC, AND SC

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
WALNUT BRANCH CREEK	CREEK

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☐ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
☐ Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		85
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	10	097	FM 78

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		86
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	10	097	FM 78

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

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

☒ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☒ No Action Required ☐ Required Action

Action No.

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

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

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

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

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

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

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

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

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	10	097	FM 78
	DIST	COUNTY		SHEET NO.
	SAN	GUADALUPE		87

DATE:2022
FILE:ec116.dgn
DW:TxDOT
CK:KM
DW:VP
CK:LS
©TxDOT:JULY 2016
DIST:SAT
COUNTY:GUADALUPE
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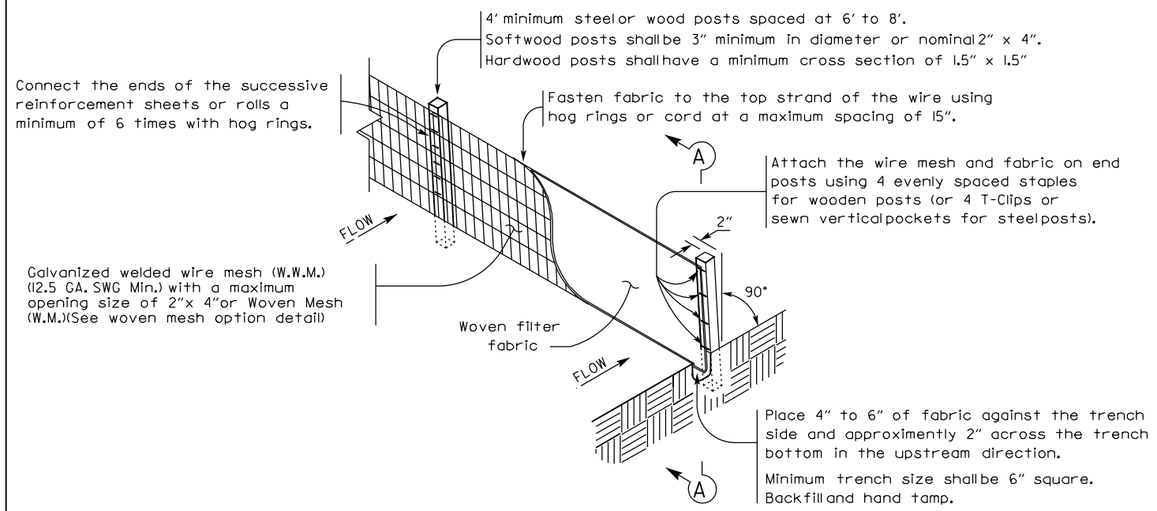
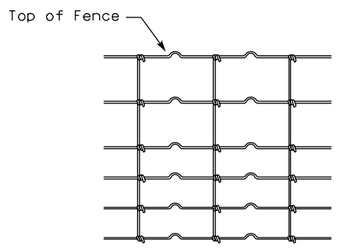
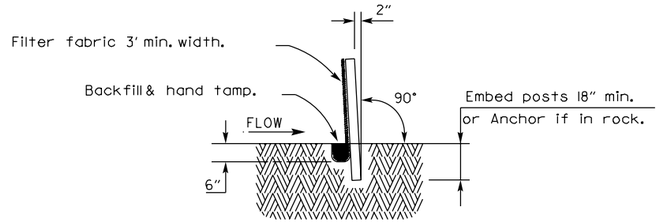
JOB:097
HIGHWAY:FM 78
SHEET NO.:88



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

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/FT ? Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

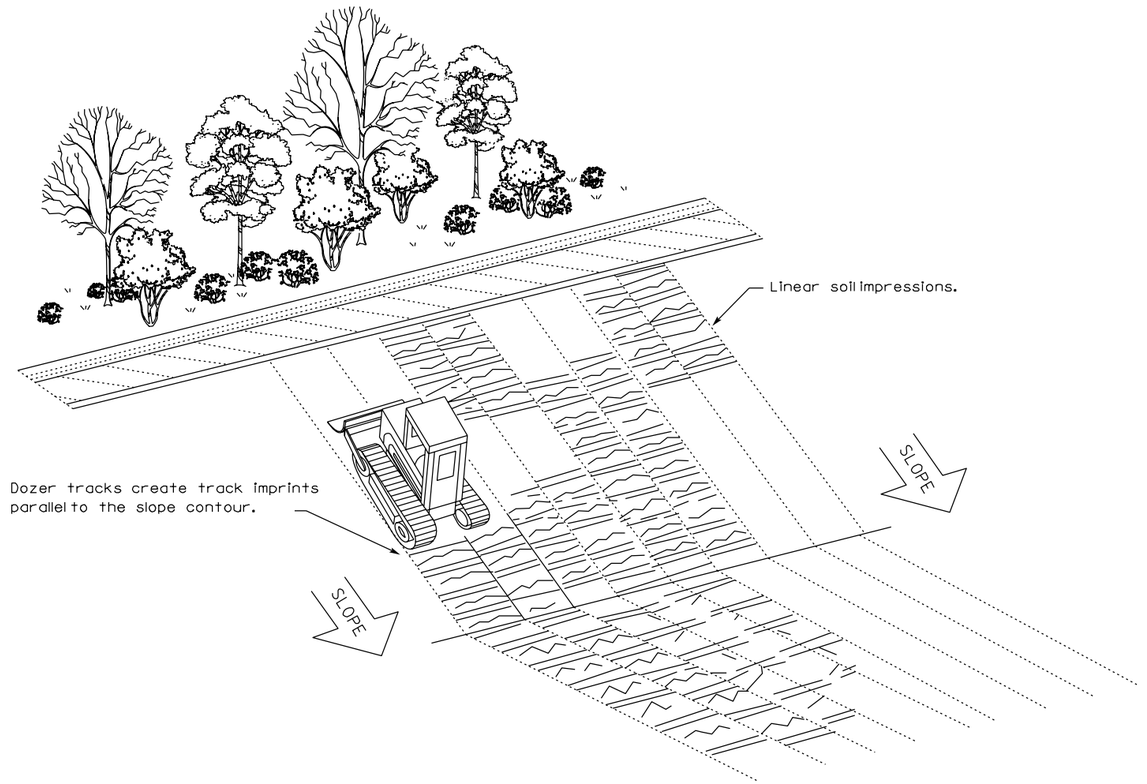
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

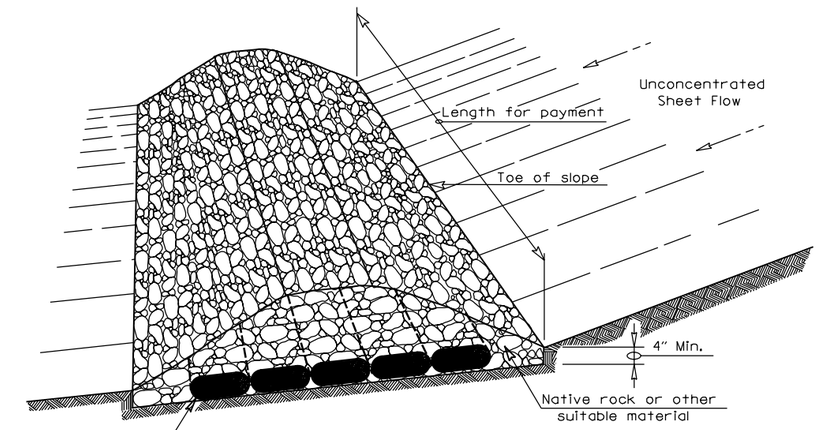
Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

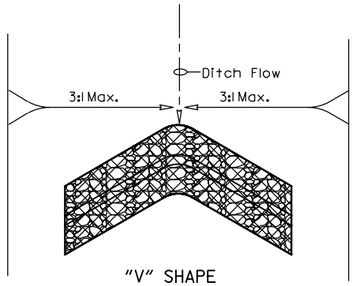
FENCE & VERTICAL TRACKING

EC(1)-16

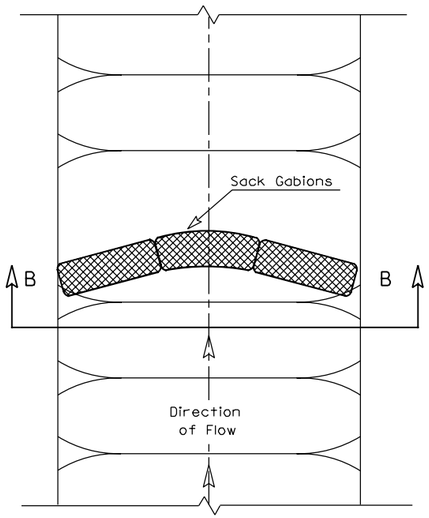


FILTER DAM AT TOE OF SLOPE

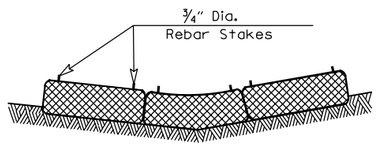
RFD1



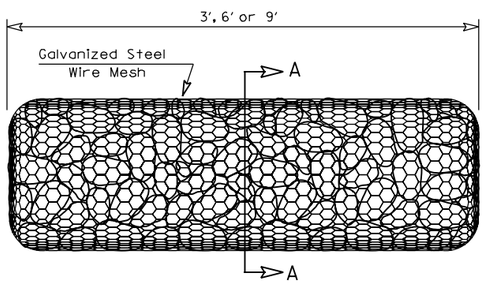
"V" SHAPE
PLAN VIEW



PLAN VIEW

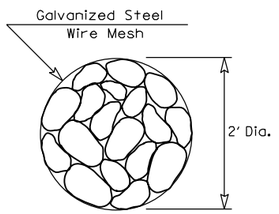


SECTION B-B

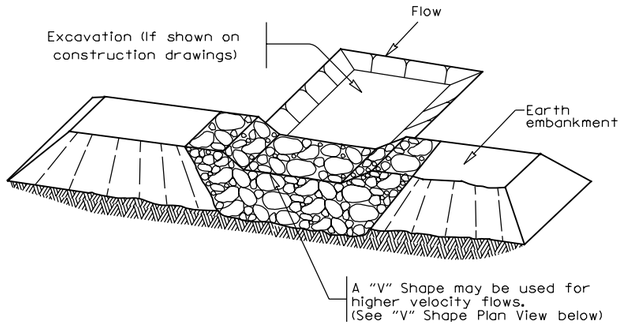


TYPE 4 (SACK GABIONS)

RFD4

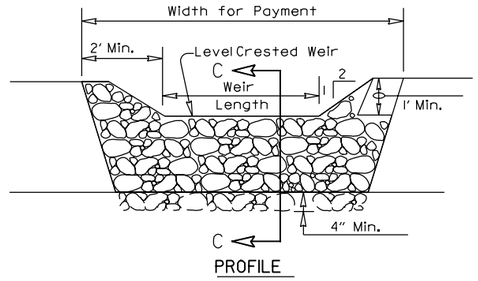


SECTION A-A

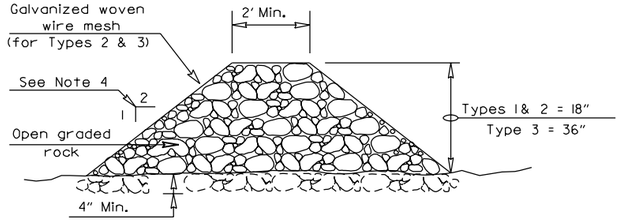


FILTER DAM AT SEDIMENT TRAP

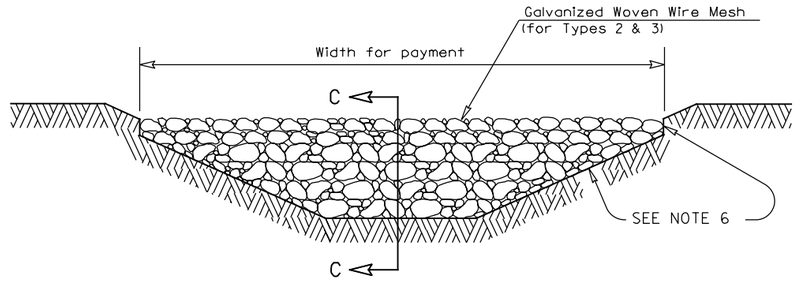
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT		CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0025	10	097		FM 78
	DIST	COUNTY			SHEET NO.
	SAT	GUADALUPE			89

DATE: 12/1/2022
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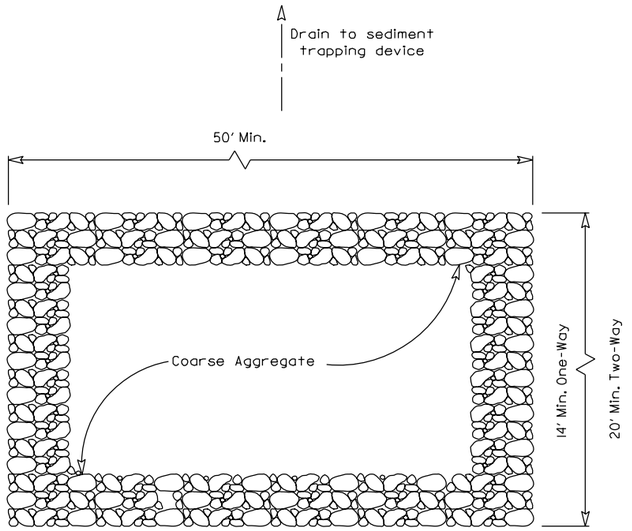
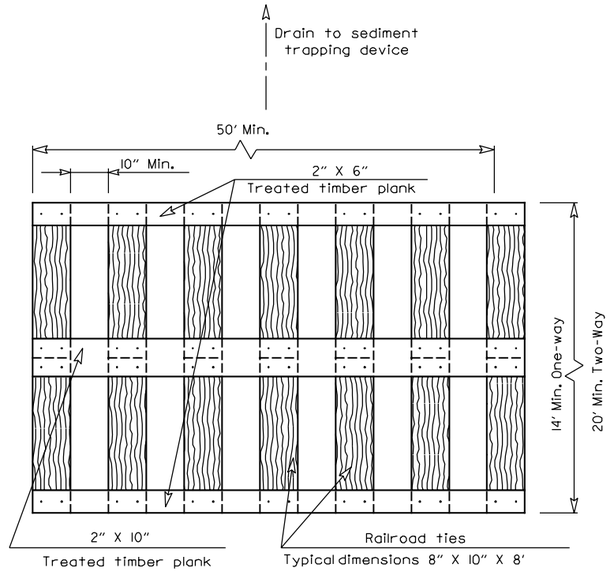
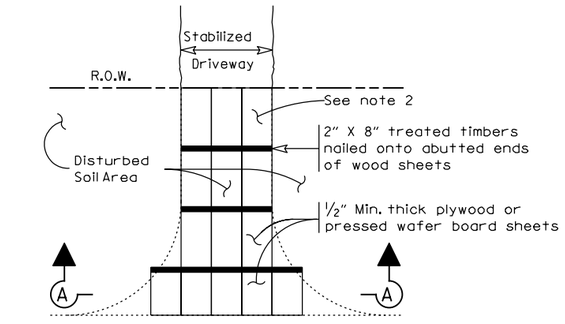


PLAN VIEW



PLAN VIEW



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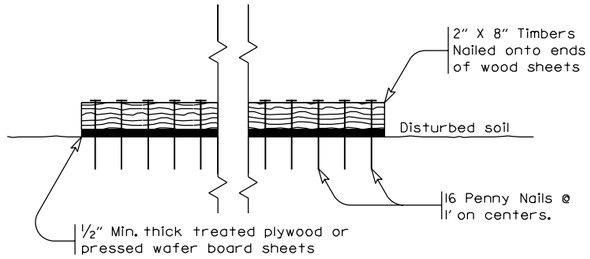
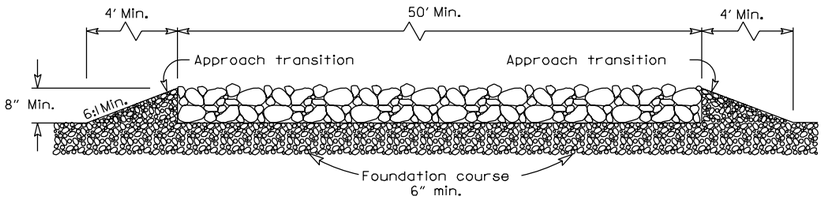


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



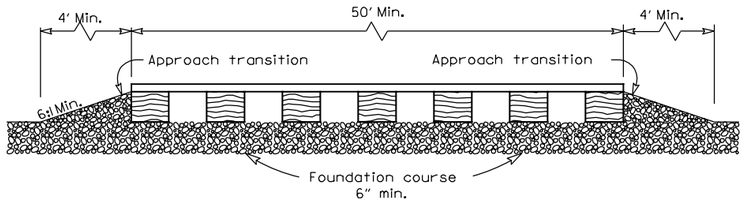
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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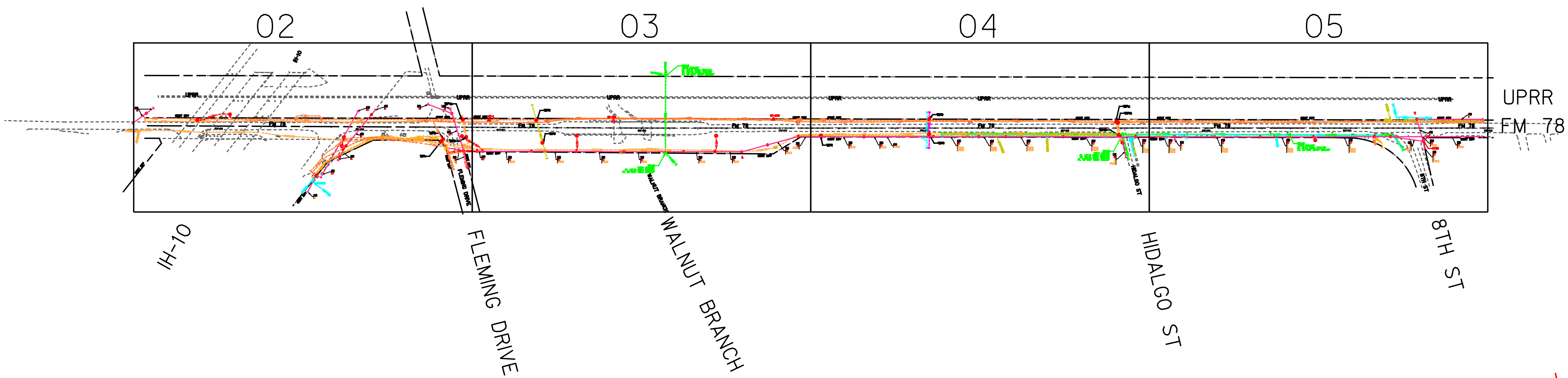
	SAT	GUADALUPE		90



QUANTITIES:
LEVEL "B" = 23,319'
LEVEL "C/D" = 10,896'
TOTAL = 34,215'

0 100 200 300 400
SCALE: 1"=400'

SURVEY CONTROL					
C.P. No.	NORTHING	EASTING	ELEVATION	DESC.	SHT No.
1	13764436.35	2291021.72	539.75'	1/2"IB	03
200	13764208.56	2292003.20	538.72'	1/2"IB	03
201	13764331.80	2291449.42	541.63'	1/2"IB	03

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
(test hole symbol)			TEST HOLE
	—T(B)—	—T(D)—	TELEPHONE LINE
	—FOC(B)—	—FOC(D)—	FIBER OPTIC LINE
	—C(B)—	—C(D)—	CABLE TV LINE
	—W(B)—	—W(D)—	WATER LINE
	—RW(B)—	—RW(D)—	RECLAIMED WATER LINE
	—WW(B)—	—WW(C)—	WASTEWATER LINE
	—G(B)—	—G(D)—	GAS LINE
	—E(B)—	—E(D)—	ELECTRIC LINE
			OVERHEAD UTILITY LINE

- TELEPHONE PEDESTAL
- TELEPHONE MANHOLE
- TELEPHONE CABINET
- UNDERGROUND TELEPHONE SPLICE
- FIBER OPTIC PEDESTAL
- FIBER OPTIC HAND HOLE
- FIBER OPTIC CABINET
- CABLE TV PEDESTAL
- CABLE TV CABINET
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- WATER MANHOLE
- WATER TEST STATION
- WASTEWATER MANHOLE
- WASTEWATER CLEAN OUT
- GAS VALVE
- GAS TEST STATION
- GAS VENT PIPE
- POWER POLE
- POWER POLE W/RISER
- ELECTRIC BOX
- LIGHT POLE
- GUY WIRE
- UTILITY CONTINUATION/ QUALITY LEVEL CHANGE
- UTILITY END POINT
- OH SVC — OVERHEAD UTILITIES SERVICE
- CP — CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	PARISH AUSTIN	210-213-1893
FIBER OPTIC CABLE(FOC)	= AT&T	PARISH AUSTIN	210-213-1893
FIBER OPTIC CABLE(FOC1)	= LUMEN (CENTURYLINK)	MARSHALL HOLLINGSWORTH	210-907-7266
FIBER OPTIC CABLE(FOC2)	= SPECTRUM	JOEL GONZALES	210-582-9357
FIBER OPTIC CABLE(FOC3)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
CABLE TV(C)	= SPECTRUM	JOEL GONZALES	210-582-9357
WATER(W)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
RECLAIMED WATER(RW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
WASTEWATER(WW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
GAS(G)	= CENTERPOINT ENERGY	CLIFF WHARTON	830-643-6927
GAS(G1)	= MARKWEST	DENNIS THEBEAU	303-531-9089
ELECTRIC(E)	= GUADALUPE VALLEY ELECTRIC CO-OP	TRAVIS ENGLER	830-386-4424
ELECTRIC(E1)	= CITY OF SEGUIN	CLARENCE SMITH	801-401-2405
ELECTRIC(E2)	= TXDOT	-----	-----

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STATE OF TEXAS
CHRISTOPHER M. VILLAR
117026
LICENSED PROFESSIONAL ENGINEER
11/30/2022

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100 NE Loop 410
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San Antonio, Texas 78216
Tel: (210) 798-1895
Fax: (210) 798-1896

Texas Department of Transportation

FM 78

EXISTING UTILITY LAYOUT

SCALE: 1"=400'   SHEET 01 OF 05

DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
JY	6	SEE TITLE SHEET		FM 78
GRAPHICS BC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MH	TEXAS	SAT	GUADALUPE	91
CHECK CV	CONTROL	SECTION	JOB	
	0025	10	097	

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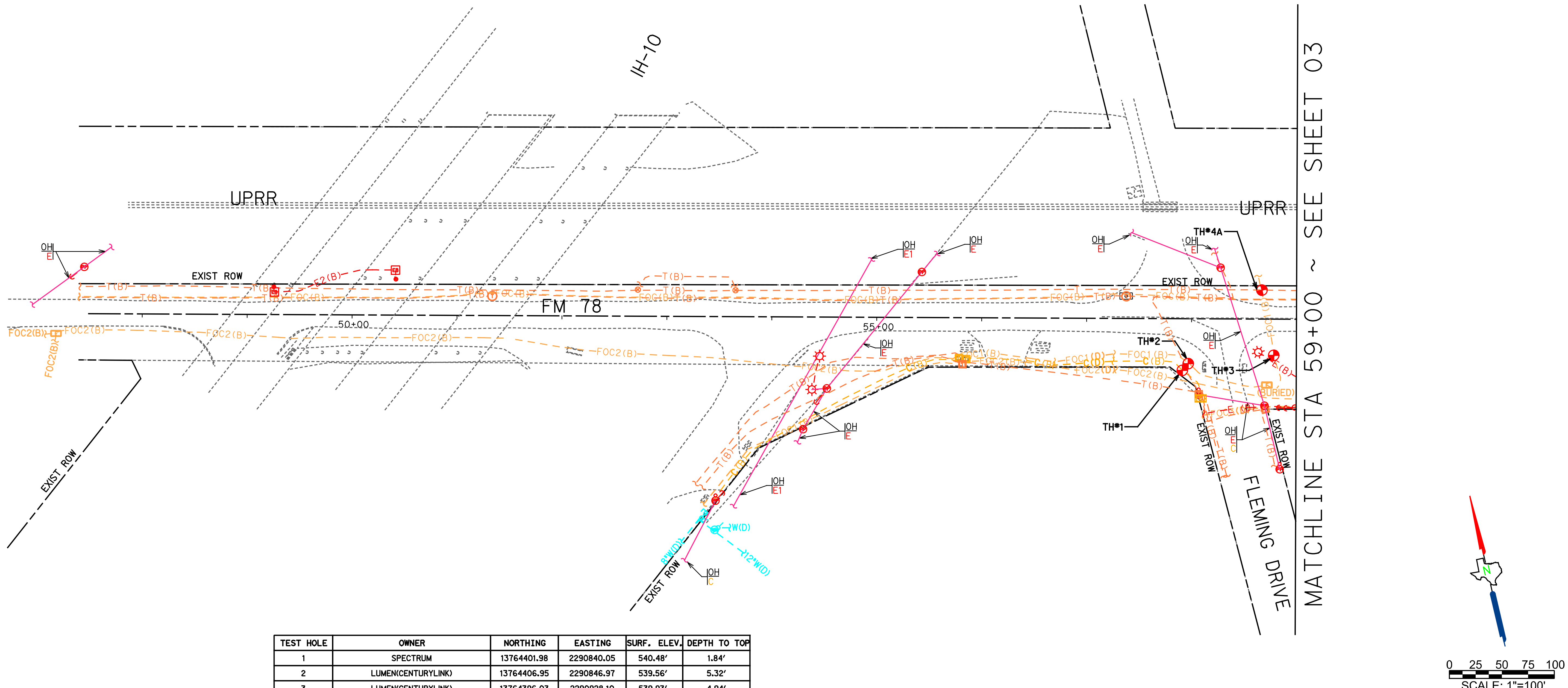

TEST HOLE	OWNER	NORTHING	EASTING	SURF. ELEV.	DEPTH TO TOP
1	SPECTRUM	13764401.98	2290840.05	540.48'	1.84'
2	LUMEN(CENTURYLINK)	13764406.95	2290846.97	539.56'	5.32'
3	LUMEN(CENTURYLINK)	13764396.03	2290928.10	539.93'	4.94'
4A	LUMEN(CENTURYLINK)	13764459.06	2290931.40	540.58'	6.13'*

*TH4A - DRY HOLE (ELECTRONIC DEPTH = 10.3')

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
	—T(B)—	—T(D)—	TELEPHONE LINE
	—FOC(B)—	—FOC(D)—	FIBER OPTIC LINE
	—C(B)—	—C(D)—	CABLE TV LINE
	—W(B)—	—W(D)—	WATER LINE
	—RW(B)—	—RW(D)—	RECLAIMED WATER LINE
	—WW(B)—	—WW(C)—	WASTEWATER LINE
	—G(B)—	—G(D)—	GAS LINE
	—E(B)—	—E(D)—	ELECTRIC LINE
			OVERHEAD UTILITY LINE

TELEPHONE PEDESTAL
TELEPHONE MANHOLE
TELEPHONE CABINET
UNDERGROUND TELEPHONE SPLICE
FIBER OPTIC PEDESTAL
FIBER OPTIC HAND HOLE
FIBER OPTIC CABINET
CABLE TV PEDESTAL
CABLE TV CABINET
FIRE HYDRANT
WATER VALVE
WATER METER
WATER MANHOLE
WATER TEST STATION
WASTEWATER MANHOLE
WASTEWATER CLEAN OUT
GAS VALVE
GAS TEST STATION
GAS VENT PIPE
POWER POLE
POWER POLE W/RISER
ELECTRIC BOX
LIGHT POLE
GUY WIRE
UTILITY CONTINUATION/ QUALITY LEVEL CHANGE
UTILITY END POINT
OH — OVERHEAD UTILITIES
SVC — SERVICE
CP — CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	PARISH AUSTIN	210-213-1893
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FIBER OPTIC CABLE(FOC3)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
CABLE TV(C)	= SPECTRUM	JOEL GONZALES	210-582-9357
WATER(W)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
RECLAIMED WATER(RW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
WASTEWATER(WW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
GAS(G)	= CENTERPOINT ENERGY	CLIFF WHARTON	830-643-6927
GAS(G1)	= MARKWEST	DENNIS THEBEAU	303-531-9089
ELECTRIC(E)	= GUADALUPE VALLEY ELECTRIC CO-OP	TRAVIS ENGLER	830-386-4424
ELECTRIC(E1)	= CITY OF SEGUIN	CLARENCE SMITH	801-401-2405
ELECTRIC(E2)	= TXDOT	-----	-----

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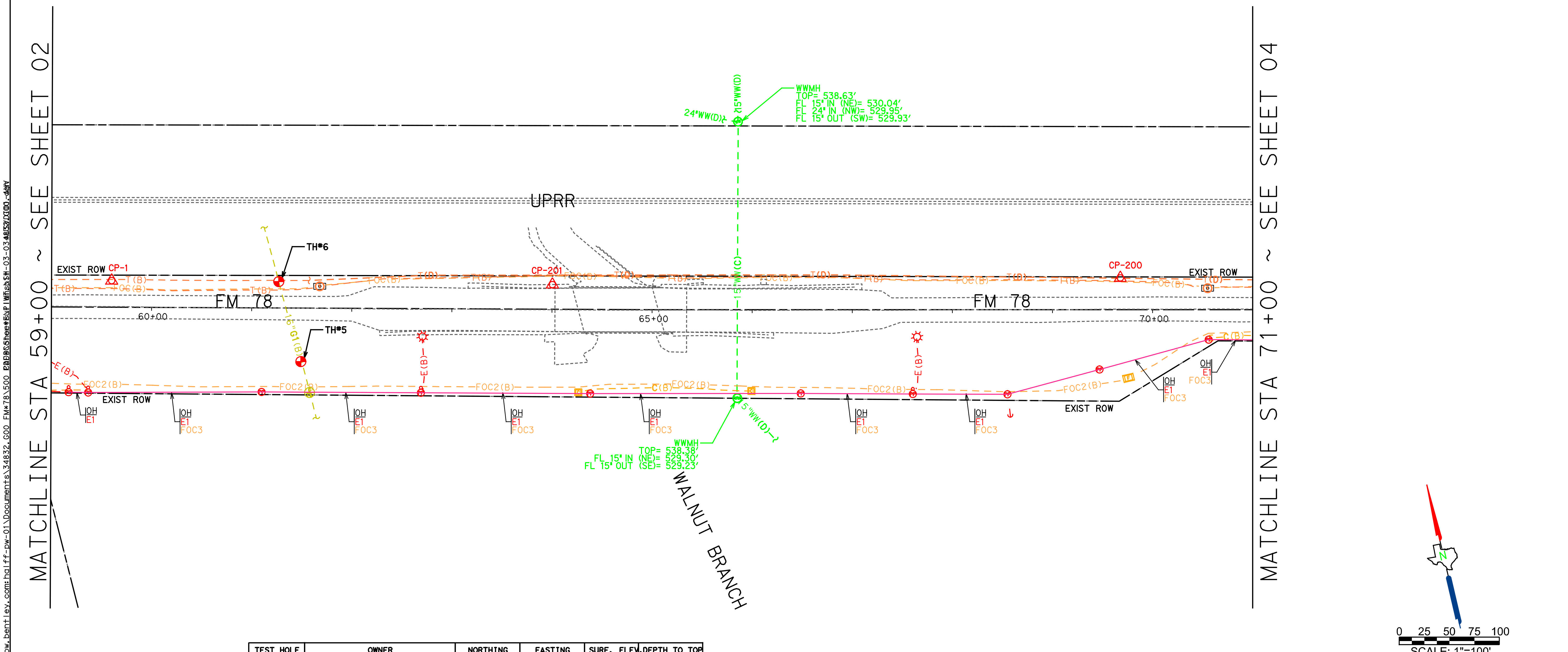
Texas Department of Transportation

FM 78

EXISTING UTILITY LAYOUT

SCALE: 1"=100' SHEET 02 OF 05

DESIGN JY	FED. RD. DIV. NO. 6	STATE PROJECT NO. SEE TITLE SHEET		HIGHWAY NO. FM 78
GRAPHICS BC	STATE TEXAS	DISTRICT SAT	COUNTY GUADALUPE	SHEET NO. 92
CHECK MH	CONTROL 0025	SECTION 10	JOB 097	
CHECK CV				



TEST HOLE	OWNER	NORTHING	EASTING	SURF. ELEV.	DEPTH TO TOP
5	MARKWEST	13764314.46	2291187.15	537.75'	8.62'
6	MARKWEST	13764397.22	2291184.01	540.00'	8.74'

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
(symbol)			TEST HOLE
	—T(B)—	—T(D)—	TELEPHONE LINE
	—FOC(B)—	—FOC(D)—	FIBER OPTIC LINE
	—C(B)—	—C(D)—	CABLE TV LINE
	—W(B)—	—W(D)—	WATER LINE
	—RW(B)—	—RW(D)—	RECLAIMED WATER LINE
	—WW(B)—	—WW(C)—	WASTEWATER LINE
	—G(B)—	—G(D)—	GAS LINE
	—E(B)—	—E(D)—	ELECTRIC LINE
			OVERHEAD UTILITY LINE

TELEPHONE PEDESTAL
TELEPHONE MANHOLE
TELEPHONE CABINET
UNDERGROUND TELEPHONE SPLICE
FIBER OPTIC PEDESTAL
FIBER OPTIC HAND HOLE
FIBER OPTIC CABINET
CABLE TV PEDESTAL
CABLE TV CABINET
FIRE HYDRANT
WATER VALVE
WATER METER
WATER MANHOLE
WATER TEST STATION
WASTEWATER MANHOLE
WASTEWATER CLEAN OUT
GAS VALVE
GAS TEST STATION
GAS VENT PIPE
POWER POLE
POWER POLE W/RISER
ELECTRIC BOX
LIGHT POLE
GUY WIRE
UTILITY CONTINUATION/ QUALITY LEVEL CHANGE
UTILITY END POINT
OH SVC OVERHEAD UTILITIES SERVICE
CP CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
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FIBER OPTIC CABLE(FOC2)	= SPECTRUM	JOEL GONZALES	210-582-9357
FIBER OPTIC CABLE(FOC3)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
CABLE TV(C)	= SPECTRUM	JOEL GONZALES	210-582-9357
WATER(W)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
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WASTEWATER(WW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
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Texas Department of Transportation

FM 78

EXISTING UTILITY LAYOUT

SCALE: 1"=100' SHEET 03 OF 05

DESIGN JY	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 78
GRAPHICS BC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MH	TEXAS	SAT	GUADALUPE	93
	CONTROL	SECTION	JOB	
CHECK CV	0025	10	097	

Design
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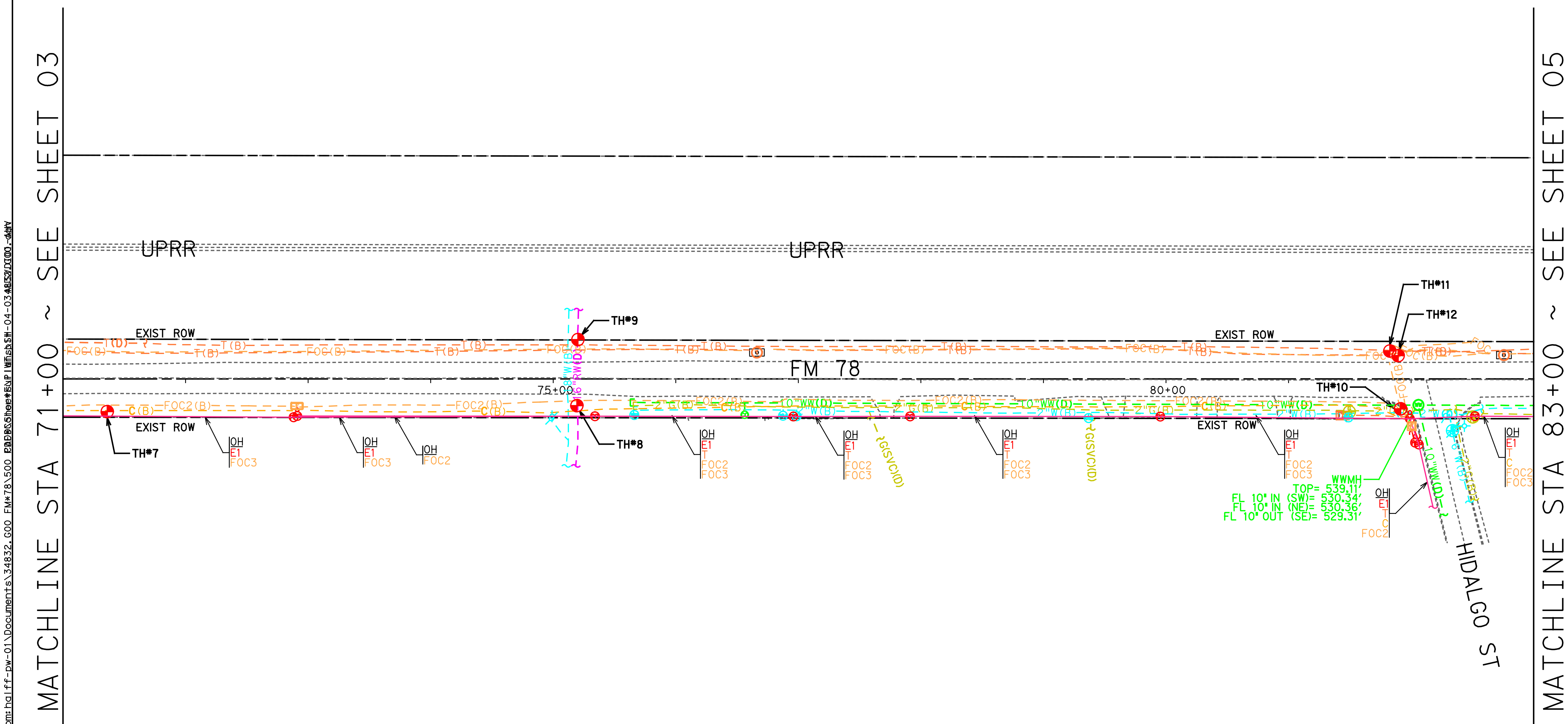

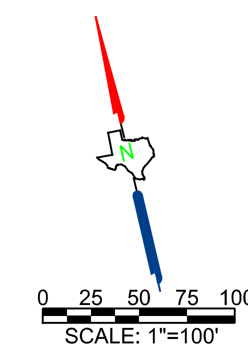

TEST HOLE	OWNER	NORTHING	EASTING	SURF. ELEV.	DEPTH TO TOP
7	SPECTRUM	13764113.25	2292153.73	540.57'	1.93'
8	CITY OF SEGUIN	13764030.37	2292527.93	540.25'	8.12'
9	CITY OF SEGUIN	13764082.67	2292541.06	540.03'	7.97'
10	AT&T	13763874.10	2293181.64	539.09'	4.60'
11	AT&T	13763922.09	2293183.86	538.64'	5.60'
12	AT&T	13763916.80	2293189.60	539.47'	1.58'

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
(symbol)			TEST HOLE
	— —T(B)— — —	— —T(D)— — —	TELEPHONE LINE
	—FOC(B)— — —	—FOC(D)— — —	FIBER OPTIC LINE
	— —C(B)— — —	— —C(D)— — —	CABLE TV LINE
	— —W(B)— — —	— —W(D)— — —	WATER LINE
	- —RW(B)— — —	- —RW(D)— — —	RECLAIMED WATER LINE
	- —WW(B)— — —	- —WW(C)— — —	WASTEWATER LINE
	— —G(B)— — —	— —G(D)— — —	GAS LINE
	— —E(B)— — —	— —E(D)— — —	ELECTRIC LINE
			OVERHEAD UTILITY LINE

TELEPHONE PEDESTAL
TELEPHONE MANHOLE
TELEPHONE CABINET
UNDERGROUND TELEPHONE SPLICE
FIBER OPTIC PEDESTAL
FIBER OPTIC HAND HOLE
FIBER OPTIC CABINET
CABLE TV PEDESTAL
CABLE TV CABINET
FIRE HYDRANT
WATER VALVE
WATER METER
WATER MANHOLE
WATER TEST STATION
WASTEWATER MANHOLE
WASTEWATER CLEAN OUT
GAS VALVE
GAS TEST STATION
GAS VENT PIPE
POWER POLE
POWER POLE W/RISER
ELECTRIC BOX
LIGHT POLE
GUY WIRE
UTILITY CONTINUATION/ QUALITY LEVEL CHANGE
UTILITY END POINT
OH SVC OVERHEAD UTILITIES SERVICE
CP CONTROL POINT

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GAS(G1)	= MARKWEST	DENNIS THEBEAU	303-531-9089
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ELECTRIC(E1)	= CITY OF SEGUIN	CLARENCE SMITH	801-401-2405
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Texas Department of Transportation

FM 78

EXISTING UTILITY LAYOUT

SCALE: 1"=100' SHEET 04 OF 05

DESIGN JY	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 78
GRAPHICS BC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MH	TEXAS	SAT	GUADALUPE	94
	CONTROL	SECTION	JOB	
CHECK CV	0025	10	097	

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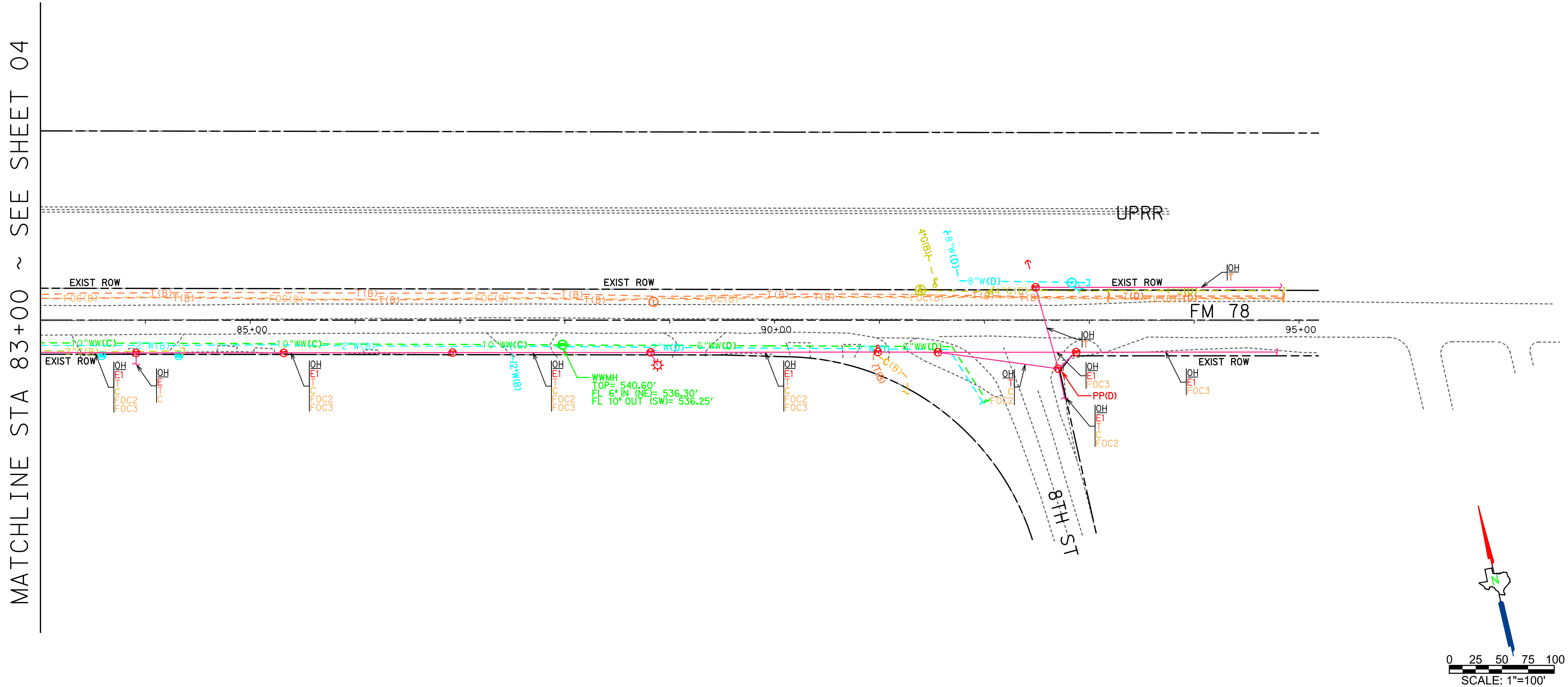

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
(symbol)			TEST HOLE
	— —T(B)— — —	— —T(D)— — —	TELEPHONE LINE
	—FOC(B)— — —	—FOC(D)— — —	FIBER OPTIC LINE
	— —C(B)— — —	— —C(D)— — —	CABLE TV LINE
	— —W(B)— — —	— —W(D)— — —	WATER LINE
	- —RW(B)— — —	- —RW(D)— — —	RECLAIMED WATER LINE
	- —WW(B)— — —	- —WW(C)— — —	WASTEWATER LINE
	— —G(B)— — —	— —G(D)— — —	GAS LINE
	— —E(B)— — —	— —E(D)— — —	ELECTRIC LINE
	———	———	OVERHEAD UTILITY LINE

Symbol	Description	Symbol	Description
T	TELEPHONE PEDESTAL	CO	WASTEWATER CLEAN OUT
T	TELEPHONE MANHOLE		GAS VALVE
T	TELEPHONE CABINET	G TS	GAS TEST STATION
⊗	UNDERGROUND TELEPHONE SPLICE		GAS VENT PIPE
F	FIBER OPTIC PEDESTAL	PP	POWER POLE
F	FIBER OPTIC HAND HOLE	PP	POWER POLE W/RISER
F	FIBER OPTIC CABINET	EB	ELECTRIC BOX
C	CABLE TV PEDESTAL		LIGHT POLE
C	CABLE TV CABINET		GUY WIRE
	FIRE HYDRANT	~	UTILITY CONTINUATION/ QUALITY LEVEL CHANGE
	WATER VALVE	[	UTILITY END POINT
WM	WATER METER	OH SVC	OVERHEAD UTILITIES SERVICE
W	WATER MANHOLE		
W TS	WATER TEST STATION		
WW	WASTEWATER MANHOLE	CP	CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	PARISH AUSTIN	210-213-1893
FIBER OPTIC CABLE(FOC)	= AT&T	PARISH AUSTIN	210-213-1893
FIBER OPTIC CABLE(FOC1)	= LUMEN (CENTURYLINK)	MARSHALL HOLLINGSWORTH	210-907-7266
FIBER OPTIC CABLE(FOC2)	= SPECTRUM	JOEL GONZALES	210-582-9357
FIBER OPTIC CABLE(FOC3)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
CABLE TV(C)	= SPECTRUM	JOEL GONZALES	210-582-9357
WATER(W)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
RECLAIMED WATER(RW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
WASTEWATER(WW)	= CITY OF SEGUIN	TIM HOWE	830-386-2540
GAS(G)	= CENTERPOINT ENERGY	CLIFF WHARTON	830-643-6927
GAS(G1)	= MARKWEST	DENNIS THEBEAU	303-531-9089
ELECTRIC(E)	= GUADALUPE VALLEY ELECTRIC CO-OP	TRAVIS ENGLER	830-386-4424
ELECTRIC(E1)	= CITY OF SEGUIN	CLARENCE SMITH	801-401-2405
ELECTRIC(E2)	= TXDOT	-----	-----

UTILITY INVESTIGATION BEGAN ON MARCH 21, 2022 AND WAS COMPLETED JUNE 21, 2022. HALFF EXPRESSLY DISCLAIMS RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS OR ADJUSTMENTS TO EXISTING UTILITIES AFTER JUNE 21, 2022.

SIZE INFORMATION SHOWN HEREON IS TAKEN FROM AVAILABLE UTILITY RECORDS:

LEVEL "B" (B) INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF UTILITIES.

LEVEL "C" (C) DEPICTED ACCORDING TO RECORD INFORMATION AND EXISTING ASSOCIATED UTILITY STRUCTURES. NO ELECTRONIC INFORMATION WAS OBTAINED

LEVEL "D" (D) DEPICTED ACCORDING TO RECORD INFORMATION. NO ELECTRONIC INFORMATION WAS OBTAINED.

UNLESS OTHERWISE NOTED, UTILITY LINE LIMITS DEPICTED REPRESENT FIELD DESIGNATING LIMITS AND NOT END POINTS OF UTILITIES.

UTILITY INFORMATION LABELED LEVEL "C" OR "D" IS DERIVED FROM FURNISHED RECORDS. SUCH INFORMATION MAY NOT BE ACCURATE OR RELIABLE. HALFF EXPRESSLY DISCLAIMS RESPONSIBILITY FOR THE ACCURACY OR RELIABILITY OF UTILITY INFORMATION DEPICTED ACCORDING TO RECORDS.

WITHOUT VISUAL VERIFICATION, UTILITIES LOCATED BY MEANS OF TRACER WIRE MAY NOT DEPICT THE ACTUAL LOCATION OF THE UTILITY AS THE TRACER WIRE MAY NOT BE DIRECTLY ON OR ABOVE THE UTILITY.

THE ROADWAY AND ROW FILES WERE PROVIDED TO HALFF BY OTHERS AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

STORM SEWER AND ASSOCIATED APPURTENANCES ARE NOT SHOWN ON THESE PLANS.

WASTEWATER FLOWLINE INFORMATION SHOWN HEREON ARE BASED ON FIELD MEASURED DEPTHS AND SHALL BE DEEMED APPROXIMATE.

STATE OF TEXAS
CHRISTOPHER M. VILLAR
117026
LICENSED PROFESSIONAL ENGINEER
11/30/2022

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TBPELS F-312
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Fax: (210) 798-1896

Texas Department of Transportation

FM 78

EXISTING UTILITY LAYOUT

SCALE: 1"=100' SHEET 05 OF 05

DESIGN JY	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 78
GRAPHICS BC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MH	TEXAS	SAT	GUADALUPE	95
	CONTROL	SECTION	JOB	
CHECK CV	0025	10	097	

Design
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