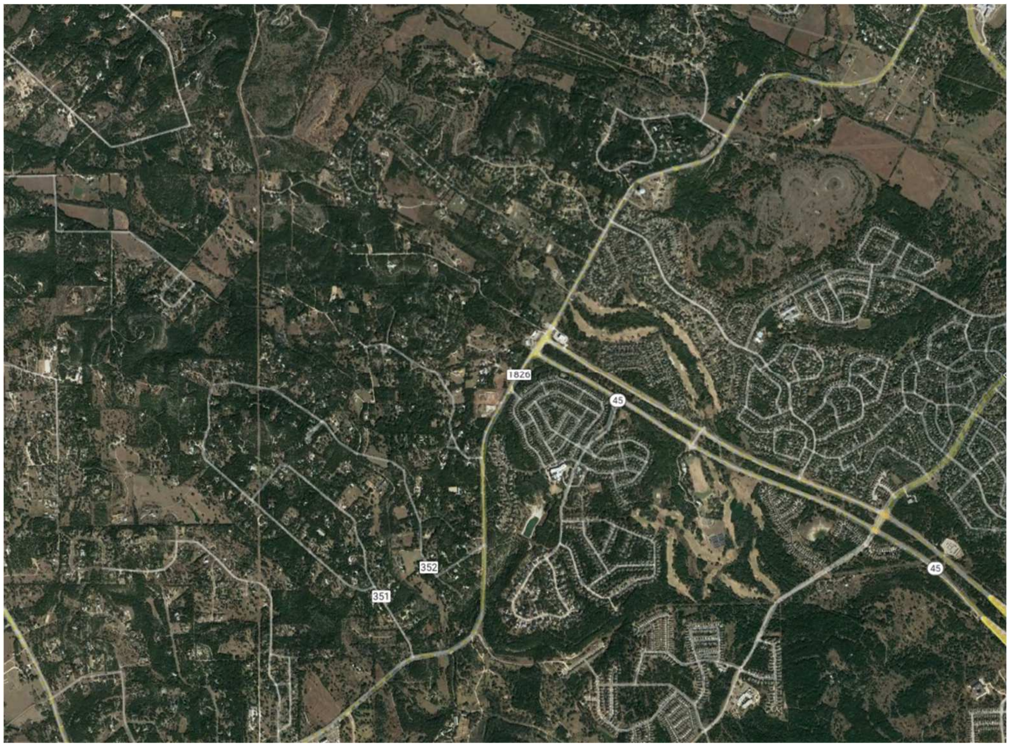
Edwards Aquifer Contributing Zone Plan

CSJ: 0914-33-097

North of Lewis Mountain Road to South of Towering Cedar Drive.



May 2023

Prepared For:

Texas Department of Transportation
7901 N. I-35
Austin, TX 78753

Edwards Aquifer Protection Program Roadway Checklist

- **Edwards Aquifer Application Cover Page (TCEQ-20705)**
- **Edwards Aquifer Protection Program Roadway Application (TCEQ-20872)**

  Attachment A - Road Map
  Attachment B - USGS Quadrangle
  Attachment C - Project Description
  Attachment D - Factors Affecting Surface Water Quality
  Attachment E - BMPs for Upgradient (Offsite) Stormwater N/A
  Attachment F - BMPs for On-site Stormwater
  Attachment G - Construction Plans
  Attachment H - Inspection, Maintenance, Repair and Retrofit Plan
  Attachment I - Pilot-Scale Field Testing Plan N/A
  Attachment J - Measures for Minimizing Surface Stream Contamination
  Attachment K - Volume and Character of Stormwater

- **Geologic Assessment Form (TCEQ-0585)** N/A
  - *Required for site over the Recharge zone*

  Attachment A - Geologic Assessment Table (TCEQ-0585-Table)
  Attachment B - Stratigraphic Column
  Attachment C - Site Geology
  Attachment D - Site Geologic Map(s)

- **Temporary Stormwater Section (TCEQ-0602)** N/A
  - *Review Item 37 on Roadway Application for applicability*

  Attachment A - Spill Response Actions
  Attachment B - Potential Sources of Contamination
  Attachment C - Sequence of Major Activities
  Attachment D - Temporary Best Management Practices and Measures
  Attachment E - Request to Temporarily Seal a Feature (if requested)
  Attachment F - Structural Practices
  Attachment G - Drainage Area Map
  Attachment H - Temporary Sediment Pond(s) Plans and Calculations
  Attachment I - Inspection and Maintenance for BMPs
  Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

- **Agent Authorization Form (TCEQ-0599)**
  - *Only if application is submitted by an authorized agent*
- **Application Fee Form (TCEQ-0574)** N/A
  - *Do not submit for TxDOT roadways*
- **Core Data Form (TCEQ-10400)**

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region

County:	Hays	Travis	Williamson
Original (1 req.)	X	X	___
Region (1 req.)	X	X	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer X_Hays Trinity ___Plum Creek	_Barton Springs/ Edwards Aquifer X Southwestern Travis	NA
City(ies) Jurisdiction	X_Austin ___Buda X_Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	X_Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region

County:	Bexar	Comal	Kinney	Medina	Uvalde
Original (1 req.)	___	___	___	___	___
Region (1 req.)	___	___	___	___	___
County(ies)	___	___	___	___	___
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___San Antonio ETJ (SAWS)	NA

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a “Mid-Review Modification”. Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ’s Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ’s San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: RM 1826 from Lewis Mountain Dr to Towering Cedar Dr in Hays and Travis County						**2. Regulated Entity No.:**			
3. Customer Name: TxDOT						**4. Customer No.: 600803456**			
5. Project Type: **(Please circle/check one)**	[✓ New]		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	[✓ CZP]	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		[✓ Non-residential]			**8. Site (acres):**			78.60
9. Application Fee:	N/A		**10. Permanent BMP(s):**					Vegetative Filter Strips	
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**					N/A	
13. County:	Hays & Travis		**14. Watershed:**					Onion Creek-Colorado River	

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http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	X	X	___
Region (1 req.)	X	X	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer X_Hays Trinity ___Plum Creek	_Barton Springs/ Edwards Aquifer X Southwestern Travis	NA
City(ies) Jurisdiction	X_Austin ___Buda X_Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	X_Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	___	___	___	___	___
Region (1 req.)	___	___	___	___	___
County(ies)	___	___	___	___	___
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. Stephanie L. Russell, PE	
Print Name of Customer/Authorized Agent Stephanie Russell	19 May 2023
Signature of Customer/Authorized Agent	Date

FOR TCEQ INTERNAL USE ONLY			
Date(s)Reviewed:		Date Administratively Complete:	
Received From:		Correct Number of Copies:	
Received By:		Distribution Date:	
EAPP File Number:		Complex:	
Admin. Review(s) (No.):		No. AR Rounds:	
Delinquent Fees (Y/N):		Review Time Spent:	
Lat./Long. Verified:		SOS Customer Verification:	
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):
Core Data Form Complete (Y/N):			Signed (Y/N):
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):

Edwards Aquifer Protection Program Roadway Application

Texas Commission on Environmental Quality

This application is intended only for projects which a major roadway is designed for construction, such as State highways, County roads, and City thoroughfares.

Designed for Regulated Activities on the Contributing Zone to the Edwards Aquifer in relation to 30 TAC §213.24, Regulated Activities on the Edwards Aquifer Recharge Zone, in relation to 30 TAC §213.5(b), Effective June 1, 1999.

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer.

The application was prepared by:

Print Name of Customer/Agent: Stephanie L. Russell, PE

Date: 2023 May 19

Signature of Customer/Agent:

Stephanie Russell

Project Information

1. Regulated Entity (Project) Name: RM 1826 from Lewis Mountain Dr to Towering Cedar Dr. in Hays and Travis County
2. County: Hays County and Travis County
3. Stream Basin(s): Colorado River Basin
4. Groundwater Conservation District (if applicable): Hays Trinity GCD and Southwestern Travis County GCD
5. Customer (Applicant):

   Contact Person: Shane Rotter
   Entity: Texas Department of Transportation
   Mailing Address: P.O. Drawer 15426
   City, State: Austin, TX Zip: 78761
   Telephone: 512-415-8257
   Email Address: Shane.Rotter@txdot.gov

6. Agent (Representative):

   Contact Person: Stephanie L. Russell, PE
   Entity: Garver LLC
   Mailing Address: 285 SE Inner Loop Suite #110
   City, State: Georgetown, TX Zip: 78626
   Telephone: 512-539-1998
   Email Address: slrussell@garverusa.com

7. Landowner of R.O.W. (Right of Way)
   Person or entity responsible for maintenance of water quality Best Management Practices (BMPs), if not applicant.

   Contact Person: ______
   Entity: ______
   Mailing Address: ______
   City, State: ______ Zip: ______
   Telephone: ______
   Email Address: ______

8. ☐ **The TCEQ must be able to inspect the project site or the application will be returned.** Sufficient survey marking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of any regulated activities and the geologic or manmade features noted in the Geologic Assessment.

   ☐ Survey marking will be completed by this date: ______

N/A-Existing ROW boundary delineated by fencing and overhead utilities.

9. ☒ **Attachment A - Road Map**. A road map showing directions to and the location of the project site is attached. The map clearly shows the boundary of the project site.

10. ☒ **Attachment B - USGS Quadrangle**. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') is attached. The map(s) clearly show:

    ☒ Project site boundaries
    ☒ USGS Quadrangle Name(s)
    ☒ All drainage paths from site to surface waters

11. ☒ **This project extends into (Check all that apply):**

    ☐ Recharge Zone (RZ)
    ☒ Contributing Zone (CZ)
    ☐ Transition Zone (TZ)
    ☐ Contributing Zone within Transition Zone (CZ/TZ)
    ☐ Zone not regulated by EAPP

12. ☒ **Attachment C - Project Description**. A detailed narrative description of the proposed project is attached. The project description is consistent throughout the application and contains, at a minimum, the following details:

   - ☒ Complete site area [Acres]
   - ☐ Offsite upgradient stormwater areas to be captured
   - ☒ Impervious area [Acres]
   - ☒ Permanent BMP(s)
   - ☒ Proposed site use
   - ☒ Existing roadway (paved and/or unpaved)
   - ☒ Structures to be demolished [Include demo phase]
   - ☒ Major interim phases

13. Existing project site conditions are noted below:

   - ☒ Existing paved and/or unpaved roads
   - ☐ Undeveloped (Cleared)
   - ☐ Undeveloped (Undisturbed/Not cleared)
   - ☐ Existing commercial site
   - ☐ Existing industrial site
   - ☐ Existing residential site
   - ☐ Other: _____

14. ☒ **Attachment D - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water quality is attached.

15. ☒ Only inert materials as defined by 30 TAC §330.3 will be used as fill material.

16. Type of pavement or road surface to be used:

   - ☐ Concrete
   - ☒ Asphaltic concrete pavement
   - ☐ Permeable Friction Course (PFC)
   - ☐ Other: _____

17. Right of Way (R.O.W.) and Pavement Area:

R.O.W. for project: 78.60 (ac.)
Length: 42,800 ft.
Width: varies from 80 ft. to 80 ft.
Impervious cover (IC): 37.86 (ac.)
Total of Pavement area 37.86 (ac.) ÷ R.O.W. area 78.60 (ac.) x 100 = 48.17% IC.

   - ☒ CAD program was used to determine areas.
   - ☒ Number of travel lanes: proposed: Varies 3-4, existing: 2
   - ☒ Typical widths of lanes: 11 (ft.)
   - ☒ Are intersections also being improved? (Y/N) Y

Site Plan Requirements

Items 18 - 28 must be included on the Site Plan.

18. ☒ The Site Plan must have a minimum scale of 1" = 400'.
Site Plan Scale: 1" = 50'

19. 100-year floodplain boundaries:

☐ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled. The 100-year floodplain boundaries are based on the following specific (including date of material) source(s):______.

☒ No part of the project site is located within the 100-year floodplain.

20. ☒ A layout of the development with existing and finished contours at appropriate, but not greater than ten-foot contour intervals is shown. Sensitive features, lots, wells, buildings, roads, culverts, etc. are shown on the site plan.

21. ☒ A figure (map) indicating all paths of drainage from the site to surface waters.

☐ Name all stream crossings: ___________________________
☐ Drainage patterns and approximate slopes.
☒ There will be no discharge to surface waters.

22. ☒ Distinguish between areas of soil disturbance and areas which will not be disturbed.

23. ☒ Show locations of major structural and nonstructural controls. These are the temporary and permanent best management practices. Include the following:

☐ Show design and location of any hazardous materials traps. N/A
☒ Show design at outfalls of major control structures and conveyances.
☒ A description of the BMPs and measures that prevent pollutants from entering surface streams.

24. Show locations of staging areas or project specific locations (PSL). Are they:

☐ Onsite, within project R.O.W.
☐ Offsite.
☒ Not yet determined. (Requires future authorization)

25. ☒ Show locations where soil stabilization practices are expected to occur.

26. ☒ Show surface waters (including wetlands).

27. Temporary aboveground storage tank facilities:

☐ Temporary aboveground storage tank facilities will be located on this site. Show on site plan.
☒ Temporary aboveground storage tank facilities will not be located on this site.

28. ☒ Plan(s) also include:

☐ Sidewalks
☒ Related turn lanes
☐ Demolition plans
☐ Other improved areas: ___________________________
☐ Shared-use paths
☐ Off-site improvements and staging areas
☐ Utility relocations

Permanent Best Management Practices (BMPs)

Description of practices and measures that will be used after construction is completed.

29. ☒ Permanent BMPs and measures have been designed, and will be constructed, operated, and maintained to ensure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance accepted by the executive director.

    ☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.
    ☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used: ________________________

30. ☐ **Attachment E - BMPs for Upgradient (Offsite) Stormwater.**

    ☐ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.
    ☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.
    ☒ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

31. ☒ **Attachment F - BMPs for On-site Stormwater**.

    ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.
    ☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.

32. ☒ **Attachment G - Construction Plans**. Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. Construction plans for the proposed permanent BMPs and measures are attached and include all proposed structural plans and specifications, and appropriate details.

    ☒ Major bridge cross-sections, and roadway plan and profiles

    ☒ BMP plans and details

    ☒ Erosion control

    ☒ SW3P

    ☒ Design calculations

    ☒ TCEQ Construction Notes

    ☒ EPIC, as necessary

33. ☒ **Attachment H - Inspection, Maintenance, Repair and Retrofit Plan**. A site and BMP specific plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan fulfills all the following:

    ☒ Prepared and certified by the engineer designing the permanent BMPs and measures.
    ☒ Signed by the owner or responsible party.
    ☒ Outlines specific procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofit.
    ☒ Contains a discussion of recordkeeping procedures.

34. ☐ **Attachment I - Pilot-Scale Field Testing Plan.** Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.

    ☒ N/A

35. ☒ **Attachment J - Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows, and in-stream effects caused by the regulated activity which increase erosion or may result in water quality degradation.

    ☒ Include permanent spill measures used to contain hydrocarbons or hazardous substances by way of traps, or response contingencies.

36. The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity.

    If the applicant intends to transfer responsibility, check the box below.

    ☐ Yes

    A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days.

Stormwater to be generated by the Proposed Project

Description of practices and measures that will be used during construction.

37. ☒ The site description, controls, maintenance, and inspection requirements for the Storm Water Pollution Prevention Plan (SWPPP or SW3P) developed under the Texas Pollutant Discharge Elimination System (TPDES) general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) & §213.5(b) of the technical report.

    ☐ The Temporary Stormwater Section (TCEQ-0602) is included with the application.
    ☒ The SWPPP (SW3P) will serve as the Temporary Stormwater Section (TCEQ-0602).

38. ☒ **Attachment K - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover.

    ☒ Include the pre-construction runoff coefficient.
    ☒ Include the post-construction runoff coefficient.

Administrative Information

39. ☒ Submit one (1) original and one (1) copy of the application, plus one electronic copy as needed, for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ is required to distribute the additional copies to these jurisdictions.

40. The fee for the plan(s) is based on:

    ☐ The total R.O.W. (as in Item 17).

    ☒ TxDOT roadway project.

FORM TCEQ-20872 ATTACHMENTS

ATTACHMENT A – ROAD MAP

Attached following this page.

ATTACHMENT B – USGS/EDWARDS AQUIFER RECHARGE ZONE MAP

Attached following this page.

ATTACHMENT C – PROJECT DESCRIPTION

The Texas Department of Transportation (TxDOT) Austin District is proposing roadway improvements to RM 1826 from north of Lewis Mountain Drive to south of Towering Cedar Drive specifically near the intersections of Lewis Mountain Drive, Zyle Road, Appaloosa Run, Oso Creek Road, Woodland Drive, Shelf Rock Road, and Towering Cedar Drive.

Within the project limits, RM 1826 consists typically of 2-11’ lanes (one lane in each direction) with outside shoulders that vary between 3’ to 11.5’. The existing right-of-way (ROW) is 80’ wide (usual).

The proposed project will consist of a TOM overlay of the existing pavement and widening to include 11’ turn lanes in each direction at multiple intersections. Additionally, the project will consist of grading and improvements to drainage structures.

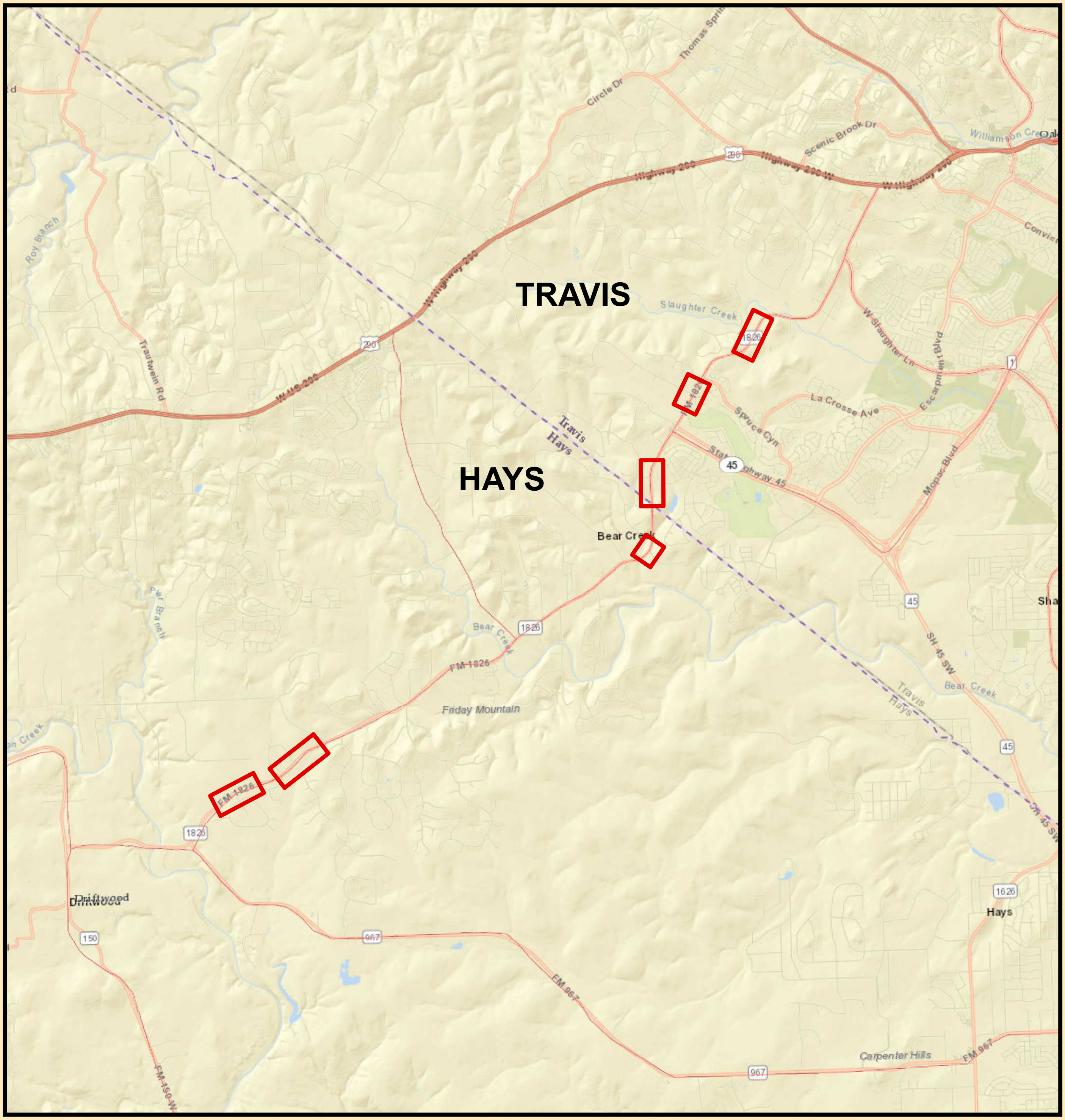
Drainage

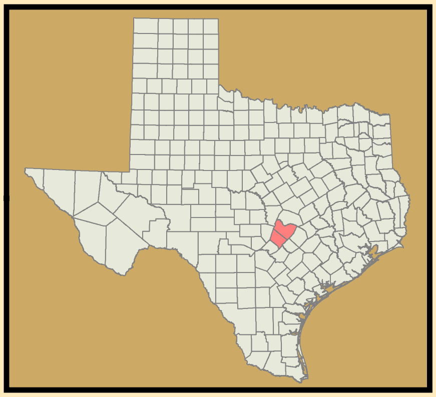
Existing culverts have been lengthened to convey the drainage through the project as well as the use of a stormwater system. The project incorporates post construction total suspended solids (TSS) controls that have been created in compliance with the Edwards Aquifer Rules (30 TAC 213) such as vegetative filter strips and soil retention blankets. The amount of TSS treated is based on the amount of impervious area added to the project. All controls will be located within existing ROW.

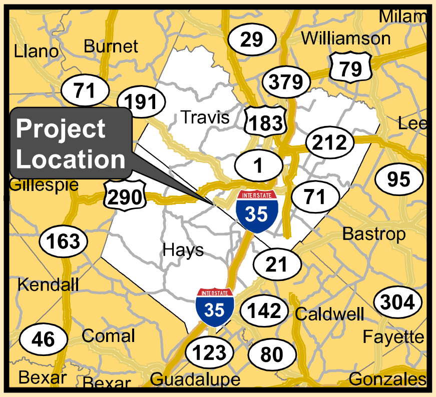
The complete site area is 78.60 acres. The project will add 1.78 acres of impervious cover (calculated by measuring design drawings). Resulting in 37.86 acres of total impervious cover post-construction (calculated by measuring design drawings).

Right-of-Way and Easements

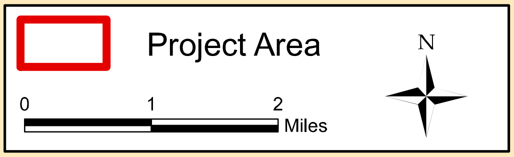
It is expected that proposed work will be done within existing ROW.







🟥 Project Area



Road Map

Attachment A

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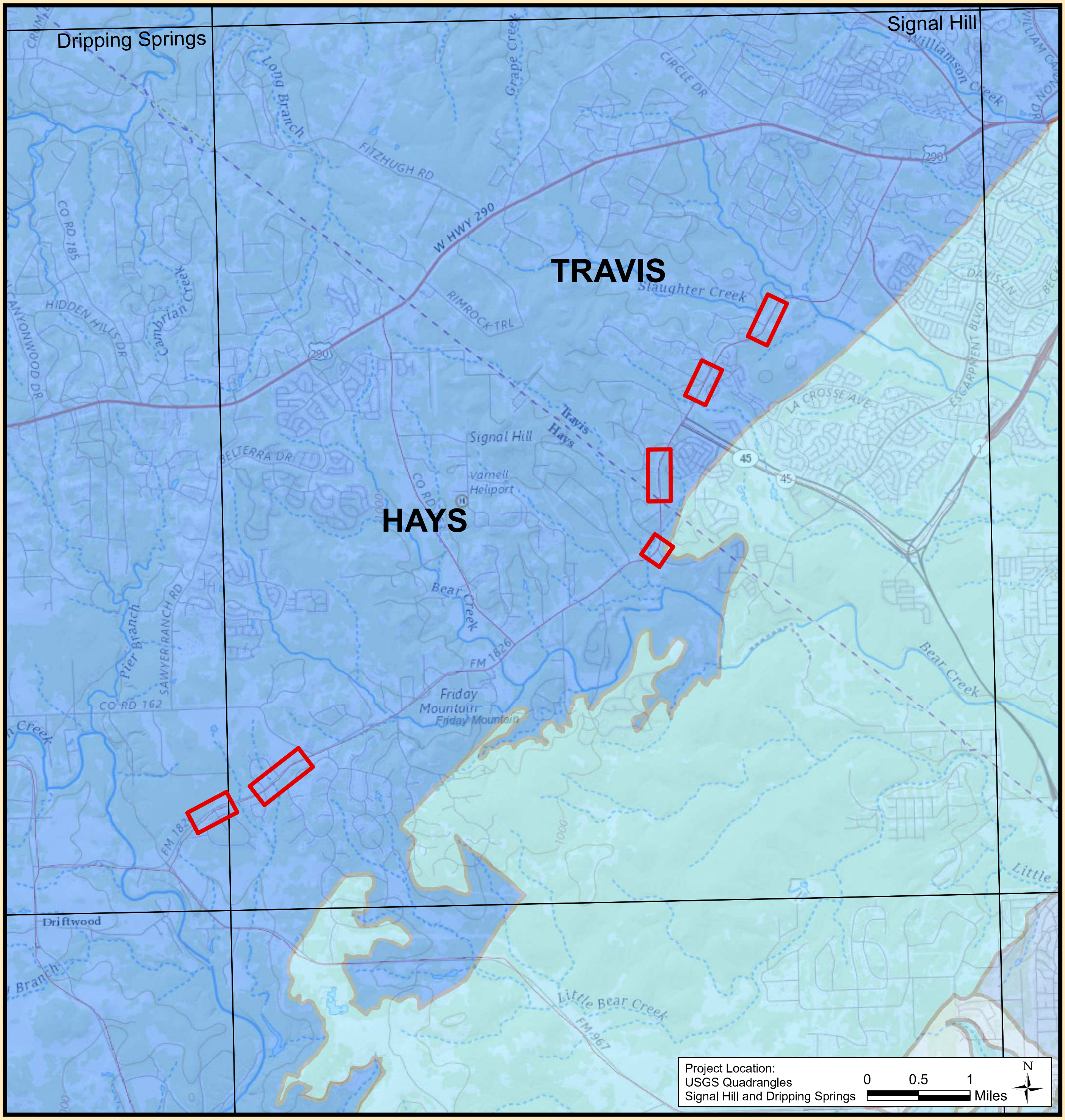
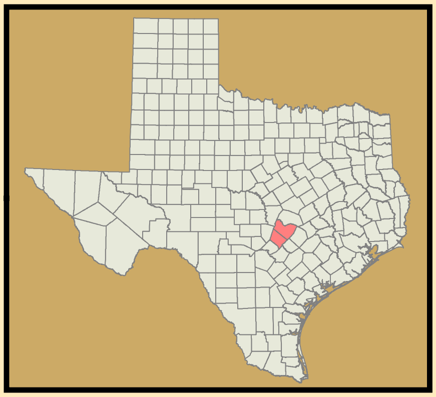
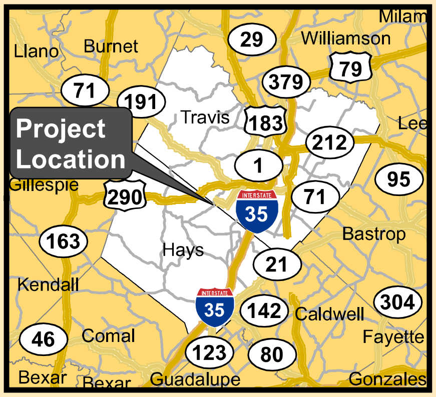






🟥 Project Area
— USGS Quagrangle Boundary

Edwards Aquifer

🟦 Contributing Zone
▨ Contributing within the Transition Zone
▨ Recharge Zone
▨ Edwards Aquifer Transition Zone

RM 1826 USGS/Edwards Aquifer Zone Map

Attachment B

Document Path: L:\2019\19T43347 - FM 1826 PSE\GIS\Maps\Project Location\FM1826_USGS-Edwards_Aquifer_Zone_Map.mxd Date Saved: 4/20/2023 1:47:36 PM User Name: KANorman

FORM TCEQ-20872 ATTACHMENTS

ATTACHMENT D – FACTORS AFFECTING SURFACE WATER QUALITY

Pre-Construction

Prior to construction, the primary factors that have an impact on water quality are the exhaust fumes from the daily vehicular traffic and deposits and gas leaks from vehicles. As well as the potential for any other associated materials released from commercial traffic.

During Construction

Once construction commences, there is a possibility of heightened exhaust fumes resulting from increased traffic congestion and the usage of construction equipment. Additionally, there is potential for residuals from material used during the construction process such as sealants and paving materials that can adversely impact the project's surrounding area. Also, excavation during construction may lead to an increased movement of sediments, which increases the likelihood of solids carried downstream to local surface water bodies.

Post Construction

After construction is completed, water quality impacts will result from daily vehicle traffic and the increase of impervious cover. RM 1826 improvements will increase the runoff coefficient which will allow for the possibility of an increase of solids transporting to water bodies.

ATTACHMENT E – BMPS FOR UPGRADIENT (OFFSITE) STORM WATER

There is no offsite storm water runoff upgradient of the project.

ATTACHMENT F– BMPS FOR ON-SITE STORMWATER

Eighteen areas of vegetative filter strips were designed in compliance with TCEQ technical guidance. Design calculations are attached. Additionally, silt fence has been proposed on the downstream side of each project site, temporary rock filter dam (Ty 4) has been proposed on the upstream side of driveway culverts, and temporary rock filter dam (Ty 2) has been proposed on the downstream end of the roadside ditches prior to cross drainage structures.

ATTACHMENT G – CONSTRUCTION PLANS

Attached.

FORM TCEQ-20872 ATTACHMENTS

ATTACHMENT H – INSPECTION, MAINTENANCE, REPAIR AND RETROFIT PLAN

Attached.

ATTACHMENT I – PILOT-SCALE FIELD TESTING PLAN

Not Applicable.

ATTACHMENT J – MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

Vegetative filter strips will be used at locations throughout the project to minimize the number of contaminants that could drain within the project area. Rock filter dams are placed upstream of drainage structures, silt fences are placed along the ROW on the downstream side of project sites, and soil retention blankets are placed within the limits of seeding. These measures are expected to lessen the impacts of increased impervious cover, such as erosion and stream scour.

ATTACHMENT K – VOLUME AND CHARACTER OF STORMWATER

Based on the amount of new impervious cover created by the improvements to RM 1826 in Hays County (0.84 acres) and an annual rainfall of 33 inches, approximately 2.31 acre-feet of additional runoff will be generated per year in Hays County.

Based on the amount of new impervious cover created by the improvements to RM 1826 in Travis County (0.94 acres) and an annual rainfall of 32 inches, approximately 2.51 acre-feet of additional runoff will be generated per year in Travis County.

The total impervious cover (1.78 acres) created by the improvements to RM 1826 will approximately generate 4.82 acre-feet of additional runoff.

The pre-construction runoff coefficient is 0.59 and post-construction runoff coefficient is 0.61 for the portion of the project within Hays County.

The pre-construction runoff coefficient is 0.57 and post-construction runoff coefficient is 0.58 for the portion of the project within Travis County.

The overall project pre-construction runoff coefficient is 0.58 and post-construction runoff coefficient is 0.59.

ATTACHMENT H

INSPECTION, MAINTENANCE, REPAIR AND RETROFIT PLAN
RM 1826
North of Lewis Mountain Road to South of Towering Cedar Drive.
Hays County, Texas
Travis County, Texas
0914-33-097, etc

These maintenance guidelines were prepared at the request of the Texas Commission of Environmental Quality (TCEQ) with regard to their approval of an Edwards Aquifer Protection Plan for the above referenced project. These guidelines apply to the permanent storm water controls constructed for this project.

Pest management: *Any vegetated areas that have noxious vegetation, insects, or other pests will be remedied with the minimum amount of selective pesticide necessary to control the pest. All chemicals are EPA labeled, registered, and approved. Personnel licensed and/or trained according to Texas Department of Agriculture (TDA) laws and regulations will apply pesticides. Records are kept for each application in accordance with TDA laws and regulations.*

Seasonal mowing and vegetation management: *Right-of-Way areas,* which includes the vegetative filter strip BMP for this project, *will be mowed by contract. The cutting height is usually 5-7 inches for all areas.*

Inspection cycles: *Maintenance forces will review roadways and roadsides at least twice per year. Any problem areas are duly noted particularly if there is an absence of vegetation, any accumulation of brush, debris or litter, and/or any areas of significant erosion. These items will then be scheduled for repair on priority basis.*

Debris and litter removal: *Litter, debris and brush accumulation is assessed not only for aesthetic reasons but also for the tendency to clog drainage paths or impede the intended flow of a structure's hydraulic design. Areas are cleaned periodically by state forces or by outside contractor. Areas documented as trouble spots are scheduled on a priority basis.*

Sediment removal: *During inspections if sediment has accumulated to a depth that hinders original design characteristics it will be removed. Excessive sedimentation, or a significant load of silt, does not normally occur in filter strip areas, grassy swale areas, or in permanent pond structures after project completion, but it may occur from other drainage areas or construction underway beyond State right-of-way.*

Maintenance Contact
The contact for questions or concerns pertaining to maintenance of the facility is listed below.

Mr. Ronald Switzer
TxDOT Department of Transportation
12315 US 290 W.
Austin, Texas
Tel: (512) 288-4761

Signature

STATE OF TEXAS
STEPHANIE LEIGH RUSSELL
103741
LICENSED PROFESSIONAL ENGINEER

Stephanie Russell 5/31/2023

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **RM 1826**
Date Prepared: **5/31/2023**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.

Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project:

Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
County = **Travis**
Total project area included in plan * = **55.65** acres
Predevelopment impervious area within the limits of the plan * = **25.04** acres
Total post-development impervious area within the limits of the plan* = **25.98** acres
Total post-development impervious cover fraction * = **0.47**
P = **32** inches

$L_{M\ TOTAL\ PROJECT}$ = **816** lbs.

*** The values entered in these fields should be for the total project area.**

Number of drainage basins / outfalls areas leaving the plan area = **1**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **1**

Total drainage basin/outfall area = **55.65** acres
Predevelopment impervious area within drainage basin/outfall area = **25.04** acres
Post-development impervious area within drainage basin/outfall area = **25.98** acres
Post-development impervious fraction within drainage basin/outfall area = **0.47**
$L_{M\ THIS\ BASIN}$ = **817** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**
Removal efficiency = **85** percent

Aqualogic Cartridge Filter
Bioretention

Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C = **1.75** acres
A_I = **1.75** acres
A_P = **0.00** acres
L_R = **1647** lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = **817** lbs.

F = **0.50**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth = **0.42** inches
Post Development Runoff Coefficient = **0.82**
On-site Water Quality Volume = **2188** cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = **0.00** acres
Off-site Impervious cover draining to BMP = **0.00** acres
Impervious fraction of off-site area = **0**
Off-site Runoff Coefficient = **0.00**
Off-site Water Quality Volume = **0** cubic feet

Storage for Sediment = **438**

Total Capture Volume (required water quality volume(s) x 1.20) = 2626 cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System

Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin = **NA** cubic feet

Irrigation Area Calculations:

Soil infiltration/permeability rate = 0.1 in/hr **Enter determined permeability rate or assumed value of 0.1**
Irrigation area = NA square feet
NA acres

8. Extended Detention Basin System

Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **NA** cubic feet

9. Filter area for Sand Filters

Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet **For minimum water depth of 2 feet**
Minimum sedimentation basin area = **NA** square feet **For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet **For minimum water depth of 2 feet**
Minimum sedimentation basin area = **NA** square feet **For maximum water depth of 8 feet**

10. Bioretention System

Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins

Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool = **NA** cubic feet **Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation = **NA** cubic feet **Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands

Designed as Required in RG-348 Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic^{TM} Cartridge System

Designed as Required in RG-348 Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic^{TM}.**

Required Sedimentation chamber capacity = **NA** cubic feet
Filter canisters (FCs) to treat WQV = **NA** cartridges
Filter basin area (RIA_F) = **NA** square feet

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

15. Grassy Swales

Designed as Required in RG-348 Pages 3-51 to 3-54

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A = 8.00 acres
Impervious Cover in Drainage Area = 4.00 acres
Rainfall intensity = i = 1.1 in/hr
Swale Slope = 0.01 ft/ft
Side Slope (z) = 3
Design Water Depth = y = 0.33 ft
Weighted Runoff Coefficient = C = 0.54

A_{CS} = cross-sectional area of flow in Swale = 13.17 sf
P_W = Wetted Perimeter = 40.62 feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W = 0.32 feet
n = Manning's roughness coefficient = 0.2

15A. Using the Method Described in the RG-348

Manning's Equation: $$Q = \frac{1.49}{n} A_{CS} R_H^{2/3} S^{0.5}$$

$$b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy = 38.51 \text{ feet}$$

Q = CiA = 4.71 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.36 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 107.24 feet

If any of the resulting values do not meet the design requirement set forth in RG-348, the design parameters must be modified and the solver rerun.

15B. Alternative Method using Excel Solver

Design Q = CiA = 4.71 cfs

Manning's Equation Q = 0.76 cfs Error 1 = 3.95
Swale Width= 6.00 ft

Instructions are provided to the right (green comments).

Flow Velocity 0.36 ft/s
Minimum Length = 107.24 ft

Instructions are provided to the right (blue comments).

Design Width = 6 ft
Design Discharge = 0.76 cfs Error 2 = 3.95
Design Depth = 0.33 ft
Flow Velocity = 0.32 cfs
Minimum Length = 97.48 ft

If any of the resulting values do not meet the design requirement set forth in RG-348, the design parameters may be modified and the solver rerun.
If any of the resulting values still do not meet the design requirement set forth in RG-348, widening the swale bottom value may not be possible.

16. Vegetated Filter Strips

Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

STEPHANIE LEIGH RUSSELL
103741

Stephanie Russell 5/31/2023

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: RM 1826
Date Prepared: 5/30/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spre

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of ir
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
County = **Hays**
Total project area included in plan * = **22.96** acres
Predevelopment impervious area within the limits of the plan * = **11.05** acres
Total post-development impervious area within the limits of the plan* = **11.88** acres
Total post-development impervious cover fraction * = **0.52**
P = **33** inches

$L_{M\ TOTAL\ PROJECT}$ = **749** lbs.

*** The values entered in these fields should be for the total project area.**

Number of drainage basins / outfalls areas leaving the plan area = **1**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = 1

Total drainage basin/outfall area = **22.96** acres
Predevelopment impervious area within drainage basin/outfall area = **11.05** acres
Post-development impervious area within drainage basin/outfall area = **11.88** acres
Post-development impervious fraction within drainage basin/outfall area = **0.52**
$L_{M\ THIS\ BASIN}$ = **745** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**
Removal efficiency = **85** percent

Aqualogic Cartridge Filte
Bioretention

Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C = **1.71** acres
A_I = **1.71** acres
A_P = **0.00** acres
L_R = **1660** lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = **749** lbs.

F = **0.45**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348 Pages 3-

Rainfall Depth = **0.36** inches
Post Development Runoff Coefficient = **0.82**
On-site Water Quality Volume = **1809** cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = **0.00** acres
Off-site Impervious cover draining to BMP = **0.00** acres
Impervious fraction of off-site area = **0**
Off-site Runoff Coefficient = **0.00**
Off-site Water Quality Volume = **0** cubic feet

Storage for Sediment = **362**

Total Capture Volume (required water quality volume(s) x 1.20) = 2171 cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System

Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin = **NA** cubic feet

Irrigation Area Calculations:

Soil infiltration/permeability rate = 0.1 in/hr **Enter determined permeability rate or assur**
Irrigation area = NA square feet
NA acres

8. Extended Detention Basin System

Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **NA** cubic feet

9. Filter area for Sand Filters

Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet **For minimum water depth of 2 feet**
Minimum sedimentation basin area = **NA** square feet **For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet **For minimum water depth of 2 feet**
Minimum sedimentation basin area = **NA** square feet **For maximum water depth of 8 feet**

10. Bioretention System

Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins

Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool = **NA** cubic feet **Permanent Pool Capacity is 1.20 times the**
Required capacity at WQV Elevation = **NA** cubic feet **Total Capacity should be the Permanent Po**
plus a second WQV.

12. Constructed Wetlands

Designed as Required in RG-348 Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic^{TM} Cartridge System

Designed as Required in RG-348 Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic^{TM}.**

Required Sedimentation chamber capacity = **NA** cubic feet
Filter canisters (FCs) to treat WQV = **NA** cartridges
Filter basin area (RIA_F) = **NA** square feet

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QU

15. Grassy Swales

Designed as Required in RG-348 Pages 3-51 to 3-54

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A = 8.00 acres
Impervious Cover in Drainage Area = 4.00 acres
Rainfall intensity = i = 1.1 in/hr
Swale Slope = 0.01 ft/ft
Side Slope (z) = 3
Design Water Depth = y = 0.33 ft
Weighted Runoff Coefficient = C = 0.54

A_{CS} = cross-sectional area of flow in Swale = 13.17 sf
P_W = Wetted Perimeter = 40.62 feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W = 0.32 feet
n = Manning's roughness coefficient = 0.2

15A. Using the Method Described in the RG-348

Manning's Equation: $$Q = \frac{1.49}{n} A_{CS} R_H^{2/3} S^{0.5}$$

$$b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy = 38.51 \text{ feet}$$

Q = CiA = 4.71 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.36 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 107.24 feet

If any of the resulting values do not meet the design requirement set forth in RG-348, the design parameters must be modified and the solver

15B. Alternative Method using Excel Solver

Design Q = CiA = 4.71 cfs

Manning's Equation Q = 0.76 cfs Error 1 = 3.95
Swale Width= 6.00 ft

Instructions are provided to the right (green comments).

Flow Velocity 0.36 ft/s
Minimum Length = 107.24 ft

Instructions are provided to the right (blue comments).

Design Width = 6 ft
Design Discharge = 0.76 cfs Error 2 = 3.95
Design Depth = 0.33 ft
Flow Velocity = 0.32 cfs
Minimum Length = 97.48 ft

If any of the resulting values do not meet the design requirement set forth in RG-348, the design parameters may be modified and the solver rerun.
If any of the resulting values still do not meet the design requirement set forth in RG-348, widening the swale bottom value may not be possible.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and
the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or
across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

Agent Authorization Form

For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I Shane Rotter,
Print Name

Water Quality Program SME,
Title - Owner/President/Other

of Texas Department of Transportation,
Corporation/Partnership/Entity Name

have authorized Stephanie L. Russell, PE
Print Name of Agent/Engineer

of Garver, LLC
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.
2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.
4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.
5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Applicant's Signature

5/11/23
Date

THE STATE OF Texas §

County of Travis §

BEFORE ME, the undersigned authority, on this day personally appeared Shane Rotter known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this ____ day of __________, _____.

NOTARY PUBLIC

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: ________________

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)*

☐ Other

2. Customer Reference Number *(if issued)*

CN 600803456

Follow this link to search for CN or RN numbers in Central Registry**

3. Regulated Entity Reference Number *(if issued)*

RN

SECTION II: Customer Information

4. General Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*

If new Customer, enter previous Customer below:

Texas Department of Transportation

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☐ City ☐ County ☐ Federal ☐ Local ☒ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees

☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

13. Independently Owned and Operated?

☐ **Yes** ☒ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator ☐ Other:

☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant

15. Mailing Address:

Texas Department of Transportation

P.O. Drawer 15426

City	Austin	**State**	TX	**ZIP**	78761	**ZIP + 4**	5426

16. Country Mailing Information *(if outside USA)*

17. E-Mail Address *(if applicable)*

Shane.Rotter@txdot.gov

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(512) 832-7160		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

RM 1826 from Lewis Mountain Dr to Towering Cedar Dr. in Hays and Travis County

23. Street Address of the Regulated Entity: ***(No PO Boxes)***								
	City		**State**		**ZIP**		**ZIP + 4**	
24. County								

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	from Lewis Mountain Dr to Towering Cedar Dr. in Hays and Travis County

26. Nearest City	**State**	**Nearest ZIP Code**
Austin	TX	78737

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	30.174464		**28. Longitude (W) In Decimal:**	-97.929289	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
30	10	28.07	97	55	45.44

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
1611		237310	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

Existing roadway improvements

34. Mailing Address:	**Texas Department of Transportation**							
	P.O. Drawer 15426							
	City	**Austin**	**State**	**TX**	**ZIP**	**78761**	**ZIP + 4**	**5426**

35. E-Mail Address:	**Shane.Rotter@txdot.gov**

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 832-7160		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
		11-15062401		
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☒ Other: Water Quality Non Permitted
				R11106912066

SECTION IV: Preparer Information

40. Name:	Stephanie L. Russell, PE	**41. Title:**	Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512) 539-1998		( ) -	slrussell@garverusa.com

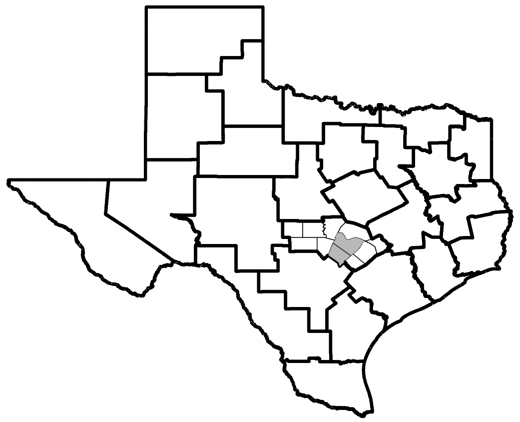
SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Texas Department of Transportation	**Job Title:**	Project Manager
Name *(In Print)*:	Shane Rotter	**Phone:**	(512) 415- **8257**
Signature:	SRott	**Date:**	5/11/23

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	1



STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NUMBER
STP () HES
CSJs: 0914-33-097, 1754-02-030

RM 1826
TRAVIS COUNTY AND HAYS COUNTY

CSJ 0914-33-097
NET LENGTH OF PROJECT
ROADWAY = 8564.00 FT = 1.622 MI
BRIDGE = 0.00 FT = 0.0000 MI
TOTAL = 8564.00 FT = 1.622 MI

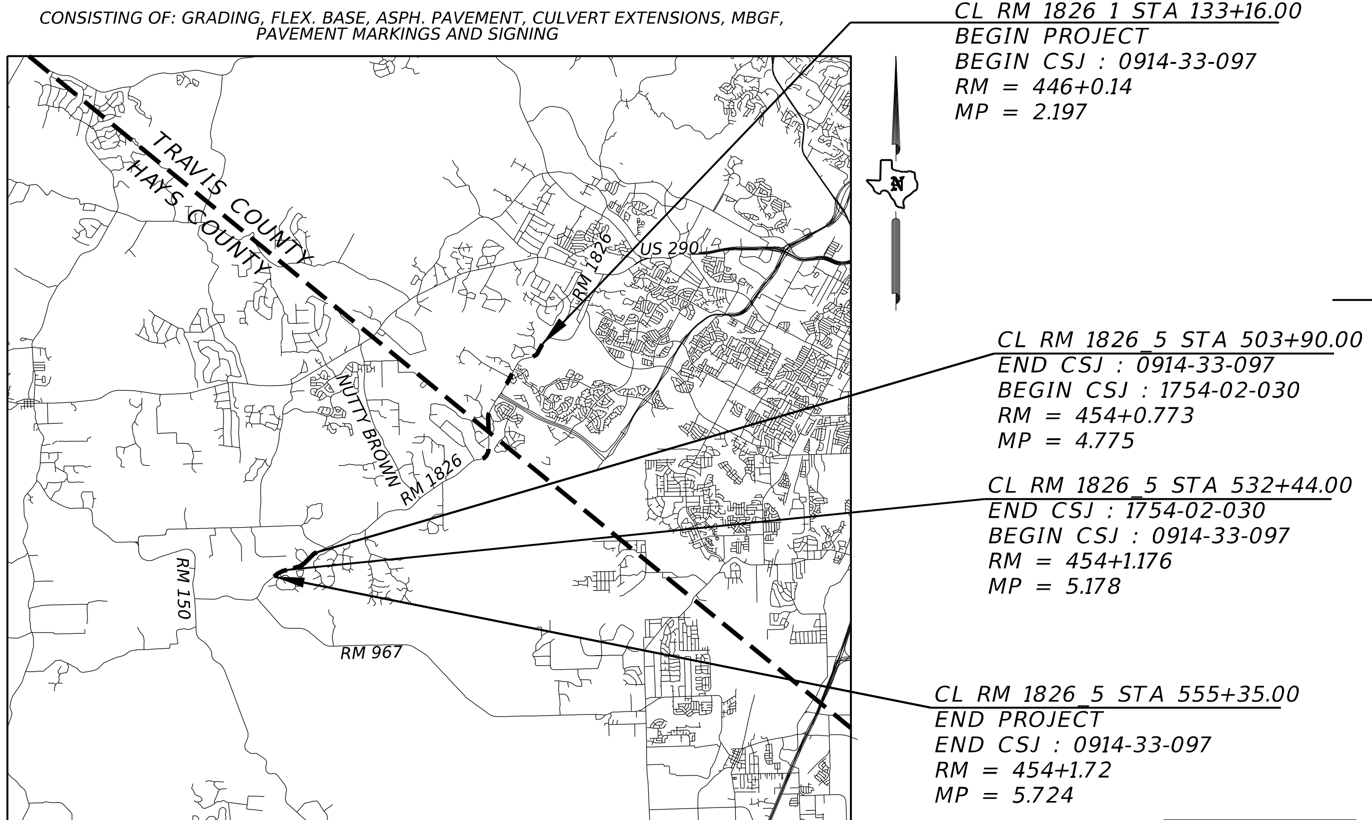
CSJ 1754-02-030
NET LENGTH OF PROJECT
ROADWAY = 2854.00 FT = 0.541 MI
BRIDGE = 0.00 FT = 0.0000 MI
TOTAL = 2854.00 FT = 0.541 MI

TOTAL LENGTH = 11,418.00 FT = 2.163 MI

LIMITS: FROM NORTH OF LEWIS MOUNTAIN ROAD
TO: SOUTH OF TOWERING CEDAR DRIVE

FOR THE CONSTRUCTION OF TURN LANES

CONSISTING OF: GRADING, FLEX. BASE, ASPH. PAVEMENT, CULVERT EXTENSIONS, MBGF, PAVEMENT MARKINGS AND SIGNING



NOT TO SCALE

RAILROAD CROSSINGS:NONE

Texas Department of Transportation

DESIGN SPEED:
Mainlane: 50 MPH
Cross Street: 35 MPH

A.D.T.:
2023: 18,332
2043: 30,431

FINAL PLANS

LETTING DATE: ______________________________

DATE CONTRACTOR BEGAN WORK: ____________________

DATE WORK WAS COMPLETED & ACCEPTED: ______________

FINAL CONTRACT COST: $___________________________

CONTRACTOR: _________________________________

I CERTIFY THAT THIS PROJECT WAS CONSTRUCTED IN SUBSTANTIAL COMPLIANCE WITH THE FINAL AS-BUILT PLANS AND SPECIFICATIONS.

________________________________ P.E. ____________ DATE

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

CORRECT: 5/30/2023

Alfred Lopez

CONSULTING ENG. (TBPE FIRM REG. F-5713)

SUBMITTED FOR LETTING:

LOCAL PUBLIC AGENCY

RECOMMENDED FOR LETTING:

DISTRICT DESIGN ENGINEER

SUBMITTED FOR LETTING:

AREA ENGINEER

APPROVED FOR LETTING:

DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

Registered Accessibility Specialist (RAS)
Inspection Required

TDLR No. EABPRJ ____________________________

ATTACHMENT NO.___ TO SPECIAL AGREEMENT FOR CONSTRUCTION, MAINTENANCE, AND OPERATIONS OF CONTINUOUS HIGHWAY ILLUMINATION SYSTEM, DATED ________________, 20___. THE CITY-STATE CONSTRUCTION, MAINTENANCE, AND OPERATION RESPONSIBILITIES SHALL BE AS HERETOFORE AGREED TO, ACCEPTED, AND SPECIFIED IN THE AGREEMENT TO WHICH THESE PLANS ARE MADE A PART.

CITY OF ____________ TITLE ____________ DATE ____________

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON 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 2022).

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13-15	PROPOSED TYPICAL SECTIONS
16	GENERAL NOTES
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ALFREDO L. LOPEZ
101155
5/30/2023

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

MEHREEN HALANI
134322
5/30/2023

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

GEORGE H. AMEN JR
106655
5/30/2023

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

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

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CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	2

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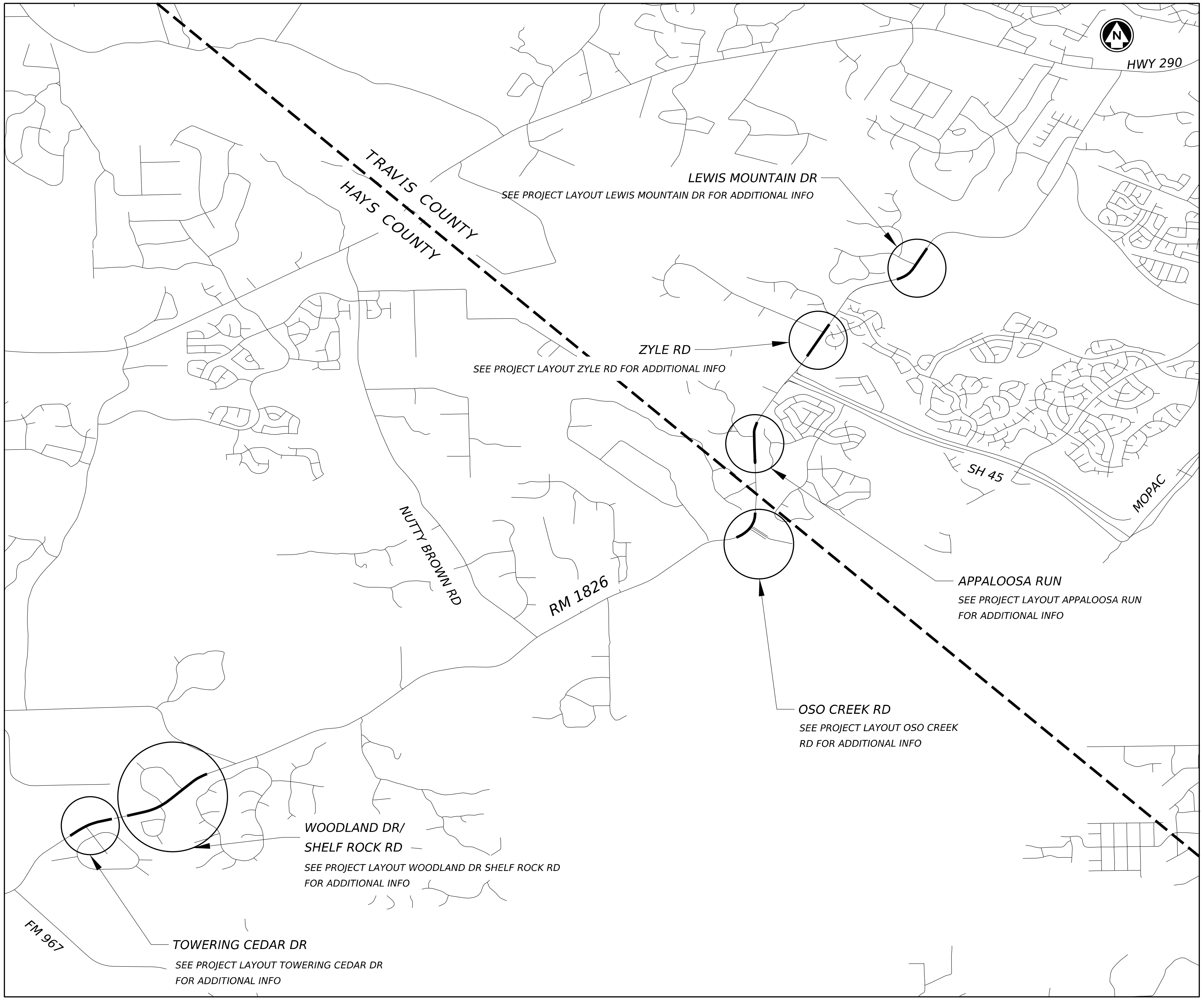

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

GARVER
3000 INTERNET BLVD
SUITE 400
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RM 1826

LOCATION KEY MAP

NTS
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		3

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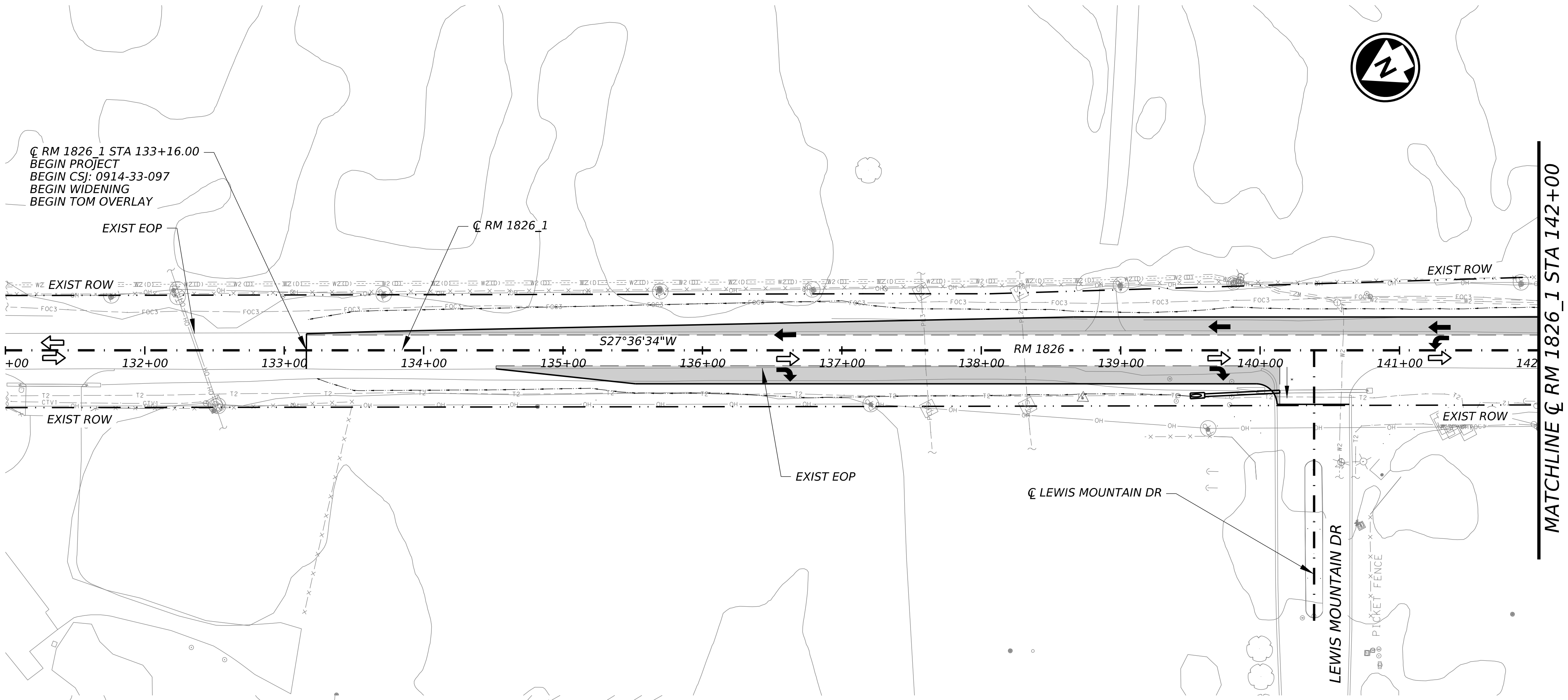

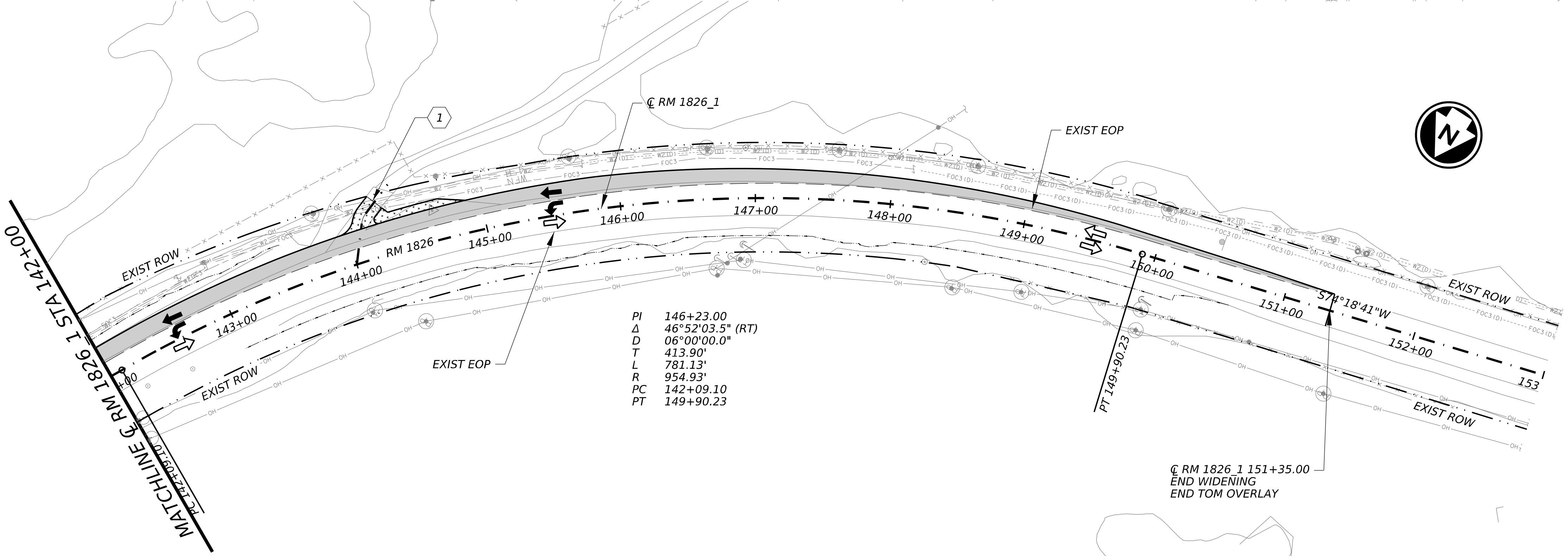

PI	146+23.00
Δ	46°52'03.5" (RT)
D	06°00'00.0"
T	413.90'
L	781.13'
R	954.93'
PC	142+09.10
PT	149+90.23

℄ RM 1826_1 151+35.00
END WIDENING
END TOM OVERLAY

LEGEND

▨	PROPOSED PAVEMENT
▒	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—·→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – – –	DRAINAGE EASEMENT
~→	FLOW ARROW
⬡ #	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

ALFREDO L. LOPEZ
101155
5/30/2023
Alfred Lopez

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

PROJECT LAYOUT
LEWIS MOUNTAIN DR

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	4

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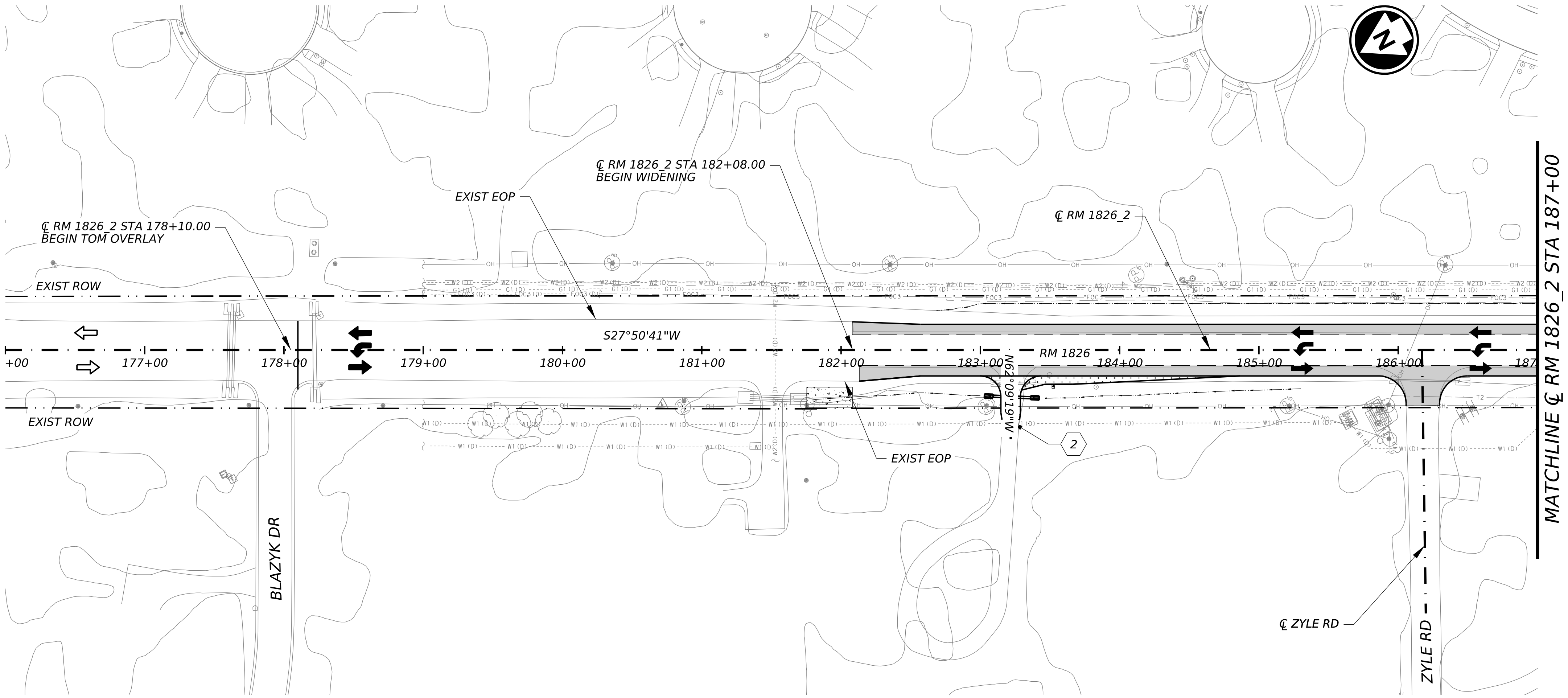

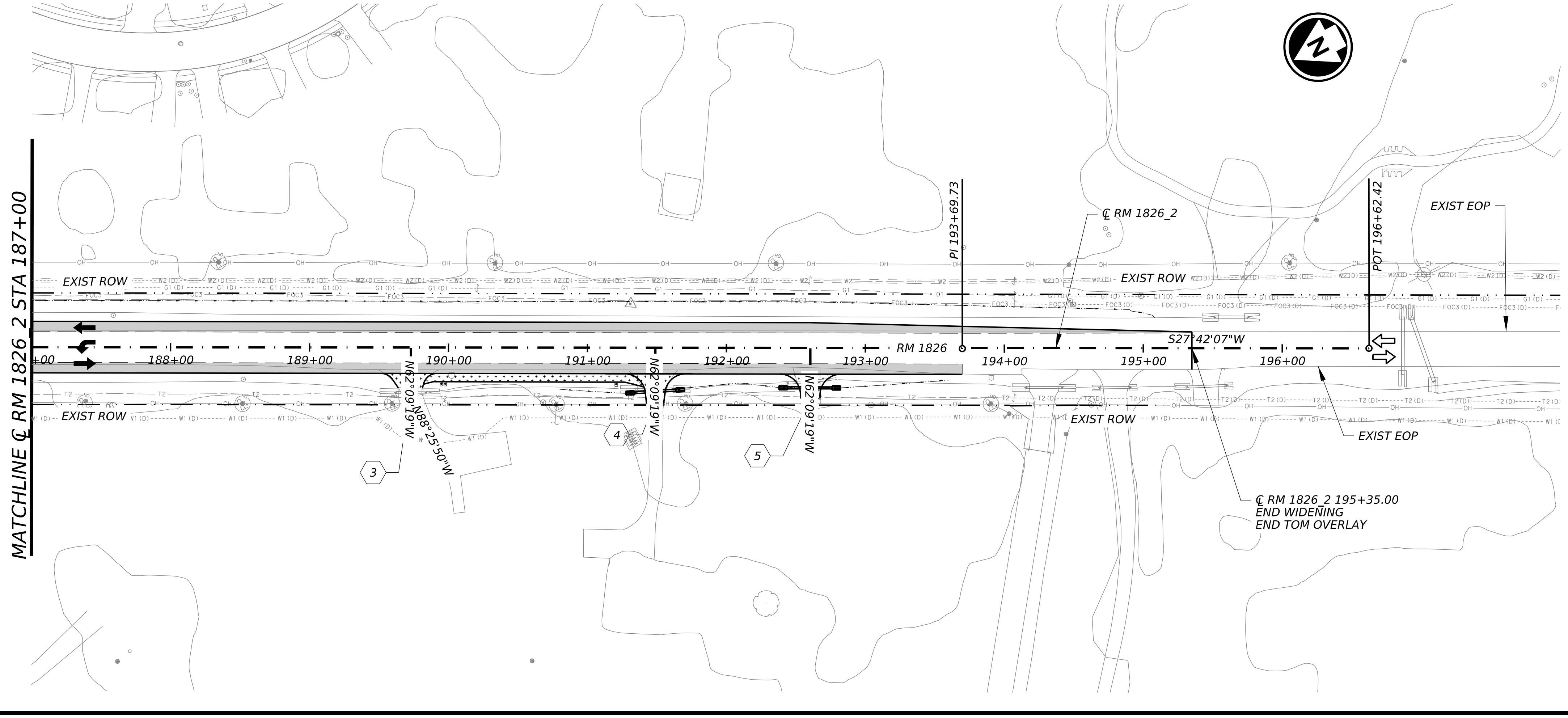

LEGEND

▨	PROPOSED PAVEMENT
▩	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸·—	PROPOSED DITCH
—·· —	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
~→	FLOW ARROW
⬡#	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

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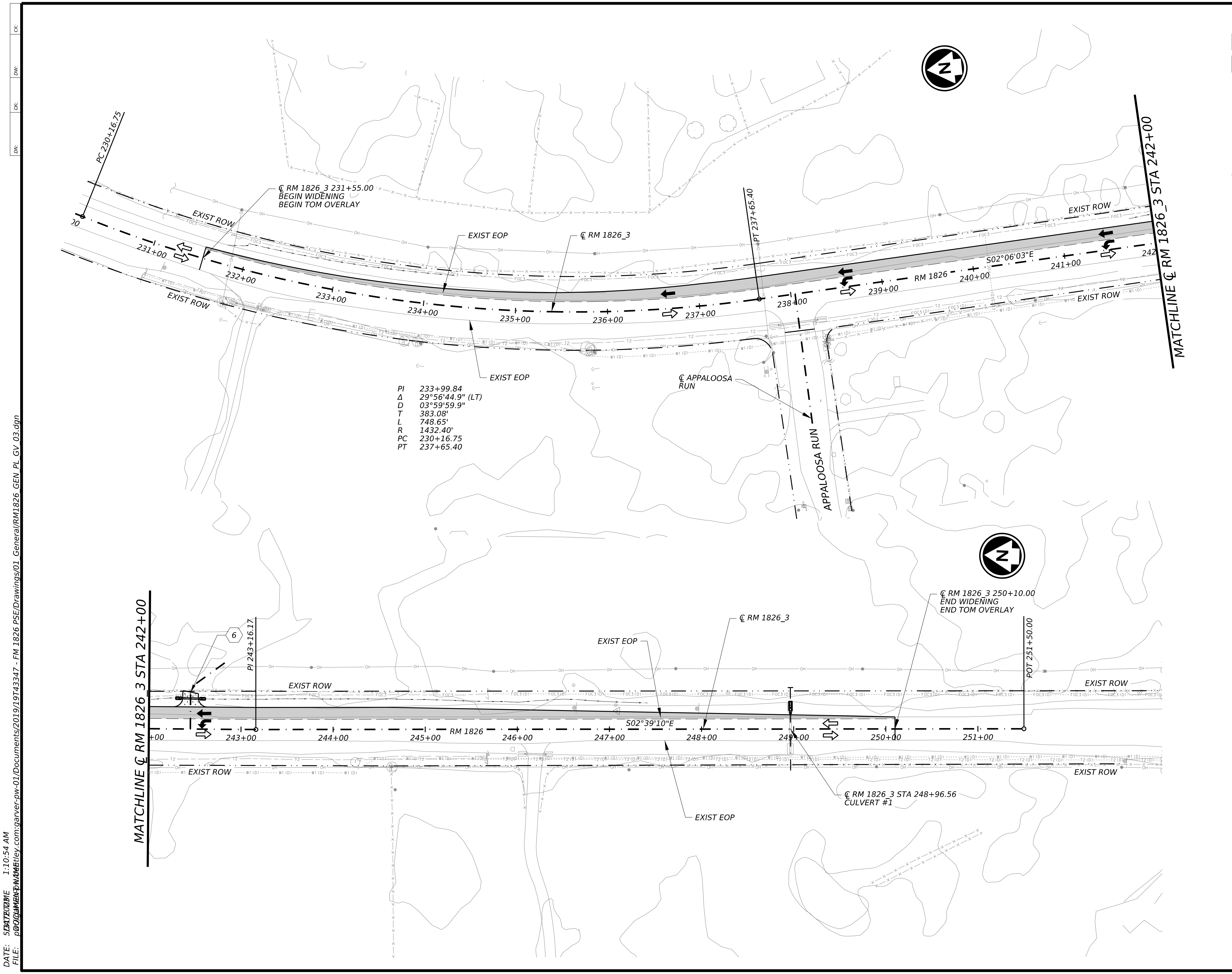
Texas Department of Transportation

RM 1826

PROJECT LAYOUT
ZYLE RD

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	5



LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—·→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW
#	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED
PROFESSIONAL ENGINEER
5/30/2023
Alfredo Lopez

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SUITE 400
FRISCO, TX 75034
(972) 377-7480
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Texas Department of Transportation

RM 1826

PROJECT LAYOUT
APPALOOSA RUN

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		6

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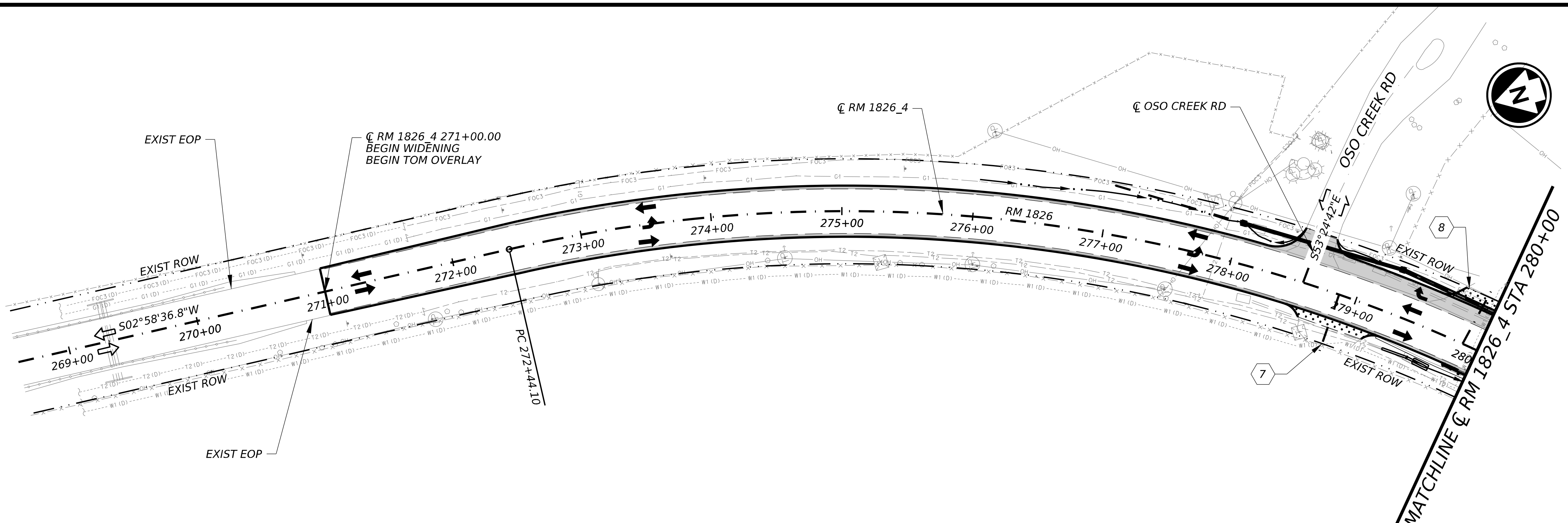
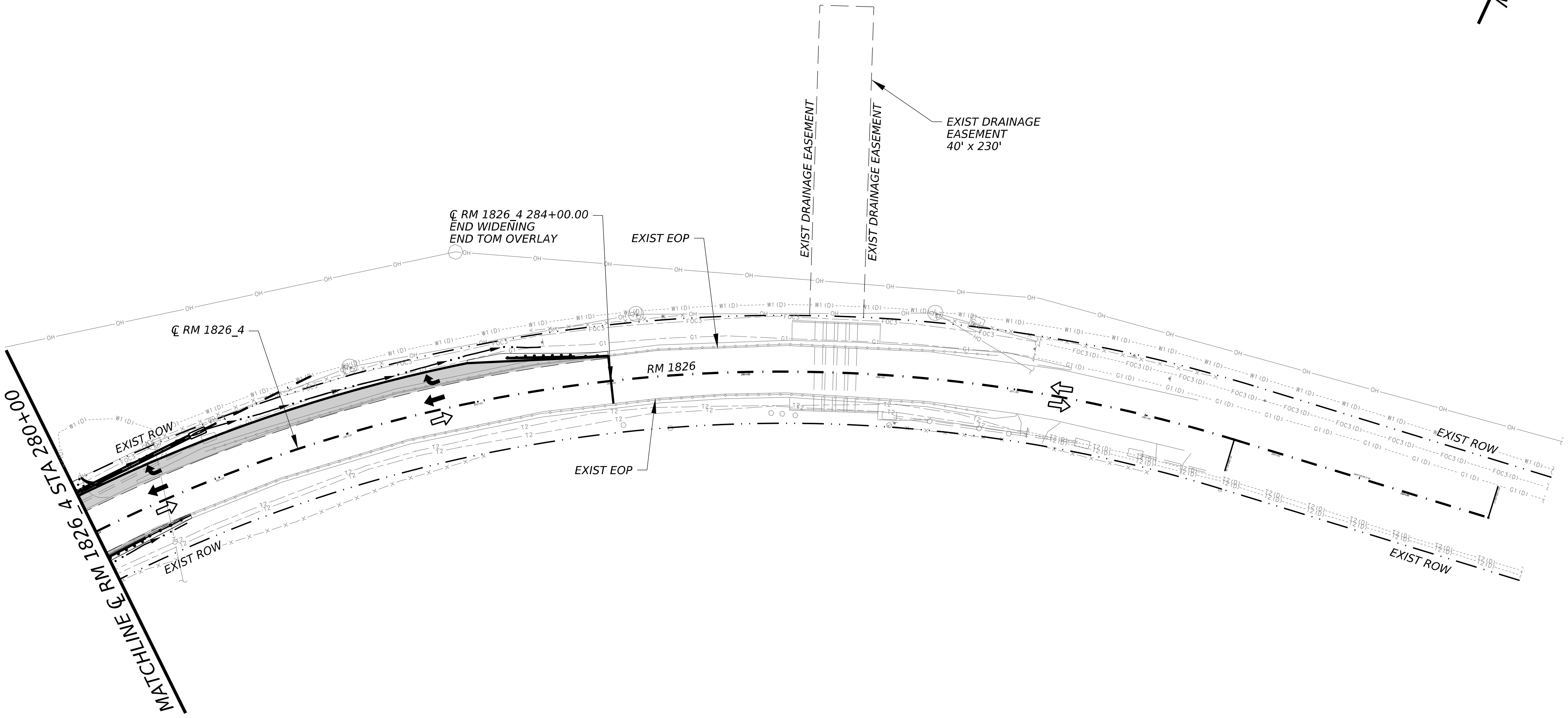


LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—·→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW
⬡ #	DRIVEWAY & CULVERT DESIGNATION



50' 0 50' 100'

HORZ. SCALE: 1" = 100'

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
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RM 1826

PROJECT LAYOUT
OSO CREEK RD

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		7

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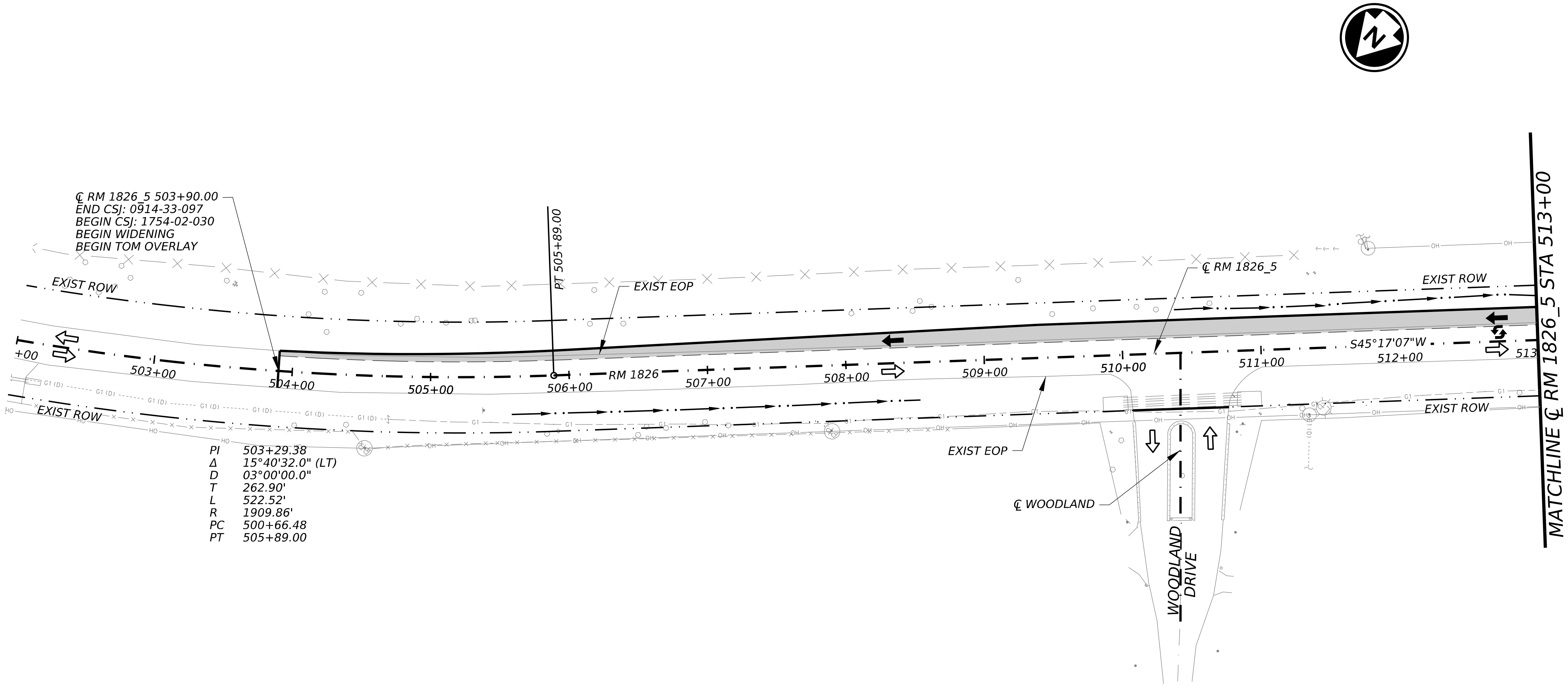

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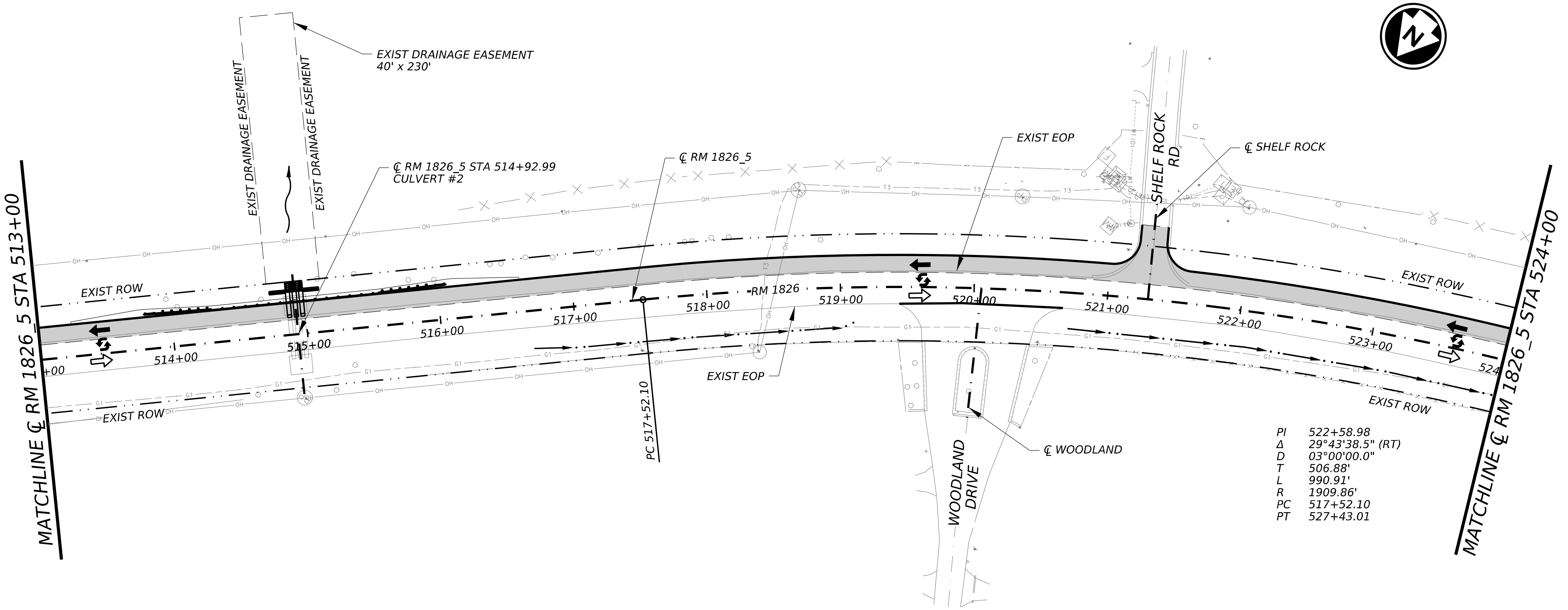
T 262.90'
L 522.52'
R 1909.86'
PC 500+66.48
PT 505+89.00



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D 03°00'00.0"
T 506.88'
L 990.91'
R 1909.86'
PC 517+52.10
PT 527+43.01

LEGEND

▨	PROPOSED PAVEMENT
▒	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸·—	PROPOSED DITCH
—··—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW
#	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED
PROFESSIONAL ENGINEER
5/30/2023
Alfred Lopez

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

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RM 1826

PROJECT LAYOUT
WOODLAND DR
SHELF ROCK RD

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	8

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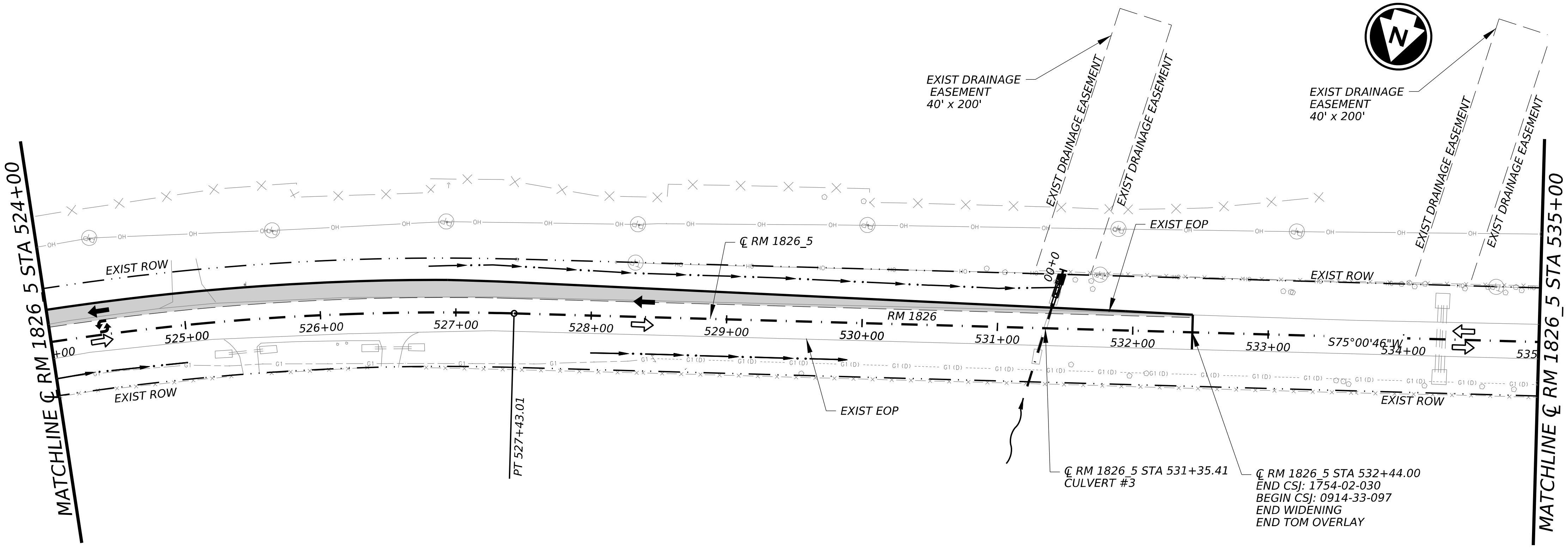

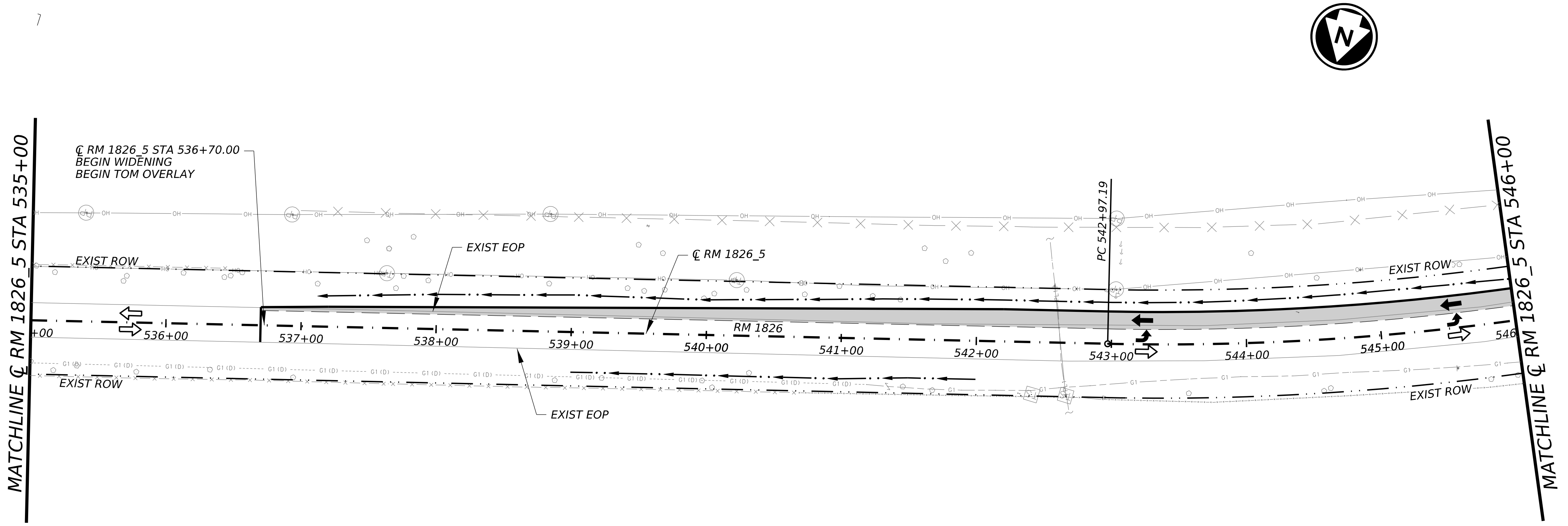

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
~→	FLOW ARROW
#	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

ALFREDO L. LOPEZ
101155
5/30/2023

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SUITE 400
FRISCO, TX 75034
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RM 1826

PROJECT LAYOUT
WOODLAND DR
SHELF ROCK RD
TOWERING CEDAR DR

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		9

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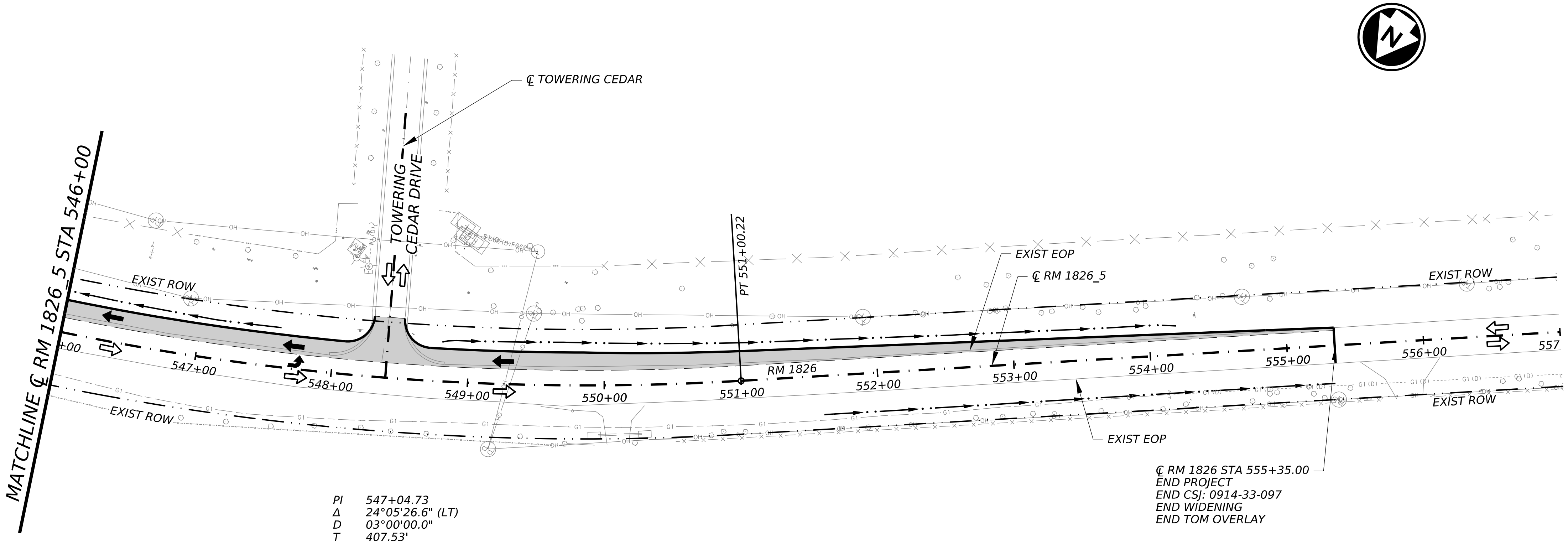

PI	547+04.73
Δ	24°05'26.6" (LT)
D	03°00'00.0"
T	407.53'
L	803.02'
R	1909.86'
PC	542+97.19
PT	551+00.22

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
~→	FLOW ARROW
⬡#	DRIVEWAY & CULVERT DESIGNATION

50' 0 50' 100'

HORZ. SCALE: 1" = 100'

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RM 1826

PROJECT LAYOUT

TOWERING CEDAR DR

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	10

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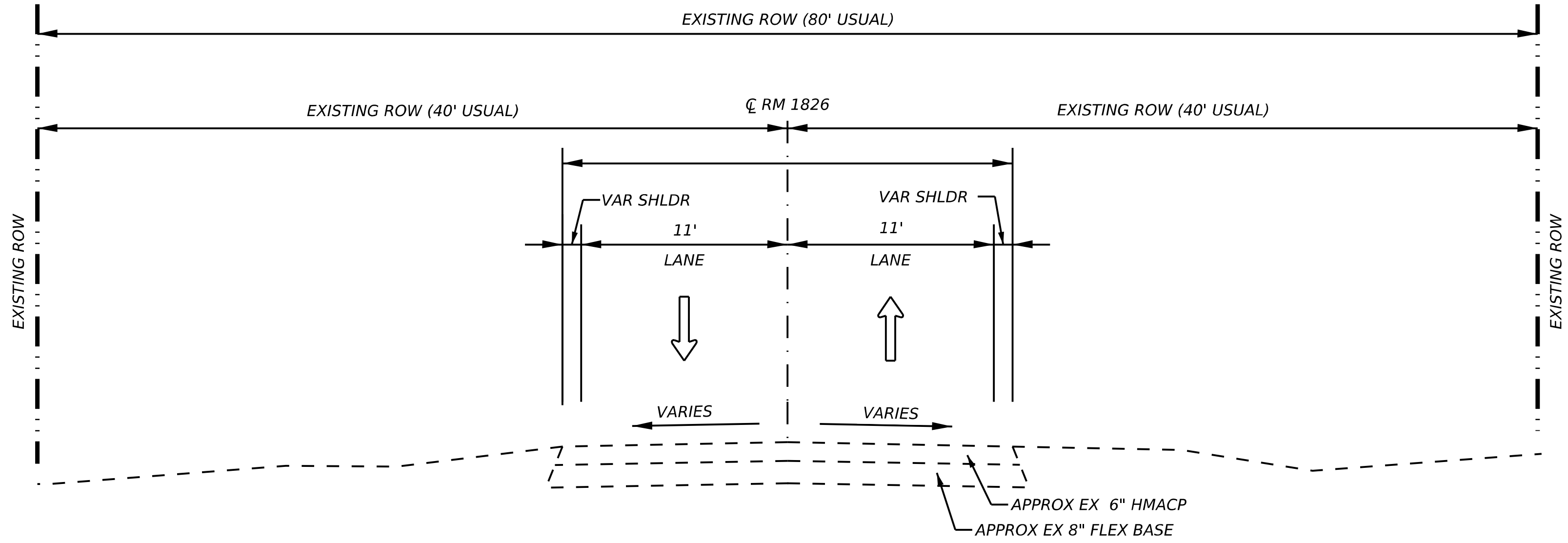
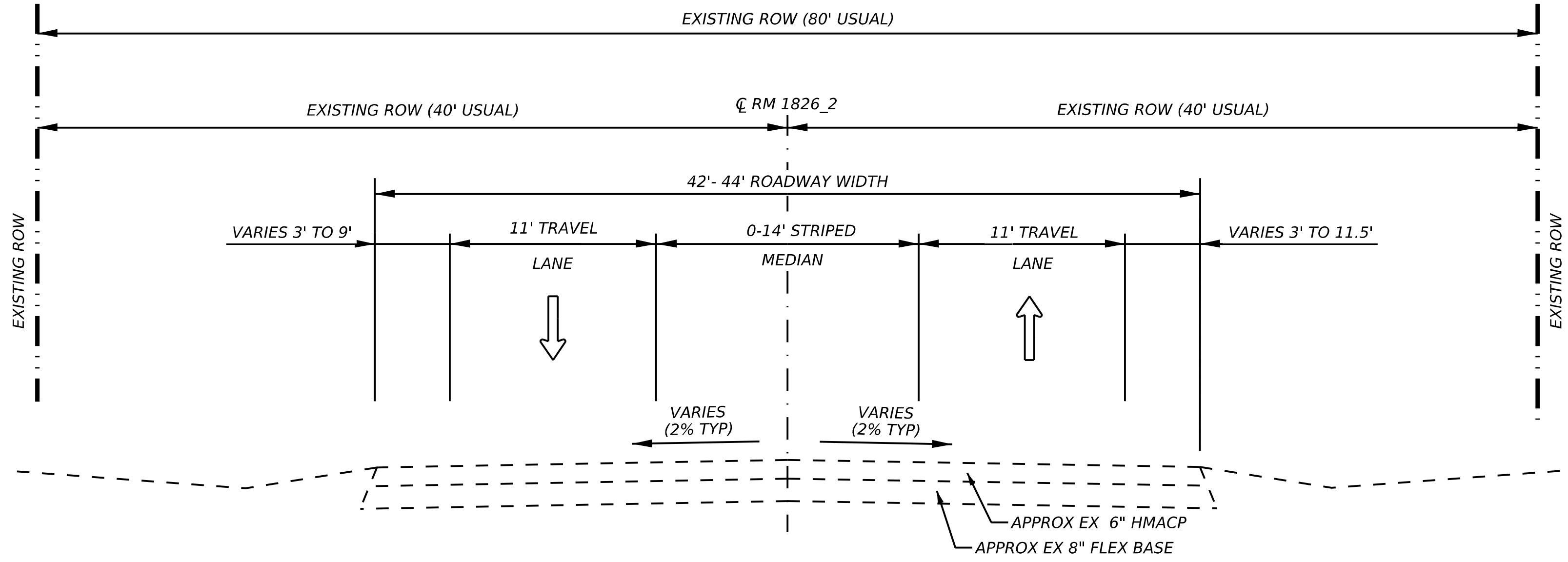


EXISTING RM 1826 TYPICAL SECTION

RM 1826 AT LEWIS MOUNTAIN DR - ℄ RM 1826_1 STA 133+16.00 TO STA 151+35.00
RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 182+08.00 TO STA 195+35.00
RM 1826 AT APPALOOSA RUN - ℄ RM 1826_3 STA 231+55.00 TO STA 250+10.00
RM 1826 AT WOODLAND/SHELF ROCK - ℄ RM 1826_5 STA 503+90.00 TO STA 532+44.00
RM 1826 AT TOWERING CEDAR DR - ℄ RM 1826_5 STA 536+70.00 TO STA 555+35.00
NTS



EXISTING RM 1826 TYPICAL SECTION

RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 178+10.00 TO STA 182+08.00
NTS

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RM 1826

EXISTING TYPICAL
SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	11

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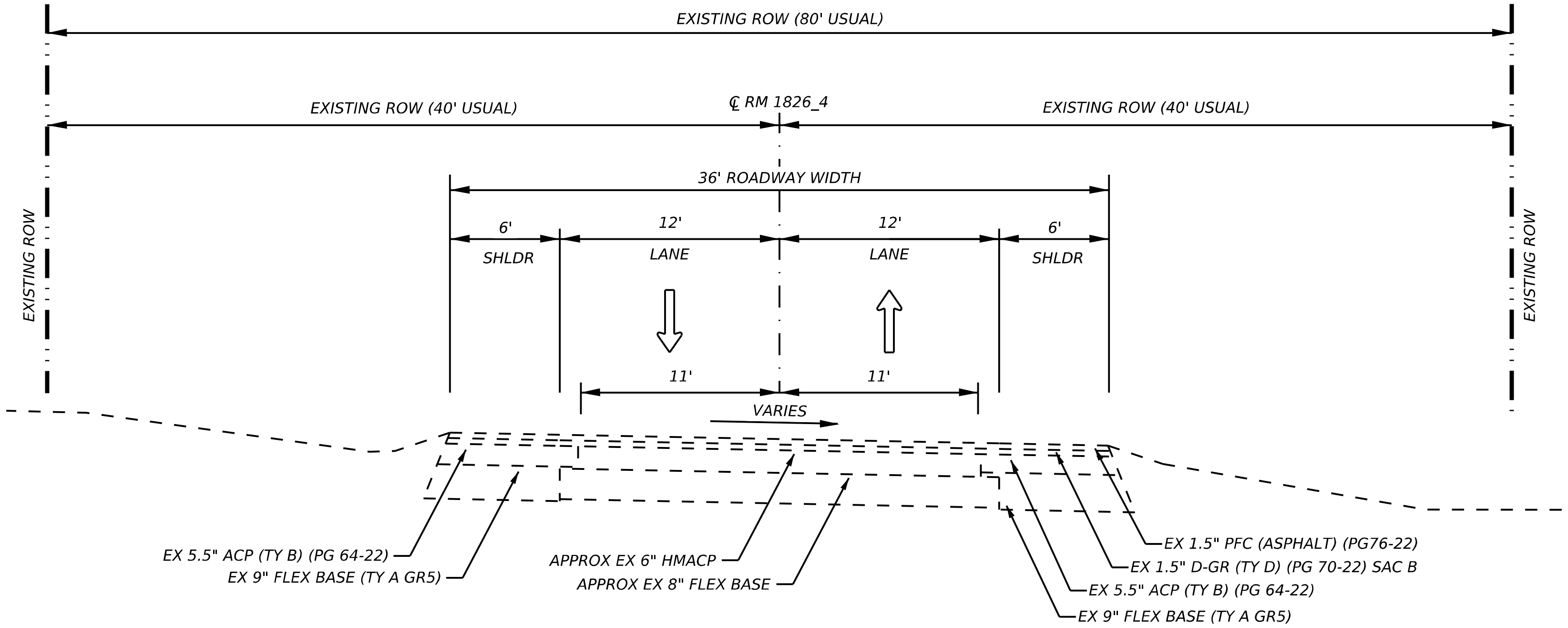

EXISTING RM 1826 TYPICAL SECTION

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 271+00.00 TO STA 284+00.00
NTS

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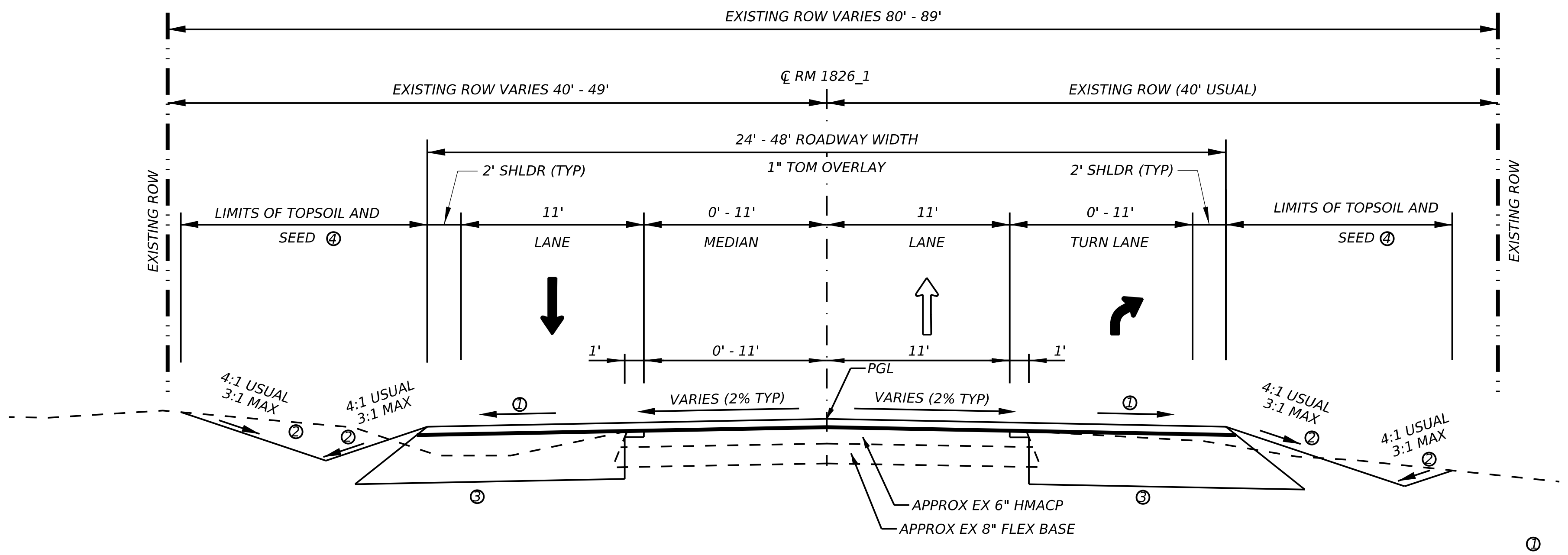
RM 1826

EXISTING TYPICAL
SECTIONS

SHEET 2 OF 2

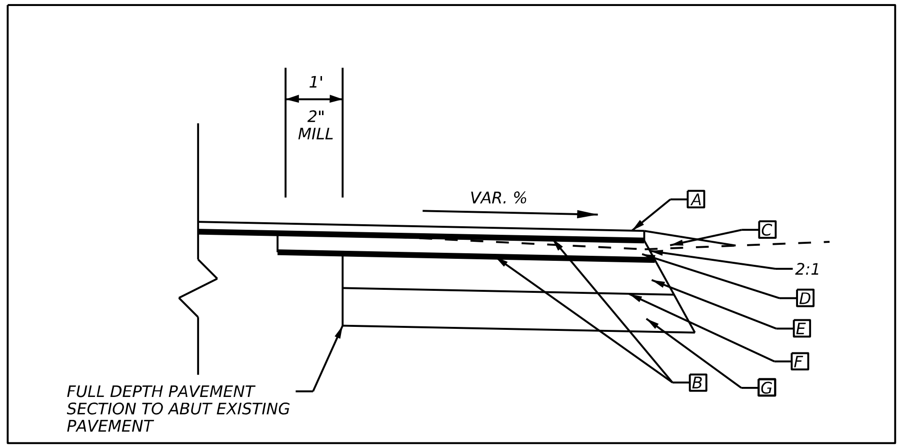
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	12



PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT LEWIS MOUNTAIN RD - ℄ RM 1826_1 STA 133+16.00 TO STA 140+14.17
NTS



PAVEMENT STRUCTURE DETAIL

NTS

A	1" TOM-C PG 76-22 SAC-B
B	BONDING COURSE
C	BACKFILL, TY A
D	2" D-GR TY D PG 76-22
E	5" D-GR TY B PG 64-22
F	PRIME COAT
G	8" SELECT FILL (TY C1)

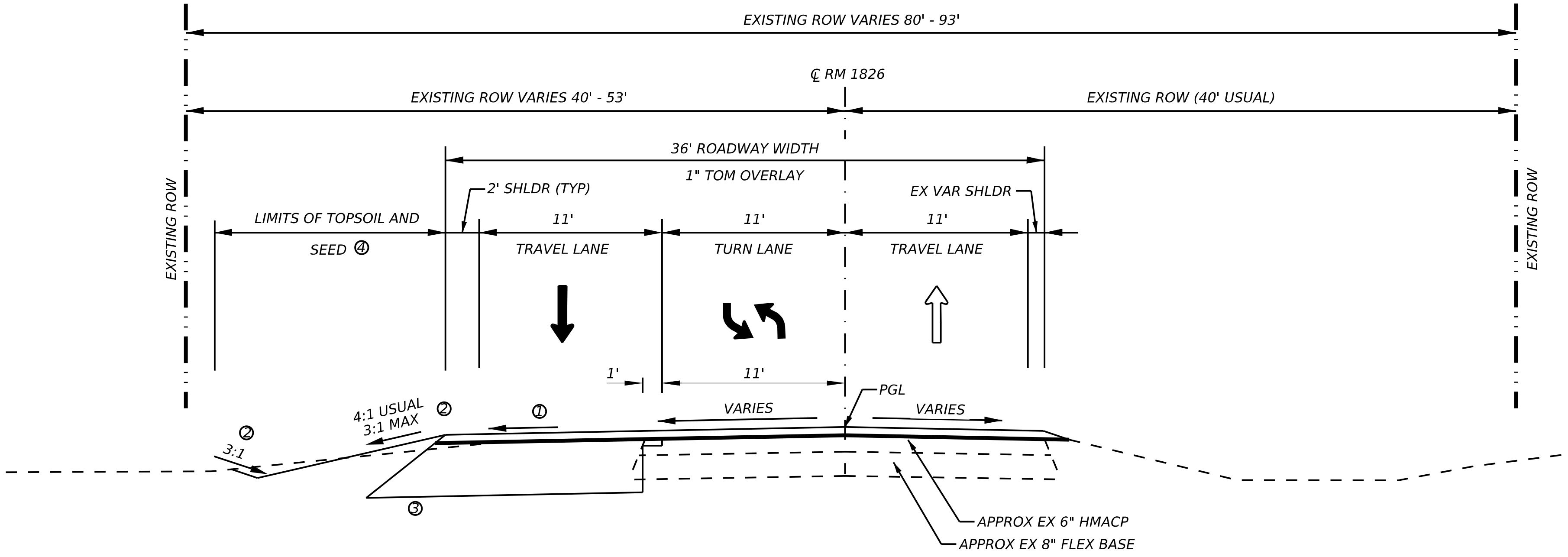
① MATCH EXISTING PAVEMENT GRADE.

② MAX FORESLOPE IS 3:1 WITHOUT MBGF. MAX BACKSLOPE IS 2:1 OUTSIDE OF CLEAR ZONE. SEE CROSS SECTIONS FOR FORESLOPE AND BACKSLOPE INFORMATION.

③ SEE PAVEMENT STRUCTURE DETAIL

④ LIMITS OF TOPSOIL & SEEDING VARY. SEE CROSS-SECTIONS FOR MORE INFORMATION. PLACE TOPSOIL AND SEEDING ON ALL DISTURBED AREAS BETWEEN THE PROPOSED EDGE OF PAVEMENT AND EXISTING GROUND.

NOTE : UNDERGROUND UTILITIES IN DITCH WILL NOT BE RELOCATED. CONTRACTOR SHALL POTHOLE AND LOCATE UTILITIES. WORK SHALL PROGRESS AROUND AND VERY CLOSE TO LIVE UTILITIES. TXDOT MAY ADJUST THICKNESS OF PAVEMENT SECTION TO PROVIDE MINIMUM OF 6 INCHES DISTANCE FROM UTILITIES. EXCAVATION AND EMBANKMENT WORK MAY BE ADJUSTED TO PROVIDE MINIMUM OF 3 INCHES OF DISTANCE FROM UTILITIES.



PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT LEWIS MOUNTAIN - ℄ RM 1826_1 STA 140+14.17 TO STA 151+35.00
RM 1826 AT APPALOOSA RUN - ℄ RM 1826_3 STA 231+55.00 TO STA 250+10.00
RM 1826 AT WOODLAND DR/SHELF ROCK - ℄ RM 1826_5 STA 503+90.00 TO STA 532+44.00
RM 1826 AT TOWERING CEDAR DR - ℄ RM 1826_5 STA 536+70.00 TO STA 555+35.00
NTS

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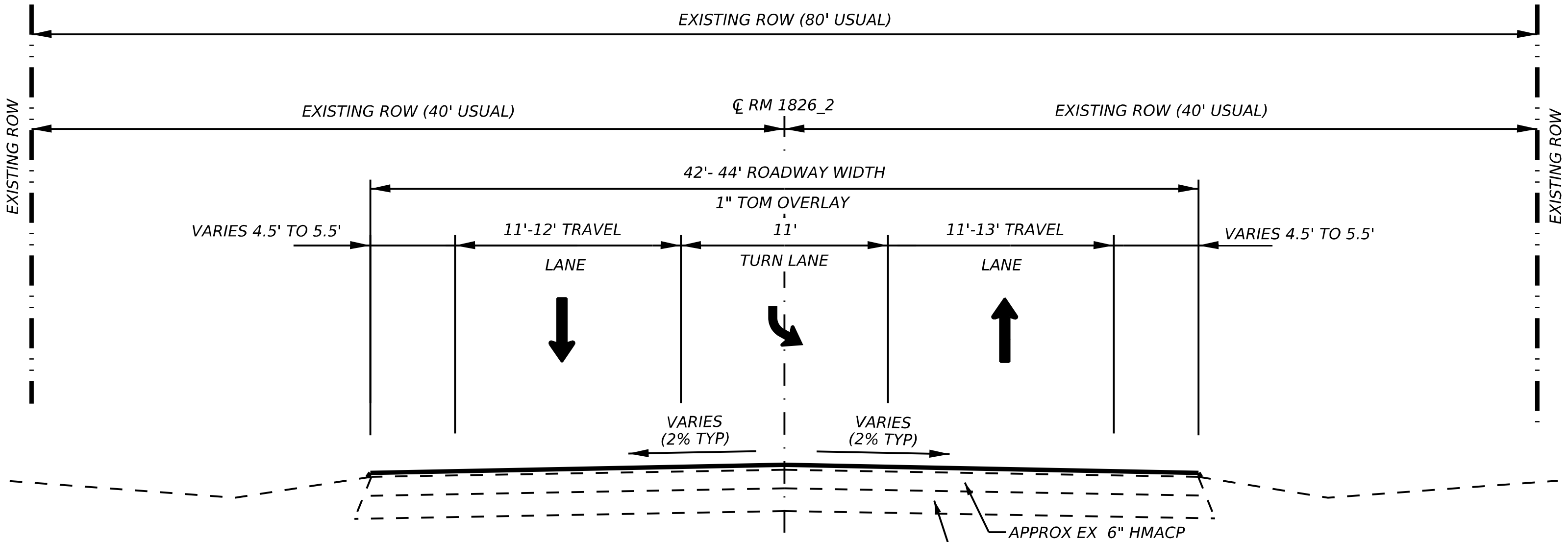
RM 1826

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 3

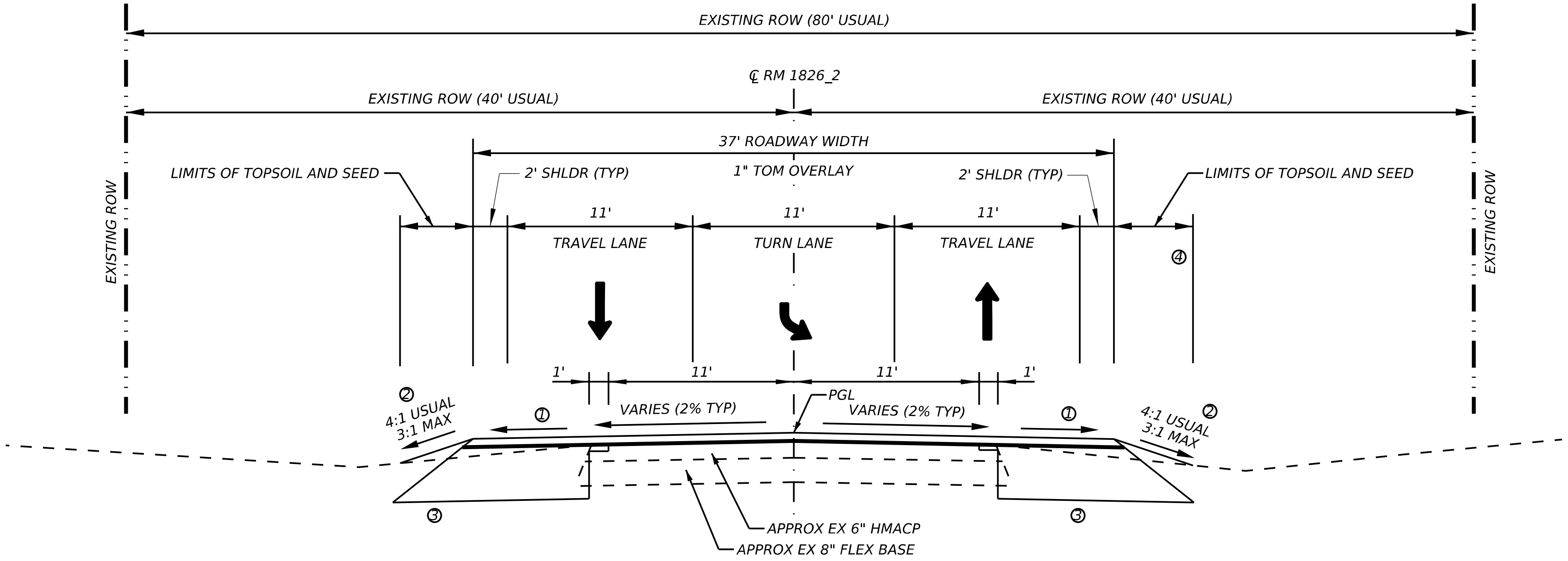
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	13



PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 178+10.00 TO STA 182+08.00
NTS

① MATCH EXISTING PAVEMENT GRADE.
② MAX FORESLOPE IS 3:1 WITHOUT MBGF.
MAX BACKSLOPE IS 2:1 OUTSIDE OF CLEAR ZONE.
SEE CROSS SECTIONS FOR FORESLOPE AND
BACKSLOPE INFORMATION.
③ SEE PAVEMENT STRUCTURE DETAIL ON SHEET 1 OF 3
④ LIMITS OF TOPSOIL & SEEDING VARY. SEE
CROSS-SECTIONS FOR MORE INFORMATION. PLACE
TOPSOIL AND SEEDING ON ALL DISTURBED AREAS
BETWEEN THE PROPOSED EDGE OF PAVEMENT
AND EXISTING GROUND.



PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 182+08.00 TO STA 195+35.00
NTS

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RM 1826

PROPOSED TYPICAL
SECTIONS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		14

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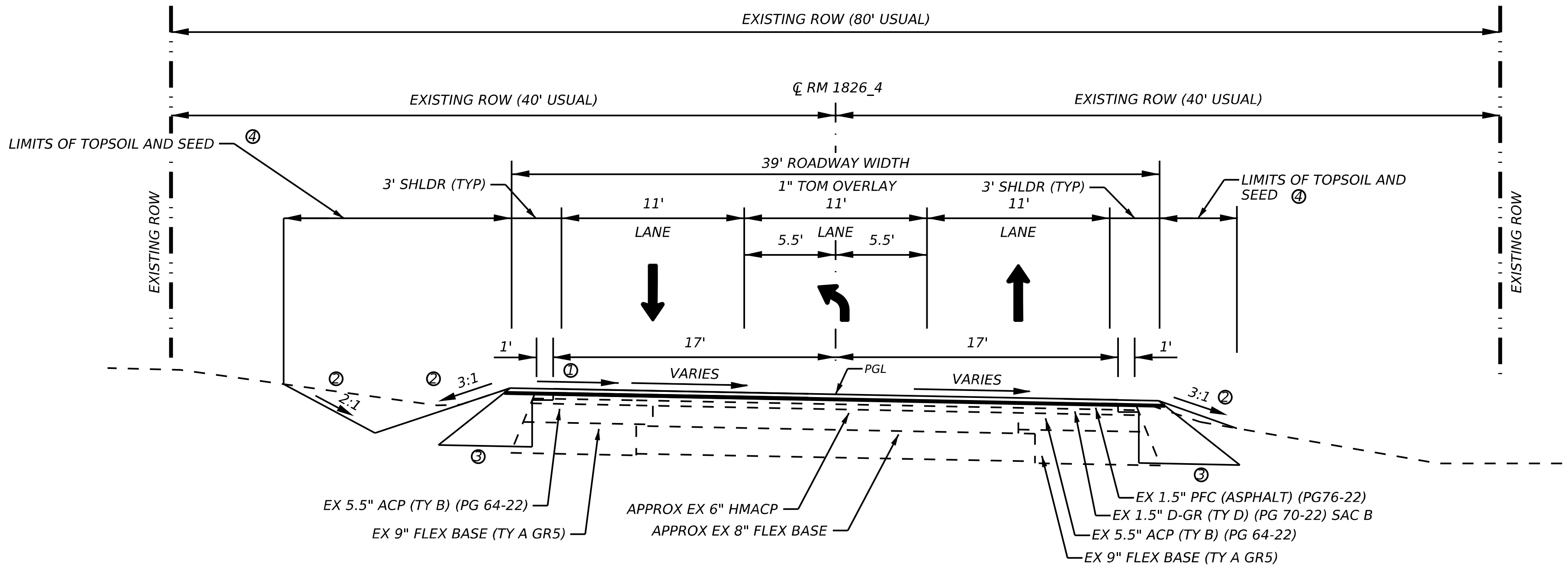
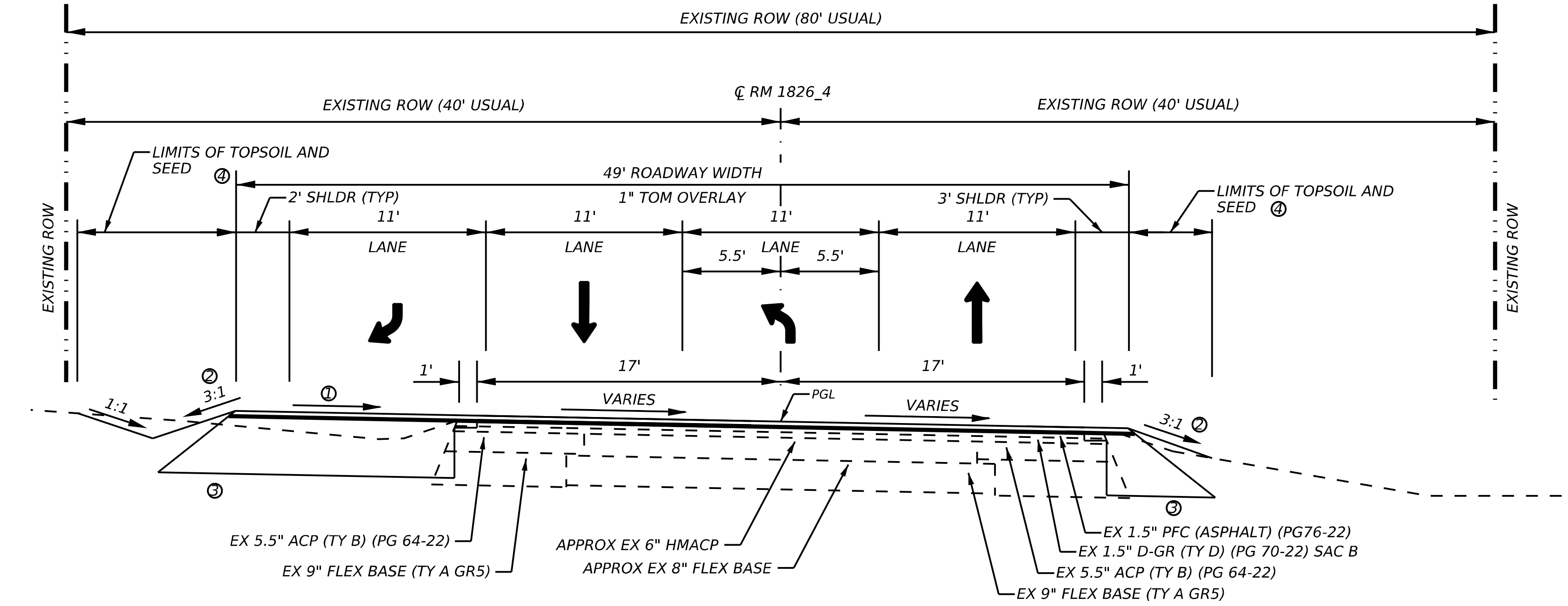


PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 271+00.00 TO STA 278+39.39
NTS

① MATCH EXISTING PAVEMENT GRADE.
② MAX FORESLOPE IS 3:1 WITHOUT MBGF.
MAX BACKSLOPE IS 2:1 OUTSIDE OF CLEAR ZONE.
SEE CROSS SECTIONS FOR FORESLOPE AND
BACKSLOPE INFORMATION.
③ SEE PAVEMENT STRUCTURE DETAIL ON SHEET 1 OF 3
④ LIMITS OF TOPSOIL & SEEDING VARY. SEE
CROSS-SECTIONS FOR MORE INFORMATION. PLACE
TOPSOIL AND SEEDING ON ALL DISTURBED AREAS
BETWEEN THE PROPOSED EDGE OF PAVEMENT
AND EXISTING GROUND.



PROPOSED RM 1826 TYPICAL SECTION

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 278+39.39 TO STA 284+00.00
NTS

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RM 1826

PROPOSED TYPICAL
SECTIONS

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		15

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Texas Department of Transportation

RM 1826

GENERAL NOTES

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	16

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-33-097

DISTRICT Austin
HIGHWAY RM 1826, Various

COUNTY Hays

			CONTROL SECTION JOB	**0914-33-097**		**1754-02-030**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00184594**		**A00184595**			
			COUNTY	**Hays**		**Hays**			
			HIGHWAY	**Various**		**RM 1826**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	87.000		29.000		116.000	
	104-6001	REMOVING CONC (PAV)	SY	100.000		24.000		124.000	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	507.000				507.000	
	105-6107	REMOVING STAB BASE & ASPH PAV(15"-16")	SY	1,913.000		521.000		2,434.000	
	110-6001	EXCAVATION (ROADWAY)	CY	3,004.000		629.000		3,633.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	1,765.000		999.000		2,764.000	
	132-6047	EMBANKMENT (FINAL)(ORD COMP)(TY C1)	CY	2,693.000		921.000		3,614.000	
	134-6001	BACKFILL (TY A)	STA	87.000		29.000		116.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	25,584.000		8,532.000		34,116.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	25,584.000		8,532.000		34,116.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	25,584.000		8,532.000		34,116.000	
	168-6001	VEGETATIVE WATERING	MG	430.000		143.000		573.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	25,584.000		8,532.000		34,116.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	2,423.000		830.000		3,253.000	
	351-6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	3,530.000		1,155.000		4,685.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	1,215.000		317.000		1,532.000	
	400-6005	CEM STABIL BKFL	CY	1.000		14.000		15.000	
	401-6001	FLOWABLE BACKFILL	CY	18.000				18.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	300.000				300.000	
	403-6001	TEMPORARY SPL SHORING	SF	50.000		79.000		129.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	8.000				8.000	
	432-6025	RIRRAP (STONE COMMON)(DRY)(15 IN)	CY			6.000		6.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	13.000		17.000		30.000	
	460-6002	CMP (GAL STL 18 IN)	LF	28.000				28.000	
	460-6003	CMP (GAL STL 24 IN)	LF	56.000				56.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	127.000				127.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	180.000		10.000		190.000	
	464-6008	RC PIPE (CL III)(36 IN)	LF			57.000		57.000	
	464-6017	RC PIPE (CL IV)(18 IN)	LF	125.000				125.000	
	465-6126	INLET (COMPL)(PSL)(FG)(3FTX3FT-3FTX3FT)	EA	2.000				2.000	
	466-6101	HEADWALL (CH - PW - 0) (DIA= 36 IN)	EA			1.000		1.000	
	467-6344	SET (TY II) (18 IN) (CMP) (3: 1) (P)	EA	1.000				1.000	
	467-6359	SET (TY II) (18 IN) (RCP) (4: 1) (P)	EA	8.000				8.000	
	467-6378	SET (TY II) (24 IN) (CMP) (4: 1) (P)	EA	1.000				1.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	1.000		1.000		2.000	
	467-6391	SET (TY II) (24 IN) (RCP) (4: 1) (P)	EA	1.000				1.000	
	480-6001	CLEAN EXIST CULVERTS	EA	5.000		4.000		9.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-33-097
DISTRICT Austin
HIGHWAY RM 1826, Various
COUNTY Hays

			CONTROL SECTION JOB	**0914-33-097**		**1754-02-030**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00184594**		**A00184595**			
			COUNTY	**Hays**		**Hays**			
			HIGHWAY	**Various**		**RM 1826**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	496-6004	REMOV STR (SET)	EA	12.000				12.000	
	496-6007	REMOV STR (PIPE)	LF	430.000				430.000	
	500-6001	MOBILIZATION	LS	0.770		0.230		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	14.000				14.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	30.000		139.000		169.000	
	506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	254.000				254.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	284.000		139.000		423.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	1,792.000		672.000		2,464.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	1,792.000		672.000		2,464.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	6,224.000				6,224.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	6,224.000				6,224.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	90.000				90.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	90.000				90.000	
	530-6004	DRIVEWAYS (CONC)	SY	59.000				59.000	
	530-6005	DRIVEWAYS (ACP)	SY	492.000				492.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	63.000		75.000		138.000	
	540-6033	MTL BM GD FEN (LONG SPAN SYSTEM)	EA			1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	302.000				302.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000				2.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA	4.000				4.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	28.000		7.000		35.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	9.000		2.000		11.000	
	644-6037	IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	EA	1.000				1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	9.000				9.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	4.000		6.000		10.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	13.000		3.000		16.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	11,312.000		2,854.000		14,166.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	7,592.000				7,592.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	3,146.000				3,146.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	1,713.000		571.000		2,284.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	140.000				140.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	3,616.000		150.000		3,766.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	76.000		78.000		154.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	25.000		9.000		34.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	25.000		1.000		26.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	17,219.000		5,406.000		22,625.000	

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DISTRICT	COUNTY	CCSJ	SHEET
Austin	Hays	0914-33-097	17 A

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-33-097 **DISTRICT** Austin **COUNTY** Hays
HIGHWAY RM 1826, Various

			CONTROL SECTION JOB	**0914-33-097**		**1754-02-030**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00184594**		**A00184595**			
			COUNTY	**Hays**		**Hays**			
			HIGHWAY	**Various**		**RM 1826**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF			2,833.000		2,833.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	33,582.000		7,857.000		41,439.000	
	672-6007	REFL PAV MRKR TY I-C	EA	184.000		8.000		192.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	1,362.000		730.000		2,092.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	18,904.000		2,854.000		21,758.000	
	730-6107	FULL - WIDTH MOWING	CYC	2.000				2.000	
	734-6002	LITTER REMOVAL	CYC	2.000				2.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	2,891.000		1,024.000		3,915.000	
	3076-6050	D-GR HMA TY-D SAC-B PG76-22	TON	1,181.000		415.000		1,596.000	
	3076-6051	D-GR HMA TY-D PG76-22 (LEVEL-UP)	TON	200.000		65.000		265.000	
	3081-6008	TOM-C PG76-22 SAC-B	TON	1,997.000		653.000		2,650.000	
	3084-6001	BONDING COURSE	GAL	4,144.000		1,379.000		5,523.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000				2.000	
	6185-6002	TMA (STATIONARY)	DAY	524.000		80.000		604.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	90.000		14.000		104.000	
	7251-6001	Subsurface Util Locate (Outside Rdbed)	EA	8.000		2.000		10.000	
	7251-6002	Subsurface Util Locate (Within Rdbed)	EA	4.000		1.000		5.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000				1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000				1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000				1.000	

CK:
DW:
CK:
DN:

SUMMARY OF TRAFFIC CONTROL QUANTITIES

SHEET NO.	LOCATION	500 6001	502 6001	662 6004	662 6034	662 6063	662 6110	677 6001	6001 6002	6185 6002	6185 6003
		MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK SHT TERM (TAB)TY Y	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		LS	MO	LF	LF	LF	EA	LF	EA	DAY	HR
LEWIS MOUNTAIN DRIVE 0914-33-097											
SHEET 1 OF 4	BEGIN TO STA 136+50			668	668	334	67	1336			
SHEET 2 OF 4	STA 136+50 TO STA 142+00			1100	1100	550	110	2200			
SHEET 3 OF 4	STA 142+00 TO STA 147+50			1100	1100	550	110	2200			
SHEET 4 OF 4	STA 147+50 TO END			770	770	385	77	1540			
	SUBTOTAL	0	0	3638	3638	1819	364	7276	0	0	0
ZYLE RD 0914-33-097											
SHEET 1 OF 4	BEGIN TO STA 181+50			534	534		68	1068			
SHEET 2 OF 4	STA 181+50 TO STA 187+00			1100	1100	492	110	2200			
SHEET 3 of 4	STA 187+00 TO STA 192+50			1100	1100	550	110	2200			
SHEET 4 OF 4	STA 192+50 TO END			1220	1220	285	57	2440			
	SUBTOTAL	0	0	3954	3954	1327	345	7908	0	0	0
APPALOOSA RUN 0914-33-097											
SHEET 1 OF 4	BEGIN TO STA 234+50			295			59	295			
SHEET 2 OF 4	STA 234+50 TO STA 240+00			550			110	550			
SHEET 3 OF 4	STA 240+00 TO STA 245+50			550			110	550			
SHEET 4 OF 4	STA 245+50 TO END			460			92	460			
	SUBTOTAL	0	0	1855	0	0	371	1855	0	0	0
OSO CREEK RD 0914-33-097											
SHEET 1 OF 3	BEGIN TO STA 275+50						90				
SHEET 2 OF 3	STA 275+50 TO STA 281+00						110				
SHEET 3 OF 3	STA 281+00 TO END						60				
	SUBTOTAL	0	0	0	0	0	260	0	0	0	0
WOODLAND DR / SHELF ROCK RD 1754-02-030											
SHEET 1 OF 6	BEGIN TO STA 507+50			360			72	360			
SHEET 2 OF 6	STA 507+50 TO STA 513+00			550			110	550			
SHEET 3 OF 6	STA 513+00 TO STA 518+50			550			110	550			
SHEET 4 OF 6	STA 518+50 TO STA 524+00			550			110	550			
SHEET 5 OF 6	STA 524+00 TO STA 529+50			550			110	550			
SHEET 6 OF 6	STA 529+50 TO END			294			59	294			
	SUBTOTAL	0	0	2854	0	0	571	2854	0	0	0
TOWERING CEDAR DR 0914-33-097											
SHEET 1 OF 4	BEGIN TO STA 540+50			380			76	380			
SHEET 2 OF 4	STA 540+50 TO STA 546+00			550			110	550			
SHEET 3 OF 4	STA 546+00 TO STA 551+50			550			110	550			
SHEET 4 OF 4	STA 551+50 TO END			385			77	385			
	SUBTOTAL	0	0	1865	0	0	373	1865	0	0	0
	CSJ 0914-33-097	1	14	11312	7592	3146	1713	18904	2	524	90
	CSJ 1754-02-030	1	0	2854	0	0	571	2854	0	80	14
	PROJECT TOTALS	2	14	14166	7592	3146	2284	21758	2	604	104

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3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

SUMMARY OF QUANTITIES

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	18

CK:
DW:
CK:
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SUMMARY OF ROADWAY QUANTITIES

SHEET NO.	LOCATION	100 6002	104 6001	104 6054	105 6107	110 6001	132 6003	132 6047	134 6001	310 6001	351 6004	354 6045	432 6002	432 6045	530 6004	530 6005	540 6001	540 6033	542 6001	544 6001	544 6003	560 6011	730 6107	734 6002	3076 6001
		PREPARING ROW	REMOVING CONC (PAV)	REMOVING CONCRETE (MOW STRIP)	REMOVING STAB BASE & ASPH PAV(15"-16")	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP)(TY B)	EMBANKMENT (FINAL) (ORD COMP) (TY C1)	BACKFILL (TY A)	PRIME COAT (MULTI OPTION)	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	PLANE ASPH CONC PAV (2")	RIPRAP (CONC)(5 IN)	RIPRAP (MOW STRIP)(4 IN)	DRIVEWAYS (CONC)	DRIVEWAYS (ACP)	MTL W-BEAM GD FEN (TIM POST)	MTL BM GD FEN (LONG SPAN SYSTEM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	MAILBOX INSTALL-S (TWW-POST) TY 4	FULL - WIDTH MOWING	LITTER REMOVAL	D-GR HMA TY-B PG64-22
		STA	SY	LF	SY	CY	CY	CY	STA	GAL	SY	SY	CY	CY	SY	SY	LF	EA	LF	EA	EA	EA	CYC	CYC	TON
LEWIS MOUNTAIN DRIVE 0914-33-097																									
SHEET 1 OF 4	BEGIN TO STA 136+50	3.5			31			113	3.5	101	127	59											2	2	118
SHEET 2 OF 4	STA 136+50 TO STA 142+00	5.5	7		164			321	5.5	289	283	105													360
SHEET 3 OF 4	STA 142+00 TO STA 147+50	5.5			285			197	5.5	177	221	62				80									221
SHEET 4 OF 4	STA 147+50 TO END	4			26			73	4	66	126	43													74
	SUBTOTAL	18.5	7	0	506	0	0	704	18.5	633	757	269	0	0	0	80	0	0	0	0	0	0	2	2	773
ZYLE RD 0914-33-097																									
SHEET 1 OF 4	BEGIN TO STA 181+50	3.5						0	3.5	0	166														0
SHEET 2 OF 4	STA 181+50 TO STA 187+00	5.5	73		141			242	5.5	217	241	110	8		59	64						1			259
SHEET 3 OF 4	STA 187+00 TO STA 192+50	5.5			245			249	5.5	224	228	122				175						3			264
SHEET 4 OF 4	STA 192+50 TO END	3			53			70	3	63	103	46				38									70
	SUBTOTAL	17.5	73	0	439	0	0	561	17.5	504	738	278	8	0	59	277	0	0	0	0	0	4	0	0	593
APPALOOSA RUN 0914-33-097																									
SHEET 1 OF 4	BEGIN TO STA 234+50	3			38			47	3	43	101	33													47
SHEET 2 OF 4	STA 234+50 TO STA 240+00	5.5			101			182	5.5	164	235	61													203
SHEET 3 OF 4	STA 240+00 TO STA 245+50	5.5			130			197	5.5	177	222	61				35									222
SHEET 4 OF 4	STA 245+50 TO END	5			30			96	5	86	154	51													99
	SUBTOTAL	19	0	0	299	0	0	522	19	470	712	206	0	0	0	35	0	0	0	0	0	0	0	0	571
OSO CREEK RD 0914-33-097																									
SHEET 1 OF 3	BEGIN TO STA 275+50	4.5			42			88	4.5	79	194	100													72
SHEET 2 OF 3	STA 275+50 TO STA 281+00	5.5		202	268			182	5.5	164	272	120		7		100	38		43	1	1				182
SHEET 3 OF 3	STA 281+00 TO END	3		305	10			91	3	82	148	34		6			25		259	1	1				100
	SUBTOTAL	13	0	507	320	0	0	361	13	325	614	254	0	13	0	100	63	0	302	2	2	0	0	0	354
WOODLAND DR / SHELF ROCK RD- 1754-02-030																									
SHEET 1 OF 6	BEGIN TO STA 507+50	4			81			74	4	67	123	40													78
SHEET 2 OF 6	STA 507+50 TO STA 513+00	5.5			56			192	5.5	173	248	61													215
SHEET 3 OF 6	STA 513+00 TO STA 518+50	5.5			53			200	5.5	180	225	61		17			75	1		2					225
SHEET 4 OF 6	STA 518+50 TO STA 524+00	5.5	24		159			222	5.5	200	236	61													251
SHEET 5 OF 6	STA 524+00 TO STA 529+50	5.5			138			184	5.5	166	227	61													206
SHEET 6 OF 6	STA 529+50 TO END	3			34			49	3	44	96	33													49
	SUBTOTAL	29	24	0	521	0	0	921	29	830	1155	317	0	17	0	0	75	1	0	2	0	0	0	0	1024
TOWERING CEDAR DR 0914-33-097																									
SHEET 1 OF 4	BEGIN TO STA 540+50	4			43			75	4	68	129	43													78
SHEET 2 OF 4	STA 540+50 TO STA 546+00	5.5			84			192	5.5	173	223	61													215
SHEET 3 OF 4	STA 546+00 TO STA 551+50	5.5	20		203			206	5.5	185	228	61													233
SHEET 4 OF 4	STA 551+50 TO END	4			19			72	4	65	129	43													74
	SUBTOTAL	19	20	0	349	0	0	545	19	491	709	208	0	0	0	0	0	0	0	0	0	0	0	0	600
	CSJ 0914-33-097	87	100	507	1913	3004	1765	2693	87	2423	3530	1215	8	13	59	492	63	0	302	2	2	4	2	2	2891
	CSJ 1754-02-030	29	24	0	521	629	999	921	29	830	1155	317	0	17	0	0	75	1	0	2	0	0	0	0	1024
	PROJECT TOTALS	116	124	507	2434	3633	2764	3614	116	3253	4685	1532	8	30	59	492	138	1	302	4	2	4	2	2	3915

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SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

SUMMARY OF QUANTITIES

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		19

SUMMARY OF ROADWAY QUANTITIES

SHEET NO.	LOCATION	3076 6050	3076 6051	3081 6008	3084 6001	7251 6001	7251 6002
		D-GR HMA TY-D SAC-B PG76-22	D-GR HMA TY-D PG76-22 (LEVEL-UP)	TOM-C PG76-22 SAC-B	BONDING COURSE	SUBSURFACE UTIL LOCATE (OUTSIDE RDBED)	SUBSURFACE UTIL LOCATE (WITHIN RDBED)
		TON	TON	TON	GAL	EA	EA
LEWIS MOUNTAIN DRIVE 0914-33-097							
SHEET 1 OF 4	BEGIN TO STA 136+50	48	7	72	154	8	4
SHEET 2 OF 4	STA 136+50 TO STA 142+00	146	16	160	374		
SHEET 3 OF 4	STA 142+00 TO STA 147+50	89	13	125	272		
SHEET 4 OF 4	STA 147+50 TO END	31	7	71	138		
	SUBTOTAL	314	43	428	938	8	4
ZYLE RD 0914-33-097							
SHEET 1 OF 4	BEGIN TO STA 181+50	0	9	94	149		
SHEET 2 OF 4	STA 181+50 TO STA 187+00	106	14	136	304		
SHEET 3 OF 4	STA 187+00 TO STA 192+50	108	13	129	293		
SHEET 4 OF 4	STA 192+50 TO END	29	6	58	117		
	SUBTOTAL	243	42	417	863	0	0
APPALOOSA RUN 0914-33-097							
SHEET 1 OF 4	BEGIN TO STA 234+50	19	6	57	107		
SHEET 2 OF 4	STA 234+50 TO STA 240+00	83	13	133	280		
SHEET 3 OF 4	STA 240+00 TO STA 245+50	90	12	126	274		
SHEET 4 OF 4	STA 245+50 TO END	41	9	87	171		
	SUBTOTAL	233	40	403	832	0	0
OSO CREEK RD 0914-33-097							
SHEET 1 OF 3	BEGIN TO STA 275+50	31	11	110	200		
SHEET 2 OF 3	STA 275+50 TO STA 281+00	75	15	154	306		
SHEET 3 OF 3	STA 281+00 TO END	41	9	84	167		
	SUBTOTAL	147	35	348	673	0	0
WOODLAND DR / SHELF ROCK RD- 1754-02-030							
SHEET 1 OF 6	BEGIN TO STA 507+50	32	7	70	137	2	1
SHEET 2 OF 6	STA 507+50 TO STA 513+00	87	14	140	294		
SHEET 3 OF 6	STA 513+00 TO STA 518+50	91	13	127	277		
SHEET 4 OF 6	STA 518+50 TO STA 524+00	102	13	134	296		
SHEET 5 OF 6	STA 524+00 TO STA 529+50	83	13	128	272		
SHEET 6 OF 6	STA 529+50 TO END	20	5	54	103		
	SUBTOTAL	415	65	653	1379	2	1
TOWERING CEDAR DR 0914-33-097							
SHEET 1 OF 4	BEGIN TO STA 540+50	32	7	73	142		
SHEET 2 OF 4	STA 540+50 TO STA 546+00	87	13	126	272		
SHEET 3 OF 4	STA 546+00 TO STA 551+50	95	13	129	283		
SHEET 4 OF 4	STA 551+50 TO END	30	7	73	141		
	SUBTOTAL	244	40	401	838	0	0
	CSJ 0914-33-097	1181	200	1997	4144	8	4
	CSJ 1754-02-030	415	65	653	1379	2	1
	PROJECT TOTALS	1596	265	2650	5523	10	5

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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

SUMMARY OF QUANTITIES

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		20

CK:
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SUMMARY OF EARTHWORK QUANTITIES

PROJECT	STATION	110 6001	132 6004
		EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY B)
		CY	CY
CSJ: 0914-33-097			
LEWIS MOUNTAIN DR	133+16.00	0	0
	134+00.00	20	16
	135+00.00	37	29
	136+00.00	41	24
	137+00.00	42	35
	138+00.00	42	37
	139+00.00	64	27
	140+00.00	109	46
	141+00.00	92	35
	142+00.00	39	4
	143+00.00	22	40
	144+00.00	17	53
	145+00.00	17	44
	146+00.00	13	79
	147+00.00	13	90
	148+00.00	11	95
	149+00.00	56	92
	150+00.00	70	50
	151+00.00	23	14
	151+35.00	3	0
ZYLE RD	181+80.00	0	0
	182+00.00	1	0
	182+08.00	1	0
	183+00.00	31	21
	184+00.00	43	45
	185+00.00	33	41
	186+00.00	52	35
	187+00.00	52	34
	188+00.00	34	35
	189+00.00	34	33
	190+00.00	37	33
	191+00.00	38	34
	192+00.00	35	32
	193+00.00	39	29
	194+00.00	32	31
	195+00.00	16	25
	195+35.00	3	3
APPALOOSA RUN RD	231+55.00	0	0
	232+00.00	5	3
	233+00.00	37	7
	234+00.00	51	0
	235+00.00	47	1
	236+00.00	53	1
	237+00.00	57	0
	238+00.00	49	0
	239+00.00	34	0
	240+00.00	19	13
	241+00.00	10	28
	242+00.00	10	29
	243+00.00	19	30
	244+00.00	27	44
	245+00.00	23	42
	246+00.00	16	25
	247+00.00	16	29
	248+00.00	16	30
	249+00.00	15	14
	250+00.00	12	4
	250+10.00	1	0

PROJECT	STATION	110 6001	132 6004
		EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY B)
		CY	CY
OSO CREEK RD	271+00.00	0	0
	272+00.00	23	0
	273+00.00	22	0
	274+00.00	21	1
	275+00.00	26	1
	276+00.00	29	4
	277+00.00	79	3
	278+00.00	94	0
	279+00.00	83	10
	280+00.00	125	10
	281+00.00	110	9
	282+00.00	69	8
	283+00.00	57	2
	284+00.00	32	2
TOWERING CEDAR DR	536+70.00	0	0
	537+00.00	3	4
	538+00.00	13	12
	539+00.00	16	16
	540+00.00	19	17
	541+00.00	22	18
	542+00.00	23	24
	543+00.00	20	19
	544+00.00	20	9
	545+00.00	32	8
	546+00.00	41	5
	547+00.00	41	1
	548+00.00	46	0
	549+00.00	42	2
	550+00.00	28	6
	551+00.00	24	6
	552+00.00	31	8
	553+00.00	30	9
	554+00.00	23	4
	555+00.00	22	5
	555+35.00	7	2

PROJECT	STATION	110 6001	132 6004
		EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY B)
		CY	CY
CSJ: 1754-02-030	504+00.00	1	2
WOODLAND / SHELF ROCK RD	503+90.00	0	0
	504+00.00	1	2
	505+00.00	11	26
	506+00.00	15	41
	507+00.00	19	54
	508+00.00	16	58
	509+00.00	13	54
	510+00.00	13	40
	511+00.00	15	22
	512+00.00	15	17
	513+00.00	13	35
	514+00.00	14	33
	515+00.00	10	70
	516+00.00	8	76
	517+00.00	14	43
	518+00.00	22	50
	519+00.00	28	40
	520+00.00	24	27
	521+00.00	38	13
	522+00.00	40	17
	523+00.00	25	30
	524+00.00	32	32
	525+00.00	26	22
	526+00.00	12	42
	527+00.00	10	62
	528+00.00	27	42
	529+00.00	44	23
	530+00.00	49	11
	531+00.00	47	7
	532+00.00	25	6
	532+44.00	4	1
CSJ: 0914-33-097 TOTAL		3004	1765
CSJ: 1754-02-030 TOTAL		629	999
PROJECT TOTALS		3,633	2,764

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RM 1826

SUMMARY OF QUANTITIES

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		21

CK:
DW:
CK:
DN:

SUMMARY OF DRAINAGE QUANTITIES

SHEET NO.	LOCATION	400 6003	400 6005	401 6001	402 6001	403 6001	432 6025	460 6002	460 6003	464 6003	464 6005	464 6008	464 6017	465 6126	466 6101	467 6344	467 6359	467 6378	467 6390	467 6391	480 6001	496 6004	496 6007
		STRUCT EXCAV (PIPE) ①	CEM STABIL BKFL	FLOWABLE BACKFILL	TRENCH EXCAVATION PROTECTION	TEMPORARY SPL SHORING	RIRRAP (STONE COMMON)(DRY) (15 IN)	CMP (GAL STL 18 IN)	CMP (GAL STL 24 IN)	RC PIPE (CL III)(18 IN)	RC PIPE (CL III)(24 IN)	RC PIPE (CL III)(36 IN)	RC PIPE (CL IV)(18 IN)	INLET (COMPL)(PSL) (FG)(3FTX3FT-3FTX3FT)	HEADWALL (CH - PW - 0) (DIA= 36 IN)	SET (TY II) (18 IN) (CMP) (3: 1) (P)	SET (TY II) (18 IN) (RCP) (4: 1) (P)	SET (TY II) (24 IN) (CMP) (4: 1) (P)	SET (TY II) (24 IN) (RCP) (4: 1) (C)	SET (TY II) (24 IN) (RCP) (4: 1) (P)	CLEAN EXIST CULVERTS	REMOV STR (SET)	REMOV STR (PIPE)
		CY	CY	CY	LF	SF	CY	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF
LEWIS MOUNTAIN DRIVE - 0914-33-097																							
SHEET 1 OF 4	BEGIN TO STA 136+50																						
SHEET 2 OF 4	STA 136+50 TO STA 142+00								56									1			1	1	16
SHEET 3 OF 4	STA 142+00 TO STA 147+50																						
SHEET 4 OF 4	STA 147+50 TO END																						
	SUBTOTAL	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	1	0	0	1	1	16
ZYLE RD - 0914-33-097																							
SHEET 1 OF 4	BEGIN TO STA 181+50																						
SHEET 2 OF 4	STA 181+50 TO STA 187+00	14		4									31				2					4	66
SHEET 3 OF 4	STA 187+00 TO STA 192+50	13		4									34				2				1	2	30
SHEET 4 OF 4	STA 192+50 TO END	19		6									36				2						40
	SUBTOTAL	46	0	14	0	0	0	0	0	0	0	0	101	0	0	0	6	0	0	0	1	6	136
APPALOOSA RUN - 0914-33-097																							
SHEET 1 OF 4	BEGIN TO STA 234+50																						
SHEET 2 OF 4	STA 234+50 TO STA 240+00																				1		
SHEET 3 OF 4	STA 240+00 TO STA 245+50	10		4									24				2						
SHEET 4 OF 4	STA 245+50 TO END		1			50					7								1		1		
	SUBTOTAL	10	1	4	0	50	0	0	0	0	7	0	24	0	0	0	2	0	1	0	2	0	0
OSO CREEK RD - 0914-33-097																							
SHEET 1 OF 3	BEGIN TO STA 275+50																						
SHEET 2 OF 3	STA 275+50 TO STA 281+00				300			28		127	173			2		1				1		5	278
SHEET 3 OF 3	STA 281+00 TO END																						
	SUBTOTAL	0	0	0	300	0	0	28	0	127	173	0	0	2	0	1	0	0	0	1	0	5	278
WOODLAND DR / SHELF ROCK RD - 1754-02-030																							
SHEET 1 OF 6	BEGIN TO STA 507+50																						
SHEET 2 OF 6	STA 507+50 TO STA 513+00																						
SHEET 3 OF 6	STA 513+00 TO STA 518+50		11			79	4					57			1						1		
SHEET 4 OF 6	STA 518+50 TO STA 524+00																						
SHEET 5 OF 6	STA 524+00 TO STA 529+50																				2		
SHEET 6 OF 6	STA 529+50 TO END		3				2				10								1		1		
	SUBTOTAL	0	14	0	0	79	6	0	0	0	10	57	0	0	1	0	0	0	1	0	4	0	0
TOWERING CEDAR DR - 0914-33-097																							
SHEET 1 OF 4	BEGIN TO STA 540+50																						
SHEET 2 OF 4	STA 540+50 TO STA 546+00																						
SHEET 3 OF 4	STA 546+00 TO STA 551+50																				1		
SHEET 4 OF 4	STA 551+50 TO END																						
	SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	CSJ 0914-33-097	56	1	18	300	50	0	28	56	127	180	0	125	2	0	1	8	1	1	1	5	12	430
	CSJ 1754-02-030	0	14	0	0	79	6	0	0	0	10	57	0	0	1	0	0	0	1	0	4	0	0
	PROJECT TOTALS	56	15	18	300	129	6	28	56	127	190	57	125	2	1	1	8	1	2	1	9	12	430

① FOR CONTRACTOR'S INFORMATION ONLY

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RM 1826

SUMMARY OF QUANTITIES

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		22

CK:
DW:
CK:
DN:

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

SHEET NO.	LOCATION	644 6001	644 6004	644 6037	644 6076	658 6062	658 6099	666 6018	666 6036	666 6048	666 6054	666 6078	666 6309	666 6318	666 6321	672 6007	672 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)SA(U -WC)	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	INSTL OM ASSM (OM-2Z) (WFLX)GND	REFL PAV MRK TY I (W)6"(DOT) (100MIL)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I (W)(WORD) (100MIL)	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
		EA	EA	EA	EA	EA	EA	LF	LF	LF	EA	EA	LF	LF	LF	EA	EA
LEWIS MOUNTAIN DR- CSJ : 0914-33-097																	
SHEET 1 OF 2	BEGIN TO STA 143+00	4	1		2		1		672	28	5	4	1882		3174	33	158
SHEET 2 OF 2	STA 143+00 TO END	5	1	1	1				177		1	2	1678		2950	9	148
SUBTOTAL		9	2	1	3	0		0	849	28	6	6	3560	0	6124	42	14
ZYLE RD- CSJ : 0914-33-097																	
SHEET 1 OF 2	BEGIN TO STA 187+00	2	1				4		677	12	5	4	1725		2006	34	200
SHEET 2 OF 2	STA 187+00 TO END	3	1		1		6		335		2	3	1670		2620	17	262
SUBTOTAL		5	2	0	1	0	10	0	1012	12	7	7	3395	0	4626	51	462
APPALOOSA RUN - CSJ : 0914-33-097																	
SHEET 1 OF 2	BEGIN TO STA 243+00	1	1		2				413	12	3	3	2225		4934	21	176
SHEET 2 OF 2	STA 243+00 TO END	2			2		1						1420		2840		142
SUBTOTAL		3	1	0	4	0	1	0	413	12	3	3	3645	0	7774	21	318
OSO CREEK RD- CSJ : 0914-33-097																	
SHEET 1 OF 2	BEGIN TO STA 281+00	7	1			2	2		713	12	5	4	2120		3316	38	166
SHEET 2 OF 2	STA 281+00 TO END	3	1			2		140	201		1	2	855		1700	10	86
SUBTOTAL		10	2	0	0	4	2	140	914	12	6	6	2975	0	5016	48	252
WOODLAND / SHELF ROCK RD - CSJ : 1754-02-030																	
SHEET 1 OF 5	BEGIN TO STA 514+00	3	1			1			150	40	3	1	1912	247	3069	8	294
SHEET 2 OF 5	STA 514+00 TO STA 536+00	3	1			5	2			38	6		2205	2400	2400		308
SHEET 3 OF 5	STA 526+00 TO STA 536+00	1					1						1289	186	2388		128
SUBTOTAL		7	2	0	0	6	3	0	150	78	9	1	5406	2833	7857	8	730
TOWERING CEDAR DR- CSJ : 0914-33-097																	
SHEET 4 OF 5	STA 536+00 TO STA 548+00		1		1				408		3	3	2256		7360	21	184
SHEET 5 OF 5	STA 548+00 TO END	1	1						20	12			1388		2682	1	132
SUBTOTAL		1	2	0	1	0	0	0	428	12	3	3	3644	0	10042	22	316
	CSJ 0914-33-097	28	9	1	9	4	13	140	3616	76	25	25	17219	0	33582	184	1362
	CSJ 1754-02-030	7	2	0	0	6	3	0	150	78	9	1	5406	2833	7857	8	730
	PROJECT TOTALS	35	11	1	9	10	16	140	3766	154	34	26	22625	2833	41439	192	2092

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SUMMARY OF QUANTITIES

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	23

SUMMARY OF EROSION CONTROL

SHEET NO.	LOCATION	160 6003	164 6035	164 6071	168 6001	169 6001	506 6002	506 6004	506 6011	506 6020	506 6024	506 6038	506 6039	506 6041	506 6043
		FURNISHING AND PLACING TOPSOIL (4")	DRILL SEEDING (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP)(WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	ROCK FILTER DAMS (INSTALL) (TY2)	ROCK FILTER DAMS (INSTALL) (TY4)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
		SY	SY	SY	MG	SY	LF	LF	LF	SY	SY	LF	LF	LF	LF
LEWIS MOUNTAIN DR- CSJ 0914-33-097															
SHEET 1 OF 2	BEGIN TO STA 143+00	3482	3482	3482	58	3482		52	52	224	224	557	557	30	30
SHEET 2 OF 2	STA 143+00 TO END	3933	3933	3933	66	3933				224	224	705	705		
SUBTOTAL		7415	7415	7415	124	7415	0	52	52	448	448	1262	1262	30	30
ZYLE RD - CSJ 0914-33-097															
SHEET 1 OF 2	BEGIN TO STA 191+00	1992	1992	1992	33	1992		36	36	224	224	738	738		
SHEET 2 OF 2	STA 191+00 TO END	2771	2771	2771	47	2771		42	42			1502	1502		
SUBTOTAL		4763	4763	4763	80	4763	0	78	78	224	224	2240	2240	0	0
APPALOOSA RUN- CSJ 0914-33-097															
SHEET 1 OF 2	BEGIN TO STA 243+00	2823	2823	2823	49	2823				224	224	1115	1115		
SHEET 2 OF 2	STA 243+00 TO STA END	1913	1913	1913	32	1913	30		30	224	224	710	710		
SUBTOTAL		4736	4736	4736	81	4736	30	0	30	448	448	1825	1825	0	0
OSO CREEK RD- CSJ 0914-33-097															
SHEET 1 OF 2	BEGIN TO STA 281+00	2539	2539	2539	43	2539		20	20	224	224	897	897	60	60
SHEET 2 OF 2	STA 281+00 TO END	442	442	442	7	442		20	20						
SUBTOTAL		2981	2981	2981	50	2981	0	40	40	224	224	897	897	60	60
WOODLAND / SHELF ROCK RD - CSJ 1754-02-030															
SHEET 1 OF 5	BEGIN TO STA 514+00	3092	3092	3092	52	3092				336	336				
SHEET 2 OF 5	STA 514+00 TO STA 526+00	3408	3408	3408	57	3408	70		70	112	112				
SHEET 3 OF 5	STA 526+00 TO STA 536+00	2032	2032	2032	34	2032	69		69	224	224				
SUBTOTAL		8532	8532	8532	143	8532	139	0	139	672	672	0	0	0	0
TOWERING CEDAR DR- CSJ 0914-33-097															
SHEET 4 OF 5	STA 536+00 TO STA 548+00	3167	3167	3167	53	3167		40	40	224	224				
SHEET 5 OF 5	STA 548+00 TO END	2522	2522	2522	42	2522		44	44	224	224				
SUBTOTAL		5689	5689	5689	95	5689	0	84	84	448	448	0	0	0	0
	CSJ 0914-33-097	25584	25584	25584	430	25584	30	254	284	1792	1792	6224	6224	90	90
	CSJ 1754-02-030	8532	8532	8532	143	8532	139	0	139	672	672	0	0	0	0
	PROJECT TOTALS	34116	34116	34116	573	34116	169	254	423	2464	2464	6224	6224	90	90

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SUMMARY OF QUANTITIES

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	24

DN:
CK:
DW:
CK:

SEQUENCE OF WORK

GENERAL:

1. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE CONCLUSION OF EACH WORKDAY, THE CONTRACTOR SHALL ARRANGE TRAFFIC CONTROL DEVICES FOR 2 LANES OF TRAFFIC AND PLACE A 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
2. THE CONTRACTOR SHALL COMPLETE All WORK (EXCEPT FINAL SURFACE) IN ONE LOCATION BEFORE MOVING TO THE NEXT LOCATION. TWO OR MORE AREAS SHALL NOT BE UNDER CONSTRUCTION AT THE SAME TIME WITHOUT THE ENGINEER'S APPROVAL.
3. PORTABLE CHANGEABLE MESSAGE SIGN SHALL BE PLACED FOR AT LEAST SEVEN DAYS PRIOR TO CHANGES IN TRAFFIC CONTROL OPERATIONS TO WARN TRAFFIC ABOUT THE CHANGE IN CONDITIONS.
4. PLACE ALL TRAFFIC CONTROL DEVICES BEFORE OPENING TO TRAFFIC.
5. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL WEATHER ACCESS TO PRIVATE ROADWAYS AND DRIVEWAYS AT ALL TIMES. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. TCP WILL BE PERFORMED AS DESCRIBED IN PLANS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. CONTRACTOR TO MAINTAIN EXISTING SIGNAGE UNTIL WIDENING IS COMPLETE. THIS IS SUBSIDIARY TO ITEM 502.
8. COVER PERMANENT SIGNS IN CONFLICT WITH TRAFFIC PHASING. THIS IS SUBSIDIARY TO ITEM 502.

PHASE START DATE RESTRICTIONS

1. CONTRACTOR SHALL SUBSTANTIALLY COMPLETE A PHASE/STEP, INCLUDING PERMANENT EROSION CONTROL MEASURES, PRIOR TO PROCEEDING WITH NEXT PHASE/STEP. FOR EXAMPLE, COMPLETE PHASE 1A BEFORE BEGIN PHASE 1B. (WITH THE EXCEPTION OF OSO CREEK AND ZYLE ROAD).
2. WORK IN MULTIPLE PHASES AND/OR STEPS SHALL BE APPROVED BY THE ENGINEER.
3. FRONTIER RESTRICTION - PHASE 1B MAY NOT BEGIN UNTIL 3/1/2024 UNLESS APPROVED BY THE ENGINEER.
4. TEXAS GAS SERVICE RESTRICTION - PHASE 1F MAY NOT BEGIN UNTIL 7/5/2024 UNLESS APPROVED BY THE ENGINEER.
5. ATT RESTRICTION - PHASE 1F FROM STA 278+00 TO 283+00 MAY NOT BEGIN UNTIL 9/1/2024 UNLESS APPROVED BY THE ENGINEER.
6. ATT RESTRICTION - PHASE 1G FROM STA 186+00 to 194+00 MAY NOT BEGIN UNTIL 9/1/2024 UNLESS APPROVED BY THE ENGINEER.
7. ATT RESTRICTION - PHASE 1I FROM STA 131+00 to 141+50 MAY NOT BEGIN UNTIL 9/1/2024 UNLESS APPROVED BY THE ENGINEER.

WORK TO PROGRESS NEAR LIVE UTILITIES:

1. THE FOLLOWING IS A LIST OF BURIED UTILITIES THAT MAY REMAIN LIVE DURING CONSTRUCTION. TXDOT IS ACTIVELY WORKING TO RELOCATE THESE LINES TO OBTAIN ADEQUATE CLEARANCE FROM THE PROPOSED CONSTRUCTION. IF LINE HAS NOT BEEN RELOCATED PRIOR TO BEGIN WORK IN THE PHASE, CONTRACTOR SHALL USE ITEM 7251 TO LOCATE THE UTILITIES PRIOR TO BEGIN WORK IN THE AREA. CONTRACTOR SHALL CONTINUE WORK NEAR THESE LIVE UTILITIES PRIOR TO THE RELOCATION OF THE UTILITY. THESE LIVE UTILITIES MAY BE LOCATED AND REMAIN WITHIN THE PROPOSED PAVEMENT OR GRADING. UNLESS THE LINE IS IN DIRECT CONFLICT WITH DRAINAGE PIPE, THE PAVMENT AND EARTHWORK WORK SHALL PROCEED AND CONTRACTOR SHALL USE CAUTION TO PERFORM THE WORK WITHOUT DAMAGE TO THE UTILITY.

- FRONTIER HAS A UTILITY CROSSING NEAR STA 518+50.
- ATT HAS A UTILITY NEAR STA 131+00 TO 141+50.
- ATT HAS A UTILITY NEAR STA 186+00 TO 194+00.
- ATT HAS A UTILITY NEAR STA 278+00 TO 283+00

PHASE 1A: PAVEMENT WIDENING NORTH BOUND LANES AT APPALOOSA RUN ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PAVEMENT WIDENING AND DRIVEWAYS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1B: PAVEMENT WIDENING NORTH BOUND LANES AT TOWERING CEDAR DRIVE.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1C: PAVEMENT WIDENING NORTH BOUND LANES AT WOODLAND DRIVE AND SHELF ROCK ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PROPOSED CROSS CULVERTS. FOR CULVERT CONSTRUCTION LOCATIONS REQUIRING MBGF, COMPLETE CULVERT CONSTRUCTION AT EACH LOCATION AND INSTALL PROPOSED MBGF. UTILIZE BC(10)-21 AS REQUIRED.
5. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
6. PLACE PERMANENT EROSION CONTROL MEASURES.
7. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1D: PAVEMENT WIDENING NORTH BOUND LANES AT ZYLE ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PAVEMENT WIDENING AND DRIVEWAYS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1E: PAVEMENT WIDENING SOUTH BOUND LANES AT OSO CREEK ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1F: PAVEMENT WIDENING NORTH BOUND LANES AT OSO CREEK ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1G: PAVEMENT WIDENING SOUTH BOUND LANES AT ZYLE ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1H: PAVEMENT WIDENING NORTH BOUND LANES AT LEWIS MOUNTAIN DRIVE.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PAVEMENT WIDENING AND DRIVEWAYS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 1I: PAVEMENT WIDENING SOUTH BOUND LANES AT LEWIS MOUNTAIN ROAD.

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (1-1)-18, TCP (2-2)-18, AND TCP (2-3)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. ARRANGE TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TRAFFIC CONTROL TYPICAL SECTIONS AND STANDARDS. CONTRACTOR SHALL MAINTAIN TWO-LANE TRAFFIC. AT THE END OF EACH WORK DAY, CONTRACTOR SHALL PLACE 3:1 (OR FLATTER) SAFETY SLOPE AT ALL DROP-OFFS GREATER THAN 2".
4. CONSTRUCT PARALLEL DRAINAGE STRUCTURES, PAVEMENT WIDENING, AND T-STREETS FOR STATION LIMITS SHOWN ON THE TRAFFIC CONTROL TYPICAL SECTIONS. PERFORM BASE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.
5. PLACE PERMANENT EROSION CONTROL MEASURES.
6. REMOVE TRAFFIC CONTROL DEVICES FROM THIS PHASE.

PHASE 2: OVERLAY THE FOLLOWING INTERSECTIONS:

RM 1826 AT LEWIS MOUNTAIN ROAD - CL RM 1826_1 STA 133+16.00 to STA 151+35.00
RM 1826 AT ZYLE ROAD - CL RM 1826_2 STA 178+10.00 to STA 195+35.00
RM 1826 AT APPALOOSA DRIVE - CL RM 1826_3 STA 231+55.00 to STA 250+10.00
RM 1826 AT OSO CREEK ROAD - CL RM 1826_4 STA 271+00.00 to STA 284+00.00
RM 1826 AT WOODLAND DR / SHELF ROCK - CL RM 1826_5 STA 503+90.00 to STA 532+44.00
RM 1826 AT TOWERING CEDAR DRIVE - CL RM 1826_5 STA 536+70.00 to STA 555+35.00

1. PLACE ALL ADVANCED WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TMUTCD, GENERAL NOTES, BC STANDARDS (1-12)-21, TCP (3-3)-14, TCP (7-1)-13, WZ(STPM)-23, WZ(UL)-23, AND WZ(BRK)-23.
2. INSTALL BMP AND EROSION CONTROL DEVICES AS SHOWN ON PLANS, AND AS DIRECTED BY THE ENGINEER.
3. COMPLETE OVERLAY USING STANDARD TCP (2-2)-18, TCP (7-1)-13, WZ(STPM)-23.
4. PLACE TEMPORARY TABS IN LINE WITH PROPOSED CENTERLINE STRIPING.
5. PLACE PERMANENT STRIPING AND PAVEMENT MARKING AS INDICATED ON THE SIGNING AND PAVEMENT MARKING LAYOUTS.
6. OPEN ALL LANES TO TRAFFIC.

PERFORM FINAL CLEAN UP IN COMPLETED CONSTRUCTION AREA. REMOVE ALL REMAINING TEMPORARY EROSION CONTROL DEVICES AND ADVANCED WARNING SIGNS WHEN DIRECTED BY THE ENGINEER.

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Texas Department of Transportation

RM 1826

TCP NARRATIVE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	25

CK:
DW:
CK:
DN:

DATE: 5/30/2023 6:18:28 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/02 TCP/Sheets/RM1826_TCP_NAR_GV_01

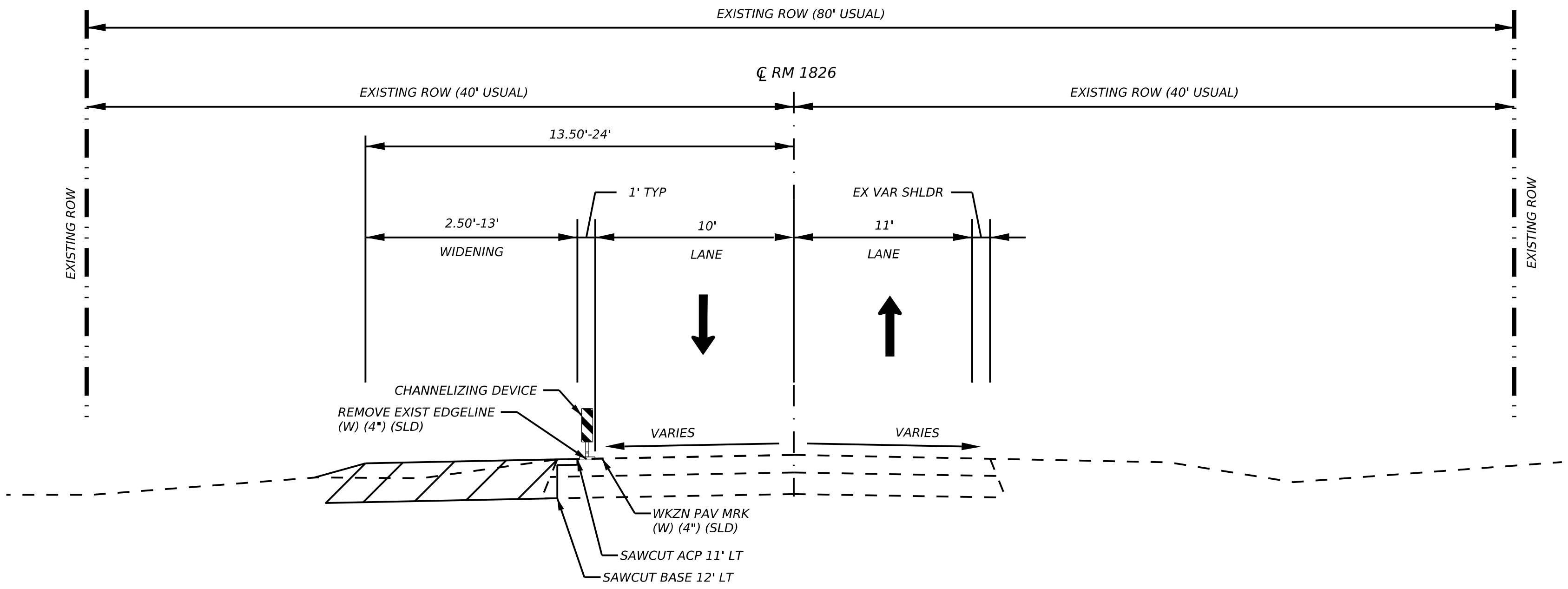
LEGEND

▨ PERMANENT PAVEMENT THIS PHASE

▩ PERMANENT PAVEMENT PREVIOUS PHASE

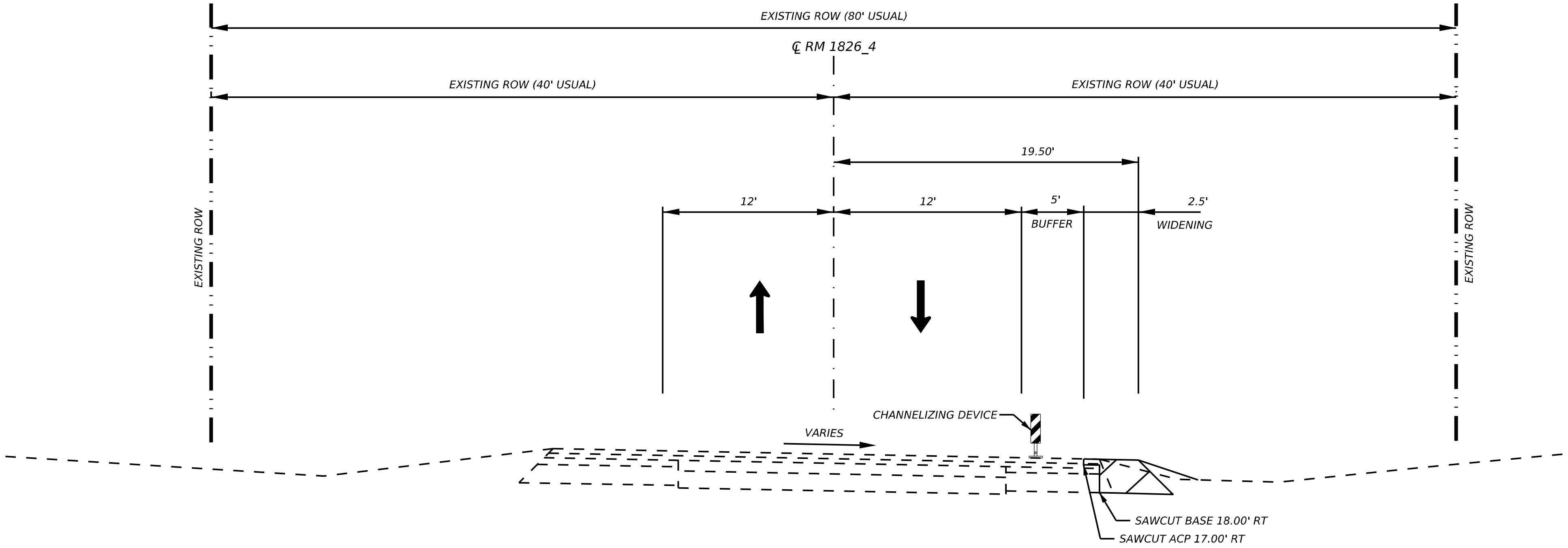
← DIRECTION OF TRAFFIC

▮ CHANNELIZING DEVICE



TCP TYPICAL SECTION PHASE 1A, 1B, 1C, 1D, AND 1H

RM 1826 AT APPALOOSA RUN - ℄ RM 1826_3 STA 231+55.00 TO STA 250+10.00
RM 1826 AT TOWERING CEDAR DR - ℄ RM 1826_5 STA 536+70.00 TO STA 555+35.00
RM 1826 AT WOODLAND DR AND SHELF ROCK - ℄ RM 1826_5 STA 503+90.00 TO STA 532+44.00
RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 182+08.00 TO STA 195+35.00
RM 1826 AT LEWIS MOUNTAIN DR - ℄ RM 1826_1 STA 133+16.00 TO STA 151+35.00



TCP TYPICAL SECTION PHASE 1E

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 271+00.00 TO STA 284+00.00

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RM 1826

TCP TYPICAL
SECTIONS

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	26

DATE: 5/30/2023 6:18:38 PM
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DN:
CK:
DW:
CK:

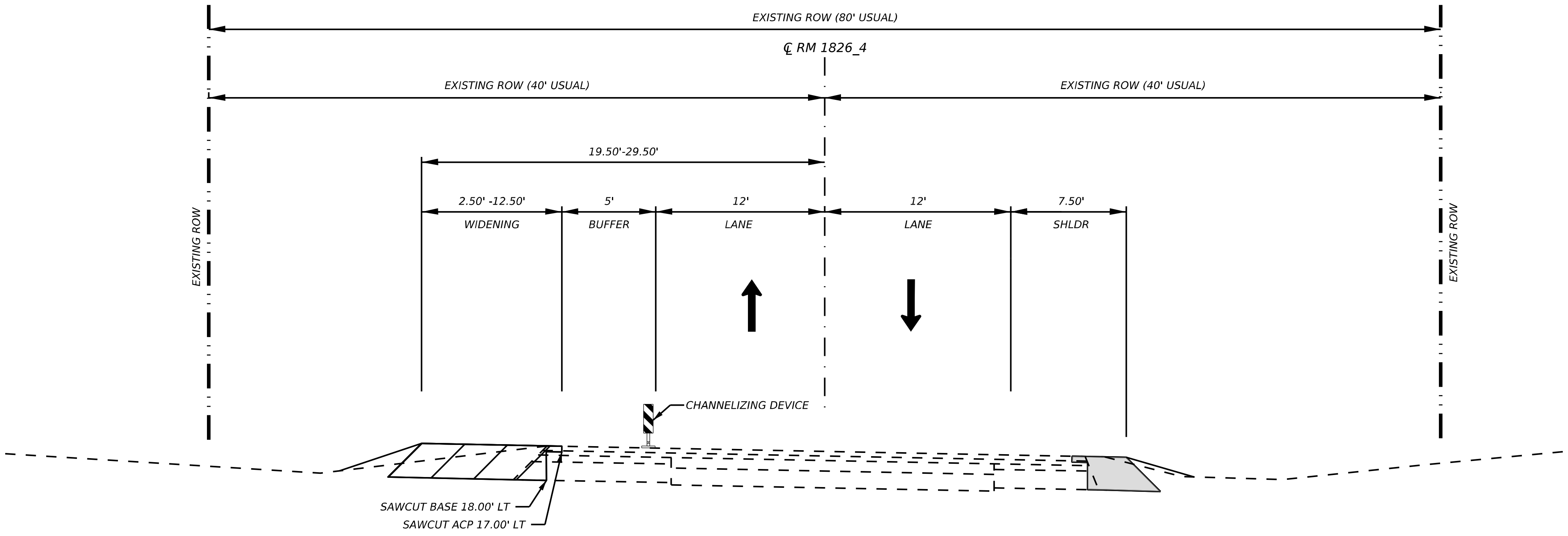
LEGEND

▨ PERMANENT PAVEMENT THIS PHASE

▩ PERMANENT PAVEMENT PREVIOUS PHASE

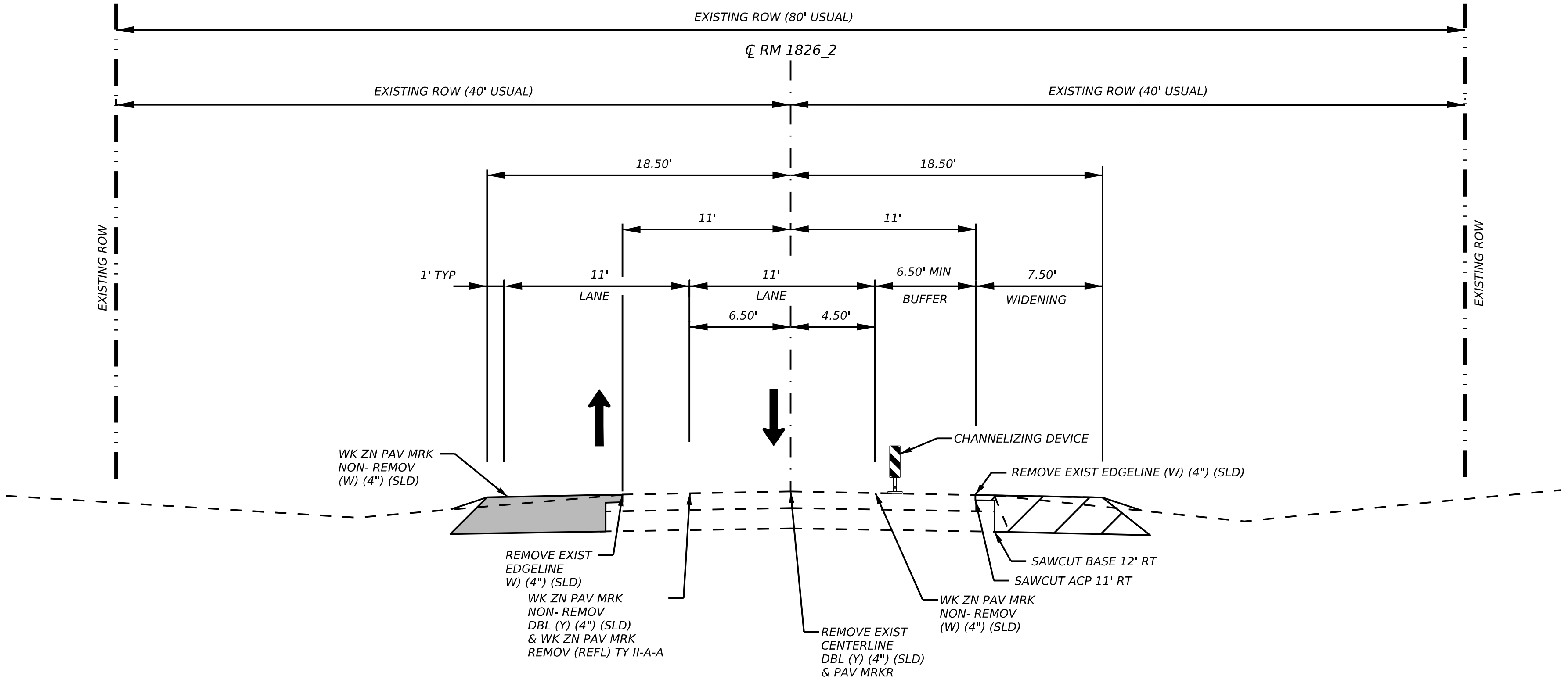
← DIRECTION OF TRAFFIC

▮ CHANNELIZING DEVICE



TCP TYPICAL SECTION PHASE 1F

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 271+00.00 TO STA 284+00.00



TCP TYPICAL SECTION PHASE 1G

RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 182+08.00 TO STA 195+35.00

DATE: 5/30/2023 6:18:50 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/02 TCP/Sheets/RM1826 TCP TYP GV 02.dgn

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Texas Department of Transportation

RM 1826

TCP TYPICAL
SECTIONS

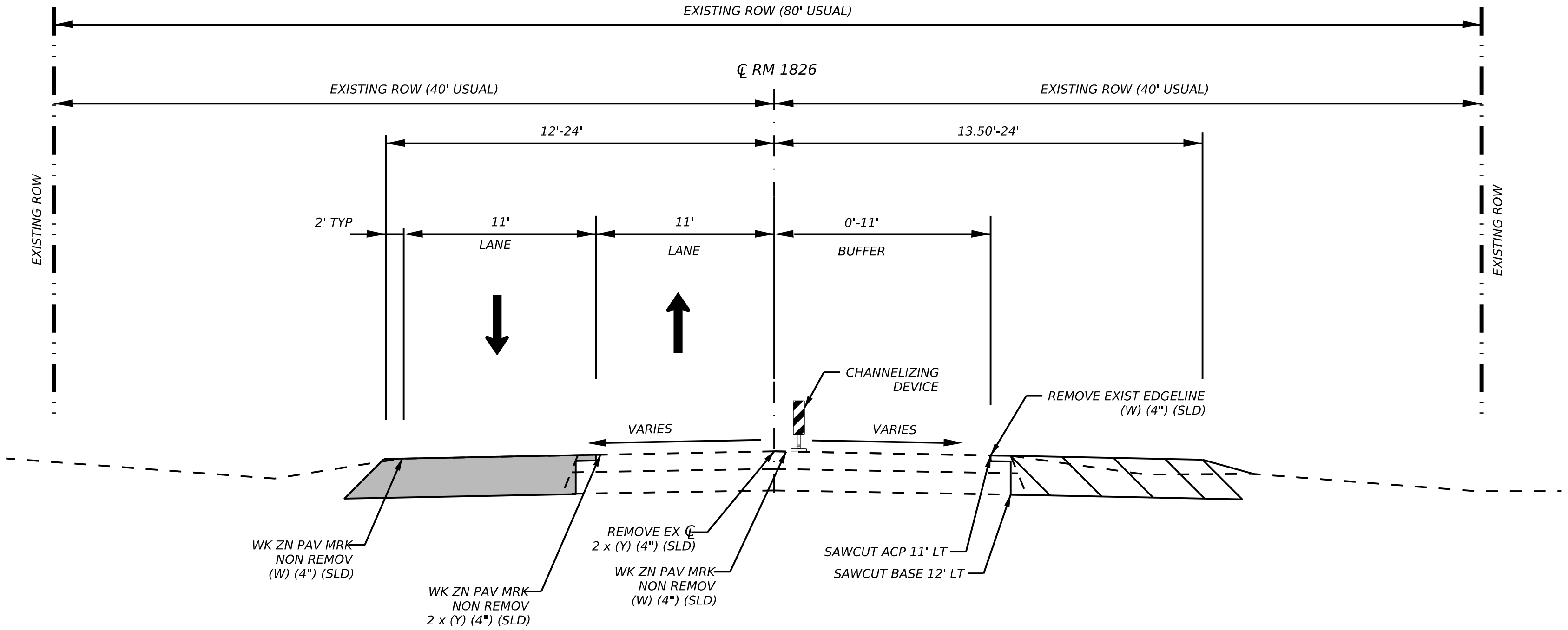
SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	27

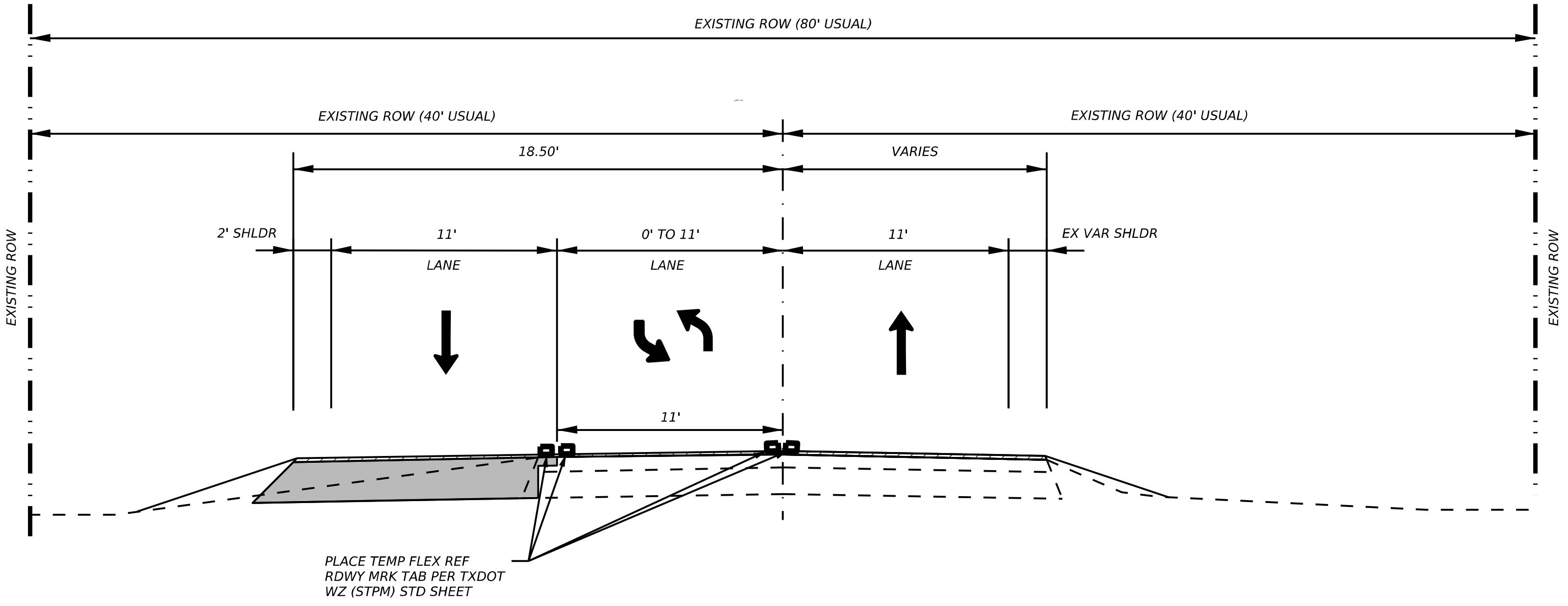
LEGEND

- ▨ PERMANENT PAVEMENT THIS PHASE
- ▩ PERMANENT PAVEMENT PREVIOUS PHASE
- ← DIRECTION OF TRAFFIC
- ▮ CHANNELIZING DEVICE



TCP TYPICAL SECTION PHASE 1I

RM 1826 AT LEWIS MOUNTAIN DR - ℄ RM 1826_1 STA 133+16.00 TO STA 140+14.17



TCP TYPICAL SECTION PHASE 2

RM 1826 AT LEWIS MOUNTAIN DR - ℄ RM 1826_1 STA 133+16.00 TO STA 151+35.00
RM 1826 AT APPALOOSA RUN - ℄ RM 1826_3 STA 231+55.00 TO STA 250+10.00
RM 1826 AT WOODLAND DR AND SHELF ROCK - ℄ RM 1826_5 STA 503+90.00 TO STA 532+44.00
RM 1826 AT TOWERING CEDAR DR - ℄ RM 1826_5 STA 536+70.00 TO STA 555+35.00

DATE: 5/30/2023 6:18:59 PM
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RM 1826

TCP TYPICAL
SECTIONS

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		28

DN:
CK:
DW:
CK:

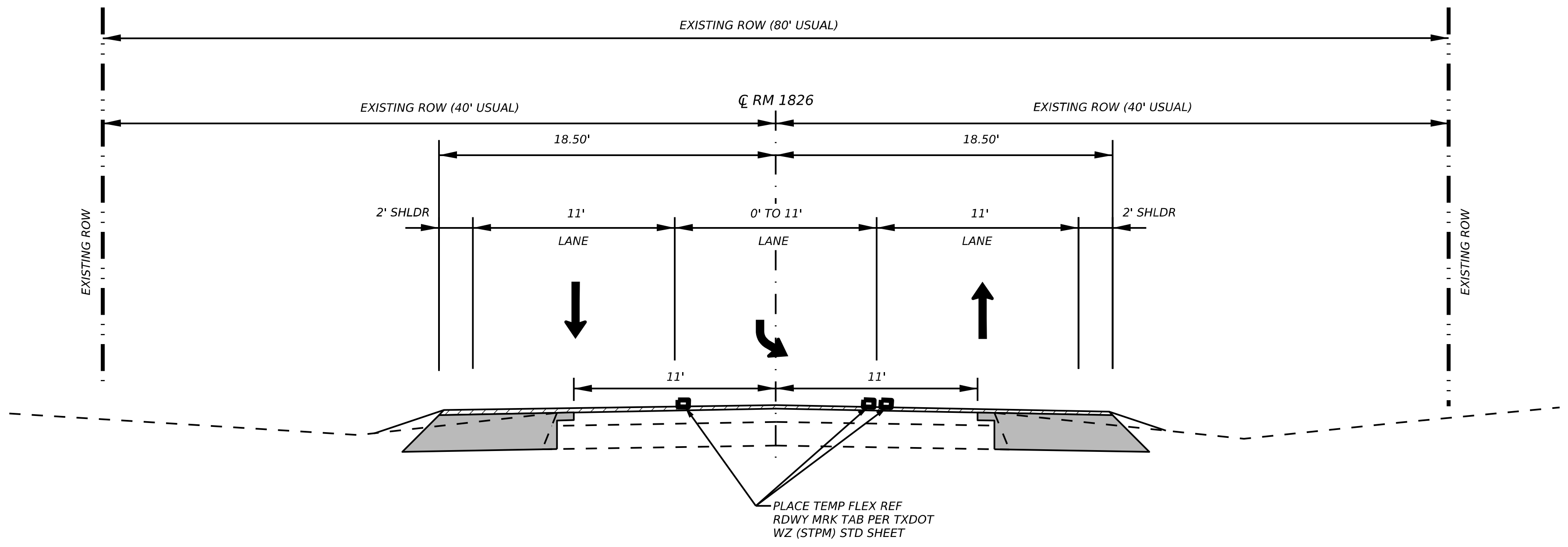
LEGEND

▨ PERMANENT PAVEMENT THIS PHASE

■ PERMANENT PAVEMENT PREVIOUS PHASE

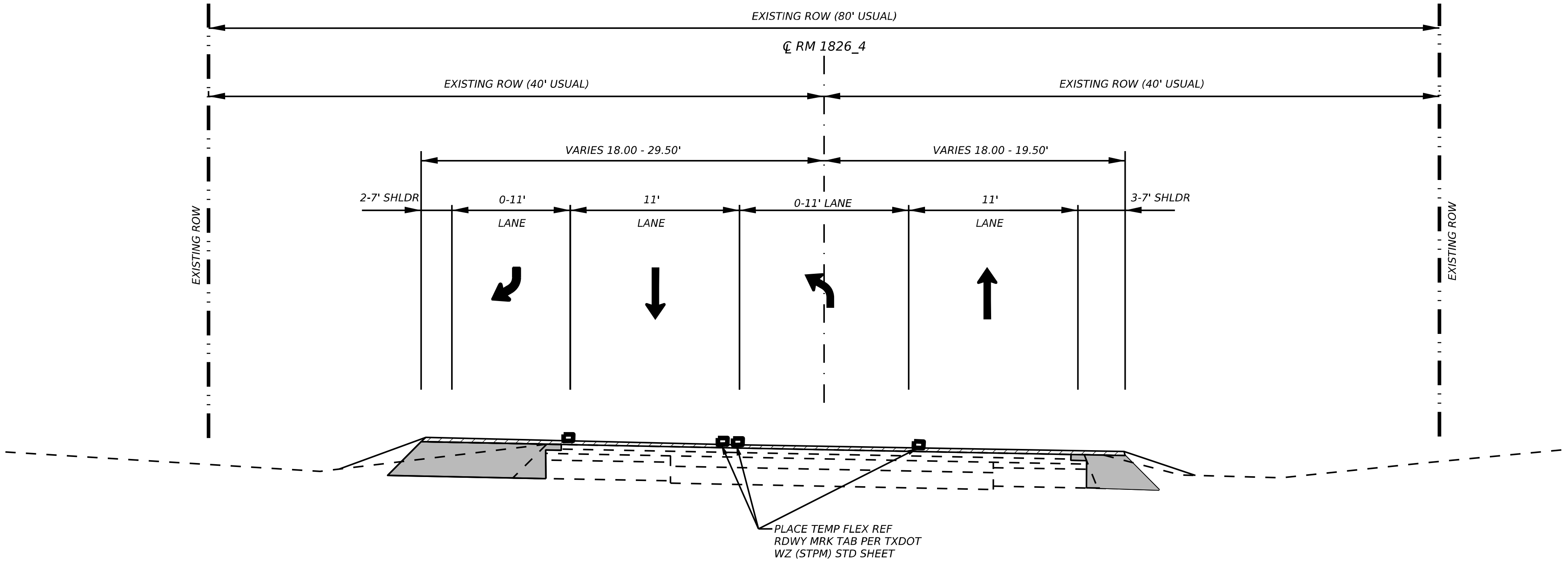
← DIRECTION OF TRAFFIC

▮ CHANNELIZING DEVICE



TCP TYPICAL SECTION PHASE 2

RM 1826 AT ZYLE RD - ℄ RM 1826_2 STA 178+10.00 TO STA 195+35.00



TCP TYPICAL SECTION PHASE 2

RM 1826 AT OSO CREEK RD - ℄ RM 1826_4 STA 271+00.00 TO STA 284+00.00

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RM 1826

TCP TYPICAL
SECTIONS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		29

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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

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FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/02 TCP/Standards/bc-21.dgn

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

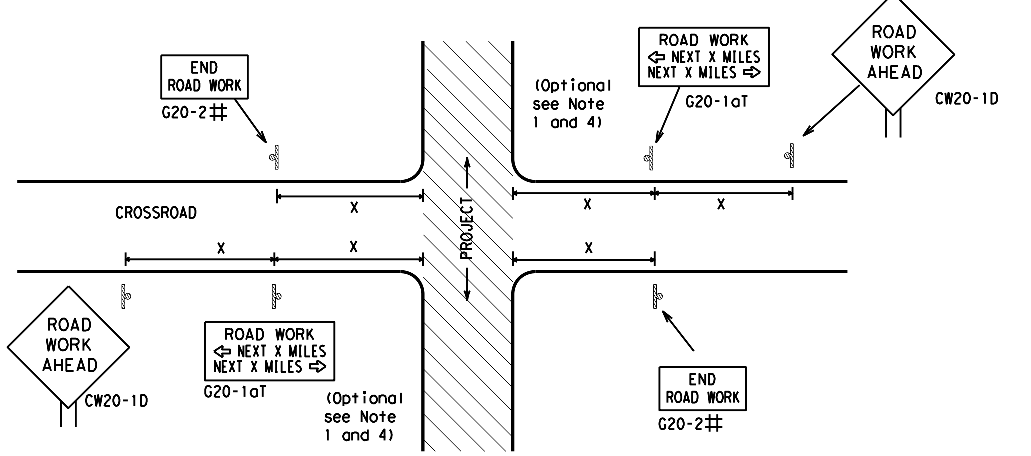
REVISIONS
4-03 7-13
9-07 8-14
5-10 5-21

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	30

DATE: 5/30/2023 3:07:43 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/02 TCP/Standards/bc-21.dgn

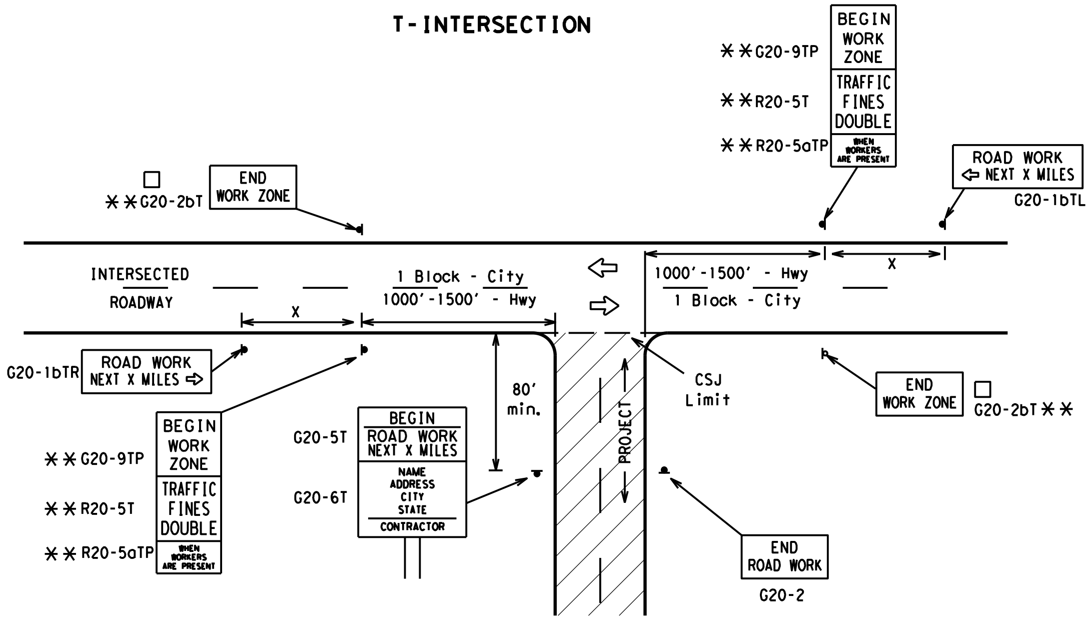
TYPICAL LOCATION OF CROSSROAD SIGNS



\# 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.

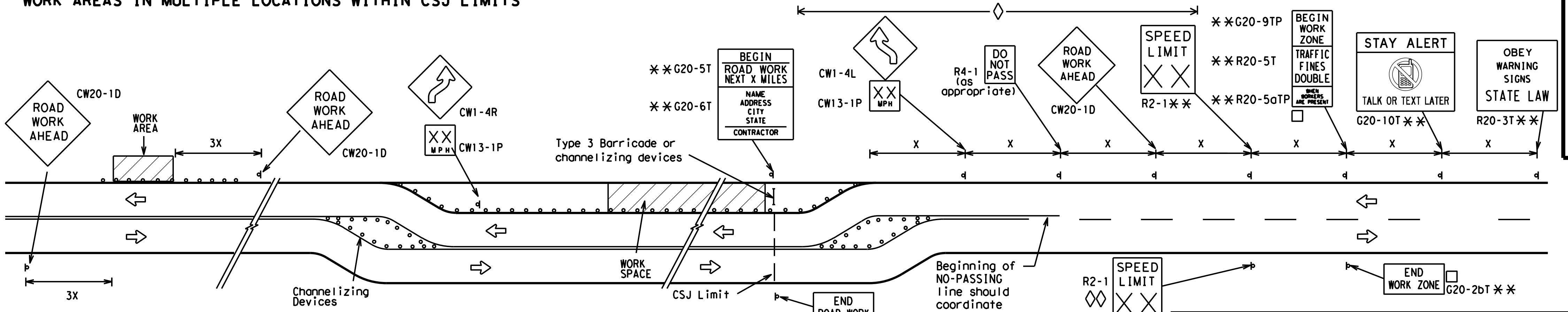
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".

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.

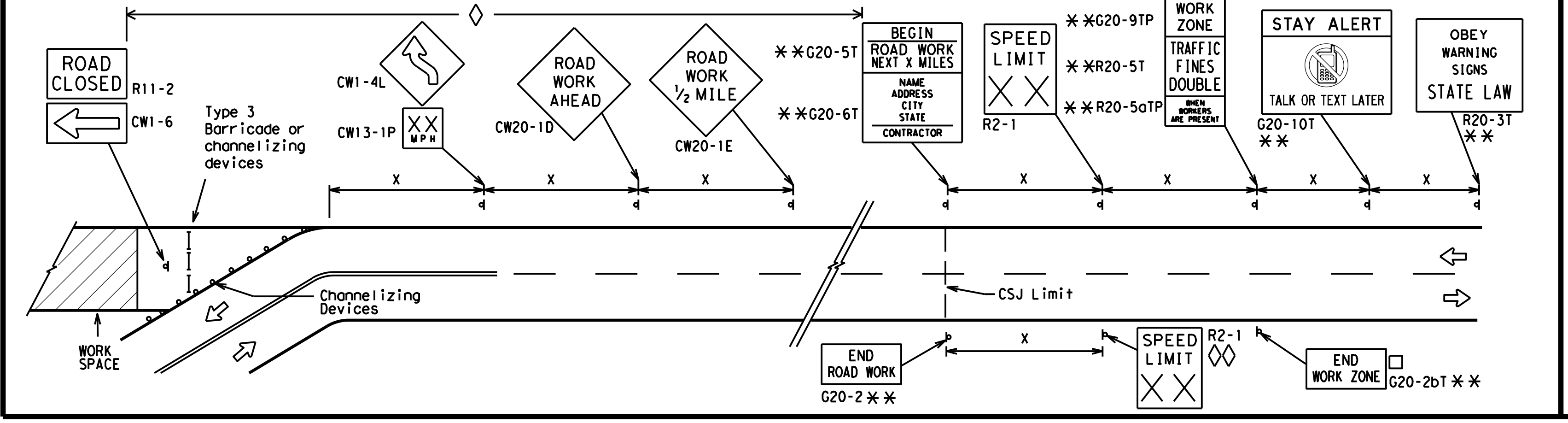
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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.

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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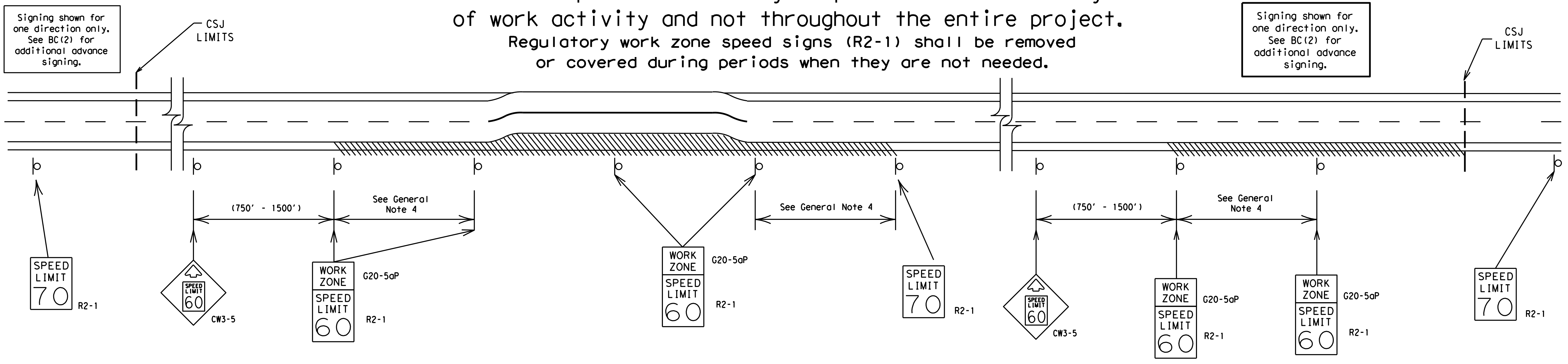
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:
- a) rough road or damaged pavement surface
- b) substantial alteration of roadway geometrics (diversions)
- c) construction detours
- d) grade
- e) width
- f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile

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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION
WORK ZONE SPEED LIMIT

BC(3)-21

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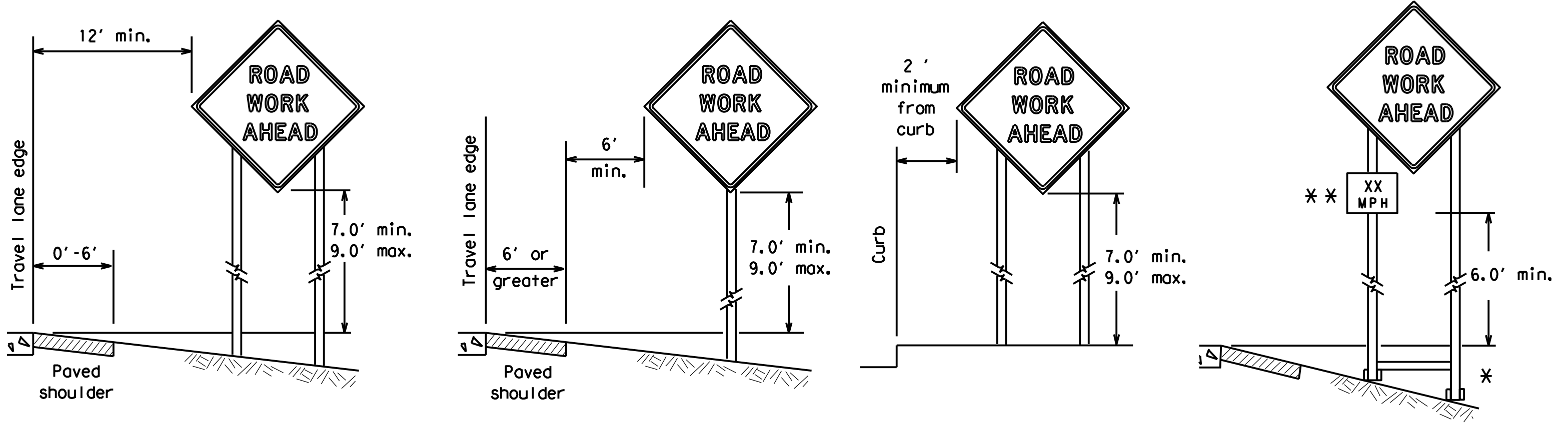
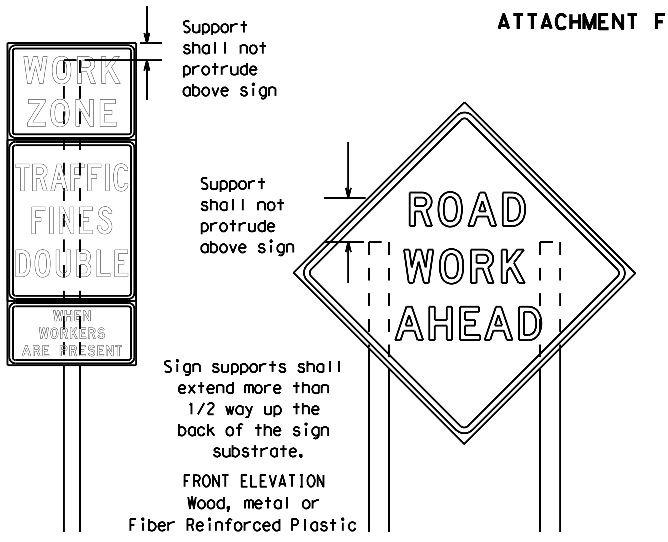
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

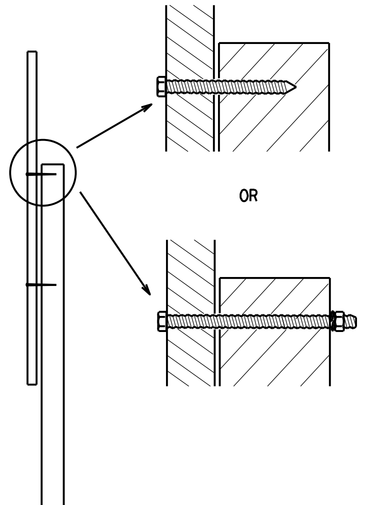
* * When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Sign supports shall extend more than 1/2 way up the back of the sign substrate.

FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

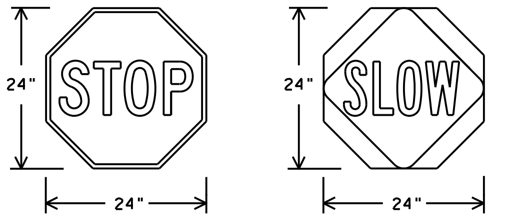
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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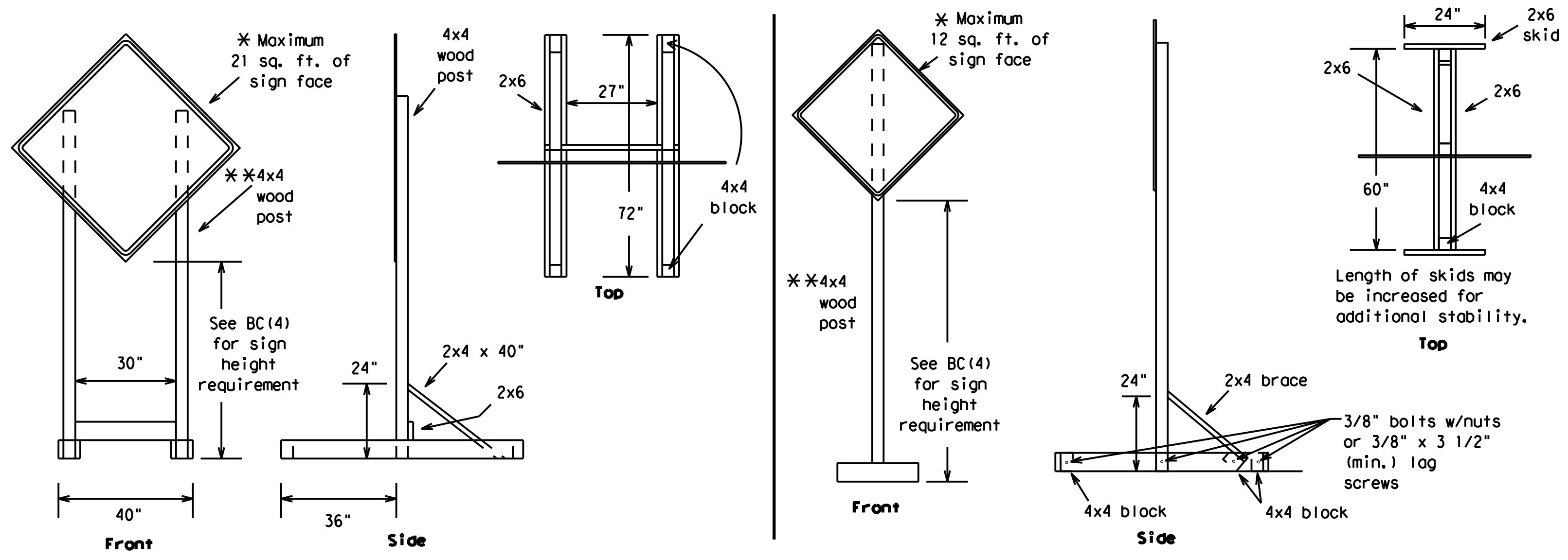
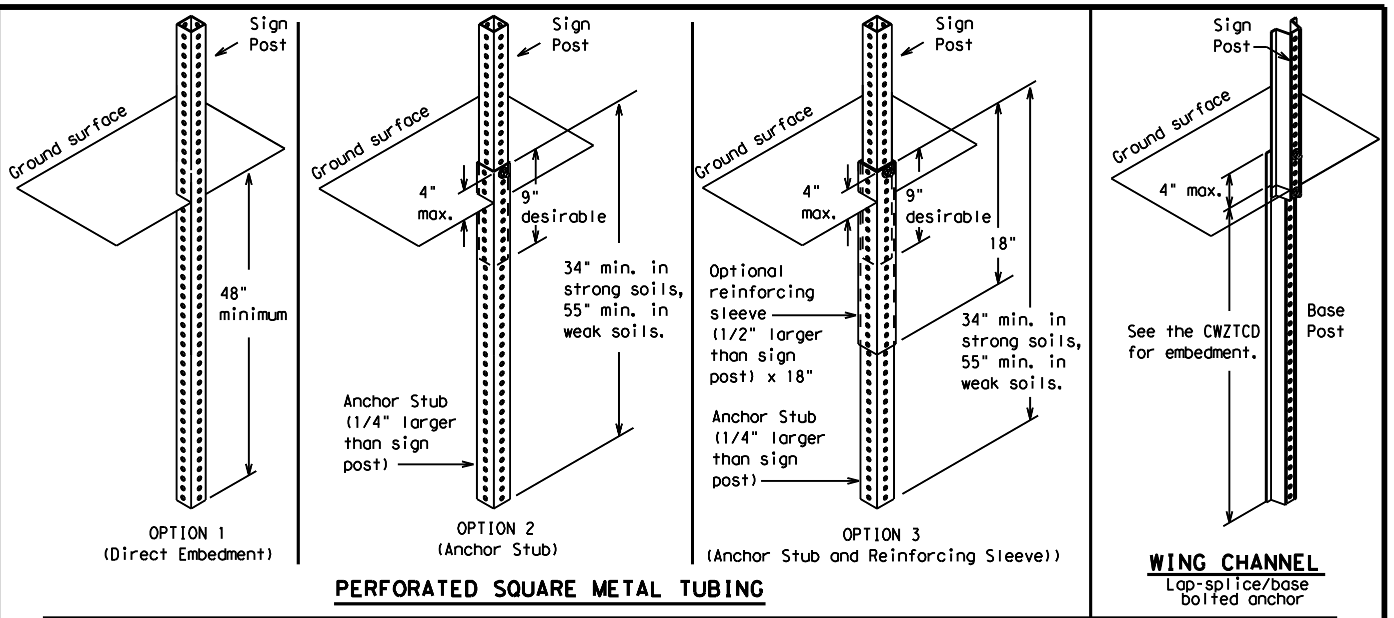


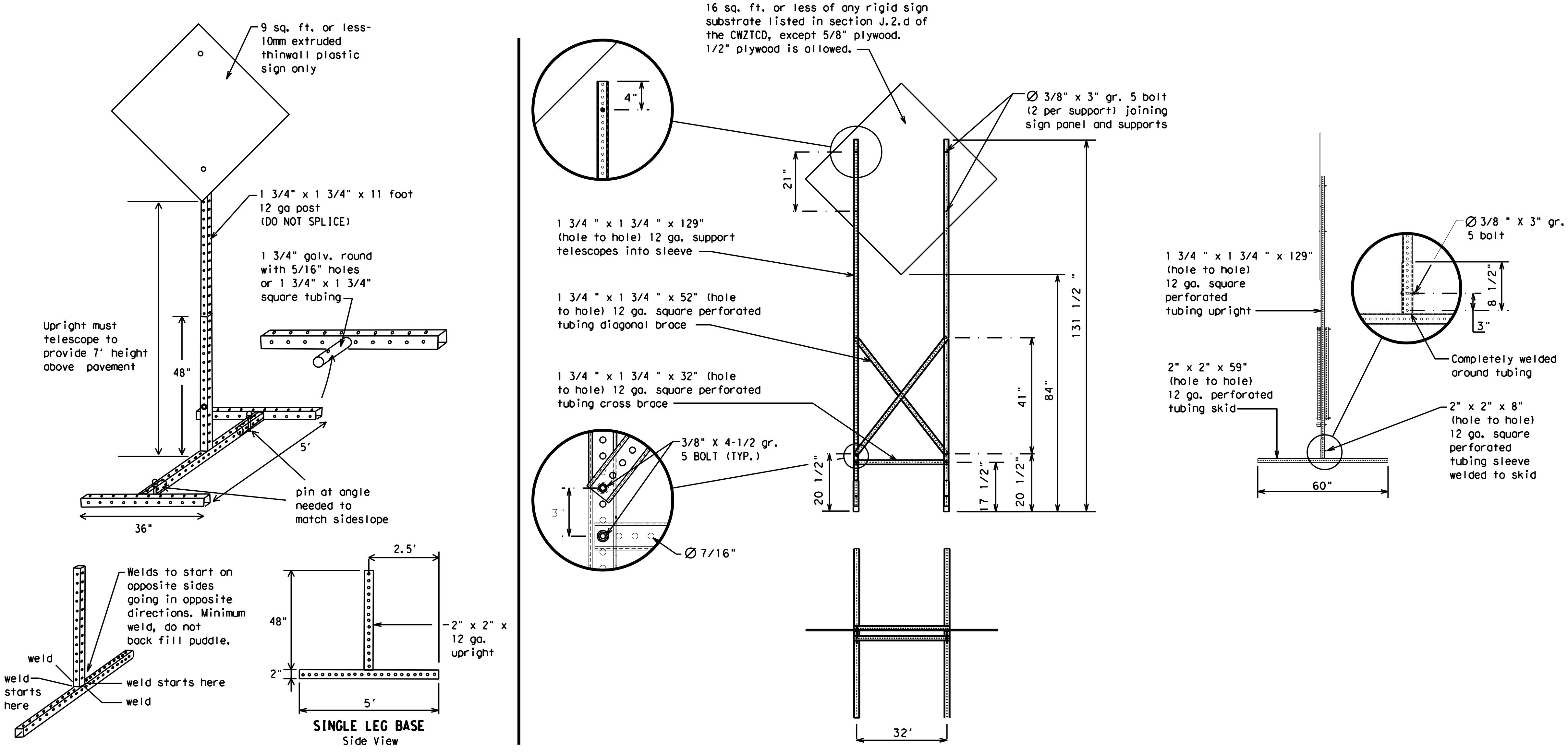
SKID MOUNTED WOOD SIGN SUPPORTS

* 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.

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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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX- XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** 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.

SHEET 6 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0914	33	097, ETC.	RM 1826	
9-07 8-14	DIST	COUNTY		SHEET NO.	
7-13 5-21	AUS	TRAVIS & HAYS		35	

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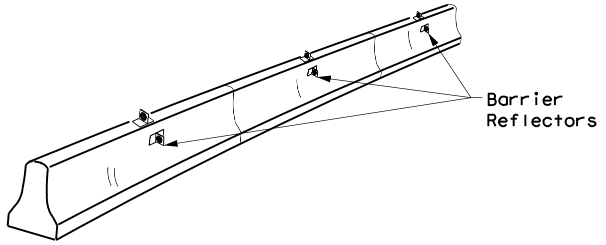
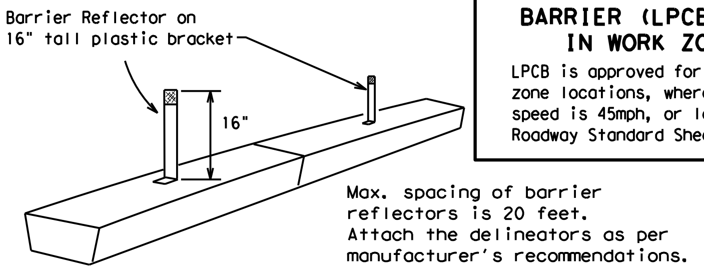
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

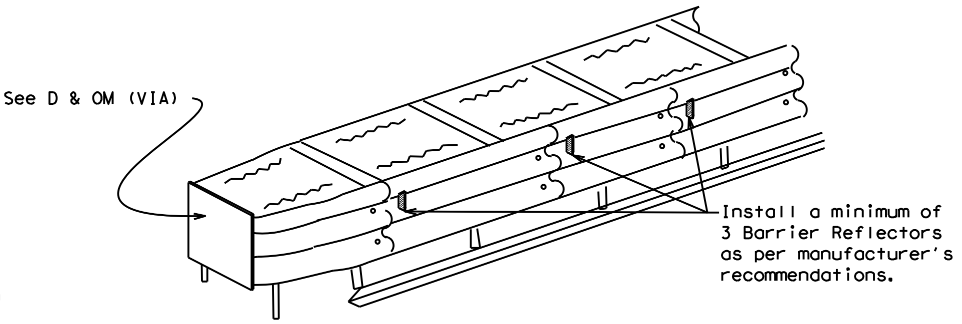


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

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.

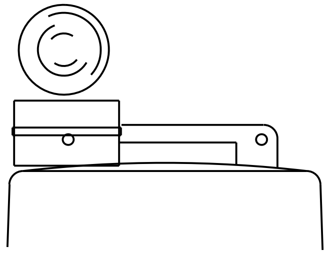


DELINEATION OF END TREATMENTS

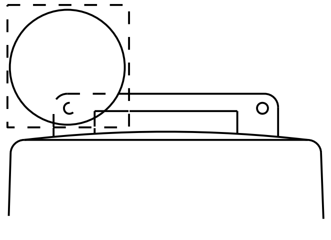
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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

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

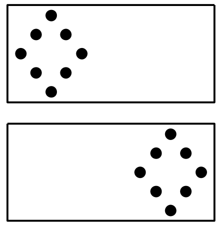
1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate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

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

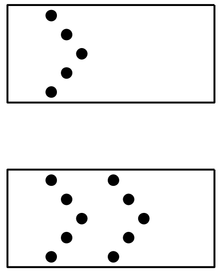
1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION"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

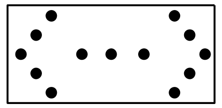
4 CORNER CAUTION

OR

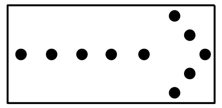


ALTERNATING DIAMOND CAUTION

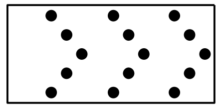




DOUBLE ARROW



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

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic
Safety
Division
Standard

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

BC(7)-21

FILE:	bc-21.dgn	DN: TxDOT		CK: TxDOT	DW: TxDOT		CK: TxDOT
© TxDOT November 2002		CONT	SECT	JOB		HIGHWAY	
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		AUS	TRAVIS & HAYS			36	

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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:

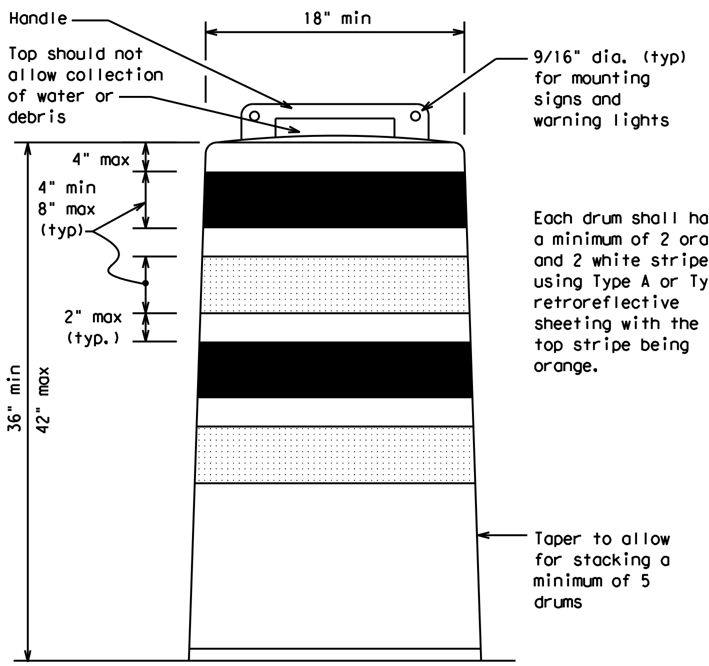
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

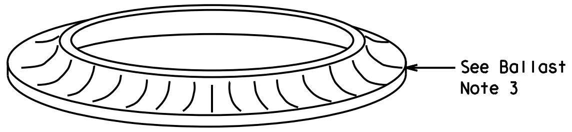
RETROREFLECTIVE SHEETING

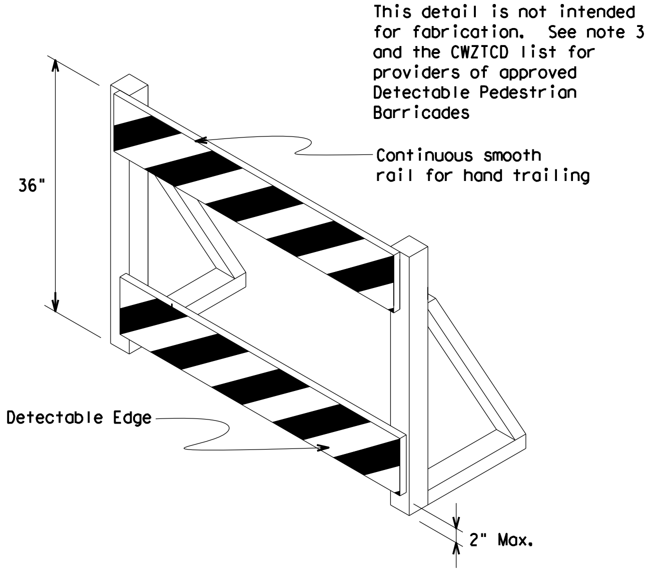
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

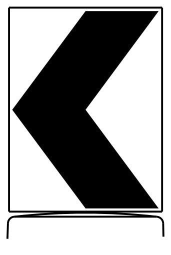




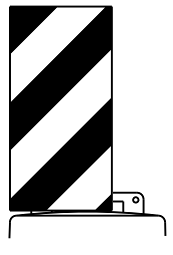


DETECTABLE PEDESTRIAN BARRICADES

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.

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Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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© TxDOT November 2002		CONT	SECT	JOB		HIGHWAY	
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		DIST	COUNTY			SHEET NO.	
		AUS	TRAVIS & HAYS			37	

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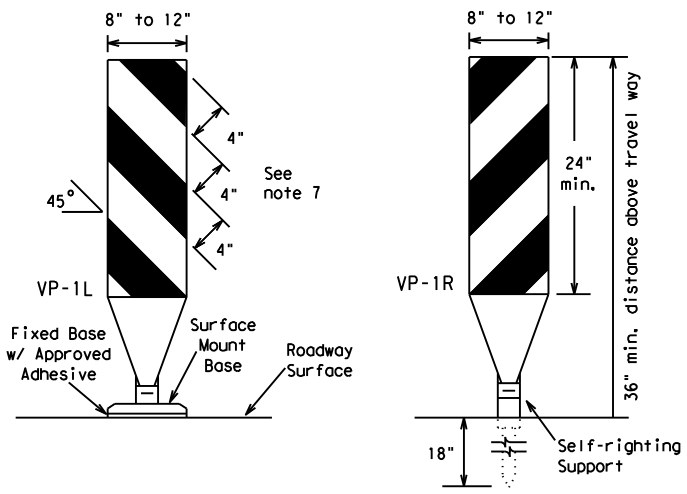
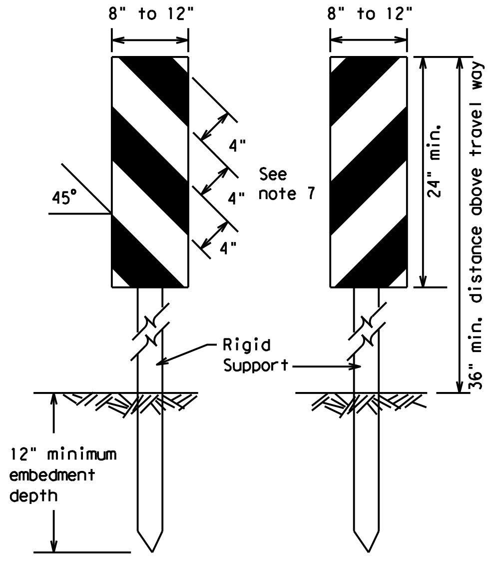
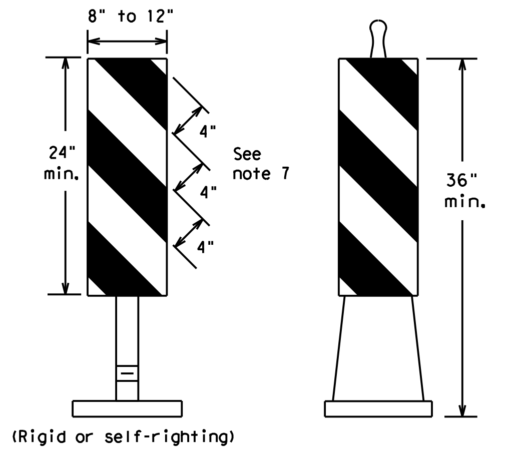


FIXED
(Rigid or self-righting)



DRIVEABLE

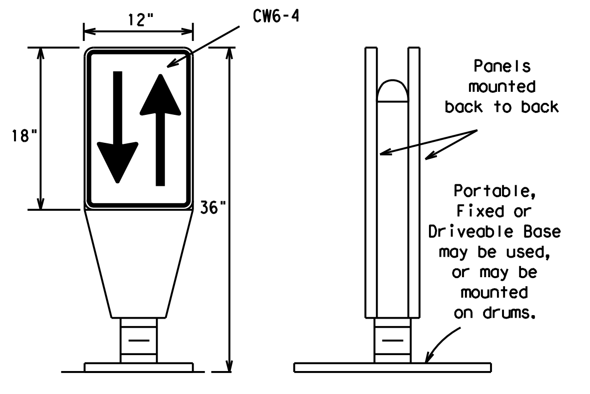


(Rigid or self-righting)

PORTABLE

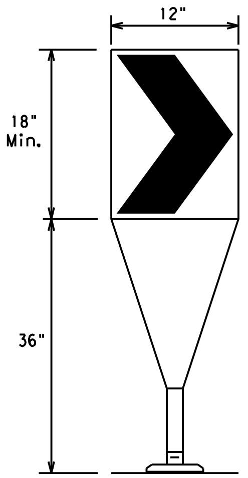
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



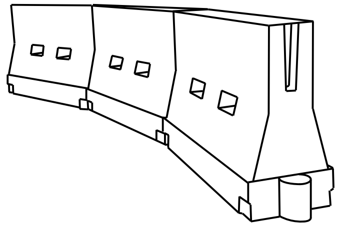
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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9-07 8-14	DIST	COUNTY			SHEET NO.	
7-13 5-21	AUS	TRAVIS & HAYS			38	

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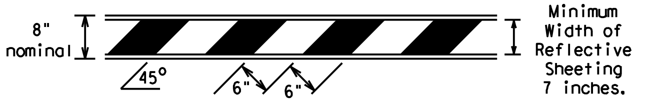
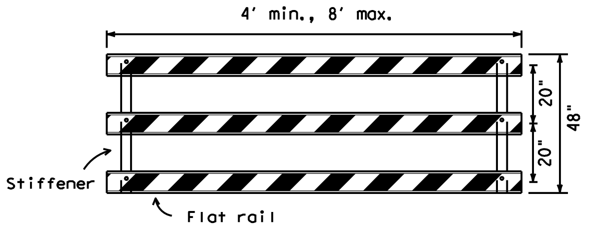
TYPE 3 BARRICADES

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.

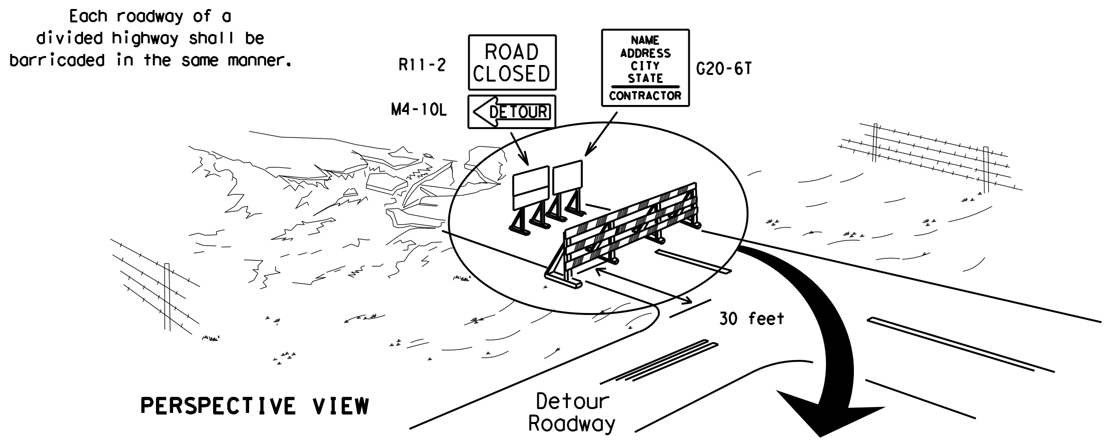


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



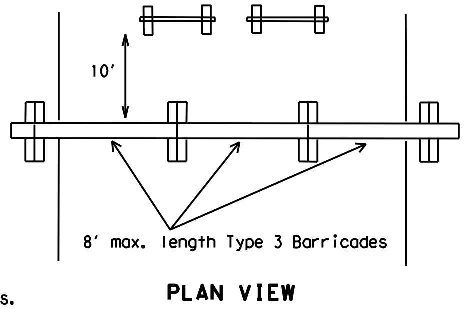
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



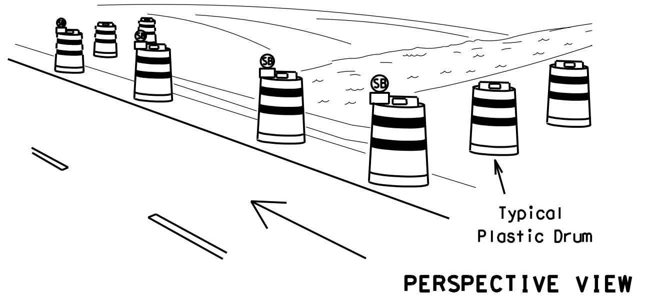
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

Barricade striping should slant downward in the direction of detour.

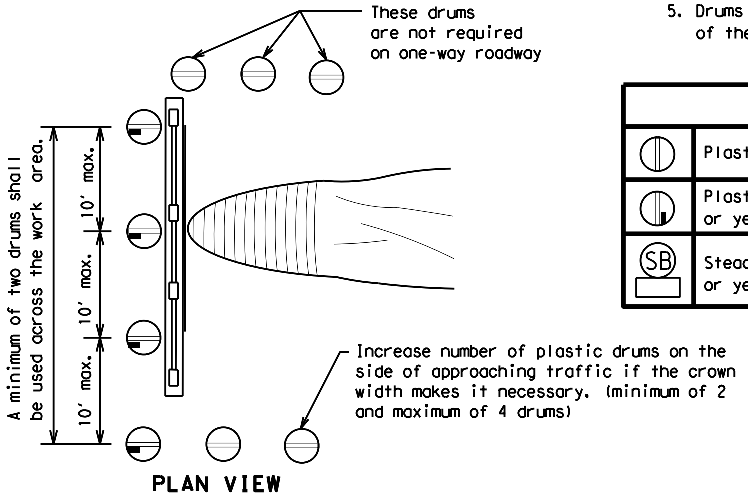


1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

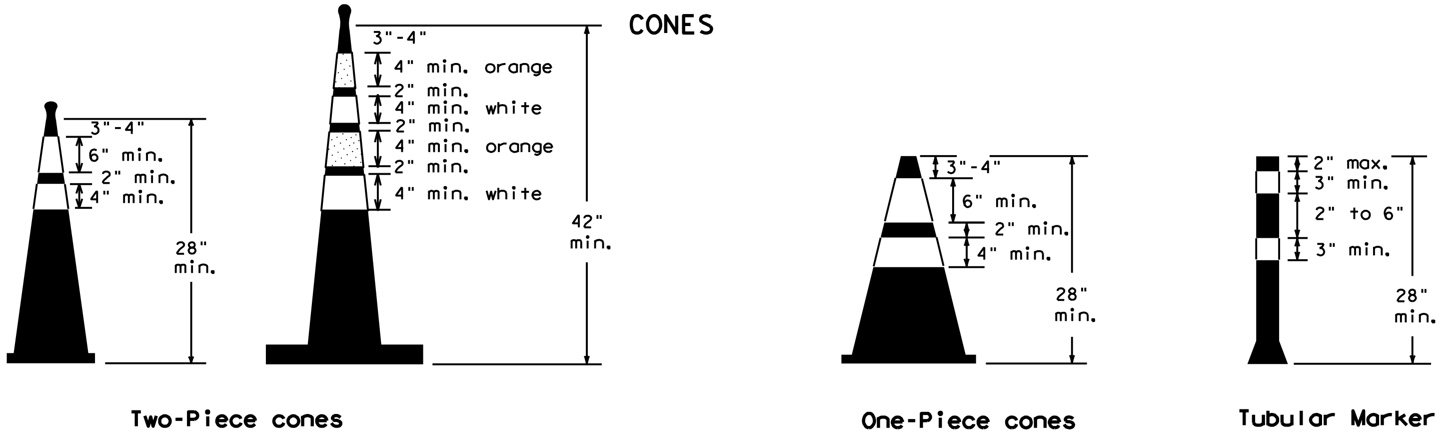


1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

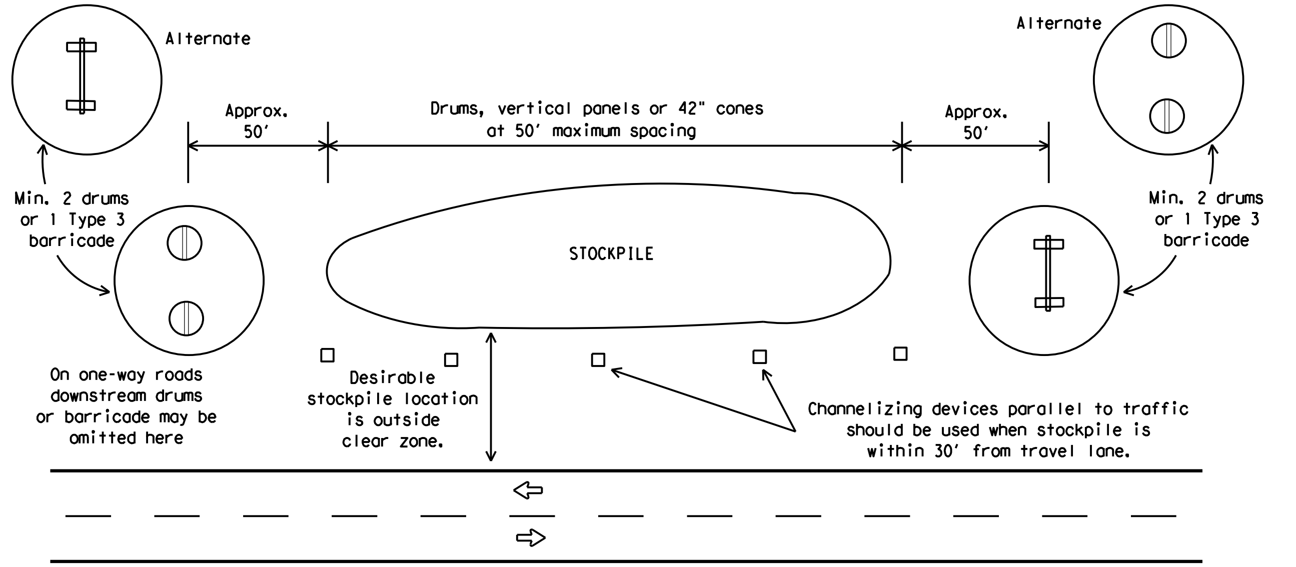
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

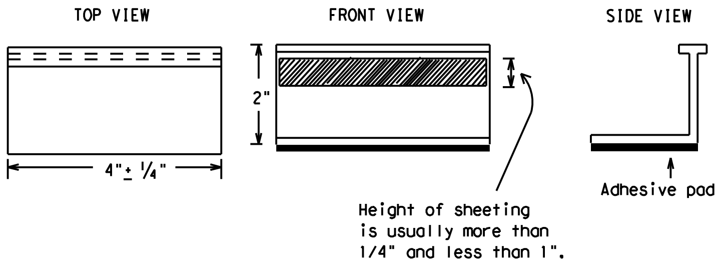
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



Height of sheeting is usually more than 1/4" and less than 1".

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).

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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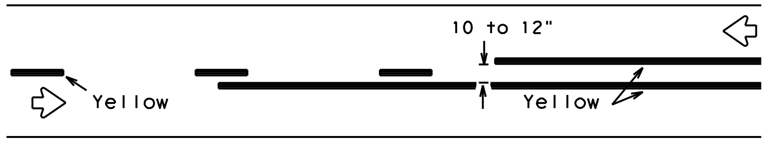
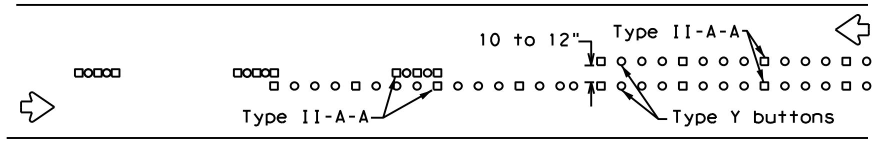
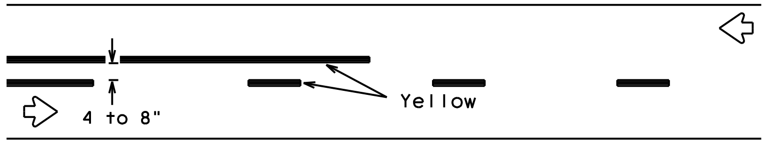
PAVEMENT MARKING PATTERNS



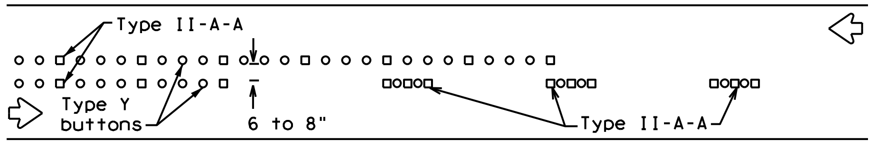
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



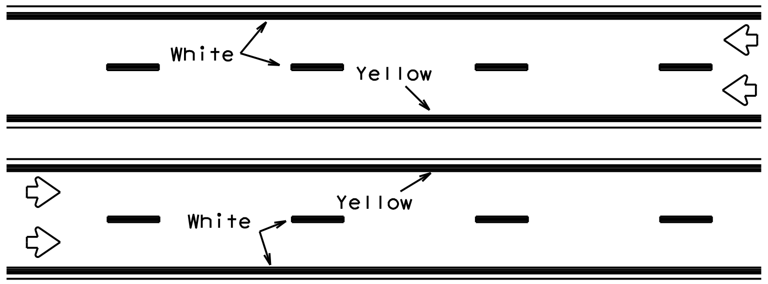
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



RAISED PAVEMENT MARKERS - PATTERN B

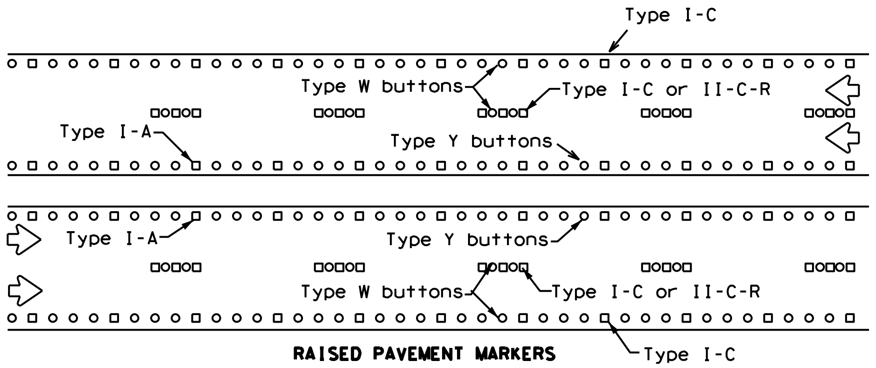
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



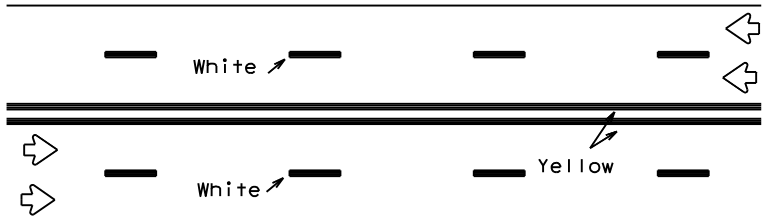
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



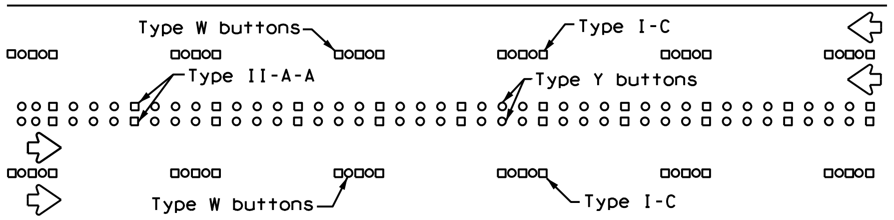
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



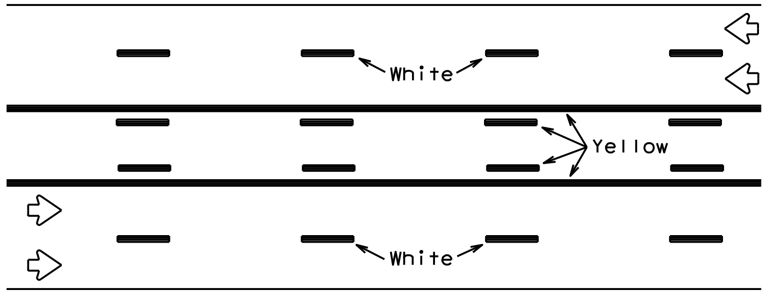
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



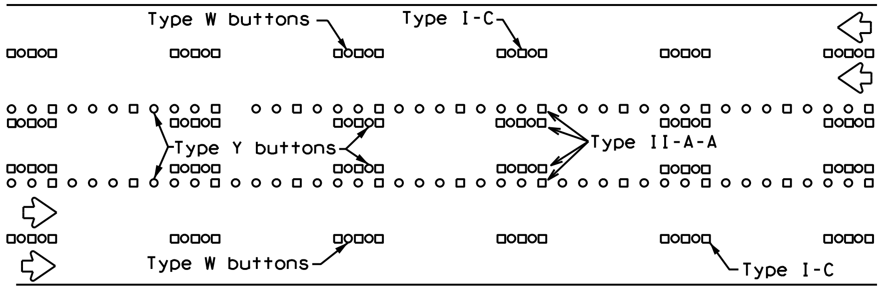
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

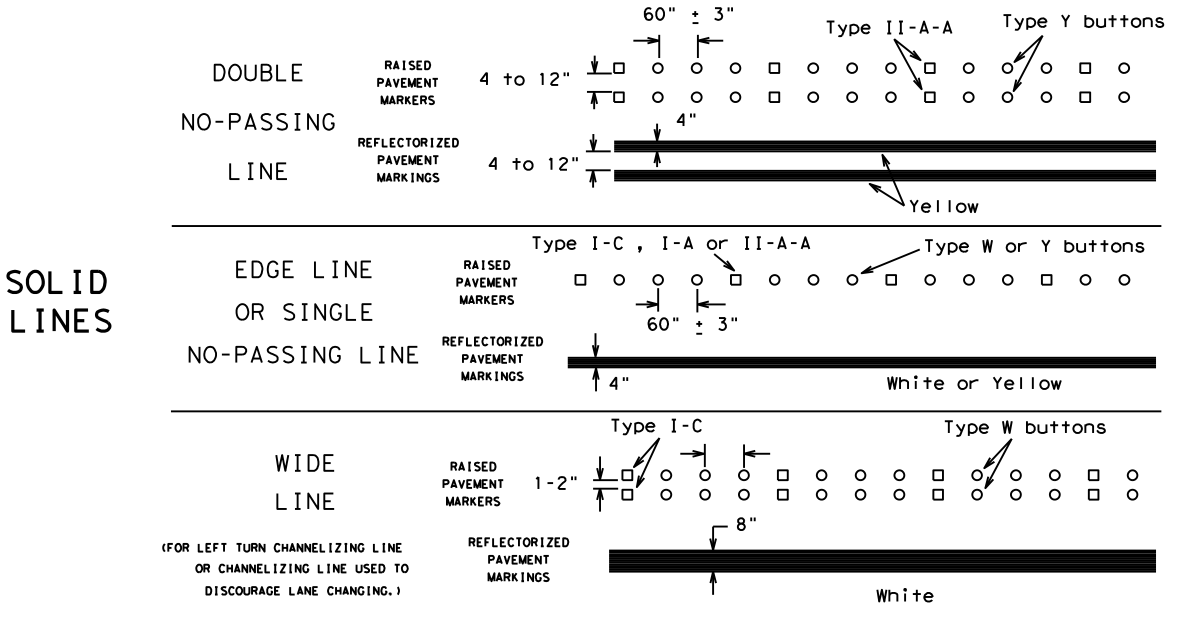
Prefabricated markings may be substituted for reflectorized pavement markings.

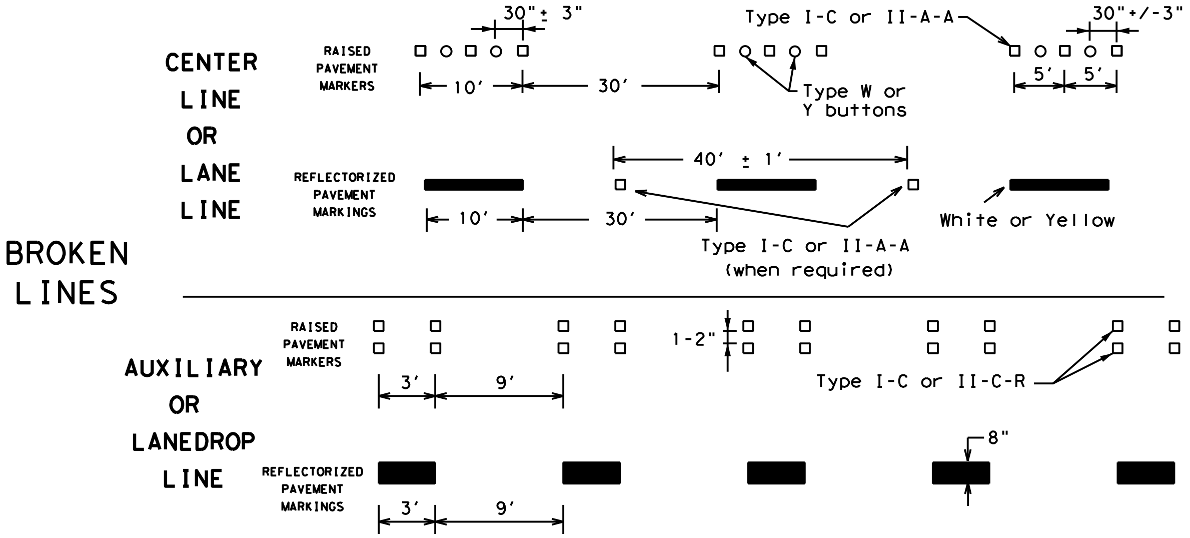


RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

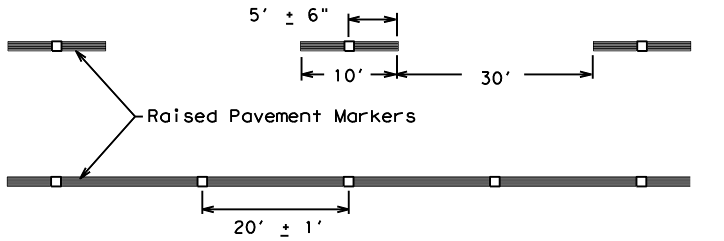
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS





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

SHEET 12 OF 12

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	0914	33	097, ETC.	RM 1826
	DIST		COUNTY	SHEET NO.
	AUS		TRAVIS & HAYS	41

106

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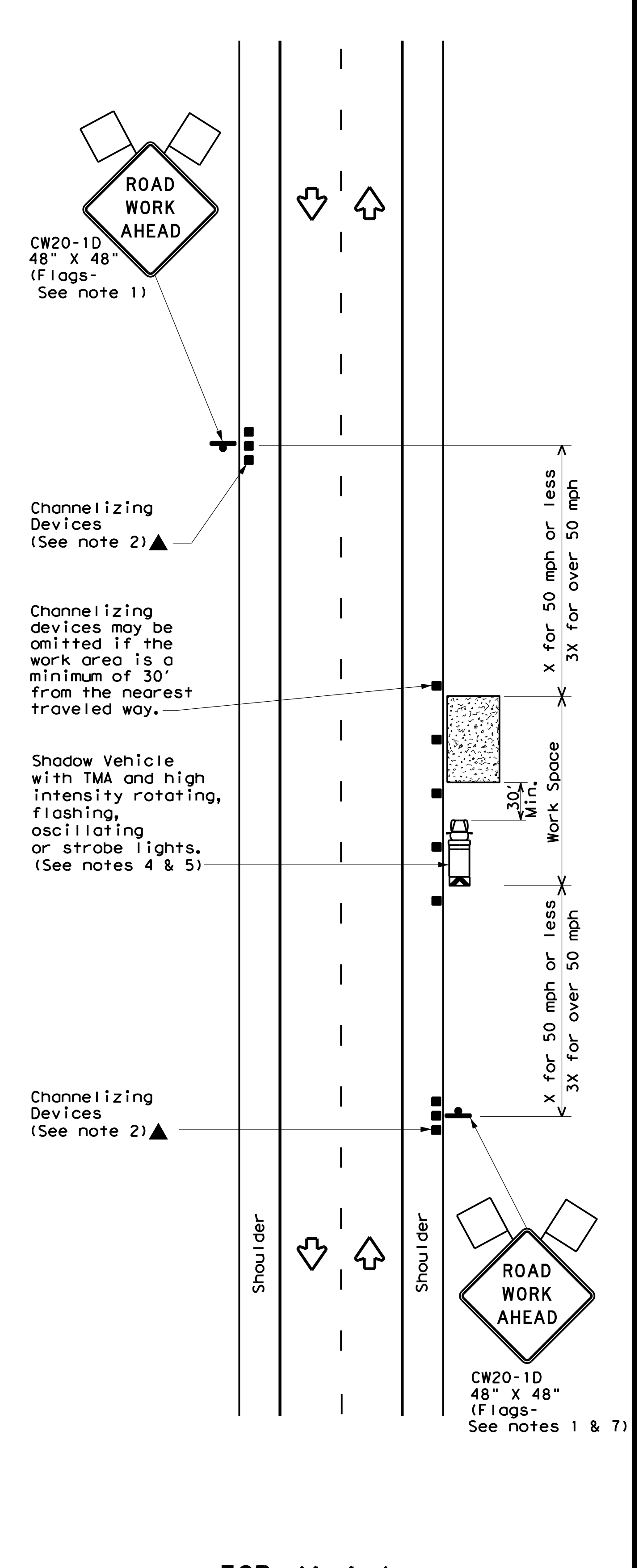
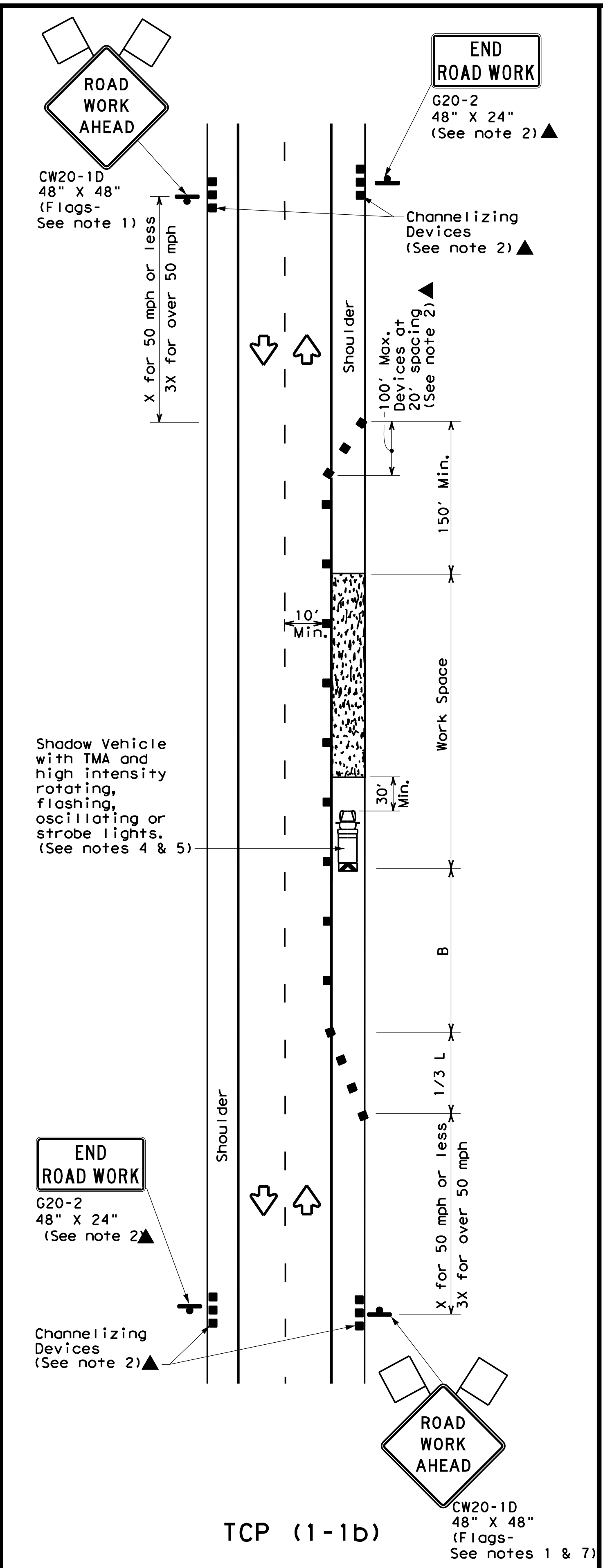


TCP (1-1a)

WORK SPACE NEAR SHOULDER

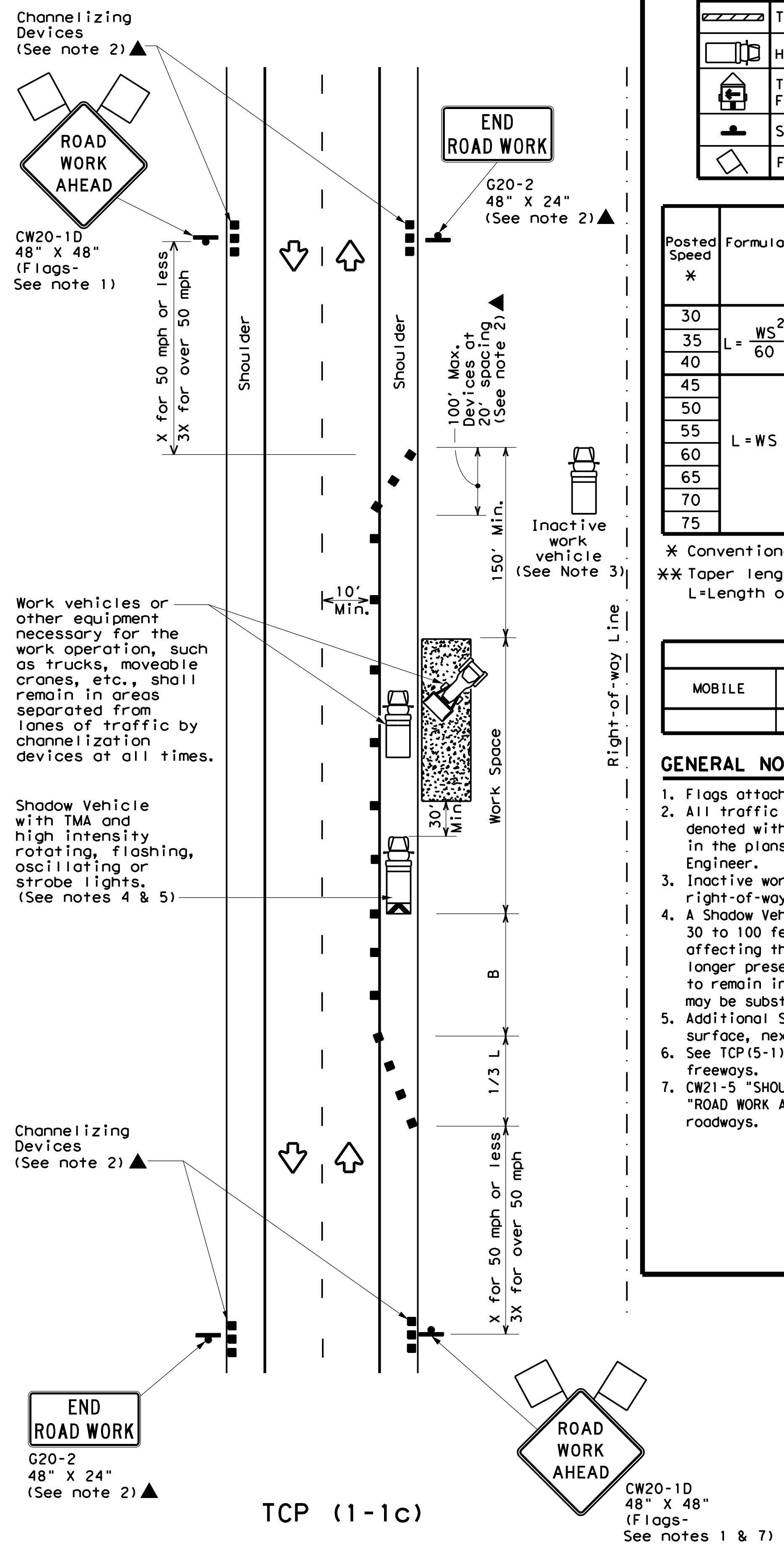
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		42

151

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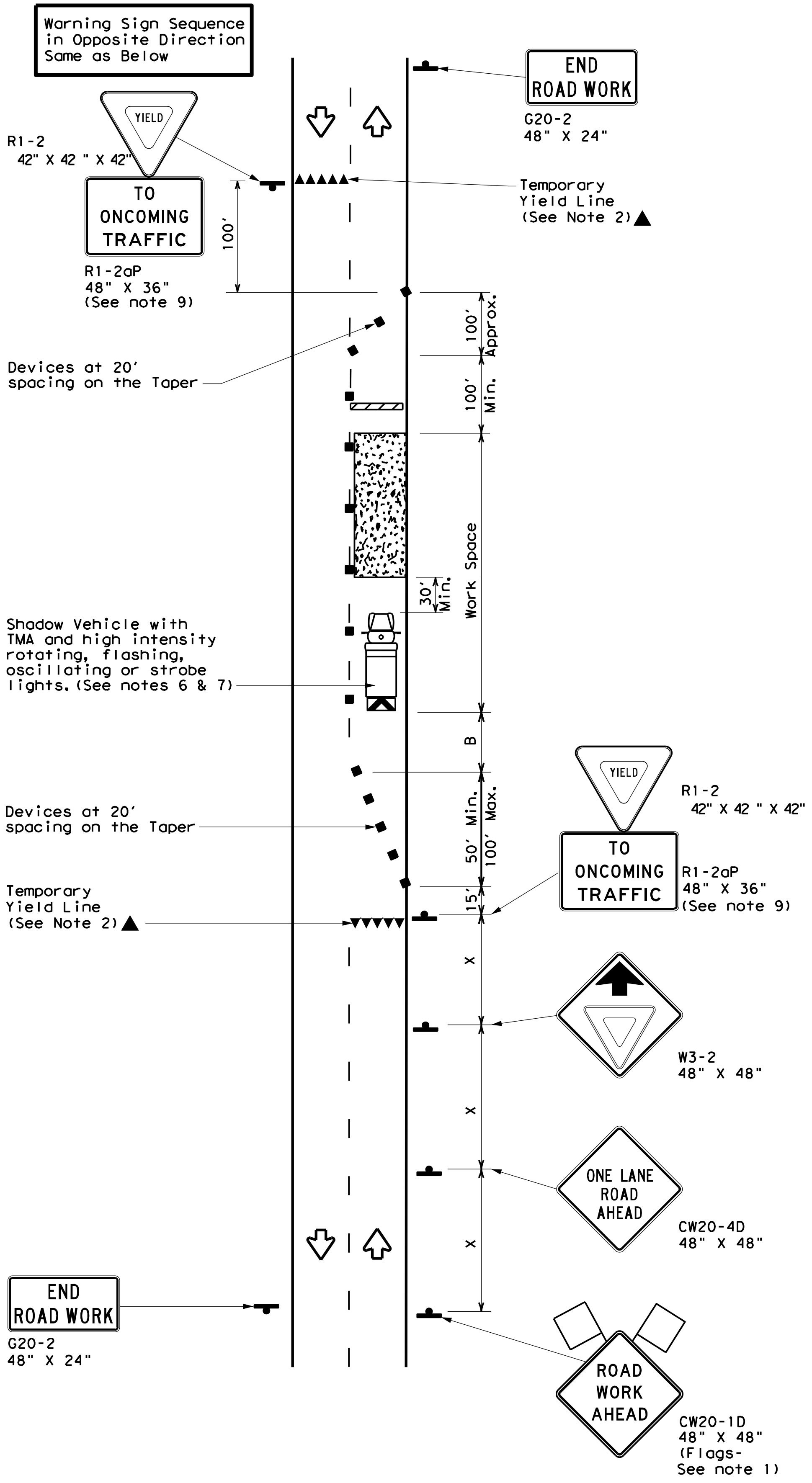


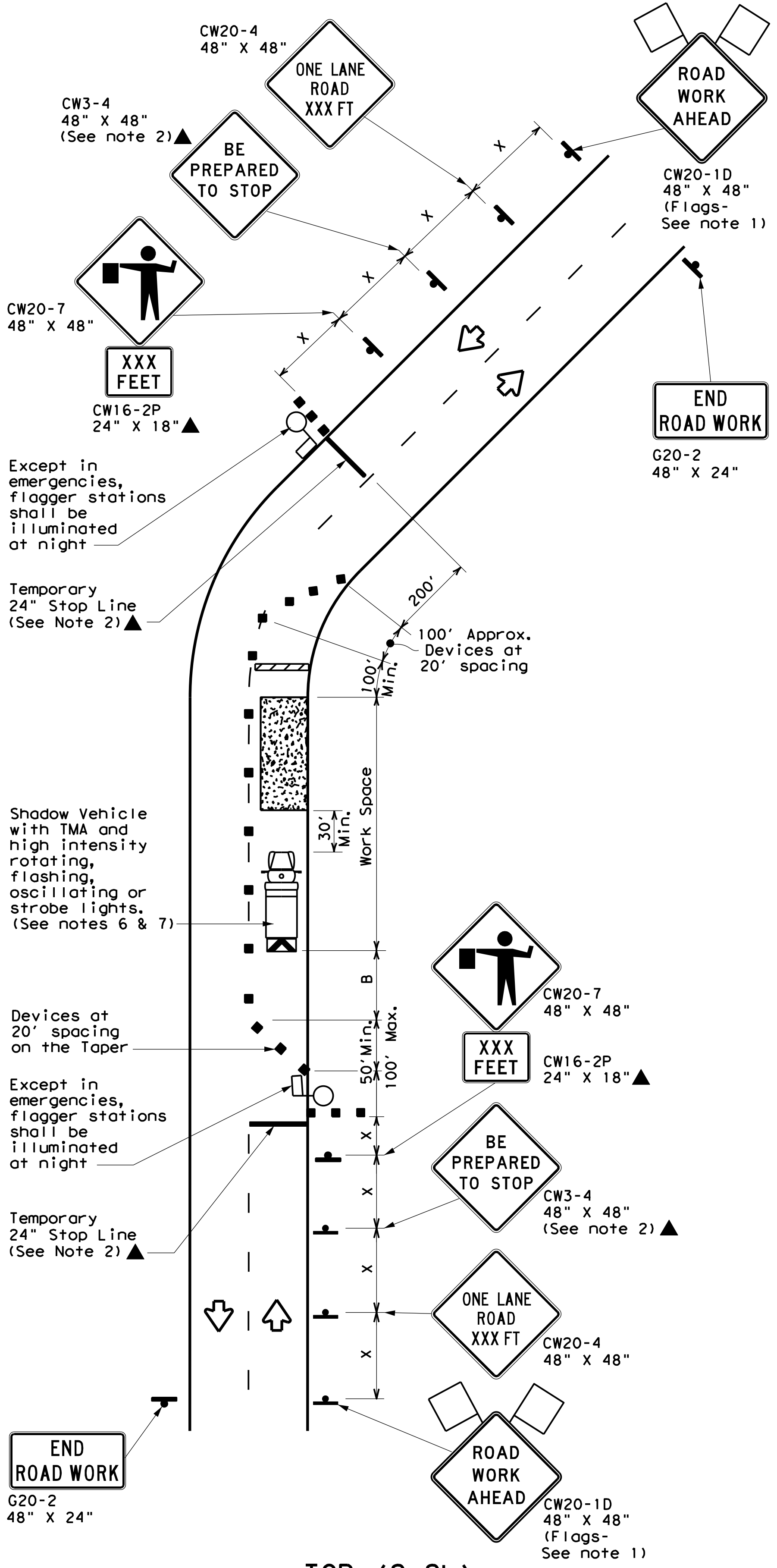
TCP (2-2a)

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 **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	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	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			43

DATE: 5/30/2023 3:08:14 PM
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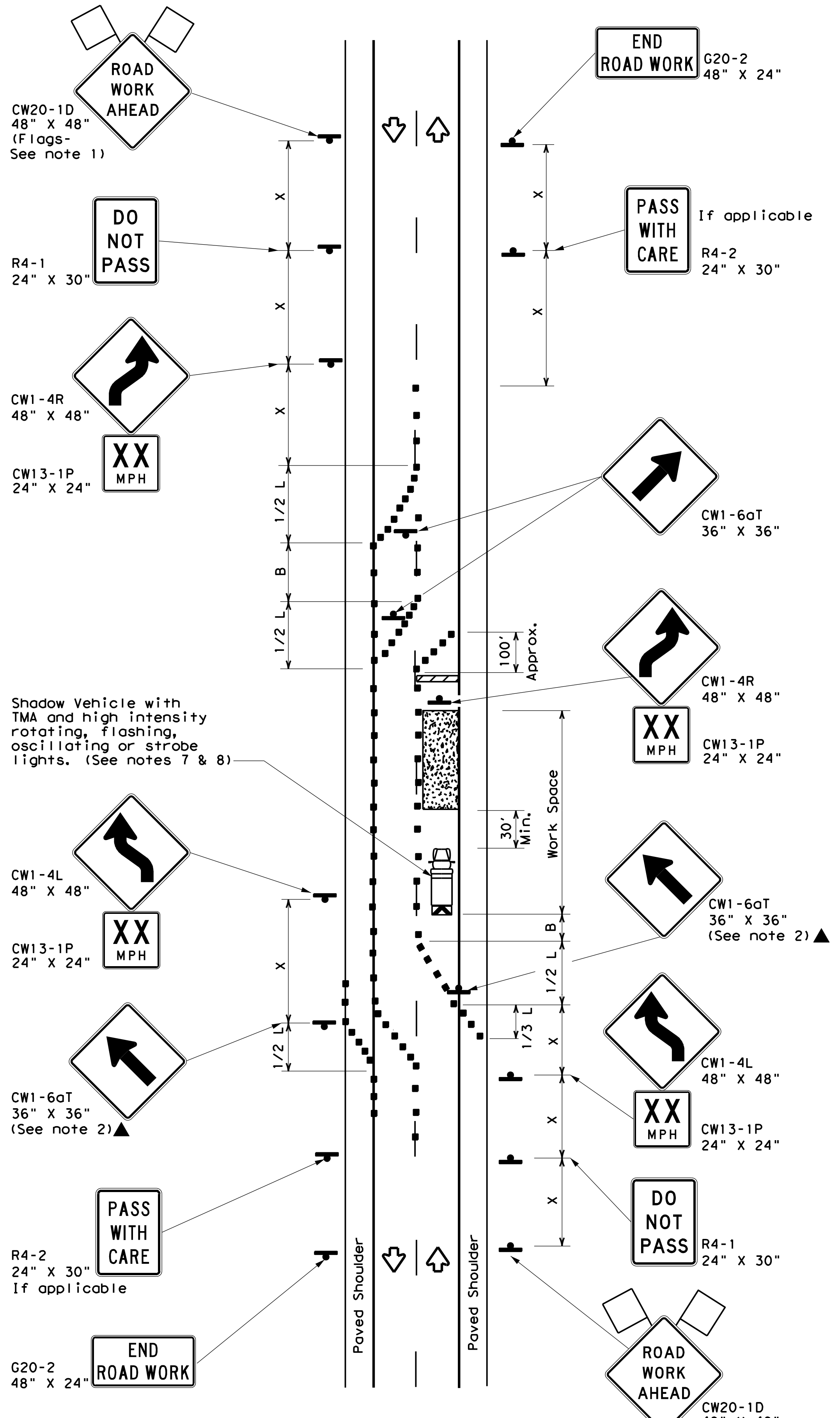
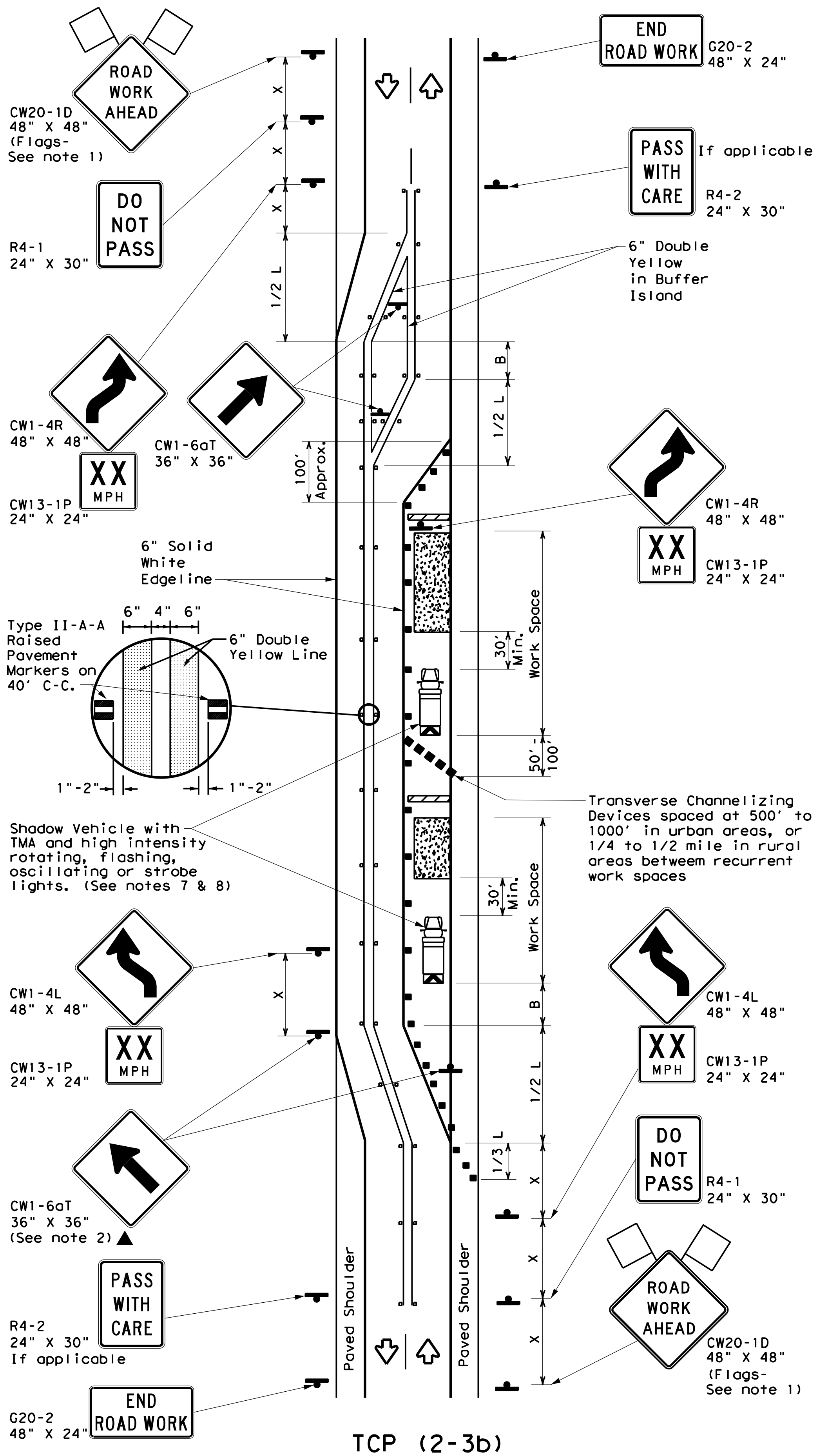


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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

* Conventional Roads Only

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

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

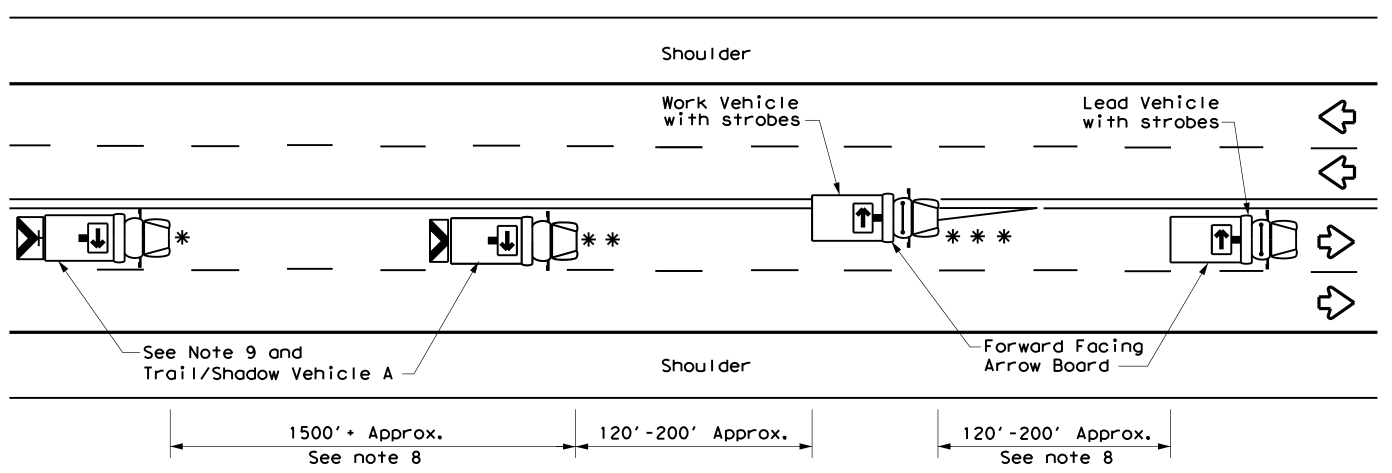
TCP(2-3)-23

FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

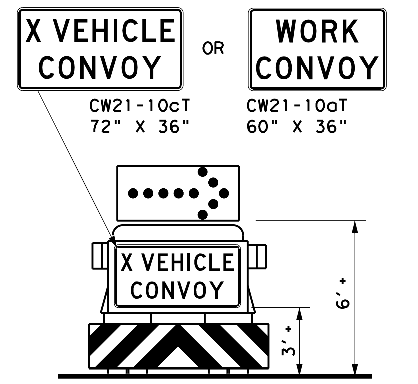
DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	44

REVISIONS
12-85 4-98 2-18
8-95 3-03 4-23
1-97 2-12



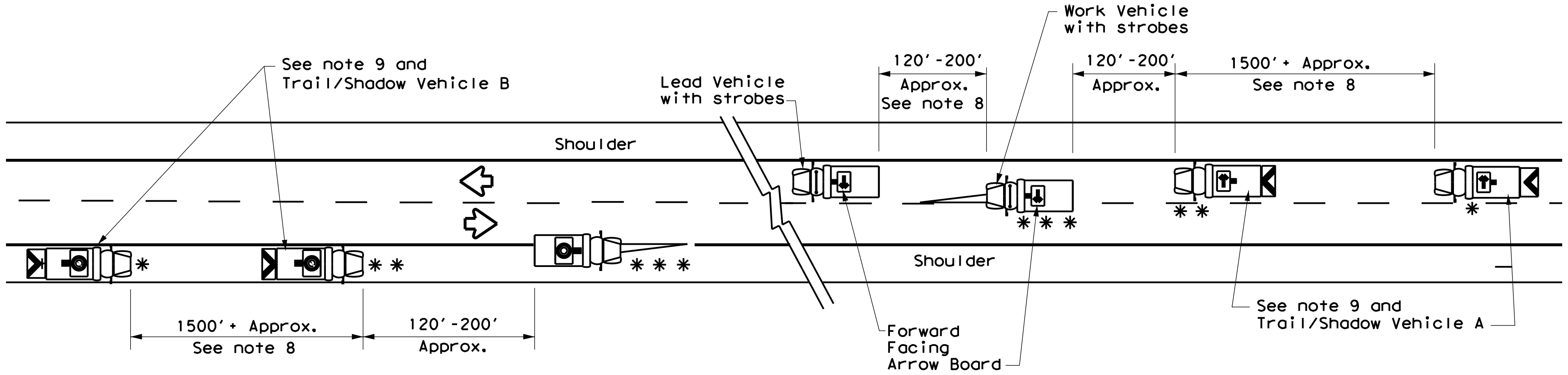
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

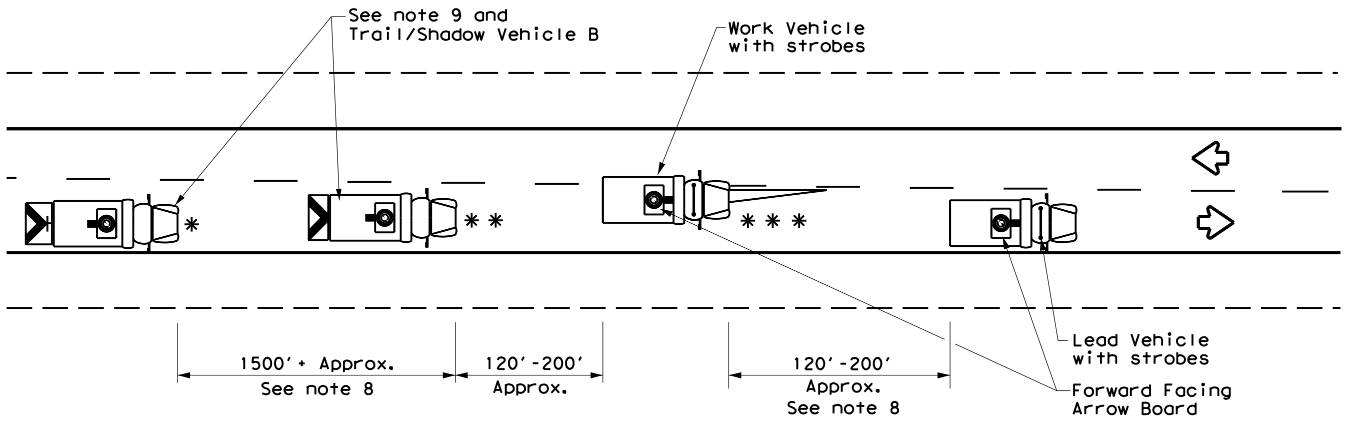


WORK ON SHOULDER

WORK ON TRAVEL LANE

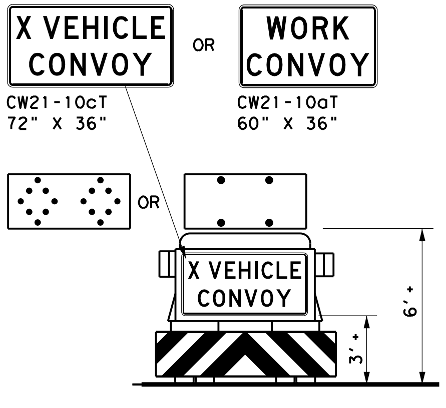
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

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 the WORK vehicle must be equipped with an arrow board. 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 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.

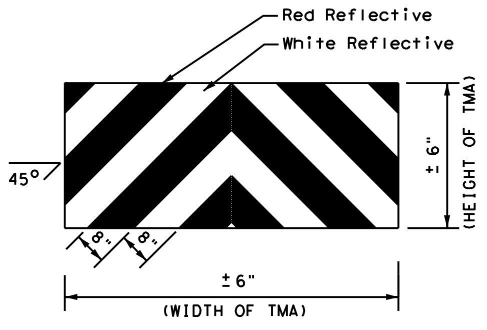
6. Each vehicle shall have two-way radio communication capability.

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 work 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. 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.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
UNDIVIDED HIGHWAYS

TCP(3-1)-13

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© TxDOT	December 1985	CONT	SECT	JOB		HIGHWAY	
REVISIONS 2-94 4-98 8-95 7-13 1-97		0914	33	097, ETC.		RM 1826	
		DIST	COUNTY			SHEET NO.	
		AUS	TRAVIS & HAYS			45	

175

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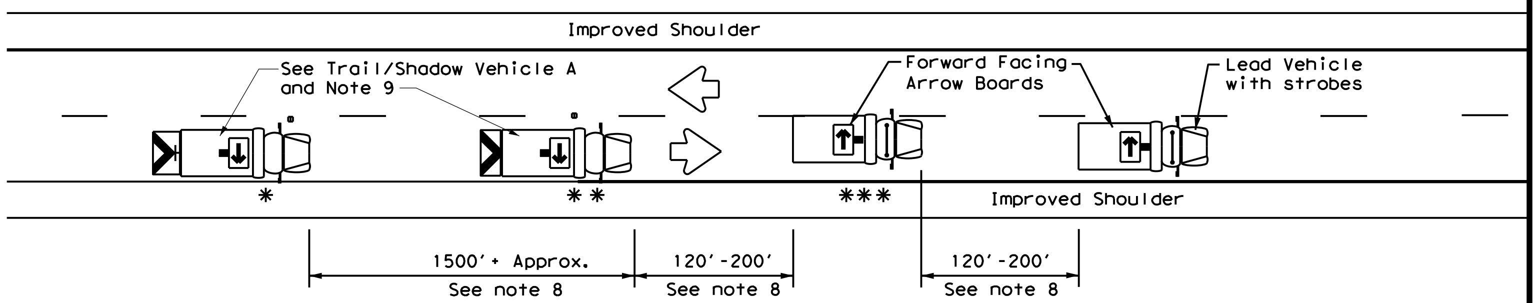
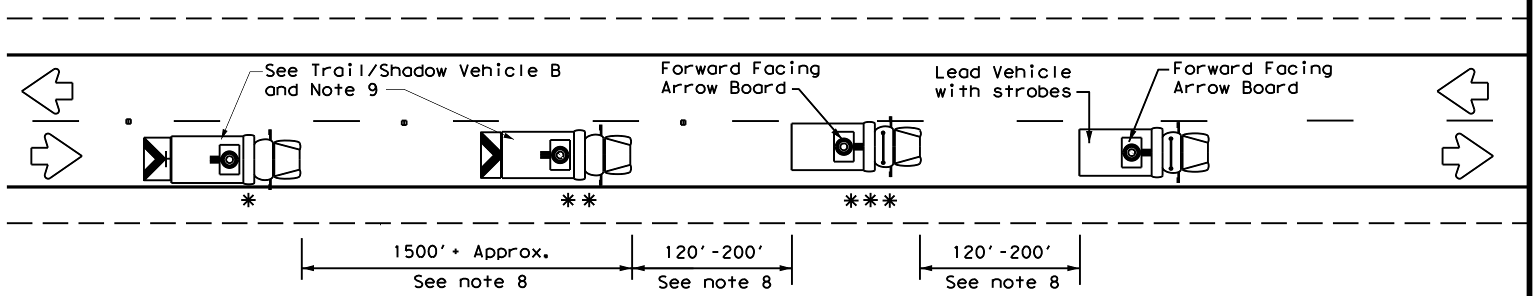


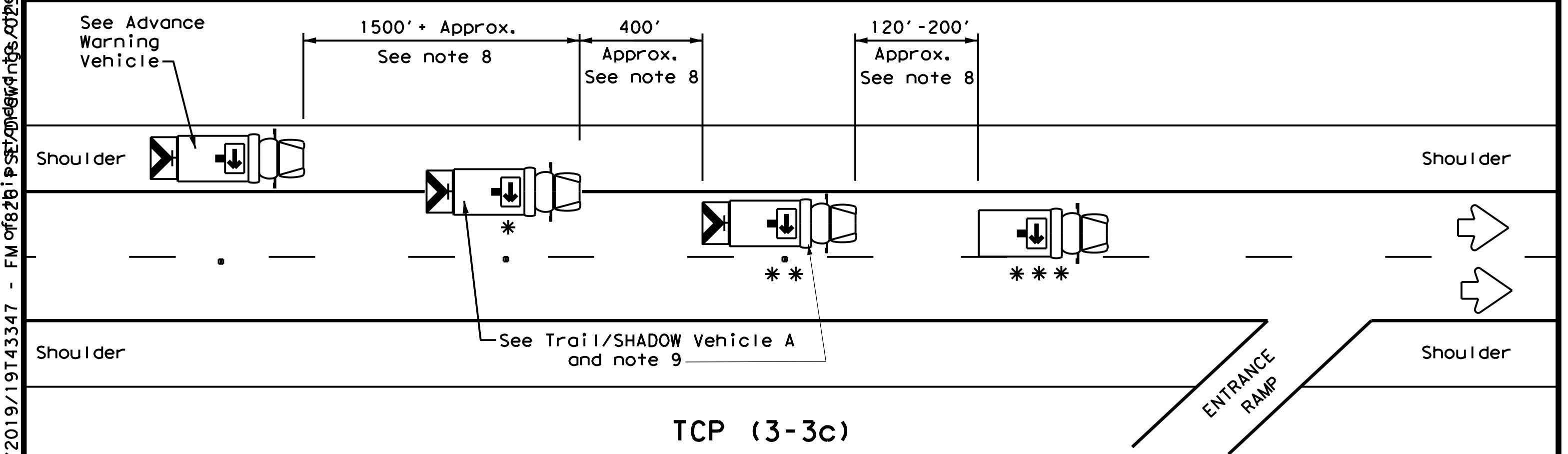
TCP (3-3a)

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



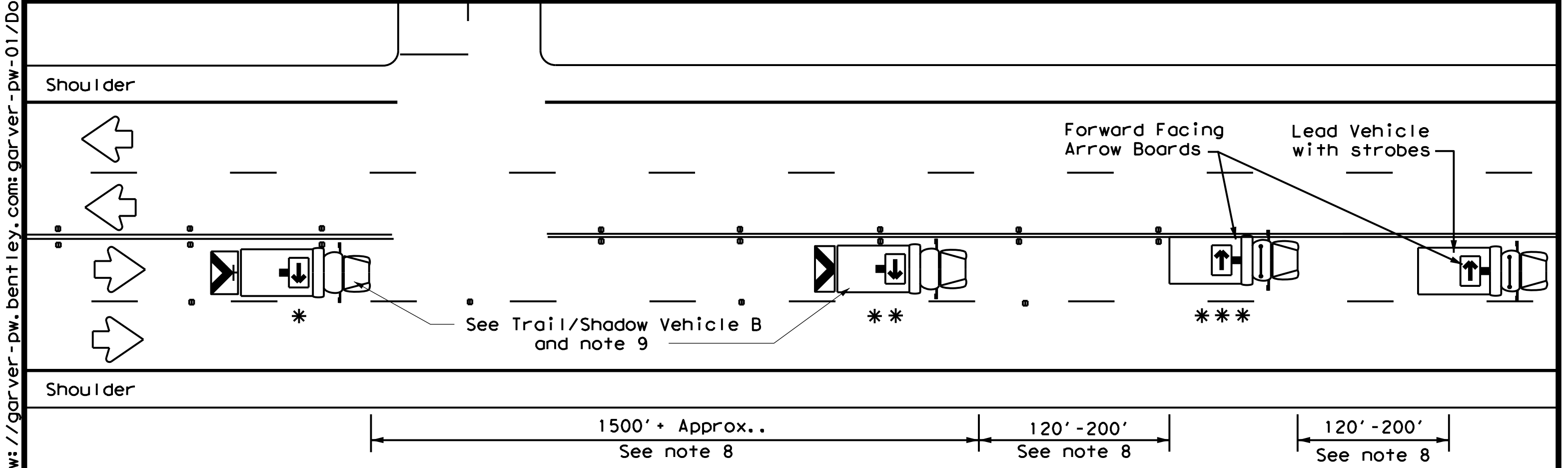
TCP (3-3b)

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



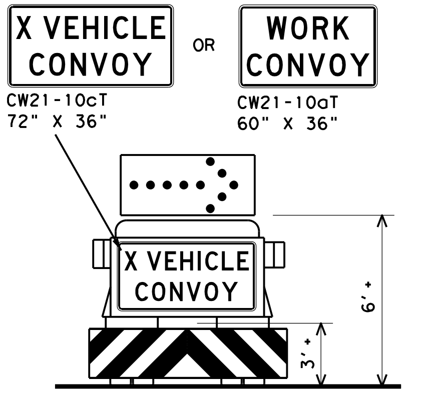
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



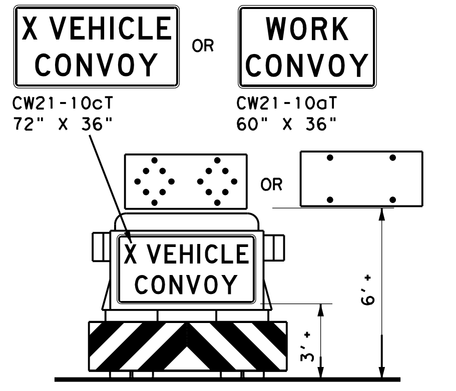
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



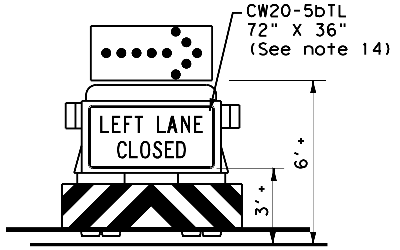
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

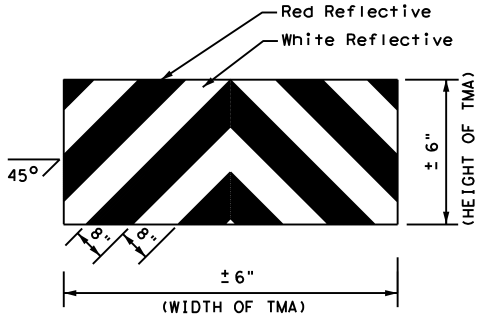


TRAIL/SHADOW VEHICLE B

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
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REVISIONS 2-94 4-98 8-95 7-13 1-97 7-14		0914	33	097, ETC.	RM 1826
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		AUS	TRAVIS & HAYS		46

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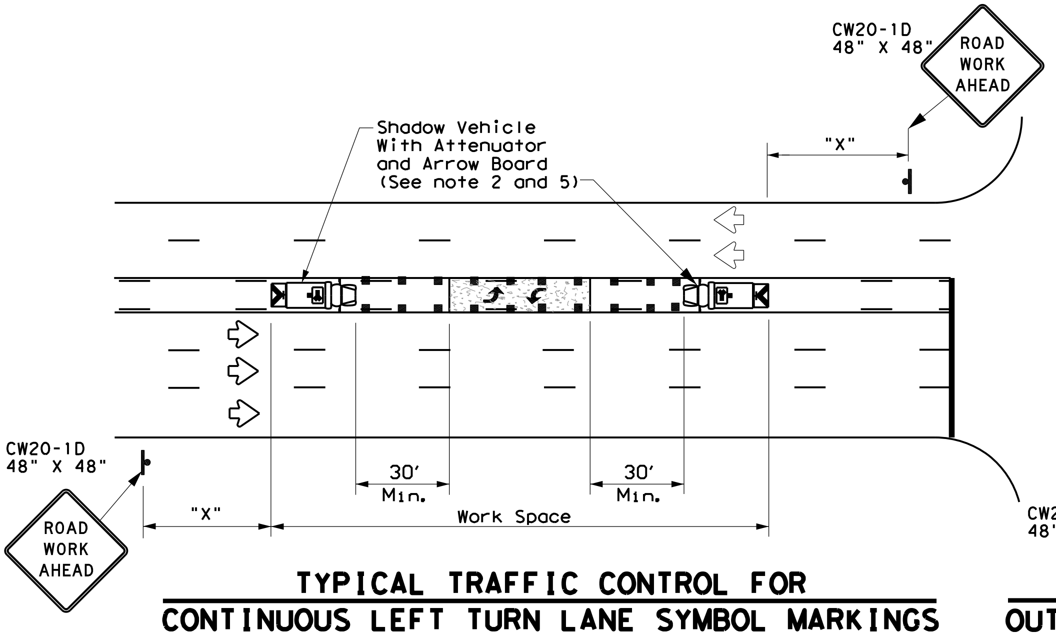
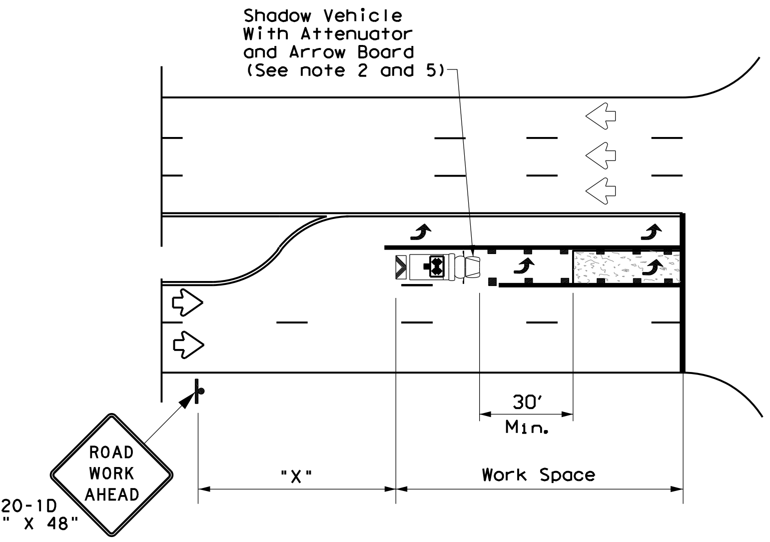
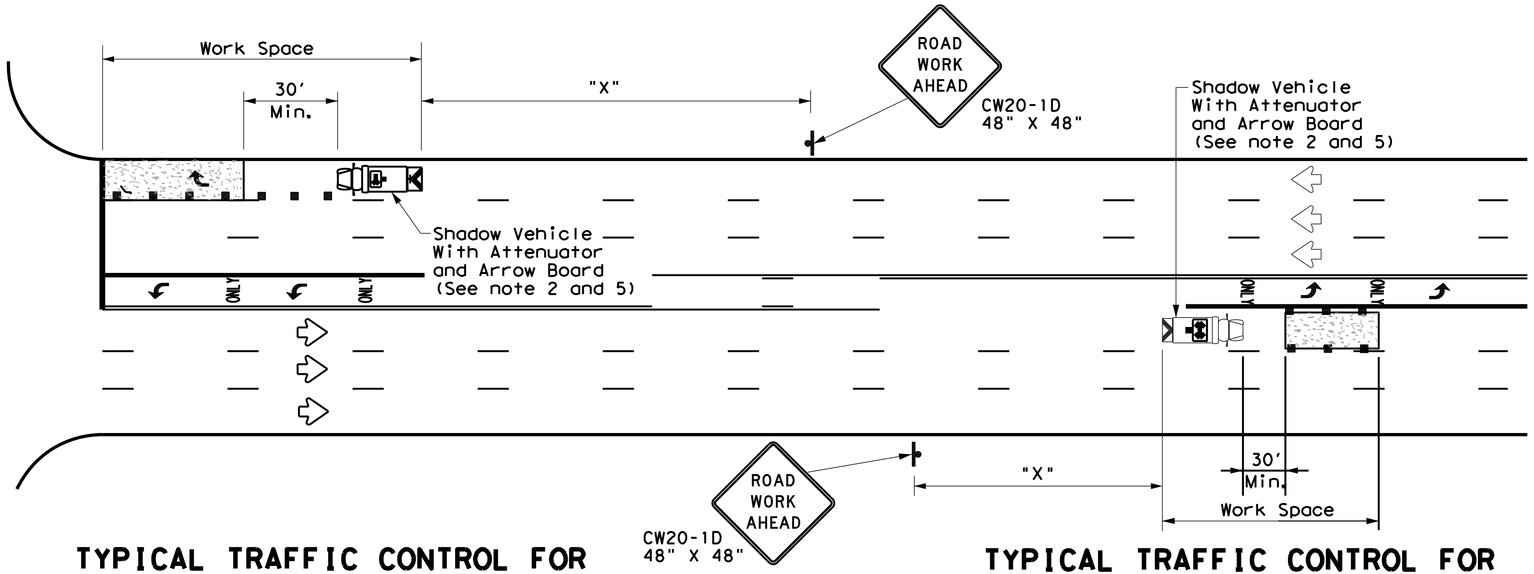


TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

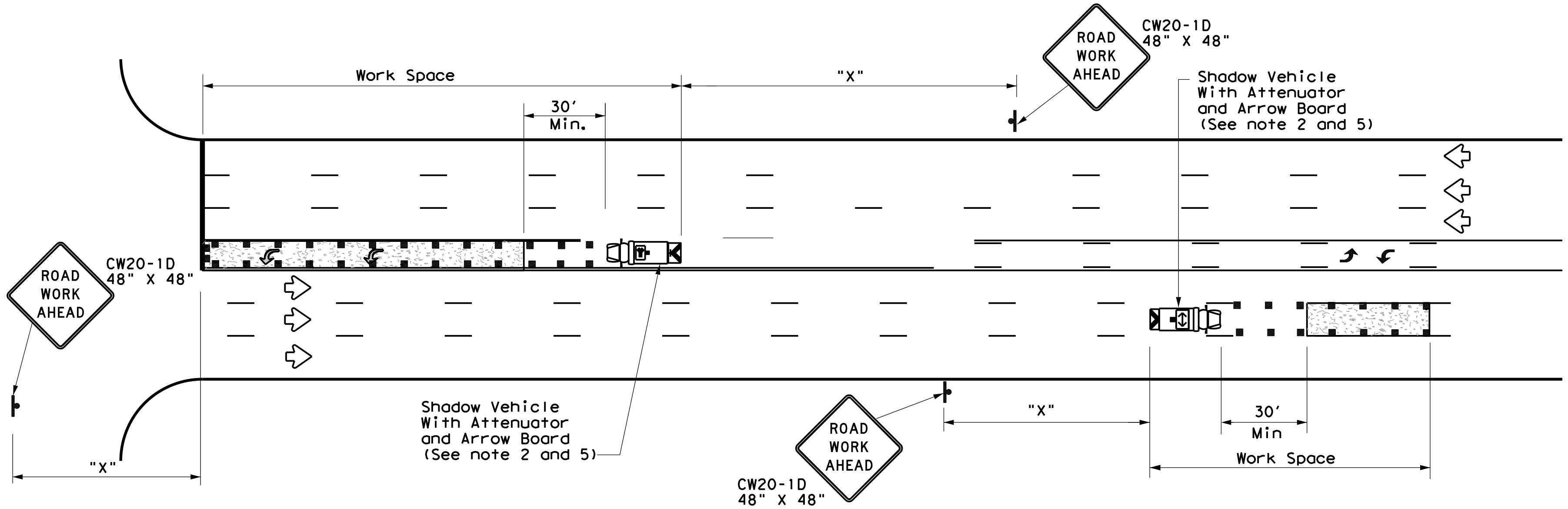


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS

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	■ ■ ■	Channelizing Devices

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

✱ Conventional Roads Only

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

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

GENERAL NOTES

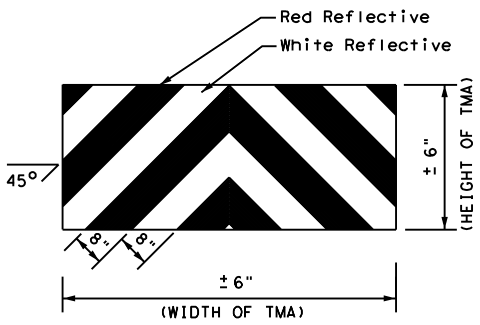
1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.

2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.

3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.

4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.

5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
© TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY		
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	DIST	COUNTY	SHEET NO.			
	AUS	TRAVIS & HAYS	47			

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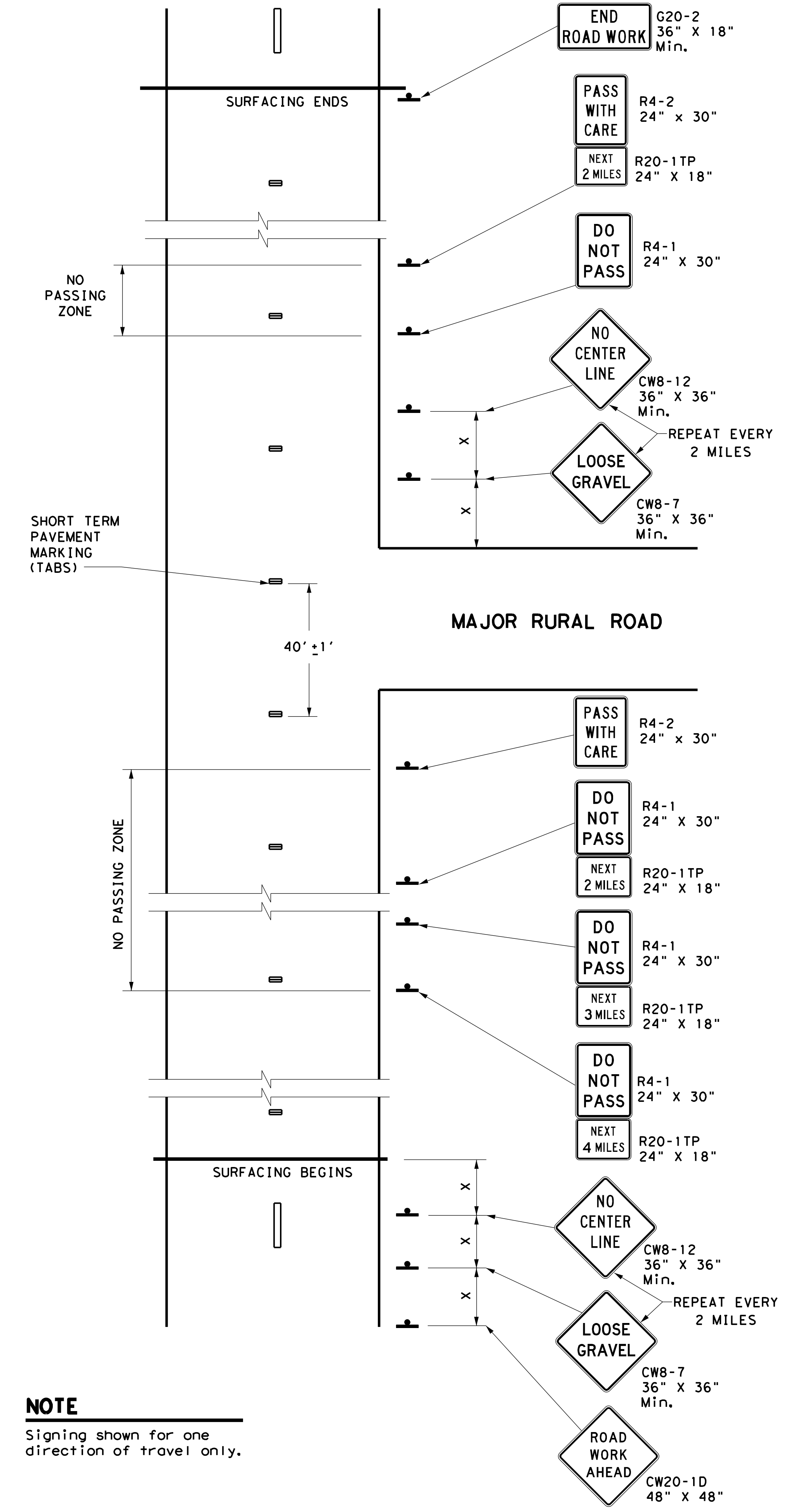
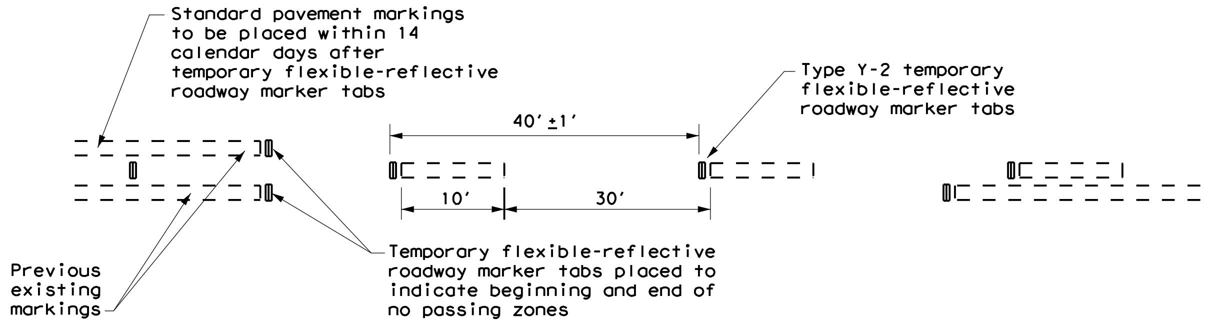


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS
FOR
SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS
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1-97 7-13

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0914	33	097, ETC.	RM 1826

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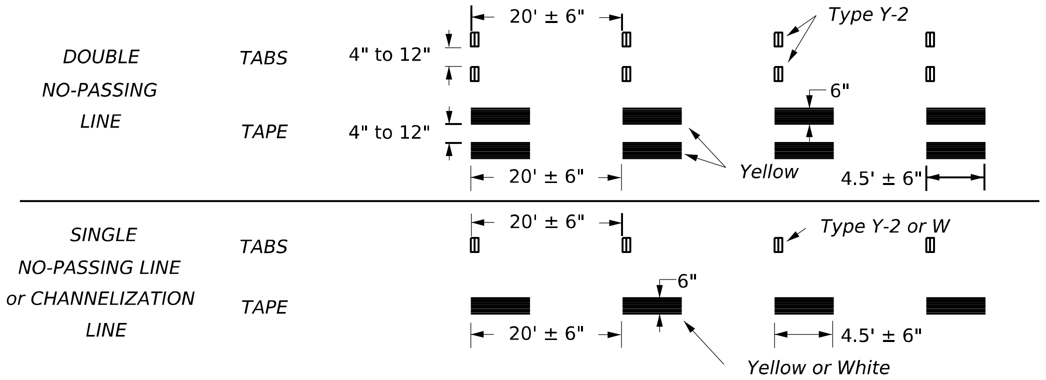
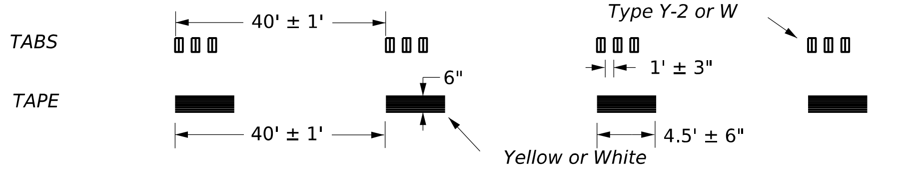
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES



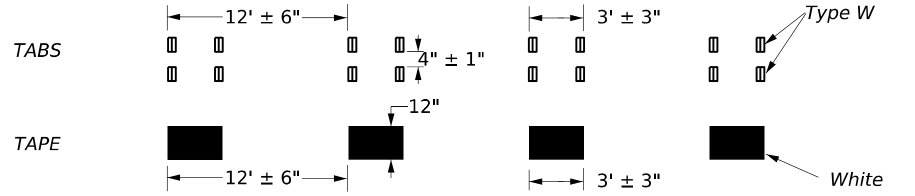
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

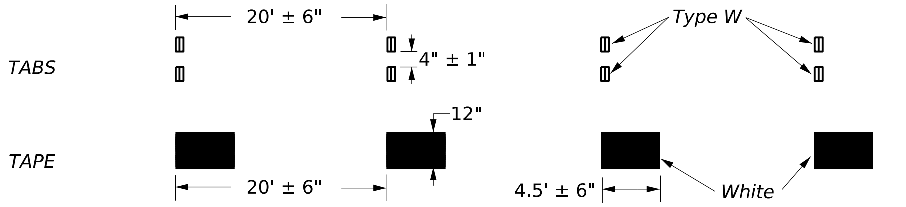


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



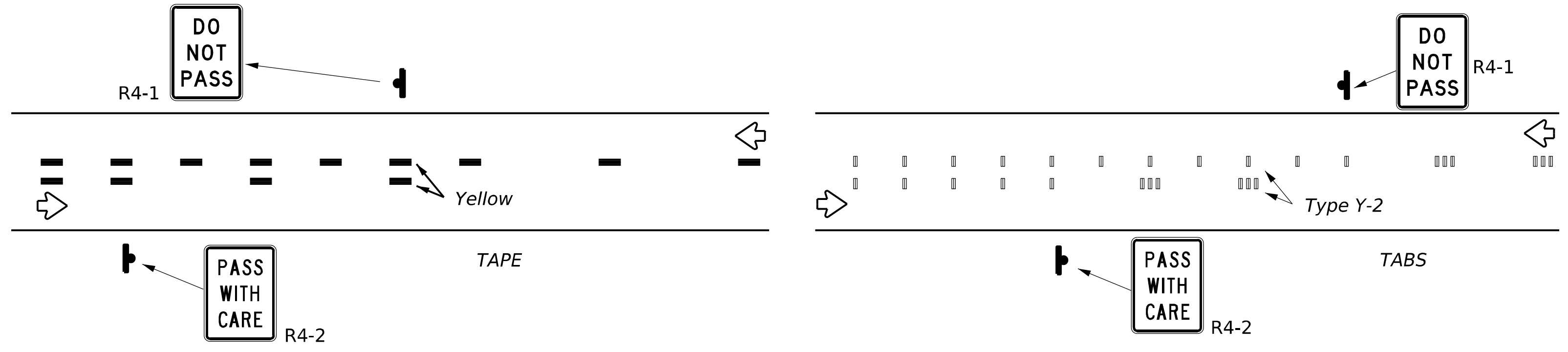
NOTES:

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.

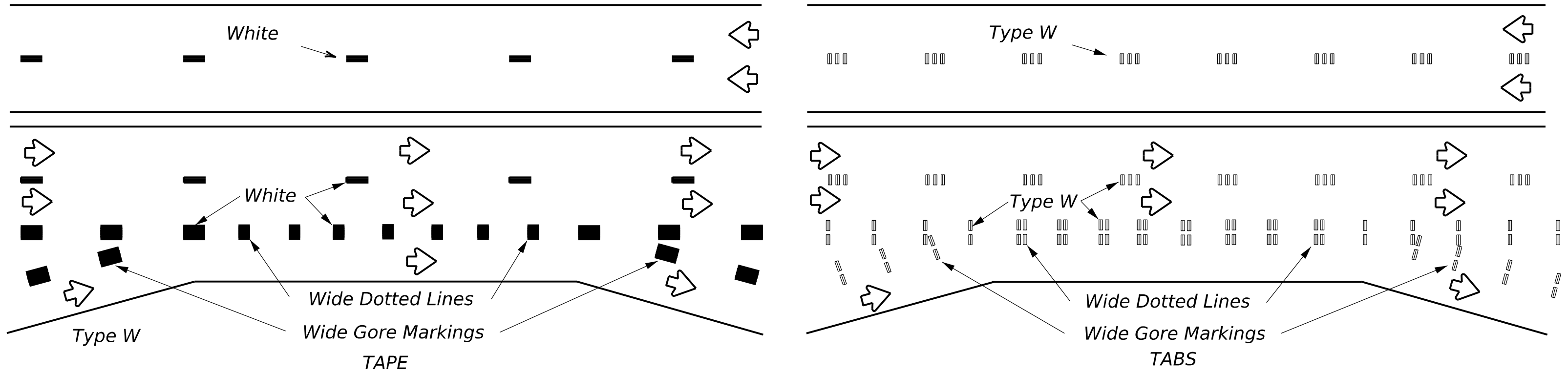
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

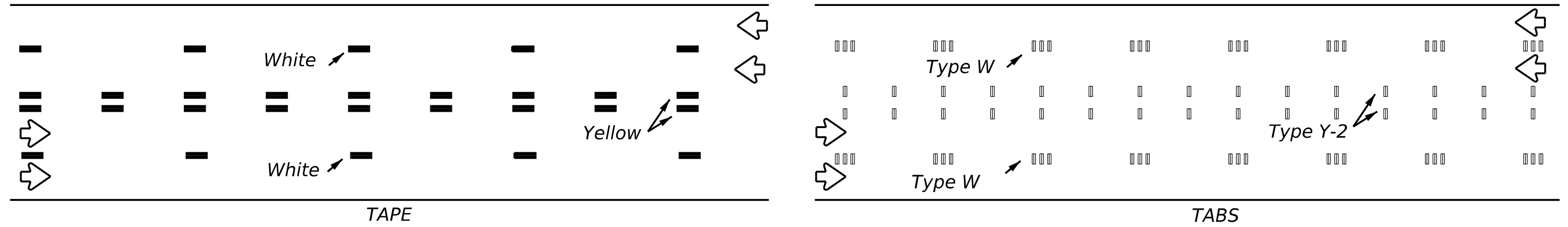
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



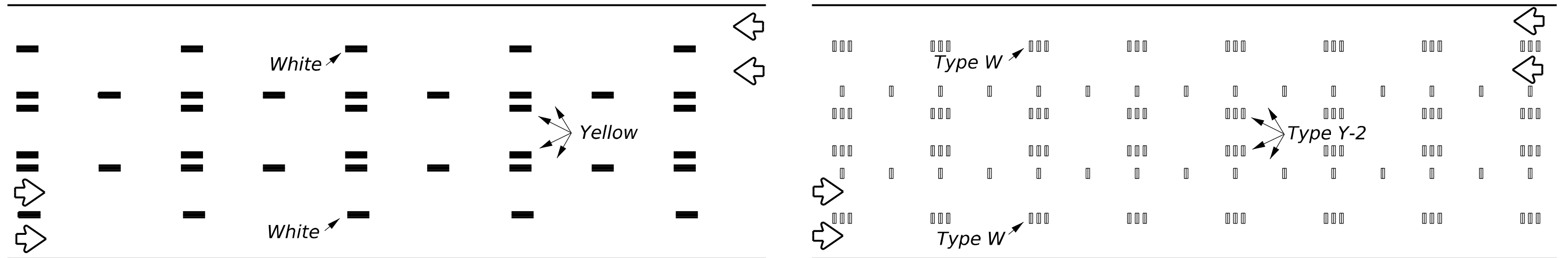
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



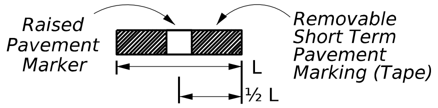
LANE LINES FOR DIVIDED HIGHWAY



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 Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

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4-92 7-13 1-97 2-23 3-03		DIST	COUNTY		SHEET NO.	
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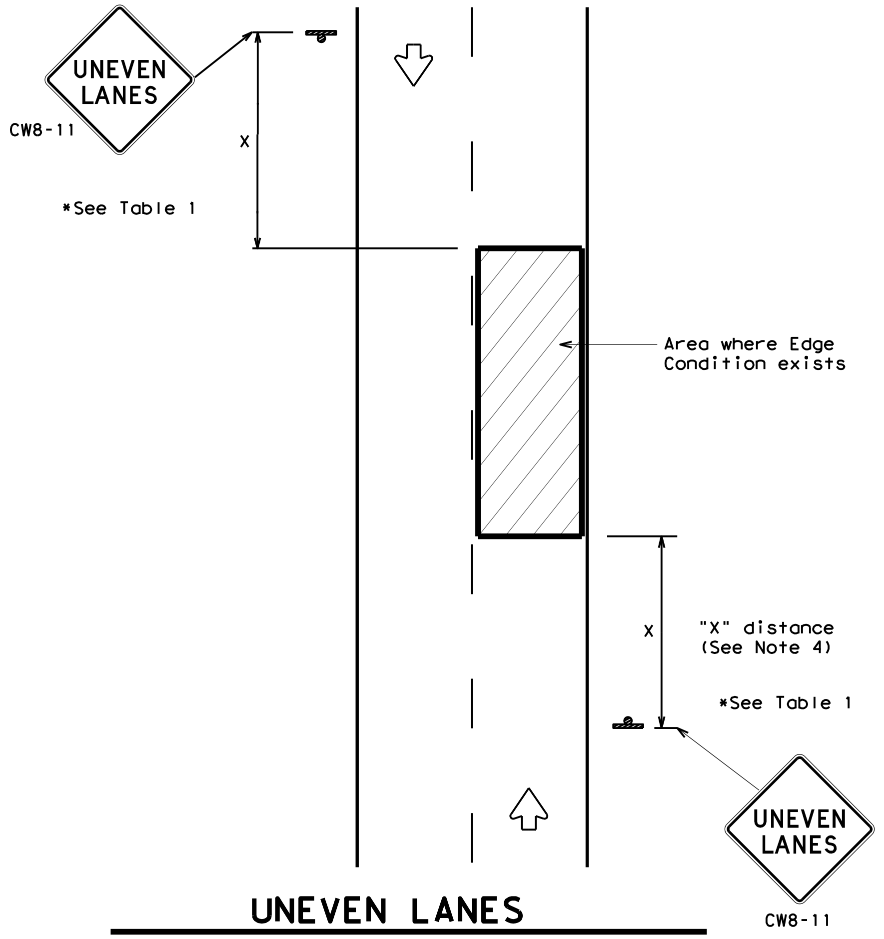
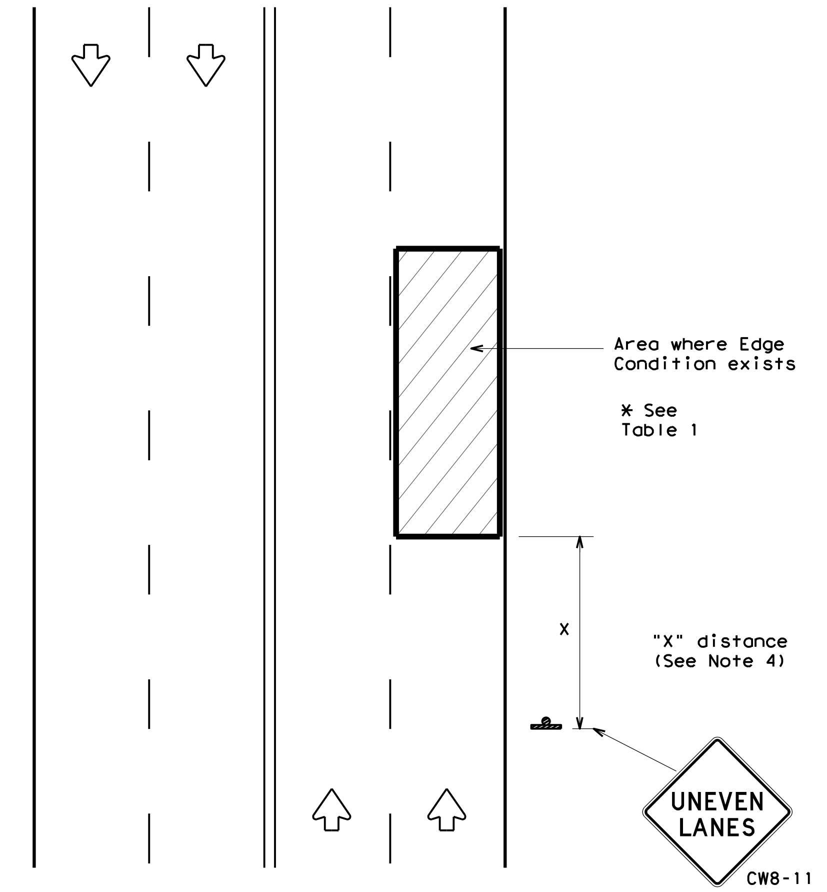
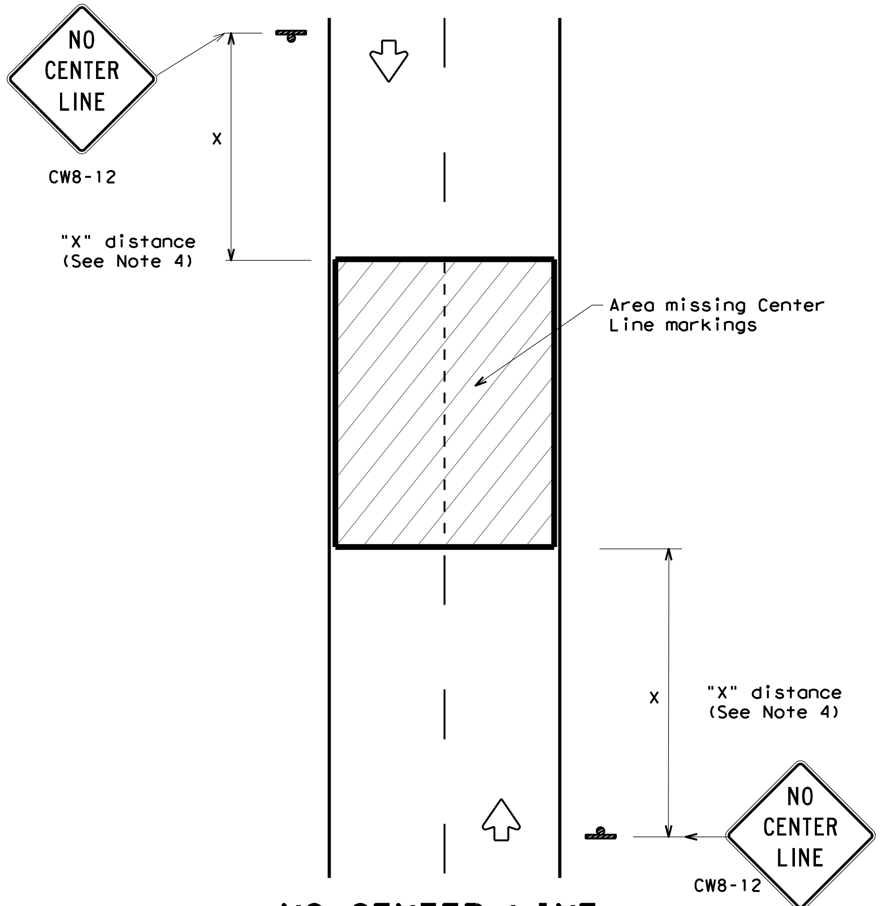


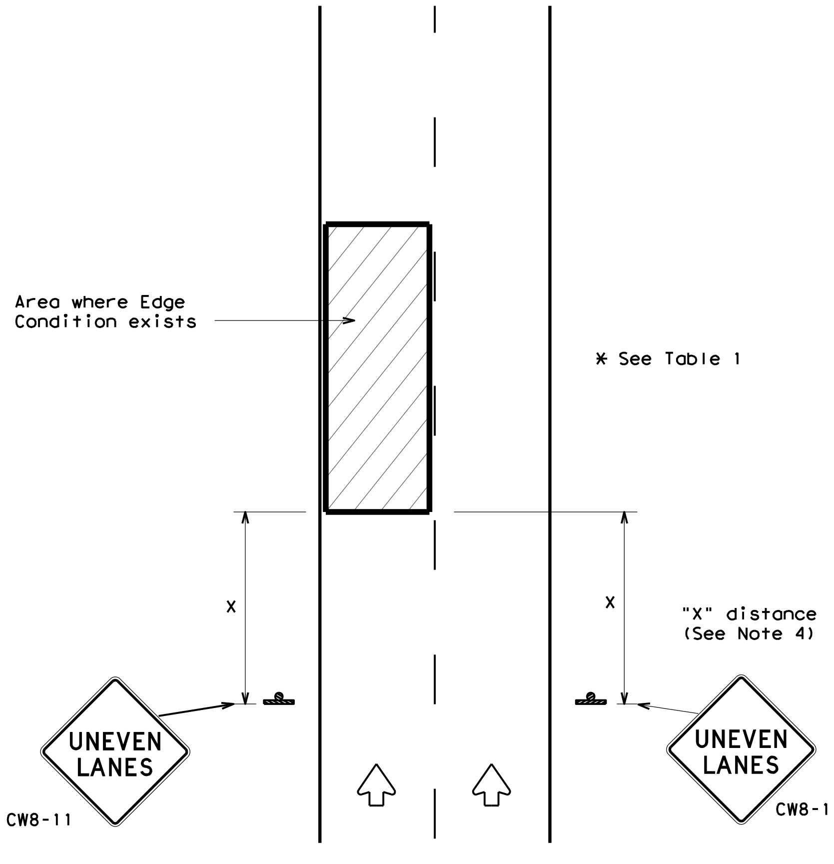
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

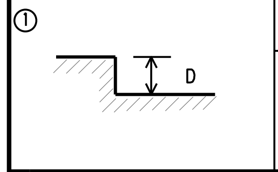
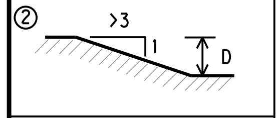
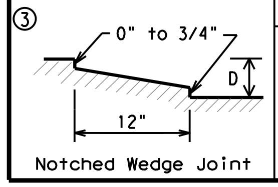
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

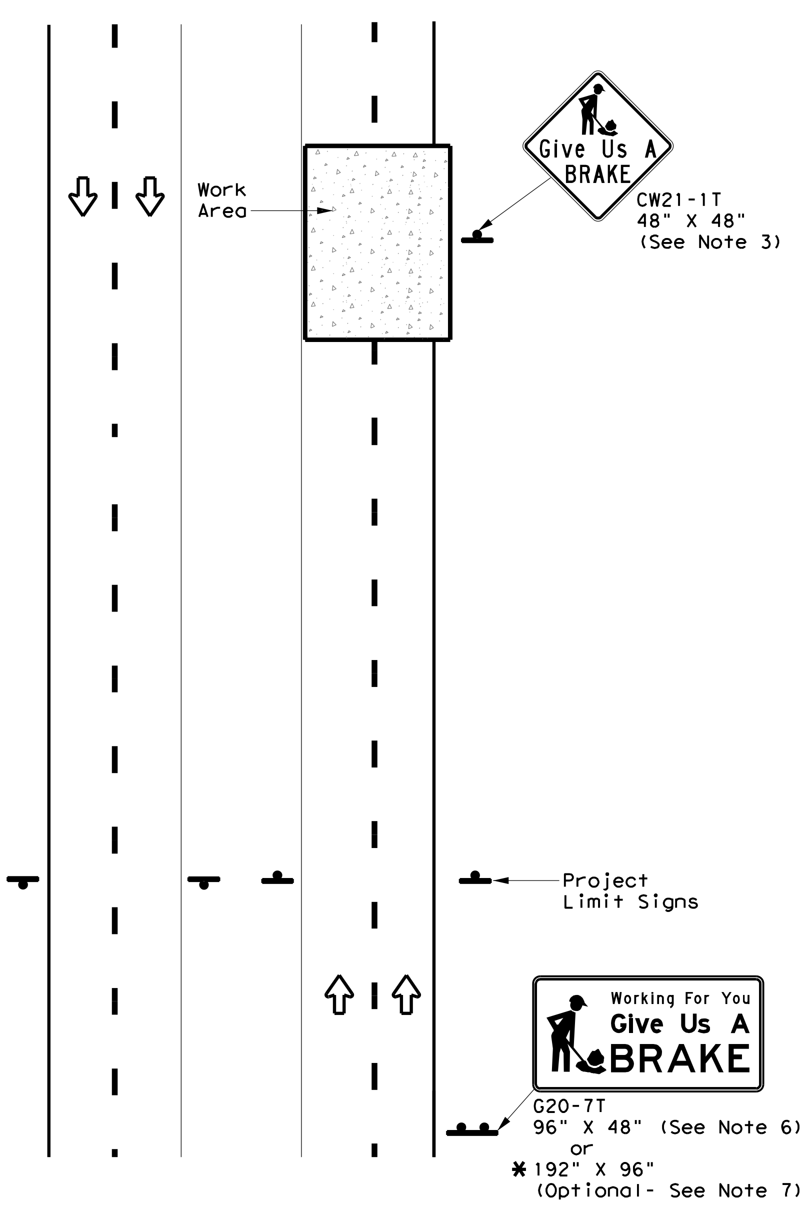
SIGNING FOR UNEVEN LANES

WZ(UL)-13

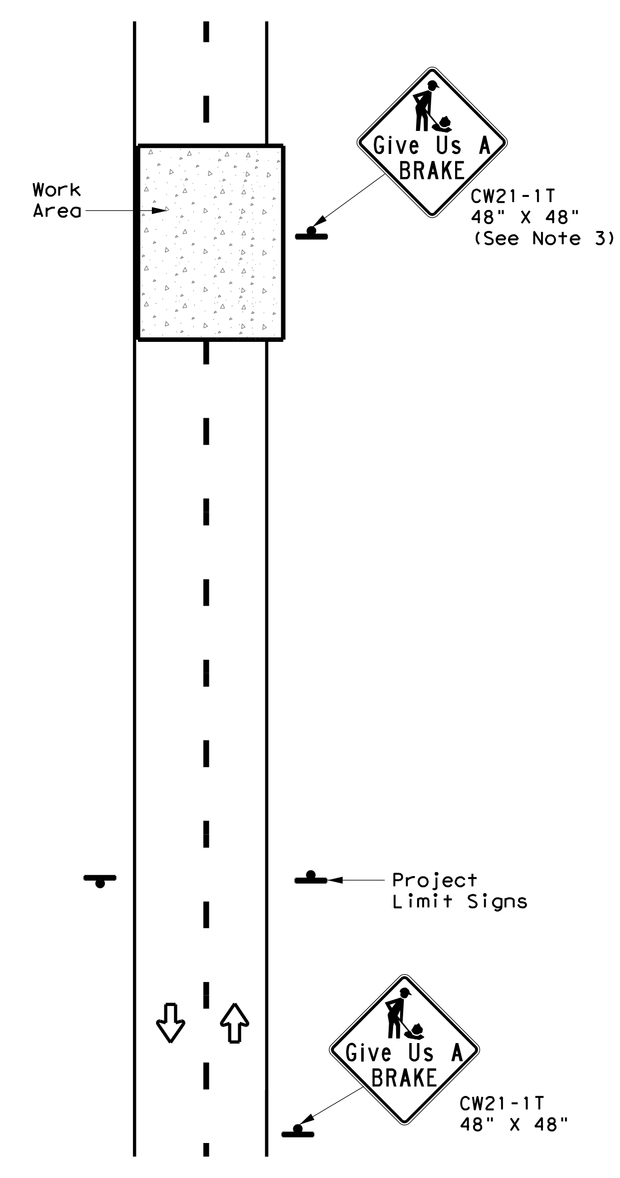
FILE:	wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY		
REVISIONS		0914	33	097, ETC.	RM 1826		
8-95 2-98 7-13 1-97 3-03		DIST	COUNTY	SHEET NO.			
		AUS	TRAVIS & HAYS	50			

112

DATE: 5/30/2023 3:10:05 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/02_TCP/Standards/wzbrk-13.dgn



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 Size	(LF) ①	(LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T		192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND

┴	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		0914	33	097, ETC.		RM 1826	
6-96 5-98 7-13 8-96 3-03		DIST	COUNTY			SHEET NO.	
		AUS	TRAVIS & HAYS			51	

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The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/30/2023 3:10:18 PM
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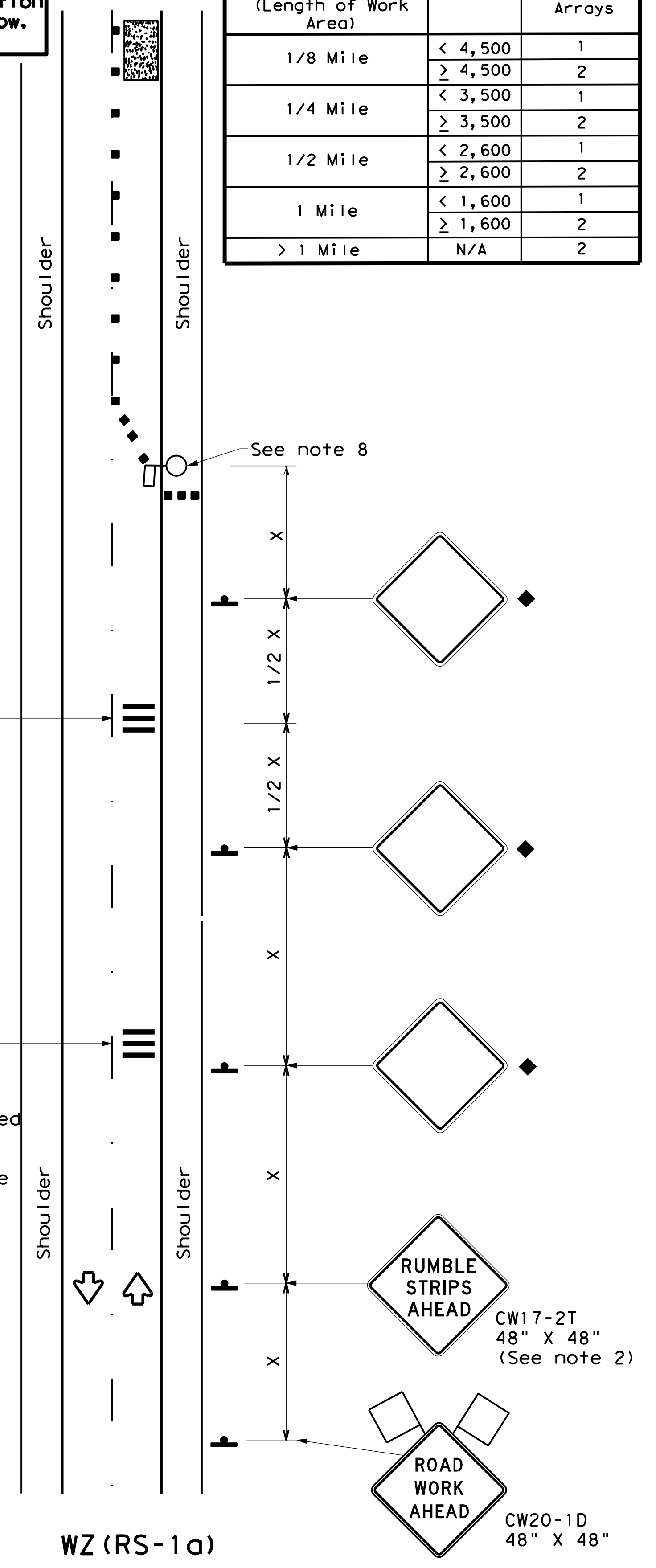
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1

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



Rumble Strip Array (See note 1)

Rumble Strip Array (See note 1)

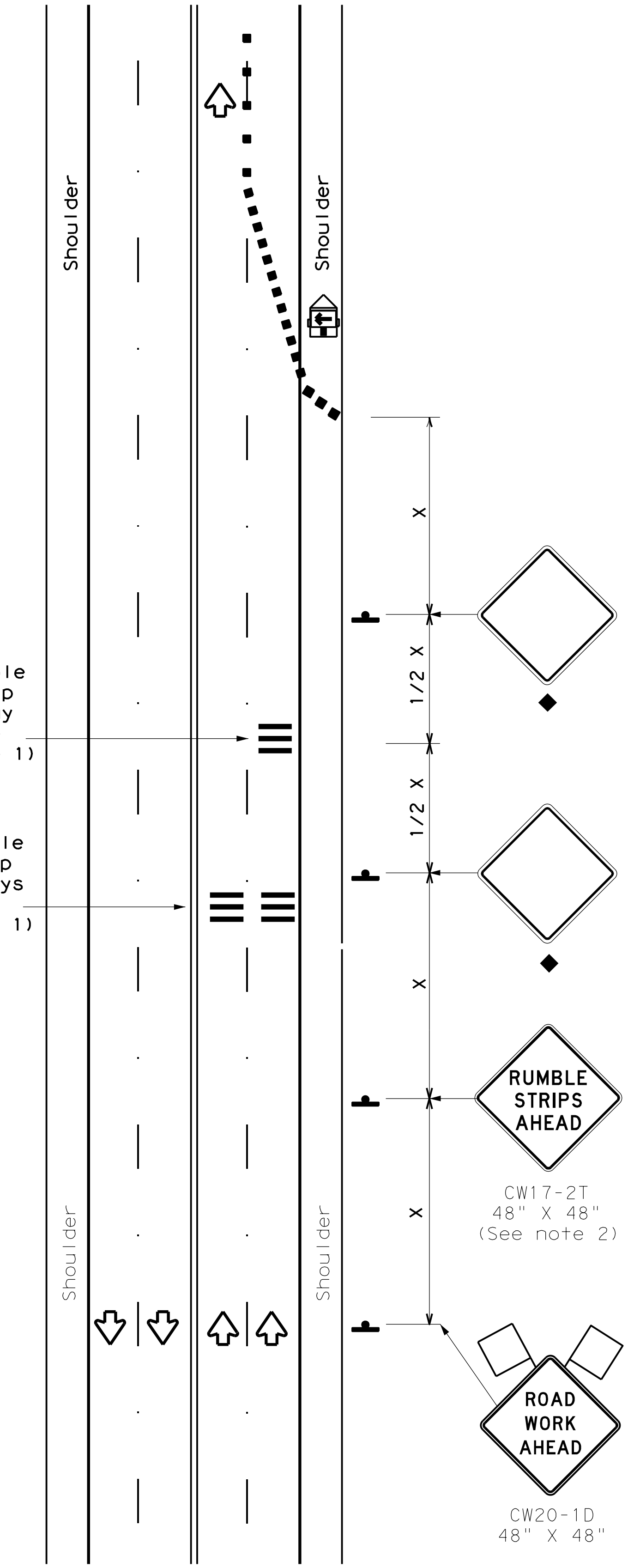
The second Rumble Strip Array is required when the ADT thresholds in Table 1 indicate the need for 2 Arrays.

WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

Rumble Strip Array (See note 1)

Rumble Strip Arrays (See note 1)



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

TABLE 2

Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	✱ 35'+

LEGEND

▭	Type 3 Barricade	■ ■	Channelizing Devices
▭	Heavy Work Vehicle	▲	Truck Mounted Attenuator (TMA)
⇦	Trailer Mounted Flashing Arrow Panel	M	Portable Changeable Message Sign (PCMS)
⊥	Sign	⇦	Traffic Flow
◇	Flag	○	Flagger

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

✱ Conventional Roads Only

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

TYPICAL USAGE

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

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

✱ **For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.**

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

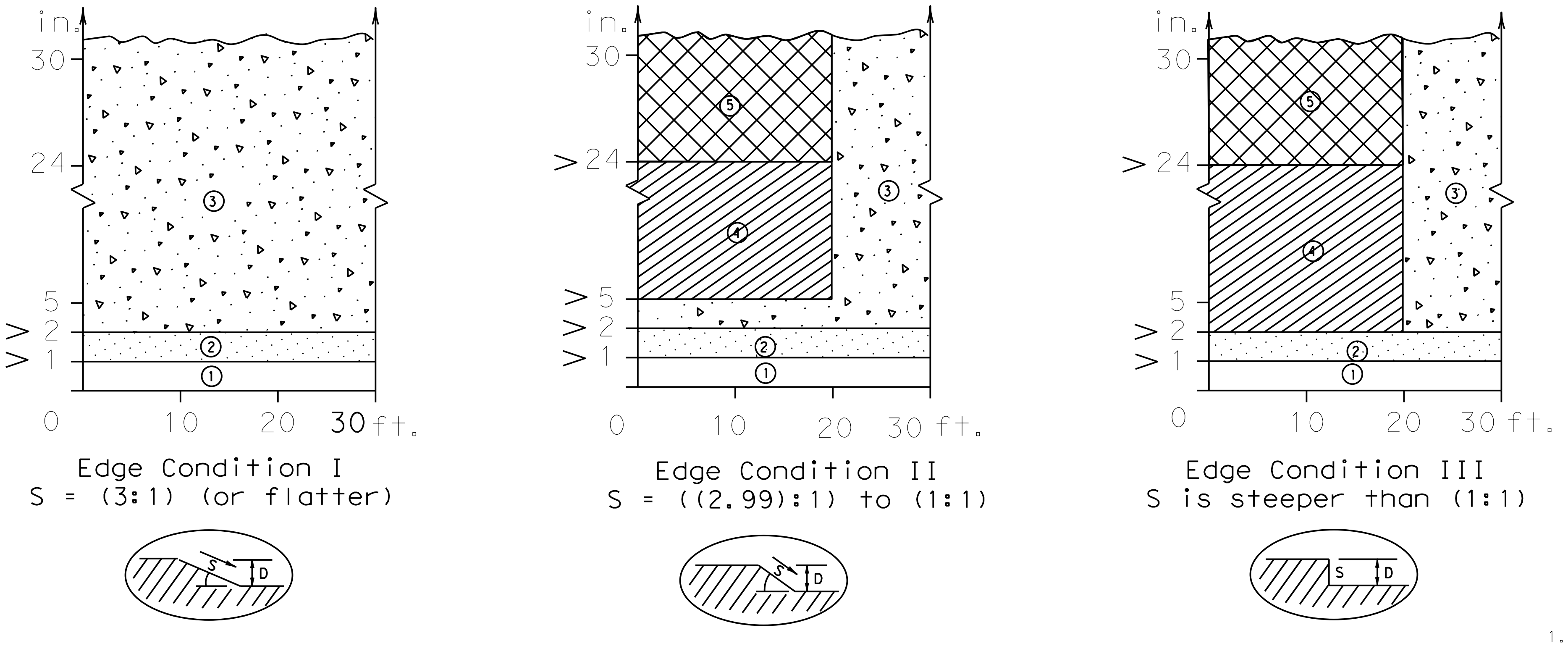
REVISIONS
2-14 1-22
4-16

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	52

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

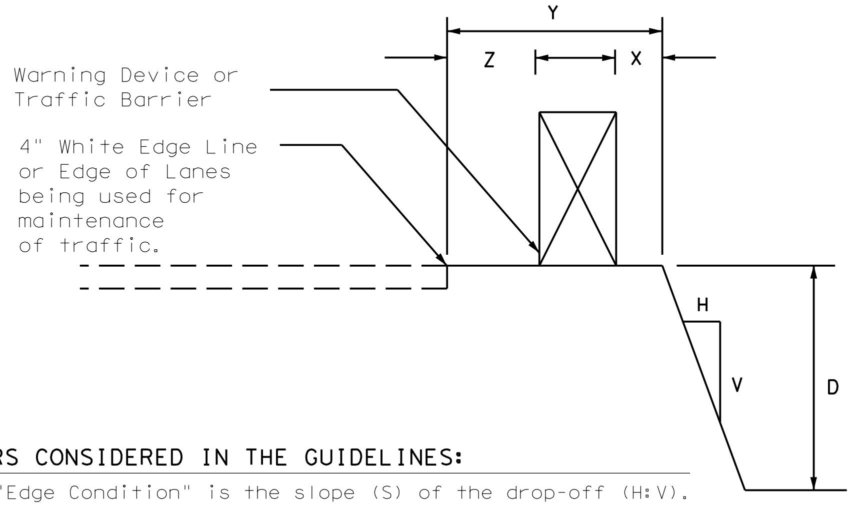
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



Edge Condition I
S = (3:1) (or flatter)

Edge Condition II
S = ((2.99):1) to (1:1)

Edge Condition III
S is steeper than (1:1)



Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

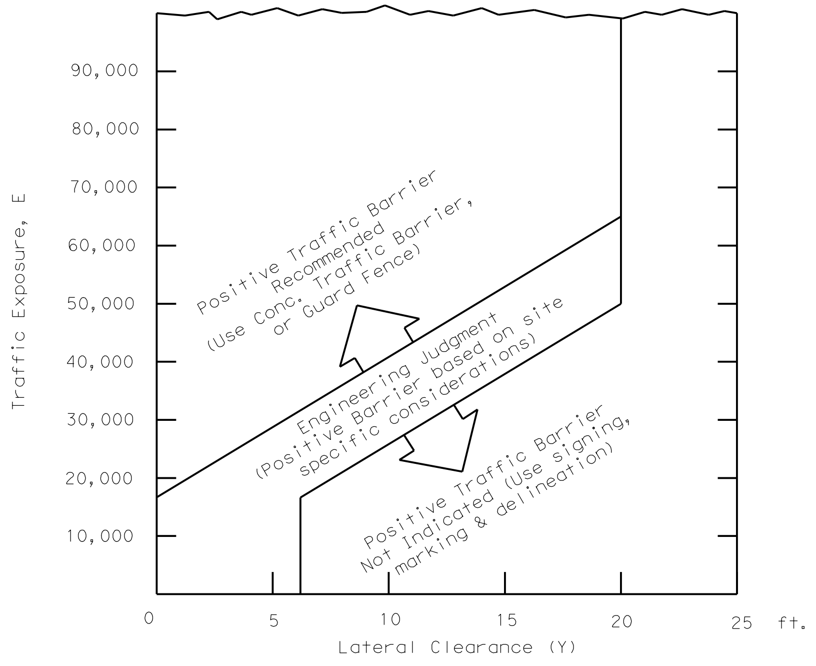
FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".
2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Edge Condition Notes:

1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.
3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▩)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

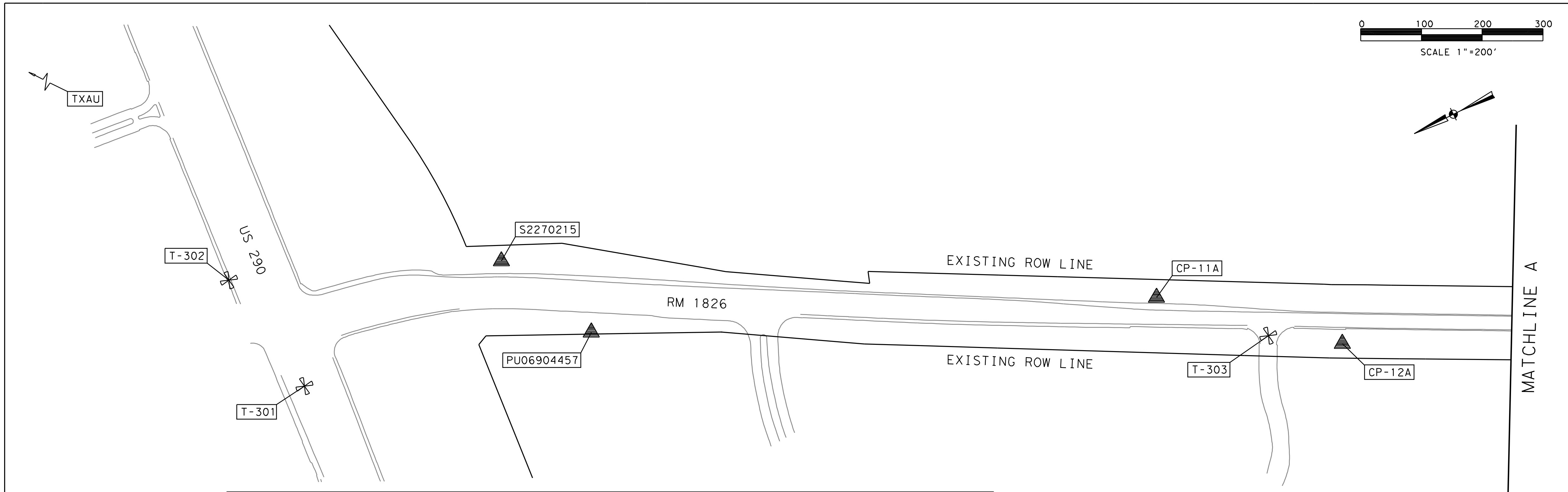
ALFREDO L. LOPEZ
101155
5/30/2023

Texas Department of Transportation

Traffic
Safety
Division
Standard

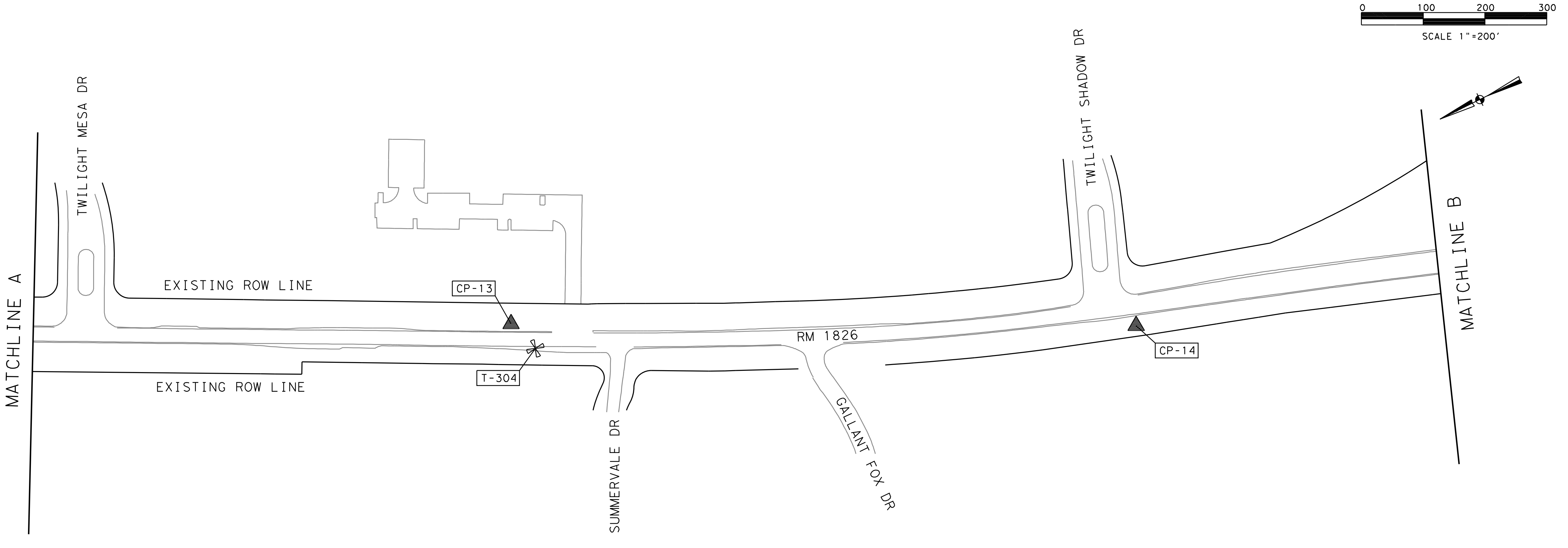
TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:	
© TxDOT August 2000	CONT	SECT	JOB	HIGHWAY	
REVISIONS 03-01 08-01 9-21	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		53	



Point	North	East	Elevation	Description
TXAU	10,087,171.95	3,109,884.79	720.76'	CORS TXAU
T-302	10,056,299.66	3,069,023.80	949.67'	SET MAG-NAIL IN ASPHALT
T-301	10,056,265.50	3,068,812.50	957.09'	SET MAG-NAIL IN ASPHALT
S2270215	10,055,884.00	3,068,853.24	975.68'	FND TXDOT ALUM DISK IN CONC (S2270215 201B)
PU06904457	10,055,803.56	3,068,682.88	975.75'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (1 PU06904457)
CP-11A	10,054,944.87	3,068,322.01	992.00'	SET 5/8" IR W/RODS CAP IN ASPHALT
T-303	10,054,807.74	3,068,184.34	997.27'	SET MAG-NAIL IN ASPHALT
CP-12A	10,054,704.50	3,068,118.73	995.15'	SET SPINDLE ON CONC SW

From	To	Direction	Distance
S2270215	PU06904457	S 64° 43' 28" W	188.40'
PU06904457	CP-11A	S 22° 47' 42" W	931.44'
CP-11A	CP-12A	S 40° 13' 16" W	314.80'
CP-12A	CP-13	S 23° 33' 49" W	1,052.88'



Point	North	East	Elevation	Description
CP-13	10,053,739.41	3,067,697.82	943.38'	SET 5/8" IR W/RODS CAP
T-304	10,053,721.76	3,067,644.66	947.07'	SET MAG-NAIL IN ASPHALT
CP-14	10,052,834.41	3,067,247.05	981.53'	SET MAG-NAIL W/SHINER

From	To	Direction	Distance
CP-12A	CP-13	S 23° 33' 49" W	1,052.88'
CP-13	CP-14	S 26° 28' 39" W	1,011.05'
CP-14	CP-15	S 17° 56' 08" W	669.43'

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000065048, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXAU DURING JULY 2020 AND CONSTRAINED TO THE PUBLISHED COORDINATES FOR S2270215.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 1 of 6
Survey Date: July, 2020

RODS
Surveying, Inc.
Control
Infrastructure
Transportation
Land Development
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
TEL (281) 257-4020
FAX (281) 257-4021
TBPELS SURVEYING FIRM REG. No. 10030700

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RM 1826
SURVEY CONTROL
INDEX SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				54
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST. NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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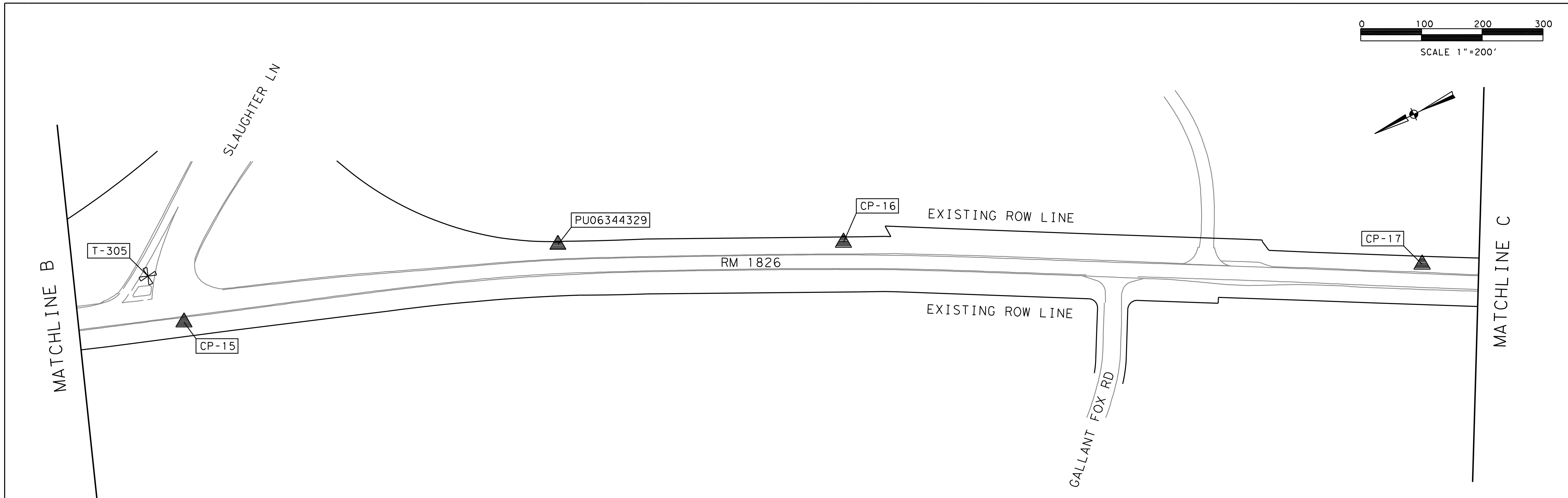
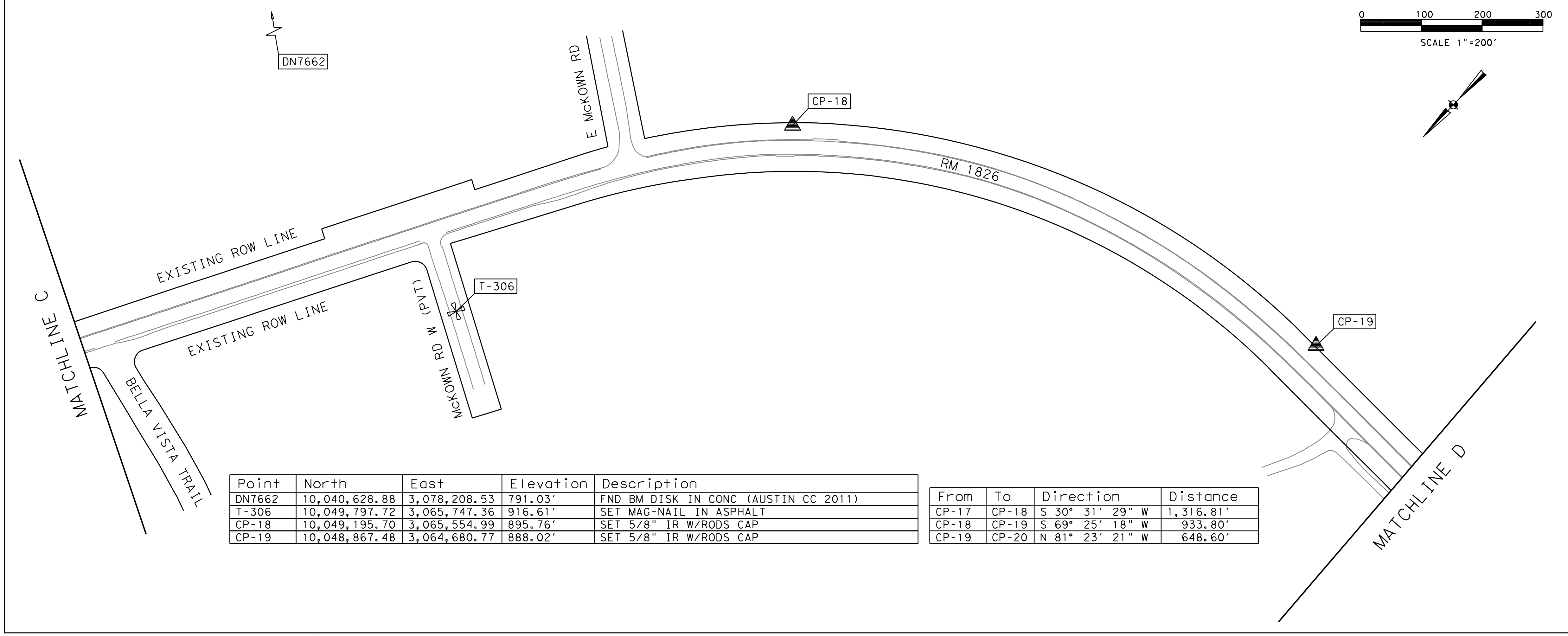


Point	North	East	Elevation	Description
T-305	10,052,217.29	3,067,135.18	973.35'	SET MAG-NAIL IN ASPHALT
CP-15	10,052,197.51	3,067,040.90	972.96'	SET 5/8" IR W/RODS CAP
PU06344329	10,051,589.99	3,066,882.76	1,003.71'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (2 PU06344329)
CP-16	10,051,167.17	3,066,677.96	996.01'	SET 5/8" IR W/RODS CAP
CP-17	10,050,330.01	3,066,223.81	941.45'	SET 5/8" IR W/RODS CAP

From	To	Direction	Distance
CP-14	CP-15	S 17° 56' 08" W	669.43'
CP-15	PU06344329	S 14° 35' 26" W	627.76'
PU06344329	CP-16	S 25° 50' 38" W	469.81'
CP-16	CP-17	S 28° 28' 46" W	952.41'
CP-17	CP-18	S 30° 31' 29" W	1,316.81'



Point	North	East	Elevation	Description
DN7662	10,040,628.88	3,078,208.53	791.03'	FND BM DISK IN CONC (AUSTIN CC 2011)
T-306	10,049,797.72	3,065,747.36	916.61'	SET MAG-NAIL IN ASPHALT
CP-18	10,049,195.70	3,065,554.99	895.76'	SET 5/8" IR W/RODS CAP
CP-19	10,048,867.48	3,064,680.77	888.02'	SET 5/8" IR W/RODS CAP

From	To	Direction	Distance
CP-17	CP-18	S 30° 31' 29" W	1,316.81'
CP-18	CP-19	S 69° 25' 18" W	933.80'
CP-19	CP-20	N 81° 23' 21" W	648.60'

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

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5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 2 of 6
Survey Date: July, 2020

RODS
Surveying, Inc.
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
TEL (281) 257-4020
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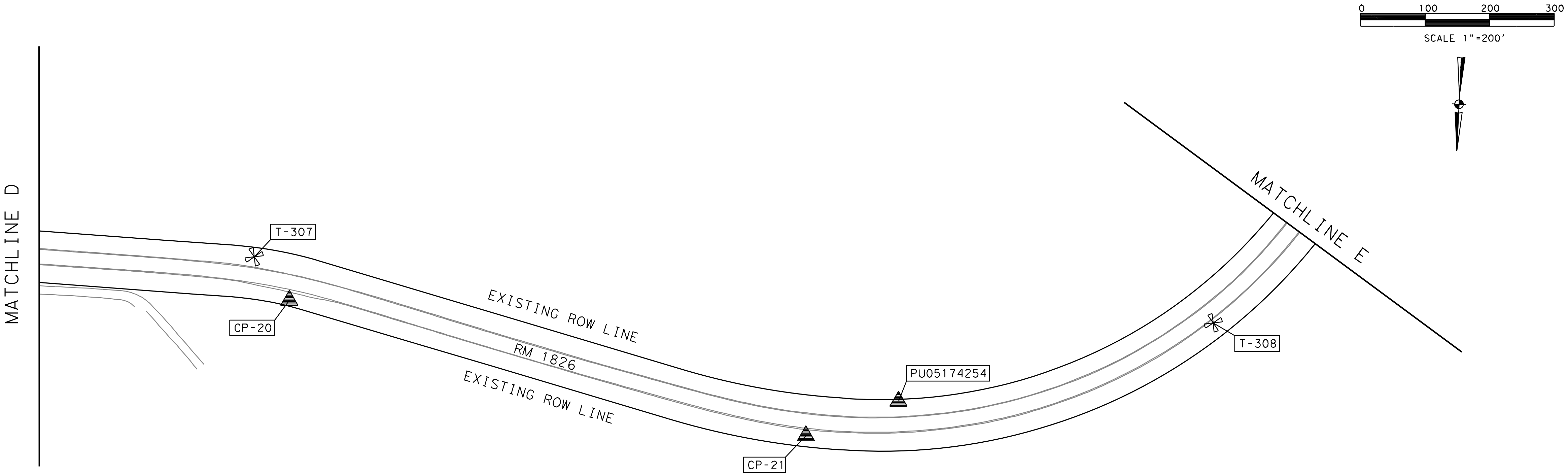
RM 1826
SURVEY CONTROL
INDEX SHEET

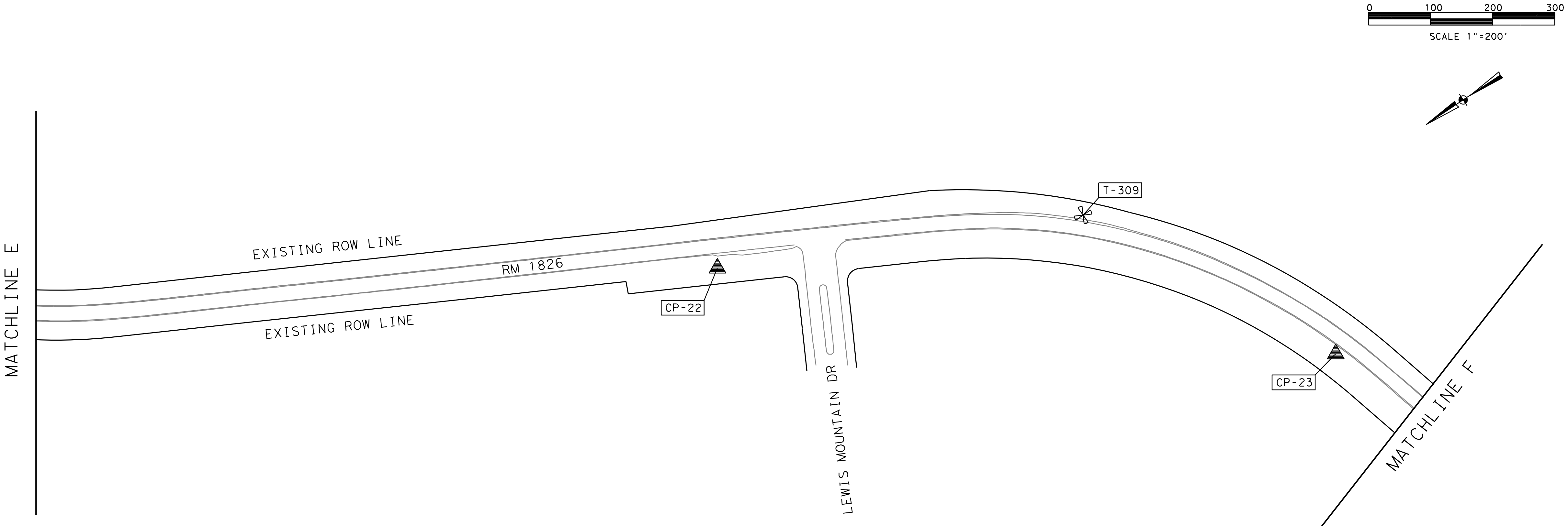
FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				55
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

N:\Omega Eng 007\21833001\CAD\H&V Control\H&V Index Sheet 2.dgn



Point	North	East	Elevation	Description
T-307	10,048,899.94	3,064,097.07	886.75'	SET MAG-NAIL IN ASPHALT
CP-20	10,048,964.59	3,064,039.48	886.87'	SET 5/8" IR W/RODS CAP
CP-21	10,049,135.32	3,063,230.68	903.81'	SET 5/8" IR W/RODS CAP
PU05174254	10,049,075.15	3,063,090.30	903.71'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (3 PU05174254)
T-308	10,048,930.21	3,062,609.35	905.63'	SET MAG-NAIL IN ASPHALT

From	To	Direction	Distance
CP-19	CP-20	N 81° 23' 21" W	648.60'
CP-20	CP-21	N 78° 04' 49" W	826.62'
CP-21	PU05174254	S 66° 47' 56" W	152.73'
PU05174254	CP-22	S 42° 29' 16" W	1,696.47'



Point	North	East	Elevation	Description
CP-22	10,047,824.14	3,061,944.45	927.09'	SET 5/8" IR W/RODS CAP
T-309	10,047,287.28	3,061,688.80	974.79'	SET MAG-NAIL IN ASPHALT
CP-23	10,047,073.19	3,061,277.28	1,005.66'	SET 5/8" IR W/RODS CAP

From	To	Direction	Distance
PU05174254	CP-22	S 42° 29' 16" W	1,696.47'
CP-22	CP-23	S 41° 37' 08" W	1,004.51'
CP-23	CP-24	S 74° 45' 02" W	383.05'

NOTES:

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5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

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JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

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Sheet 3 of 6
Survey Date: July, 2020

RODS
Surveying, Inc.
6810 LEE ROAD, STE.100
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RM 1826
SURVEY CONTROL
INDEX SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				56
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST. NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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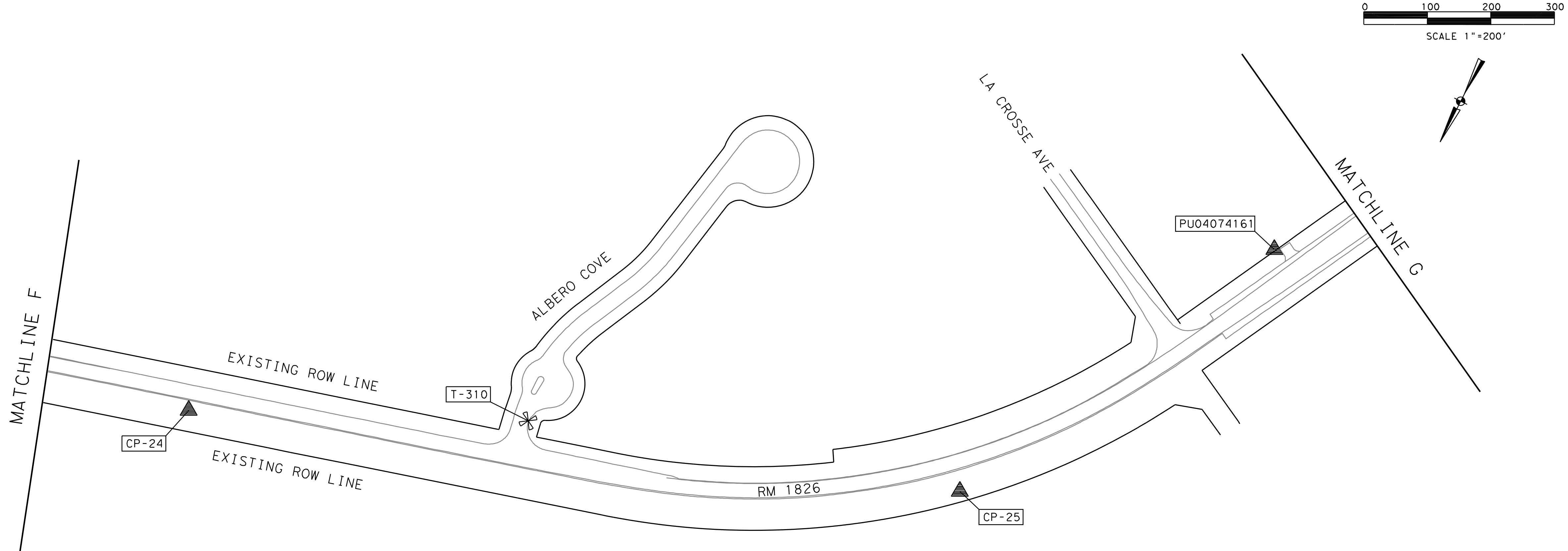
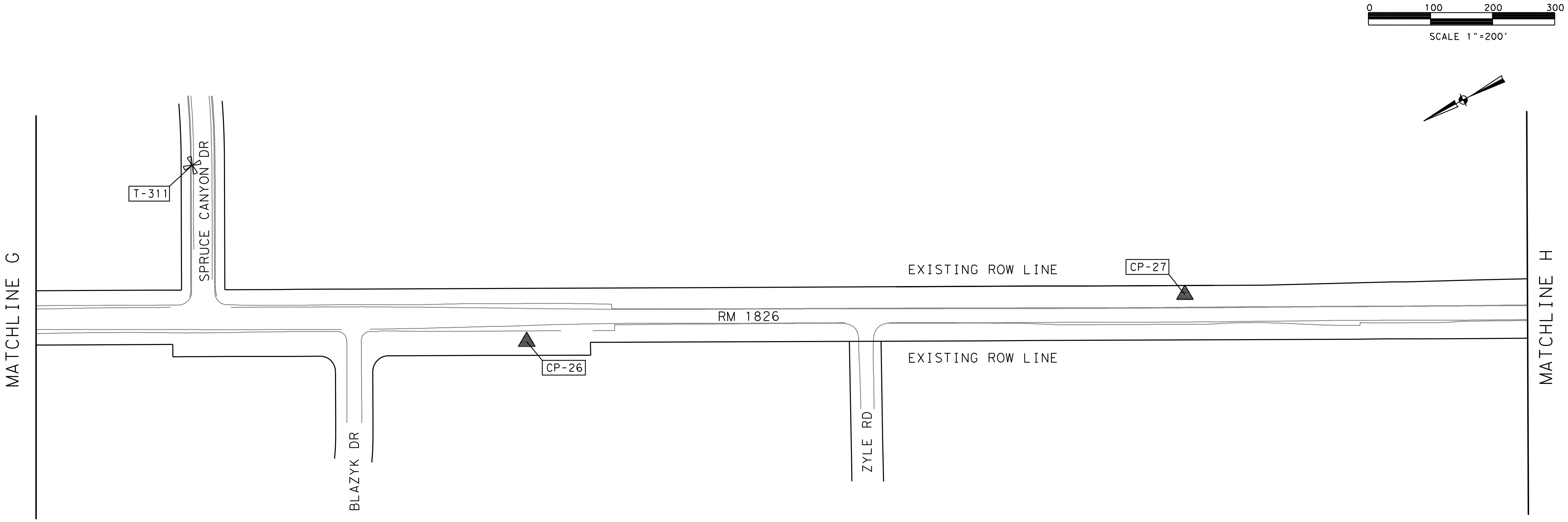


Point	North	East	Elevation	Description
CP-24	10,046,972.44	3,060,907.72	1,011.21'	SET 5/8" IR W/RODS CAP
T-310	10,046,746.94	3,060,423.68	998.44'	SET MAG-NAIL IN ASPHALT
CP-25	10,046,540.31	3,059,767.53	1,031.59'	SET 5/8" IR W/RODS CAP
PU04074161	10,045,977.90	3,059,497.03	1,013.39'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (4 PU04074161)

From	To	Direction	Distance
CP-23	CP-24	S 74° 45' 02" W	383.05'
CP-24	CP-25	S 69° 14' 36" W	1,219.33'
CP-25	PU04074161	S 25° 41' 09" W	624.08'
PU04074161	CP-26	S 33° 13' 17" W	929.19'



Point	North	East	Elevation	Description
T-311	10,045,541.75	3,059,491.86	998.34'	SET MAG-NAIL IN ASPHALT
CP-26	10,045,200.58	3,058,987.95	997.01'	SET 5/8" IR W/RODS CAP
CP-27	10,044,230.76	3,058,556.04	993.93'	SET 5/8" IR W/RODS CAP

From	To	Direction	Distance
PU04074161	CP-26	S 33° 13' 17" W	929.19'
CP-26	CP-27	S 24° 00' 21" W	1,061.65'
CP-27	CP-28	S 28° 04' 39" W	935.08'

NOTES:

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JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

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Sheet 4 of 6
Survey Date: July, 2020

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RM 1826
SURVEY CONTROL
INDEX SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				57
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST. NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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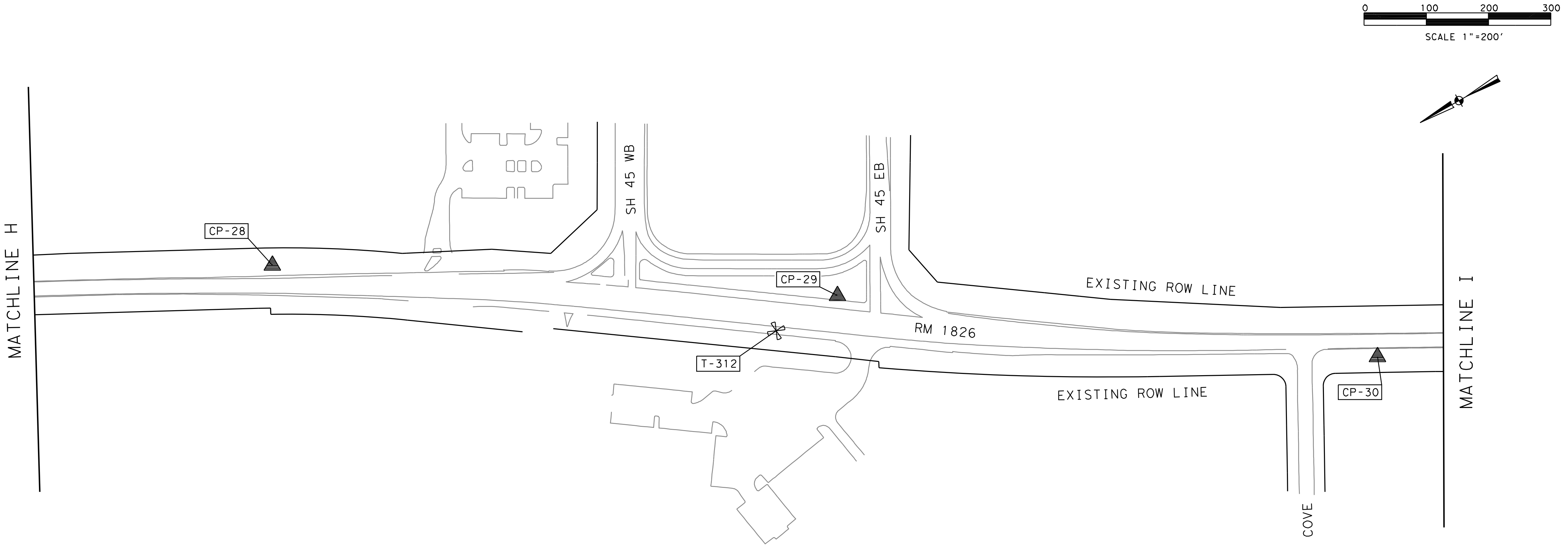
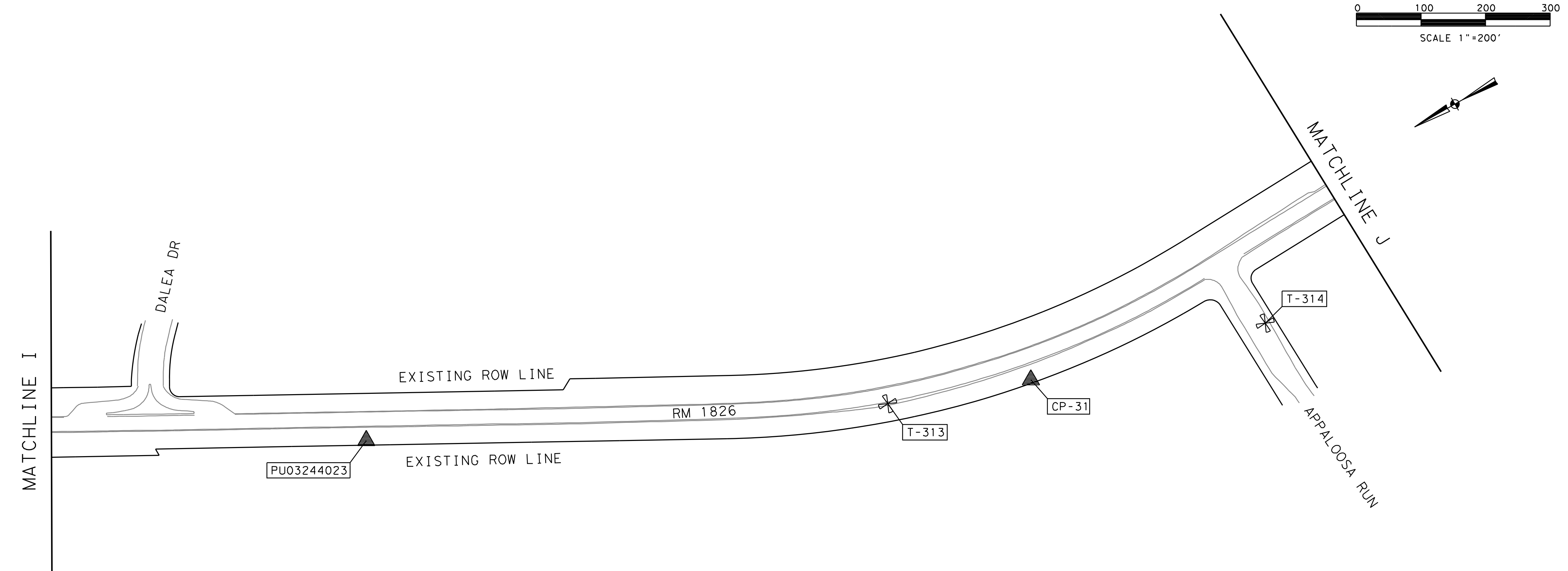


Point	North	East	Elevation	Description
CP-28	10,043,405.73	3,058,115.93	984.69'	SET 5/8" IR W/RODS CAP
T-312	10,042,753.24	3,057,626.57	1,000.71'	SET MAG-NAIL IN ASPHALT
CP-29	10,042,639.92	3,057,627.23	1,002.59'	SET MAG-NAIL IN BRICK SEAM
CP-30	10,041,933.58	3,057,115.60	1,002.60'	SET 5/8" IR W/RODS CAP

From	To	Direction	Distance
CP-27	CP-28	S 28° 04' 39" W	935.08'
CP-28	CP-29	S 32° 32' 38" W	908.46'
CP-29	CP-30	S 35° 55' 02" W	872.17'
CP-30	PU03244023	S 29° 15' 21" W	593.11'



Point	North	East	Elevation	Description
PU03244023	10,041,416.12	3,056,825.74	993.12'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (5 PU03244023)
T-313	10,040,685.59	3,056,478.44	988.67'	SET MAG-NAIL IN ASPHALT
CP-31	10,040,474.48	3,056,401.72	983.28'	SET 5/8" IR W/RODS CAP
T-314	10,040,115.63	3,056,299.59	985.44'	SET MAG-NAIL IN ASPHALT

From	To	Direction	Distance
CP-30	PU03244023	S 29° 15' 21" W	593.11'
PU03244023	CP-31	S 24° 14' 31" W	1,032.70'
CP-31	PU03123974	S 04° 34' 24" E	670.62'

NOTES:

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JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

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Sheet 5 of 6
Survey Date: July, 2020

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RM 1826
SURVEY CONTROL
INDEX SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				58
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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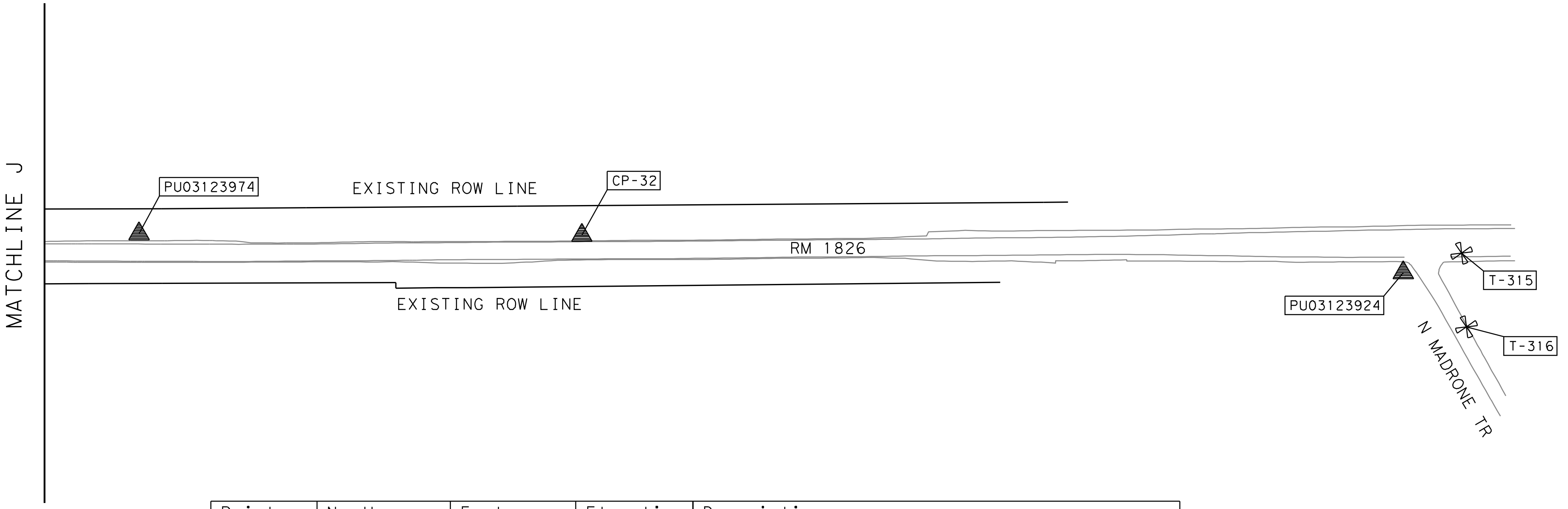

Point	North	East	Elevation	Description
PU03123974	10,039,806.00	3,056,455.19	977.97'	FND DATUM ROD IN SLEEVE W/AC (PU03123974)
CP-32	10,039,229.29	3,056,475.51	953.83'	SET 5/8" IR W/RODS CAP
PU03123924	10,038,157.62	3,056,467.98	979.50'	SET 5/8" IR W/TXDOT ALUM DISK IN CONC (6 PU03123924)
T-315	10,038,082.71	3,056,496.37	977.50'	SET MAG-NAIL IN ASPHALT
T-316	10,038,072.70	3,056,400.83	976.80'	SET MAG-NAIL IN ASPHALT

From	To	Direction	Distance
CP-31	PU03123974	S 04° 34' 24" E	670.62'
PU03123974	CP-32	S 02° 01' 05" E	577.07'
CP-32	PU03123924	S 00° 24' 09" W	1,071.70'

Control Name	Published: NAD83 (2011) Coordinate Information			Measured: NAD83 (2011) Coordinate Information			Deferent (Published - Measured)		
	North	East	Elev.	North	East	Elev.	North	East	Elev.
S2270215	10,055,884.00	3,068,853.24	975.68	10,055,884.00	3,068,853.24	975.68	0.00	0.00	0.00
PU03123974	10,039,806.05	3,056,455.23	977.97	10,039,806.00	3,056,455.19	977.97	0.05	0.04	0.00
DN7662	10,040,628.99	3,078,208.55	791.00	10,040,628.88	3,078,208.53	791.03	0.11	0.02	-0.03

Notes:

1. Published values for S2270215, according to control layout and sketches sheets for Oak Hill Parkway prepared by SAM, are based on NAD83 (2011 Adj), NAVD88 (Geoid 12A), and were constrained to during calibration.

2. Published values for PU03123974, according to control layout and sketches sheets for RM 1826 in Hays County, prepared by H. A. Kuehlem Survey Company and signed 01/28/15, are based on NAD83 (2011 Adj), NAVD88 (Geoid 12A). The published elevation of this point was constrained to during calibration.

3. NGS Monument DN7662 is a Height Modernization Survey Station; published values are based on NAD83 (2011 Adj), NAVD88 (Geoid 09).

NOTES:

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JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

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Survey Date: July, 2020

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RM 1826
SURVEY CONTROL
INDEX SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				59
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STATE DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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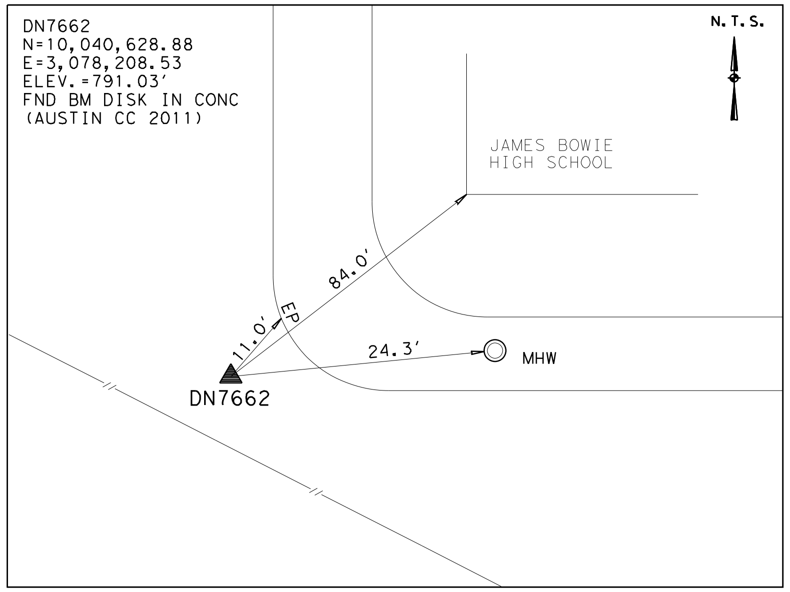
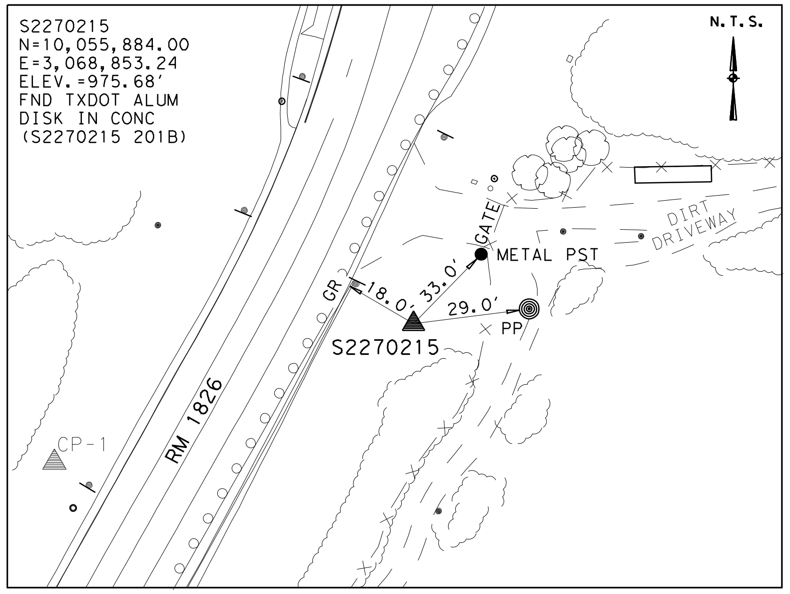
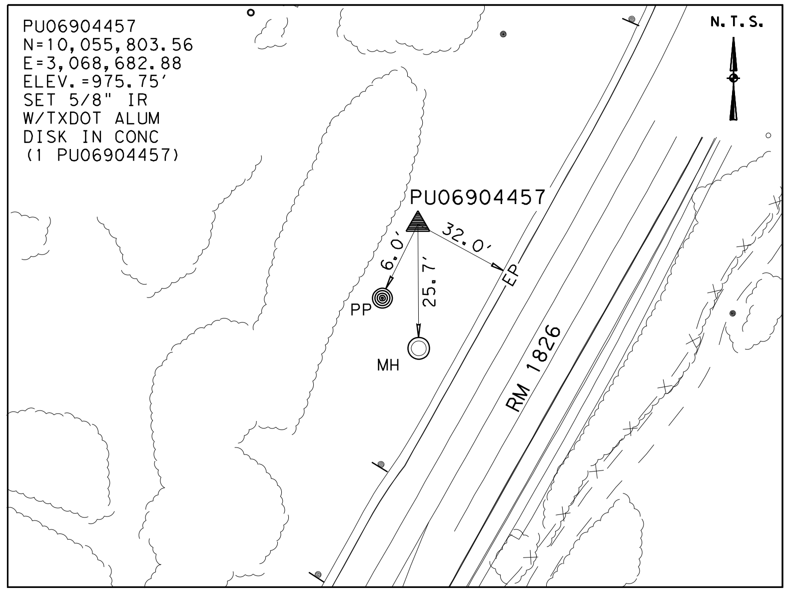

DN7662
N=10,040,628.88
E=3,078,208.53
ELEV.=791.03'
FND BM DISK IN CONC
(AUSTIN CC 2011)

STATION IS LOCATED NEAR THE SOUTHWEST CORNER OF THE JAMES BOWIE HIGH SCHOOL CAMPUS.


S2270215
N=10,055,884.00
E=3,068,853.24
ELEV.=975.68'
FND TXDOT ALUM
DISK IN CONC
(S2270215 201B)

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 359' SOUTH OF US 290.


PU06904457
N=10,055,803.56
E=3,068,682.88
ELEV.=975.75'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(1 PU06904457)

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 503' SOUTH OF US 290.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

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JIMMY D. WALTON
5889
12-6-2022

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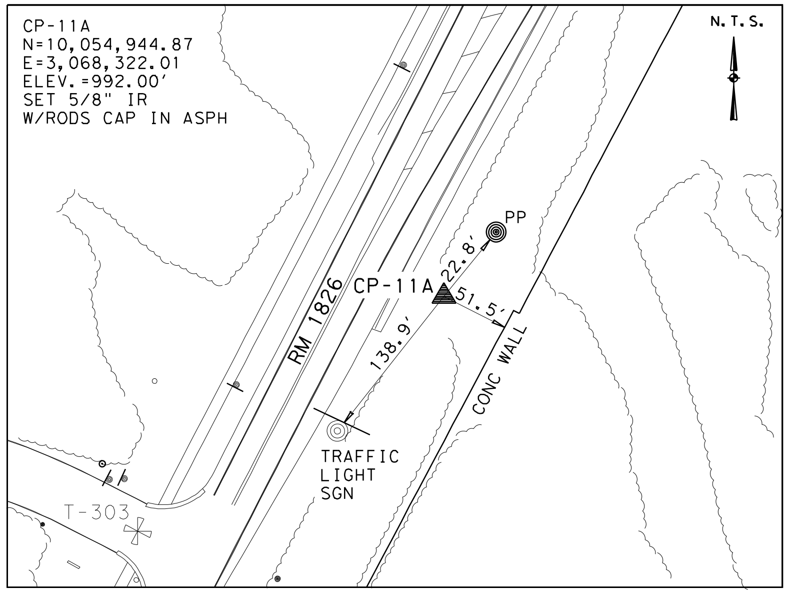
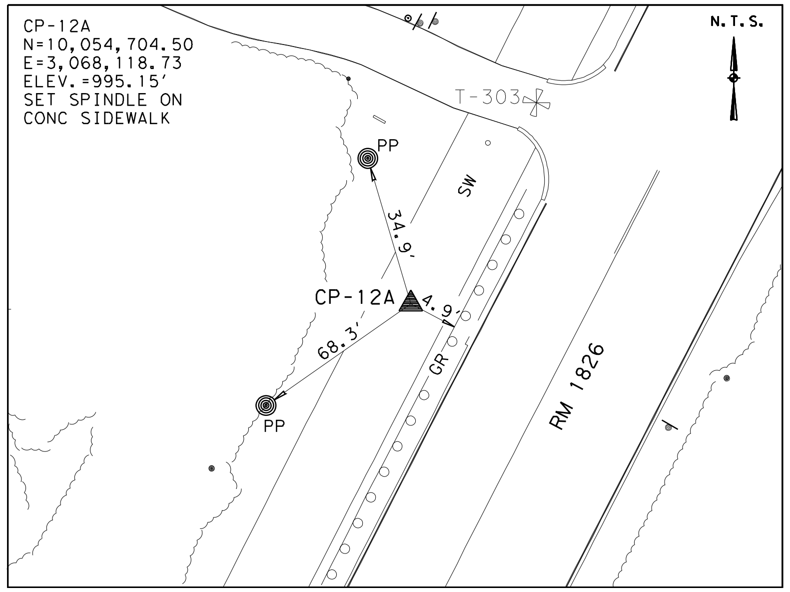
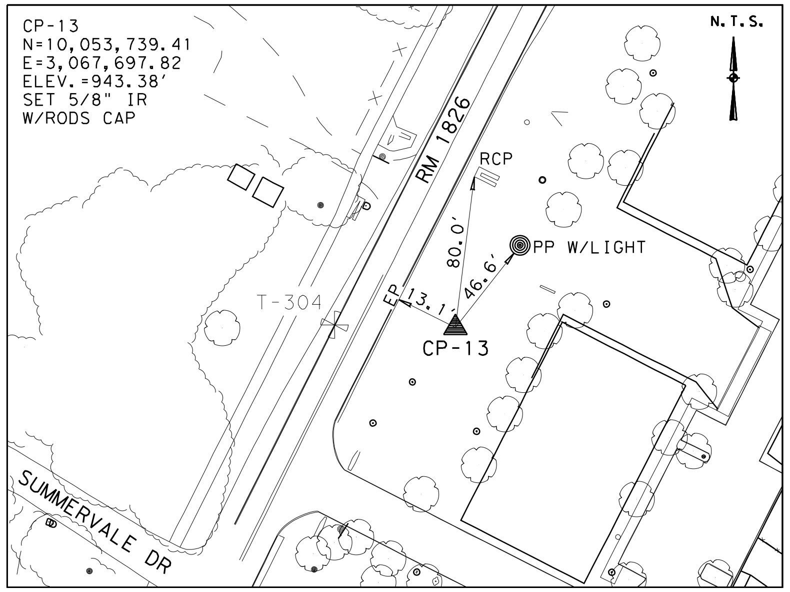

CP-11A
N=10,054,944.87
E=3,068,322.01
ELEV.=992.00'
SET 5/8" IR
W/RODS CAP IN ASPH

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 0.28 MILE SOUTH OF US 290.

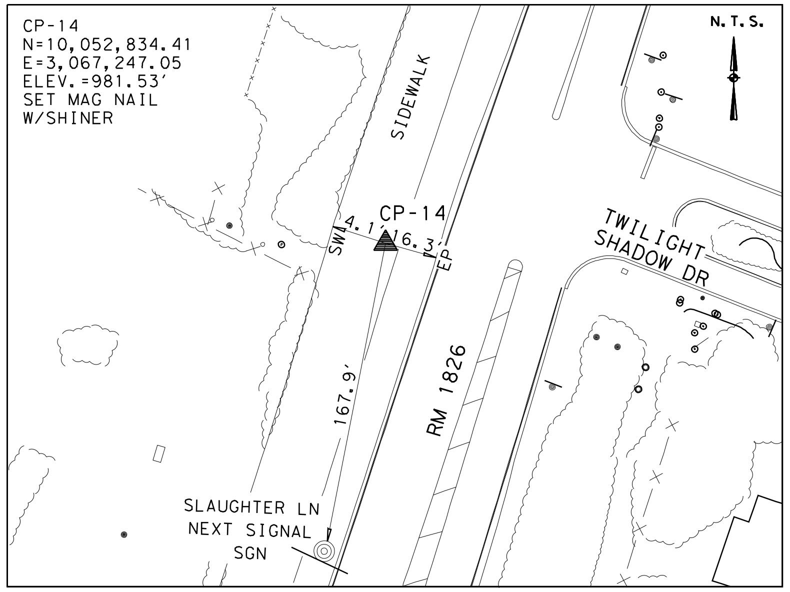

CP-12A
N=10,054,704.50
E=3,068,118.73
ELEV.=995.15'
SET SPINDLE ON
CONC SIDEWALK

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 0.33 MILE SOUTH OF US 290.

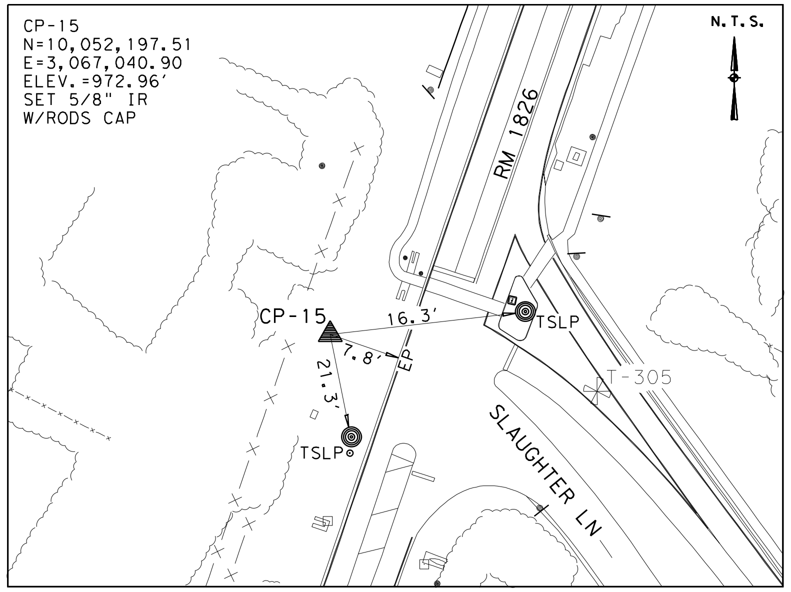

CP-13
N=10,053,739.41
E=3,067,697.82
ELEV.=943.38'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 0.53 MILE SOUTH OF US 290.

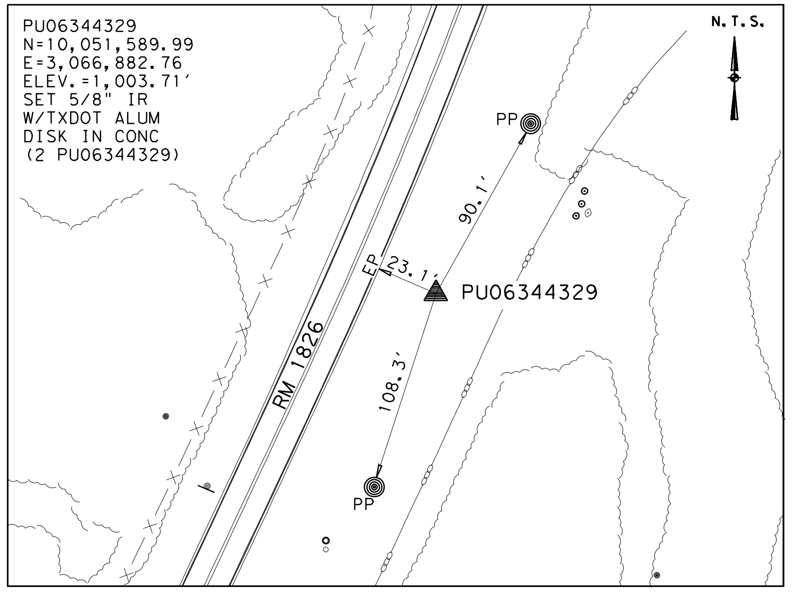
Sheet 1 of 4
Survey Date: SEPTEMBER, 2020


CP-14
N=10,052,834.41
E=3,067,247.05
ELEV.=981.53'
SET MAG NAIL
W/SHINER

STATION IS LOCATED ON THE WEST SIDE OF THE INTERSECTION OF RM 1826 AND TWILIGHT SHADOW DR.


CP-15
N=10,052,197.51
E=3,067,040.90
ELEV.=972.96'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE WEST SIDE OF THE INTERSECTION OF RM 1826 AND SLAUGHTER LN.


PU06344329
N=10,051,589.99
E=3,066,882.76
ELEV.=1,003.71'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(2 PU06344329)

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 0.97 MILE SOUTH OF US 290.

RODS
Surveying, Inc.
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
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FAX (281) 257-4021
TBPELS SURVEYING FIRM REG. No. 10030700

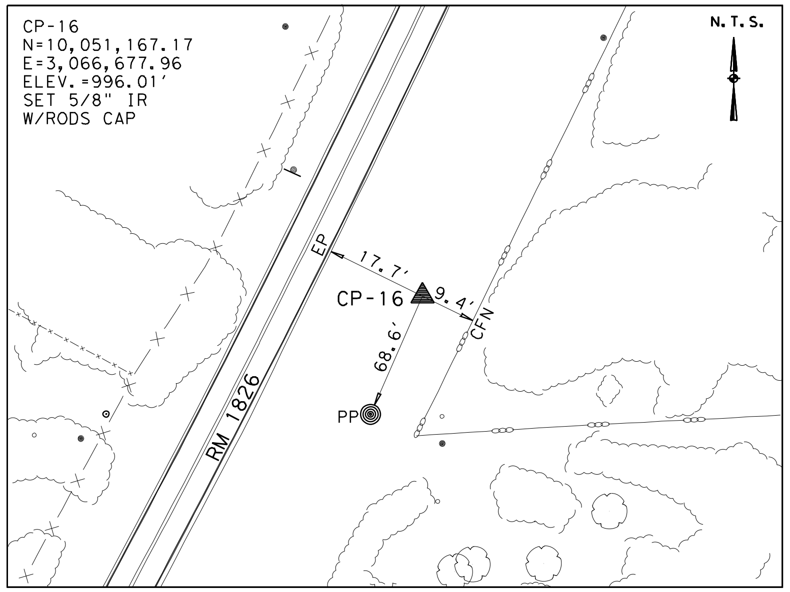
Control
Infrastructure
Transportation
Land Development

Texas
Department
of TransportT-ion

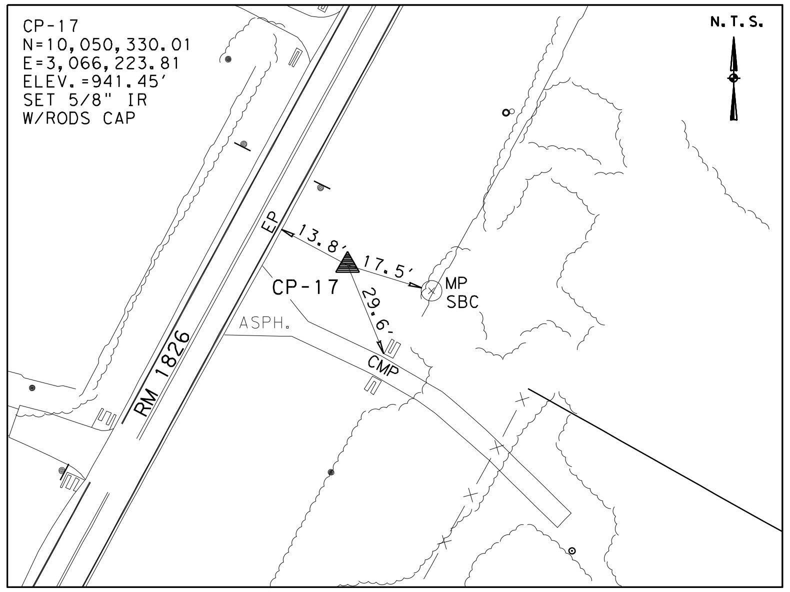
RM 1826
HORIZONTAL & VERTICAL
CONTROL SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				60
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STT-E DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

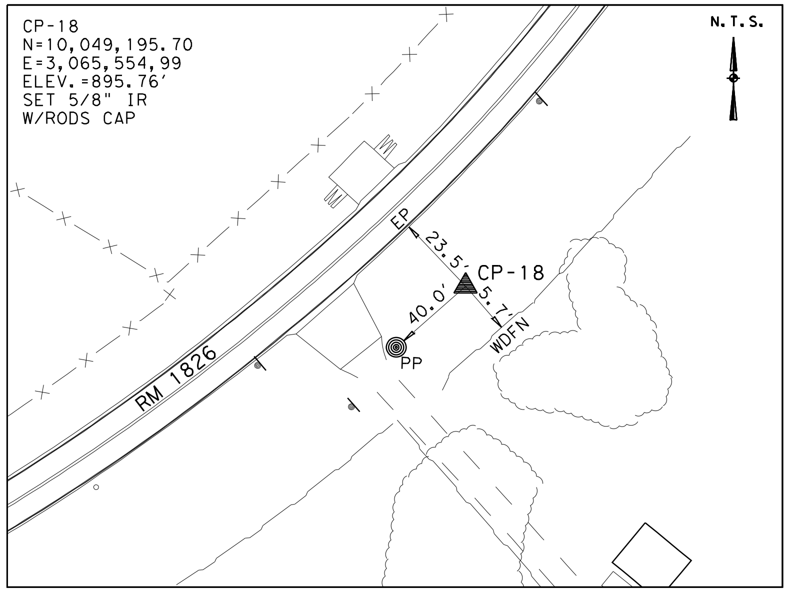
N:\Omega Eng 007\21833001\CAD\H&V Control\H&V Sketches.dgn


CP-16
N=10,051,167.17
E=3,066,677.96
ELEV.=996.01'
SET 5/8" IR
W/RODS CAP

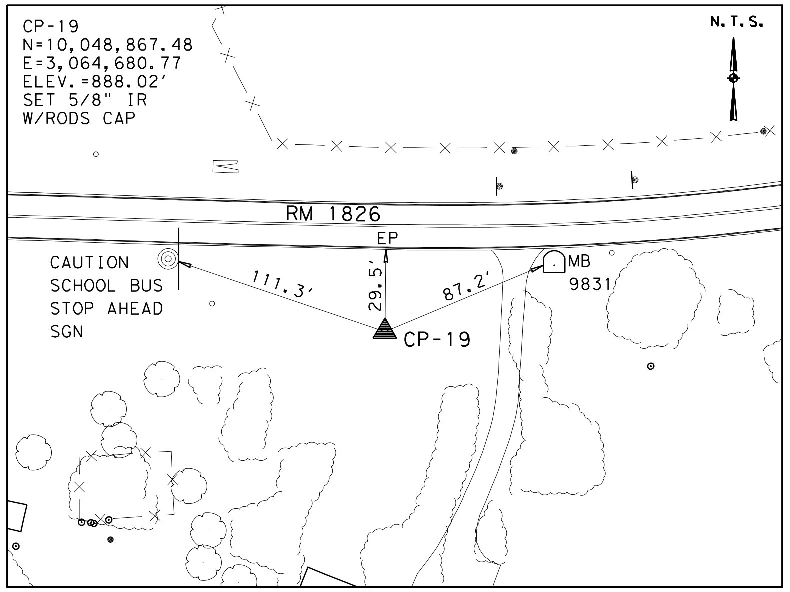
STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 1.05 MILE SOUTH OF US 290.


CP-17
N=10,050,330.01
E=3,066,223.81
ELEV.=941.45'
SET 5/8" IR
W/RODS CAP

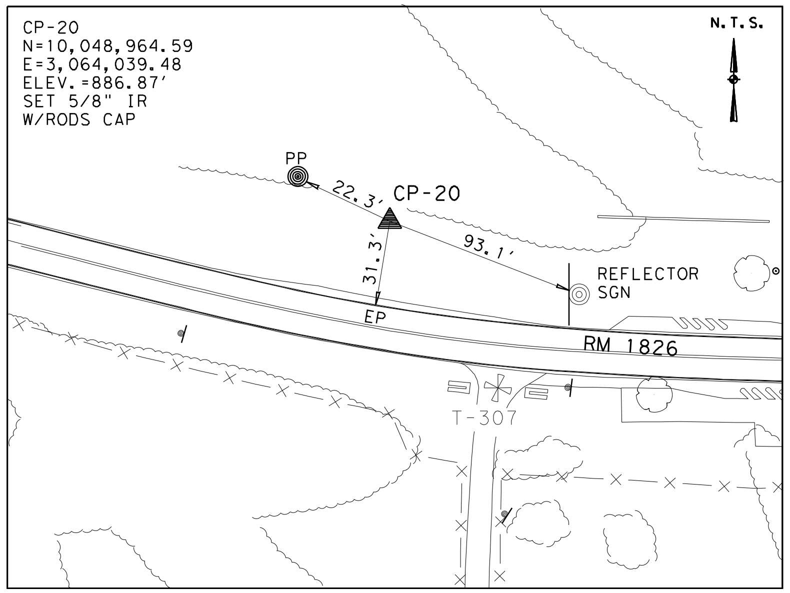
STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 1.24 MILE SOUTH OF US 290.


CP-18
N=10,049,195.70
E=3,065,554.99
ELEV.=895.76'
SET 5/8" IR
W/RODS CAP

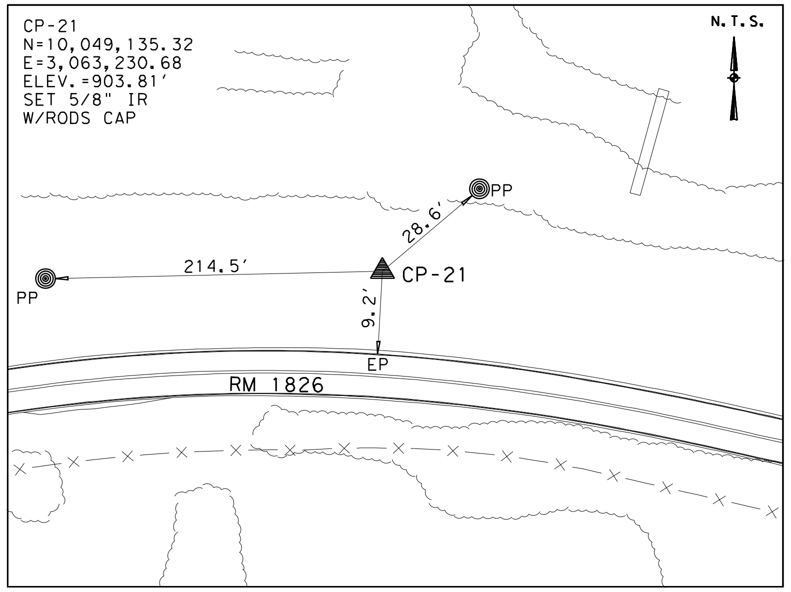
STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 1.48 MILE SOUTH OF US 290.


CP-19
N=10,048,867.48
E=3,064,680.77
ELEV.=888.02'
SET 5/8" IR
W/RODS CAP

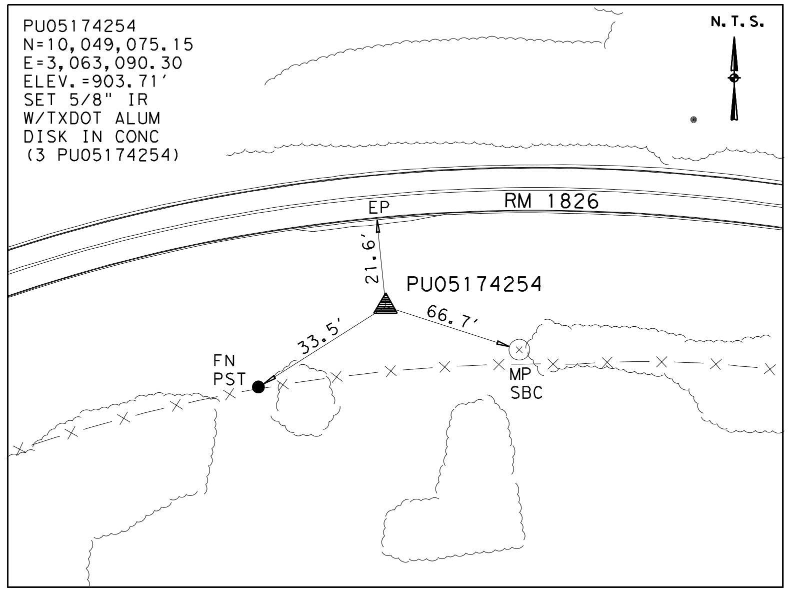
STATION IS LOCATED ON THE SOUTH SIDE OF RM 1826, AND LYING 1.66 MILE SOUTH OF US 290.


CP-20
N=10,048,964.59
E=3,064,039.48
ELEV.=886.87'
SET 5/8" IR
W/RODS CAP

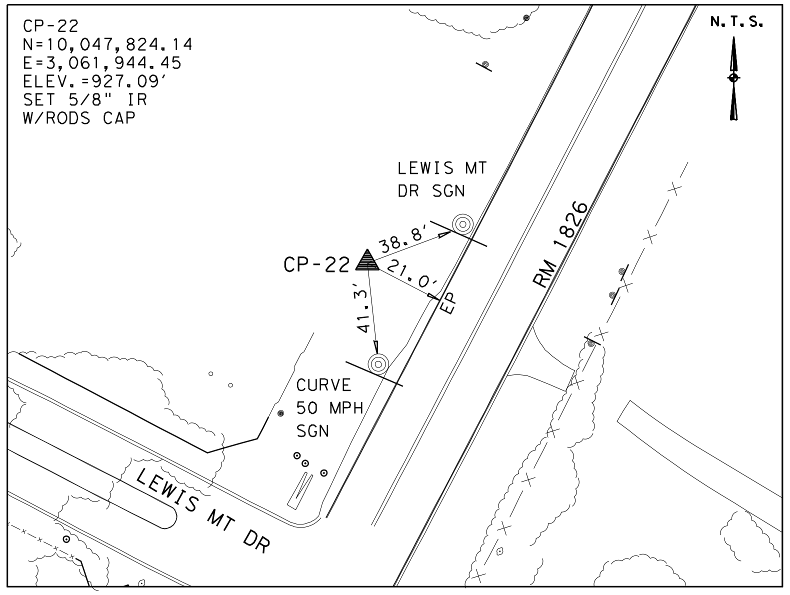
STATION IS LOCATED ON THE NORTH SIDE OF RM 1826, AND LYING 1.78 MILE SOUTH OF US 290.


CP-21
N=10,049,135.32
E=3,063,230.68
ELEV.=903.81'
SET 5/8" IR
W/RODS CAP

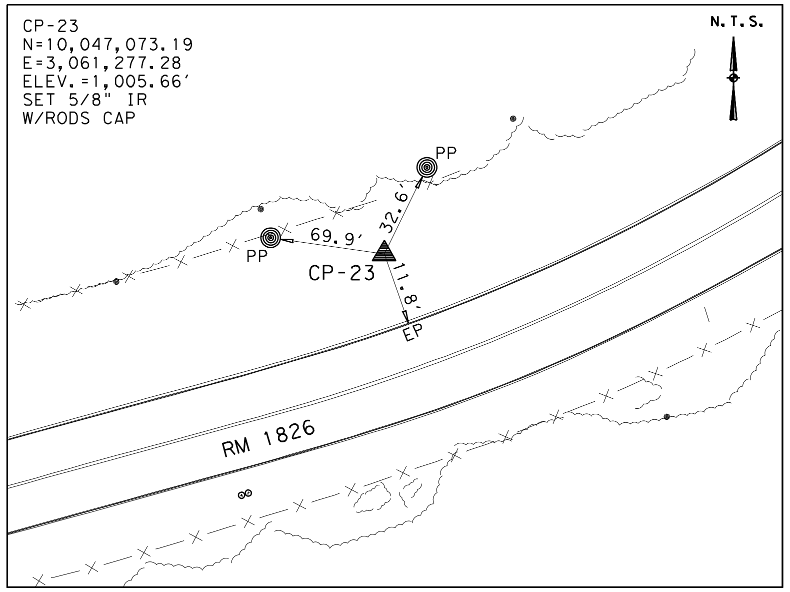
STATION IS LOCATED ON THE NORTH SIDE OF RM 1826, AND LYING 1.94 MILE SOUTH OF US 290.


PU05174254
N=10,049,075.15
E=3,063,090.30
ELEV.=903.71'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(3 PU05174254)

STATION IS LOCATED ON THE SOUTH SIDE OF RM 1826, AND LYING 1.96 MILE SOUTH OF US 290.


CP-22
N=10,047,824.14
E=3,061,944.45
ELEV.=927.09'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 2.30 MILES SOUTH OF US 290.


CP-23
N=10,047,073.19
E=3,061,277.28
ELEV.=1,005.66'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE NORTH SIDE OF RM 1826, AND LYING 2.51 MILES SOUTH OF US 290.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000065048, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXAU DURING JULY 2020 AND CONSTRAINED TO THE PUBLISHED COORDINT-ES FOR S2270215.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

JIMMY D. WALTON
5889

12-6-2022

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 2 of 4
Survey Date: SEPTEMBER, 2020

RODS Surveying, Inc.
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
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FAX (281) 257-4021
TBPELS SURVEYING FIRM REG. No. 10030700

Control
Infrastructure
Transportation
Land Development

Texas
Department
of TransportT-ion

RM 1826
HORIZONTAL & VERTICAL
CONTROL SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				61
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STT-E DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

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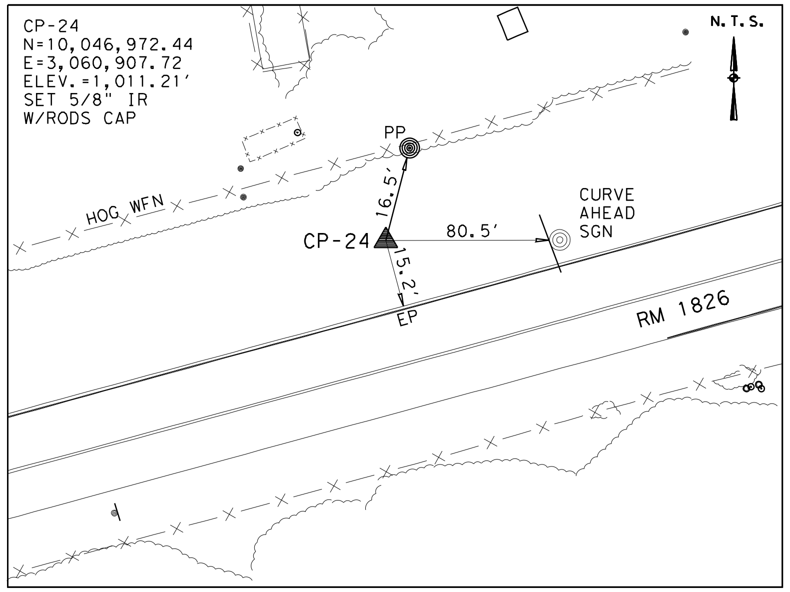
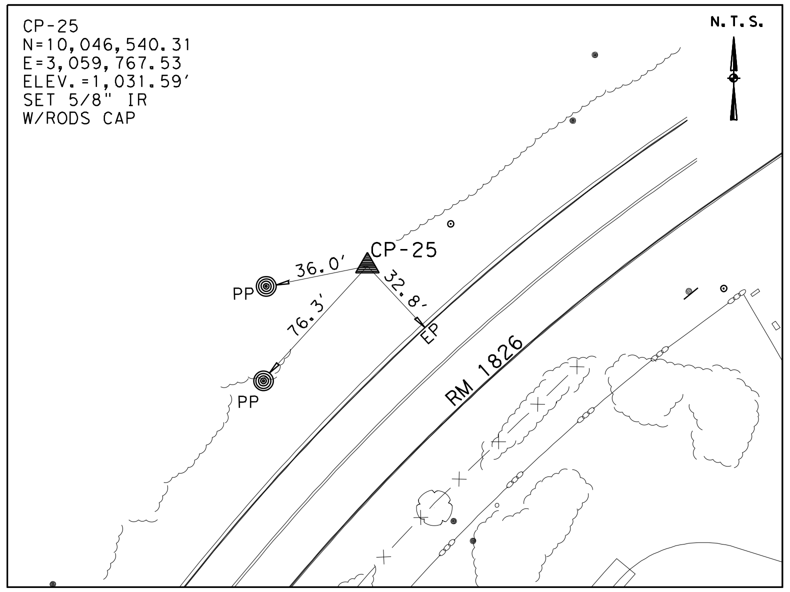


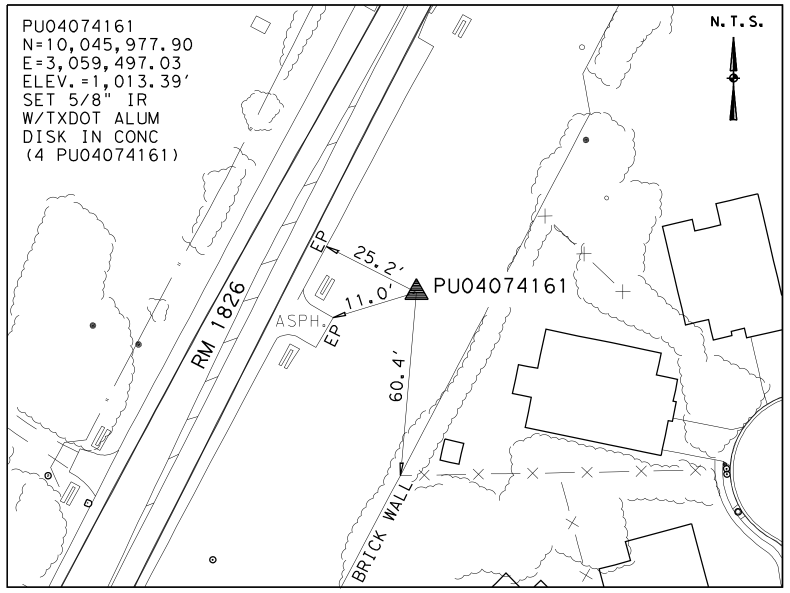
CP-24
N=10,046,972.44
E=3,060,907.72
ELEV.=1,011.21'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE NORTH SIDE OF RM 1826, AND LYING 2.58 MILES SOUTH OF US 290.



CP-25
N=10,046,540.31
E=3,059,767.53
ELEV.=1,031.59'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 2.81 MILES SOUTH OF US 290.



PU04074161
N=10,045,977.90
E=3,059,497.03
ELEV.=1,013.39'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(4 PU04074161)

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 2.92 MILES SOUTH OF US 290.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000065048, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXAU DURING JULY 2020 AND CONSTRAINED TO THE PUBLISHED COORDINT-ES FOR S2270215.

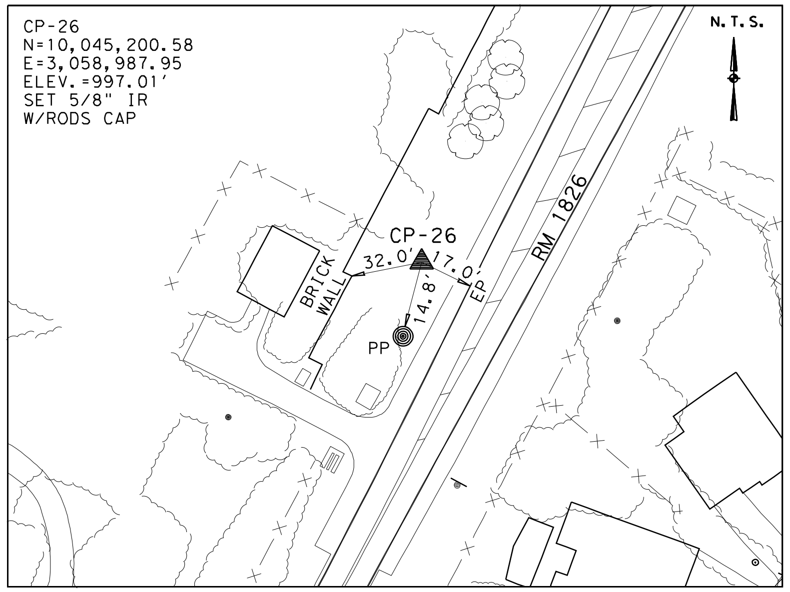
5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JIMMY D. WALTON
5889
PROFESSIONAL
LAND SURVEYOR

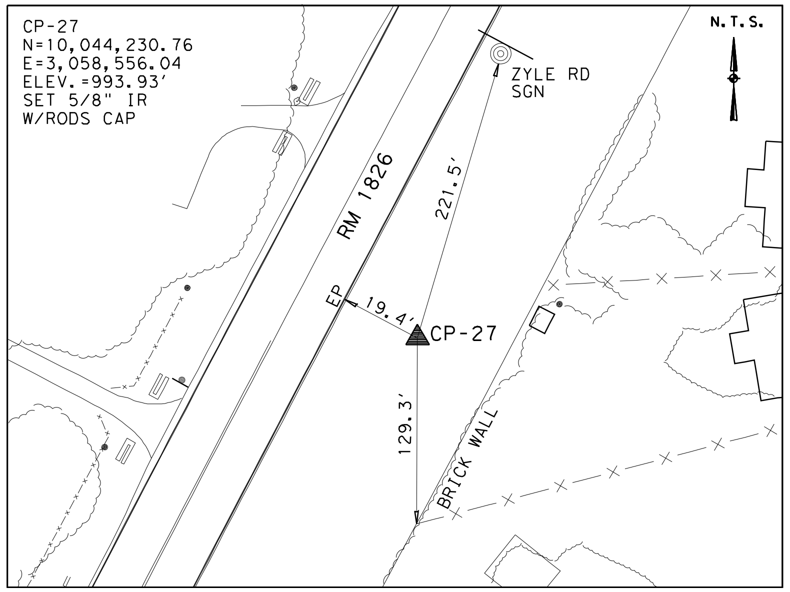
12-6-2022
Jimmy Walton

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E



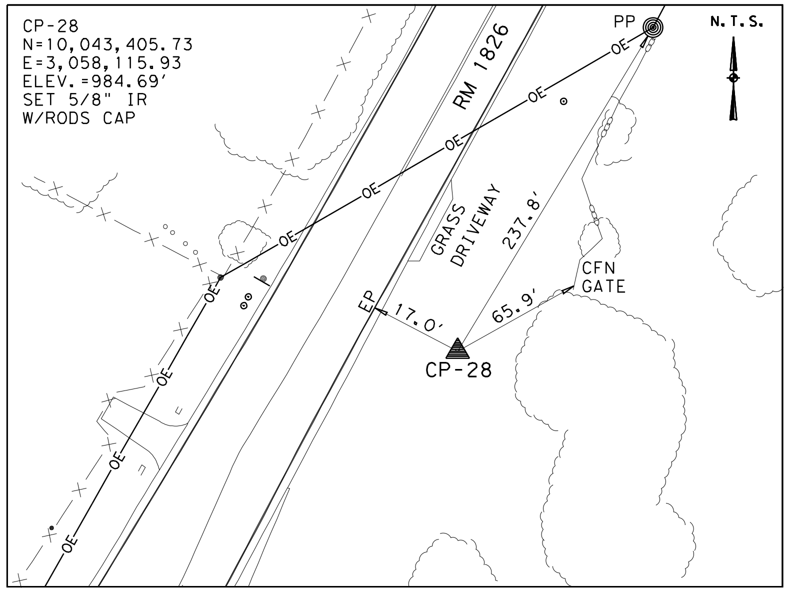
CP-26
N=10,045,200.58
E=3,058,987.95
ELEV.=997.01'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 3.10 MILES SOUTH OF US 290.



CP-27
N=10,044,230.76
E=3,058,556.04
ELEV.=993.93'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 3.30 MILES SOUTH OF US 290.



CP-28
N=10,043,405.73
E=3,058,115.93
ELEV.=984.69'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 3.48 MILES SOUTH OF US 290.

Sheet 3 of 4
Survey Date: SEPTEMBER, 2020

RODS
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6810 LEE ROAD, STE.100
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TEL (281) 257-4020
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TBPELS SURVEYING FIRM REG. No. 10030700

Control
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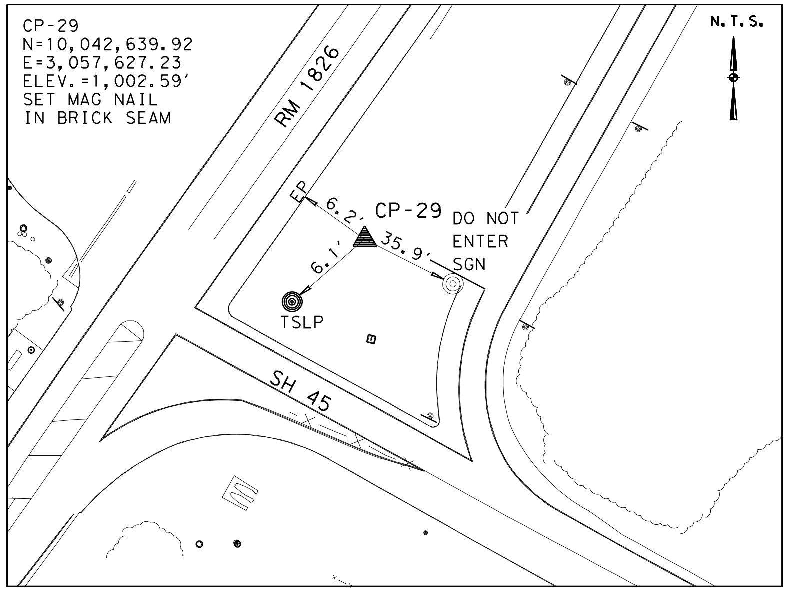
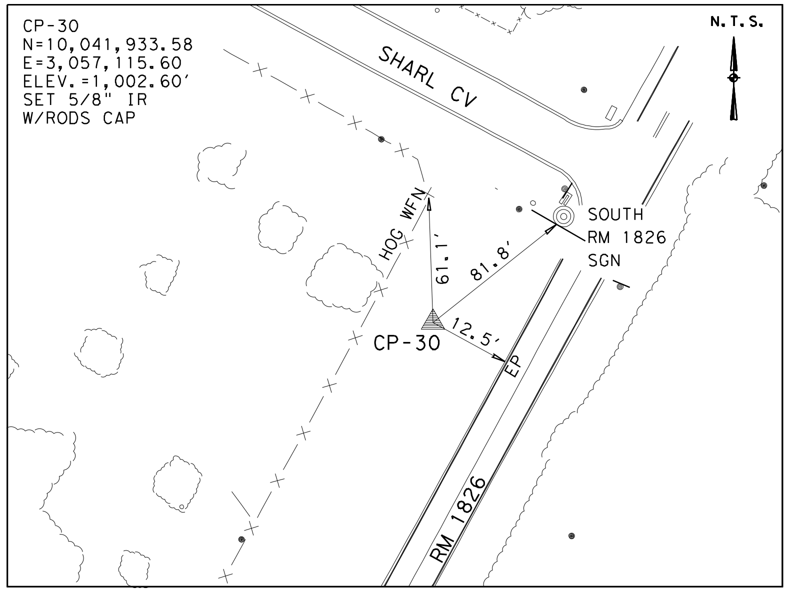


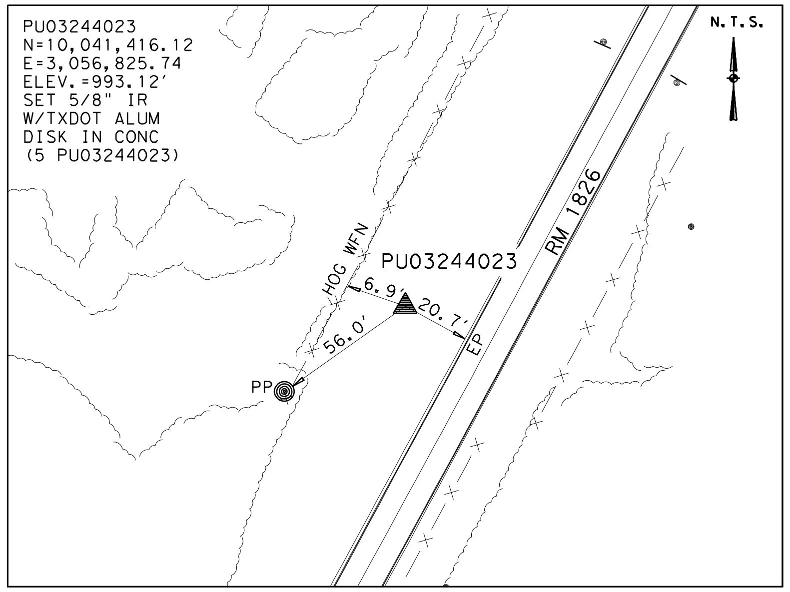
CP-29
N=10,042,639.92
E=3,057,627.23
ELEV.=1,002.59'
SET MAG NAIL
IN BRICK SEAM

STATION IS LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF RM 1826 AND SH 45



CP-30
N=10,041,933.58
E=3,057,115.60
ELEV.=1,002.60'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 119' SOUTH OF SHARL CV.



PU03244023
N=10,041,416.12
E=3,056,825.74
ELEV.=993.12'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(5 PU03244023)

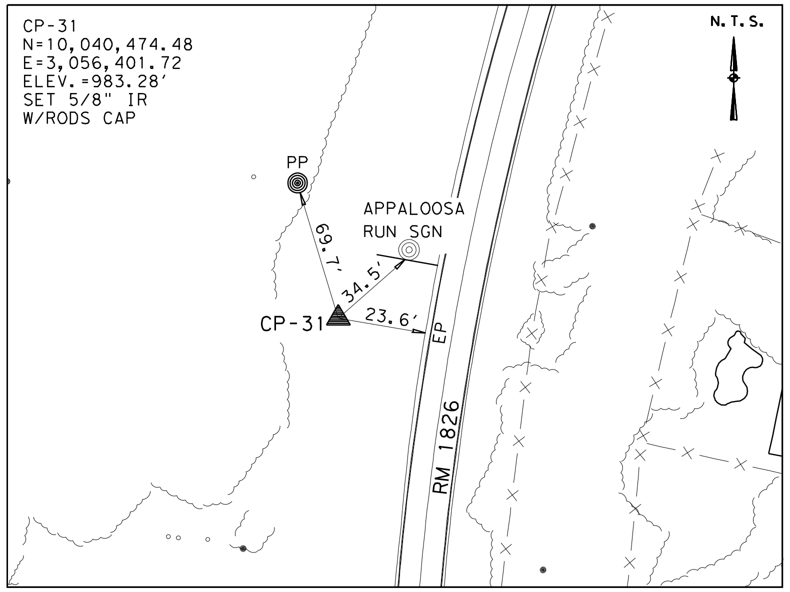
STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 3.93 MILES SOUTH OF US 290.

Texas Department of TransportT-ion

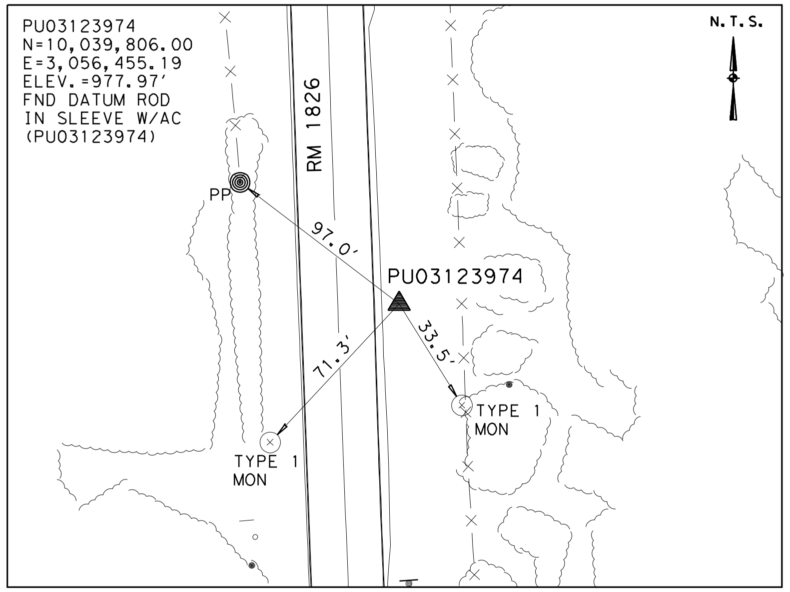
RM 1826
HORIZONTAL & VERTICAL
CONTROL SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				62
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STT-E DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

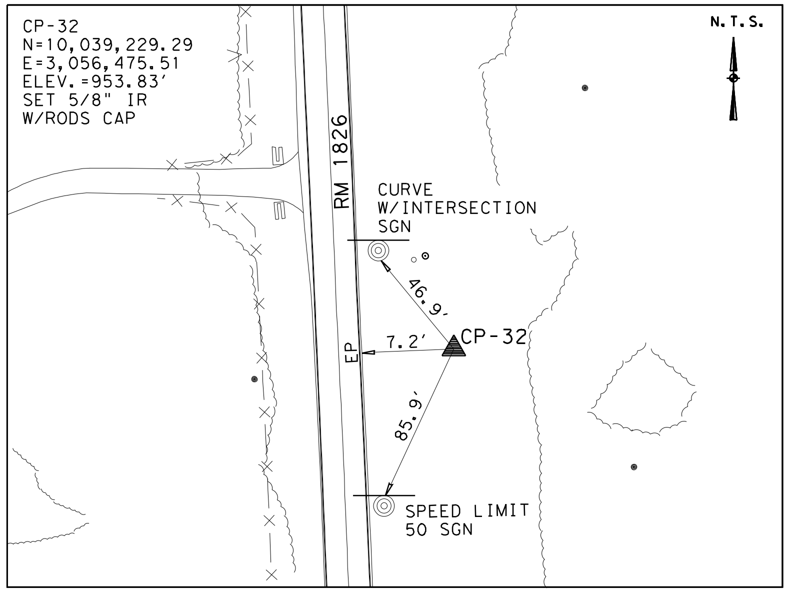
N:\Omega Eng 007\21833001\CAD\H&V Control\H&V Sketches.dgn


CP-31
N=10,040,474.48
E=3,056,401.72
ELEV.=983.28'
SET 5/8" IR
W/RODS CAP

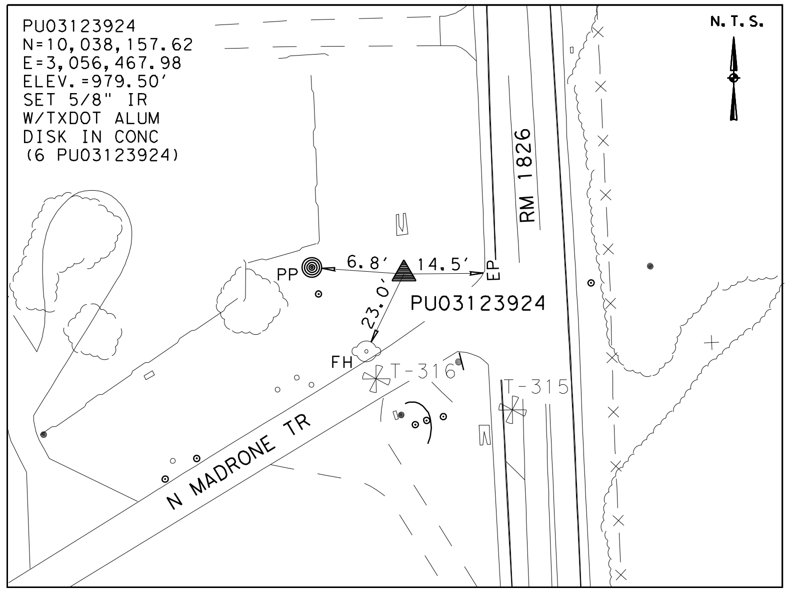
STATION IS LOCATED ON THE WEST SIDE OF RM 1826, AND LYING 4.12 MILES SOUTH OF US 290.


PU03123974
N=10,039,806.00
E=3,056,455.19
ELEV.=977.97'
FND DATUM ROD
IN SLEEVE W/AC
(PU03123974)

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 4.25 MILES SOUTH OF US 290.


CP-32
N=10,039,229.29
E=3,056,475.51
ELEV.=953.83'
SET 5/8" IR
W/RODS CAP

STATION IS LOCATED ON THE EAST SIDE OF RM 1826, AND LYING 4.36 MILES SOUTH OF US 290.


PU03123924
N=10,038,157.62
E=3,056,467.98
ELEV.=979.50'
SET 5/8" IR
W/TXDOT ALUM
DISK IN CONC
(6 PU03123924)

STATION IS LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF RM 1826 AND N MADRONE TR.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000065048, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXAU DURING JULY 2020 AND CONSTRAINED TO THE PUBLISHED COORDINT-ES FOR S2270215.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING CONSTRAINED TO THE PUBLISHED ELEVATIONS OF S2270215 AND PU03123974.

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

JIMMY D. WALTON
5889

12-6-2022

Jimmy Walton

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 4 of 4
Survey Date: SEPTEMBER, 2020

RODS
Surveying, Inc.
6810 LEE ROAD, STE. 100
SPRING, TEXAS 77379
TEL (281) 257-4020
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TBPELS SURVEYING FIRM REG. No. 10030700

Control
Infrastructure
Transportation
Land Development

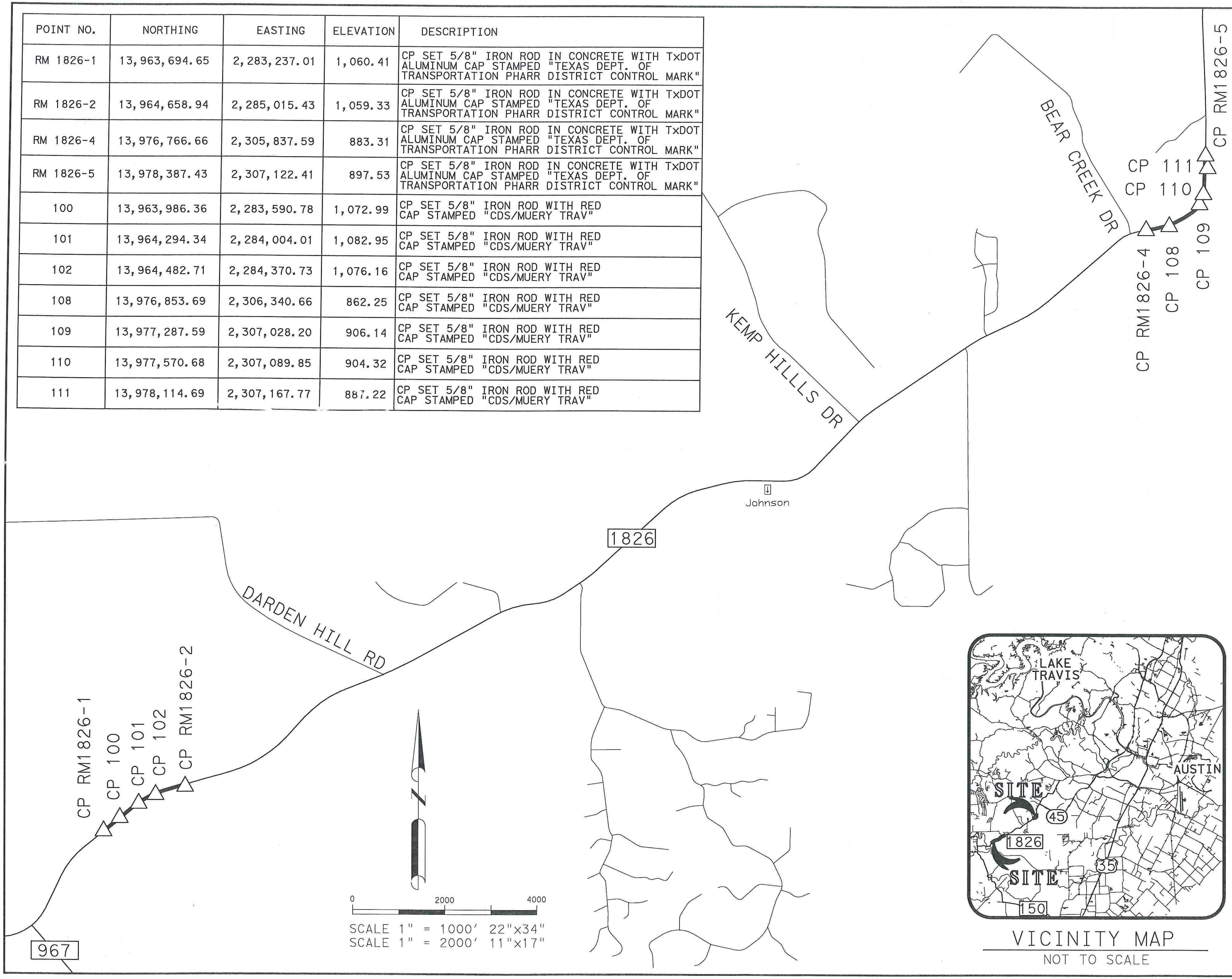
Texas
Department
of TransportT-ion

RM 1826
HORIZONTAL & VERTICAL
CONTROL SHEET

FEDERAL AID PROJECT NO.				SHEET NO.
SEE COVER SHEET				63
FED. RD. DIV. NO.	STATE	DISTRICT		COUNTY
6	TEXAS	AUS		TRAVIS
STT-E DIST.NO.	CONTROL	SECTION	JOB	HIGHWAY
14	1754	01	024	RM 1826

N:\Omega Eng 007\21833001\CAD\H&V Control\H&V Sketches.dgn

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
RM 1826-1	13,963,694.65	2,283,237.01	1,060.41	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
RM 1826-2	13,964,658.94	2,285,015.43	1,059.33	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
RM 1826-4	13,976,766.66	2,305,837.59	883.31	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
RM 1826-5	13,978,387.43	2,307,122.41	897.53	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
100	13,963,986.36	2,283,590.78	1,072.99	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
101	13,964,294.34	2,284,004.01	1,082.95	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
102	13,964,482.71	2,284,370.73	1,076.16	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
108	13,976,853.69	2,306,340.66	862.25	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
109	13,977,287.59	2,307,028.20	906.14	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
110	13,977,570.68	2,307,089.85	904.32	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
111	13,978,114.69	2,307,167.77	887.22	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"



VICINITY MAP

NOT TO SCALE

NOTES:

1.) PRIMARY CONTROL (HORIZONTAL) WAS ESTABLISHED USING GPS METHODS CONFORMING TO THE "TxDOT SURVEY MANUAL 2016-1".

2.) BEARINGS ARE BASED ON GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE 4204, NAD83 (2011) EPOCH: 2010.

3.) COORDINATES AND DISTANCES SHOWN ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET.

PROJECT COORDINATES =
GRID COORDINATES x 1.00008

4.) THE VERTICAL VALUES ARE BASED ON NAVD88, GEOID 12A, USING DIGITAL LEVELS HOLDING THE GPS ELEVATION OF CONTROL POINT RM 1826-3 AND RM 1826-4

LEGEND

△ PRIMARY CONTROL POINTS

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

R. CLAY SWETMAN
5397

7/25/2022

R. CLAY SWETMAN DATE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5397

CDS muery
ENGINEERS | SURVEYORS
100 NE LOOP 410, STE. 300 | SAN ANTONIO, TEXAS 78216
(210) 581-1111 | TBPE NO. F-1733 | TBPLS NO. 100495-00

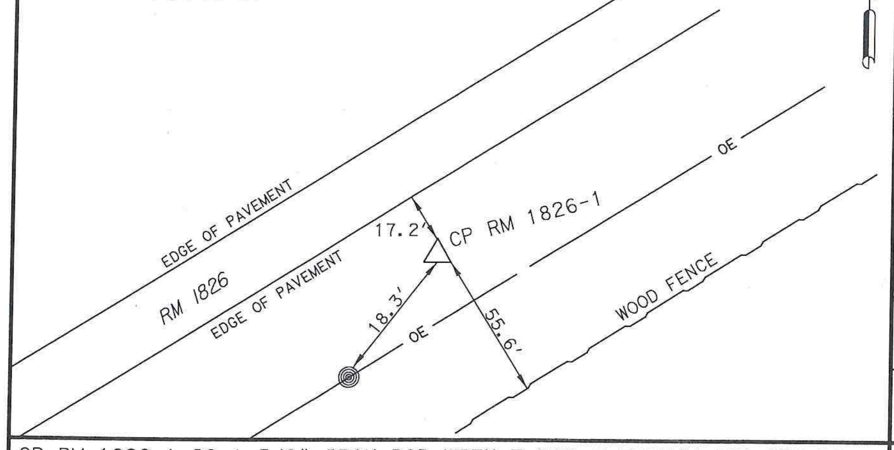
Texas Department of Transportation®

INDEX SHEET
RM 1826
PROJECT CONTROL

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	TEXAS			RM 1826
STATE DIST. NO.	COUNTY			SHEET NO.
14	HAYS	CSJ: 0914-33-097		64

CP RM 1826-1

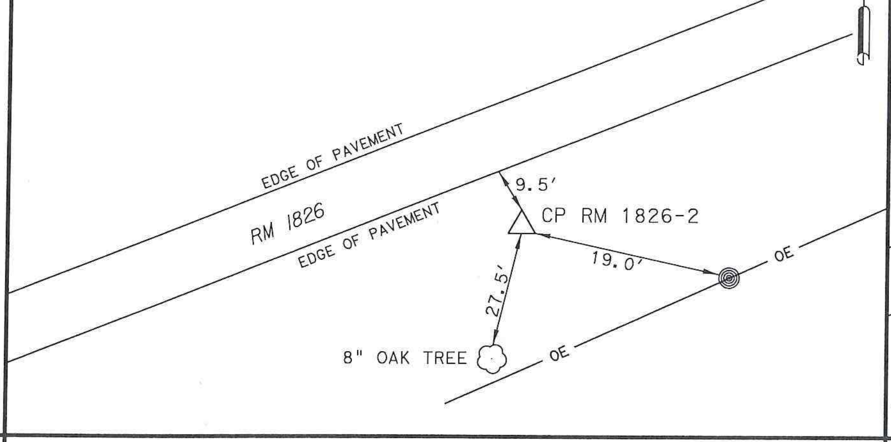
N: 13,963,694.65
E: 2,283,237.01
ELEV.: 1060.41



CP RM 1826-1 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE SOUTH SIDE OF FM 1826 APPROXIMATELY 0.2' OF A MILE SOUTHWEST OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP RM 1826-2

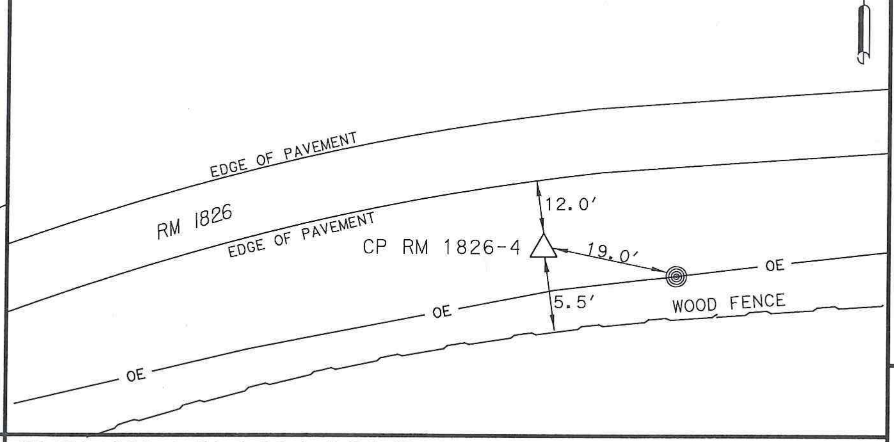
N: 13,964,658.94
E: 2,285,015.43
ELEV.: 1059.33



CP RM 1826-2 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE NORTH SIDE OF RM 1826 APPROXIMATELY 0.2' OF A MILE NORTHEAST OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP RM 1826-4

N: 13,976,766.66
E: 2,305,837.59
ELEV.: 883.31



CP RM 1826-4 BM 4 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE SOUTH SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE SOUTHWEST OF THE INTERSECTION OF BEAR CREEK DR AND RM 1826.

NOTES:

1.) PRIMARY CONTROL (HORIZONTAL) WAS ESTABLISHED USING GPS METHODS CONFORMING TO THE "TxDOT SURVEY MANUAL 2016-1".

2.) BEARINGS ARE BASED ON GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE 4204, NAD83 (2011) EPOCH: 2010.

3.) COORDINATES AND DISTANCES SHOWN ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET.

PROJECT COORDINATES =
GRID COORDINATES x 1.00008

4.) THE VERTICAL VALUES ARE BASED ON NAVD88, GEOID 12A, USING DIGITAL LEVELS HOLDING THE GPS ELEVATION OF CONTROL POINT RM 1826-3 AND RM 1826-4

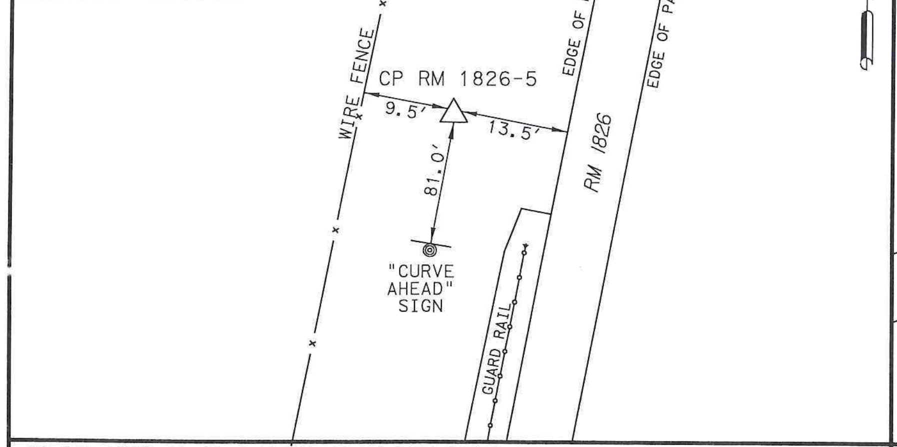
LEGEND

△ PRIMARY CONTROL POINT
✿ TREE
◎ POWER POLE
—◎ SIGN

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

CP RM 1826-5

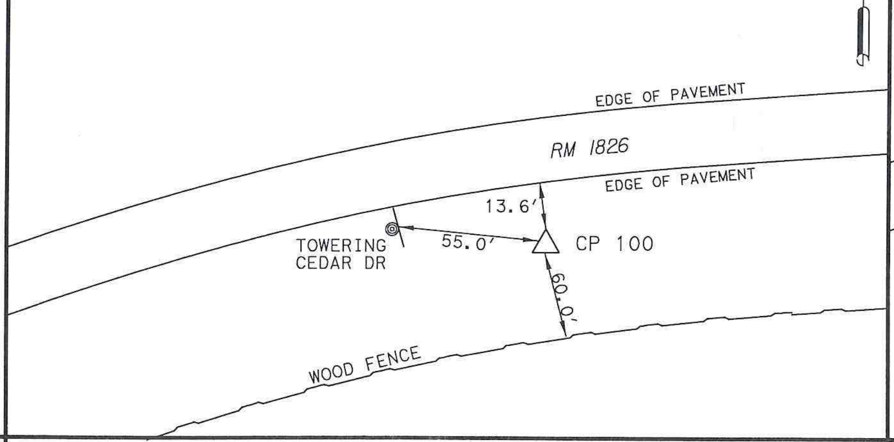
N: 13,978,387.43
E: 2,307,122.41
ELEV.: 897.35



CP RM 1826-5 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE WEST SIDE OF RM 1826 APPROXIMATELY 0.2' OF A MILE NORTH OF THE INTERSECTION OF GORMAN SPRINGS ROAD AND RM 1826.

CP 100

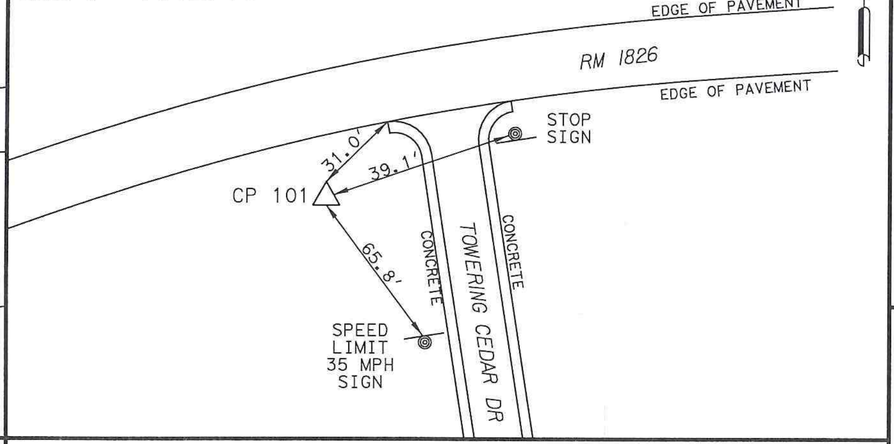
N: 13,963,986.36
E: 2,283,590.78
ELEV.: 1072.99



CP 100 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE SOUTHWEST OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP 101

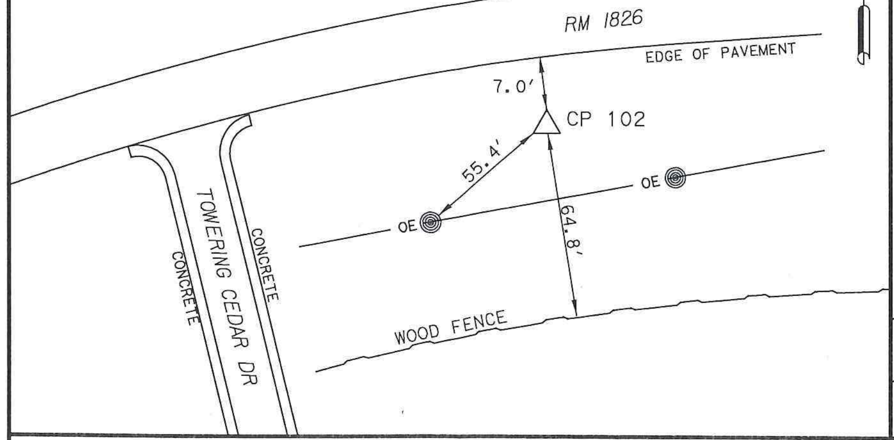
N: 13,964,294.34
E: 2,284,004.01
ELEV.: 1082.95



CP 101 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826 ON THE SOUTHWEST CORNER OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP 102

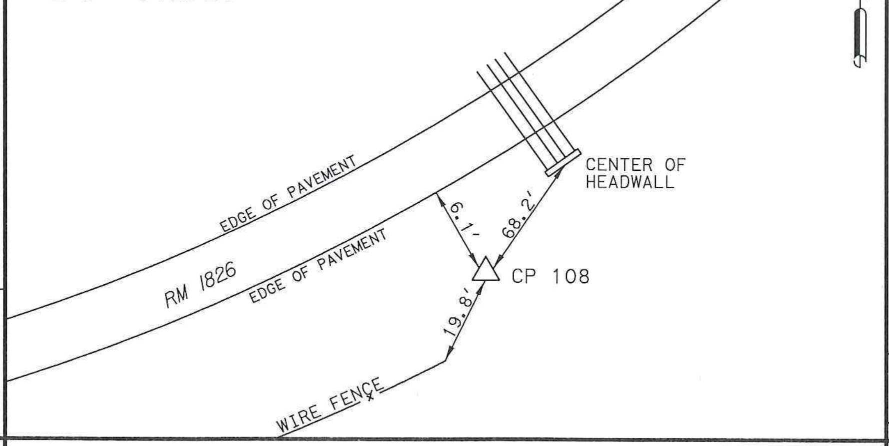
N: 13,964,482.71
E: 2,284,370.73
ELEV.: 1076.16



CP 102 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE SOUTHWEST OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP 108

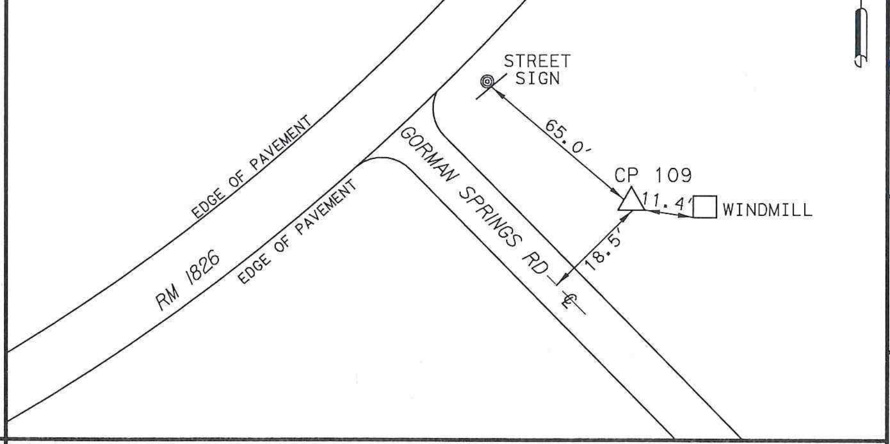
N: 13,976,853.69
E: 2,306,340.66
ELEV.: 862.25



CP 108 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826 APPROXIMATELY 0.2' OF A MILE NORTH OF THE INTERSECTION OF GORMAN SPRINGS ROAD AND RM 1826.

CP 109

N: 13,977,287.59
E: 2,307,028.20
ELEV.: 906.14



CP 109 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE NORTH SIDE OF GORMAN SPRINGS RD. ON THE NORTH EAST CORNER OF THE INTERSECTION OF RM 1826 AND GORMAN SPRINGS RD.

R. CLAY SWETMAN
5397

7/25/2022
R. CLAY SWETMAN DATE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5397

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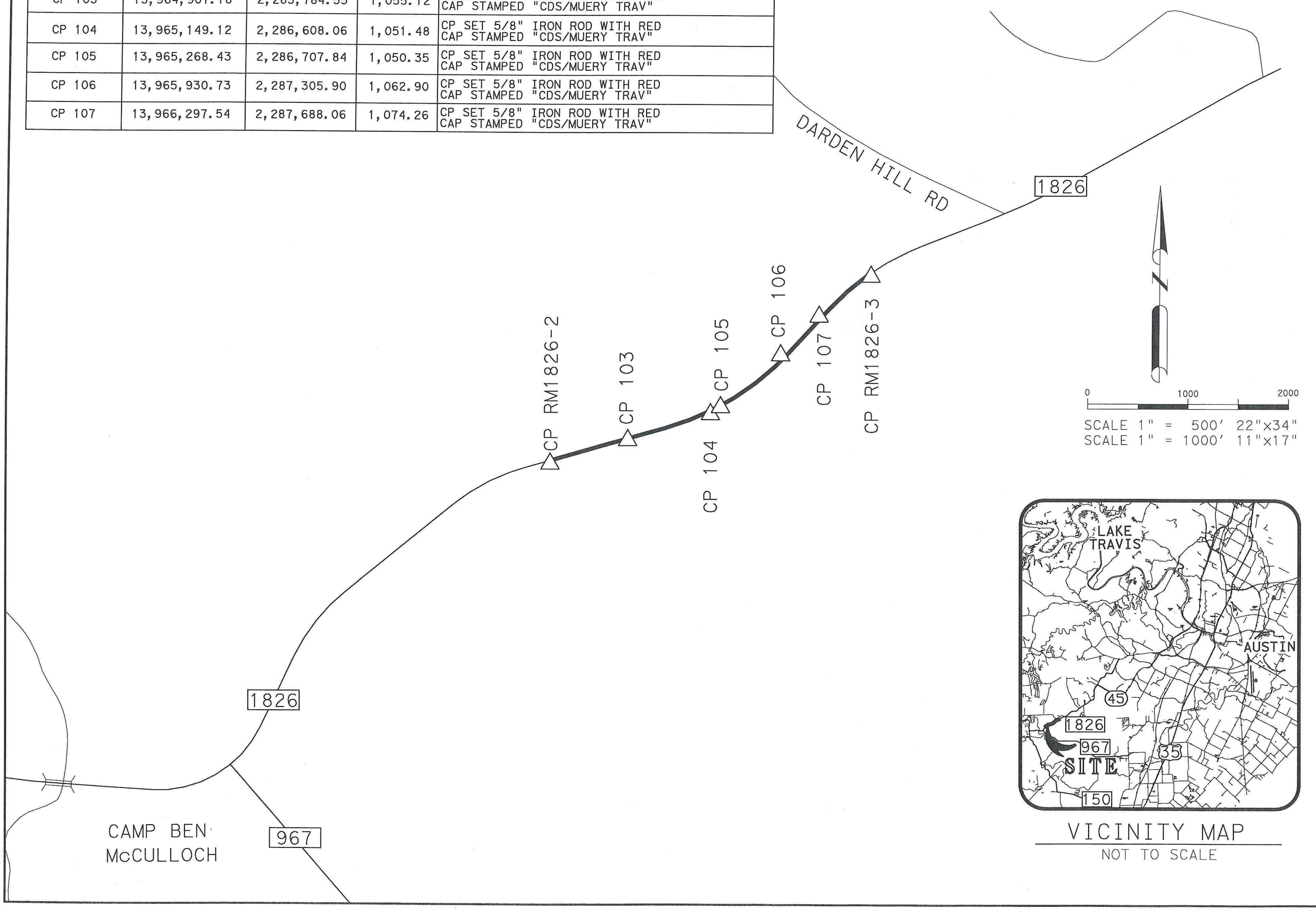
100 NE Loop 410, Ste. 300 | San Antonio, Texas 78216
(210) 581-1111 | TBPE No. F-1733 | TBPLS No. 100495-00

Texas Department of Transportation

RM 1826 CONTROL DETAIL SHEET

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	TEXAS			RM 1826
STATE DIST. NO.	COUNTY			SHEET NO.
14	HAYS	CSJ: 0914-33-097		65

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
RM 1826-2	13,964,658.94	2,285,015.43	1,059.33	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
RM 1826-3	13,966,579.73	2,288,205.43	1,079.52	CP SET 5/8" IRON ROD IN CONCRETE WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK"
CP 103	13,964,907.18	2,285,784.55	1,055.12	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
CP 104	13,965,149.12	2,286,608.06	1,051.48	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
CP 105	13,965,268.43	2,286,707.84	1,050.35	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
CP 106	13,965,930.73	2,287,305.90	1,062.90	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"
CP 107	13,966,297.54	2,287,688.06	1,074.26	CP SET 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV"



SCALE 1" = 500' 22"x34"
SCALE 1" = 1000' 11"x17"

VICINITY MAP
NOT TO SCALE

NOTES:

1.) PRIMARY CONTROL (HORIZONTAL) WAS ESTABLISHED USING GPS METHODS CONFORMING TO THE "TxDOT SURVEY MANUAL 2016-1".

2.) BEARINGS ARE BASED ON GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE 4204, NAD83 (2011) EPOCH: 2010.

3.) COORDINATES AND DISTANCES SHOWN ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET.

PROJECT COORDINATES =
GRID COORDINATES x 1.00008

4.) THE VERTICAL VALUES ARE BASED ON NAVD88, GEOID 12A, USING DIGITAL LEVELS HOLDING THE GPS ELEVATION OF CONTROL POINT RM 1826-3 AND RM 1826-4

LEGEND

△ PRIMARY CONTROL POINTS

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

R. CLAY SWETMAN
5397

7/25/2022

R. CLAY SWETMAN
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5397
DATE

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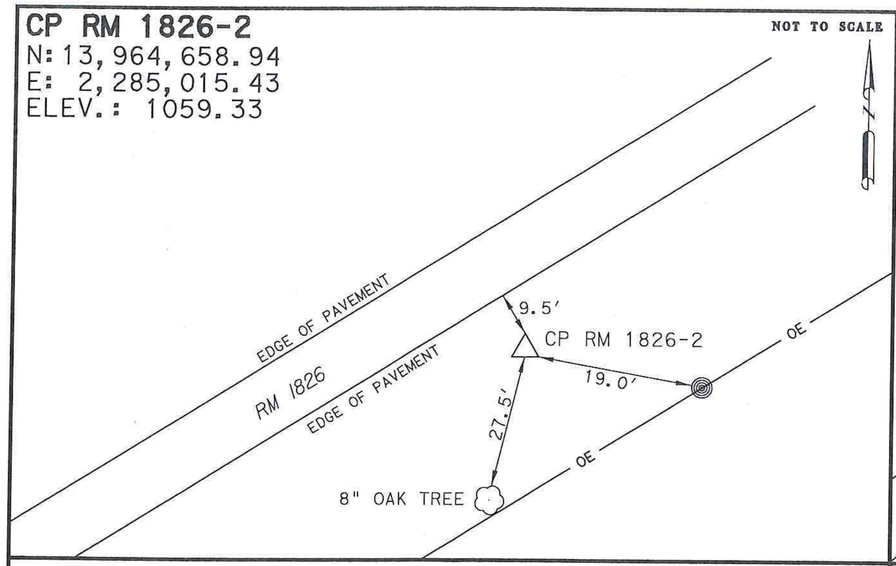
(210) 581-1111 | TBPE NO. F-1733 | TBPLS NO. 100495-00

Texas Department of Transportation

INDEX SHEET
RM 1826
PROJECT CONTROL

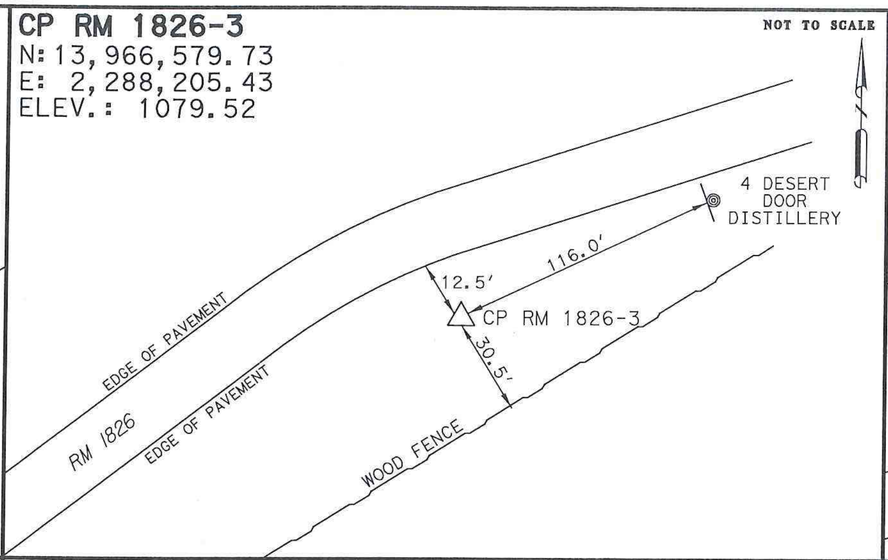
FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	TEXAS		RM 1826
STATE DIST. NO.	COUNTY		SHEET NO.
14	HAYS	CSJ: 1754-02-030	66

CP RM 1826-2
N: 13,964,658.94
E: 2,285,015.43
ELEV.: 1059.33



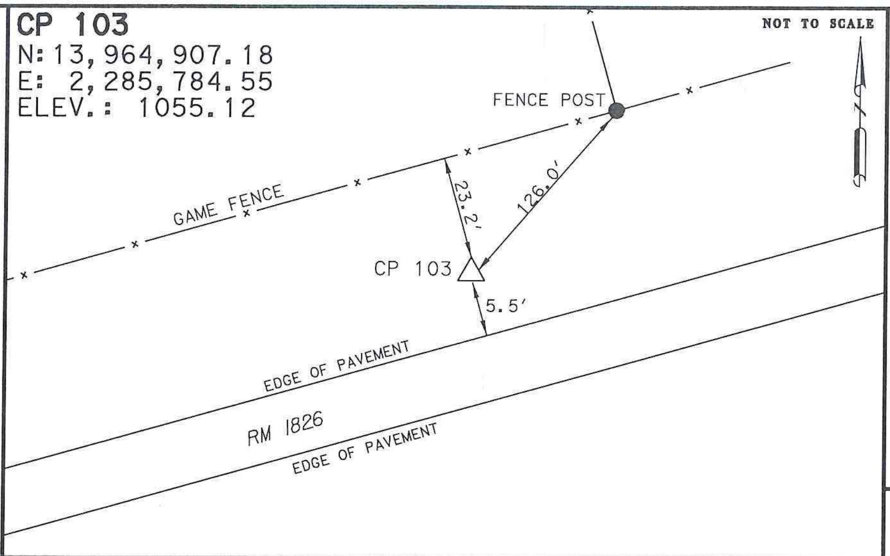
CP RM 1826-2 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE NORTH SIDE OF RM 1826 APPROXIMATELY 0.2' OF A MILE NORTHEAST OF THE INTERSECTION OF TOWERING CEDAR DR AND RM 1826.

CP RM 1826-3
N: 13,966,579.73
E: 2,288,205.43
ELEV.: 1079.52



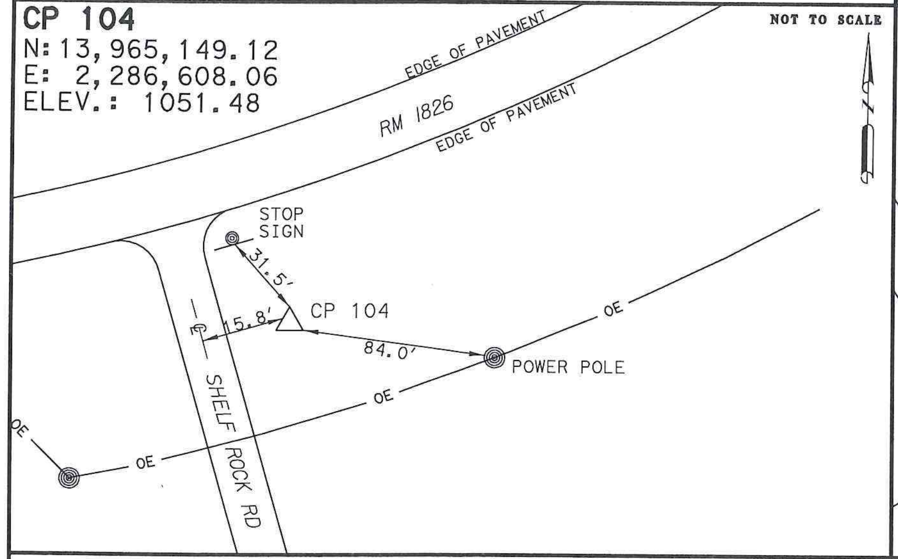
CP RM 1826-3 IS A 5/8" IRON ROD WITH TxDOT ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION PHARR DISTRICT CONTROL MARK" IN CONCRETE SET ON THE SOUTH SIDE OF FM 1826 APPROXIMATELY 0.2' OF A MILE SOUTHWEST OF THE INTERSECTION OF DARDEN HILL ROAD AND RM 1826.

CP 103
N: 13,964,907.18
E: 2,285,784.55
ELEV.: 1055.12



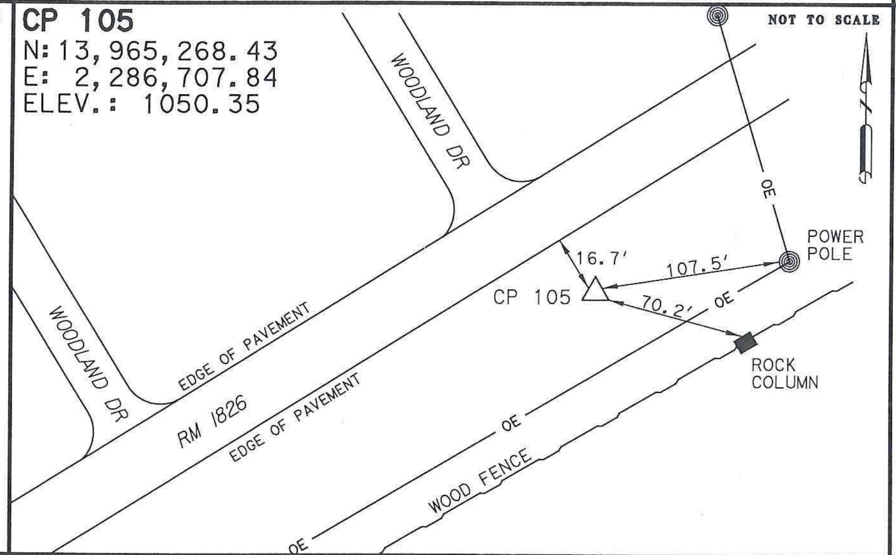
CP 103 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE NORTH SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE SOUTHWEST OF THE INTERSECTION OF SHELF ROCK RD AND RM 1826.

CP 104
N: 13,965,149.12
E: 2,286,608.06
ELEV.: 1051.48



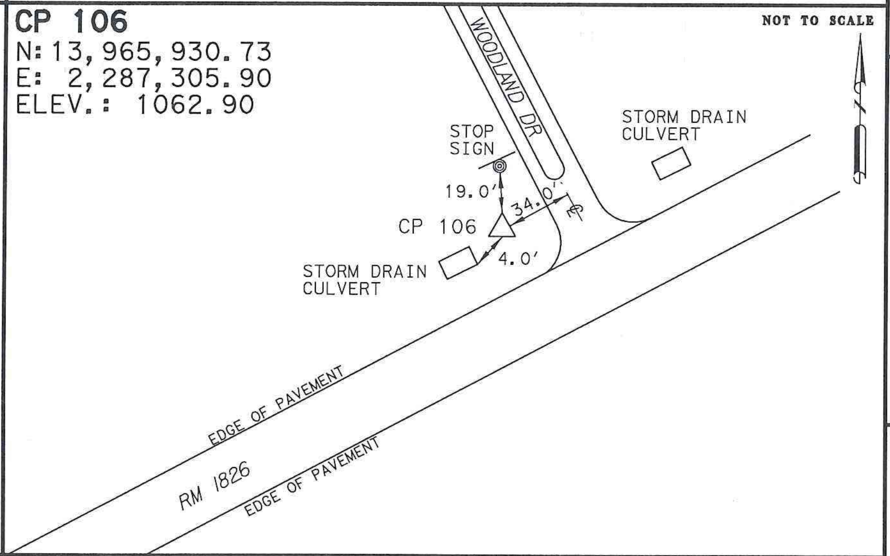
CP 104 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826. ON THE SOUTHEAST CORNER OF THE INTERSECTION OF SHELF ROAD RD AND RM 1826.

CP 105
N: 13,965,268.43
E: 2,286,707.84
ELEV.: 1050.35



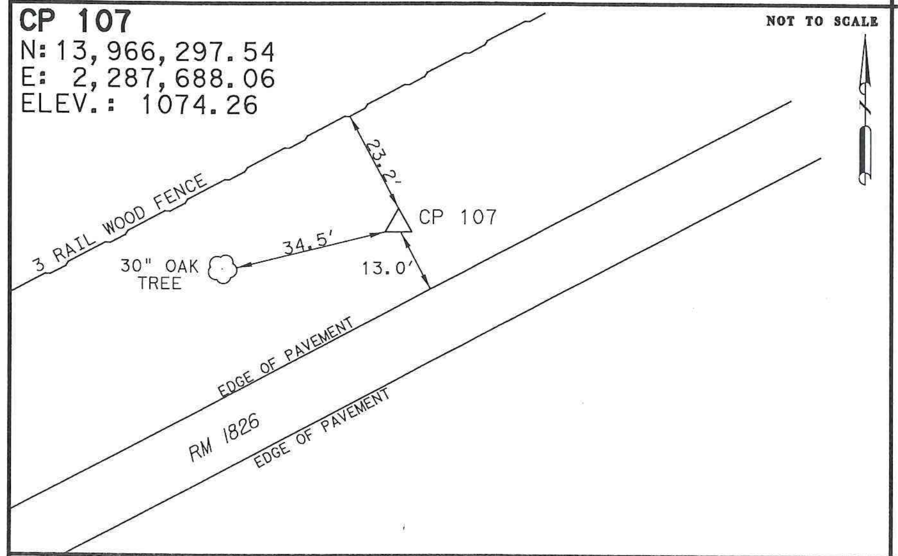
CP 105 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE SOUTH SIDE OF RM 1826 APPROXIMATELY 170 FEET OF THE OF THE INTERSECTION OF SHELF ROCK RD AND RM 1826.

CP 106
N: 13,965,930.73
E: 2,287,305.90
ELEV.: 1062.90



CP 106 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE NORTH SIDE OF RM 1925 ON THE NORTHWEST CORNER OF THE INTERSECTION OF WOODLAND DR AND RM 1826.

CP 107
N: 13,966,297.54
E: 2,287,688.06
ELEV.: 1074.26



CP 107 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE NORTH SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE NORTHEAST OF THE INTERSECTION OF WOODLAND DR AND RM 1826.

NOTES:

1.) PRIMARY CONTROL (HORIZONTAL) WAS ESTABLISHED USING GPS METHODS CONFORMING TO THE "TxDOT SURVEY MANUAL 2016-1".

2.) BEARINGS ARE BASED ON GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE 4204, NAD83 (2011) EPOCH: 2010.

3.) COORDINATES AND DISTANCES SHOWN ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET.

PROJECT COORDINATES =
GRID COORDINATES × 1.00008

4.) THE VERTICAL VALUES ARE BASED ON NAVD88, GEOID 12A, USING DIGITAL LEVELS HOLDING THE GPS ELEVATION OF CONTROL POINT RM 1826-3 AND RM 1826-4

LEGEND

△ PRIMARY CONTROL POINT
○ TREE
◎ POWER POLE
⊙ SIGN

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

R. CLAY SWETMAN
5397

7/25/2022

R. CLAY SWETMAN — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5397

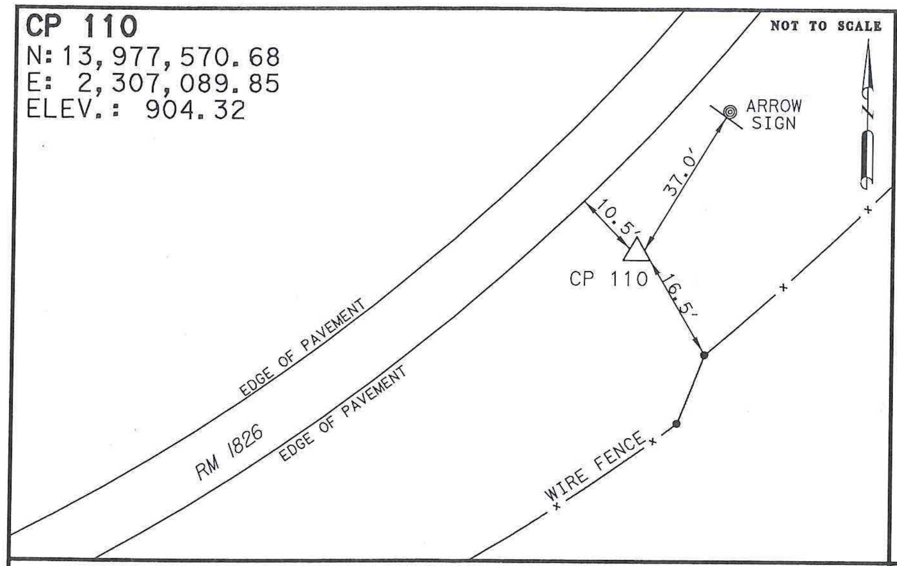
CDS muery
ENGINEERS | SURVEYORS
100 NE Loop 410, Ste. 300 | San Antonio, Texas 78216
(210) 581-1111 | TBPE No. F-1733 | TBPLS No. 100495-00

Texas Department of Transportation

RM 1826 CONTROL
DETAIL SHEET

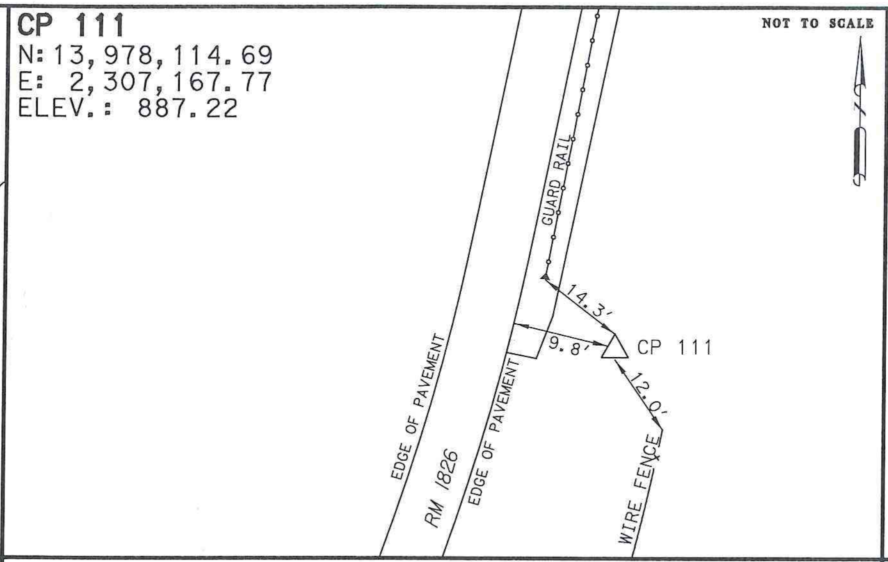
FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	TEXAS			RM 1826
STATE DIST. NO.	COUNTY			SHEET NO.
14	HAYS	CSJ: 1754-02-030		67

CP 110
N: 13,977,570.68
E: 2,307,089.85
ELEV.: 904.32



CP 110 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE EAST SIDE OF RM 1826 APPROXIMATELY 0.1' OF A MILE NORTHEAST OF THE INTERSECTION OF GORMAN SPRINGS RD AND RM 1826.

CP 111
N: 13,978,114.69
E: 2,307,167.77
ELEV.: 887.22



CP 111 IS A 5/8" IRON ROD WITH RED CAP STAMPED "CDS/MUERY TRAV" SET ON THE EASTSIDE OF RM 1826 APPROXIMATELY 0.2' OF A MILE NORTH EAST OF THE INTERSECTION OF RM 1826 AND GORMAN SPRINGS RD.

NOTES:

1.) PRIMARY CONTROL (HORIZONTAL) WAS ESTABLISHED USING GPS METHODS CONFORMING TO THE "TxDOT SURVEY MANUAL 2016-1".

2.) BEARINGS ARE BASED ON GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE 4204, NAD83 (2011) EPOCH: 2010.

3.) COORDINATES AND DISTANCES SHOWN ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET.

PROJECT COORDINATES =
GRID COORDINATES x 1.00008

4.) THE VERTICAL VALUES ARE BASED ON NAVD88, GEOID 12A, USING DIGITAL LEVELS HOLDING THE GPS ELEVATION OF CONTROL POINT RM 1826-3 AND RM 1826-4

LEGEND

△ PRIMARY CONTROL POINT
○ TREE
◎ POWER POLE
◉ SIGN

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

7/25/2022
R. CLAY SWETMAN — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 5397

CDS muery
ENGINEERS | SURVEYORS
100 NE Loop 410, Ste. 300 | San Antonio, Texas 78216
(210) 581-1111 | TBPE No. F-1733 | TBPLS No. 100495-00

Texas Department of Transportation

RM 1826 CONTROL
DETAIL SHEET

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	TEXAS		RM 1826
STATE DIST. NO.	COUNTY		SHEET NO.
14	HAYS	CSJ: 0914-33-097	68

CK:

DW:

CK:

DN:

TRAVIS COUNTY

ALIGNMENT (RM 1826) - LEWIS MOUNTAIN RD
CL-RM1826_1

Element: Linear

POT	( )	128+98.70 R1	10048671.2452 N	3062426.2617 E
PC	( )	142+09.10 R1	10047510.0646 N	3061818.9662 E

Tangential Direction: S27°36'34"W
Tangential Length: 1310.40

Element: Circular

PC	(CL-RM1826_1)	142+09.10 R1	10047510.0646 N	3061818.9662 E
PI	( )	146+23.00 R1	10047143.2928 N	3061627.1452 E
CC	( )	10047952.6201 N	3060972.7771 E	
PT	( )	149+90.23 R1	10047032.5224 N	3061228.3385 E

Radius: 954.93
Delta: 46°52'03.46" Right
Degree of Curvature (Arc): 05°59'59.99"
Length: 781.13

Tangent: 413.90
Chord: 759.53
Middle Ordinate: 78.76
External: 85.84
Back Tangent Direction: S27°36'34"W
Back Radial Direction: N62°23'25.83"W
Chord Direction: S51°02'35"W
Ahead Radial Direction: N15°31'22"W
Ahead Tangent Direction: S74°28'37"W

Element: Linear

PT	( )	149+90.23 R1	10047032.5224 N	3061228.3385 E
POT	( )	153+02.78 R1	10046948.0060 N	3060927.4338 E

Tangential Direction: S74°18'41"W
Tangential Length: 312.55

ALIGNMENT (RM 1826) - ZYLE RD
CL-RM1826_2

Element: Linear

POT	( )	169+24.90 R1	10046196.0181 N	3059558.2789 E
PI	( )	193+69.73 R1	10044034.2522 N	3058416.3569 E

Tangential Direction: S27°50'41"W
Tangential Length: 2444.83

Element: Linear

PI	( )	193+69.73 R1	10044034.2522 N	3058416.3569 E
POT	( )	196+62.42 R1	10043775.1182 N	3058280.2980 E

Tangential Direction: S27°42'07"W
Tangential Length: 292.68

ALIGNMENT (RM 1826) - APPALOOSA RUN
CL-RM1826_3

Element: Linear

POT	( )	227+88.65 R1	10041093.7699	3056688.7339
PC	( )	230+16.75 R1	10040892.0787	3056582.1917

Tangential Direction: S27°50'42"W
Tangential Length: 228.10

Element: Circular

PC	( )	230+16.75 R1	10040892.0787	3056582.1917
PI	( )	233+99.84 R1	10040553.3500	3056403.2602
CC	( )	10040223.0317	3057848.7405	
PT	( )	237+65.40 R1	10040170.5230	3056417.3032

Radius: 1432.40
Delta: 29°56'44.89" Left
Degree of Curvature (Arc): 03°59'59.94"
Length: 748.65

Tangent: 383.08
Chord: 740.16
Middle Ordinate: 48.63
External: 50.34
Back Tangent Direction: S27°50'41"W
Back Radial Direction: N62°09'18"W
Chord Direction: S12°52'19"W
Ahead Radial Direction: S87°53'57"W
Ahead Tangent Direction: S02°06'02"E

Element: Linear

PT	( )	237+65.40 R1	10040170.5230	3056417.3032
PI	( )	243+16.17 R1	10039620.1192	3056437.4934

Tangential Direction: S02°06'03"E
Tangential Length: 550.77

Element: Linear

PI	( )	243+16.17 R1	10039620.1192	3056437.4934
POT	( )	250+00.00 R1	10038937.0260	3056469.1417

Tangential Direction: S02°39'10"E
Tangential Length: 683.83

CL-LEWIS MOUNTAIN

Element: Linear

POT	( )	0+00.00 R1	10047660.9874 N	3061897.8986 E
POT	( )	2+00.00 R1	10047753.6760 N	3061720.6732 E

Tangential Direction: N62°23'26"W
Tangential Length: 200.00

CL-ZYLE RD

Element: Linear

POT	(CL-RM1826_2)	0+00.00 R1	10044699.7643 N	3058767.9041 E
POT	( )	2+00.00 R1	10044790.5345 N	3058589.6886 E

Tangential Direction: N63°00'32"W
Tangential Length: 200.00

CL-APPALOOSA RUN

Element: Linear

POT	( )	0+00.00 R1	10047660.9874 N	3061897.8986 E
POT	( )	2+00.00 R1	10047753.6760 N	3061720.6732 E

Tangential Direction: N62°23'26"W
Tangential Length: 200.00

CL-RM1826_1_DRWY1

Element: Linear

POT	( )	0+00.00	10047350.8412 N	3061714.2308 E
PC	( )	0+30.58	10047323.3438 N	3061727.6045 E

Tangential Direction: S25°56'11"E
Tangential Length: 30.58

Element: Circular

PC	( )	0+30.58	10047323.3438 N	3061727.6045 E
PI	( )	0+34.67	10047319.6648 N	3061729.3938 E
CC	( )		10047316.7832 N	3061714.1153 E
PT	( )	0+38.57	10047315.5867 N	3061729.0675 E

Radius: 15.00
Delta: 30°30'42.58" Right
Degree of Curvature (Arc): 21°58'18.71"
Length: 7.99

Tangent: 4.09
Chord: 7.89
Middle Ordinate: 0.53
External: 0.55
Back Tangent Direction: S25°56'11"E
Back Radial Direction: S64°03'49"W
Chord Direction: S10°40'50"E
Ahead Radial Direction: N85°25'29"W
Ahead Tangent Direction: S04°34'31"W

Element: Linear

PT	( )	0+38.57	10047315.5867 N	3061729.0675 E
POT	( )	0+65.43	10047288.8036 N	3061726.9242 E

Tangential Direction: S04°34'31"W
Tangential Length: 26.87

CL-RM1826_2_DRWY2

Element: Linear

POT	( )	0+00.00 R1	10044960.8736 N	3058905.8315 E
POT	( )	0+65.00 R1	10044991.2335 N	3058860.3573 E

Tangential Direction: N62°09'19"W
Tangential Length: 65.00

CL-RM1826_2_DRWY3

Element: Linear

POT	( )	0+00.00	10044385.2052	3058601.7428
PC	( )	0+29.55	10044399.0070	3058575.6147

Tangential Direction: N62°09'19"W
Tangential Length: 29.55

Element: Circular

PC	( )	0+29.55	10044399.0070	3058575.6147
PI	( )	0+33.05	10044400.6422	3058572.5191
CC	( )		10044385.7438	3058568.6086
PT	( )	0+36.43	10044400.7381	3058569.0194

Radius: 15.00
Delta: 26°16'30.45" Left
Degree of Curvature (Arc): 21°58'18.71"
Length: 6.88

Tangent: 3.50
Chord: 6.82
Middle Ordinate: 0.39
External: 0.40
Back Tangent Direction: N62°09'19"W
Back Radial Direction: N27°50'41"E
Chord Direction: N75°17'35"W
Ahead Radial Direction: N01°34'10"E
Ahead Tangent Direction: N88°25'50"W

Element: Linear

PT	( )	0+36.43	10044400.7381	3058569.0194
POT	( )	0+60.18	10044401.3888	3058545.2734

Tangential Direction: N88°25'50"W
Tangential Length: 23.75

CL-RM1826_2_DRWY4

Element: Linear

POT	( )	0+00.00 R1	10044229.6139 N	3058519.5539 E
POT	( )	0+50.00 R1	10044252.9677 N	3058475.3430 E

Tangential Direction: N62°09'19"W
Tangential Length: 50.00

CL-RM1826_2_DRWY5

Element: Linear

POT	( )	0+00.00 R1	10044130.9162 N	3058467.4182 E
POT	( )	0+50.00 R1	10044154.2699 N	3058423.2074 E

Tangential Direction: N62°09'19"W
Tangential Length: 50.00

CL-RM1826_3_DRWY6

Element: Linear

POT	( )	0+00.00	10039691.2726 N	3056434.8833 E
PC	( )	0+37.40	10039692.6438 N	3056472.2623 E

Tangential Direction: N87°53'57"E
Tangential Length: 37.40

Element: Circular

PC	( )	0+37.40	10039692.6438 N	3056472.2623 E
PI	( )	0+44.98	10039692.9216 N	3056479.8372 E
CC	( )		10039677.6539 N	3056472.8121 E
PT	( )	0+51.44	10039686.9881 N	3056484.5541 E

Radius: 15.00
Delta: 53°37'04.73" Right
Degree of Curvature (Arc): 2°58'18.71"
Length: 14.04

Tangent: 7.58
Chord: 13.53
Middle Ordinate: 1.61
External: 1.81
Back Tangent Direction: N87°53'57"E
Back Radial Direction: S02°06'03"E
Chord Direction: S65°17'31"E
Ahead Radial Direction: S51°31'02"W
Ahead Tangent Direction: S38°28'58"E

Element: Linear

PT	( )	0+51.44	10039686.9881 N	3056484.5541 E
POT	( )	0+95.35	10039652.6156 N	3056511.8783 E

Tangential Direction: S38°28'58"E
Tangential Length: 43.91

NOTES:

1. THE HORIZONTAL DATA IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
2. TRAVIS COUNTY ALIGNMENTS: ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).
3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES. SEE TRAVIS COUNTY SURVEY CONTROL SHEETS FOR COMBINED ADJUSTMENT FACTORS.

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Texas Department of Transportation

RM 1826

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	69

DATE: 5/30/2023 5:26:41 PM
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HAYS COUNTY

ALIGNMENT (RM 1826) - OSO CREEK RD
CL-RM1826_4

```
Element: Linear
POT ( )       267+00.00 R1    13978454.4225   2307157.9912
PC     ( )     272+44.10 R1    13977911.0543   2307129.7343
Tangential Direction:   S02°58'37"W
Tangential Length:      544.10

Element: Circular
PC     ( )     272+44.10 R1    13977911.0543   2307129.7343
PI     ( )     282+25.64 R1    13976930.8365   2307078.7598
CC     ( )     13977970.5655   2305985.3607
PT     ( )     288+67.38 R1    13976830.6325   2306102.3456
Radius:       1145.92
Delta:        81°09'49.25"      Right
Degree of Curvature (Arc):   04°59'59.93"
Length:       1623.28

Tangent:    981.54
Chord:      1490.92
Middle Ordinate: 275.62
External:   362.91
Back Tangent Direction:       S02°58'36"W
Back Radial Direction:  N87°01'23"W
Chord Direction:  S43°33'31"W
Ahead Radial Direction:       N05°51'33"W
Ahead Tangent Direction:      S84°08'26"W

Element: Linear
PT     ( )     288+67.38 R1    13976830.6325   2306102.3456
POT   ( )     290+64.37 R1    13976810.5219   2305906.3827
Tangential Direction:   S84°08'26"W
Tangential Length:      196.99
```

ALIGNMENT (RM 1826) - WOODLAND DR / SHELF ROCK RD, TOWERING CEDAR DR
CL-RM1826_5

```
Element: Circular
PC     ( )     500+66.48 R1    13966564.9924   2288094.4146
PI     ( )     503+29.38 R1    13966437.3784   2287864.5632
CC     ( )     13964895.2240   2289021.4738
PT     ( )     505+89.00 R1    13966252.4072   2287677.7406
Radius:       1909.86
Delta:        15°40'31.97"      Left
Degree of Curvature (Arc):   03°00'00.00"
Length:       522.52

Tangent:    262.90
Chord:      520.89
Middle Ordinate: 17.84
External:   18.01
Back Tangent Direction:       S60°57'39"W
Back Radial Direction:  N29°02'20"W
Chord Direction:  S53°07'23"W
Ahead Radial Direction:       N44°42'52"W
Ahead Tangent Direction:      S45°17'07"W

Element: Linear
PT     ( )     505+89.00 R1    13966252.4072   2287677.7406
PC     ( ML CL-2 ) 517+52.10 R1    13965434.0744   2286851.2167
Tangential Direction:   S45°17'07"W
Tangential Length:      1163.10


Element: Circular
PC     ( )     517+52.10 R1    13965434.0744   2286851.2167
PI     ( )     522+58.98 R1    13965077.4466   2286491.0192
CC     ( )     13966791.2577   2285507.4835
PT     ( )     527+43.01 R1    13964946.3652   2286001.3833
Radius:       1909.86
Delta:        29°43'38.51"      Right
Degree of Curvature (Arc):   03°00'00.00"
Length:       990.91

Tangent:    506.88
Chord:      979.84
Middle Ordinate: 63.91
External:   66.12
Back Tangent Direction:       S45°17'07"W
Back Radial Direction:  N44°42'52"W
Chord Direction:  S60°08'56"W
Ahead Radial Direction:       N14°59'14"W
Ahead Tangent Direction:      S75°00'45"W

Element: Linear
PT     ( ML CL-2 ) 527+43.01 R1    13964946.3652   2286001.3833
PC     ( ML CL-3 ) 542+97.19 R1    13964544.4457   2284500.0701
Tangential Direction:   S75°00'46"W
Tangential Length:      1554.18

Element: Circular
PC     ( )     542+97.19 R1    13964544.4457   2284500.0701
PI     ( )     547+04.73 R1    13964439.0553   2284106.3993
CC     ( )     13962699.5532   2284993.9699
PT     ( )     551+00.22 R1    13964182.1548   2283790.0357
Radius:       1909.86
Delta:        24°05'26.58"      Left
Degree of Curvature (Arc):   03°00'00.00"
Length:       803.02

Tangent:    407.53
Chord:      797.12
Middle Ordinate: 42.05
External:   43.00
Back Tangent Direction:       S75°00'45"W
Back Radial Direction:  N14°59'14"W
Chord Direction:  S62°58'02"W
Ahead Radial Direction:       N39°04'40"W
Ahead Tangent Direction:      S50°55'19"W

Element: Linear
PT     ( ML CL-3 ) 551+00.22 R1    13964182.1548   2283790.0357
POT   ( )     570+53.46 R1    13962950.8724   2282273.7557
Tangential Direction:   S50°55'19"W
Tangential Length:      1953.24
```

CL-OSO CREEK RD

```
Element: Linear
POT   ( CL-RM1826_4 )  0+00.00    13977335.6034   2306939.2767
POT   ( )     0+52.00    13977304.6082   2306981.0295
Tangential Direction:   S53°24'42"E
Tangential Length:      52.00
```

CL-WOODLAND DR

```
Element: Linear
POT   ( )     0+00.00    13965933.8356 N       2287355.9802 E
POT   ( )     2+00.00    13966080.8697 N       2287220.4037 E
Tangential Direction:   N42°40'42"W
Tangential Length:      200.00

Element: Linear
POT   ( )     0+00.00 R1       13965268.2679 N       2286659.9016 E
POT   ( )     1+00.00 R1       13965352.4361 N       2286605.9041 E
Tangential Direction:   N32°40'55"W
Tangential Length:      100.00
```

CL-SHELF ROCK RD

```
Element: Linear
POT   ( )     0+00.00    13965196.3007 N       2286558.0441 E
POT   ( )     1+00.00    13965112.9616 N       2286613.3125 E
Tangential Direction:   S33°33'05"E
Tangential Length:      100.00
```

CL-TOWERING CEDAR

```
Element: Linear
POT   ( )     0+00.00    13964332.1028 N       2284002.8357 E
POT   ( )     2+00.00    13964161.1427 N       2284106.6270 E
Tangential Direction:   S31°15'44"E
Tangential Length:      200.00
```

CL-RM1826_4_DRWY7

```
Element: Linear
POT   ( )     0+00.00    13977311.7407 N       2306922.9547 E
POT   ( )     0+50.00    13977340.4873 N       2306882.0446 E
Tangential Direction:   N54°54'19"W
Tangential Length:      50.00
```

CL-RM1826_4_DRWY8

```
Element: Linear
POT   ( CL-RM1826_4 )  0+00.00    13977231.4273   2306861.0360
POT   ( )     0+50.00    13977196.3848   2306896.7015
Tangential Direction:   S45°30'17"E
Tangential Length:      50.00
```

NOTES:

1. THE HORIZONTAL DATA IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY.CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.

2. COORDINATES AND DISTANCES ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ASJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83 (2011) EPOCH: 2010, TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET. SEE HAYS COUNTY SURVEY CONTROL SHEETS FOR ADDITIONAL INFO.

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FIRM REGISTRATION NO. 5713

GARVER

Texas Department of Transportation

RM 1826

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	70

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UTILITY LEGEND:

COMMUNICATIONS

	QL "B"
VERIZON (TELE)	— —— T1 —— —
AT&T (TELE)	— —— T2 —— —
FRONTIER (TELE)	— —— T3 —— —
FRONTIER (FO/DUCT)	— —— FOC1 —— —
SUDDENLINK (FO/DUCT)	— —— FOC2 —— —
AT&T (FO/DUCT)	— —— FOC3 —— —
SPECTRUM (CATV)	— —— CTV1 —— —

ELECTRIC / POWER

	QL "B"
PEDERNALES ELEC COOP	— —— E1 —— —
PRIVATE	— —— E2 —— —

GAS / PETROLEUM

	QL "B"
TEXAS GAS SERVICE	— —— G1 —— —
ENTERPRISE	— ——PL1—— —
KINDER MORGAN	— ——PL2—— —
PHILLIPS 66	— ——PL3—— —

POTABLE WATER

	QL "B"
WEST TRAVIS COUNTY PUA	— —— W1 —— —
CITY OF AUSTIN	— —— W2 —— —

OVERHEAD UTILITY

	QL "C"/QL "D"
OVERHEAD LINES	———— OH ————

THESE NOTES APPLY TO ALL ROADWAY PLAN SHEETS

GENERAL NOTES

1. HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION
2. EXISTING PAVEMENT CROSS SLOPES AND TRANSITIONS SHOWN ARE BASED ON AS-BUILTS AND ARE PROVIDED FOR INFORMATION ONLY. ALL PAVEMENT WIDENING SHALL MATCH THE CROSS SLOPE OF THE EXISTING PAVEMENT ADJACENT TO THE WIDENING UNLESS OTHERWISE NOTED IN PAVING PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING PAVEMENT ELEVATION AND CROSS SLOPE PRIOR TO WIDENING. FIELD VERIFICATION IS SUBSIDIARY TO PAVEMENT QUANTITIES.
3. SEE DRIVEWAY, SIDESTREETS AND CULVERT PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION .
4. ALL MBGF AND SGT INSTALLATION SHALL INCLUDE THE INSTALLATION OF MOW STRIP (TXDOT STANDARD GF (31) MS-19).
5. THE INFORMATION SHOWN CONCERNING TYPE AND LOCATION OF UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATIONS AS TO THE TYPE AND LOCATION OF ALL UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
6. UTILITIES IN DITCH WILL NOT BE RELOCATED . CONTRACTOR SHALL POTHOLE AND LOCATE UTILITIES. WORK SHALL PROGRESS AROUND AND NEAR UTILITIES. TXDOT MAY ADJUST DEPTH OF PAVEMENT SECTION TO PROVIDE MINIMUM OF 6 IN DISTANCE FROM UTILITIES.
7. TRAVIS COUNTY TOPO - COORDINATES BASED ON THE TEXAS COORDINATES SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.). COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES. SEE TRAVIS COUNTY SURVEY CONTROL SHEETS FOR COMBINED ADJUSTMENT FACTORS.
8. HAYS COUNTY TOPO - COORDINATES AND DISTANCES ARE SURFACE COORDINATES BASED ON A PROJECT COORDINATE SYSTEM ESTABLISHED BY APPLYING A SURFACE ADJUSTMENT FACTOR OF 1.00008 TO STATE PLANE GRID COORDINATES NAD83(2011) EPPOCH:2010, TEXAS STATE PLANECOORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, U.S. SURVEY FEET. SEE HAYS COUNTY SURVEY CONTROL SHEETS FOR ADDITIONAL INFO.

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Texas Department of Transportation

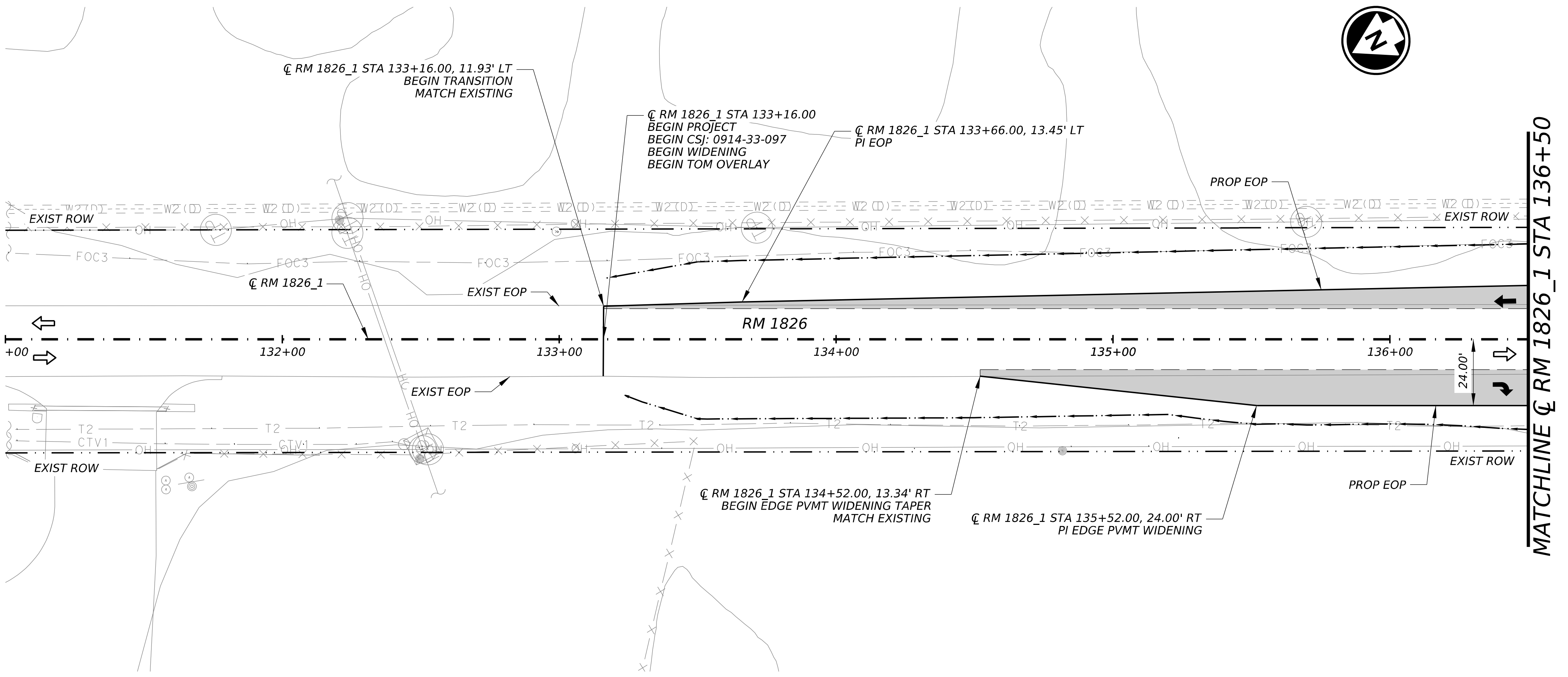
RM 1826

ROADWAY
GENERAL NOTES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	71



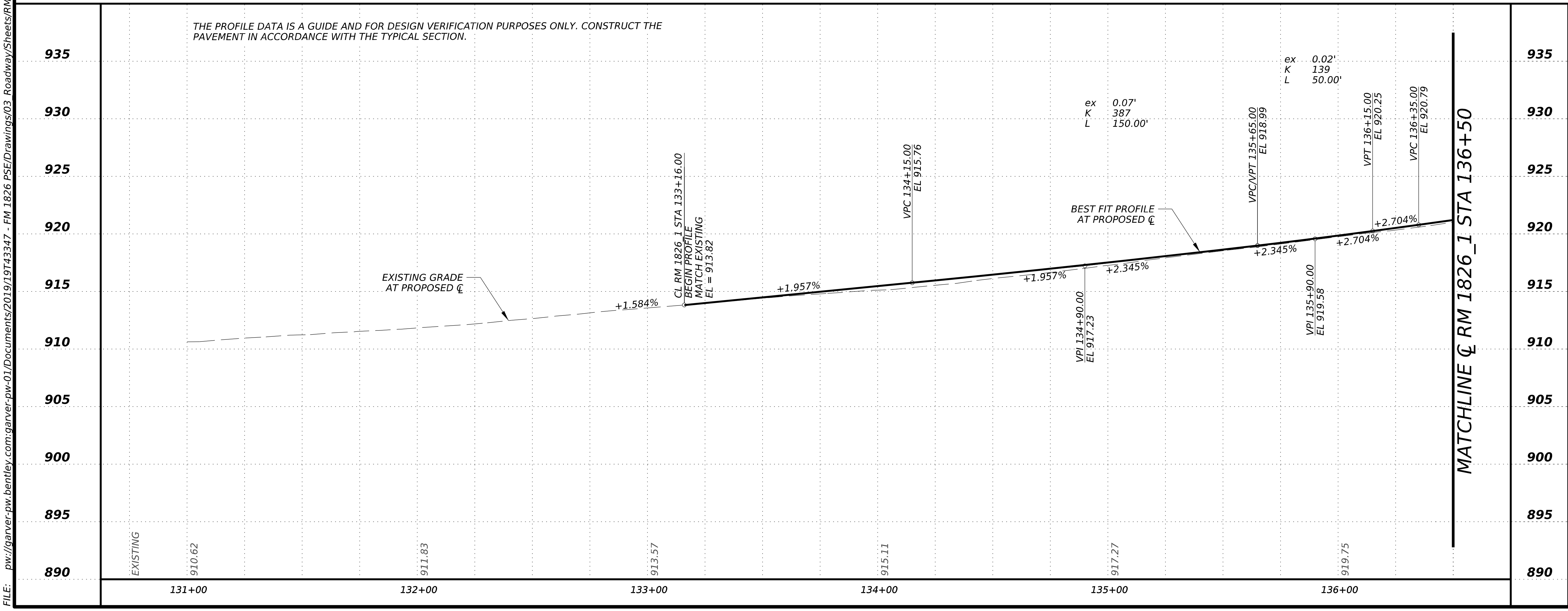
LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.

THE PROFILE DATA IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.



25' 0 25' 50'
HORZ. SCALE 1"=50'

5' 0 5' 10'
VERT. SCALE 1"=10'

STATE OF TEXAS
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RM 1826

PLAN AND PROFILE
LEWIS MOUNTAIN DR

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	72

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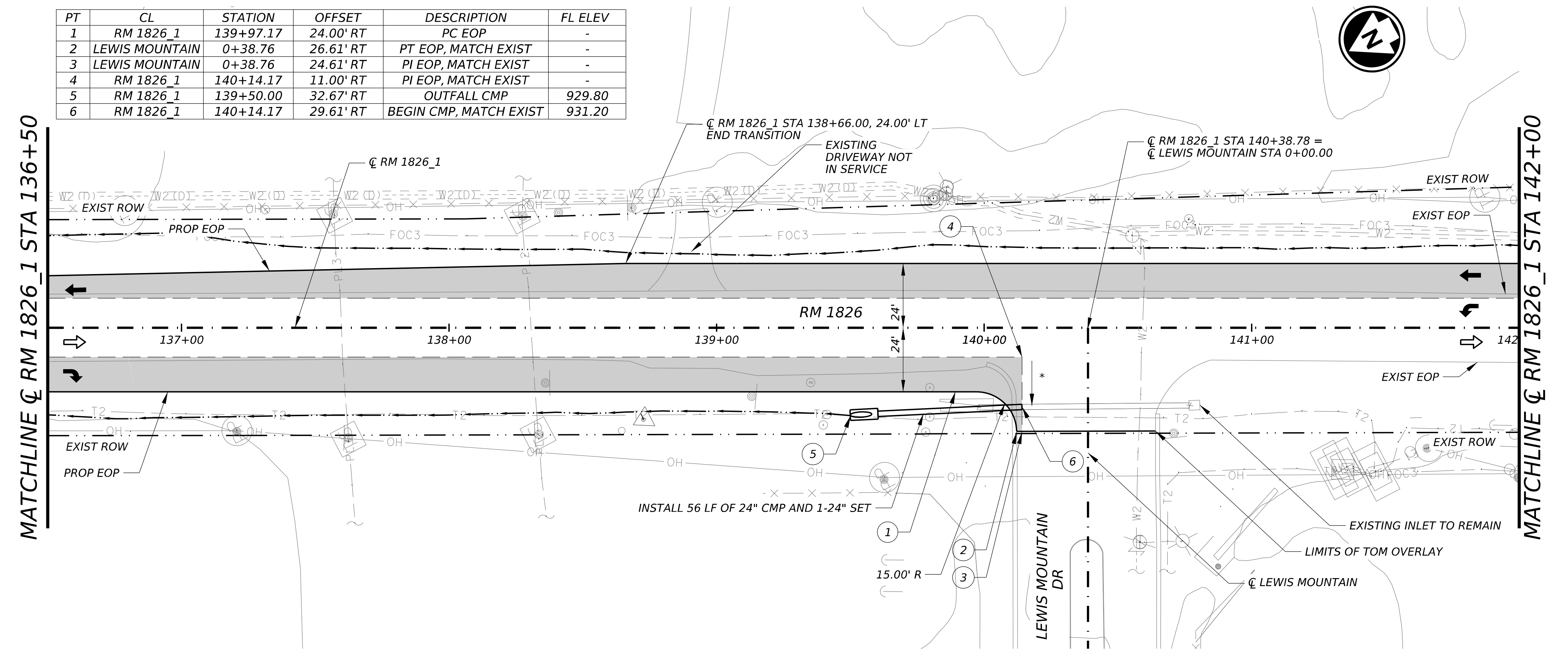
PT	CL	STATION	OFFSET	DESCRIPTION	FL ELEV
1	RM 1826_1	139+97.17	24.00' RT	PC EOP	-
2	LEWIS MOUNTAIN	0+38.76	26.61' RT	PT EOP, MATCH EXIST	-
3	LEWIS MOUNTAIN	0+38.76	24.61' RT	PI EOP, MATCH EXIST	-
4	RM 1826_1	140+14.17	11.00' RT	PI EOP, MATCH EXIST	-
5	RM 1826_1	139+50.00	32.67' RT	OUTFALL CMP	929.80
6	RM 1826_1	140+14.17	29.61' RT	BEGIN CMP, MATCH EXIST	931.20



LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—·	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.

* MATCH EXISTING SLOPE

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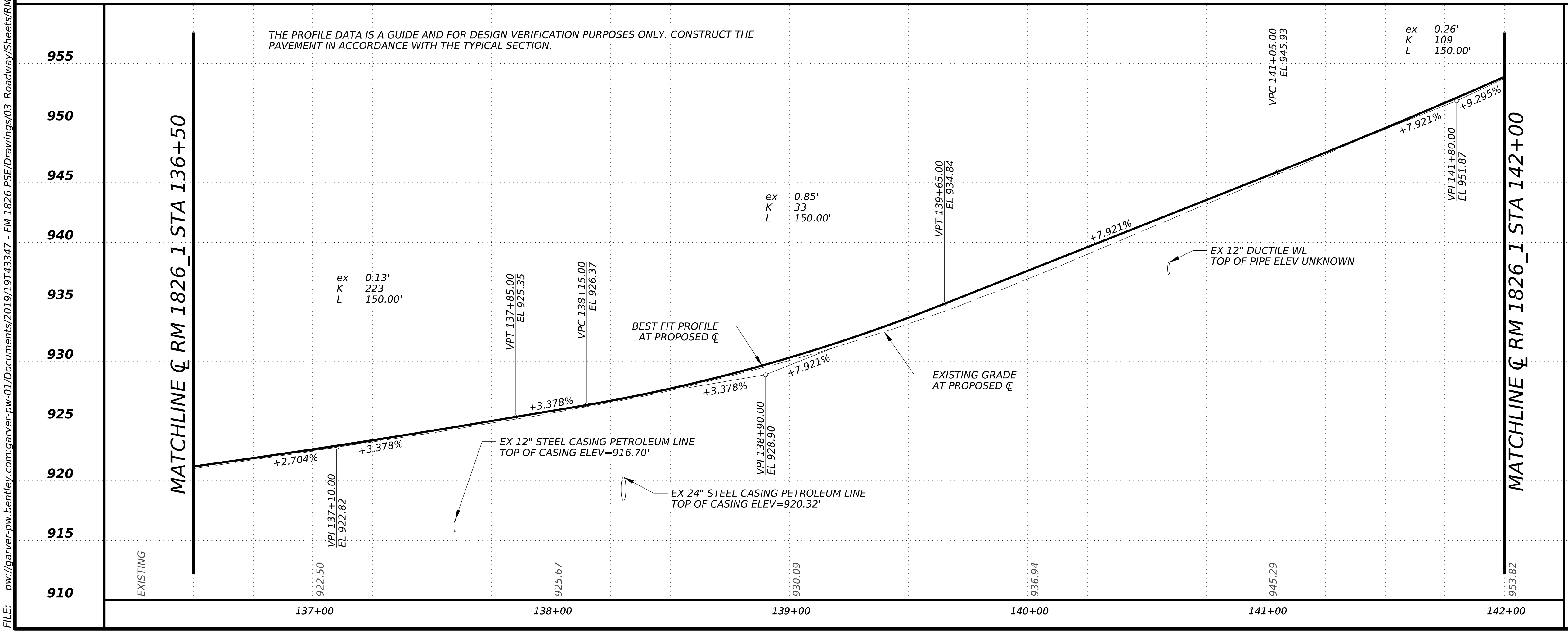

25' 0 25' 50'
HORZ. SCALE 1"=50'

5' 0 5' 10'
VERT. SCALE 1"=10'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023
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RM 1826

PLAN AND PROFILE
LEWIS MOUNTAIN DR

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	73

DATE: 5/30/2023 4:50:53 PM
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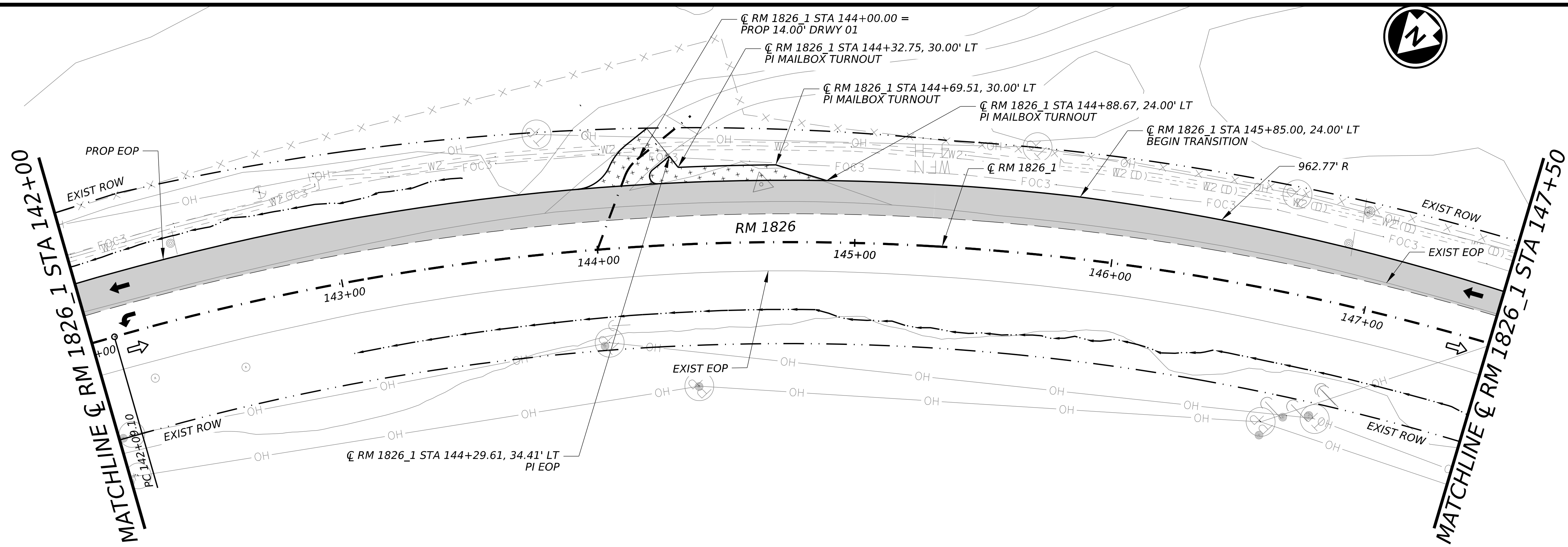

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
∼→	FLOW ARROW

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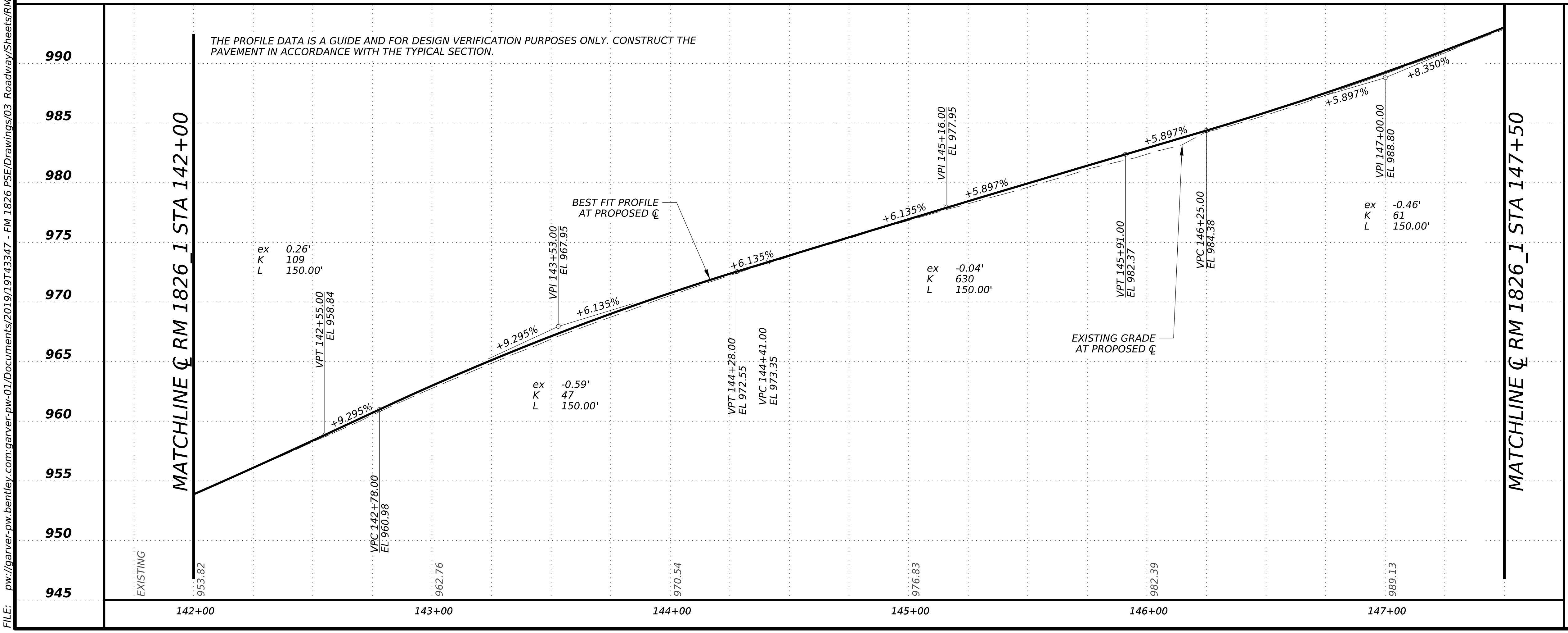

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PLAN AND PROFILE
LEWIS MOUNTAIN DR

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	74

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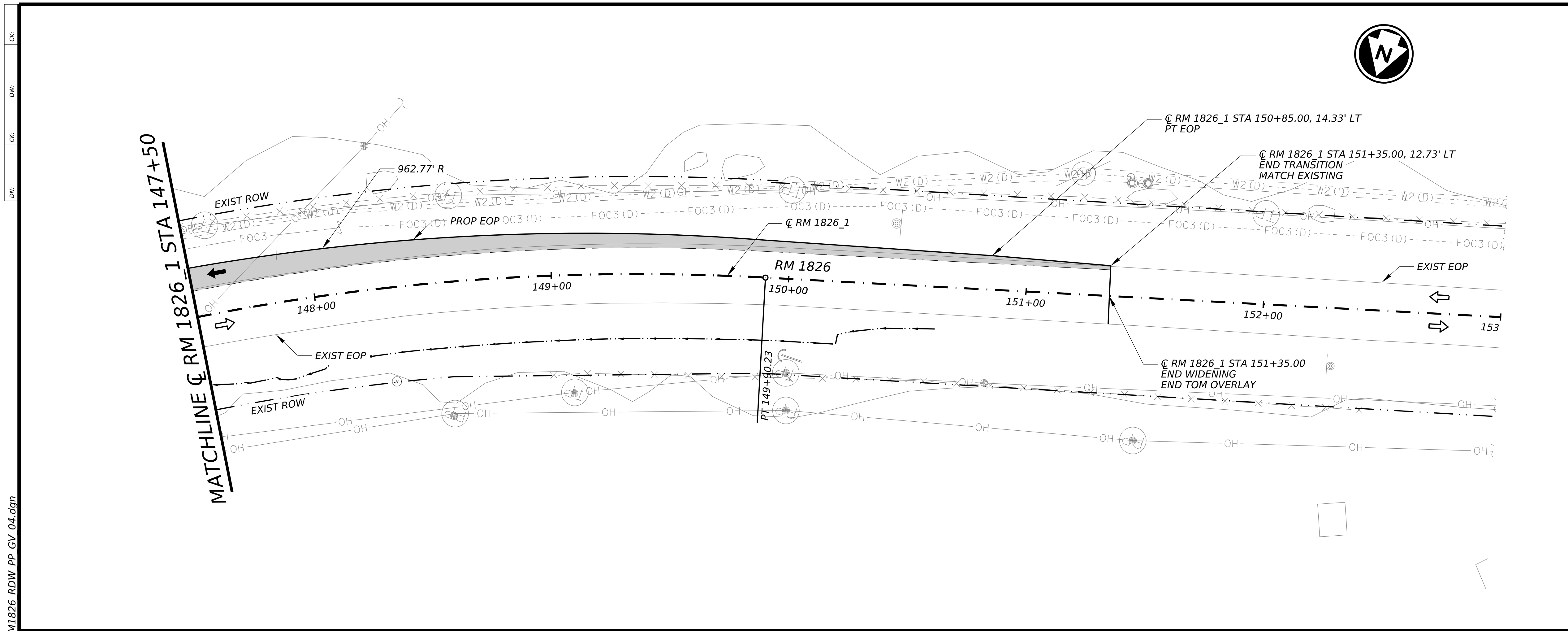

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—·→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

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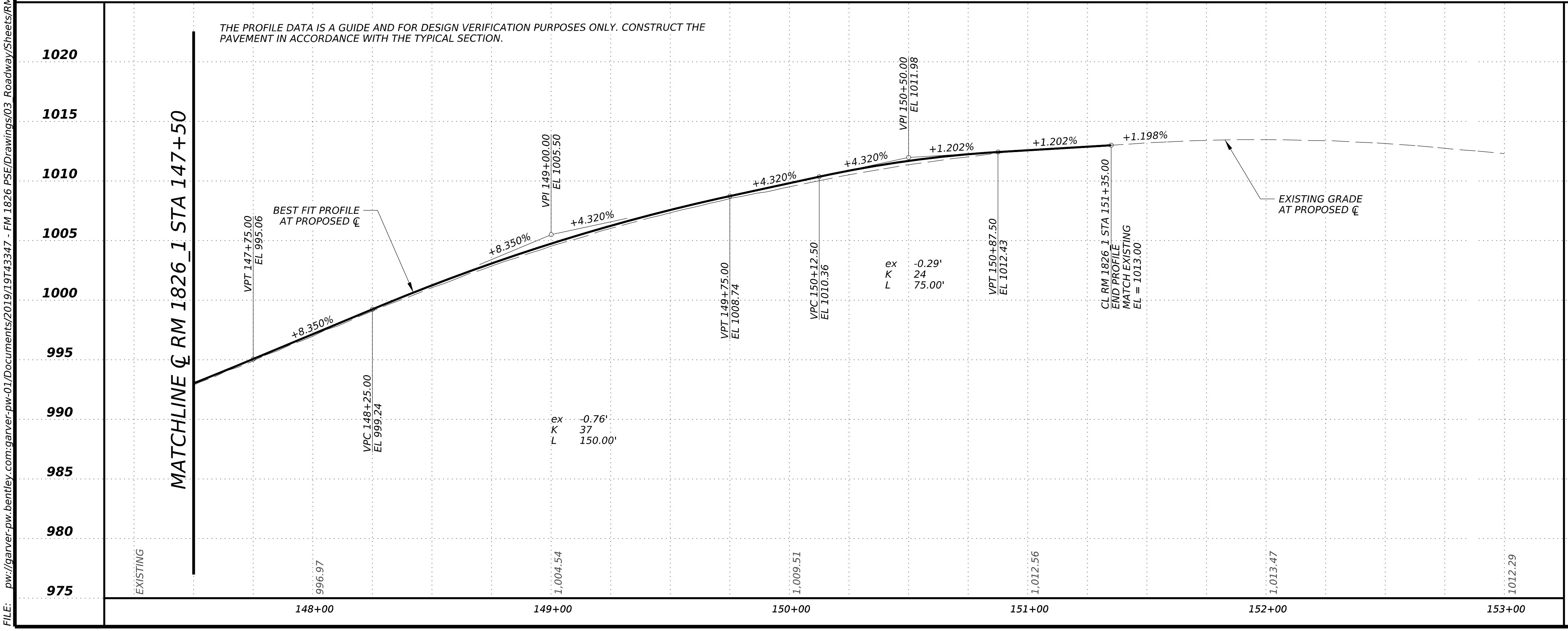

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RM 1826

PLAN AND PROFILE
LEWIS MOUNTAIN DR

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	75

DATE: 5/30/2023 4:51:19 PM
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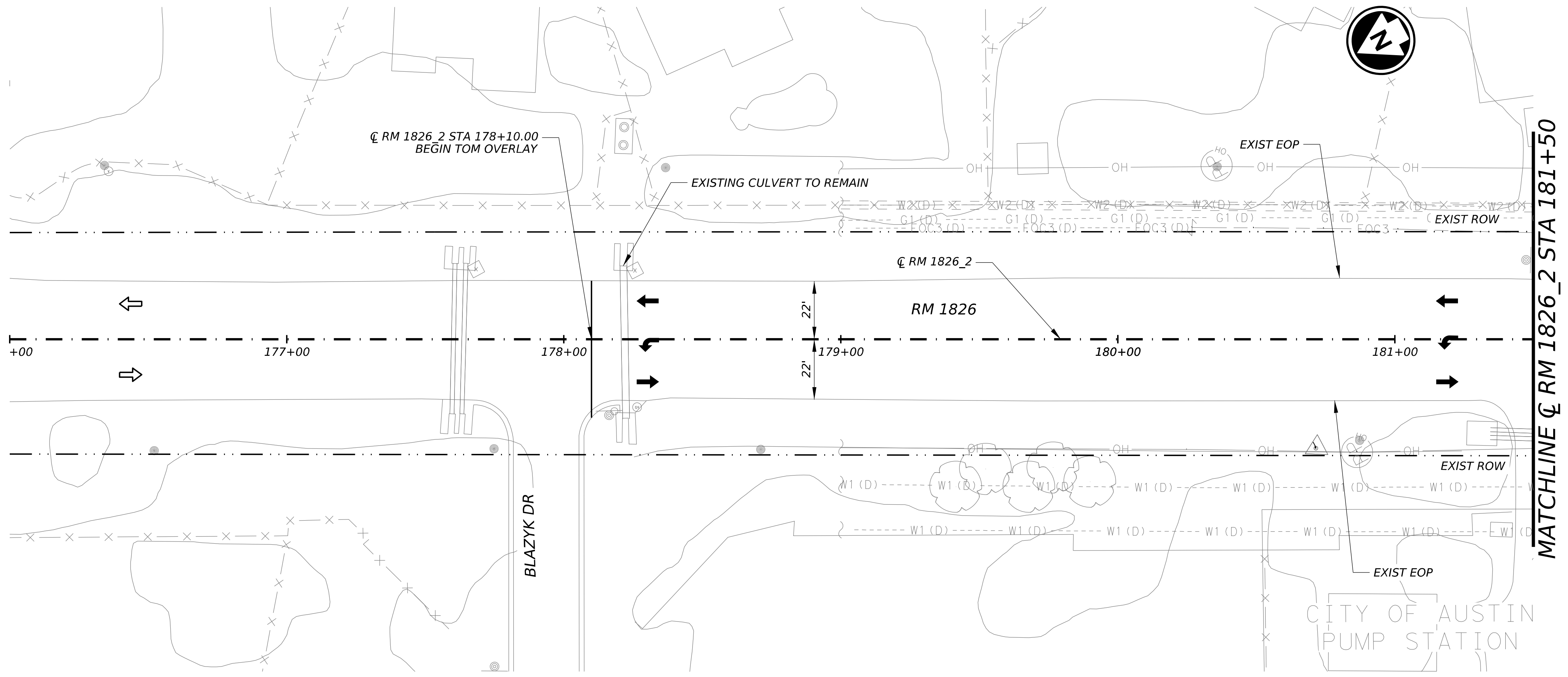

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—•—▸	PROPOSED DITCH
—•—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~▸	FLOW ARROW

NOTES:

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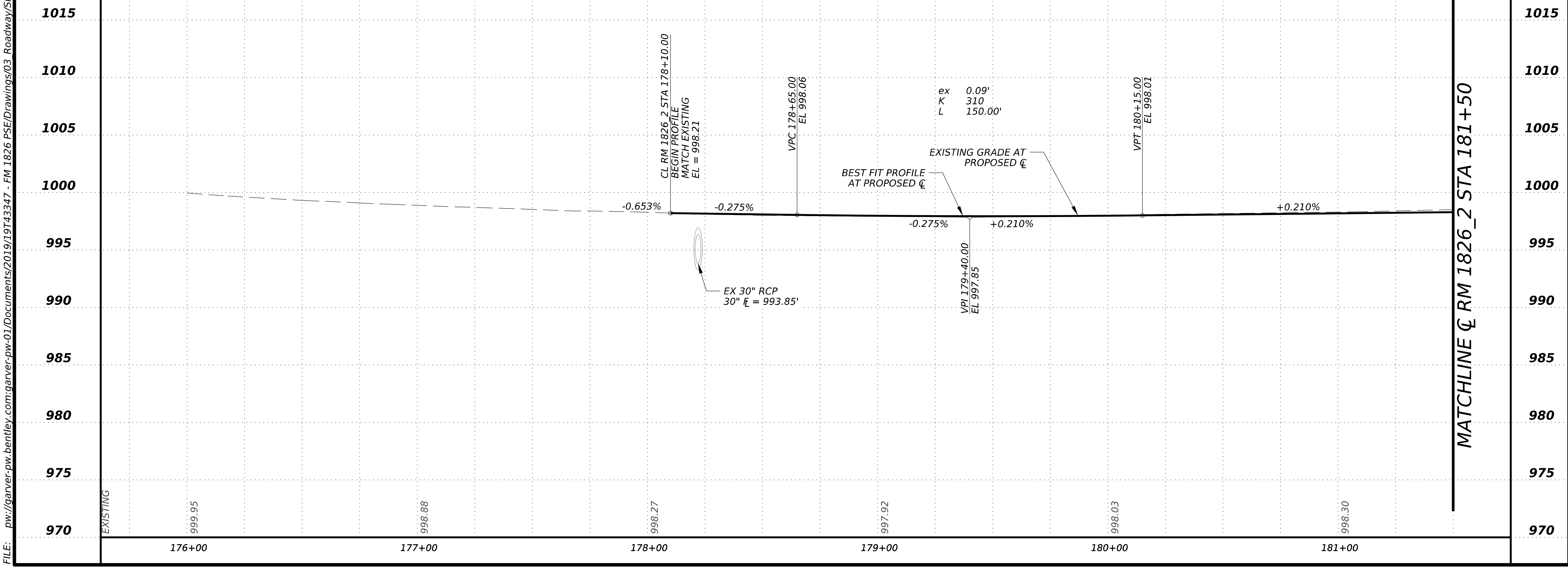

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RM 1826

PLAN AND PROFILE
ZYLE RD

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	76

DATE: 5/30/2023 4:51:32 PM
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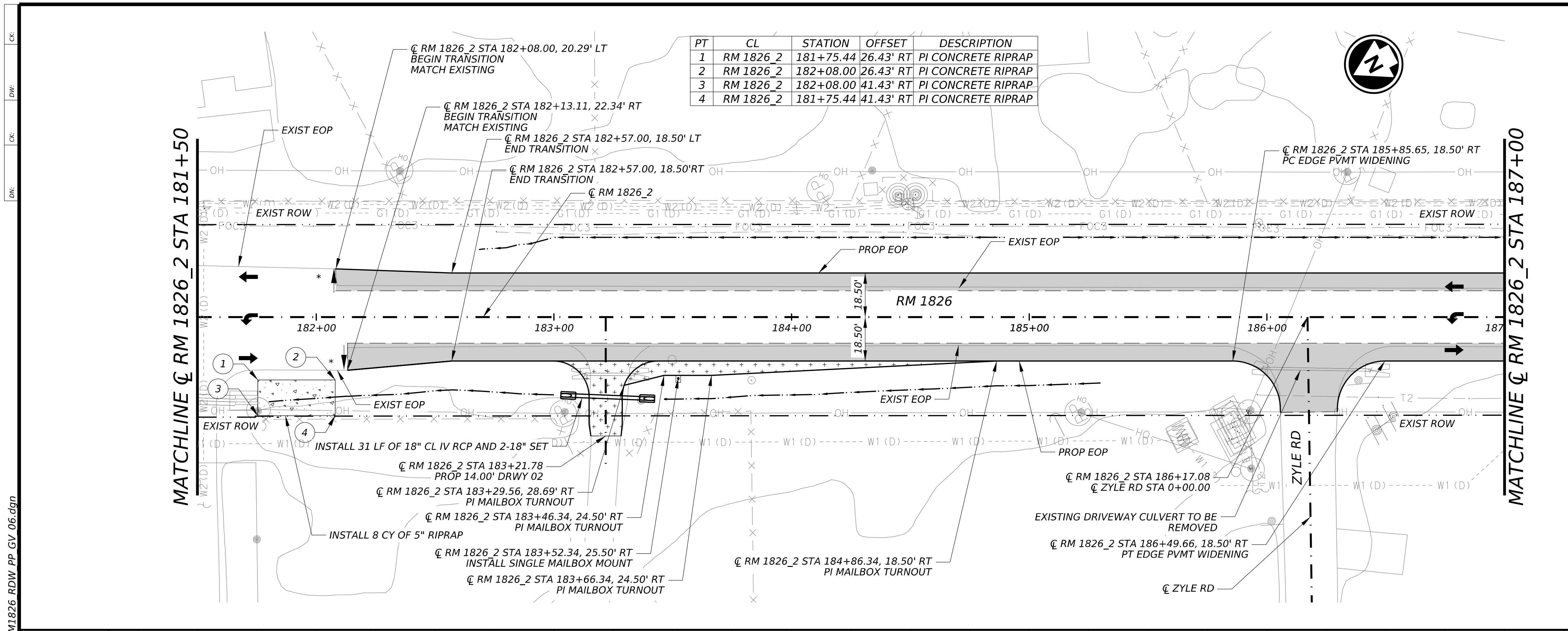

PT	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_2	181+75.44	26.43' RT	PI CONCRETE RIPRAP
2	RM 1826_2	182+08.00	26.43' RT	PI CONCRETE RIPRAP
3	RM 1826_2	182+08.00	41.43' RT	PI CONCRETE RIPRAP
4	RM 1826_2	181+75.44	41.43' RT	PI CONCRETE RIPRAP

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—·—►	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~►	FLOW ARROW

NOTES:

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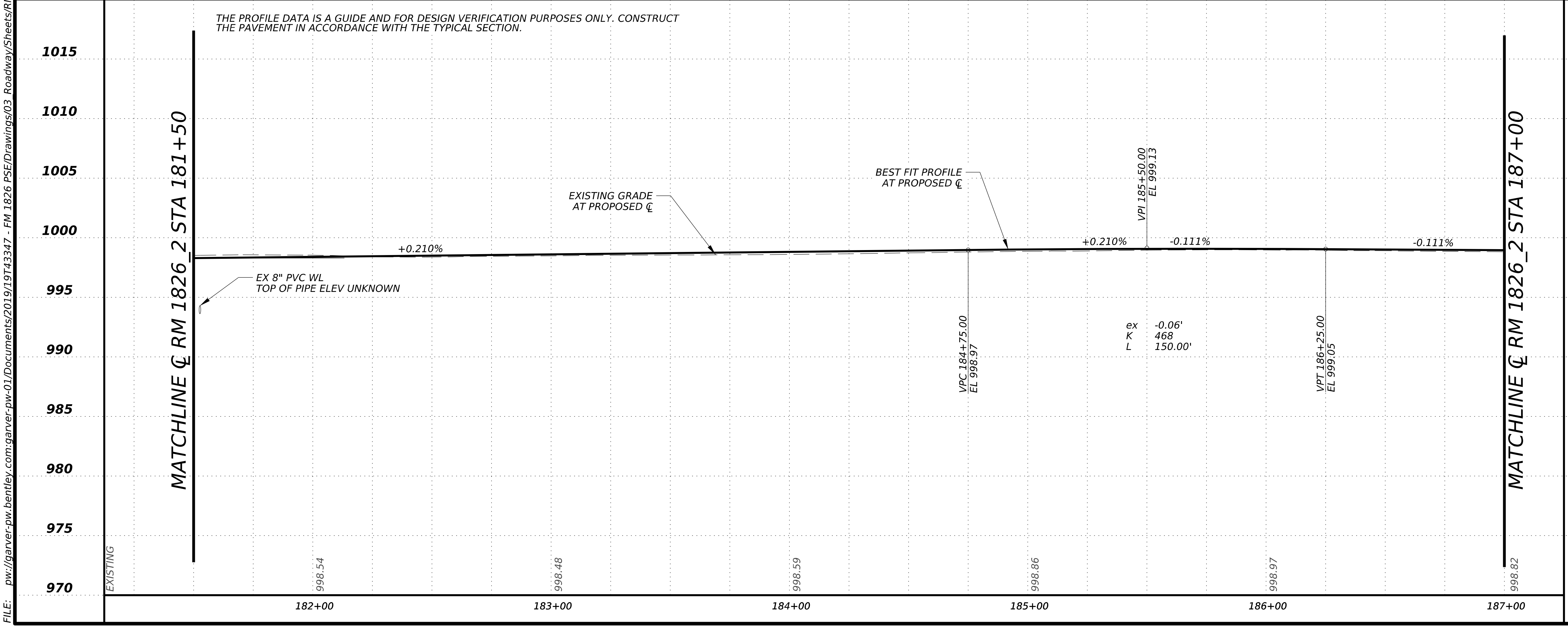
* MATCH EXISTING CROSS SLOPE



25' 0 25' 50'
HORZ. SCALE 1"=50'

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RM 1826

PLAN AND PROFILE
ZYLE RD

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	77

DATE: 5/30/2023 5:01:23 PM
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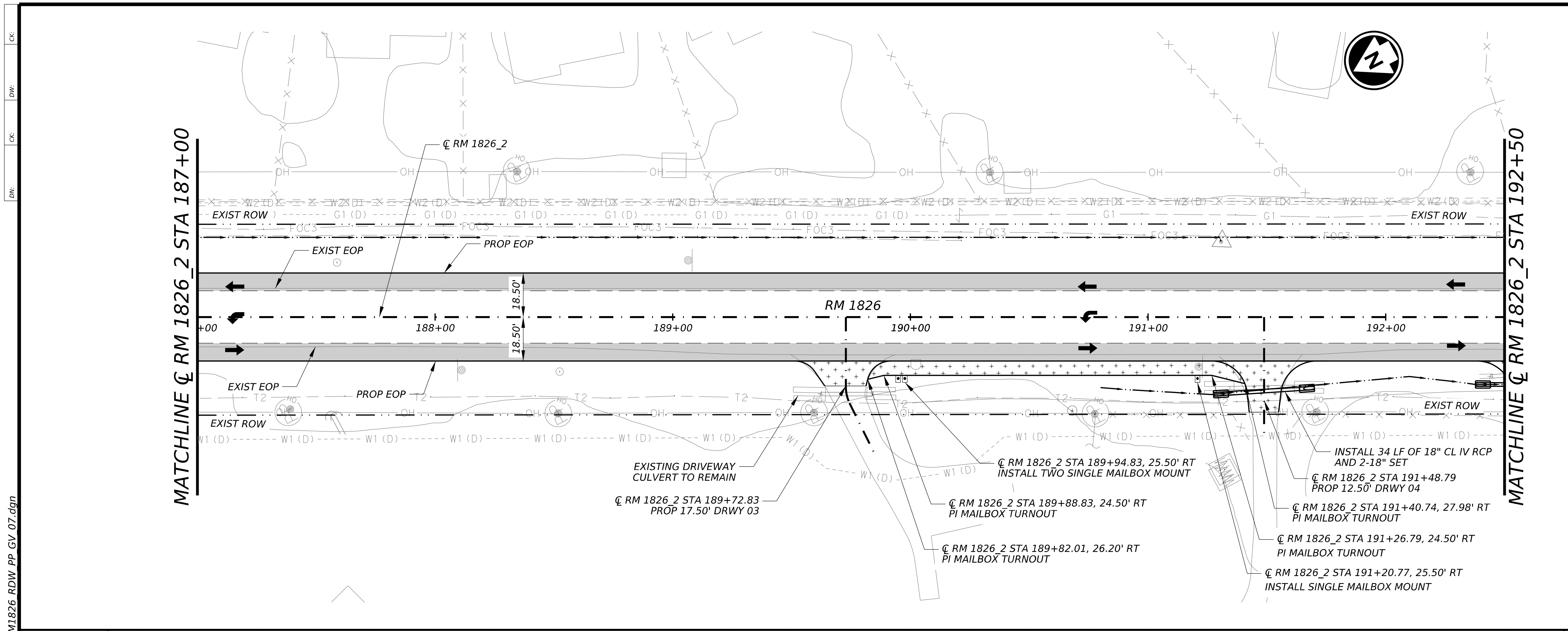

LEGEND

▨	PROPOSED PAVEMENT
⁖	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
∼→	FLOW ARROW

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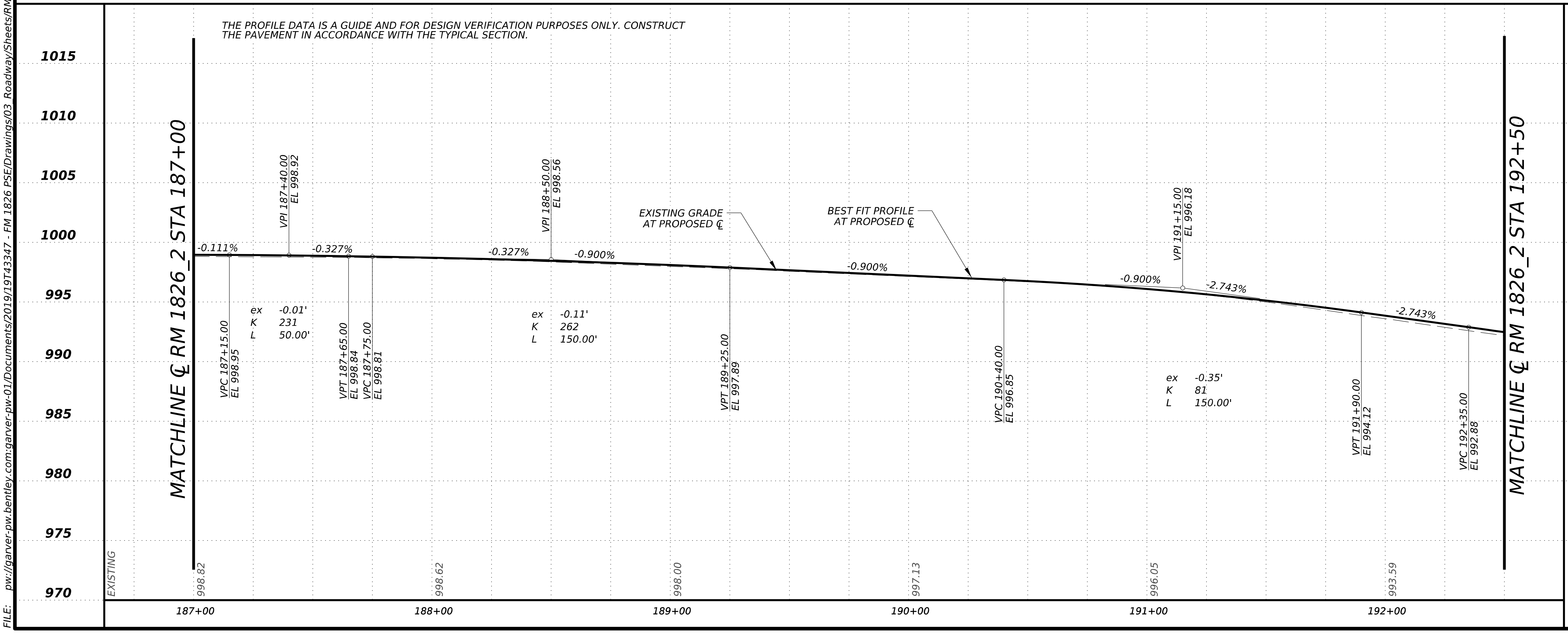

25' 0 25' 50'
HORZ. SCALE 1"=50'

5' 0 5' 10'
VERT. SCALE 1"=10'

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5/30/2023
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PLAN AND PROFILE
ZYLE RD

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	78

DATE: 5/30/2023 4:51:58 PM
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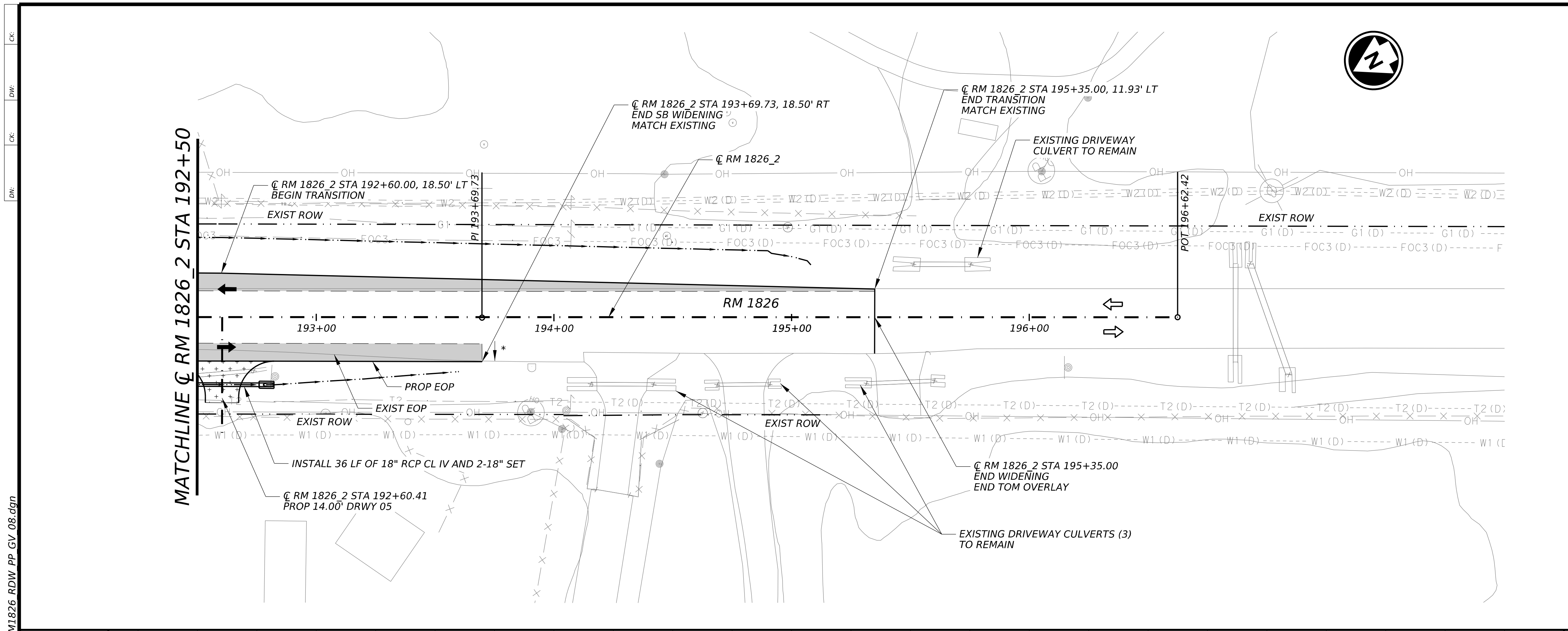

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸·—·	PROPOSED DITCH
—··—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
∼▸	FLOW ARROW

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*MATCH EXISTING CROSS SLOPE

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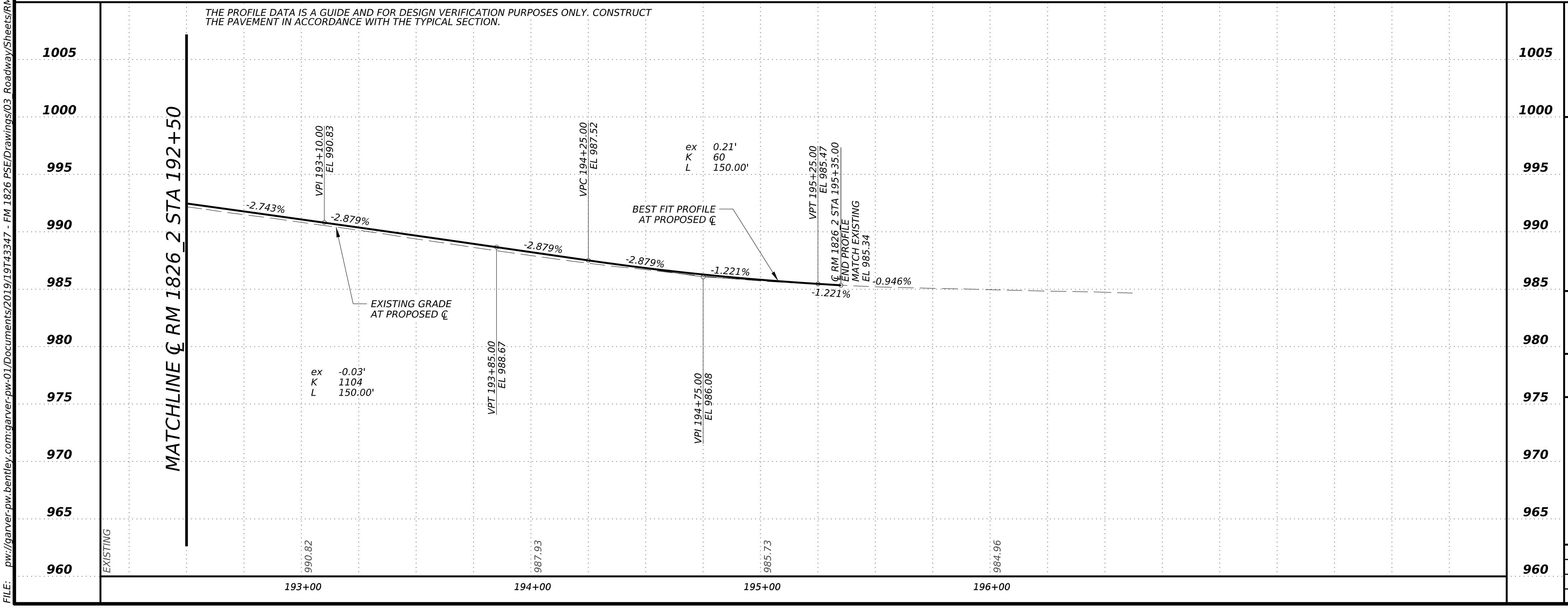

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HORZ. SCALE 1"=50'

5' 0 5' 10'
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PLAN AND PROFILE
ZYLE RD

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	79

DATE: 5/30/2023 4:52:10 PM
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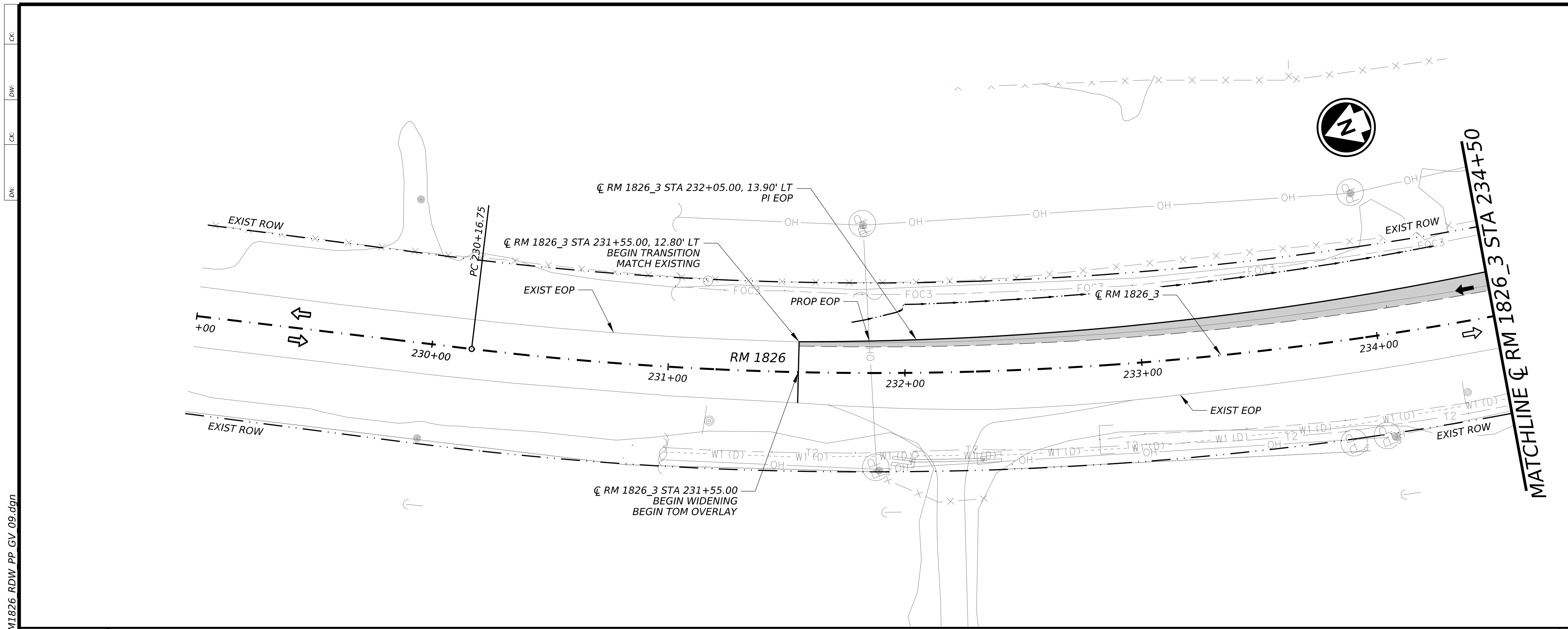

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—→—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
～→	FLOW ARROW

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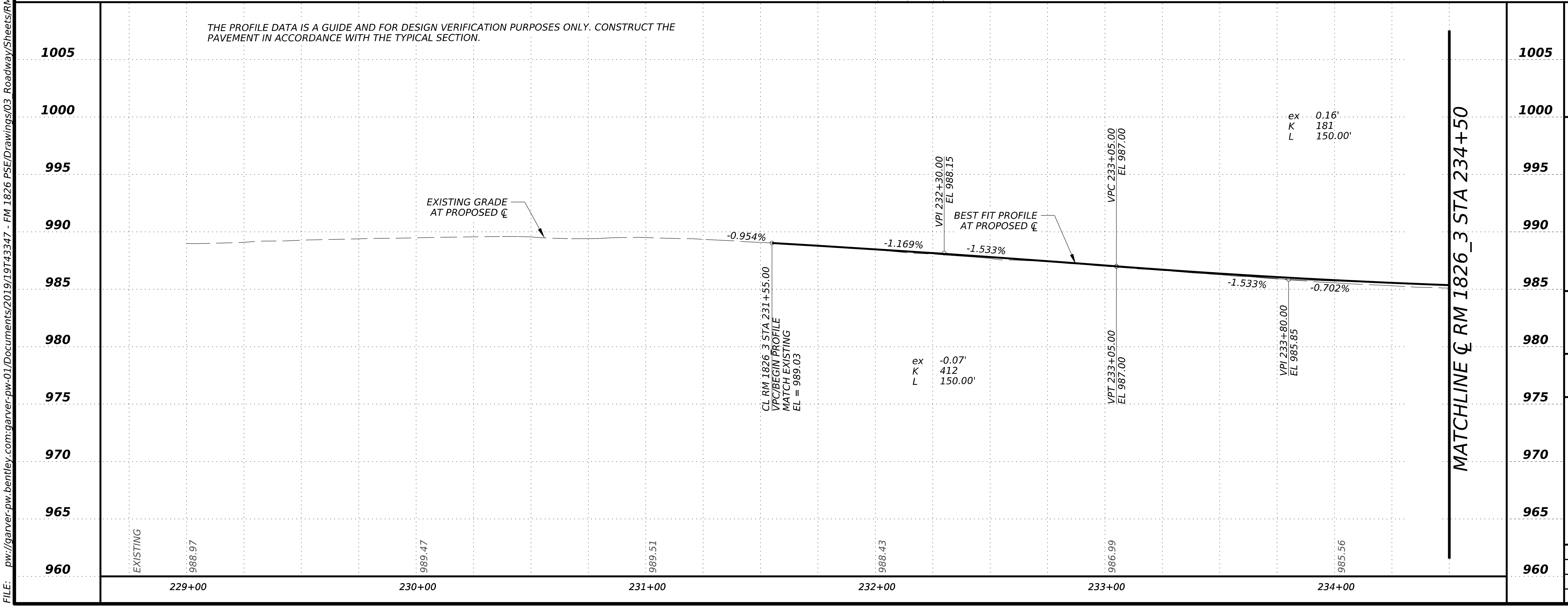

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PLAN AND PROFILE
APPALOOSA RUN

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	80

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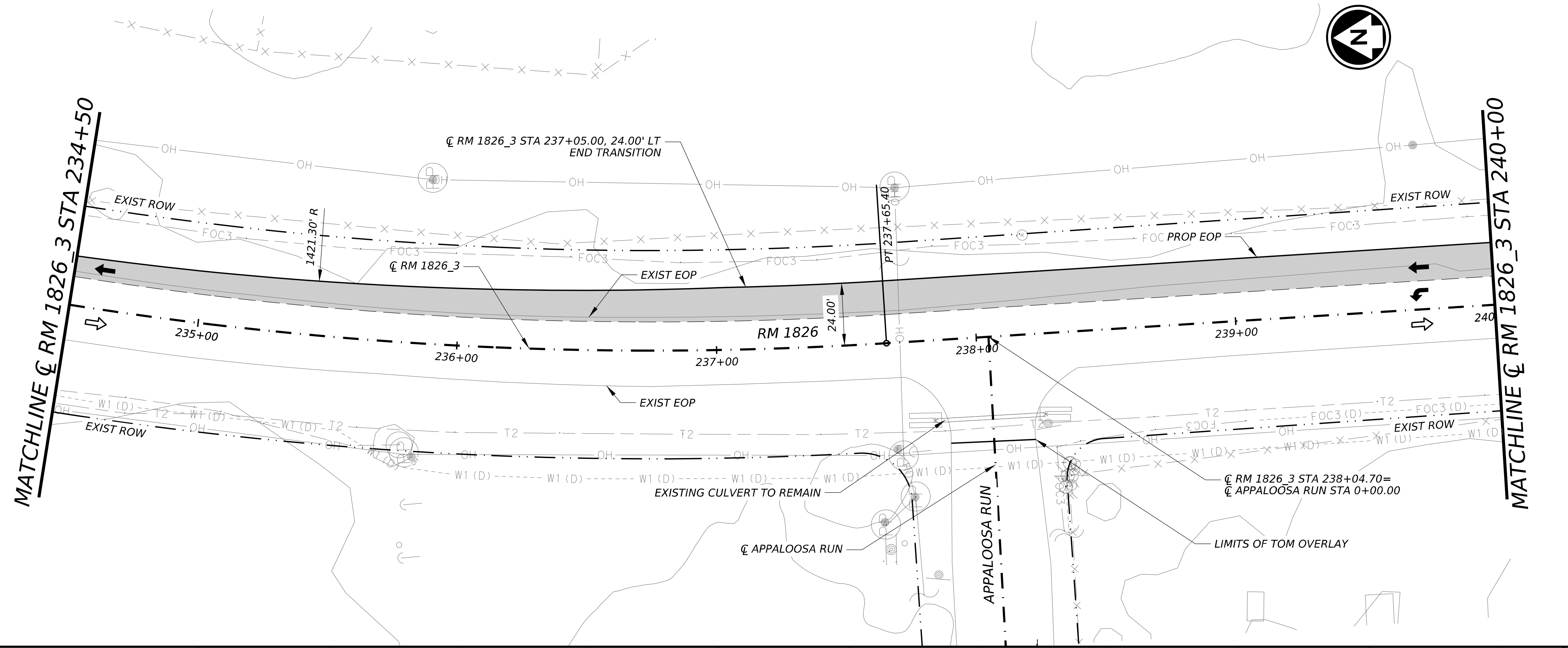

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—·—	PROPOSED DITCH
—··—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

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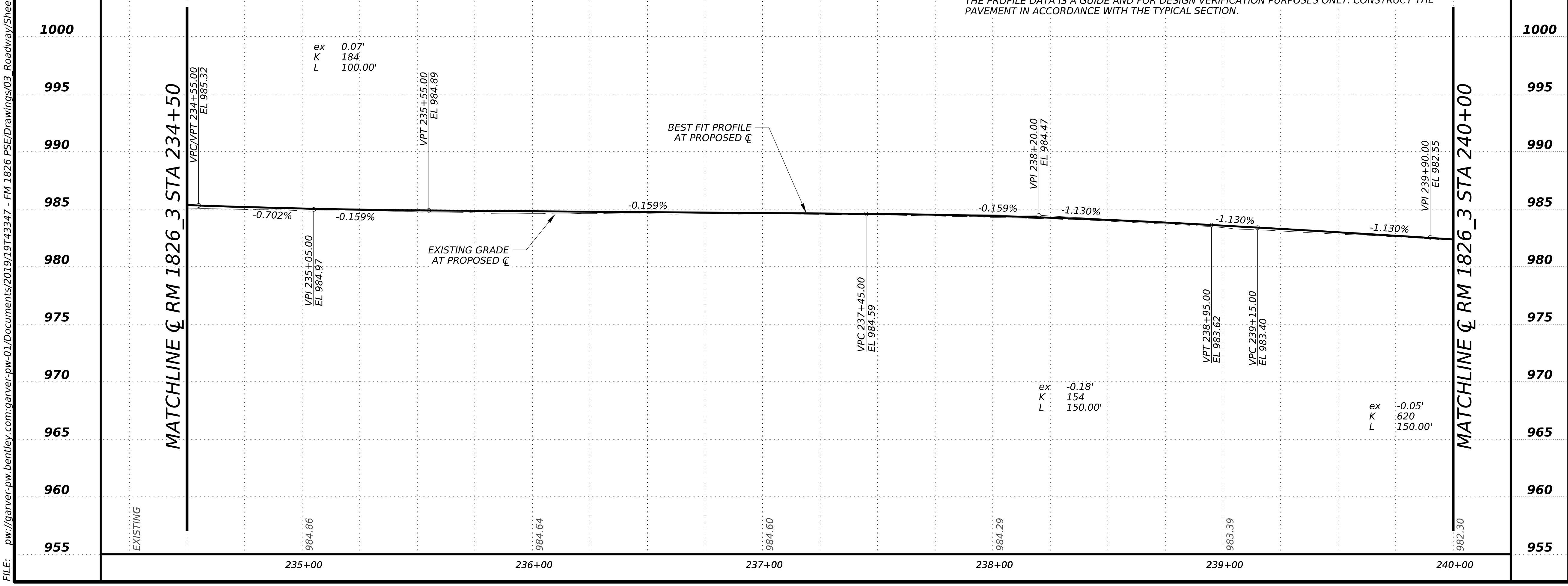

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PLAN AND PROFILE
APPALOOSA RUN

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	81

DATE: 5/30/2023 4:52:38 PM
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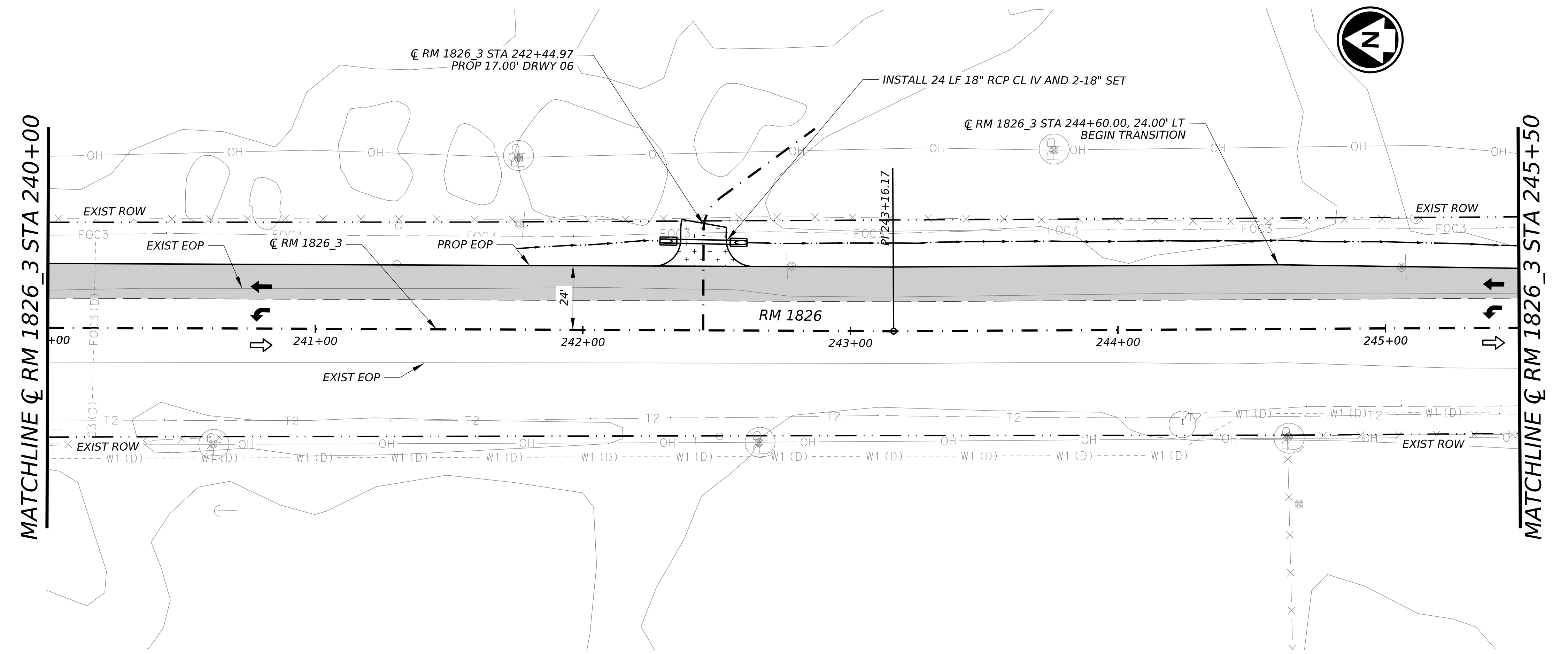

LEGEND

▨	PROPOSED PAVEMENT
+ + +	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – – –	DRAINAGE EASEMENT
~▸	FLOW ARROW

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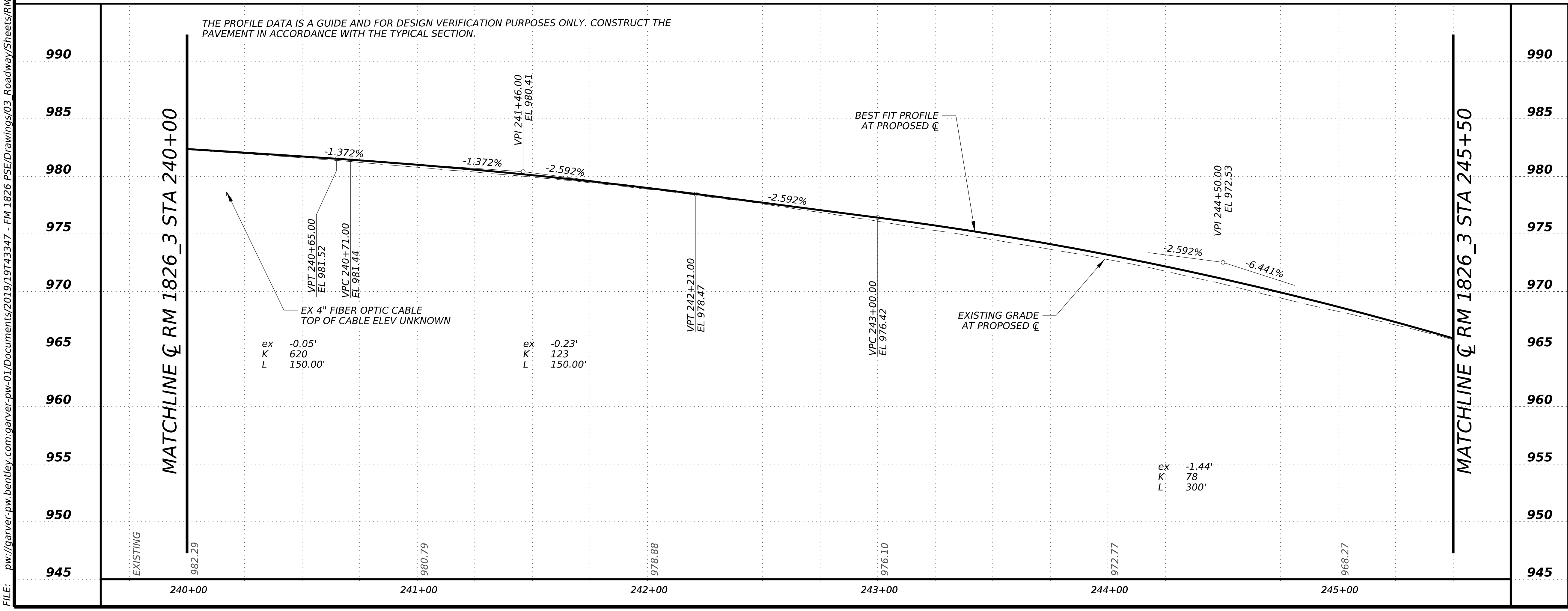

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PLAN AND PROFILE
APPALOOSA RUN

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		82

DATE: 5/30/2023 4:52:50 PM
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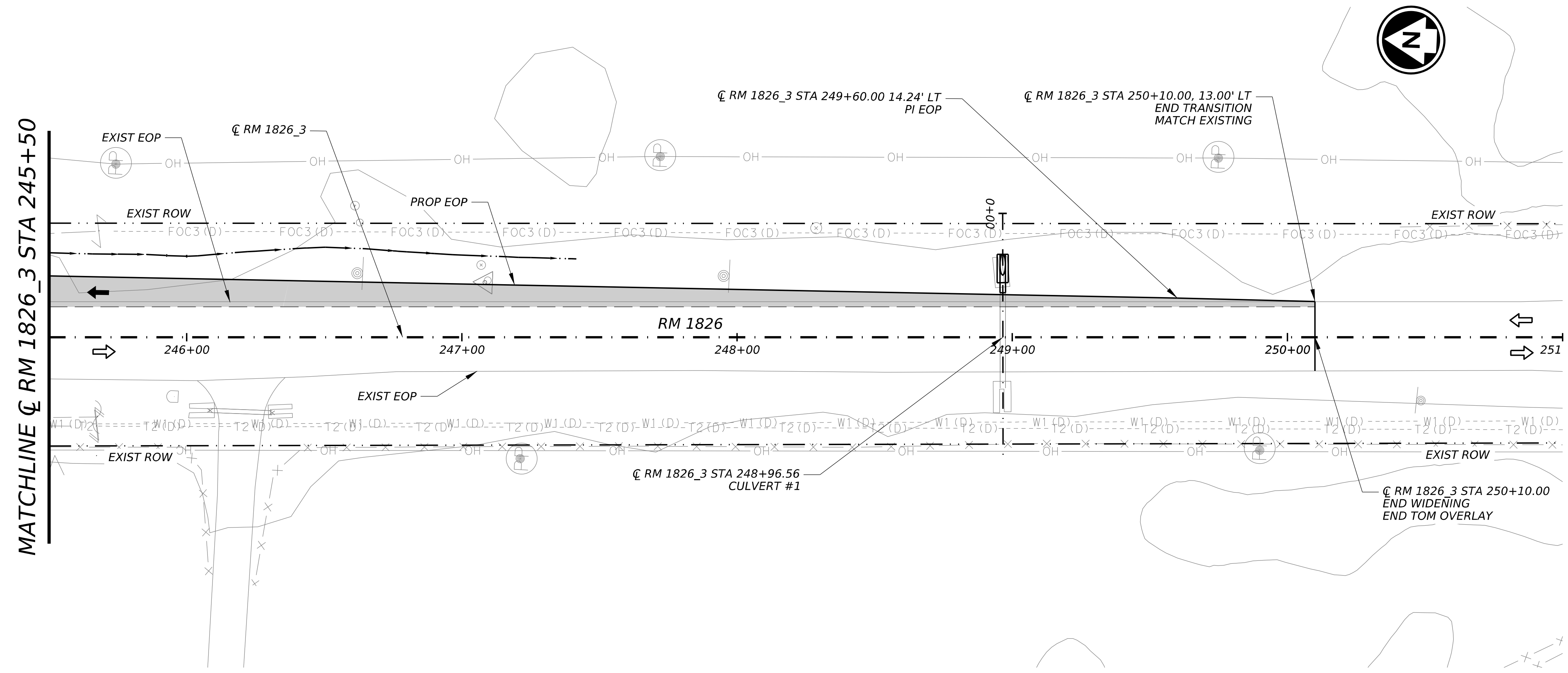

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
→·—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — — —	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.

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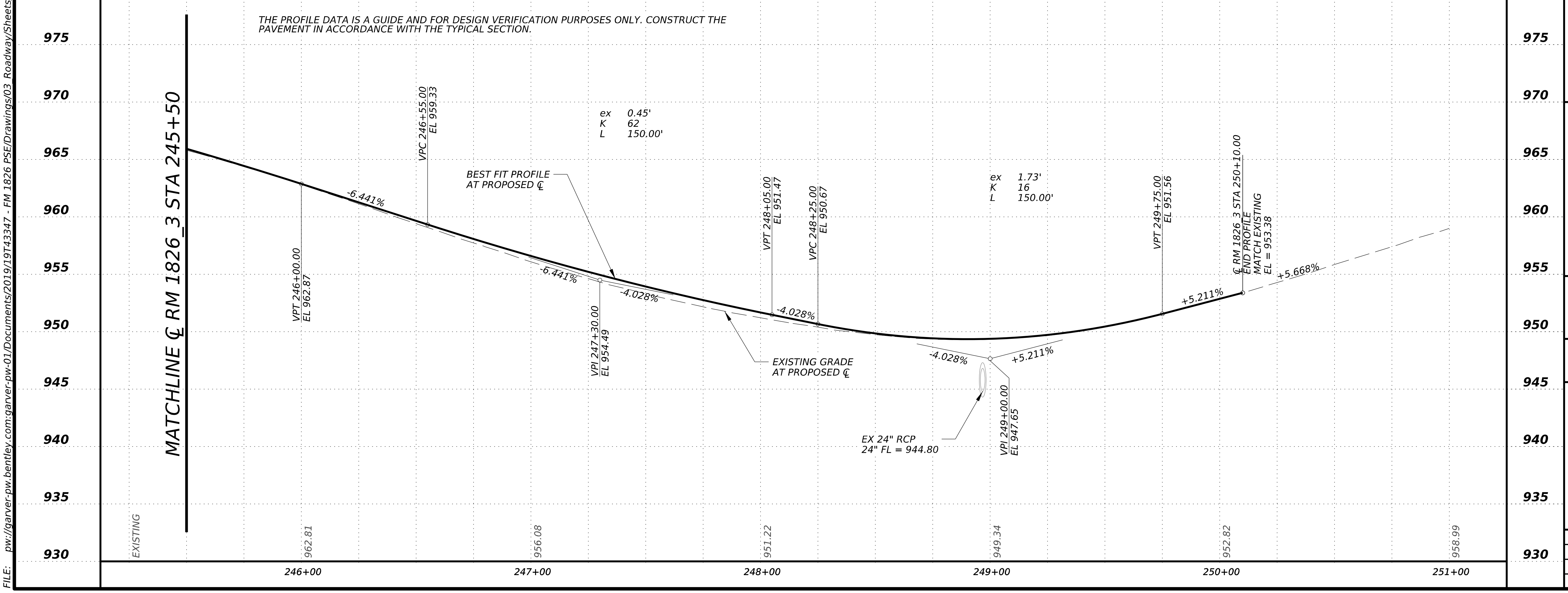

25' 0 25' 50'
HORZ. SCALE 1"=50'

5' 0 5' 10'
VERT. SCALE 1"=10'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023
Alfredo Lopez

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(972) 377-7480
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RM 1826

PLAN AND PROFILE
APPALOOSA RUN

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	83

DATE: 5/30/2023 4:53:03 PM
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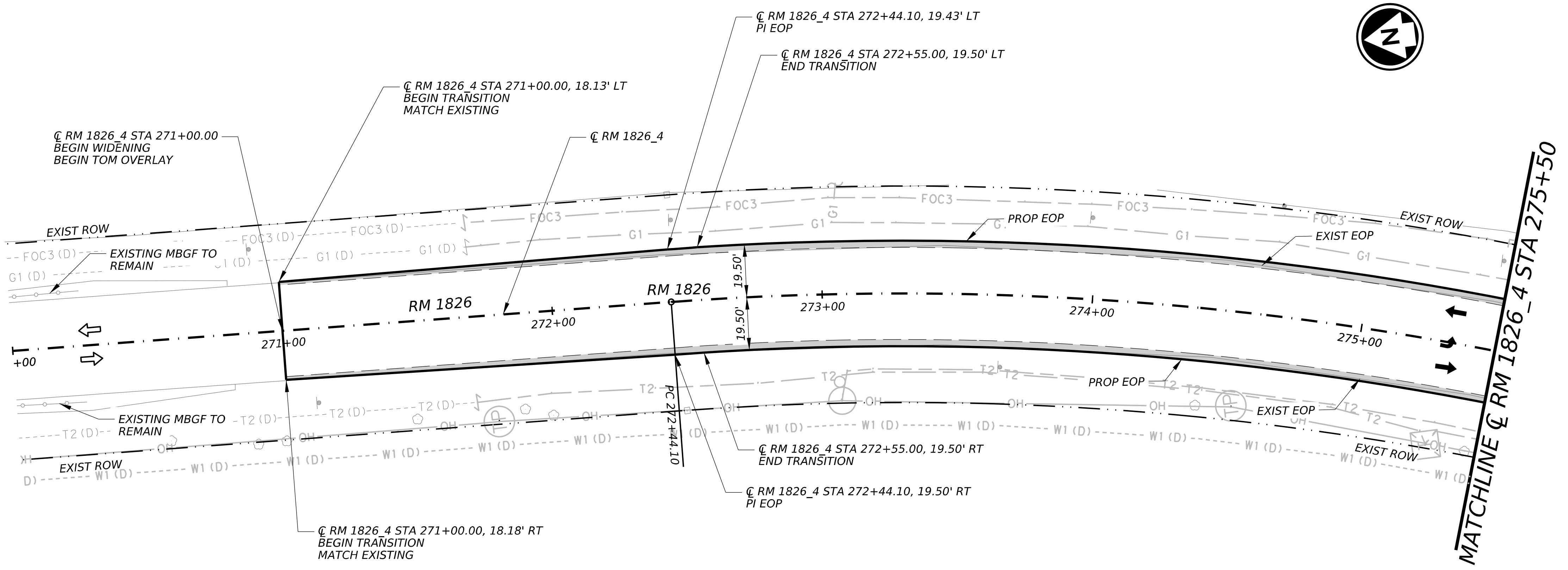

LEGEND

▨ PROPOSED PAVEMENT
▨ PROPOSED DRIVEWAY / MB TURNOUT
— — SAWCUT LINE
→·— PROPOSED DITCH
—·· — EXISTING ROW
o o o o o PROPOSED METAL BEAM GUARD FENCE
⇦ EXISTING DIRECTION OF TRAFFIC
⬅ PROPOSED DIRECTION OF TRAFFIC
×—×—× FENCE LINE
- - - - DRAINAGE EASEMENT
~→ FLOW ARROW

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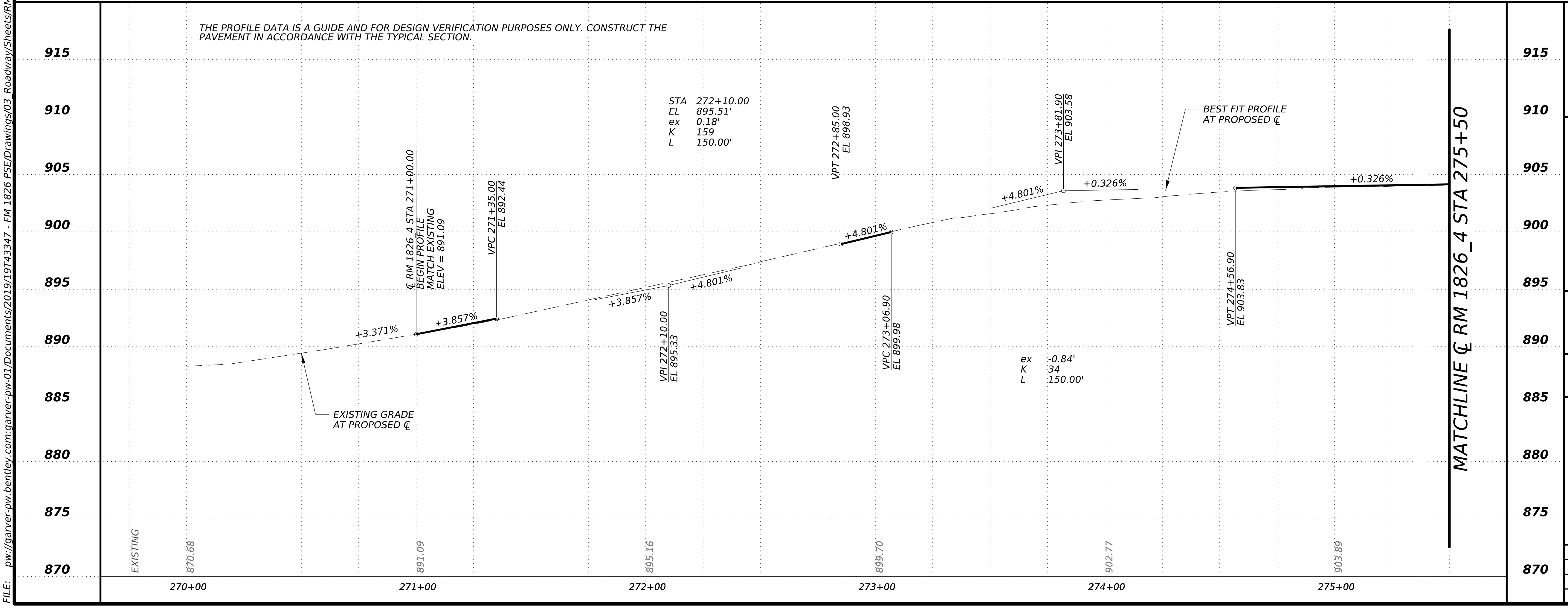

25' 0 25' 50'
HORZ. SCALE 1"=50'
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RM 1826

PLAN AND PROFILE
OSO CREEK RD

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		84

DATE: 5/30/2023 4:53:18 PM
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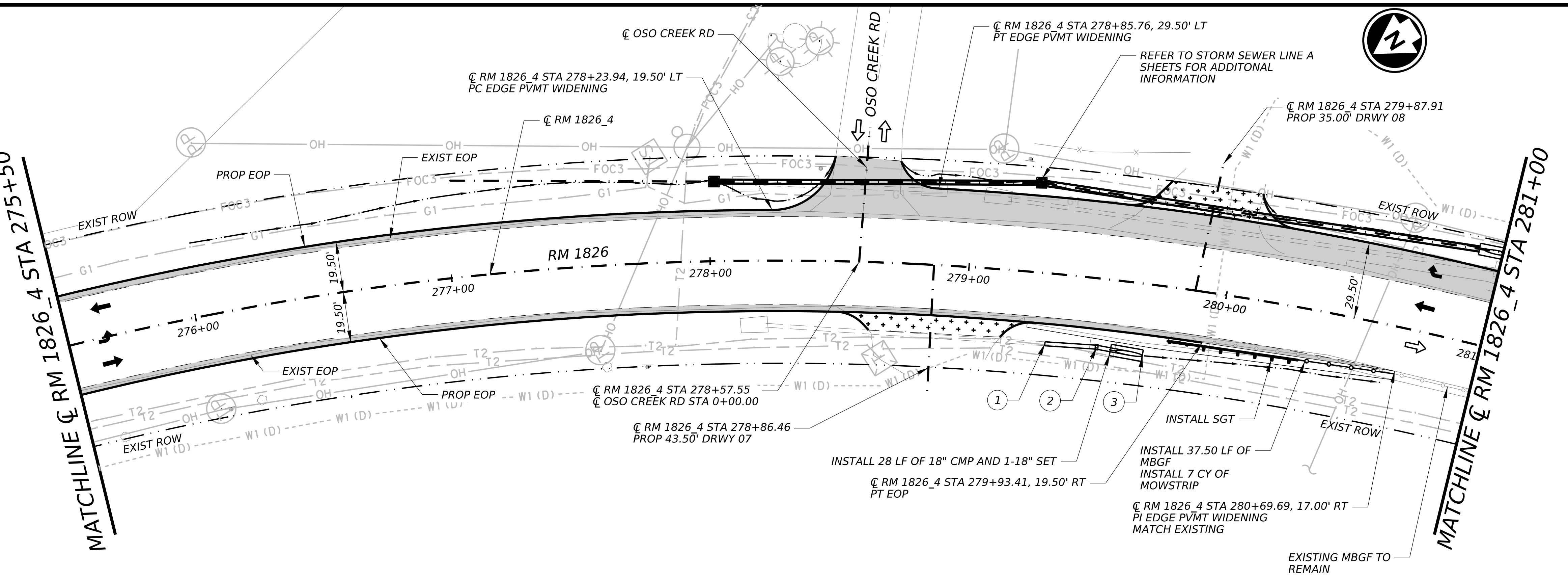

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
∼→	FLOW ARROW

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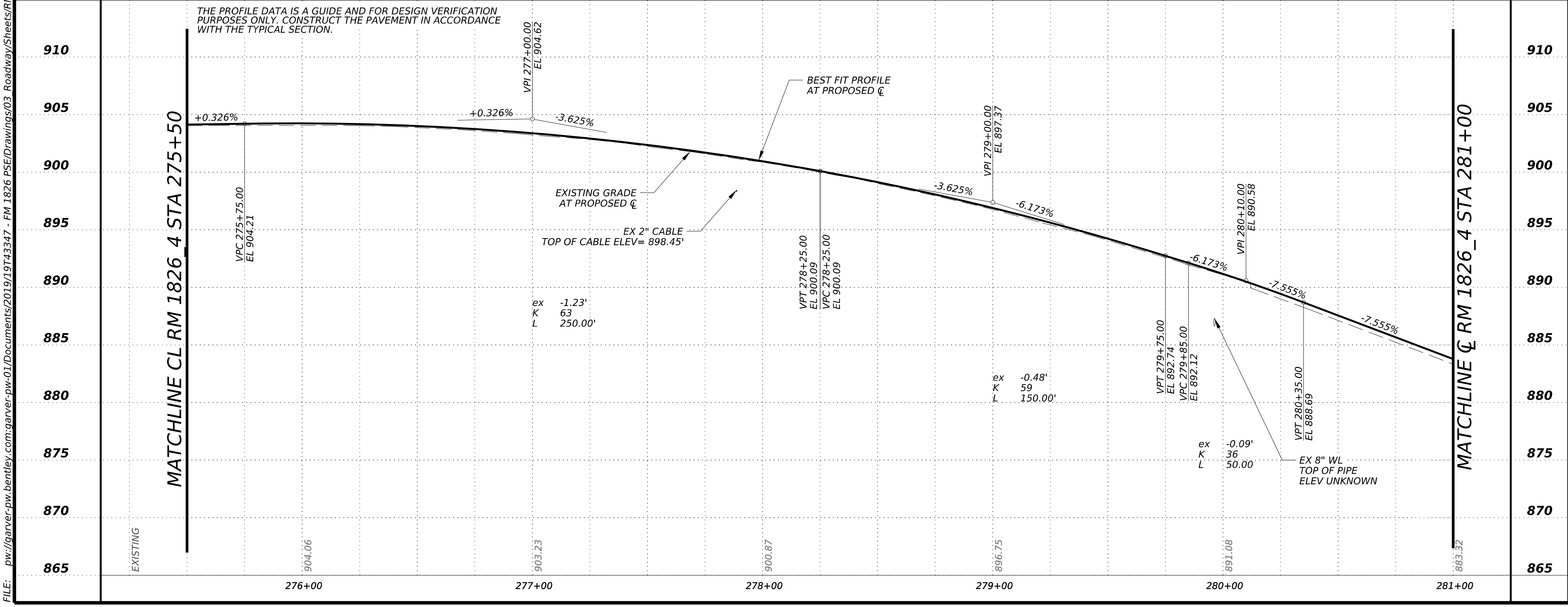
PT	CL	STATION	OFFSET	DESCRIPTION	ELEVATION
1	RM 1826_4	279+31.91	27.21' RT	BEGIN CMP, MATCH EXIST	891.45
2	RM 1826_4	279+52.38	26.50' RT	PI CMP	890.54
3	RM 1826_4	279+70.73	27.70' RT	OUTFALL CMP	889.71



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RM 1826

PLAN AND PROFILE
OSO CREEK RD

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	85

DATE: 5/30/2023 4:53:31 PM
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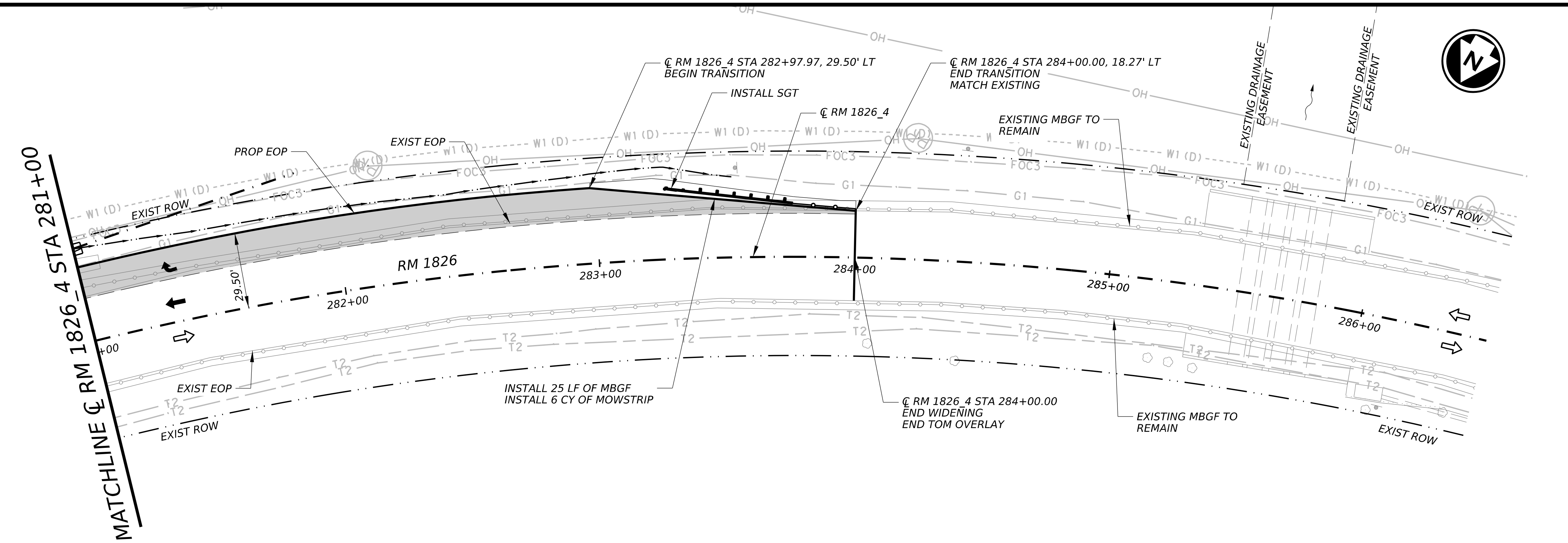

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
∿→	FLOW ARROW

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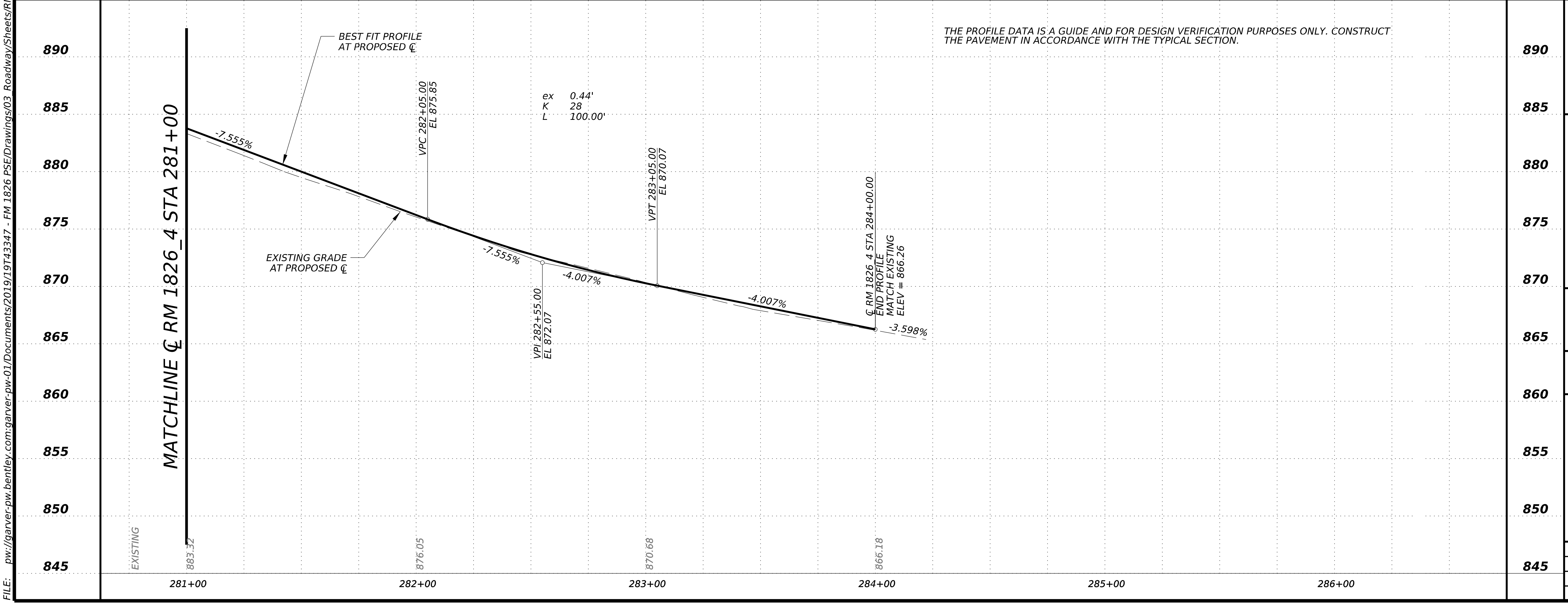

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PLAN AND PROFILE
OSO CREEK RD

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	86

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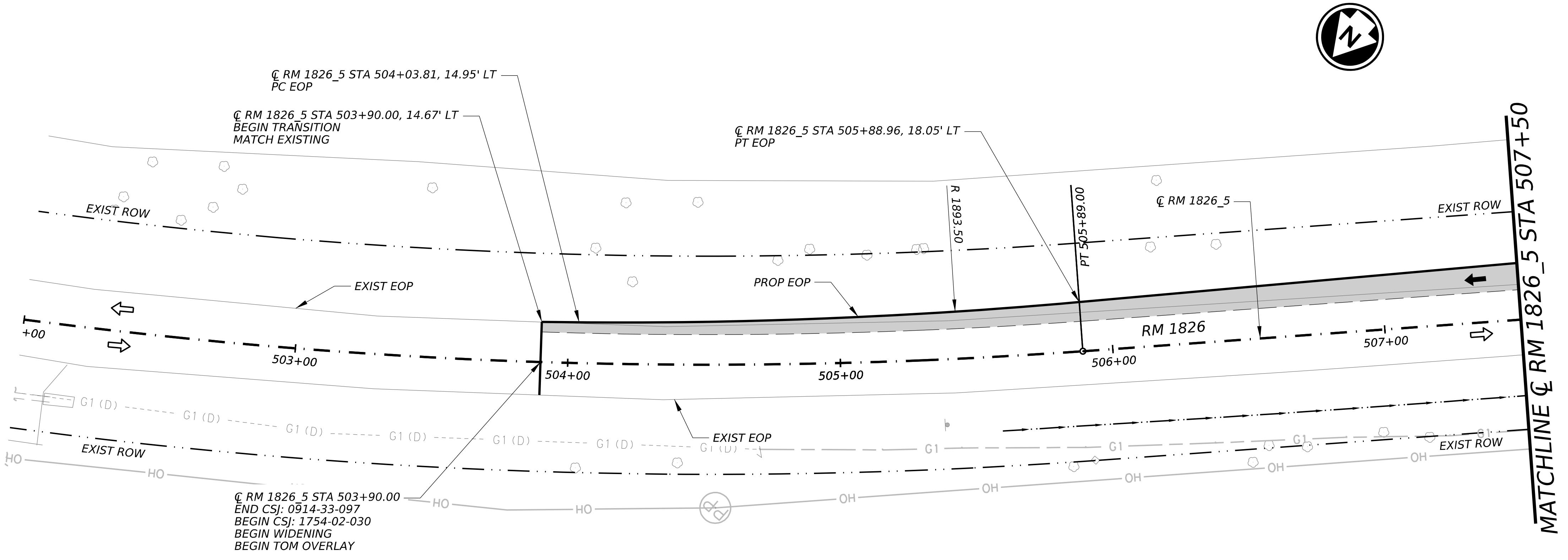

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
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∼→	FLOW ARROW

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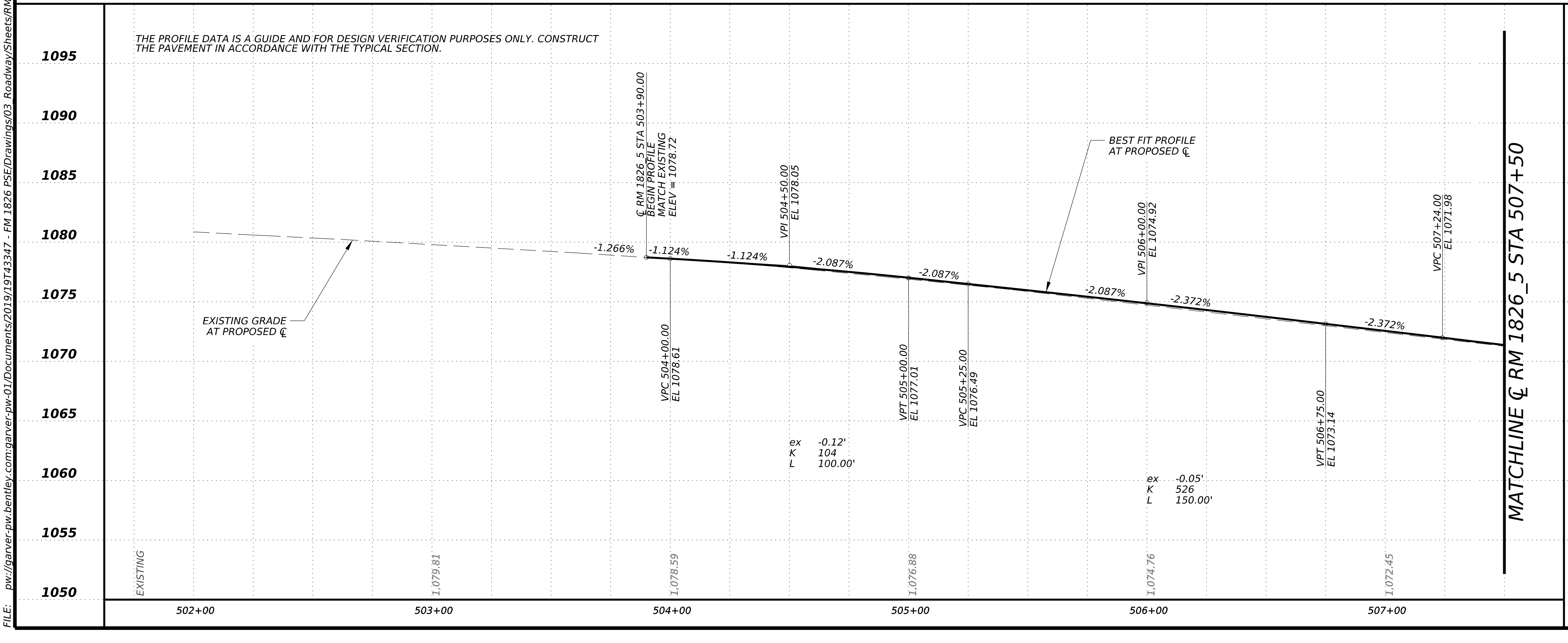

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RM 1826

PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	87

DATE: 5/30/2023 4:53:56 PM
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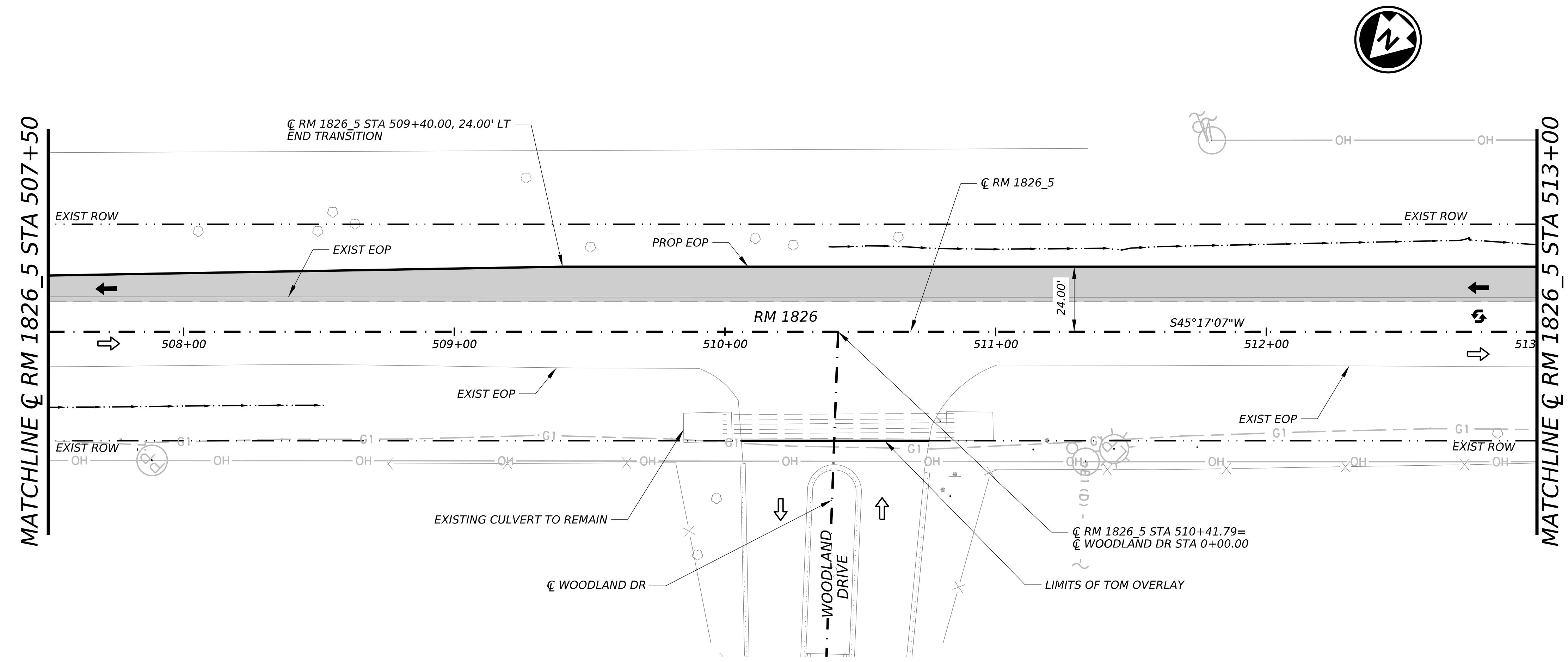

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
~→	FLOW ARROW

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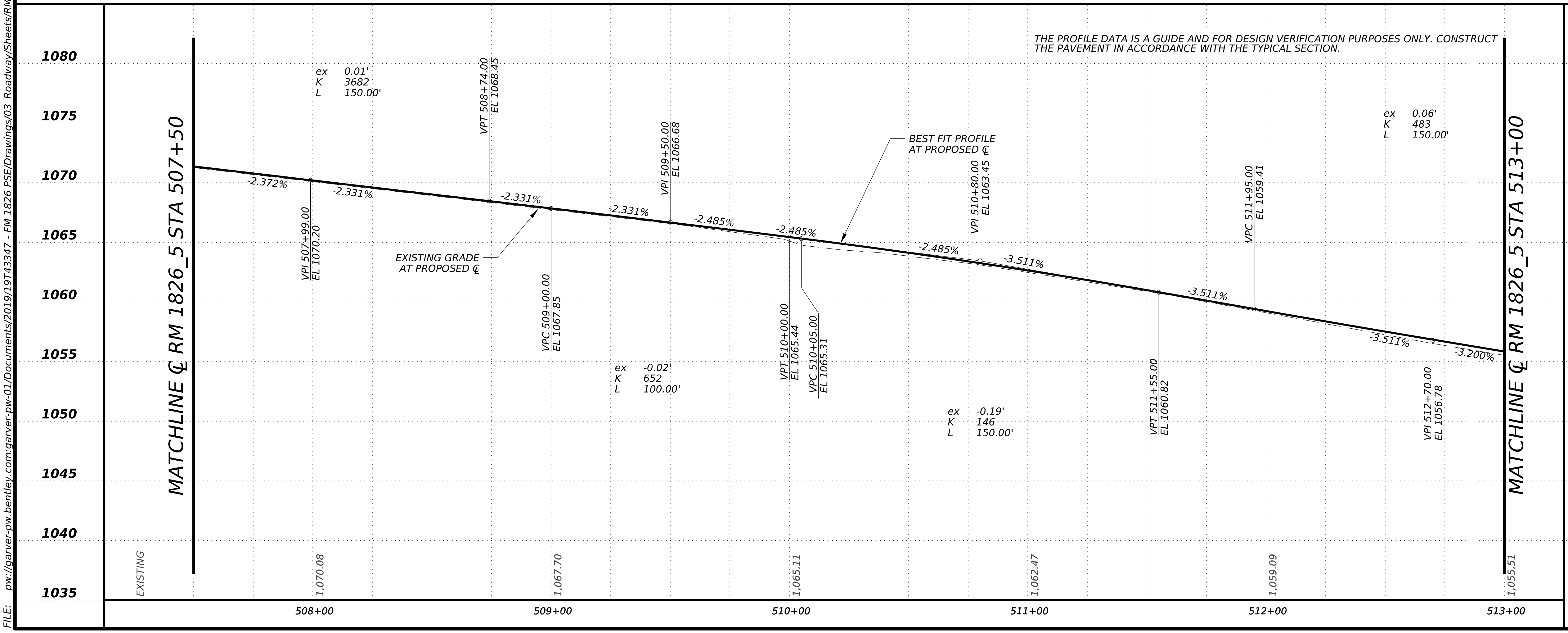

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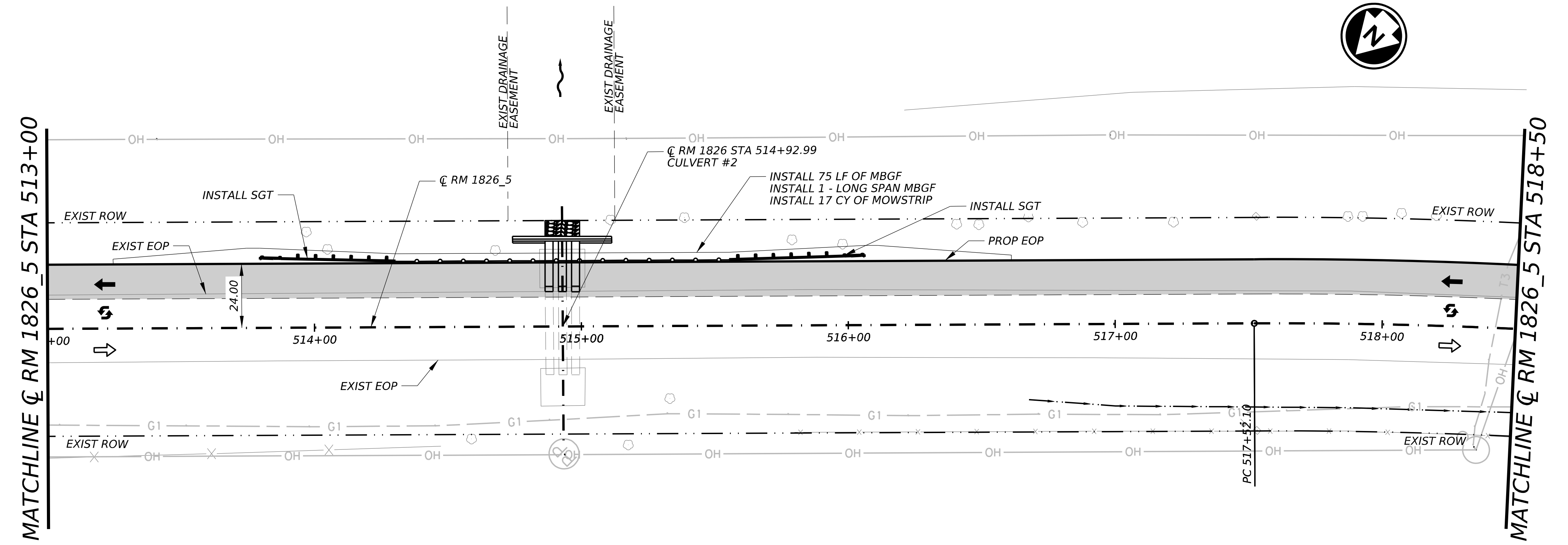
PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	88



LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·–·–	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
∼→	FLOW ARROW

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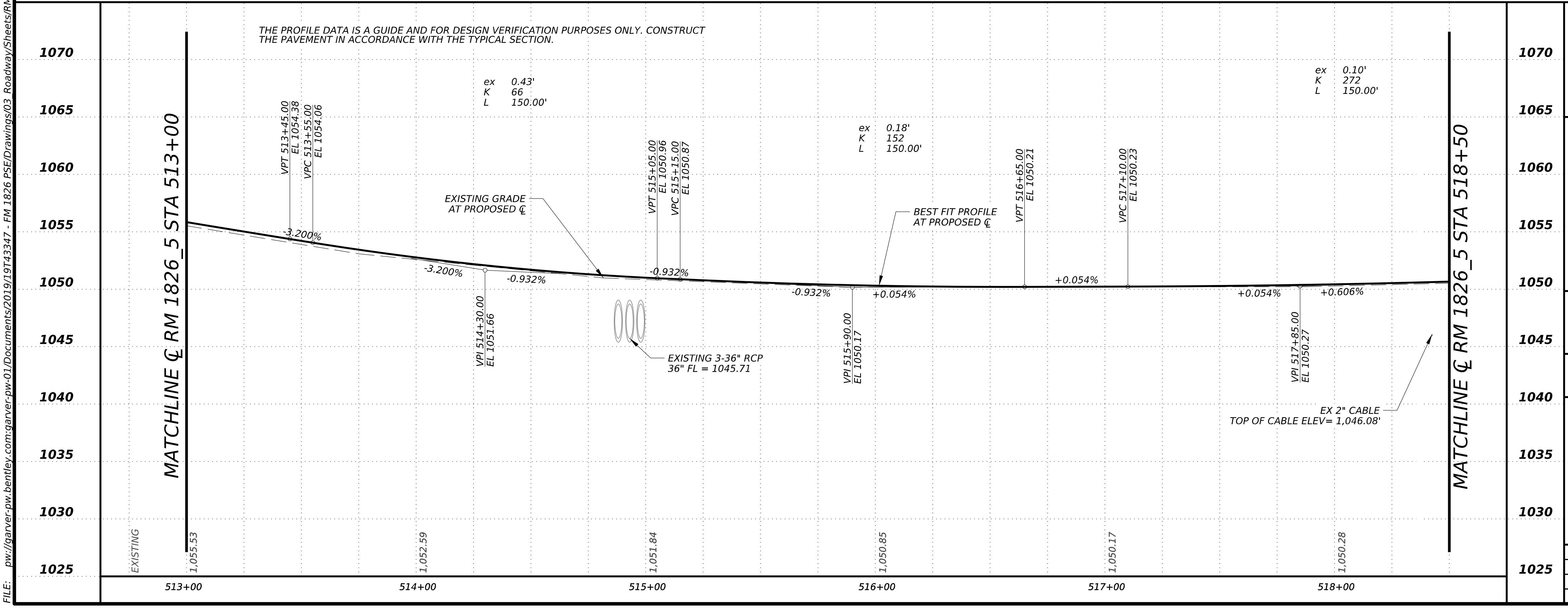
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25' 0 25' 50'
HORZ. SCALE 1"=50'
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PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		89

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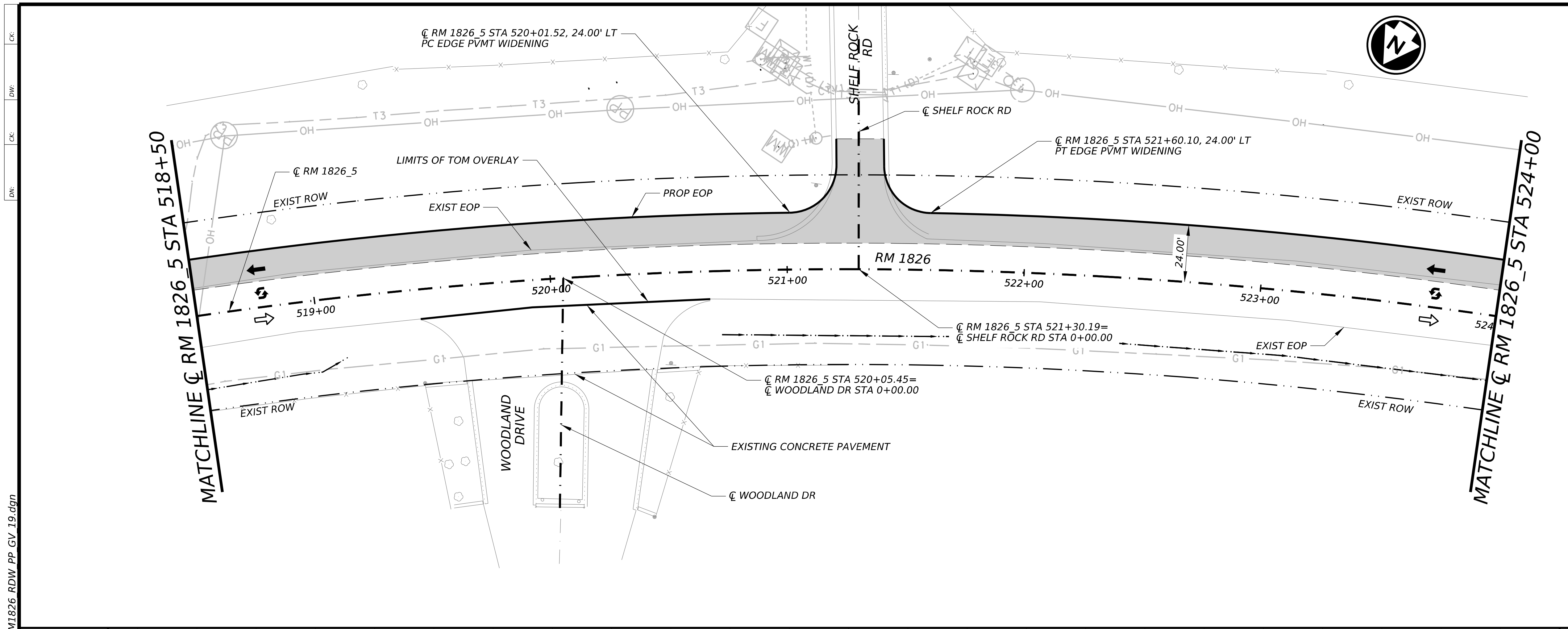

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW

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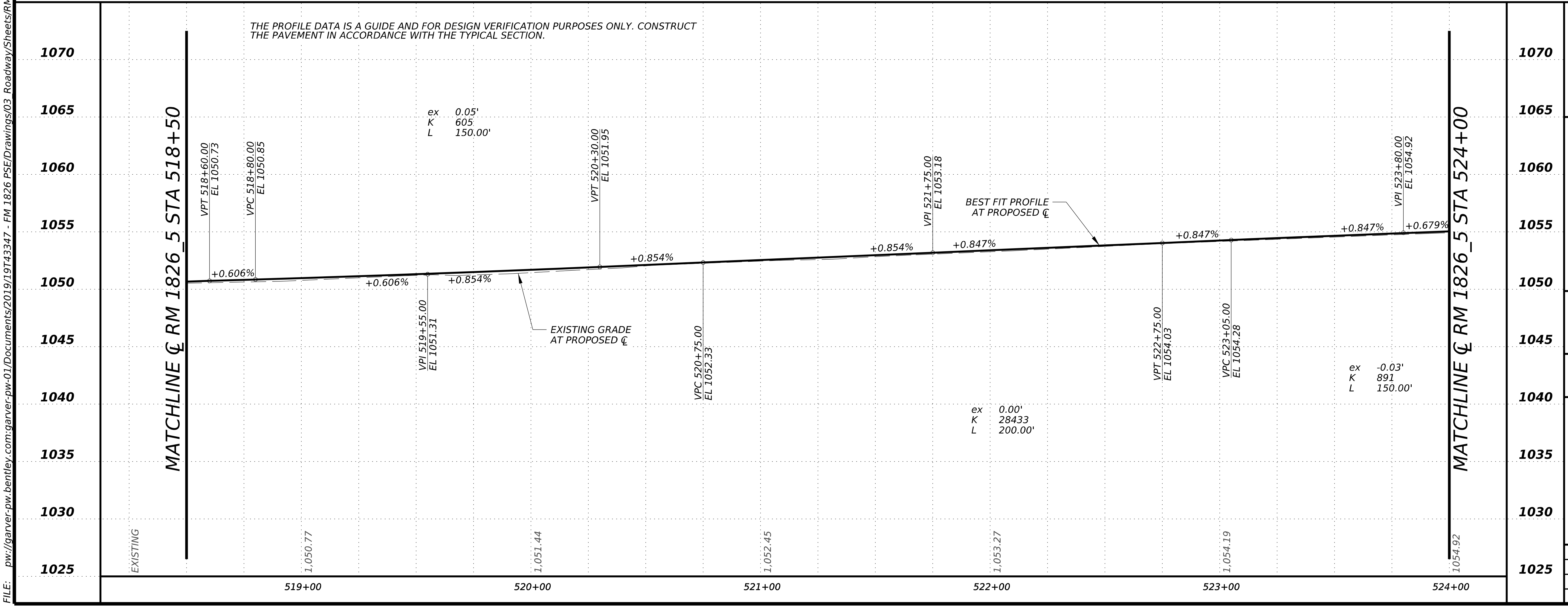

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PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 4 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		90

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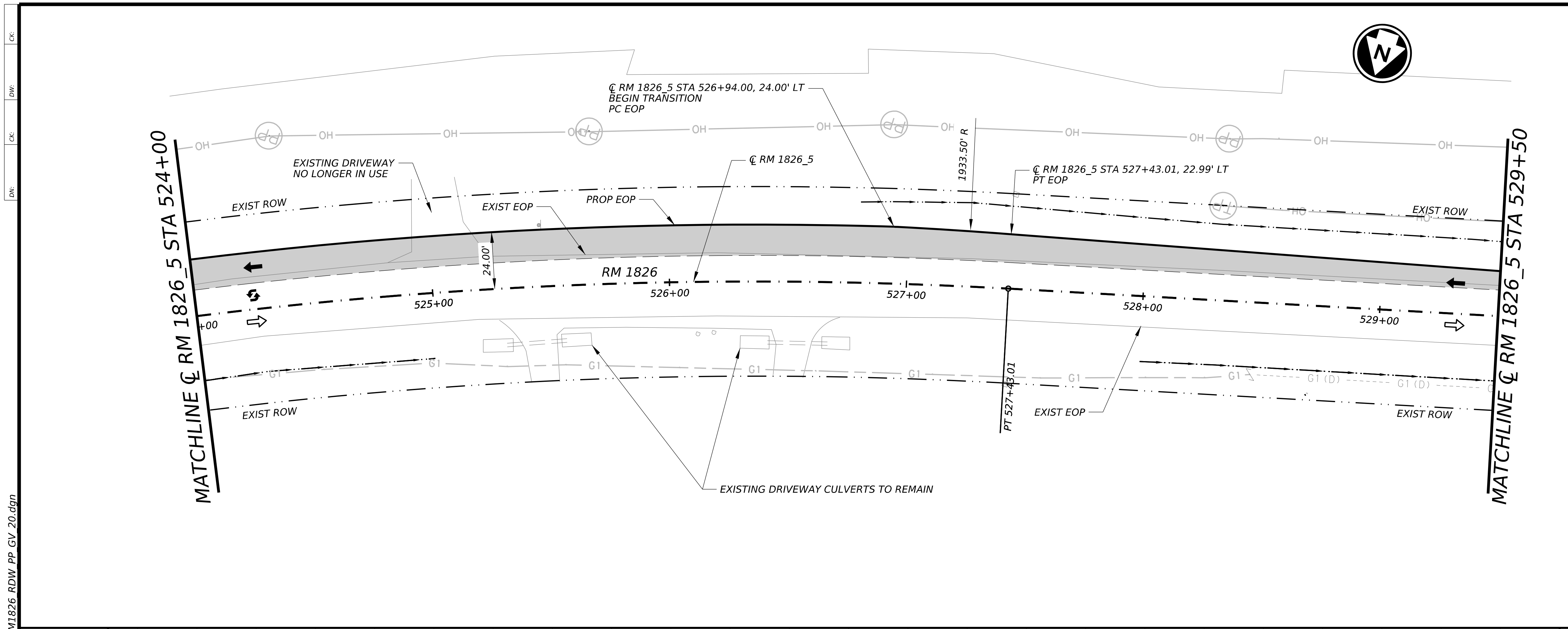

LEGEND

▨ PROPOSED PAVEMENT
▨ PROPOSED DRIVEWAY / MB TURNOUT
— — SAWCUT LINE
—▸-·- PROPOSED DITCH
— · — EXISTING ROW
○○○○○ PROPOSED METAL BEAM GUARD FENCE
⇦ EXISTING DIRECTION OF TRAFFIC
⬅ PROPOSED DIRECTION OF TRAFFIC
×—×—× FENCE LINE
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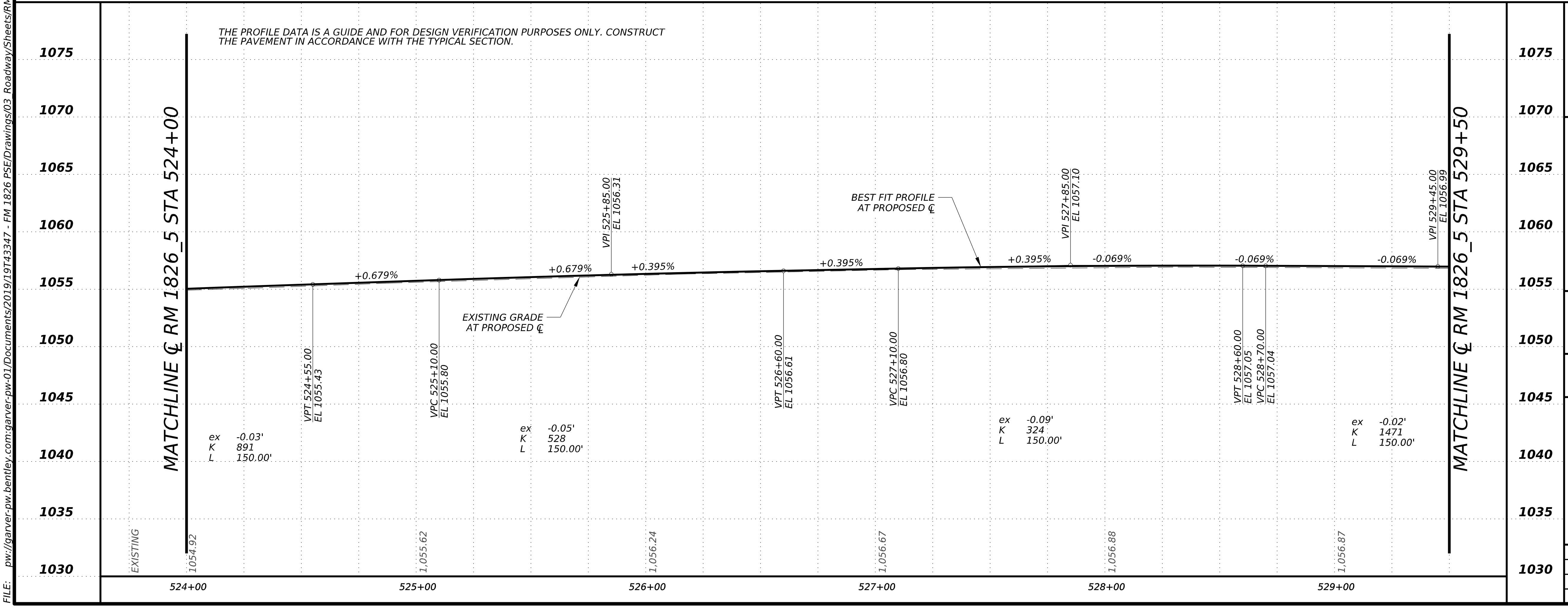

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PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		91

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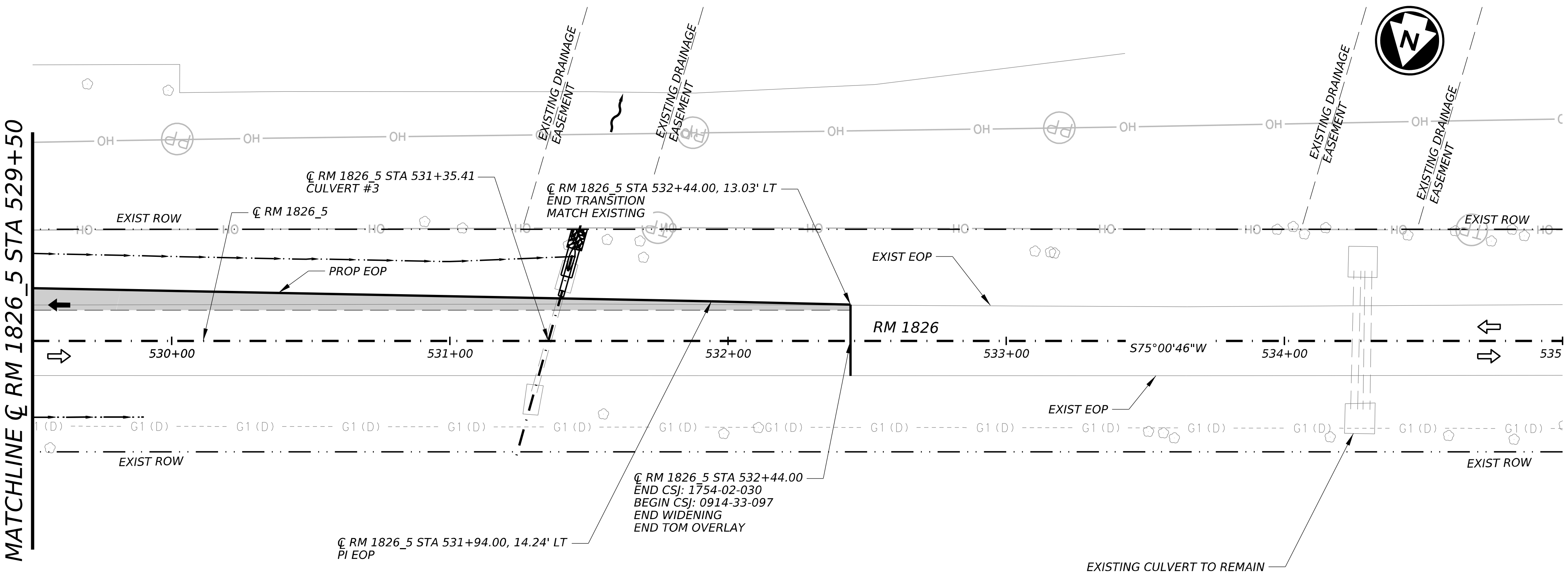

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—▸·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
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×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
∼→	FLOW ARROW

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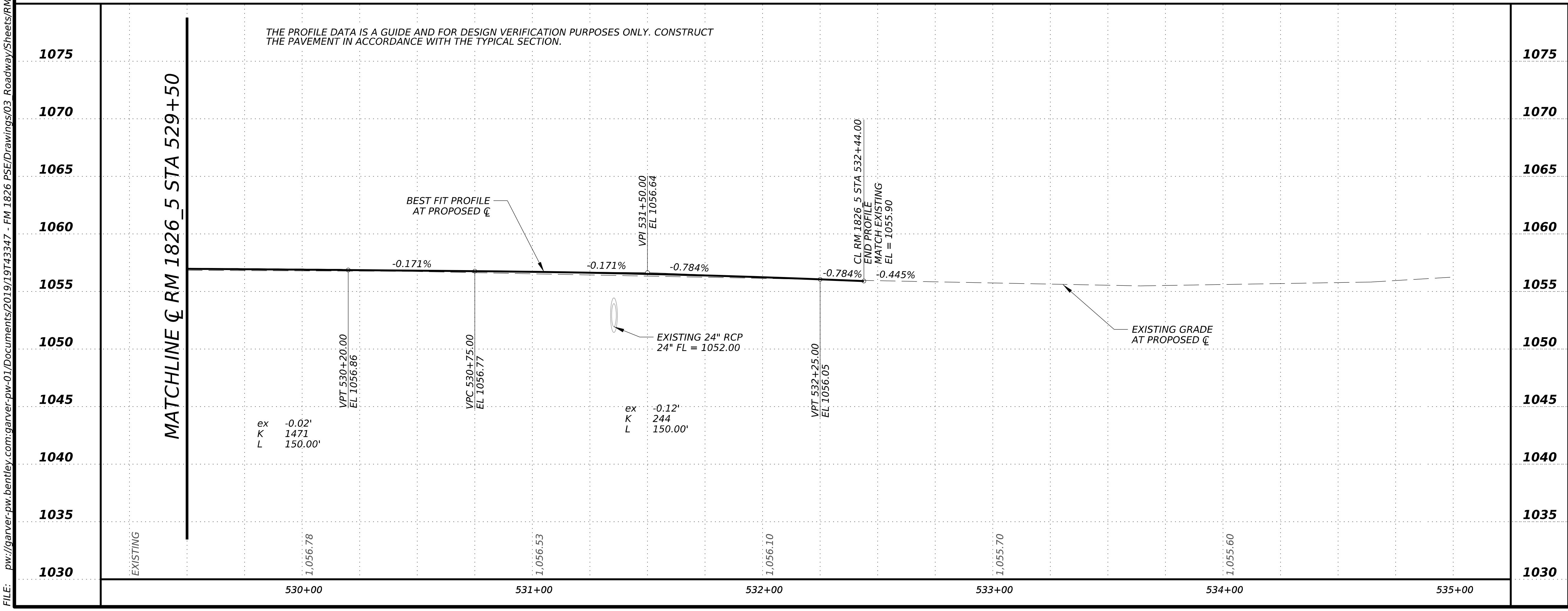

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PLAN AND PROFILE
WOODLAND DR/
SHELF ROCK RD

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	92

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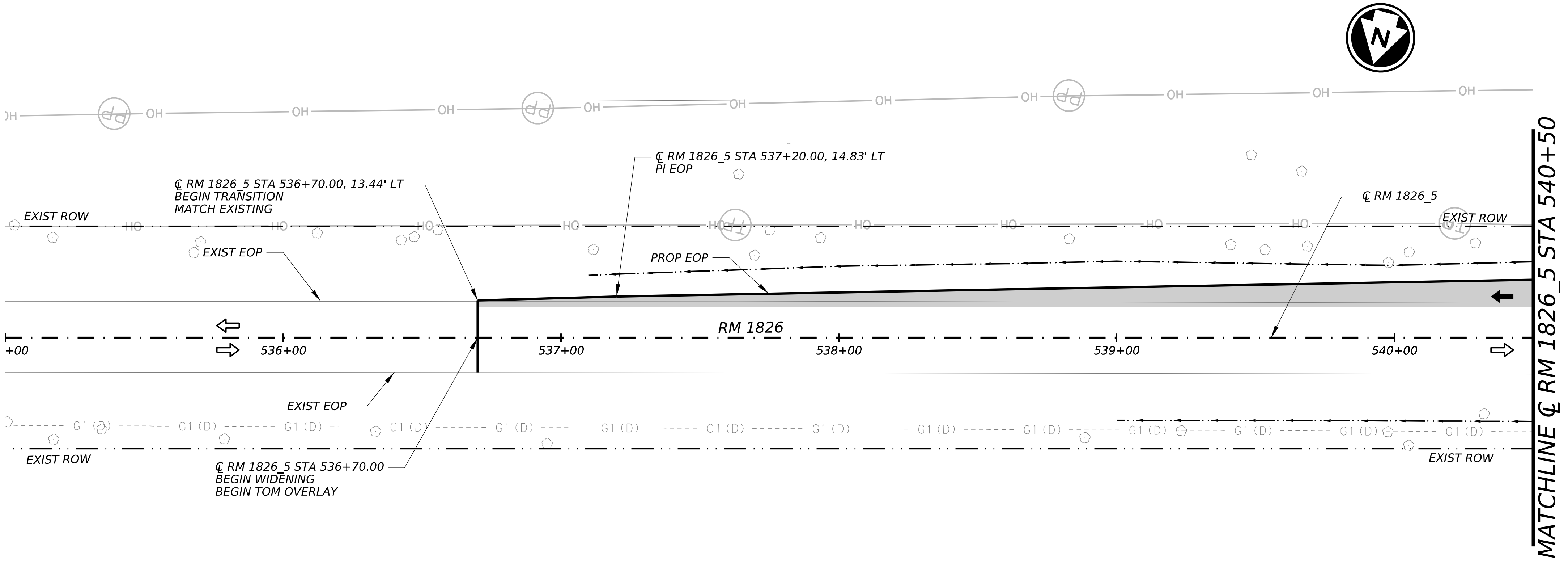
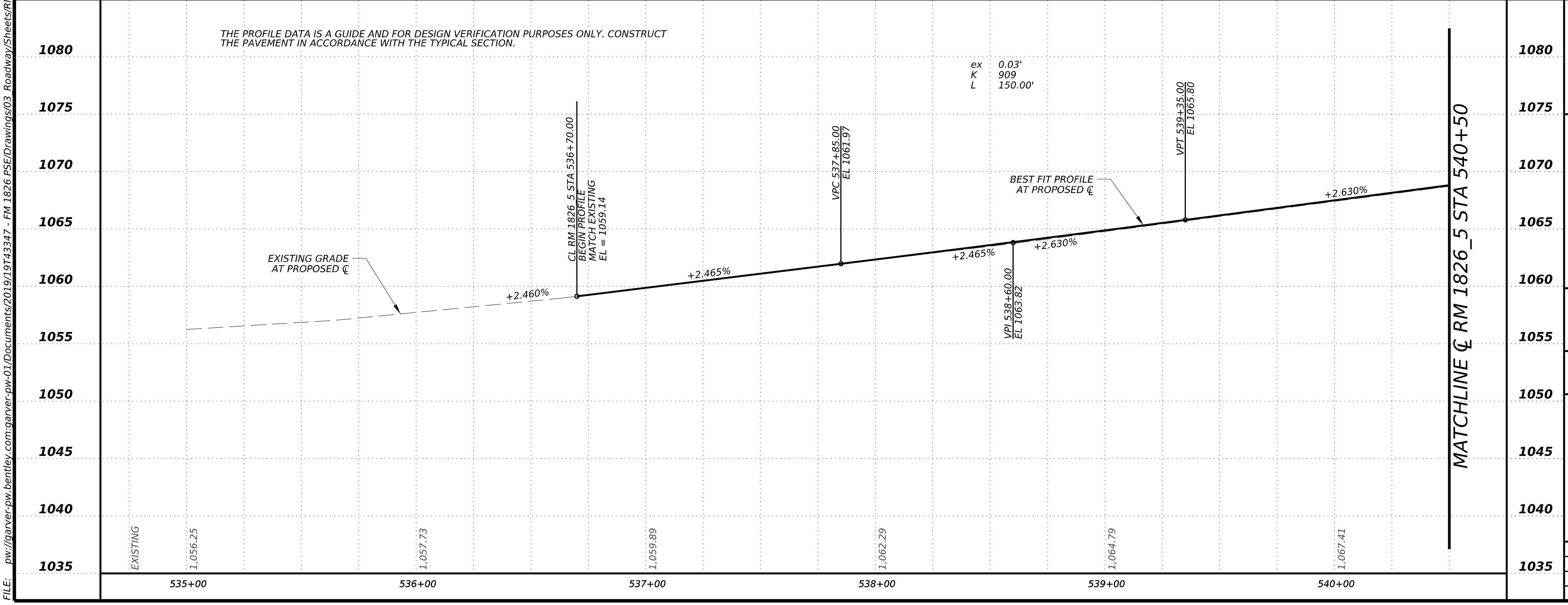


LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
∼▸	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.


THE PROFILE DATA IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.

25' 0 25' 50'
HORZ. SCALE 1"=50'

5' 0 5' 10'
VERT. SCALE 1"=10'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
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RM 1826

PLAN AND PROFILE
TOWERING CEDAR DR

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		93

DN: CK: DW: CK:

DATE: 5/30/2023 4:55:11 PM
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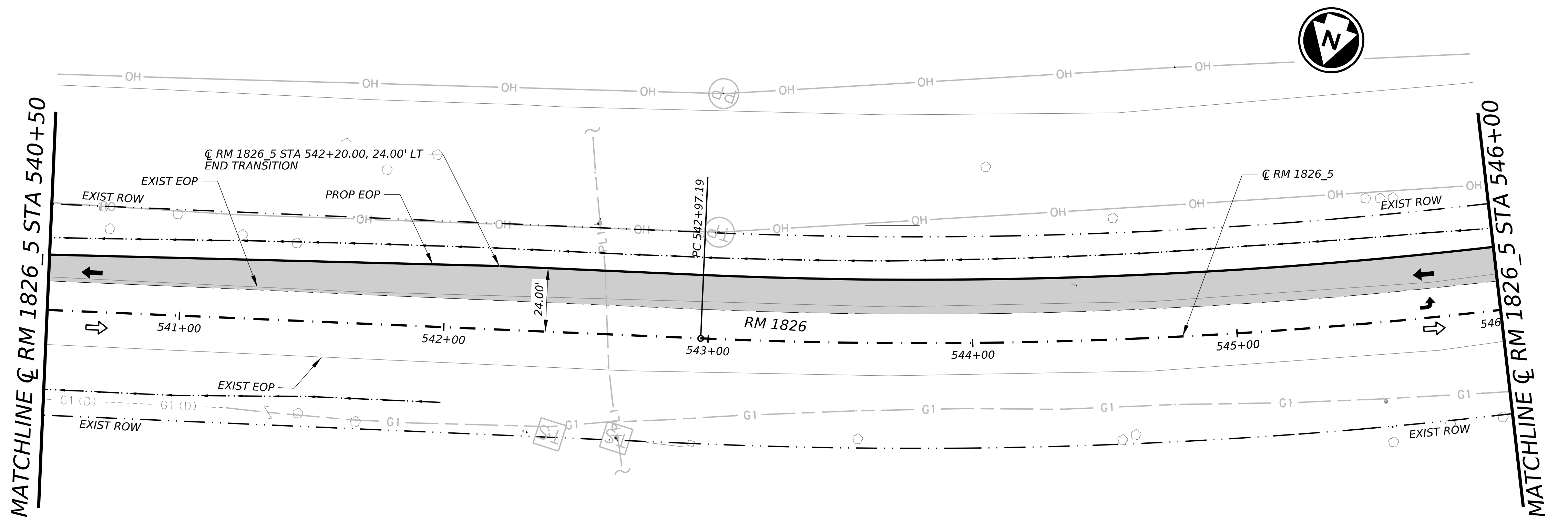

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~▸	FLOW ARROW

NOTES:

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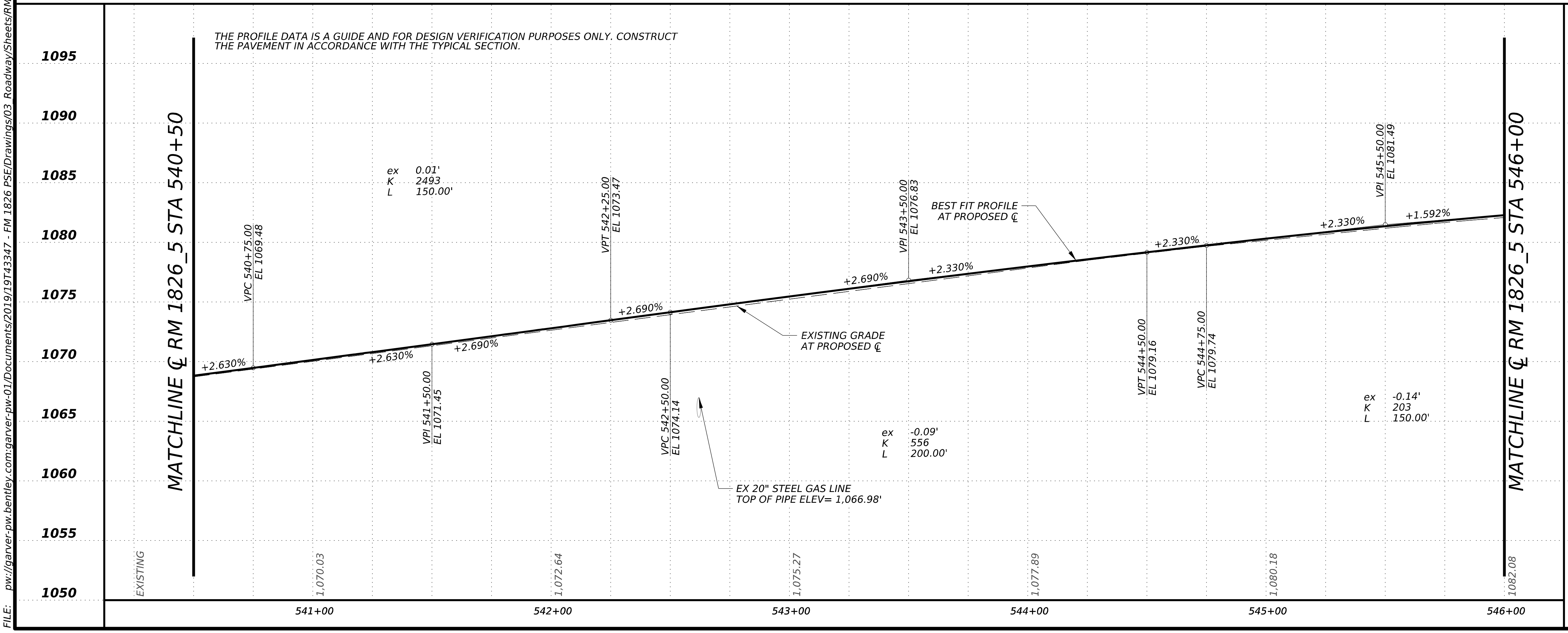

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Alfred Lopez

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RM 1826

PLAN AND PROFILE
TOWERING CEDAR DR

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	94

DATE: 5/30/2023 4:55:30 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/03 Roadway/Sheets/RM1826 RDW PP GV 23.dgn

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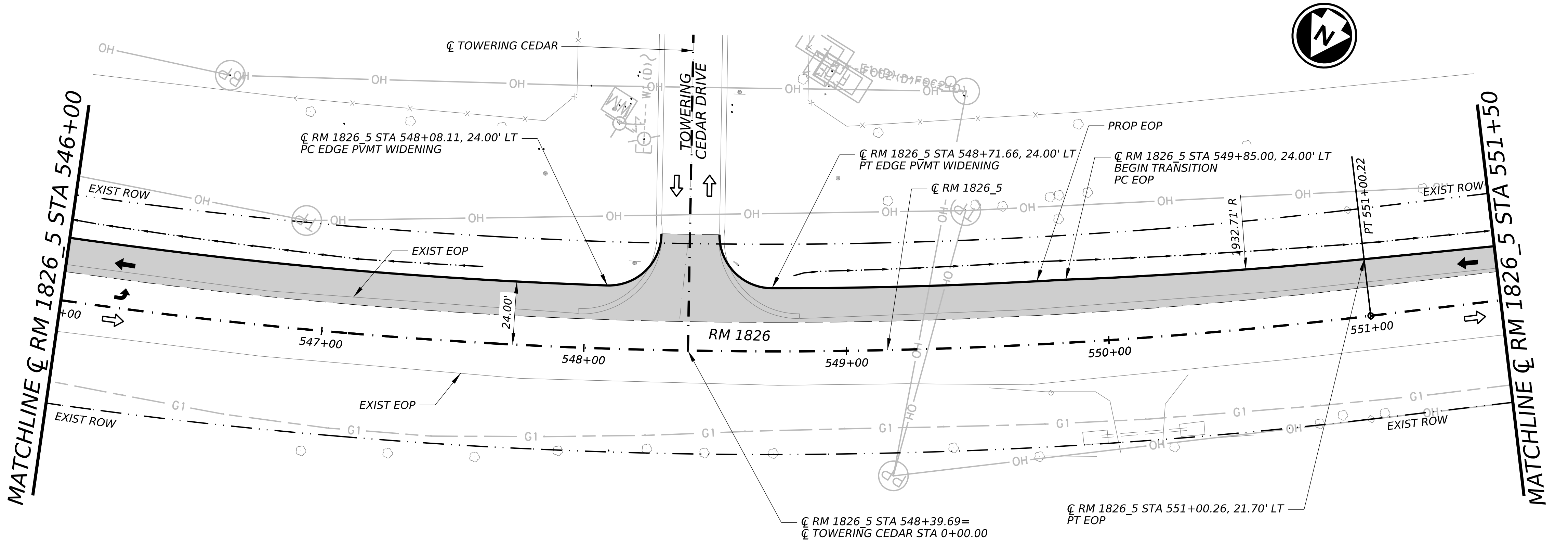

LEGEND

▨	PROPOSED PAVEMENT
☐	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

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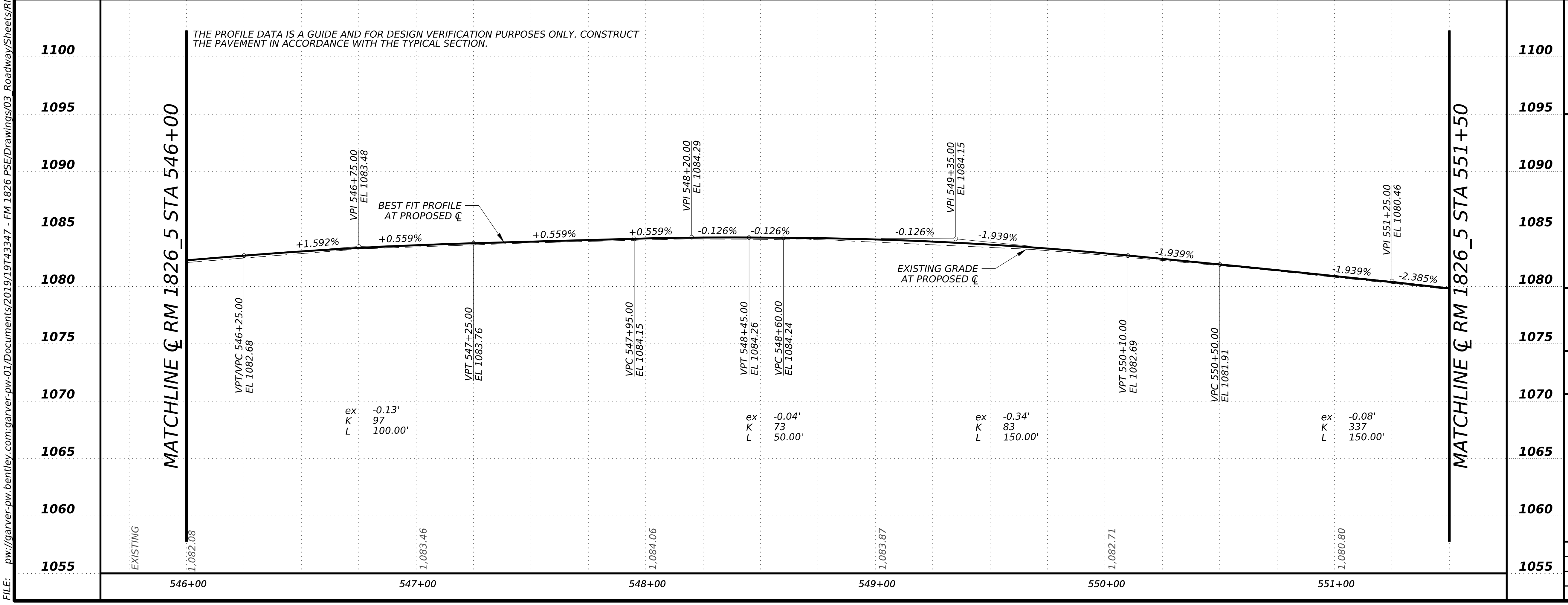

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RM 1826

PLAN AND PROFILE
TOWERING CEDAR DR

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	95

DATE: 5/30/2023 4:55:43 PM
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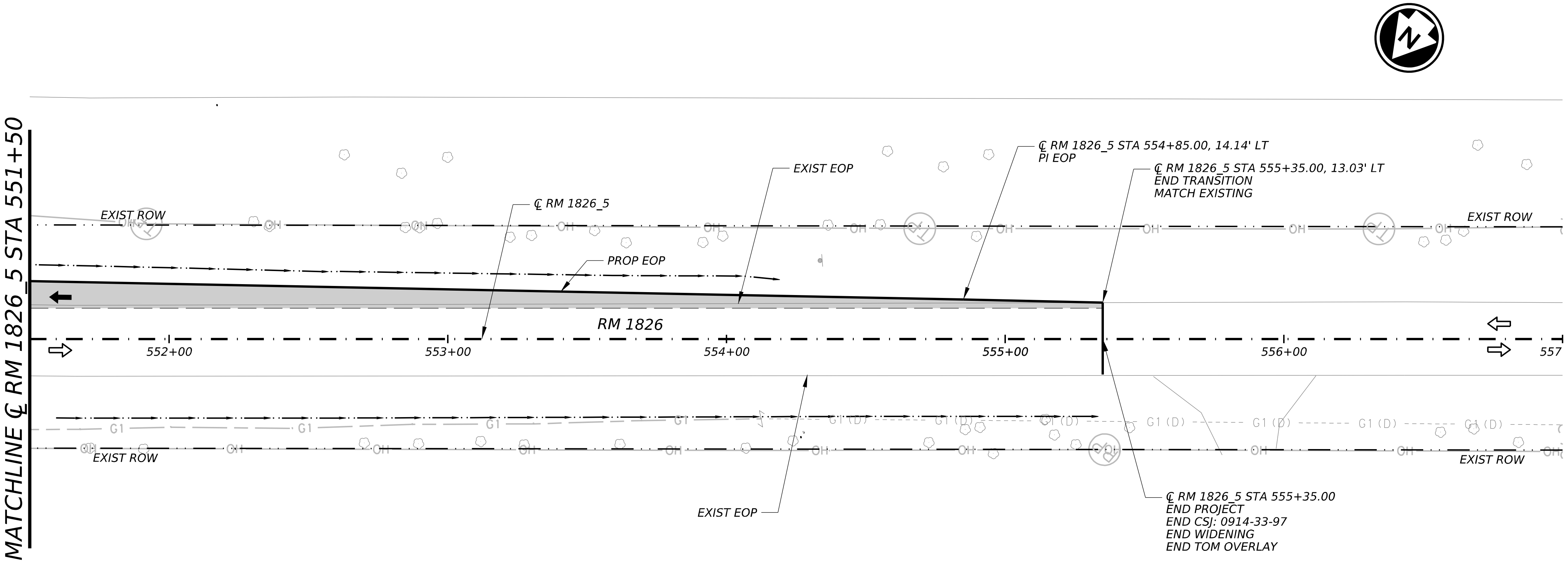

LEGEND

▒	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—▸—·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
∼→	FLOW ARROW

NOTES:

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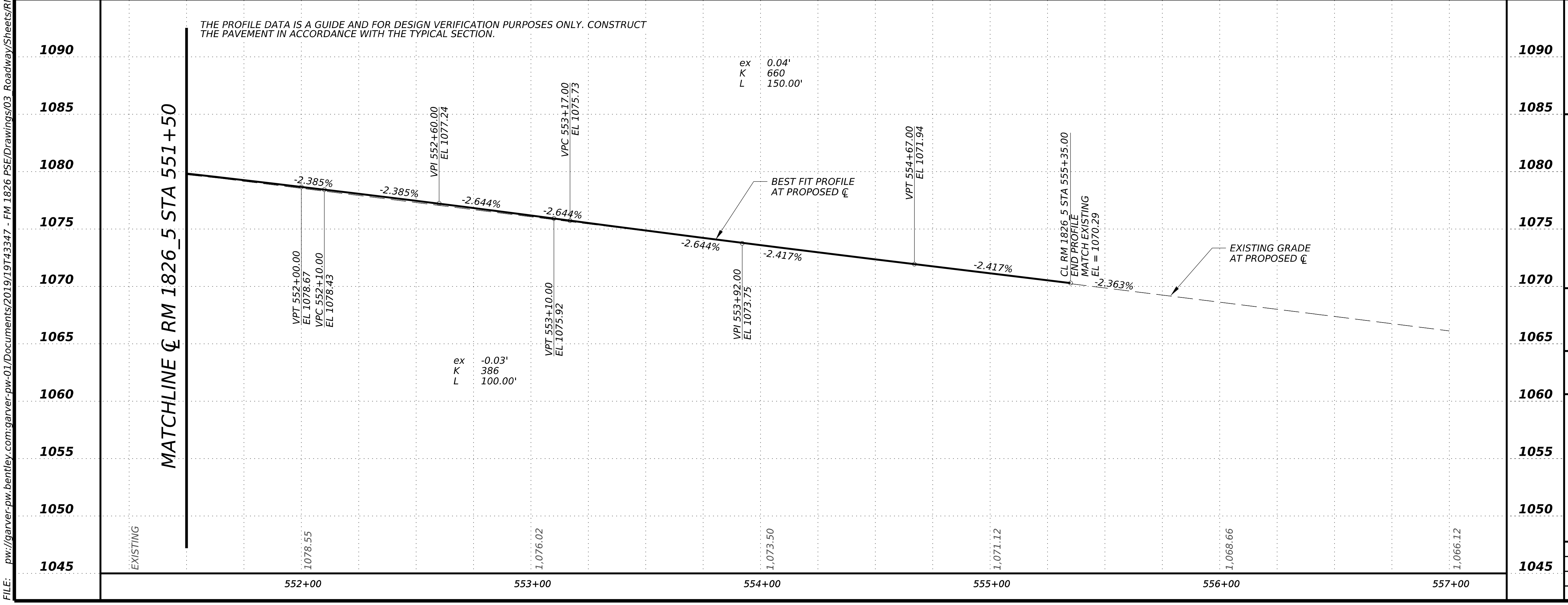

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RM 1826

PLAN AND PROFILE
TOWERING CEDAR DR

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		96

DATE: 5/30/2023 4:56:01 PM
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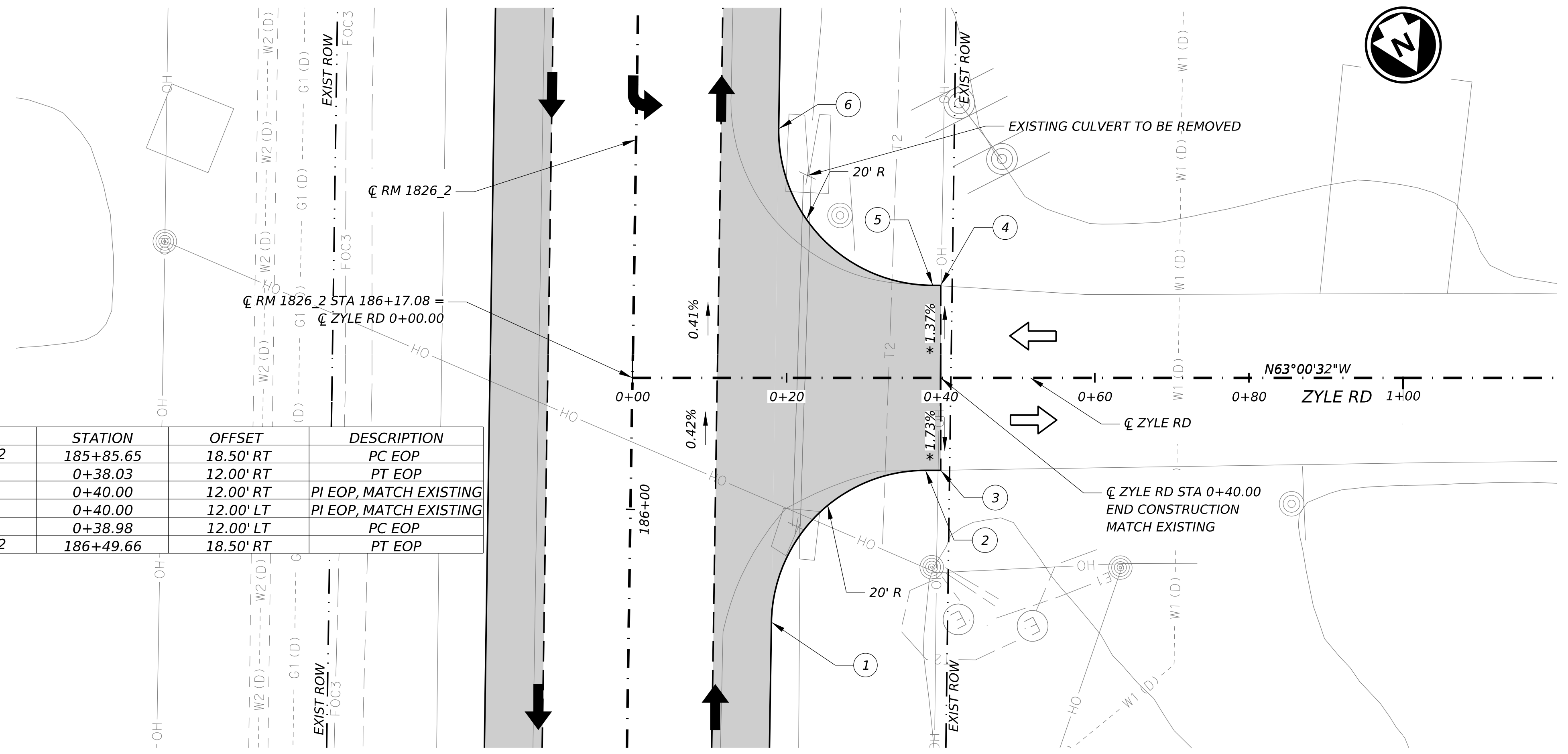

PT	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_2	185+85.65	18.50' RT	PC EOP
2	ZYLE RD	0+38.03	12.00' RT	PT EOP
3	ZYLE RD	0+40.00	12.00' RT	PI EOP, MATCH EXISTING
4	ZYLE RD	0+40.00	12.00' LT	PI EOP, MATCH EXISTING
5	ZYLE RD	0+38.98	12.00' LT	PC EOP
6	RM 1826_2	186+49.66	18.50' RT	PT EOP

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
– – –	DRAINAGE EASEMENT
∼→	FLOW ARROW

NOTES:

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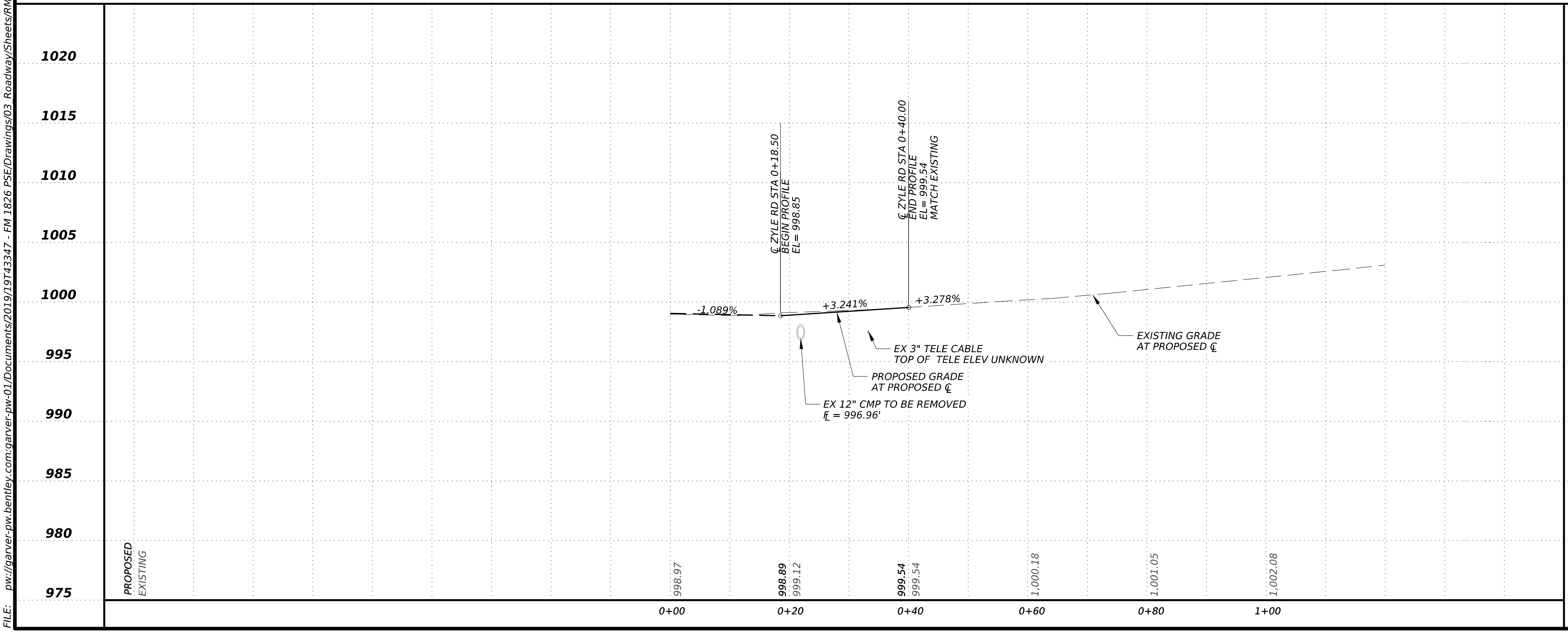
* MATCH EXISTING SLOPE



10' 0 10' 20'
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RM 1826

SIDE STREET
PLAN AND PROFILE
ZYLE RD

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	97

DATE: 5/30/2023 4:56:21 PM
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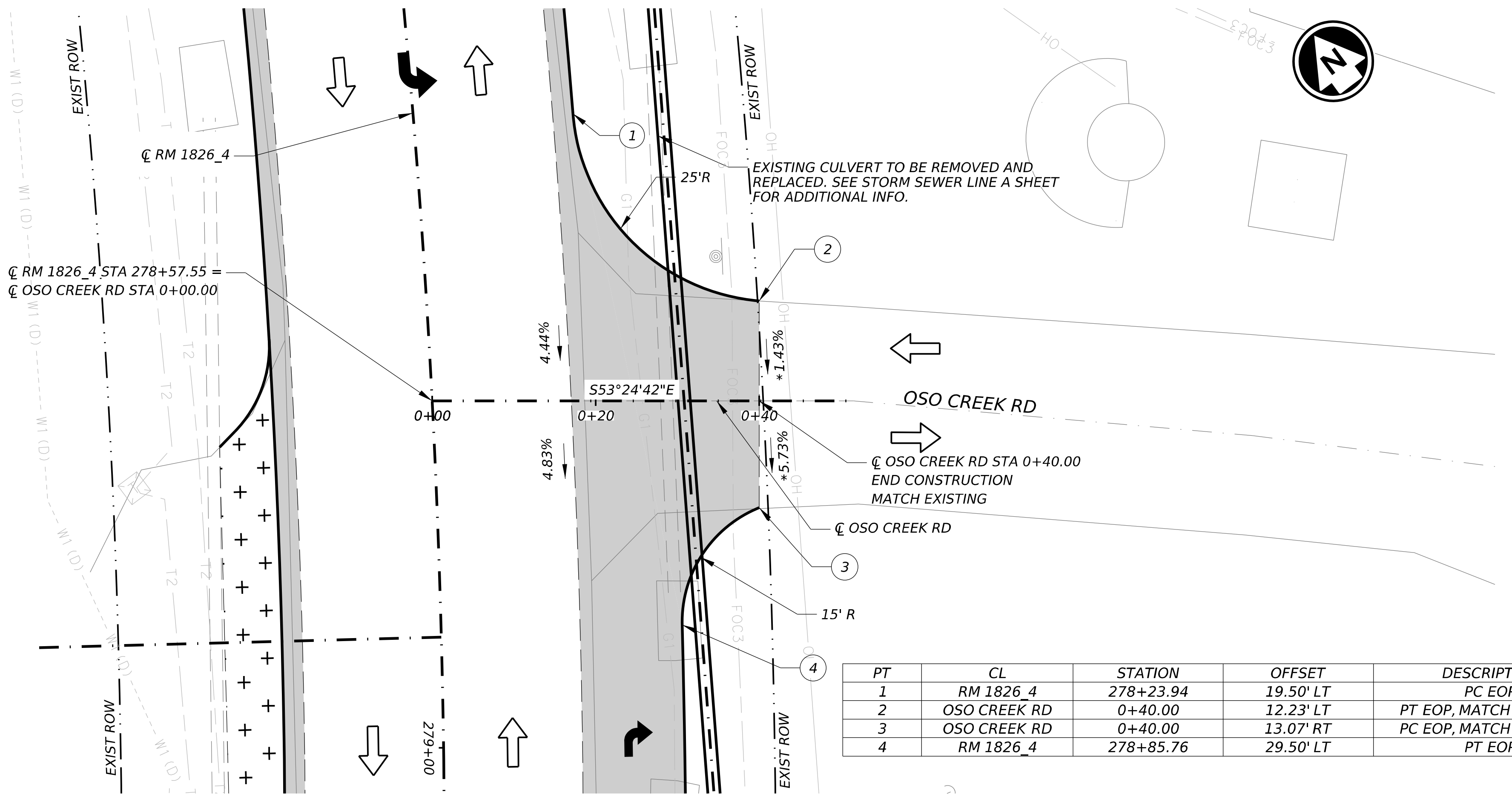

PT	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_4	278+23.94	19.50' LT	PC EOP
2	OSO CREEK RD	0+40.00	12.23' LT	PT EOP, MATCH EXISTING
3	OSO CREEK RD	0+40.00	13.07' RT	PC EOP, MATCH EXISTING
4	RM 1826_4	278+85.76	29.50' LT	PT EOP

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW

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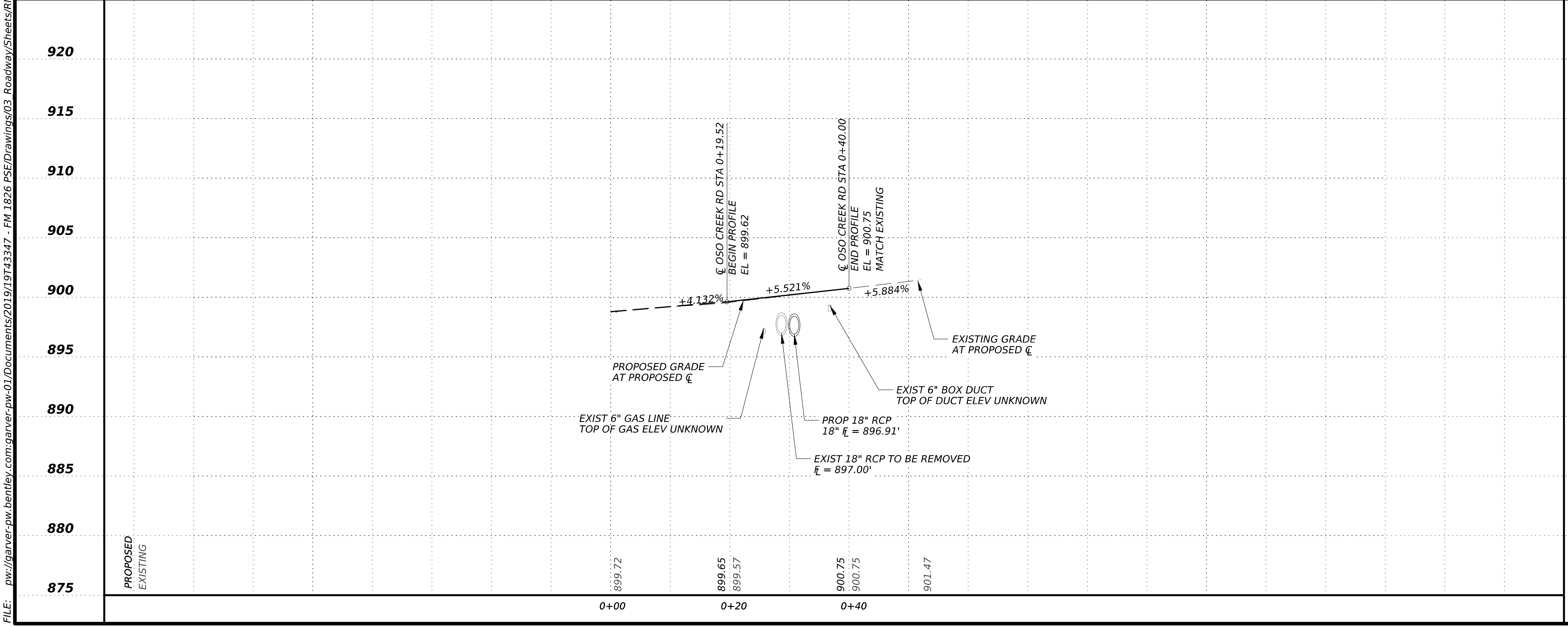

10' 0 10' 20'
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VERT. SCALE 1"=10'

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101155
5/30/2023

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RM 1826

SIDE STREET
PLAN AND PROFILE
OSO CREEK RD

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	98

DATE: 5/30/2023 4:56:36 PM
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DATE: 5/30/2023 4:56:48 PM
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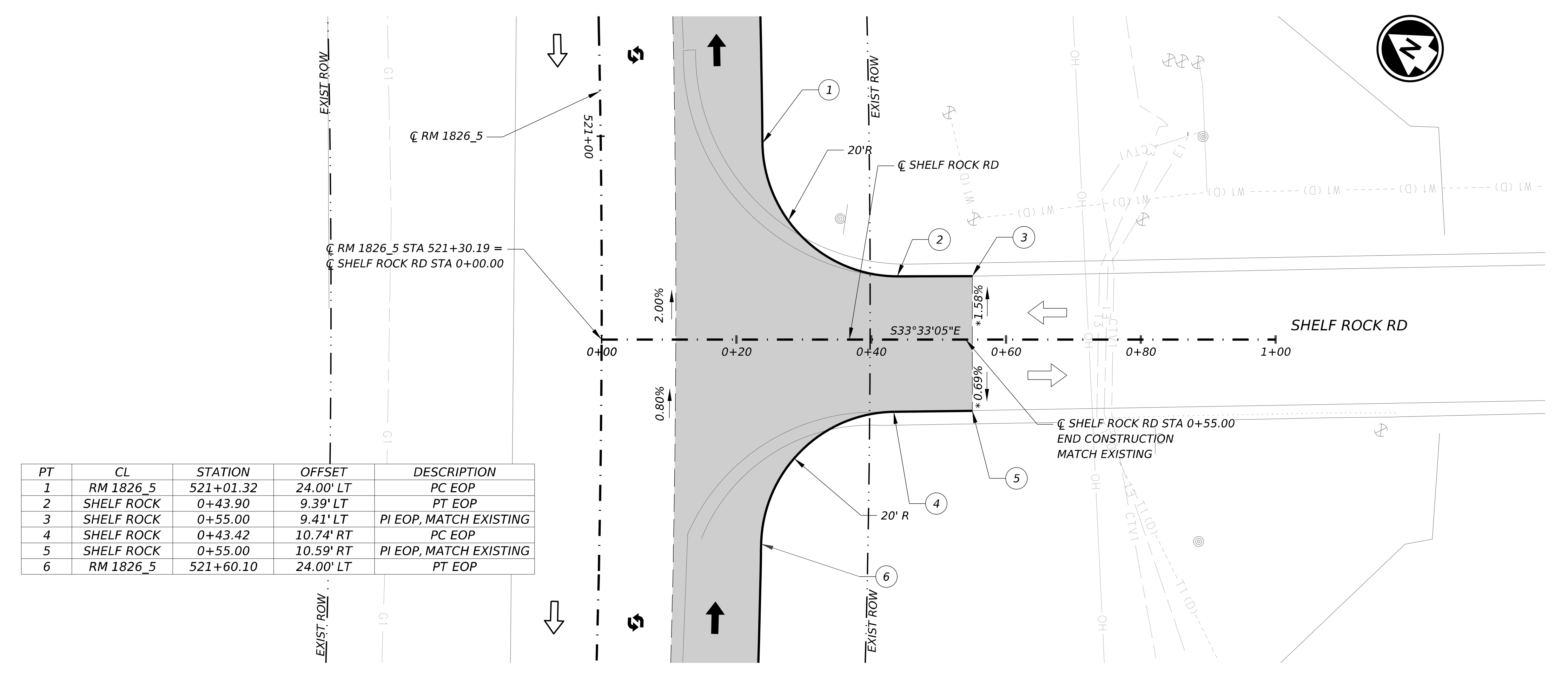

PT	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_5	521+01.32	24.00' LT	PC EOP
2	SHELF ROCK	0+43.90	9.39' LT	PT EOP
3	SHELF ROCK	0+55.00	9.41' LT	PI EOP, MATCH EXISTING
4	SHELF ROCK	0+43.42	10.74' RT	PC EOP
5	SHELF ROCK	0+55.00	10.59' RT	PI EOP, MATCH EXISTING
6	RM 1826_5	521+60.10	24.00' LT	PT EOP

LEGEND

▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW

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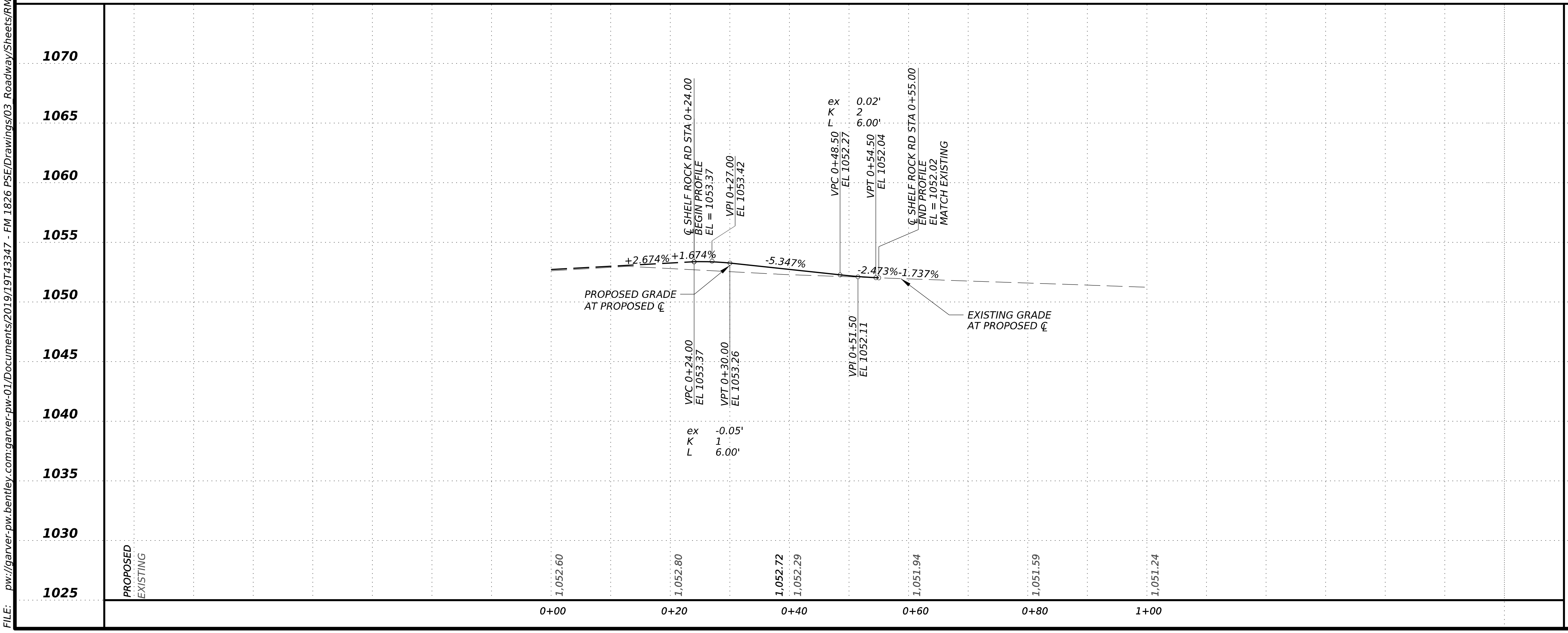

10' 0 10' 20'
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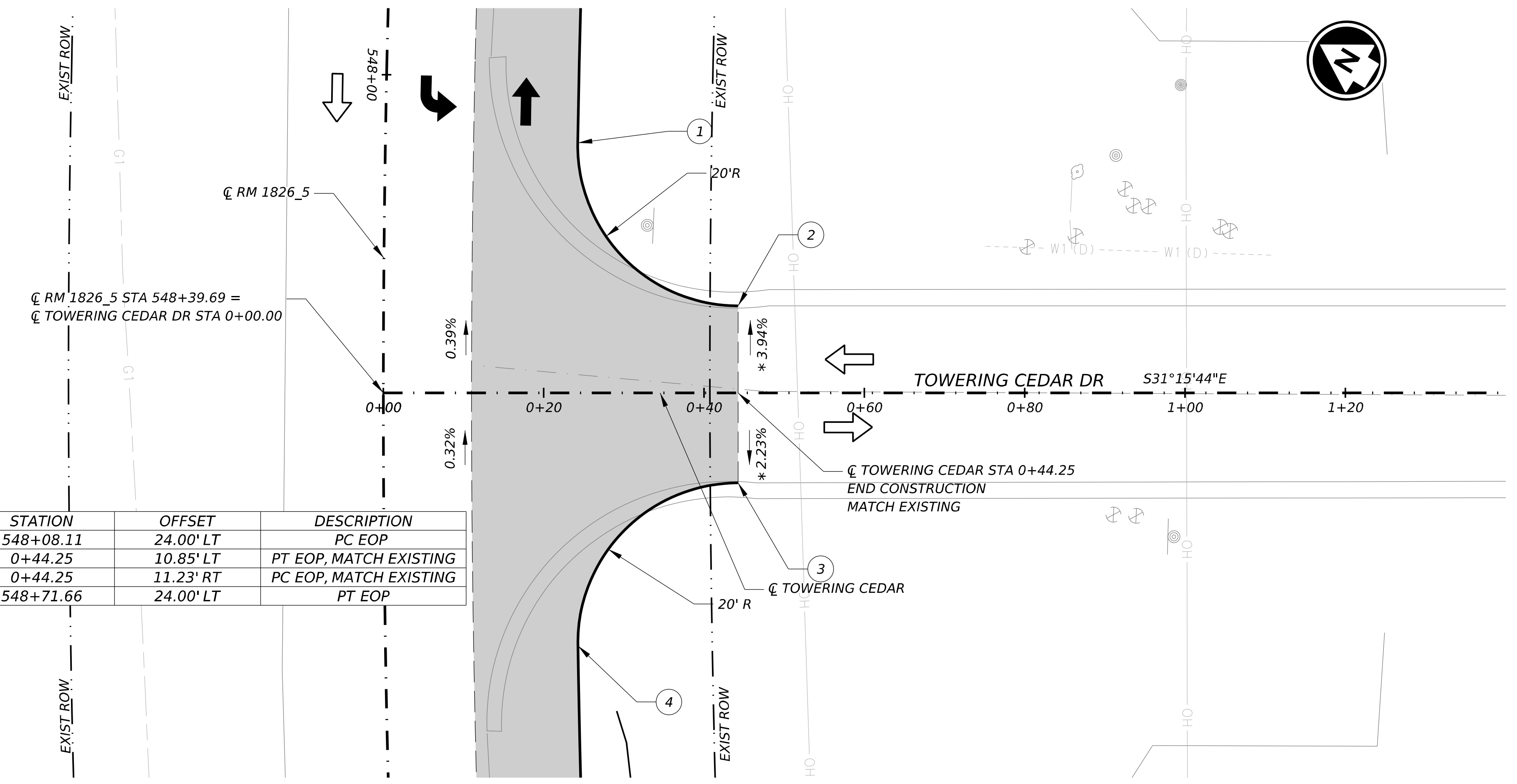
Texas Department of Transportation

RM 1826

SIDE STREET
PLAN AND PROFILE
SHELF ROCK RD

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		99



PT	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_5	548+08.11	24.00' LT	PC EOP
2	TOWERING CEDAR	0+44.25	10.85' LT	PT EOP, MATCH EXISTING
3	TOWERING CEDAR	0+44.25	11.23' RT	PC EOP, MATCH EXISTING
4	RM 1826_5	548+71.66	24.00' LT	PT EOP

LEGEND

▨	PROPOSED PAVEMENT
⁘	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
∼→	FLOW ARROW

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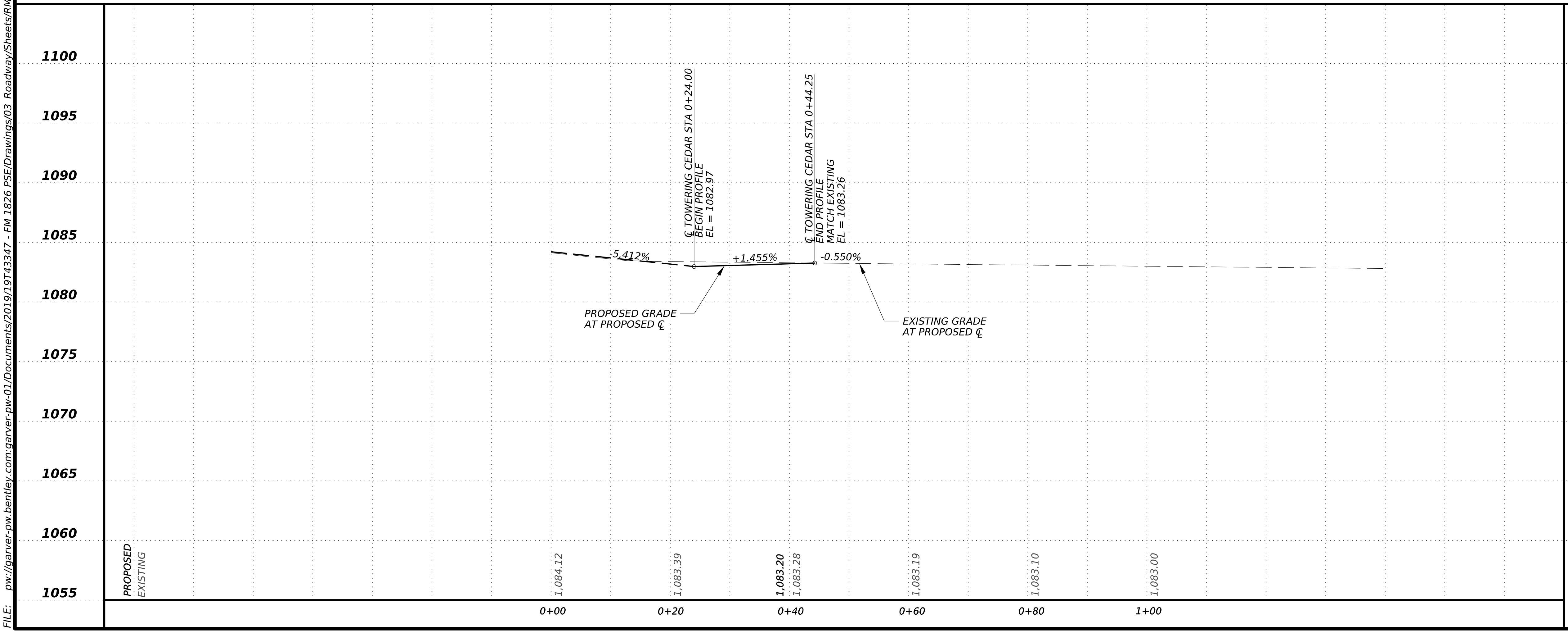

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RM 1826

SIDE STREET
PLAN AND PROFILE
TOWERING CEDAR DR

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	100

DATE: 5/30/2023 4:57:00 PM
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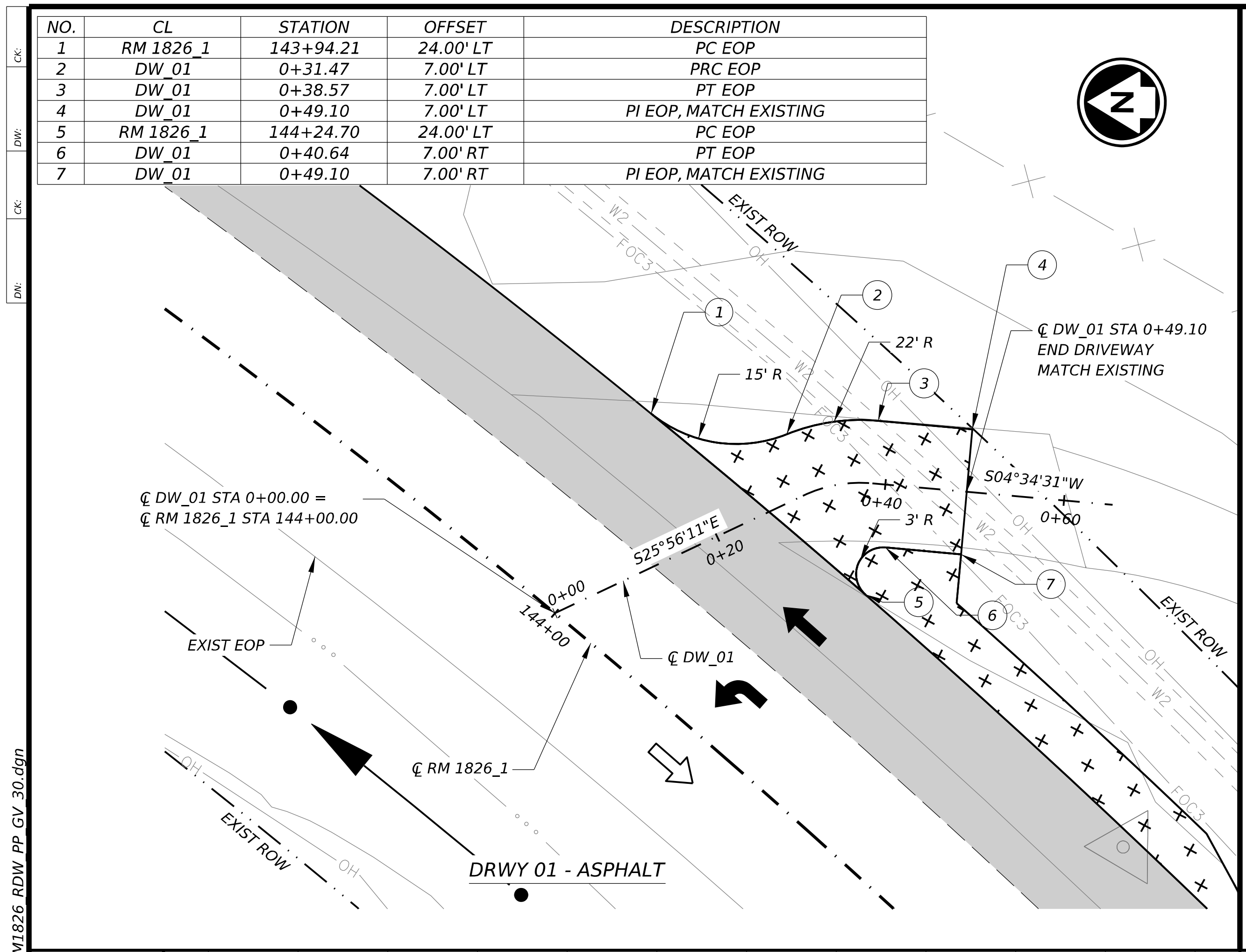
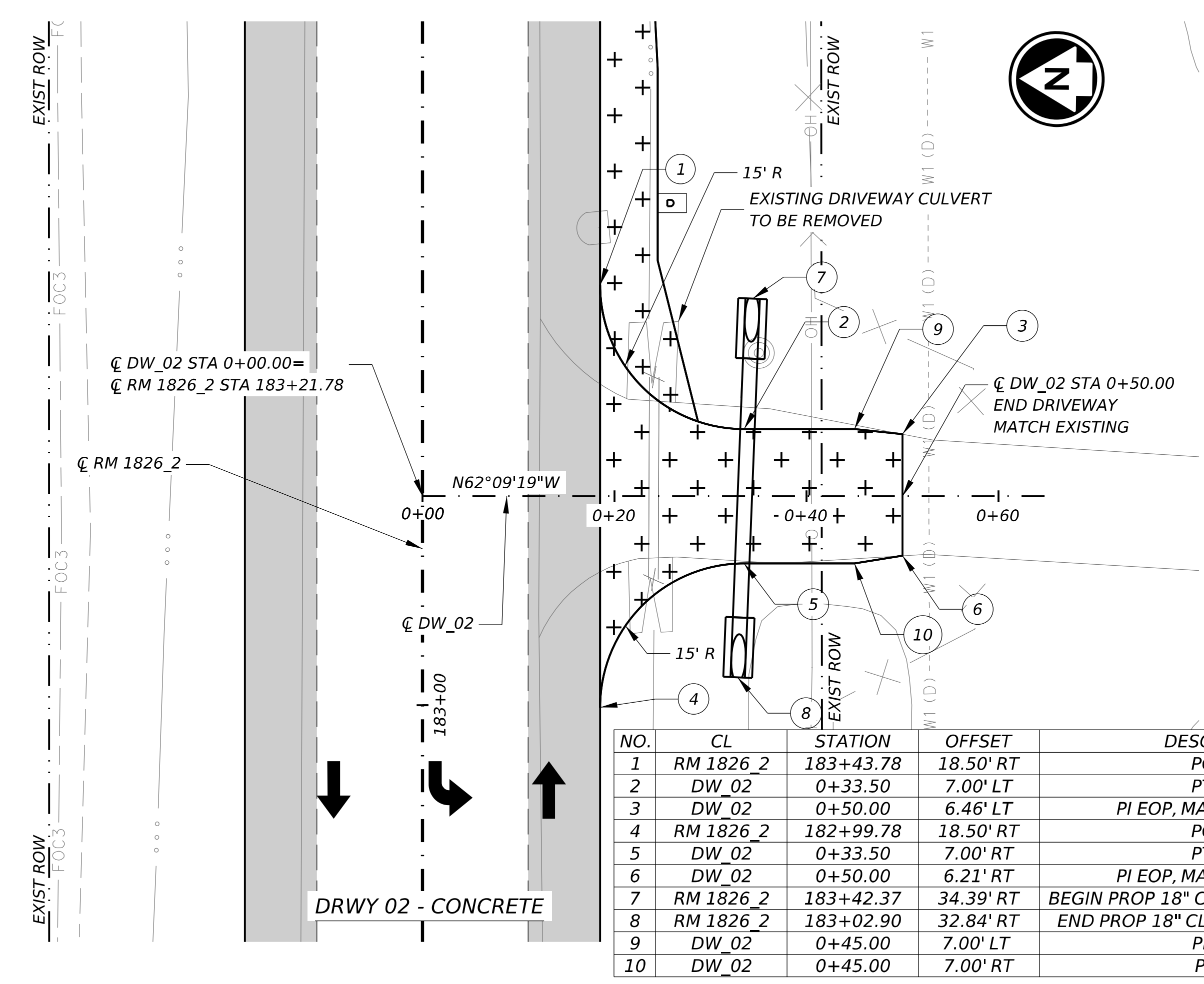
NO.	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_1	143+94.21	24.00' LT	PC EOP
2	DW_01	0+31.47	7.00' LT	PRC EOP
3	DW_01	0+38.57	7.00' LT	PT EOP
4	DW_01	0+49.10	7.00' LT	PI EOP, MATCH EXISTING
5	RM 1826_1	144+24.70	24.00' LT	PC EOP
6	DW_01	0+40.64	7.00' RT	PT EOP
7	DW_01	0+49.10	7.00' RT	PI EOP, MATCH EXISTING





LEGEND

▨	PROPOSED PAVEMENT
⊞	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
—→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

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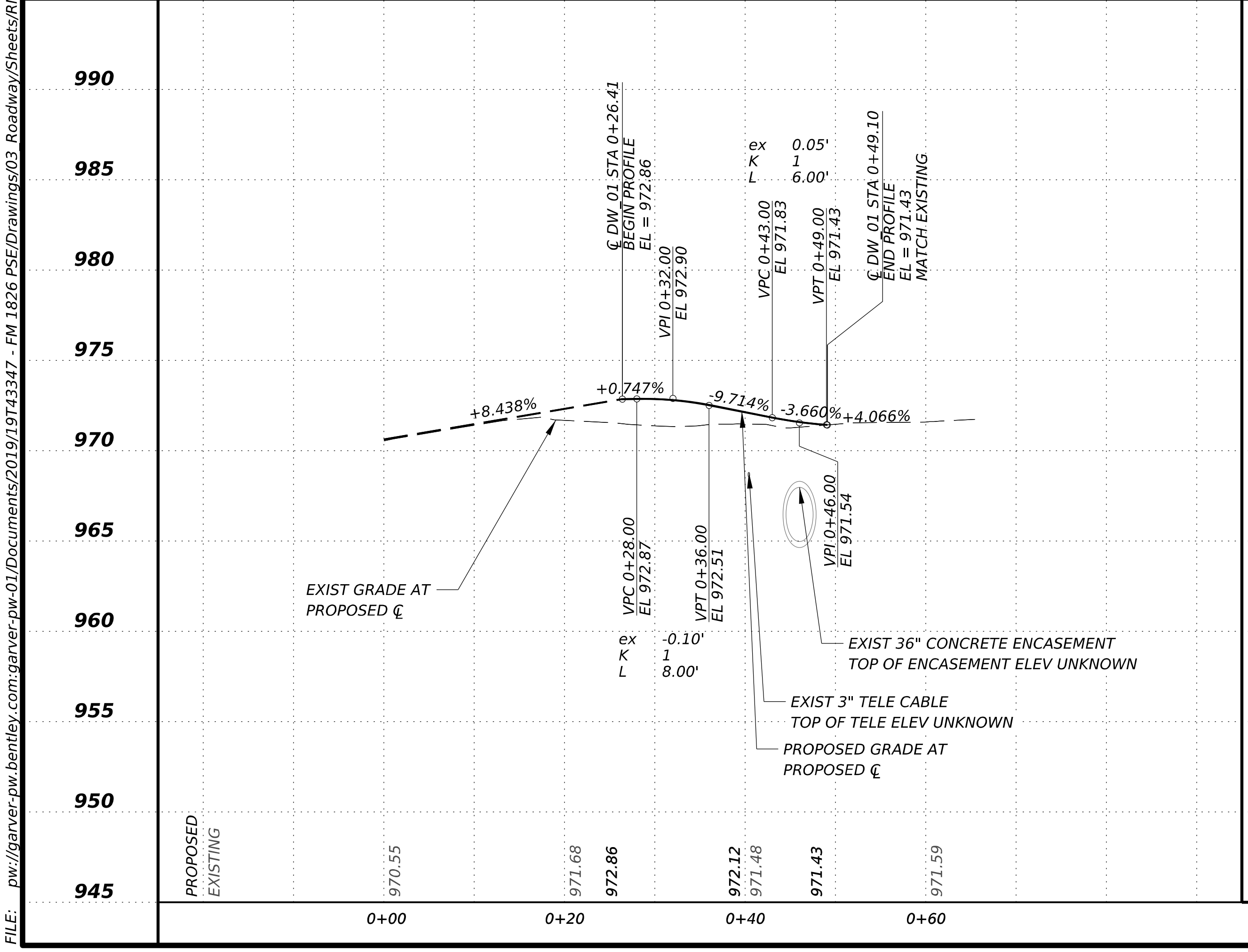
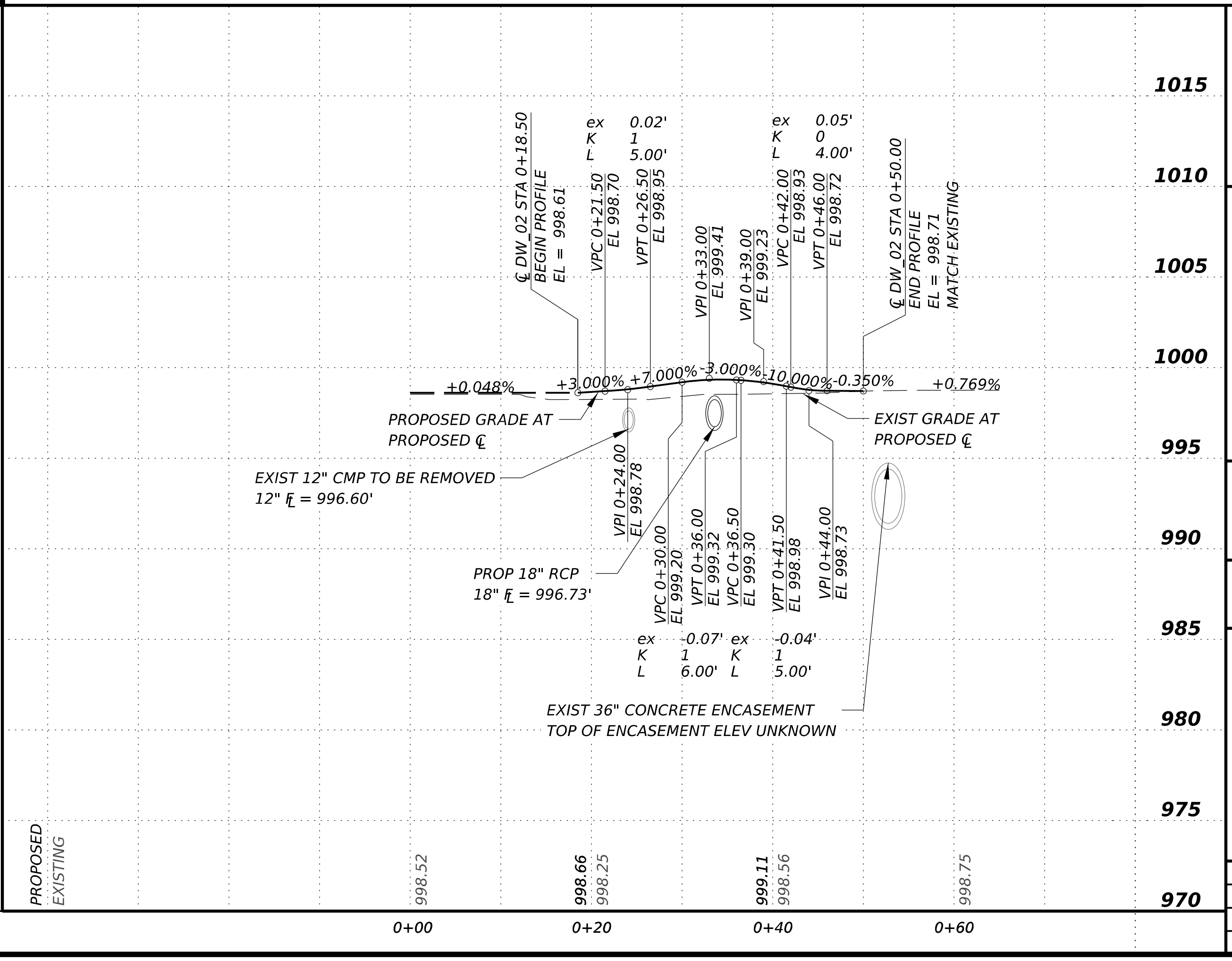
NO.	CL	STATION	OFFSET	DESCRIPTION	FL ELEV
1	RM 1826_2	183+43.78	18.50' RT	PC EOP	-
2	DW_02	0+33.50	7.00' LT	PT EOP	-
3	DW_02	0+50.00	6.46' LT	PI EOP, MATCH EXISTING	-
4	RM 1826_2	182+99.78	18.50' RT	PC EOP	-
5	DW_02	0+33.50	7.00' RT	PT EOP	-
6	DW_02	0+50.00	6.21' RT	PI EOP, MATCH EXISTING	-
7	RM 1826_2	183+42.37	34.39' RT	BEGIN PROP 18" CL IV RCP, INSTALL SET	996.79'
8	RM 1826_2	183+02.90	32.84' RT	END PROP 18" CL IV RCP, INSTALL SET	996.67'
9	DW_02	0+45.00	7.00' LT	PI EOP	-
10	DW_02	0+45.00	7.00' RT	PI EOP	-





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RM 1826

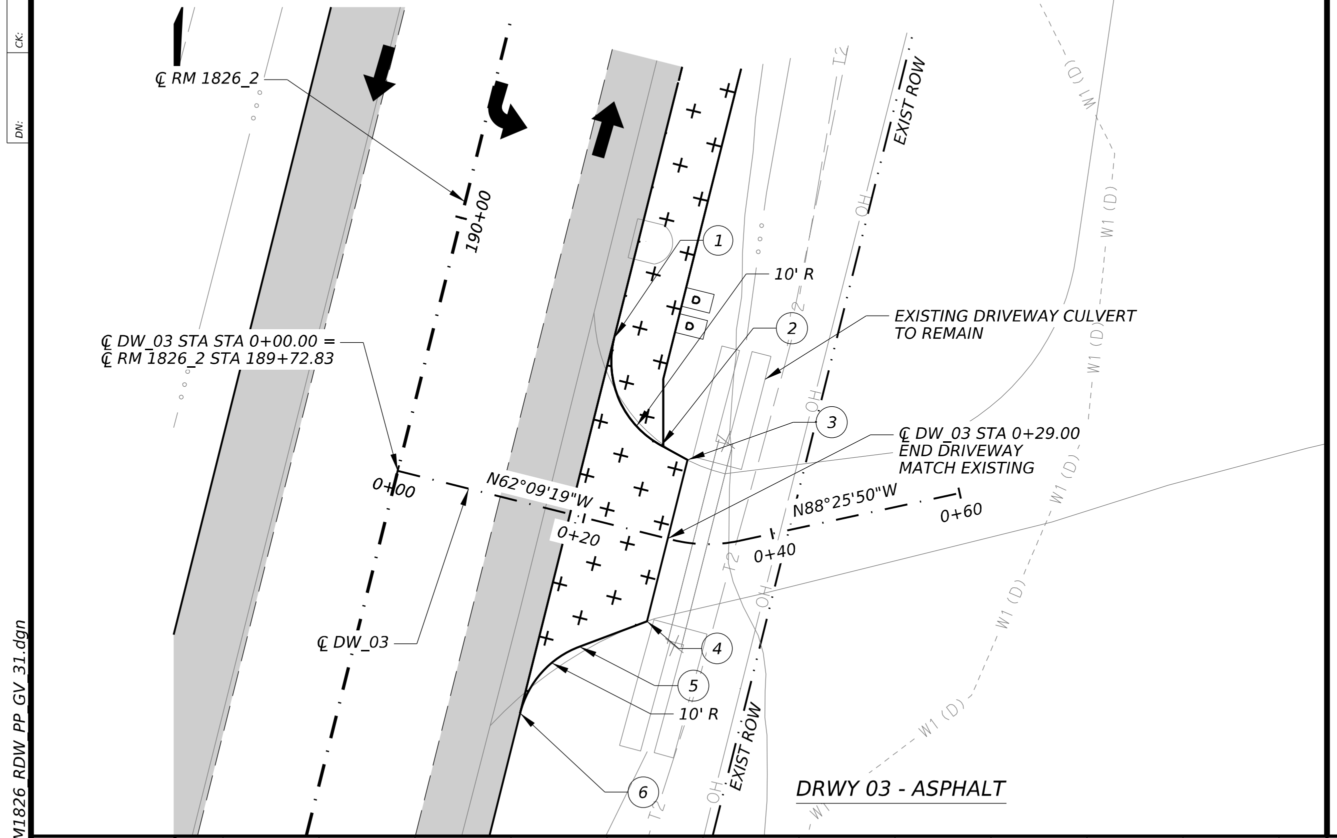
DRIVEWAY
PLAN AND PROFILE

SHEET 1 OF 4

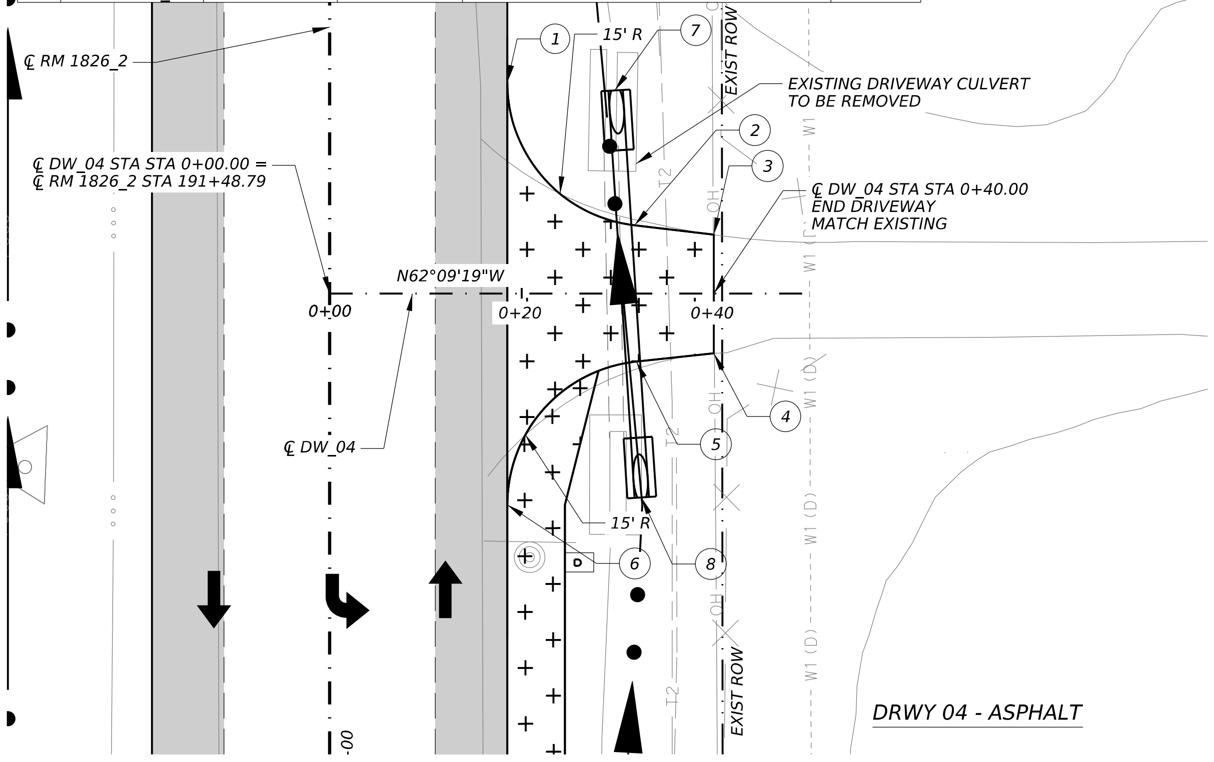
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	101

DATE: 5/30/2023 4:57:22 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/03 Roadway/Sheets/RM1826 RDW PP GV 30.dgn

NO.	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_2	189+91.74	18.50' RT	PC EOP
2	DW_03	0+25.98	9.24' LT	PT EOP
3	DW_03	0+29.00	8.45' LT	PI EOP, MATCH EXISTING
4	DW_03	0+29.00	8.87' RT	PI EOP, MATCH EXISTING
5	DW_03	0+22.82	13.14' RT	PC EOP
6	RM 1826_2	189+51.46	18.50' RT	PT EOP



NO.	CL	STATION	OFFSET	DESCRIPTION	FL ELEV
1	RM 1826_2	191+70.79	18.50' RT	PC EOP	-
2	DW_04	0+31.74	7.10' LT	PT EOP	-
3	DW_04	0+40.00	6.13' LT	PI EOP, MATCH EXISTING	-
4	DW_04	0+40.00	6.24' RT	PI EOP, MATCH EXISTING	-
5	DW_04	0+31.94	7.08' RT	PC EOP	-
6	RM 1826_2	191+26.79	18.50' RT	PT EOP	-
7	RM 1826_2	191+69.96	29.77' RT	BEGIN PROP 18" CL IV RCP, INSTALL SET	992.49'
8	RM 1826_2	191+27.54	32.50' RT	END PROP 18" CL IV RCP, INSTALL SET	993.28'

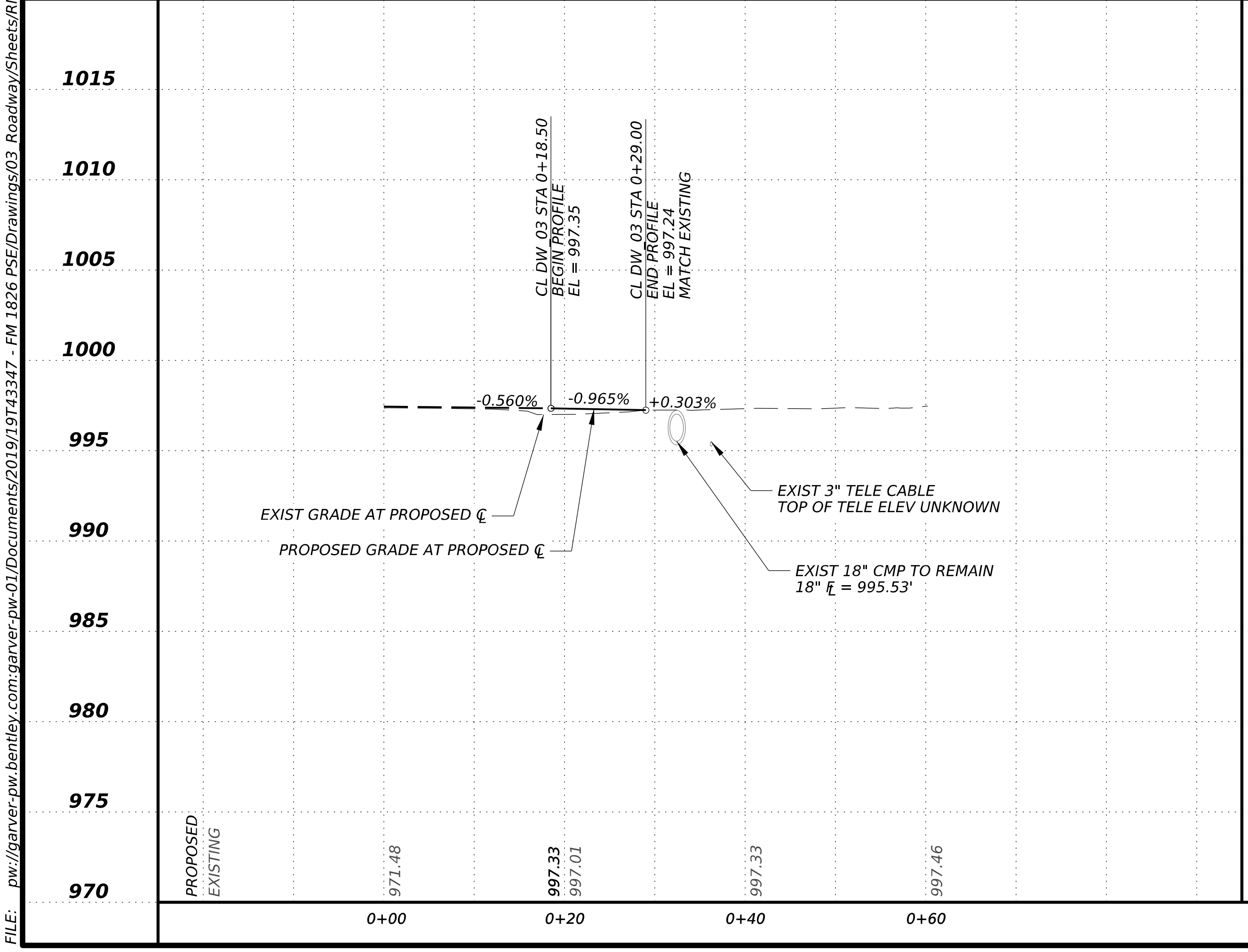


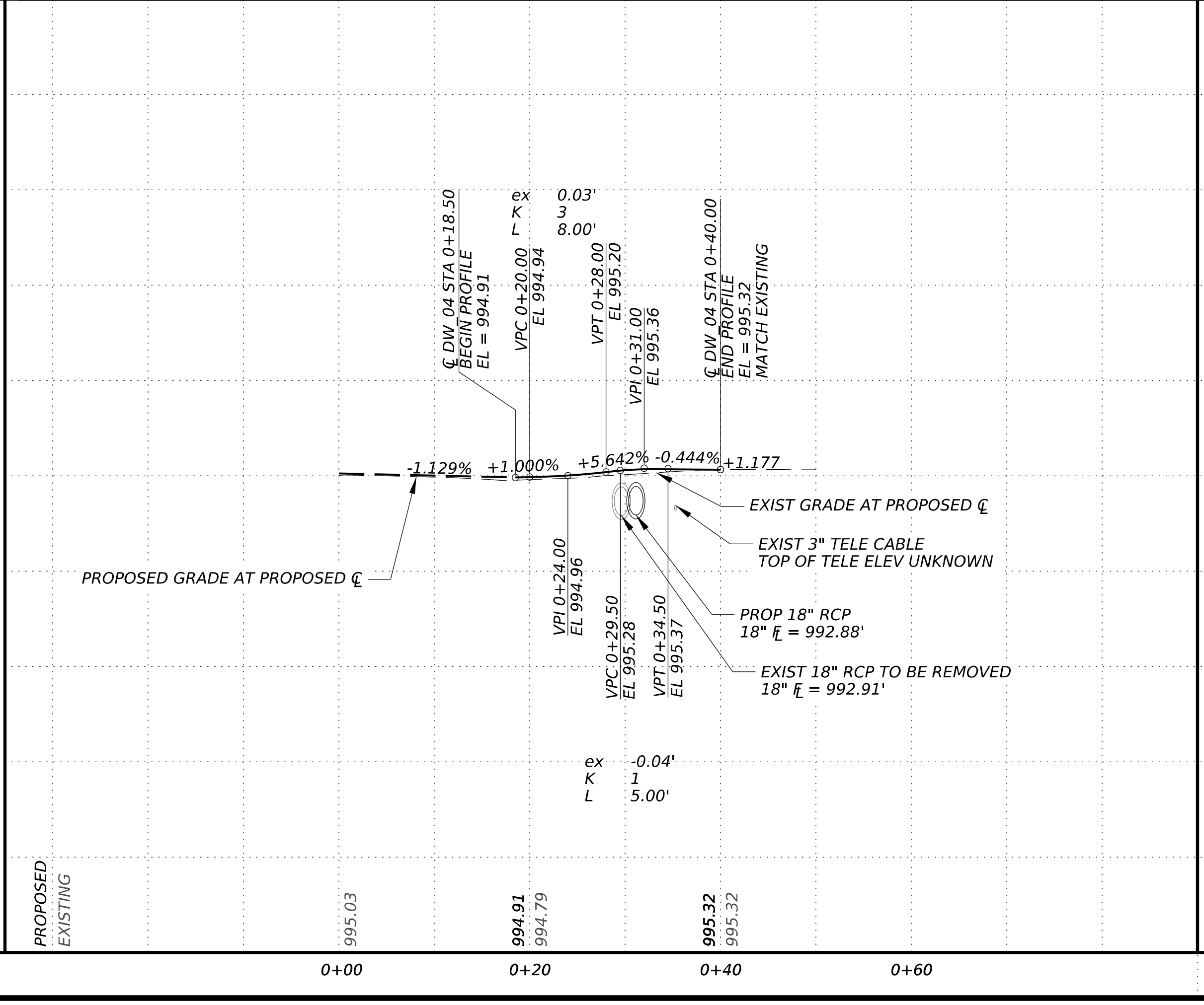
LEGEND

▨	PROPOSED PAVEMENT
+	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
— — —	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.





10' 0 10' 20'
HORZ. SCALE 1"=20'

5' 0 5' 10'
VERT. SCALE 1"=10'

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5/30/2023

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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

DRIVEWAY
PLAN AND PROFILE

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	102

DATE: 5/30/2023 4:57:42 PM
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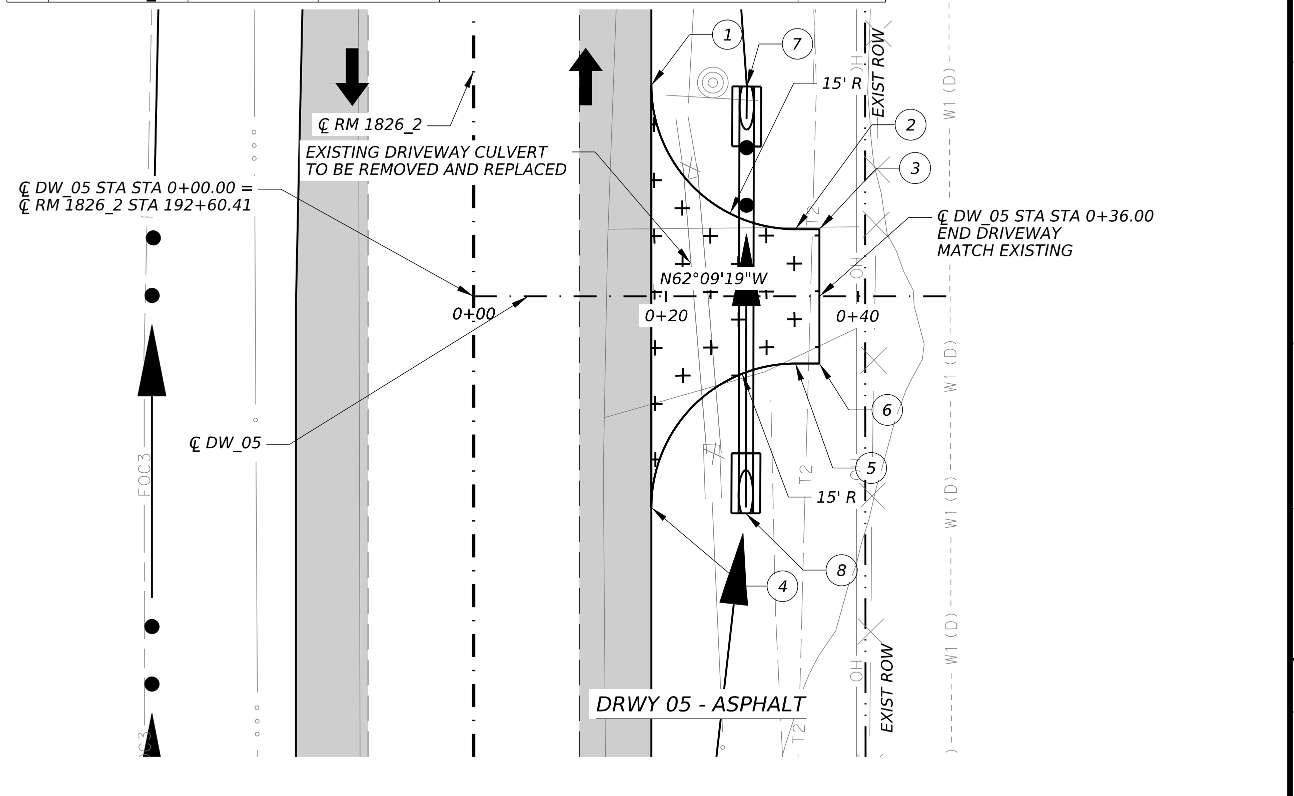
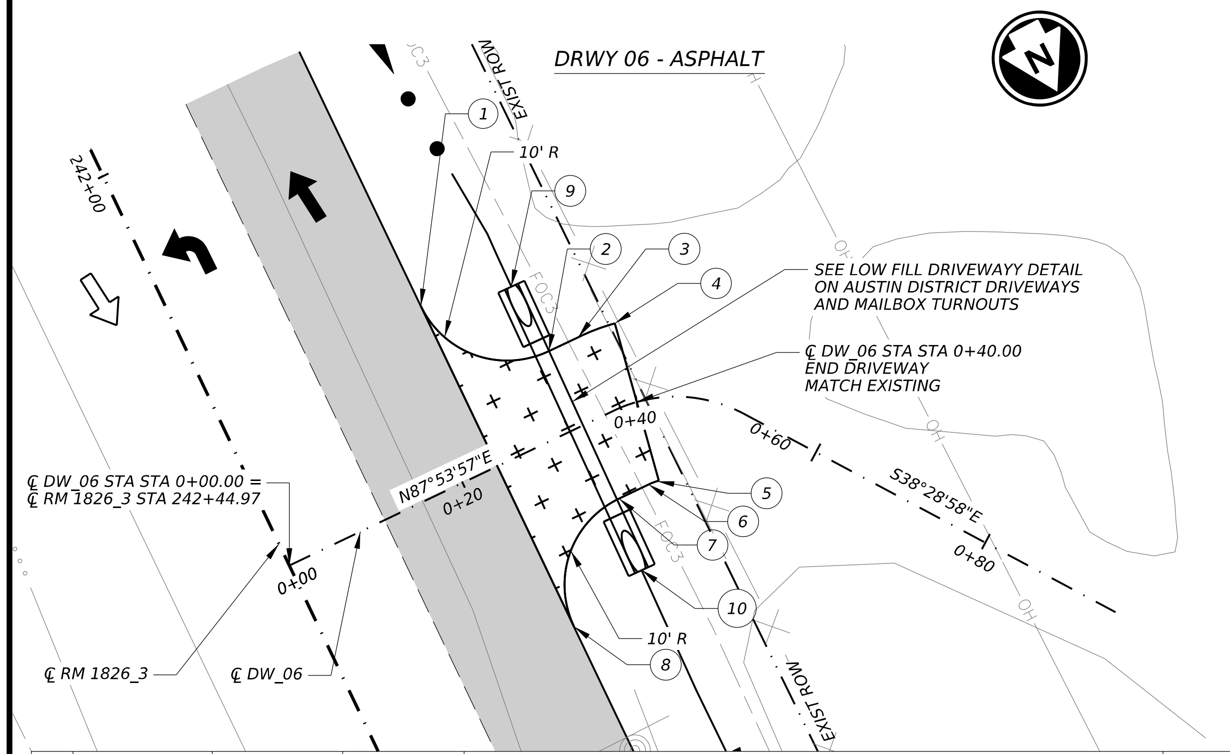
CK:
DW:
CK:
DN:

NO	CL	STATION	OFFSET	DESCRIPTION	FL ELEV
1	RM 1826_2	192+82.41	18.50' RT	PC EOP	-
2	DW_05	0+30.50	7.00' LT	PT EOP	-
3	DW_05	0+36.00	7.00' LT	PI EOP, MATCH EXISTING	-
4	DW_05	192+38.41	18.50' RT	PC EOP	-
5	DW_05	0+30.50	7.00' RT	PT EOP	-
6	DW_05	0+36.00	7.00' RT	PI EOP, MATCH EXISTING	-
7	RM 1826_2	192+82.29	28.43' RT	BEGIN PROP 18" CL IV RCP, INSTALL SET	988.73'
8	RM 1826_2	192+37.79	28.34' RT	END PROP 18" CL IV RCP, INSTALL SET	989.90'





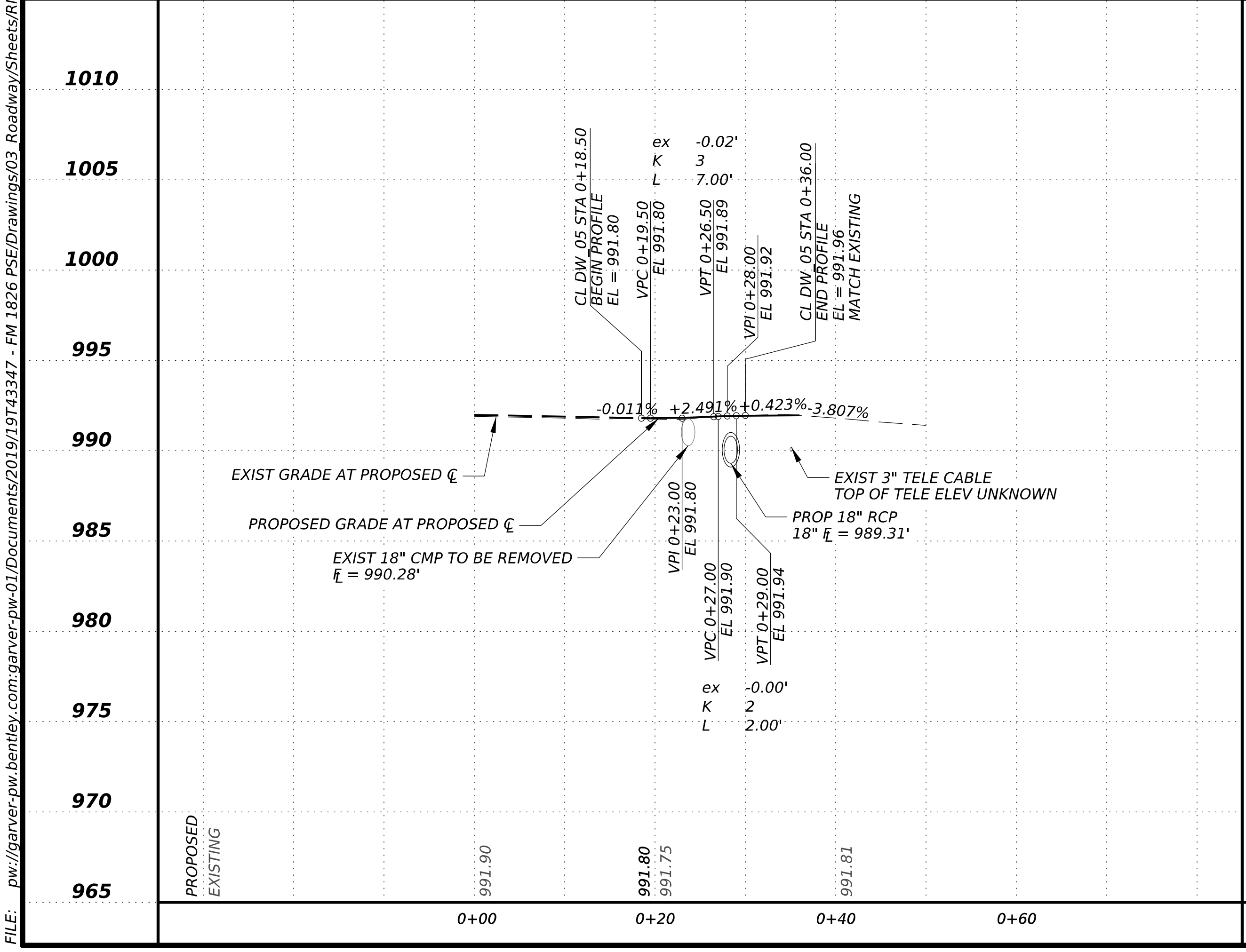
LEGEND

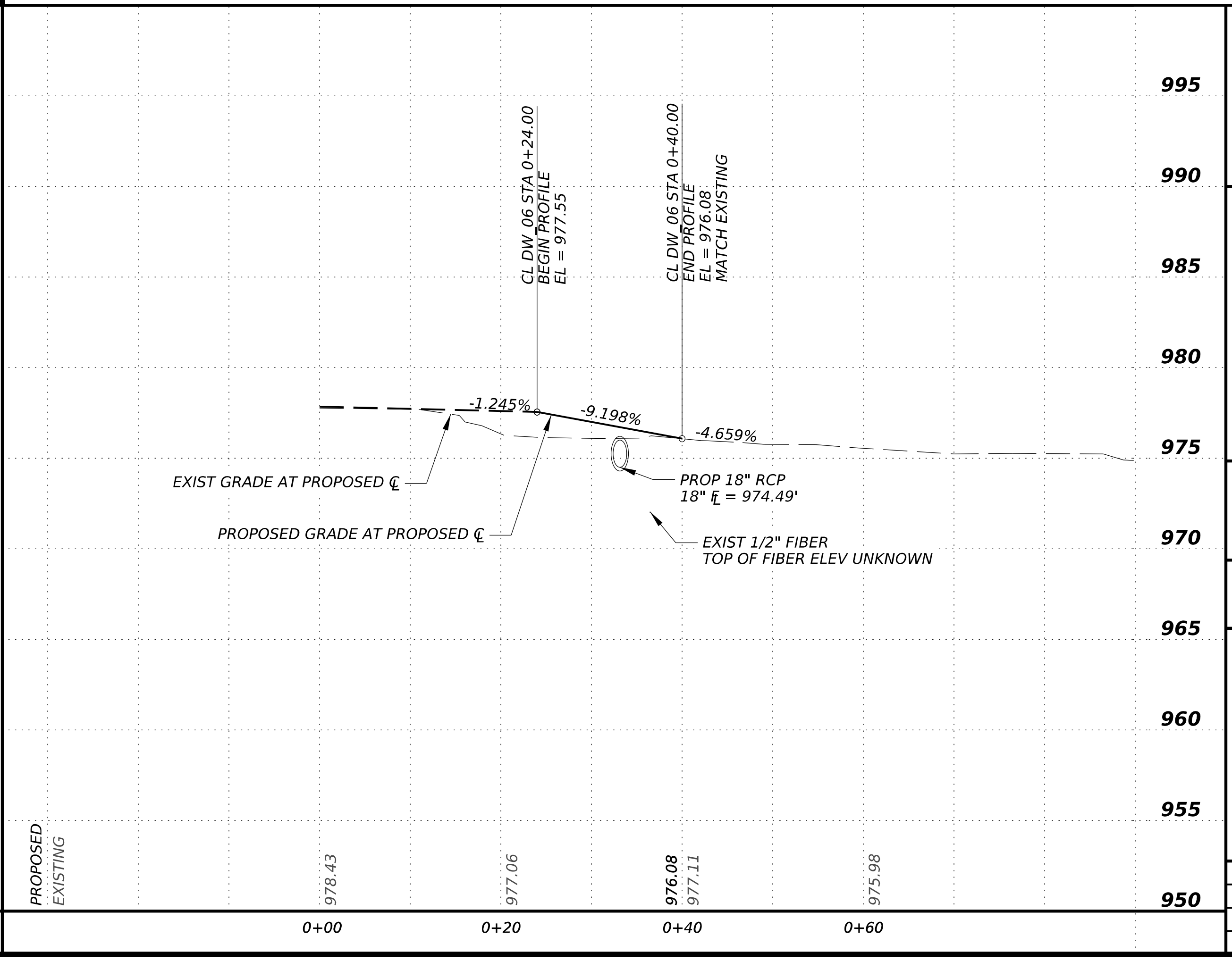
▨	PROPOSED PAVEMENT
▨	PROPOSED DRIVEWAY / MB TURNOUT
— —	SAWCUT LINE
→·—	PROPOSED DITCH
—·—	EXISTING ROW
○○○○○	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - -	DRAINAGE EASEMENT
~→	FLOW ARROW

NOTES:

1. REFER TO ROADWAY GENERAL NOTES FOR UTILITY LEGEND AND NOTES APPLICABLE TO ALL ROADWAY SHEETS.
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.

NO	CL	STATION	OFFSET	DESCRIPTION	FL ELEV
1	RM 1826_3	242+26.47	24.00' LT	PC EOP	-
2	DW_06	0+34.00	8.50' LT	PT EOP	-
3	DW_06	0+37.40	8.50' LT	PC EOP	-
4	DW_06	0+40.00	8.50' RT	PT EOP, MATCH EXISTING	-
5	DW_06	0+40.00	8.50' RT	PT EOP, MATCH EXISTING	-
6	DW_06	0+37.40	8.50' LT	PC EOP	-
7	DW_06	0+34.00	8.50' RT	PT EOP	-
8	RM 1826_3	242+63.47	24.00' RT	PC EOP	-
9	RM 1826_3	242+28.73	33.38' LT	BEGIN PROP 18" CL IV RCP LOW FILL DRIVEWAY CULVERT, INSTALL SET	974.73
10	RM 1826_3	242+61.22	32.89' LT	END PROP 18" CL IV RCP LOW FILL DRIVEWAY CULVERT, INSTALL SET	974.25





10' 0 10' 20'
HORZ. SCALE 1"=20'

5' 0 5' 10'
VERT. SCALE 1"=10'

ALFREDO L. LOPEZ
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Texas Department of Transportation
© 2023

RM 1826

DRIVEWAY
PLAN AND PROFILE

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	103

CK:
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CK:
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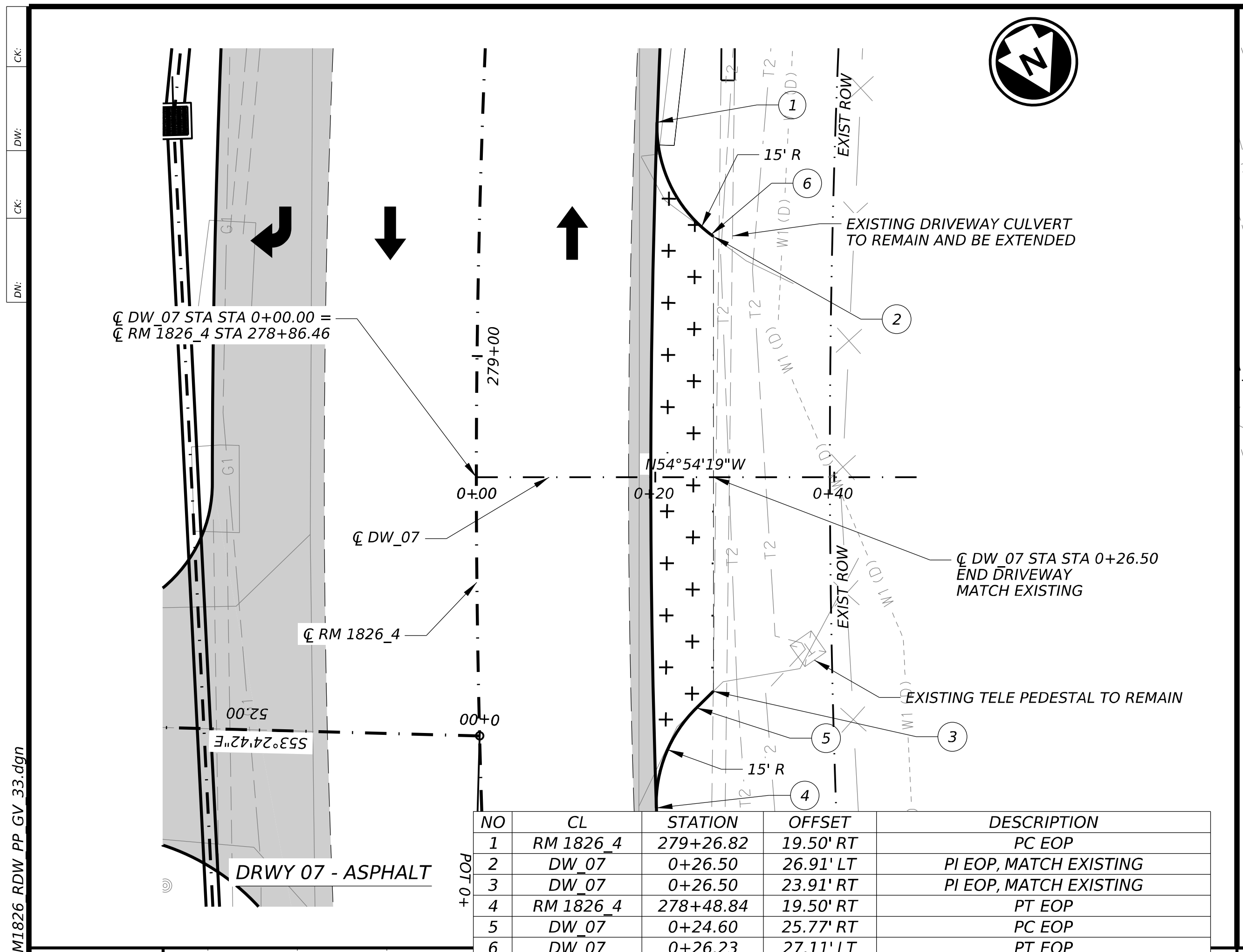
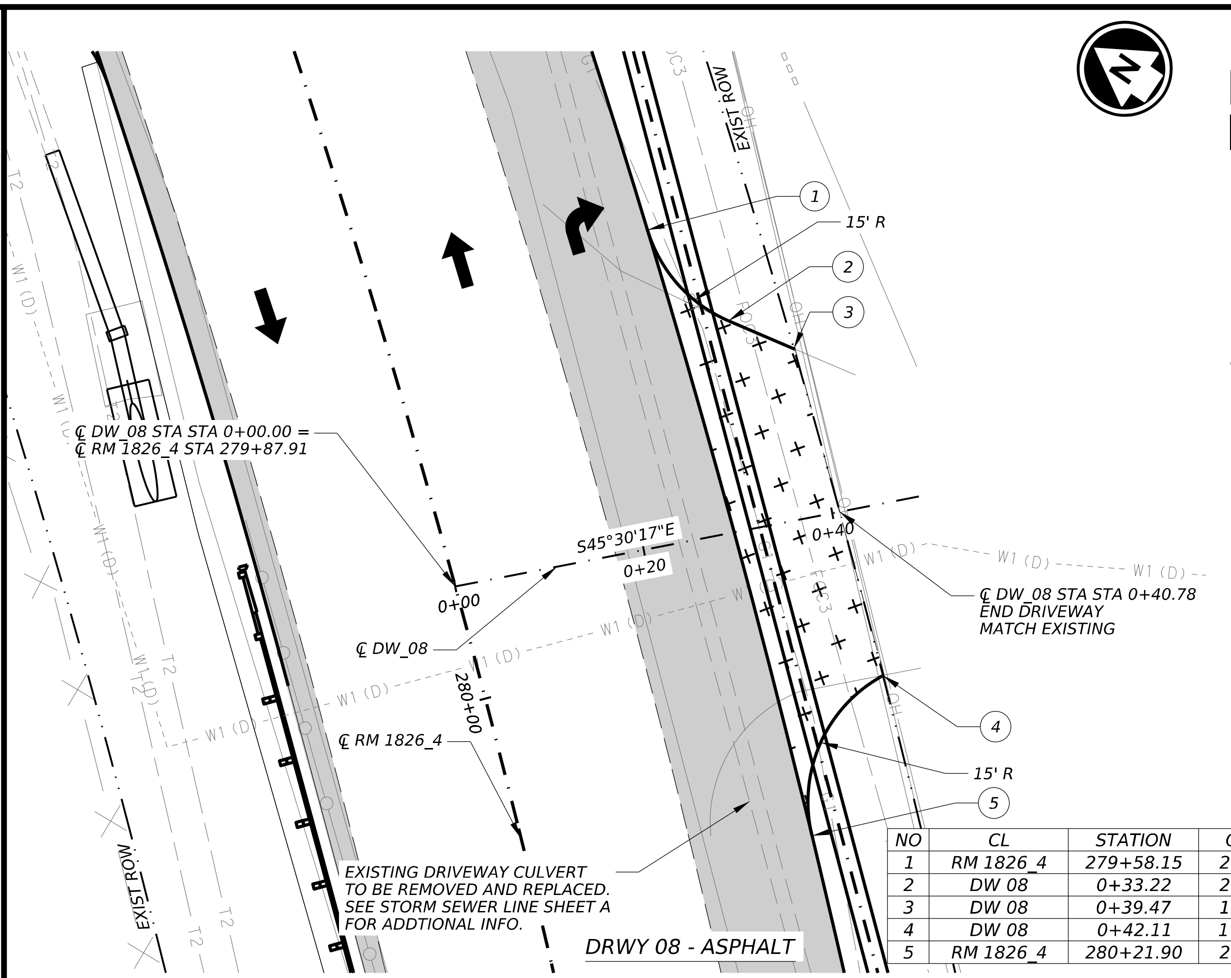


NO	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_4	279+26.82	19.50' RT	PC EOP
2	DW_07	0+26.50	26.91' LT	PI EOP, MATCH EXISTING
3	DW_07	0+26.50	23.91' RT	PI EOP, MATCH EXISTING
4	RM 1826_4	278+48.84	19.50' RT	PT EOP
5	DW_07	0+24.60	25.77' RT	PC EOP
6	DW_07	0+26.23	27.11' LT	PT EOP



NO	CL	STATION	OFFSET	DESCRIPTION
1	RM 1826_4	279+58.15	29.50' LT	PC EOP
2	DW 08	0+33.22	21.74' LT	PT EOP
3	DW 08	0+39.47	17.50' LT	PI EOP, MATCH EXISTING
4	DW 08	0+42.11	17.55' RT	PC EOP, MATCH EXISTING
5	RM 1826_4	280+21.90	29.50' LT	PT EOP

LEGEND

▨	PROPOSED PAVEMENT
+ + +	PROPOSED DRIVEWAY / MB TURNOUT
— — —	SAWCUT LINE
—·→·—	PROPOSED DITCH
—·—·—	EXISTING ROW
o o o o o	PROPOSED METAL BEAM GUARD FENCE
⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
×—×—×	FENCE LINE
- - - -	DRAINAGE EASEMENT
∼→	FLOW ARROW

NOTES:

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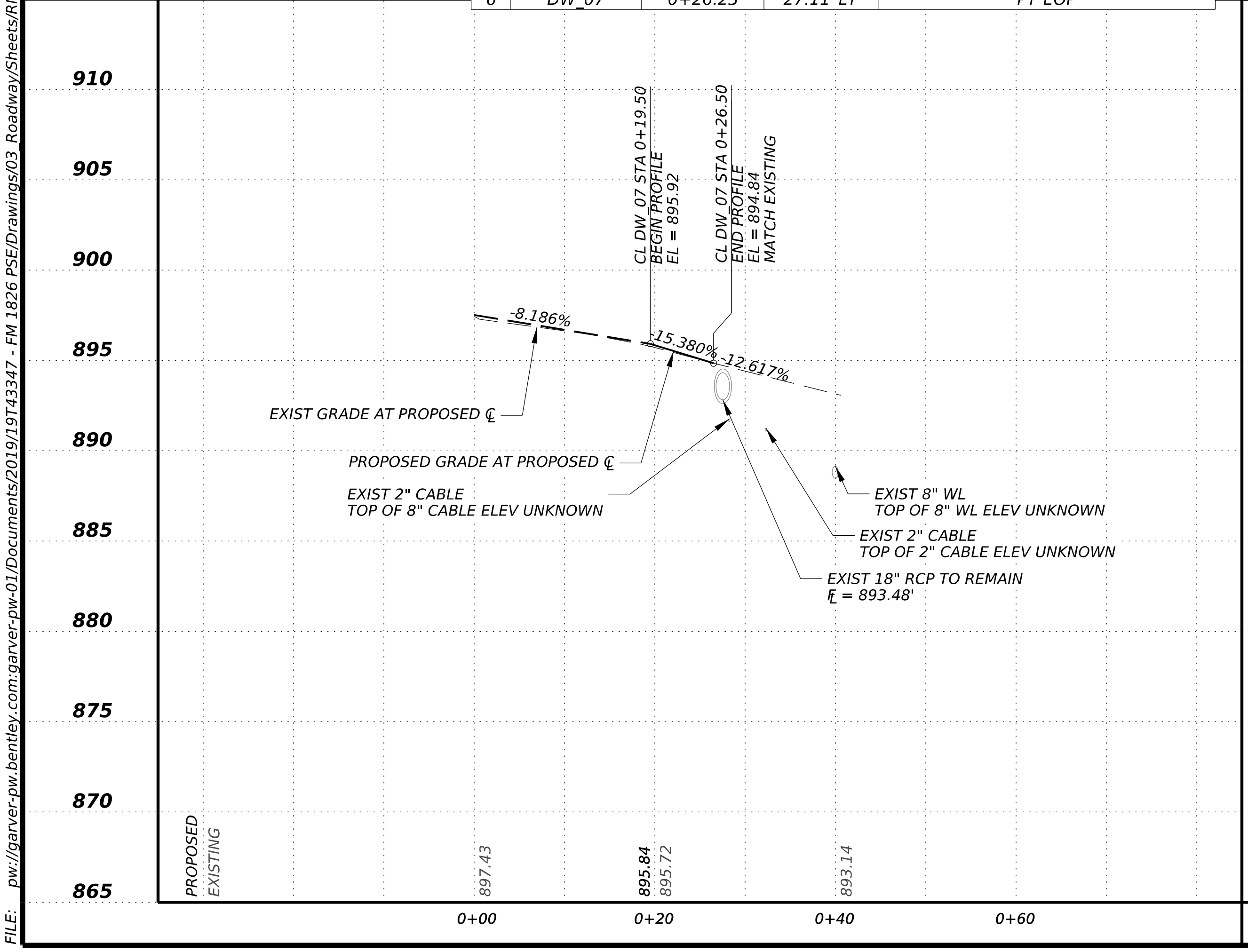
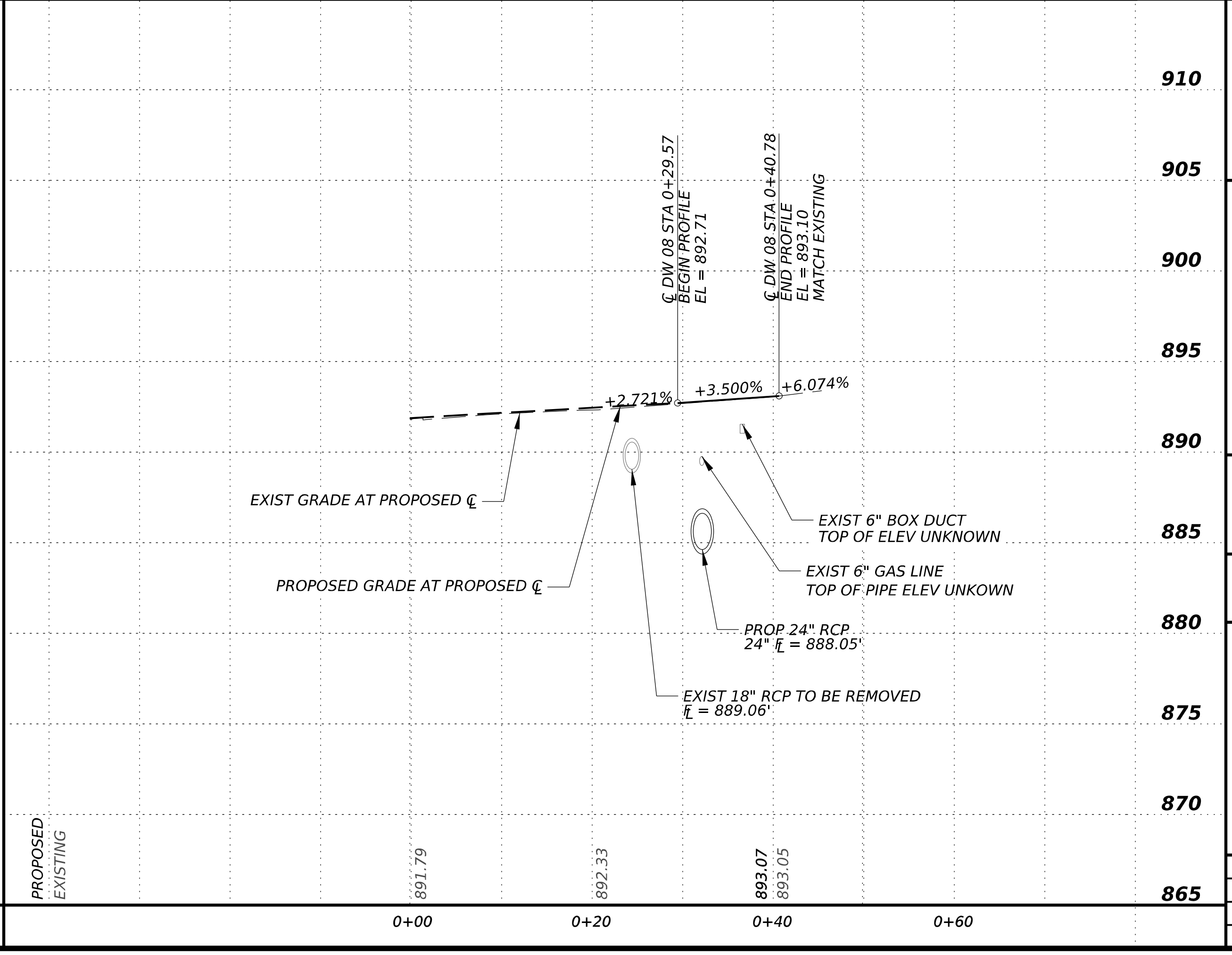
2. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL CURVE INFORMATION.





10' 0 10' 20'
HORZ. SCALE 1"=20'

5' 0 5' 10'
VERT. SCALE 1"=10'

STATE OF TEXAS
ALFREDO L. LOPEZ
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Texas Department of Transportation

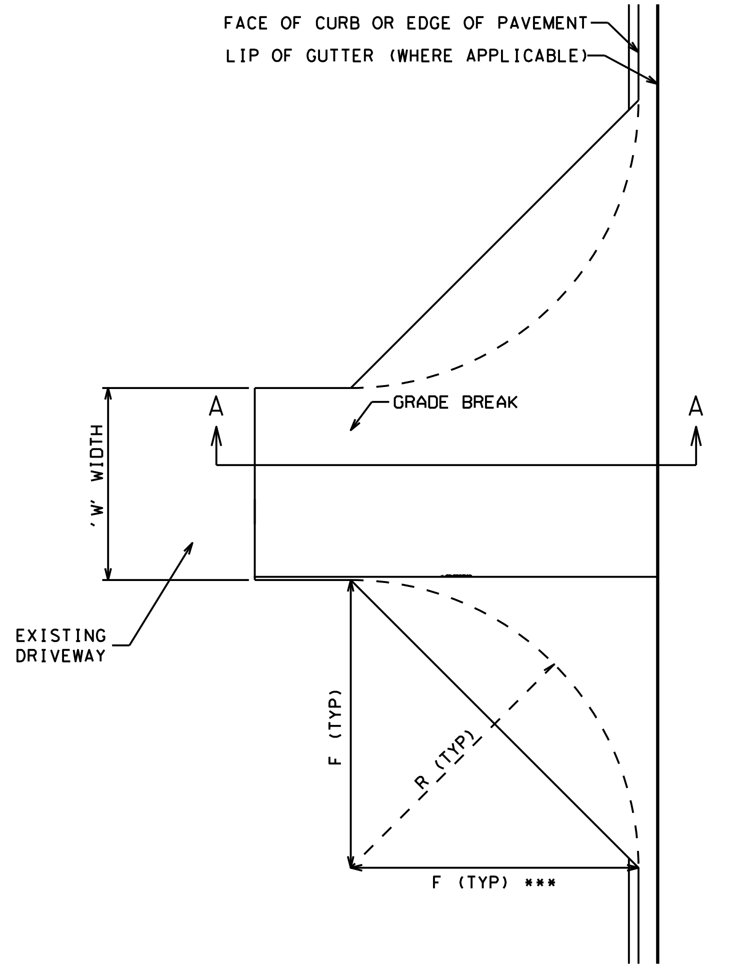
RM 1826

DRIVEWAY
PLAN AND PROFILE

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	104



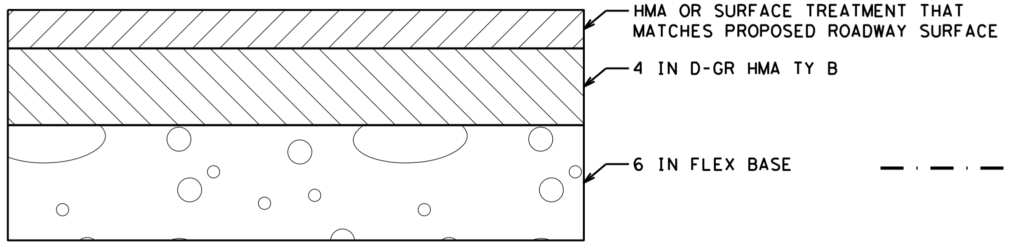
DRIVEWAY PLAN

FLARE OR RADIUS	FARM/RANCH	RESIDENTIAL	COMMERCIAL
"F" OR "R" (FT)	25	25	25

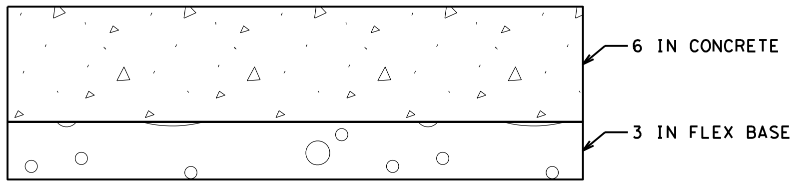
THESE ARE STANDARD DIMENSIONS UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS.

FLARES ARE TYPICALLY USED FOR SUBURBAN/URBAN (CURBED) ROADWAYS. RADII ARE TYPICALLY USED FOR RURAL OR UNCURBED ROADWAYS.

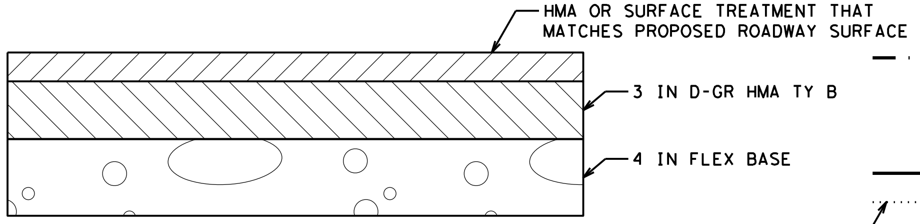
*** THIS 'F' DIMENSION MAY BE REDUCED TO KEEP WORK WITHIN THE ROW.



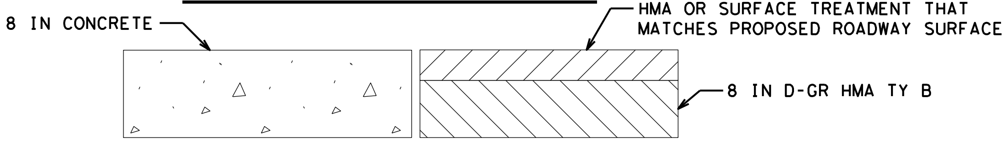
HMA OR SURFACE TREATEMENT - COMMERCIAL



CONCRETE - ALL DRIVEWAY TYPES

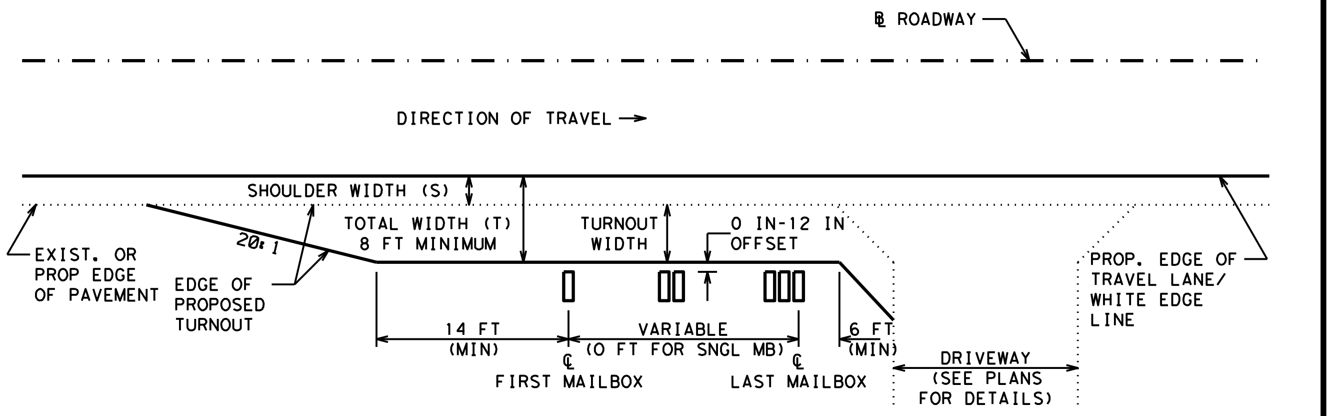


HMA OR SURFACE TREATMENT - FARM/RANCH/RESIDENTIAL

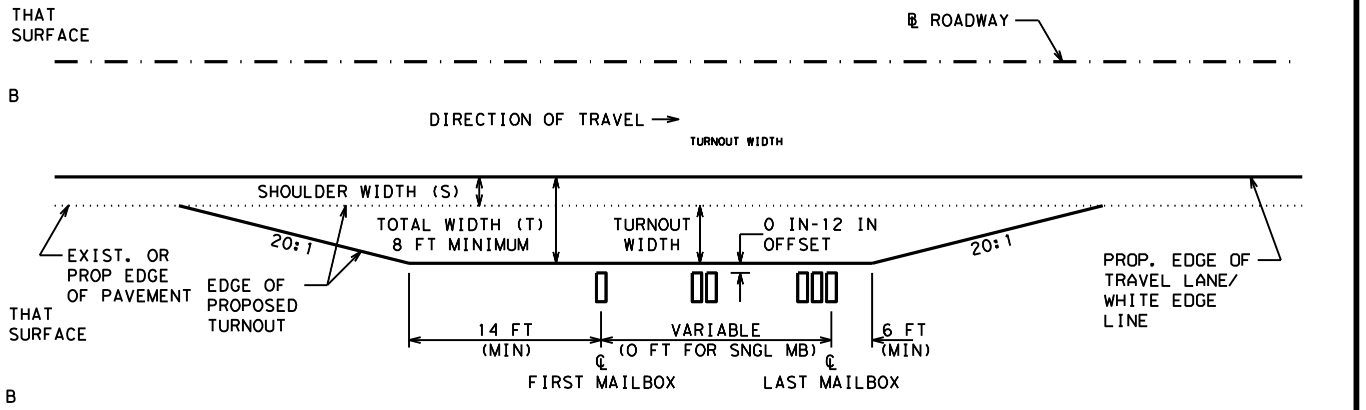


FAST TRACK ACP (TYPE 3) OR CONCRETE

DRIVEWAY AND TURNOUT TYPICAL SECTIONS

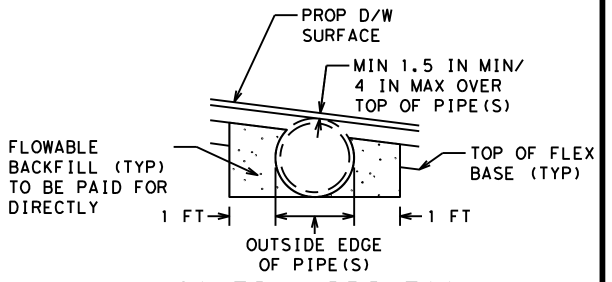


MAILBOX TURNOUT PLAN WITH DRIVEWAY



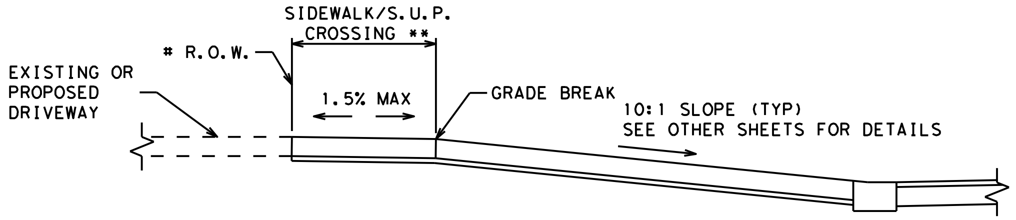
MAILBOX TURNOUT PLAN WITHOUT DRIVEWAY

ALFREDO L. LOPEZ
101155
5/30/2023



LOW FILL DRIVEWAY

ONLY ONE PIPE SHOWN
SEE ELSEWHERE ON THE PLANS FOR SPECIFIC DRIVEWAY DETAILS



* ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED

DRIVEWAY WITH GUTTER SECTION A-A

ENSURE GRADE BREAK DOES NOT EXCEED 8% UNLESS OTHERWISE DIRECTED. PROVIDE ABSOLUTE MINIMUM SIDEWALK CROSSING WIDTH OF 4' FOR DRIVEWAYS WIDTH OF 20' OR LESS

** LOCATE SIDEWALK CROSSING TO ALIGN WITH ADJACENT SIDEWALK; SIDEWALK/S.U.P. WIDTH AND LOCATION SHOWN ELSEWHERE ON THE PLANS.

GENERAL NOTES

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

IN LIEU OF PFC OR TOM, SURFACE MUST BE 1.5" D-GR HMA TY D. IF SURFACE IS A MULTIPLE COURSE SURFACE TREATEMENT, ALL COURSES MUST BE PLACED ON DRIVEWAY. SURFACE HMA IS PG 76-22. NON SURFACE HMA IS PG 64-22 AND MAY BE BLADE LAID.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

FAST TRACK DRIVEWAYS MUST BE CLOSED, CONSTRUCTED, AND REOPENED WITHIN 24 HOURS.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING 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 IMPACTS 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
Austin District Standard

DRIVEWAYS AND MAILBOX TURNOUTS

DWMB-22 (AUS)

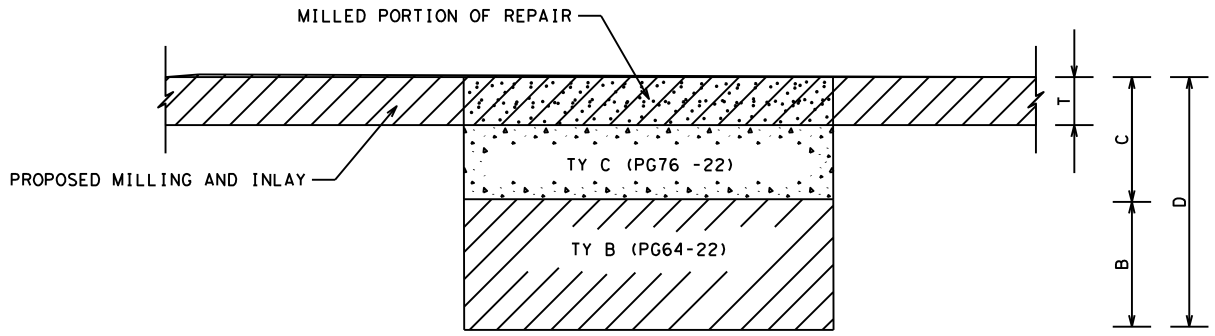
REVISIONS
01/16: SHEET CREATED
04/19: APPROVED
11/20: TABLE REVISED, GN ADDED, PLAN & PROFILE MODIFIED
01/22: ADDED TURNOUT INFO

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	105

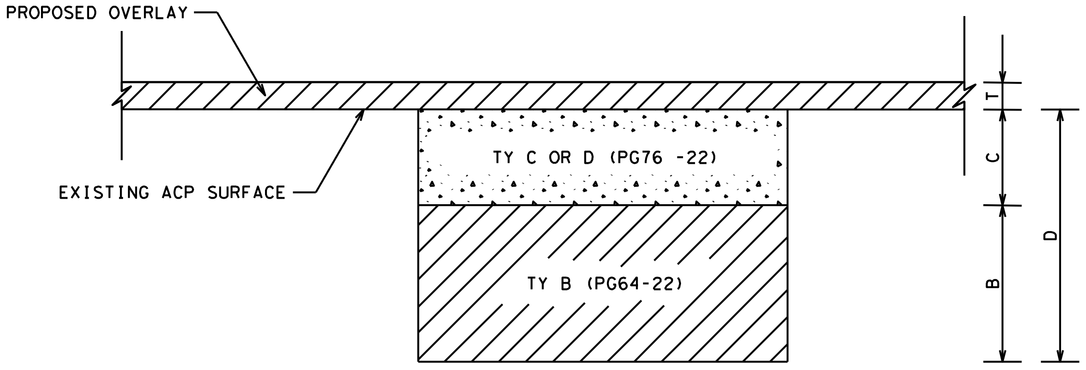
DATE: 5/30/2023 5:17:26 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/03 Roadway/Standards/dwmb-22.dgn

REPAIR DEPTH W/ MILLING	T = 1 IN		T = 1.5 IN		T = 2 IN	
	TY C	TY B	TY C	TY B	TY C	TY B
<= 4	4	0	4	0	4	0
5	5	0	5	0	5	0
6	6	0	6	0	6	0
7	3	4	4	3	4	3
8	4	4	4	4	4	4
>= 9	4	D-4	4	D-4	4	D-4

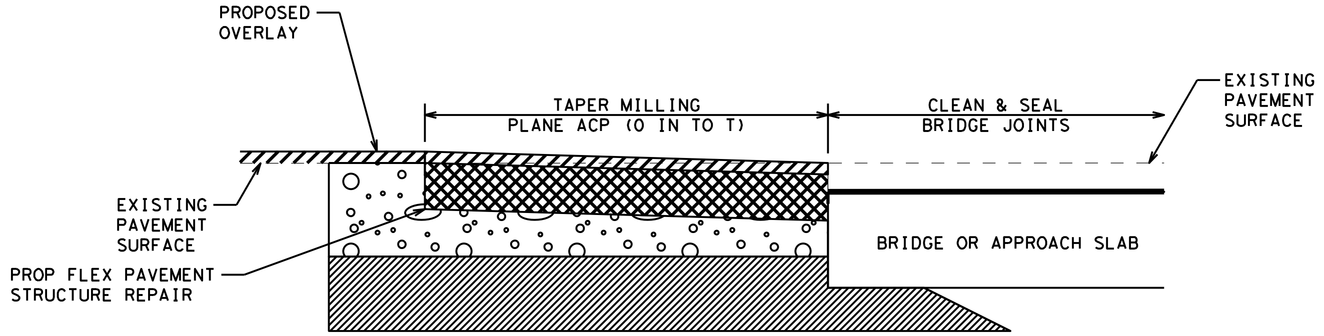


REPAIR WITH MILLING

REPAIR DEPTH W/O MILLING	TY D	TY C	TY B
2	2	0	0
3	0	3	0
4	0	4	0
5	0	5	0
6	0	6	0
7	2	0	5
8	2	0	6
>= 9	2	0	D-4

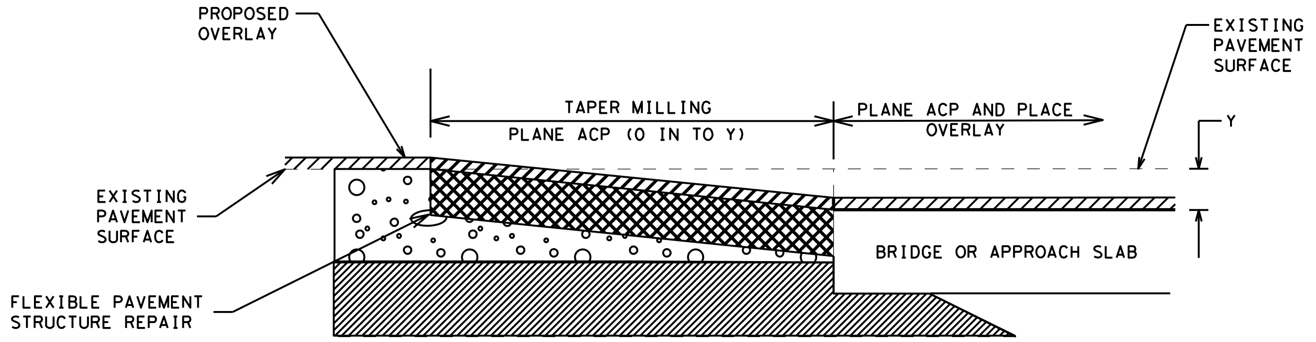


REPAIR WITHOUT MILLING



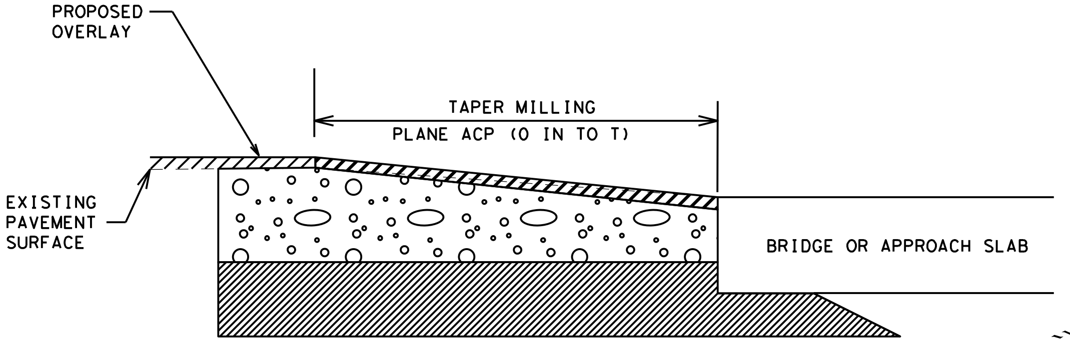
BRIDGE APPROACH/DEPARTURE TRANSITION

MATCHING EXISTING ACP ON BRIDGE



BRIDGE APPROACH/DEPARTURE TRANSITION

REMOVING EXISTING ACP ON BRIDGE



BRIDGE APPROACH/DEPARTURE TRANSITION

MATCH EXISITING BRIDGE DECK

FLEX PAV REPAIR NOTES

T = OVERLAY/INLAY THICKNESS (IN)
D = REPAIR DEPTH
C = TY C/D ACP DEPTH
B = TY B ACP DEPTH

TY B MAY BE BLADE LAID.

TY C/D MUST BE PAVER LAID.

TY C/D MAX LIFT THICKNESS 3 IN

TY B MAX LIFT THICKNESS 5 IN

ALL ACP PER ITEM 3076.

FOLLOWING WORK IS SUBSIDIARY:
-SAW CUT ALL EDGES
-TACK ALL ACP SURFACES AND LAYERS

BRIDGE APPROACH MILLING NOTES

T = OVERLAY/INLAY THICKNESS (IN)
Y = DEPTH OF MILLING ON BRIDGE

TAPER LENGTH = 100 FT PER 1 IN OF T OR Y

ENGINEER SHOULD INCLUDE WORK TO ADJUST MBGF TO MEET STANDARD HEIGHT. ADJUSTMENT TO MBGF WILL BE PAID USING APPROPRIATE BID ITEMS.

ENGINEER MUST INCLUDE WORK TO ADJUST MOWSTRIP TO ELIMINATE PONDING.

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101155
5/30/2023
Alfred Lopez

NOT TO SCALE

Texas Department of Transportation

Austin
District
Standard

FLEXIBLE PAVEMENT DETAILS

FLEXPAVE(3)-22 (AUS)

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	106

DATE: 5/30/2023 12:37:27 AM
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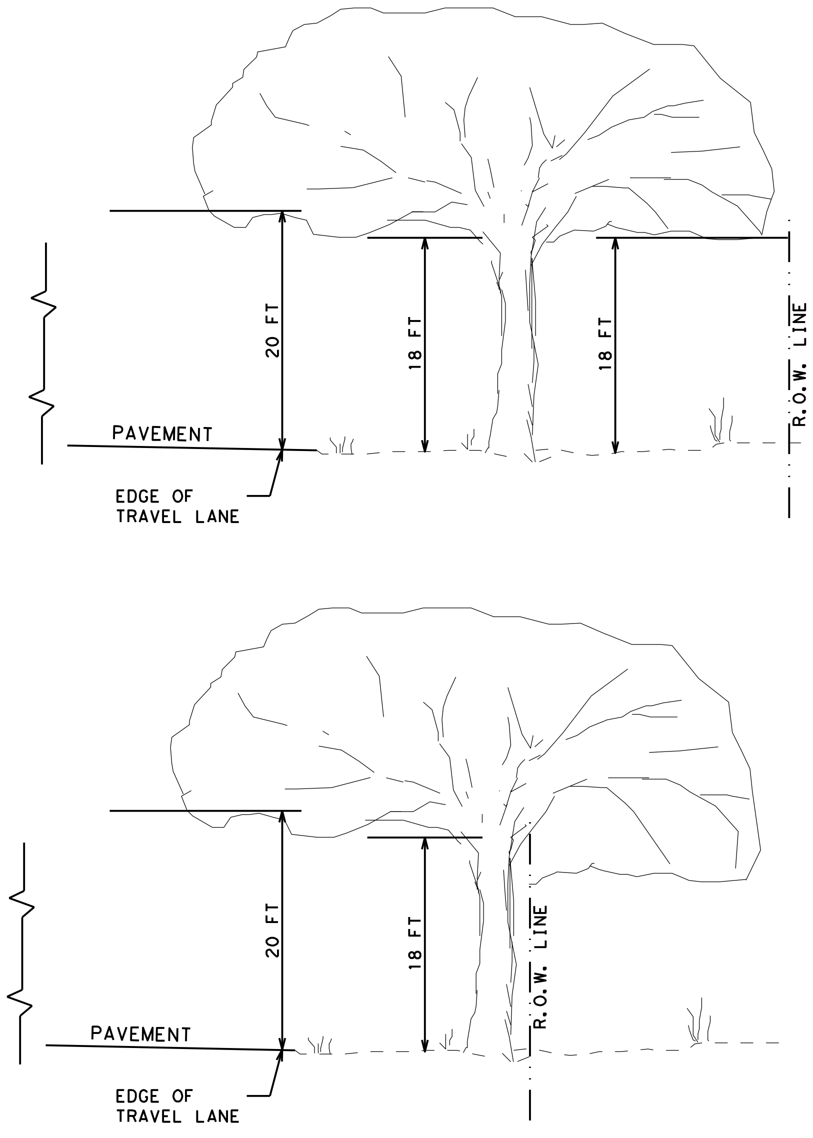
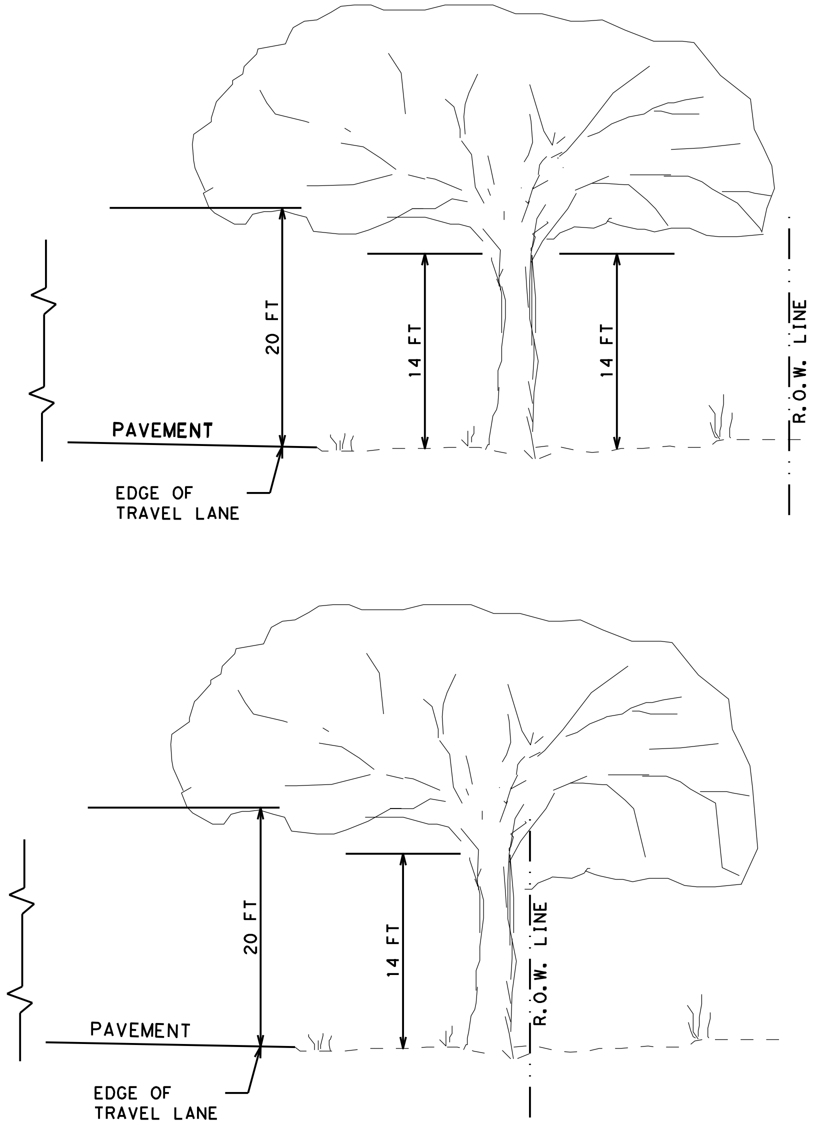


NON-OAK SPECIES
TREE PRUNING LIMITS

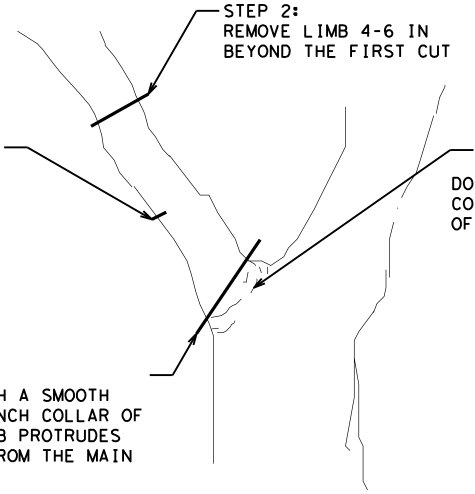


OAK SPECIES
TREE PRUNING LIMITS

GENERAL NOTES

PAYMENT FOR THIS WORK IS SUBSIDIARY TO PREP R.O.W.

1. REMOVE ALL DEAD TREES, DEAD BRUSH, AND DEAD MULTI-TRUNKED TREES WITHIN THE R.O.W.. TREES, SHRUBS, OR MULTI-TRUNKED TREES THAT DIE DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO COMPLETION OF THE PROJECT.
2. USE WORK METHODS IN ACCORDANCE WITH ANSI A300 STANDARDS AND ITEM 752.
3. FLAILING EQUIPMENT IS NOT ALLOWED ON OAK TREES.
4. REPAIR DAMAGE TO PRIVATE FENCES AND/OR PRIVATE PROPERTY.
5. PERFORM TREE PRUNING ONLY WITHIN THE R.O.W.. NO CUTS SHALL BE MADE OUTSIDE THE R.O.W..
6. PERFORM TREE PRUNING PER DETAIL FOR ENTIRE R.O.W. AREA WITHIN PROJECT LIMITS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT TREE PRUNING.
7. REVIEW EPIC SHEETS FOR AREAS TO BE AVOIDED DUE TO ENVIRONMENTAL REASONS OR ADDITIONAL NOTES THAT PERTAIN TO TREE PRUNING.
8. MIGRATORY BIRDS AND BATS MAY BE NESTING WITHIN THE PROJECT LIMITS. PERFORM TREE TRIMMING OUTSIDE THE NESTING SEASON DATES LISTED IN THE GENERAL NOTES.
9. NO TRIMMING OF THE VEGETATION THAT CONTAINS AN ACTIVE NEST FOR MIGRATORY BIRDS IS ALLOWED.
10. THE TRIMMING OR CUTTING OF RED OAK AND LIVE OAK SPECIES FOR PURPOSES OTHER THAN PROTECTING PUBLIC SAFETY IS ONLY PERMITTED BETWEEN JULY 1ST AND JANUARY 31ST AND PROHIBITED BETWEEN FEBRUARY 1ST AND JUNE 30TH
11. ALL PRUNING CUTS MUST BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE EXPOSED SURFACE FROM CONTAMINATION. USE OF AEROSOL CAN IS THE PREFERRED METHOD OF APPLICATION FOR SEALING CUTS. ANY WOUNDS, WHETHER MADE BY TRIMMING, CONSTRUCTION OR ACCIDENT, SHALL BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE SURFACE FROM CONTAMINATION. THE TXDOT INSPECTOR MAY CONDUCT UNANNOUNCED INSPECTIONS TO ENSURE COMPLIANCE.
12. IF MORE THAN 25% OF THE TREE CANOPY WILL BE REMOVED CONTACT THE TXDOT ABORIST OR INSPECTOR FOR APPROVAL PRIOR TO PROCEEDING.



STEP 2:
REMOVE LIMB 4-6 IN
BEYOND THE FIRST CUT

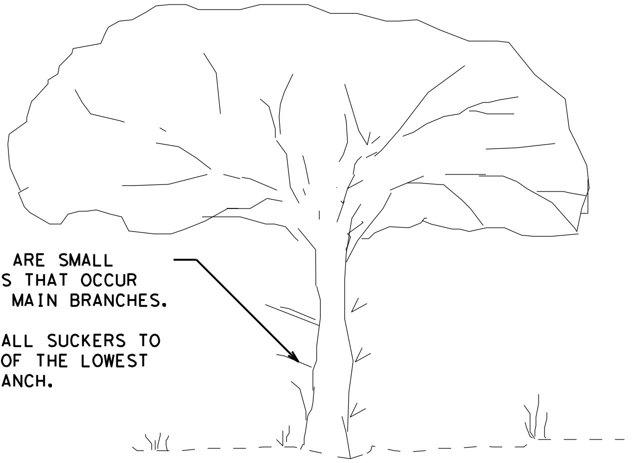
STEP 1:
CUT 1/3 WAY
THROUGH BOTTOM OF
LIMB 8-12 IN ABOVE
MAIN STEM OR TRUNK

BRANCH COLLAR

DO NOT DAMAGE BRANCH
COLLAR DURING PRUNING
OF ANY TYPE

STEP 3:
REMOVE STUB WITH A SMOOTH
CUT SO THAT BRANCH COLLAR OF
THE REMOVED LIMB PROTRUDES
APPROX.1/2 IN FROM THE MAIN
STEM

PROPER TREE PRUNING
FOR LIMBS 2" IN DIA. AND GREATER



SUCKERS ARE SMALL
BRANCHES THAT OCCUR
BENEATH MAIN BRANCHES.

REMOVE ALL SUCKERS TO
HEIGHT OF THE LOWEST
MAIN BRANCH.

SUCKER REMOVAL DETAIL

ALFREDO L. LOPEZ
101155
5/30/2023

Alfred Lopez

Texas Department of Transportation

Austin
District
Standard

PREP R.O.W.
PRUNING
DETAIL

PRWPD-20 (AUS)

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	107

DATE: 5/30/2023 12:37:38 AM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/03 Roadway/Standards/prwpd-20.dgn

DATE:
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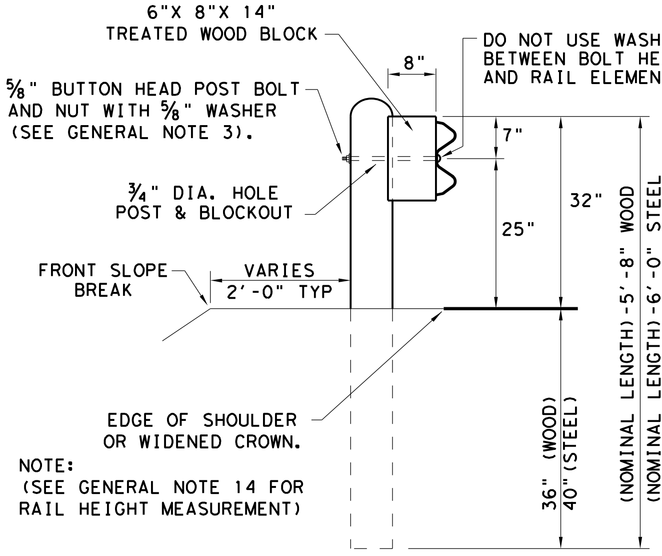
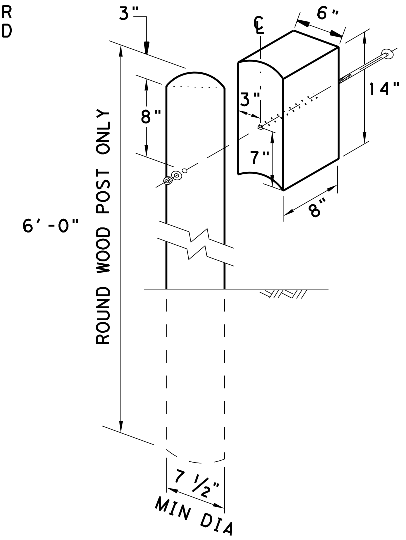


NOTE:
(SEE GENERAL NOTE 14 FOR
RAIL HEIGHT MEASUREMENT)

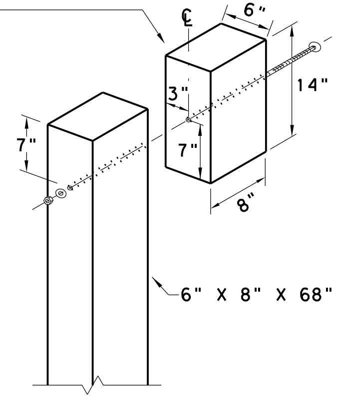
TYPICAL POST PLACEMENT



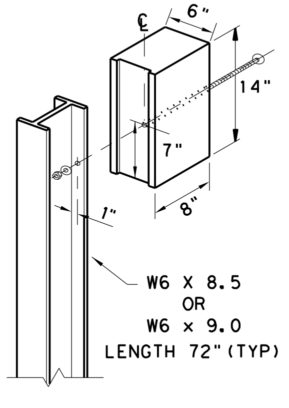
WOOD BLOCK TO ROUND WOOD POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

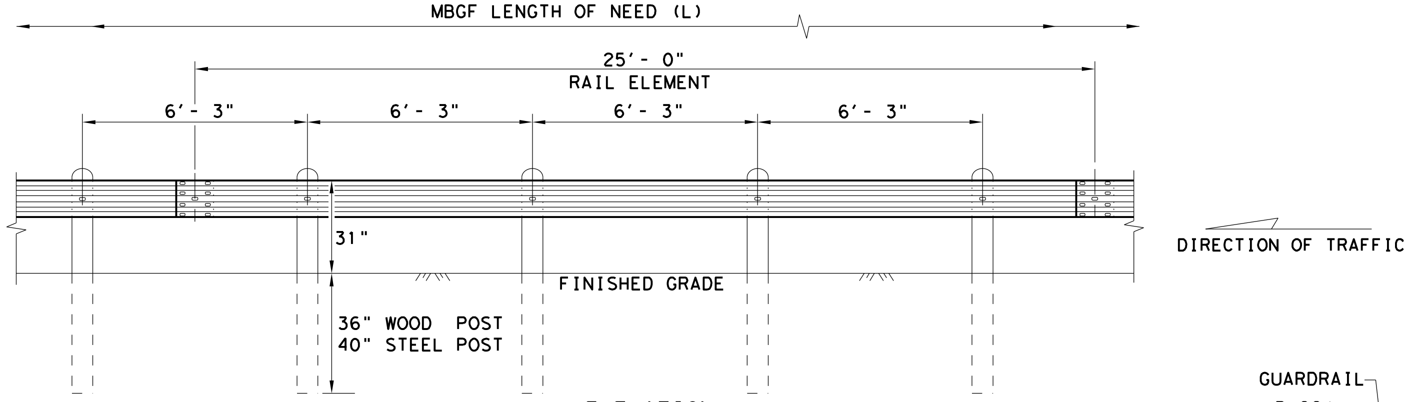
NOTE: TOENAIL WITH ONE 16D GALV. NAIL
TO PREVENT BLOCK ROTATION.



WOOD BLOCK TO RECTANGULAR WOOD POST

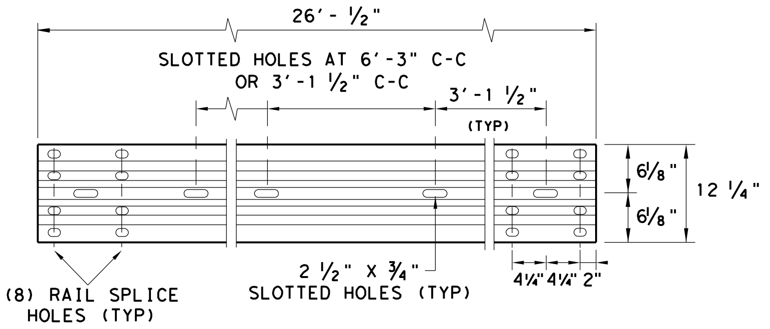


ROUTED WOOD BLOCK TO I-BEAM STEEL POST



ELEVATION
MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



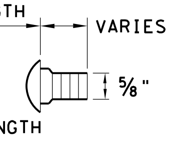
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH

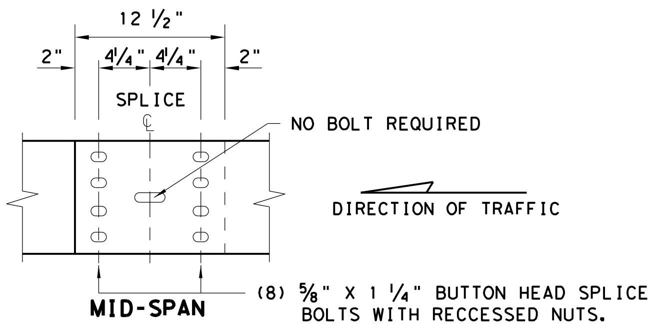
FBB01 = 1 1/4"
FBB02 = 2"



POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

BUTTON HEAD BOLT

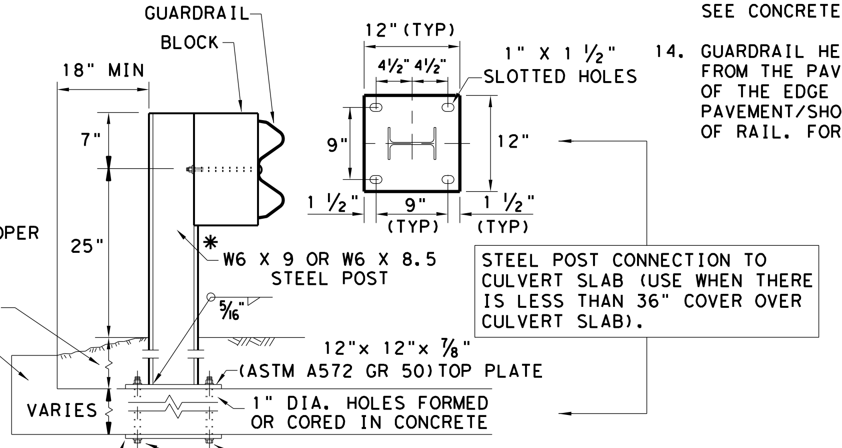
NOTE: SEE GENERAL NOTE 3 FOR
SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE
REQUIRED WITH 6'-3" POST SPACINGS.

*POST(S) MAY REQUIRE FIELD
MODIFICATION TO ENSURE PROPER
GUARDRAIL HEIGHT.



12" X 12" X 1/4" (ASTM A36) STEEL BOTTOM
PLATE WITH 1" DIA. HOLES REQUIRED WITH
BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

NOTE: TRANSITIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

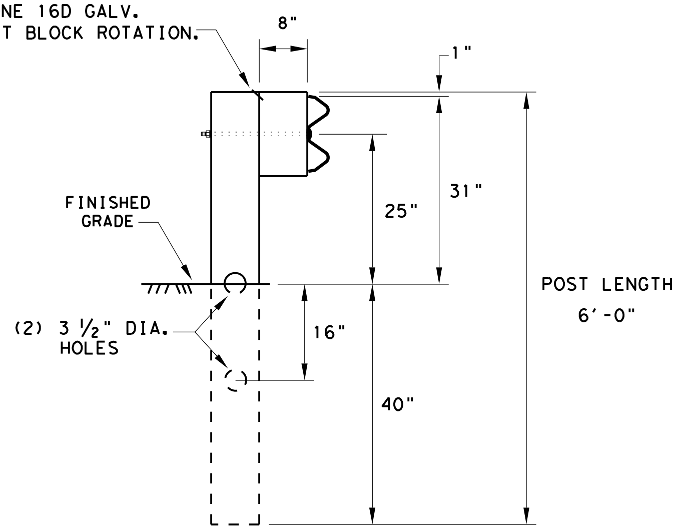
Texas Department of Transportation

Design
Division
Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT

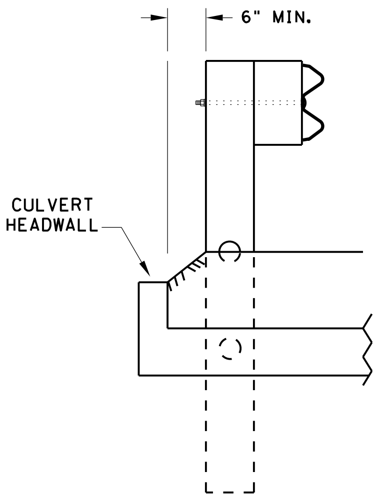
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		108



RECTANGULAR CRT POST
(6"X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS

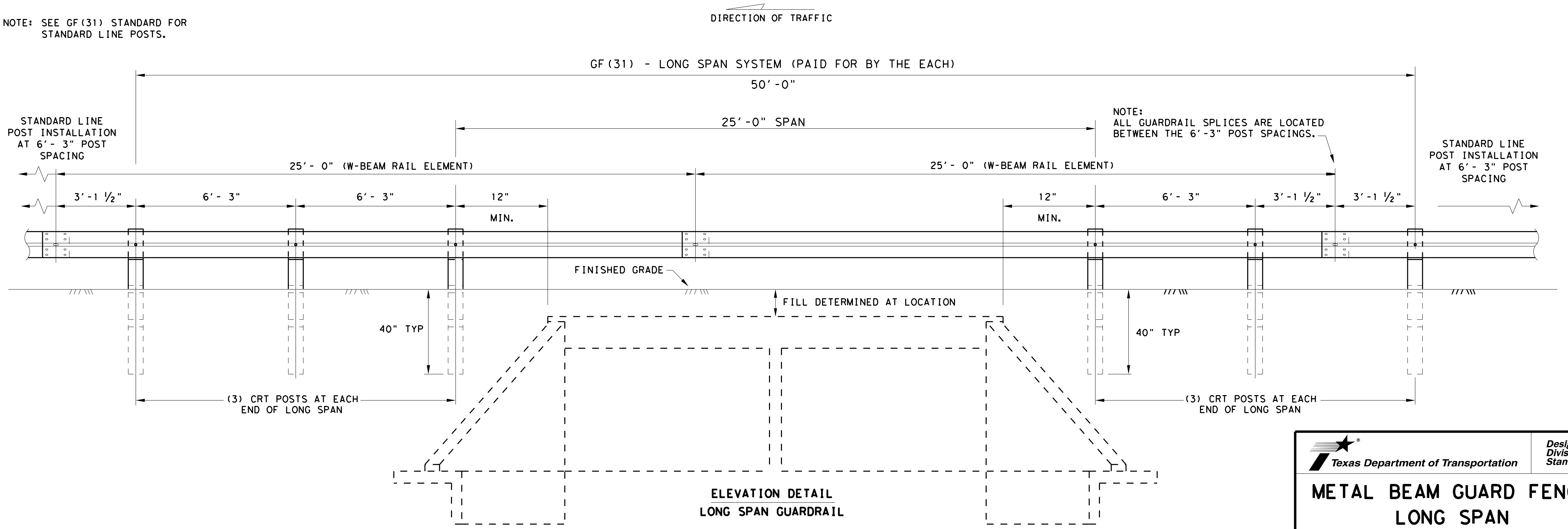


LATERAL OFFSET BETWEEN THE GUARDRAIL AND THE CULVERT HEADWALL

GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12'- 6" OR 25'- 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3'- 1 ½" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

NOTE: SEE GF(31) STANDARD FOR STANDARD LINE POSTS.



ELEVATION DETAIL
LONG SPAN GUARDRAIL

Texas Department of Transportation

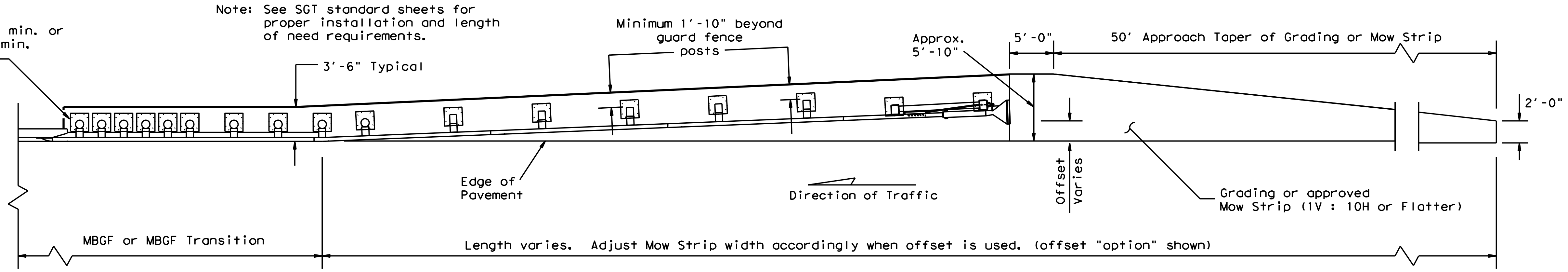
Design Division Standard

METAL BEAM GUARD FENCE
LONG SPAN
TL-3 MASH COMPLIANT

GF(31)LS-19

FILE: gf31ls19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		109

DATE:
FILE:

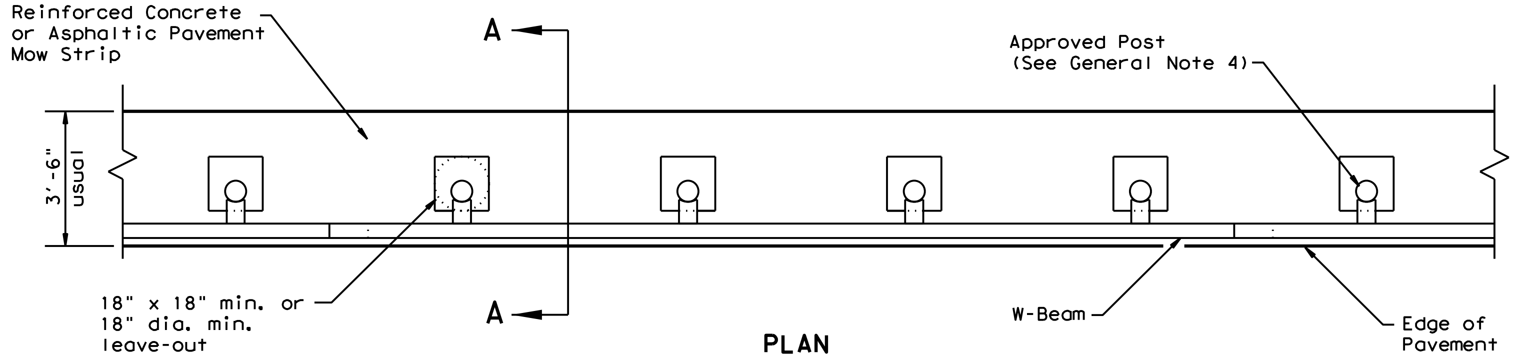


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)

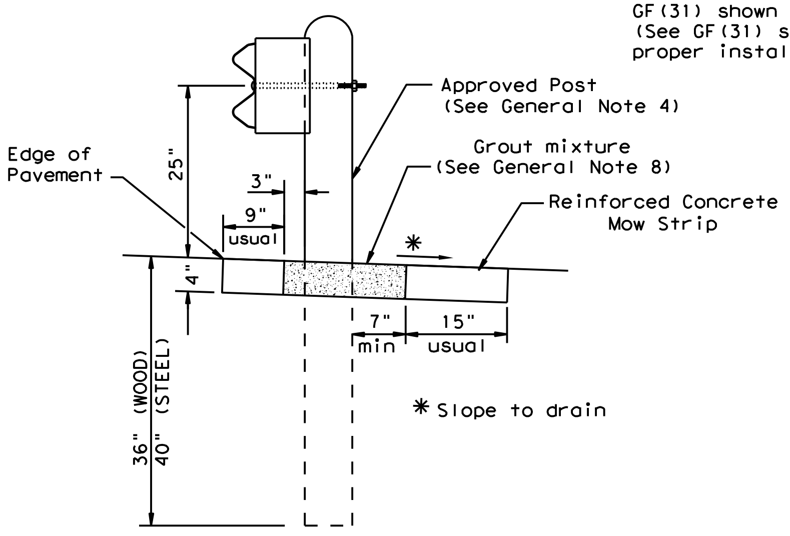
Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.



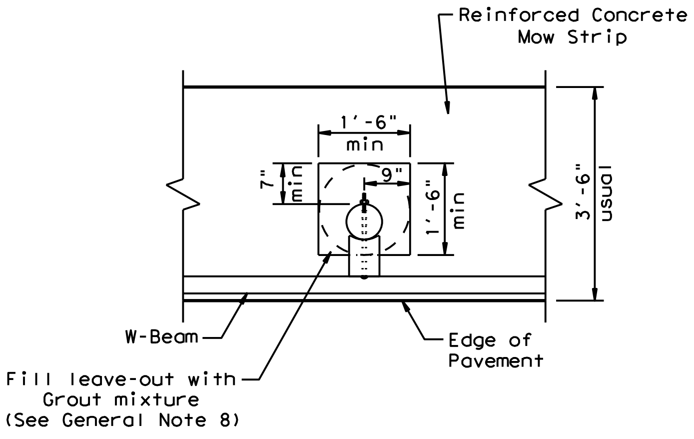
PLAN

GF(31) shown with Mow Strip (See GF(31) standard sheet for proper installation)



SECTION A-A

Typical

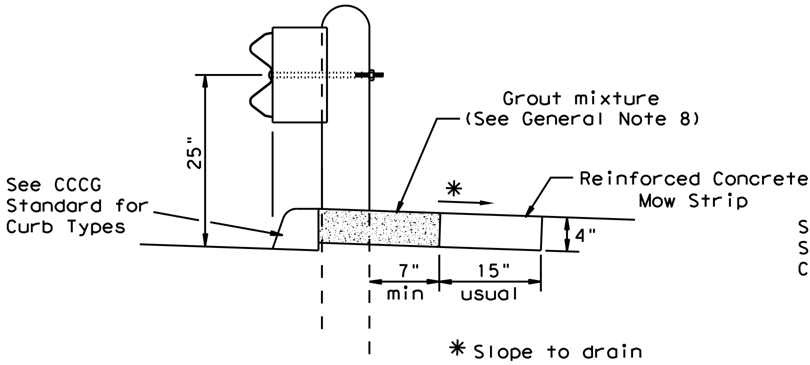


MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

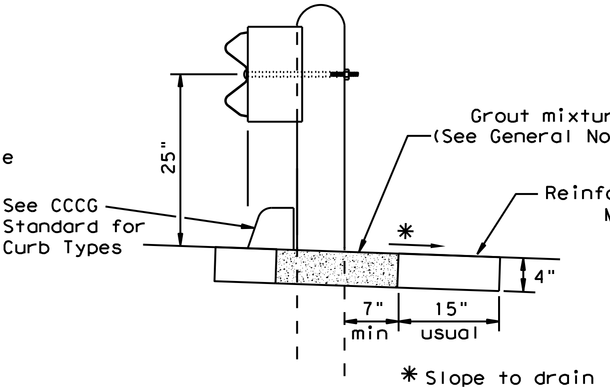
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



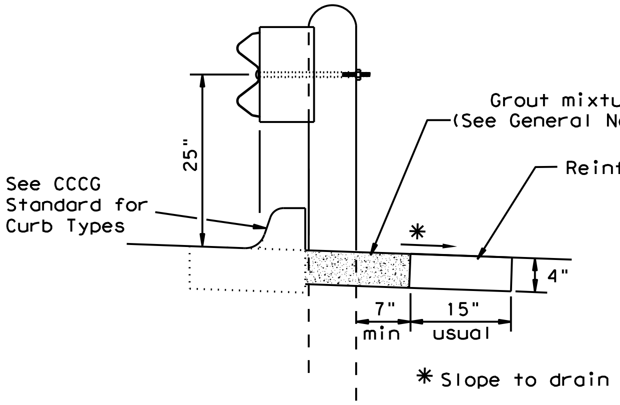
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
(MOW STRIP)
TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG

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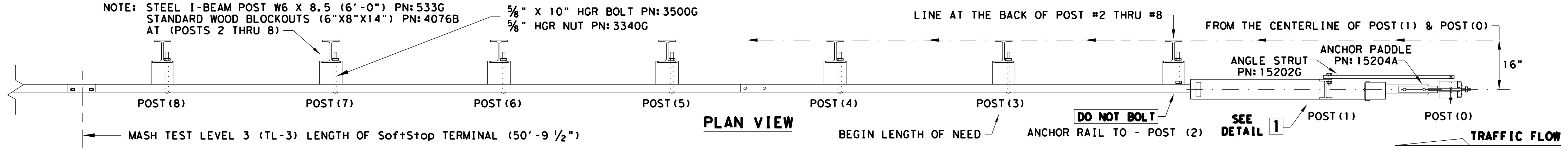
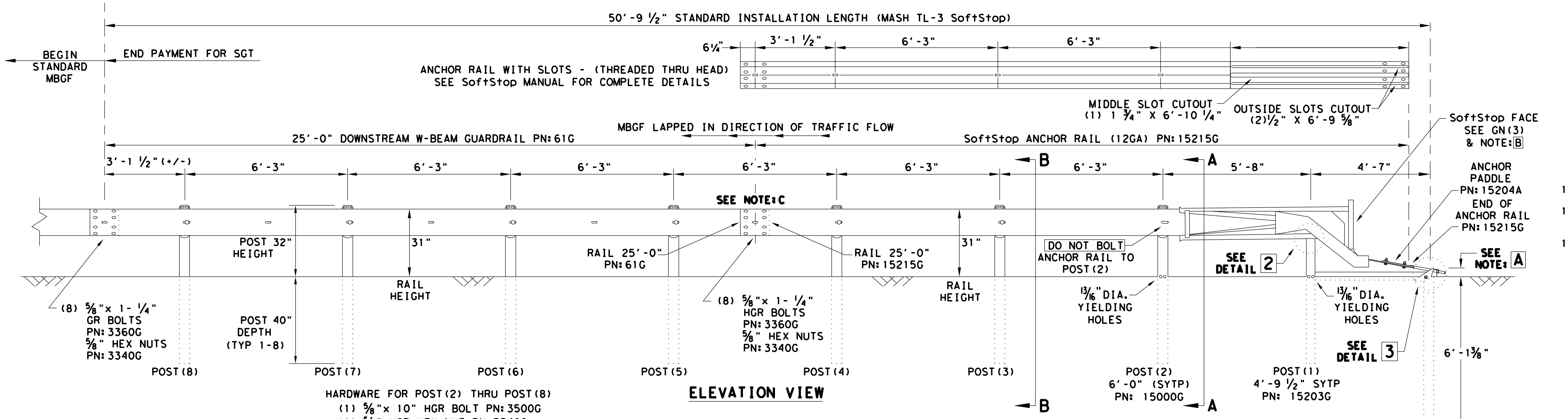
REVISIONS

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	110



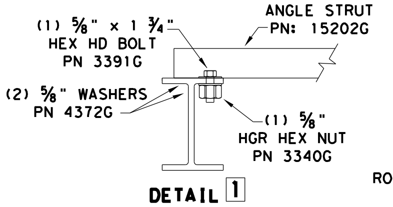
PLAN VIEW



ELEVATION VIEW

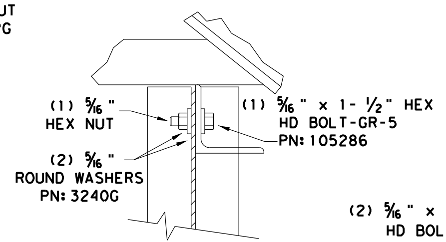
HARDWARE FOR POST(2) THRU POST(8)
(1) 5/8"x 10" HGR BOLT PN:3500G
(1) 5/8" HGR HEX NUT PN:3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)



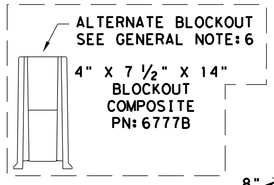
DETAIL 1

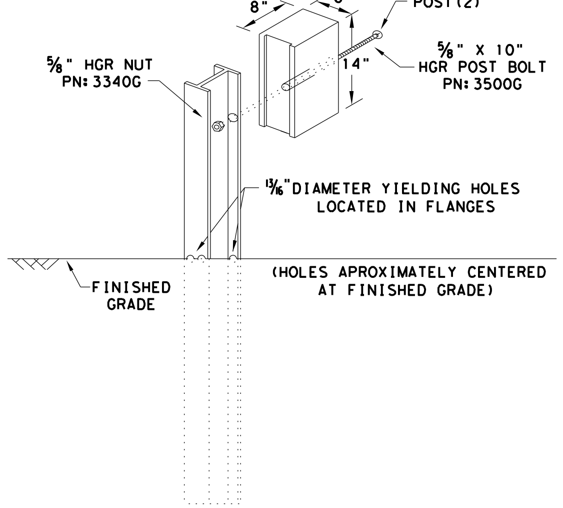
SHOWN AT POST(1) NEAR GROUND



DETAIL 2

SHOWN AT POST(1)

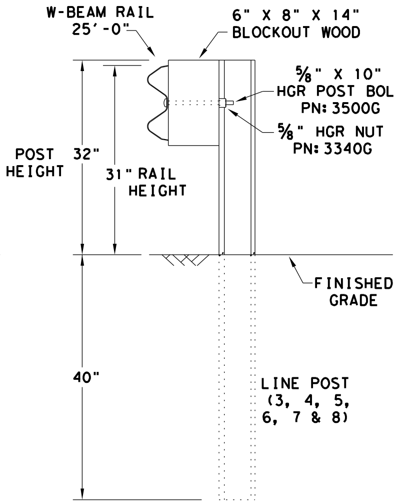




ISOMETRIC VIEW POST(1 & 2)

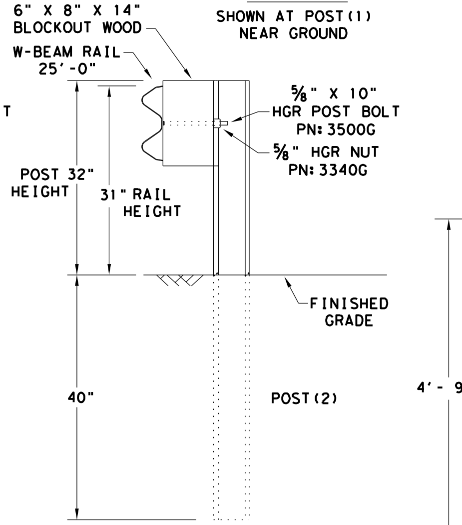
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)



SECTION VIEW B-B

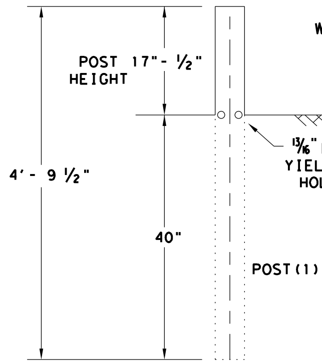
6'-0" (W6 X 8.5) I-BEAM POST PN: 533G



SECTION VIEW A-A

6'-0" (W6 X 8.5) (SYTP) I-BEAM POST PN:15000G

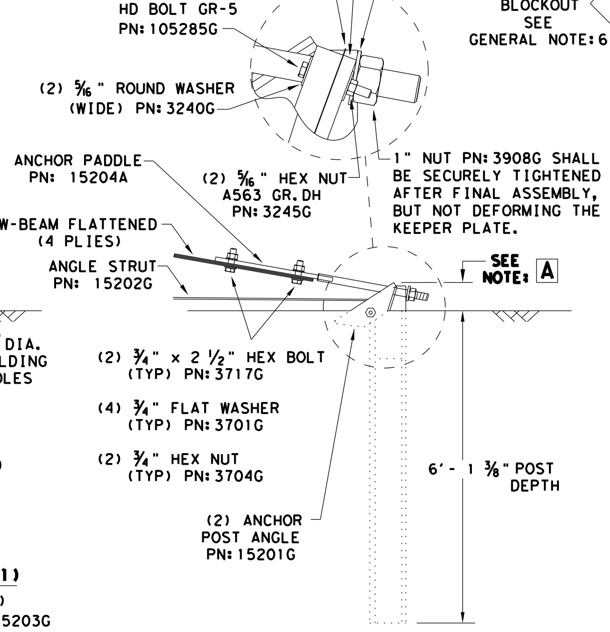
NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)



FRONT VIEW POST(1)

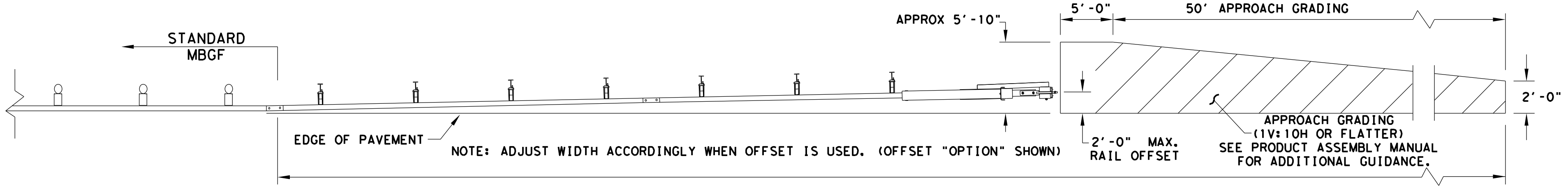
4'-9 1/2" (W6 X 8.5) (SYTP) I-BEAM POST PN:15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)



DETAIL 3 AT POST(0)

6'-5 3/8" (W6 X 15) I-BEAM POST PN:15205A



APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374.
   2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN:620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-3/4" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN:5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN:5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4)AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN:61G ANCHOR RAIL 25'-0" PN:15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 7/8")
15203G	1	POST #1 - (SYTP) (4'- 9 1/2")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 1/2" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" x 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" x 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" x 10" HGR POST BOLT A307
3391G	1	5/8" x 1 3/4" HEX HD BOLT A325
4489G	1	5/8" x 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/16" x 2 1/2" HEX HD BOLT GR-5
105286G	1	5/16" x 1 1/2" HEX HD BOLT GR-5
3240G	6	5/16" ROUND WASHER (WIDE)
3245G	3	5/16" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

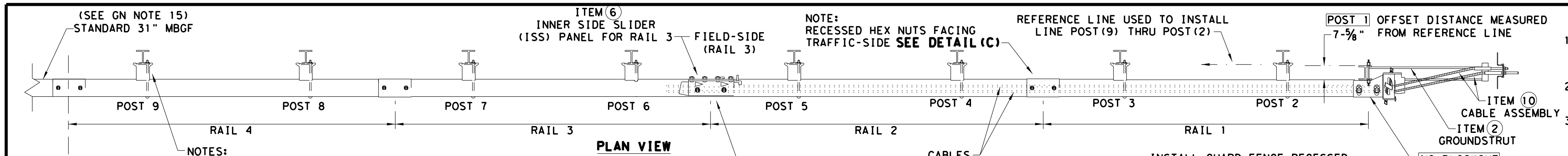
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT		CK: KM	DW: VP	CK: MB/VP
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			111

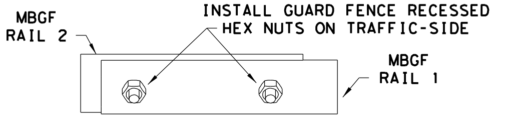
DATE:
FILE:



PLAN VIEW

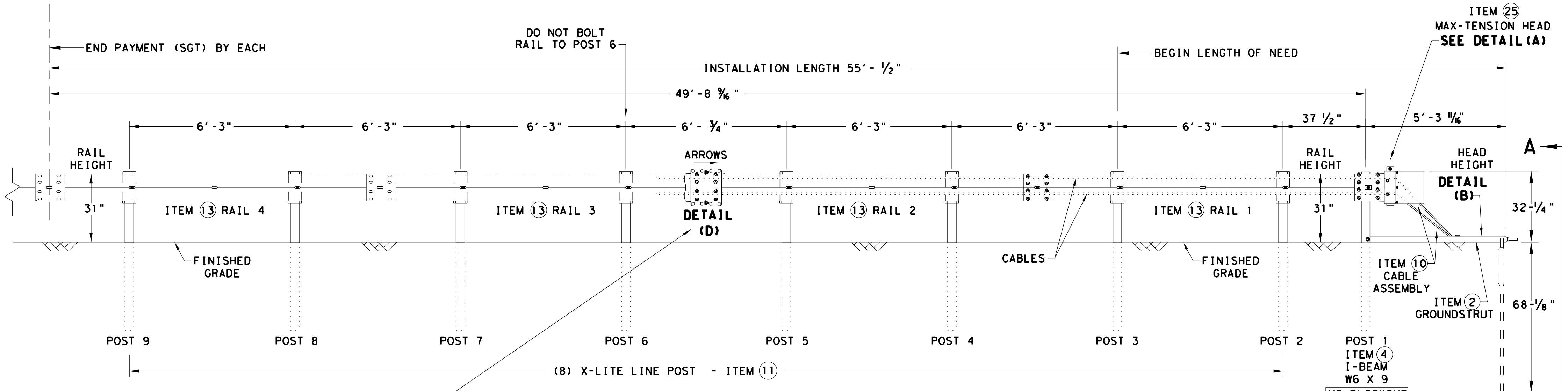
NOTES:
1. ITEM ⑫ COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.



DETAIL (C)

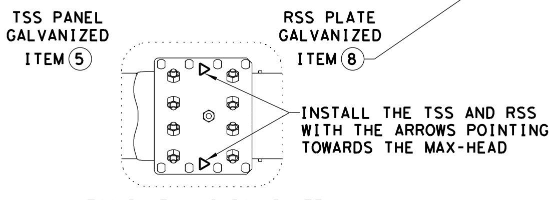
TRAFFIC FLOW



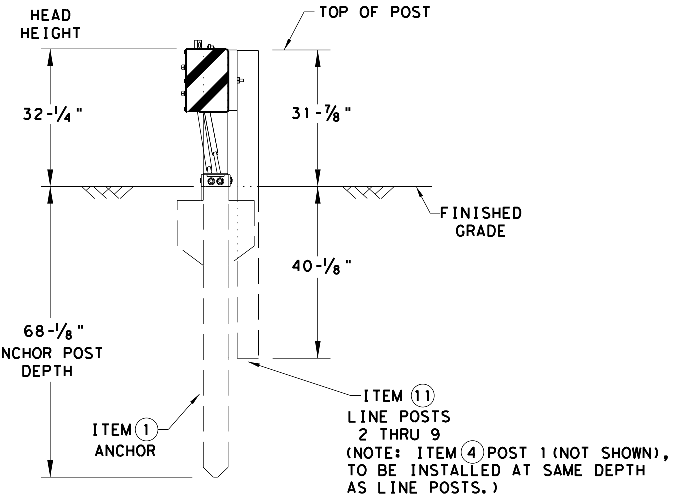
ELEVATION VIEW

SOIL ANCHOR POST
ITEM ①

A



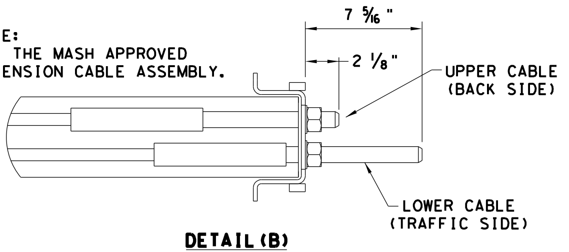
TSS PANEL AND RSS PLATE
DETAIL (D)



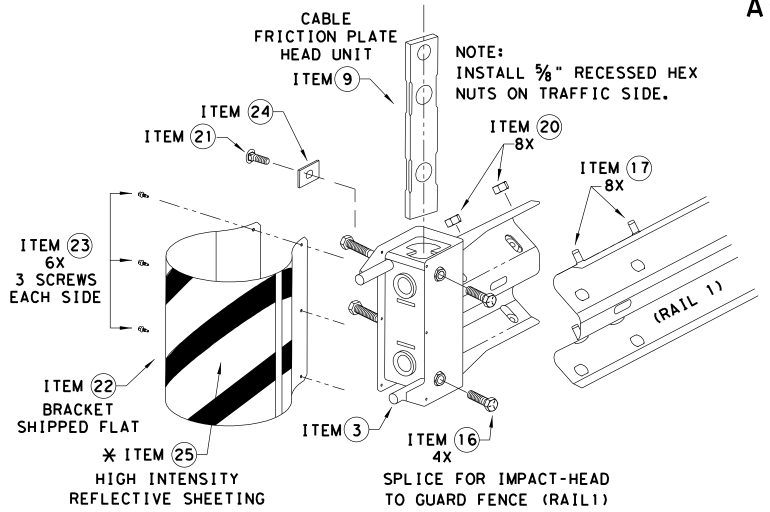
SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED X-TENSION CABLE ASSEMBLY.



DETAIL (B)

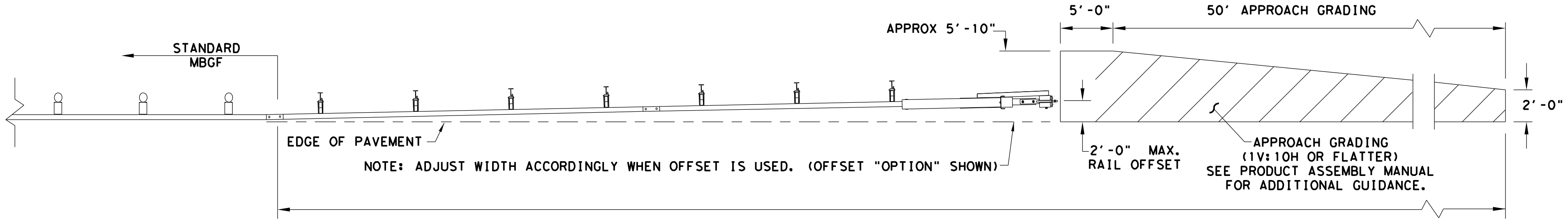


NOTE:
INSTALL ⅝" RECESSED HEX NUTS ON TRAFFIC SIDE.

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD TO GUARD FENCE (RAIL1)

DETAIL (A)



TRAFFIC FLOW

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

	ITEM#	PART NUMBER	DESCRIPTION	QTY
	1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
	2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
	3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
	4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
	5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
	6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
	7	BSI-1610066-00	TOOTH - GEOMET	1
	8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
	9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
	10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
	11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
	12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
	13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
	14	BSI-1102027-00	X-LITE SQUARE WASHER	1
	15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
	16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
	17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
	18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
	19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
	20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
	21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
	22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
	23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
	24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
✱	25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
✱✱	26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
	27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
	28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

✱ TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

✱✱ ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25' GUARD FENCE PANELS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3

SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL	
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		112	

DATE:
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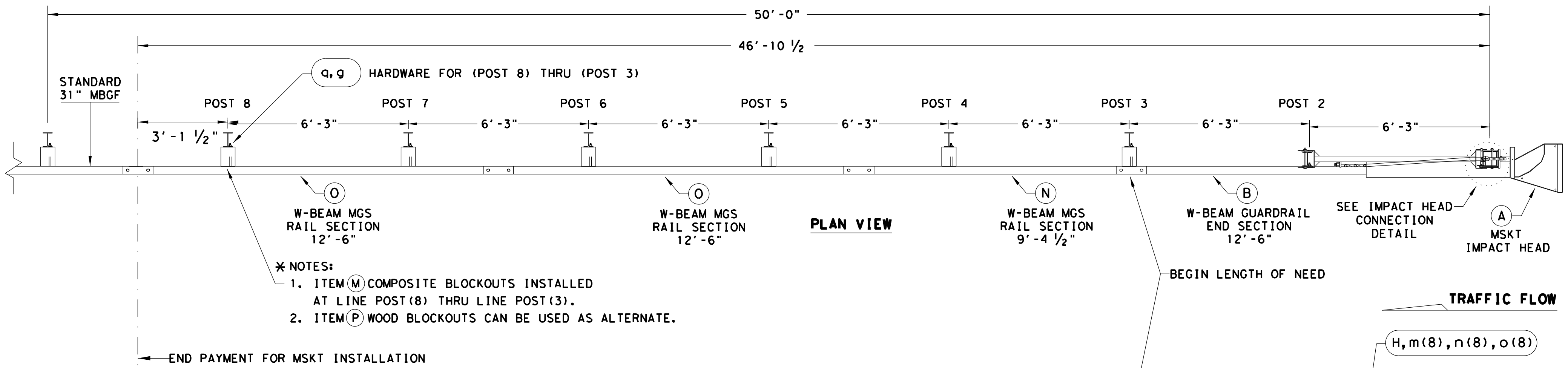
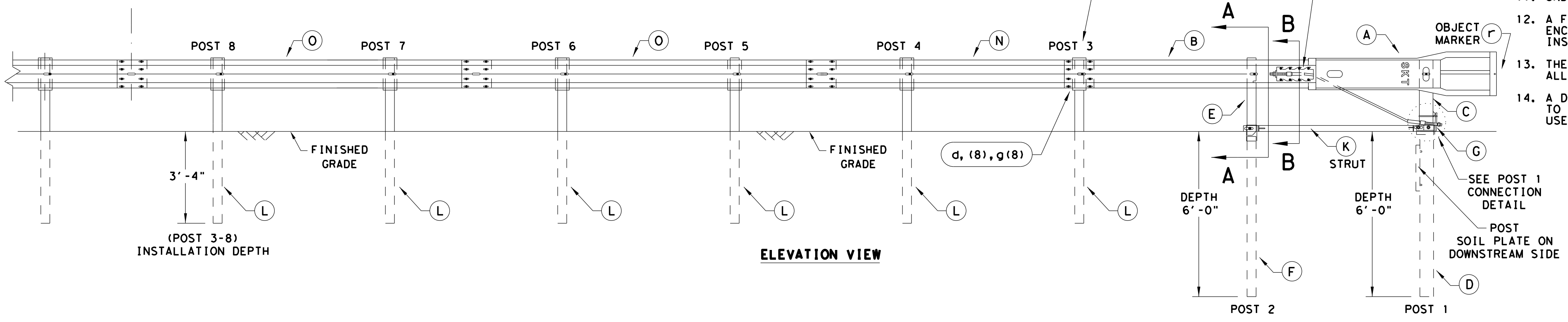


PLAN VIEW

✱ NOTES:
1. ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(8) THRU LINE POST(3).
2. ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.



ELEVATION VIEW

NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

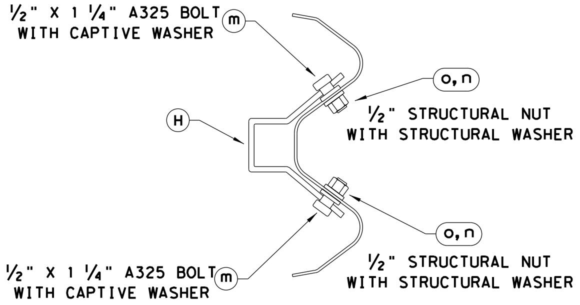
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

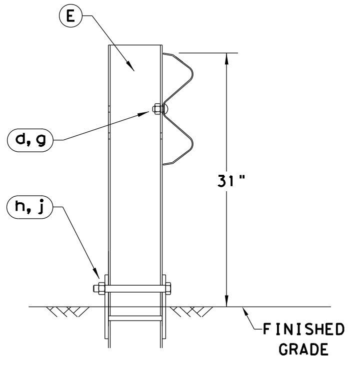
SEE NOTES: ✱ (ITEM M)

ALTERNATIVE ITEMS NOT SHOWN. ✱✱ (ITEMS P, Q)
✱ ITEM(P) 8" WOOD-BLOCKOUT
✱✱ ITEM(Q) 25' GUARD FENCE PANEL

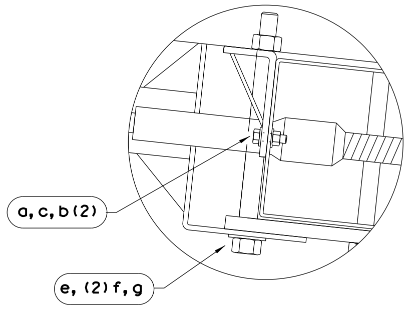
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X $\frac{1}{8}$" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 $\frac{1}{2}$")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	$\frac{5}{16}$" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	$\frac{5}{16}$" WASHER	W0516
c	2	$\frac{5}{16}$" HEX NUT	N0516
d	25	$\frac{5}{8}$" Dia. x 1 $\frac{1}{4}$" SPLICE BOLT (POST 2)	B580122
e	2	$\frac{5}{8}$" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	$\frac{5}{8}$" WASHER	W050
g	33	$\frac{5}{8}$" Dia. H.G.R NUT	N050
h	1	$\frac{3}{4}$" Dia. x 8 $\frac{1}{2}$" HEX BOLT (GRD A449)	B340854A
j	1	$\frac{3}{4}$" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	$\frac{1}{2}$" x 1 $\frac{1}{4}$" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	$\frac{1}{2}$" STRUCTURAL NUTS	N012A
o	8	1 $\frac{1}{16}$" O.D. x $\frac{9}{16}$" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	$\frac{5}{8}$" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



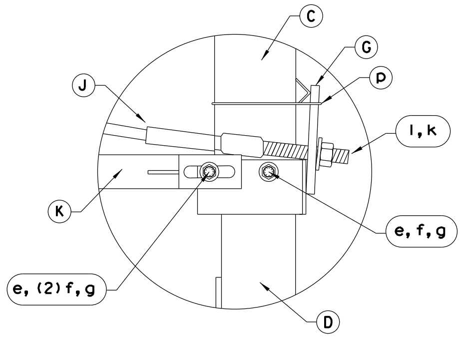
SECTION B-B
ANCHOR BRACKET



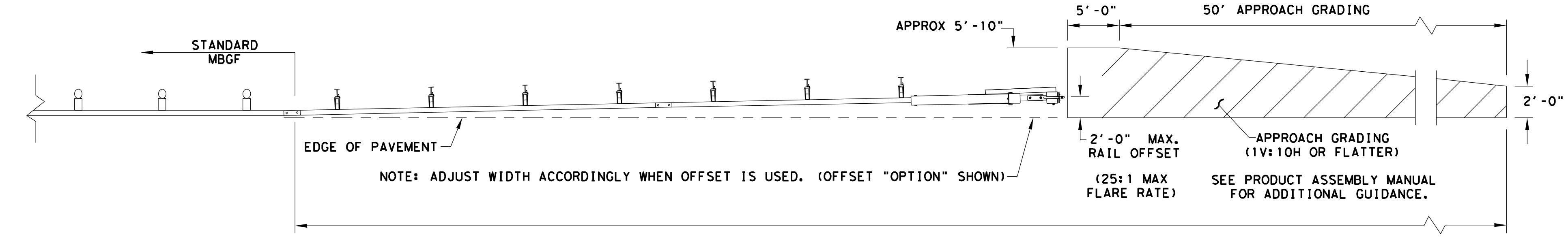
POST 2
SECTION A-A



IMPACT HEAD CONNECTION DETAIL



POST 1 CONNECTION DETAIL



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT
USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn
DN: TxDOT | CK: KM | DW: VP | CK: CL

REVISIONS

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	113

DATE:
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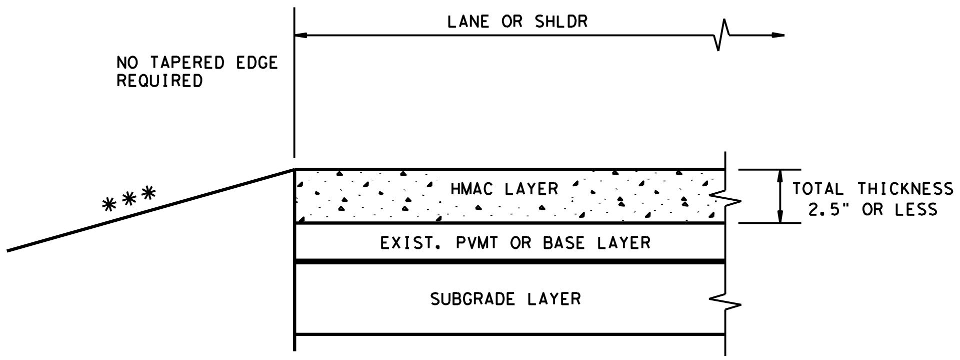
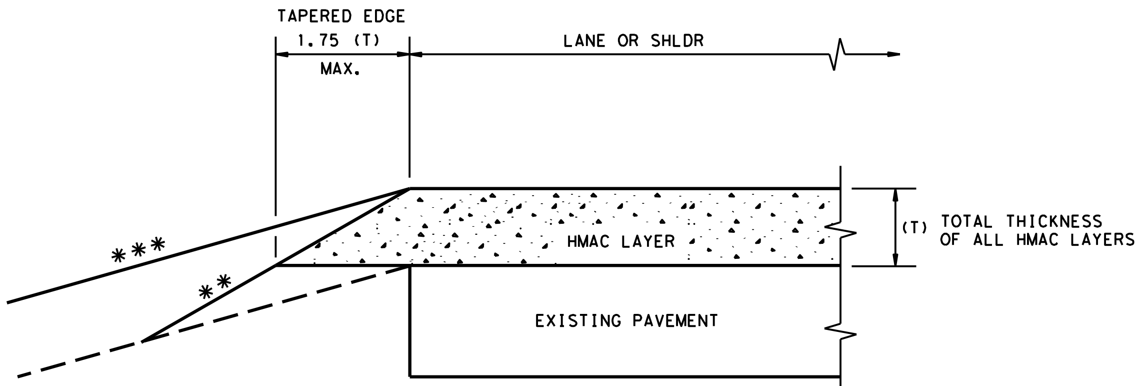
DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 1

THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS

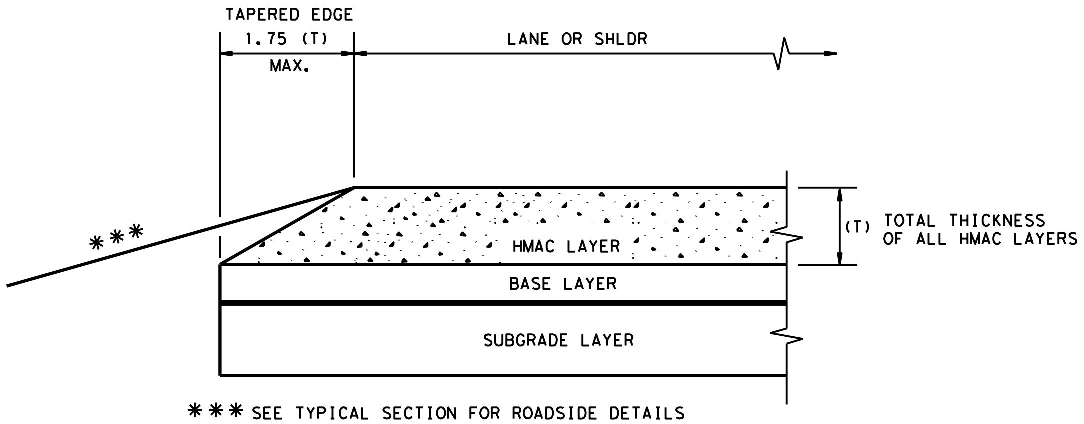


** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2

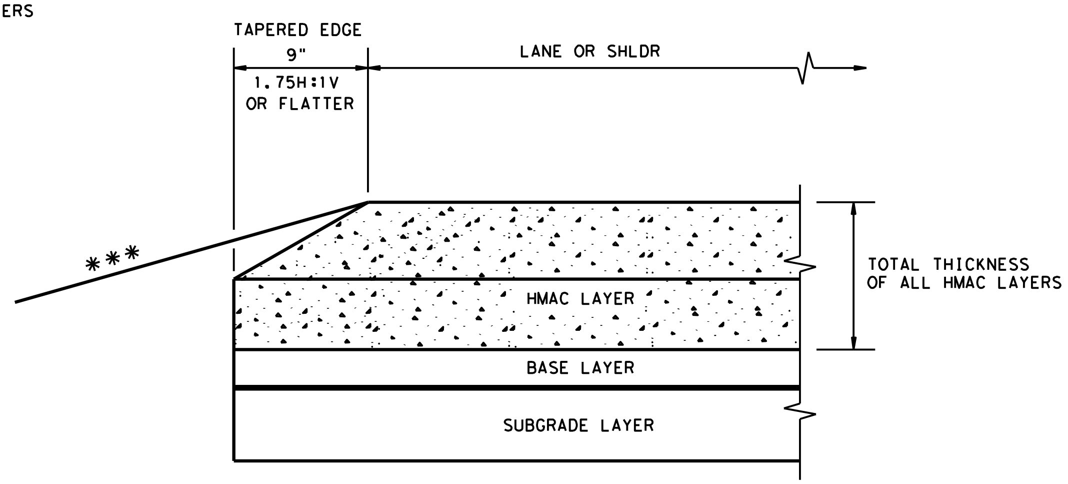
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3

NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** **SEE TYPICAL SECTION FOR ROADSIDE DETAILS**

CONDITION - 4

NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

Texas Department of Transportation

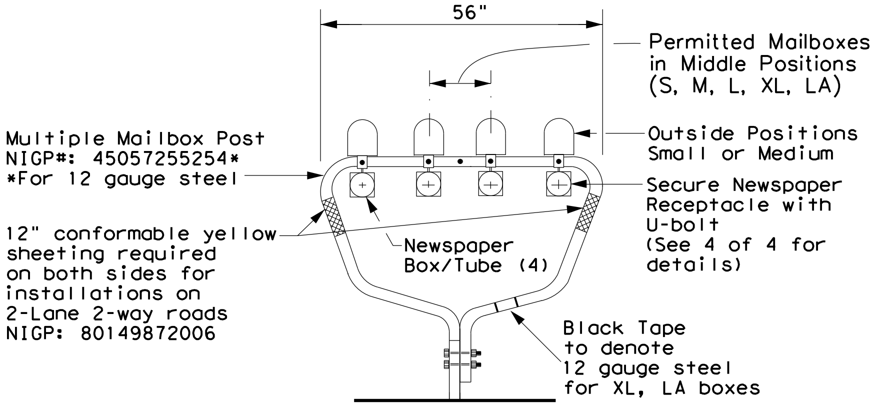
Design Division Standard

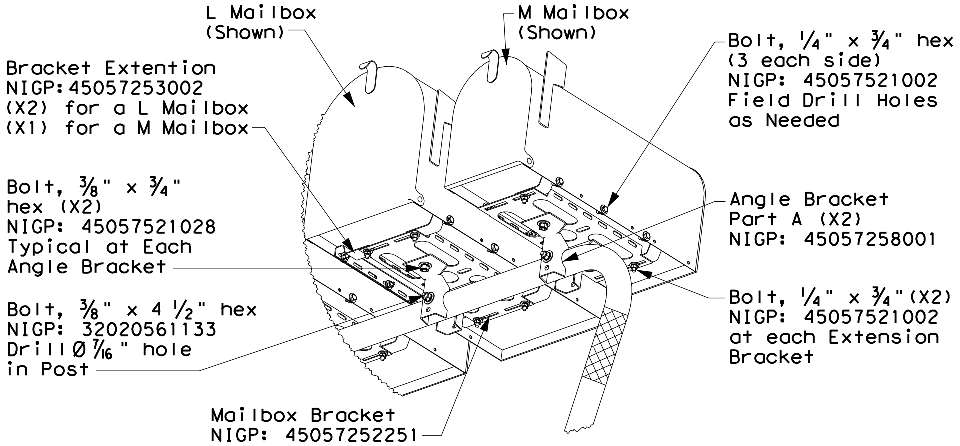
TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

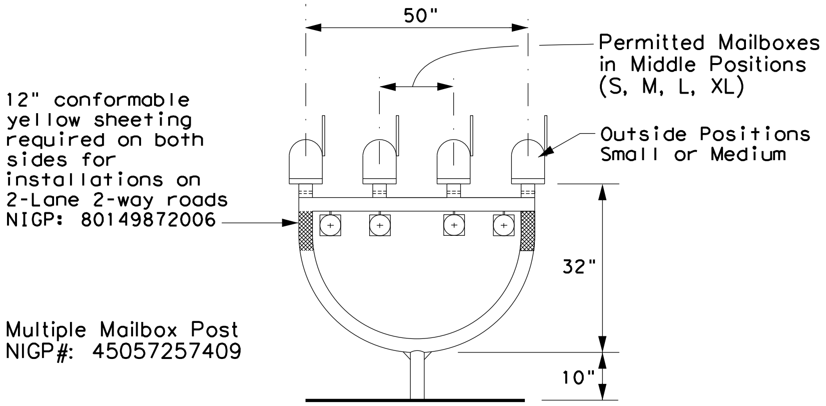
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
©TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		114

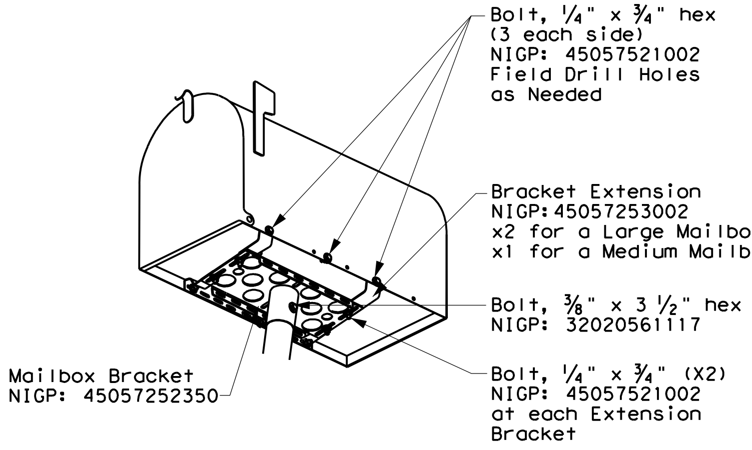
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

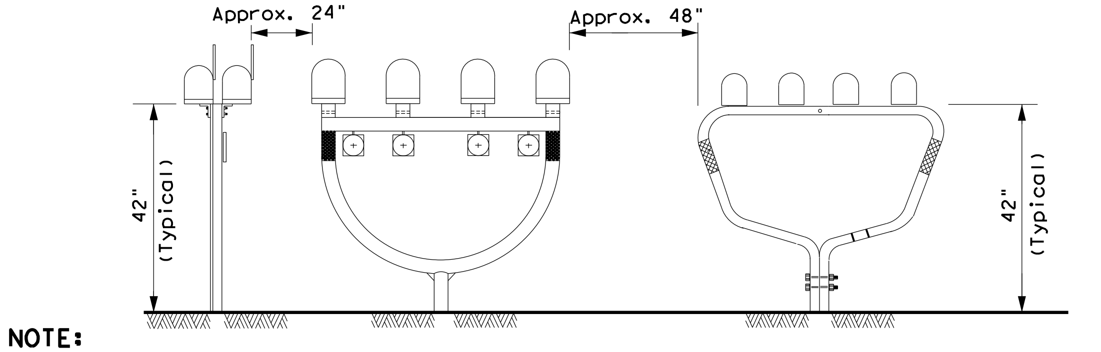
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX ** WEIGHT
	LENGTH	WIDTH	HEIGHT	
SMALL	19 ½"	6"	7"	6 LBS
MEDIUM	22 ½" *	8" *	11 ½" *	8 LBS
LARGE	23 ½"	11 ½"	13 ½"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 ½"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

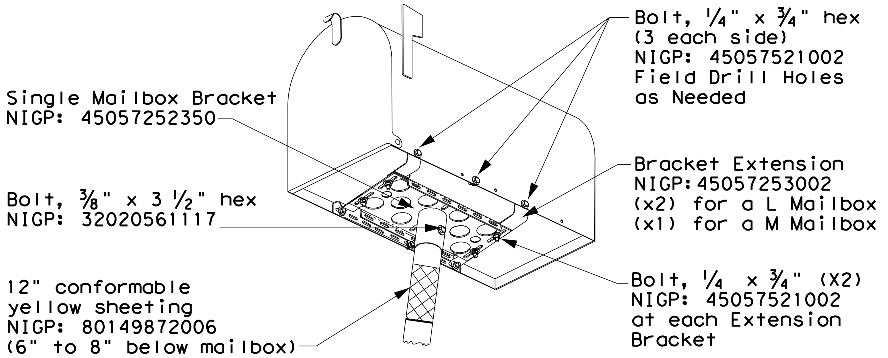
TYPICAL INSTALLATION MEASUREMENTS

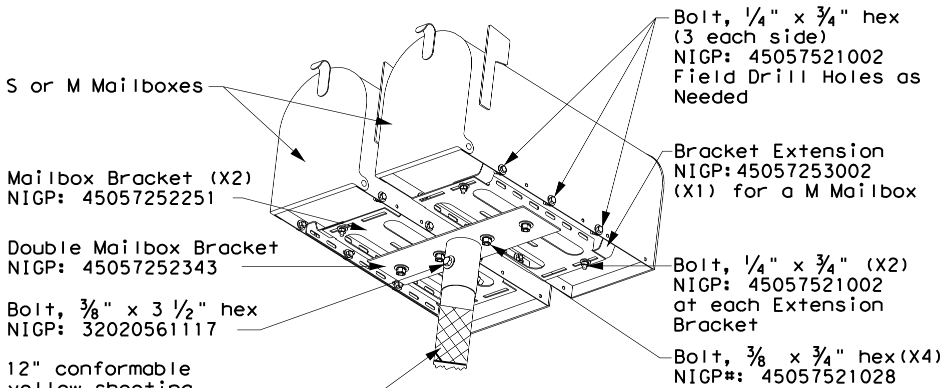


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

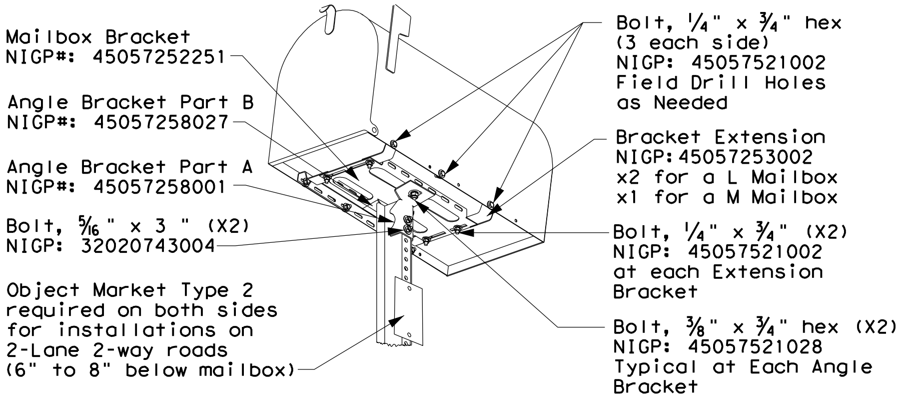


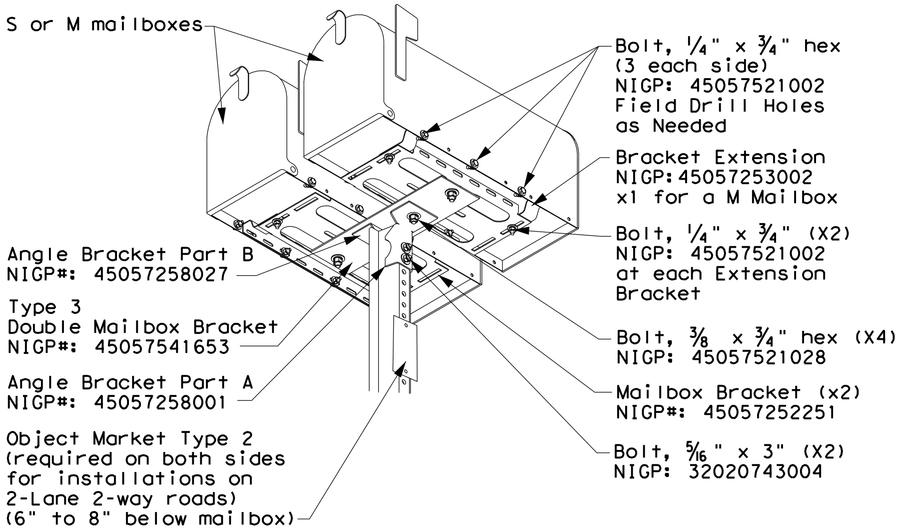


NOTE:

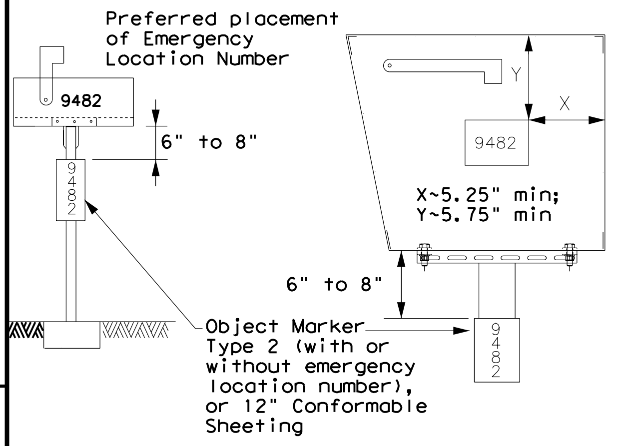
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

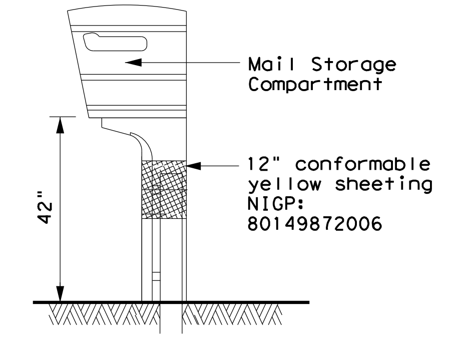


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

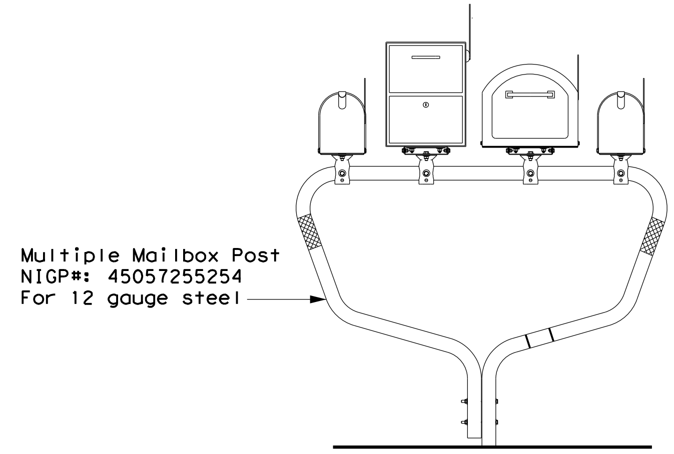
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

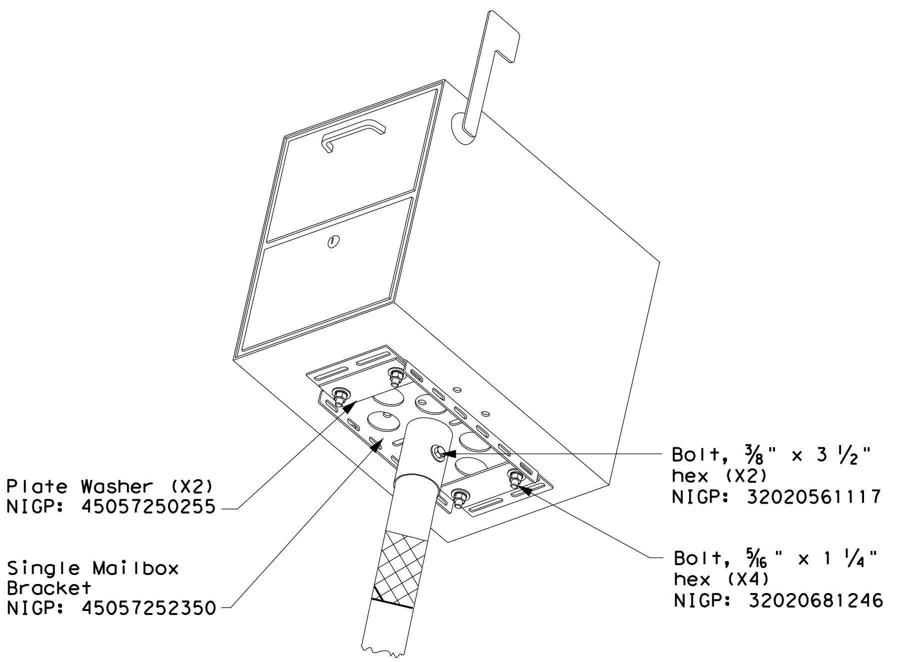
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		115	

DATE:
FILE:

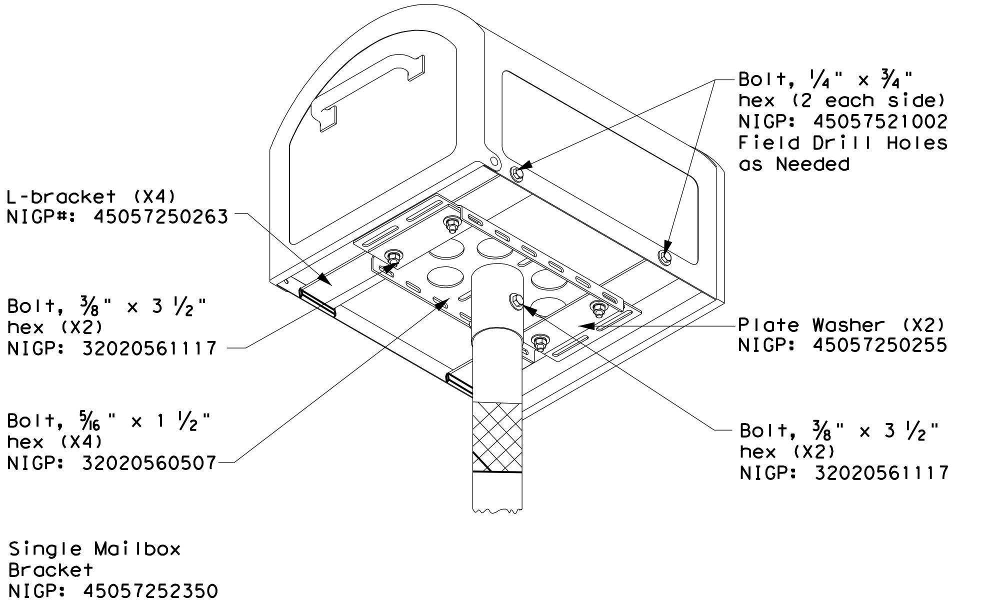
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX



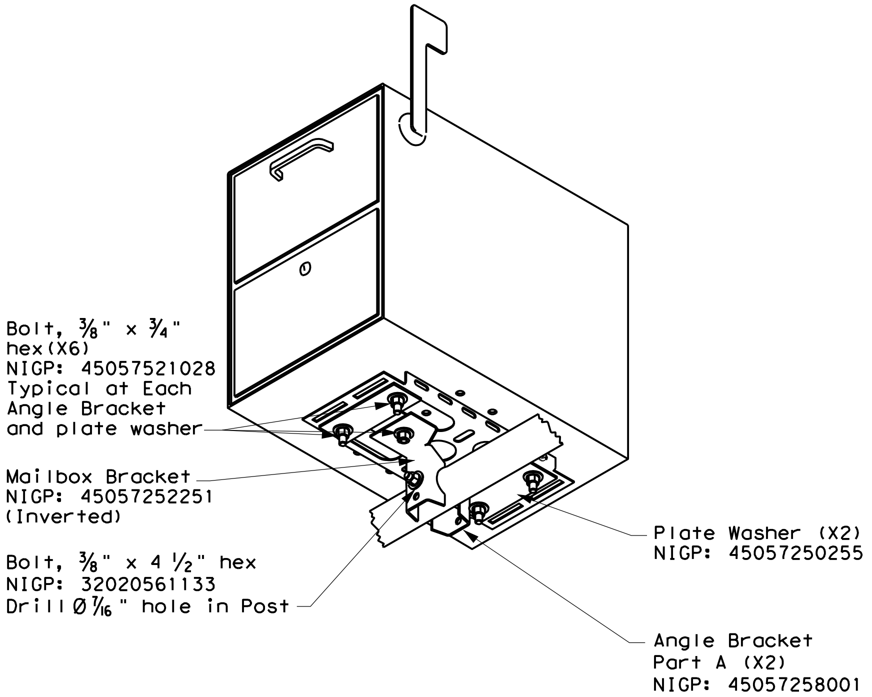
TYPE 2/4 - SINGLE XL MAILBOX



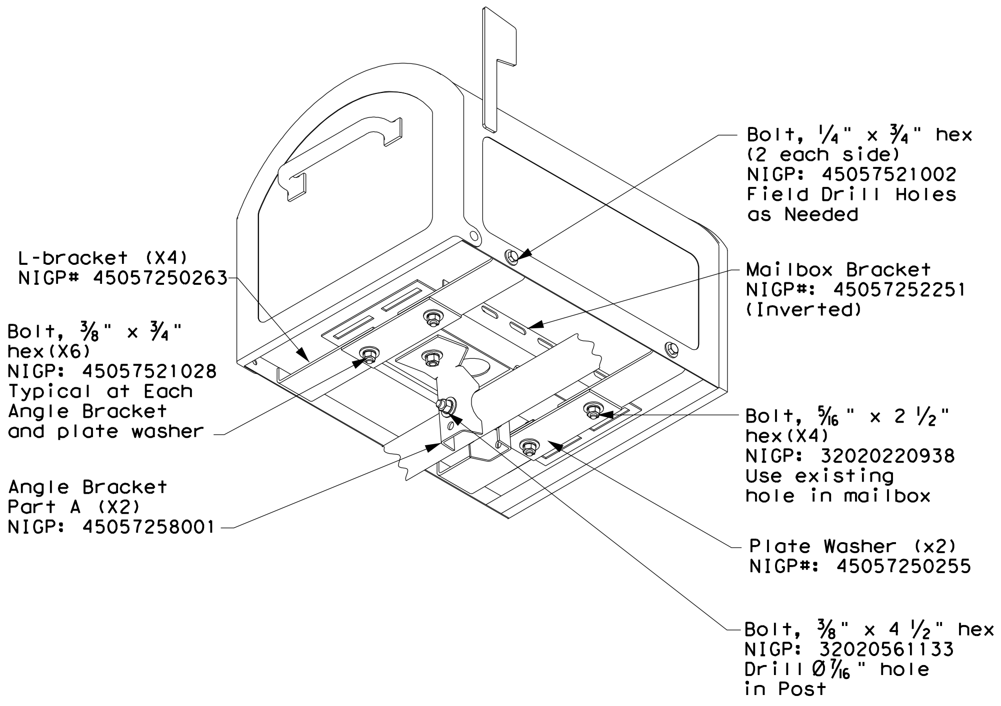
NOTE:

Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

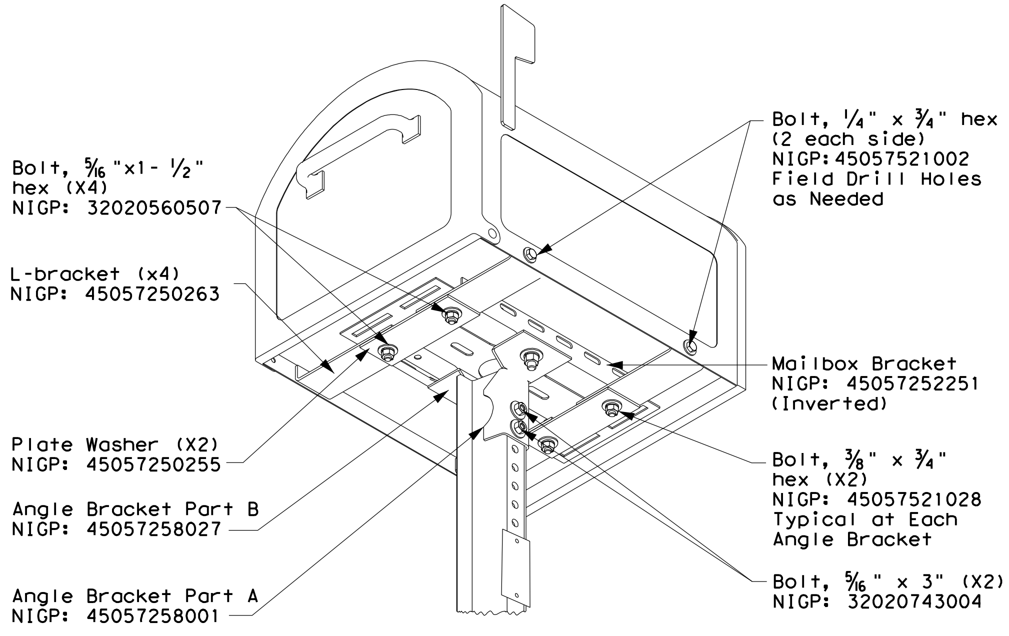
TYPE 1 MULTI - LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI - XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



SHEET 2 OF 4

Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS
2/2005 11/2009 4/2015
6/2005 1/2011
11/2006 7/2014

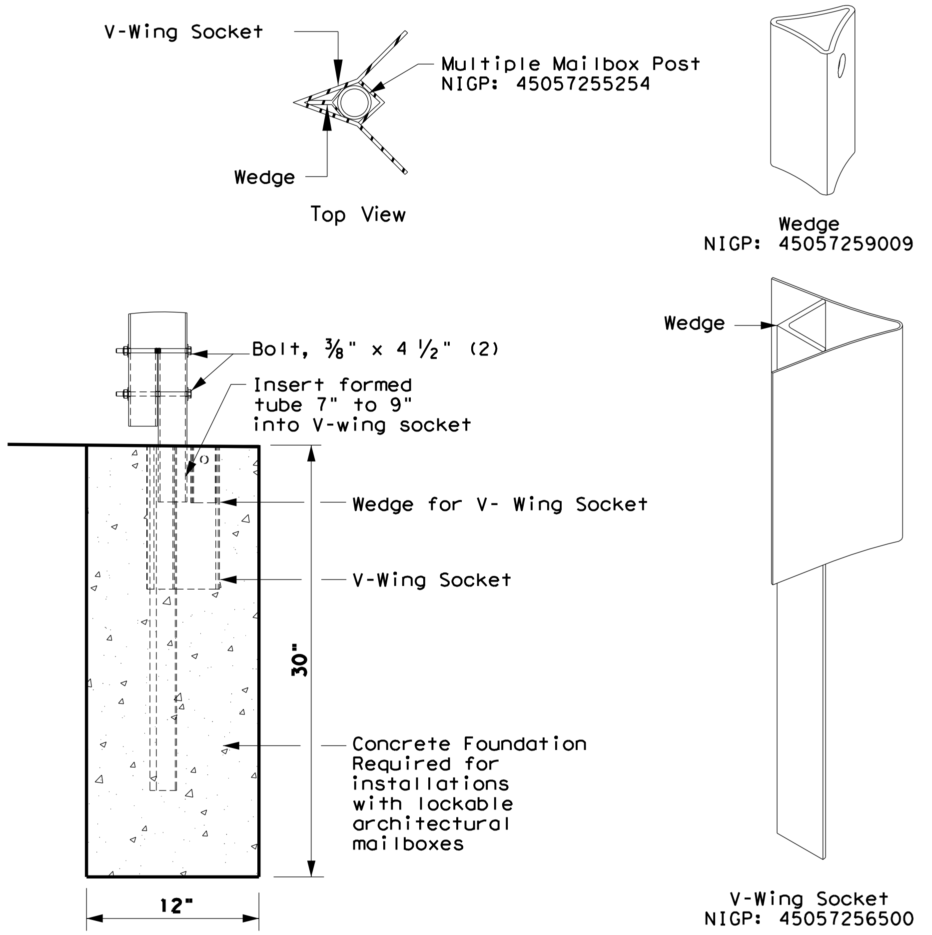
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	116

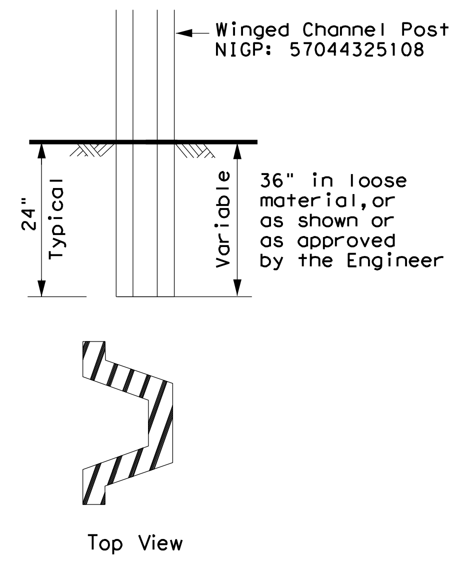
DATE:
FILE:

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



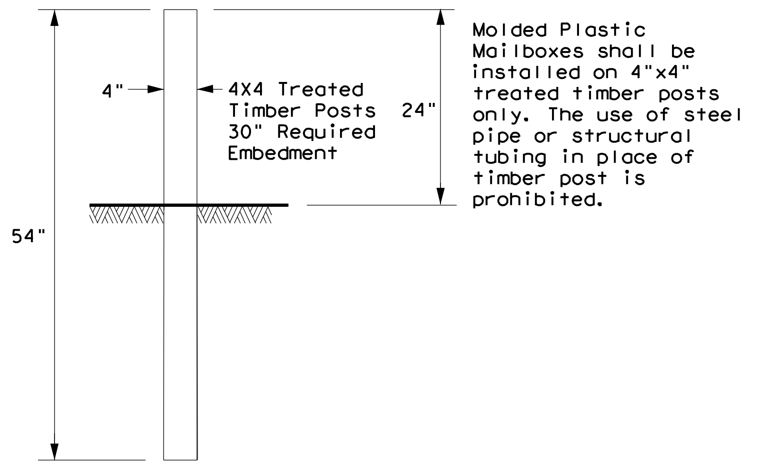
TYPE 3 - SUPPORT/FOUNDATION



NOTES:

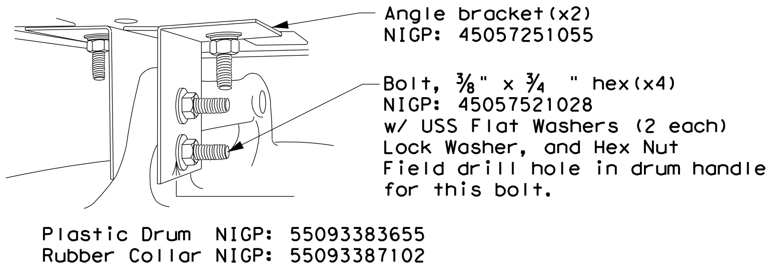
1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.

TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

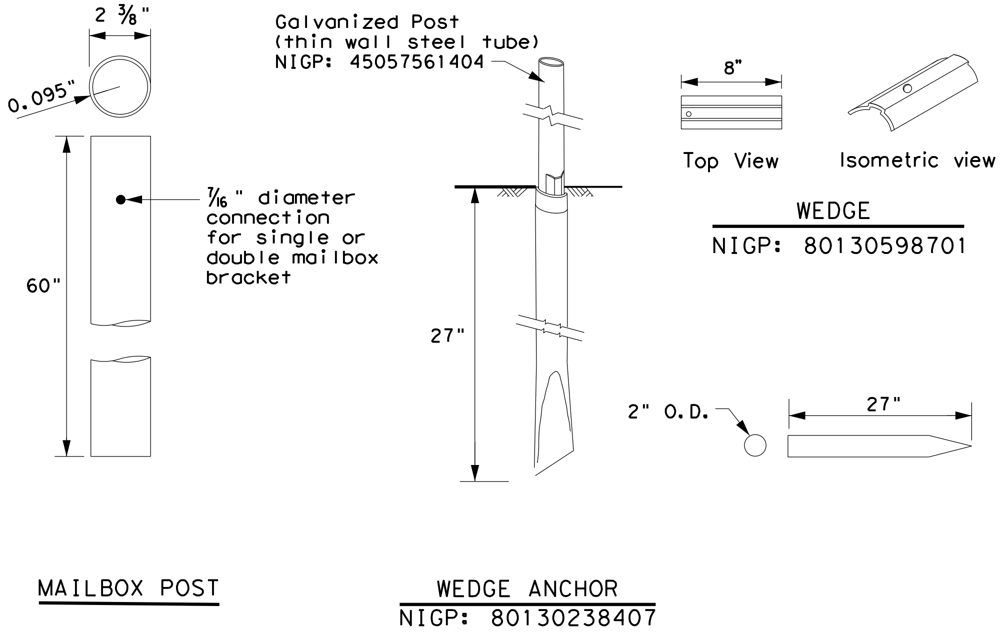
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

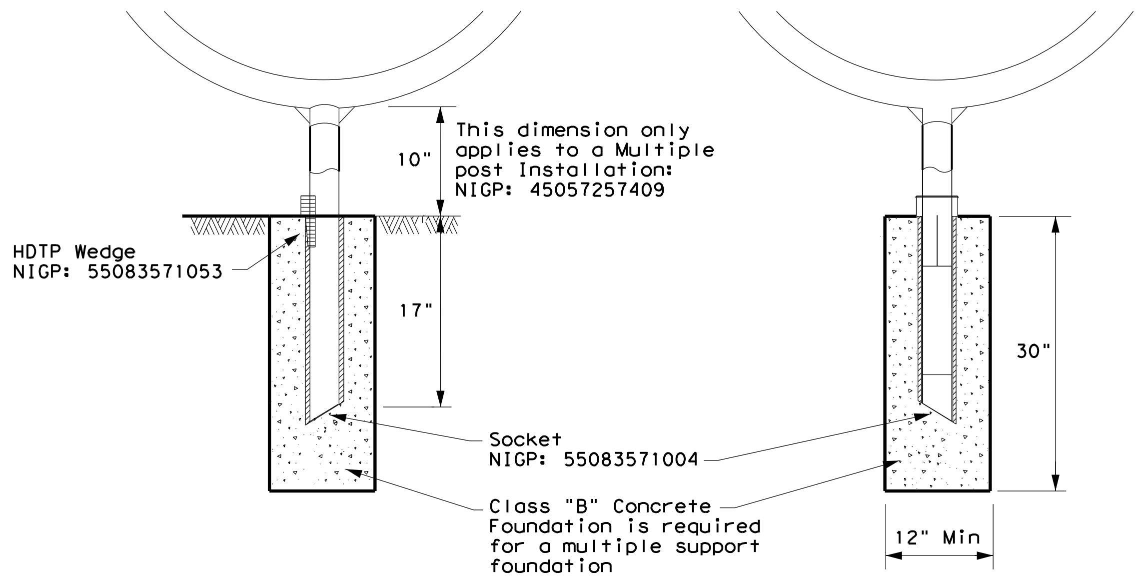
TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System



TYPE 4 - SUPPORT/FOUNDATION

Whitecooted steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:

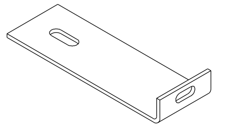
REVISIONS
2/2005 11/2009 4/2015
6/2005 1/2011
11/2006 7/2014

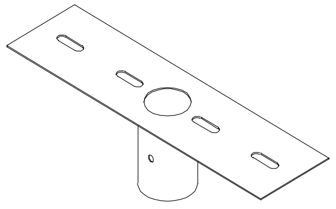
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

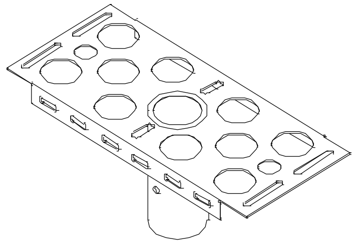
DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	117

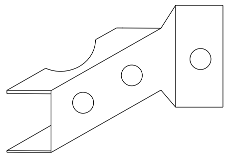
DATE:
FILE:

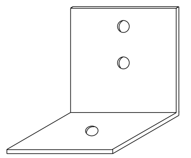
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None

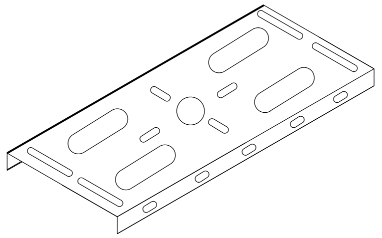

NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes

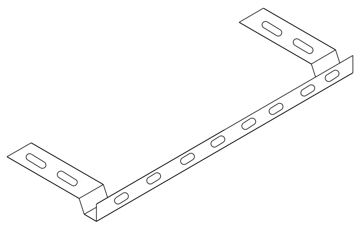

NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount

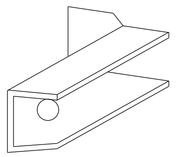

NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount

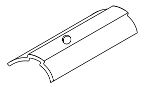

NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double


NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)

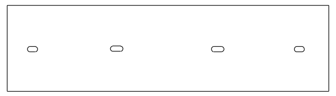

NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)

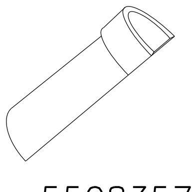

NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox

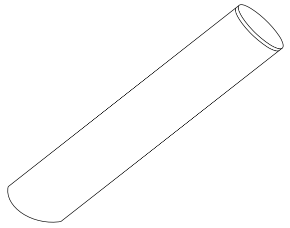

NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double

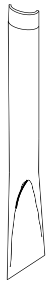

NIGP: 80130598701
Wedge for Type 2

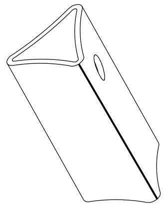

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

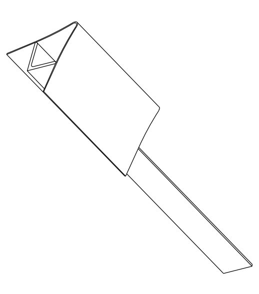

NIGP: 45057541653
Type 3 double mailbox bracket


NIGP: 55083571053
Type 4 Mailbox Wedge


NIGP: 55083571004
Type 4 Mailbox Socket


NIGP: 80130238407
Type 2 Wedge Anchor


NIGP: 45057259009
Wedge for Type 1 V-wing Socket


NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
S = Single
D = Double
M = Multiple
MP = Molded Plastic

Type of Post
WC = Winged Channel Post
RR = Recycled Rubber
TWW = Thin Walled White Tubing
TWG = Thin Walled Galvanized Tubing
TIM = Timber

Type of Foundation
Ty 1 = V-Loc
Ty 2 = Wedge Anchor Steel System
Ty 3 = Winged Channel post
Ty 4 = Wedge Anchor Plastic System
Ty 5 = 4 X 4 Post

SHEET 4 OF 4

Texas Department of Transportation

Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		118

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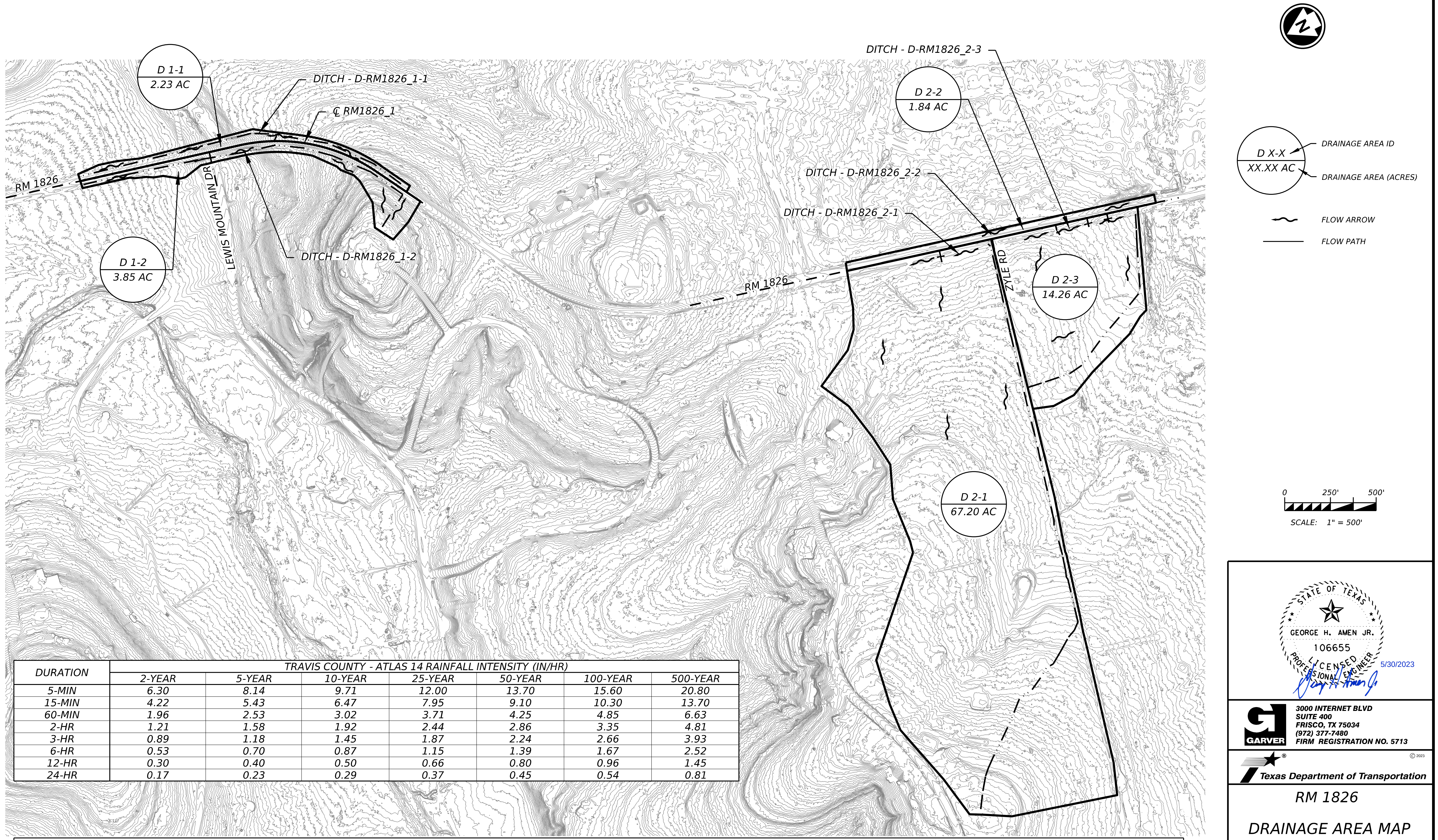

DURATION	TRAVIS COUNTY - ATLAS 14 RAINFALL INTENSITY (IN/HR)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	6.30	8.14	9.71	12.00	13.70	15.60	20.80
15-MIN	4.22	5.43	6.47	7.95	9.10	10.30	13.70
60-MIN	1.96	2.53	3.02	3.71	4.25	4.85	6.63
2-HR	1.21	1.58	1.92	2.44	2.86	3.35	4.81
3-HR	0.89	1.18	1.45	1.87	2.24	2.66	3.93
6-HR	0.53	0.70	0.87	1.15	1.39	1.67	2.52
12-HR	0.30	0.40	0.50	0.66	0.80	0.96	1.45
24-HR	0.17	0.23	0.29	0.37	0.45	0.54	0.81

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

BASIN ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		RAINFALL INTENSITY (IN/HR)							PEAK DISCHARGE (CFS)						
		ACRES	SQ. MI.	C	MIN	HRS	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
D 1-1	RATIONAL	2.23	0.00	0.56	10	0.17	5.02	6.48	7.75	9.55	11.00	12.50	16.40	6	8	10	12	14	16	21
D 1-2	RATIONAL	3.85	0.01	0.55	12	0.20	4.70	6.06	7.24	8.91	10.24	11.62	15.32	10	13	15	19	22	25	33
D 2-1	RATIONAL	67.20	0.10	0.53	17	0.28	4.05	5.22	6.21	7.63	8.73	9.89	13.16	145	187	222	273	312	354	471
D 2-2	RATIONAL	1.84	0.00	0.68	10	0.17	5.02	6.48	7.75	9.55	11.00	12.50	16.40	6	8	10	12	14	16	20
D 2-3	RATIONAL	14.26	0.02	0.52	11	0.18	4.86	6.27	7.49	9.23	10.62	12.06	15.86	36	46	55	68	78	89	117

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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP
LEWIS MOUNTAIN & ZYLE RD
DITCHES

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	119

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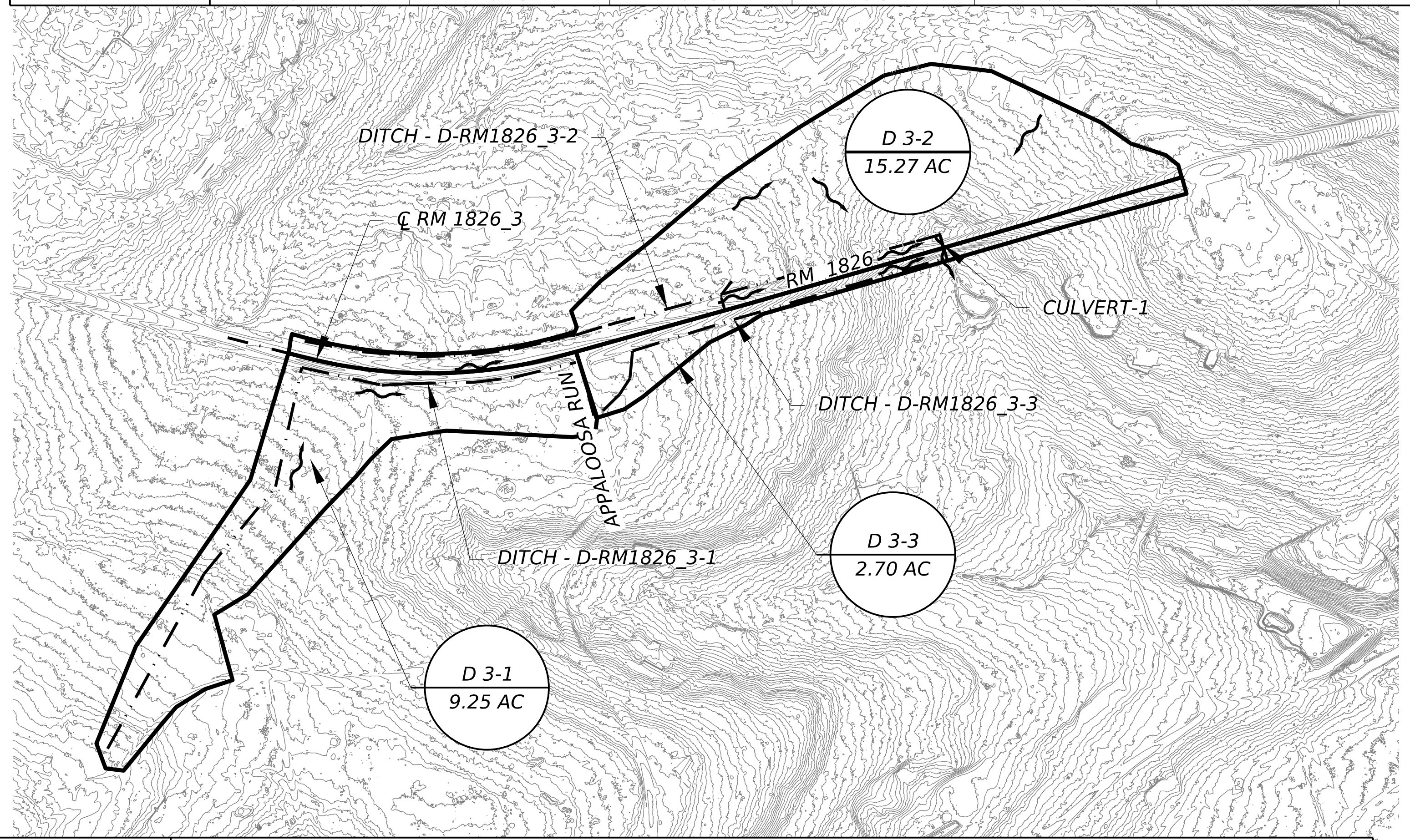
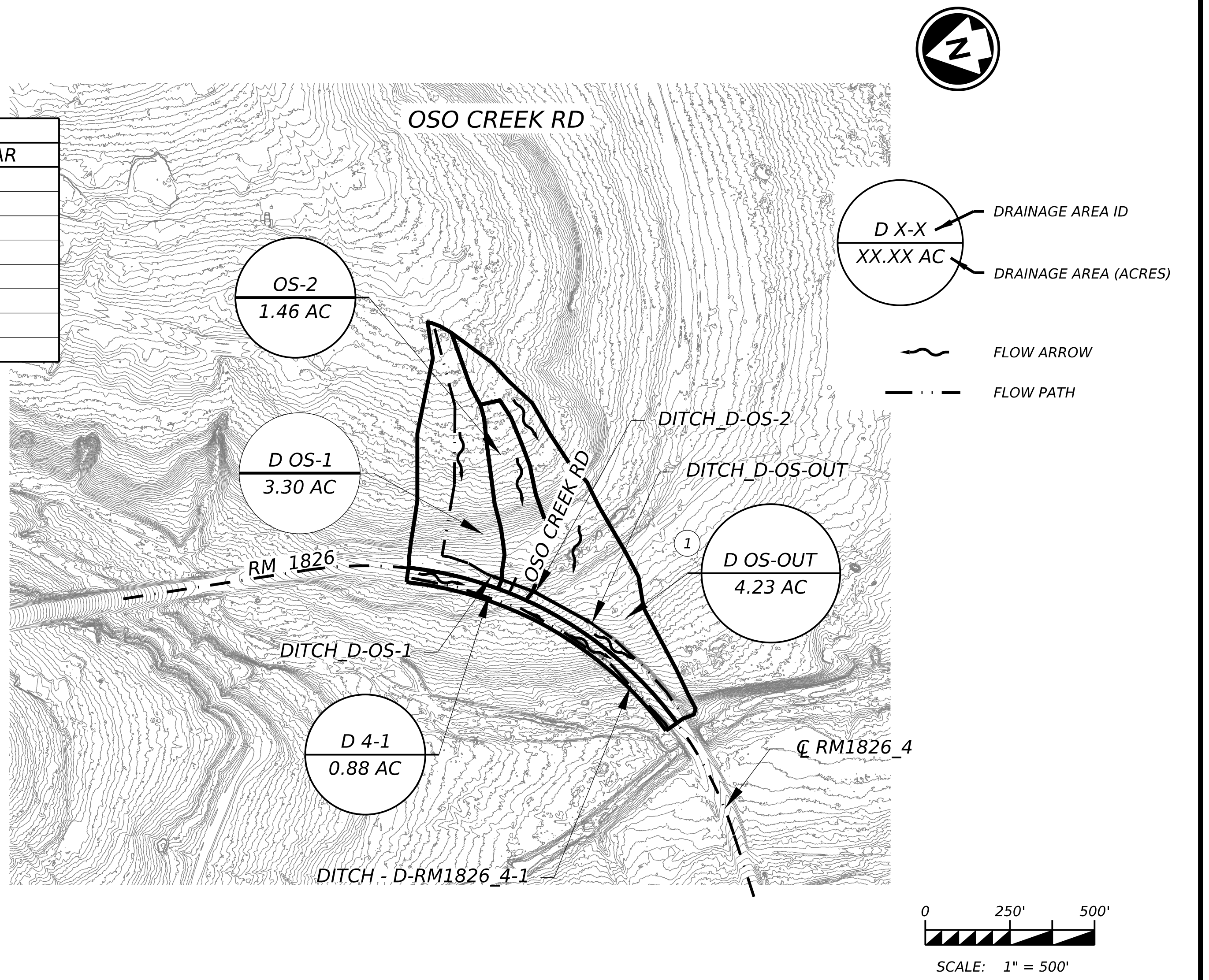


DURATION	TRAVIS COUNTY - ATLAS 14 RAINFALL INTENSITY (IN/HR)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	6.30	8.14	9.71	12.00	13.70	15.60	20.80
15-MIN	4.22	5.43	6.47	7.95	9.10	10.30	13.70
60-MIN	1.96	2.53	3.02	3.71	4.25	4.85	6.63
2-HR	1.21	1.58	1.92	2.44	2.86	3.35	4.81
3-HR	0.89	1.18	1.45	1.87	2.24	2.66	3.93
6-HR	0.53	0.70	0.87	1.15	1.39	1.67	2.52
12-HR	0.30	0.40	0.50	0.66	0.80	0.96	1.45
24-HR	0.17	0.23	0.29	0.37	0.45	0.54	0.81



① DITCH AREA D-OS-OUT INCLUDES AREAS OF 3.32 AC AND 1.46 AC FROM OS-1 & OS-2, RESPECTIVELY AND AN ADDITIONAL AREA OF 4.23 AC FOR A TOTAL AREA OF 9.84 AC.

DURATION	HAYS COUNTY - ATLAS 14 RAINFALL INTENSITY (IN/HR)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	6.31	8.11	9.66	11.90	13.70	15.50	20.60
15-MIN	4.22	5.41	6.44	7.90	9.06	10.30	13.60
60-MIN	1.96	2.52	3.00	3.69	4.23	4.83	6.57
2-HR	1.21	1.58	1.92	2.43	2.86	3.35	4.80
3-HR	0.90	1.18	1.45	1.87	2.24	2.67	3.93
6-HR	0.53	0.70	0.88	1.15	1.39	1.68	2.54
12-HR	0.30	0.40	0.50	0.66	0.80	0.97	1.47
24-HR	0.17	0.23	0.29	0.38	0.46	0.55	0.83

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

BASIN ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		RAINFALL INTENSITY (IN/HR)							PEAK DISCHARGE (CFS)						
		ACRES	SQ MI	C	MIN	HRS	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
D 3-1	RATIONAL	9.25	0.014	0.51	15	0.25	4.22	5.43	6.47	7.95	9.10	10.30	13.70	20	26	31	38	43	49	65
D 3-2	RATIONAL	15.27	0.024	0.38	10	0.17	5.02	6.48	7.75	9.55	11.00	12.50	16.40	29	38	45	56	64	73	96
D 3-3	RATIONAL	2.70	0.004	0.59	14	0.23	4.38	5.64	6.73	8.27	9.48	10.74	14.24	7	9	11	13	15	17	23
D OS-1	RATIONAL	3.25	0.005	0.32	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	5	7	8	10	11	13	17
D OS-2	RATIONAL	1.46	0.002	0.38	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	3	4	4	5	6	7	9
① D OS-OUT	RATIONAL	8.94	0.014	0.34	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	15	20	23	29	33	38	49
D 4-1	RATIONAL	0.88	0.001	0.75	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	3	4	5	6	7	8	11

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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP
APPALOOSA & OSO CREEK RD
DITCHES

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	120

D X-X — DRAINAGE AREA ID

XX.XX AC — DRAINAGE AREA (ACRES)

FLOW ARROW

FLOW PATH

② DITCH AREA D 5-1 INCLUDES AREAS OF 30.95 AC AND 14.59 AC FROM D 5-1E & D 5-1W, RESPECTIVELY AND AN ADDITIONAL AREA OF 182.68 AC FOR A TOTAL AREA OF 228.22 AC.

0 400' 800'

SCALE: 1" = 800'

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP

WOODLAND DR / SHELF ROCK RD & TOWERING CEDAR DITCHES

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	121

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WOODLAND DR / SHELF ROCK & TOWERING CEDAR DR

DURATION	HAYS COUNTY - ATLAS 14 RAINFALL INTENSITY (IN/HR)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	6.31	8.11	9.66	11.90	13.70	15.50	20.60
15-MIN	4.22	5.41	6.44	7.90	9.06	10.30	13.60
60-MIN	1.96	2.52	3.00	3.69	4.23	4.83	6.57
2-HR	1.21	1.58	1.92	2.43	2.86	3.35	4.80
3-HR	0.90	1.18	1.45	1.87	2.24	2.67	3.93
6-HR	0.53	0.70	0.88	1.15	1.39	1.68	2.54
12-HR	0.30	0.40	0.50	0.66	0.80	0.97	1.47
24-HR	0.17	0.23	0.29	0.38	0.46	0.55	0.83

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

BASIN ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		RAINFALL INTENSITY (IN/HR)							PEAK DISCHARGE (CFS)						
		ACRES	SQ MI	C	MIN	HRS	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
② D 5-1	RATIONAL	228.22	0.357	0.39	48	0.80	2.37	3.04	3.61	4.43	5.06	5.76	7.75	209	267	318	389	445	506	682
D 5-1E	RATIONAL	30.95	0.048	0.36	14	0.23	4.38	5.62	6.69	8.22	9.43	10.74	14.12	48	62	74	91	104	119	156
D 5-1W	RATIONAL	14.59	0.023	0.51	22	0.37	3.65	4.67	5.55	6.79	7.78	8.83	11.70	27	35	41	50	58	66	87
D 5-2	RATIONAL	4.38	0.007	0.64	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	14	18	22	27	31	35	46
D 5-3	RATIONAL	293.61	0.459	0.36	33	0.55	2.89	3.69	4.38	5.35	6.10	6.92	9.23	303	387	460	561	641	726	970
D 5-4	RATIONAL	2.72	0.004	0.52	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	7	9	11	13	15	18	23
D 5-5	RATIONAL	1.11	0.002	0.65	10	0.17	5.02	6.46	7.70	9.49	10.90	12.50	16.20	4	5	6	7	8	9	12
D 5-6	RATIONAL	11.55	0.018	0.32	21	0.35	3.73	4.77	5.68	6.95	7.96	9.04	11.97	14	18	21	26	30	34	45

② DITCH AREA D 5-1 INCLUDES AREAS OF 30.95 AC AND 14.59 AC FROM D 5-1E & D 5-1W, RESPECTIVELY AND AN ADDITIONAL AREA OF 182.68 AC FOR A TOTAL AREA OF 228.22 AC.

TR-55 TIME OF CONCENTRATION

BASIN ID	SHEET FLOW						SHALLOW CONCENTRATED FLOW													TOTAL TIME
	LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		P2 (IN)	TSHEET (MIN)	LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		TSHALLOW (MIN)	LENGTH (FT)	SLOPE (FT/FT)	n	A (FT2)	WP (FT)	R (FT)	V (FT/S)	TCHANNEL (MIN)	Tc (MIN)
			TYPE	nol					TYPE	K										
D 1-1	MINIMUM ALLOWABLE TC USED																			10
D 1-2	100	0.058	SHORT GRASS	0.15	4.12	6	135	0.146	UNPAVED	16.13	1	1832	0.055	0.03	6.3	13.9	0.45	6.8	5	12
D 2-1	100	0.028	SHORT GRASS	0.011	4.12	1	1083	0.041	UNPAVED	16.13	6	2132	0.017	0.03	5.4	12.6	0.43	3.7	10	17
D 2-2	MINIMUM ALLOWABLE TC USED																			10
D 2-3	100	0.036	SHORT GRASS	0.15	4.12	7	757	0.022	UNPAVED	16.13	1	412	0.019	0.03	4.4	12.8	0.34	3.3	3	11
D 3-1	100	0.024	SHORT GRASS	0.15	4.12	9	1175	0.023	UNPAVED	16.13	1	796	0.007	0.03	16.8	25	0.67	3.2	5	15
D 3-2	MINIMUM ALLOWABLE TC USED																			10
D 3-3	100	0.018	SHORT GRASS	0.15	4.12	10	141	0.028	UNPAVED	16.13	1	933	0.040	0.03	7.3	14.4	0.51	6.3	3	14
D OS-1	MINIMUM ALLOWABLE TC USED																			10
D OS-2	MINIMUM ALLOWABLE TC USED																			10
D OS-OUT	MINIMUM ALLOWABLE TC USED																			10
D 4-1	MINIMUM ALLOWABLE TC USED																			10
D 5-1	100	0.011	SHORT GRASS	0.15	4.15	11	3180	0.022	UNPAVED	16.13	22	2769	0.014	0.035	17.6	33.1	0.53	3.3	15	48
D 5-1E	100	0.055	SHORT GRASS	0.15	4.15	6	1130	0.049	UNPAVED	16.13	6	316	0.016	0.03	13.5	22.5	0.60	4.4	2	14
D 5-1W	100	0.011	SHORT GRASS	0.15	4.15	11	1124	0.021	UNPAVED	16.13	9	358	0.009	0.03	13.5	22.5	0.60	3.3	2	22
D 5-2	MINIMUM ALLOWABLE TC USED																			10
D 5-3	100	0.010	SHORT GRASS	0.15	4.15	12	1198	0.054	UNPAVED	16.13	6	5758	0.016	0.03	24.6	24	1.03	6.5	15	33
D 5-4	MINIMUM ALLOWABLE TC USED																			10
D 5-5	MINIMUM ALLOWABLE TC USED																			10
D 5-6	100	0.028	SHORT GRASS	0.15	4.15	8	1498	0.023	UNPAVED	16.13	11	465	0.023	0.03	7.2	17.1	0.42	4.2	2	21

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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP
WOODLAND DR / SHELF ROCK RD
& TOWERING CEDAR

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	122

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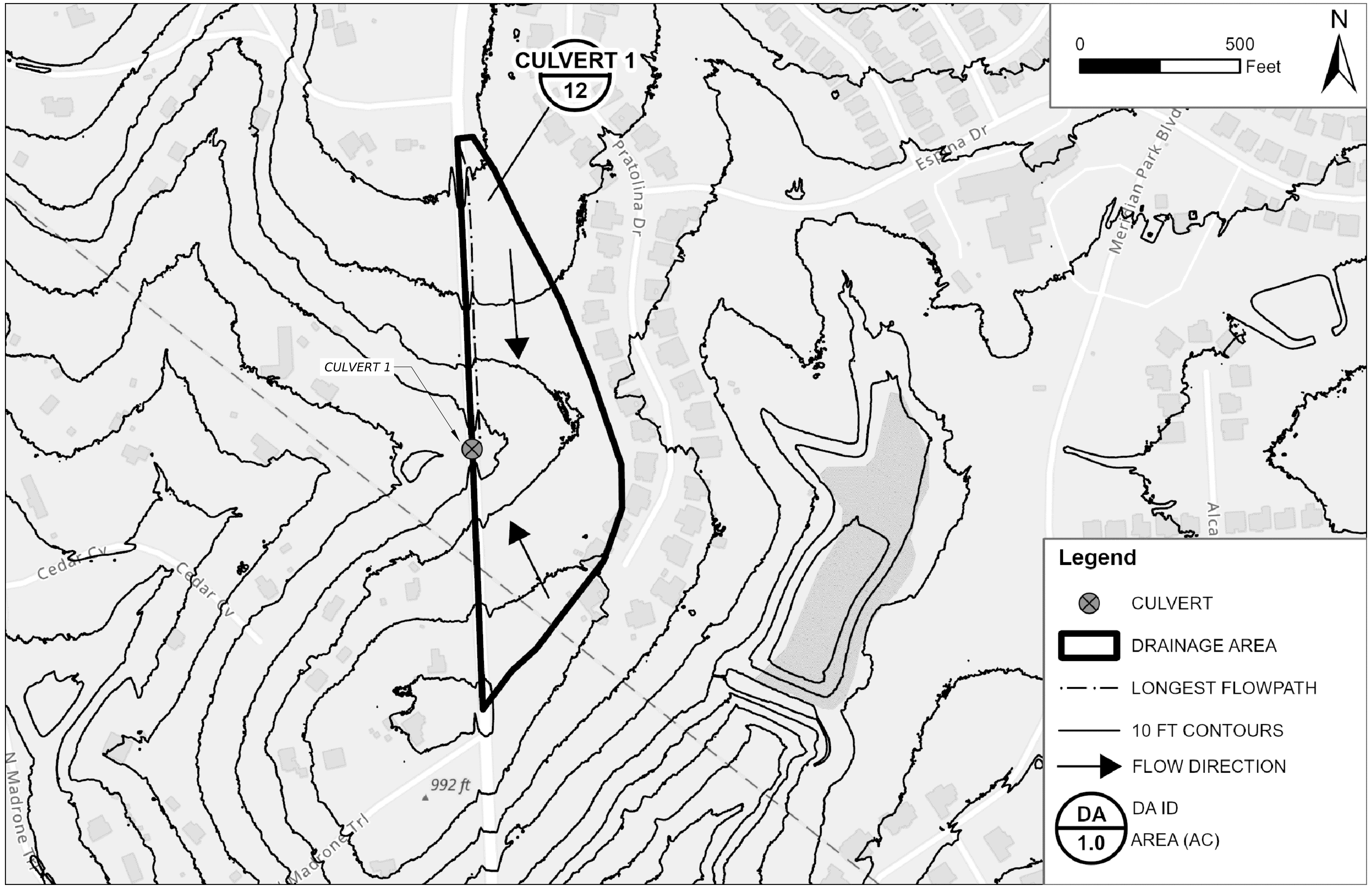

NOTES:

1. CULVERT 1 IS LOCATED IN TRAVIS COUNTY.
2. THE CULVERT 1 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 1 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48453C0570J, EFFECTIVE DATE JANUARY 22, 2020.
3. DRAINAGE AREA BOUNDARY WAS DELINEATED USING THE TNRIS 2021 LIDAR.
4. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
5. THE PROJECT FLOWS WERE CALCULATED USING RATIONAL METHOD AND COMPARED TO SCS HYDROGRAPH DISCHARGES.
6. TIME OF CONCENTRATION FOUND USING TR-55 METHODOLOGY ; LAG=0.6TC.
7. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL DEPTH.
8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS THE 10-YR EVENT WITH A CHECK FLOOD OF 100-YR EVENT FOR ANALYSIS.
9. HEC-HMS V4.10 WAS USED TO MODEL THE WATERSHED FOR SCS HYDROGRAPH METHOD.

REFERENCES

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

STATION	BASIN/ CULVERT ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		RAINFALL INTENSITY (IN/HR)							PEAK DISCHARGE (CFS)						
			ACRES	SQ. MI.	C	MIN	HRS	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
EXISTING/ PROPOSED CONDITIONS																					
248+96.56	CULVERT 1	RATIONAL	12	0.02	0.36	13	0.22	4.54	5.85	6.98	8.59	9.86	11.18	14.78	20	25	30	37	43	48	64

TR-55 TIME OF CONCENTRATION

EXISTING/ PROPOSED CONDITIONS

STATION	BASIN/ CULVERT ID	SHEET FLOW						SHALLOW CONCENTRATED FLOW					OPEN CHANNEL FLOW									TOTAL TIME	
		LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		P2 (IN)	T_{SHEET} (MIN)	LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		TSHALLOW (MIN)	SECTION	LENGTH (FT)	SLOPE (FT/FT)	n	A (FT2)	WP (FT)	R (FT)	V (FT/S)	$T_{CHANNEL}$ (MIN)	Tc (MIN)	Tlag (MIN)
				TYPE	nol					TYPE	K												
248+96.73	CULVERT 1	100	0.032	SHORT GRASS	0.15	4.12	8	879	0.040	UNPAVED	16.13	5	-	-	-	-	-	-	-	-	-	13	7.8

DURATION	ATLAS 14 RAINFALL INTENSITY (IN/HR)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	6.30	8.14	9.71	12.00	13.70	15.60	20.80
15-MIN	4.22	5.43	6.47	7.95	9.10	10.30	13.70
60-MIN	1.96	2.53	3.02	3.71	4.25	4.85	6.63
2-HR	1.21	1.58	1.92	2.44	2.86	3.35	4.81
3-HR	0.89	1.18	1.45	1.87	2.24	2.66	3.93
6-HR	0.53	0.70	0.87	1.15	1.39	1.67	2.52
12-HR	0.30	0.40	0.50	0.66	0.80	0.96	1.45
24-HR	0.17	0.23	0.29	0.37	0.45	0.54	0.81

GEORGE H. AMEN JR.
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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP
CULVERT 1

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	123

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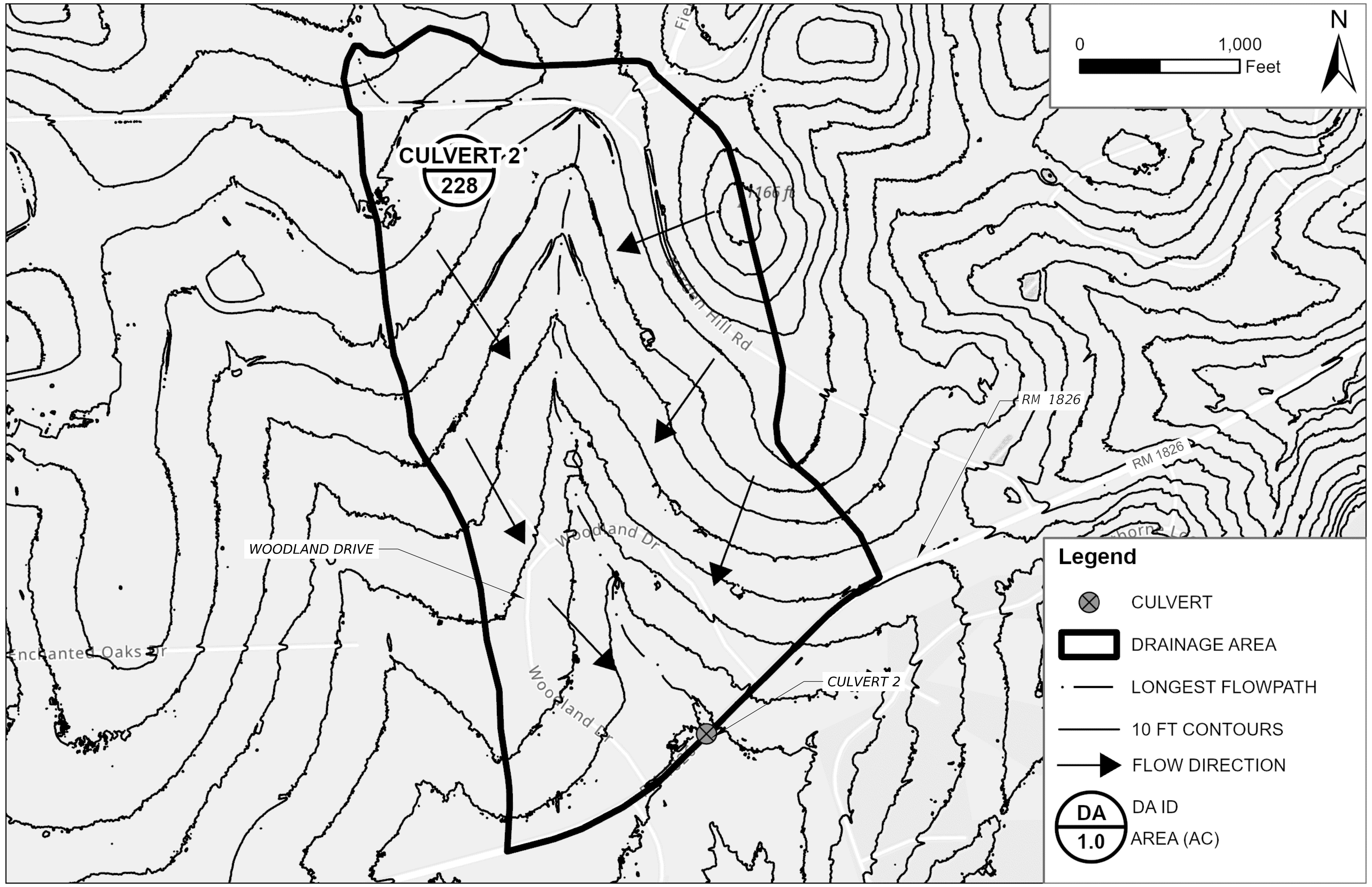

NOTES:

1. CULVERT 2 IS LOCATED IN HAYS COUNTY.
2. THE CULVERT 2 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE A FLOODPLAIN WITH NO FLOODWAY THROUGHOUT THE PROJECT REACH WHICH INDICATES THAT BASE FLOOD ELEVATIONS (BFE) HAVE NOT BEEN DETERMINED. CULVERT 2 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0137F, EFFECTIVE DATE SEPTEMBER 2, 2005.
3. THE HAYS COUNTY LOCAL FLOODPLAIN ADMINISTRATOR (FPA) WILL BE PROVIDED A COPY OF THE PLANS AND HYDRAULIC MODELS AT THE COMPLETION OF THE PROJECT.
4. DRAINAGE AREA BOUNDARY WAS DELINEATED USING THE TNRIS 2021 LIDAR.
5. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
6. THE PROJECT FLOWS WERE CALCULATED USING SCS HYDROGRAPH METHOD AND COMPARED TO EM OMEGA REGRESSION METHOD.
7. TIME OF CONCENTRATION FOUND USING TR-55 METHODOLOGY ; LAG=0.6TC.
8. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL DEPTH.
9. THE DESIGN ANNUAL RECURRENCE INTERVAL IS 10-YR FOR MAINLANES, WITH A 100-YR EVENT FOR THE CHECK FLOOD.
10. HEC-HMS V4.10 WAS USED TO MODEL THE WATERSHED FOR SCS HYDROGRAPH METHOD.
11. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).

REFERENCES:

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

STATION	BASIN/ CULVERT ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		LAG TIME	RAINFALL DEPTH (IN)							PEAK DISCHARGE (CFS)						
			ACRES	SQ. MI.	CN	MIN	HRS	MIN	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
EXISTING/ PROPOSED CONDITIONS																						
514+92.99	CULVERT 2	SCS HYDROGRAPH	228	0.36	71	25	0.42	15	1.06	1.35	1.61	1.98	2.26	2.57	3.39	313	521	725	1032	1276	1548	2263

TR-55 TIME OF CONCENTRATION

EXISTING/ PROPOSED CONDITIONS

STATION	BASIN/ CULVERT ID	SHEET FLOW						SHALLOW CONCENTRATED FLOW					OPEN CHANNEL FLOW									TOTAL TIME	
		LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		P2 (IN)	T (MIN)	LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		TSHALLOW (MIN)	SECTION	LENGTH (FT)	SLOPE (FT/FT)	n	A (FT2)	WP (FT)	R (FT)	V (FT/S)	T (MIN)	Tc (MIN)	Tlag (MIN)
				TYPE	nol					TYPE	K												
514+92.99	CULVERT 2	100	0.015	SHORT GRASS	0.15	4.15	10	310	0.039	UNPAVED	16.13	2	1	1274	0.019	0.03	9.7	18.5	0.52	4.43	5	25	15
													2	4301	0.017	0.03	74	39.7	1.86	9.79	8		

ATLAS 14 RAINFALL DEPTH (IN)

DURATION	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	0.53	0.68	0.81	0.99	1.14	1.30	1.71
15-MIN	1.06	1.35	1.61	1.98	2.26	2.57	3.39
60-MIN	1.96	2.52	3.00	3.69	4.23	4.83	6.57
2-HR	2.43	3.15	3.83	4.85	5.71	6.70	9.60
3-HR	2.71	3.54	4.35	5.61	6.72	8.02	11.80
6-HR	3.18	4.20	5.24	6.87	8.34	10.10	15.20
12-HR	3.65	4.85	6.06	7.96	9.69	11.70	17.70
24-HR	4.15	5.52	6.89	9.03	10.90	13.20	19.80

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Texas Department of Transportation

RM 1826

DRAINAGE AREA MAP
CULVERT 2

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	124

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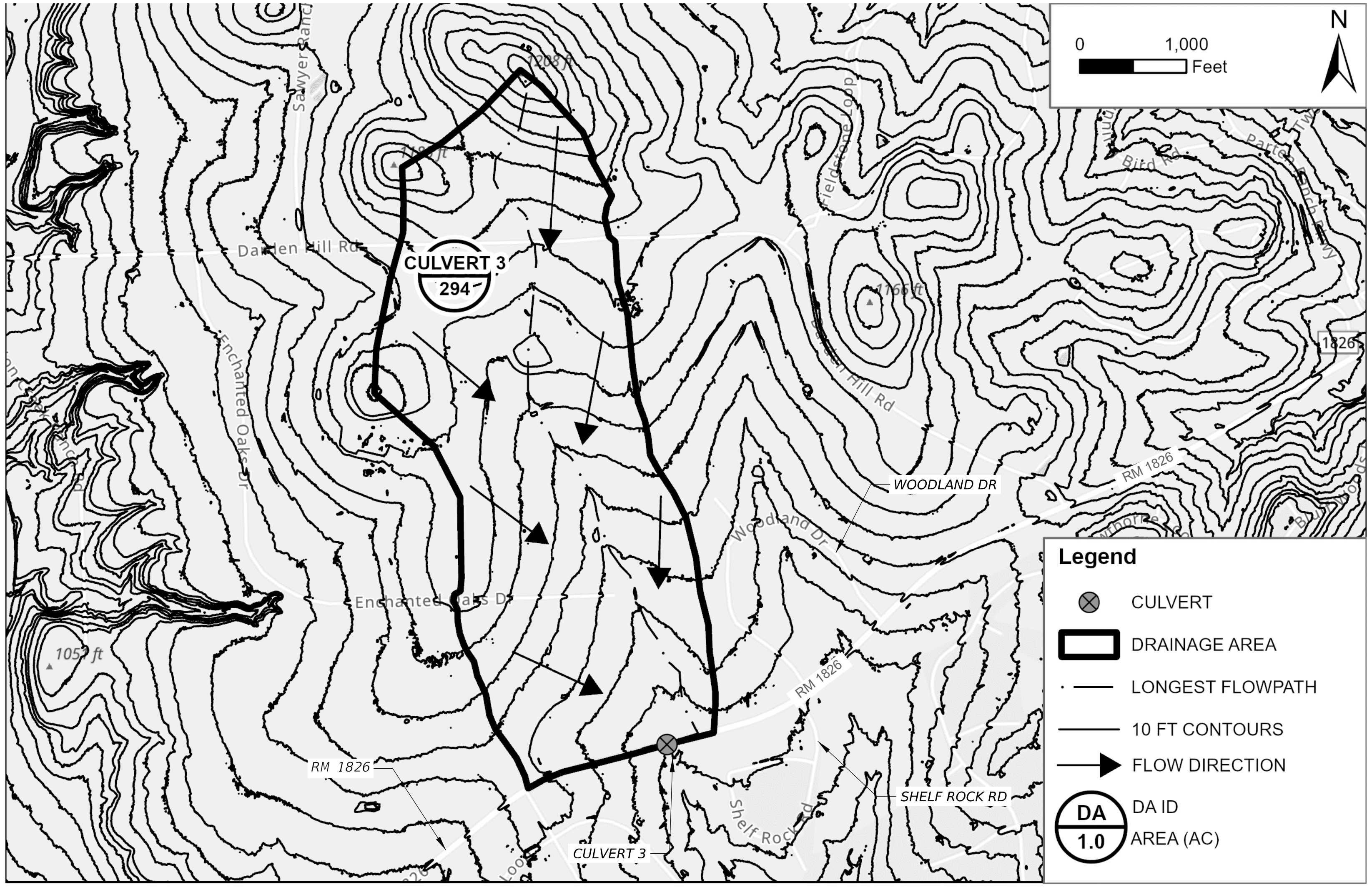

NOTES:

1. CULVERT 3 IS LOCATED IN HAYS COUNTY.
2. THE CULVERT 3 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 3 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0140F, EFFECTIVE DATE SEPTEMBER 2, 2005.
3. DRAINAGE AREA BOUNDARY WAS DELINEATED USING THE TNRIS 2021 LIDAR.
4. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
5. THE PROJECT FLOWS WERE CALCULATED USING RATIONAL METHOD AND COMPARED TO SCS HYDROGRAPH DISCHARGES.
6. TIME OF CONCENTRATION FOUND USING TR-55 METHODOLOGY ; LAG=0.6TC.
7. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL DEPTH.
8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS THE 10-YR EVENT WITH A CHECK FLOOD OF 100-YR EVENT FOR ANALYSIS.
9. HEC-HMS V4.10 WAS USED TO MODEL THE WATERSHED FOR SCS HYDROGRAPH METHOD.
10. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).

REFERENCES:

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

STATION	BASIN/ CULVERT ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		LAG TIME	RAINFALL DEPTH (IN)							PEAK DISCHARGE (CFS)						
			ACRES	SQ. MI.	CN	MIN	HRS	MIN	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
EXISTING/ PROPOSED CONDITIONS																						
531+35.41	CULVERT 3	SCS HYDROGRAPH	294	0.46	71	58	0.97	35	1.57	2.01	2.38	2.92	3.33	3.78	5.05	249	418	585	838	1044	1277	1916

TR-55 TIME OF CONCENTRATION

EXISTING/ PROPOSED CONDITIONS

STATION	BASIN/ CULVERT ID	SHEET FLOW						SHALLOW CONCENTRATED FLOW					OPEN CHANNEL FLOW									TOTAL TIME	
		LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		P2 (IN)	T_{SHEET} (MIN)	LENGTH (FT)	SLOPE (FT/FT)	SURFACE DESCRIPTION		TSHALLOW (MIN)	SECTION	LENGTH (FT)	SLOPE (FT/FT)	n	A (FT2)	WP (FT)	R (FT)	V (FT/S)	$T_{CHANNEL}$ (MIN)	Tc (MIN)	Tlag (MIN)
				TYPE	nol					TYPE	K												
531+35.41	CULVERT 3	100	0.006	Light Underbrush	0.4	4.15	30	1499	0.045	UNPAVED	16.13	8	1	1964	0.019	0.03	2.2	7.4	0.3	3.05	11	58	35
													2	3682	0.015	0.03	61.4	47.5	1.29	7.26	9		

DURATION	ATLAS 14 RAINFALL DEPTH (IN)						
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
5-MIN	0.53	0.68	0.81	0.99	1.14	1.30	1.71
15-MIN	1.06	1.35	1.61	1.98	2.26	2.57	3.39
60-MIN	1.96	2.52	3.00	3.69	4.23	4.83	6.57
2-HR	2.43	3.15	3.83	4.85	5.71	6.70	9.60
3-HR	2.71	3.54	4.35	5.61	6.72	8.02	11.80
6-HR	3.18	4.20	5.24	6.87	8.34	10.10	15.20
12-HR	3.65	4.85	6.06	7.96	9.69	11.70	17.70
24-HR	4.15	5.52	6.89	9.03	10.90	13.20	19.80

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RM 1826

DRAINAGE AREA MAP
CULVERT 3

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	125

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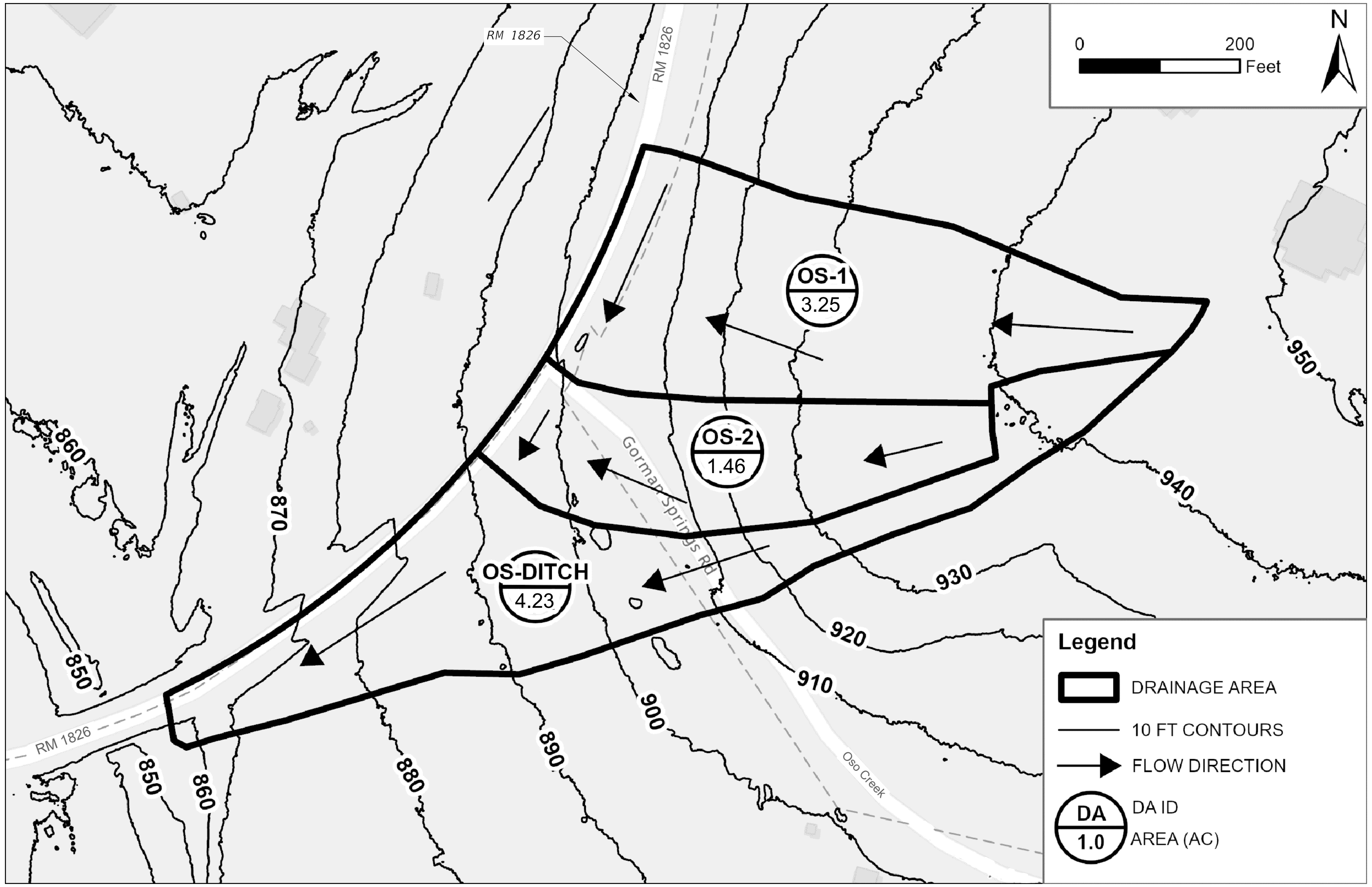

NOTES:

1. STORM SEWER LINE A IS LOCATED IN HAYS COUNTY.

3. DRAINAGE AREA BOUNDARY WAS DELINEATED USING THE TNRIS 2021 LIDAR.

4. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

5. THE PROJECT FLOWS WERE CALCULATED USING RATIONAL METHOD.

6. TIME OF CONCENTRATION FOUND USING TR-55 METHODOLOGY.

7. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL INTENSITY.

8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS THE 5-YR EVENT WITH A CHECK FLOOD OF 100-YR EVENT FOR ANALYSIS.

9. GEOPAK DRAINAGE (2020, BENTLEY SS10, GEOPAK 3.1) WAS USED TO MODEL THE STORM SEWER HYDRAULICS.

REFERENCES:

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)

2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

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RM 1826

DRAINAGE AREA MAP
STORM SEWER LINE A

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	126

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NOTES:

1. CULVERT 1 IS LOCATED IN TRAVIS COUNTY.
2. THE CULVERT 1 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 1 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48453C0570J, EFFECTIVE DATE JANUARY 22, 2020.
3. HY-8 VERSION 7.80.2.0 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 1). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0396 FT/FT.
4. ELEVATIONS REPORTED IN NAVD88.

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

STATION	BASIN/ CULVERT ID	METHOD USED	DRAINAGE AREA		WEIGHTED	TIME OF CONCENTRATION		RAINFALL INTENSITY (IN/HR)							PEAK DISCHARGE (CFS)						
			ACRES	SQ. MI.	C	MIN	HRS	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
EXISTING/ PROPOSED CONDITIONS																					
248+96.56	CULVERT 1	RATIONAL	12	0.02	0.36	13	0.22	4.54	5.85	6.98	8.59	9.86	11.18	14.78	20	25	30	37	43	48	64

HYDRAULIC DATA - EXISTING CONDITIONS

STATION	BASIN/ CULVERT ID	STREAM	FREQUENCY	OUTLET CHANNEL					CULVERT													COMMENTS
				FLOW (CFS)	INVERT (FT)	S (FT/FT)	TW (FT)	TW VELOCITY (FPS)	NO. OF BARRELS	DIAM. (IN)	SLOPE (FT/FT)	LENGTH (FT)	TYPE	MANNING'S N-VALUE	CULVERT CAPACITY (CFS)	CRITICAL DEPTH (FT)	NORMAL DEPTH (FT)	OUTLET VELOCITY (FPS)	HEADWATER ELEVATION (FT)	ROADWAY CREST ELEVATION (FT)		
248+96.56	CULVERT 1	NOT IDENTIFIED BY FEMA	10-YR	30	944.52	0.0396	946.03	6.48	1	24	0.015	38.38	RCP	0.012	24.66	1.75	1.37	9.91	949.46	949.29	EXISTING STRUCTURE OVERTOPS FOR THE 5-YR EVENT. HYDRAULIC MODEL INDICATES THAT EXISTING STRUCTURE IS UNDERSIZED.	
			100-YR	48			946.32	7.29							25.36	1.77	1.40	10.00	949.64			

HYDRAULIC DATA - PROPOSED CONDITIONS

STATION	BASIN/ CULVERT ID	STREAM	FREQUENCY	OUTLET CHANNEL					CULVERT													COMMENTS
				FLOW (CFS)	INVERT (FT)	S (FT/FT)	TW (FT)	TW VELOCITY (FPS)	NO. OF BARRELS	DIAM. (IN)	SLOPE (FT/FT)	LENGTH (FT)	TYPE	MANNING'S N-VALUE	CULVERT CAPACITY (CFS)	CRITICAL DEPTH (FT)	NORMAL DEPTH (FT)	OUTLET VELOCITY (FPS)	HEADWATER ELEVATION (FT)	ROADWAY CREST ELEVATION (FT)		
248+96.56	CULVERT 1	NOT IDENTIFIED BY FEMA	10-YR	30	944.52	0.0396	946.03	6.48	1	24	0.015	41.10	RCP	0.012	24.51	1.74	1.37	9.93	949.46	949.29	PROPOSED STRUCTURE OVERTOPS FOR THE 5-YR EVENT. HYDRAULIC MODEL INDICATES THAT PROPOSED STRUCTURE IS UNDERSIZED.	
			100-YR	48			946.32	7.29							25.21	1.77	1.40	10.01	949.64			

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RM 1826

HYDRAULIC CALCULATION SUMMARY

CULVERT 1

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		127

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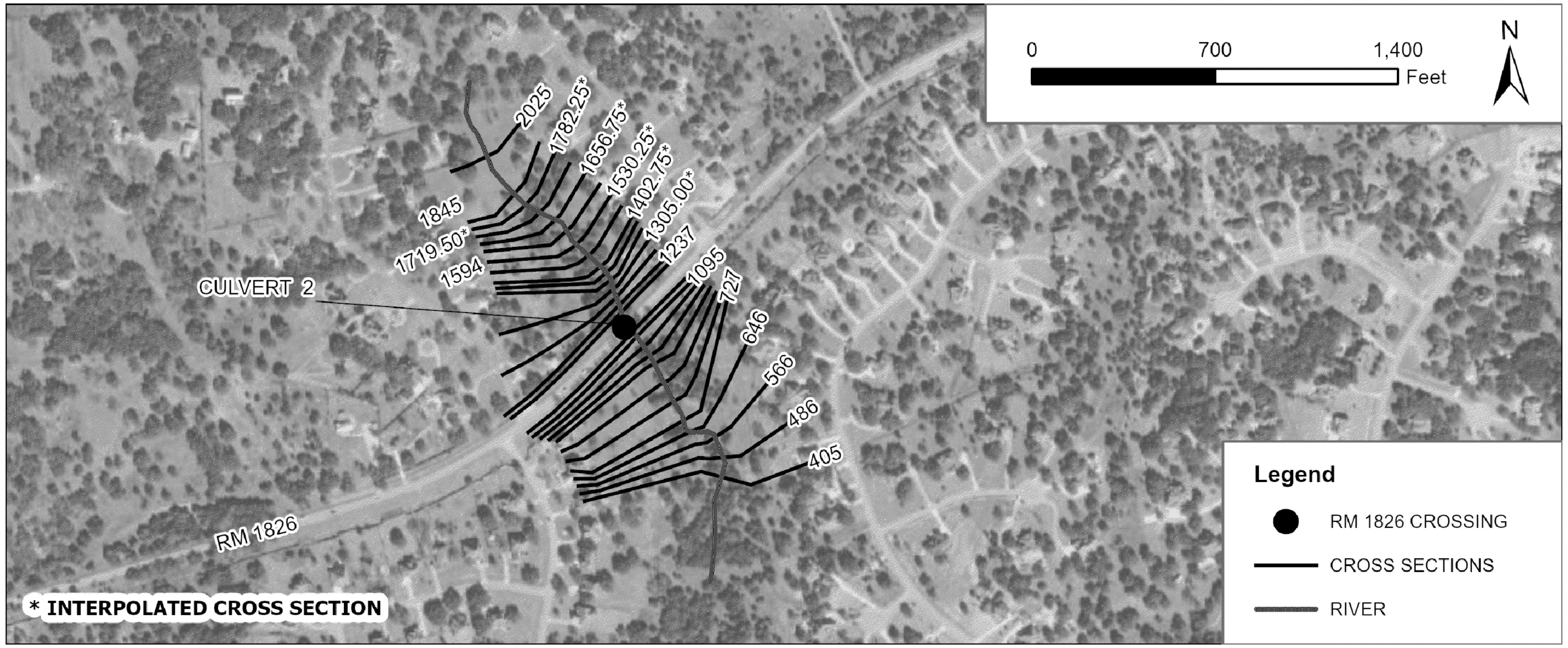


CULVERT 2 CROSS SECTION LAYOUT MAP

NOTES:

1. CULVERT 2 IS LOCATED IN HAYS COUNTY.

2. THE CULVERT 2 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE A FLOODPLAIN WITH NO FLOODWAY THROUGHOUT THE PROJECT REACH WHICH INDICATES THAT BASE FLOOD ELEVATIONS (BFE) HAVE NOT BEEN DETERMINED. CULVERT 2 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0137F, EFFECTIVE DATE SEPTEMBER 2, 2005.

3. USACE HEC-RAS VERSION 6.3.1 WAS USED FOR THE HYDRAULIC ANALYSIS.

4. THE PROJECT FLOWS WERE CALCULATED USING THE SCS HYDROGRAPH METHOD AND COMPARED TO THE TX OMEGA EM REGRESSION EQUATIONS.

5. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).

6. THE SCS HYDROGRAPH METHOD DISCHARGES WERE USED FOR THE HYDRAULIC MODELING.

7. THE DOWNSTREAM BOUNDARY CONDITION WAS ESTABLISHED USING A NORMAL DEPTH OF 0.006 FT/FT FOR ALL PROFILES EXCEPT THE 2-, 5-, AND 10-YR EVENTS. DOWNSTREAM BOUNDAY CONDITION FOR THE 2-, 5-, AND 10-YR EVENTS USE KNOWN WSE WITH ELEVATIONS SET AT 1042.5', 1042.75', AND 1043.00, RESPECTIVELY.

8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS 10-YR FOR MAINLANES, WITH A 100-YR EVENT FOR THE CHECK FLOOD:

Q10 = 725 CFS   Q100 = 1,548 CFS

V10 = 6.05 FPS   V100 = 8.53 FPS

HW10 = 1050.98   HW100 = 1051.44

9. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

REFERENCES:

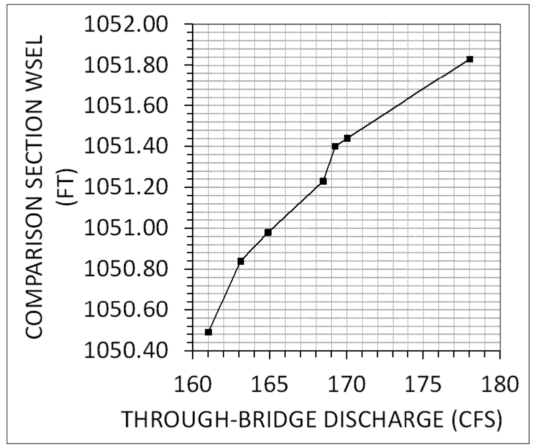
1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)

2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

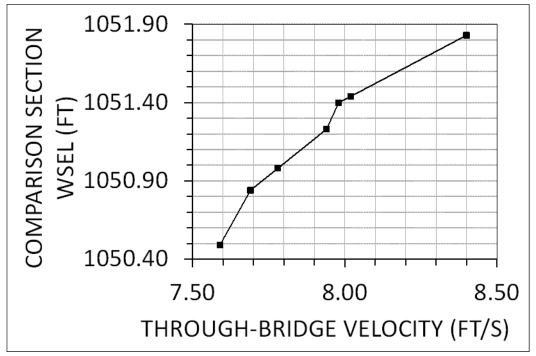
PROPOSED CULVERT 2 COMPARISON TABLE

DESIGN STORM	WSEL (FT)	THROUGH-CULVERT FLOW (CFS)	THROUGH-CULVERT VELOCITY (FT/S)	Q OVERTOPPING (CFS)
2-YR	1050.49	161.00	7.59	152.00
5-YR	1050.84	163.10	7.69	357.90
10-YR	1050.98	164.88	7.78	560.12
25-YR	1051.23	168.46	7.94	863.54
50-YR	1051.40	169.91	8.30	1100.10
100-YR	1051.44	170.03	8.02	1377.97
500-YR	1051.83	178.02	8.40	2084.98

THE VALUES IN THIS TABLE ARE THE RESULTS FROM THE CULVERT OUTPUT WINDOW IN THE HYDRAULIC MODEL FOR FLOW THROUGH THE CULVERT CONVEYANCE PATH FOR THE NOTED AEP STORM.



PROPOSED THROUGH-CULVERT CONVEYANCE CURVE



PROPOSED THROUGH-CULVERT VELOCITY CURVE

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Texas Department of Transportation

RM 1826

HYDRAULIC CALCULATION SUMMARY

CULVERT 2

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	128

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NOTES:

1. CULVERT 3 IS LOCATED IN HAYS COUNTY.
2. THE CULVERT 3 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 3 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0140F, EFFECTIVE DATE SEPTEMBER 2, 2005.
3. HY-8 VERSION 7.80.0.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 3). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0068 FT/FT.
4. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).
5. CULVERT 3 ACTS AS RELIEF STRUCTURE TO EXISTING 2-30" RCP THAT IS ALSO INCLUDED IN THE HYDRAULIC MODEL. ONLY CULVERT 3 RESULTS ARE SHOWN.
6. ELEVATIONS REPORTED IN NAVD88.

HYDROLOGIC SUMMARY TABLE - OFFSITE FLOWS

STATION	BASIN/ CULVERT ID	METHOD USED	DRAINAGE AREA		WEIGHTED CN	TIME OF CONCENTRATION		LAG TIME	RAINFALL DEPTH (IN)							PEAK DISCHARGE (CFS)						
			ACRES	SQ. MI.		MIN	HRS	MIN	I2	I5	I10	I25	I50	I100	I500	Q2	Q5	Q10	Q25	Q50	Q100	Q500
EXISTING/ PROPOSED CONDITIONS																						
531+35.41	CULVERT 3	SCS HYDROGRAPH	294	0.46	71	58	0.97	35	1.57	2.01	2.38	2.92	3.33	3.78	5.05	249	418	585	838	1044	1277	1916

HYDRAULIC DATA - EXISTING CONDITIONS

STATION	BASIN/ CULVERT ID	STREAM	FREQUENCY	OUTLET CHANNEL					CULVERT												COMMENTS
				FLOW	INVERT	S	TW	TW VELOCITY	NO. OF BARRELS	DIAM.	SLOPE	LENGTH	TYPE	MANNING'S N-VALUE	CULVERT CAPACITY	CRITICAL DEPTH	NORMAL DEPTH	OUTLET VELOCITY	HEADWATER ELEVATION	ROADWAY CREST ELEVATION	
				(CFS)	(FT)	(FT/FT)	(FT)	(FPS)		(IN)	(FT/FT)	(FT)			(CFS)	(FT)	(FT)	(FPS)	(FT)	(FT)	
531+35.41	CULVERT 3	NOT IDENTIFIED BY FEMA	10-YR	585	1051.50	0.0189	1051.05	5.42	1	24	0.023	40.39	RCP	0.012	22.36	1.69	1.11	10.79	1056.26	1055.32	EXISTING STRUCTURE OVERTOPS FOR THE 2-YR EVENT. HYDRAULIC MODEL INDICATES THAT EXISTING STRUCTURE IS UNDERSIZED.
			100-YR	1277			1051.62	7.08							24.27	1.74	1.17	11.03	1056.72		

HYDRAULIC DATA - PROPOSED CONDITIONS

STATION	BASIN/ CULVERT ID	STREAM	FREQUENCY	OUTLET CHANNEL					CULVERT												COMMENTS
				FLOW	INVERT	S	TW	TW VELOCITY	NO. OF BARRELS	DIAM.	SLOPE	LENGTH	TYPE	MANNING'S N-VALUE	CULVERT CAPACITY	CRITICAL DEPTH	NORMAL DEPTH	OUTLET VELOCITY	HEADWATER ELEVATION	ROADWAY CREST ELEVATION	
				(CFS)	(FT)	(FT/FT)	(FT)	(FPS)		(IN)	(FT/FT)	(FT)			(CFS)	(FT)	(FT)	(FPS)	(FT)	(FT)	
531+35.41	CULVERT 3	NOT IDENTIFIED BY FEMA	10-YR	585	1051.38	0.0189	1051.05	5.42	1	24	0.023	45.44	RCP	0.012	22.36	1.69	1.11	10.96	1056.26	1055.32	PROPOSED STRUCTURE OVERTOPS FOR THE 2-YR EVENT. HYDRAULIC MODEL INDICATES THAT PROPOSED STRUCTURE IS UNDERSIZED.
			100-YR	1277			1051.62	7.08							24.27	1.74	1.17	11.18	1056.72		

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RM 1826

HYDRAULIC CALCULATION SUMMARY

CULVERT 3

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	129

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CULVERT 1 - EXISTING CULVERT ANALYSIS SUMMARY (HY-8)

****
STRAIGHT CULVERT
INLET ELEV (INVERT): 945.10 FT   OUTLET ELEV (INVERT): 944.52 FT
CULVERT LENGTH: 38.38 FT   CULVERT SLOPE: 0.015 FT/FT
****

NOTES:

1. CULVERT 1 IS LOCATED IN TRAVIS COUNTY.

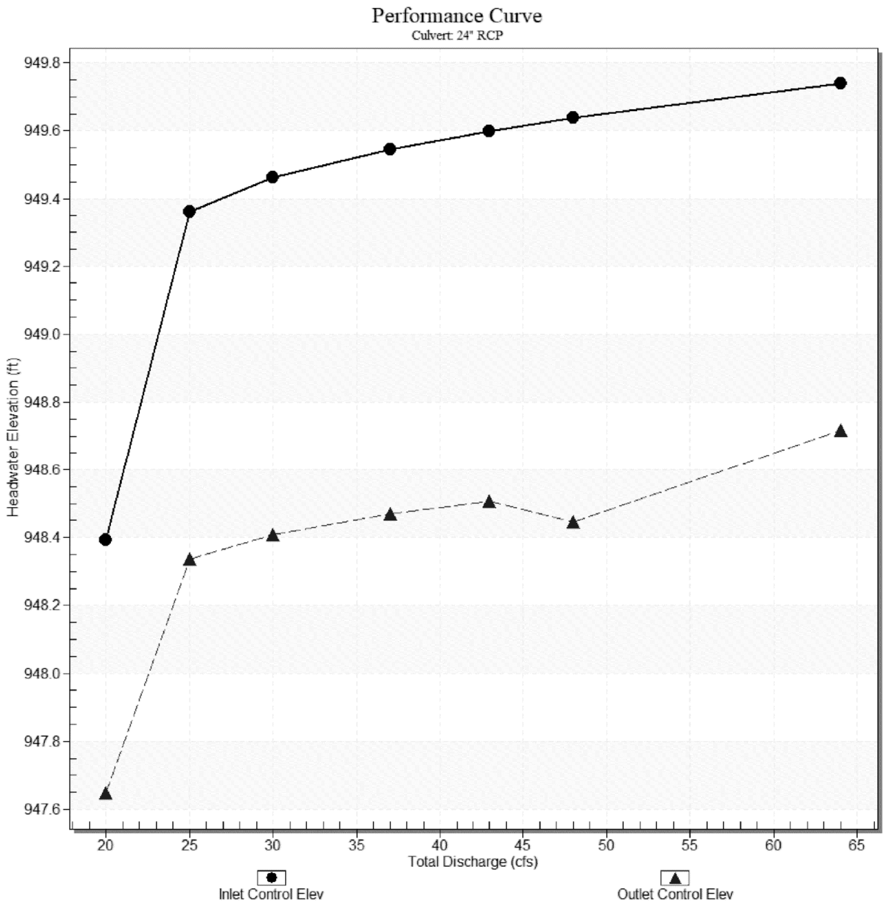
2. THE CULVERT 1 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 1 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48453C0570J, EFFECTIVE DATE JANUARY 22, 2020.

3. HY-8 VERSION 7.80.2.0 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 1). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0396 FT/FT.

4. ELEVATIONS REPORTED IN NAVD88.

FREQUENCY	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FPS)	TAILWATER VELOCITY (FPS)
2-YR	20.00	20.00	948.39	3.29	2.55	5-S2n	1.19	1.61	1.29	1.29	9.33	5.86
5-YR	25.00	24.25	949.36	4.26	3.24	5-S2n	1.36	1.74	1.46	1.41	9.86	6.19
10-YR	30.00	24.66	949.46	4.36	3.31	5-S2n	1.37	1.75	1.48	1.51	9.91	6.48
25-YR	37.00	24.99	949.55	4.45	3.37	5-S2n	1.39	1.76	1.49	1.63	9.95	6.83
50-YR	43.00	25.21	949.60	4.5	3.41	5-S2n	1.40	1.77	1.50	1.72	9.98	7.09
100-YR	48.00	25.36	949.64	4.54	3.35	5-S2n	1.40	1.77	1.51	1.8	10	7.29
500-YR	64.00	25.76	949.74	4.64	3.62	5-S2n	1.42	1.78	1.52	2	10.05	7.83

FREQUENCY	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT 1 DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATIONS
2-YR	948.39	20.00	20	0.00	1
5-YR	949.36	25.00	24	0.75	7
10-YR	949.46	30.00	25	5.27	9
25-YR	949.55	37.00	25	11.97	7
50-YR	949.6	43.00	25	17.77	6
100-YR	949.64	48.00	25	22.62	5
500-YR	949.74	64.00	26	38.24	5
OVERTOPPING	949.29	23.96	24	0.00	OVERTOPPING



SITE DATA
SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 945.10 FT
OUTLET STATION: 38.38 FT
OUTLET ELEVATION: 944.52
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY
BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.012
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE (Ke=0.7)
INLET DEPRESSION: NONE

TAILWATER CHANNEL DATA
TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL
SLOPE OF CHANNEL: 0.0396 FT/FT
MANNING'S N: 0.035
CHANNEL INVERT: 944.52 FT

ROADWAY DATA
ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY
IRREGULAR ROADWAY CROSS-SECTION:

COORD NO.	STA (FT)	ELEV (FT)
1	0.00	959.24
2	38.98	956.64
3	58.98	955.38
4	85.96	953.88
5	111.95	952.62
6	144.94	951.29
7	173.93	950.40
8	178.93	950.19
9	207.91	949.55
10	220.91	949.34
11	230.90	949.29
12	246.90	949.34
13	257.89	949.44
14	272.88	949.73
15	286.88	950.11
16	307.87	950.87
17	334.86	952.21
18	350.85	953.07
19	384.84	955.10
20	416.82	957.13

ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 22 FT

GEORGE H. AMEN JR.
106655
5/30/2023

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	130

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CULVERT 1 - PROPOSED CULVERT ANALYSIS SUMMARY (HY-8)

****
STRAIGHT CULVERT
INLET ELEV (INVERT): 945.14 FT OUTLET ELEV (INVERT): 944.52 FT
CULVERT LENGTH: 44.00 FT CULVERT SLOPE: 0.014 FT/FT
****

NOTES:

1. CULVERT 1 IS LOCATED IN TRAVIS COUNTY.

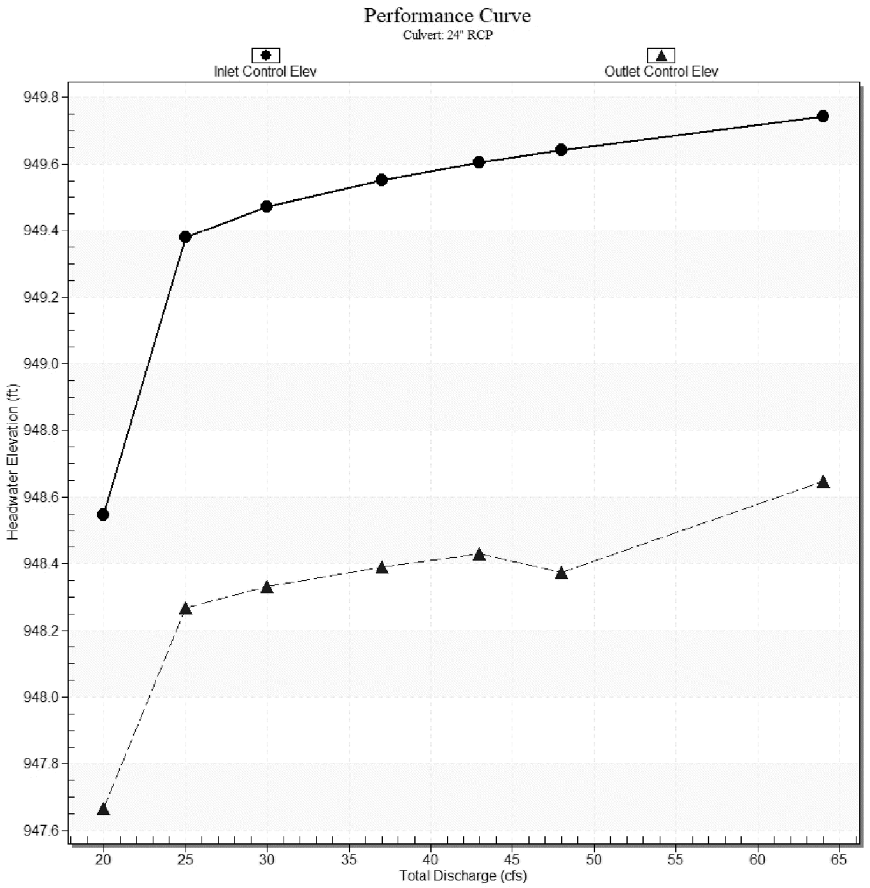
2. THE CULVERT 1 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 1 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48453C0570J, EFFECTIVE DATE JANUARY 22, 2020.

3. HY-8 VERSION 7.80.2.0 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 1). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0396 FT/FT.

4. ELEVATIONS REPORTED IN NAVD88.

FREQUENCY	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FPS)	TAILWATER VELOCITY (FPS)
2-YR	20.00	20.00	948.43	3.29	2.52	5-S2n	1.19	1.61	1.28	1.29	9.38	5.86
5-YR	25.00	24.11	949.37	4.23	3.20	5-S2n	1.35	1.74	1.45	1.41	9.88	6.19
10-YR	30.00	24.51	949.46	4.32	3.27	5-S2n	1.37	1.75	1.47	1.51	9.93	6.48
25-YR	37.00	24.84	949.55	4.41	3.33	5-S2n	1.38	1.76	1.48	1.63	9.97	6.83
50-YR	43.00	25.05	949.60	4.46	3.37	5-S2n	1.39	1.76	1.49	1.72	9.99	7.09
100-YR	48.00	25.21	949.64	4.50	3.31	5-S2n	1.40	1.77	1.49	1.80	10.01	7.29
500-YR	64.00	25.61	949.74	4.60	3.58	5-S2n	1.42	1.78	1.51	2.00	10.06	7.83

FREQUENCY	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT 1 DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATIONS
2-YR	948.43	20.00	20.00	0.00	1
5-YR	949.37	25.00	24.11	1.28	9
10-YR	949.46	30.00	24.51	5.88	9
25-YR	949.55	37.00	24.84	12.57	7
50-YR	949.60	43.00	25.50	18.37	6
100-YR	949.64	48.00	25.21	23.21	5
500-YR	949.74	64.00	25.61	38.83	5
OVERTOPPING	949.29	23.80	23.80	0.00	OVERTOPPING



SITE DATA

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 945.14 FT
OUTLET STATION: 41.10 FT
OUTLET ELEVATION: 944.52
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.012
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE (Ke=0.7)
INLET DEPRESSION: NONE

TAILWATER CHANNEL DATA

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL
SLOPE OF CHANNEL: 0.0396 FT/FT
MANNING'S N: 0.035
CHANNEL INVERT: 944.52 FT

ROADWAY DATA

ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY
IRREGULAR ROADWAY CROSS-SECTION:

COORD NO.	STA (FT)	ELEV (FT)
1	0.00	959.24
2	38.98	956.64
3	58.98	955.38
4	85.96	953.88
5	111.95	952.62
6	144.94	951.29
7	173.93	950.40
8	178.93	950.19
9	207.91	949.55
10	220.91	949.34
11	230.90	949.29
12	246.90	949.34
13	257.89	949.44
14	272.88	949.73
15	286.88	950.11
16	307.87	950.87
17	334.86	952.21
18	350.85	953.07
19	384.84	955.10
20	416.82	957.13

ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 28 FT

GEORGE H. AMEN JR.
106655
5/30/2023

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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	131

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CK:
DW:
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DN:

HYDRAULIC ANALYSIS

RIVER STATION	EXISTING MODEL						PROPOSED MODEL					
	DESIGN			CHECK			DESIGN			CHECK		
	10-YEAR			100-YEAR			10-YEAR			100-YEAR		
	Q (CFS)	V (FT/S)	WSEL (FT)	Q (CFS)	V (FT/S)	WSEL (FT)	Q (CFS)	V (FT/S)	WSEL (FT)	Q (CFS)	V (FT/S)	WSEL (FT)
2025	725	5.09	1058.59	1548	7.20	1059.32	725	5.09	1058.59	1548	7.20	1059.32
1845	725	6.95	1057.14	1548	8.07	1057.82	725	6.95	1057.14	1548	8.07	1057.82
1782.25*	725	5.68	1056.56	1548	7.06	1057.26	725	5.68	1056.56	1548	7.06	1057.26
1719.50*	725	5.09	1056.20	1548	6.27	1056.93	725	5.09	1056.20	1548	6.27	1056.93
1656.75*	725	4.85	1055.78	1548	6.11	1056.50	725	4.85	1055.78	1548	6.11	1056.50
1594	725	7.09	1054.93	1548	8.61	1055.59	725	7.09	1054.93	1548	8.61	1055.59
1530.25*	725	6.93	1054.10	1548	8.67	1054.76	725	6.93	1054.10	1548	8.67	1054.76
1466.50*	725	7.43	1053.18	1548	8.90	1053.92	725	7.43	1053.18	1548	8.90	1053.92
1402.75*	725	6.37	1052.54	1548	8.43	1053.18	725	6.37	1052.54	1548	8.43	1053.18
1372	725	8.12	1052.05	1548	9.28	1052.8	725	8.12	1052.05	1548	9.3	1052.84
1339	725	6.52	1051.20	1548	7.14	1052.30	725	6.52	1051.20	1548	7.14	1052.30
1305.00*	725	6.42	1050.80	1548	7.18	1051.67	725	6.41	1050.80	1548	7.18	1051.67
1271.00*	725	3.51	1051.01	1548	4.87	1051.54	725	3.51	1051.01	1548	4.96	1051.52
1237	725	2.27	1051.02	1548	3.33	1051.55	725	2.27	1051.02	1548	3.39	1051.52
1208	725	2.59	1050.98	1548	3.90	1051.47	725	2.58	1050.98	1548	4.00	1051.44
1154	CULVERT 2: 3 - 36" RCP						CULVERT 2: 3 - 36" RCP					
1120	725	6.05	1049.11	1548	7.94	1049.51	725	6.05	1049.11	1548	7.94	1049.51
1095	725	5.40	1048.32	1548	6.21	1048.81	725	5.40	1048.32	1548	6.21	1048.81
1054.00*	725	5.45	1048.00	1548	6.41	1048.47	725	5.45	1048.00	1548	6.41	1048.47
1013.00*	725	5.82	1047.62	1548	6.81	1048.10	725	5.82	1047.62	1548	6.81	1048.10
972	725	4.36	1047.40	1548	5.43	1047.85	725	4.36	1047.40	1548	5.43	1047.85
891	725	4.87	1046.66	1548	5.77	1047.15	725	4.87	1046.66	1548	5.77	1047.15
809	725	4.60	1045.87	1548	6.02	1046.33	725	4.60	1045.87	1548	6.02	1046.33
727	725	3.16	1045.15	1548	4.05	1045.71	725	3.16	1045.15	1548	4.05	1045.71
646	725	3.17	1044.76	1548	4.04	1045.40	725	3.17	1044.76	1548	4.04	1045.40
566	725	2.63	1043.78	1548	3.93	1044.72	725	2.63	1043.78	1548	3.93	1044.72
486	725	2.08	1043.28	1548	4.18	1044.18	725	2.08	1043.28	1548	4.18	1044.18
405	725	1.43	1043.00	1548	3.66	1043.73	725	1.43	1043.00	1548	3.66	1043.73

CROSSING	RI	*PROPOSED FREEBOARD (FT)
CULVERT 2 @ RM 1826	10 YR	-1.10
	100 YR	-1.56

*NEGATIVE VALUES INDICATE WATER OVERTOPS ROAD

EXISTING CULVERT OUTPUT

STAT	BASIN/ CULVERT ID	CULVERT QUANTITY / SIZE	CULVERT TYPE	Q (CFS)		HW/TW (FT)		HW/TW (FT)		FLOW LINE		ROADWAY CREST (FT)	MODELING SOFTWARE USED	DESIGN 10YR FREEBOARD (FT)	DESIGN V10 (FPS)	CHECK 100YR FREEBOARD (FT)	CHECK V100 (FPS)
				Q10	Q100	HW10	TW10	HW100	TW100	INLET	OUTLET						
514+92.99	CULVERT 2	3 - 36"	RCP	725	1548	1050.98	1049.11	1051.47	1049.51	1045.76	1045.66	1049.88	HEC-RAS 6.3.1	-1.10	7.99	-1.59	8.29

PROPOSED CULVERT OUTPUT

STAT	BASIN/ CULVERT ID	CULVERT QUANTITY / SIZE	CULVERT TYPE	Q (CFS)		HW/TW (FT)		HW/TW (FT)		FLOW LINE		ROADWAY CREST (FT)	MODELING SOFTWARE USED	DESIGN 10YR FREEBOARD (FT)	DESIGN V10 (FPS)	CHECK 100YR FREEBOARD (FT)	CHECK V100 (FPS)
				Q10	Q100	HW10	TW10	HW100	TW100	INLET	OUTLET						
514+92.99	CULVERT 2	3 - 36"	RCP	725	1548	1050.98	1049.11	1051.44	1049.51	1045.76	1045.62	1049.88	HEC-RAS 6.3.1	-1.10	7.78	-1.56	8.02

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5/30/2023

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Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 2

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	132

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CK:
DW:
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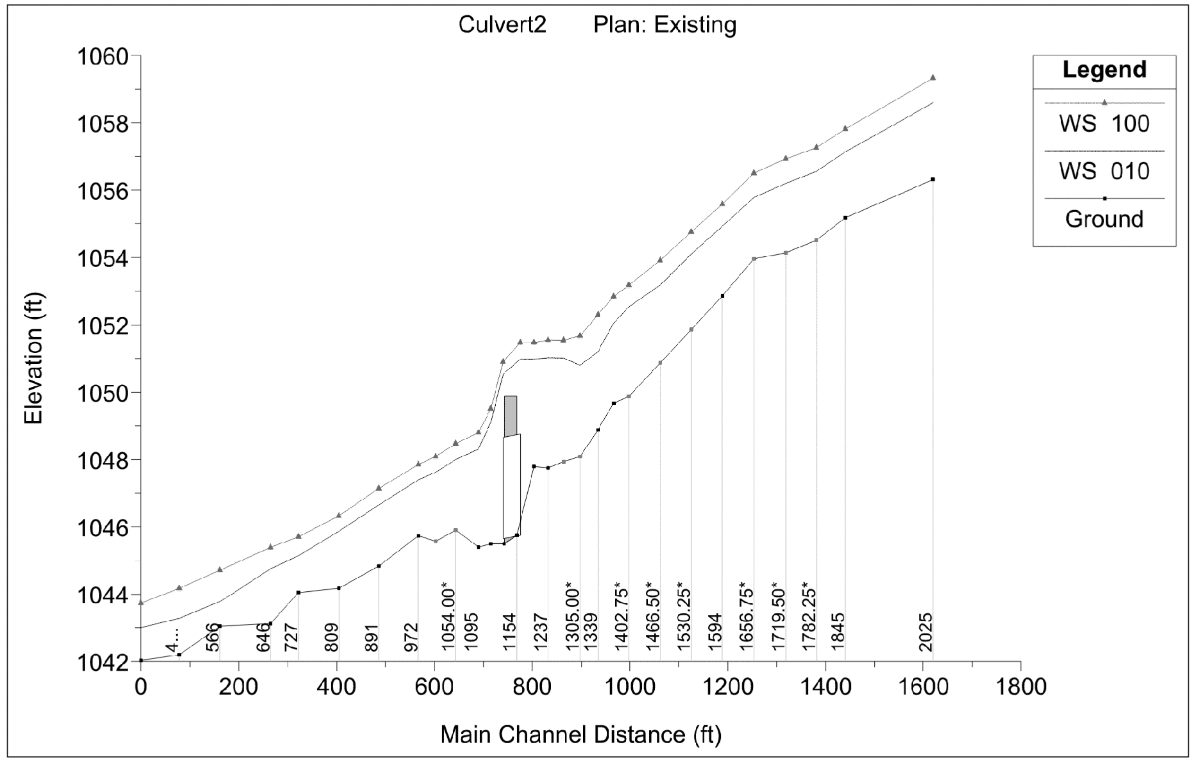
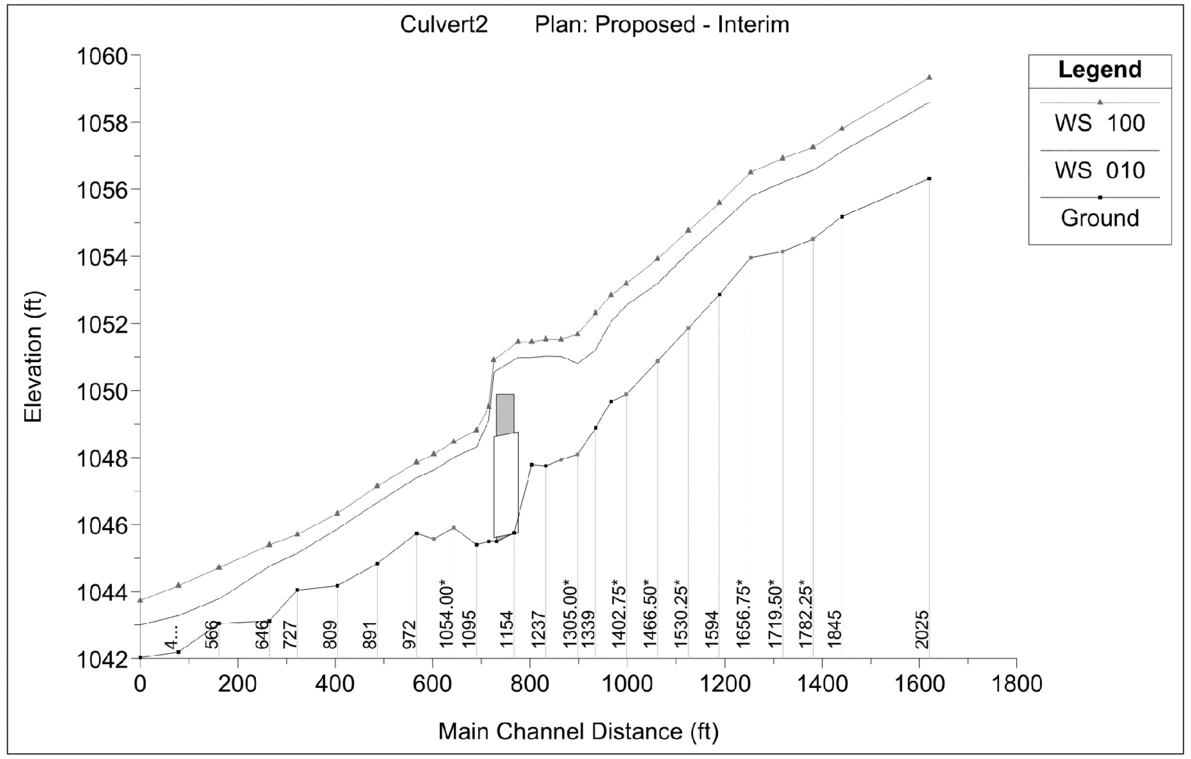


CULVERT 2 HEC RAS EXISTING PROFILE



CULVERT 2 HEC RAS PROPOSED PROFILE

NOTES

1. CULVERT 2 IS LOCATED IN HAYS COUNTY.

2. THE CULVERT 2 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE A FLOODPLAIN WITH NO FLOODWAY THROUGHOUT THE PROJECT REACH WHICH INDICATES THAT BASE FLOOD ELEVATIONS (BFE) HAVE NOT BEEN DETERMINED. CULVERT 2 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0137F, EFFECTIVE DATE SEPTEMBER 2, 2005.

3. USACE HEC-RAS VERSION 6.3.1 WAS USED FOR THE HYDRAULIC ANALYSIS.

4. THE PROJECT FLOWS WERE CALCULATED USING THE SCS HYDROGRAPH METHOD AND COMPARED TO THE TX OMEGA EM REGRESSION EQUATIONS.

5. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).

6. THE SCS HYDROGRAPH METHOD DISCHARGES WERE USED FOR THE HYDRAULIC MODELING.

7. THE DOWNSTREAM BOUNDARY CONDITION WAS ESTABLISHED USING A NORMAL DEPTH OF 0.006 FT/FT FOR ALL PROFILES EXCEPT THE 2-, 5-, AND 10-YR EVENTS. DOWNSTREAM BOUNDARY CONDITION FOR THE 2-, 5-, AND 10-YR EVENTS USE KNOWN WSE WITH ELEVATIONS SET AT 1042.5', 1042.75', AND 1043.00, RESPECTIVELY.

8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS 10-YR FOR MAINLANES, WITH A 100-YR EVENT FOR THE CHECK FLOOD:

Q10 = 725 CFS Q100 = 1,548 CFS

V10 = 7.78 FPS V100 = 8.02 FPS

HW10 = 1050.98 HW100 = 1051.44

9. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

REFERENCES

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)

2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY

DESIGN STORM	WSEL UPSTREAM (ft)		
	EXISTING	PROPOSED	DIFFERENCE
	(1)	(2)	(2)-(1)
2-YR	1050.49	1050.49	0.00
5-YR	1050.74	1050.84	0.10
10-YR	1050.98	1050.98	0.00
25-YR	1051.20	1051.23	0.03
50-YR	1051.36	1051.40	0.04
100-YR	1051.47	1051.44	-0.03
500-YR	1051.77	1051.83	0.06

DESIGN STORM	VELOCITY UPSTREAM (ft/s)		
	EXISTING	PROPOSED	DIFFERENCE
	(1)	(2)	(2)-(1)
2-YR	7.80	7.59	-0.21
5-YR	7.72	7.69	-0.03
10-YR	7.99	7.78	-0.21
25-YR	8.11	7.94	-0.17
50-YR	8.45	8.30	-0.15
100-YR	8.29	8.02	-0.27
500-YR	8.53	8.40	-0.13

DESIGN EVENT (10-YR)	CROSSING CAPACITY (cfs)
EXISITING	169.37
PROPOSED	161.00

THESE FLOW RATES REPRESENT FLOW THROUGH THE MAIN CHANNEL STRUCTURE ONLY, NOT THE TOTAL WATERSHED FLOW.

GEORGE H. AMEN JR.
106655
5/30/2023

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(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 2

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	133

CK:
DW:
CK:
DN:

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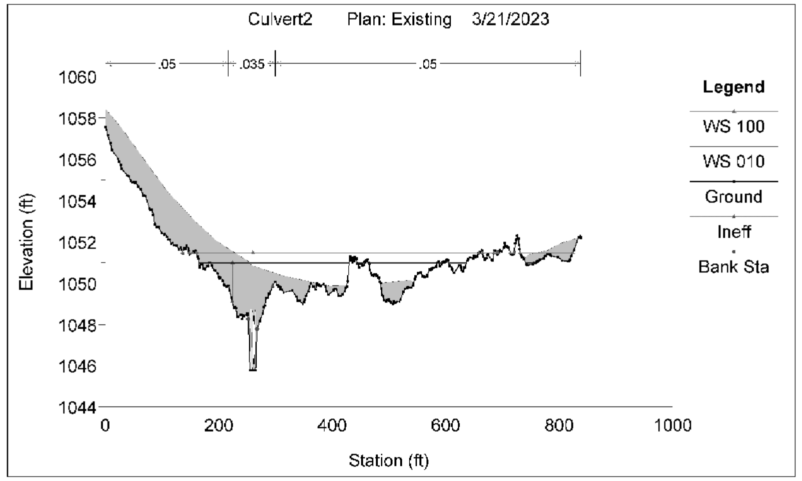
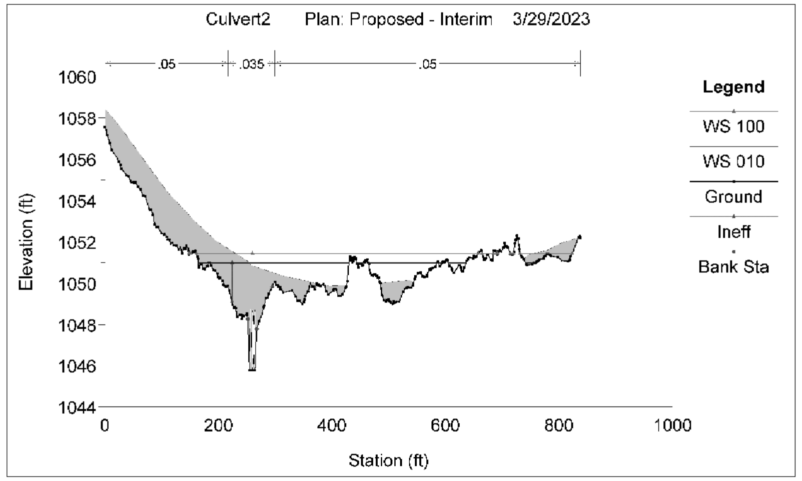


EXISTING UPSTREAM CULVERT XS



EXISTING DOWNSTREAM CULVERT XS

NOTES

1. CULVERT 2 IS LOCATED IN HAYS COUNTY.

2. THE CULVERT 2 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE A FLOODPLAIN WITH NO FLOODWAY THROUGHOUT THE PROJECT REACH WHICH INDICATES THAT BASE FLOOD ELEVATIONS (BFE) HAVE NOT BEEN DETERMINED. CULVERT 2 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0137F, EFFECTIVE DATE SEPTEMBER 2, 2005.

3. USACE HEC-RAS VERSION 6.3.1 WAS USED FOR THE HYDRAULIC ANALYSIS.

4. THE PROJECT FLOWS WERE CALCULATED USING THE SCS HYDROGRAPH METHOD AND COMPARED TO THE TX OMEGA EM REGRESSION EQUATIONS.

5. CN REDUCTION APPLIED TO WATERSHED IN ACCORDANCE WITH TXDOT HDM (SEPT. 2019).

6. THE SCS HYDROGRAPH METHOD DISCHARGES WERE USED FOR THE HYDRAULIC MODELING.

7. THE DOWNSTREAM BOUNDARY CONDITION WAS ESTABLISHED USING A NORMAL DEPTH OF 0.006 FT/FT FOR ALL PROFILES EXCEPT THE 2-, 5-, AND 10-YR EVENTS. DOWNSTREAM BOUNDARY CONDITION FOR THE 2-, 5-, AND 10-YR EVENTS USE KNOWN WSE WITH ELEVATIONS SET AT 1042.5', 1042.75', AND 1043.00, RESPECTIVELY.

8. THE DESIGN ANNUAL RECURRENCE INTERVAL IS 10-YR FOR MAINLANES, WITH A 100-YR EVENT FOR THE CHECK FLOOD:

Q10 = 725 CFS Q100 = 1,548 CFS

V10 = 7.78 FPS V100 = 8.02 FPS

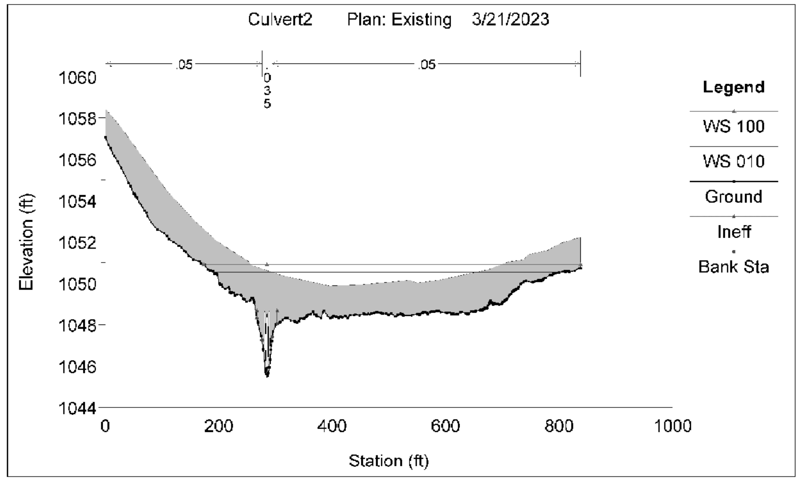
HW10 = 1050.98 HW100 = 1051.44

9. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

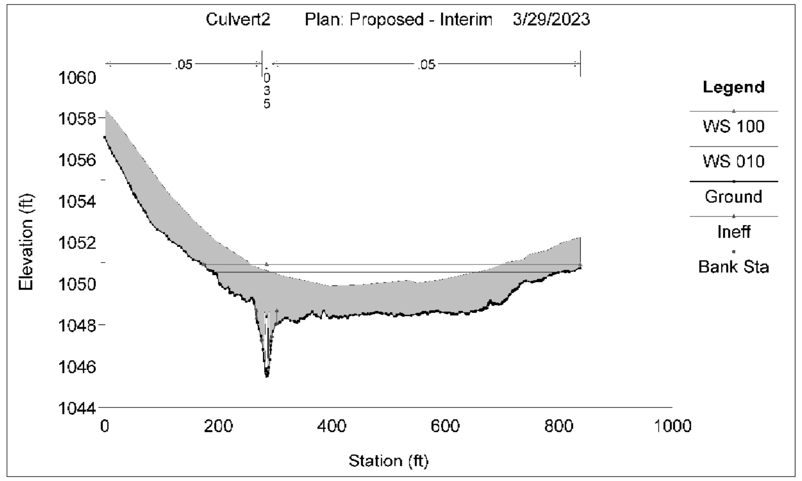
REFERENCES

1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)

2. TOPOGRAPHIC DATA SOURCE: TNRIS 2021 LIDAR AND LOCAL SURVEY



PROPOSED UPSTREAM CULVERT XS



PROPOSED DOWNSTREAM CULVERT XS

GEORGE H. AMEN JR.
106655
5/30/2023

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 2

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	134

CK:
DW:
CK:
DN:

CULVERT 3 - EXISTING CULVERT ANALYSIS SUMMARY (HY-8)

****

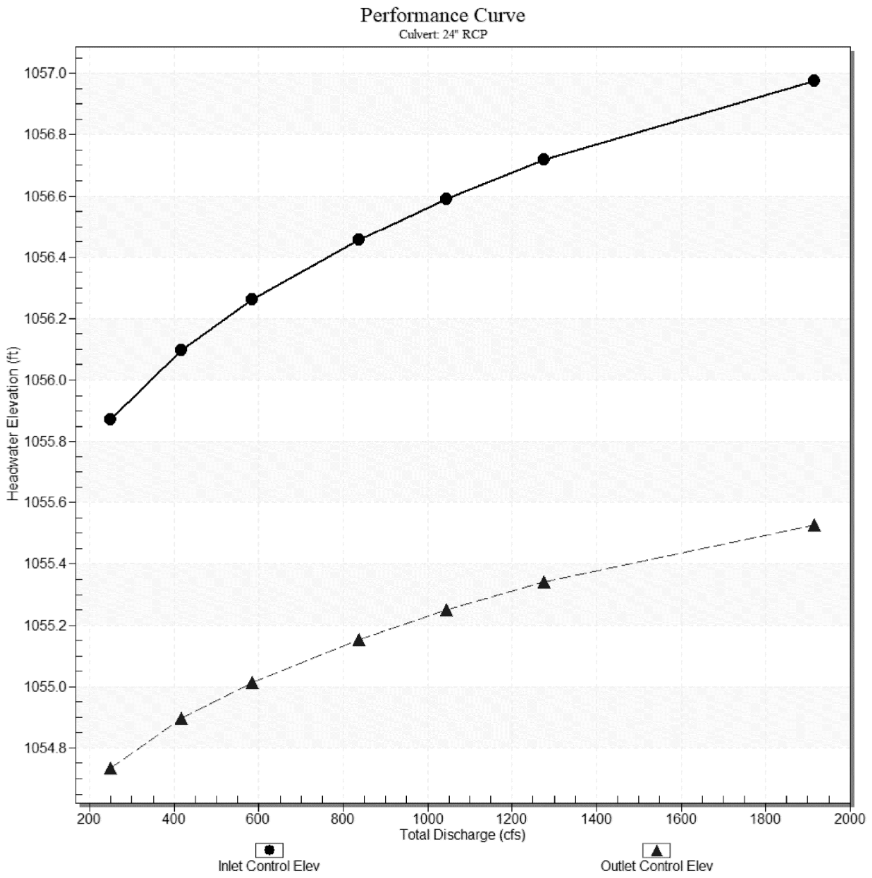
STRAIGHT CULVERT

INLET ELEV (INVERT): 1052.44 FT
OUTLET ELEV (INVERT): 1051.50 FT
CULVERT LENGTH: 40.38 FT
CULVERT SLOPE: 0.023 FT/FT

****

FREQUENCY	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FPS)	TAILWATER VELOCITY (FPS)
2-YR	249.00	20.61	1055.87	3.43	2.29	5-S2n	1.06	1.63	1.19	1.62	10.57	4.04
5-YR	418.00	21.64	1056.10	3.66	2.46	5-S2n	1.09	1.66	1.23	1.84	10.7	4.81
10-YR	585.00	22.36	1056.26	3.82	2.57	5-S2n	1.11	1.69	1.25	2.02	10.79	5.42
25-YR	838.00	23.19	1056.46	4.02	2.71	5-S2n	1.14	1.71	1.28	2.25	10.89	6.14
50-YR	1044.00	23.75	1056.59	4.15	2.81	5-S2n	1.16	1.73	1.30	2.42	10.96	6.62
100-YR	1277.00	24.27	1056.72	4.28	2.90	5-S2n	1.17	1.74	1.32	2.59	11.03	7.08
500-YR	1916.00	25.31	1056.98	4.54	3.09	5-S2n	1.20	1.77	1.36	3.01	11.17	8.01

FREQUENCY	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT 3 DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATIONS
2-YR	1055.87	249.00	20.61	134.19	16
5-YR	1056.10	418.00	21.64	299.54	8
10-YR	1056.26	585.00	22.36	464.33	8
25-YR	1056.46	838.00	23.19	714.51	7
50-YR	1056.59	1044.00	23.75	918.51	6
100-YR	1056.72	1277.00	24.27	1149.95	6
500-YR	1056.98	1916.00	25.31	1785.45	4
OVERTOPPING	1055.32	105.70	17.85	0.00	OVERTOPPING



NOTES:

1. CULVERT 3 IS LOCATED IN HAYS COUNTY.

2. THE CULVERT 3 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 3 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0140F, EFFECTIVE DATE SEPTEMBER 2, 2005.

3. HY-8 VERSION 7.80.0.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 3). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0068 FT/FT.

4. CULVERT 3 ACTS AS RELIEF STRUCTURE TO EXISTING 2-30" RCP THAT IS ALSO INCLUDED IN THE HYDRAULIC MODEL. ONLY CULVERT 3 RESULTS ARE SHOWN.

5. ELEVATIONS REPORTED IN NAVD88.

SITE DATA

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 1052.44 FT
OUTLET STATION: 40.38 FT
OUTLET ELEVATION: 1051.50
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.012
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE (Ke=0.7)
INLET DEPRESSION: NONE

TAILWATER CHANNEL DATA

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL
SLOPE OF CHANNEL: 0.0189 FT/FT
MANNING'S N: 0.035
CHANNEL INVERT: 1049.031 FT

ROADWAY DATA

ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY
IRREGULAR ROADWAY CROSS-SECTION:

COORD NO.	STAT (FT)	ELEV (FT)
1	0.00	1056.76
2	45.98	1056.83
3	115.94	1056.78
4	133.93	1056.91
5	225.89	1056.74
6	351.82	1056.66
7	453.77	1056.20
8	525.74	1055.93
9	593.70	1055.55
10	699.65	1055.32
11	773.61	1055.89
12	831.59	1056.59
13	903.55	1057.75
14	931.53	1058.30
15	1057.47	1061.45
16	1111.44	1062.60
17	1187.41	1064.46
18	1279.36	1067.07
19	1297.35	1067.47
20	1373.31	1069.45

ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30 FT

GEORGE H. AMEN JR.
106655
5/30/2023
George H Amen Jr

3000 INTERNET BLVD
SUITE 400
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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 3

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	135

DATE: 5/30/2023 7:35:03 PM
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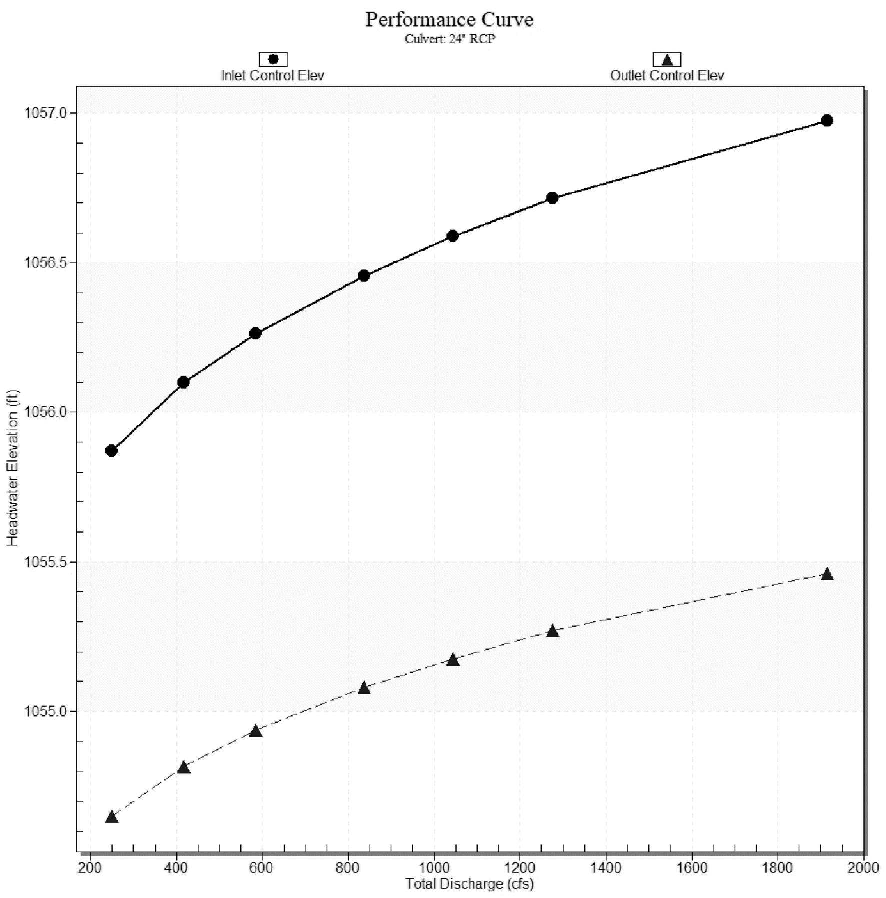
CK:
DW:
CK:
DN:

CULVERT 3 - PROPOSED CULVERT ANALYSIS SUMMARY (HY-8)

****
STRAIGHT CULVERT
INLET ELEV (INVERT): 1052.44 FT   OUTLET ELEV (INVERT): 1051.50 FT
CULVERT LENGTH: 45.50 FT   CULVERT SLOPE: 0.021 FT/FT
****

FREQUENCY	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FPS)	TAILWATER VELOCITY (FPS)
2-YR	249.00	20.61	1055.87	3.43	2.21	5-S2n	1.06	1.63	1.19	1.62	10.73	4.04
5-YR	418.00	21.64	1056.10	3.66	2.38	5-S2n	1.09	1.66	1.21	1.84	10.87	4.81
10-YR	585.00	22.36	1056.26	3.82	2.5	5-S2n	1.11	1.69	1.24	2.02	10.96	5.42
25-YR	838.00	23.19	1056.46	4.02	2.64	5-S2n	1.14	1.71	1.27	2.25	11.06	6.14
50-YR	1044.00	23.74	1056.59	4.15	2.74	5-S2n	1.15	1.73	1.29	2.42	11.12	6.62
100-YR	1277.00	24.27	1056.72	4.28	2.83	5-S2n	1.17	1.74	1.30	2.59	11.18	7.08
500-YR	1916.00	25.31	1056.98	4.54	3.02	5-S2n	1.20	1.77	1.34	3.01	11.30	8.01

FREQUENCY	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT 3 DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATIONS
2-YR	1055.87	249.00	20.61	134.19	16
5-YR	1056.10	418.00	21.64	299.54	8
10-YR	1056.26	585.00	22.36	464.33	8
25-YR	1056.46	838.00	23.19	714.51	7
50-YR	1056.59	1044.00	23.74	918.51	6
100-YR	1056.72	1277.00	24.27	1149.95	6
500-YR	1056.98	1916.00	25.31	1785.45	4
OVERTOPPING	1055.32	105.70	17.85	0.00	OVERTOPPING



NOTES:

1. CULVERT 3 IS LOCATED IN HAYS COUNTY.

2. THE CULVERT 3 STREAM CROSSES RM 1826 AND IS DESIGNATED AS SPECIAL FLOOD HAZARD (SFHA) ZONE X FLOODPLAIN. CULVERT 3 CAN BE FOUND ON THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 48209C0140F, EFFECTIVE DATE SEPTEMBER 2, 2005.

3. HY-8 VERSION 7.80.0.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE CROSS CULVERT (CULVERT 3). DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.0068 FT/FT.

4. CULVERT 3 ACTS AS RELIEF STRUCTURE TO EXISTING 2-30" RCP THAT IS ALSO INCLUDED IN THE HYDRAULIC MODEL. ONLY CULVERT 3 RESULTS ARE SHOWN.

5. ELEVATIONS REPORTED IN NAVD88.

SITE DATA

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 1052.44 FT
OUTLET STATION: 45.44 FT
OUTLET ELEVATION: 1051.38
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.012
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE (Ke=0.7)
INLET DEPRESSION: NONE

TAILWATER CHANNEL DATA

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL
SLOPE OF CHANNEL: 0.0189 FT/FT
MANNING'S N: 0.035
CHANNEL INVERT: 1049.031 FT

ROADWAY DATA

ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY
IRREGULAR ROADWAY CROSS-SECTION:

COORD NO.	STAT (FT)	ELEV (FT)
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7	453.77	1056.20
8	525.74	1055.93
9	593.70	1055.55
10	699.65	1055.32
11	773.61	1055.89
12	831.59	1056.59
13	903.55	1057.75
14	931.53	1058.30
15	1057.47	1061.45
16	1111.44	1062.60
17	1187.41	1064.46
18	1279.36	1067.07
19	1297.35	1067.47
20	1373.31	1069.45

ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30 FT

GEORGE H. AMEN JR.
106655
5/30/2023

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Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
CULVERT 3

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	136

DATE: 5/30/2023 7:35:14 PM
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5-YR INLET CONFIGURATION

INLET ID	NODE NAME	NODE STATION	CL	OFFSET (LT/RT)	NODE ELEVATION (FT)	NODE TYPE	NODE PROFILE TYPE	INLET COMPOSITE SPREAD SLOPE	INLET GRATE TYPE	INLET GRATE LENGTH	INLET GRATE WIDTH	INLET GRATE AREA	INLET GRATE PERIMETER	INLET - GRATE CLOG AREA REDUCTION	INLET - GRATE CLOG PERIMETER REDUCTION
OS-02	PSL FG-SFG 3x3 W/ 3x3 GRATE	279+25.10	RM1826_4	34.50 LT	895.65	GRATE	SAG	0.33	PARALLEL 1 7/8 - 4	3.17	3.17	4.54	12.67	0.500	0.50
OS-01	PSL FG-SFG 3x3 W/ 3x3 GRATE	278+02.12	RM1826_4	30.71 LT	897.99	GRATE	SAG	0.33	PARALLEL 1 7/8 - 4	3.17	3.17	4.54	12.67	0.500	0.50

5-YR LINK COMPUTATIONS

LINK - ID	LINK - PIPE	LINK - UPSTREAM NODE	LINK - DOWNSTREAM NODE	LINK - SHAPE	LINK - MATERIAL	LINK - NUMBER OF BARRELS	LINK - ACTUAL LENGTH	LINK - HYDRAULIC LENGTH	LINK - MANNING'S N VALUE	LINK - SLOPE	LINK -RISE	LINK - SOFFIT UPSTREAM	LINK - SOFFIT DOWNSTREAM	LINK - INVERT UPSTREAM	LINK - INVERT DOWNSTREAM
OS-2	PIPE	OS-02	OS-OUT	CIRCULAR	CONCRETE	1.00	171.48	172.98	0.01	1.12	2.00	887.35	885.42	885.35	883.42
OS-1	PIPE	OS-01	OS-02	CIRCULAR	CONCRETE	1.00	123.48	126.48	0.01	2.00	1.50	895.37	892.84	893.87	891.34

5-YR RUNOFF COMPUTATIONS

DRAINAGE AREA		COMPOSITE C-VALUE	TIME OF CONCENTRATION	INTENSITY	DESIGN DISCHARGE (5-YR)
ID	ACRES		(MINUTE)	(IN/HR)	(CFS)
OS-01	3.250	0.32	10.00	6.46	6.7
OS-02	1.460	0.38	10.00	6.46	3.6
OS-DITCH	8.900	0.34	10.00	6.46	19.5

5-YR INLET HYDRAULIC COMPUTATIONS

INLET ID	INLET TYPE	INLET PROFILE TYPE	NODE STATION	CL	INLET DISCHARGE (CFS)	INLET CAPACITY (CFS)	INLET - BY PASS FLOW INTO (CFS)	INLET - BY PASS FLOW (CFS)	INLET - BY PASS NODE ID	INLET - COMPUTED PONDED WIDTH (FT)	INLET - MAX PONDED WIDTH (FT)	INLET - COMPUTED PONDED WIDTH (FT)	INLET - MAX PONDED DEPTH (FT)	INLET - LONGITUDINAL SLOPE %	NODE - JUNCTION LOSS (FT)	INLET - SPREAD N
OS-02	GRATE	SAG	279+25.10	RM1826_4	4	10.48	0.00	0.00		1.14	8.18	0.35	0.74	n/a	0.08	0.01
OS-01	GRATE	SAG	278+02.12	RM1826_4	7	21.87	0.00	0.00		1.89	22.34	0.50	3.22	n/a	0.46	0.01

100-YR LINK HYDRAULICS

LINK - ID	LINK - DISCHARGE (CFS)	LINK - CAPACITY (CFS)	LINK - UNIFORM DEPTH (FT)	LINK - UNIFORM VELOCITY (FT/S)	LINK - CRITICAL DEPTH (FT)	LINK - CRITICAL VELOCITY (FT/S)	LINK - CRITICAL SLOPE (FT/FT)	LINK - FRICTION SLOPE (FT/S)	LINK - ACTUAL VELOCITY DOWNSTREAM (FT/S)	LINK - ACTUAL VELOCITY UPSTREAM (FT/S)	LINK - ACTUAL DEPTH DOWNSTREAM (FT)	LINK - ACTUAL DEPTH UPSTREAM (FT)	LINK - HGL DOWNSTREAM (FT)	LINK - HGL UPSTREAM (FT)	LINK - EGL DOWNSTREAM (FT)	LINK - EGL UPSTREAM (FT)	LINK - UPSTREAM JUNCTION LOSS (FT)
OS-2	11	27.85	0.91	7.91	1.190	5.65	0.00	0.01	7.88	5.22	0.91	1.27	884.33	886.62	885.30	887.12	0.08
OS-1	7	17.31	0.69	8.79	1.020	5.44	0.01	0.02	8.73	3.96	0.70	1.50	892.04	895.51	893.22	895.82	0.46

100-YR RUNOFF COMPUTATIONS

DRAINAGE AREA		COMPOSITE C-VALUE	TIME OF CONCENTRATION	INTENSITY	DESIGN DISCHARGE (5-YR)
ID	ACRES		(MINUTE)	(IN/HR)	(CFS)
OS-01	3.250	0.32	10.00	12.50	13.0
OS-02	1.460	0.38	10.00	12.50	6.9
OS-DITCH	8.940	0.34	10.00	12.50	38.0

100-YR INLET HYDRAULIC COMPUTATIONS

INLET ID	INLET TYPE	INLET PROFILE TYPE	NODE STATION	CL	INLET DISCHARGE (CFS)	INLET CAPACITY (CFS)	INLET - BY PASS FLOW INTO (CFS)	INLET - BY PASS FLOW (CFS)	INLET - BY PASS NODE ID	INLET - COMPUTED PONDED WIDTH (FT)	INLET - MAX PONDED WIDTH (FT)	INLET - COMPUTED PONDED WIDTH (FT)	INLET - MAX PONDED DEPTH (FT)	INLET - LONGITUDINAL SLOPE %	NODE - JUNCTION LOSS (FT)	INLET - SPREAD N
OS-02	GRATE	SAG	279+25.10	RM1826_4	10	10.48	0.00	0.00		1.51	8.18	0.50	0.74	N/A	0.06	0.01
OS-01	GRATE	SAG	278+02.12	RM1826_4	7	21.87	0.00	0.00		6.41	22.34	1.14	3.22	N/A	0.93	0.01

100-YR LINK HYDRAULICS

LINK - ID	LINK - DISCHARGE (CFS)	LINK - CAPACITY (CFS)	LINK - UNIFORM DEPTH (FT)	LINK - UNIFORM VELOCITY (FT/S)	LINK - CRITICAL DEPTH (FT)	LINK - CRITICAL VELOCITY (FT/S)	LINK - CRITICAL SLOPE (FT/FT)	LINK - FRICTION SLOPE (FT/S)	LINK - ACTUAL VELOCITY DOWNSTREAM (FT/S)	LINK - ACTUAL VELOCITY UPSTREAM (FT/S)	LINK - ACTUAL DEPTH DOWNSTREAM (FT)	LINK - ACTUAL DEPTH UPSTREAM (FT)	LINK - HGL DOWNSTREAM (FT)	LINK - HGL UPSTREAM (FT)	LINK - EGL DOWNSTREAM (FT)	LINK - EGL UPSTREAM (FT)	LINK - UPSTREAM JUNCTION LOSS (FT)
OS-2	20	27.85	1.32	9.09	1.610	7.40	0.01	0.01	9.06	7.15	1.32	1.67	884.74	887.02	886.02	887.87	0.06
OS-1	13	17.31	1.02	10.13	1.350	7.76	0.01	0.02	10.04	7.36	1.03	1.50	892.37	897.01	893.94	897.09	0.93

GEORGE H. AMEN JR.
106655
5/30/2023

George H. Amen Jr.

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(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

HYDRAULIC DATA SHEET
STORM SEWER

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		137

DATE: 5/30/2023 7:35:26 PM
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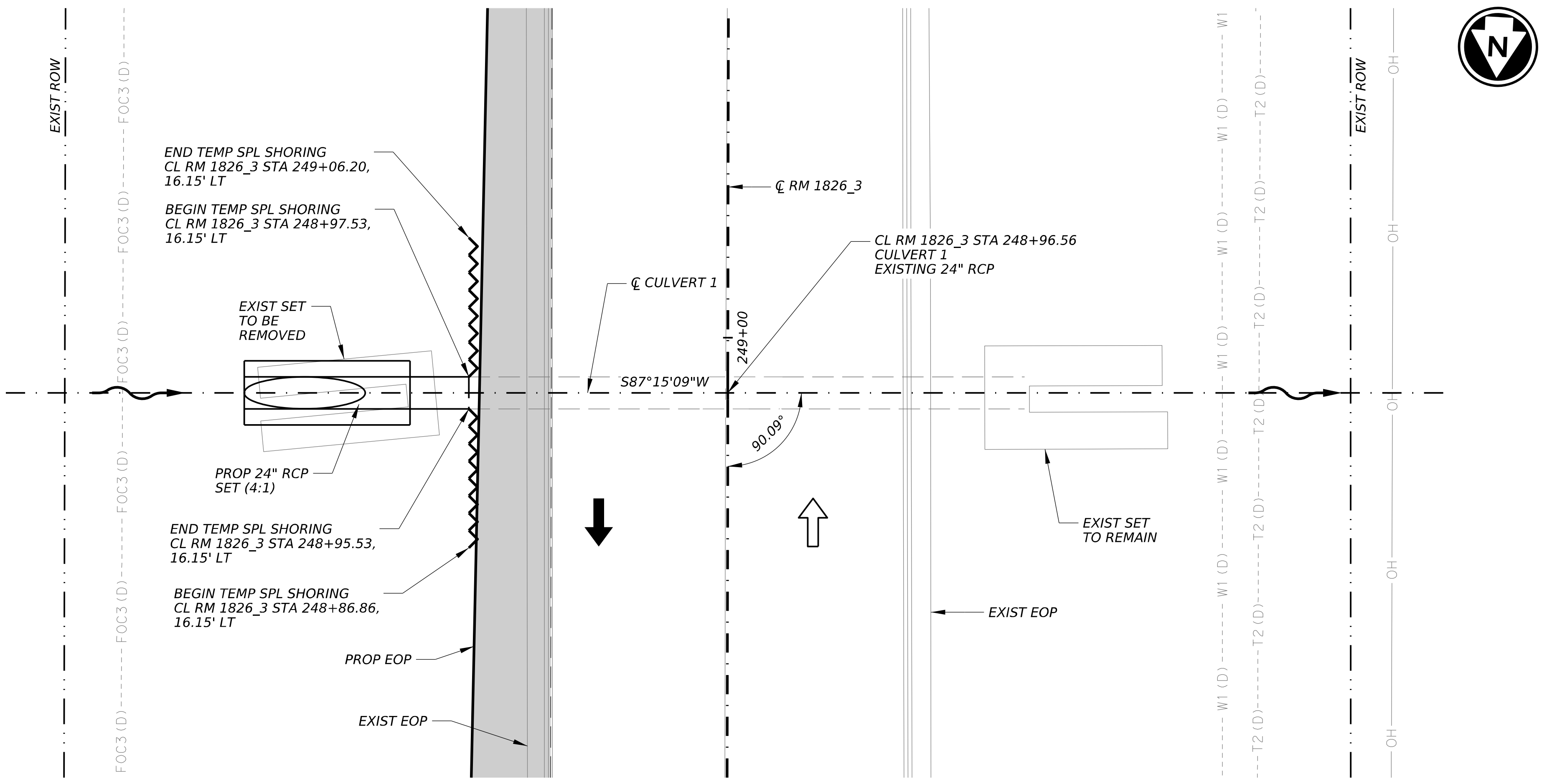
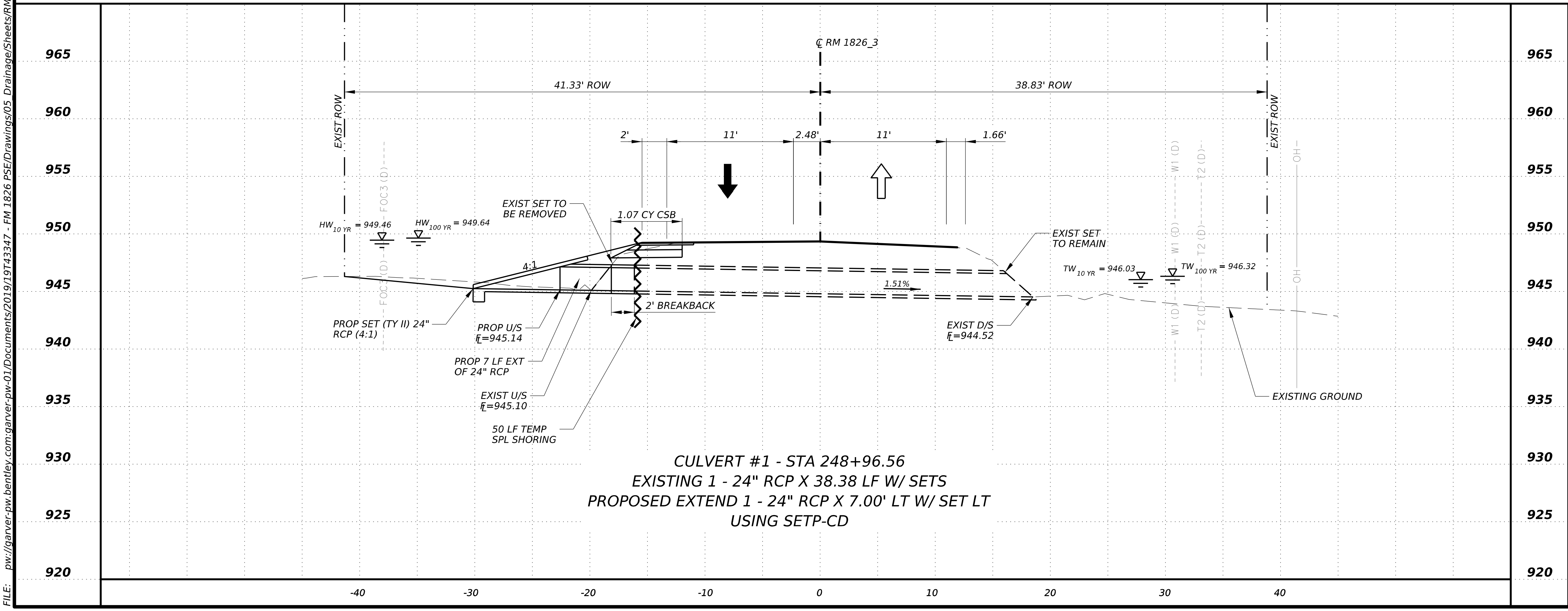


ITEM	ITEM DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	1.07
0403-6001	TEMPORARY SPL SHORING	SF	50
0464-6005	RC PIPE (CL III) (24 IN)	LF	7
0467-6390	SET (TY II) (24 IN) (RCP) (4:1) (C)	EA	1
0480-6001	CLEAN EXISTING CULVERTS	EA	1

DESIGN FREQUENCY 10-YR	10-YR EXIST	10-YR PROP	100-YR EXIST	100-YR PROP
Q (CFS)	30.00	30.00	48.00	48.00
HW ELEV (FT)	949.46	949.46	949.64	949.64
TW ELEV (FT)	946.03	946.03	946.32	946.32
OUT VELOCITY (FT/SEC)	9.91	9.93	10.00	10.01

NOTES:

1. HYDRAULIC CALCULATIONS ARE PERFORMED USING FHWA HY-8, V.7.60. FOR NON-BRIDGE CLASS CULVERTS AND HEC-RAS, V.6.0 FOR BRIDGE CLASS AND FEMA ZONE-A CULVERTS.
2. REFER TO TYPICAL SECTIONS, ROADWAY PLANS AND MISC. DRAINAGE DETAILS SHEET FOR ADDITIONAL INFORMATION.
3. DEWATERING WILL BE REQUIRED FOR CULVERT EXTENSION AND END TREATMENT INSTALLATION.
4. CONTRACTOR TO GRADE TO DRAIN AS DIRECTED BY THE ENGINEER.
5. UTILITIES DISPLAYED ARE FOR INFORMATION PURPOSE ONLY AND NEED TO BE FIELD VERIFIED.
6. REMOVAL OF EXISTING SET AND PORTION OF EXISTING CULVERTS ARE SUBSIDIARY TO ITEM 464, ITEM 466 AND ITEM 467.



CULVERT #1 - STA 248+96.56
EXISTING 1 - 24" RCP X 38.38 LF W/ SETS
PROPOSED EXTEND 1 - 24" RCP X 7.00' LT W/ SET LT
USING SETP-CD

HORZ 0 5' 10'
VERT 0 5' 10'
SCALE IN FEET

ALFREDO L. LOPEZ
101155
5/30/2023
Alfred Lopez

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Texas Department of Transportation

RM 1826

CULVERT LAYOUT
CULVERT #1
STA 248+96.56

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	138

DATE: 5/30/2023 7:36:14 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826_DRN_CUL_GV_01

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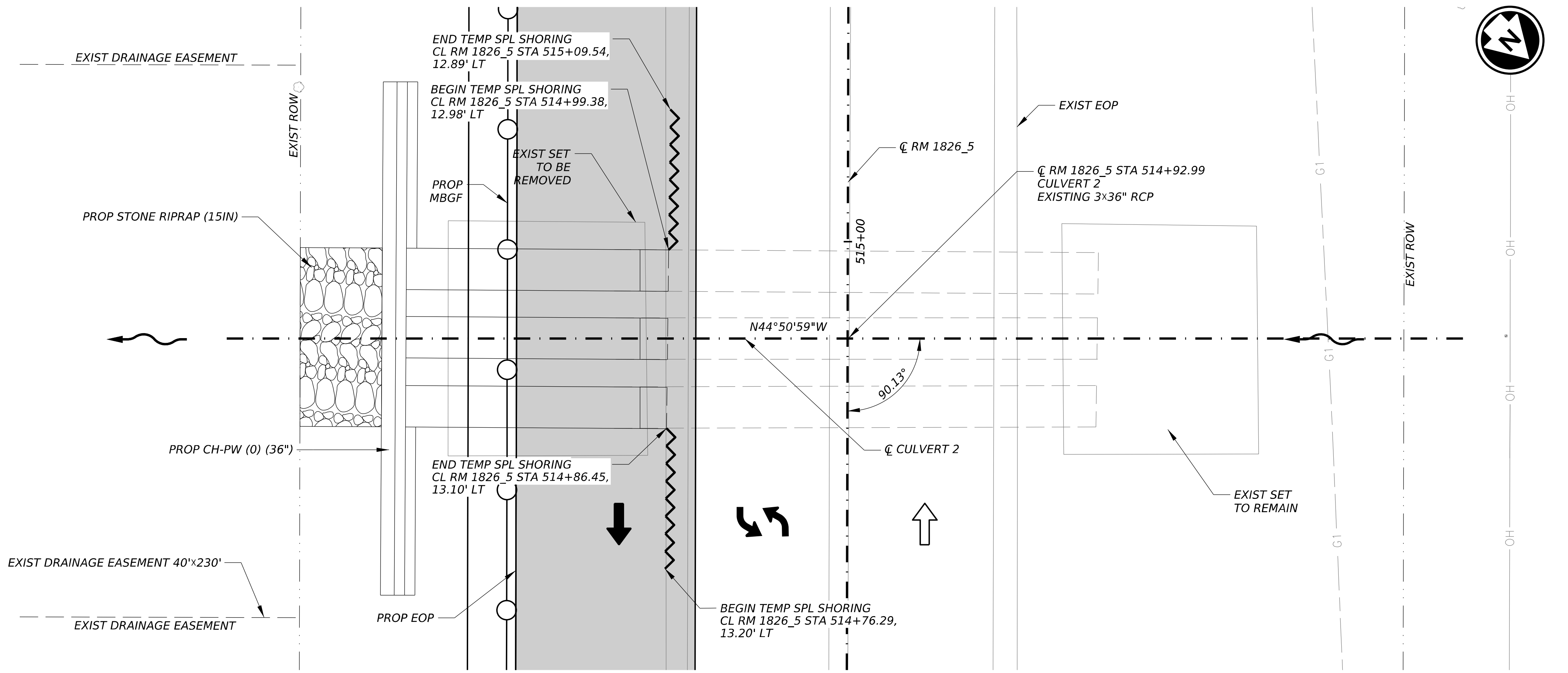
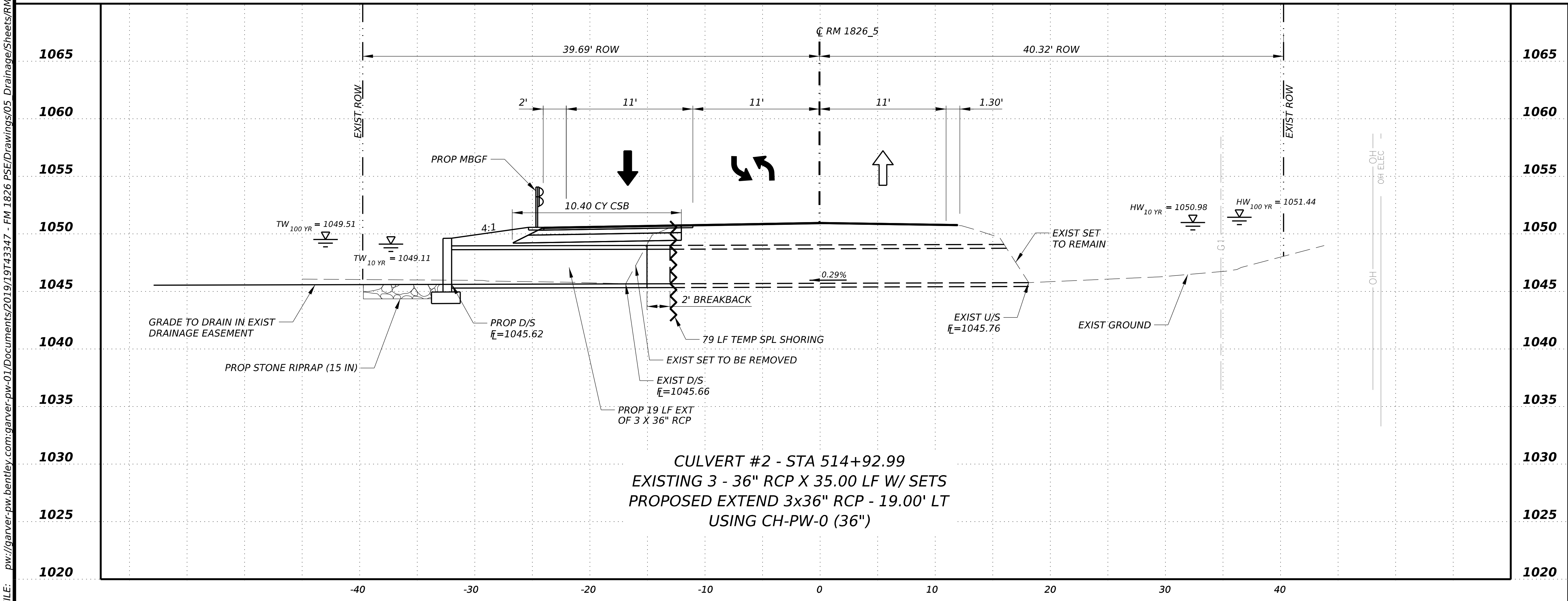


ITEM	ITEM DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	10.40
0403-6001	TEMPORARY SPL SHORING	SF	79
0432-6025	RIPRAP (STONE COMMON) (DRY) (15IN)	CY	4
0464-6008	RC PIPE (CL III) (36 IN)	LF	57
0466-6101	HEADWALL (CH-PW-0) (DIA=36 IN)	EA	1
0480-6001	CLEAN EXISTING CULVERTS	EA	1

DESIGN FREQUENCY 10-YR	10-YR EXIST	10-YR PROP	100-YR EXIST	100-YR PROP
Q (CFS)	725.00	725.00	1548.00	1548.00
HW ELEV (FT)	1050.98	1050.98	1051.47	1051.44
TW ELEV (FT)	1049.11	1049.11	1049.51	1049.51
OUT VELOCITY (FT/SEC)	7.99	7.78	8.29	8.02

NOTES:

1. HYDRAULIC CALCULATIONS ARE PERFORMED USING FHWA HY-8, V.7.60. FOR NON-BRIDGE CLASS CULVERTS AND HEC-RAS, V.6.0 FOR BRIDGE CLASS AND FEMA ZONE-A CULVERTS.
2. REFER TO TYPICAL SECTIONS, ROADWAY PLANS AND MISC. DRAINAGE DETAILS SHEET FOR ADDITIONAL INFORMATION.
3. DEWATERING WILL BE REQUIRED FOR CULVERT EXTENSION AND END TREATMENT INSTALLATION.
4. CONTRACTOR TO GRADE TO DRAIN AS DIRECTED BY THE ENGINEER.
5. UTILITIES DISPLAYED ARE FOR INFORMATION PURPOSE ONLY AND NEED TO BE FIELD VERIFIED.
6. REMOVAL OF EXISTING SET AND PORTION OF EXISTING CULVERTS ARE SUBSIDIARY TO ITEM 464, ITEM 466 AND ITEM 467.



CULVERT #2 - STA 514+92.99
EXISTING 3 - 36" RCP X 35.00 LF W/ SETS
PROPOSED EXTEND 3x36" RCP - 19.00' LT
USING CH-PW-0 (36")

HORZ 0 5' 10'
VERT 0 5' 10'
SCALE IN FEET

ALFREDO L. LOPEZ
101155
5/30/2023
Alfred Lopez

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

CULVERT LAYOUT
CULVERT #2
STA 514+92.99

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	139

DATE: 5/28/2023 12:48:59 AM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826_DRN_CUL_GV_02

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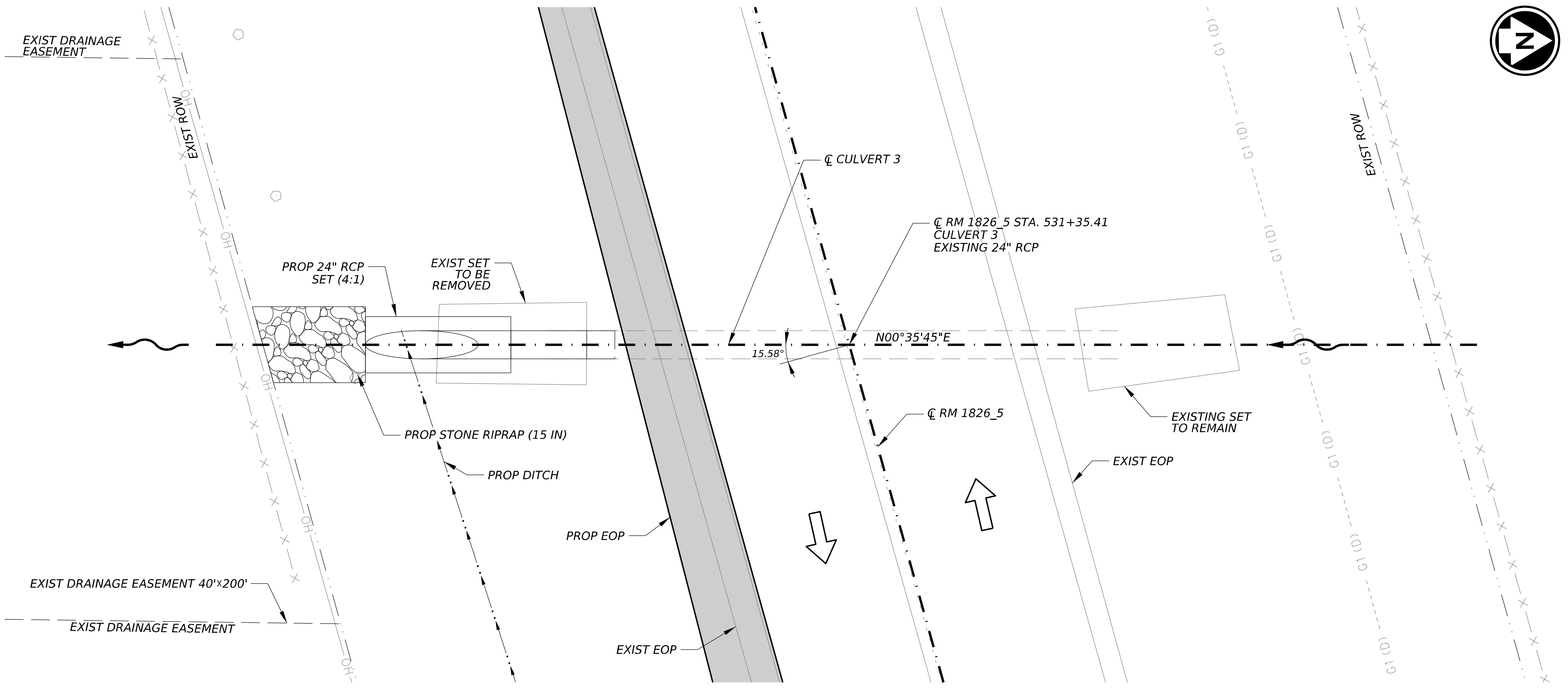
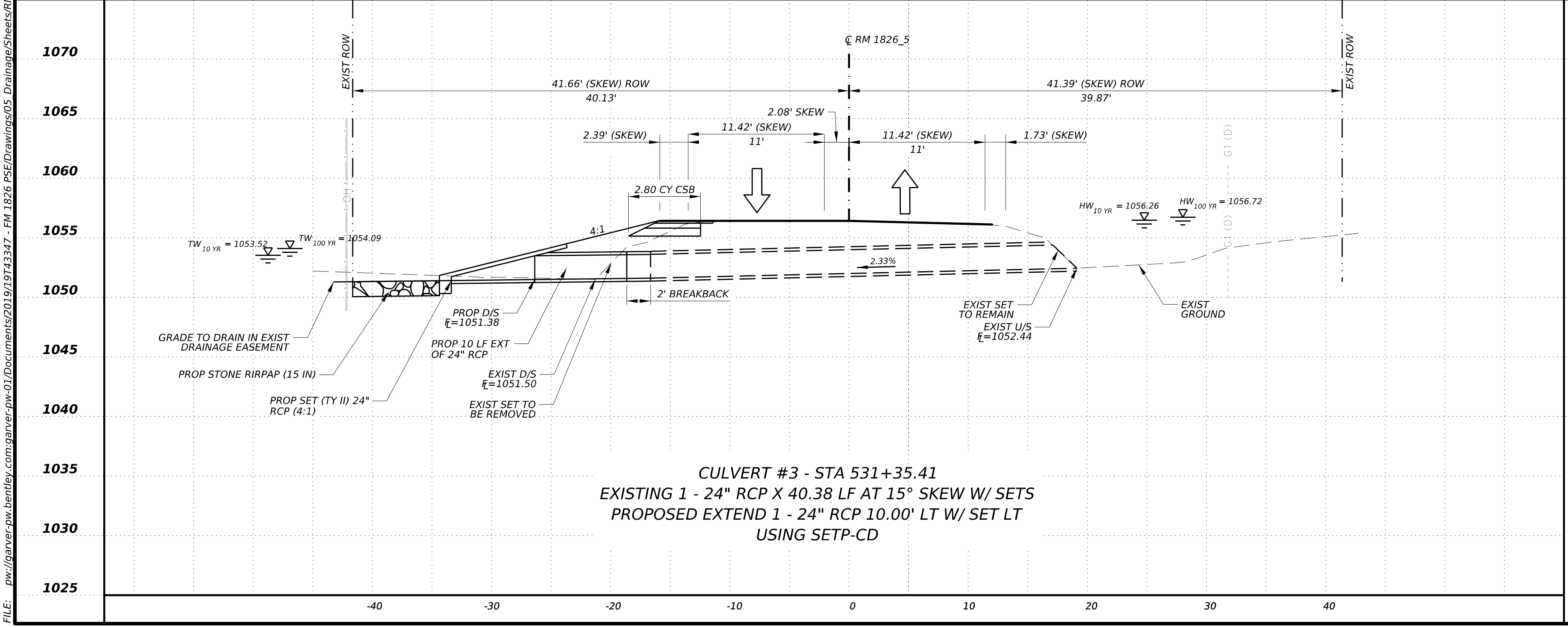


ITEM	ITEM DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	2.80
0432-6025	RIPRAP (STONE COMMON) (DRY) (15IN)	CY	2
0464-6005	RC PIPE (CL III) (24 IN)	LF	10
0467-6390	SET (TY II) (24 IN) (RCP) (4:1) (C)	EA	1
0480-6001	CLEAN EXISTING CULVERTS	EA	1

DESIGN FREQUENCY 10-YR	10-YR EXIST	10-YR PROP	100-YR EXIST	100-YR PROP
Q (CFS)	585.00	585.00	1277.00	1277.00
HW ELEV (FT)	1056.26	1056.26	1056.72	1056.72
TW ELEV (FT)	1053.52	1053.52	1054.09	1054.09
OUT VELOCITY (FT/SEC)	10.79	10.96	11.03	11.18

NOTES:

1. HYDRAULIC CALCULATIONS ARE PERFORMED USING FHWA HY-8, V.7.60. FOR NON-BRIDGE CLASS CULVERTS AND HEC-RAS, V.6.0 FOR BRIDGE CLASS AND FEMA ZONE-A CULVERTS.
2. REFER TO TYPICAL SECTIONS, ROADWAY PLANS AND MISC. DRAINAGE DETAILS SHEET FOR ADDITIONAL INFORMATION.
3. DEWATERING WILL BE REQUIRED FOR CULVERT EXTENSION AND END TREATMENT INSTALLATION.
4. CONTRACTOR TO GRADE TO DRAIN AS DIRECTED BY THE ENGINEER.
5. UTILITIES DISPLAYED ARE FOR INFORMATION PURPOSE ONLY AND NEED TO BE FIELD VERIFIED.
6. REMOVAL OF EXISTING SET AND PORTION OF EXISTING CULVERTS ARE SUBSIDIARY TO ITEM 464, ITEM 466 AND ITEM 467.



CULVERT #3 - STA 531+35.41
EXISTING 1 - 24" RCP X 40.38 LF AT 15° SKEW W/ SETS
PROPOSED EXTEND 1 - 24" RCP 10.00' LT W/ SET LT
USING SETP-CD

HORZ 0 5' 10'
VERT 0 5' 10'
SCALE IN FEET

ALFREDO L. LOPEZ
101155
5/30/2023
Alfred Lopez

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

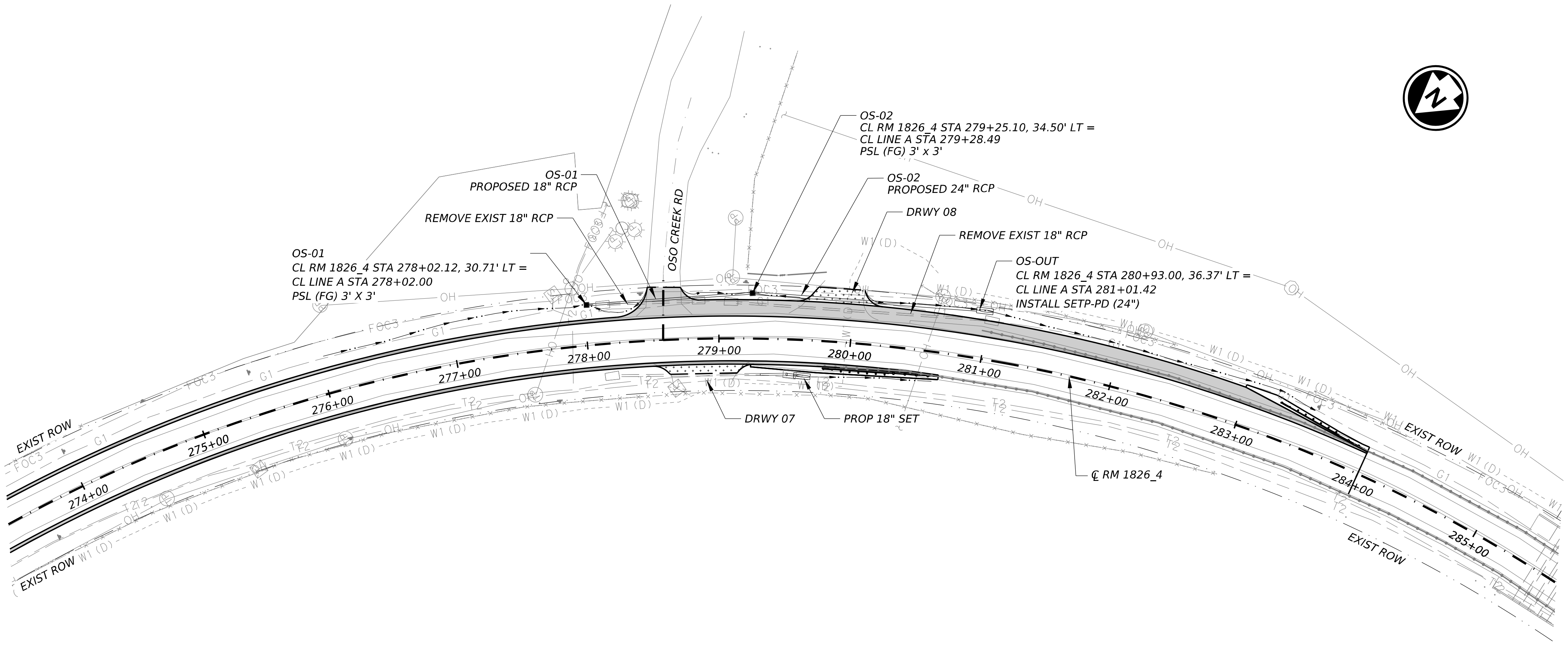
CULVERT LAYOUT
CULVERT #3
STA 531+35.41

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	140

DATE: 5/28/2023 12:49:25 AM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826_DRN_CUL_GV_03

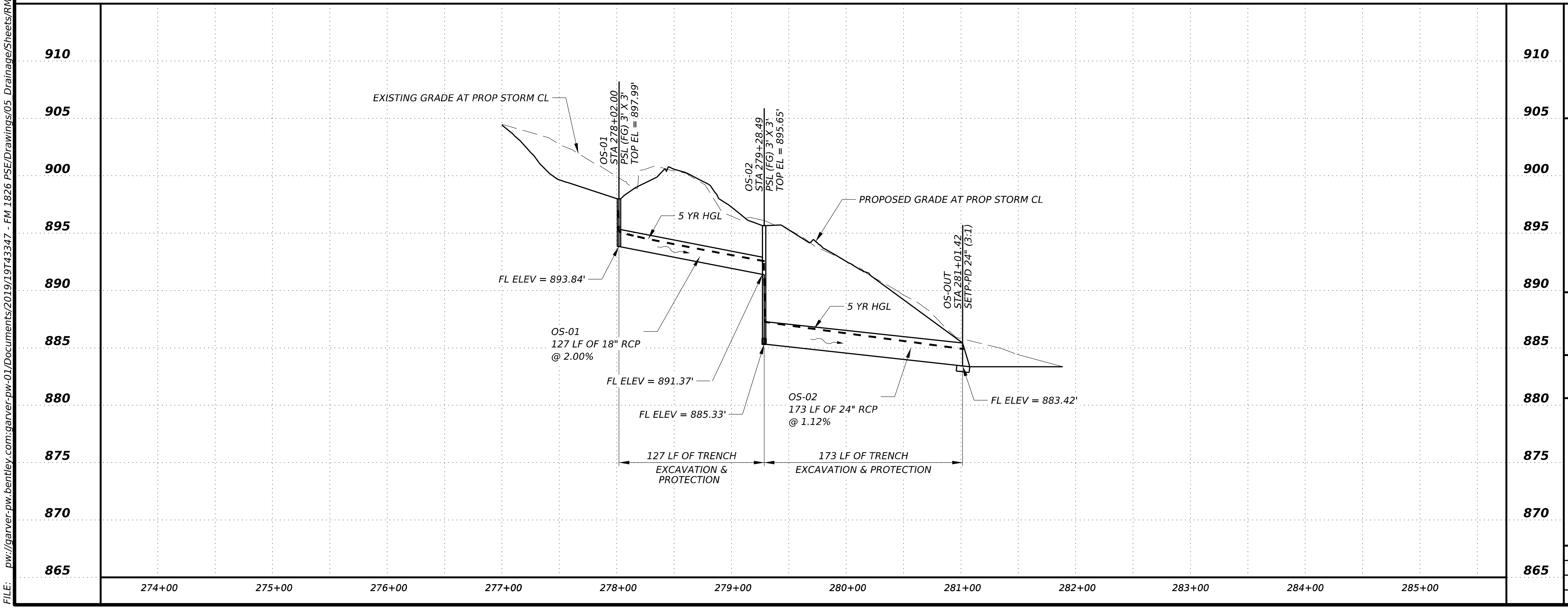


LEGEND

〜	FLOW ARROW
—▸·—·	PROPOSED DITCH
—·—·	EXISTING ROW
═	PROPOSED STORM DRAIN
- - -	EXIST STORM DRAIN

NOTES:

1. ALL PIPES SHALL BE RCP (CL III) UNLESS OTHERWISE NOTED.
2. A 5-YR DESIGN FREQUENCY AND 100-YR CHECK FREQUENCY IS USED FOR THE DESIGN OF THE STORM DRAIN SYSTEM.
3. CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES TO VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION. ALL UTILITIES ARE SHOWN FOR INFORMATION PURPOSES ONLY AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL HORIZONTAL AND VERTICAL INFORMATION.
4. STORM DRAIN SYSTEM IS DESIGNED WITH TAILWATER ELEVATION AT OUTFALL PIPE SOFFIT UNLESS OTHERWISE SHOWN ON PLANS.



HORZ 0 50' 100'
VERT 0 5' 10'
SCALE IN FEET

GEORGE H. AMEN JR.
106655
5/30/2023

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

GARVER

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Texas Department of Transportation

RM 1826

STORM SEWER
LINE A

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	141

DATE: 5/30/2023 3:18:30 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826 DRN SSPP GV 01.dgn

PROPOSED DRIVEWAY CULVERT SUMMARY

CULVERT ID	STATION	OFFSET (FT)	SIDE	NO OF CULVERTS	CULVERT SIZE	CULVERT LENGTH (FT)	UPSTREAM FL ELEV	DOWNSTREAM FL ELEV	UPSTREAM END TREATMENT	DOWNSTREAM END TREATMENT	DESIGN FREQUENCY
1	144+00.00	-	LT	NO CULVERT NEEDED							
2	183+21.78	18.50	RT	1	18" RCP (CL IV)	31	996.79	996.67	1 - SET TY-II-PD (4:1)	1 - SET TY-II-PD (4:1)	5-YR
3	189+72.83	-	RT	EXISTING DRIVEWAY CULVERT TO REMAIN							
4	191+48.79	31.20	RT	1	18" RCP (CL IV)	34	993.28	992.49	1 - SET TY-II-PD (4:1)	1 - SET TY-II-PD (4:1)	5-YR
5	192+60.41	28.39	RT	1	18" RCP (CL IV)	36	989.90	988.28	1 - SET TY-II-PD (4:1)	1 - SET TY-II-PD (4:1)	5-YR
① 6	242+44.97	33.17	LT		18" RCP (CL IV)	24	974.73	974.25	1 - SET TY-II-PD (4:1)	1 - SET TY-II-PD (4:1)	5-YR
7	278+86.46	27.53	RT	1	18" CMP	28	890.54	889.71	PIPE COLLAR	1 - SET TY-II-PD (3:1)	5-YR
8	279+87.91	-	LT	LINE A							
				PIPE SUBTOTAL (FT):		153					

① LOW FILL DRIVEWAY, SEE DRIVEWAYS AND MAILBOX STANDARD FOR DETAILS

PROPOSED SIDE STREET CULVERT SUMMARY

CULVERT ID	STREET NAME	STATION	OFFSET (FT)	SIDE	NO OF CULVERTS	CULVERT SIZE	CULVERT LENGTH (FT)	UPSTREAM FL ELEV	DOWNSTREAM FL ELEV	UPSTREAM END TREATMENT	DOWNSTREAM END TREATMENT	DESIGN FREQUENCY
A	LEWIS MOUNTAIN DR	140+38.78	29.39	RT	1	24" CMP	56	930.29	929.80	1 - SET TY-II-PD (4:1)	PIPE COLLAR	5-YR
B	ZYLE RD	186+17.08	-	RT	EXISTING DRIVEWAY CULVERT TO BE REMOVED							
C	OSO CREEK DR	278+57.55	-	LT	STORM SEWER LINE A							
D	SHELF ROCK RD	521+30.19	-	LT	NO CULVERT NEEDED							
E	TOWERING CEDAR DR	548+39.69	-	LT	NO CULVERT NEEDED							
					PIPE SUBTOTAL (FT):		56					

MEHREEN HALANI
134322
5/30/2023

3000 INTERNET BLVD
SUITE 400
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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

DRIVEWAY CULVERT
SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	142

DATE: 5/30/2023 1:00:46 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826 DRN DCS GV 01

DITCH ID	STATION (STA)	FLOWLINE ELEVATION (FT)	OFFSET (LT/RT) (FT)	DESIGN DISCHARGE 'Q' (CFS)	DESIGN VELOCITY 'V' (FPS)	DITCH FLOW DEPTH 'D' (FT)	DS WATER SURFACE (FT)	MAX WATER SURFACE ELEV (FT)
LEWIS MOUNTAIN RD - CL RM 1826_1								
D-RM1826_1-1 Q5 = 8.1 CFS	143+00.00	962.68	31.49 LT	0.0	-	-	-	964.55
	142+00.00	953.08	30.77 LT	0.8	3.7	0.24	953.32	954.77
	141+00.00	944.28	29.90 LT	1.6	4.2	0.31	944.59	945.76
	140+00.00	935.48	30.33 LT	2.5	4.6	0.37	935.85	937.06
	139+00.00	929.00	27.34 LT	3.3	4.4	0.43	929.43	929.83
	138+00.00	923.93	29.47 LT	4.1	4.3	0.49	924.42	925.64
	137+00.00	920.30	37.97 LT	4.9	3.5	0.46	920.76	922.31
	136+00.00	917.19	29.89 LT	5.8	3.7	0.56	917.75	919.49
	135+00.00	914.50	31.34 LT	6.6	3.5	0.58	915.08	917.00
	134+00.00	912.92	29.16 LT	7.4	2.9	0.65	913.57	914.92
	133+16.00	911.60	21.93 LT	8.1	3.2	0.75	912.35	913.60
D-RM1826_1-2 Q5 = 12.8 CFS	150+00.00	1007.59	26.29 RT	1.0	2.3	0.25	1007.84	1009.09
	149+00.00	1001.99	27.46 RT	1.7	3.3	0.30	1002.29	1003.99
	147+00.00	986.23	27.63 RT	3.1	-	-	-	-
	146+00.00	977.88	30.53 RT	3.8	4.4	0.34	978.22	981.58
	145+00.00	972.40	29.82 RT	4.5	3.9	0.39	972.79	976.09
	144+00.00	967.84	26.58 RT	5.2	3.9	0.45	968.29	969.84
	140+00.00	934.65	35.53 RT	8.0	4.8	-0.52	934.13	936.23
	139+00.00	927.51	31.14 RT	8.7	6.2	0.68	928.19	929.89
	138+00.00	923.41	32.61 RT	9.4	4.9	0.70	924.11	925.56
	137+00.00	919.61	33.57 RT	10.1	4.8	0.73	920.34	922.00
	136+00.00	917.25	30.60 RT	10.8	3.9	0.76	918.01	918.90
	135+00.00	915.25	24.65 RT	11.5	3.6	0.48	915.73	916.80
	134+00.00	912.80	28.58 RT	12.2	3.9	0.72	913.52	914.79
	133+16.00	911.62	28.35 RT	8.1	3.2	0.75	912.35	913.60
ZYLE RD - CL RM 1826_2								
D-RM1826_2-2 Q5 = 8.1 CFS	184+00.00	996.11	33.50 LT	-23.0				
	183+00.00	995.72	33.50 LT	-22.3				
	184+00.00	996.11	33.50 LT	-	-	-	-	-
	185+00.00	996.50	33.50 LT	0.7	0.8	0.26	996.76	998.52
	186+00.00	996.37	33.50 LT	1.4	0.8	0.60	996.97	998.70
	187+00.00	996.25	33.50 LT	2.1	0.8	0.71	996.96	998.36
	188+00.00	996.00	33.50 LT	2.9	1.2	0.69	996.69	998.28
	189+00.00	995.75	33.50 LT	3.6	1.1	0.59	996.34	997.54
	190+00.00	994.87	33.50 LT	4.3	2.0	0.59	995.46	996.75
	191+00.00	994.00	33.50 LT	5.0	1.7	0.43	994.43	995.56
	192+00.00	991.37	33.50 LT	5.7	3.1	0.48	991.85	993.24
	193+00.00	988.74	32.60 LT	6.4	3.6	0.60	989.34	990.47
	194+00.00	985.72	30.29 LT	7.1	3.8	0.61	986.33	987.57
D-RM1826_2-1 Q5 = 187.0 CFS	186+00.00	998.60	28.54 RT	-	-	-	-	-
	185+00.00	997.40	24.80 RT	23.4	3.5	0.65	998.05	998.98
	184+00.00	996.96	29.94 RT	46.8	3.1	1.26	998.22	998.55
	183+00.00	996.66	29.71 RT	70.1	2.9	1.75	998.41	998.53
	182+08.00	996.38	31.31 RT	91.6	6.1	1.37	997.76	998.55
	182+00.00	996.36	32.10 RT	93.5	6.5	1.51	997.87	998.60
	181+80.00	996.30	34.15 RT	98.2	6.3	1.56	997.86	998.63
D-RM1826_2-3 Q5 = 46.5 CFS	187+00.00	997.24	24.46 RT	-	-	-	-	998.73
	188+00.00	996.90	25.09 RT	5.6	1.7	0.91	997.81	998.61
	189+00.00	996.36	24.56 RT	11.1	2.4	1.08	997.44	997.87
	190+00.00	995.28	31.48 RT	16.7	3.4	1.11	996.39	997.02
	191+00.00	994.13	30.97 RT	22.3	3.7	1.22	995.35	995.75
	192+00.00	992.08	23.88 RT	27.8	4.9	1.19	993.27	993.42
	193+00.00	989.25	24.42 RT	33.4	5.1	0.97	990.22	990.73
APPALOOSA RUN - CL RM 1826_3								
D-RM1826_3-2 Q5 = 37.6 CFS	239+00.00	981.27	28.23 LT	15.1	-	0.81	982.08	982.08
	240+00.00	980.24	29.96 LT	17.1	2.6	0.75	980.99	981.73
	241+00.00	978.74	30.38 LT	19.2	2.8	0.62	979.36	980.34
	242+00.00	976.99	30.11 LT	21.2	2.8	0.57	977.56	978.52
	243+00.00	974.19	32.28 LT	23.2	5.3	1.05	975.24	976.26
	244+00.00	970.61	33.11 LT	25.3	5.9	1.03	971.64	972.83
	245+00.00	965.81	32.45 LT	27.3	6.7	1.01	966.82	968.12
	246+00.00	960.82	29.45 LT	29.3	7.0	1.03	961.85	962.86
	247+00.00	953.47	29.82 LT	31.3	8.2	0.98	954.45	956.09
	248+00.00	949.24	25.39 LT	33.4	5.8	0.66	949.90	951.25
D-RM1826_3-3 Q5 = 9.0 CFS	240+00.00	980.48	27.86 RT	0.8	1.4	0.27	980.75	982.27
	241+00.00	978.76	27.85 RT	1.6	1.9	0.32	979.08	980.72
	242+00.00	977.27	27.57 RT	2.4	1.7	0.31	977.58	978.77
	243+00.00	973.46	27.19 RT	3.2	2.7	0.30	973.76	975.66
	244+00.00	970.28	27.25 RT	4.0	2.7	0.33	970.61	972.43
	247+00.00	953.30	27.26 RT	6.5	4.3	0.38	953.68	955.78
	248+00.00	948.06	27.00 RT	7.3	4.4	0.50	948.56	950.86

NOTES:

1. USE ROUGH COEFFICIENT 'n' = 0.030 AND GRASS DITCH LINING UNLESS NOTES OTHERWISE.
2. FOR D-RM1826_2-1 STA 181+80.00 TO STA 182+08.00 USE ROUGH COEFFICIENT 'n' = 0.012 AND CONCRETE DITCH LINING.
3. THESE DITCH TABLES ARE FOR A 5-YR FREQUENCY DESIGN FLOW.
4. MAX WATER SURFACE ELEVATION IS BASED ON THE LOWEST ROADWAY EDGE OF PAVEMENT ELEVATION.

GEORGE H. AMEN JR.
106655
5/30/2023

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

DITCH TABLE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097,JETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	143

DN:
CK:
DW:
CK:

DATE: 5/28/2023 12:50:13 AM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826_DRN_DTS_GV_01

DITCH ID	STATION (STA)	FLOWLINE ELEVATION (FT)	OFFSET (LT/RT) (FT)	DESIGN DISCHARGE 'Q' (CFS)	DESIGN VELOCITY 'V' (FPS)	DITCH FLOW DEPTH 'D' (FT)	DS WATER SURFACE (FT)	MAX WATER SURFACE ELEV (FT)
OSO CREEK RD - CL RM 1826_4								
D_OS-1	276+00.00	904.16	28.96 LT	-	-	-	-	-
Q5 = 7.0 CFS	277+00.00	900.36	31.89 LT	3.5	3.7	0.69	901.05	904.56
	278+00.00	897.99	29.16 LT	7.0	3.7	0.97	898.96	901.21
D_OS-2	278+60.10	898.50	33.71 LT					
Q5 = 4.0 CFS	279+00.00	896.56	37.78 LT	2.5	3.5	0.49	897.05	897.85
	279+25.00	895.65	34.5 LT	4.0	3.2	0.32	895.97	896.39
D_OS-OUT	279+92.96	892.19	32.05 LT	-	-	-	-	-
Q5 = 20.0 CFS	280+00.00	892.01	29.03 LT	-	-	-	-	-
	281+00.00	882.79	36.93 LT	5.3	5.7	0.68	883.47	885.27
	282+00.00	876.76	32.86 LT	10.2	5.8	0.94	877.70	877.88
	283+00.00	870.22	35.15 LT	15.1	6.6	1.07	871.29	872.13
	284+00.00	865.00	30.88 LT	20.0	6.5	1.24	866.24	867.31
D_RM1826-4-1	281+00.00	881.72	-	1.1	3.4	0.40	882.12	882.50
Q5 = 4.26 CFS	282+00.00	874.52	-	2.1	4.2	0.51	875.03	875.18
	283+00.00	868.79	-	3.2	4.2	0.61	869.40	869.41
	284+00.00	863.99	-	4.3	3.7	0.51	864.50	865.22
WOODLAND DR /SHELF ROCK RD - CL RM 1826_5								
D_RM1826_5-2	503+90.00	1075.75	29.68 LT	-	-	-	-	-
Q5 = 18.11 CFS	504+00.00	1075.66	29.85 LT	-	-	-	-	-
	505+00.00	1074.14	31.35 LT	-	-	-	-	-
	506+00.00	1072.00	33.23 LT	-	-	-	-	-
	507+00.00	1069.40	34.92 LT	-	-	-	-	-
	508+00.00	1066.97	36.61 LT	-	-	-	-	-
	509+00.00	1065.19	38.3 LT	-	-	-	-	-
	510+00.00	1063.35	39.00 LT	-	-	-	-	-
	511+00.00	1060.69	30.49 LT	11.6	3.9	0.86	1061.55	1062.31
	512+00.00	1056.69	32.27 LT	13.2	4.7	0.84	1057.53	1058.76
	513+00.00	1052.88	32.17 LT	14.8	3.6	0.58	1053.46	1054.92
	514+00.00	1050.28	32.84 LT	16.5	3.2	0.65	1050.93	1051.40
CULVERT-LP	515+00.00	1045.87	31.24 LT	18.1	4.0	0.61	1046.48	1050.20
HP	528+00.00	1054.39	33.08 LT	-				
D_RM1826_5-2	527+00.00	1054.69	34.67 LT	1.5	2.7	2.61	1057.30	1057.39
Q5 = 18.11 CFS	526+00.00	1054.20	35.63 LT	3.0	-	-	-	-
	525+00.00	1054.49	31.48 LT	4.5	-	-	-	-
	524+00.00	1053.22	33.19 LT	6.0	-	-	-	-
	523+00.00	1052.53	33.11 LT	7.5	-	-	-	-
	522+00.00	1051.98	31.98 LT	9.1	-	-	-	-
	521+00.00	1051.83	27.82 LT	10.6	-	-	-	-
	520+00.00	1050.62	31.36 LT	12.1	-	-	-	-
	519+00.00	1049.43	32.17 LT	13.6	-	-	-	-
	518+00.00	1048.27	33.36 LT	15.1	-	-	-	-
	517+00.00	1048.30	32.36 LT	16.6	-	-	-	-
	516+00.00	1048.45	34.41 LT	18.1	-	-	-	-
D_RM1826_5-1E	506+00.00	1072.69	27.46 RT	21.3	4.9	1.21	1073.90	1074.69
Q5 = 62.0 CFS	507+00.00	1070.10	28.04 RT	31.5	5.3	1.40	1071.50	1072.10
	508+00.00	1067.66	27.47 RT	41.7	5.6	1.57	1069.23	1069.66
	509+00.00	1065.06	27.77 RT	51.8	6.1	1.68	1066.74	1067.30
DWY CULVERT	510+00.00	1061.56	- RT	62.0	8.3	1.38	1062.94	1064.85
D_RM1826_5-1E	511+00.00	1059.92	27.3 RT	-	-	-	-	-
Q5 = 62.0 CFS	512+00.00	1056.34	27.54 RT	15.5	5.1	1.04	1057.38	1058.66
	513+00.00	1052.40	27.70 RT	31.0	6.0	1.22	1053.62	1054.96
	514+00.00	1050.00	- RT	46.5	5.6	1.60	1051.60	1052.30
CULVERT 2 (Q5)=267 CFS	515+00.00	1046.11	- RT	62.0	-	32.61	1078.72	1050.74
D_RM1826_5-1W	529+00.00	1054.94	27.38 RT	6.6	0.7	1.15	1056.09	1056.44
Q5 = 35.0 CFS	528+00.00	1054.40	27.59 RT	8.8	1.7	0.82	1055.22	1056.40
	524+00.00	1052.84	27.49 RT	17.5	2.1	1.06	1053.90	1054.34
	523+00.00	1052.17	27.66 RT	19.7	2.3	1.07	1053.24	1053.67
	522+00.00	1051.28	27.23 RT	21.9	2.6	1.06	1052.34	1052.78
	521+00.00	1050.41	27.68 RT	24.1	2.6	1.10	1051.51	1051.91
	519+00.00	1049.15	27.37 RT	28.4	2.7	0.86	1050.01	1050.26
	518+00.00	1048.56	28.60 RT	30.6	2.3	0.93	1049.49	1049.93
	517+00.00	1048.41	27.71 RT	32.8	1.4	1.36	1049.77	1049.91

DITCH ID	STATION (STA)	FLOWLINE ELEVATION (FT)	OFFSET (LT/RT) (FT)	DESIGN DISCHARGE 'Q' (CFS)	DESIGN VELOCITY 'V' (FPS)	DITCH FLOW DEPTH 'D' (FT)	DS WATER SURFACE (FT)	MAX WATER SURFACE ELEV (FT)
TOWERING CEDAR DR - CL RM 1826_5								
D_RM1826_5-4	528+00.00	1054.39	33.08 LT	1.8	1.1	0.65	1055.04	1057.18
Q5 = 9.1 CFS	529+00.00	1054.09	31.90 LT	3.6	1.3	0.84	1054.93	1057.07
	530+00.00	1053.79	30.35 LT	5.4	1.4	0.98	1054.77	1056.87
	531+00.00	1052.48	28.50 LT	7.3	2.7	0.87	1053.35	1056.62
	532+00.00	1053.85	23.61 LT	9.1	-	-	-	-
D_RM1826_5-4	546+00.00	1079.39	31.05 LT	0.9	1.8	0.35	1079.74	1081.15
Q5 = 9.1 CFS	545+00.00	1076.98	32.62 LT	1.8	2.3	0.43	1077.41	1079.14
	544+00.00	1075.04	31.58 LT	2.6	2.4	0.53	1075.57	1076.93
	543+00.00	1073.09	30.65 LT	3.5	2.6	0.59	1073.68	1074.75
	542+00.00	1070.59	30.62 LT	4.4	3.0	0.61	1071.20	1072.34
	541+00.00	1068.08	28.72 LT	5.3	3.1	0.65	1068.73	1069.82
	540+00.00	1065.59	26.07 LT	6.2	3.2	0.69	1066.28	1067.12
	539+00.00	1062.09	27.55 LT	7.0	3.8	0.68	1062.77	1064.44
	538+00.00	1059.59	25.75 LT	7.9	3.4	0.76	1060.35	1061.95
D_RM1826_5-3	537+00.00	1057.57	27.46 RT	8.8	3.0	0.65	1057.96	1059.54
Q5 = 387.0 CFS	536+70.00	1056.90	27.42 RT	9.1	3.1	0.65	1057.25	1058.82
	542+00.00	1070.27	28.46 RT	139.9	6.6	1.96	1072.23	1072.52
	541+00.00	1067.75	28.23 RT	186.5	6.9	1.82	1069.57	1069.75
	540+00.00	1065.18	27.87 RT	233.1	7.4	1.99	1067.17	1067.18
	539+00.00	1062.01	27.68 RT	279.8	8.7	2.17	1064.18	1064.51
D_RM1826_5-5	552+00.00	1076.38	28.32 RT	3.2	2.4	0.47	1076.85	1078.38
Q5 = 5.0 CFS	553+00.00	1073.90	28.20 RT	3.7	2.6	0.49	1074.39	1075.90
	554+00.00	1071.41	27.89 RT	4.3	2.7	0.52	1071.93	1073.41
	555+00.00	1068.89	27.74 RT	4.8	2.8	0.54	1069.43	1070.89
D_RM1826_5-6	552+00.00	1076.38	28.32 RT	9.8	3.4	0.69	1077.07	1078.38
Q5 = 18.0 CFS	553+00.00	1073.90	28.2 RT	12.2	3.5	0.76	1074.66	1075.90
	554+00.00	1071.41	27.89 RT	14.7	3.7	0.82	1072.23	1073.41
	555+00.00	1068.89	27.74 RT	17.1	3.8	0.87	1069.76	1070.89

NOTES:

1. USE ROUGH COEFFICIENT 'n' = 0.030 AND GRASS DITCH LINING UNLESS NOTES OTHERWISE.
2. FOR D-RM1826_2-1 STA 181+80.00 TO STA 182+08.00 USE ROUGH COEFFICIENT 'n' = 0.012 AND CONCRETE DITCH LINING.
3. THESE DITCH TABLES ARE FOR A 5-YR FREQUENCY DESIGN FLOW.
4. MAX WATER SURFACE ELEVATION IS BASED ON THE LOWEST ROADWAY EDGE OF PAVEMENT ELEVATION.

GEORGE H. AMEN JR.
106655
5/30/2023

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

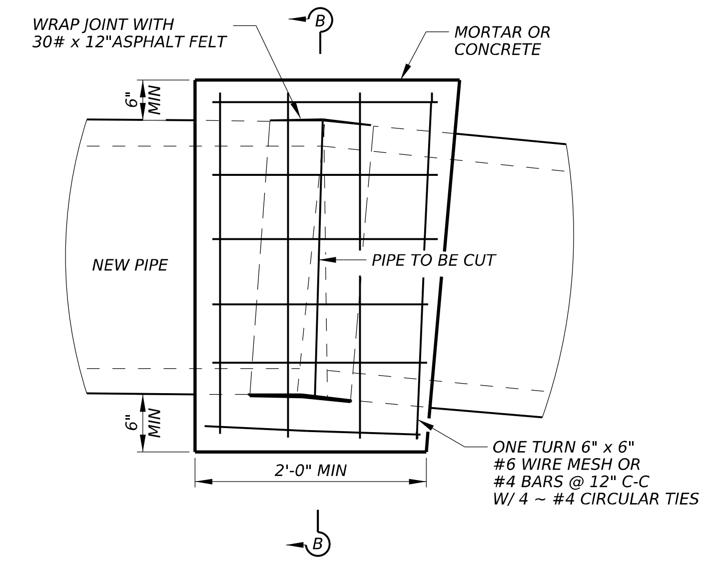
RM 1826

DITCH TABLE

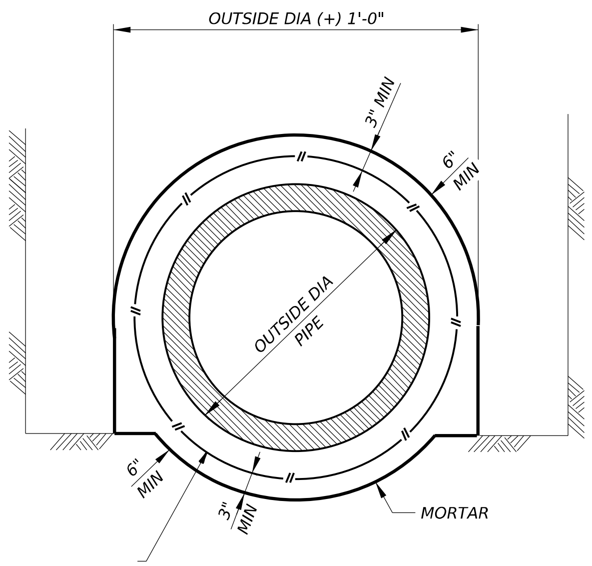
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097,JETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	144



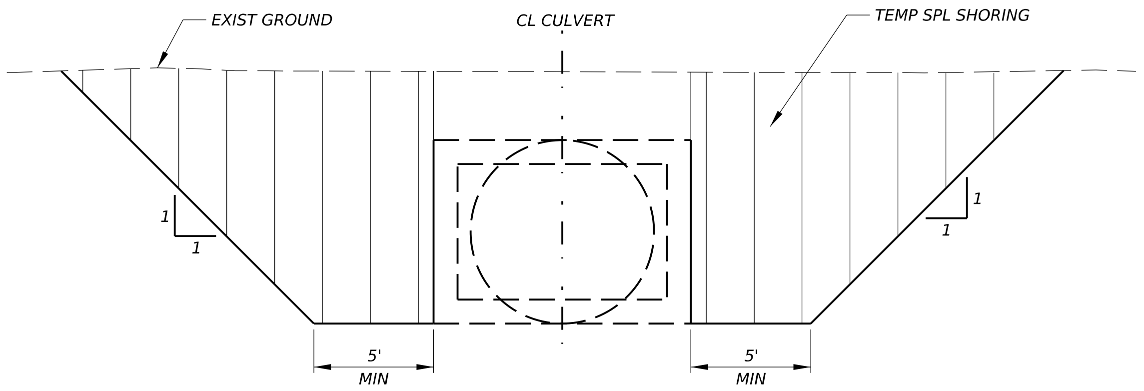
ELEVATION



SECTION B-B

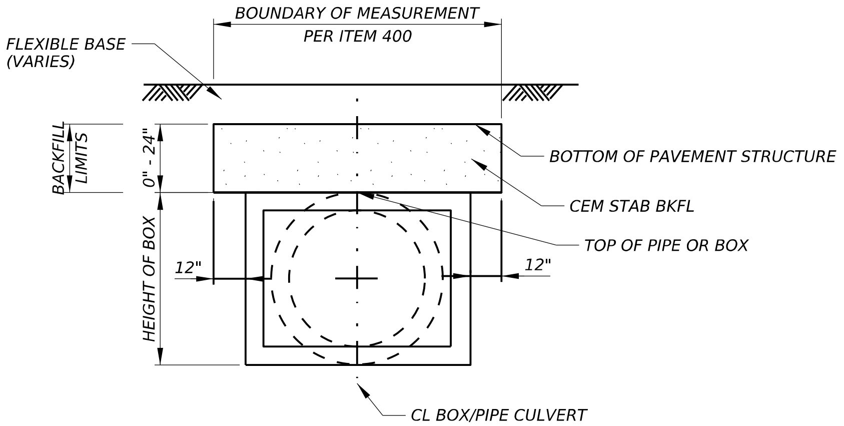
PIPE COLLAR DETAIL

FOR HORIZONTAL OR VERTICAL PLACEMENT



TEMPORARY SPECIAL SHORING

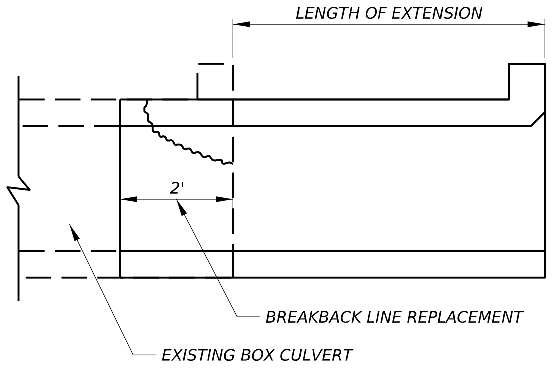
N.T.S.



FOR CULVERTS WHERE COVER BETWEEN TOP OF
PIPE OR BOX AND BOTTOM OF PAVEMENT IS LESS THAN 1'.

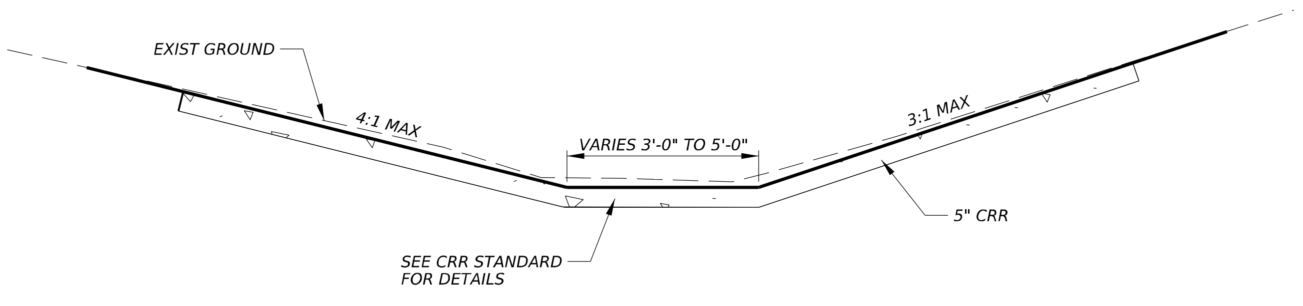
CEMENT STABILIZED BACKFILL DETAIL

N.T.S.



CULVERT LENGTHENING DETAIL

N.T.S.



CONCRETE FLUME AT FLAT BOTTOM DITCH

N.T.S.

GEORGE H. AMEN JR.
106655
5/30/2023

3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

GARVER

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Texas Department of Transportation

RM 1826

MISCELLANEOUS DRAINAGE DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		145

DATE: 5/30/2023 1:04:14 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/05 Drainage/Sheets/RM1826 DRN DET GV 01

CK:
DW:
CK:
DN:

DATE: 5/28/2023 12:50:49 AM
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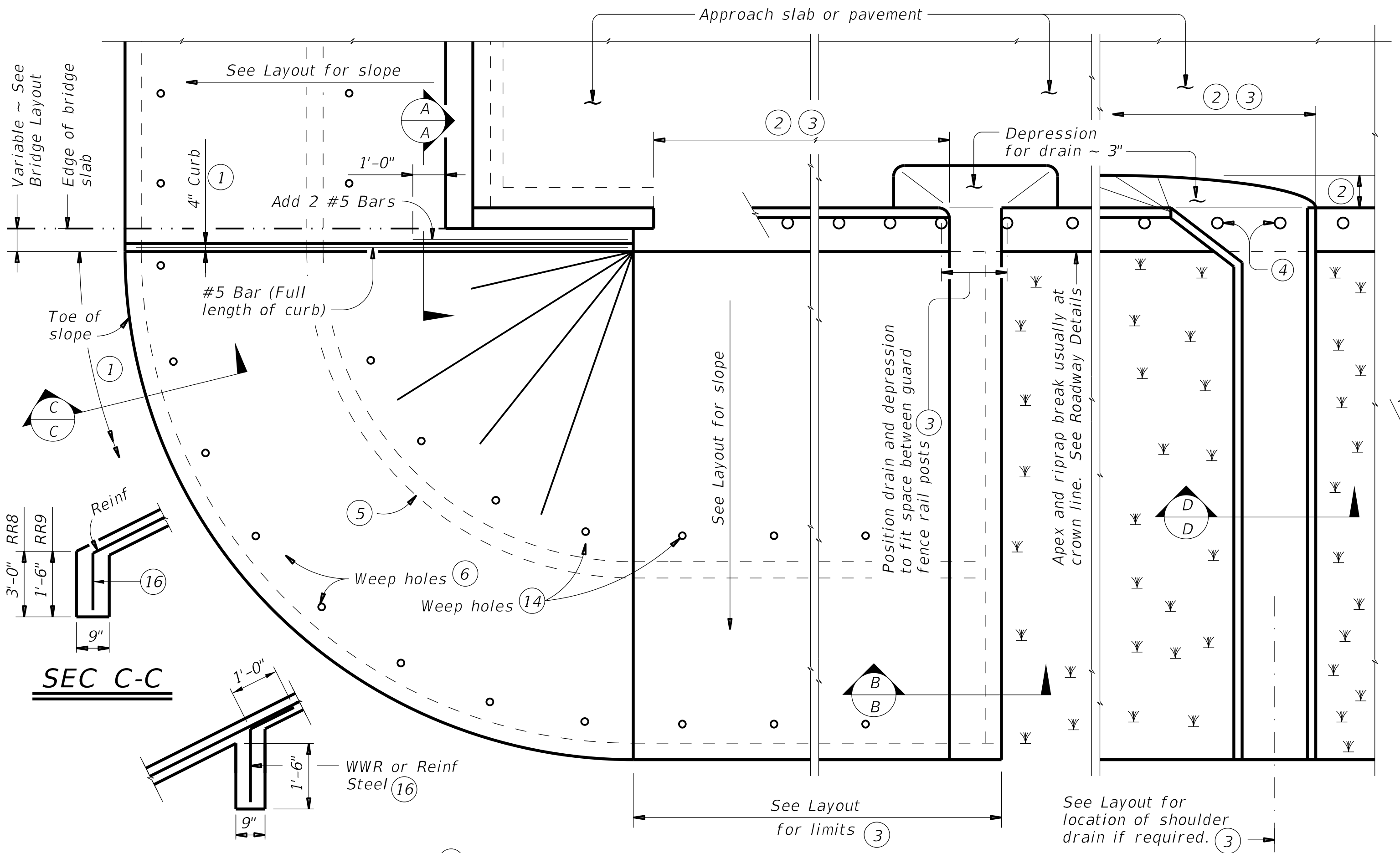
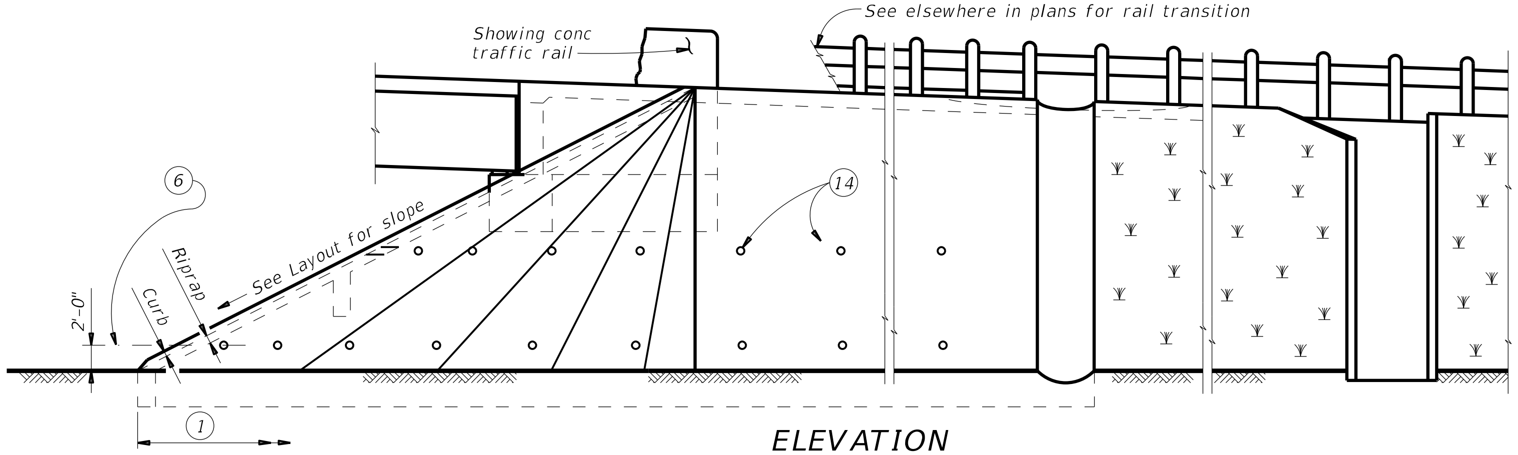


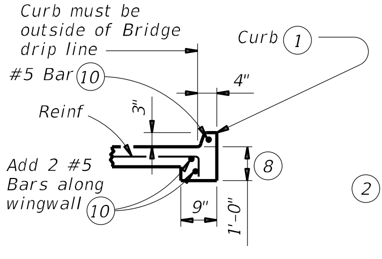
SEC C-C

INTERMEDIATE TOEWALL⑤

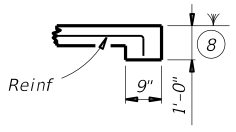
PLAN



ELEVATION

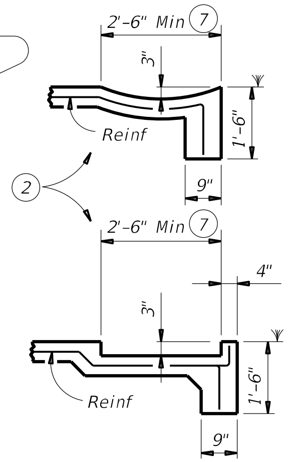


SEC A-A



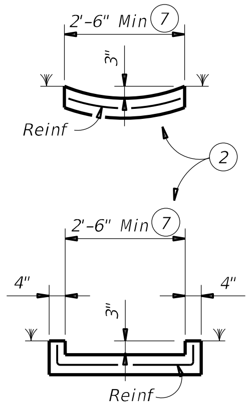
SEC B-B

(No drain)



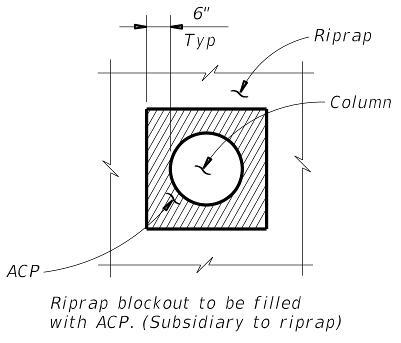
SEC B-B

(Shoulder drain integral with riprap)



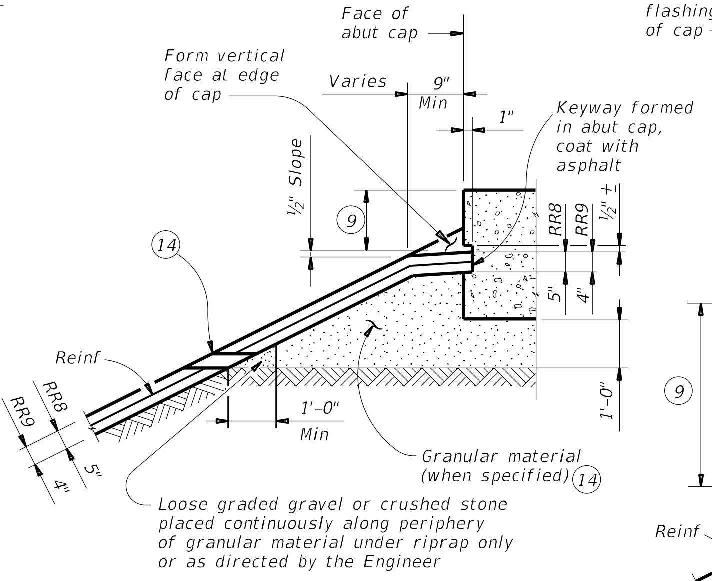
SEC D-D

(Shoulder drain)

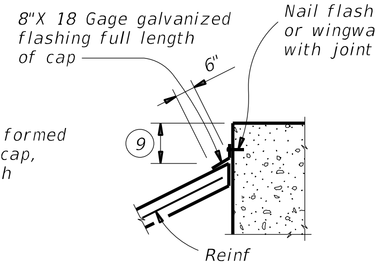


RIPRAP DETAIL AT COLUMNS

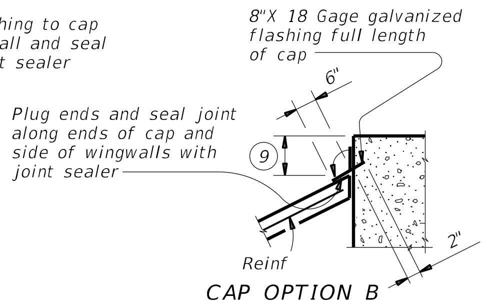
(As directed by the Engineer)



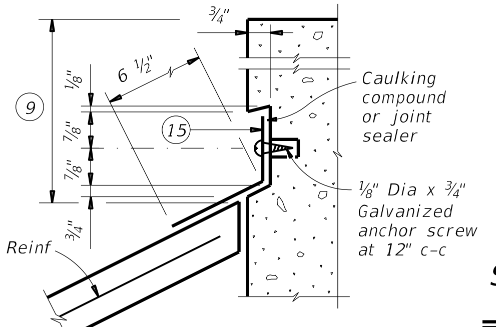
SHOWING KEYWAY OPTION



CAP OPTION A

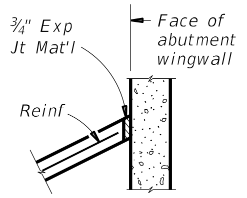


CAP OPTION B

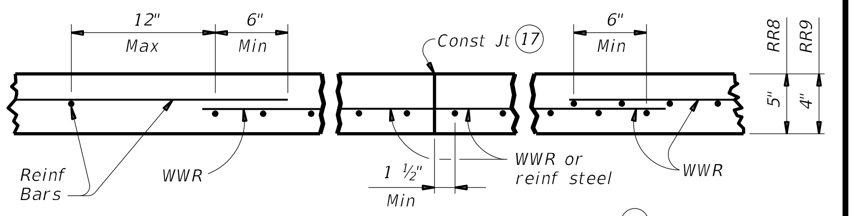


CAP OPTION C

SECTIONS THRU RIPRAP AT CAP⑪



SECT THRU RIPRAP AT WINGWALL⑫



REINFORCEMENT DETAILS⑬

See General Notes for optional synthetic fiber reinforcement.

① When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

② Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

③ Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

④ See details elsewhere in plans for installation of guard fence posts through concrete riprap.

⑤ Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

⑥ Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

⑦ Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

⑧ Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

⑨ Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

⑩ #5 bars shown are required even when synthetic fiber reinforcing option is selected.

⑪ Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

⑫ Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

⑬ Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

⑭ If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

⑮ 8" x 18 Gage Galv Sheet Metal

⑯ Provide WWR or #3 bars, with 1'-0" extension into slope.

⑰ WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

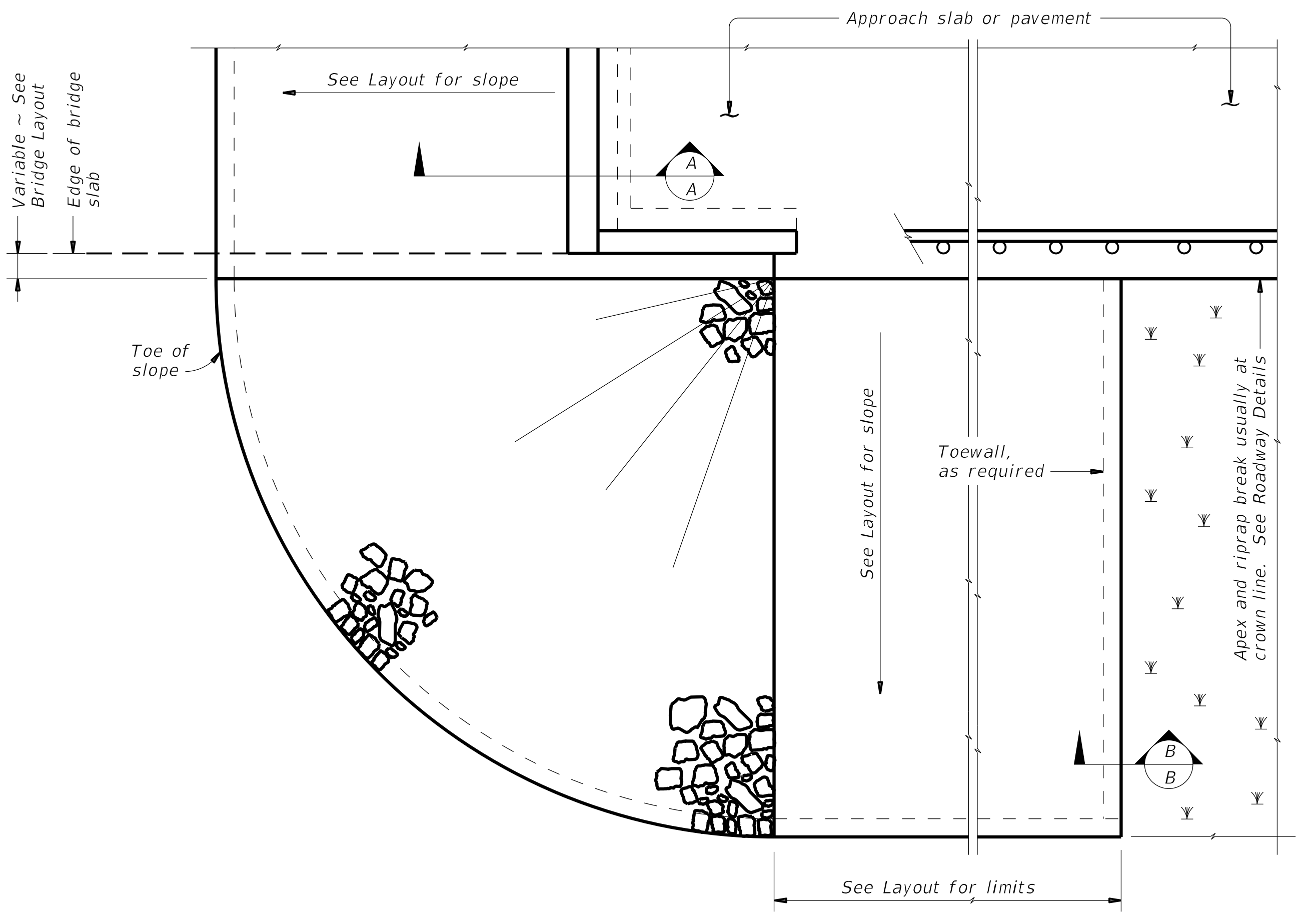
RR9 is to be used on other embankments.

Texas Department of Transportation
Bridge Division Standard

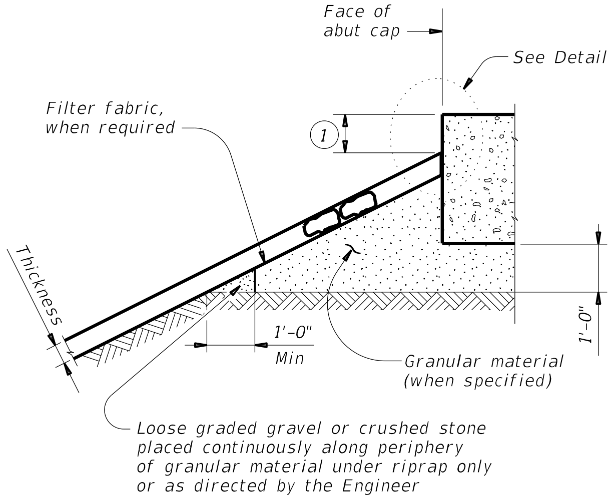
CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

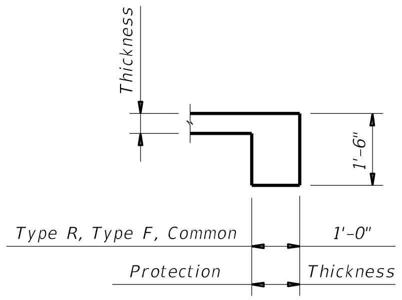
FILE: crrstde1-19.dgn	DN: TxDOT		CK: TxDOT	DW: TxDOT		CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0914		097, ETC.		RM 1826	
	DIST	COUNTY			SHEET NO.	
	AUS	TRAVIS & HAYS			146	



PLAN

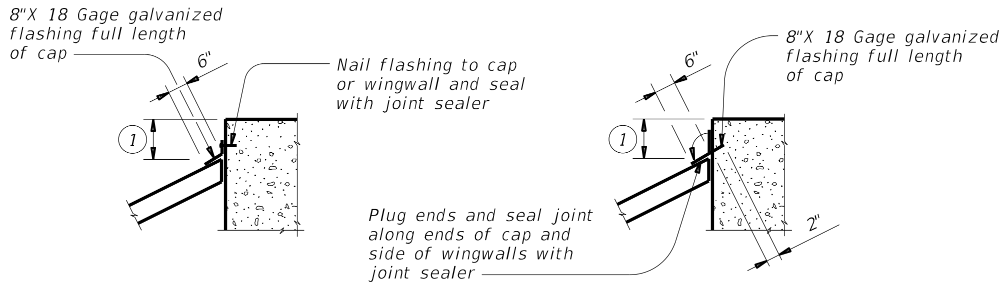


SECTION A-A AT CAP



SECTION B-B

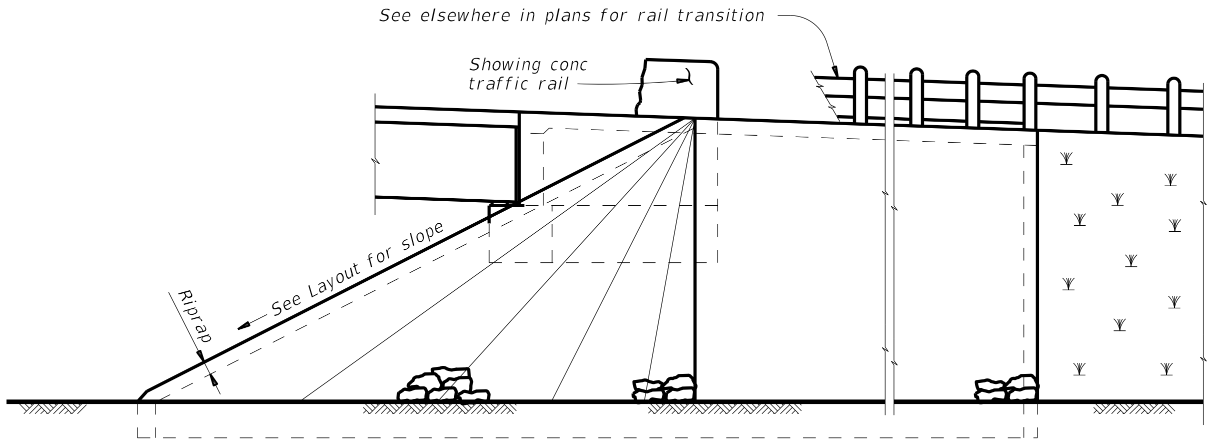
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

① Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

SHEET 1 OF 2

Texas Department of Transportation

Bridge
Division
Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES	
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0914		097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		147	

DATE:
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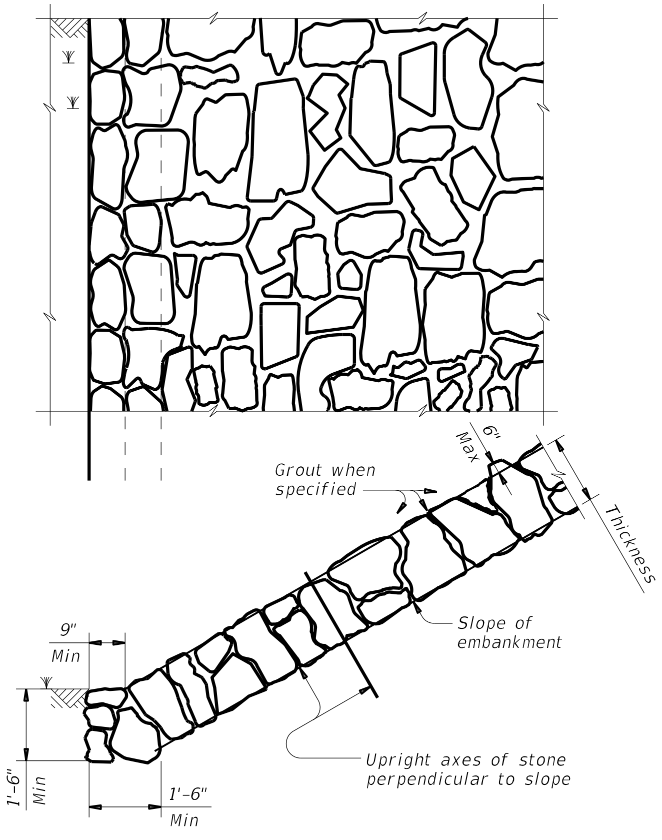


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

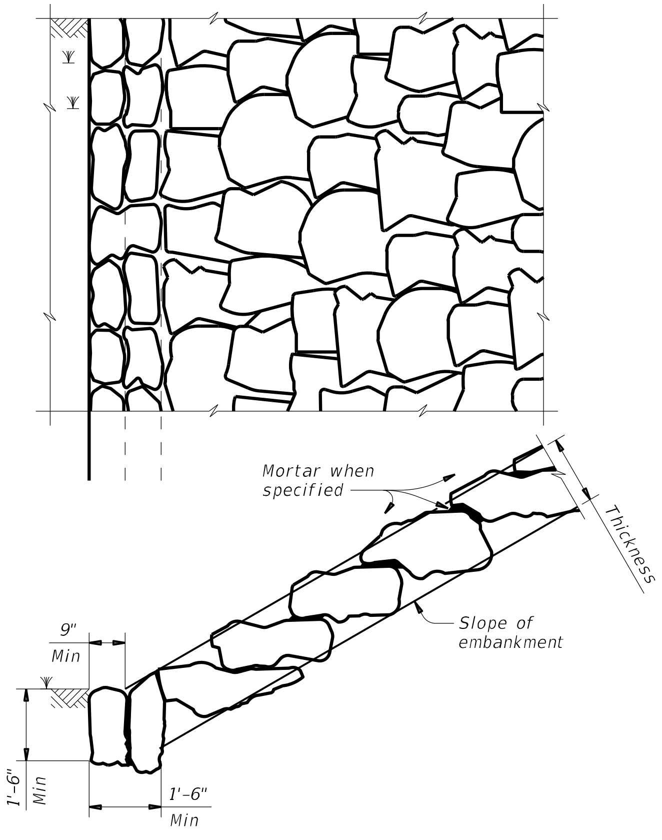


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

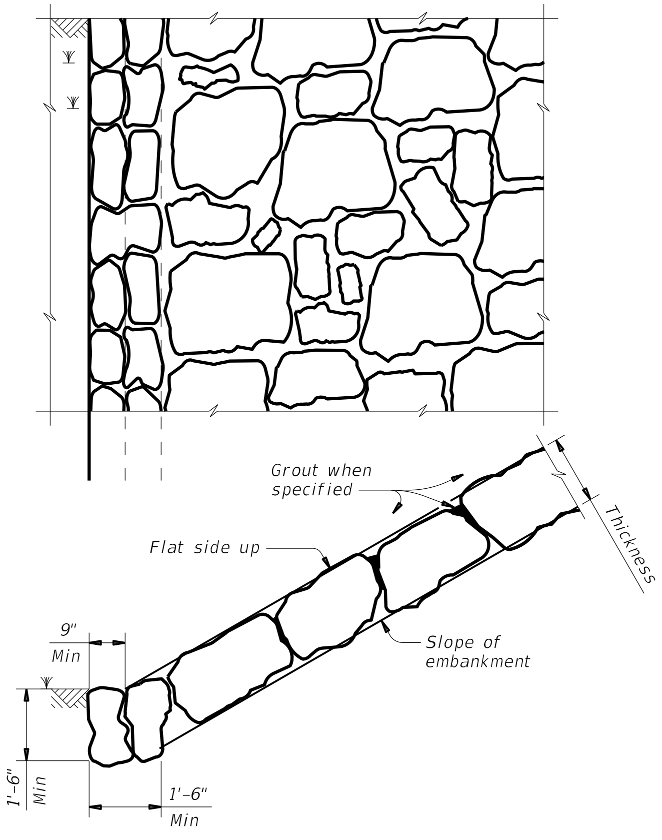


FIGURE 3 ~ TYPE F STONE RIPRAP

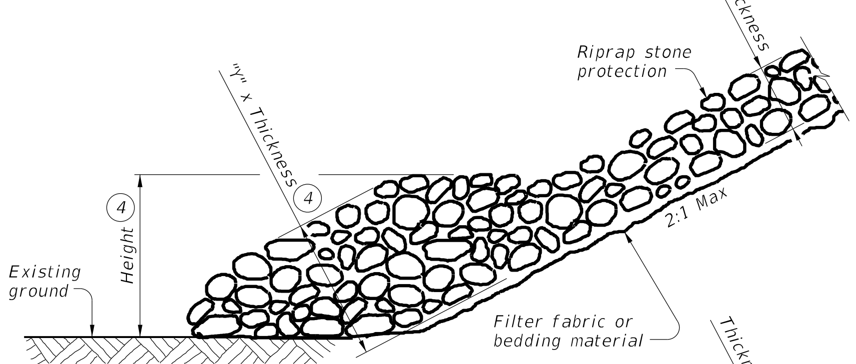
grouted

② Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

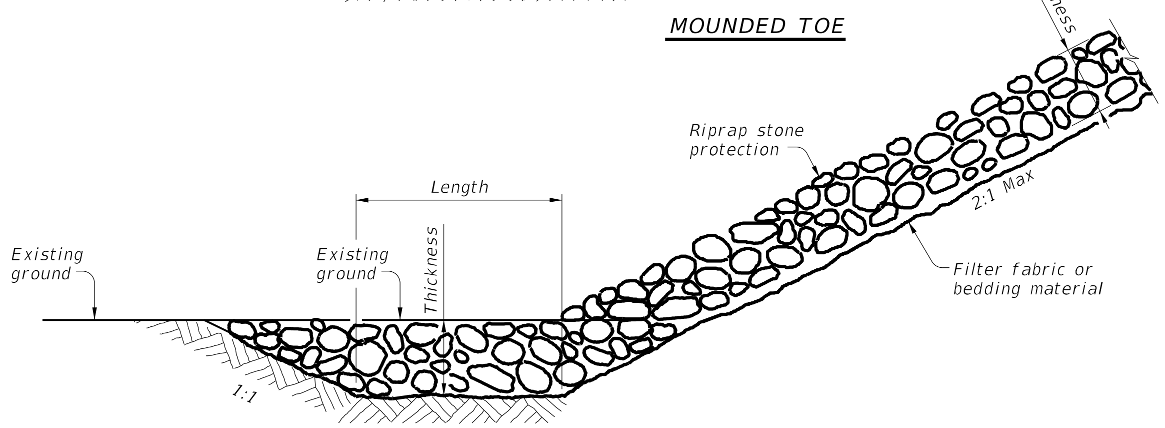
③ Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

④ "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

⑤ List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS ⑤

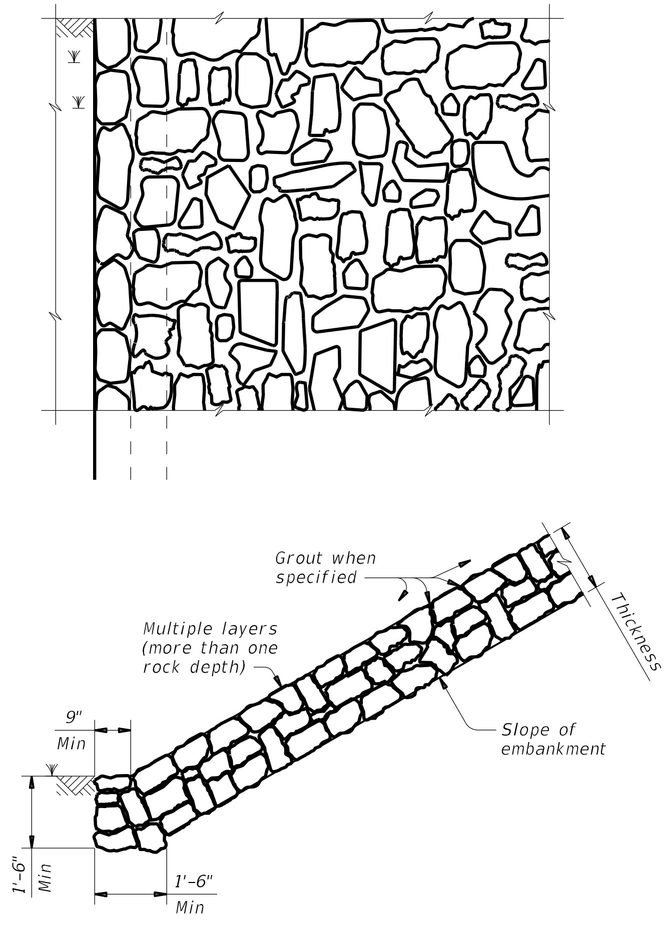


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

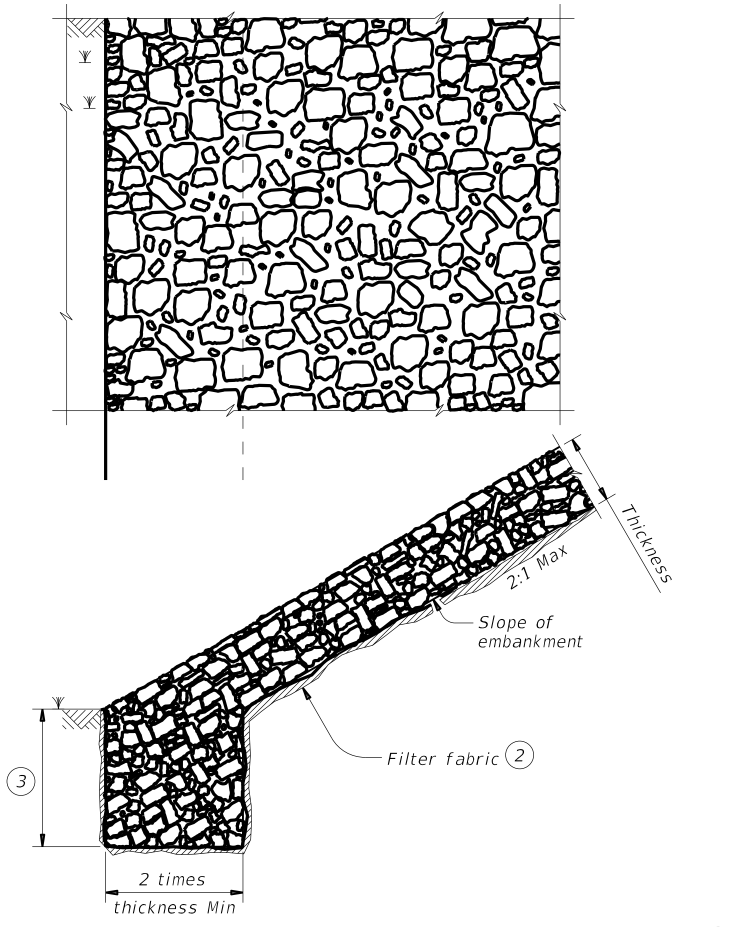


FIGURE 5 ~ PROTECTION STONE RIPRAP ⑤

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

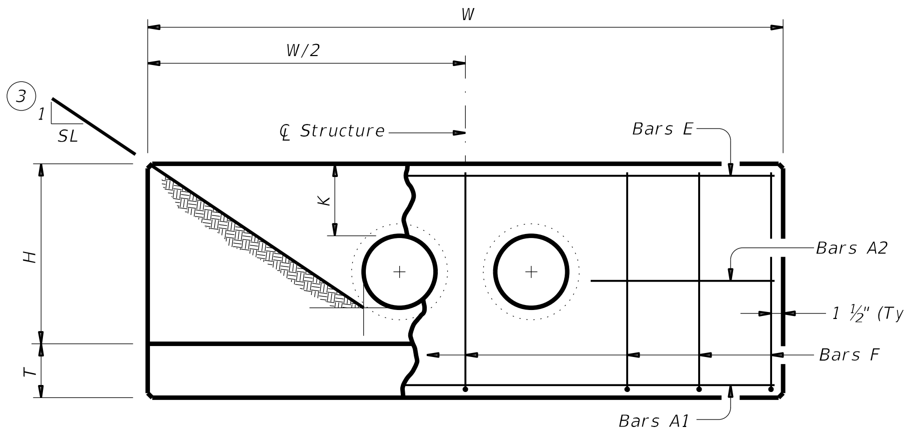
FILE: srrstde1-19.dgn		DN: AES		CK: JGD	DW: BWH		CK: AES
©TxDOT April 2019		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0914		097, ETC.		RM 1826	
		DIST		COUNTY		SHEET NO.	
		AUS		TRAVIS & HAYS		148	

DATE:
FILE:

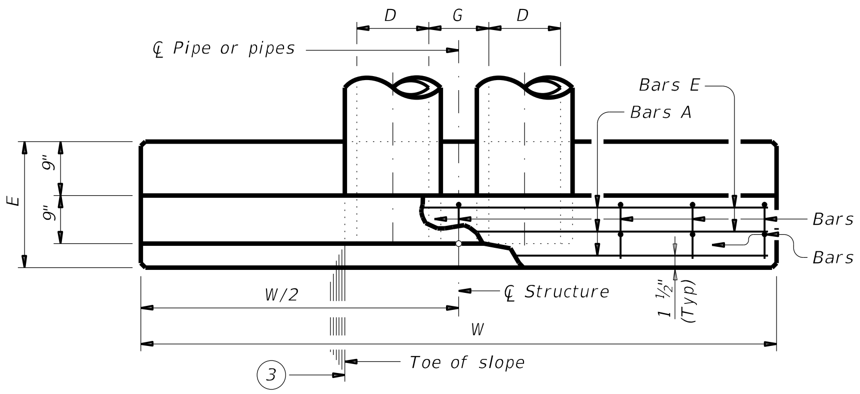
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL ⑤

Slope	Dia of Pipe (D)	Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) ①	Conc (CY) ②	W	Reinf (Lbs) ①	Conc (CY) ②
2:1	12"	9' - 0"	122	1.1	1' - 9"	15	0.2
	15"	10' - 3"	136	1.3	2' - 2"	16	0.2
	18"	11' - 6"	163	1.5	2' - 8"	19	0.3
	21"	12' - 9"	200	1.8	3' - 1"	31	0.4
	24"	14' - 0"	217	2.1	3' - 7"	34	0.4
	27"	15' - 3"	254	2.4	3' - 11"	37	0.5
	30"	16' - 6"	272	2.7	4' - 4"	40	0.6
	33"	17' - 9"	314	3.1	4' - 8"	43	0.6
	36"	19' - 0"	371	3.9	5' - 1"	46	0.8
	42"	21' - 6"	442	4.9	5' - 10"	52	1.0
	48"	25' - 0"	569	6.4	6' - 7"	59	1.3
	54"	27' - 6"	701	7.5	7' - 6"	82	1.6
	60"	30' - 0"	794	8.8	8' - 3"	90	1.8
	66"	32' - 6"	894	10.2	8' - 9"	96	2.0
	72"	35' - 0"	1,055	11.7	9' - 4"	103	2.3
3:1	12"	13' - 0"	175	1.6	1' - 9"	14	0.2
	15"	14' - 9"	193	1.9	2' - 2"	17	0.2
	18"	16' - 6"	228	2.2	2' - 8"	19	0.3
	21"	18' - 3"	299	2.6	3' - 1"	31	0.4
	24"	20' - 0"	323	3.0	3' - 7"	33	0.4
	27"	21' - 9"	371	3.5	3' - 11"	37	0.5
	30"	23' - 6"	415	4.0	4' - 4"	40	0.5
	33"	25' - 3"	469	4.6	4' - 8"	43	0.6
	36"	27' - 0"	556	5.7	5' - 1"	46	0.8
	42"	30' - 6"	675	7.1	5' - 10"	52	1.0
	48"	35' - 6"	837	9.2	6' - 7"	59	1.3
	54"	39' - 0"	1,015	11.0	7' - 6"	84	1.6
	60"	42' - 6"	1,171	12.9	8' - 3"	91	1.8
	66"	46' - 0"	1,298	14.9	8' - 9"	98	2.0
	72"	49' - 6"	1,561	17.1	9' - 4"	103	2.3
4:1	12"	17' - 0"	229	2.0	1' - 9"	15	0.2
	15"	19' - 3"	266	2.4	2' - 2"	17	0.2
	18"	21' - 6"	308	2.9	2' - 8"	19	0.3
	21"	23' - 9"	382	3.5	3' - 1"	31	0.3
	24"	26' - 0"	430	3.9	3' - 7"	34	0.4
	27"	28' - 3"	486	4.7	3' - 11"	37	0.5
	30"	30' - 6"	539	5.2	4' - 4"	40	0.6
	33"	32' - 9"	603	6.0	4' - 8"	42	0.6
	36"	35' - 0"	738	7.5	5' - 1"	47	0.8
	42"	39' - 6"	881	9.3	5' - 10"	52	1.0
	48"	46' - 0"	1,102	12.1	6' - 7"	61	1.3
	54"	50' - 6"	1,364	14.4	7' - 6"	84	1.6
	60"	55' - 0"	1,547	16.9	8' - 3"	91	1.8
	66"	59' - 6"	1,741	19.5	8' - 9"	98	2.0
	72"	64' - 0"	2,077	22.4	9' - 4"	102	2.3
6:1	12"	25' - 0"	336	3.0	1' - 9"	14	0.2
	15"	28' - 3"	384	3.6	2' - 2"	17	0.2
	18"	31' - 6"	452	4.2	2' - 8"	19	0.3
	21"	34' - 9"	581	5.1	3' - 1"	31	0.4
	24"	38' - 0"	644	5.8	3' - 7"	34	0.4
	27"	41' - 3"	737	6.9	3' - 11"	37	0.5
	30"	44' - 6"	807	7.7	4' - 4"	39	0.6
	33"	47' - 9"	912	8.9	4' - 8"	44	0.6
	36"	51' - 0"	1,108	11.0	5' - 1"	48	0.8
	42"	57' - 6"	1,318	13.7	5' - 10"	54	1.0
	48"	67' - 0"	1,682	17.9	6' - 7"	59	1.3
	54"	73' - 6"	2,072	21.3	7' - 6"	83	1.6
	60"	80' - 0"	2,351	24.9	8' - 3"	89	1.8
	66"	86' - 6"	2,643	28.9	8' - 9"	96	2.0
	72"	93' - 0"	3,121	33.1	9' - 4"	101	2.3

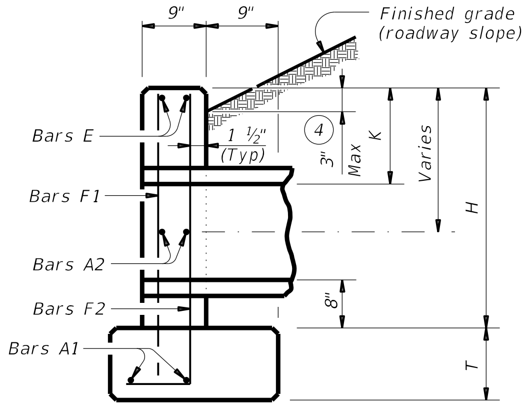
DATE:
FILE:



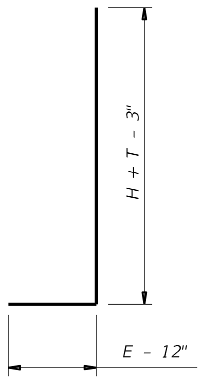
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

① Total quantities include one 3'-1" lap for bars over 60' in length.

② Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

③ Indicated slope is perpendicular to centerline pipe or pipes.

④ For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

⑤ Dimensions shown are usual and maximum.

⑥ Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K ⑤	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF REINFORCING STEEL ⑥

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

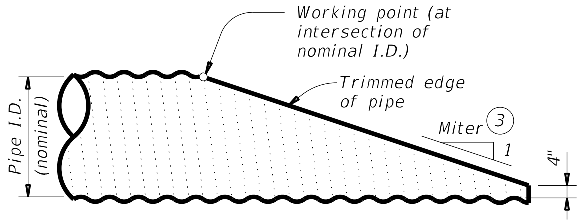
Texas Department of Transportation

Bridge
Division
Standard

CONCRETE HEADWALLS
WITH PARALLEL WINGS FOR
NON-SKEWED PIPE CULVERTS

CH-PW-0

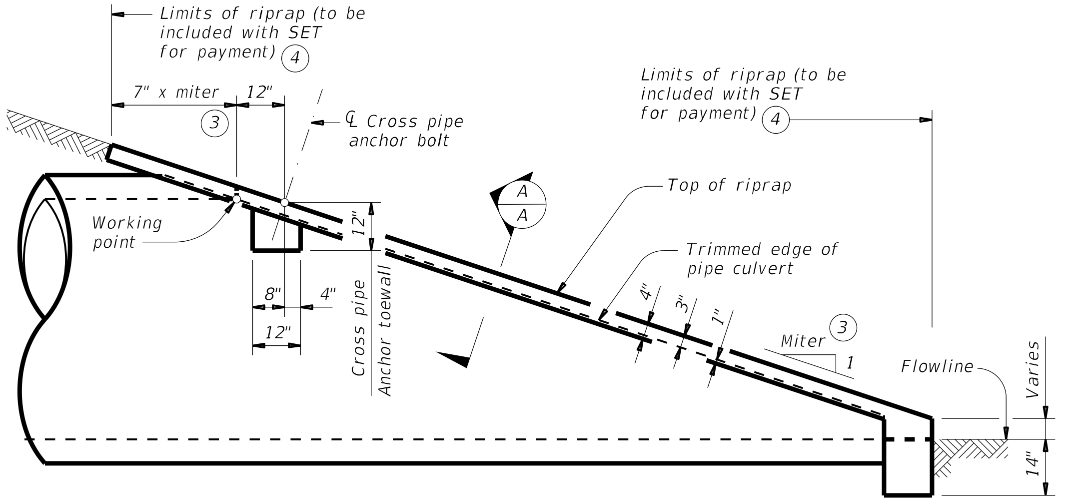
FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		149



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

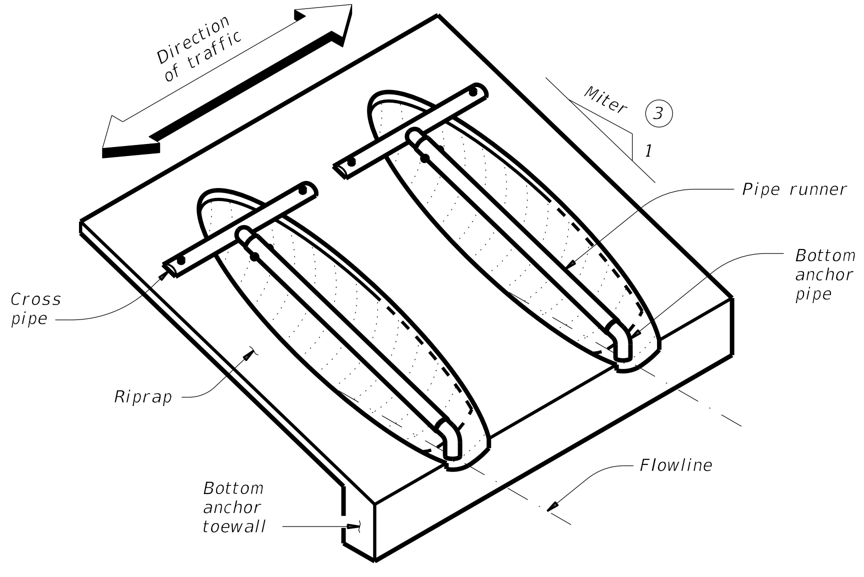
(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

Varies ~ See Bottom Anchor Toewall Details

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS ① ②

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS ③

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED ②

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS ①

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) ⑤

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

① Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

② This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

③ Miter = slope of mitered end of pipe culvert.

④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

⑤ Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

SHEET 1 OF 2

Texas Department of Transportation
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF		CK: CAT		DW: JRP	CK: GAF	
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY		
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	DIST	COUNTY				SHEET NO.	
	AUS	TRAVIS & HAYS				150	

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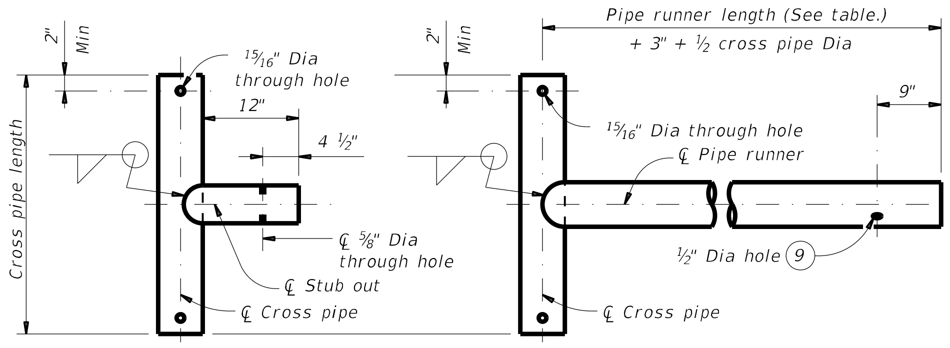
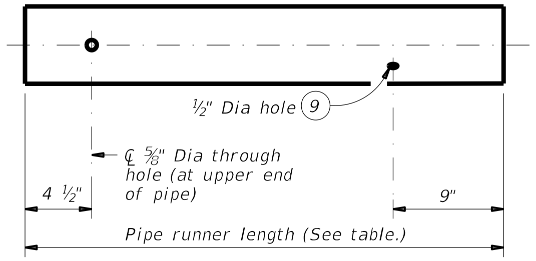


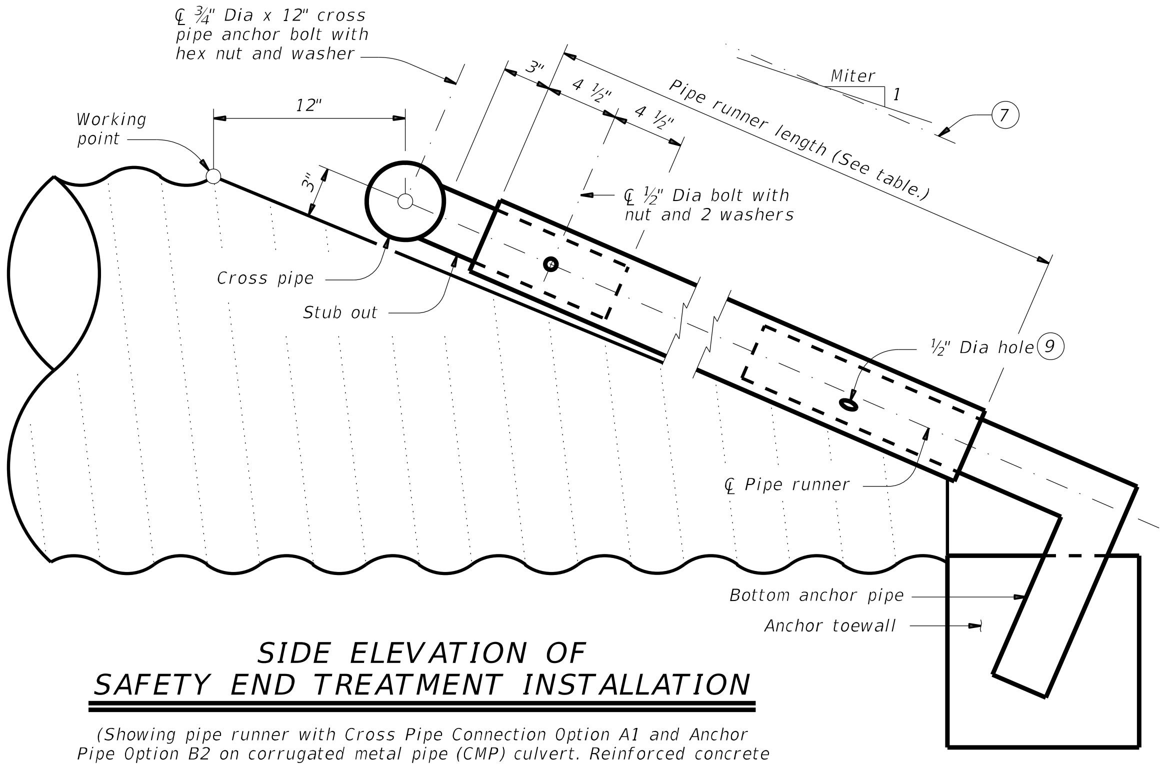
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



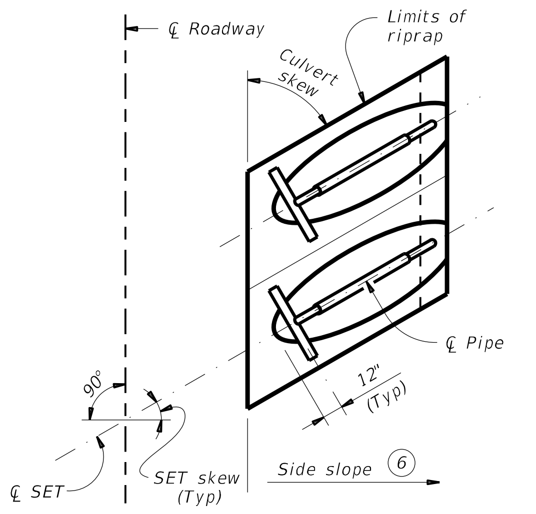
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

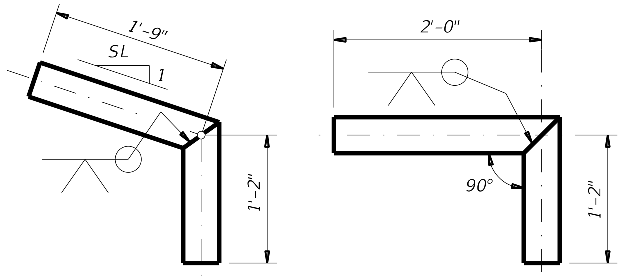


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

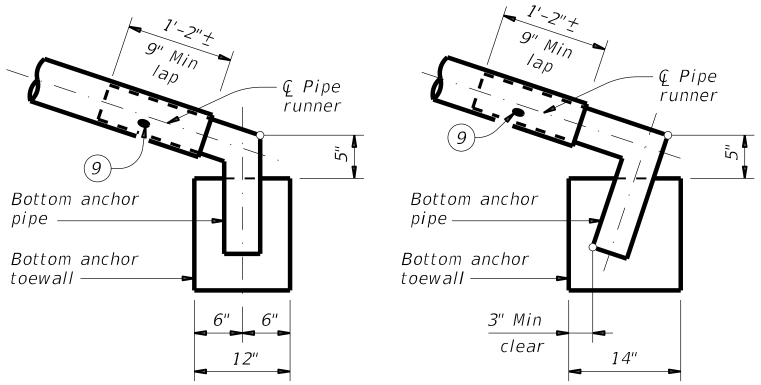


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

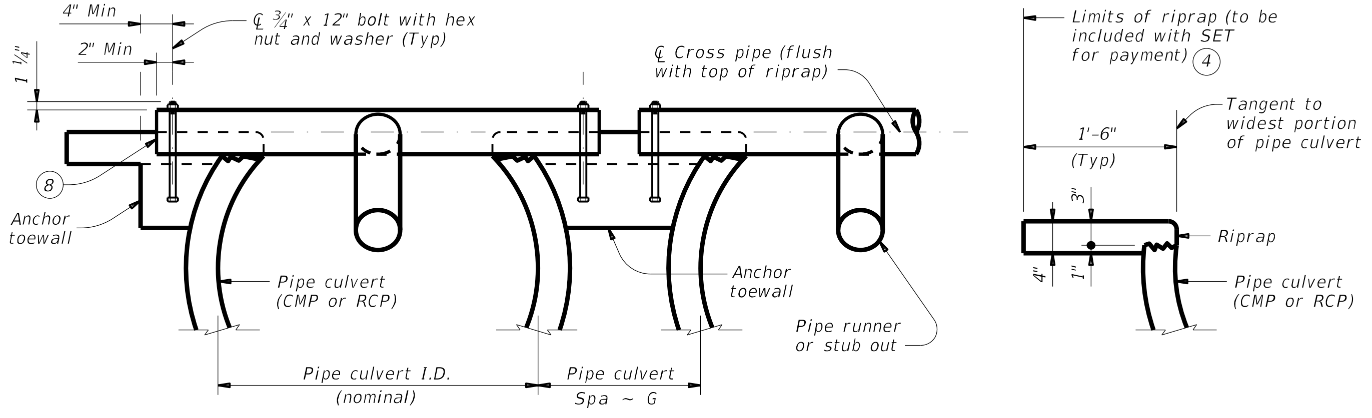
BOTTOM ANCHOR PIPE DETAILS ⑩



OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL

SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

⑥ Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

⑦ Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

⑧ Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

⑨ After installation, inspect the ½" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

⑩ At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

DATE:
FILE:

SHEET 2 OF 2

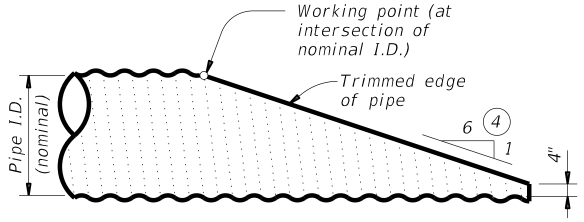
Texas Department of Transportation
Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF		CK: CAT	DW: JRP		CK: GAF
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0914	33	097, ETC.		RM 1826	
	DIST	COUNTY			SHEET NO.	
	AUS	TRAVIS & HAYS			151	

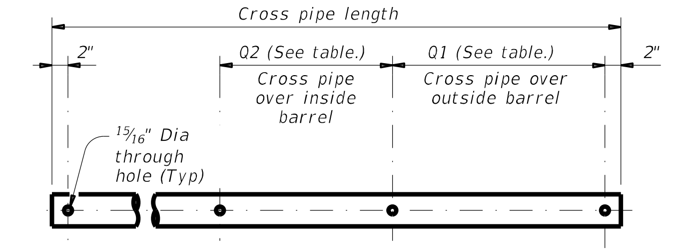
DATE:
FILE:



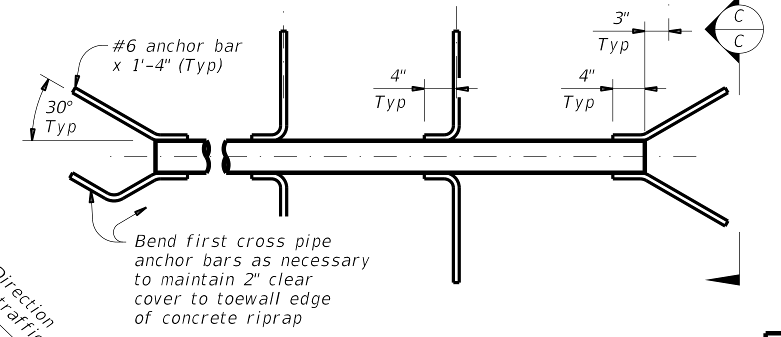
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

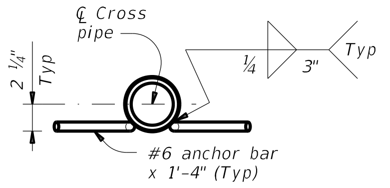
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

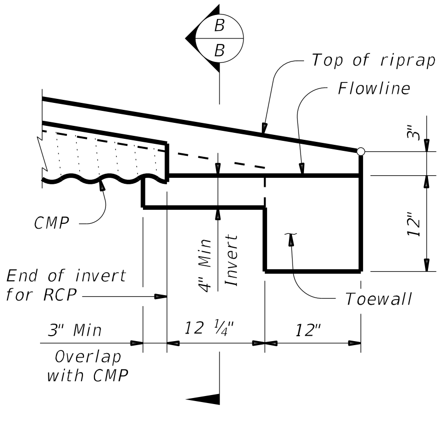


PIPE WITH ANCHOR BARS



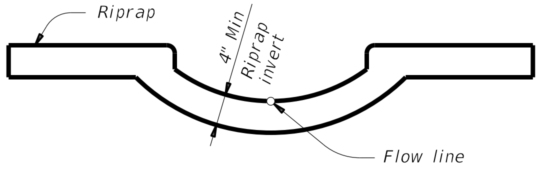
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

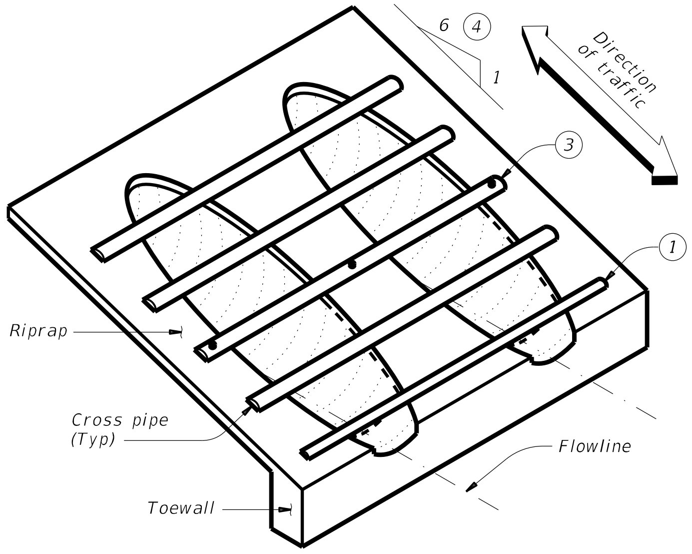
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES ②							
Nominal Culvert I.D.	Conc Riprap (CY)⑥	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		



ISOMETRIC VIEW OF TYPICAL INSTALLATION

① The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

② Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

③ Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

④ Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

⑤ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

⑥ Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

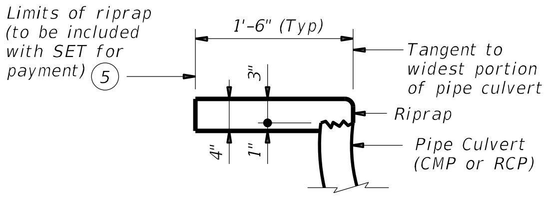
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

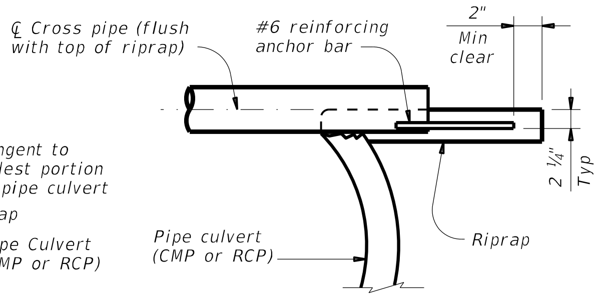
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

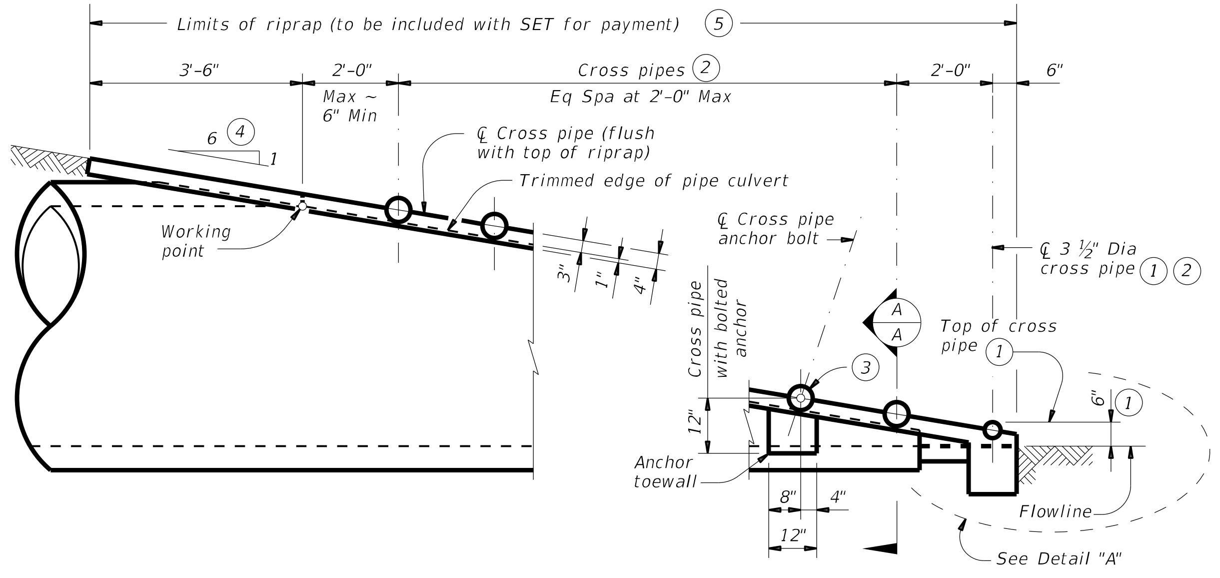
Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

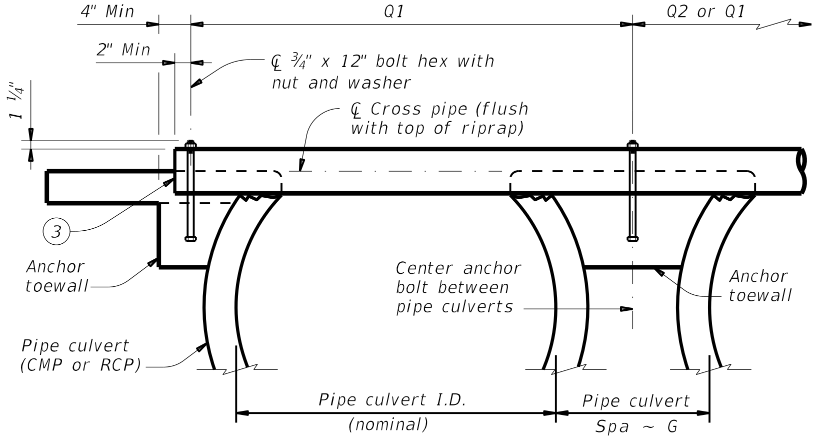


SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

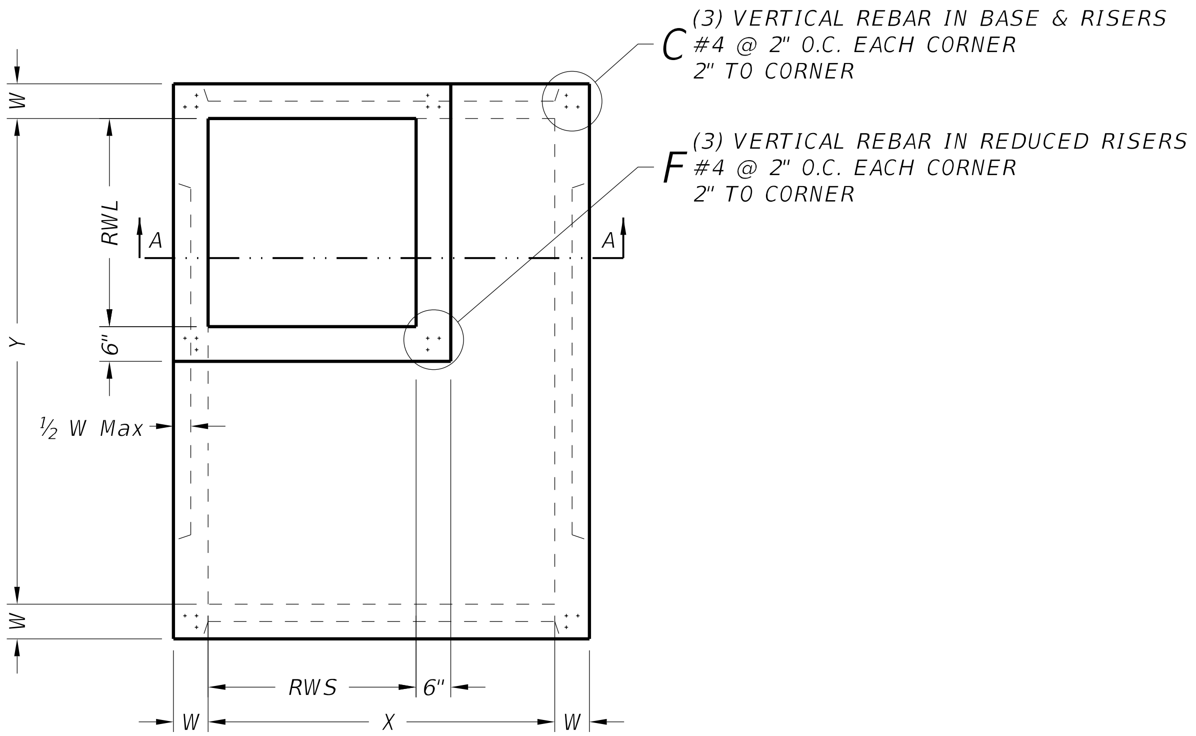
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

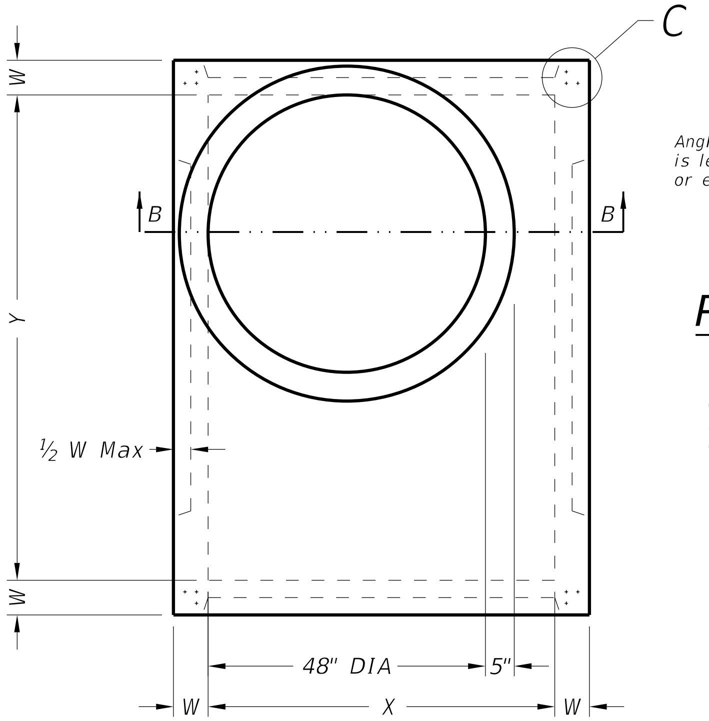
SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		152



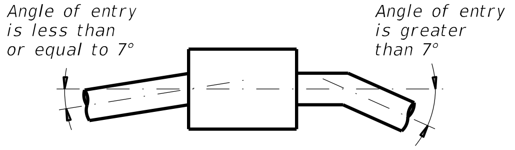
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



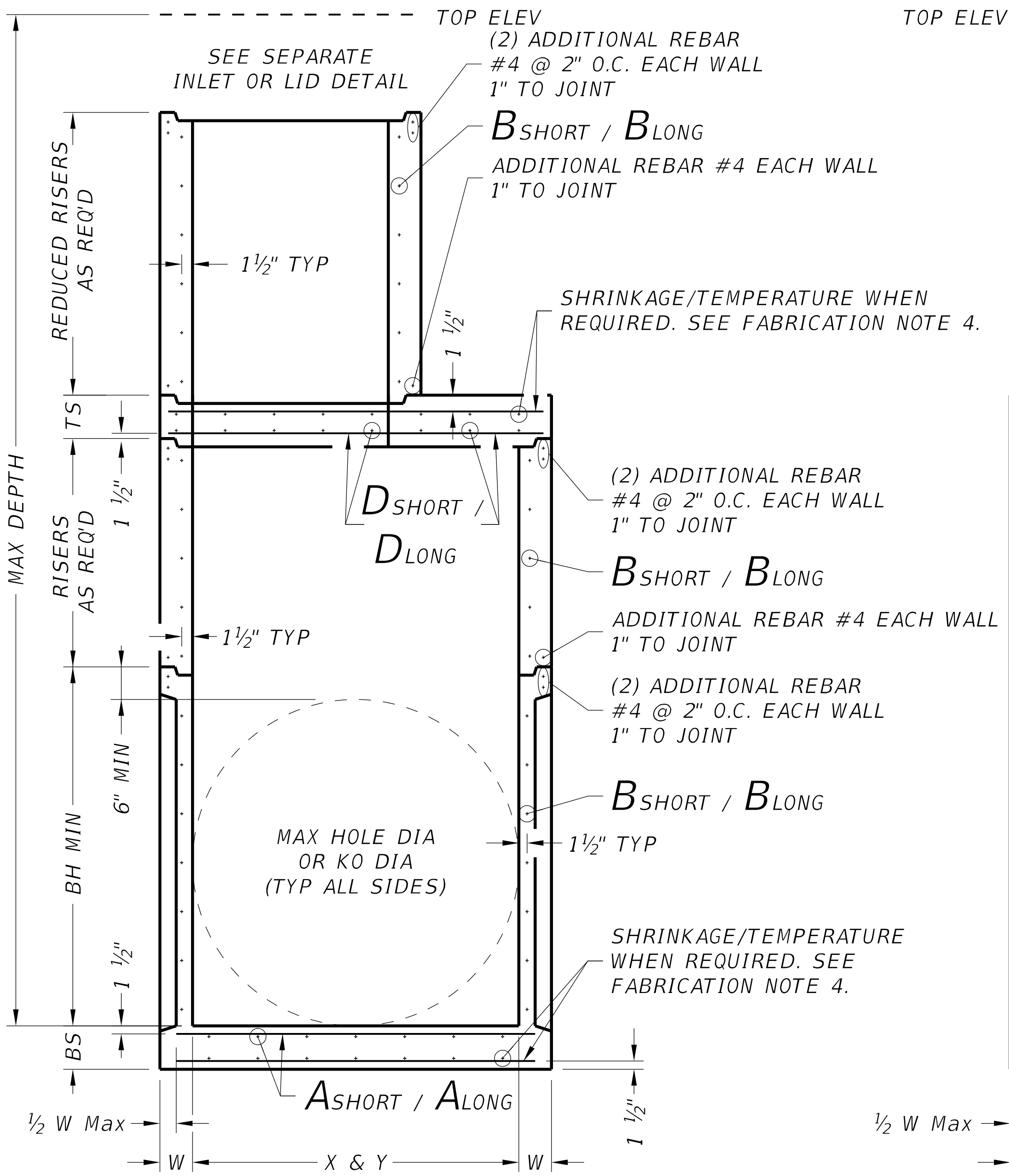
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



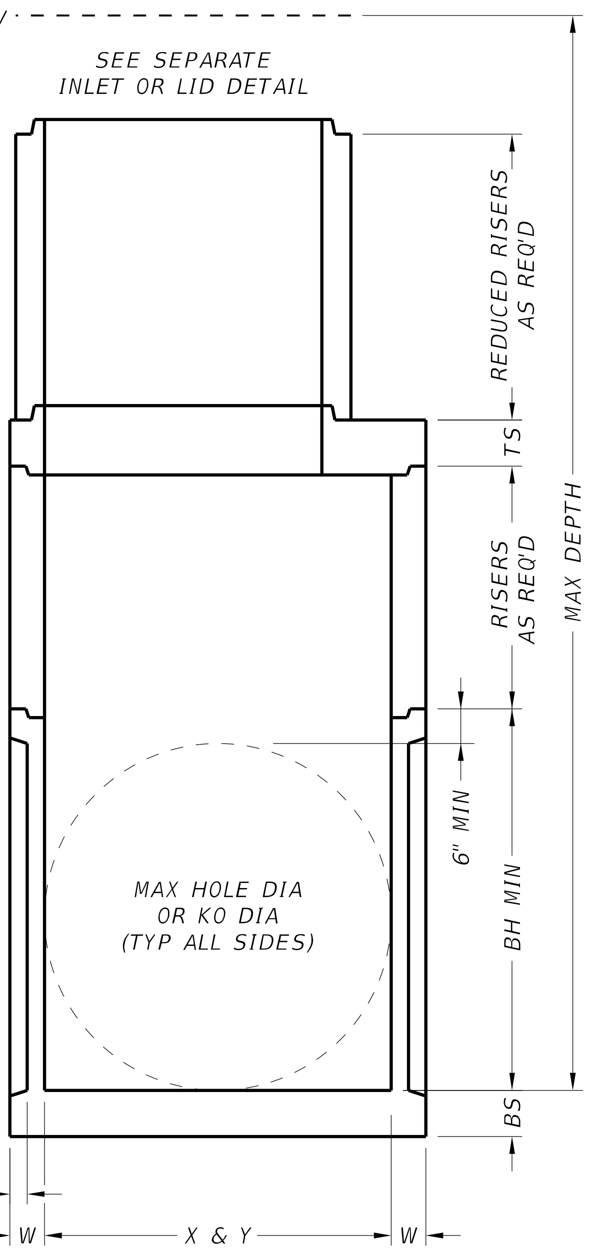
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

HL93 LOADING

Texas Department of Transportation

Bridge
Division
Standard

PRECAST BASE

PB

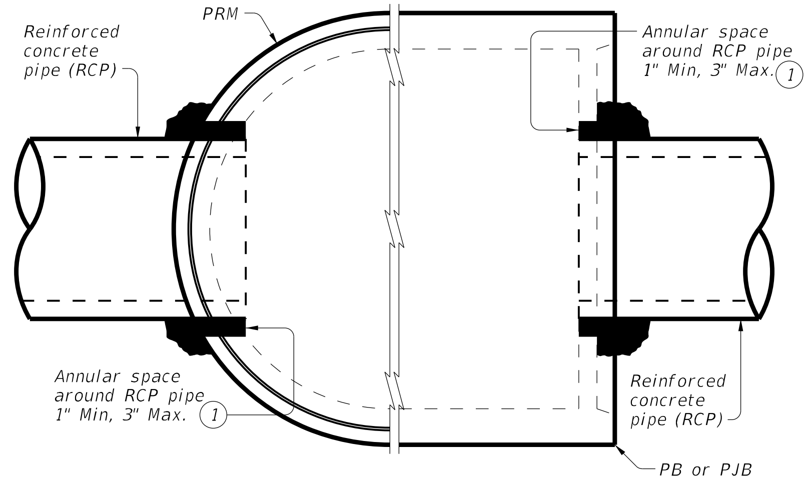
FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	153

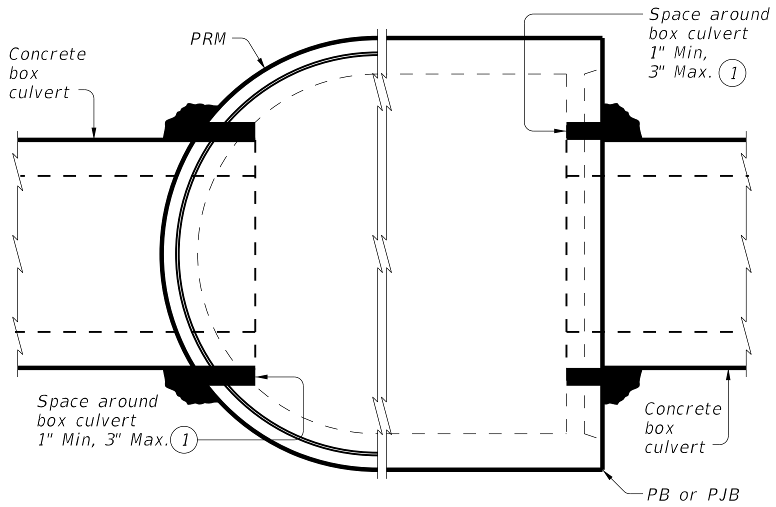
DATE:
FILE:



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

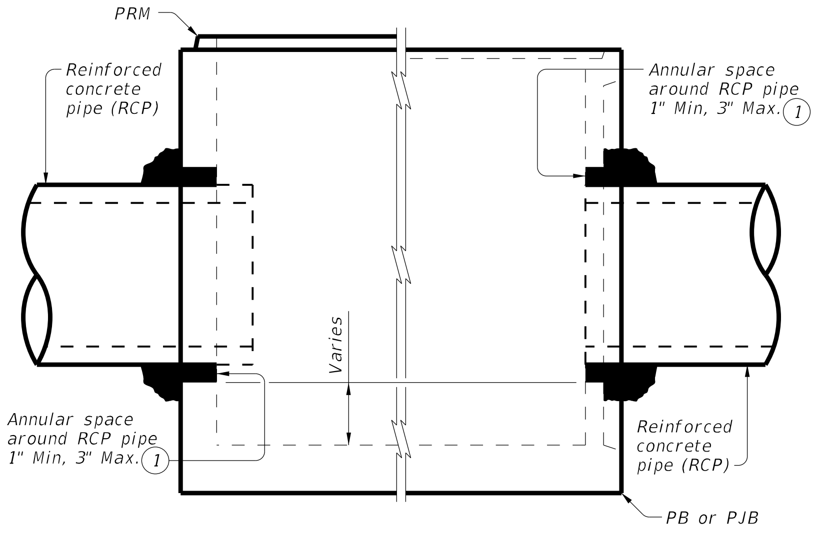
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

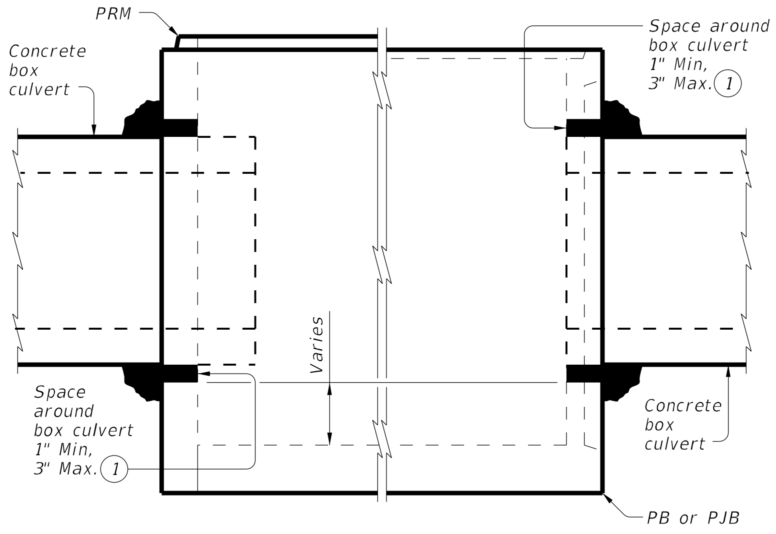
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

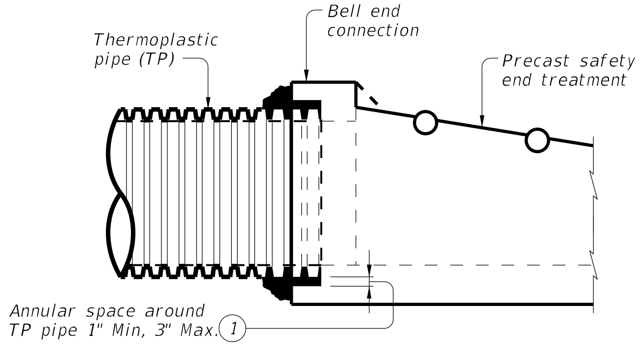
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

① Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge
Division
Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE: pbgcstd1-20.dgn	DN: TxDOT		CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB		HIGHWAY
REVISIONS	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			154

DATE:
FILE:

		MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB												
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
	Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

DATE:
FILE:

FABRICATION NOTES:

1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:

1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

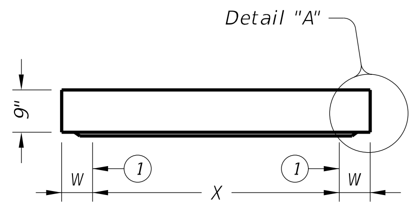
Texas Department of Transportation

Bridge
Division
Standard

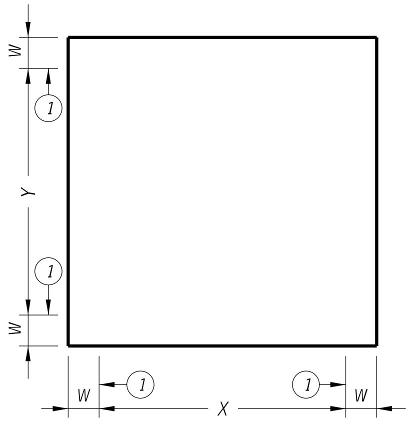
DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914		097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		155



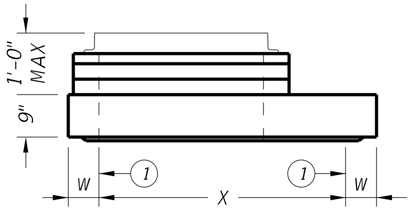
ELEVATION VIEW



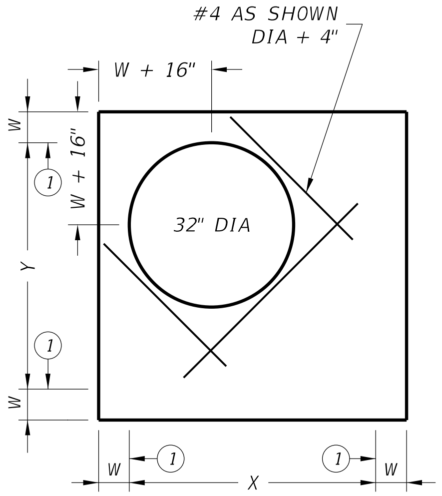
PLAN VIEW

NO OPENINGS

STYLE 'SL'



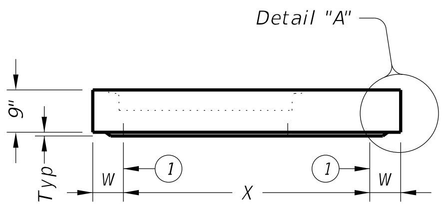
ELEVATION VIEW



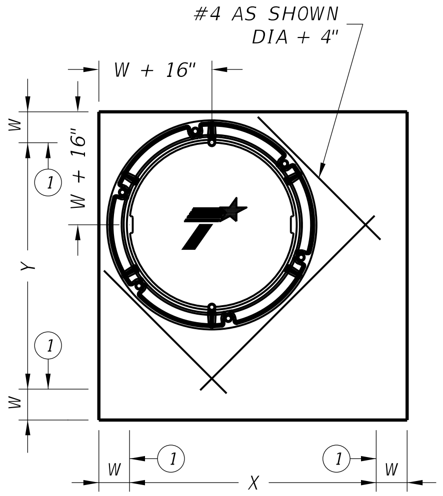
PLAN VIEW

SHIP LOOSE RING & COVER

STYLE 'RH'



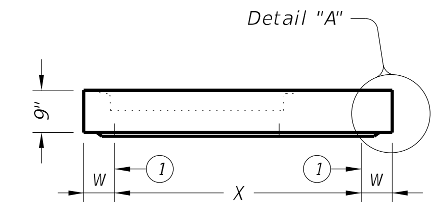
ELEVATION VIEW



PLAN VIEW

32" DIA CAST-IN RING & COVER

STYLE 'RC'



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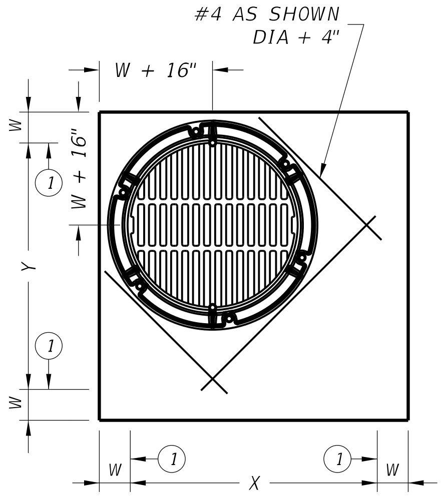
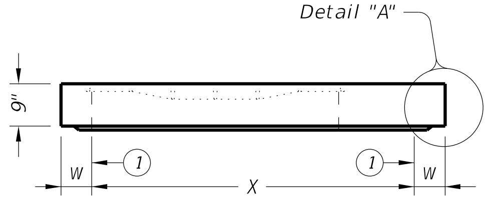


PLAN VIEW

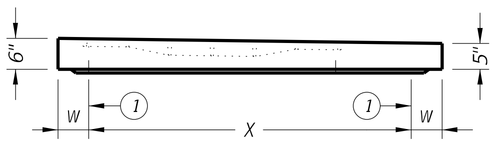
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



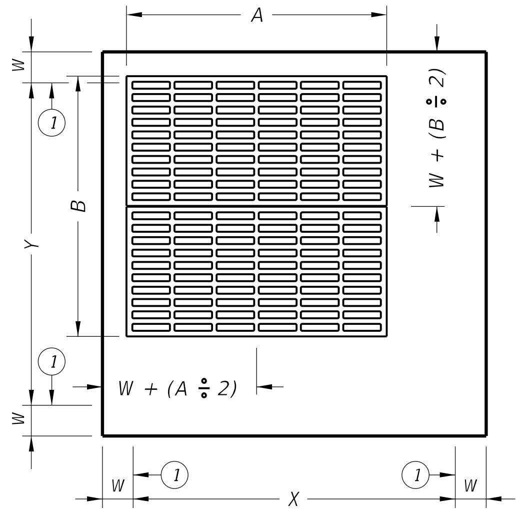
STYLE 'FG'

ORIENT TAPER TO CORRESPOND WITH ROADWAY CROSS-SLOPE.



STYLE 'SFG'

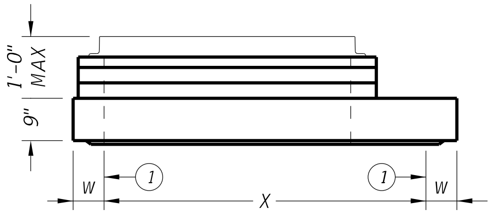
ELEVATION VIEW



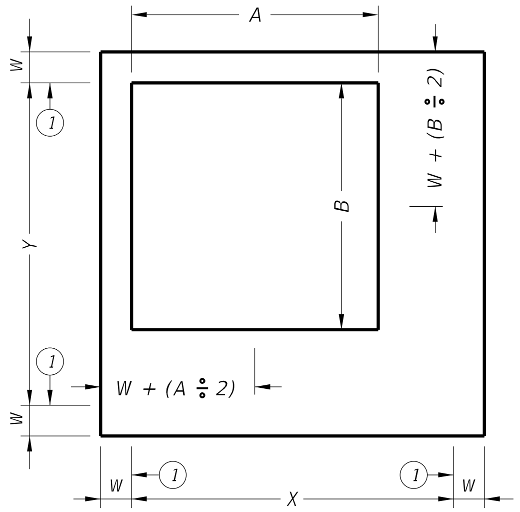
PLAN VIEW

CAST-IN FRAME & GRATE

STYLES 'FG' & 'SFG'



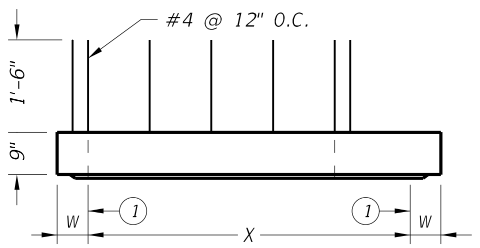
ELEVATION VIEW



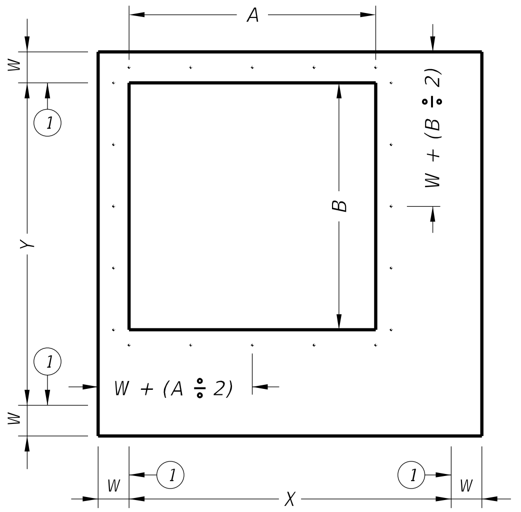
PLAN VIEW

SHIP LOOSE FRAME & GRATE

STYLE 'SH'



ELEVATION VIEW



PLAN VIEW

EXPOSED REBAR

STYLE 'S1'

① Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT

©TxDOT February 2020 | CONT 0914 | SECT 33 | JOB 097, ETC. | HIGHWAY RM 1826

REVISIONS

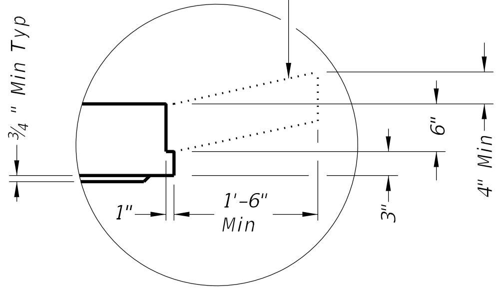
DIST AUS | COUNTY TRAVIS & HAYS | SHEET NO. 156

DATE:
FILE:

Style	Size (X x Y)	W ②	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

② See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

DATE:
FILE:

HL93 LOADING
SHEET 2 OF 2

Texas Department of Transportation
Bridge Division Standard

PRECAST SLAB LID

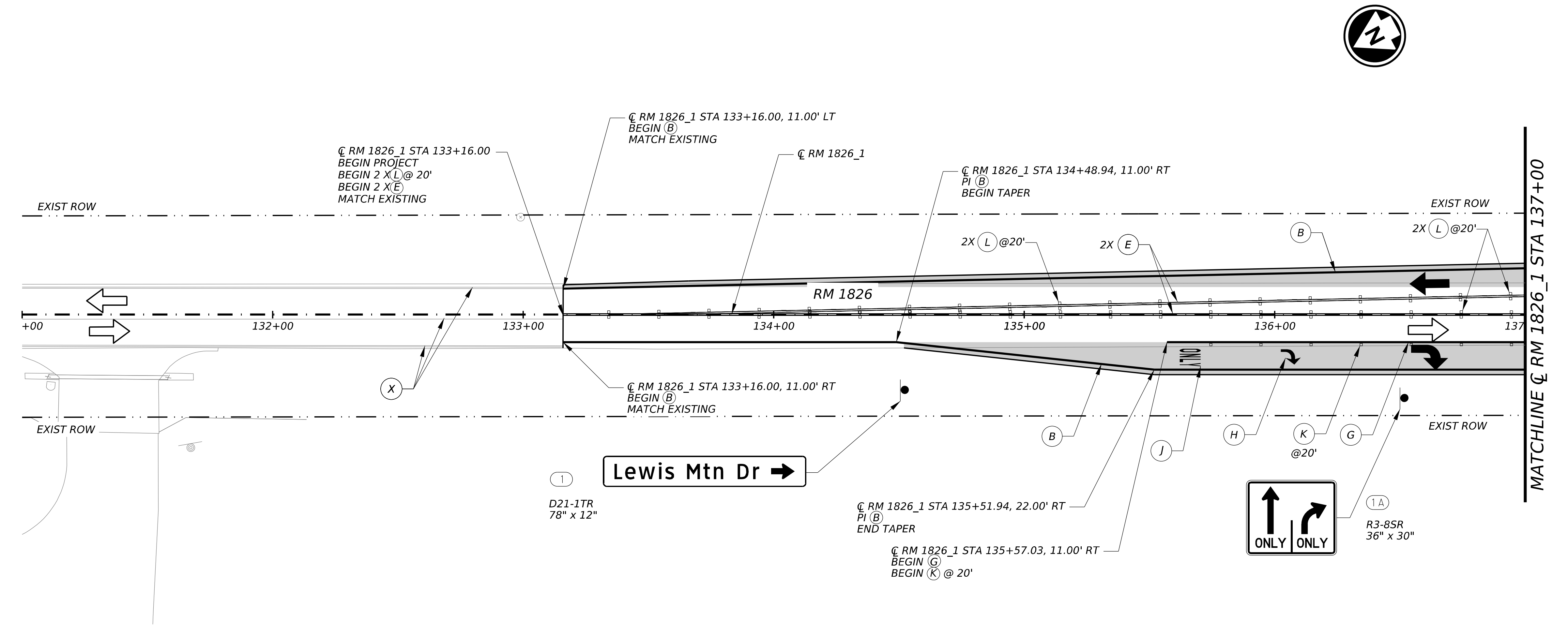
PSL

FILE: prestd05-20.dgn
DN: TxDOT
CK: TxDOT
DW: TxDOT
CK: TxDOT

REVISIONS

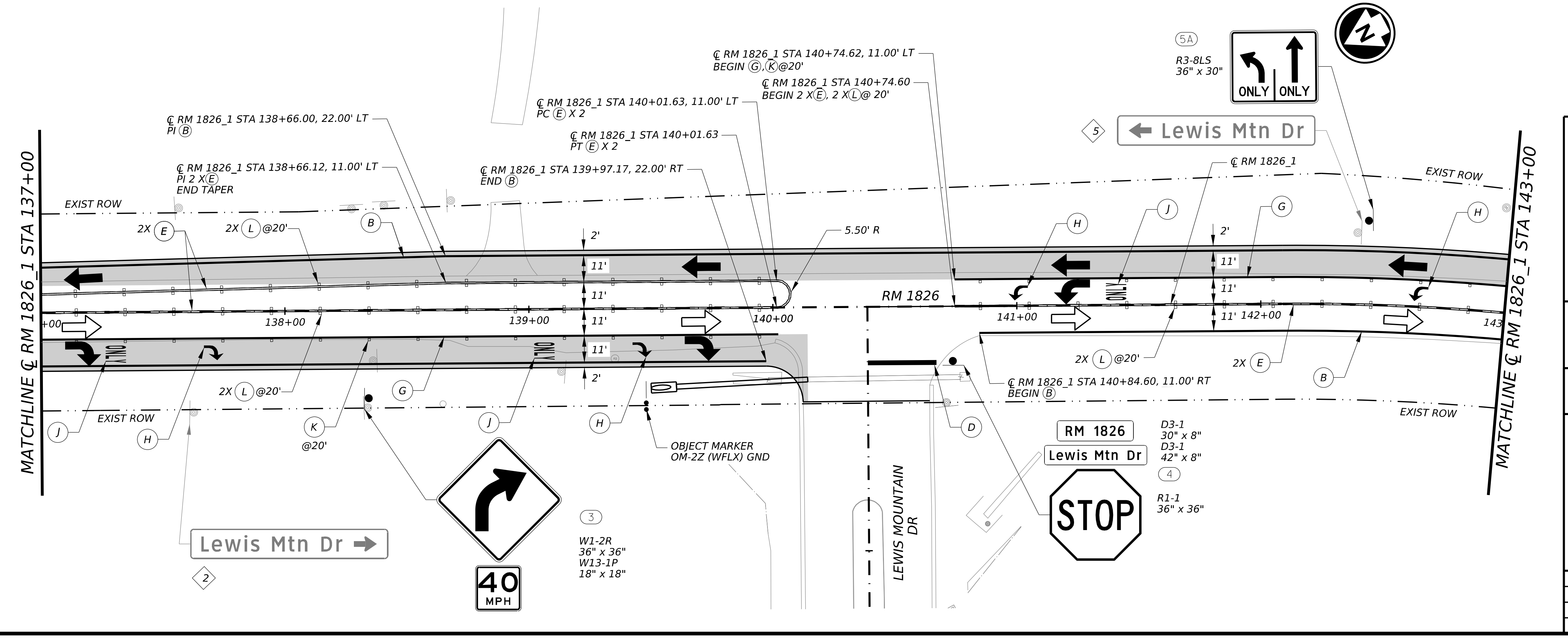
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	157



LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
Ⓧ	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☒	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023

Alfredo Lopez

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FIRM REGISTRATION NO. 5713

Texas Department of Transportation
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RM 1826

SIGNING AND PAVEMENT MARKING PLAN
LEWIS MOUNTAIN DR

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	158

DATE: 5/30/2023 12:50:14 PM
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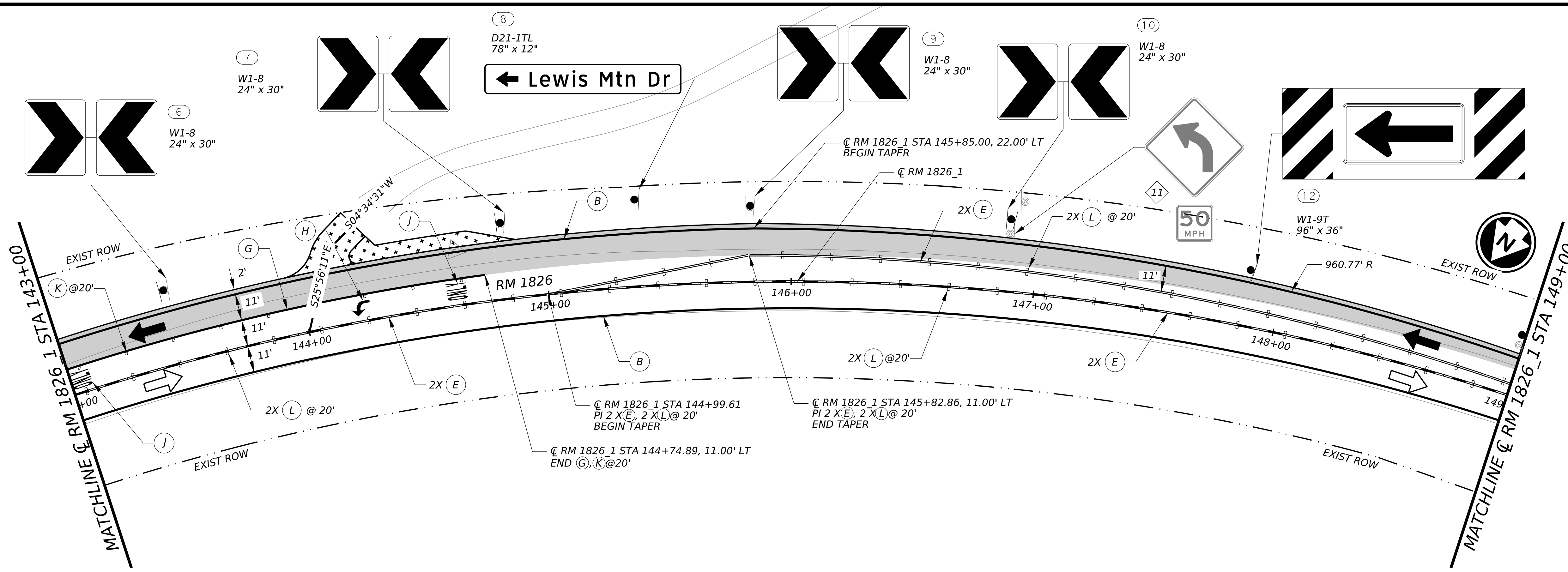
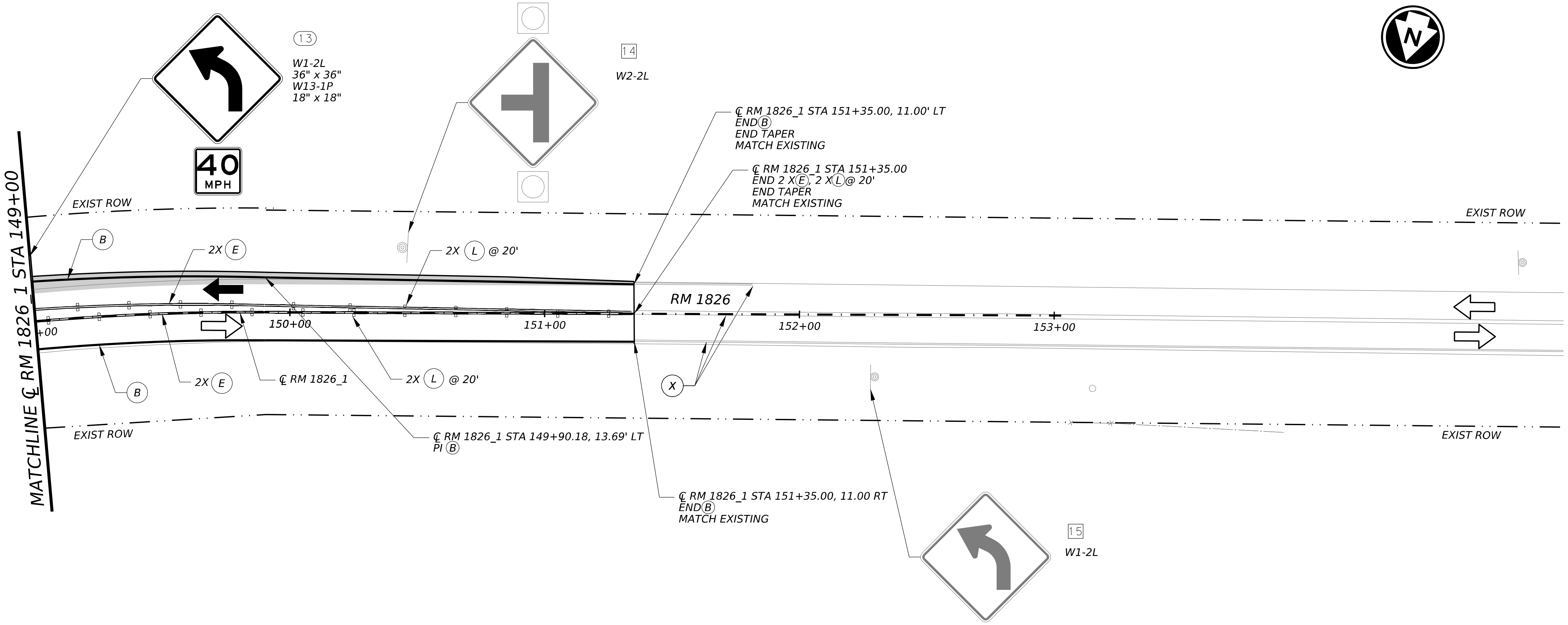


LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☐X	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

STATE OF TEXAS
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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

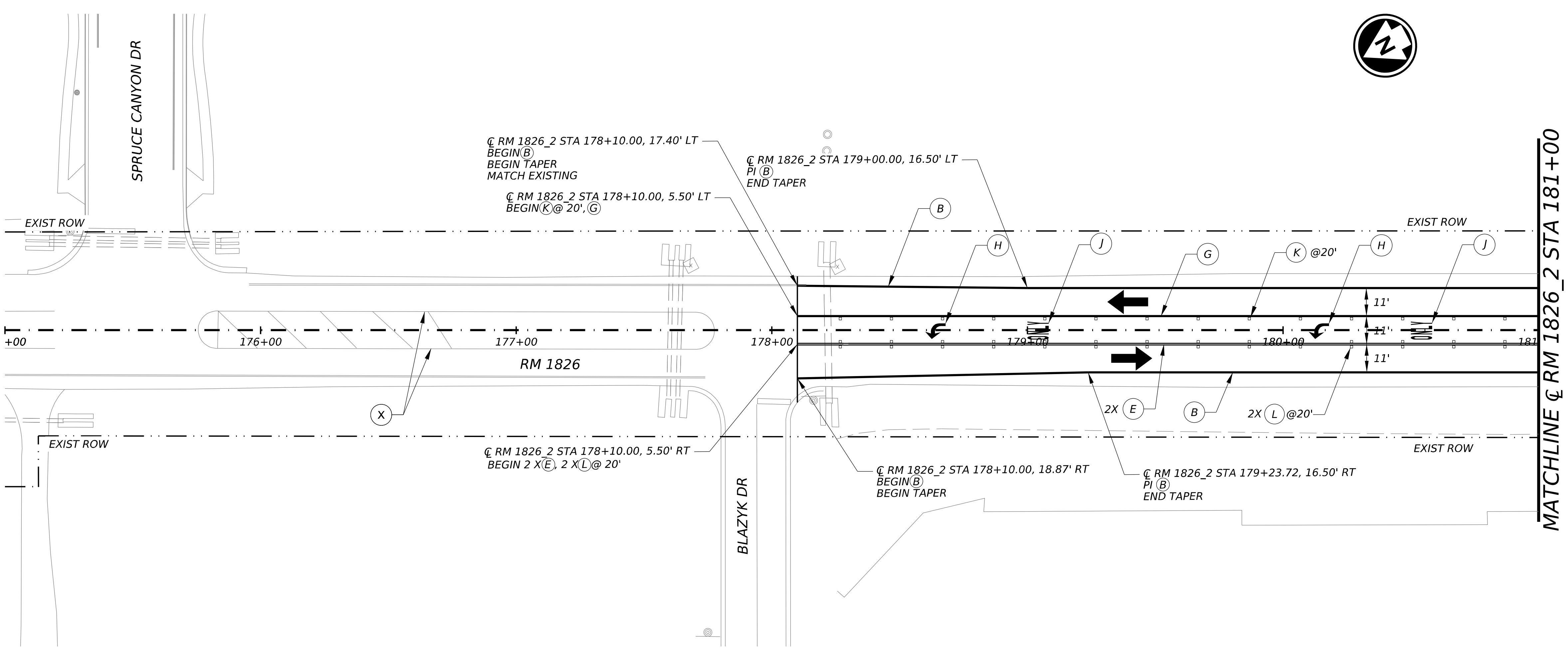
RM 1826

SIGNING AND PAVEMENT MARKING PLAN
LEWIS MOUNTAIN DR

SHEET 2 OF 2

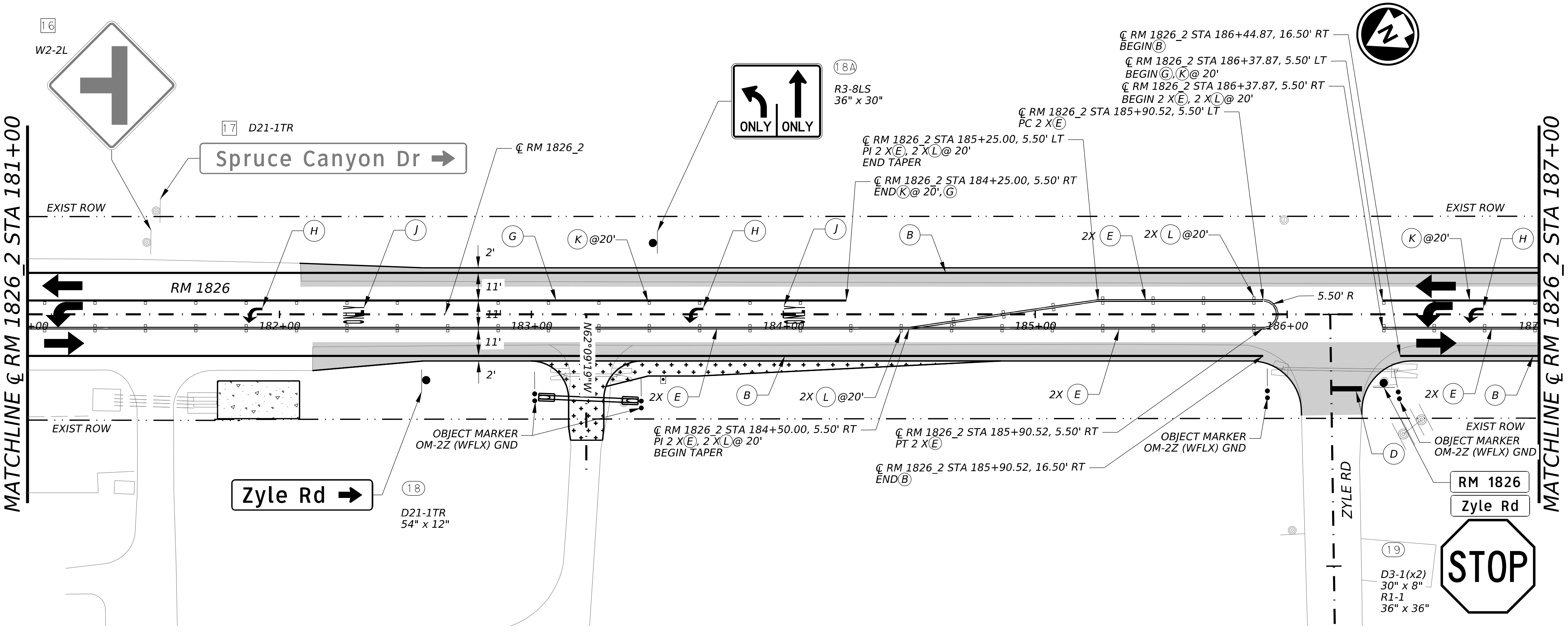
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	159

DN:
CK:
DW:
CK:



LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
Ⓧ	REMOVE AND REPLACE EXISTING SIGN
◇	EXISTING SIGN TO BE REMOVED
☐	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED
PROFESSIONAL ENGINEER
5/30/2023
Alfred Lopez

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FIRM REGISTRATION NO. 5713

GARVER

Texas Department of Transportation

RM 1826

SIGNING AND PAVEMENT MARKING PLAN

ZYLE RD

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	160

DATE: 5/30/2023 12:50:51 PM
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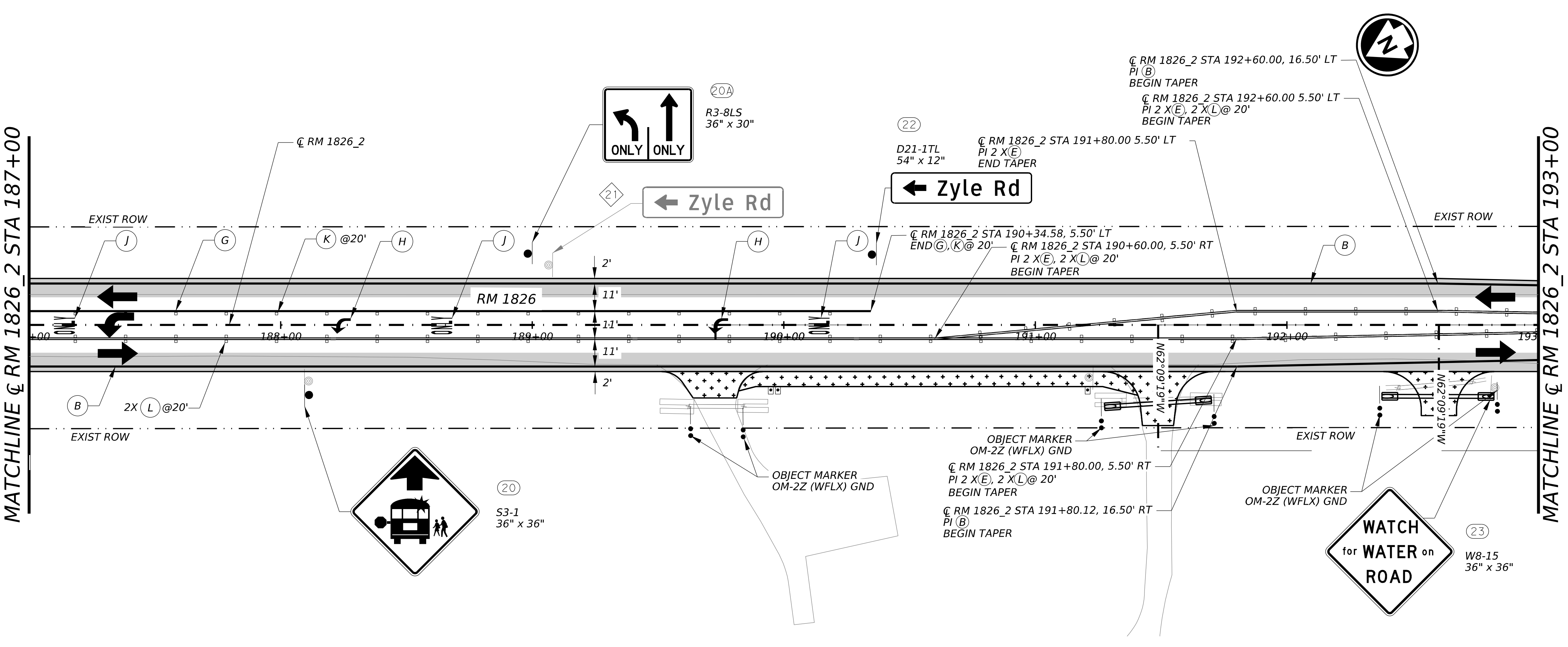
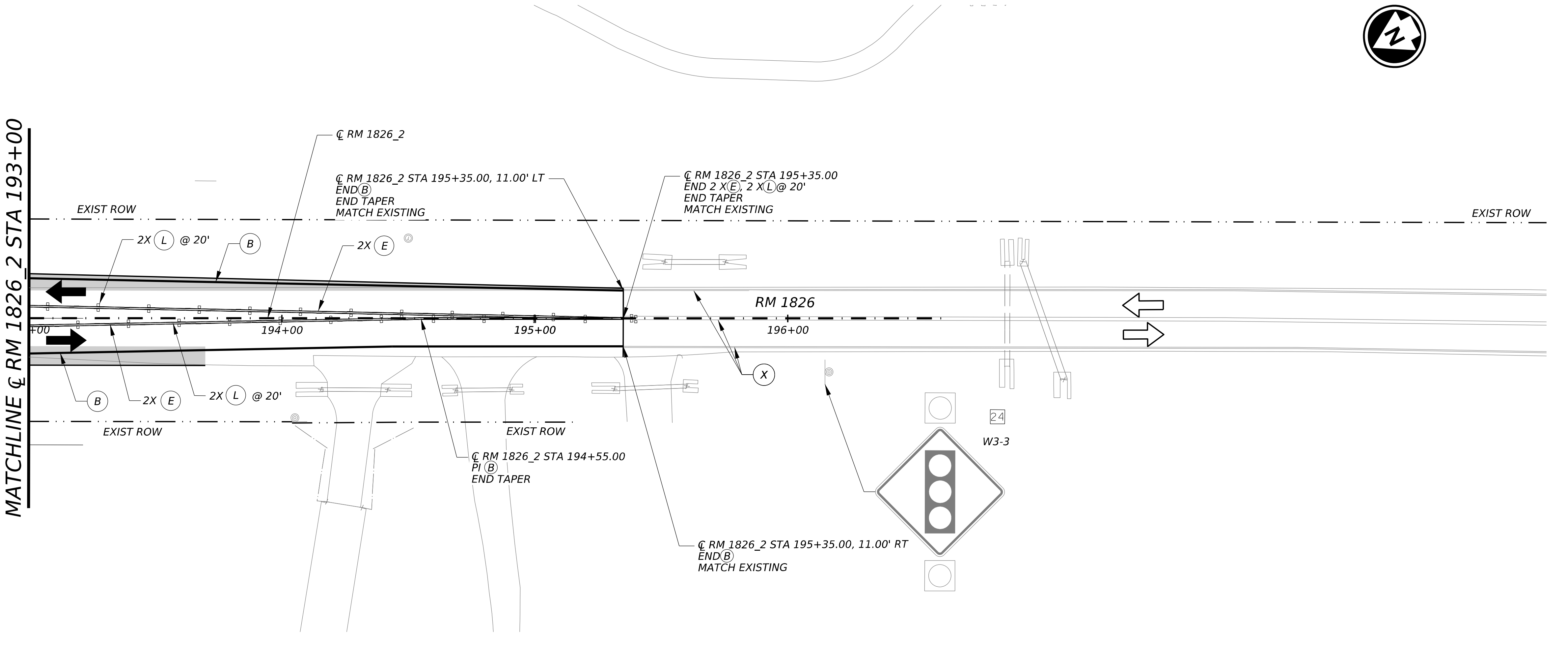


LEGEND	
Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
Ⓧ	REMOVE AND REPLACE EXISTING SIGN
◇	EXISTING SIGN TO BE REMOVED
☒	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'
HORZ. SCALE 1"=50'



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Alfredo Lopez

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FIRM REGISTRATION NO. 5713

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RM 1826

SIGNING AND PAVEMENT MARKING PLAN
ZYLE RD

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	161

DATE: 5/30/2023 12:51:08 PM
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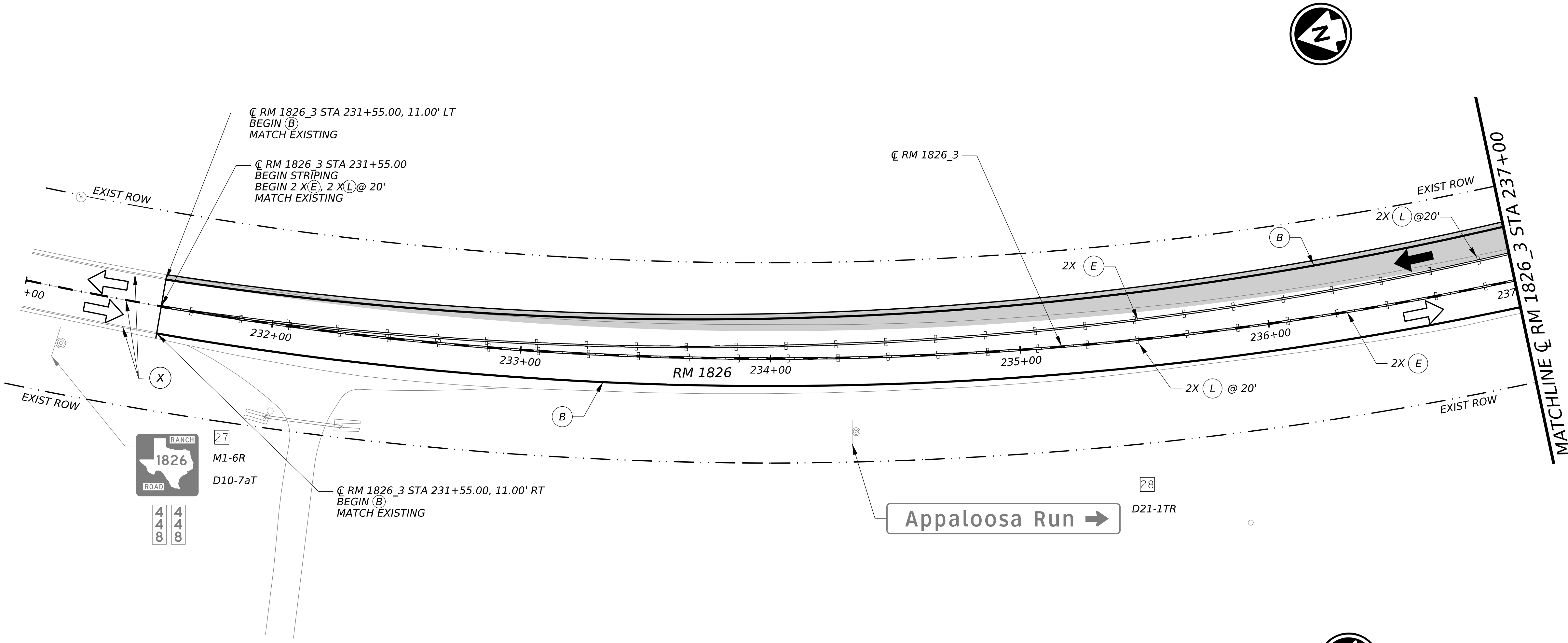

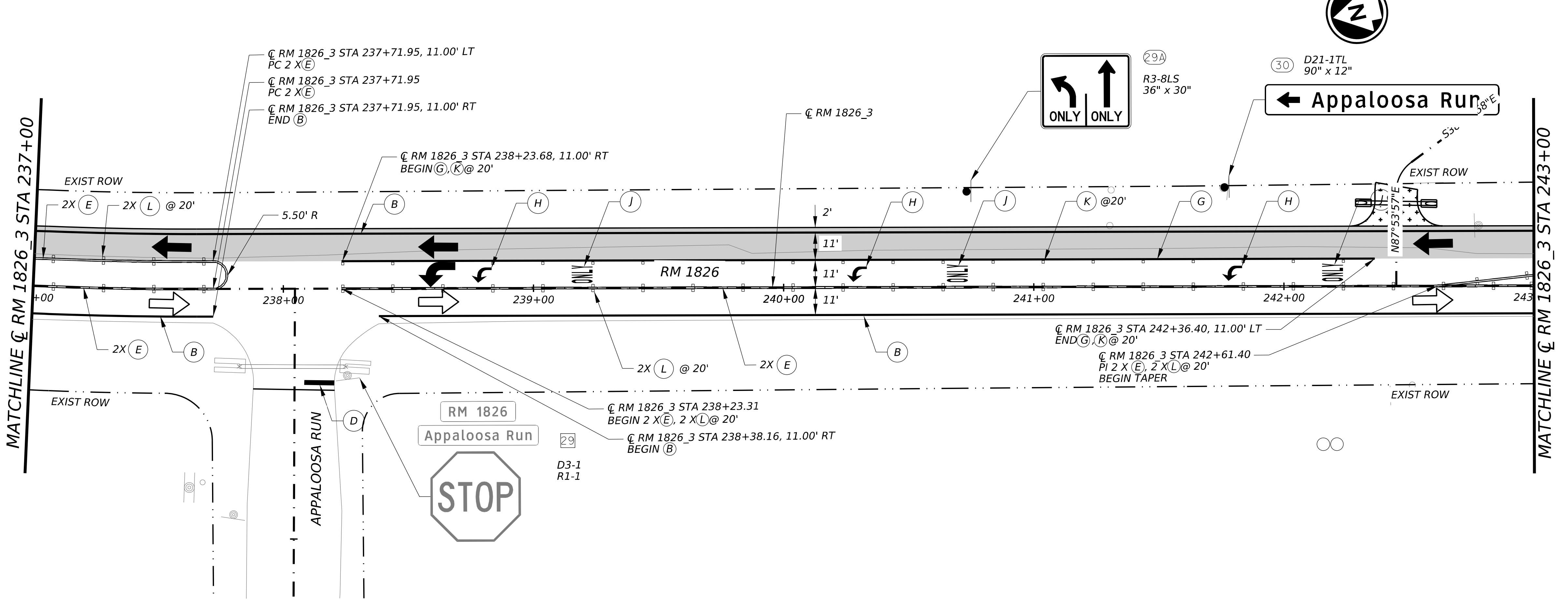

LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☐X	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
— ● ●	OBJECT MARKER
— ● ●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'

HORZ. SCALE 1"=50'

STATE OF TEXAS
ALFREDO L. LOPEZ
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Texas Department of Transportation

RM 1826

SIGNING AND PAVEMENT MARKING PLAN

APPALOOSA RUN

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	162

DATE: 5/30/2023 12:51:25 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08 Traffic/RM1826 SPM PL GV 05.dgn

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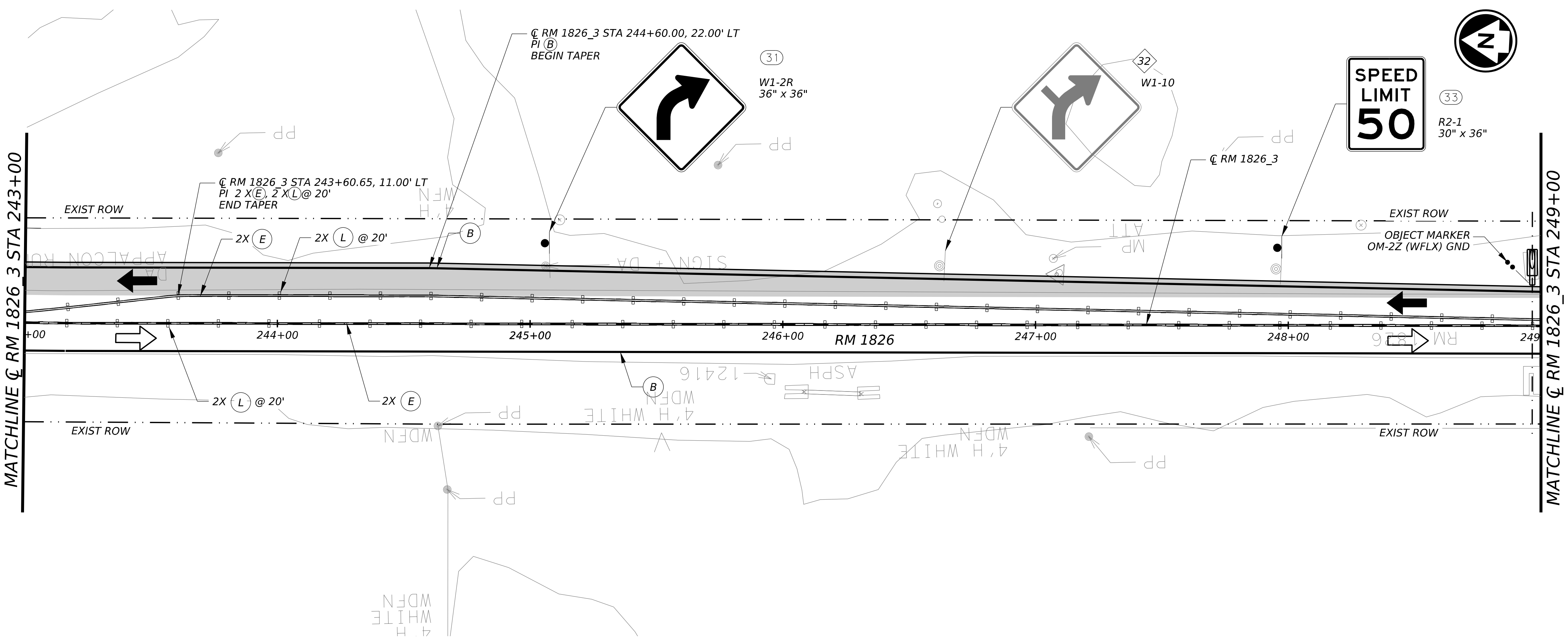
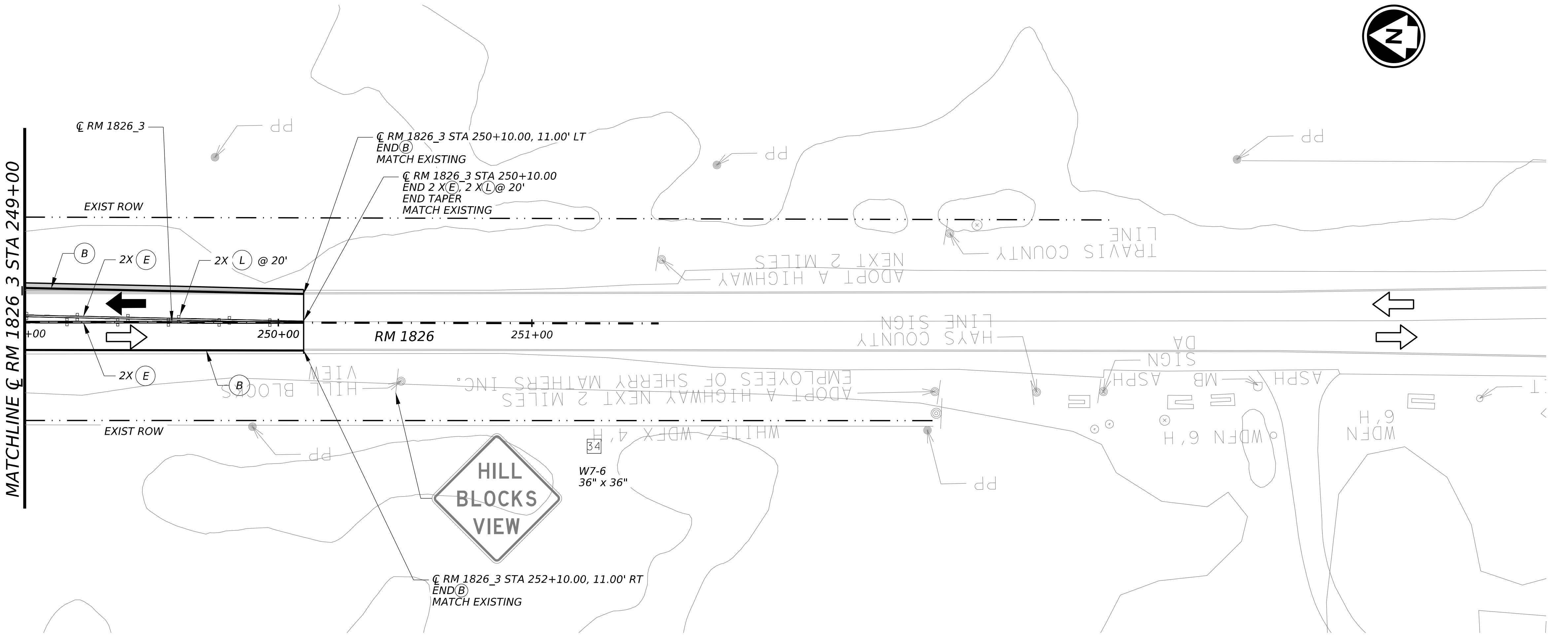


LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☒	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
— ● ●	OBJECT MARKER
— ● ●	EXISTING OBJECT MARKER
⊕	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

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ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023
Alfredo Lopez

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Texas Department of Transportation

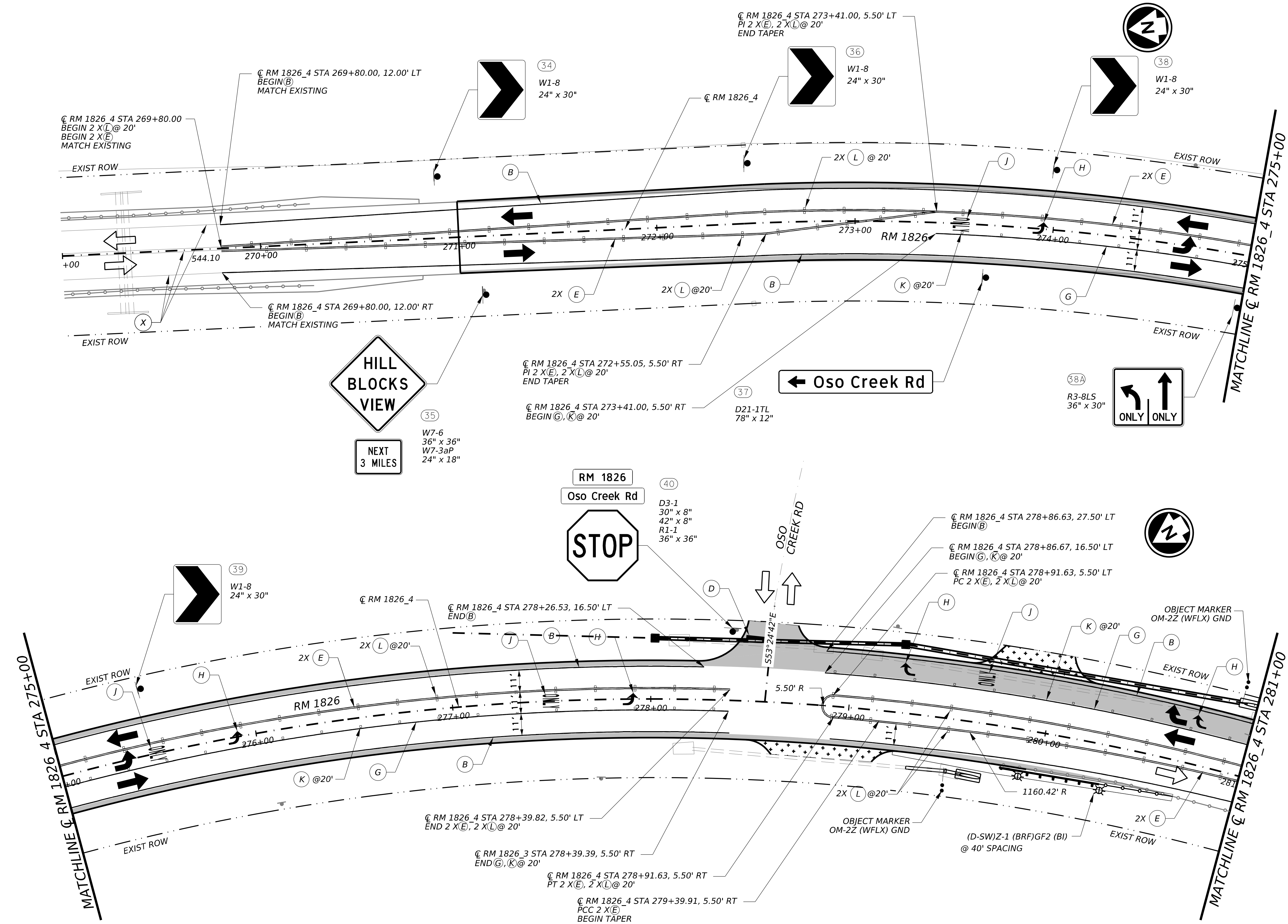
RM 1826

SIGNING AND PAVEMENT MARKING PLAN

APPALOOSA RUN

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	163



LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
ⓧ	EXISTING STRIPING
ⓧ	REMOVE AND REPLACE EXISTING SIGN
◇	EXISTING SIGN TO BE REMOVED
☒	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
—••	OBJECT MARKER
—••	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'
HORZ. SCALE 1"=50'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
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5/30/2023
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RM 1826

SIGNING AND PAVEMENT MARKING PLAN
OSO CREEK RD

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	164

DATE: 5/30/2023 12:52:04 PM
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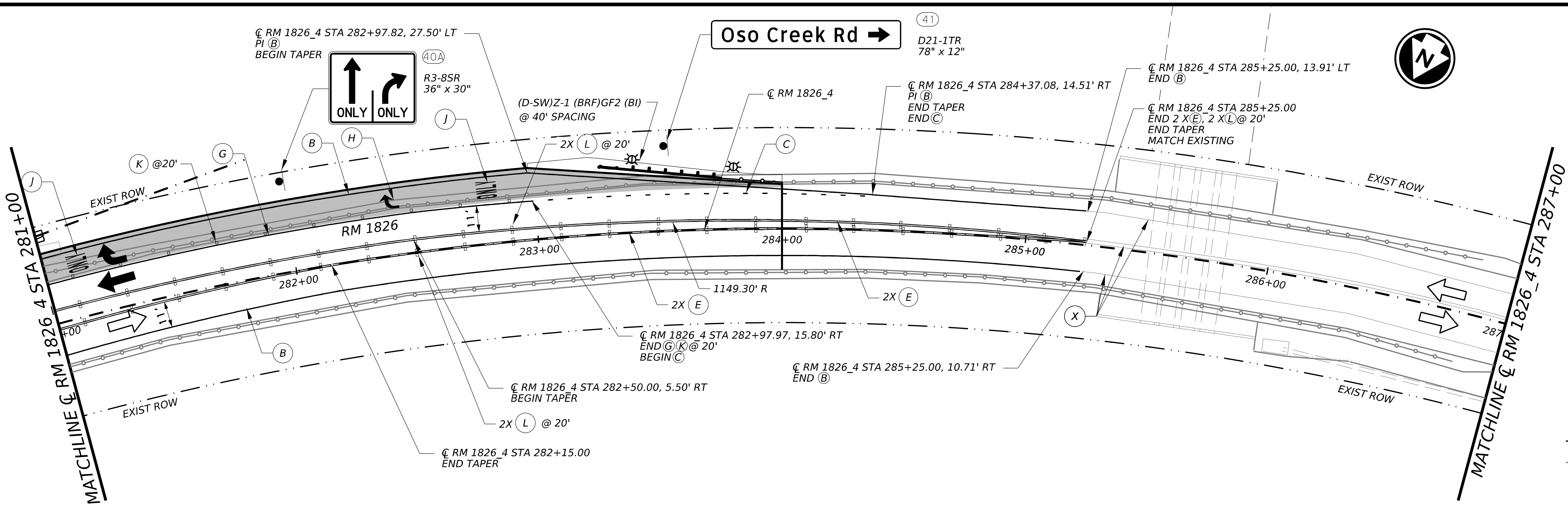
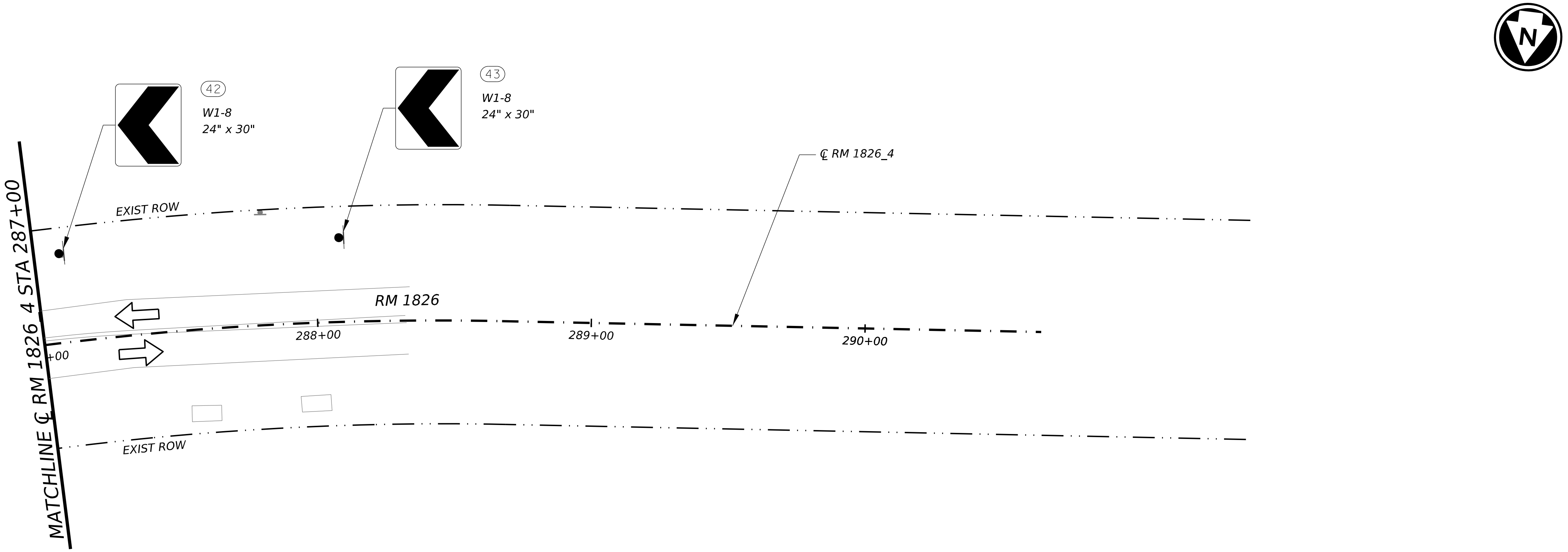


LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
⬭X	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☐X	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
⌘	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023

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Texas Department of Transportation

RM 1826

SIGNING AND PAVEMENT
MARKING PLAN
OSO CREEK RD

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	165

DATE: 5/30/2023 12:52:22 PM
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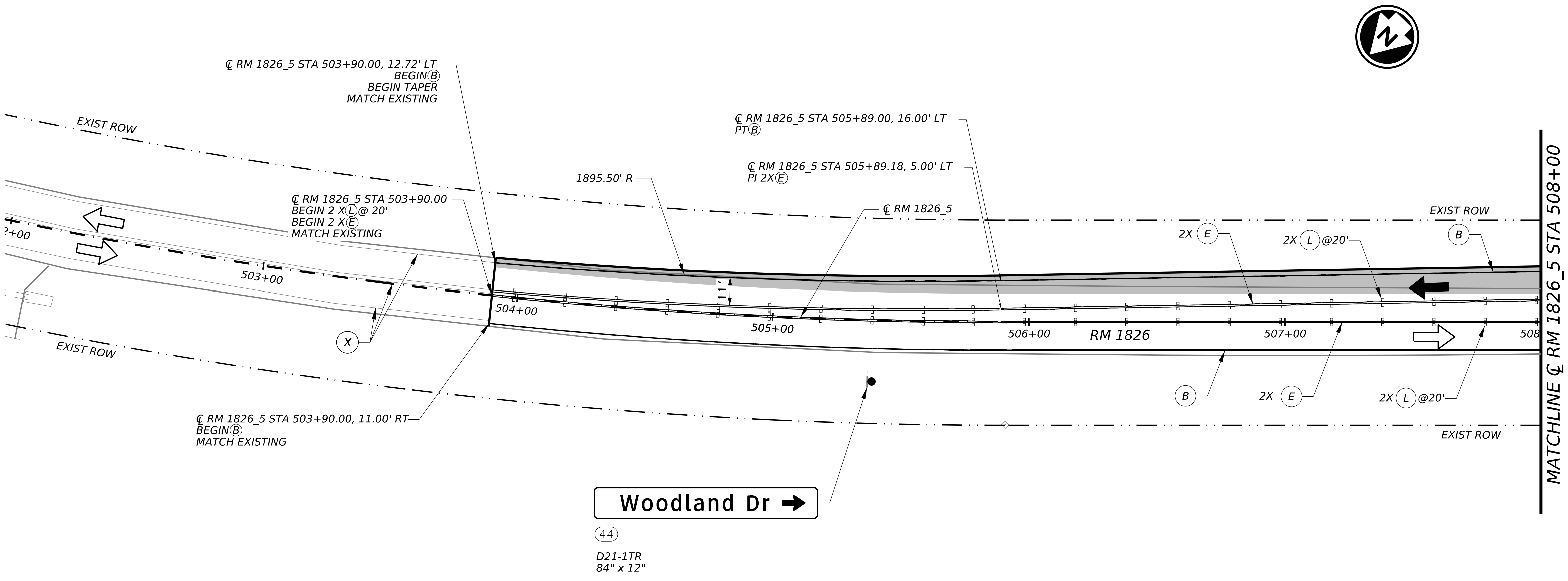

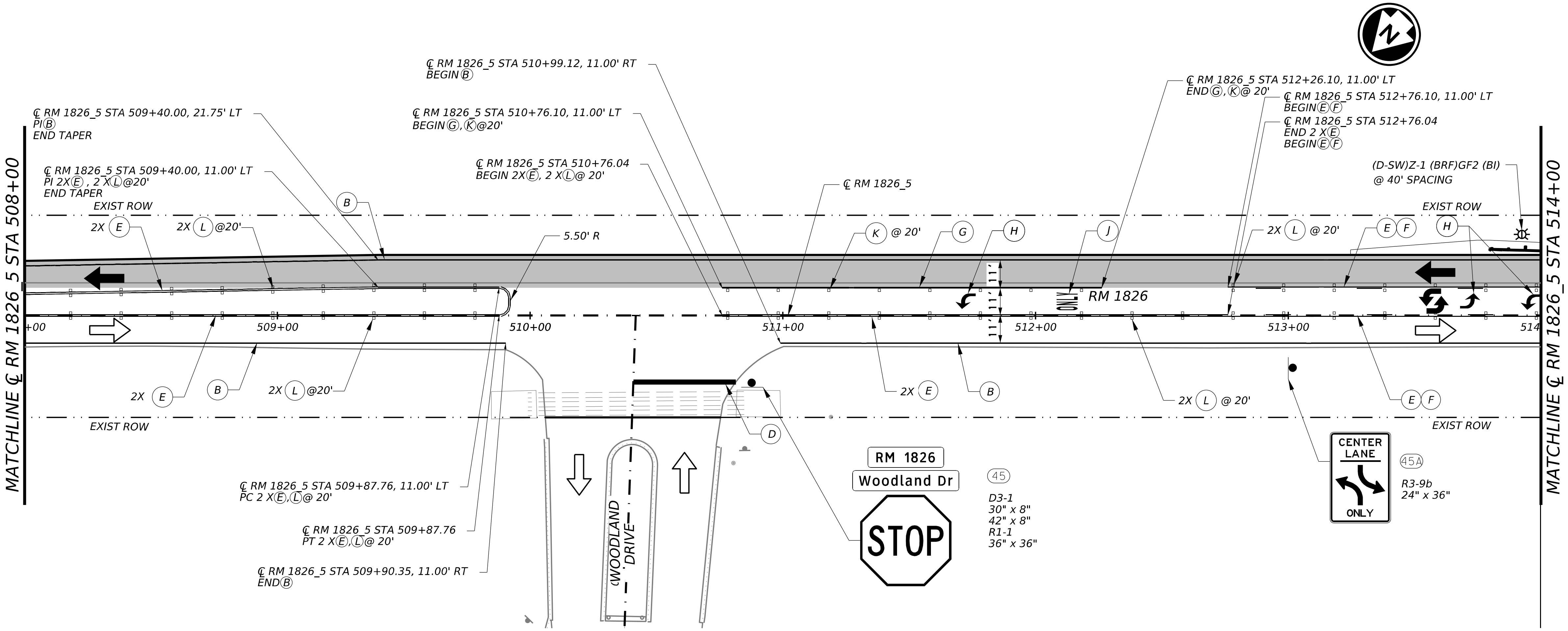

LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
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☒	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
— ● ●	OBJECT MARKER
— ● ●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

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RM 1826

SIGNING AND PAVEMENT
MARKING PLAN
WOODLAND / TOWERING CEDAR

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	166

DATE: 5/30/2023 12:52:39 PM
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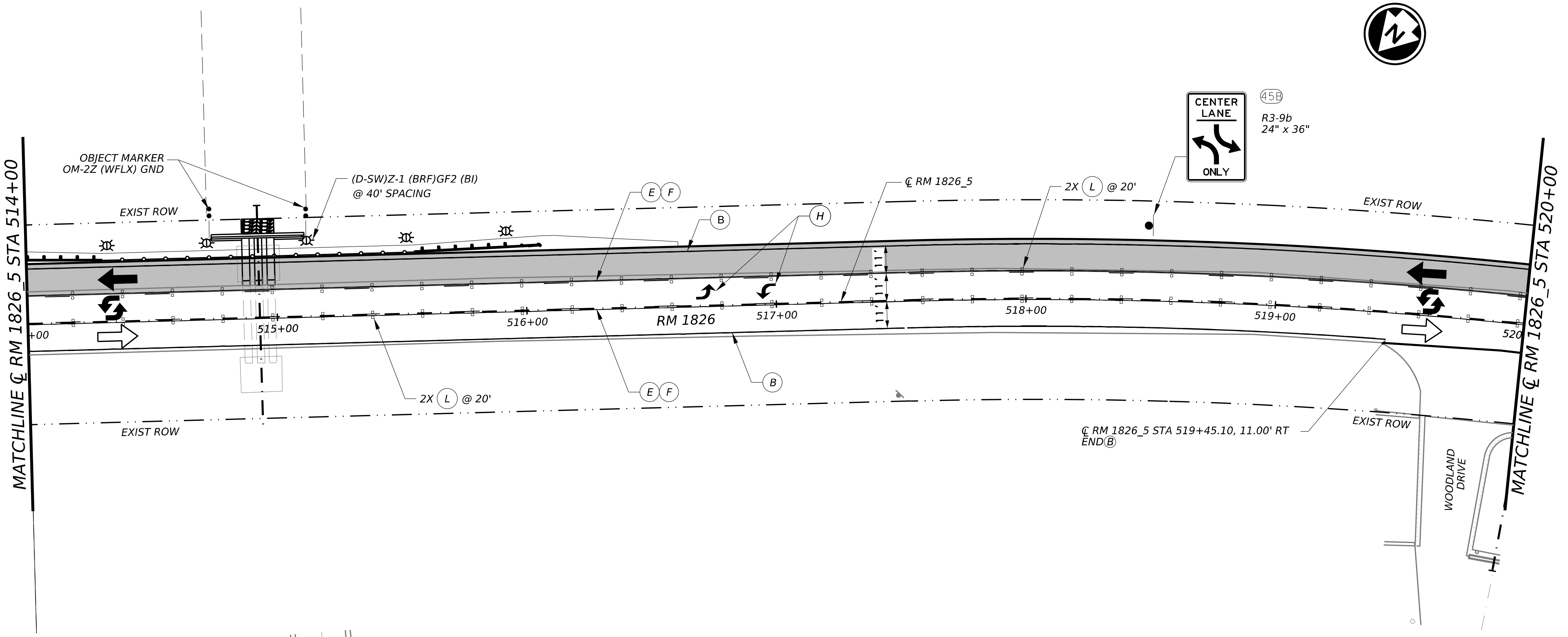

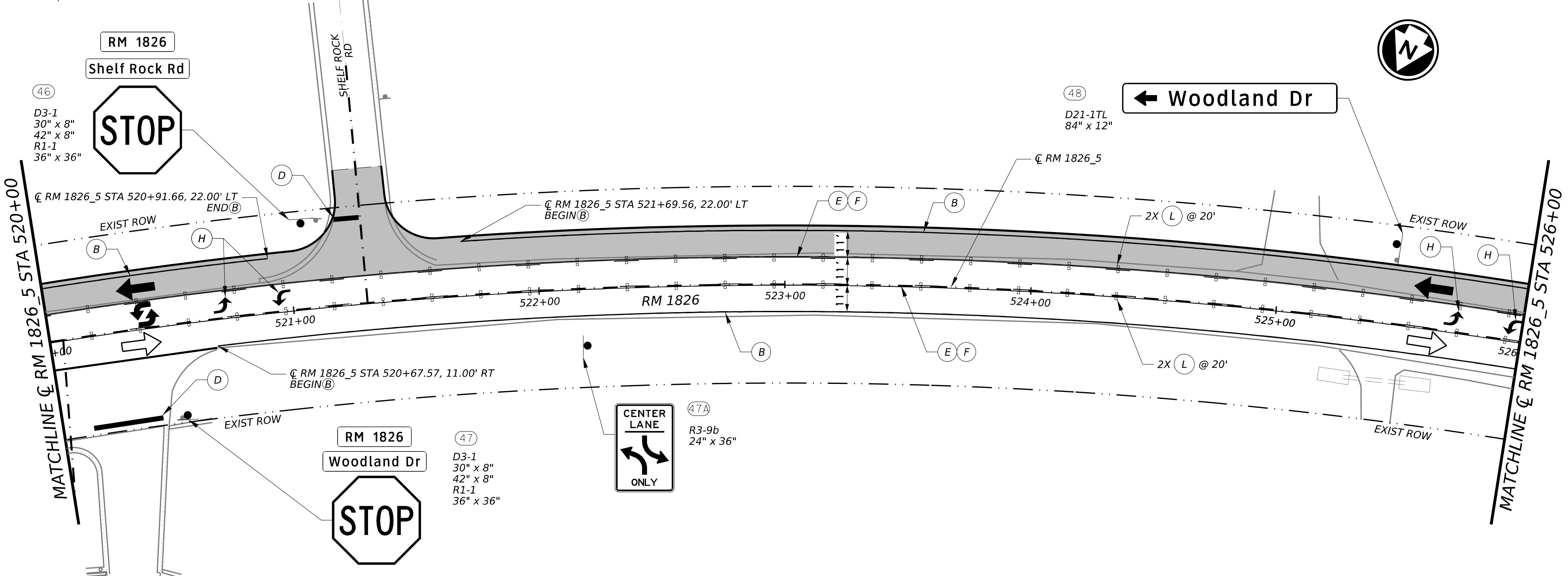

LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
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Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
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Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
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⬠X	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
✲	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'
HORZ. SCALE 1"=50'

STATE OF TEXAS
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5/30/2023
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Texas Department of Transportation

RM 1826

SIGNING AND PAVEMENT MARKING PLAN
WOODLAND / TOWERING CEDAR

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	167

DATE: 5/30/2023 12:52:56 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08 Traffic/RM1826_SPM_PL_GV 10.dgn

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CK:
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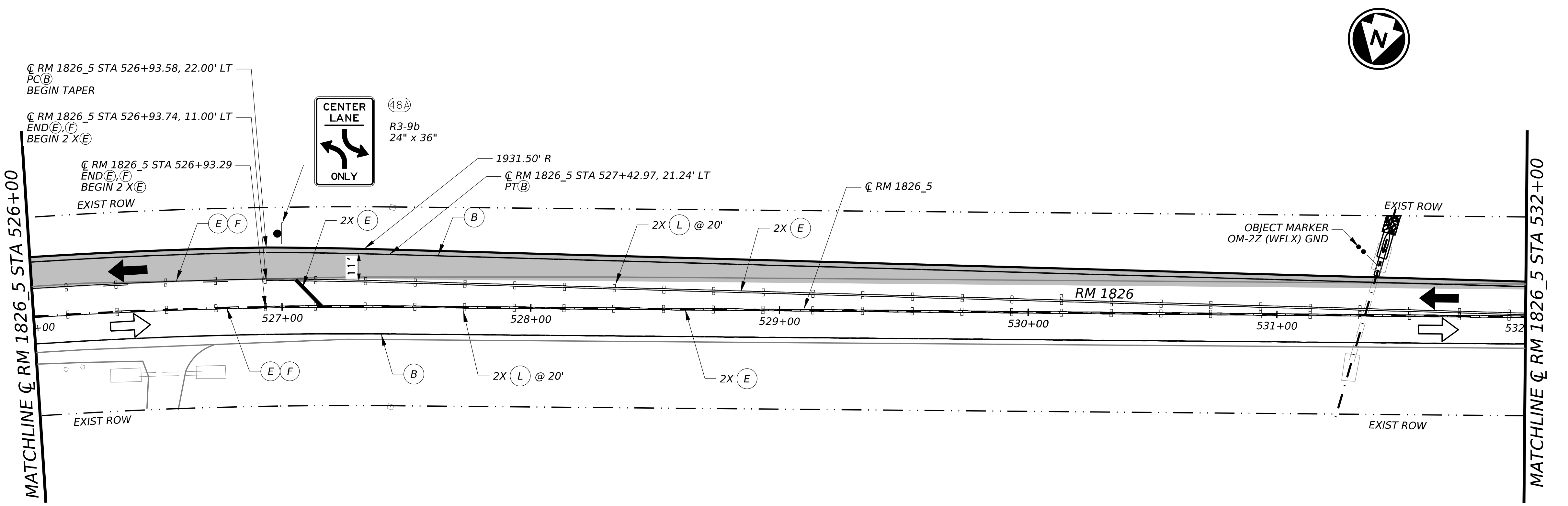
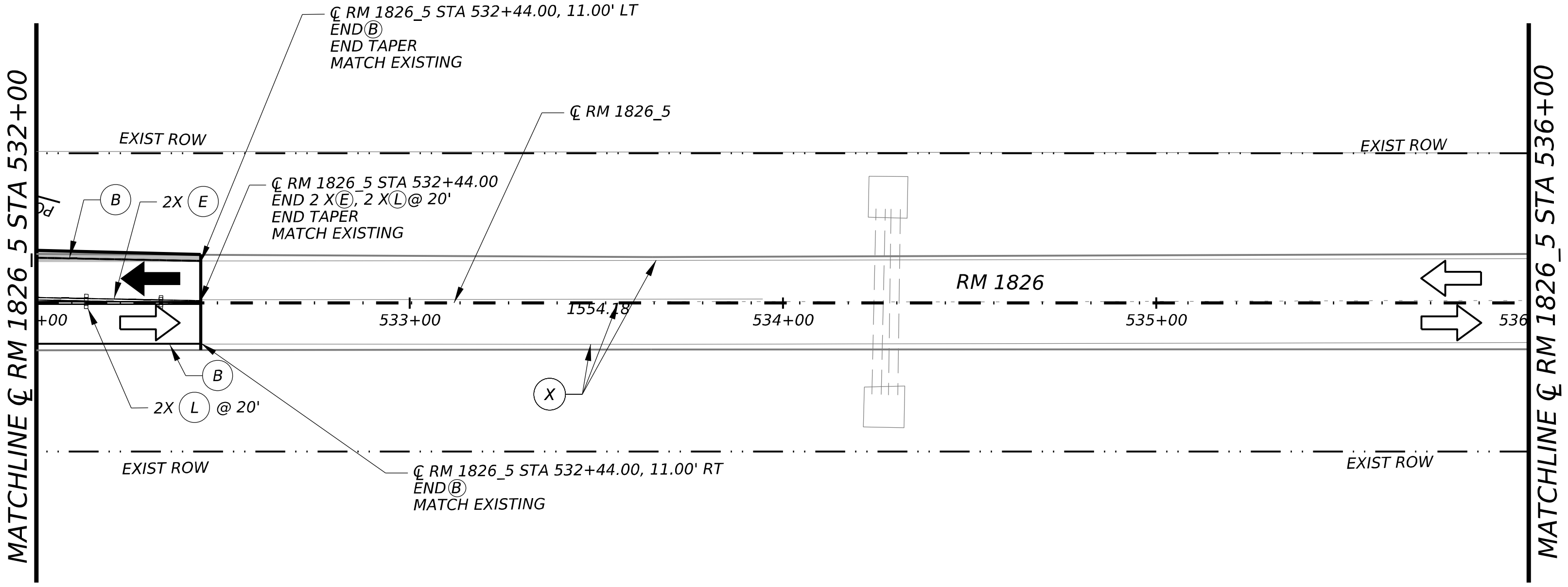


LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
ⓧ	EXISTING STRIPING
ⓧ	REMOVE AND REPLACE EXISTING SIGN
◇	EXISTING SIGN TO BE REMOVED
☐	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
✲	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN

25' 0 25' 50'
HORZ. SCALE 1"=50'



STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023
Alfredo Lopez

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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

SIGNING AND PAVEMENT MARKING PLAN

WOODLAND / TOWERING CEDAR

SHEET 3 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	168

DATE: 5/30/2023 12:53:14 PM
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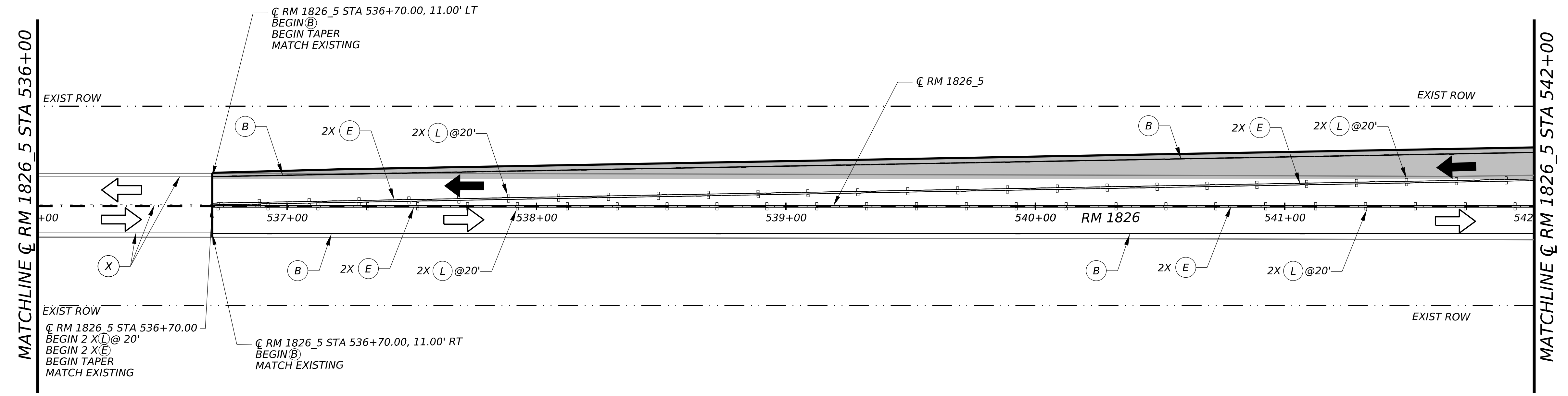
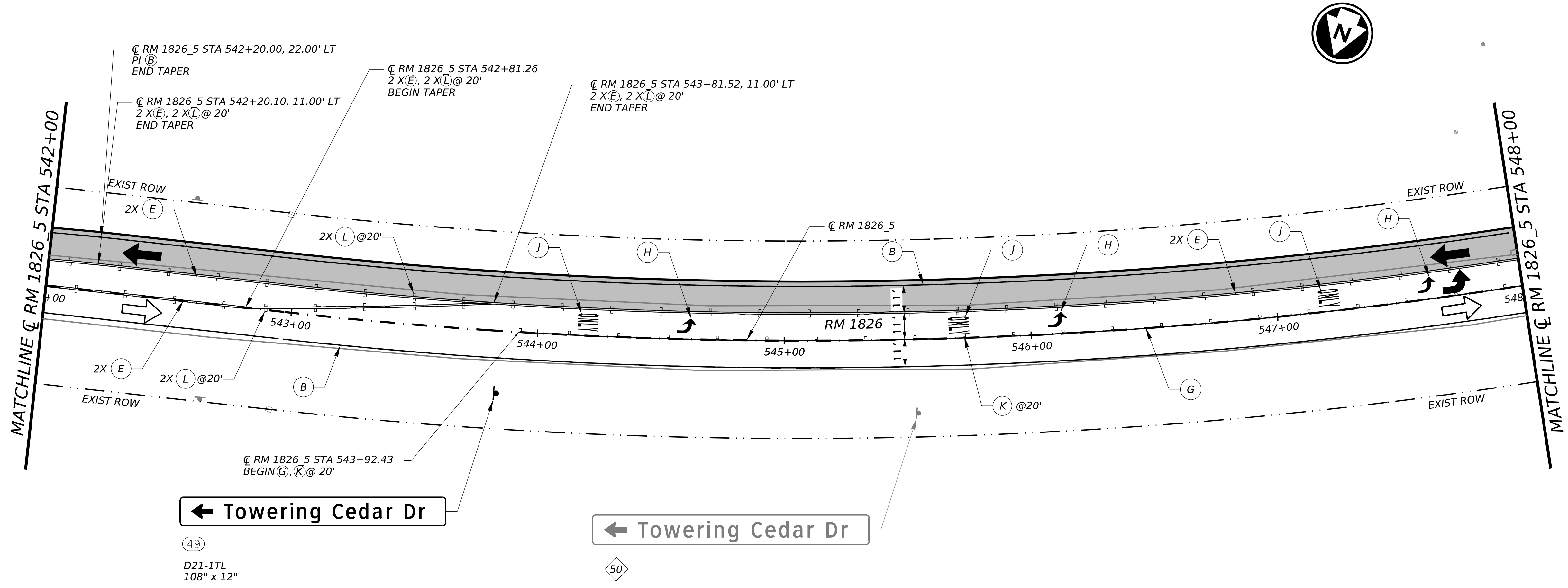


LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
Ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇X	EXISTING SIGN TO BE REMOVED
☐X	EXISTING SIGN TO REMAIN
⬠X	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
⊕	DELINEATOR ASSEMBLY
●	EXISTING SIGN
●	PROPOSED SIGN



25' 0 25' 50'
HORZ. SCALE 1"=50'

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Alfred Lopez

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RM 1826

SIGNING AND PAVEMENT MARKING PLAN
WOODLAND / TOWERING CEDAR

SHEET 4 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	169

DATE: 5/30/2023 12:53:31 PM
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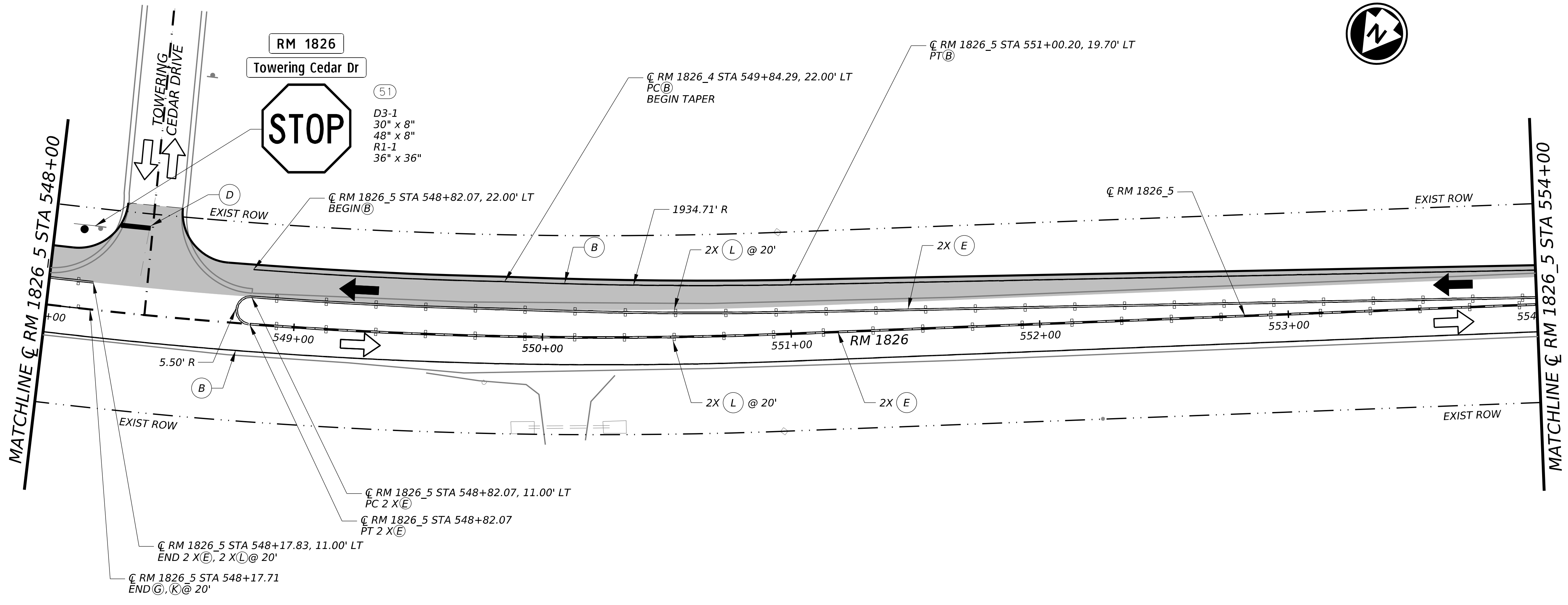
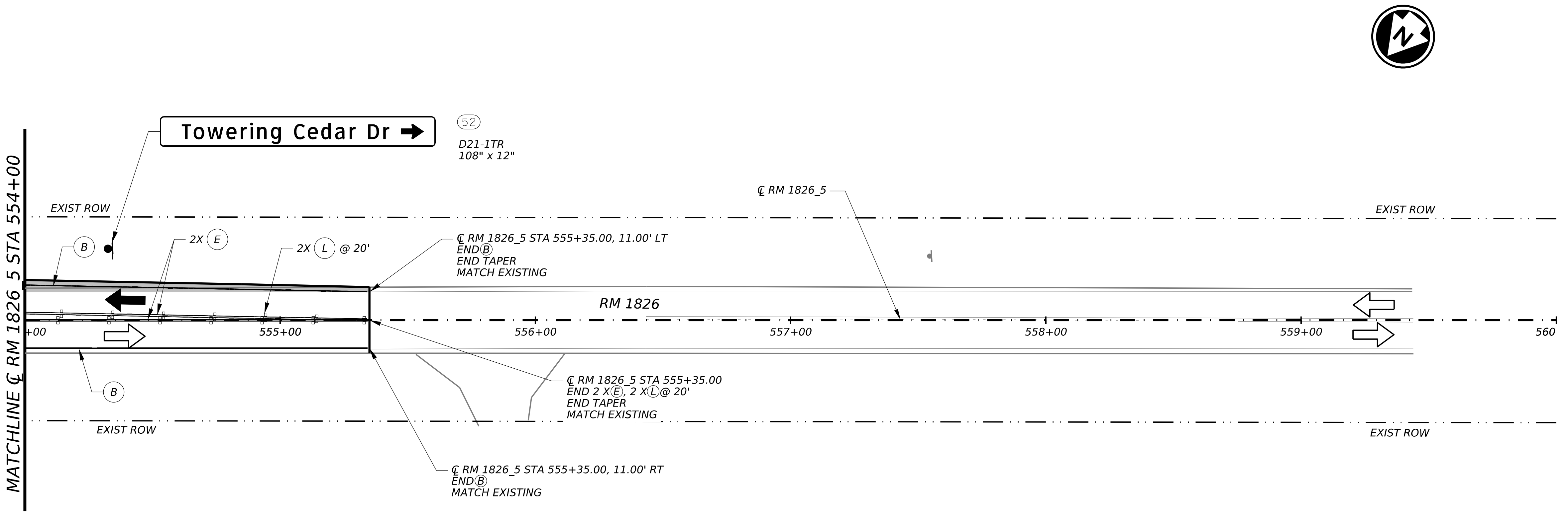
CK:
DW:
CK:
DN:





LEGEND

Ⓐ	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)
Ⓑ	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)
Ⓒ	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)
Ⓓ	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
Ⓔ	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)
Ⓕ	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)
Ⓖ	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
Ⓗ	REFL PAV MRK TY I (W)(ARROW)(100 MIL)
Ⓘ	REFL PAV MRK TY I (W)(LNDP ARROW)(100 MIL)
Ⓙ	REF PAV MRK TY I (W)(WORD)(100 MIL)
Ⓚ	REFL PAV MRK TY I-C
Ⓛ	REFL PAV MRK TY II-A-A
Ⓞ	REFL PAV MRK TY I (Y) 12" (SLD) (100 MIL)
Ⓟ	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)
ⓧ	EXISTING STRIPING
(X)	REMOVE AND REPLACE EXISTING SIGN
◇	EXISTING SIGN TO BE REMOVED
☒	EXISTING SIGN TO REMAIN
⬠	PROPOSED SMALL SIGN
—●●	OBJECT MARKER
—●●	EXISTING OBJECT MARKER
☼	DELINEATOR ASSEMBLY
●	EXISTING SIGN
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25' 0 25' 50'

HORZ. SCALE 1"=50'

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RM 1826

SIGNING AND PAVEMENT
MARKING PLAN
WOODLAND / TOWERING CEDAR

SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	170

DATE: 5/30/2023 12:53:48 PM
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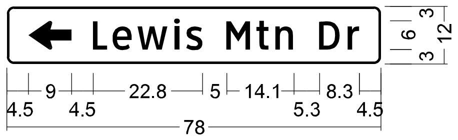
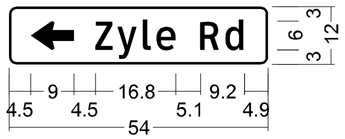


D21-1TL_78x12;
1.5" Radius, 0.5" Border, White on Green;
Standard Arrow Custom 9.0" X 6.0" 180°;
"Lewis Mtn Dr", ClearviewHwy-3-W;



D21-1TL_54x12;
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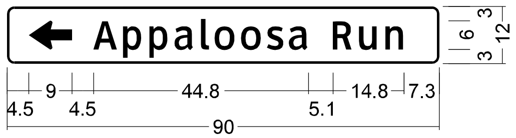
Standard Arrow Custom 9.0" X 6.0" 180°;
"Zyle Rd", ClearviewHwy-3-W;



D21-1TL_90x12;
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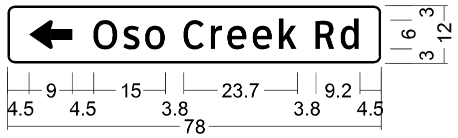
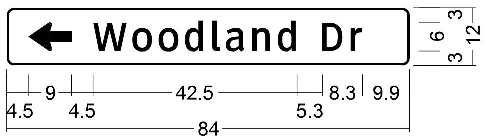
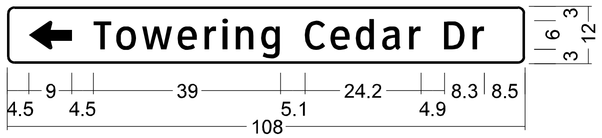
Standard Arrow Custom 9.0" X 6.0" 180°;
"Appaloosa Run", ClearviewHwy-3-W;



D21-1TL_78x12;
1.5" Radius, 0.5" Border, White on Green;
Standard Arrow Custom 9.0" X 6.0" 180°;
"Oso", ClearviewHwy-3-W;
"Creek", ClearviewHwy-3-W;
"Rd", ClearviewHwy-3-W;



D21-1TL_84x12;
1.5" Radius, 0.5" Border, White on Green;
Standard Arrow Custom 9.0" X 6.0" 180°;
"Woodland", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;



D21-1TL_108x12;
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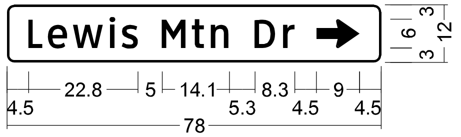
Standard Arrow Custom 9.0" X 6.0" 180°;
"Towering Cedar Dr", ClearviewHwy-3-W;



D21-1TR_78x12;
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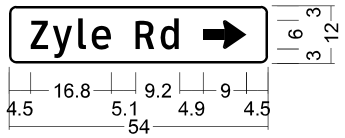
"Lewis Mtn Dr", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.0" 0°;



D21-1TR_54x12;
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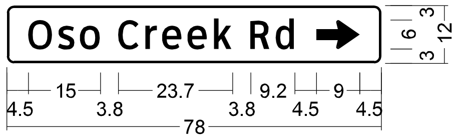
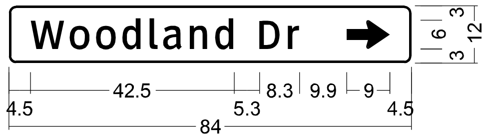
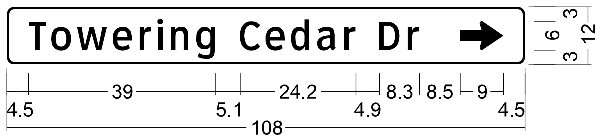
"Zyle Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.0" 0°;



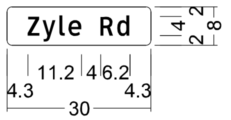
D21-1TR_78x12;
1.5" Radius, 0.5" Border, White on Green;
"Oso", ClearviewHwy-3-W;
"Creek", ClearviewHwy-3-W;
"Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.0" 0°;



D21-1TR_84x12;
1.5" Radius, 0.5" Border, White on Green;
"Woodland", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.0" 0°;



D21-1TR_108x12;
1.5" Radius, 0.5" Border, White on Green;
"Towering Cedar Dr", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.0" 0°;



D3-1_30x8;
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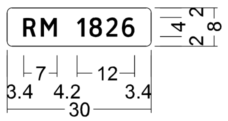
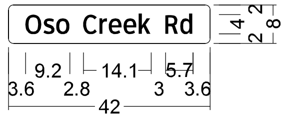
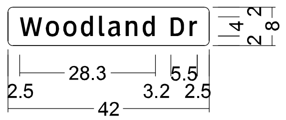
"Zyle", ClearviewHwy-3-W;
"Rd", ClearviewHwy-3-W;



D3-1_30x8;
1.0" Radius, 0.0" Border, White on Green;
"RM", ClearviewHwy-3-W;
"1826", ClearviewHwy-3-W;



D3-1_42x8;
1.0" Radius, 0.0" Border, White on Green;
"Oso Creek", ClearviewHwy-3-W 50% spacing;
"Rd", ClearviewHwy-3-W 50% spacing;



D3-1_42x8;
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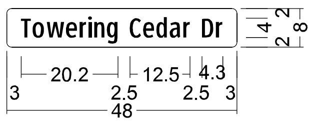
"Woodland", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;



D3-1_48x8;
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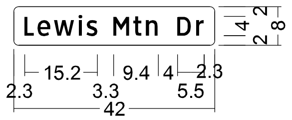
"Towering Cedar", ClearviewHwy-2-W 50% spacing;
"Dr", ClearviewHwy-2-W 50% spacing;



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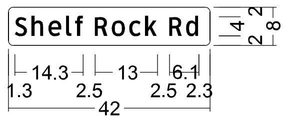
"Lewis Mtn", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;



D3-1_42x8;
1.0" Radius, 0.0" Border, White on Green;
"Shelf", ClearviewHwy-3-W;
"Rock", ClearviewHwy-3-W;
"Rd", ClearviewHwy-3-W;

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GARVER

Texas Department of Transportation

RM 1826

SMALL SIGN
DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	171

DATE: 5/30/2023 12:54:04 PM
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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)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	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	TY N TY S
1	1	D21-1TR	LEWIS MTN DR	78X12	X		10BWG	1	SA	T		
	1A	R3-8SR	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	3	W1-2R	CURVE	36X36	X		10BWG	1	SA	P		
		W13-1P	ADVISORY SPEED	18X18	X							
	4	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	RM 1826	30X8	X							
		D3-1	LEWIS MTN DR	42X8	X							
	5A	R3-8LS	LANE CONTROL	36X30	X		10BWG	1	SA	P		
2	6	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	T		
		W1-8R	CHEVRON	24X30	X							
	7	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	P		
		W1-8R	CHEVRON	24X30	X							
	8	D21-1TL	LEWIS MTN DR	78X12	X		10BWG	1	SA	P		
	9	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	P		
		W1-8R	CHEVRON	24X30	X							
	10	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	P		
		W1-8R	CHEVRON	24X30	X							
	12	W1-9T	ONE DIRECTION LARGE ARROW	96X36	X		S80	1	SA	U	WC	
	13	W1-2L	CURVE	36X36	X		10BWG	1	SA	P		
		W13-1P	ADVISORY SPEED	18X18	X							
3	18	D21-1TR	ZYLE RD	54X12	X		S80	1	SA	T		
	18A	R3-8LS	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	19	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	RM 1826	30X8	X							
		D3-1	ZYLE RD	30X8	X							
4	20	S3-1	SCHOOL BUS STOP AHEAD	36X36	X		10BWG	1	SA	P		
	20A	R3-8LS	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	22	D21-1TL	ZYLE RD	54X12	X		10BWG	1	SA	T		
	23	W8-15	WATCH FOR WATER ON ROAD	36X36	X		10BWG	1	SA	P		
5	29A	R3-8LS	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	30	D21-1TL	APPALOOSA RUN	90X12	X		10BWG	1	SA	T		
6	31	W1-2R	CURVE	36X36	X		10BWG	1	SA	P		
	33	R2-1	SPEED LIMIT	30X36	X		10BWG	1	SA	P		
7	34	W1-8R	CHEVRON	24X30	X		10BWG	1	SA	P		
	35	W7-6	HILL BLOCKS VIEW	36X36	X		10BWG	1	SA	P		
		W7-3aP	NEXT 3 MILES	24X18	X							
	36	W1-8R	CHEVRON	24X30	X		10BWG	1	SA	P		
	37	D21-1TL	OSO CREEK RD	78X12	X		10BWG	1	SA	T		
	38	W1-8R	CHEVRON	24X30	X		10BWG	1	SA	P		
	38A	R3-8LS	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	39	W1-8R	CHEVRON	24X30	X		10BWG	1	SA	P		
	40	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	RM 1826	30X8	X							
		D3-1	OSO CREEK RD	42X8	X							
8	40A	R3-8SR	LANE CONTROL	36X30	X		10BWG	1	SA	P		
	41	D21-1TR	OSO CREEK RD	78X12	X		10BWG	1	SA	T		
	42	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	P		
	43	W1-8L	CHEVRON	24X30	X		10BWG	1	SA	P		
9	44	D21-1TR	WOODLAND DR	84X12	X		10BWG	1	SA	T		
	45	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	RM 1826	30X8	X							
		D3-1	WOODLAND DR	42X8	X							
	45A	R3-9b	TWO-WAY LEFT TURN ONLY	24X36	X		10BWG	1	SA	P		
	45B	R3-9b	TWO-WAY LEFT TURN ONLY	24X36	X		10BWG	1	SA	P		
10	46	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	SHELF ROCK RD	42X8	X							
		D3-1	RM 1826	30X8	X							
	47	R1-1	STOP	36X36	X		10BWG	1	SA	P		
		D3-1	RM 1826	30X8	X							
		D3-1	WOODLAND DR	42X8	X							

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

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 4-16 8-16		0914	33	097, ETC.	RM 1826
		DIST	COUNTY		SHEET NO.
		AUS	TRAVIS & HAYS		172

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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)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	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	TY N TY S
	47A	R3-9b	TWO-WAY LEFT TURN ONLY	24X36	X		10BWG	1	SA	P		
	48	D21-1TL	WOODLAND DR	84X12	X		10BWG	1	SA	T		
11	48A	R3-9b	TWO-WAY LEFT TURN ONLY	24X36	X		10BWG	1	SA	P		
12	49	D21-1TL	TOWERING CEDAR DR	108X12	X		10BWG	1	SA	T	2EXT	
13	51	R1-1	STOP	36X36	X		10BWG	1	SA	T		
		D3-1	TOWERING CEDAR DR	48X8	X							
		D3-1	RM 1826	30X8	X							
	52	D21-1TR	TOWERING CEDAR DR	108X12	X		10BWG	1	SA	T	2EXT	

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).

DATE: 5/30/2023 12:54:34 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08 Traffic/RM1826 SPM SOSS GV 02

Texas Department of Transportation

Traffic Operations Division Standard

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		0914	33	097, ETC.	RM 1826
4-16 8-16		DIST	COUNTY		SHEET NO.
		AUS	TRAVIS & HAYS		173

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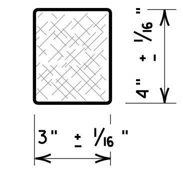
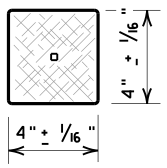
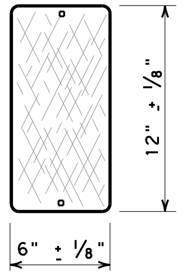
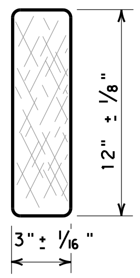
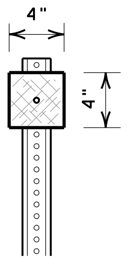
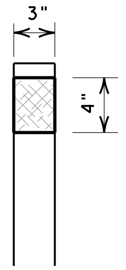
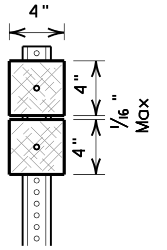
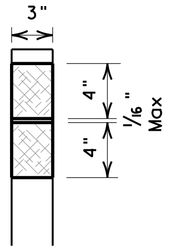
DATE: 5/30/2023 12:54:53 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08_Traffic/Standards/doml-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	 1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

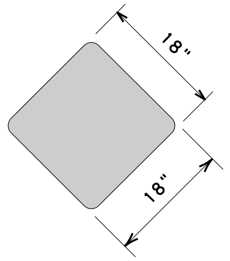
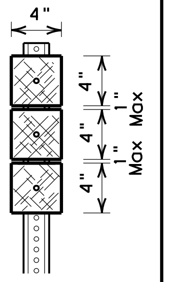
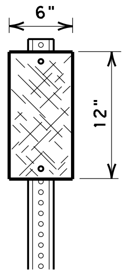
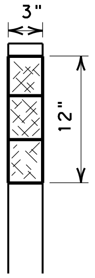
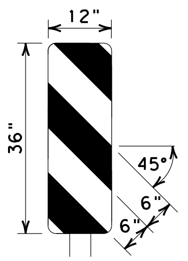
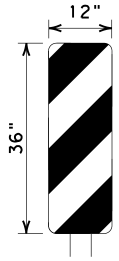
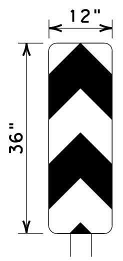
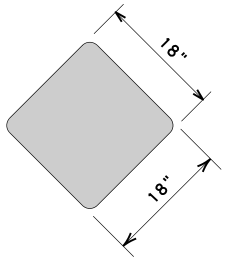
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

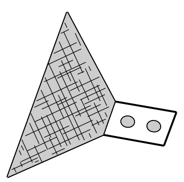
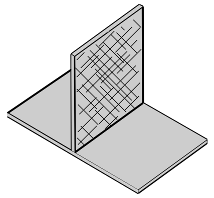
DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

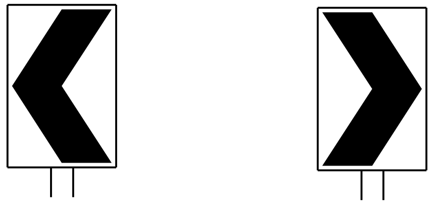
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		 3-Size 2 reflector units	 1-Size 3 reflector unit	 3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

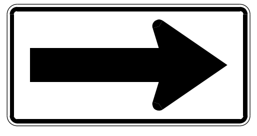
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE

1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).

2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT		CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB		HIGHWAY
REVISIONS 10-09 3-15 4-10 7-20	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			174

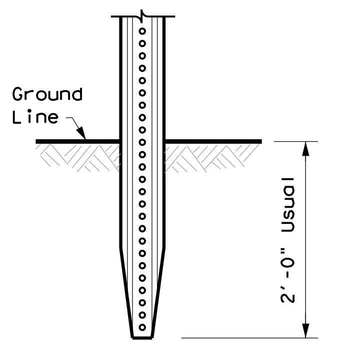
20A

DATE: 5/30/2023 12:55:07 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08_Traffic/Standards/dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

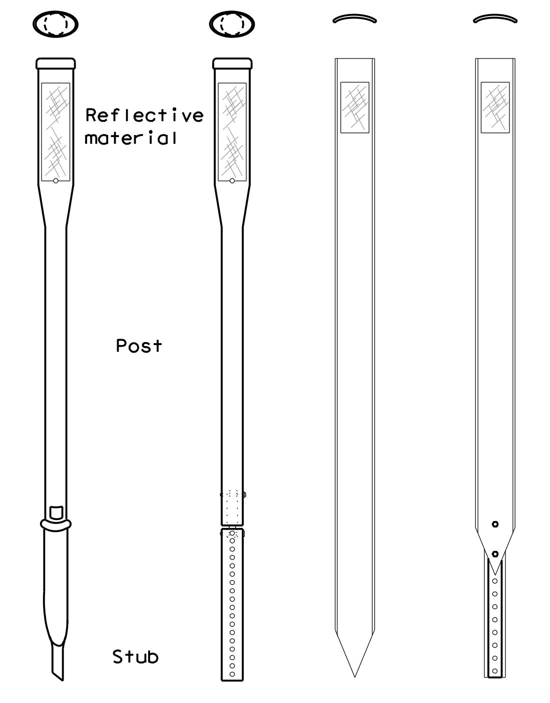


NOTES

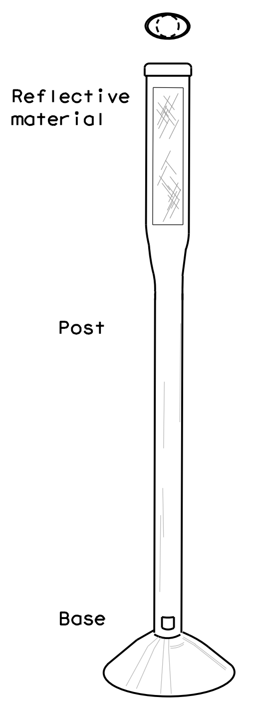
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



EMBEDDED

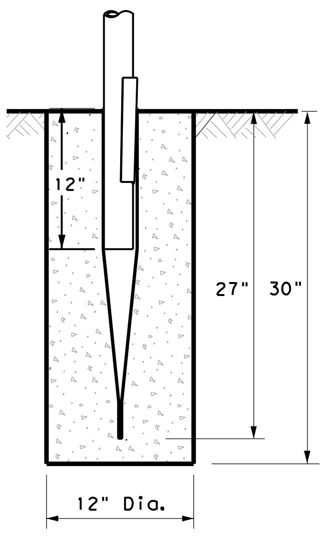
SURFACE MOUNT

NOTES

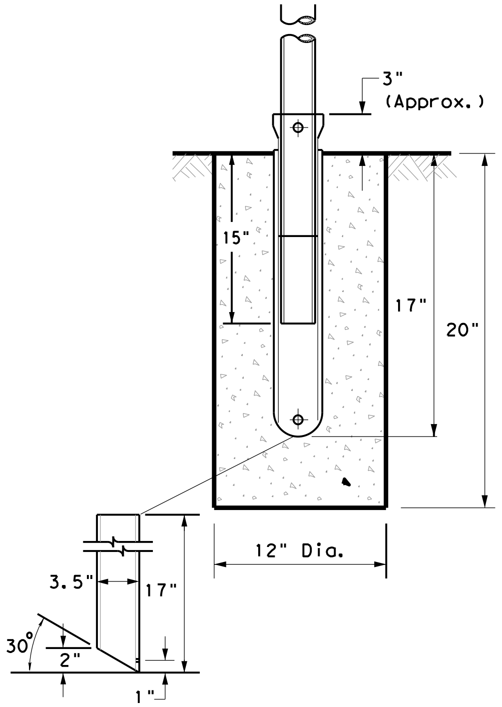
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL

PLASTIC

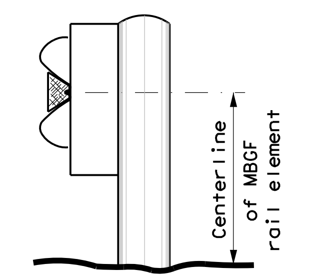
NOTE

1. Install per manufacturer's recommendations.

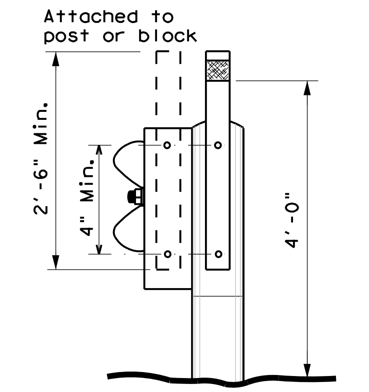
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

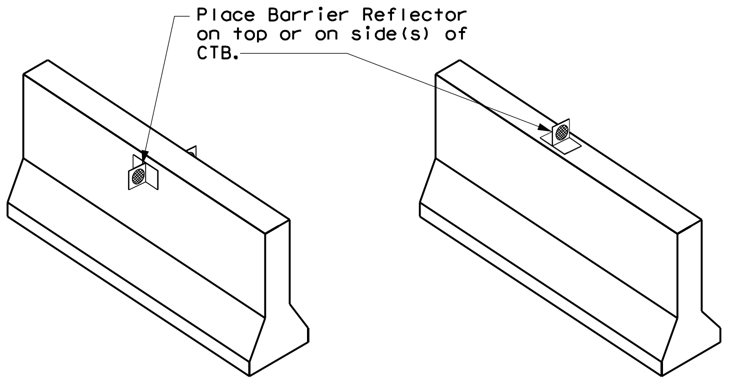
GF1



GF2



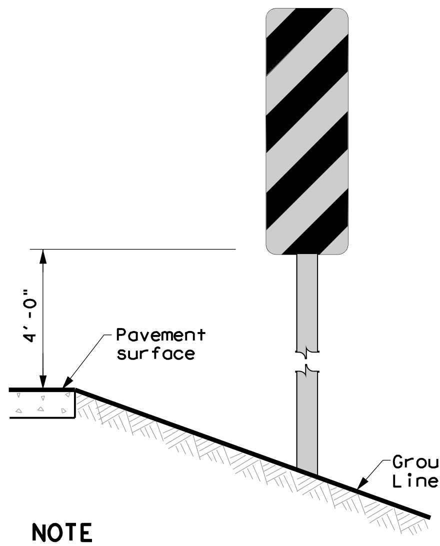
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

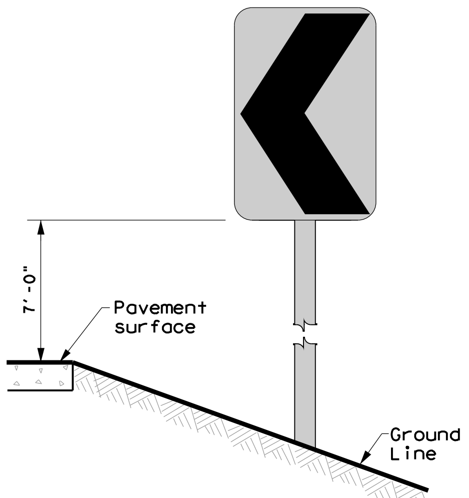
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

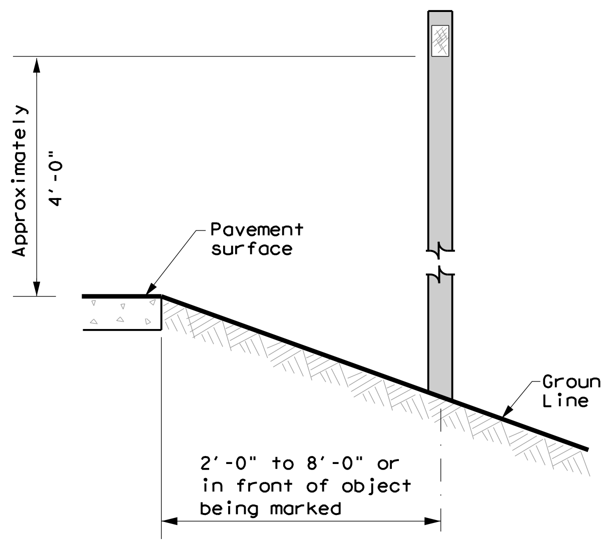
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0914	33	097, ETC.	RM 1826	
10-09 3-15 4-10 7-20	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		175	

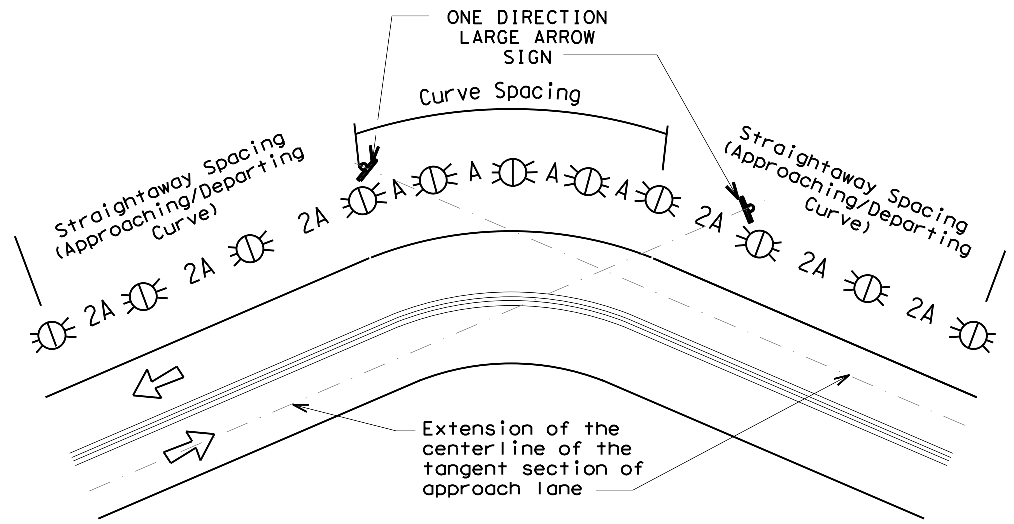
20B

DATE: 5/30/2023 12:55:24 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08_Traffic/Standards/dom3-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

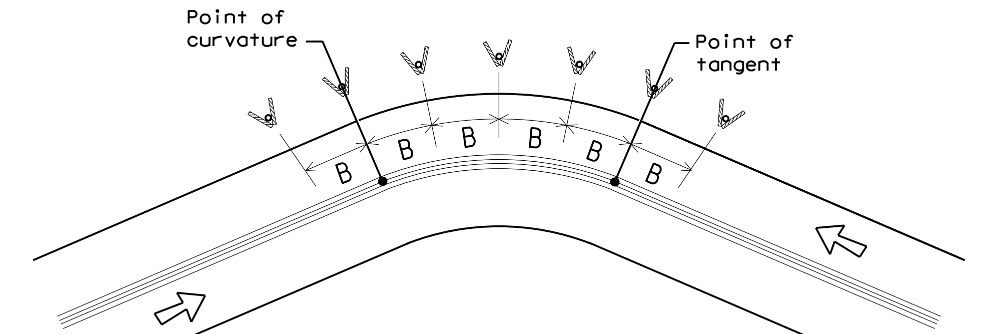
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

⊛	Bi-directional Delineator
⊤	Delineator
▲	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS 3-15 8-15 8-15 7-20	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		176	

20C

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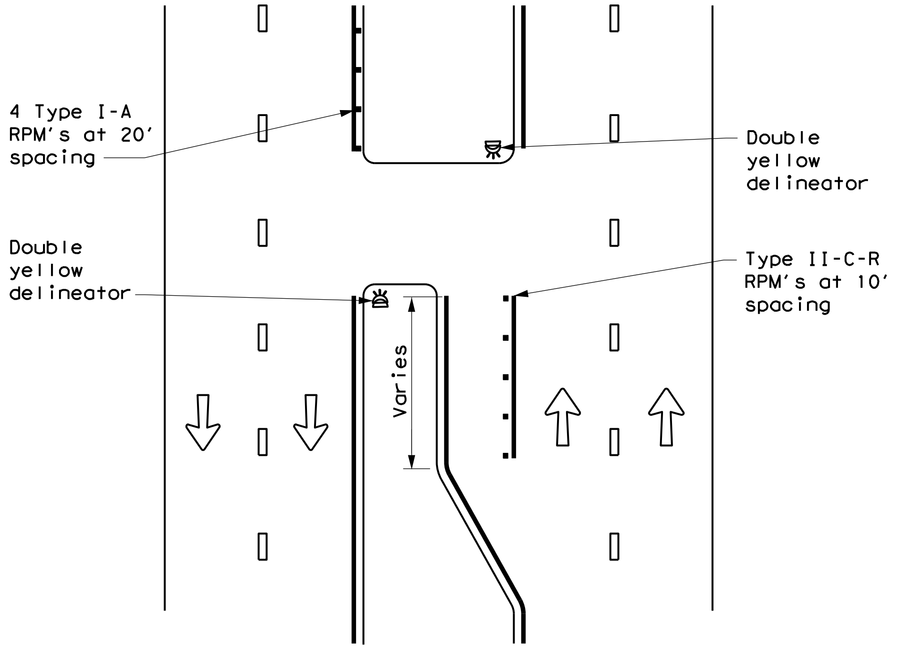
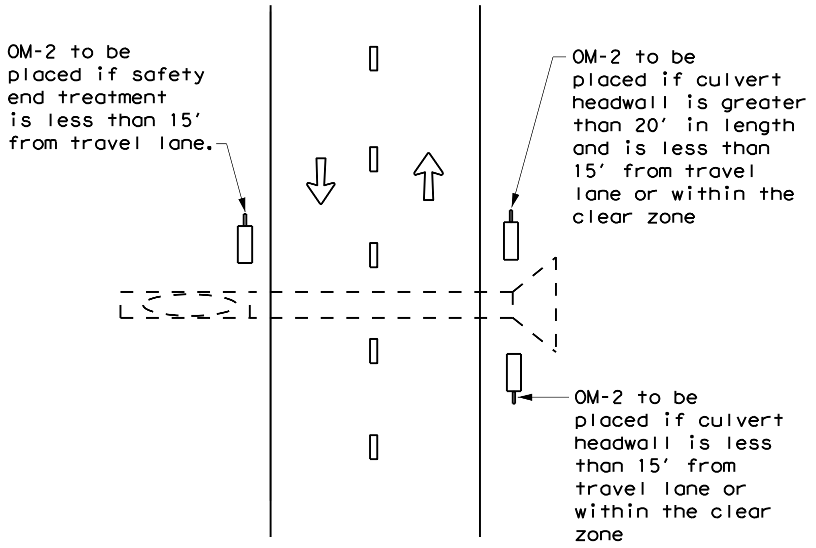
CROSSOVERS



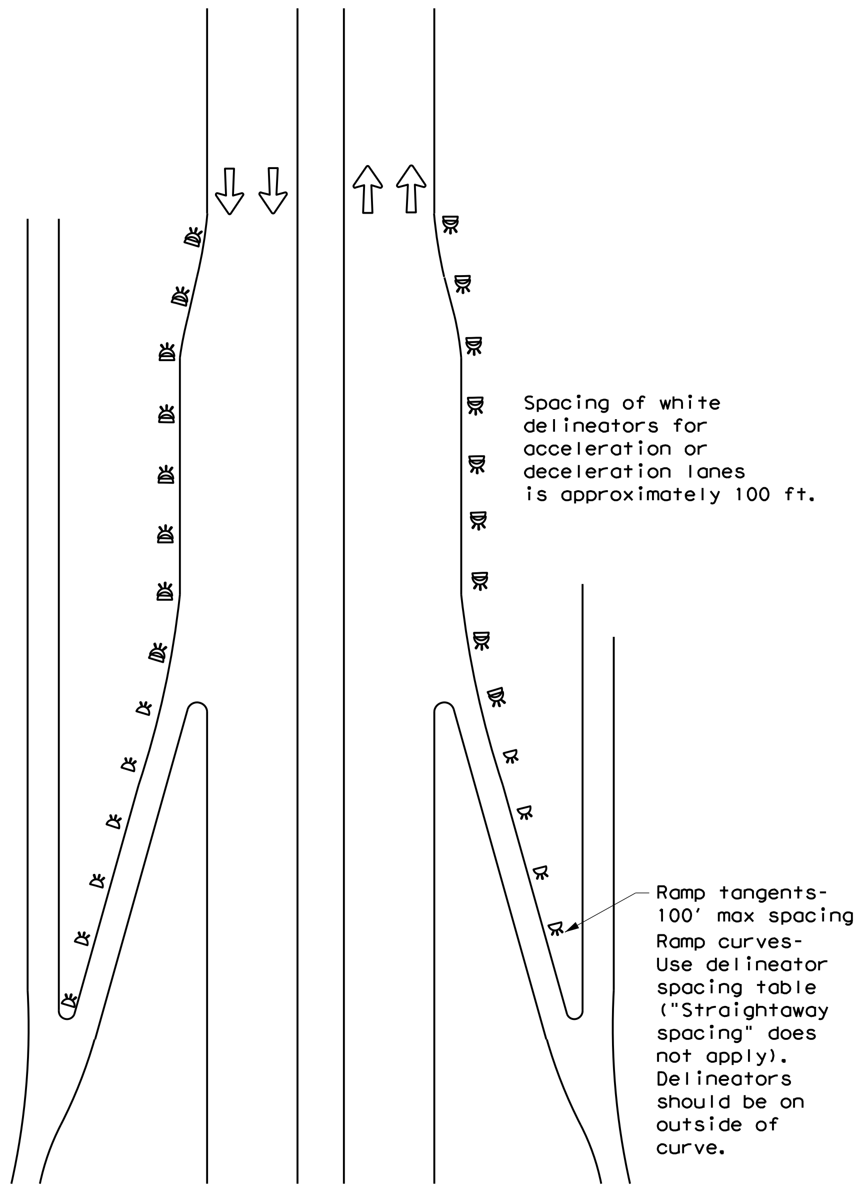
DETAIL 1

FOR CULVERTS WITHOUT MBGF



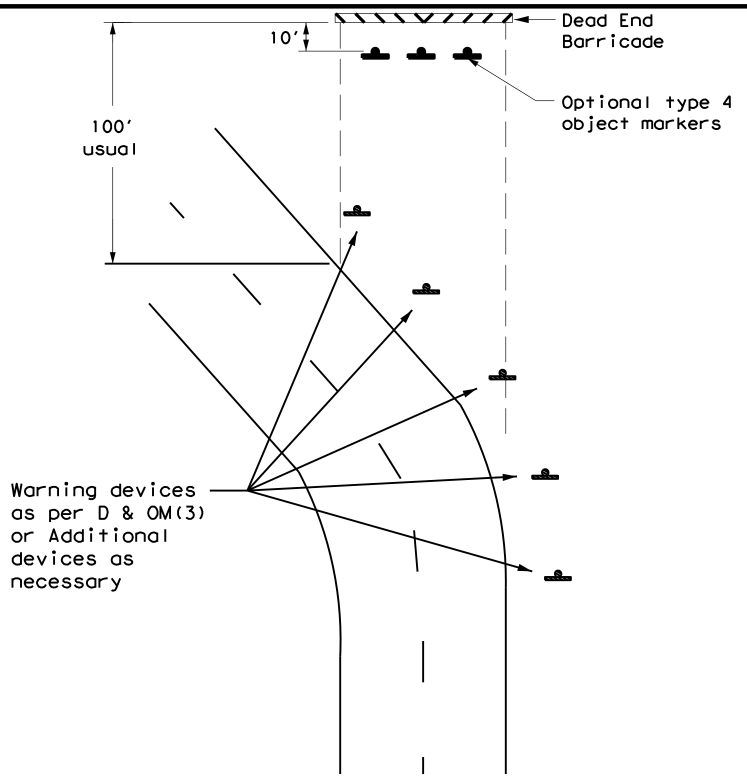
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



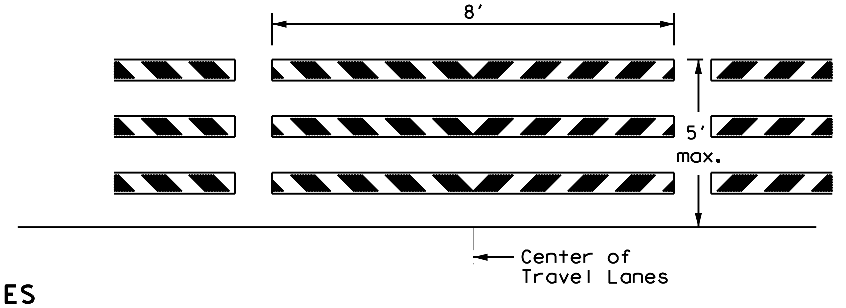
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

- Bidirectional Delineator
- Delineator
- OM-3
- Barricade
- Sign
- OM-2
- Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT			
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY			
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	DIST	COUNTY		SHEET NO.			
	AUS	TRAVIS & HAYS		177			

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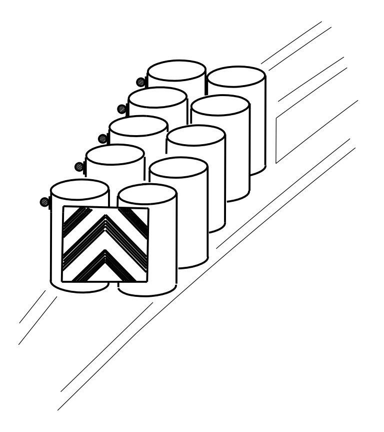
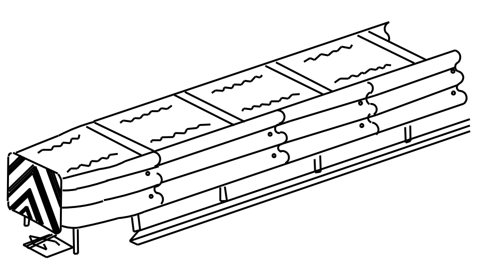
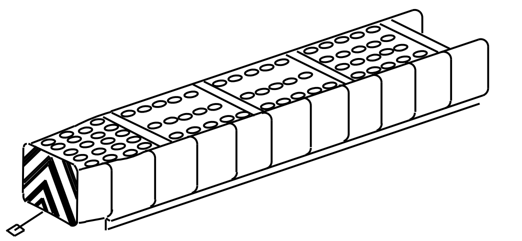
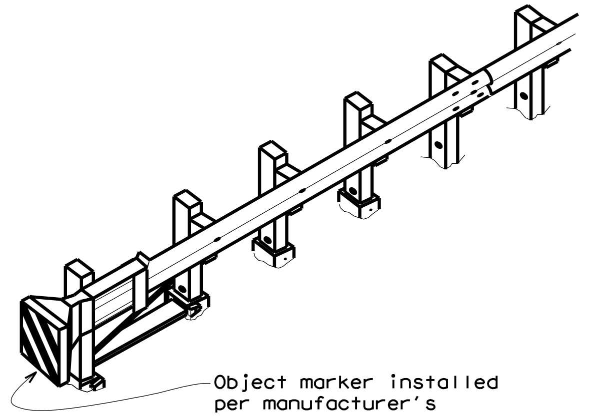
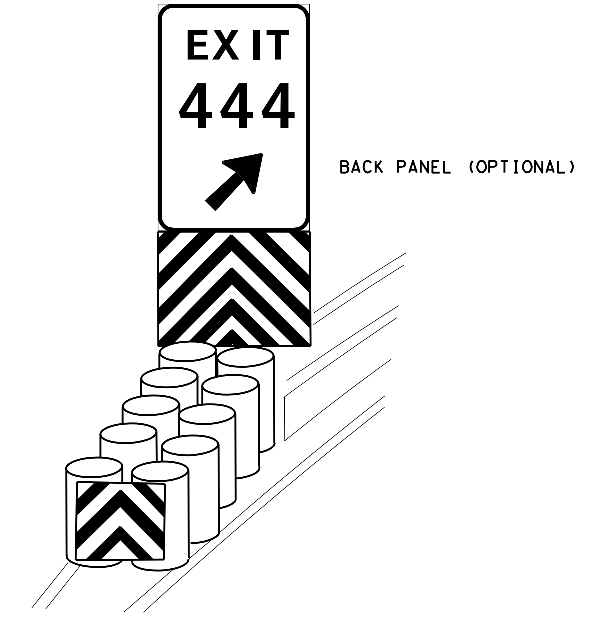


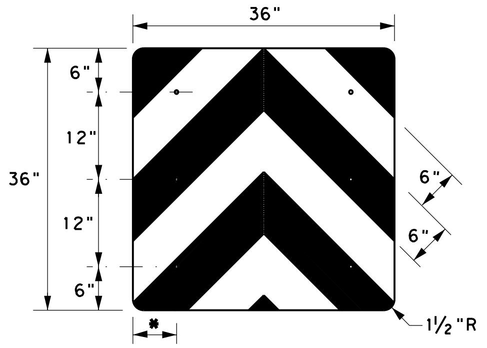


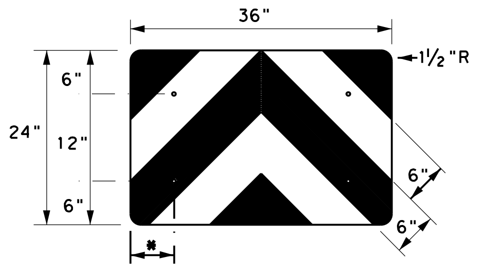




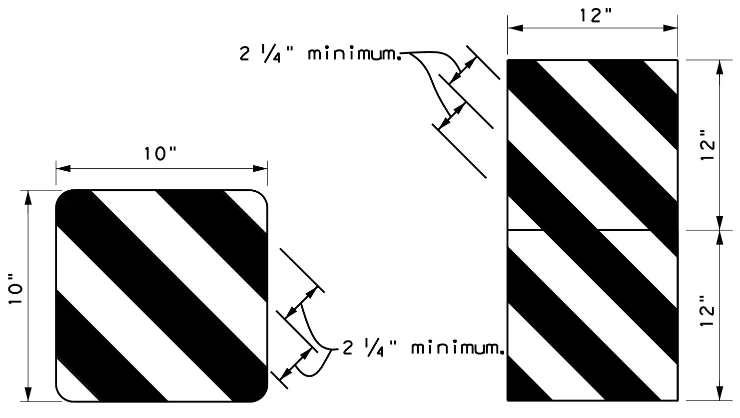
Object marker installed per manufacturer's recommendations.



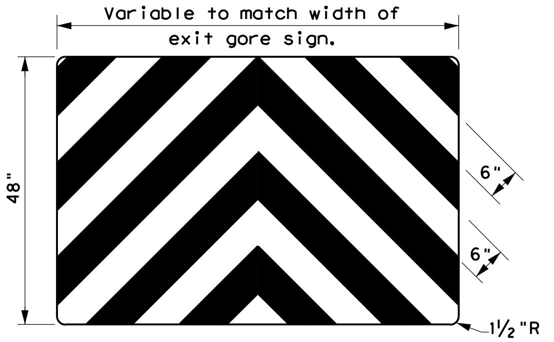


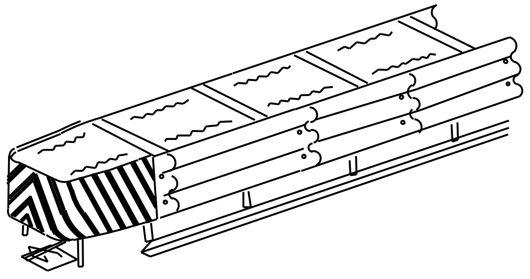


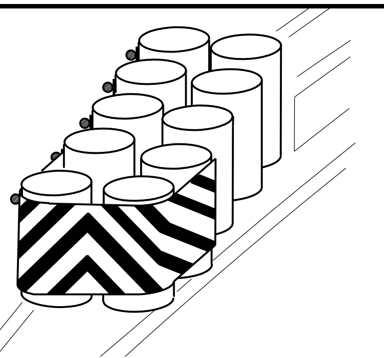
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

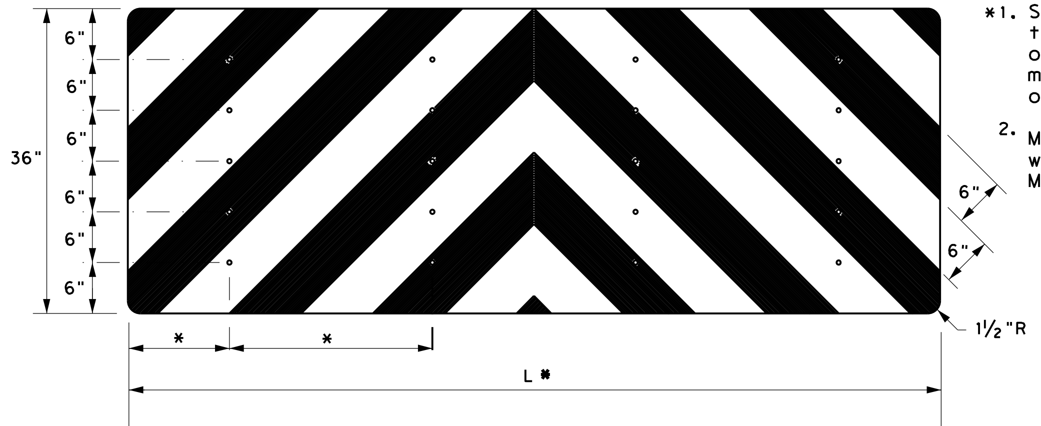


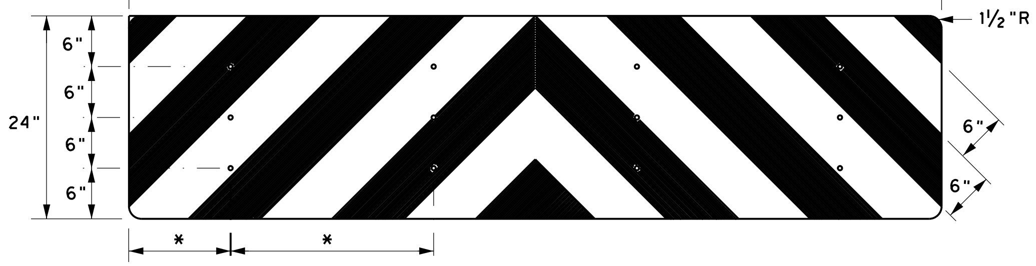
OBJECT MARKERS SMALLER THAN 3 FT^2











NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT		CK: TXDOT	
© TxDOT December 1989	CONT	SECT	JOB		HIGHWAY	
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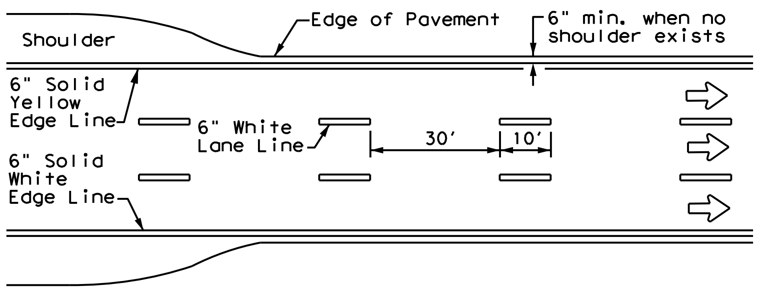
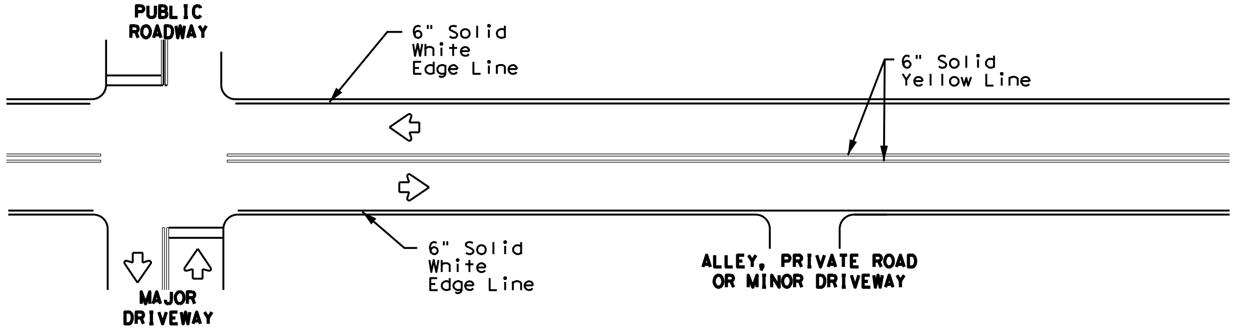
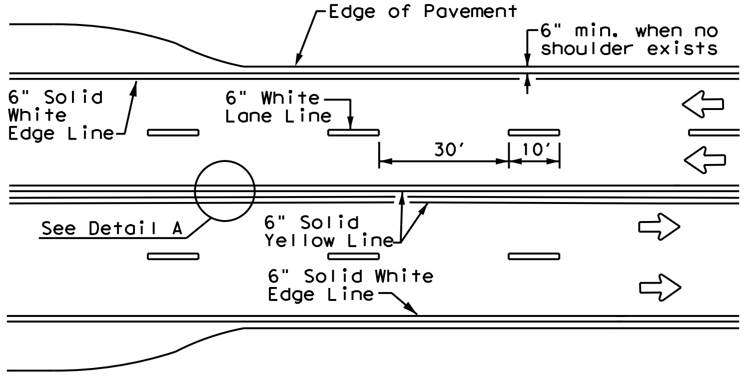


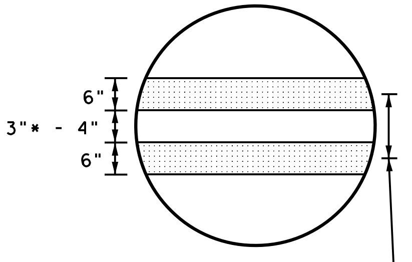
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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



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

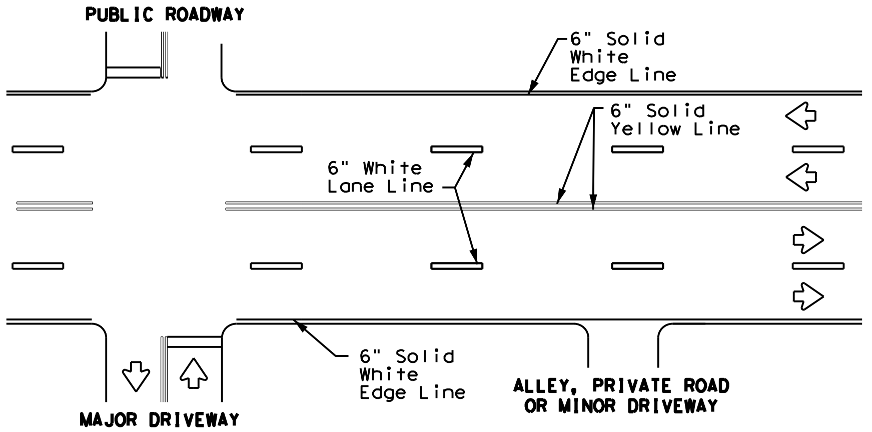


DETAIL "A"

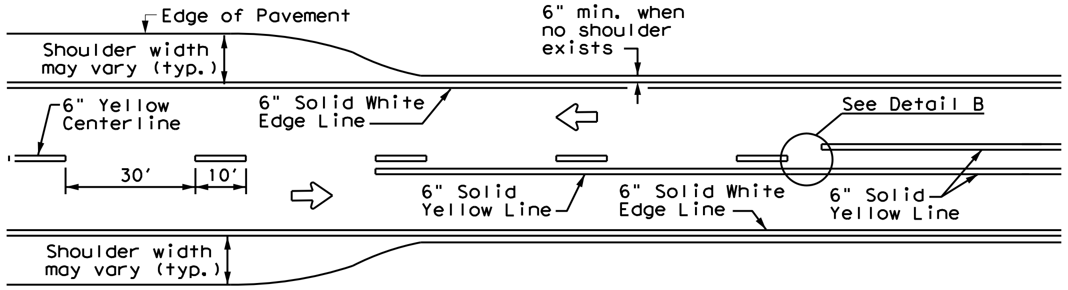
9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

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

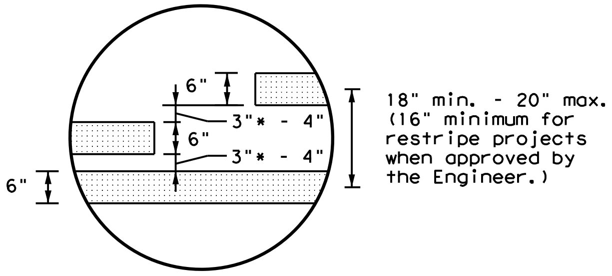
** 8" minimum for restripe projects when approved by the Engineer.



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

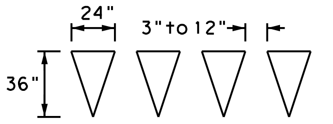


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



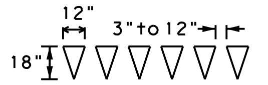
DETAIL "B"

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

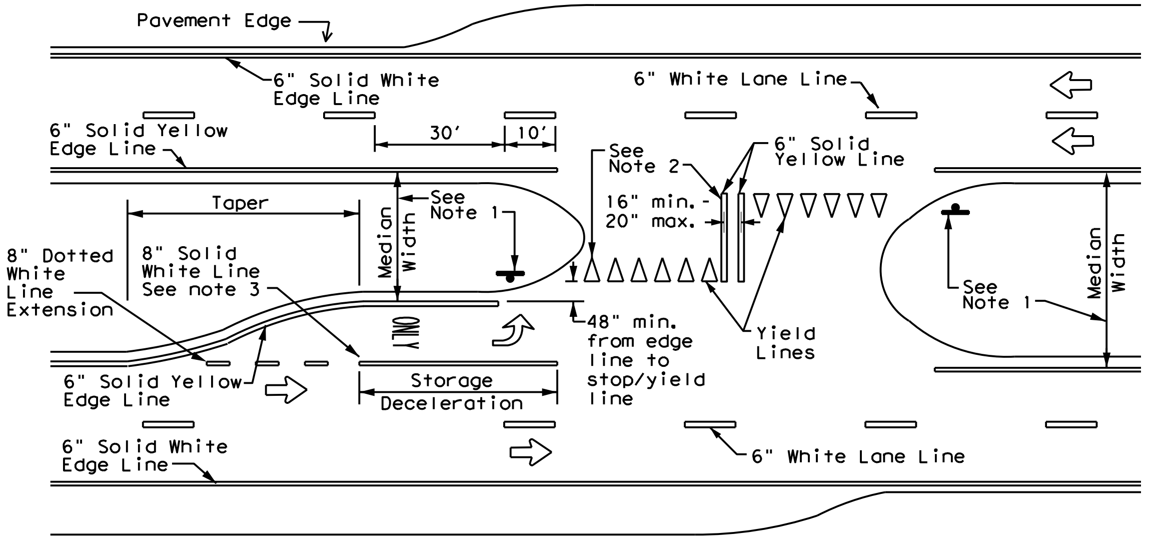


For posted speed on road being marked equal to or greater than 45 MPH.

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.

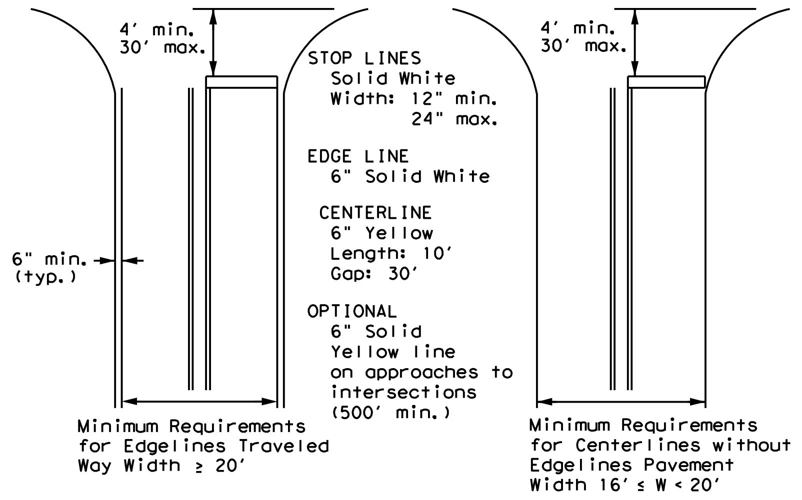
GENERAL NOTES

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

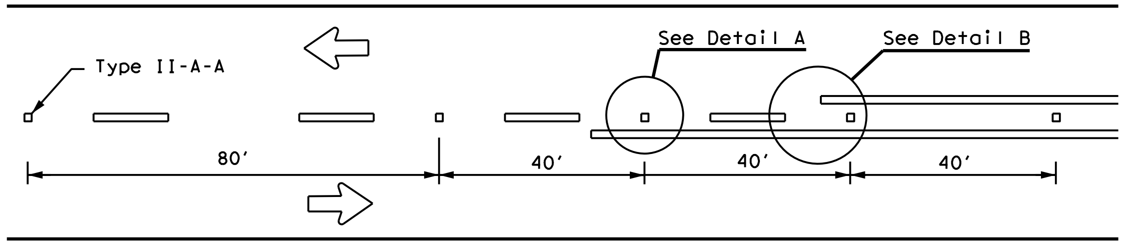
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:

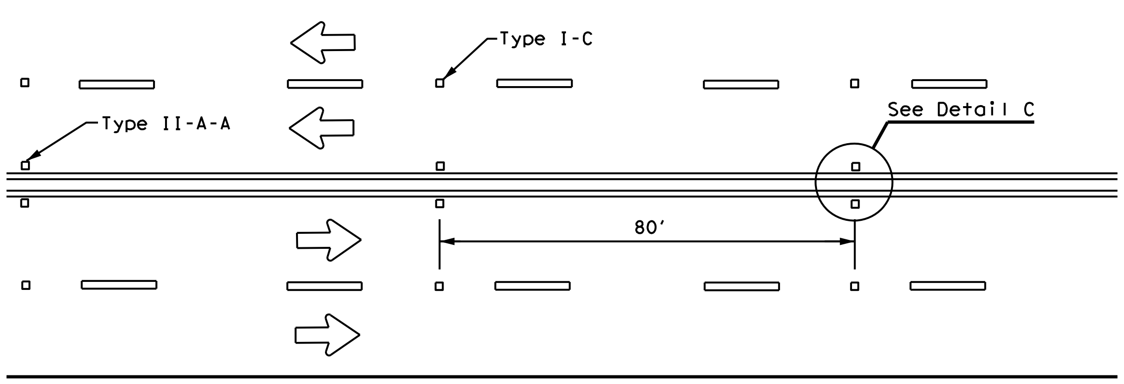
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		179

22A

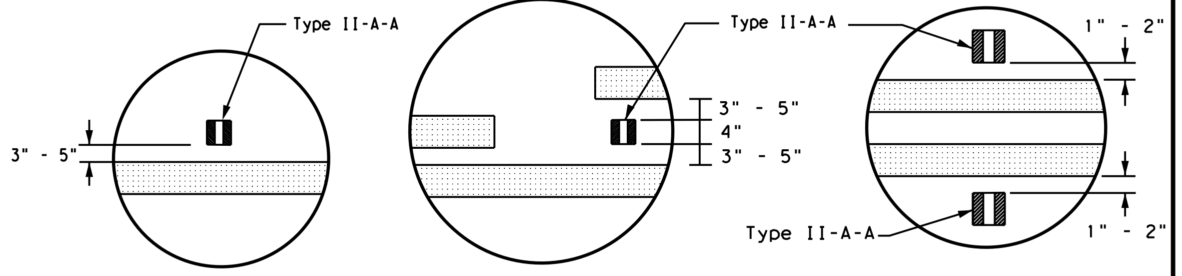
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



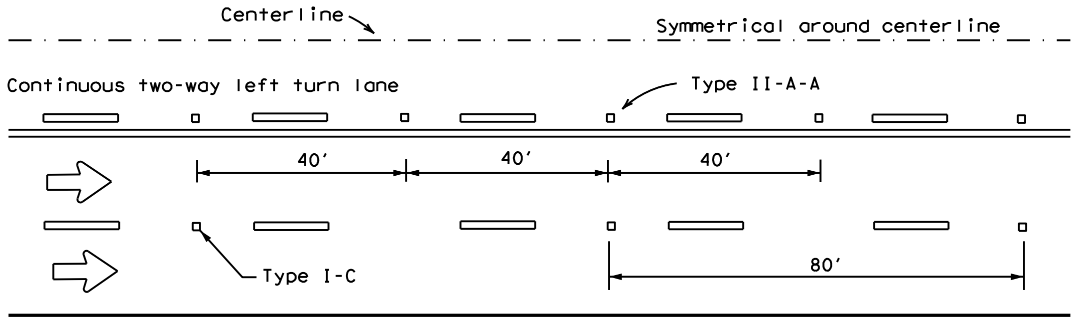
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



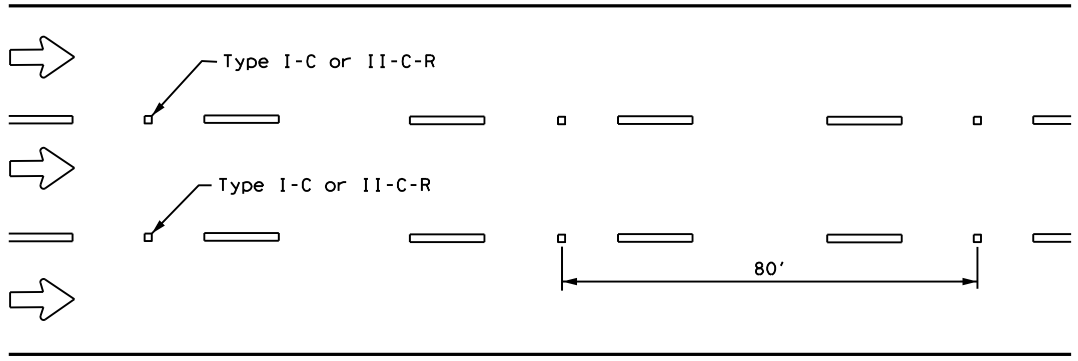
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A"　　DETAIL "B"　　DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



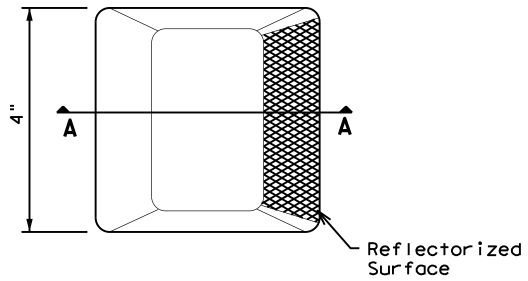
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

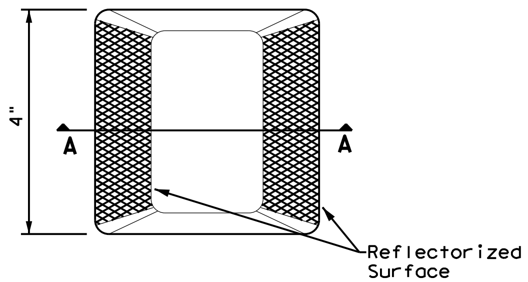
See Note 3.

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

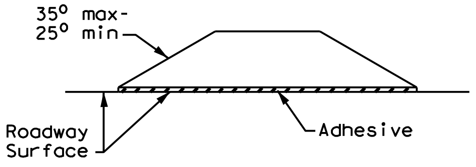
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

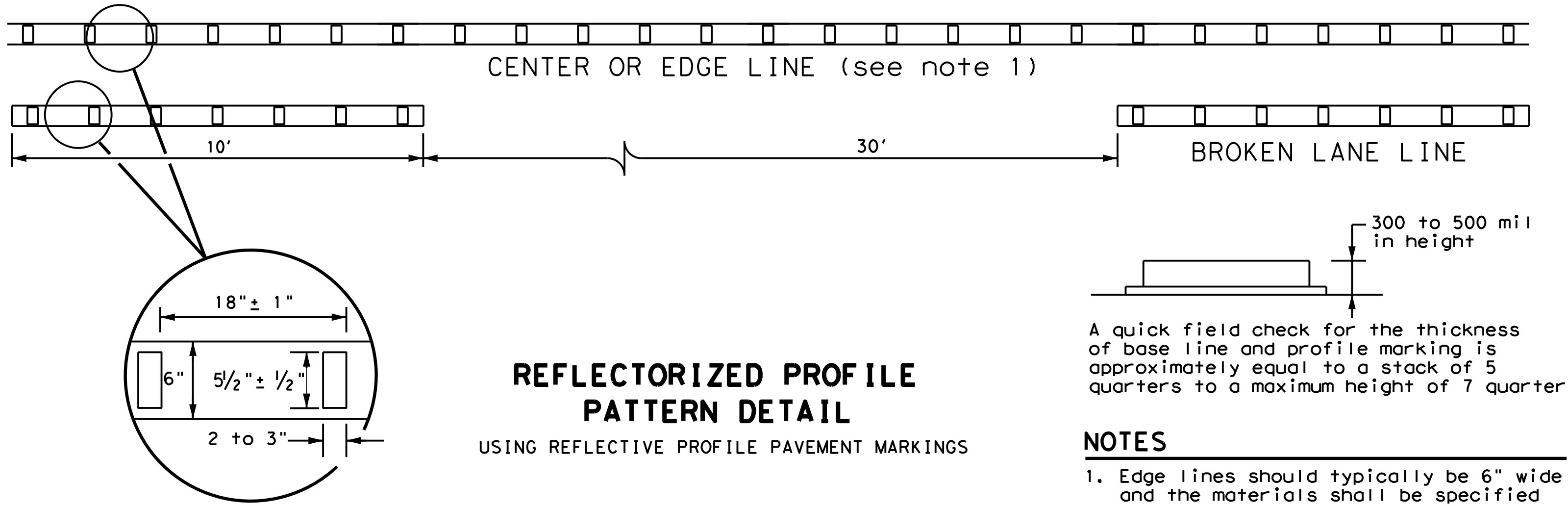


Type II (Top View)



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
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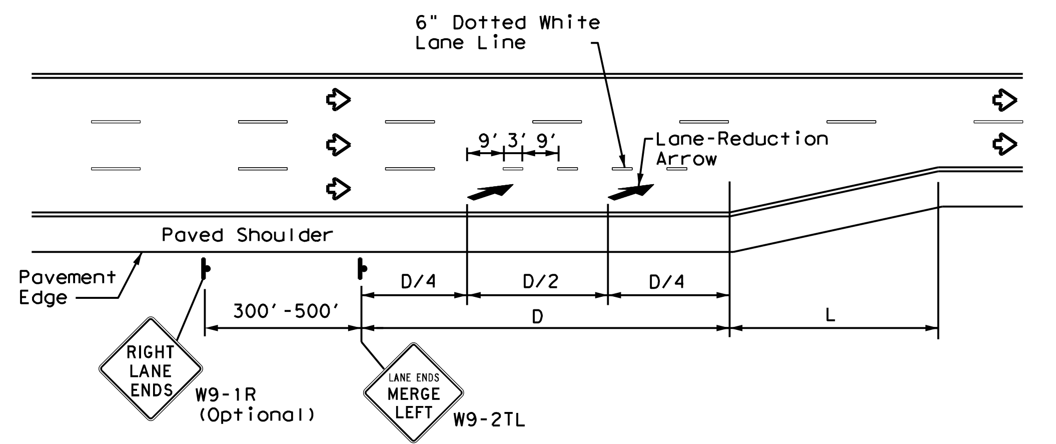
	AUS		TRAVIS & HAYS	180

228



LANE REDUCTION

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

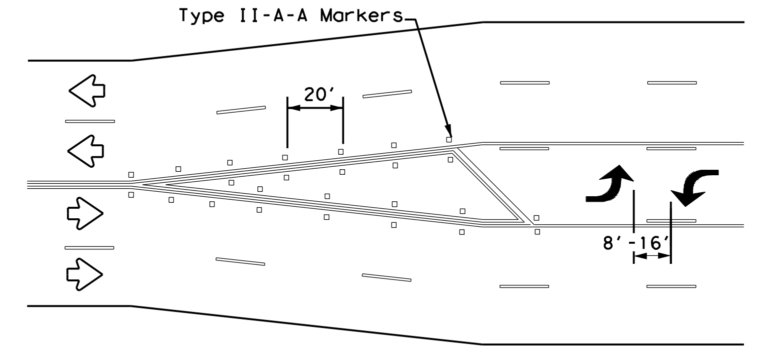
GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

MATERIAL SPECIFICATIONS

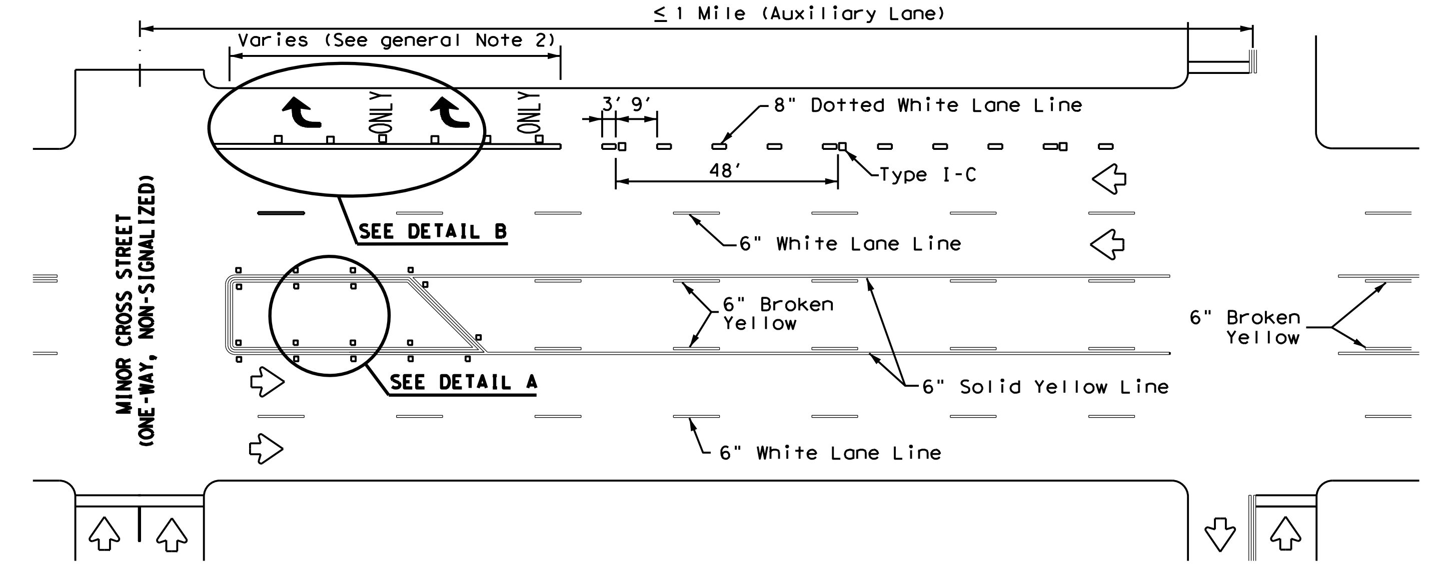
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

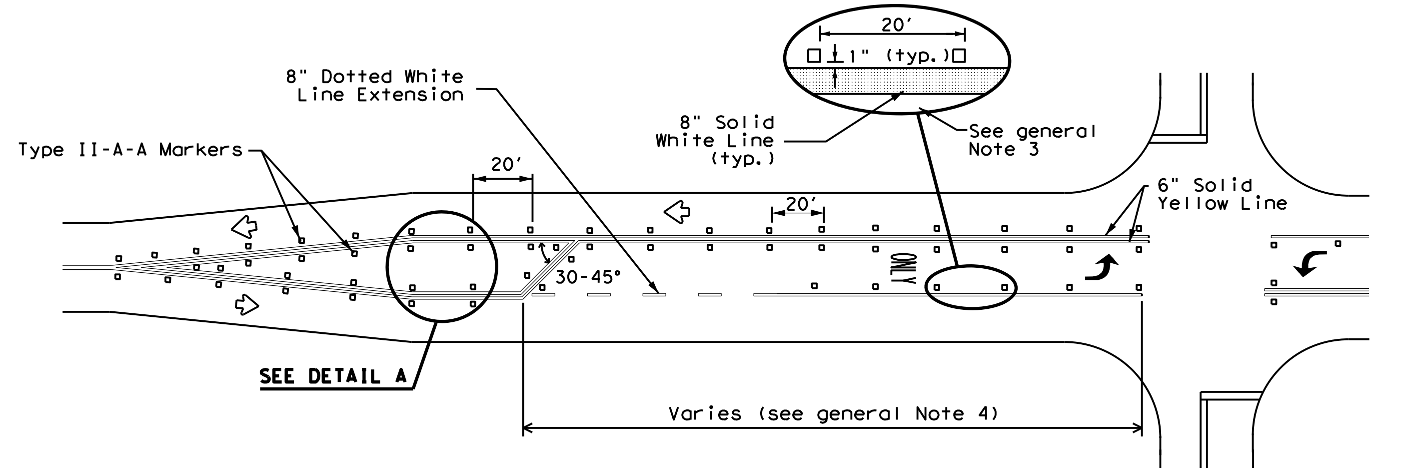


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

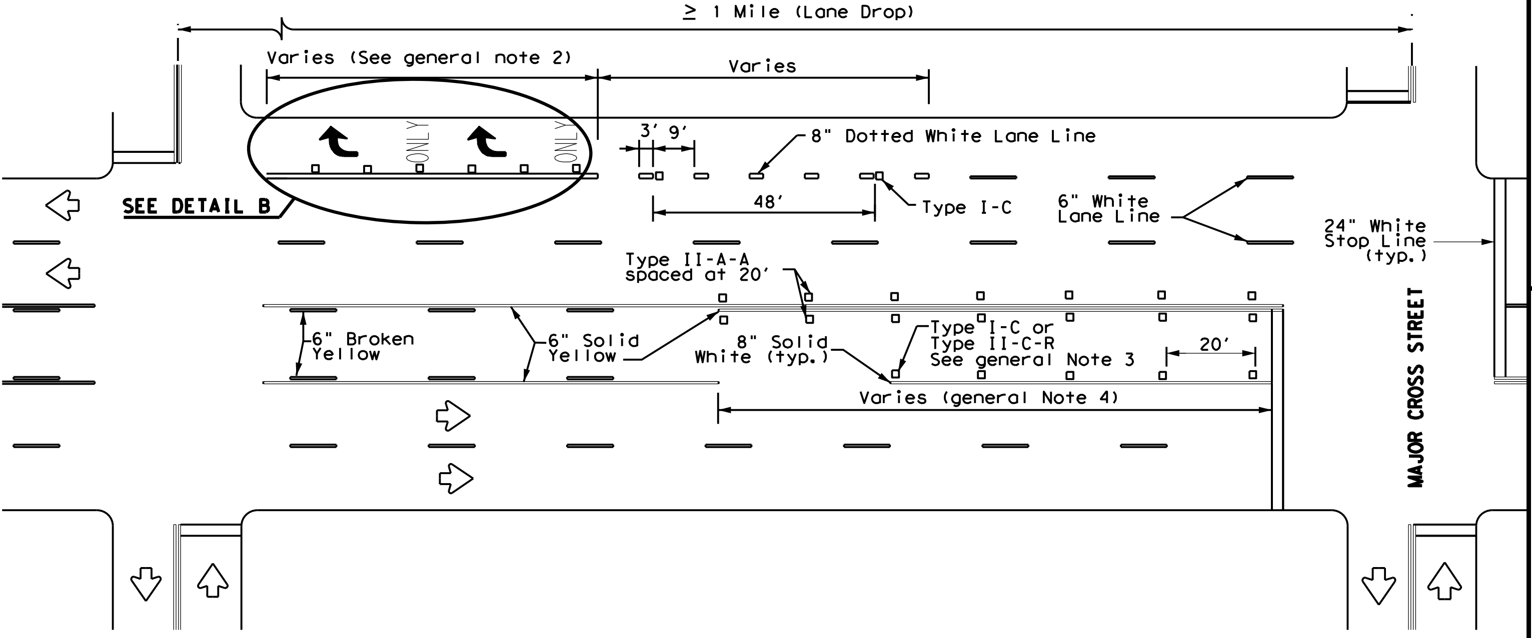
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



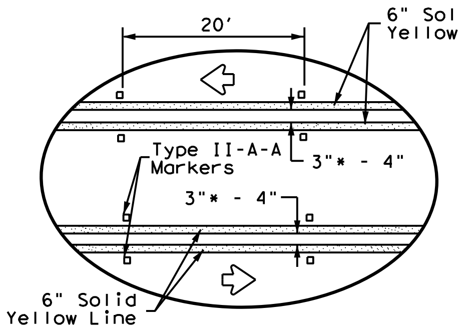
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



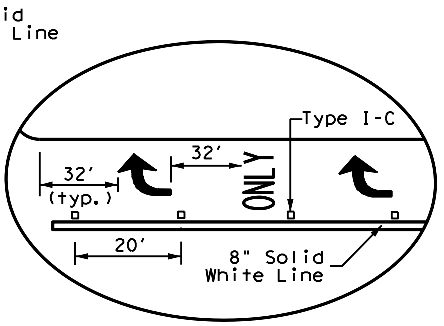
TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



DETAIL A



DETAIL B

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

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:	
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY	
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		181	

22C

DATE: 5/30/2023 12:56:44 PM
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DATE: 5/30/2023 12:56:57 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08*Traffic/Standards/smdgen.dgn

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)

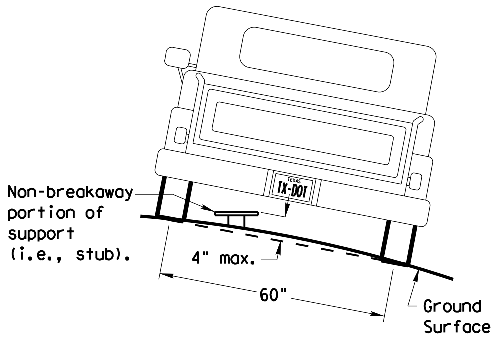
Anchor Type

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

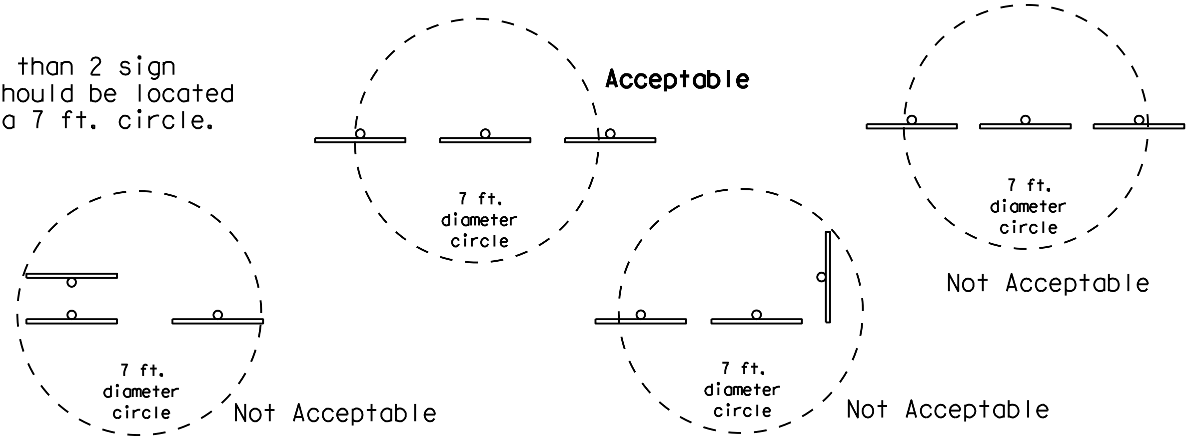
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))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

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



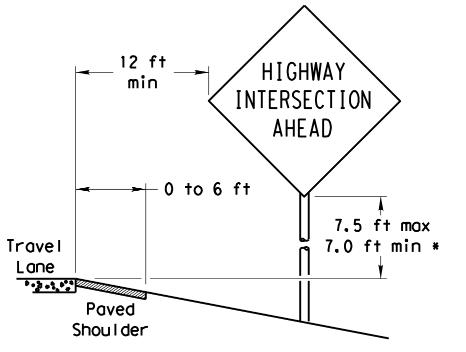
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



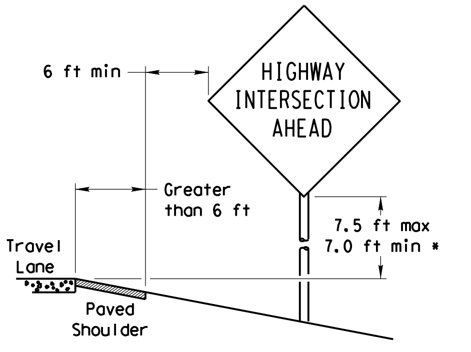
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

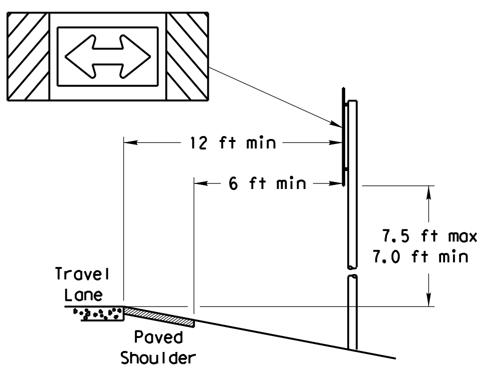
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



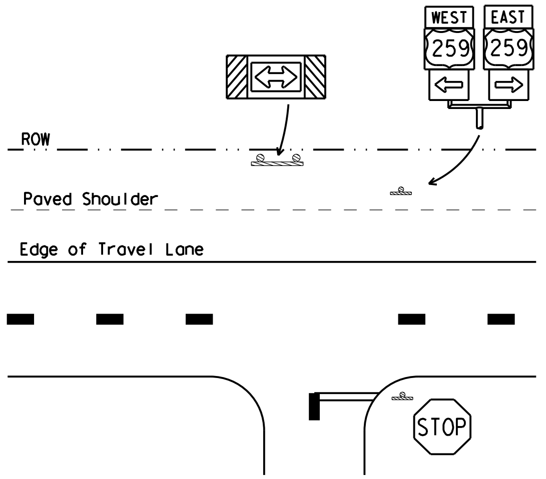
GREATER THAN 6 FT. WIDE

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.

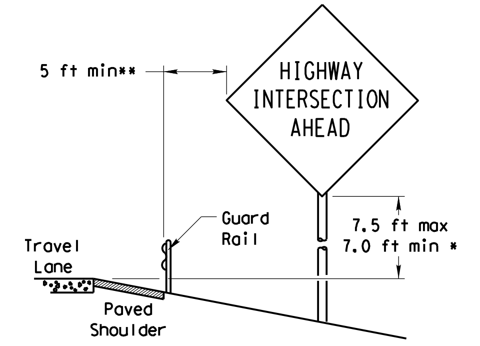
T-INTERSECTION



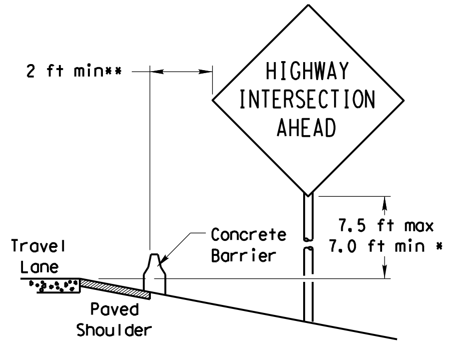
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

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

* 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.

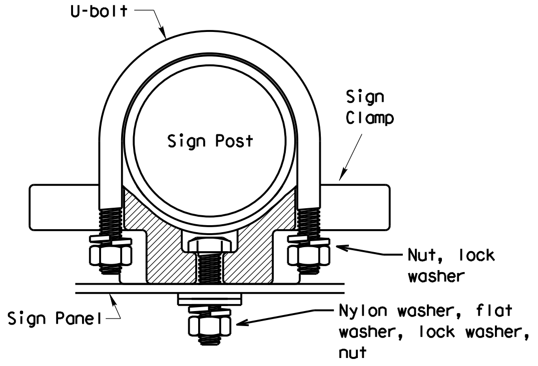
The maximum values may be increased when directed by the Engineer.

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

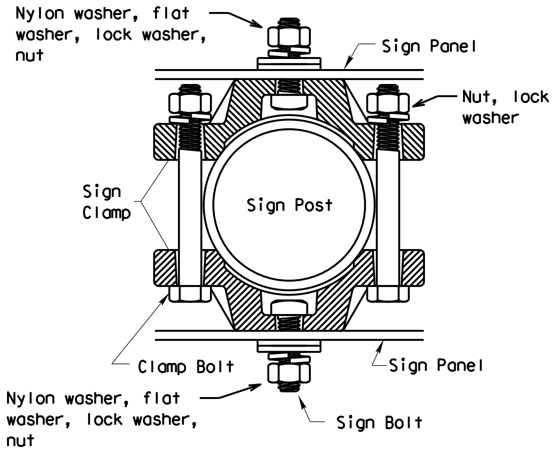
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



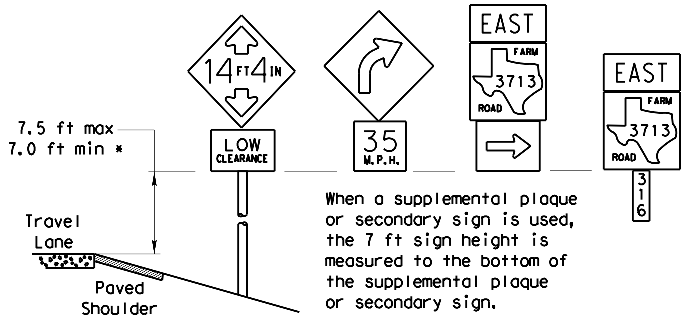
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

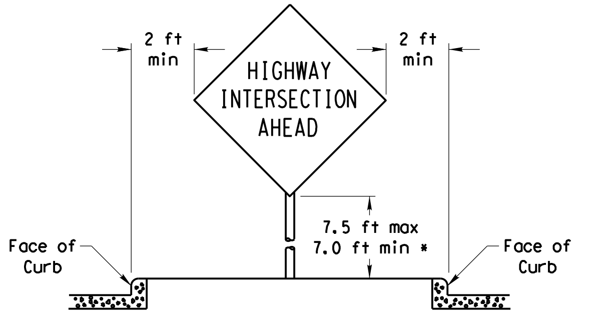
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



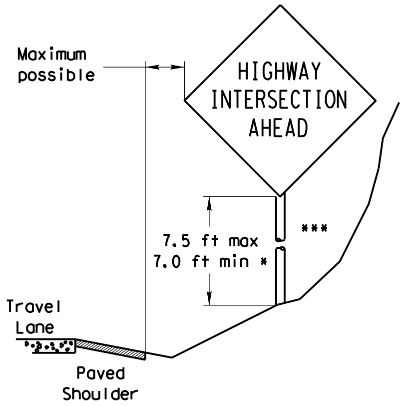
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
9-08			

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	182

26A

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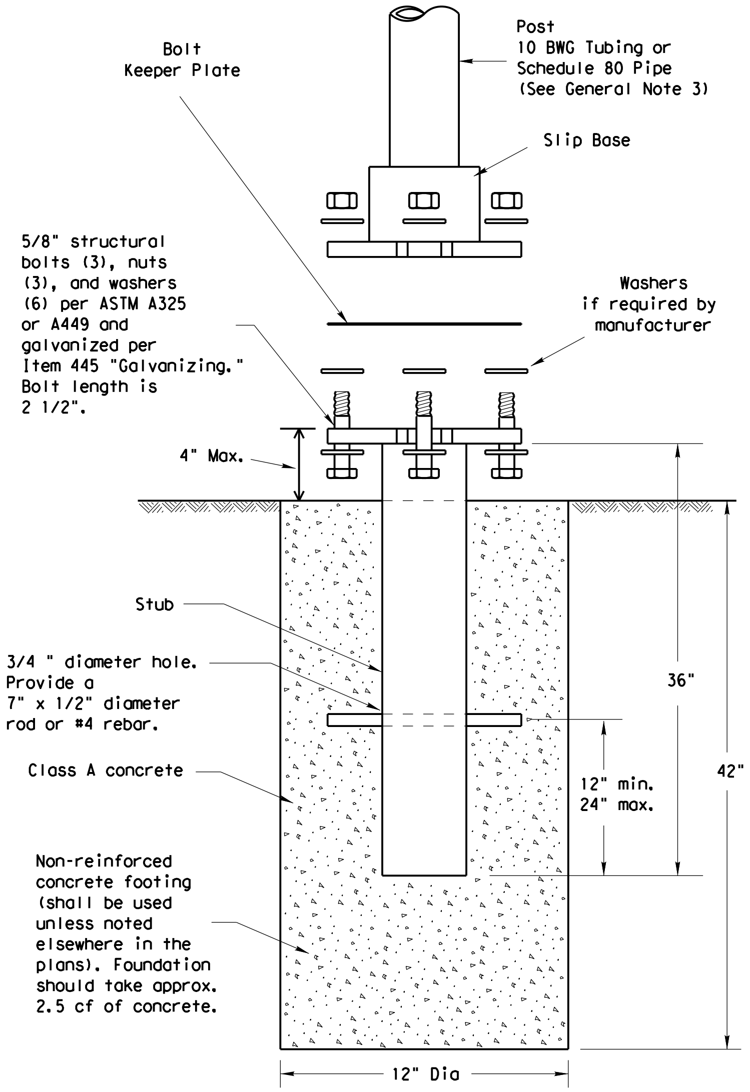
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

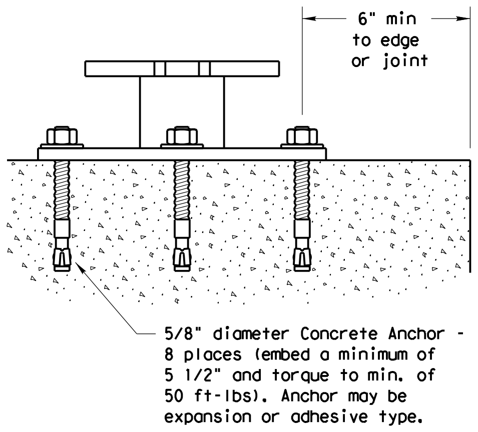
Foundation

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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	183

26B

DATE: 5/30/2023 12:57:28 PM
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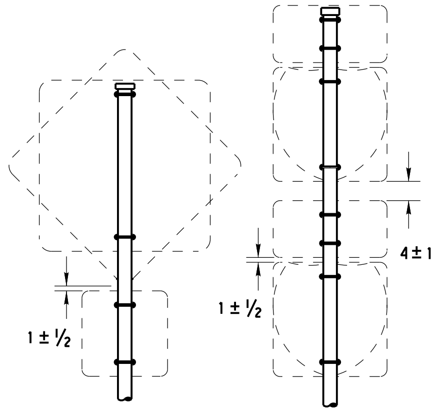
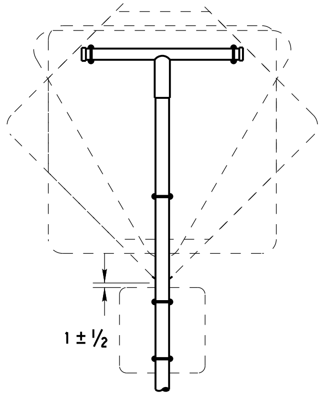


SM RD SGN ASSM TY XXXXX(1)XX(P)



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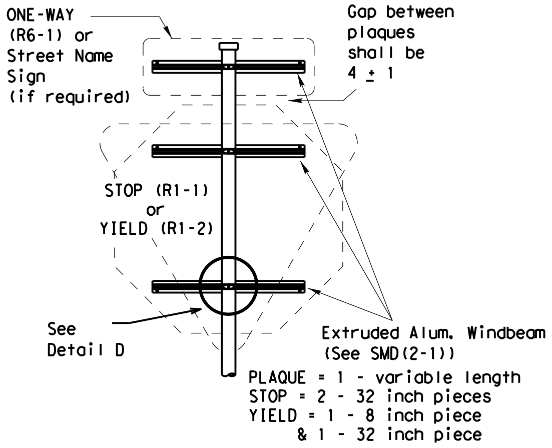

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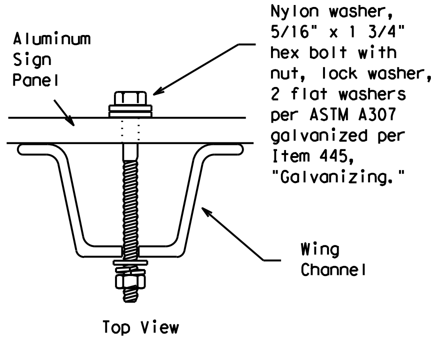
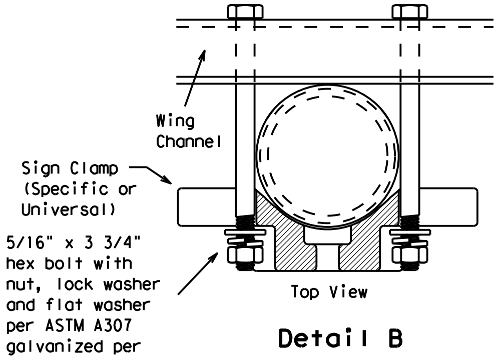
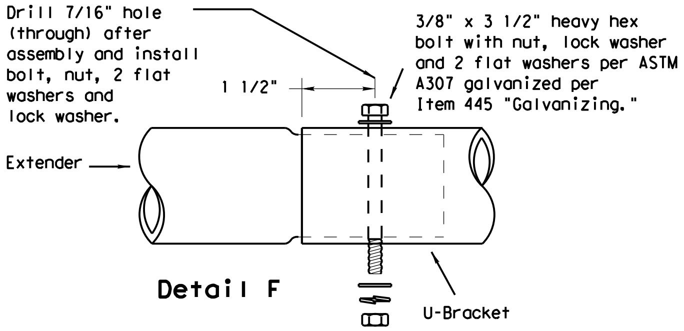


Detail A

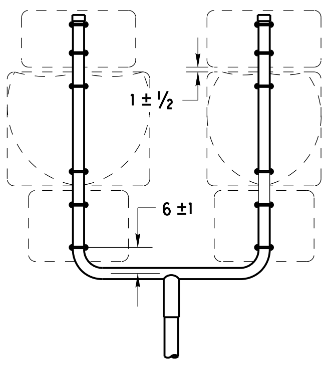


Detail B

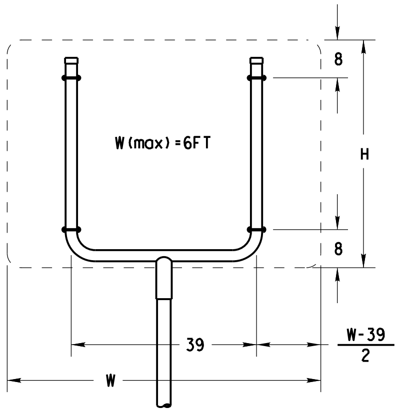


Detail F

Splices shall only be allowed behind the sign substrate.



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



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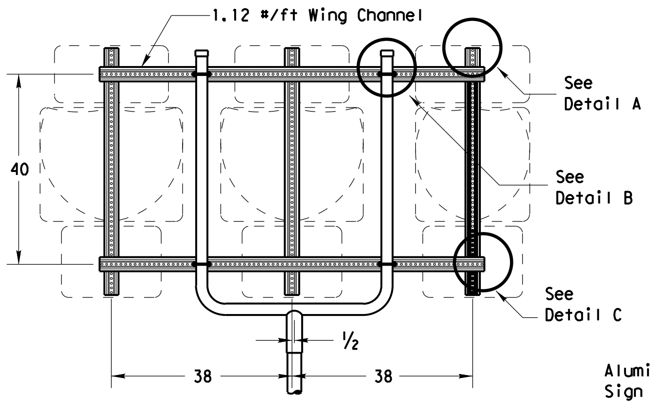
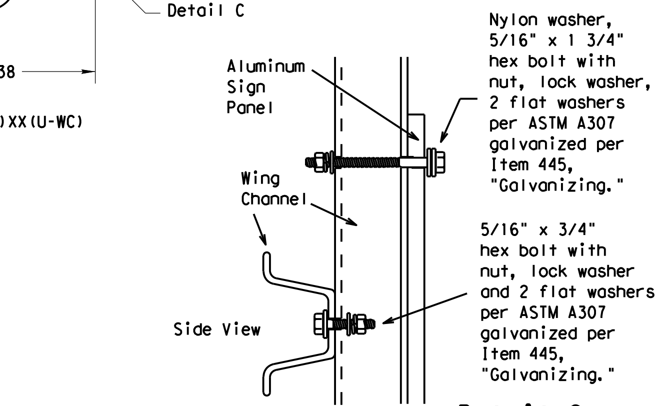
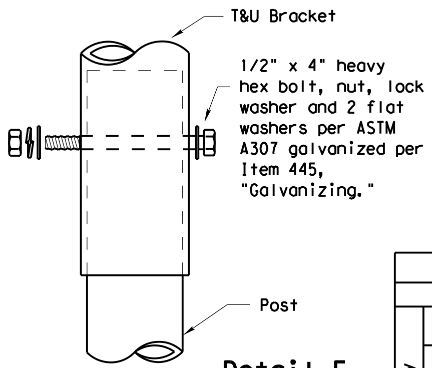


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

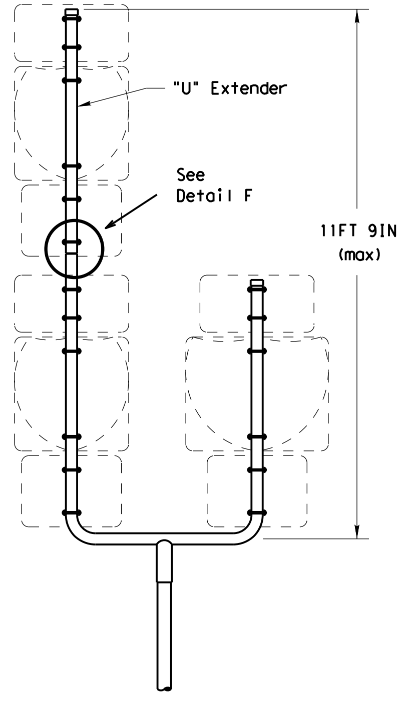


SIDE VIEW

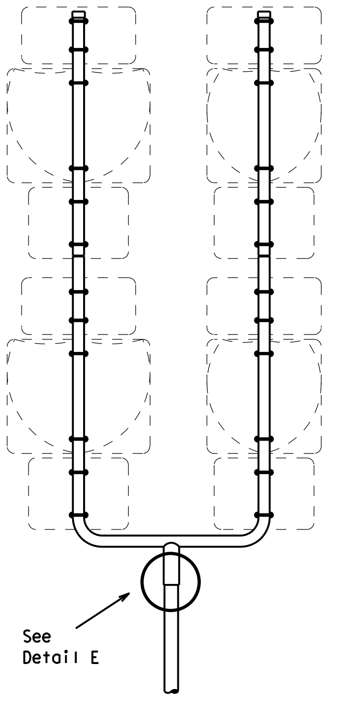
Detail C



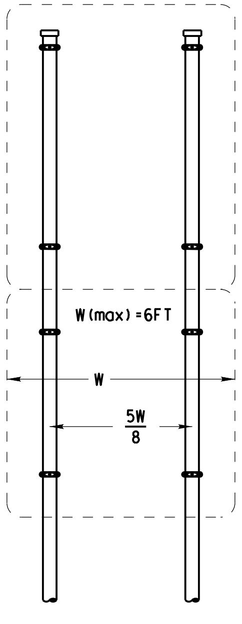
Detail E



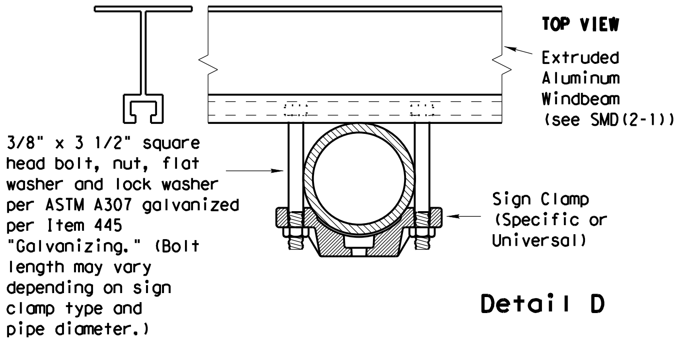
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



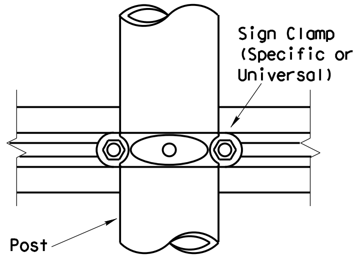
SM RD SGN ASSM TY S80(1)XX(U-2EXT)

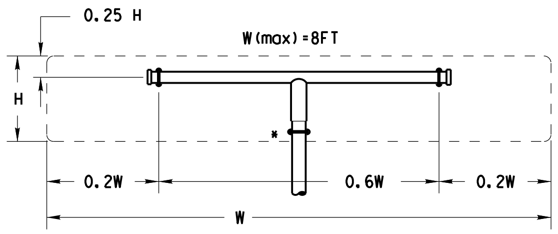


SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D

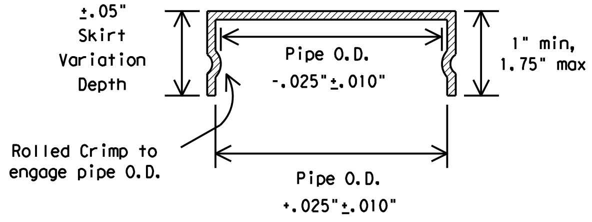




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

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.

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.

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-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
CONT	SECT	JOB	HIGHWAY	
0914	33	097, ETC.	RM 1826	
DIST	COUNTY		SHEET NO.	
AUS	TRAVIS & HAYS		184	

REVISIONS
9-08

26C

DATE: 5/30/2023 12:57:43 PM
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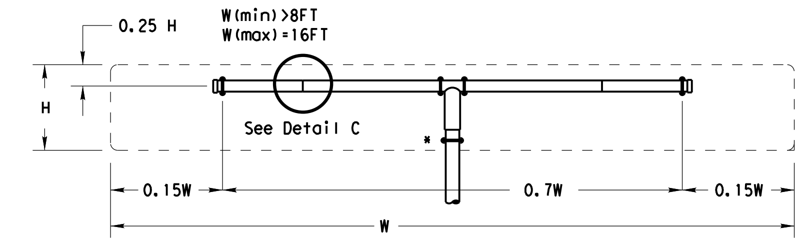
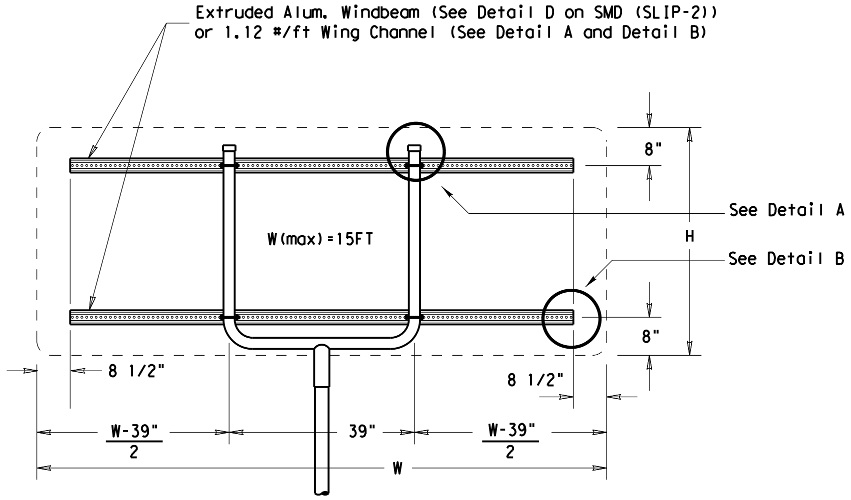
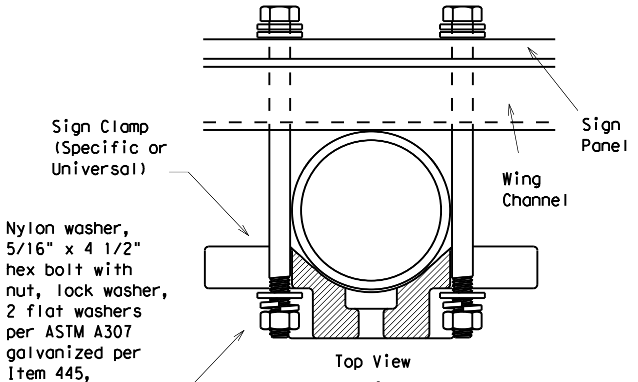


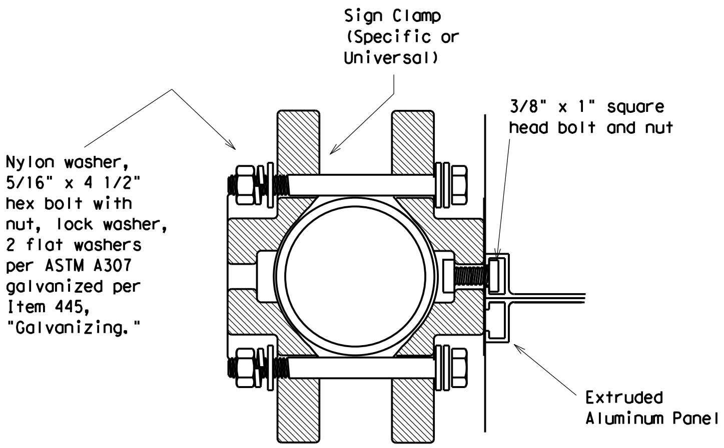
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



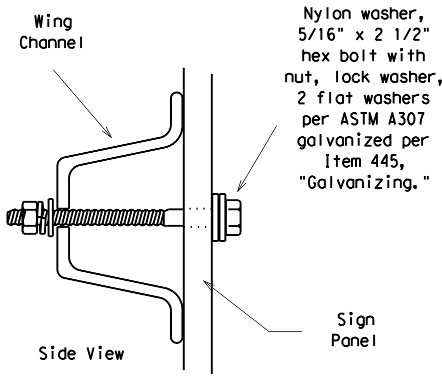
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



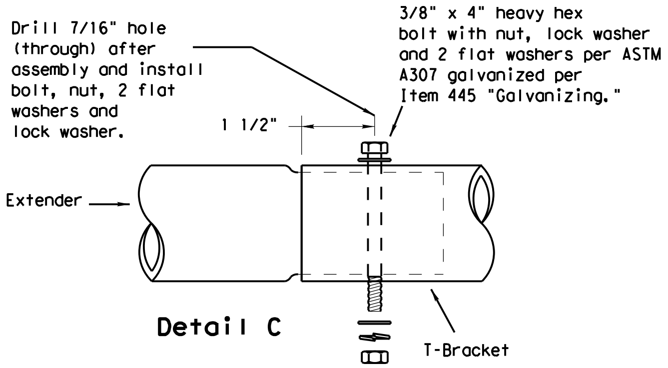
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

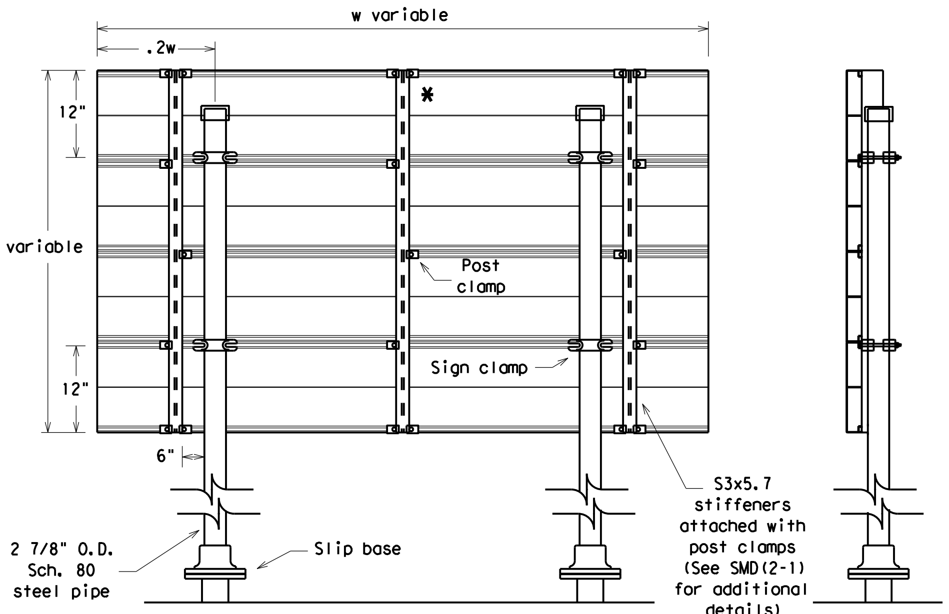


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

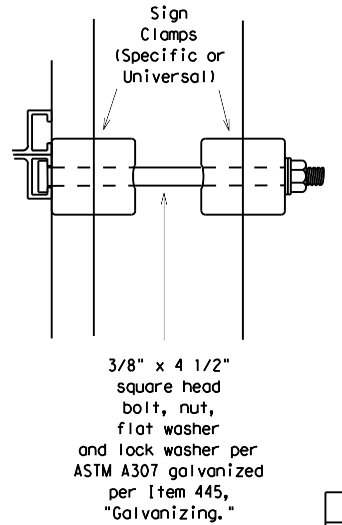


Typical Sign Mount

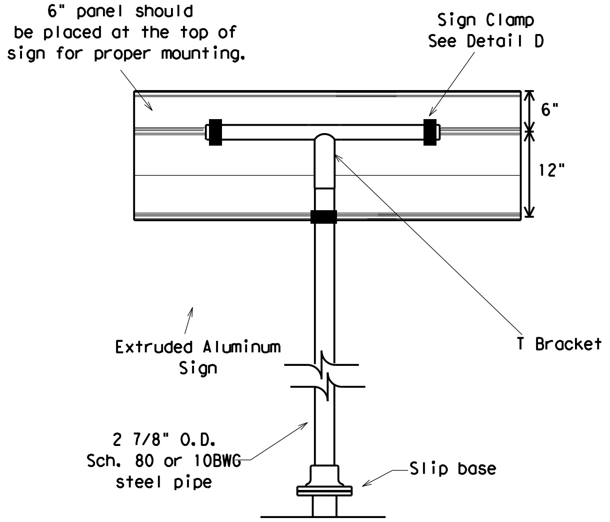
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

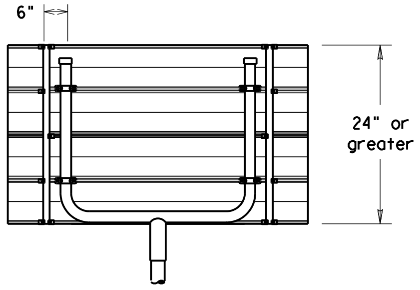
See Detail E
for clamp installation



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:

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. 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	
CONT	SECT	JOB	HIGHWAY	
0914	33	097, ETC.	RM 1826	
DIST	COUNTY		SHEET NO.	
AUS	TRAVIS & HAYS		185	

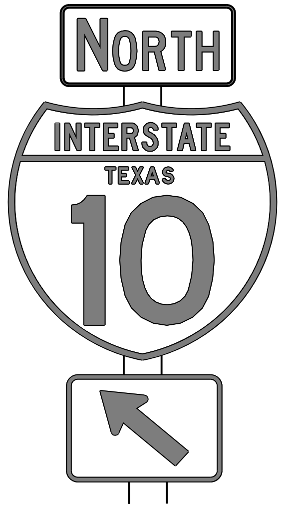
REVISIONS
9-08

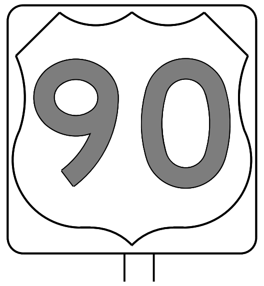
26D

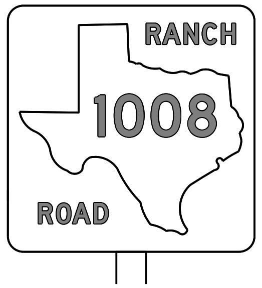
DATE: 5/30/2023 12:58:03 PM
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/08_Traffic/Standards/tsr3-13.dgn

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



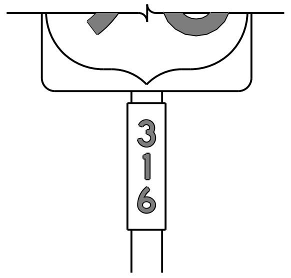


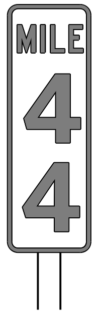


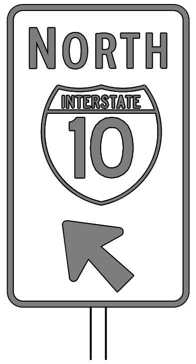
TYPICAL EXAMPLES

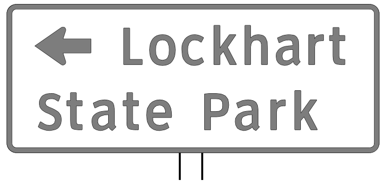
REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

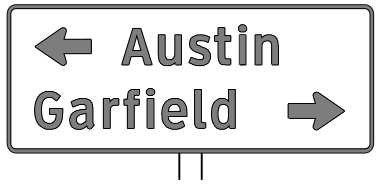
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING











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

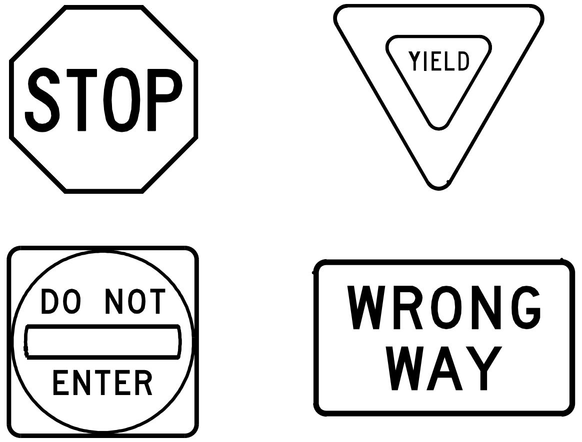
TSR(3)-13

FILE:	tsr3-13.dgn	DN: TxDOT		CK: TxDOT	DW: TxDOT		CK: TxDOT
© TxDOT	October 2003	CONT	SECT	JOB		HIGHWAY	
REVISIONS		0914	33	097, ETC.		RM 1826	
12-03 7-13 9-08		DIST	COUNTY			SHEET NO.	
		AUS	TRAVIS & HAYS			186	

3

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

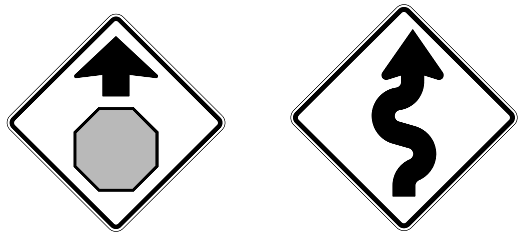
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



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 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 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 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

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REVISIONS	12-03 7-13 9-08	0914	33	097, ETC.		RM 1826	
		DIST	COUNTY			SHEET NO.	
		AUS	TRAVIS & HAYS			187	

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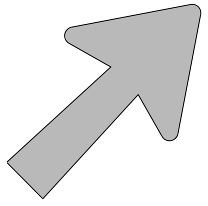
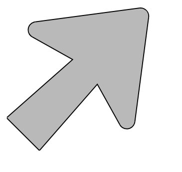
ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs


Type A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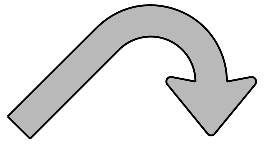
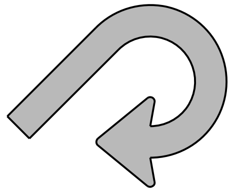

E-3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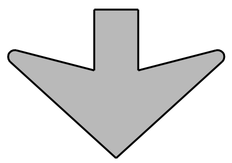

Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

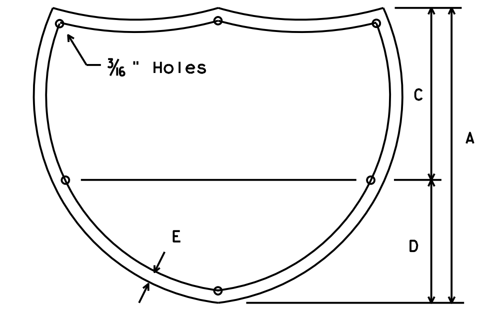
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

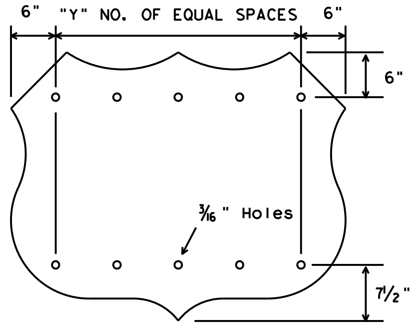
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



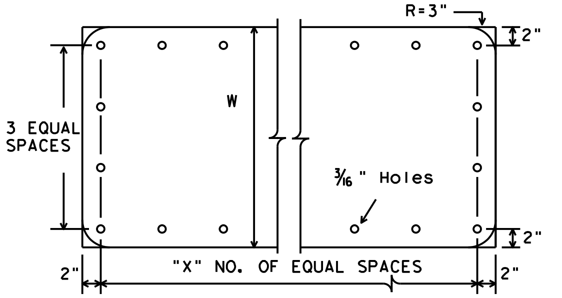
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1½
48	28	20	1¾



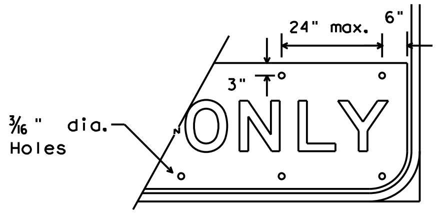
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



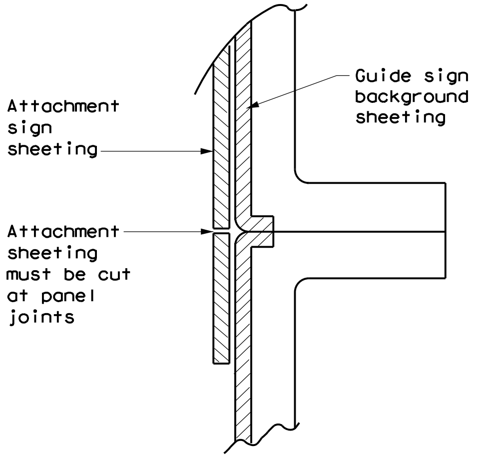
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

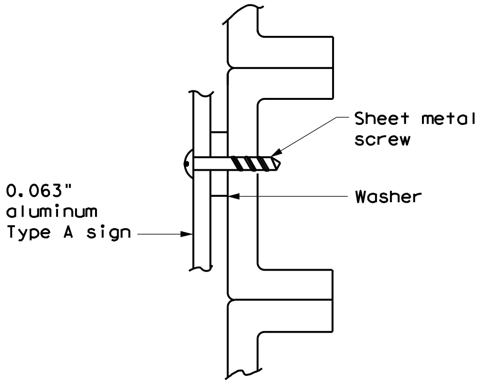


EXIT ONLY PANEL

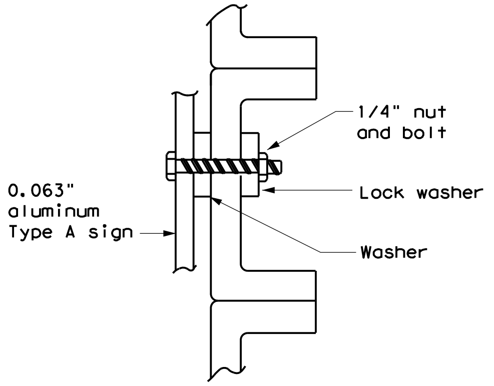
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

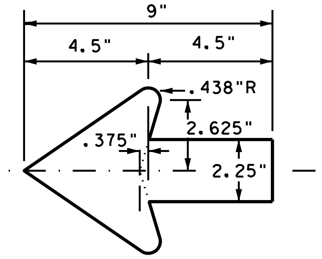
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

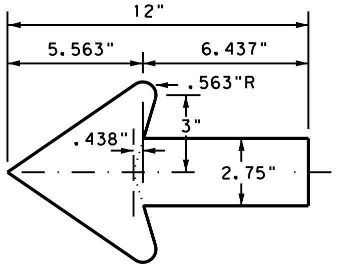
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS
12-03 7-13
9-08

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	188

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):

0914-33-097 and 1754-02-030

1.2 PROJECT LIMITS:

From: NORTH OF LEWIS MOUNTAIN ROAD

To: SOUTH OF TOWERING CEDAR DRIVE

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 30°12'28.01"N ,(Long) 97°54'35.95"W

END: (Lat) 30°8'17.78" N ,(Long) 98°0'15.12"W

1.4 TOTAL PROJECT AREA (Acres): 78.60

1.5 TOTAL AREA TO BE DISTURBED (Acres): 9.88

1.6 NATURE OF CONSTRUCTION ACTIVITY:

FOR THE CONSTRUCTION OF ADDING TURN LANES CONSISTING OF WIDENING, GRADING, STRUCTURES AND SURFACING

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Crawford clay, Volente silty clay loam	Lewis Mountain Dr
Brackett-Rock outcrop complex, Crawford clay, Eckrant very stony clay	Zyle Rd
Brackett-Rock outcrop complex, Purves clay	Appaloosa Run
Brackett-Rock outcrop-Comfort complex, Comfort-Rock outcrop complex	Oso Creek Rd
Real-Comfort-Doss complex, Comfort-Rock outcrop complex	Woodland Dr and Shelf Rock Rd
Comfort-Rock outcrop complex, Doss silty clay	Towering Cedar Dr

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

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

☒ 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:

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
SLAUGHTER CREEK	
BEAR CREEK	
ONION CREEK	

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

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

MS4 Entity

ALFREDO L. LOPEZ
101155
5/30/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

<table>
<tr><td>FED. RD. DIV. NO.</td><td colspan="3">PROJECT NO.</td><td>SHEET NO.</td></tr>
<tr><td>6</td><td colspan="3">SEE TITLE SHEET</td><td>189</td></tr>
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<tr><td>0914</td><td>33</td><td>097, ETC.</td><td colspan="2">RM 1826</td></tr>
</table>

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

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

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
VEGETATIVE FILTER STRIPS	133+50	137+00
VEGETATIVE FILTER STRIPS	133+50	134+52
VEGETATIVE FILTER STRIPS	143+00	150+20
VEGETATIVE FILTER STRIPS	183+00	192+60
VEGETATIVE FILTER STRIPS	232+00	236+75
VEGETATIVE FILTER STRIPS	239+50	244+20
VEGETATIVE FILTER STRIPS	240+00	241+75
VEGETATIVE FILTER STRIPS	246+90	248+10
VEGETATIVE FILTER STRIPS	273+69	277+00
VEGETATIVE FILTER STRIPS	503+90	506+35
VEGETATIVE FILTER STRIPS	506+35	509+73
VEGETATIVE FILTER STRIPS	506+35	503+90
VEGETATIVE FILTER STRIPS	511+00	512+60
VEGETATIVE FILTER STRIPS	516+75	519+32.27
VEGETATIVE FILTER STRIPS	520+71.75	525+00
VEGETATIVE FILTER STRIPS	527+00	529+98
VEGETATIVE FILTER STRIPS	537+00	541+80
VEGETATIVE FILTER STRIPS	551+60	555+35

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☑ Excess dirt/mud on road removed daily
- ☑ Haul roads dampened for dust control
- ☑ Loaded haul trucks to be covered with tarpaulin
- ☑ Stabilized construction exit
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☑ Concrete and Materials Waste Management
- ☑ Debris and Trash Management
- ☑ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 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.

ALFREDO L. LOPEZ
101155
5/30/2023
Alfred Lopez

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

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</table>

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☑ Required Action

Action No.

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

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

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

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

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

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

1.

2.

3.

4.

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

Best Management Practices:

Erosion
☐ Temporary Vegetation
☐ Blankets/Matting
☐ Mulch
☐ Sodding
☐ Interceptor Swale
☐ Diversion Dike
☐ Erosion Control Compost
☐ Mulch Filter Berm and Socks
☐ Compost Filter Berm and Socks

Sedimentation
☐ Silt Fence
☐ Rock Berm
☐ Triangular Filter Dike
☐ Sand Bag Berm
☐ Straw Bale Dike
☐ Brush Berms
☐ Erosion Control Compost
☐ Mulch Filter Berm and Socks
☐ Compost Filter Berm and Socks
☐ Stone Outlet Sediment Traps
☐ Sediment Basins

Post-Construction TSS
☐ Vegetative Filter Strips
☐ Retention/Irrigation Systems
☐ Extended Detention Basin
☐ Constructed Wetlands
☐ Wet Basin
☐ Erosion Control Compost
☐ Mulch Filter Berm and Socks
☐ Compost Filter Berm and Socks
☐ Vegetation Lined Ditches
☐ Sand Filter Systems
☐ 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. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area will cease and TxDOT archeological staff will be contacted to initiate post-review discovery procedures.
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. Only remove woody vegetation between October 1 and March 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. See the specific provisions for migratory birds in Item 7 of the general notes.
2.
3.
4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☐ Yes ☑ No

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

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

☐ Yes ☐ No

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

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

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

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

Texas Department of Transportation®

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		191

BMP #	INSTALL DATE	REMOVAL DATE
1		
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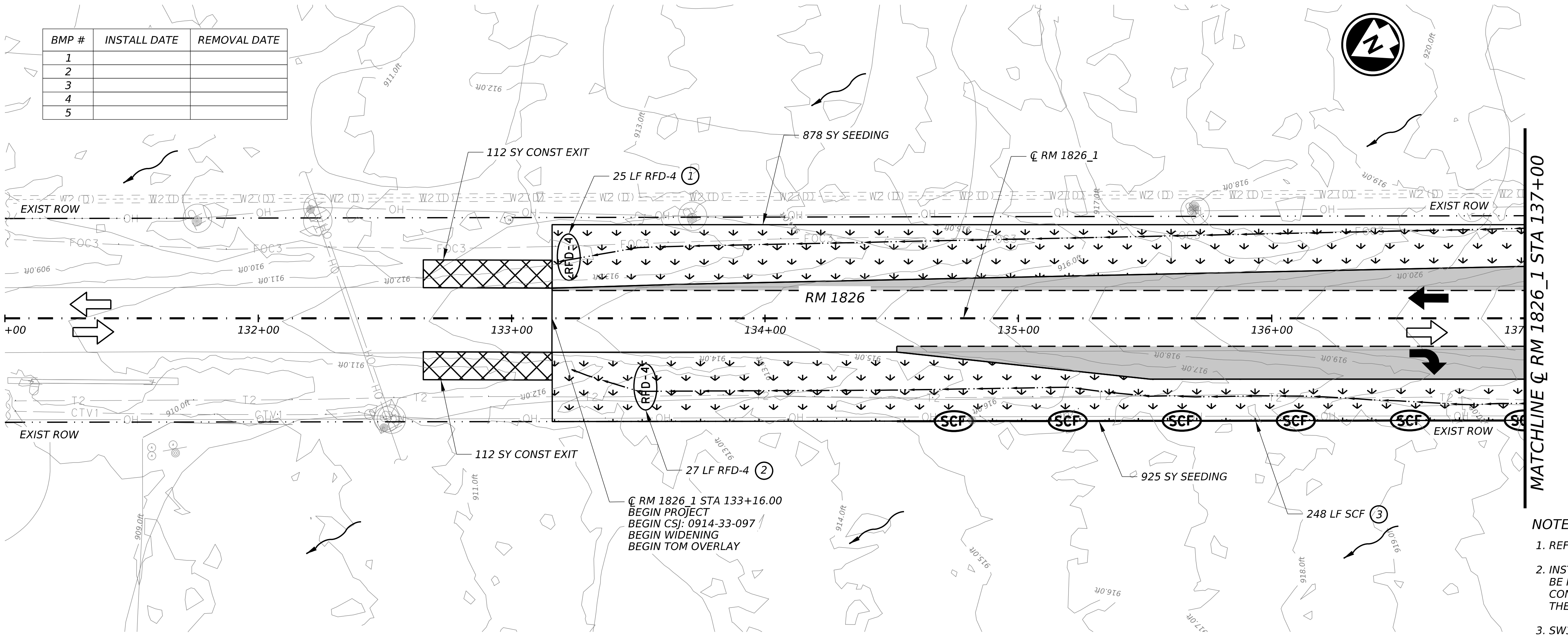
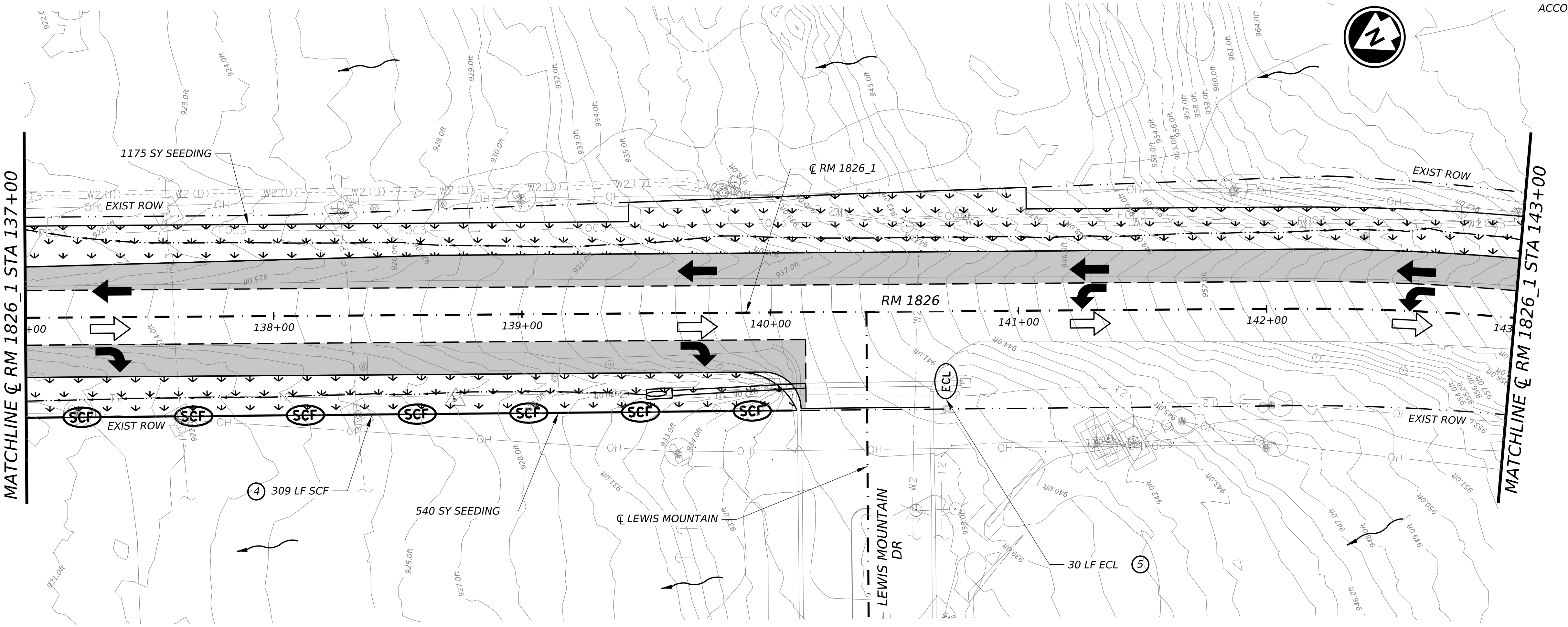
5		





LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
■	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
←	FLOW DIRECTION
➝ • •	PROPOSED DITCH
(X)	BMP NUMBER

NOTES:

1. REFER TO SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND SHALL BE MAINTAINED THROUGHOUT DURATION OF THE CONSTRUCTION IN THIS AREA OR AS DIRECTED BY THE ENGINEER.
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25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023

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FIRM REGISTRATION NO. 5713

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RM 1826

EROSION CONTROL LAYOUT
LEWIS MOUNTAIN DR

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	192

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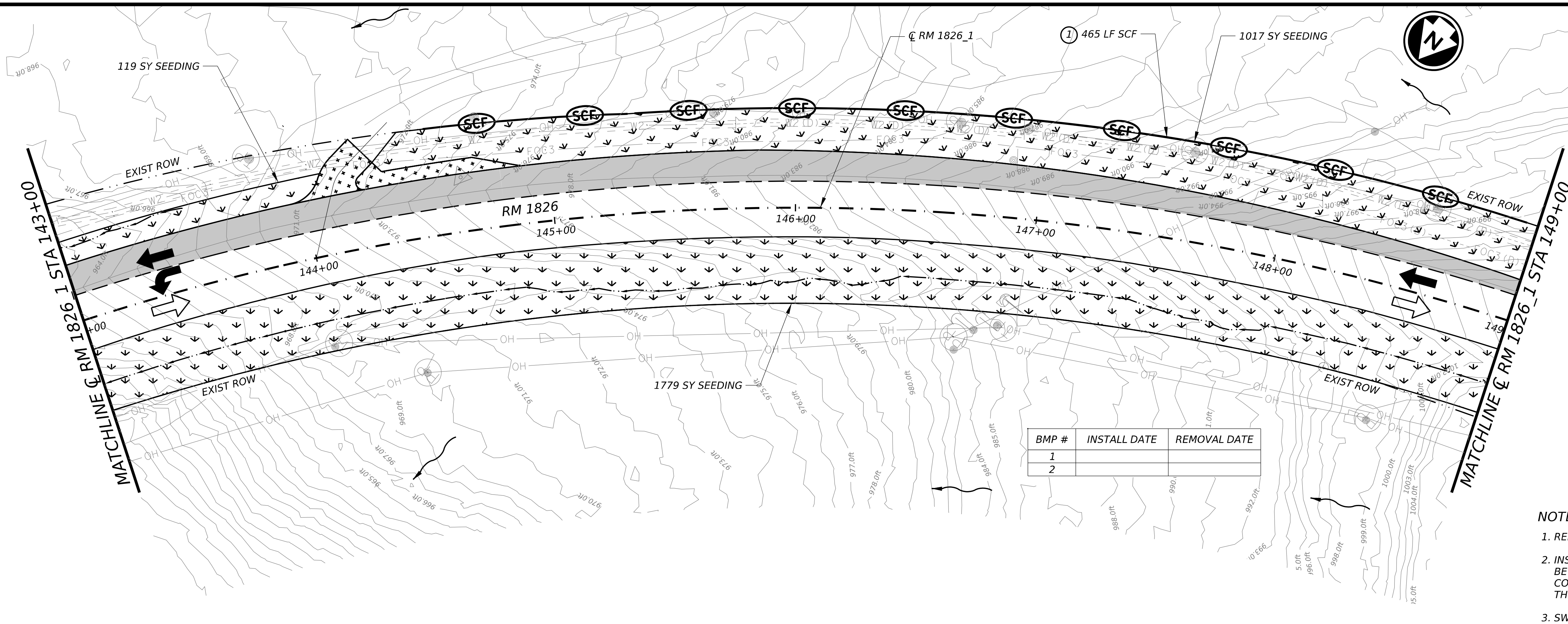

BMP #	INSTALL DATE	REMOVAL DATE
1		
2		

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
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997.0	EXISTING 1-FT CONTOURS
←	FLOW DIRECTION
→••	PROPOSED DITCH
Ⓧ	BMP NUMBER

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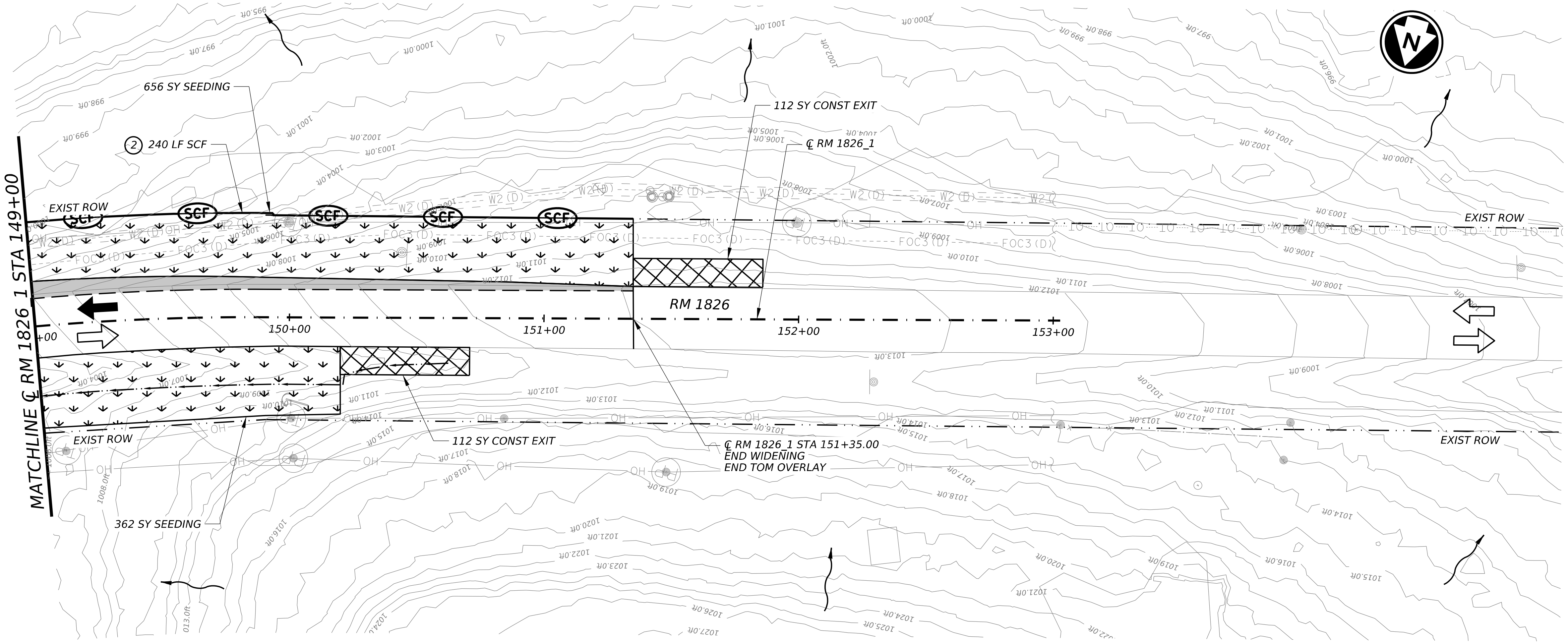

25' 0 25' 50'

HORZ. SCALE 1"=50'

STATE OF TEXAS
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RM 1826

EROSION CONTROL LAYOUT

LEWIS MOUNTAIN DR

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	193

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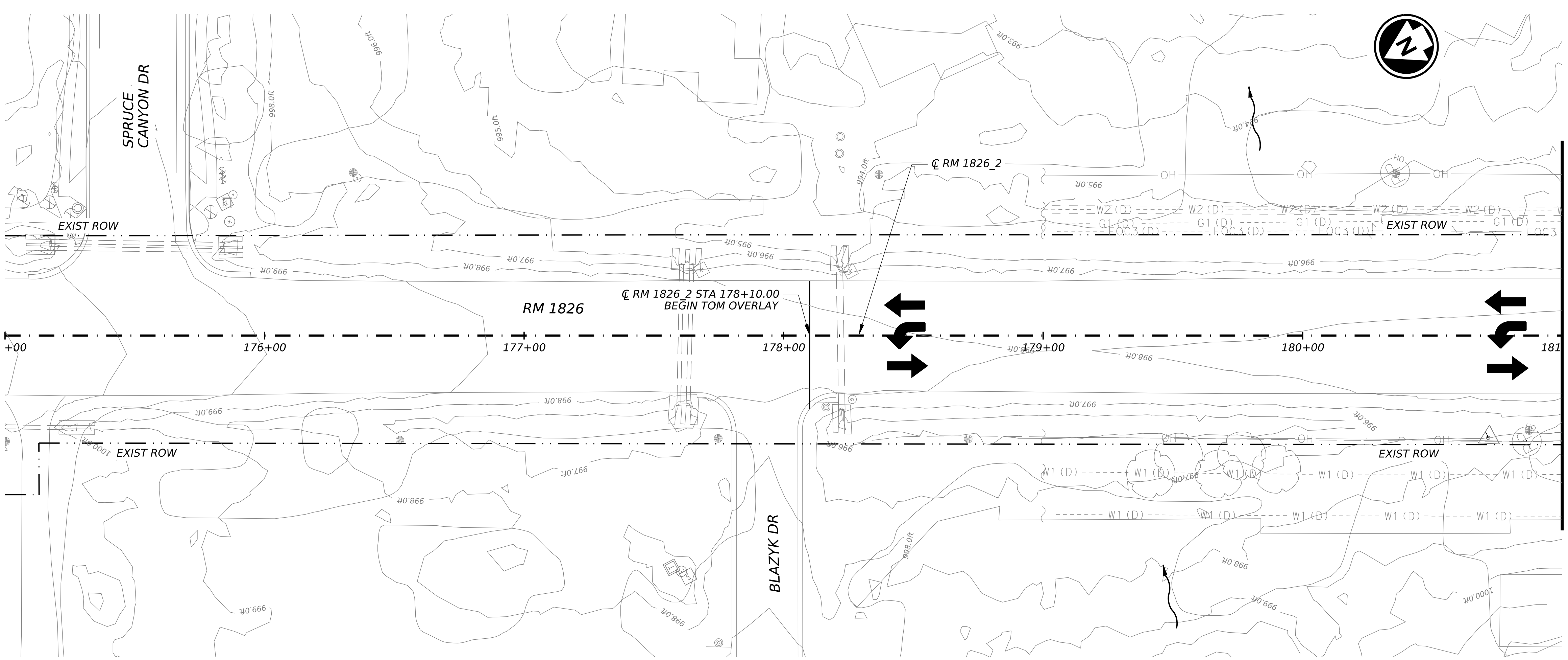

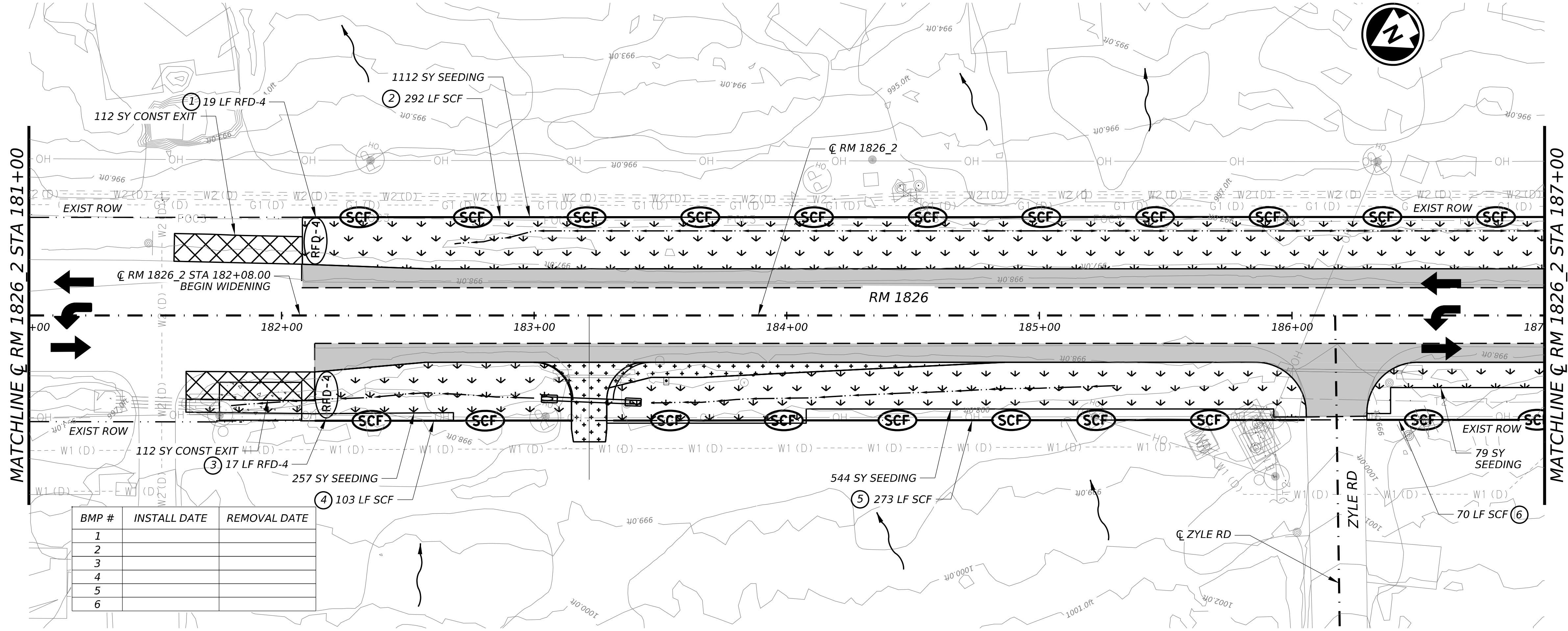

BMP #	INSTALL DATE	REMOVAL DATE
1		
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LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
⬚	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
↜	FLOW DIRECTION
→••	PROPOSED DITCH
Ⓧ	BMP NUMBER

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RM 1826

EROSION CONTROL LAYOUT

ZYLE RD

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	194

DATE: 5/31/2023 1:41:00 AM
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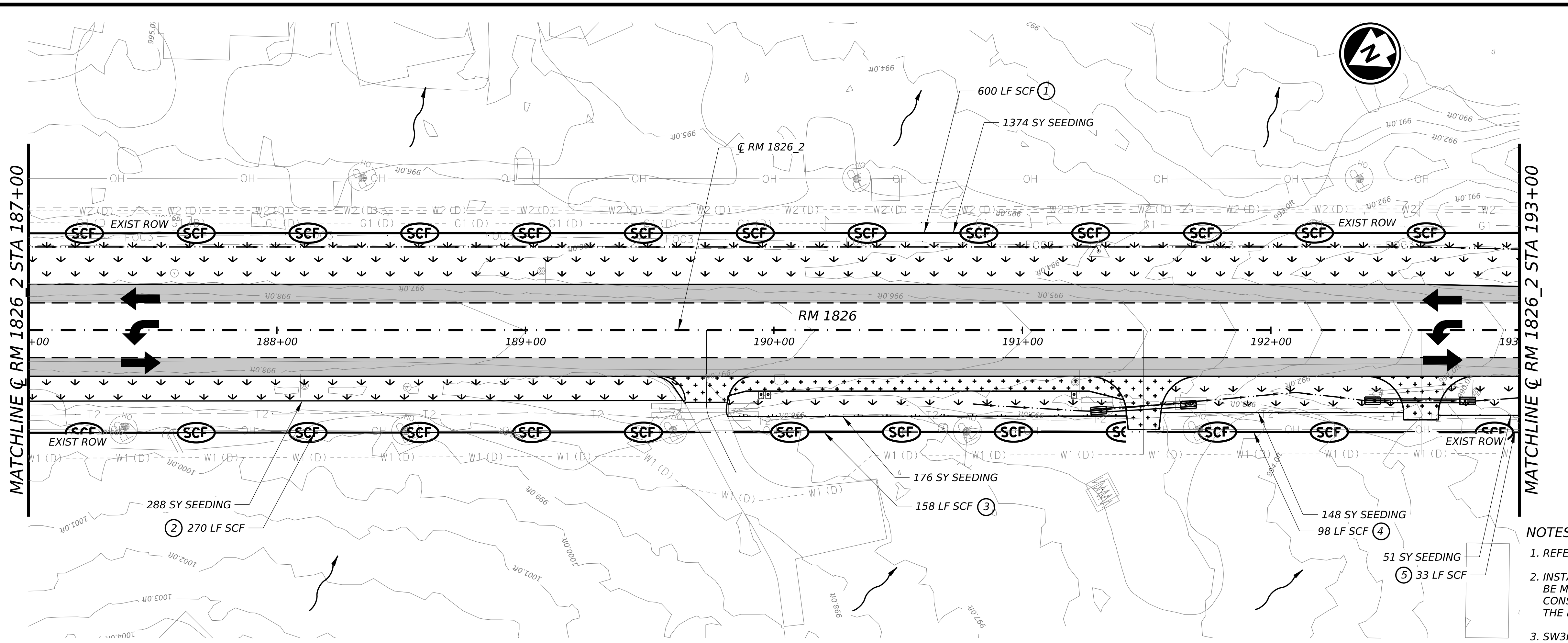

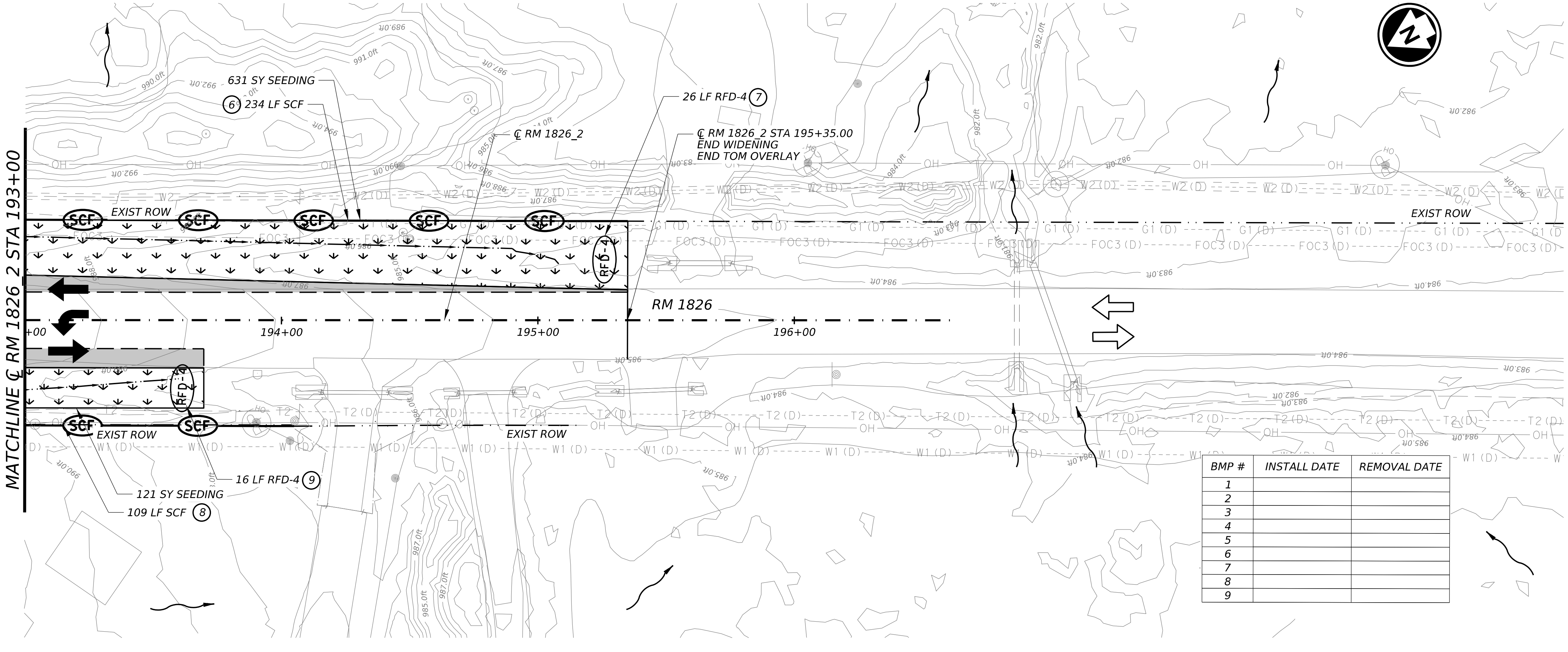

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
—(SCF)—	SILT FENCE
—(RFD-2)—	TEMPORARY ROCK FILTER DAM (TY 2)
—(RFD-4)—	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▦	CONSTRUCTION EXIT (TY 1)
▩	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
↜	FLOW DIRECTION
—►••	PROPOSED DITCH
Ⓧ	BMP NUMBER

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HORZ. SCALE 1"=50'

BMP #	INSTALL DATE	REMOVAL DATE
1		
2		
3		
4		
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9		

ALFREDO L. LOPEZ
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Alfred Lopez

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RM 1826

EROSION CONTROL LAYOUT
ZYLE RD

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	195

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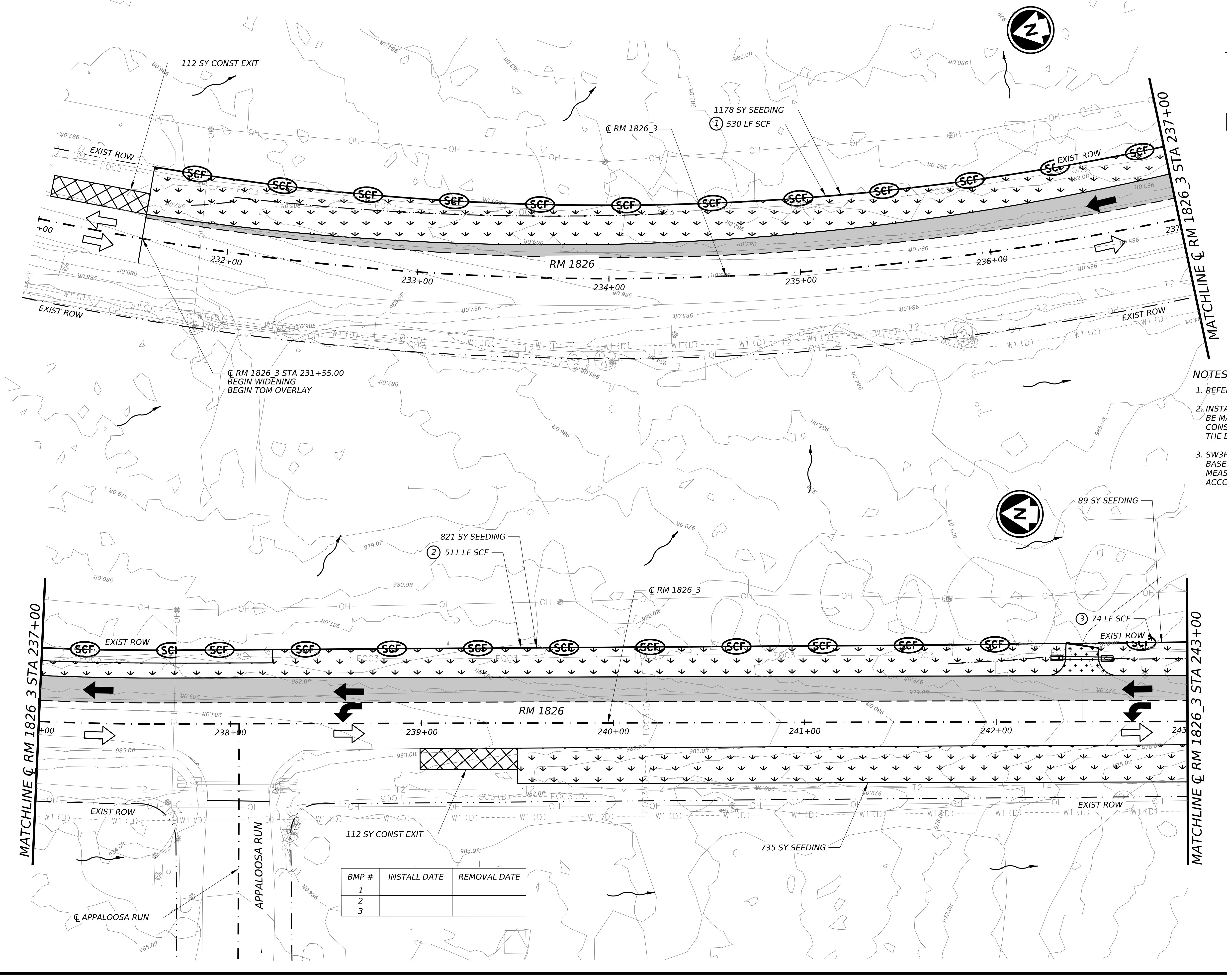

BMP #	INSTALL DATE	REMOVAL DATE
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LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
▩	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
←	FLOW DIRECTION
→●●	PROPOSED DITCH
ⓧ	BMP NUMBER

NOTES:

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25' 0 25' 50'
HORZ. SCALE 1"=50'

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Texas Department of Transportation

RM 1826

EROSION CONTROL LAYOUT
APPALOOSA RUN

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	196

DATE: 5/31/2023 1:41:00 AM
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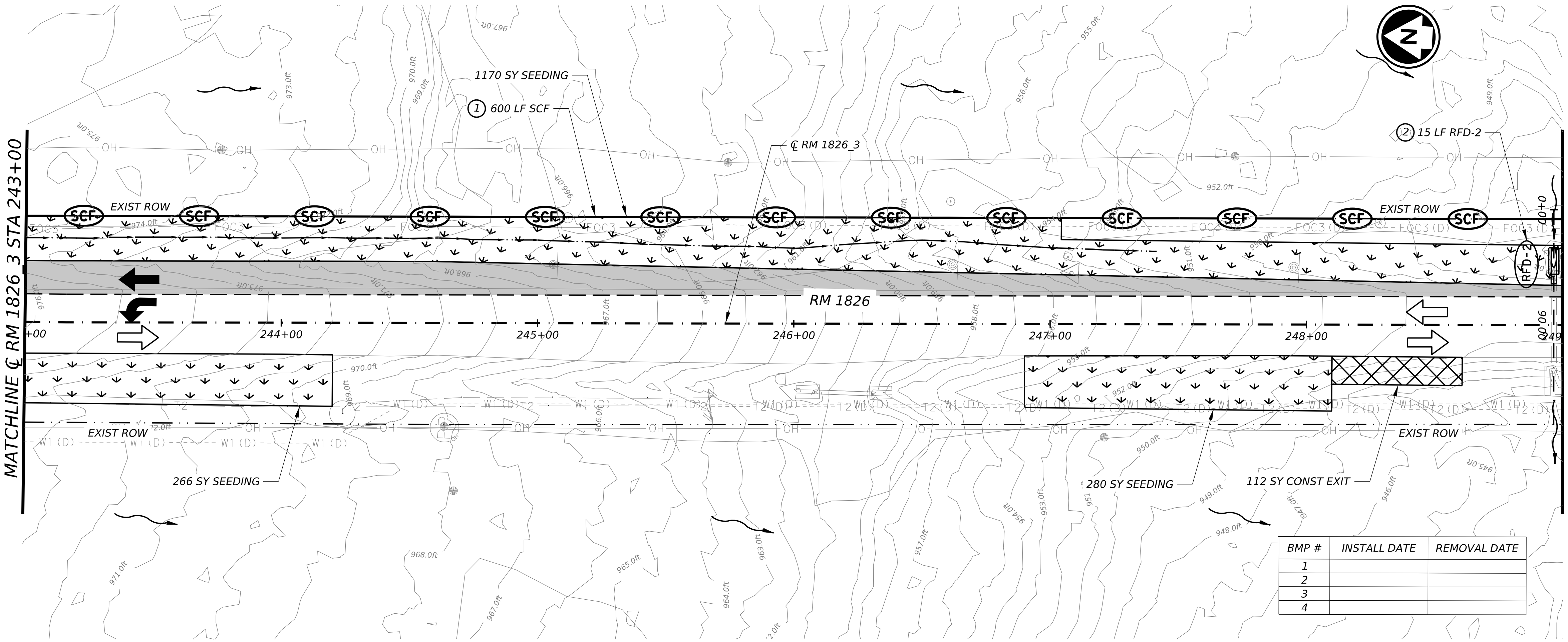

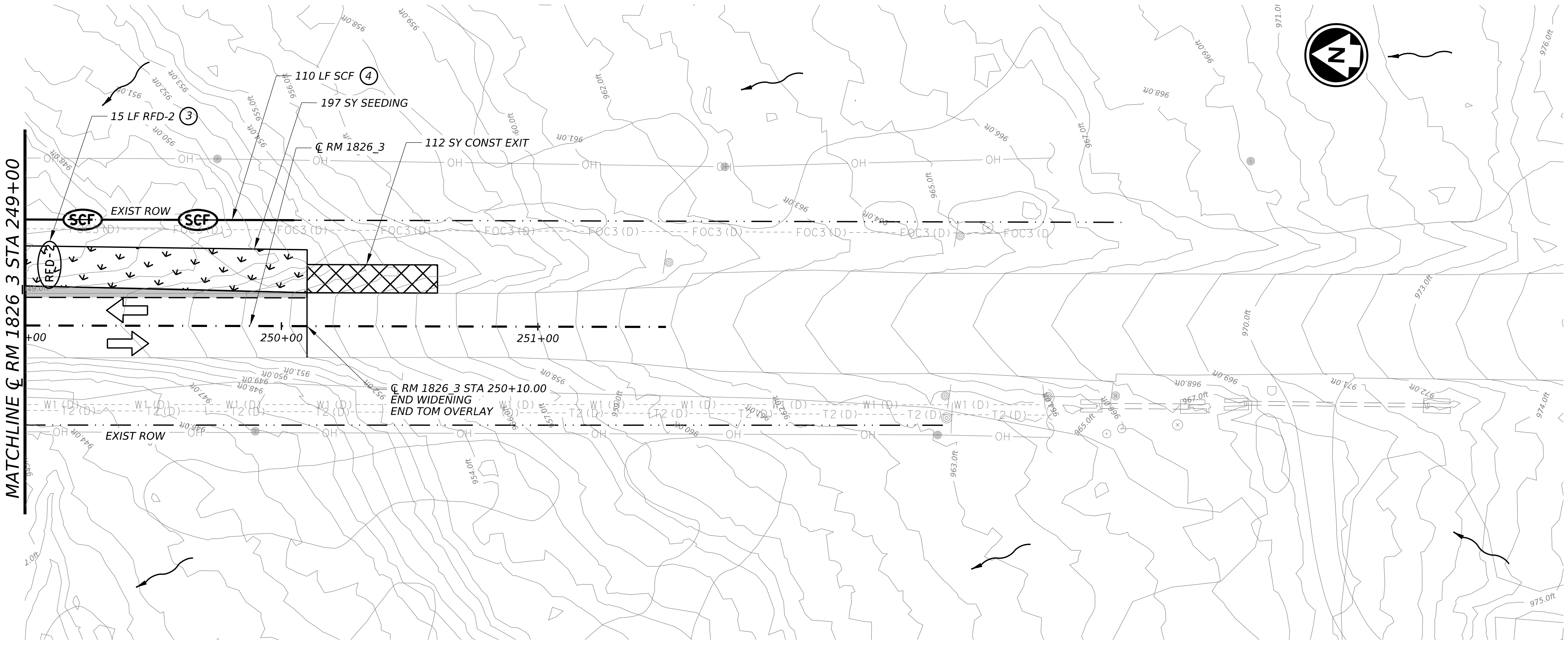

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
∼	FLOW DIRECTION
→••	PROPOSED DITCH
Ⓧ	BMP NUMBER

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BMP #	INSTALL DATE	REMOVAL DATE
1		
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25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

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SUITE 400
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RM 1826

EROSION CONTROL LAYOUT
APPALOOSA RUN

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	197

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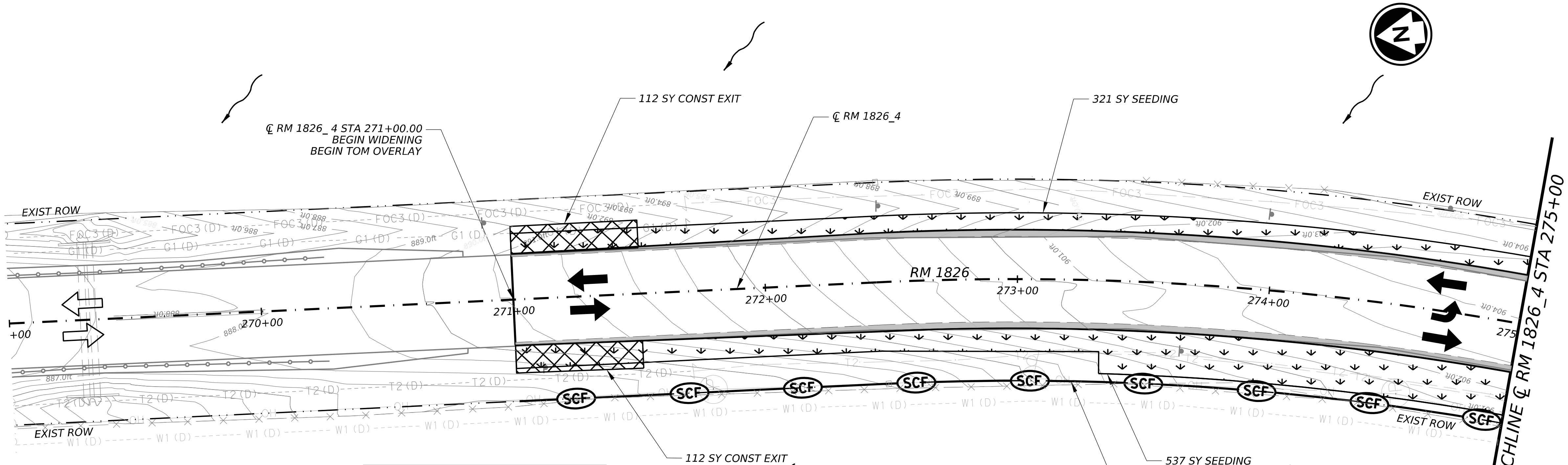

BMP #	INSTALL DATE	REMOVAL DATE
1		
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LEGEND

⇦ EXISTING DIRECTION OF TRAFFIC

⬅ PROPOSED DIRECTION OF TRAFFIC

SCF SILT FENCE

RFD-2 TEMPORARY ROCK FILTER DAM (TY 2)

RFD-4 TEMPORARY ROCK FILTER DAM (TY 4)

▨ PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING

▩ CONSTRUCTION EXIT (TY 1)

▒ PROPOSED PAVEMENT WIDENING

—997.0— EXISTING 1-FT CONTOURS

FLOW DIRECTION

→•• PROPOSED DITCH

Ⓧ BMP NUMBER

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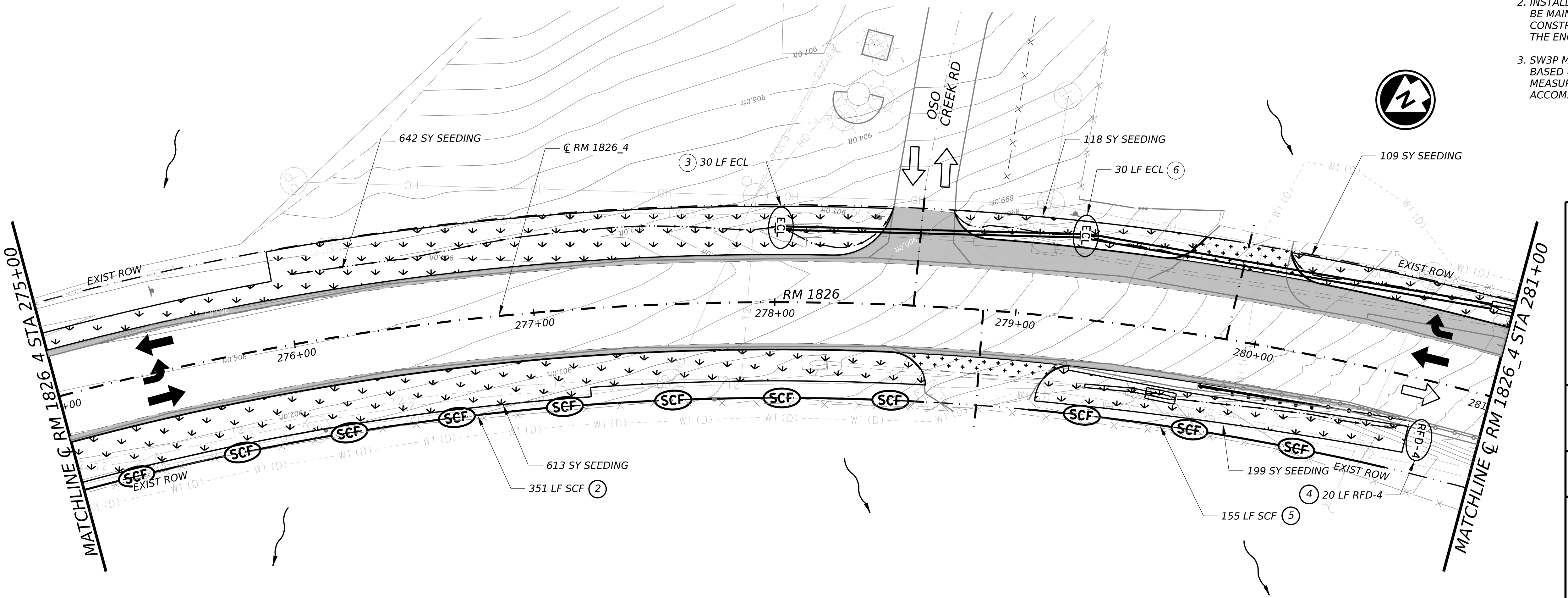

25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023

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(972) 377-7480
FIRM REGISTRATION NO. 5713

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RM 1826

EROSION CONTROL LAYOUT
OSO CREEK RD

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	198

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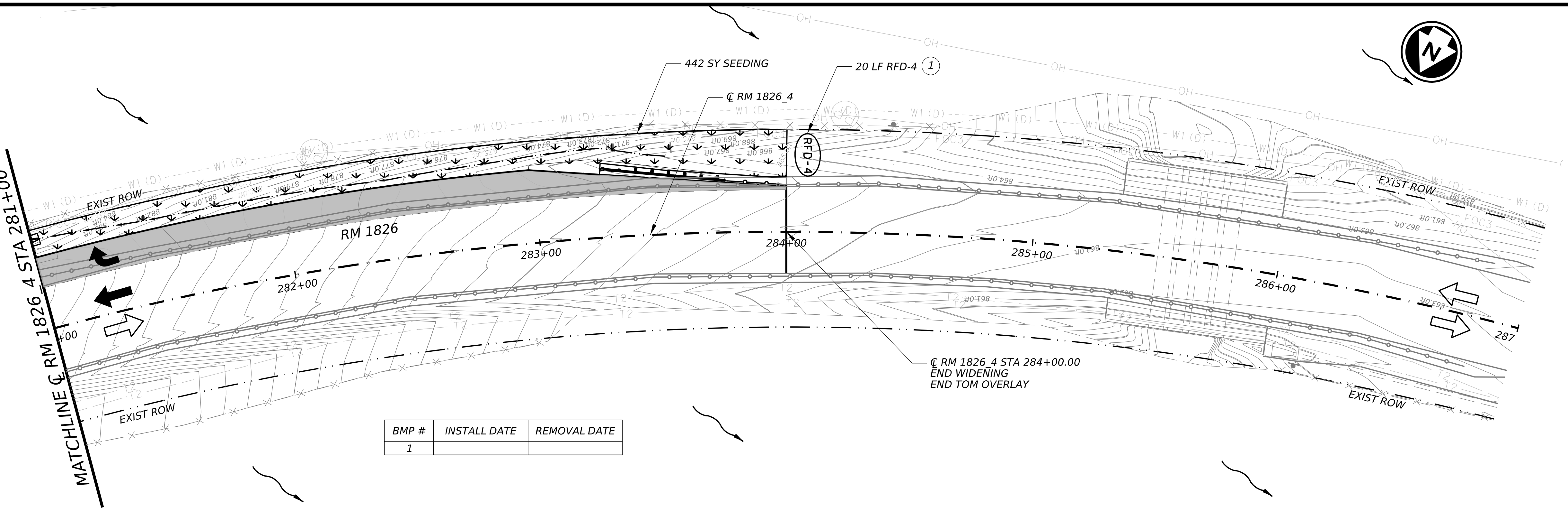

BMP #	INSTALL DATE	REMOVAL DATE
1		

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
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▩	CONSTRUCTION EXIT (TY 1)
▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
↜	FLOW DIRECTION
➤••	PROPOSED DITCH
Ⓧ	BMP NUMBER

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101155
5/30/2023

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SUITE 400
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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

EROSION CONTROL LAYOUT
OSO CREEK RD

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	199

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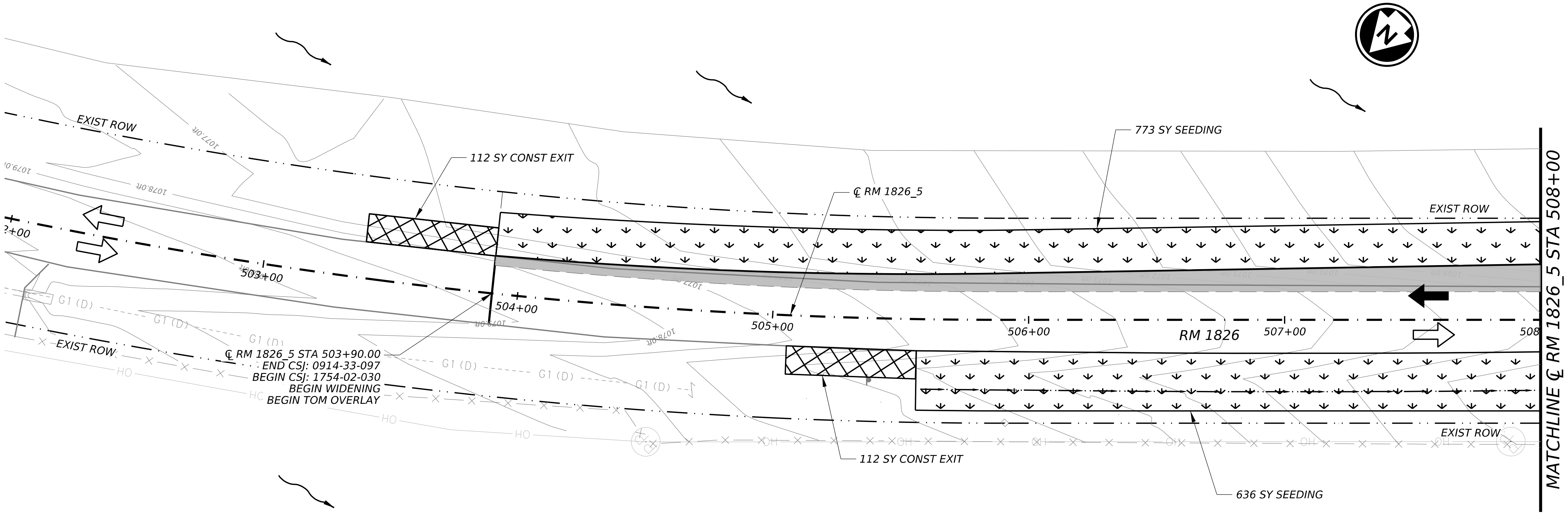

LEGEND

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⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
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▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
↜	FLOW DIRECTION
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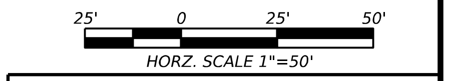

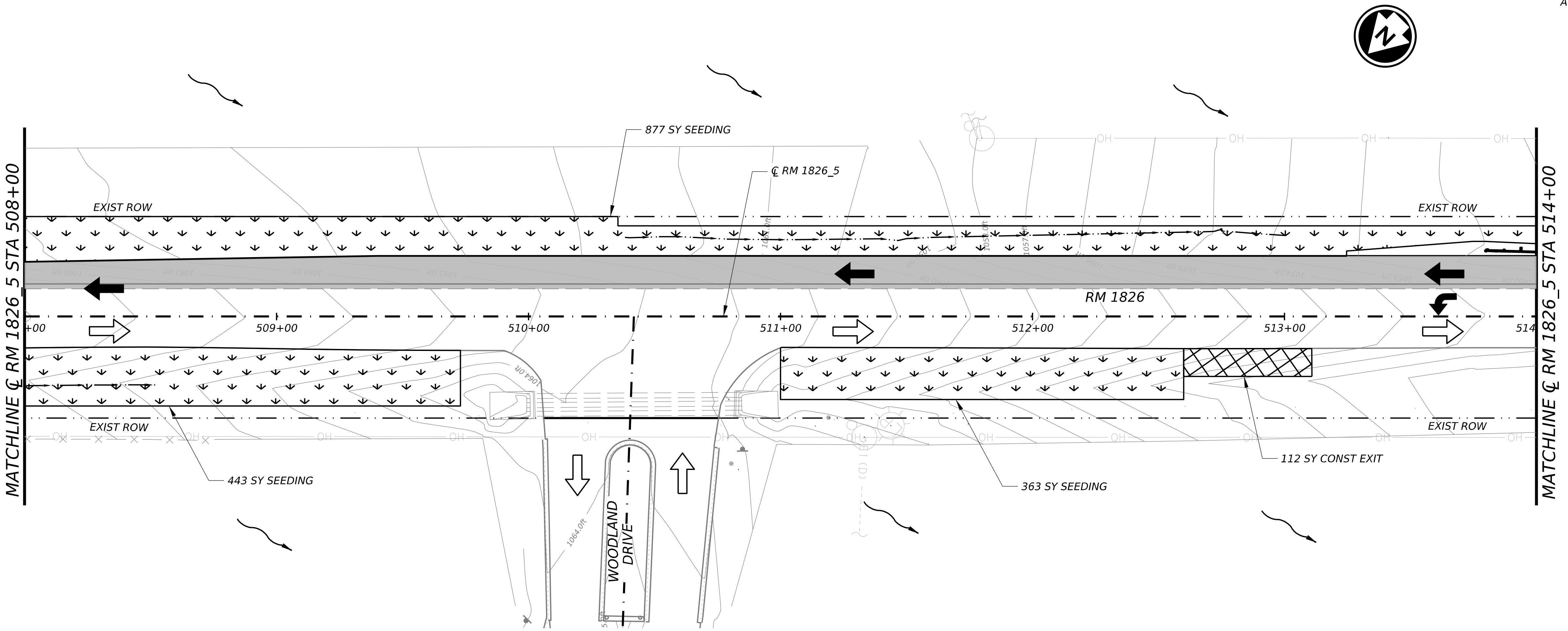

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5/30/2023
Alfredo Lopez

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FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

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RM 1826

EROSION CONTROL LAYOUT
WOODLAND / TOWERING CEDAR

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	200

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DATE: 5/30/2023 1:29:30 PM
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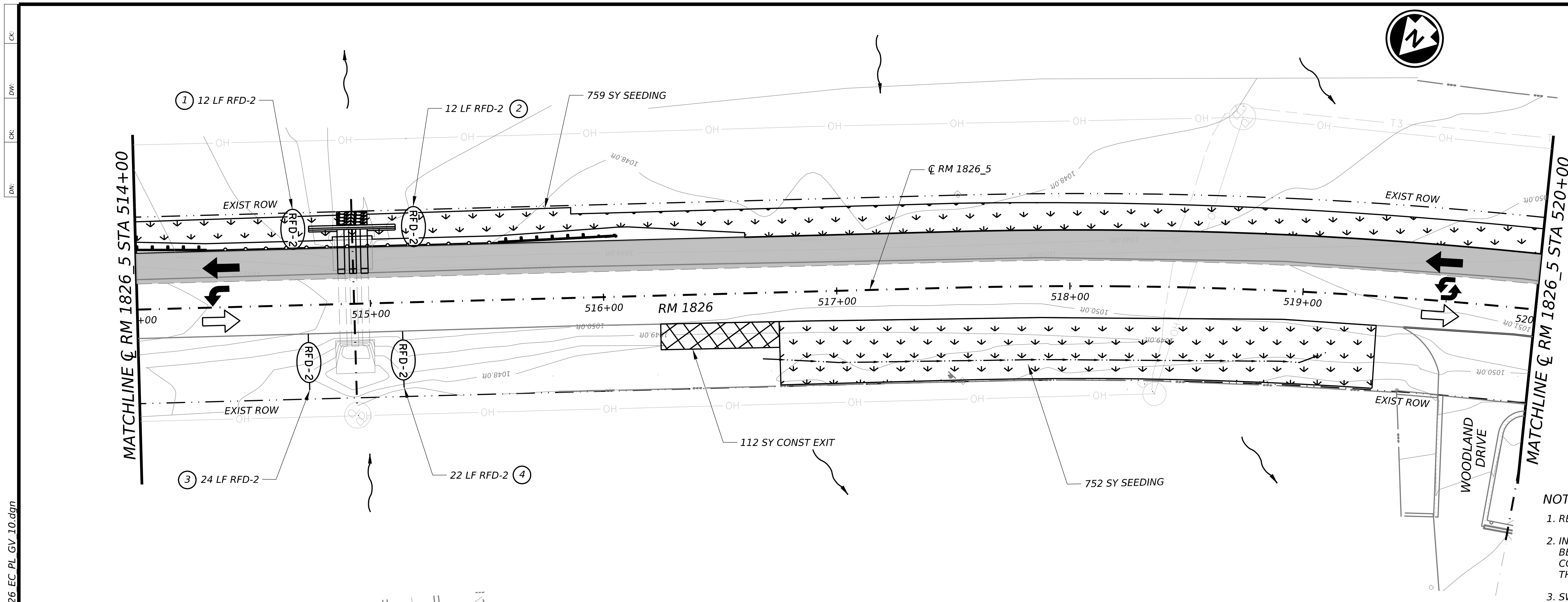

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
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—997.0—	EXISTING 1-FT CONTOURS
⟿	FLOW DIRECTION
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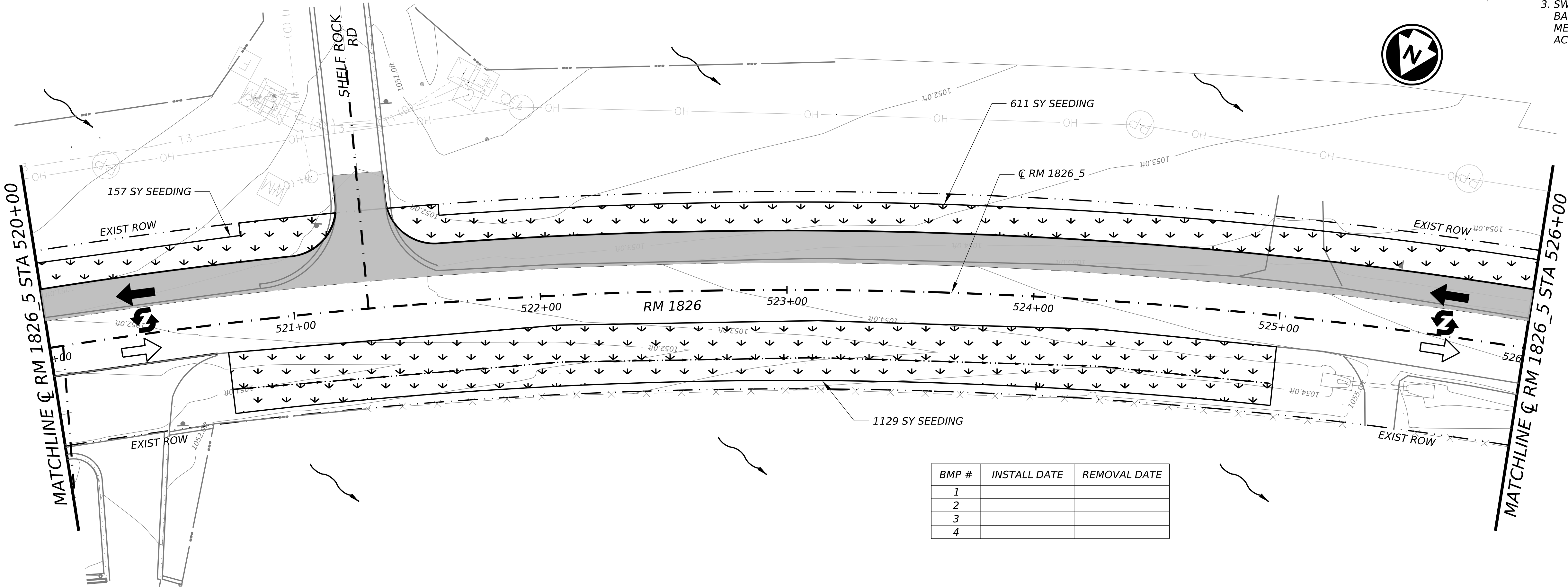

BMP #	INSTALL DATE	REMOVAL DATE
1		
2		
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25' 0 25' 50'

HORZ. SCALE 1"=50'

STATE OF TEXAS
ALFREDO L. LOPEZ
101155
LICENSED PROFESSIONAL ENGINEER
5/30/2023

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SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

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Texas Department of Transportation

RM 1826

EROSION CONTROL LAYOUT
WOODLAND / TOWERING CEDAR

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	201

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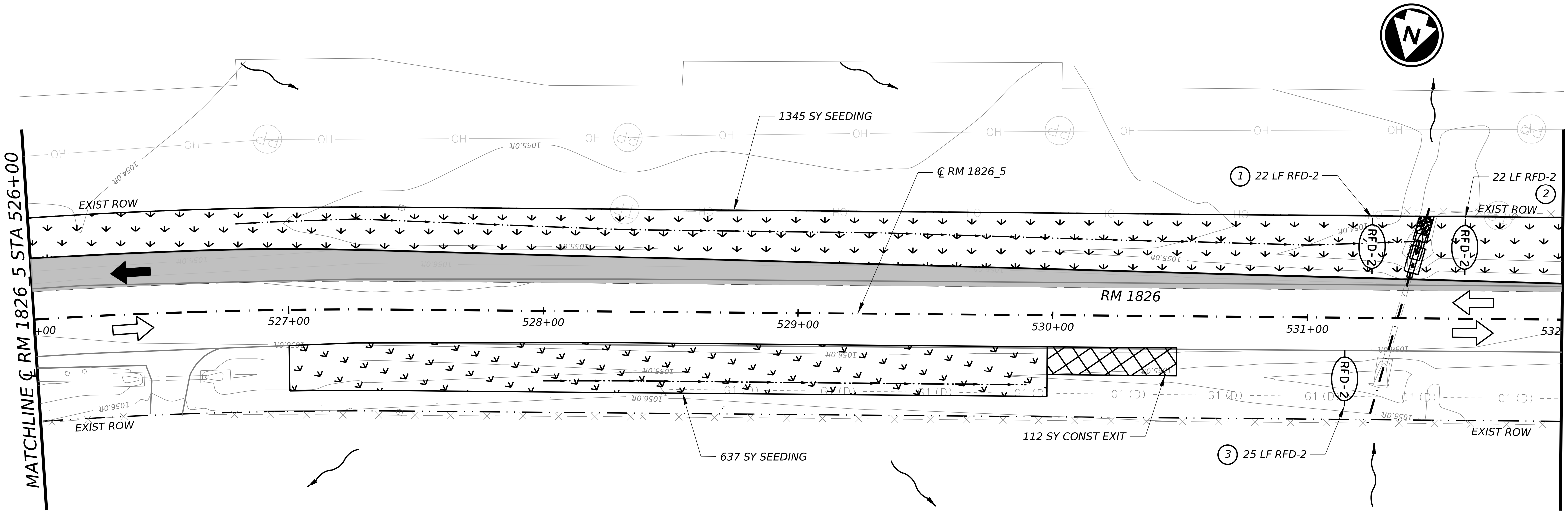
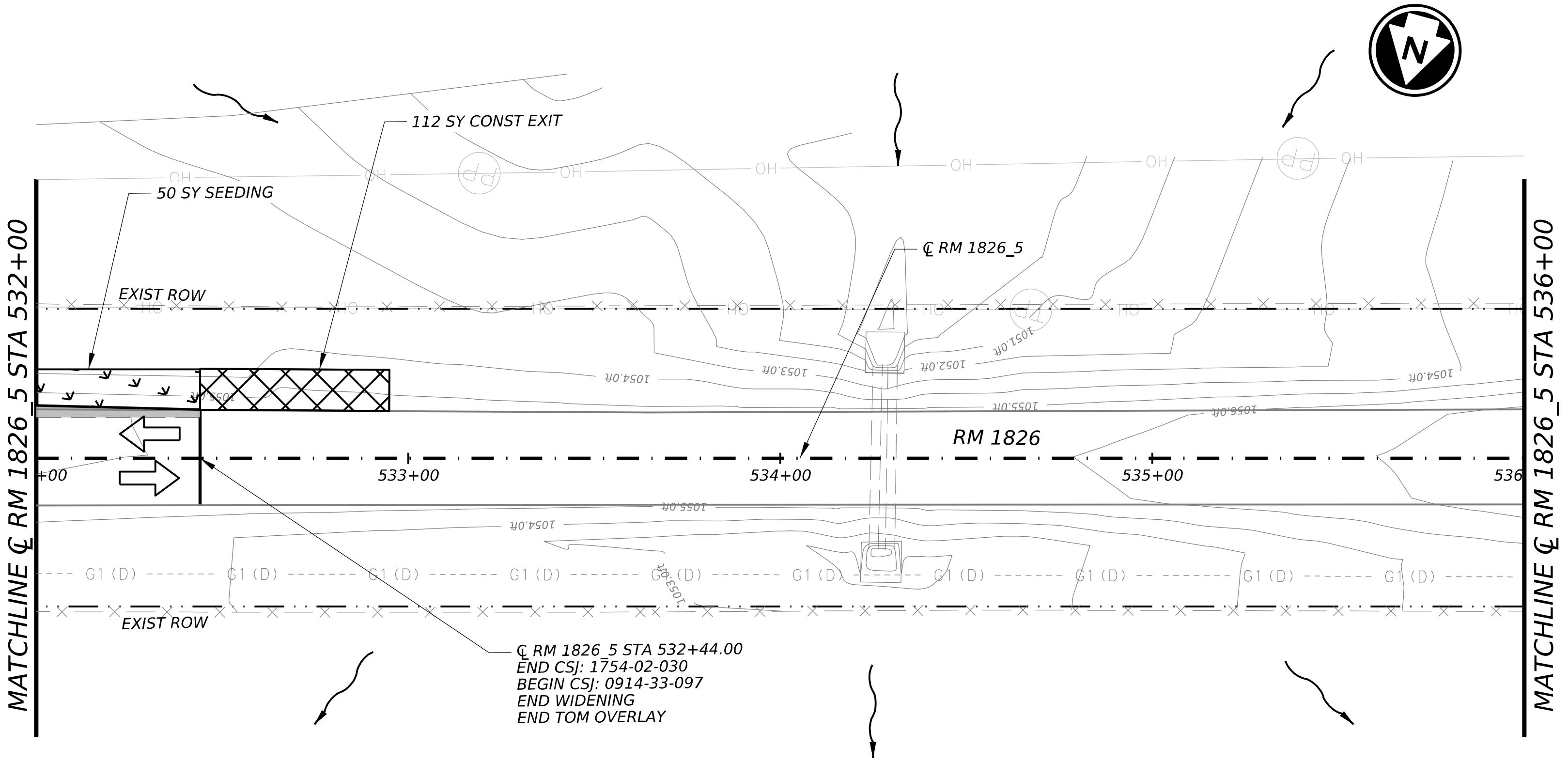


BMP #	INSTALL DATE	REMOVAL DATE
1		
2		
3		



LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▤	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
〜	FLOW DIRECTION
─►••	PROPOSED DITCH
Ⓧ	BMP NUMBER

NOTES:

1. REFER TO SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND SHALL BE MAINTAINED THROUGHOUT DURATION OF THE CONSTRUCTION IN THIS AREA OR AS DIRECTED BY THE ENGINEER.
3. SW3P MEASURES SHOWN ARE MINIMUM REQUIREMENTS BASED UPON PROJECT DESIGN. INSTALLATION OF SW3P MEASURES WILL BE AS SHOWN AND MODIFIED TO ACCOMMODATE ACTUAL FIELD CONDITIONS.

25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023

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RM 1826

EROSION CONTROL LAYOUT
WOODLAND / TOWERING CEDAR

SHEET 3 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	202

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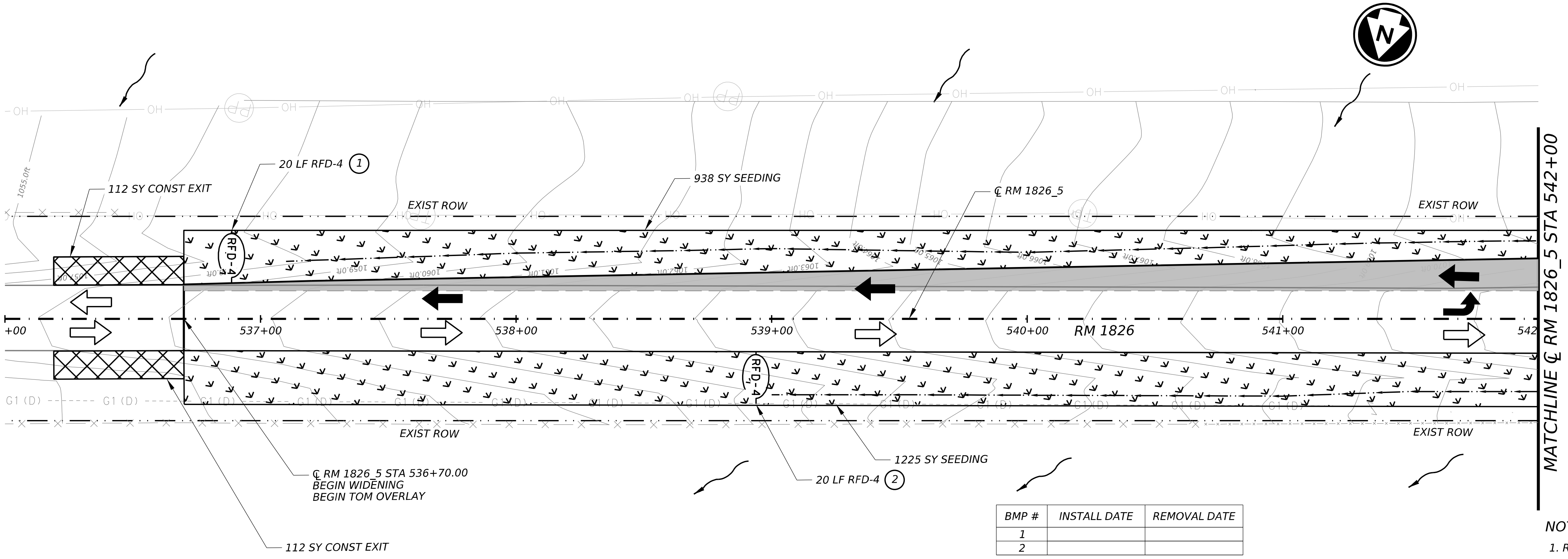

LEGEND

- ⇦ EXISTING DIRECTION OF TRAFFIC
- ⬅ PROPOSED DIRECTION OF TRAFFIC
- (SCF) SILT FENCE
- (RFD-2) TEMPORARY ROCK FILTER DAM (TY 2)
- (RFD-4) TEMPORARY ROCK FILTER DAM (TY 4)
- PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
- ▨ CONSTRUCTION EXIT (TY 1)
- ▩ PROPOSED PAVEMENT WIDENING
- —997.0— EXISTING 1-FT CONTOURS
- FLOW DIRECTION
- PROPOSED DITCH
- (X) BMP NUMBER

BMP #	INSTALL DATE	REMOVAL DATE
1		
2		

NOTES:

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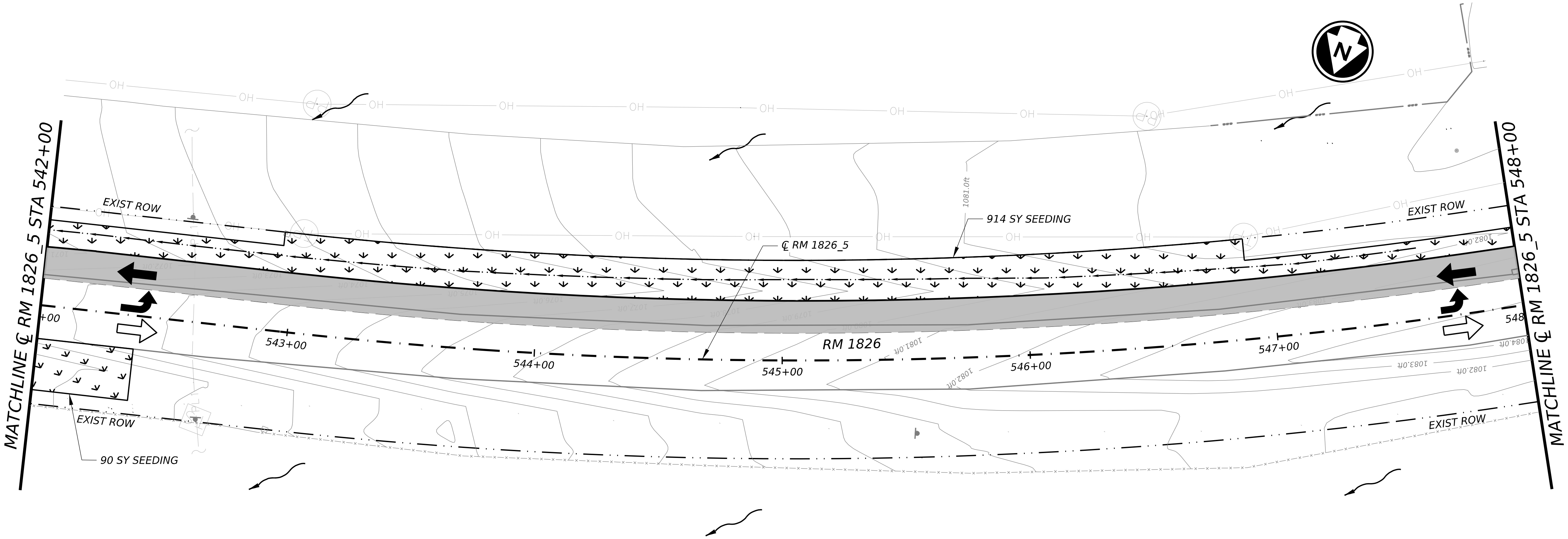

25' 0 25' 50'
HORZ. SCALE 1"=50'

ALFREDO L. LOPEZ
101155
5/30/2023
Alfredo Lopez

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EROSION CONTROL LAYOUT
WOODLAND / TOWERING CEDAR

SHEET 4 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	203

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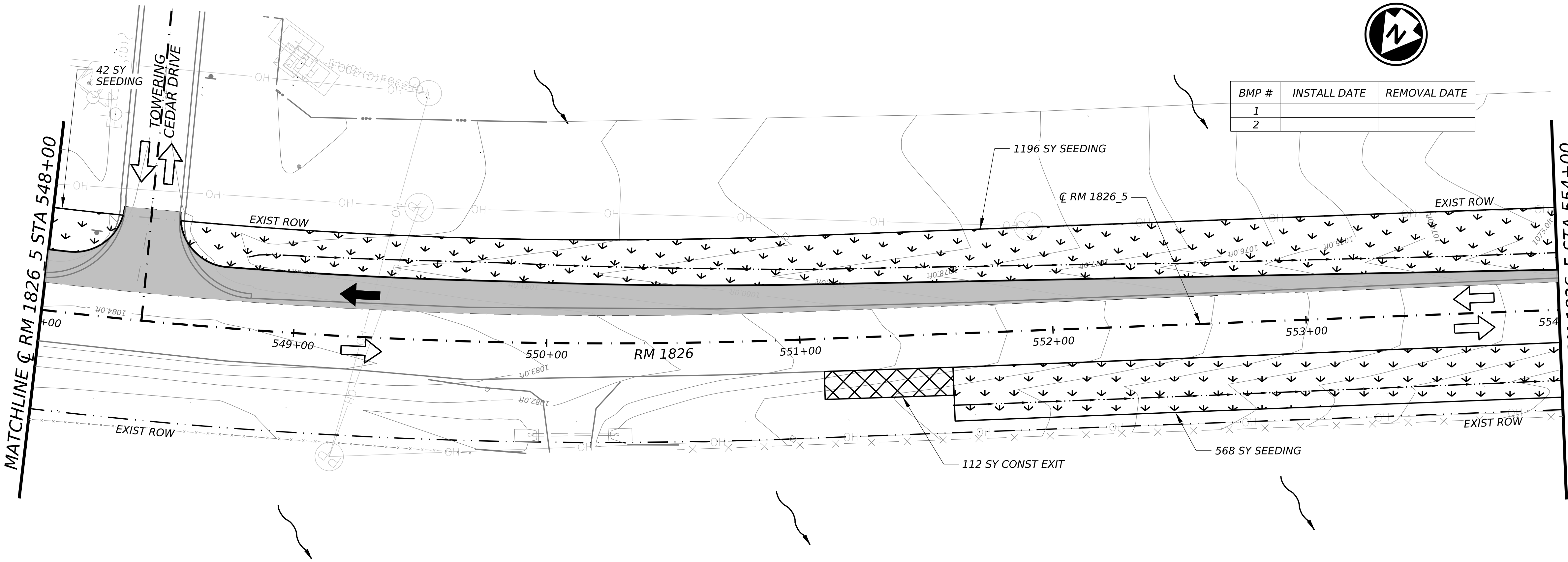

BMP #	INSTALL DATE	REMOVAL DATE
1		
2		

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
SCF	SILT FENCE
RFD-2	TEMPORARY ROCK FILTER DAM (TY 2)
RFD-4	TEMPORARY ROCK FILTER DAM (TY 4)
▨	PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
▩	CONSTRUCTION EXIT (TY 1)
▒	PROPOSED PAVEMENT WIDENING
—997.0—	EXISTING 1-FT CONTOURS
←	FLOW DIRECTION
—►••	PROPOSED DITCH
Ⓧ	BMP NUMBER

NOTES:

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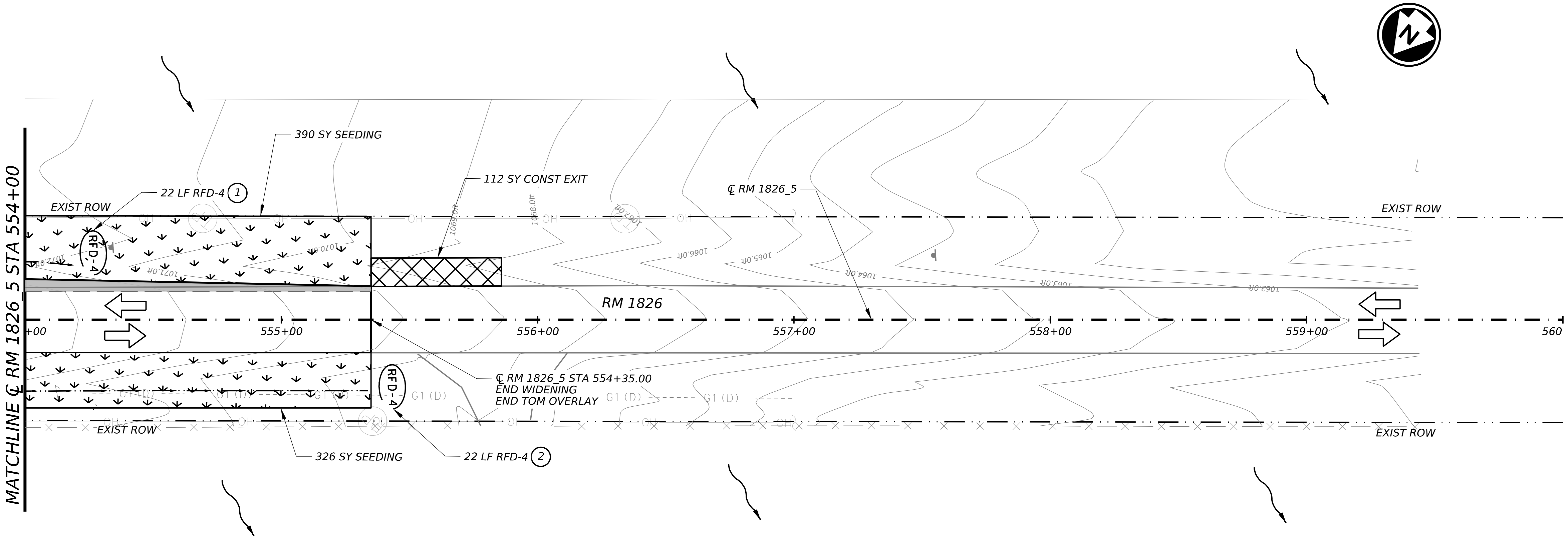

25' 0 25' 50'
HORZ. SCALE 1"=50'

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101155
5/30/2023
Alfredo Lopez

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RM 1826

EROSION CONTROL LAYOUT
WOODLAND / TOWERING CEDAR

SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	204

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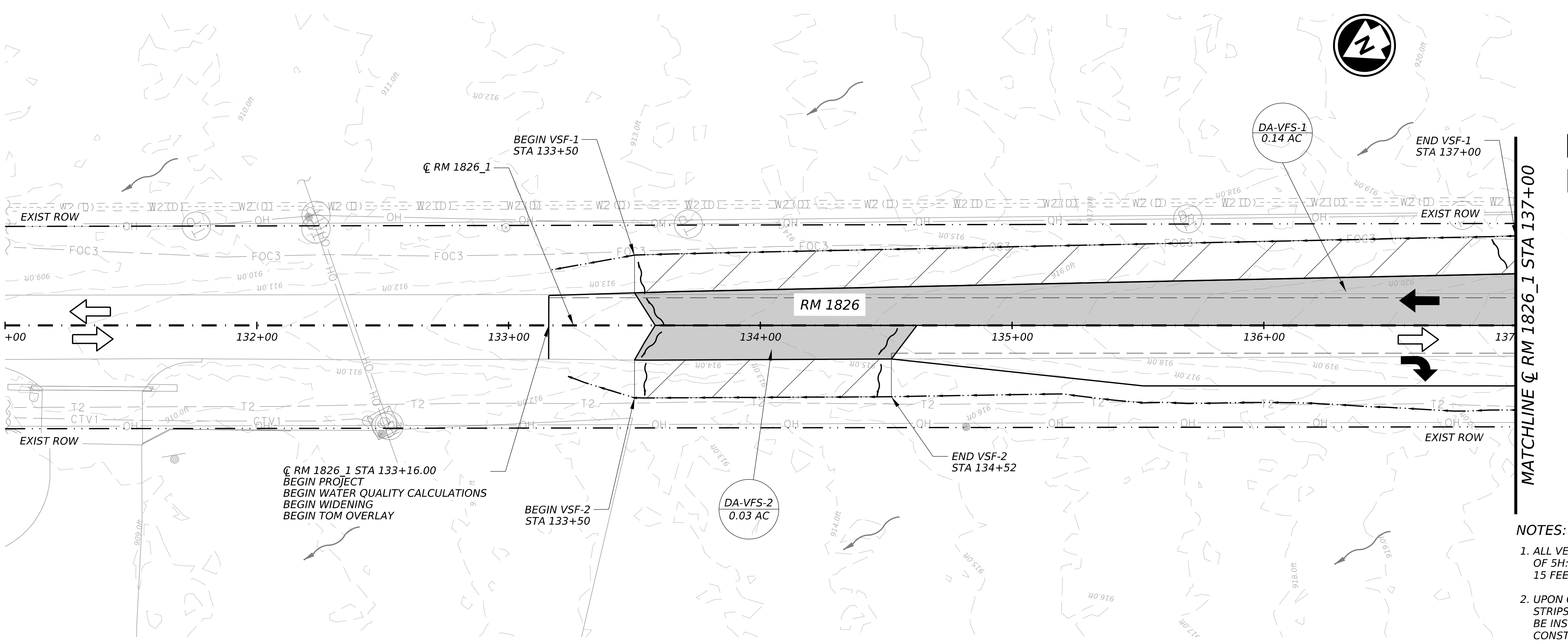
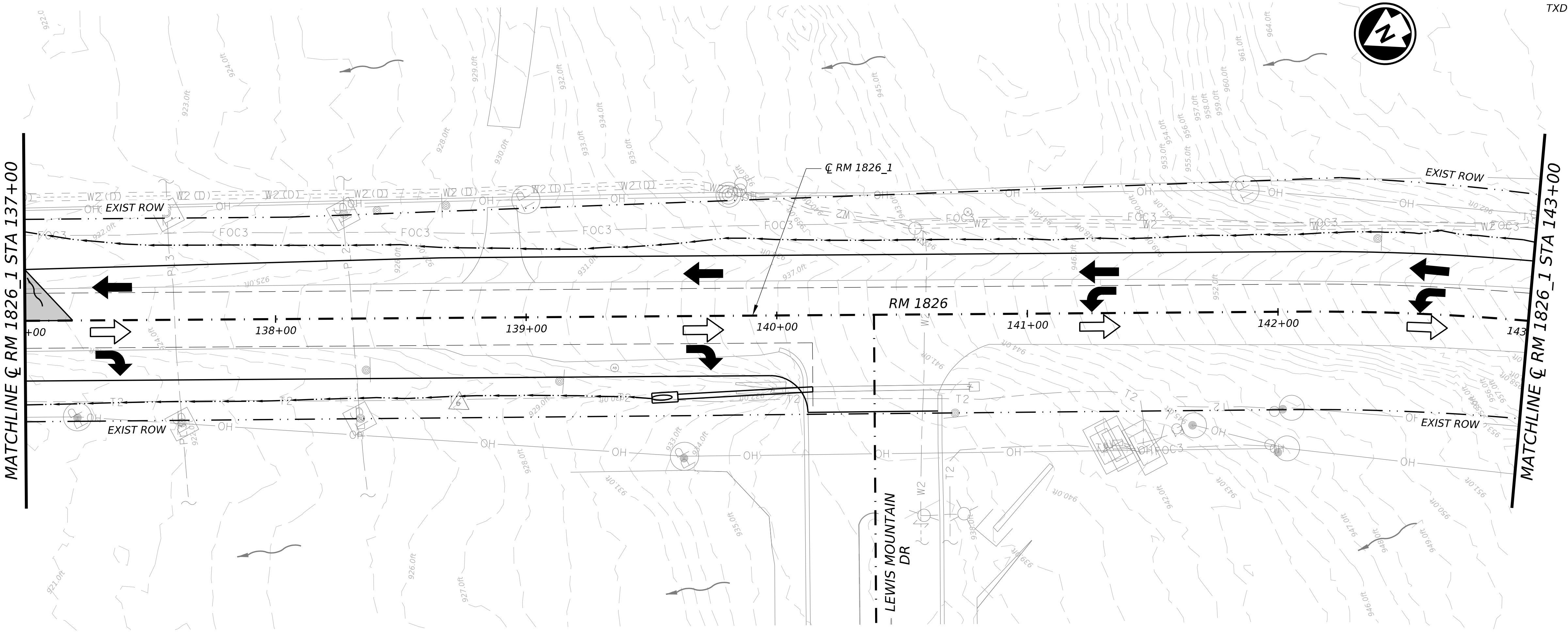


LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
←	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
—·—	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

1. ALL VEGETATIVE FILTER STRIPS SHALL BE AT A MAXIMUM OF 5H:1V SLOPE AWAY FROM THE ROADWAY AND EXTEND 15 FEET FROM THE EDGE OF PAVEMENT.
2. UPON COMPLETION OF CONSTRUCTION, VEGETATIVE FILTER STRIPS SHALL HAVE AT LEAST 80% VEGETATIVE COVER AND BE INSPECTED FOR SEDIMENT GENERATED DURING THE CONSTRUCTION PHASE. ANY CONSTRUCTION PHASE SEDIMENT PRESENT WITHIN THE VFS MUST BE REMOVED PRIOR TO ACCEPTANCE OF THE PROJECT BY THE ENGINEER, TXDOT OR TCEQ.



25' 0 25' 50'
HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023
M.Halani

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RM 1826

WATER QUALITY PLAN
LEWIS MOUNTAIN DR

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	205

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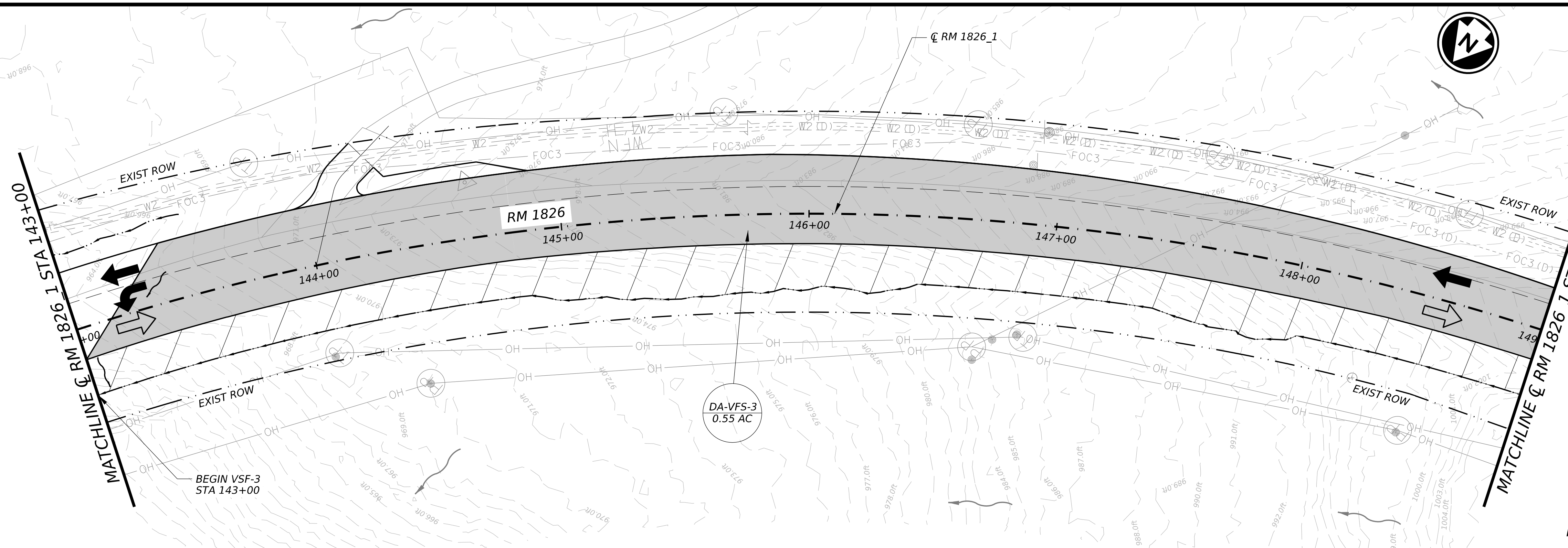

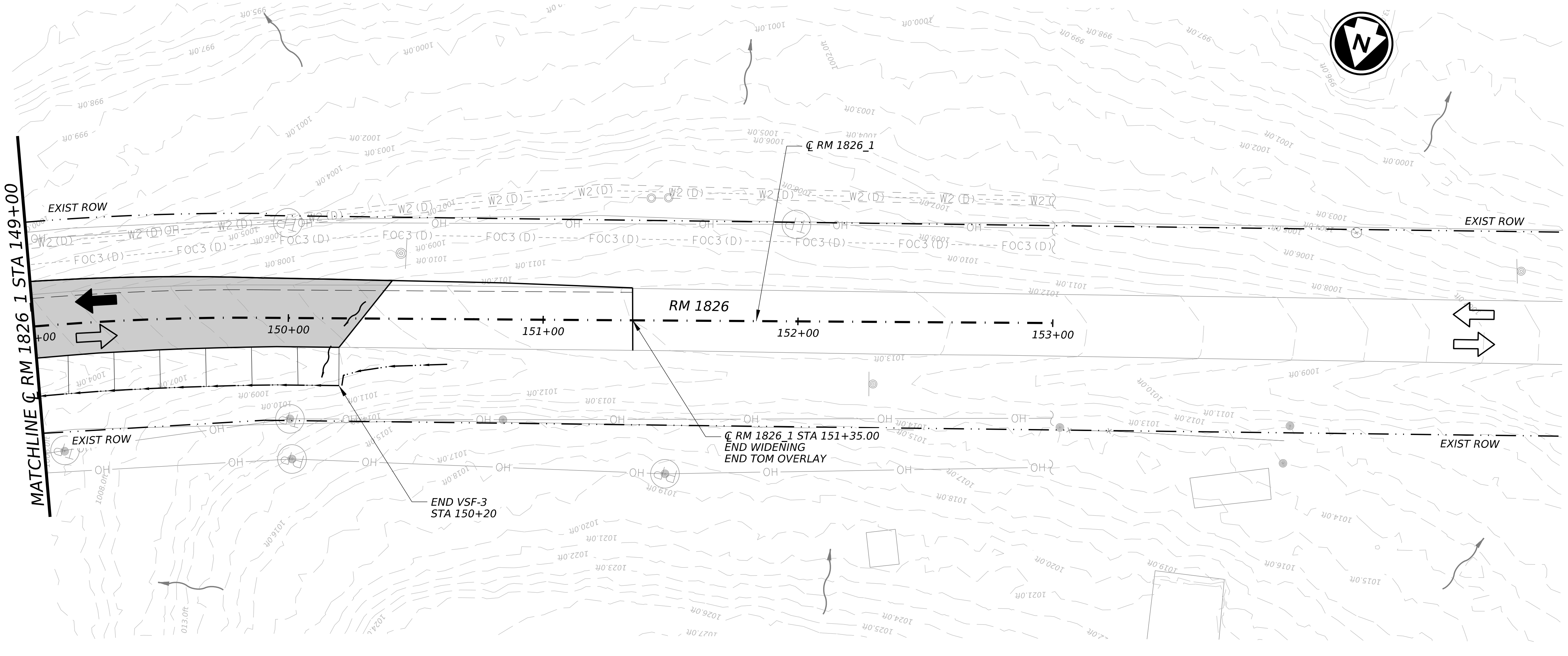

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
←	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
—·—	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

1. ALL VEGETATIVE FILTER STRIPS SHALL BE AT A MAXIMUM OF 5H:1V SLOPE AWAY FROM THE ROADWAY AND EXTEND 15 FEET FROM THE EDGE OF PAVEMENT.
2. UPON COMPLETION OF CONSTRUCTION, VEGETATIVE FILTER STRIPS SHALL HAVE AT LEAST 80% VEGETATIVE COVER AND BE INSPECTED FOR SEDIMENT GENERATED DURING THE CONSTRUCTION PHASE. ANY CONSTRUCTION PHASE SEDIMENT PRESENT WITHIN THE VFS MUST BE REMOVED PRIOR TO ACCEPTANCE OF THE PROJECT BY THE ENGINEER, TXDOT OR TCEQ.

25' 0 25' 50'
HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023
MHalani

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3000 INTERNET BLVD
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FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

WATER QUALITY PLAN
LEWIS MOUNTAIN DR

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	206

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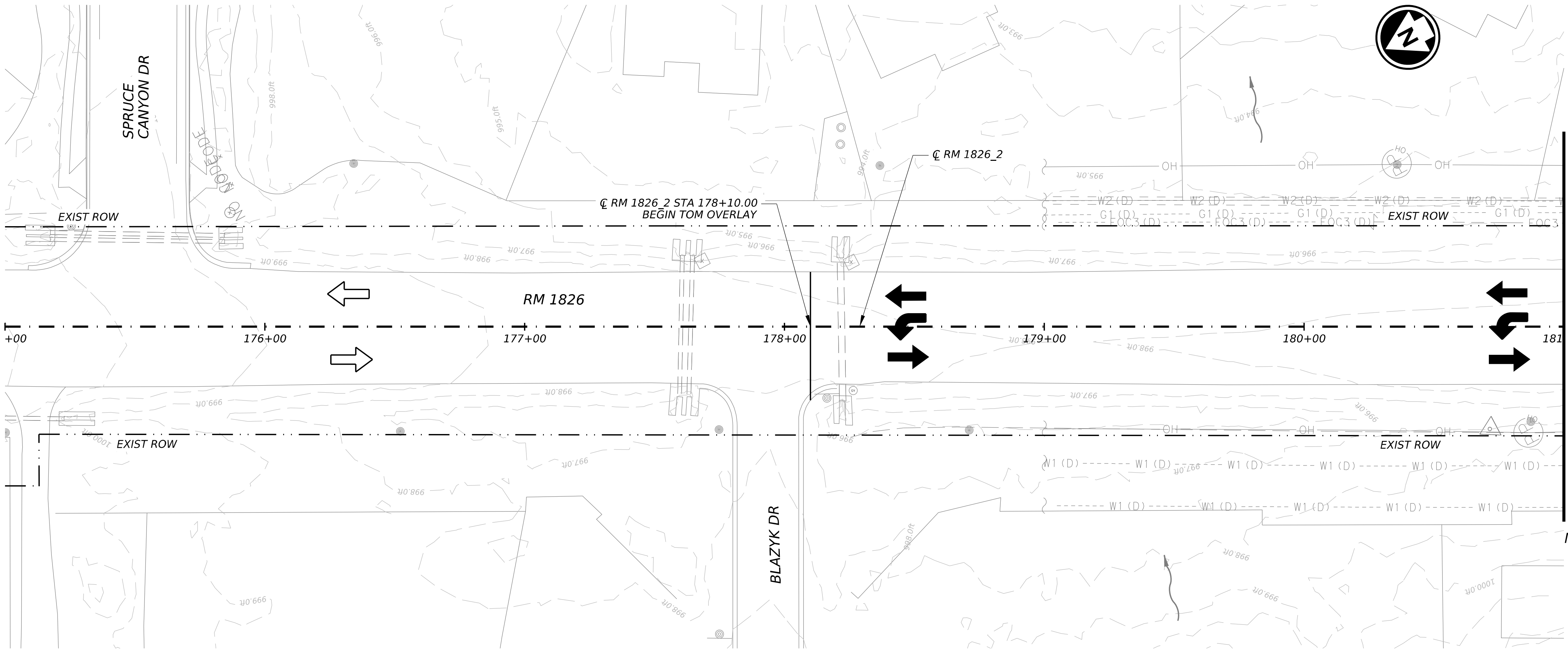

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
←	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
—·—	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

1. ALL VEGETATIVE FILTER STRIPS SHALL BE AT A MAXIMUM OF 5H:1V SLOPE AWAY FROM THE ROADWAY AND EXTEND 15 FEET FROM THE EDGE OF PAVEMENT.
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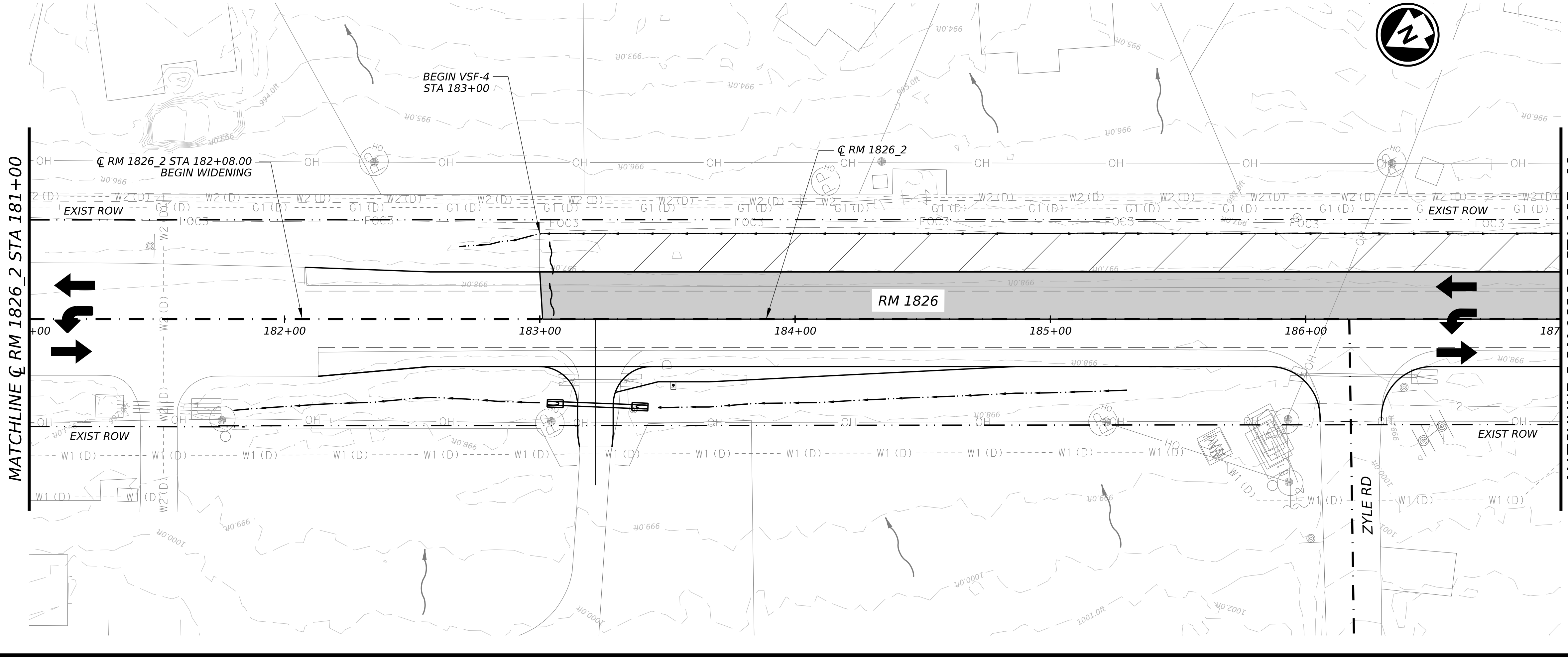

25' 0 25' 50'
HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023

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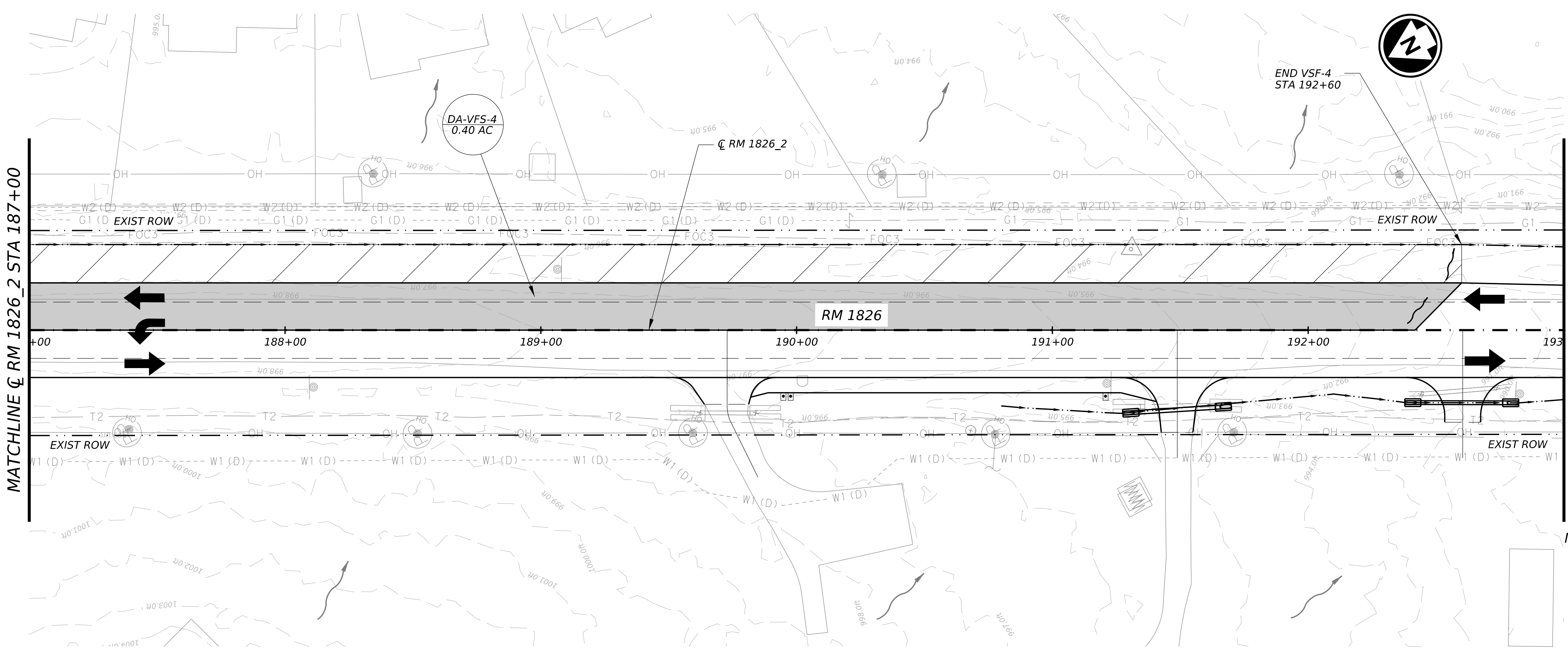
RM 1826

WATER QUALITY PLAN
ZYLE RD

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	207



LEGEND

- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- TREATED IMPERVIOUS COVER
- PROPOSED BMP DRAINAGE AREA
- PROPOSED VEGETATIVE FILTER STRIPS
- EXISTING FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- PROPOSED EDGE OF PAVEMENT
- EXISTING EDGE OF PAVEMENT
- PROPOSED DITCH
- —997.0— EXISTING 1-FT CONTOURS
- DA-VFS-X X.XX AC PROPOSED DRAINAGE AREA ID

NOTES:

1. ALL VEGETATIVE FILTER STRIPS SHALL BE AT A MAXIMUM OF 5H:1V SLOPE AWAY FROM THE ROADWAY AND EXTEND 15 FEET FROM THE EDGE OF PAVEMENT.
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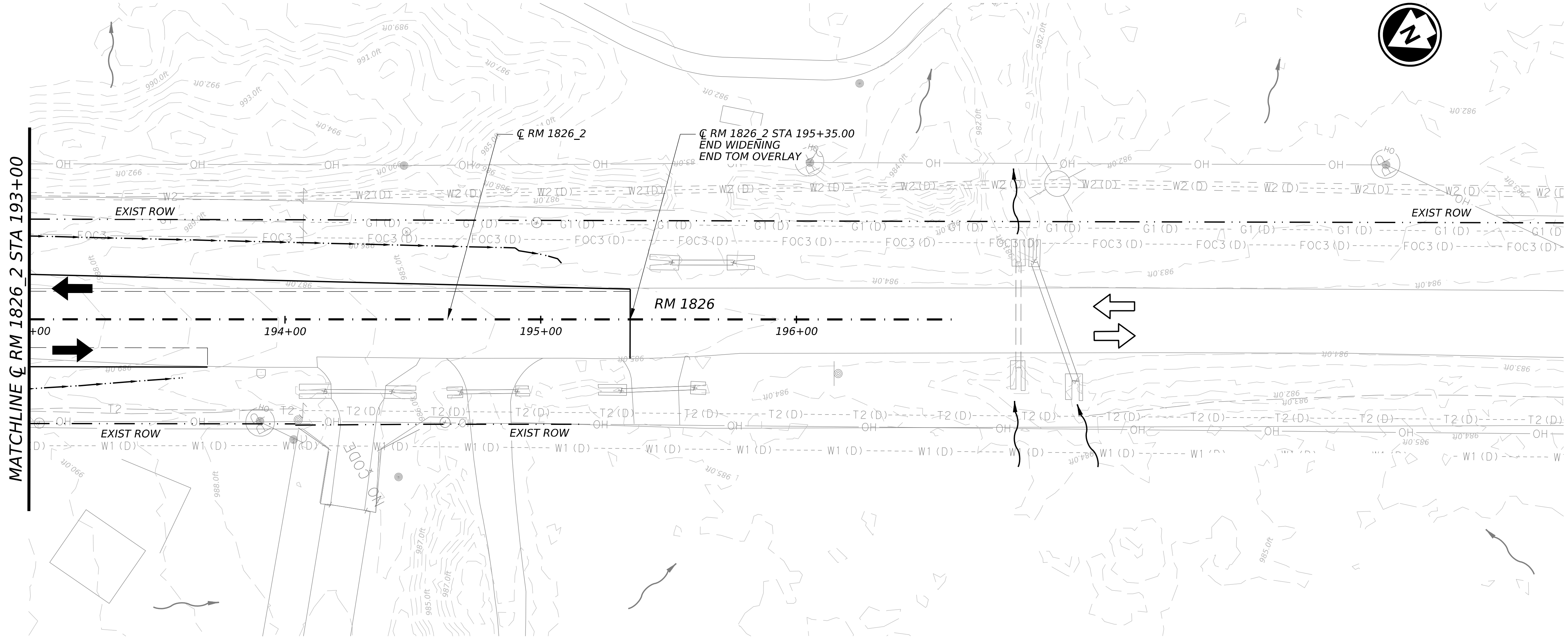

25' 0 25' 50'
HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023

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SUITE 400
FRISCO, TX 75034
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RM 1826

WATER QUALITY PLAN
ZYLE RD

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	208

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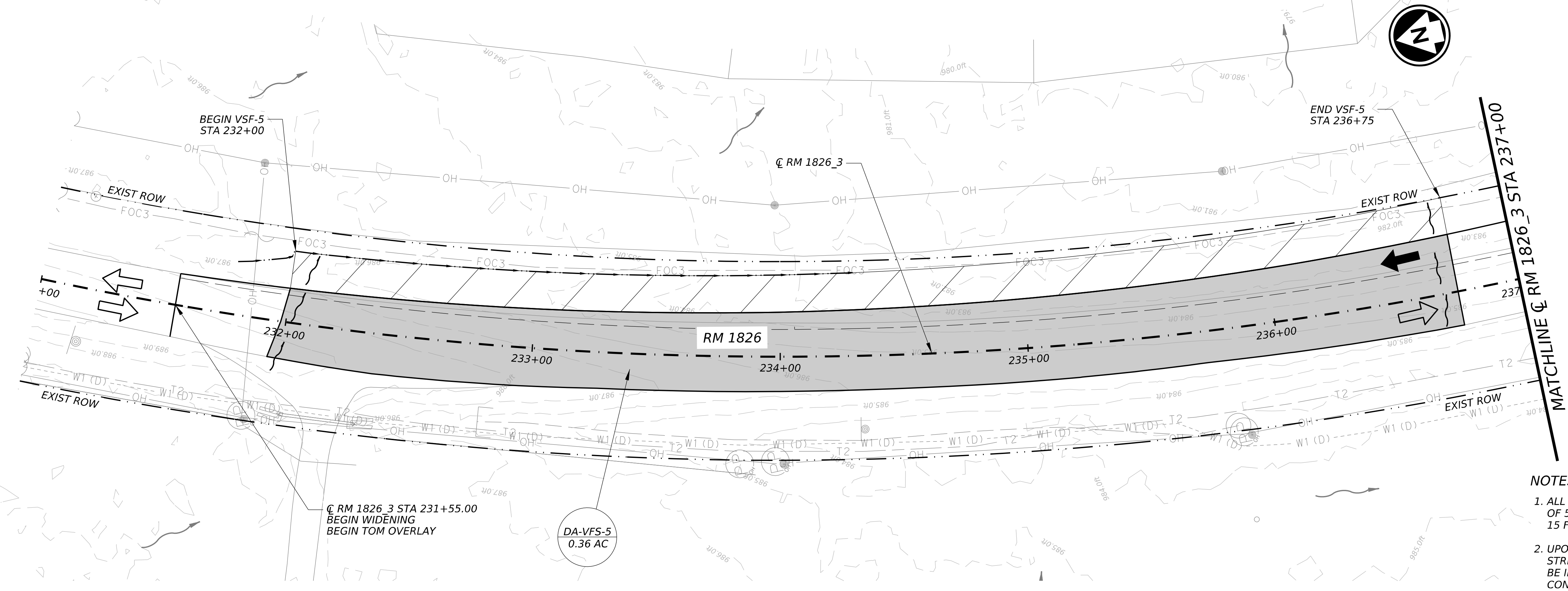

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
←	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
—·—	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

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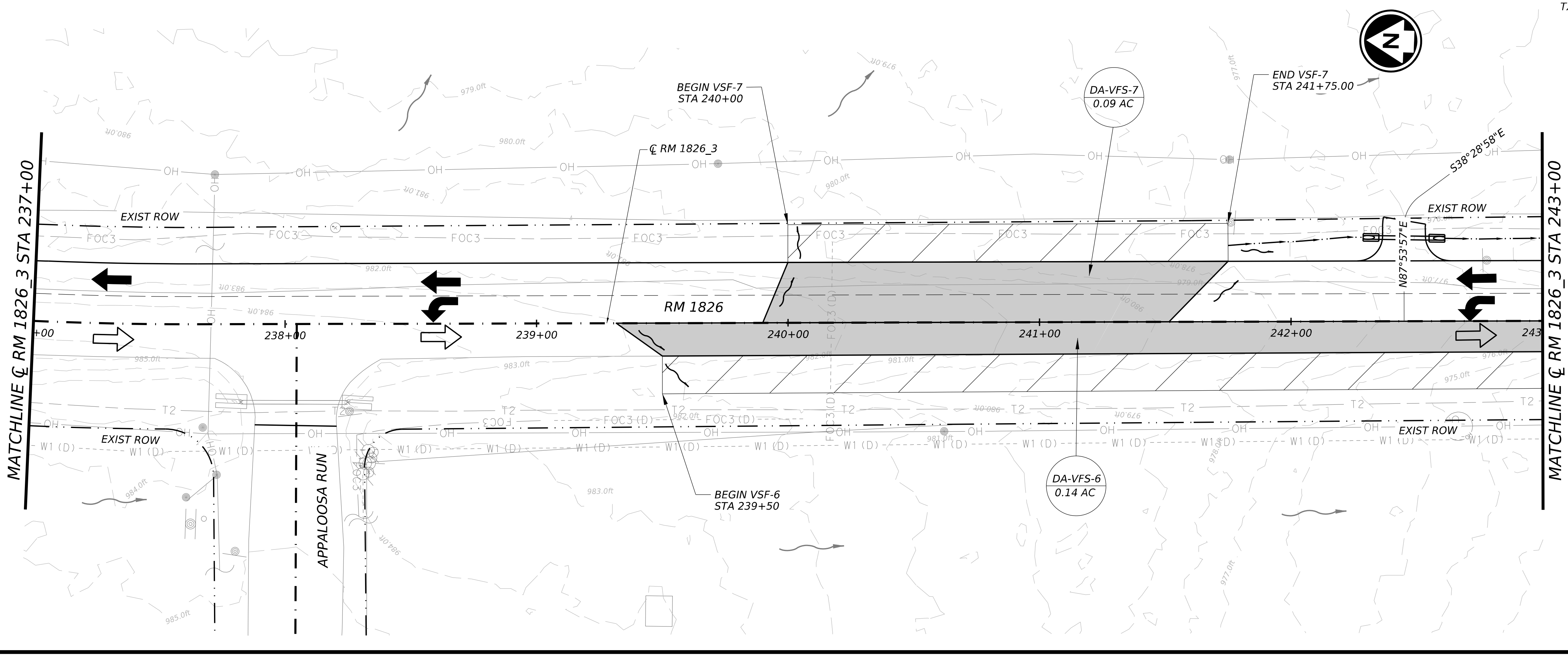

25' 0 25' 50'

HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023
mhalani

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RM 1826

WATER QUALITY PLAN
APPALOOSA RUN

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	209

DATE: 5/30/2023 1:32:21 PM
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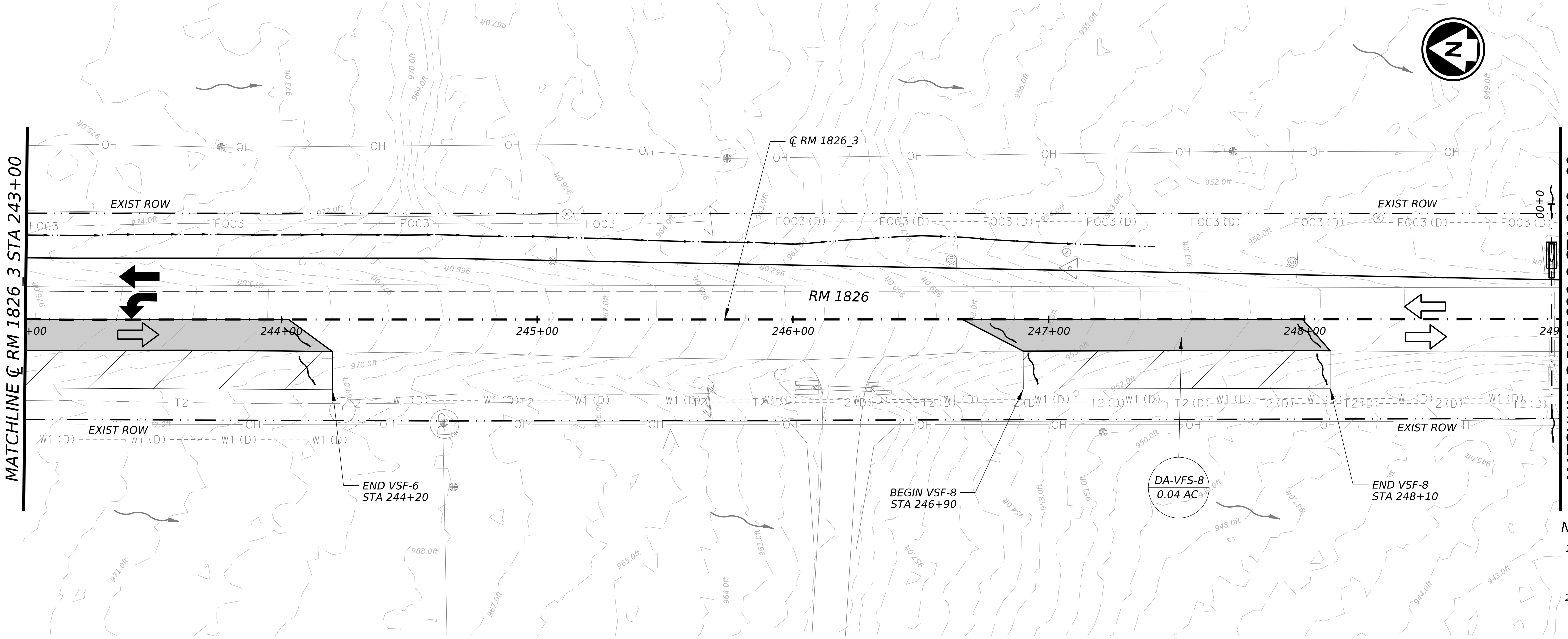

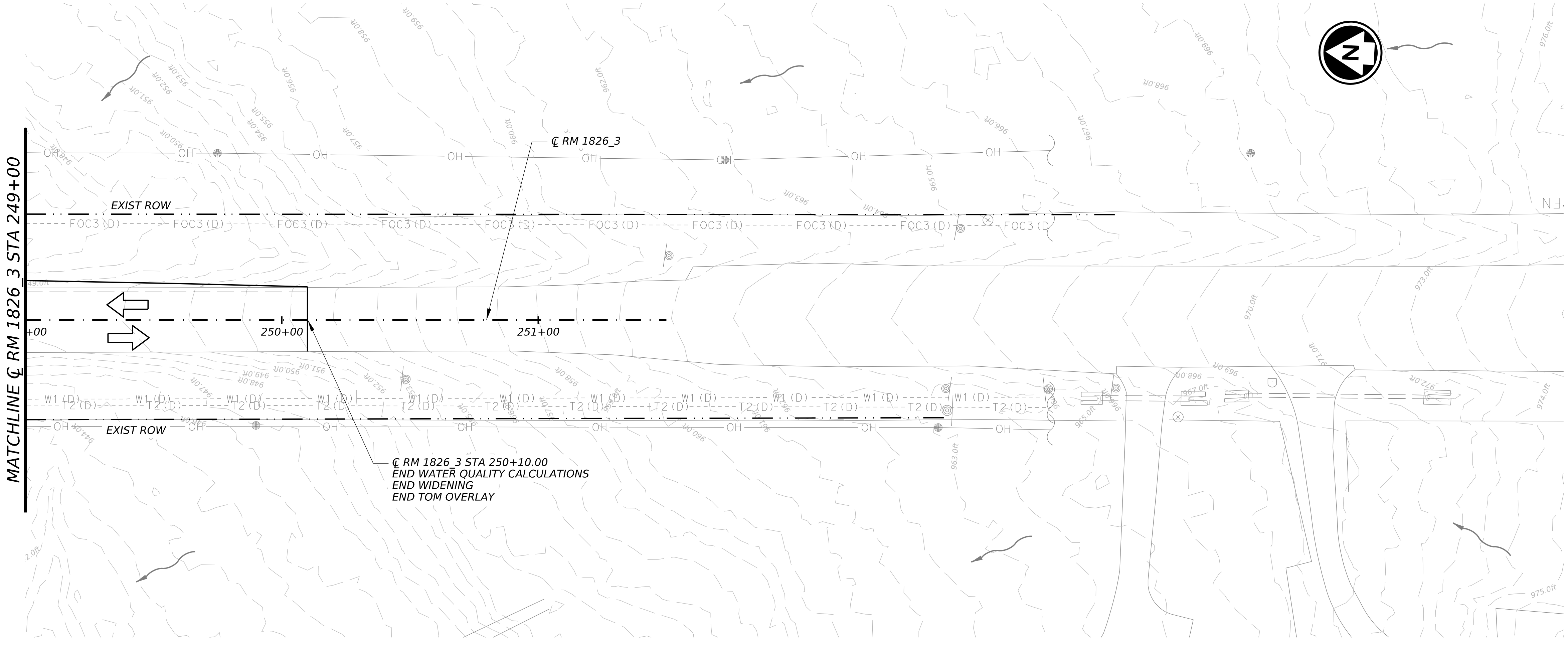

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
↜	EXISTING FLOW DIRECTION
↜	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
—·—	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

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HORZ. SCALE 1"=50'

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RM 1826

WATER QUALITY PLAN
APPALOOSA RUN

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		210

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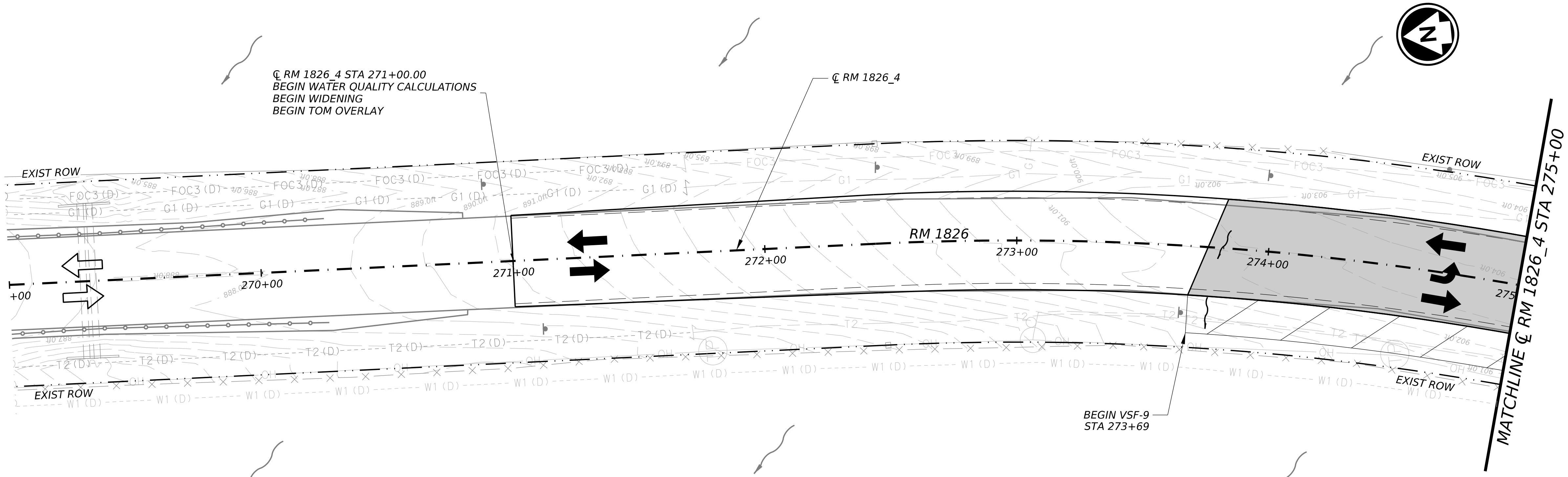

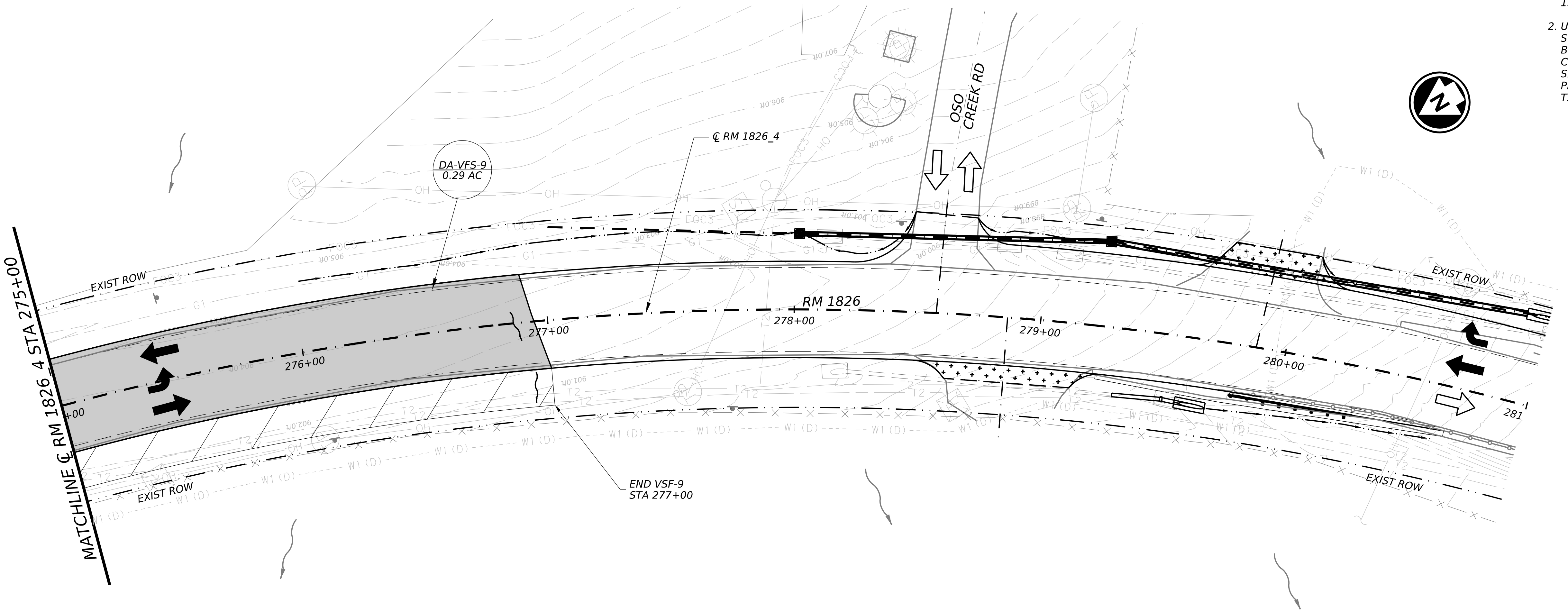

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
▭	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
←	PROPOSED FLOW DIRECTION
—	PROPOSED EDGE OF PAVEMENT
—	EXISTING EDGE OF PAVEMENT
-·-	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

NOTES:

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25' 0 25' 50'
HORZ. SCALE 1"=50'

MEHREEN HALANI
134322
5/30/2023
M.Halani

GARVER
3000 INTERNET BLVD
SUITE 400
FRISCO, TX 75034
(972) 377-7480
FIRM REGISTRATION NO. 5713

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Texas Department of Transportation

RM 1826

WATER QUALITY PLAN
OSO CREEK RD

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	211

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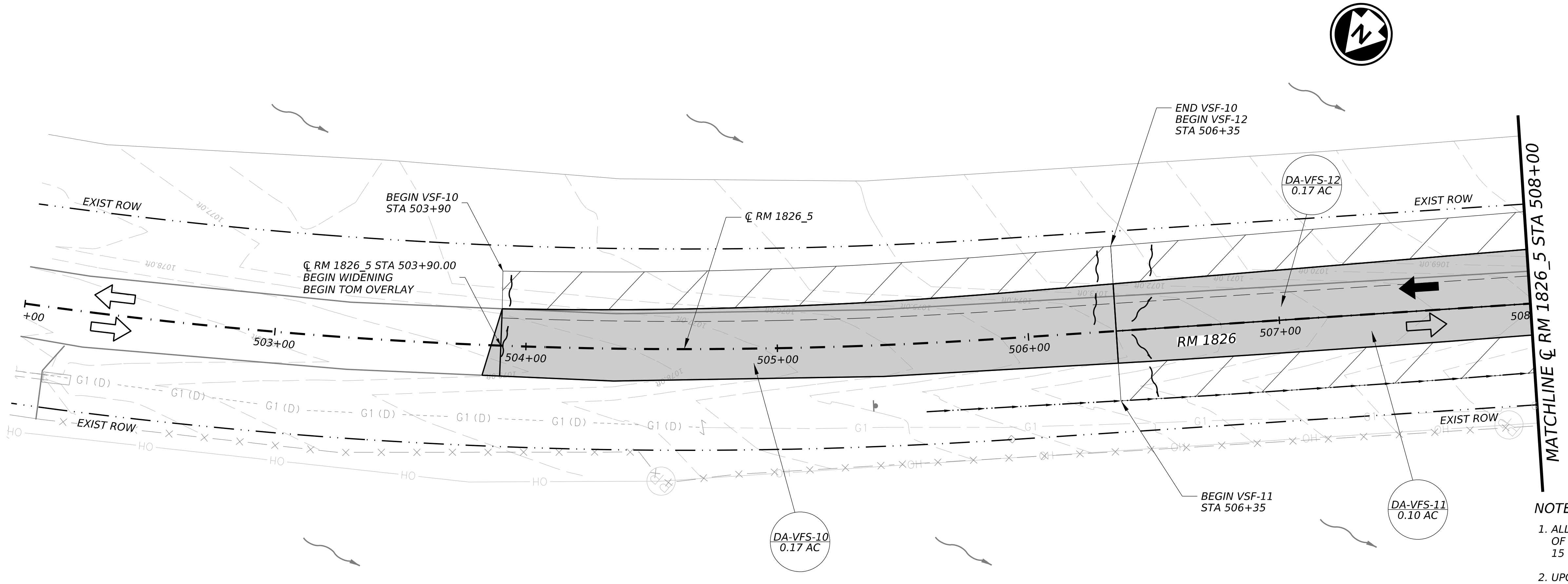

LEGEND

⇦	EXISTING DIRECTION OF TRAFFIC
⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
⟿	EXISTING FLOW DIRECTION
⟿	PROPOSED FLOW DIRECTION
——	PROPOSED EDGE OF PAVEMENT
——	EXISTING EDGE OF PAVEMENT
—·—►	PROPOSED DITCH
—997.0—	EXISTING 1-FT CONTOURS
DA-VFS-X X.XX AC	PROPOSED DRAINAGE AREA ID

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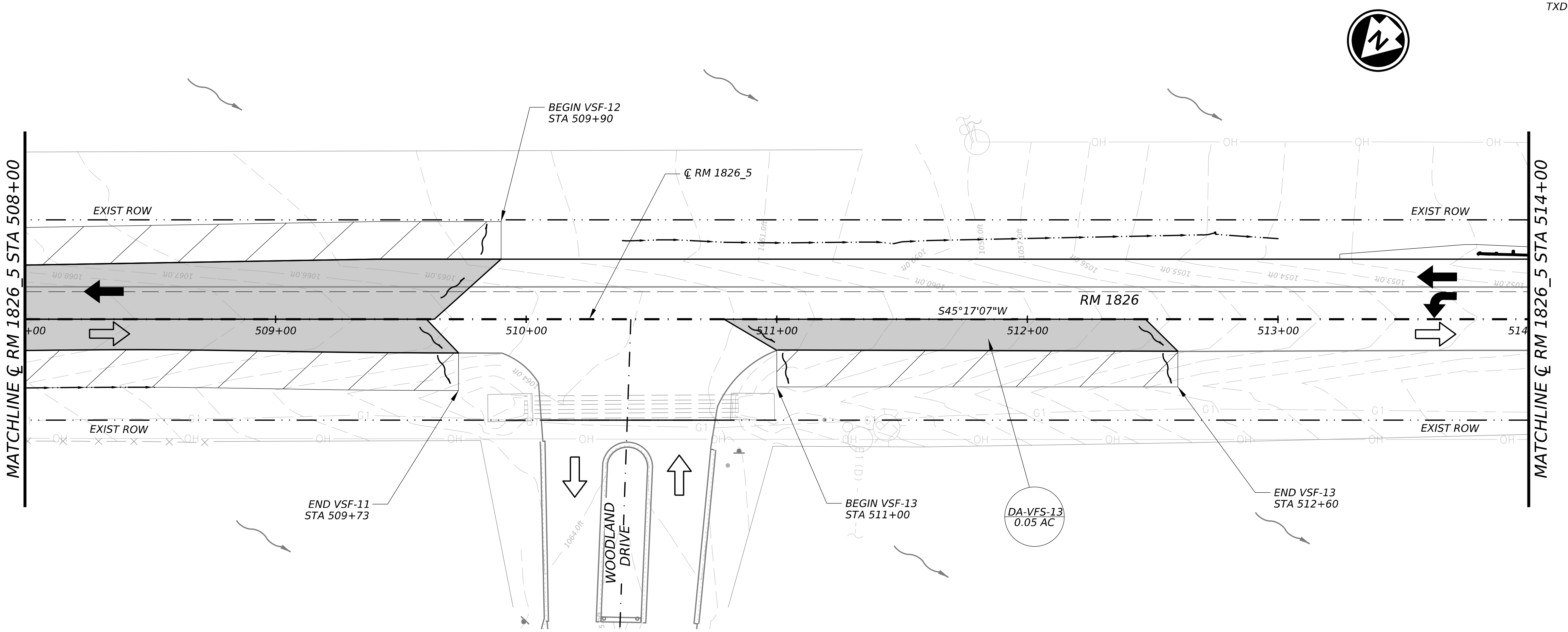

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HORZ. SCALE 1"=50'

STATE OF TEXAS
MEHREEN HALANI
134322
LICENSED
PROFESSIONAL ENGINEER
5/30/2023
Mhalani

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FRISCO, TX 75034
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FIRM REGISTRATION NO. 5713

Texas Department of Transportation

RM 1826

WATER QUALITY PLAN
WOODLAND DR / SHELF ROCK RD

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	212

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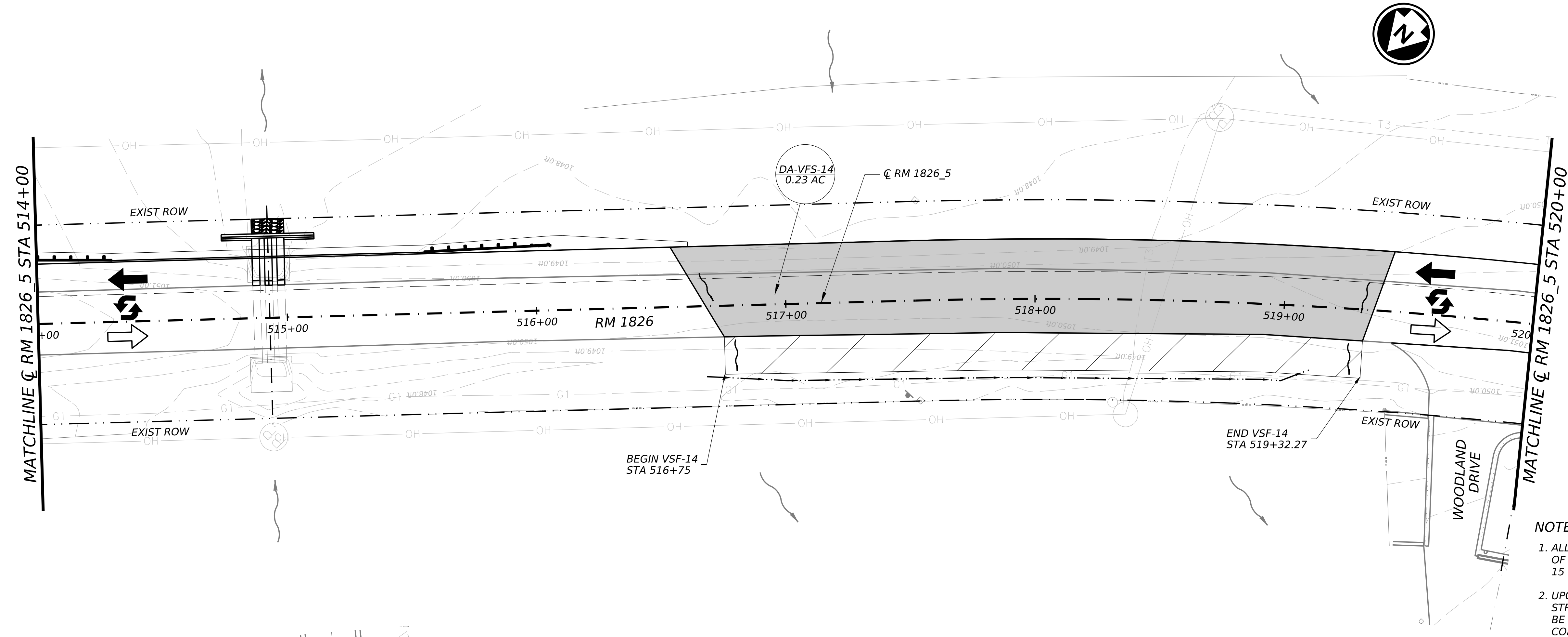

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⬅	PROPOSED DIRECTION OF TRAFFIC
▒	TREATED IMPERVIOUS COVER
☐	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
←	EXISTING FLOW DIRECTION
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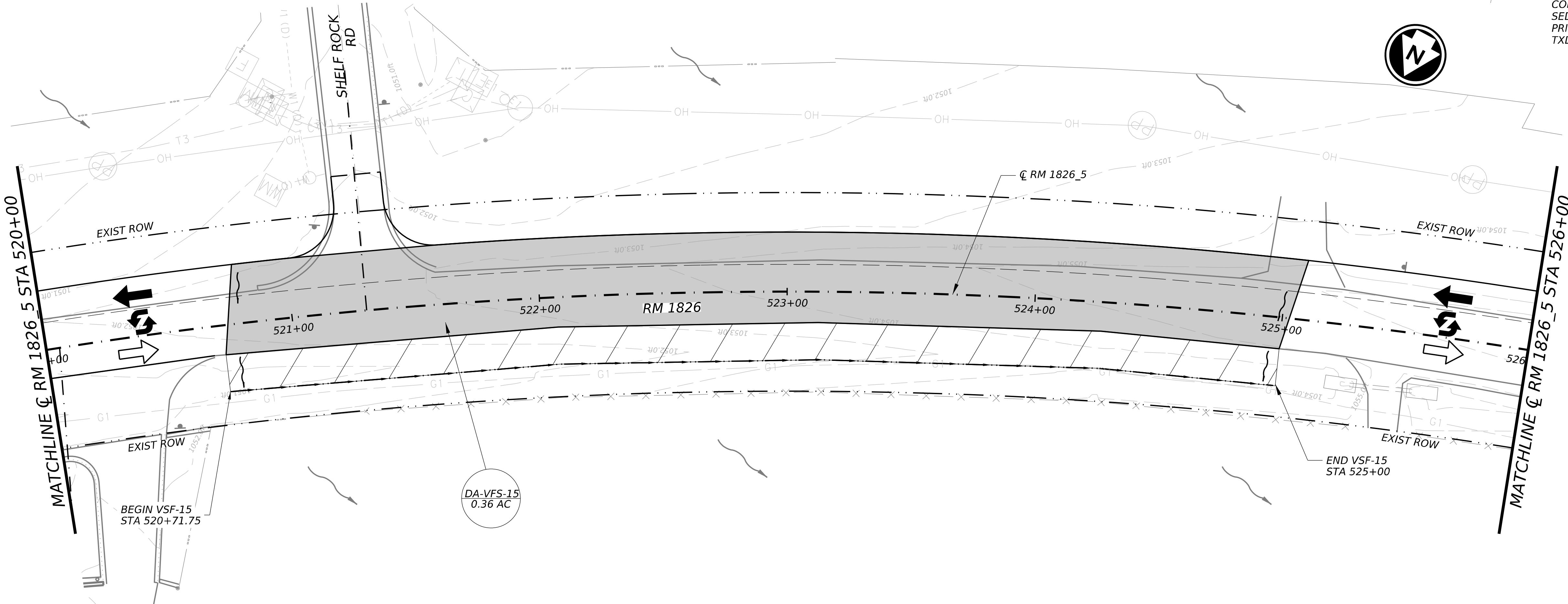

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STATE OF TEXAS
MEHREEN HALANI
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LICENSED PROFESSIONAL ENGINEER
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RM 1826

WATER QUALITY PLAN
WOODLAND DR / SHELF ROCK RD

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	213

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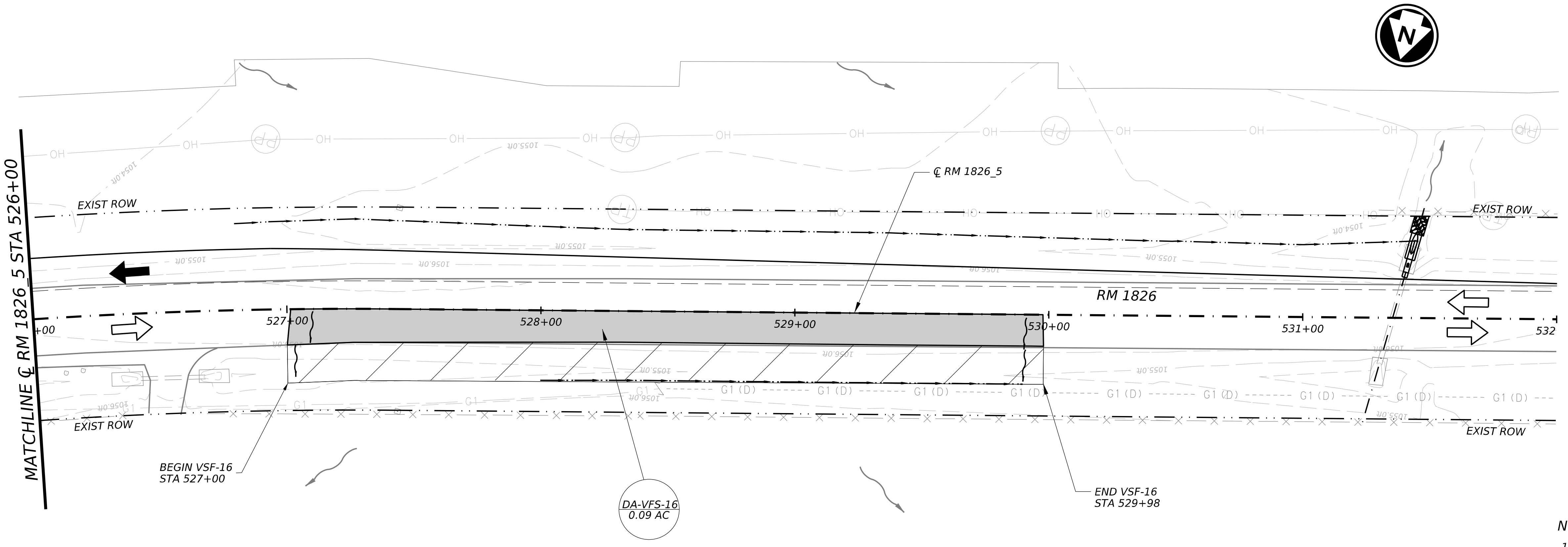

LEGEND

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⬅	PROPOSED DIRECTION OF TRAFFIC
▩	TREATED IMPERVIOUS COVER
▭	PROPOSED BMP DRAINAGE AREA
▨	PROPOSED VEGETATIVE FILTER STRIPS
↜	EXISTING FLOW DIRECTION
↜	PROPOSED FLOW DIRECTION
──	PROPOSED EDGE OF PAVEMENT
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5/30/2023
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Texas Department of Transportation

RM 1826

WATER QUALITY PLAN
WOODLAND DR / SHELF ROCK RD

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		214

DN:
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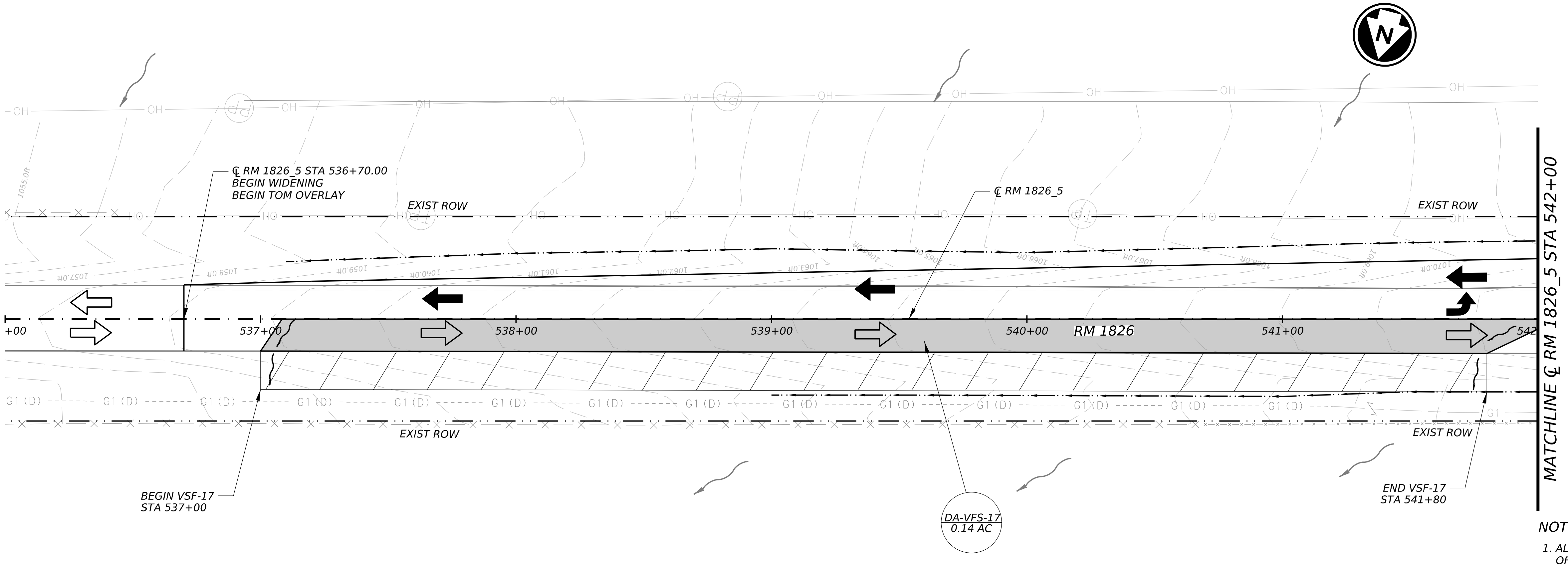

LEGEND

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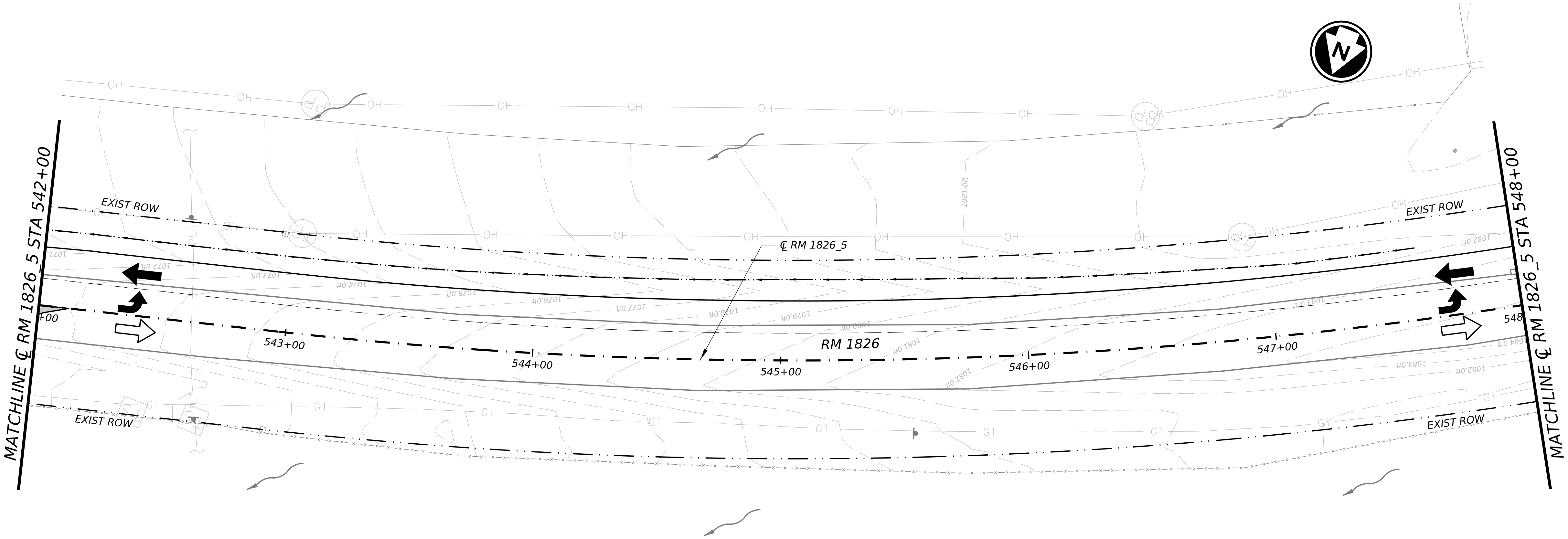

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RM 1826

WATER QUALITY PLAN

TOWERING CEDAR DR

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST		COUNTY	SHEET NO.
AUS		TRAVIS & HAYS	215

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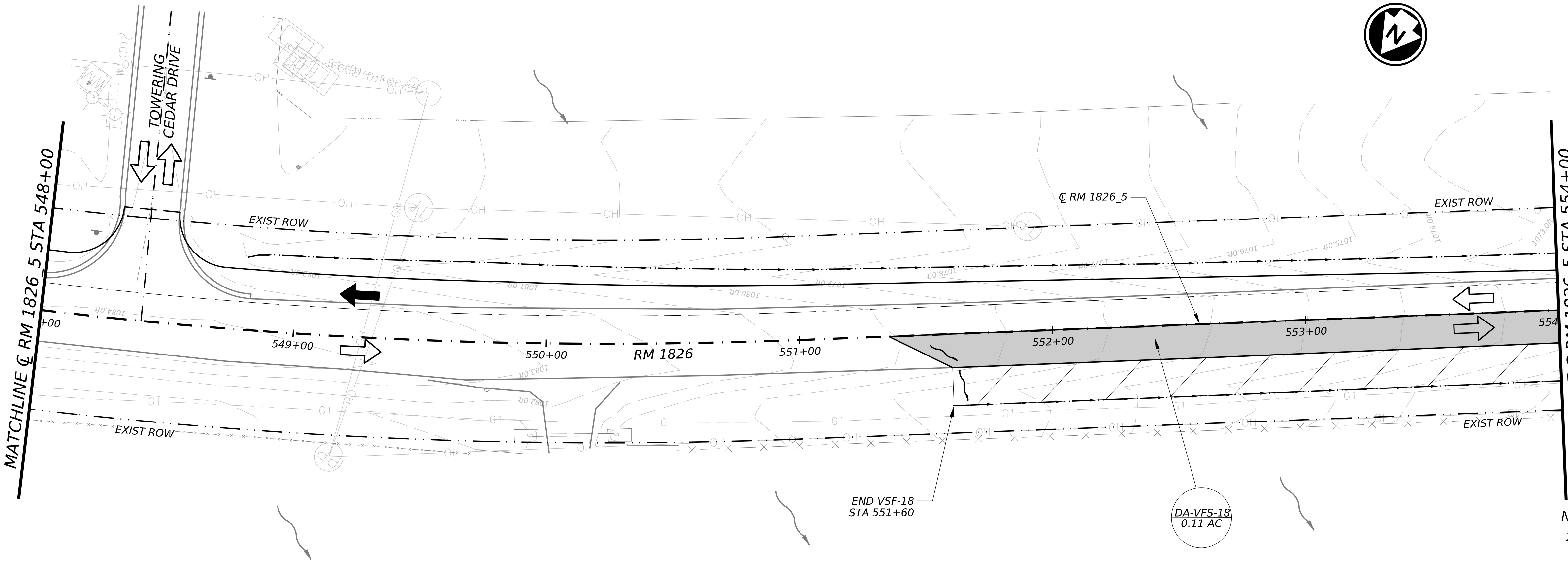

LEGEND

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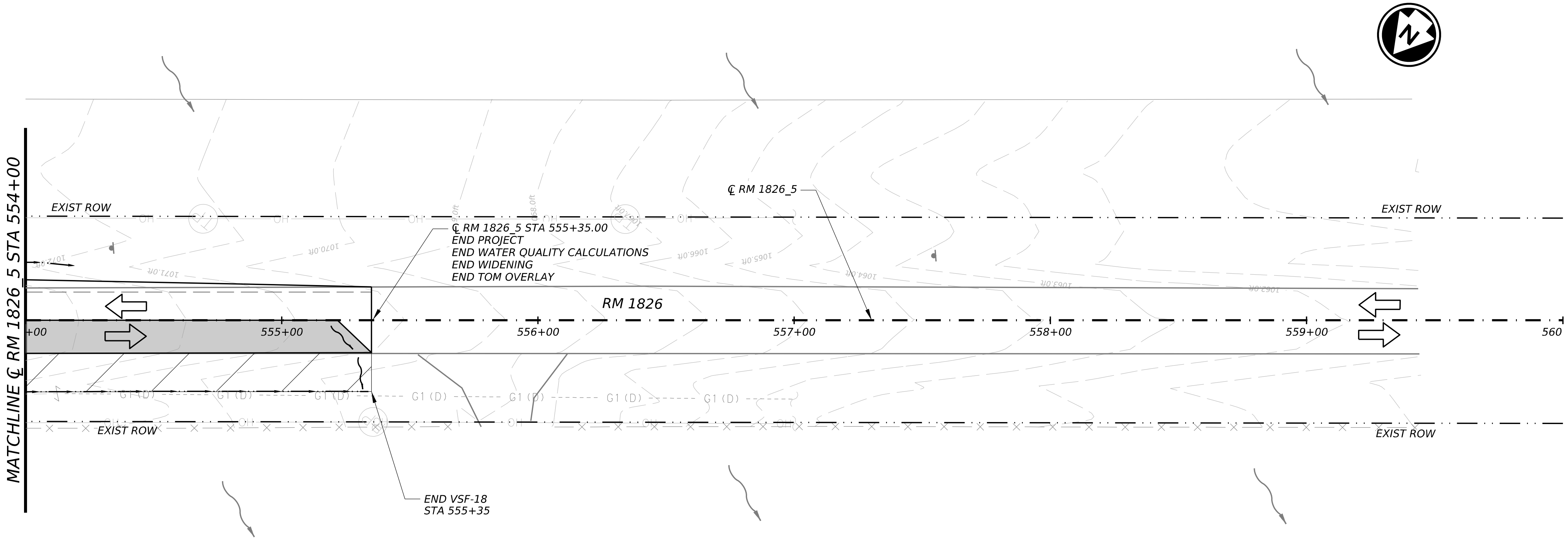

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Texas Department of Transportation

RM 1826

WATER QUALITY PLAN
TOWERING CEDAR DR

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826
DIST	COUNTY		SHEET NO.
AUS	TRAVIS & HAYS		216

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The following TCEQ requirements (Form TCEQ-0592A, Rev. 7/15/15) are applicable to all work that disturbs 5 or more acres in the contributing zone of the Edwards Aquifer in Hays, Travis and/or Williamson Counties and must be adhered to by the Contractor and all Subcontractors:

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any ground disturbance or construction activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.
2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan (CZP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.
3. No hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.
4. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.
5. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.
6. Sediment must be removed from the sediment traps or sedimentation basins when it occupies 50% of the basin's design capacity.
7. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.
8. All excavated material that will be stored on-site must have proper E&S controls.
9. If portions of the site will have a cease in construction activity lasting longer than 14 days, soilstabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.
10. The following records should be maintained and made available to the TCEQ upon request:
    - the dates when major grading activities occur;
    - the dates when construction activities temporarily or permanently cease on a portion of the site; and
    - the dates when stabilization measures are initiated.
11. The holder of any approved CZP must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

    A. any physical or operational modification of any best management practices (BMPs) or structure(s), including but not limited to temporary or permanent ponds, dams, berms, silt fences, and diversionary structures;
    B. any change in the nature or character of the regulated activity from that which was originally approved;
    C. any change that would significantly impact the ability to prevent pollution of the Edwards Aquifer; or
    D. any development of land previously identified as undeveloped in the approved contributing zone plan.

TCEQ REGIONAL OFFICE

Austin Regional Office
12100 Park 35 Circle
Bldg A, Room 179
Austin, Texas 78753
Phone: (512) 339-2929
Fax: (512) 339-3795

Texas Department of Transportation

Austin District Standard

TCEQ REQUIREMENTS FOR THE CONTRIBUTING ZONE OF THE EDWARDS AQUIFER

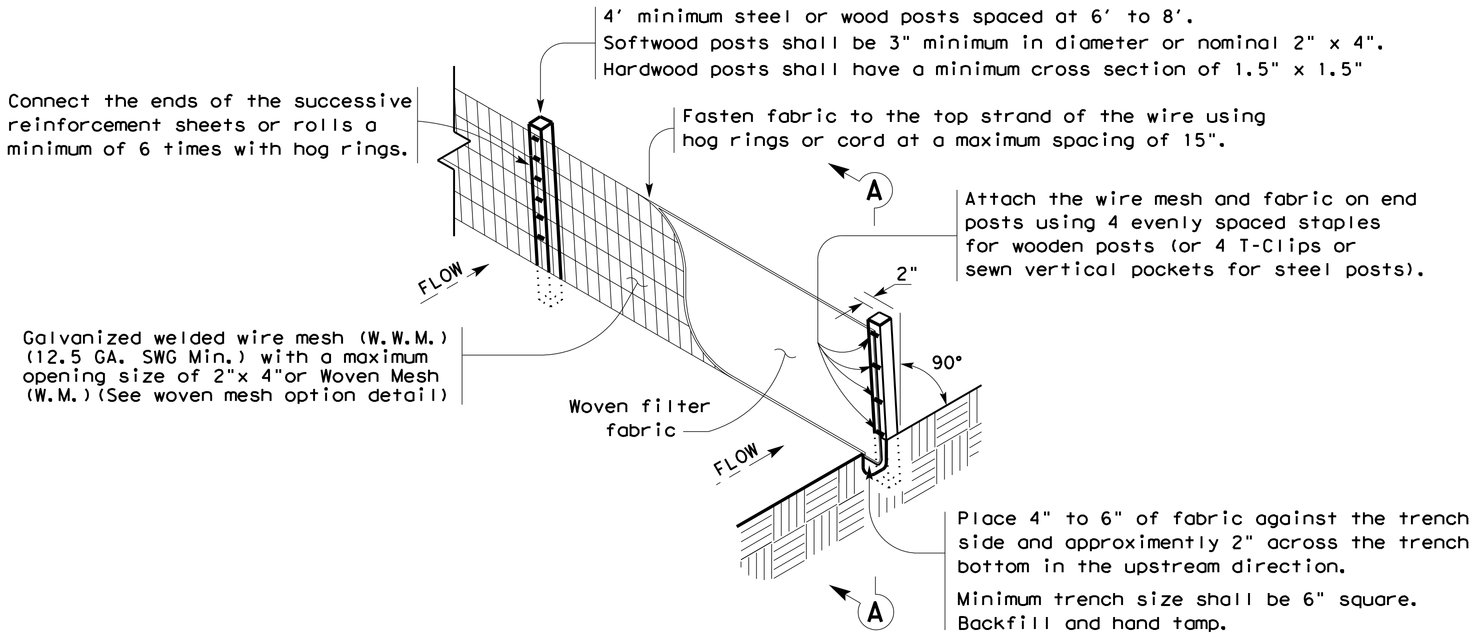
(DISTURBING 5 OR MORE ACRES)

TCEQ-CZ-19(AUS)

REVISIONS
01/10/14: REQUIREMENTS AND ADDRESS UPDATED
01/21/16: REQUIREMENTS UPDATED
09/24/19: UPDATED RELEASE YEAR

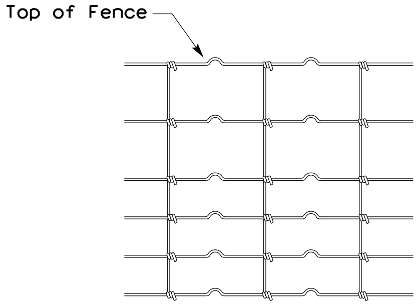
CONT	SECT	JOB	HIGHWAY
0914	33	097, ETC.	RM 1826

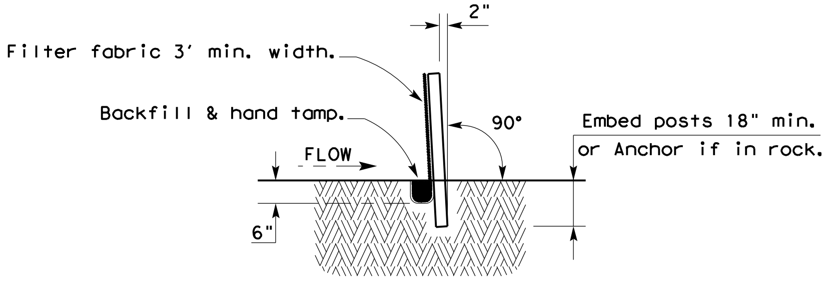
DIST	COUNTY	SHEET NO.
AUS	TRAVIS & HAYS	217



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^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

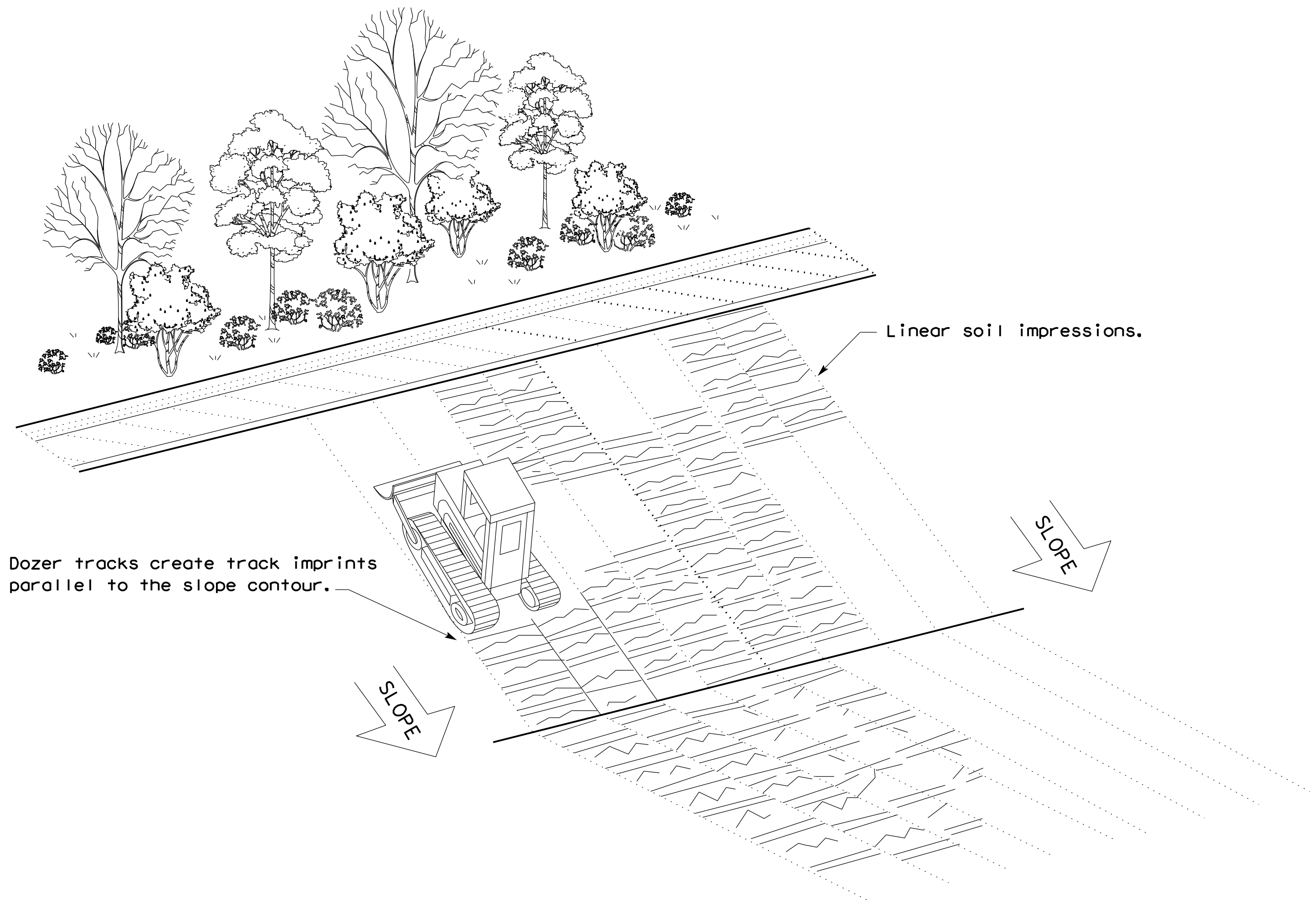
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	33	097, ETC.	RM 1826
	DIST	COUNTY		SHEET NO.
	AUS	TRAVIS & HAYS		218

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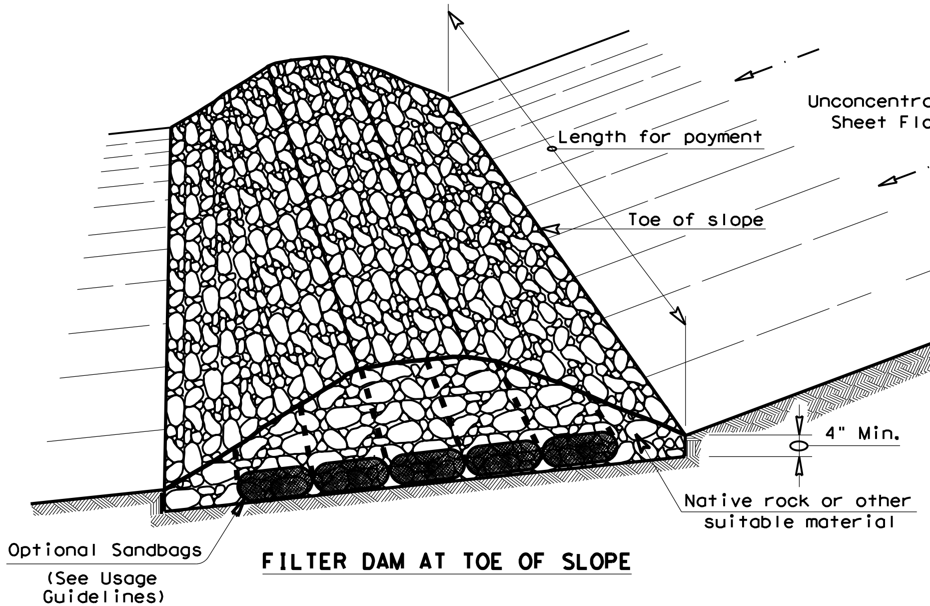
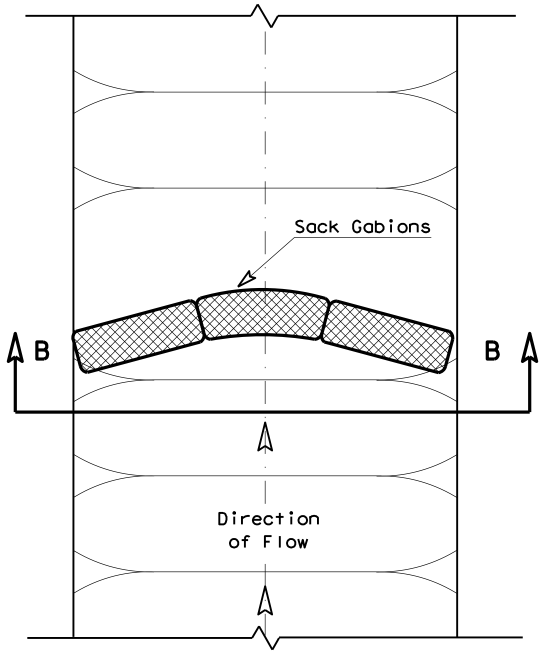
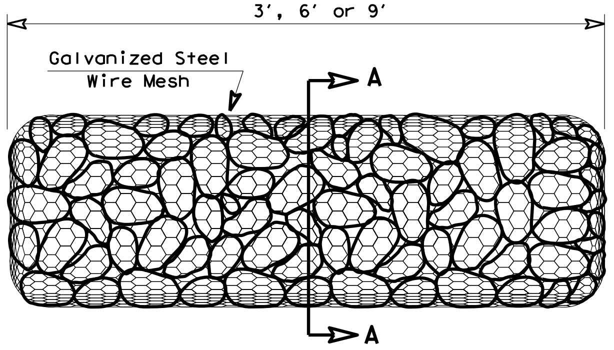


FILTER DAM AT TOE OF SLOPE

RFD1

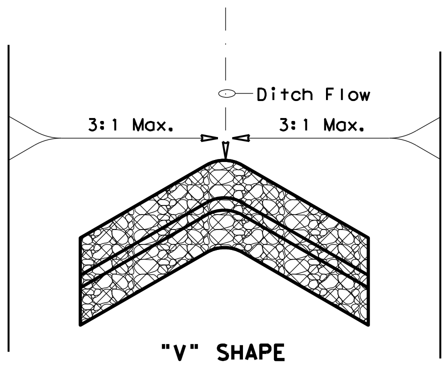


PLAN VIEW

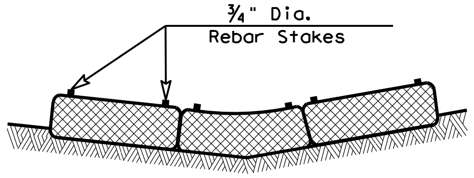


TYPE 4 (SACK GABIONS)

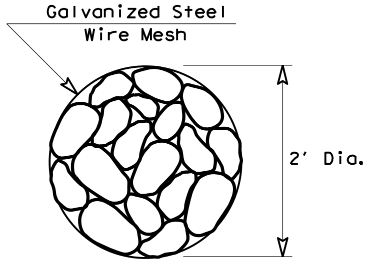
RFD4



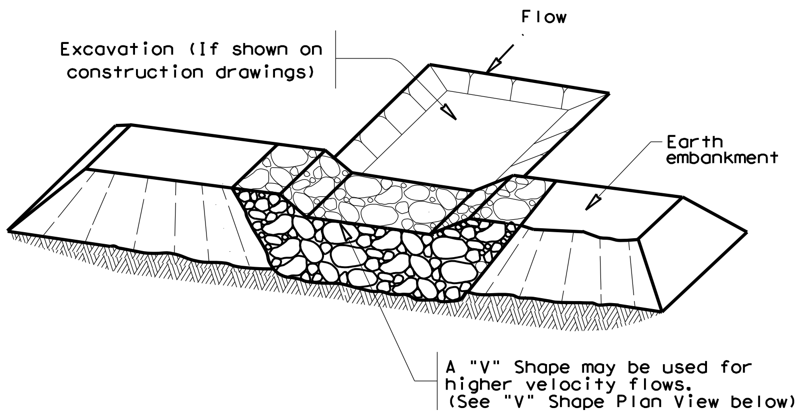
"V" SHAPE PLAN VIEW



SECTION B-B

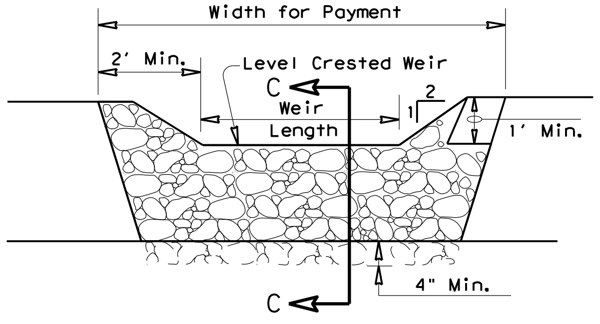


SECTION A-A

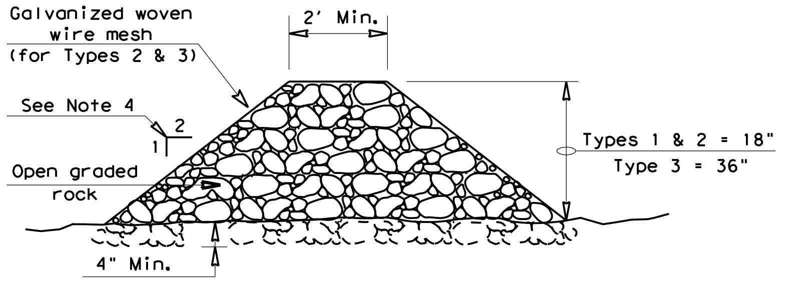


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

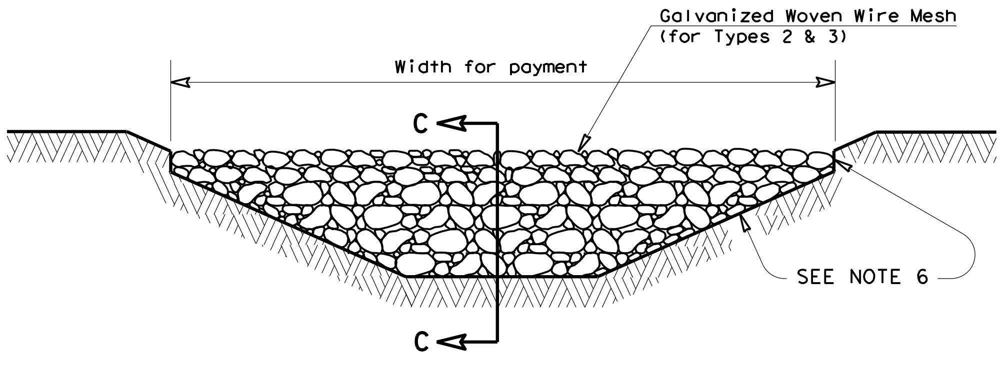
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



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 $\frac{3}{4}$" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of $2\frac{1}{2}$" x $3\frac{1}{4}$"
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.

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

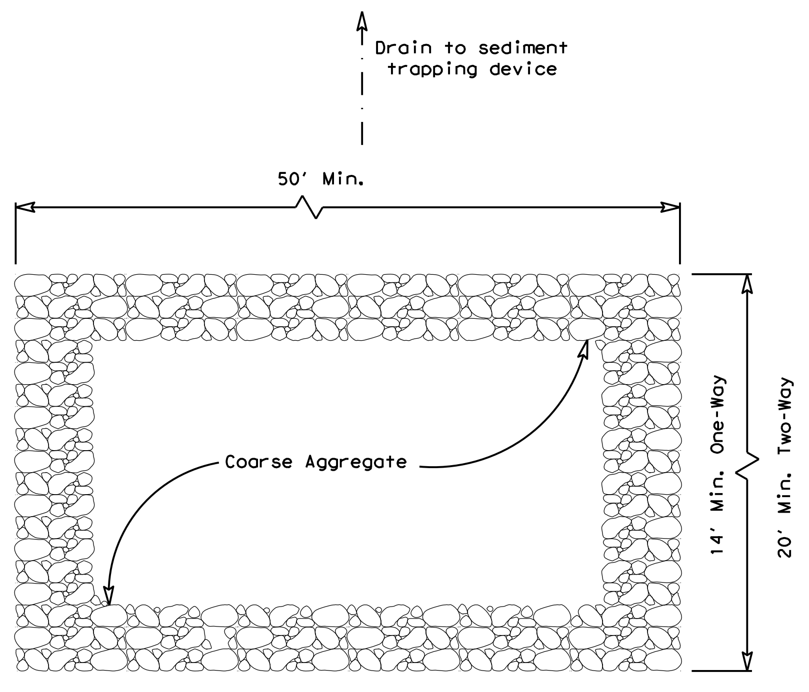
Design
Division
Standard

TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES

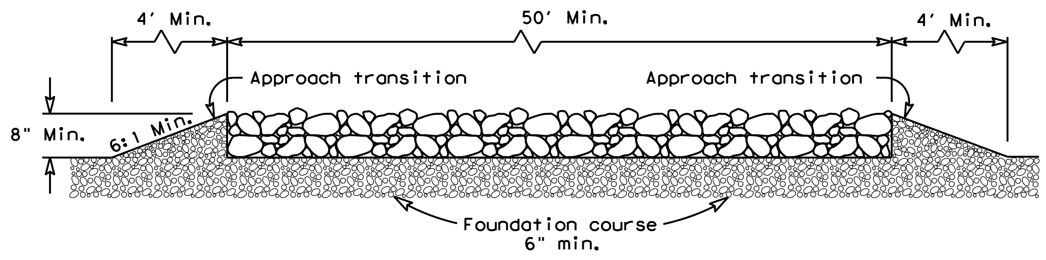
ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT		CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			219



PLAN VIEW



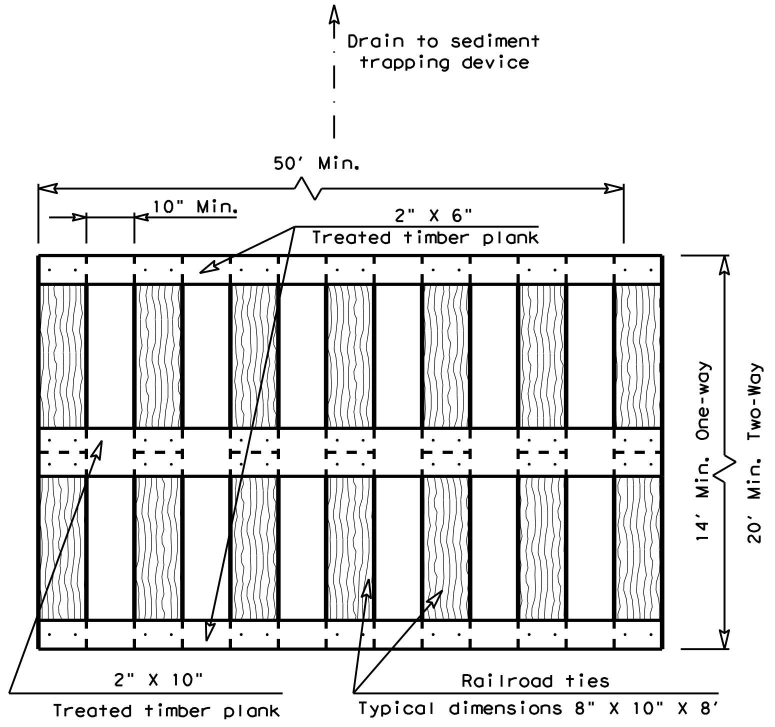
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

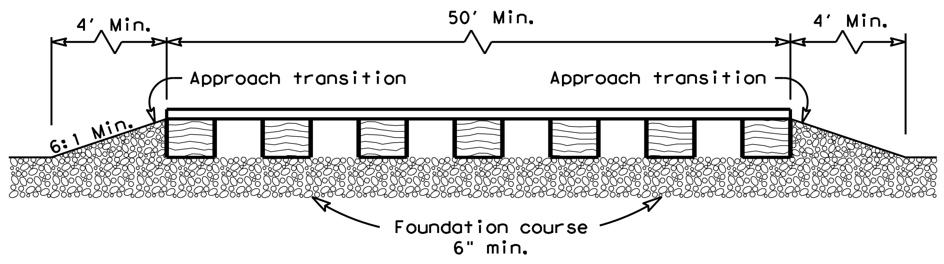
ROCK CONSTRUCTION (LONG TERM)

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 materialas 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.



PLAN VIEW



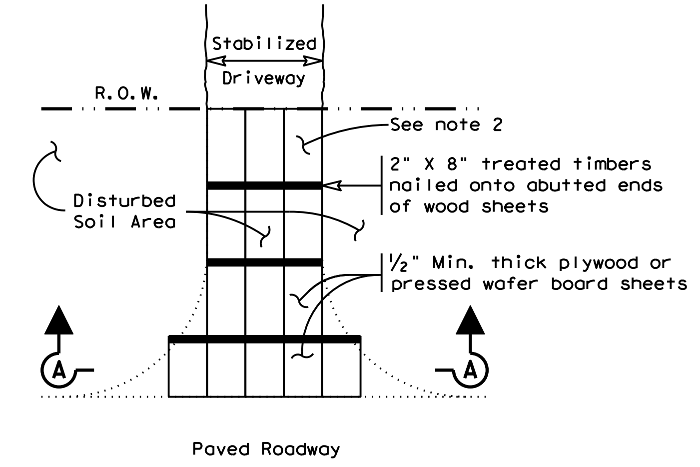
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

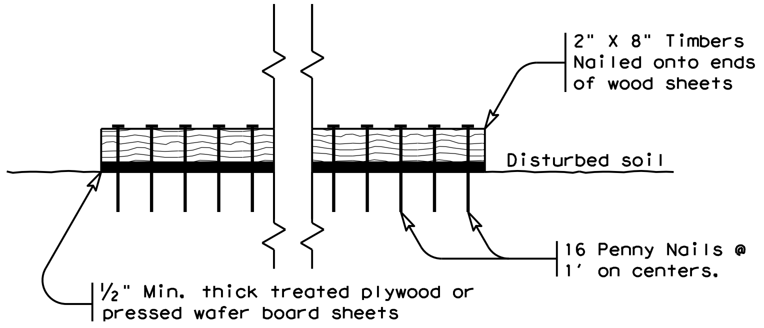
TIMBER CONSTRUCTION (LONG TERM)

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.



PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM

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

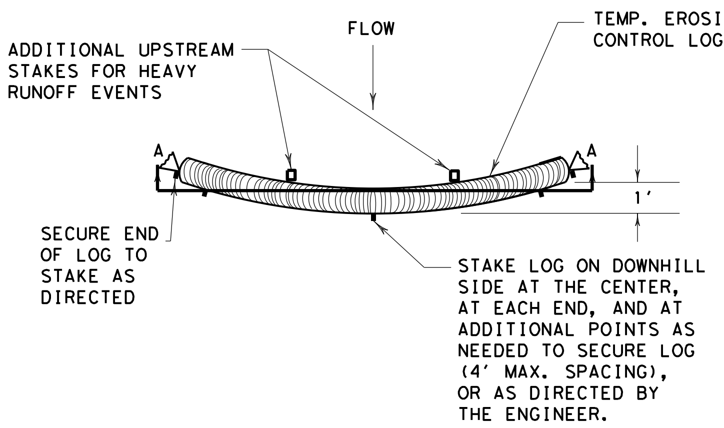
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

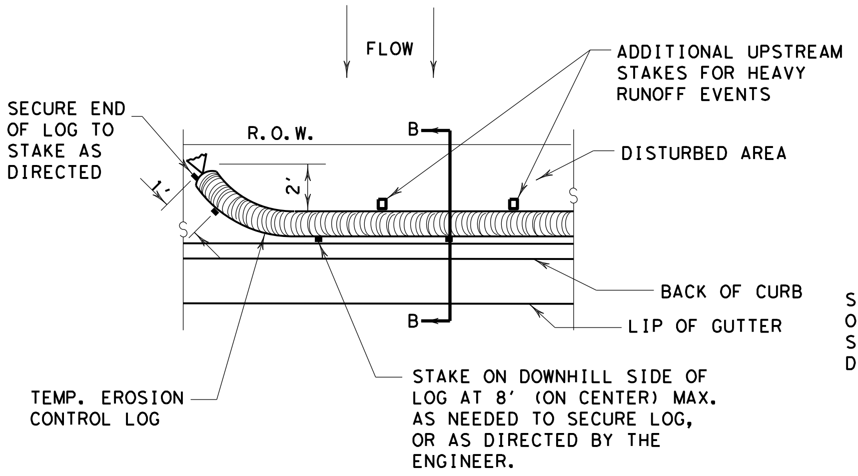
EC(3)-16

FILE: ec316	DN: TxDOT		CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0914	33	097, ETC.		RM 1826
	DIST	COUNTY			SHEET NO.
	AUS	TRAVIS & HAYS			220

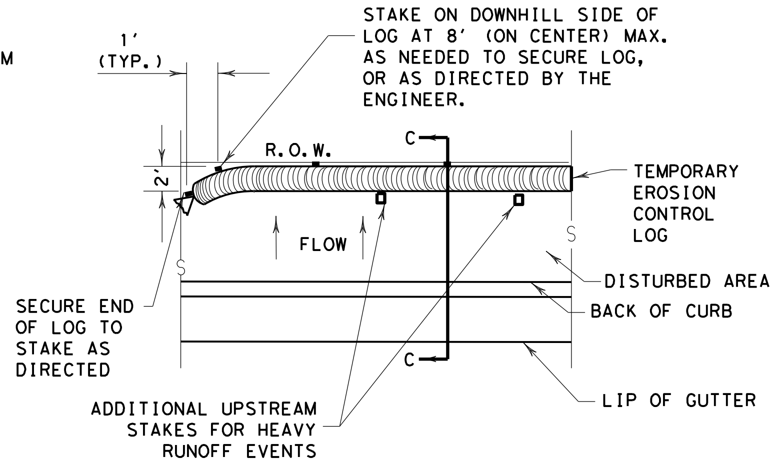
DATE: 5/28/2023
FILE: pw://garver-pw.bentley.com:garver-pw-01/Documents/2019/19T43347 - FM 1826 PSE/Drawings/10_Environmental/Standards/ec316.dgn



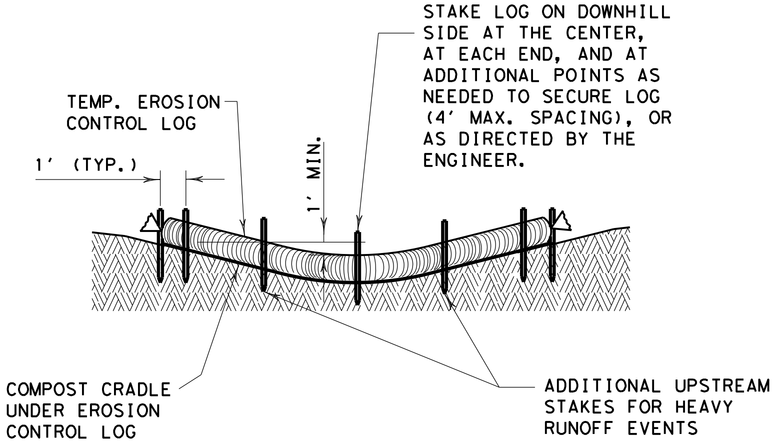
PLAN VIEW



PLAN VIEW



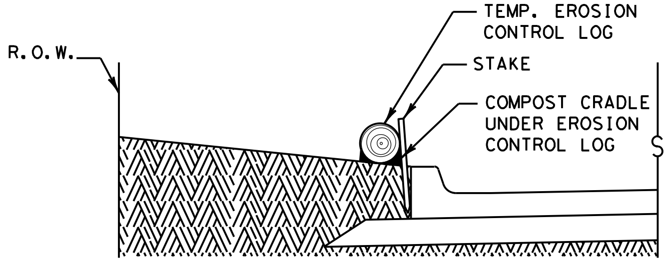
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

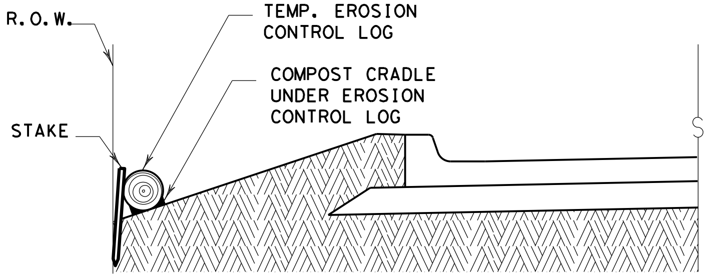
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



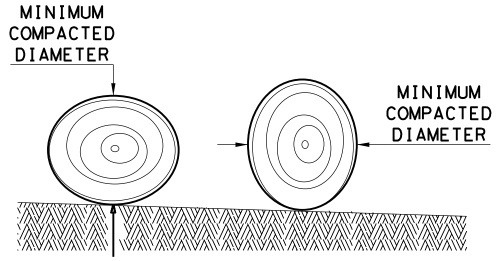
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

GENERAL NOTES:

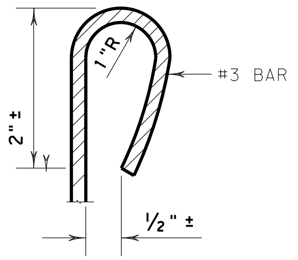
1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

LEGEND

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



REBAR STAKE DETAIL

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

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

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

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

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0914	33	097, ETC.		RM 1826	
	DIST		COUNTY			SHEET NO.
	AUS		TRAVIS & HAYS			221

DATE:
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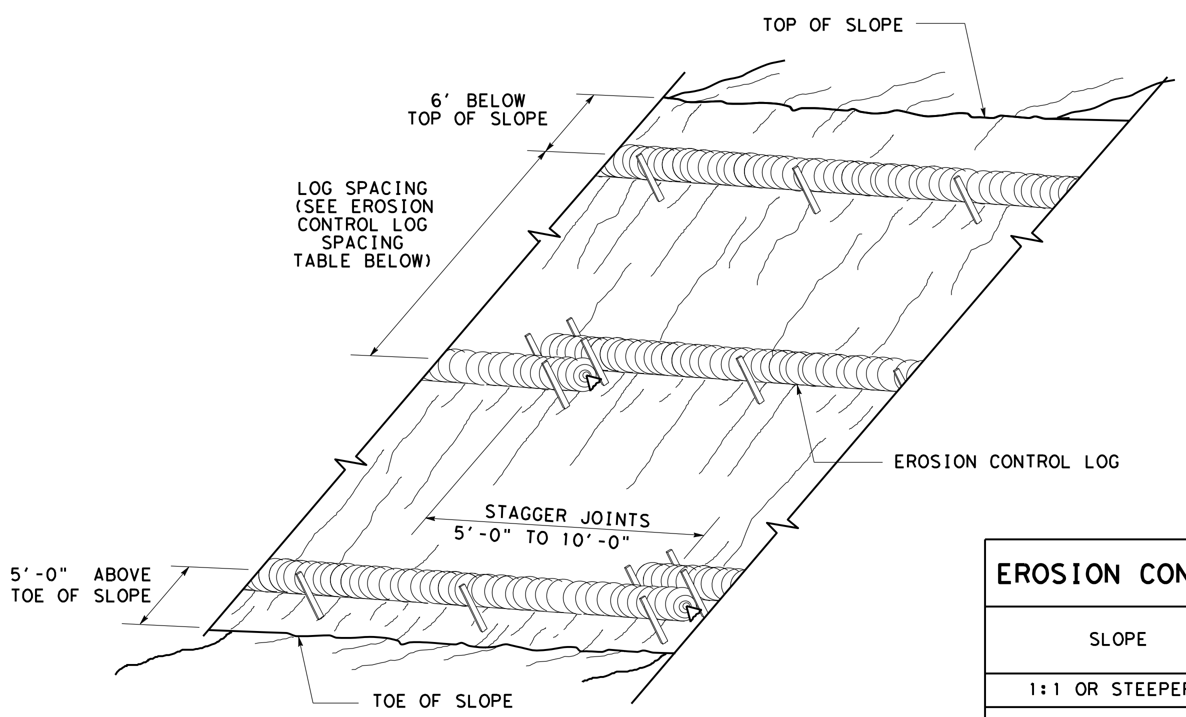
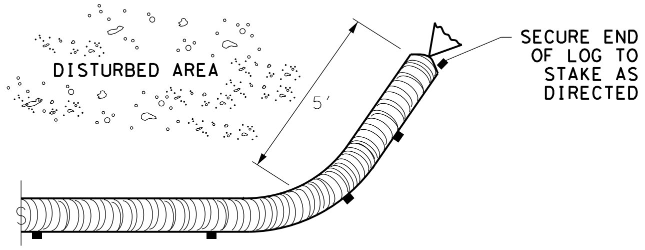
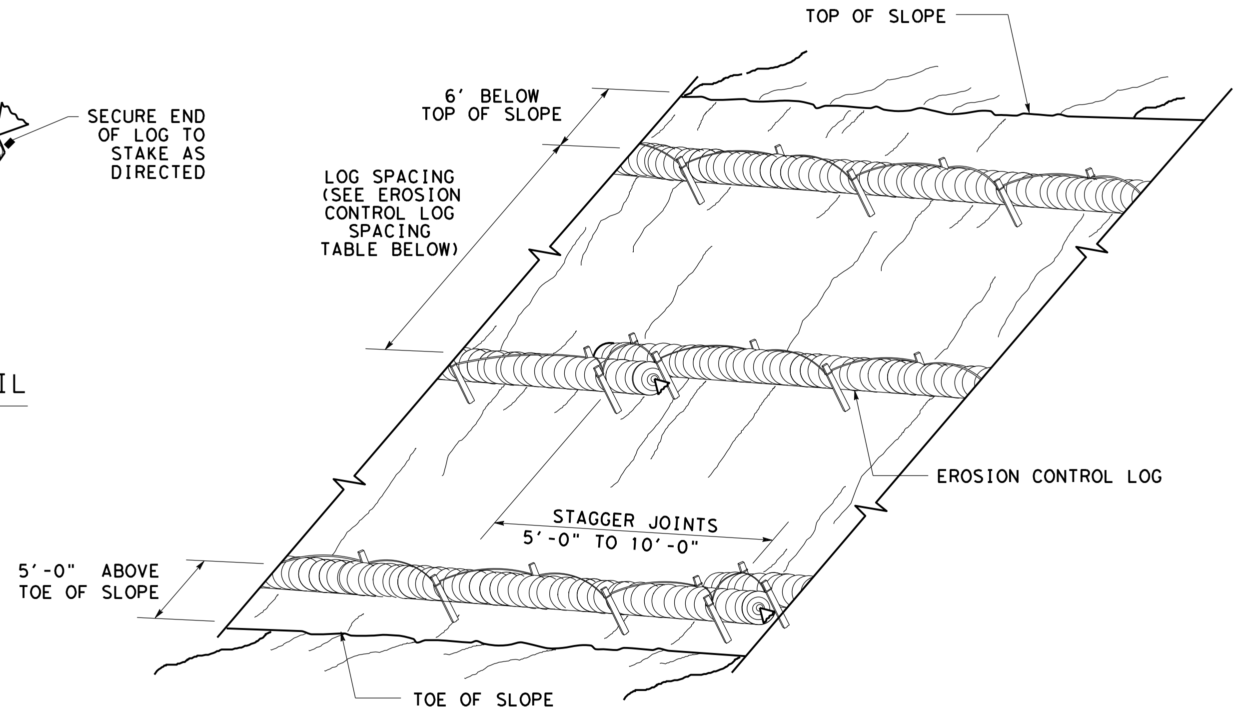


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

CL-SST



END SECTION RAP DETAIL



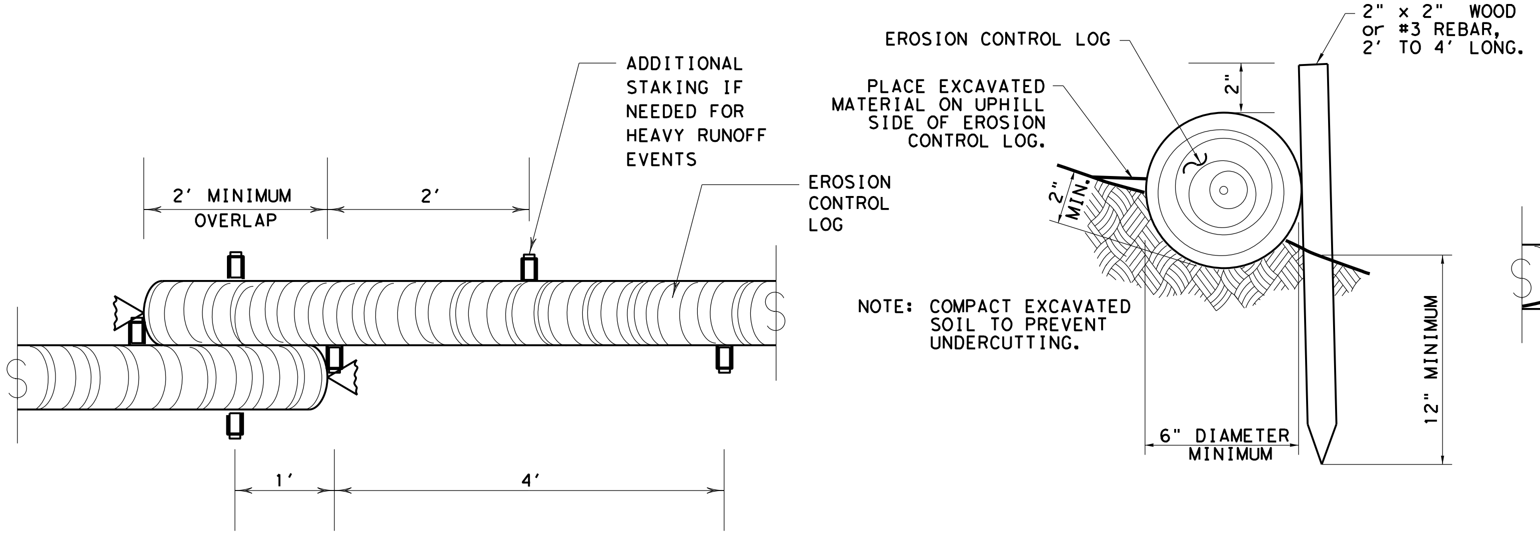
EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

EROSION CONTROL LOG SPACING TABLE

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

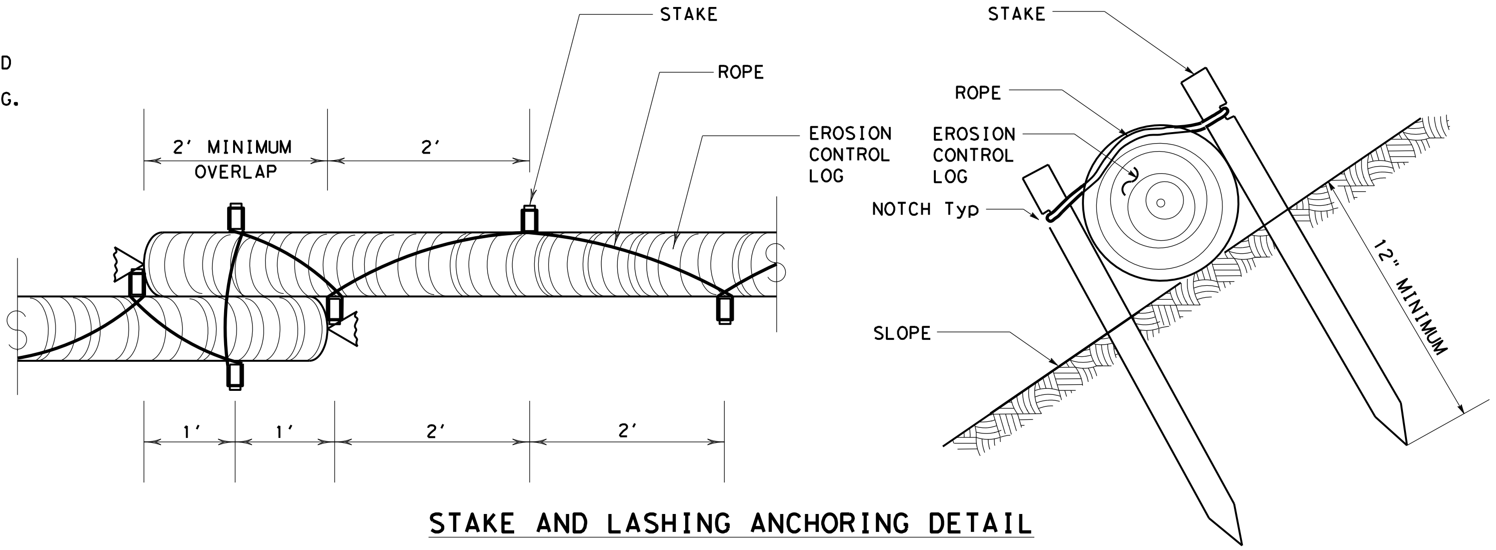
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



NOTE: COMPACT EXCAVATED SOIL TO PREVENT UNDERCUTTING.

STAKE AND TRENCHING ANCHORING DETAIL

CL-SST



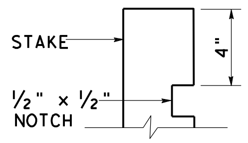
STAKE AND LASHING ANCHORING DETAIL

CL-SSL

SHEET 2 OF 3

TRENCH DEPTH TABLE

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



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0914	33	097, ETC.	RM 1826	
	DIST	COUNTY		SHEET NO.	
	AUS	TRAVIS & HAYS		222	

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FILE:

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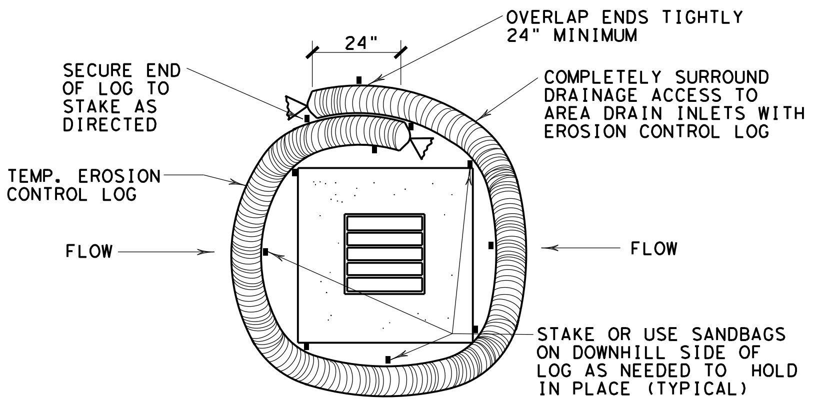
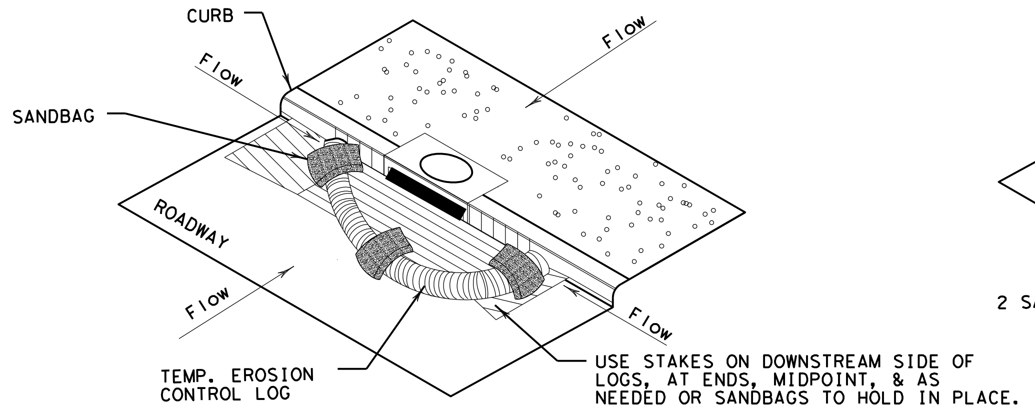


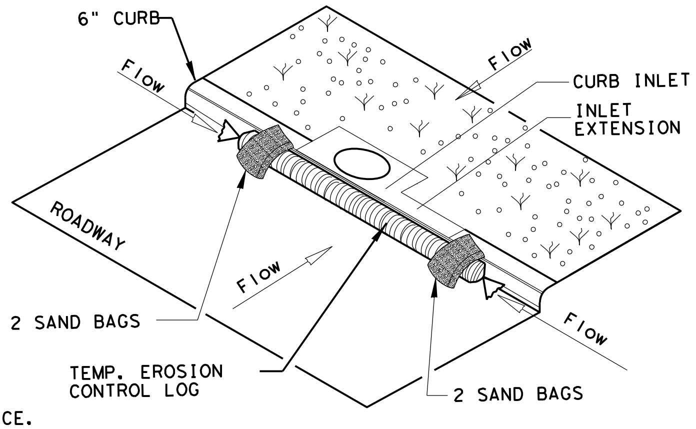
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

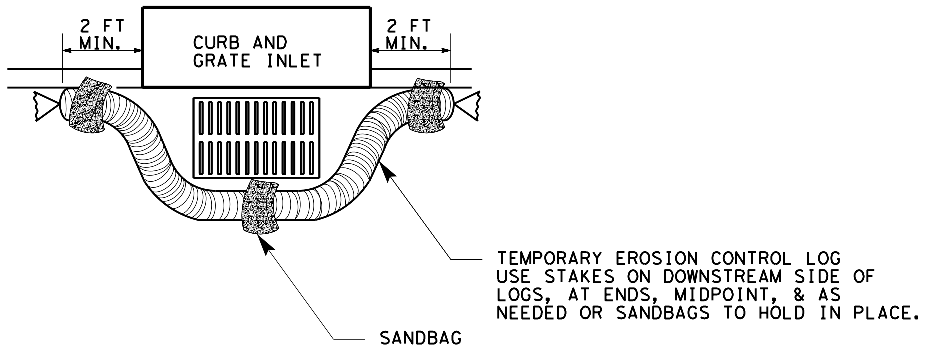
CL-CI



EROSION CONTROL LOG AT CURB INLET

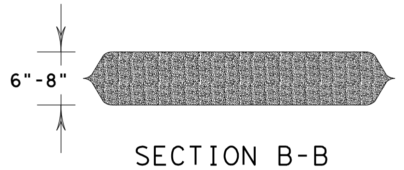
CL-CI

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

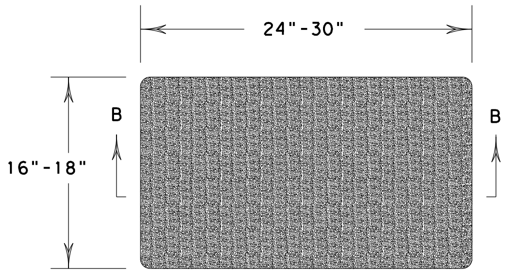


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT		CK: LS
	CONT	SECT	JOB		HIGHWAY
REVISIONS	0914	33	097, ETC.		RM 1826
	DIST		COUNTY		SHEET NO.
	AUS		TRAVIS & HAYS		223