Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

- Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.
 - To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.
- 2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.
- 3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.
- 4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.
 - An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.
- 5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
- 6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

- 1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.
- 2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

- 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: FM 3405				2. Regulated Entity No.: CSJ 1755-03-010				
3. Customer Name: David Zuhlke			4. Customer No.: 713.299.5271					
5. Project Type: (Please circle/check one)	New	Modif	ication	1	Exter	nsion	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. Sit	e (acres):	19.76	
9. Application Fee:	N/A	10. Permanent BM			BMP(s	s):	Grassy Swale	
11. SCS (Linear Ft.):	None	12. AST/UST (No. Ta			o. Tar	ıks):	None	
13. County:	Williamson	14. Watershed:				Trib 1 & 2 to North Fork San Gabriel River		

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.)	_	_	1			
Region (1 req.)	_	_	1			
County(ies)	_	_	1			
Groundwater Conservation District(s)	Edwards Aquifer AuthorityBarton Springs/ Edwards AquiferHays TrinityPlum Creek	Barton Springs/ Edwards Aquifer	NA			
City(ies) Jurisdiction	AustinBudaDripping SpringsKyleMountain CitySan MarcosWimberleyWoodcreek	AustinBee CavePflugervilleRollingwoodRound RockSunset ValleyWest Lake Hills	AustinCedar ParkFlorence _X_GeorgetownJerrellLeanderLiberty HillPflugervilleRound 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 HillsFair Oaks Ranch _Helotes _Hill Country Village _Hollywood Park _San Antonio (SAWS) _Shavano Park	BulverdeFair Oaks RanchGarden RidgeNew BraunfelsSchertz	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.		
David Zuhlke		
Print Name of Customer/Authorized Agent		
David Zuhlke	12/10/2025	
Signature of Customer/Authorized Agent	Date	

FOR TCEQ INTERNAL USE ONLY				
Date(s)Reviewed:	e(s)Reviewed: Date Administratively Complete:			
Received From:	Correct 1	Number of Copies:		
Received By:	Distribu	tion Date:		
EAPP File Number:	Complex	x:		
Admin. Review(s) (No.):	No. AR I	Rounds:		
Delinquent Fees (Y/N):	Review 7	Гime Spent:		
Lat./Long. Verified:	SOS Cus	stomer Verification:		
Agent Authorization Complete/Notarized (Y/N):	Fee	Payable to TCEQ (Y/N):		
Core Data Form Complete (Y/N):	Check:	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: <u>David Zuhlke</u>

Date: <u>11/21/2025</u>

Signature of Customer/Agent:

David Zuhlke

Project Information

1. Regulated Entity (Project) Name: FM 3405 CSJ 1755-03-010

2. County: Williamson

3. Stream Basin(s): Tributary 1 & 2 to Nort Fork San Gabriel River

4. Groundwater Conservation District (if applicable): N/A

5. Customer (Applicant):

Contact Person: Kyle Russell, PE

Entity: <u>Texas Department of Transportation</u>

Mailing Address: <u>2727 S. Austin Ave</u> City, State: <u>Georgetown,TX</u> Zip: <u>78626</u>

Telephone: 512-930-5402

Email Address: Kyle.Russell@txdot.gov

6.	Agent (Representative):	
	Contact Person: <u>David Zuhlke</u>	
	Entity: <u>Consor</u> Mailing Address: <u>8023 Vantage Dr Suite 300</u>	
	City, State: San Antonio, Texas Zip:	
	78230	
	Telephone: 713-299-5271	
	Email Address: david.zuhlke@consoreng.com	
7.	Landowner of R.O.W. (Right of Way)	
	Person or entity responsible for maintenance of water of (BMPs), if not applicant.	quality Best Management Practices
	Contact Person: <u>Kyle Russell, PE</u>	
	Entity: Texas Department of Transportation	
	Mailing Address: 2727 S. Austin Ave	
	City, State: Georgetown,TX Zip: 78626 Telephone: 512-930-5402	
	Email Address: Kyle.Russell@txdot.gov	
•		
8.	The TCEQ must be able to inspect the project site of Sufficient survey marking is provided on the project to a	
	boundaries and alignment of any regulated activities an	_
	noted in the Geologic Assessment.	
	Survey marking will be completed by this date:	Project limits within existing ROW
9.	Attachment A - Road Map. A road map showing dir	ections to and the location of the
	project site is attached. The map clearly shows the bou	ndary of the project site.
10	Attachment B - USGS Quadrangle. A copy of the of	ficial 7 ½ minute USGS Quadrangle
	Map (Scale: $1'' = 2000'$) is attached. The map(s) clearly s	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 within
	Contributing Zone (CZ)	Transition Zone (CZ/TZ)
	Transition Zone (TZ)	Zone not regulated by EAPP

.2. Attachment C - Project Description. A detailed r is attached. The project description is consistent thr minimum, the following details:	
Complete site area [Acres]	
Offsite upgradient stormwater areas to be	captured
Permanent BMP(s)	
Proposed site use	
Existing roadway (paved and/or unpaved)	
Structures to be demolished [Include demo	phasel
Major interim phases	
13. Existing project site conditions are noted below:	
Existing paved and/or unpaved	Existing commercial site
roads	Existing industrial site
Undeveloped (Cleared)	Existing residential site
Undeveloped (Undisturbed/Not	Other:
cleared)	
14. Attachment D - Factors Affecting Surface Water factors that could affect surface water quality is at	·
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:	
<u> </u>	
17. Right of Way (R.O.W.) and Pavement Area:	
R.O.W. for project: <u>19.76</u> (ac.)	
Length: 6700 ft.	
Width: varies from <u>120</u> ft. to <u>140</u> ft. Impervious cover (IC): <u>7.71</u> (ac.)	
Total of Pavement area <u>7.71</u> (ac.) ÷ R.O	.W. area <u>19.76</u> (ac.) x 100 = <u>39</u> % IC.
Number of travel lanes: proposed: 2, existing	
Typical widths of lanes: <u>11</u> (ft.)	
Are intersections also being improved? (Y/I	N) <u>N</u>

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" = $\underline{100}$ '
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: <u>Trib 1 to North Fork San Gabriel River, Trib 2 to North Fork San Gabriel River</u> ✓ 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. 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 ☐ Shared-use paths ✓ Related turn lanes ☐ Off-site improvements and staging areas ✓ Demolition plans ☐ Utility relocations

	Other improved areas:	
Per	rmanent Best Management P	ractices (BMPs)
Desci	ription of practices and measures that will be	used after construction is completed.
aı to qı		emental increase in the annual mass loading of ed by the regulated activity is removed. These
	measures for this site. A technical guidance other than the TCE	GM) was used to design permanent BMPs and Q TGM was used to design permanent BMPs te citation for the technical guidance that was
30. 🛭	Attachment E - BMPs for Upgradient (Offsi	te) Stormwater.
	and flows across the site is attached. No surface water, groundwater or storm flows across the site, and an explanation Permanent BMPs or measures are not response.	nwater originates upgradient from the site nwater originates upgradient from the site and is attached. equired to prevent pollution of surface water, ates upgradient from the site and flows across
31. 🛭	Attachment F - BMPs for On-site Stormwat	er.
	pollution caused by contaminated storn Permanent BMPs or measures are not re	nates on-site or flows off the site, including nwater runoff from the site is attached. equired to prevent pollution of surface water or lows off the site, including pollution caused by
pi st Co	Attachment G - Construction Plans. Construction Plans. Construction Plans. Construction Plans and measures have upervision of a Texas Licensed Professional Enconstruction plans for the proposed permanen Il proposed structural plans and specifications	been prepared by or under the direct gineer, and are signed, sealed, and dated. BMPs and measures are attached and include
	Major bridge cross-sections, and roadwa	ay plan and profiles
	BMP plans and details	Design calculations
	Erosion control	TCEQ Construction Notes
	⊠ SW3P	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.

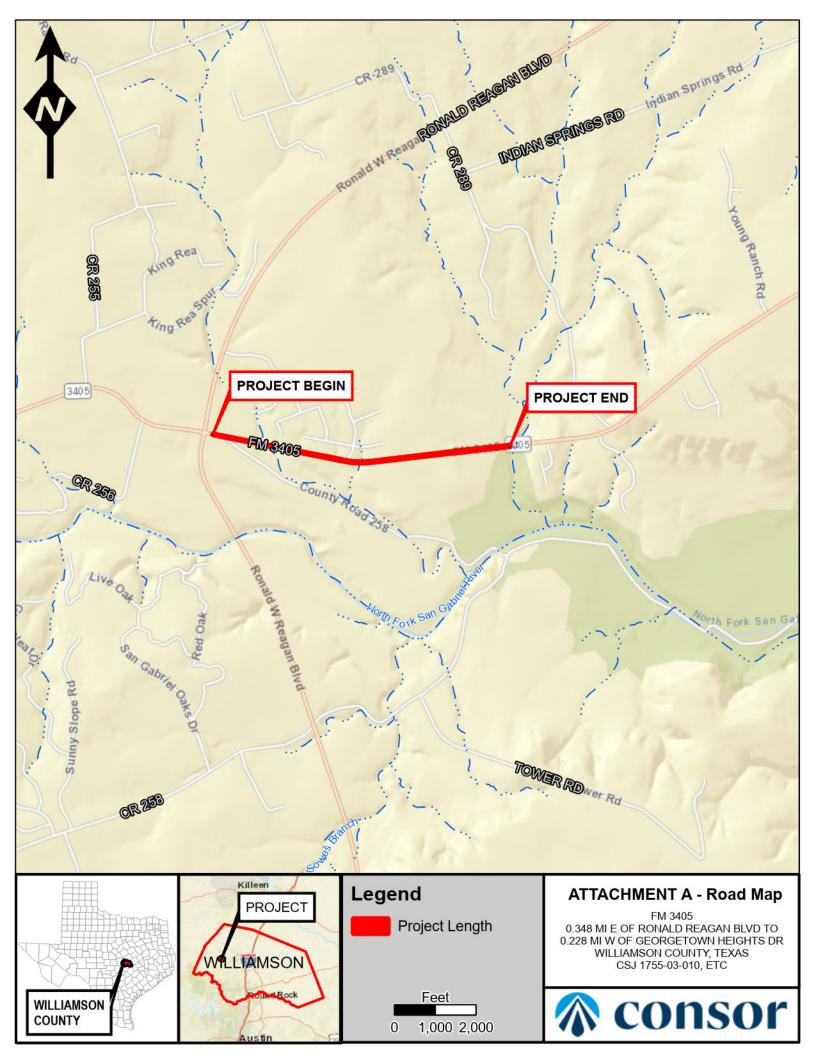
Administrative Information

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.

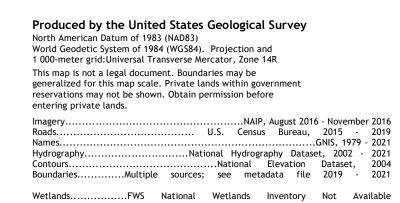
40. The fee for the plan(s) is based on:

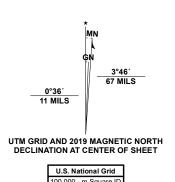
The total R.O.W. (as in Item 17).

TxDOT roadway project.



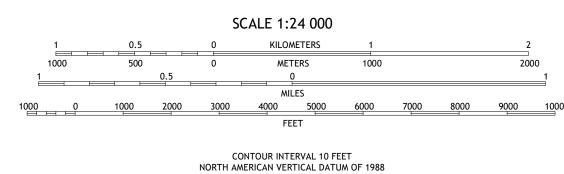




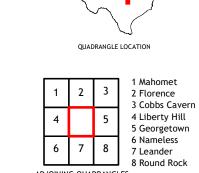


PV

PU Grid Zone Designa' 14R



This map was produced to conform with the National Geospatial Program US Topo Product Standard.



ADJOINING QUADRANGLES



Attachment C: Project Description

TxDOT proposes road improvements along FM 3405 from 0.348 mi east of Ronald Reagan Blvd. to 0.228 mi west of Georgetown Heights Dr. in Williamson County, Texas. The proposed improvements include lane widening, constructing paved shoulders (1-4 ft.), installing a continuous turn lane, and profile edge line/centerline markings. The proposed project length is approximately 1.288 miles of FM 3405 located entirely in the Edwards Aquifer Contributing Zone.

The total project area is 18.78 acres of which 12.95 acres will be disturbed. All three culverts within the project area will be extended to accommodate the proposed road changes.

Drainage from the project flows to Tributary 1 & 2 To North Fork San Gabriel River. The existing roadway drainage is accomplished by existing ditches.

Proposed drainage improvements are limited to cross culverts and roadside ditches. Grading to reestablish ditches after adding auxiliary lane will be completed. Culvert B (Sta 121+10) Culvert C (Sta 127+28) Culvert D (Sta 138+28) will have upstream and downstream headwall removed and replaced as part of project.

Regulated activities at the site will consist of grading and reworking slopes, installation of sediment and erosion controls, removing existing pavement, excavating and preparing subgrade for proposed pavement widening, and installing proposed pavement and culverts.

Attachment D: Factors Affecting Surface Water Quality

Water quality is affected by activities during and after construction. During construction, temporary controls will be in place to minimize the effects of construction. After construction, permanent controls will function to reduce the impact of the proposed development.

Construction activities that could potentially affect water quality include, construction vehicle traffic, use of construction equipment, handling of construction material, fuels, etc. Loose soil from grading operations carries the risk of sediment pollution to natural water ways. Temporary sediment barriers use are rock dams, silt fences and erosion logs. Stabilized construction entrance and exit will be used during construction to prevent sediment tracking of pollutants. Other activities include the handling and disposal of waste materials, and sanitary waste which pose a risk of contamination. Guidelines for these activities are specified in accordance to the TCEQ Stormwater General Permit for Construction Activities (TXR150000) Stormwater Pollution Prevention Plan.

Attachment E: BMPs for Upgradient (Offsite) Stormwater

The three existing cross culvert that carry upgradient water across the ROW will be improved to accommodate the proposed widening. Culvert layout sheets are included. No significant changes to offsite stormwater flows are proposed.

Attachment F: BMPs for On-site Stormwater

Stormwater runoff from the project site will be controlled by erosion control fence on the down gradient side of the ROW. Rock filter dams will be placed at Culvert B, C and D to slowdown runoff at the outfall with Tributary 1 & 2 To North Fork San Gabriel River to assist in sediment removal. SW3P sheets for more information of temporary control measures.

Grassy swales will be used as permanent BMPs for the project. The project requires 2176 lbs of TSS and grassy swales will remove 2189 lbs of TSS.



STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NUMBER STP 2026(347)HES, ETC. CSJ: 1755-03-010, ETC.

NET LENGTH OF PROJECT = 6,636.76 FEET = 1.257 MILES — ROADWAY = 6,305.76 FEET = 1.194 MILES BRIDGE = 331.00 FEET = 0.063 MILES

WILLIAMSON COUNTY FM 3405

FROM: 0.348 MI E OF RONALD REAGAN BLVD. TO: 0.228 MI W OF GEORGETOWN HEIGHTS DR, ETC.

FOR CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS

CONSISTING OF WIDEN LANE(S), CONSTRUCT PAVED SHOULDERS (1-4 FT.), INSTALL CONTINUOUS TURN LANE, PROFILE EDGELINE/CENTERLINE MARKINGS



ROADWAY LENGTH

(MI)

0.587

0.216

0.152

0.239

(FT)

3100.81

1136 76

804.00

1264 19

1755-03-010

1755-03-015

1755-03-016

1755-03-018

11/23/2025

BRIDGE LENGTH

(MI)

0.000

0.000

0.063

0.000

0.063

(FT)

0.00

0.00

0.00 331.00 TOTAL LENGTH

(MI)

0.587

0.216

0.215

0.239

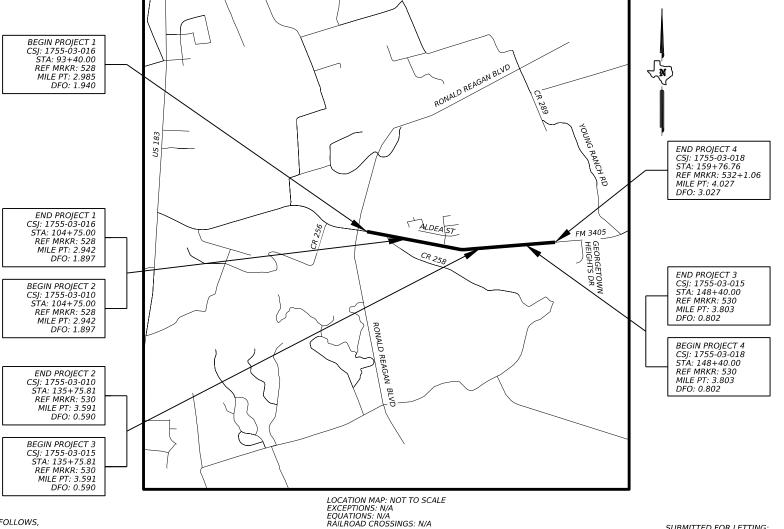
1.257

(FT)

1136 76

1135.00

1264 19



Texas Department of Transportation

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SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024 AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

010, ETC FM 3405 DIST SHEET NO. AUS WILLIAMSON

DESIGN SPEED

MAIN LANES:

A.D.T.

2024: 4,406 VPD 8,371 VPD

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.

LIST OF APPROVED CHANGE ORDERS:

P.E	
	DATE

PLANS PREPARED BY



SUBMITTED FOR LETTING:

AREA ENGINEER

4630 N Loop 1604 West, Suite 307 San Antonio, TX 78249 Firm Registration No. 1001

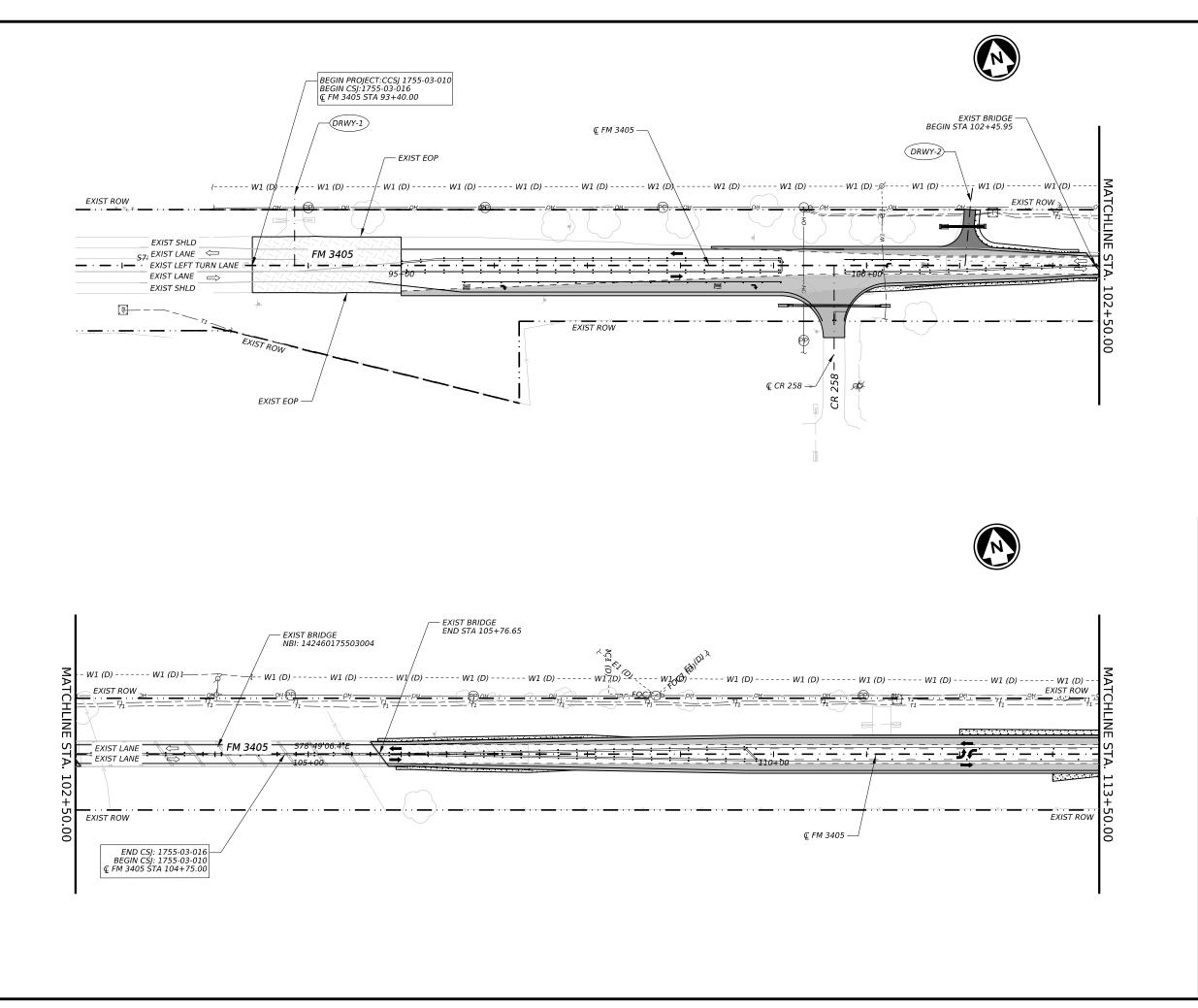
SUBMITTED FOR LETTING:	
CONSULTING ENG. (TBPE FIRM REG. F-1001)	_

RECOMMENDED FOR LETTING:	

DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING:	

DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT



EXIST ROW EXIST FEATURES EXIST FENCE EXIST FENCE
PROP EDGE OF PAVEMENT
PROP ROADWAY WIDENING
EXIST TRAFFIC DIRECTION
PROP TRAFFIC DIRECTION PROP DRIVEWAY 2.5" MILL TRANSITION

NOTES:

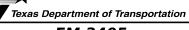
HORIZONTAL DATA IS A GUIDE FOR DESIGN VERIFICATION PURPOSE ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.







4630 N Loop 1604 West, Suite 307

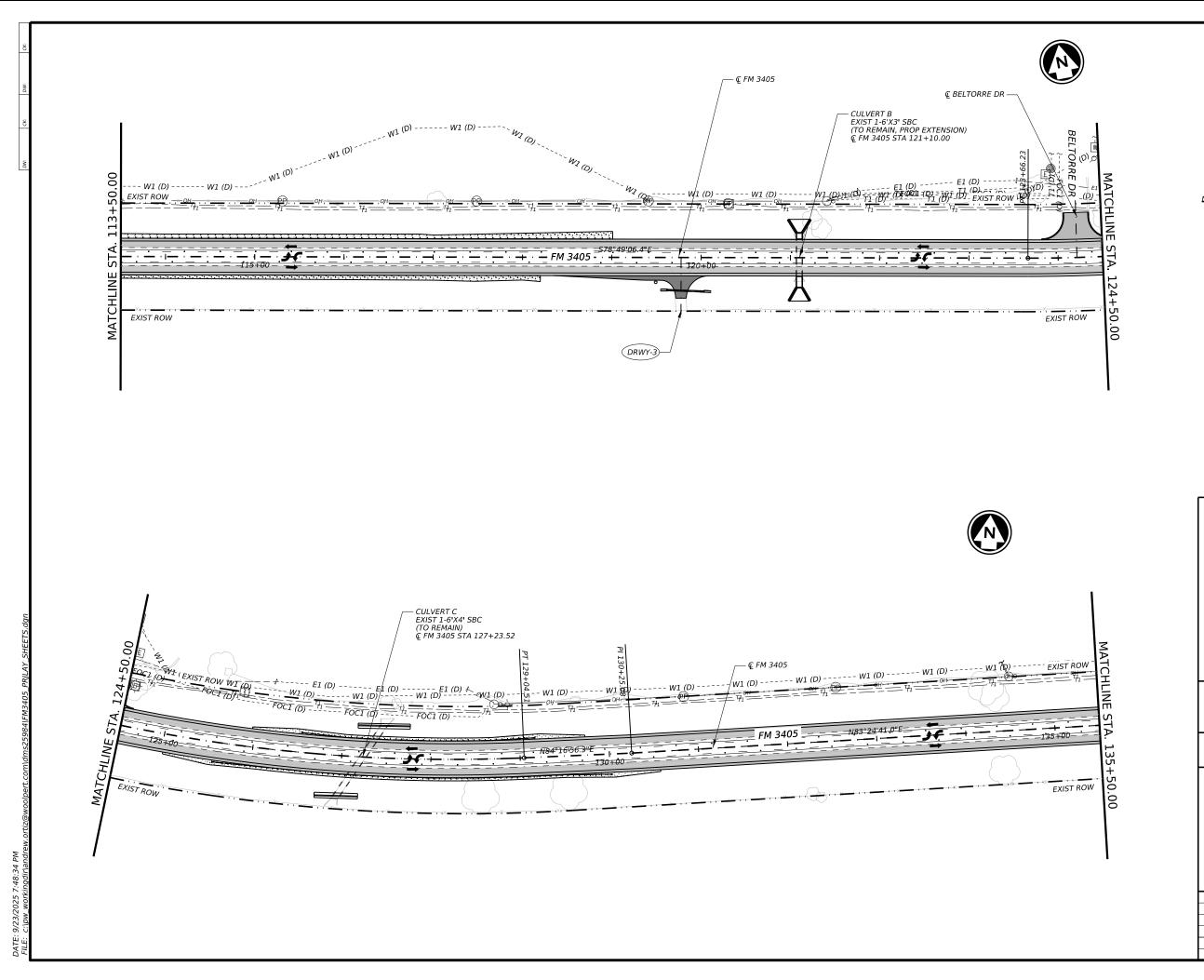


FM 3405

PROJECT LAYOUT

STA 95+00.00 TO STA 113+50.00

				SHEET 1 OF 4
55₽:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHEE	T	3
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010, ETC	FN	1 3405





EXIST ROW EXIST FEATURES EXIST FENCE PROP EDGE OF PAVEMENT PROP ROADWAY WIDENING EXIST TRAFFIC DIRECTION PROP TRAFFIC DIRECTION PROP DRIVEWAY 2.5" MILL TRANSITION

NOTES:

HORIZONTAL DATA IS A GUIDE FOR DESIGN VERIFICATION PURPOSE ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.





4630 N Loop 1604 West, Suite 307

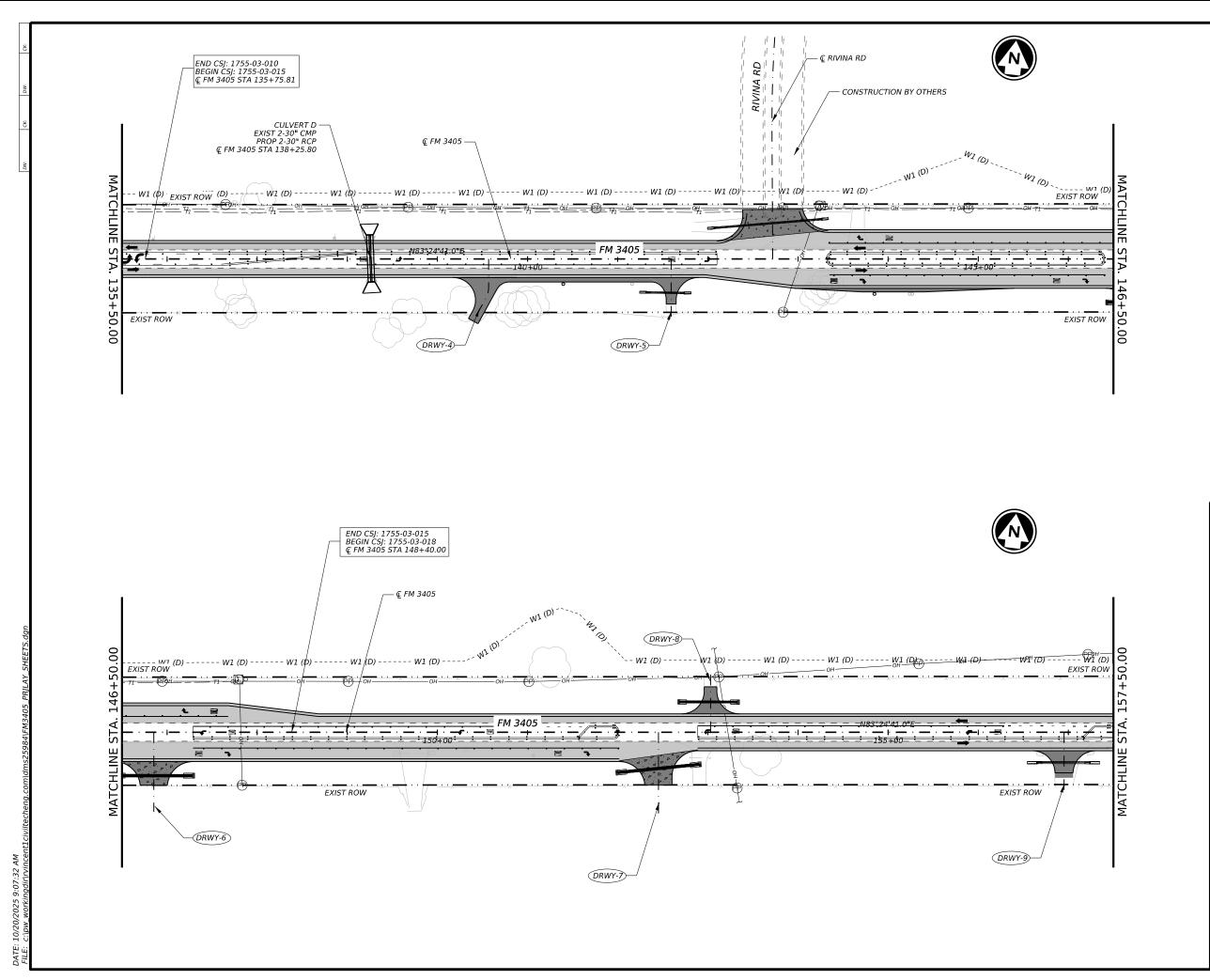


FM 3405

PROJECT LAYOUT

STA 113+50.00 TO STA 135+50.00

				SHEET 2 OF 4
55P:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHEE	T	4
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	IWAY NO.
1755	03	010, ETC	FN	1 3405

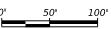


EXIST ROW EXIST FEATURES EXIST FENCE EXIST FENCE
PROP EDGE OF PAVEMENT
PROP ROADWAY WIDENING
EXIST TRAFFIC DIRECTION
PROP TRAFFIC DIRECTION PROP DRIVEWAY 2.5" MILL TRANSITION

NOTES:

HORIZONTAL DATA IS A GUIDE FOR DESIGN VERIFICATION PURPOSE ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.







4630 N Loop 1604 West, Suite 307 San Antonio, TX 78249

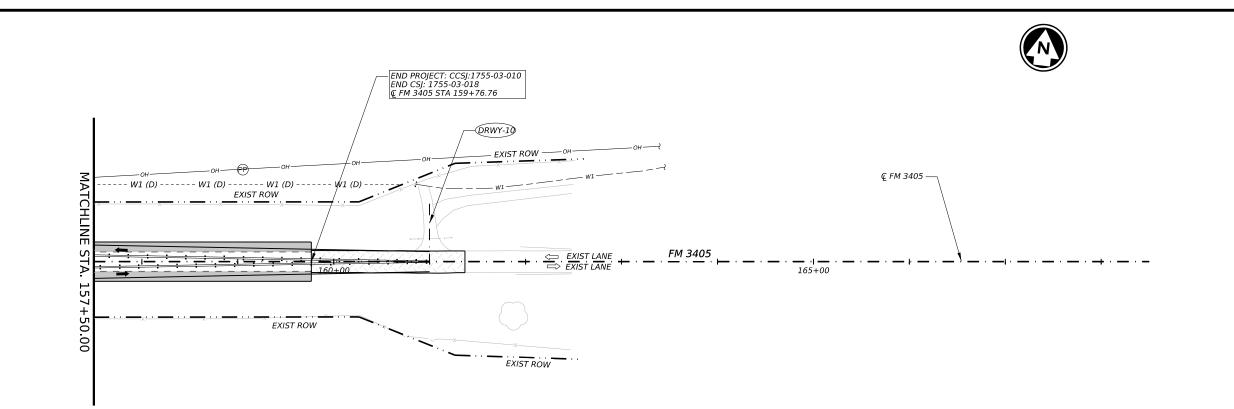


FM 3405

PROJECT LAYOUT

STA 135+50.00 TO STA 157+50.00

				SHEET 3 OF 4
5P:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHEE	T	5
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	IWAY NO.
1755	03	010. ETC	FN	1 3405



EXIST ROW
EXIST FEATURES

EXIST FEATURES

EXIST FENCE

PROP EDGE OF PAVEMENT

PROP ROADWAY WIDENING

EXIST TRAFFIC DIRECTION

PROP TRAFFIC DIRECTION PROP DRIVEWAY 2.5" MILL TRANSITION

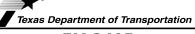
NOTES:

HORIZONTAL DATA IS A GUIDE FOR DESIGN VERIFICATION PURPOSE ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.





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FM 3405

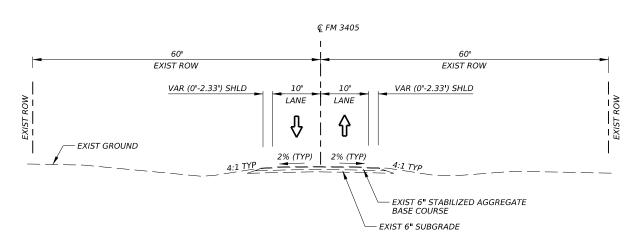
PROJECT LAYOUT

STA 157+50.00 TO STA 162+00.00

				SHEET 4 OF 4
55P:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHEE	T	6
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010, ETC	FN	1 3405

EXISTING TYPICAL SECTION

STA 93+40.00 TO STA 99+41.65



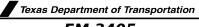
EXISTING TYPICAL SECTION

STA 99+41.65 TO STA 159+76.76





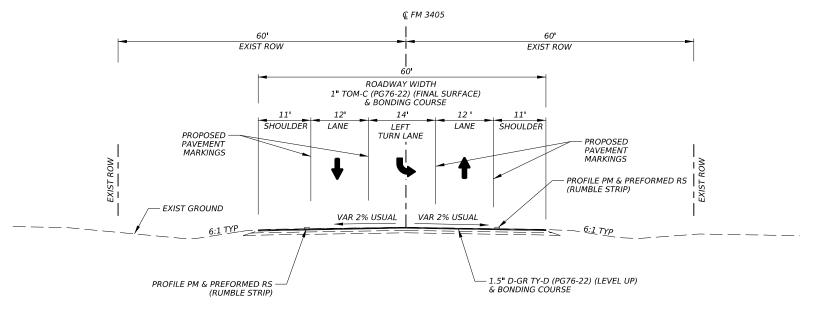
11750 Katy Freeway, Ste. 1260 Houston, Texas 77079 Firm Registration No. 1001



FM 3405

EXISTING TYPICAL SECTIONS

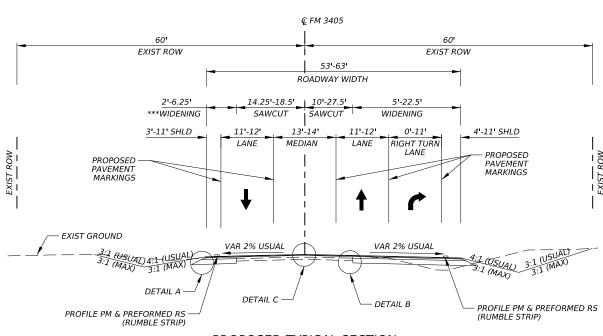
٠				SHEET 1 OF 1
<i>F51</i> ₽:88:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHEE	T	7
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010, ETC	FN	1 3405



PROPOSED TYPICAL SECTION

STA 93+40.00 TO STA 95+00.00 (MILLING TRANSITION (0" - 2.5"))

CSJ: 1755-03-016



PROPOSED TYPICAL SECTION

STA 95+00.00 TO STA 99+50.00

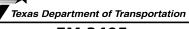
***WIDENING ON LEFT BEGINS AT STA 98+33.25

CSJ: 1755-03-016



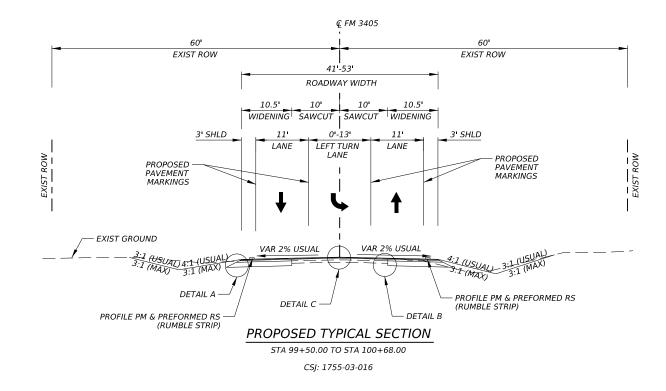


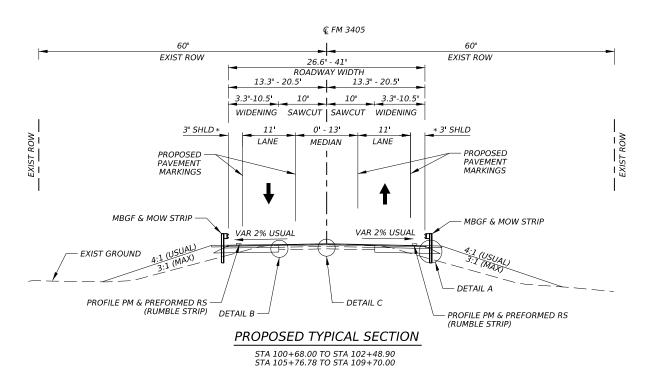
4630 N LOOP 1604 West, Suite 307



FM 3405

				SHEET 1 OF 6
55P:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHE	ET	8
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010, ETC	FN	1 3405





* 1'~3' SHOULDER WIDTH VARIES AT THE BRIDGE APPROACHES.



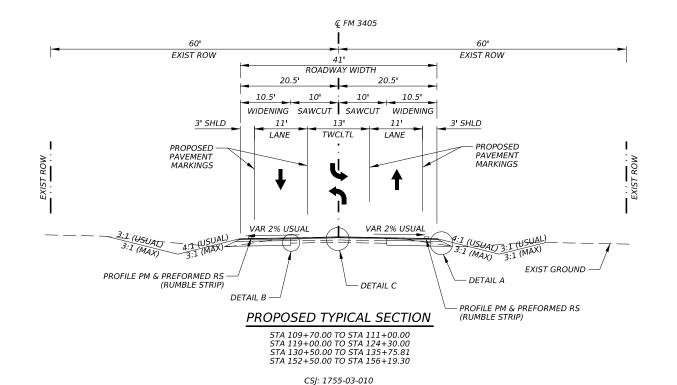


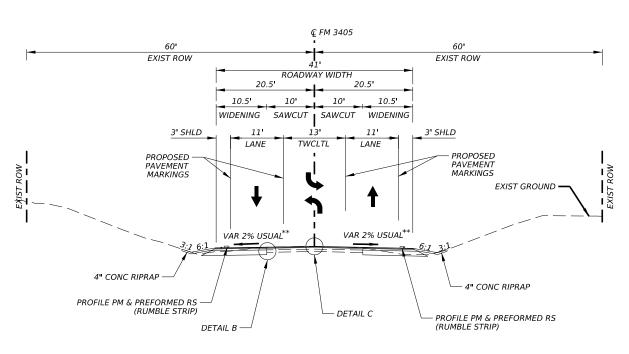
4630 N LOOP 1604 West, Suite 307



FM 3405

				SHEET 2 OF 6
FFP:RB:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHE	ET	9
STATE	DIST.		COUNTY	•
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	0.3	010. ETC	FI	1 3405





PROPOSED TYPICAL SECTION

STA 111+00.00 TO STA 119+00.00

CSJ: 1755-03-010



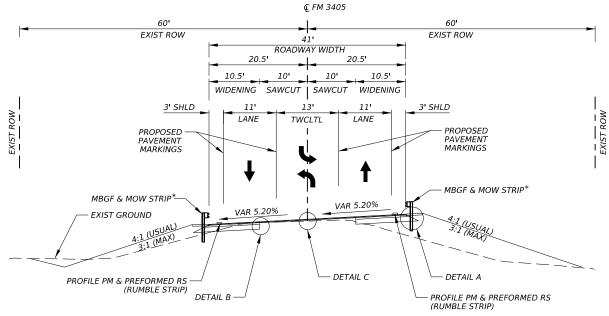


4630 N LOOP 1604 West, Suite 307



FM 3405

				SHEET 3 OF 6
55P:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHE	ET	10
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010. ETC	FN	1 3405

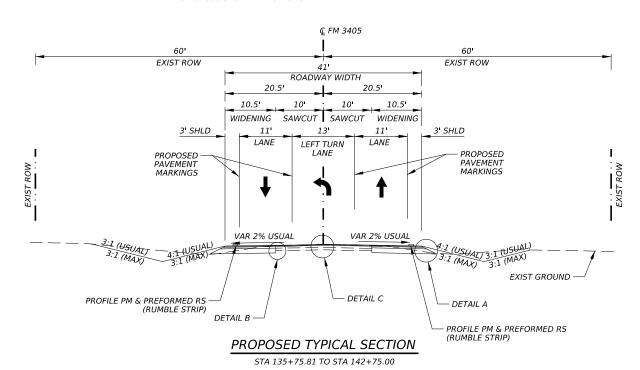


PROPOSED TYPICAL SECTION

STA 124+30.00 TO STA 130+50.00

CSJ: 1755-03-016

* SEE ROADWAY PLAN & PROFILE SHEETS FOR LIMITS OF MBGF AND MOW STRIP ** SEE SUPER ELEVATION DATA TABLE & ROADWAY PLAN & PROFILE SHEETS FOR CROSS SLOPE TRANSITIONS



CSJ: 1755-03-015





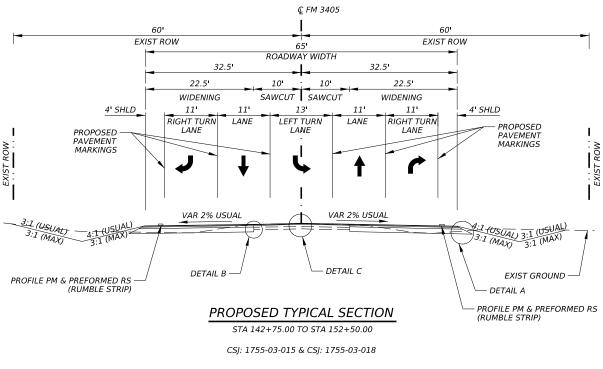
4630 N LOOP 1604 West, Suite 307 San Antonio, Texas 78249

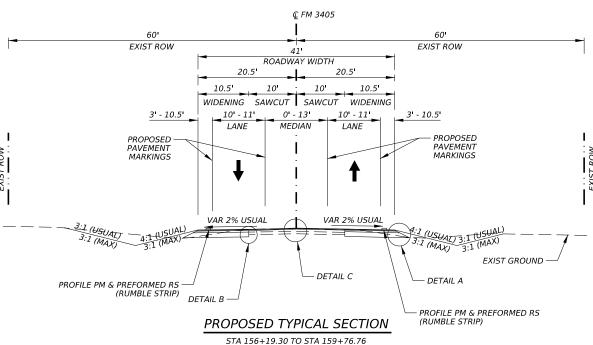


FM 3405

SHEET 4 OF

SHEET 4 OF 6						
55P:R8:	PROJECT NO.			SHEET NO.		
6	SE	E TITLE SHE	11			
STATE	DIST.	COUNTY				
TEXAS	AUS	WILLIAMSON				
CONT.	SECT.	JOB	OB HIGHWAY NO.			
1755	03	010, ETC	FM 3405			





CSJ: 1755-03-018



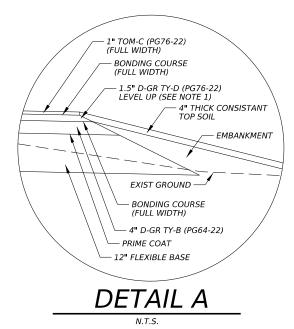


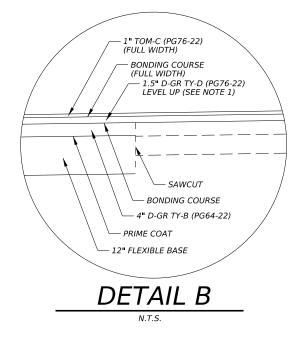
4630 N LOOP 1604 West, Suite 307

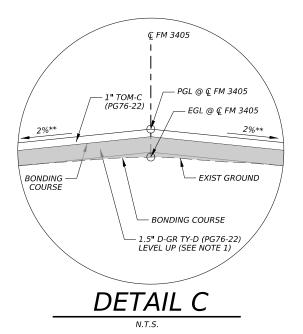


FM 3405

				SHEET 5 OF 6
55P:R8:		PROJECT NO.	SHEET NO.	
6	SE	E TITLE SHE	ET	12
STATE	DIST.	COUNTY		
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB HIGHWAY NO.		HWAY NO.
1755	03	010. ETC FM 3405		1 3405







- PLACE MINIMUM THICKNESS OF 1.5" LEVEL UP FOR 20'
 OF EXISTING ROADWAY FOR THE PURPOSE OF
 CROSS SLOPE CORRECTION. PAID AS ITEM 341-7059.
- ** SEE SUPER ELEVATION DATA TABLE & ROADWAY PLAN & PROFILE SHEETS FOR CROSS SLOPE TRANSITIONS.





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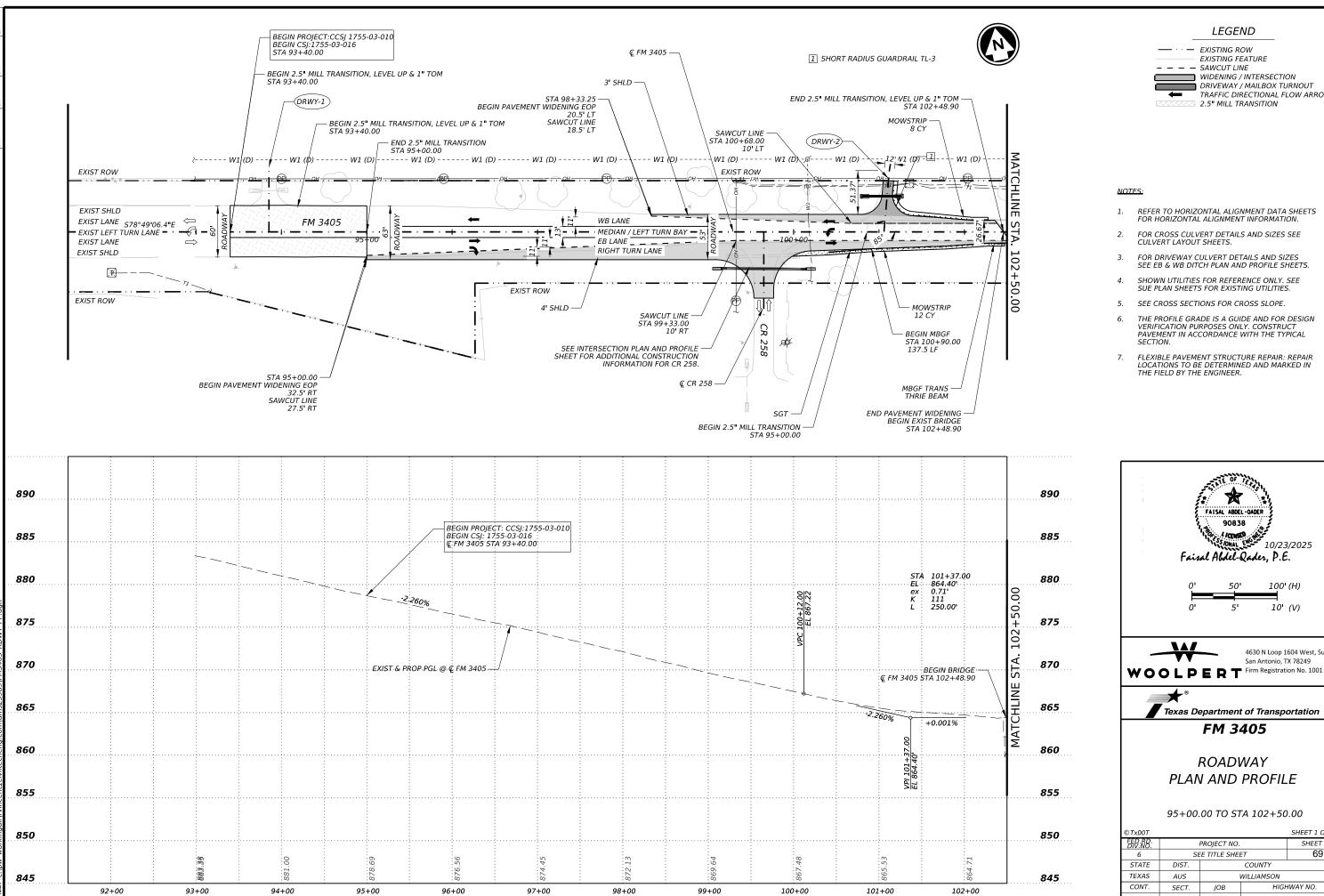


FM 3405

PROPOSED TYPICAL SECTIONS

SHEET 6 OF 6

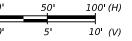
				SHEET 6 OF 6
<i>™:N8:</i>	PROJECT NO.			SHEET NO.
6	SE	E TITLE SHE	ET	13
STATE	DIST.	COUNTY		
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB	JOB HIGHWAY NO.	
1755	03	010, ETC	, ETC FM 3405	



— · · − EXISTING ROW EXISTING FEATURE - - - - SAWCUT LINE WIDENING / INTERSECTION DRIVEWAY / MAILBOX TURNOUT TRAFFIC DIRECTIONAL FLOW ARROW

- REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
- FOR DRIVEWAY CULVERT DETAILS AND SIZES SEE EB & WB DITCH PLAN AND PROFILE SHEETS.
- SHOWN UTILITIES FOR REFERENCE ONLY. SEE SUE PLAN SHEETS FOR EXISTING UTILITIES.
- SEE CROSS SECTIONS FOR CROSS SLOPE.
- VERIFICATION PURPOSES ONLY. CONSTRUCT PAVEMENT IN ACCORDANCE WITH THE TYPICAL
- FLEXIBLE PAVEMENT STRUCTURE REPAIR: REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN







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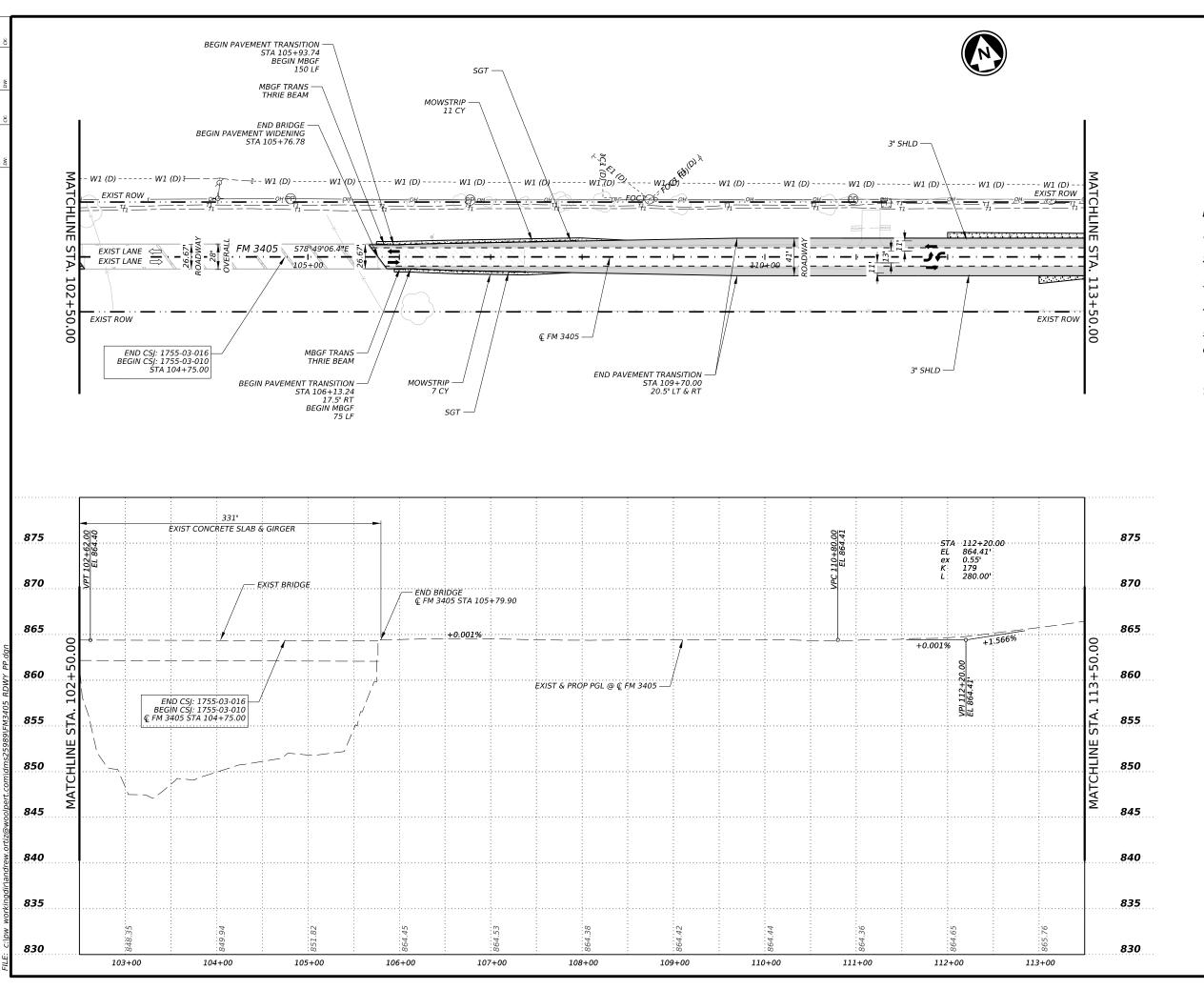


FM 3405

ROADWAY PLAN AND PROFILE

95+00.00 TO STA 102+50.00

©TxD0T				SHEET 1 OF 7
55P:R8:		PROJECT NO.	SHEET NO.	
6	SE	E TITLE SHE	ET	69
STATE	DIST.	COUNTY		
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB HIGHWAY NO.		HWAY NO.
1755	03	010. ETC FM 3405		1 3405



— · · − EXISTING ROW EXISTING FEATURE - - - - SAWCUT LINE WIDENING / INTERSECTION DRIVEWAY / MAILBOX TURNOUT TRAFFIC DIRECTIONAL FLOW ARROW 2.5" MILL TRANSITION

NOTES:

- REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
- FOR CROSS CULVERT DETAILS AND SIZES SEE CULVERT LAYOUT SHEETS.
- FOR DRIVEWAY CULVERT DETAILS AND SIZES SEE EB & WB DITCH PLAN AND PROFILE SHEETS.
- SHOWN UTILITIES FOR REFERENCE ONLY. SEE SUE PLAN SHEETS FOR EXISTING UTILITIES.
- SEE CROSS SECTIONS FOR CROSS SLOPE.
- THE PROFILE GRADE IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT PAVEMENT IN ACCORDANCE WITH THE TYPICAL
- FLEXIBLE PAVEMENT STRUCTURE REPAIR: REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN THE FIELD BY THE ENGINEER.





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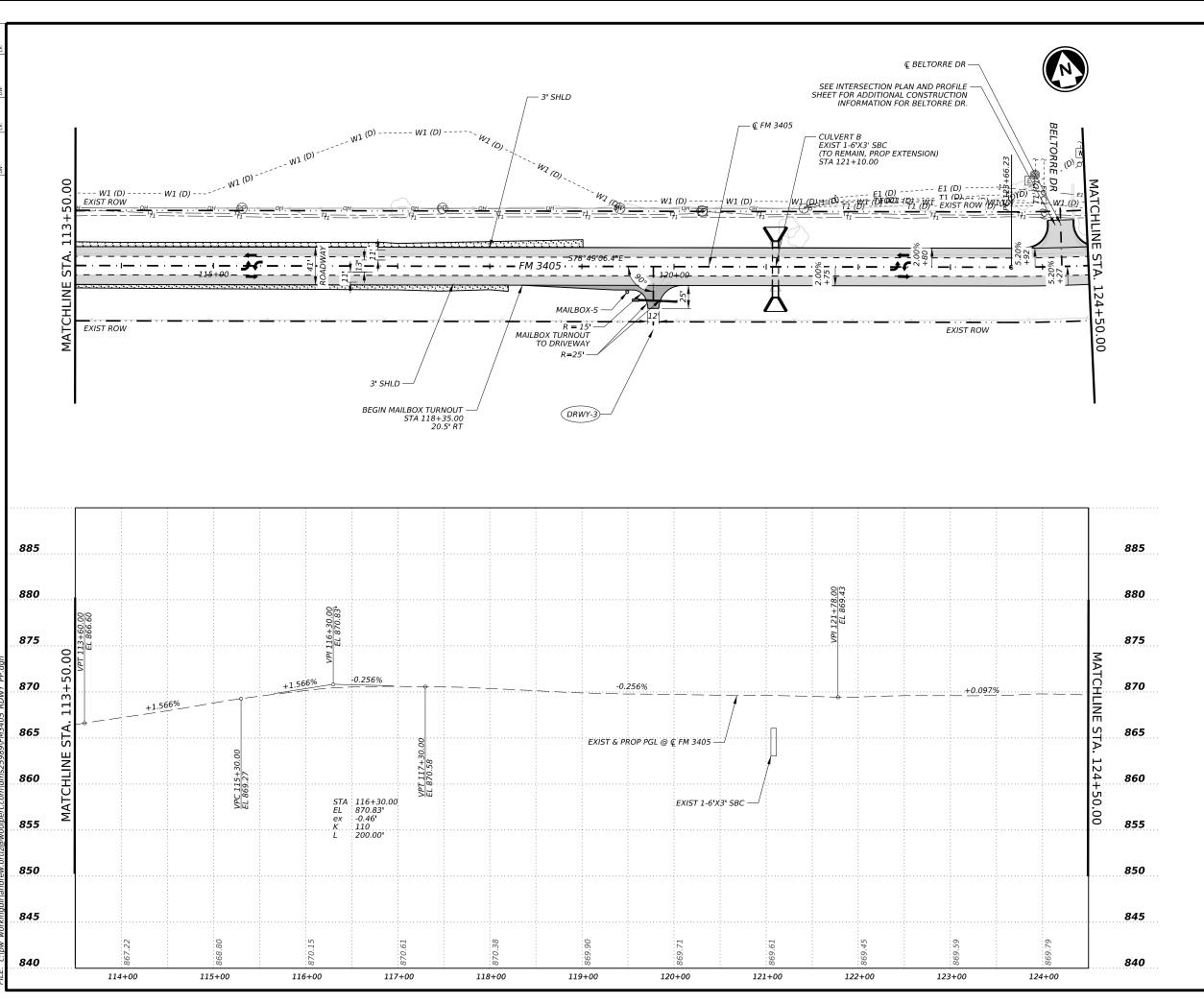


FM 3405

ROADWAY PLAN AND PROFILE

STA 102+50.00 TO STA 113+50.00

© TxD0T				SHEET 2 OF 7
<i>F5FP:RB:</i>	PROJECT NO.			SHEET NO.
6	SE	E TITLE SHE	ET	70
STATE	DIST.			
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB HIGHWAY NO.		HWAY NO.
1755	03	010, ETC FM 3405		1 3405



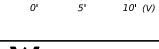


EXISTING ROW
EXISTING FEATURE
SAWCUT LINE
WIDENING / INTERSECTION
DRIVEWAY / MAILBOX TURNOUT
TRAFFIC DIRECTIONAL FLOW ARROW
2.5" MILL TRANSITION

NOTES:

- . REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
- FOR CROSS CULVERT DETAILS AND SIZES SEE CULVERT LAYOUT SHEETS.
- FOR DRIVEWAY CULVERT DETAILS AND SIZES SEE EB & WB DITCH PLAN AND PROFILE SHEETS.
- SHOWN UTILITIES FOR REFERENCE ONLY. SEE SUE PLAN SHEETS FOR EXISTING UTILITIES.
- SEE CROSS SECTIONS FOR CROSS SLOPE.
- . THE PROFILE GRADE IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
- 7. FLEXIBLE PAVEMENT STRUCTURE REPAIR: REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN THE FIELD BY THE ENGINEER.





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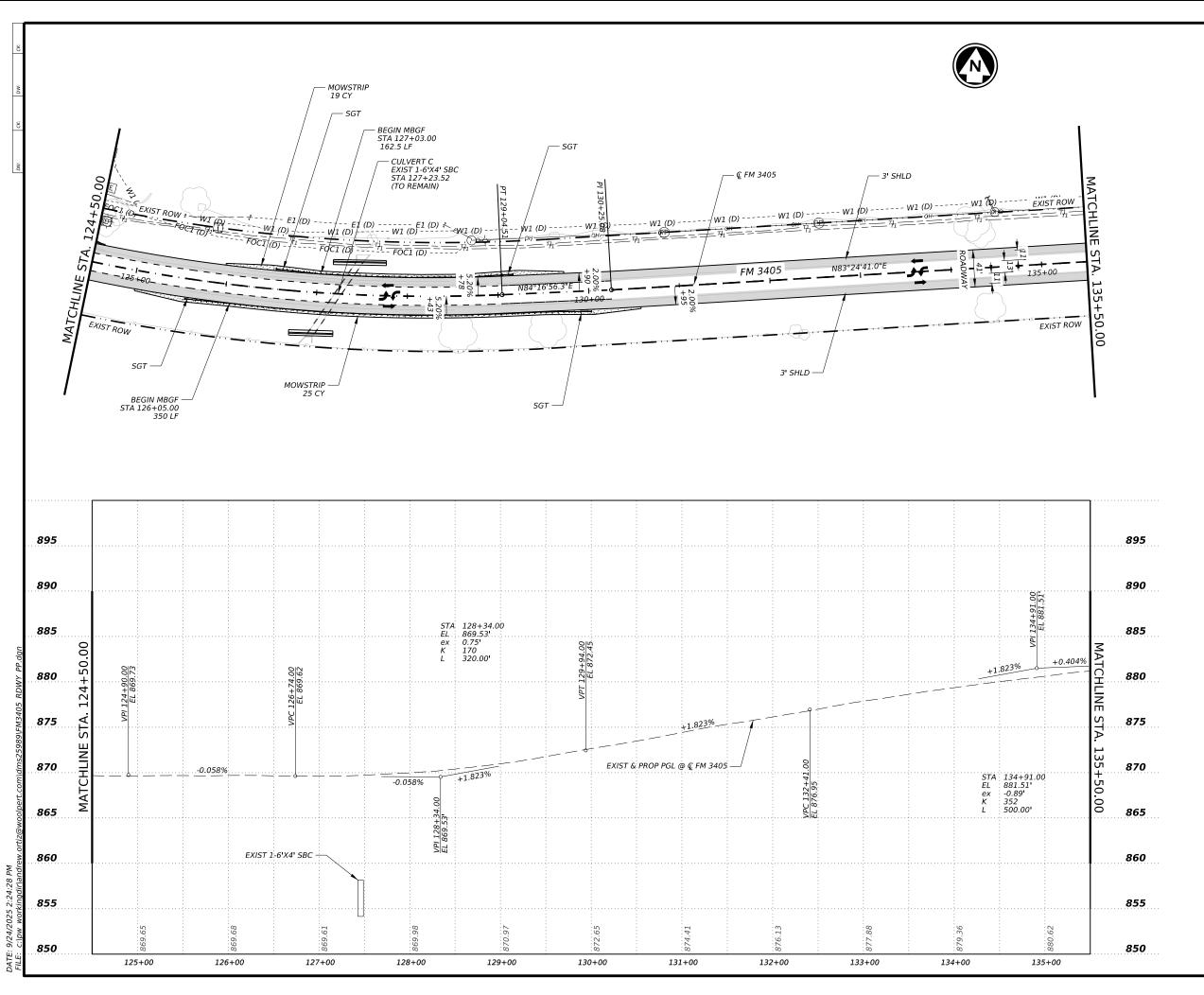


FM 3405

ROADWAY PLAN AND PROFILE

STA 113+50.00 TO STA 124+50.00

© TxD0T				SHEET 3 OF 7		
<i>F5₽:R8:</i>		SHEET NO.				
6	SE	E TITLE SHE	ET	71		
STATE	DIST.	COUNTY				
TEXAS	AUS	WILLIAMSON				
CONT.	SECT.	JOB HIGHWAY NO.		IWAY NO.		
1755	03	010, ETC FM 3405		1 3405		

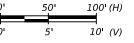


— · · − EXISTING ROW EXISTING FEATURE - - - - SAWCUT LINE WIDENING / INTERSECTION DRIVEWAY / MAILBOX TURNOUT TRAFFIC DIRECTIONAL FLOW ARROW 2.5" MILL TRANSITION

NOTES:

- REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
- FOR CROSS CULVERT DETAILS AND SIZES SEE CULVERT LAYOUT SHEETS.
- FOR DRIVEWAY CULVERT DETAILS AND SIZES SEE EB & WB DITCH PLAN AND PROFILE SHEETS.
- SHOWN UTILITIES FOR REFERENCE ONLY. SEE SUE PLAN SHEETS FOR EXISTING UTILITIES.
- SEE CROSS SECTIONS FOR CROSS SLOPE.
- THE PROFILE GRADE IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT PAVEMENT IN ACCORDANCE WITH THE TYPICAL
- FLEXIBLE PAVEMENT STRUCTURE REPAIR: REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN THE FIELD BY THE ENGINEER.







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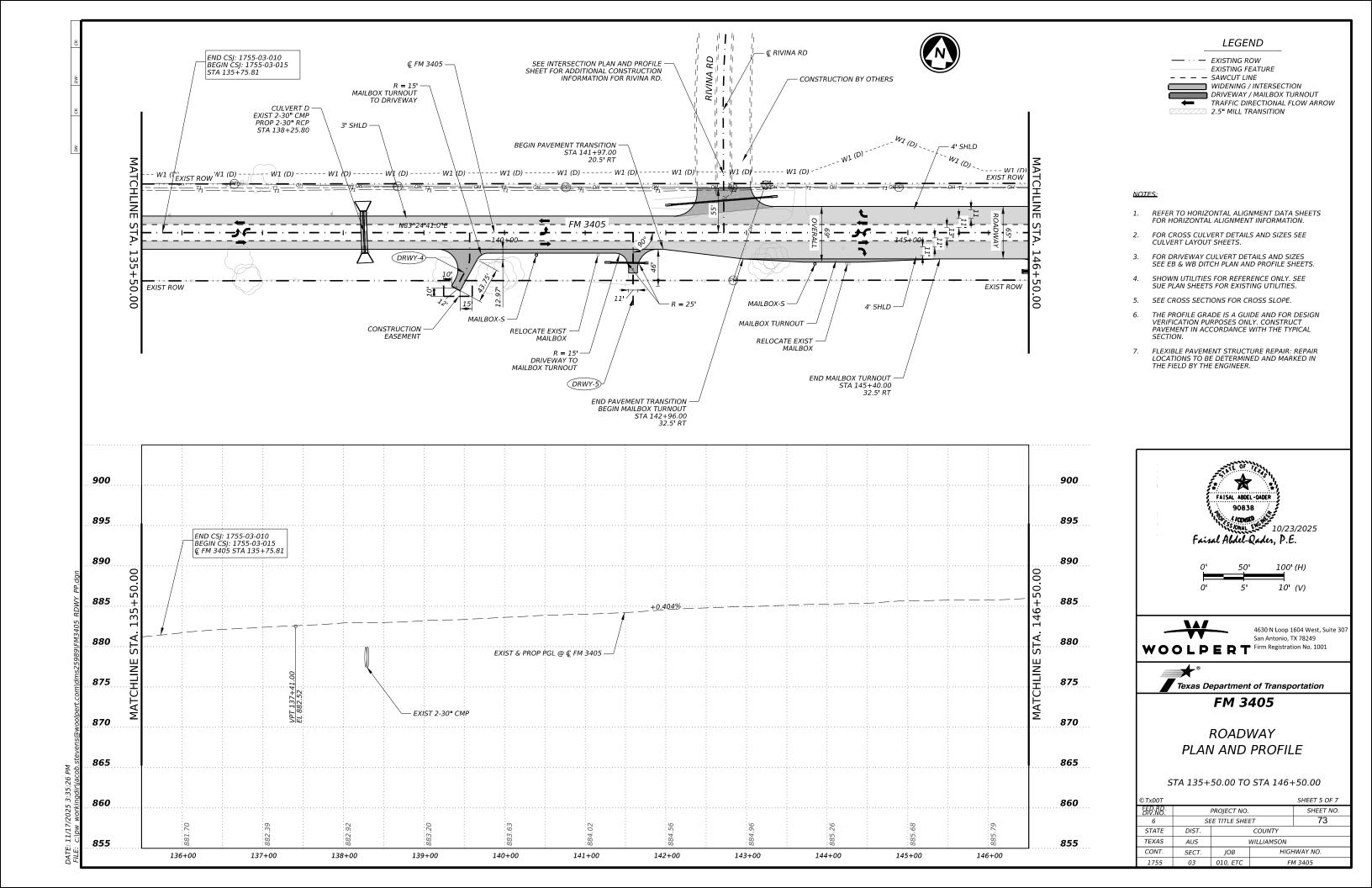


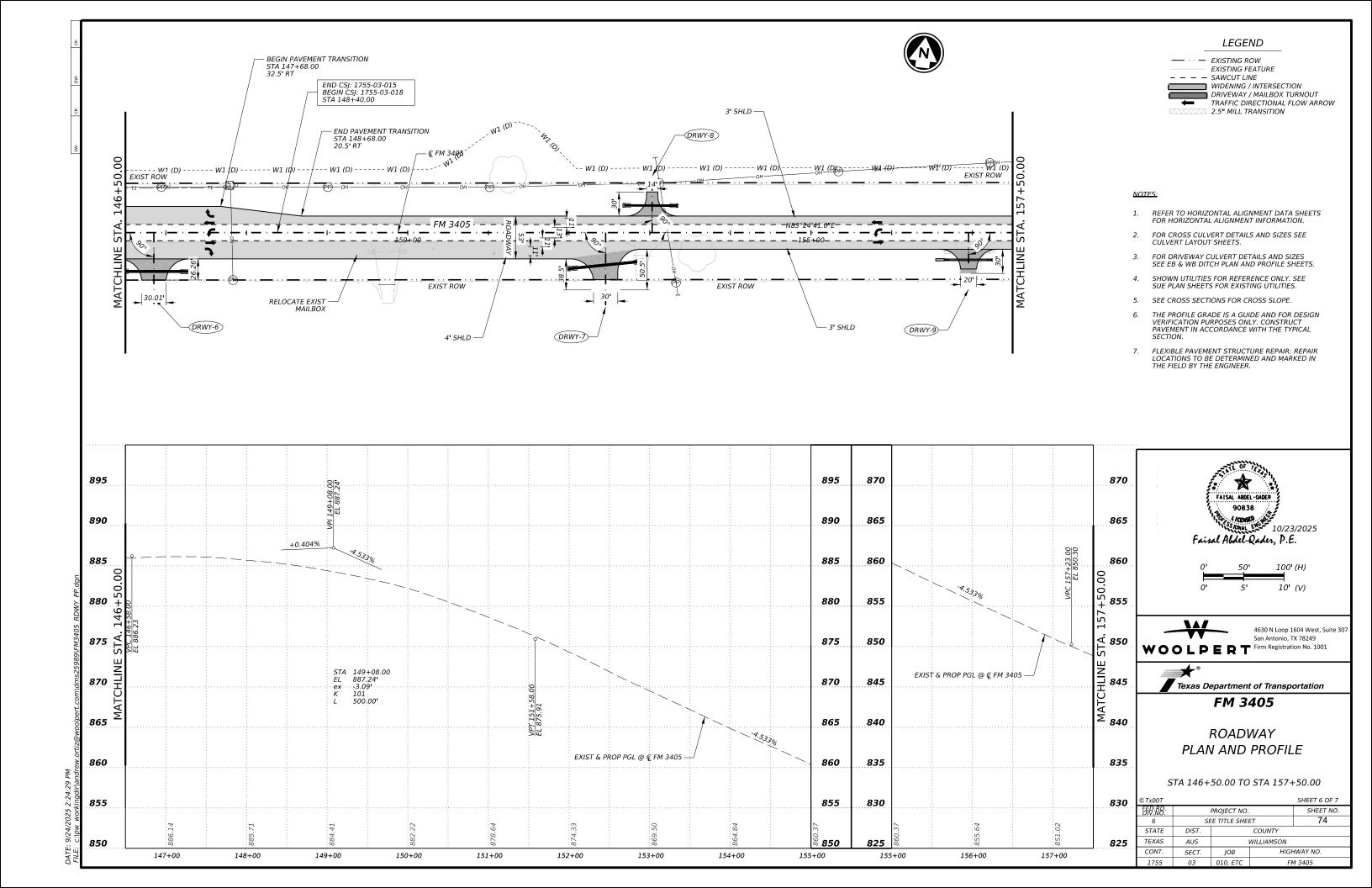
FM 3405

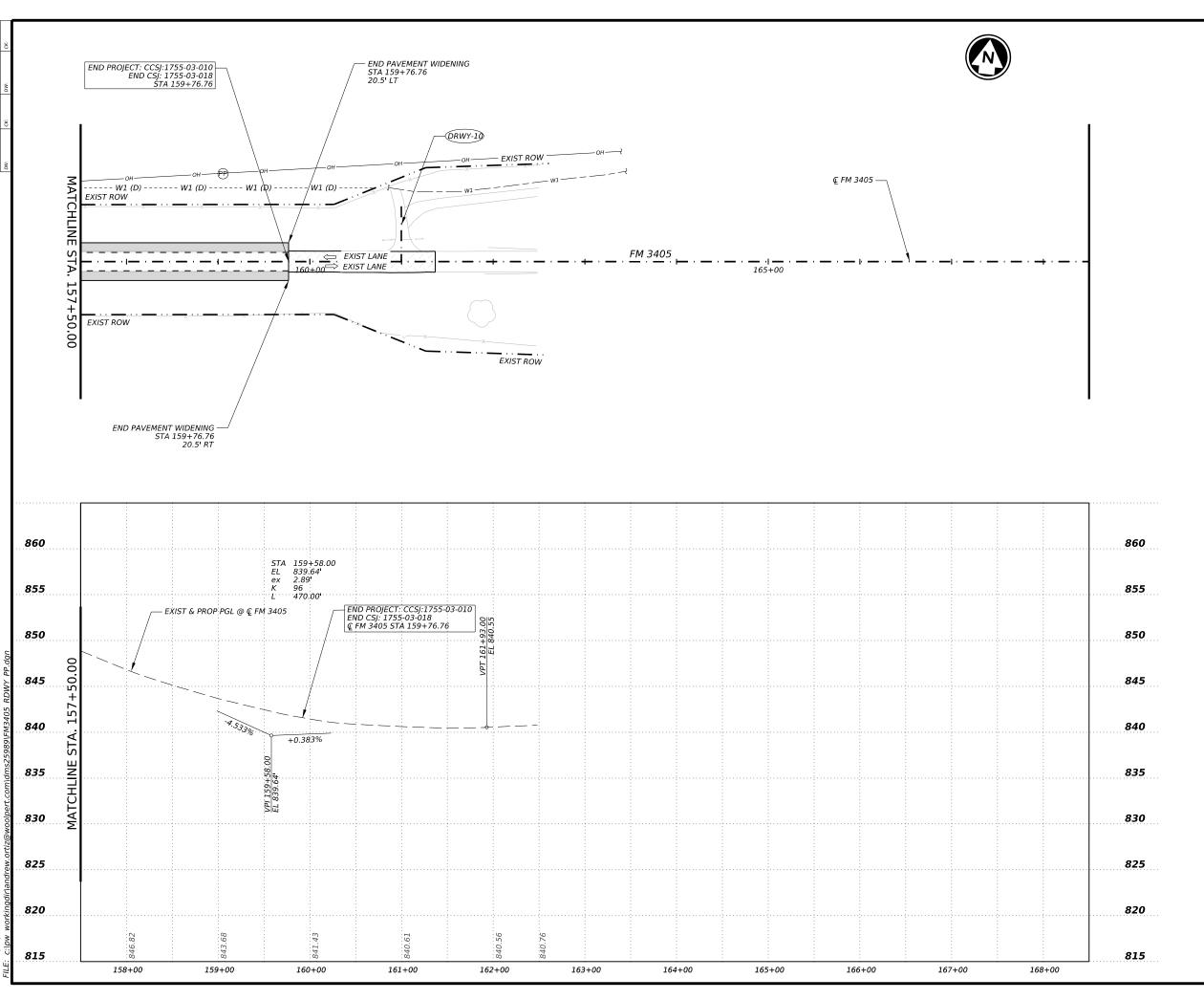
ROADWAY PLAN AND PROFILE

STA 124+50.00 TO STA 135+50.00

© TxD0T				SHEET 4 OF 7
FFR:RB:	PROJECT NO.			SHEET NO.
6	SE	E TITLE SHE	72	
STATE	DIST.		COUNTY	
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB	JOB HIGHWAY NO.	
1755	03	010 FTC	FI	1 3405







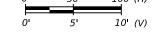
LEGEND

— · · − EXISTING ROW EXISTING FEATURE - - - SAWCUT LINE WIDENING / INTERSECTION DRIVEWAY / MAILBOX TURNOUT TRAFFIC DIRECTIONAL FLOW ARROW 2.5" MILL TRANSITION

NOTES:

- REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
- FOR CROSS CULVERT DETAILS AND SIZES SEE CULVERT LAYOUT SHEETS.
- FOR DRIVEWAY CULVERT DETAILS AND SIZES SEE EB & WB DITCH PLAN AND PROFILE SHEETS.
- SHOWN UTILITIES FOR REFERENCE ONLY. SEE SUE PLAN SHEETS FOR EXISTING UTILITIES.
- SEE CROSS SECTIONS FOR CROSS SLOPE.
- THE PROFILE GRADE IS A GUIDE AND FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT PAVEMENT IN ACCORDANCE WITH THE TYPICAL
- FLEXIBLE PAVEMENT STRUCTURE REPAIR: REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN THE FIELD BY THE ENGINEER.







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FM 3405

ROADWAY PLAN AND PROFILE

STA 157+50.00 TO 162+00.00

© TxD0T				SHEET 7 OF 7					
55P:R8:		PROJECT NO.		SHEET NO.					
6	SE	E TITLE SHE	ET	75					
STATE	DIST.		COUNTY						
TEXAS	AUS		WILLIAMSON						
CONT.	SECT.	JOB HIGHWAY NO.							
1755	0.2	010 ETC EM 2405							



EXISTING CONDITION

DRAINAGE AREA	AREA	CROSSING	METHOD	L	AND USE (LU)		TIME OF CON (T	CENTRATION C)	LAG	ТІМЕ			INTENSIT	Y (IN/HR)				PE	AK FLOW V	ALUES, Q(CI	FS)	
ID	(AC)	STATION		WEIGHTED "C"	WEIGHTED "CN"	% IMP	TC (MIN)	TC (HR)	T. (MIN)	T, (HR)	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
Α	4184.74	104+00	NRCS	-	72.79	10.37	198.78	3.31	119.27	1.99	-	-	-	-	-	-	1442.41	2381.90	3319.94	4786.16	6065.70	7524.07
В	69.61	121+10	RATIONAL	0.32	-	16.07	67.47	1.12	-	-	1.73	2.21	2.64	3.28	3.82	4.40	37.89	48.44	57.99	72.06	83.75	96.66
С	73.76	127+28	RATIONAL	0.33	-	20.29	53.12	0.89	-	-	2.03	2.59	3.09	3.84	4.45	5.12	49.97	63.76	76.20	94.45	109.55	126.14
D	7.19	138+28	RATIONAL	0.28	-	2.96	23.13	0.39	-	-	3.35	4.25	5.04	6.17	7.10	8.09	6.81	8.63	10.24	12.55	14.43	16.44
Е	4049.45	164+50	NRCS	-	74.44	14.53	212.13	3.54	127.28	2.12	-	-	-	-	-	-	1446.52	2340.05	3225.43	4604.88	5806.41	7174.16

PROPOSED CONDITION

	The GLE Continent																					
DRAINAGE AREA	AREA	CROSSING	METHOD	L	LAND USE (LU)			ICENTRATION C)	LAG	TIME	INTENSITY (IN/HR) PEAK FLOW VALUES, Q(CFS)									-S)		
ID	(AC)	STATION		WEIGHTED "C"	WEIGHTED "CN"	% IMP	TC (MIN)	TC (HR)	T. (MIN)	T. (HR)	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
Α	4184.74	104+00	NRCS	-	72.79	10.37	198.78	3.31	119.27	1.99	-	-	-	-	-	-	1442.41	2381.90	3319.94	4786.16	6065.70	7524.07
В	69.61	121+10	RATIONAL	0.32	-	16.27	67.47	1.12	-	-	1.73	2.21	2.64	3.28	3.82	4.40	38.02	48.61	58.20	72.31	84.04	97.00
С	73.76	127+28	RATIONAL	0.34	-	20.63	53.12	0.89	-	-	2.03	2.59	3.09	3.84	4.45	5.12	50.25	64.11	76.62	94.97	110.16	126.84
D	7.19	138+28	RATIONAL	0.30	-	5.32	23.13	0.39	-	-	3.35	4.25	5.04	6.17	7.10	8.09	7.13	9.03	10.71	13.13	15.09	17.19
Е	4049.45	164+50	NRCS	-	74.44	14.54	212.13	3.54	127.28	2.12	-	-	-	-	-	-	1446.52	2340.05	3225.43	4604.88	5806.41	7174.16

ATLAS 14 RAINFALL DEPTH (IN)*													
TIME		STORM EVENTS											
INTERVAL	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR							
5 MIN	0.51	0.65	0.76	0.93	1.06	1.20							
15 MIN	1.03	1.29	1.52	1.85	2.11	2.38							
1 HOUR	1.88	2.38	2.80	3.41	3.90	4.41							
2 HOUR	2.30	2.95	3.55	4.43	5.17	5.99							
3 HOUR	2.54	3.30	4.01	5.09	6.02	7.06							
6 HOUR	2.97	3.90	4.80	6.17	7.36	8.73							
12 HOUR	3.43	4.50	5.53	7.09	8.45	10.00							
24 HOUR	3.93	5.14	6.28	8.00	9.48	11.20							

*RAINFALL DEPTH UTILIZED FOR THE NRCS METHOD (CROSSING A & E)

- 1. HYDROLOGY WAS BASED ON NOAA ATLAS 14 RAINFALL.
- 2. NRCS AND RATIONAL HYDROLOGIC METHODS WERE UTILIZED FOR THE HYDROLOGIC ANALYSIS.
- 3. THE RATIONAL METHOD WAS USED FOR BASINS WITH AREAS SMALLER THAN 200 ACRES AND THE NRCS METHOD WAS USED FOR BASINS WITH AREAS GREATER THAN 200 ACRES.
- 4. CURVE NUMBERS WERE ADJUSTED BASED ON HAILEY AND MCGILL (1983) ADJUSTMENTS, FROM 79.76 TO 72.79 (CROSSING AREA A) & 81.15 TO 74.44 (CROSSING AREA E).
- 5. THE SOFTWARE USED TO CALCULATE THE PEAK FLOWS FOR DAS GREATER THAN 200 ACRES IS HEC-HMS (V4.9).
- 6. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR <u>DAVID ZWERNEMANN, P.E, CFM</u> ON <u>07/23/2025</u>.





4630 N Loop 1604 West, Suite 307

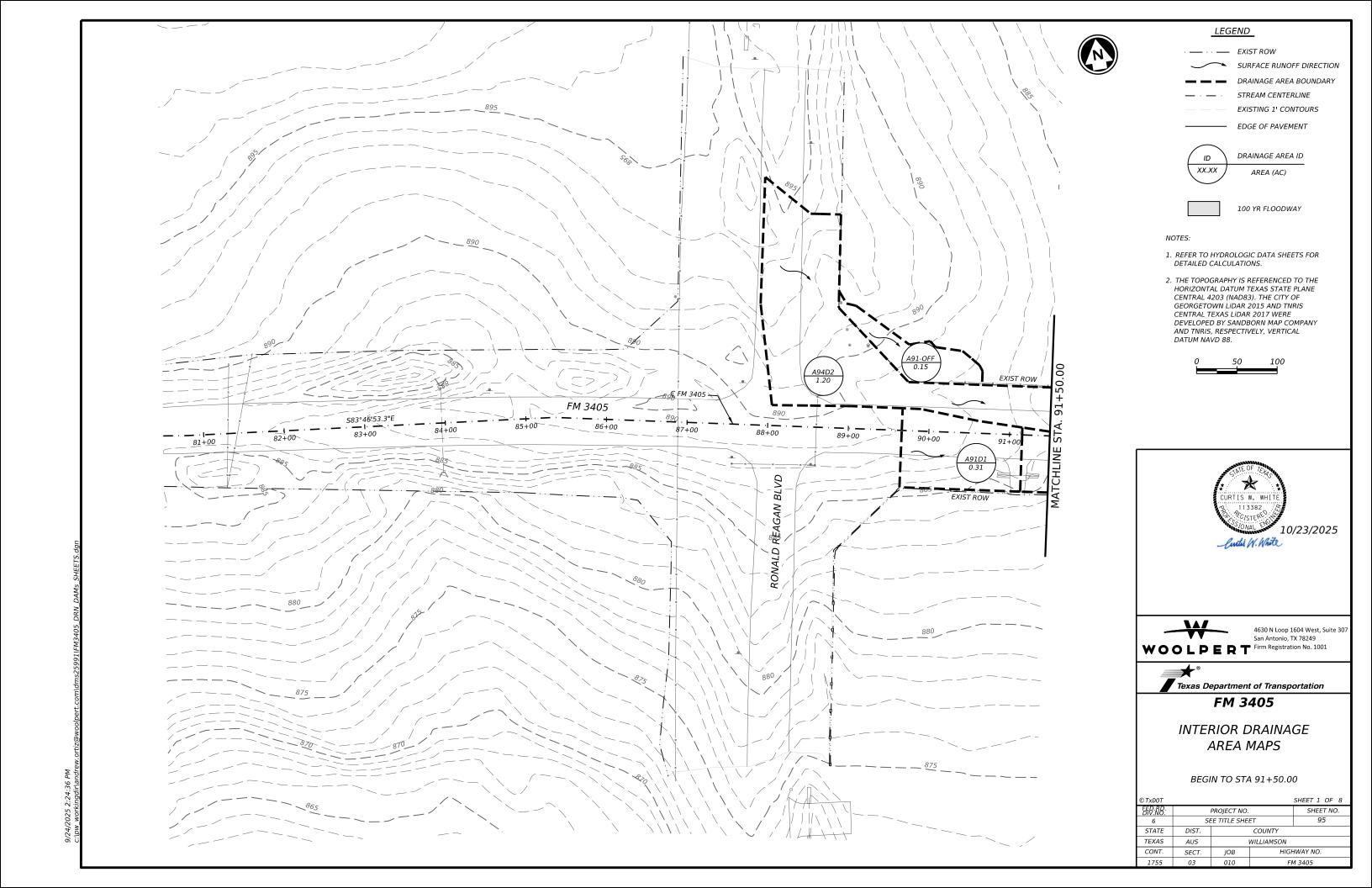


FM 3405

HYDROLOGIC DATA SHEET

EXTERIOR DRAINAGE AREAS

TxD0T				SHEET 1 OF 1					
<i>550:88:</i>		PROJECT NO.		SHEET NO.					
6	SE	E TITLE SHE	ET	94					
STATE	DIST.		COUNTY						
TEXAS	AUS		WILLIAMSON						
CONT.	SECT.	JOB HIGHWAY NO.							
1755	0.2	010 EM 240E							



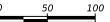


➤ SURFACE RUNOFF DIRECTION

STREAM CENTERLINE

EXISTING 1' CONTOURS

DRAINAGE AREA ID



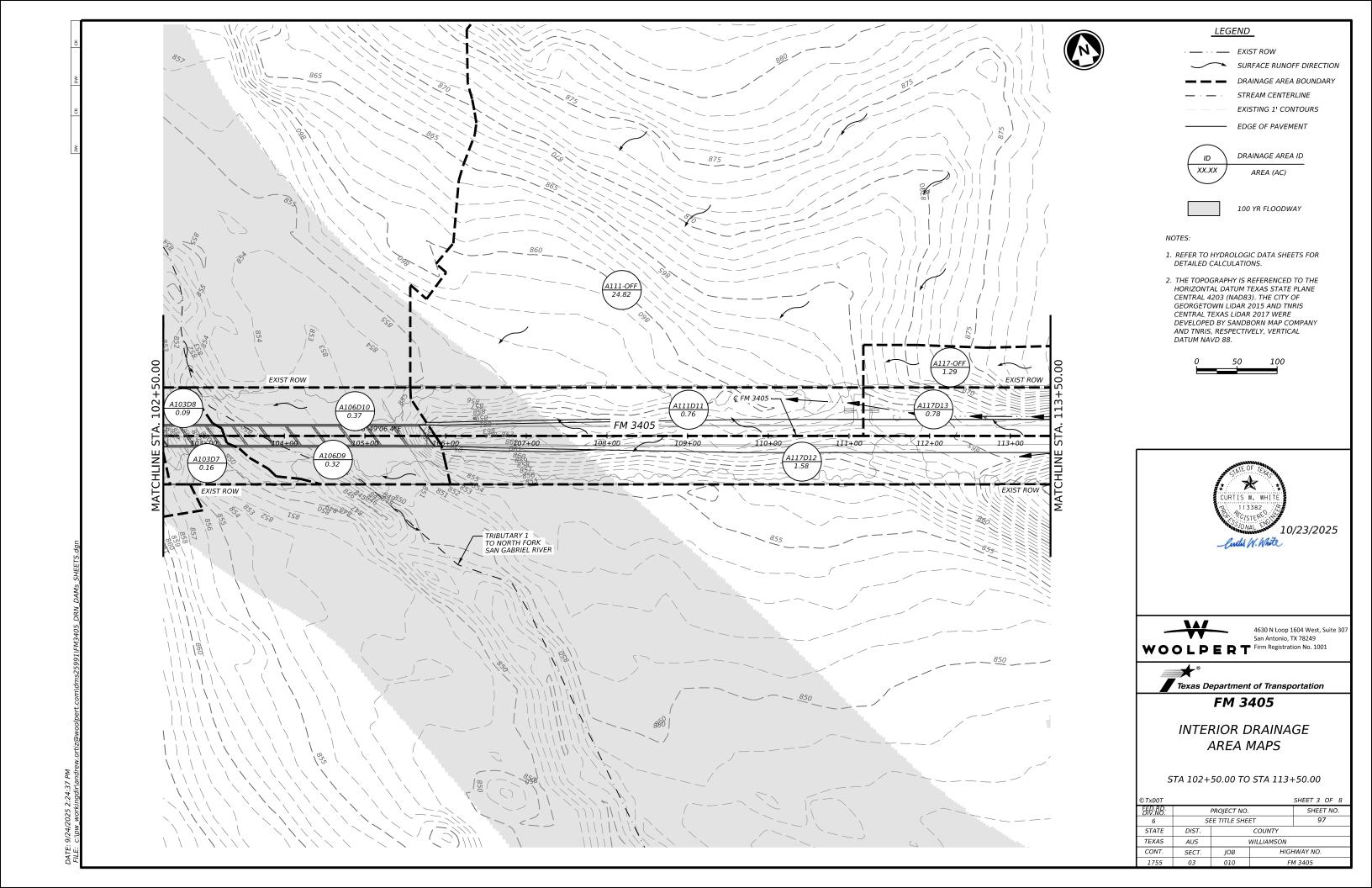


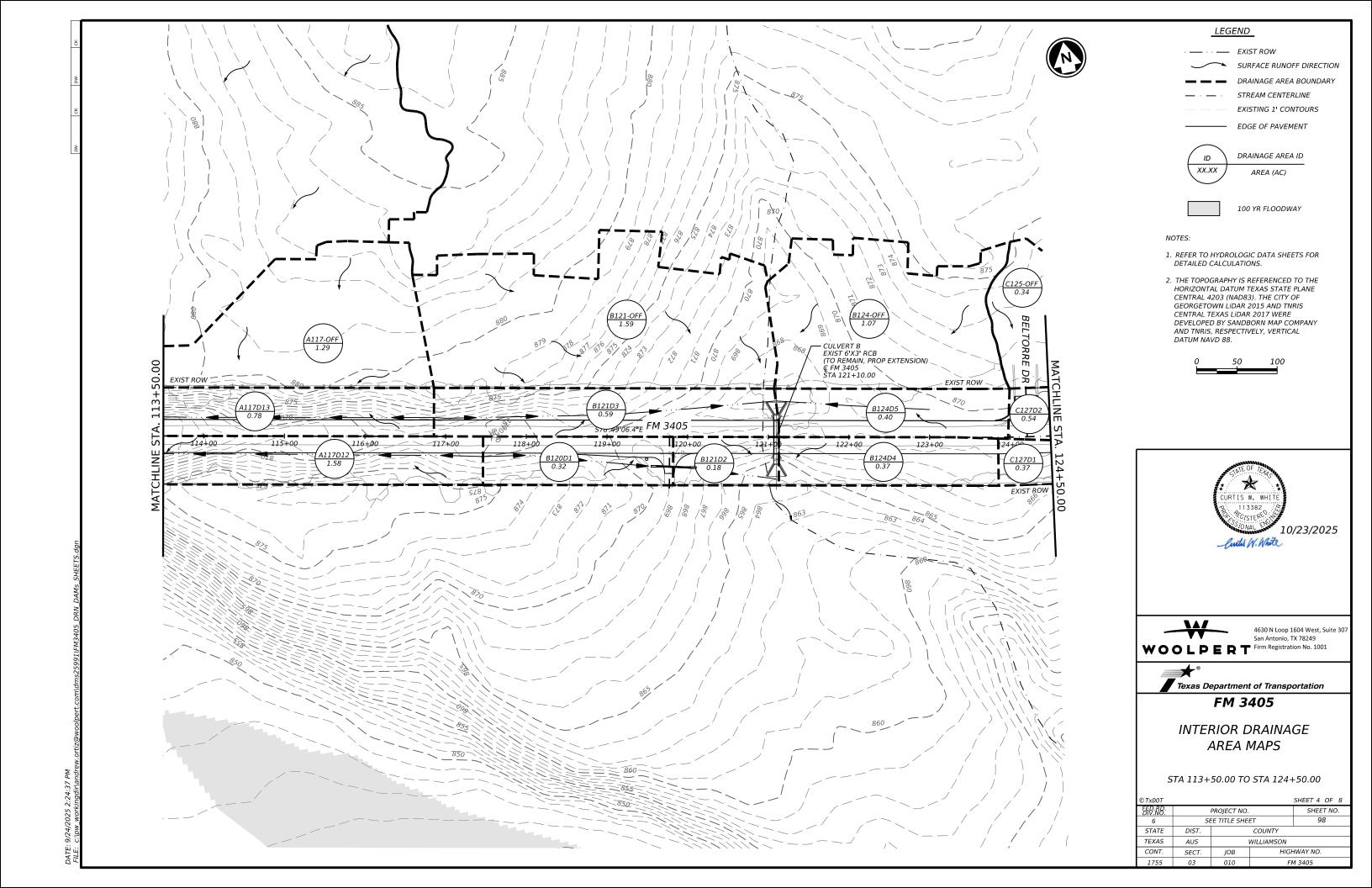
4630 N Loop 1604 West, Suite 307

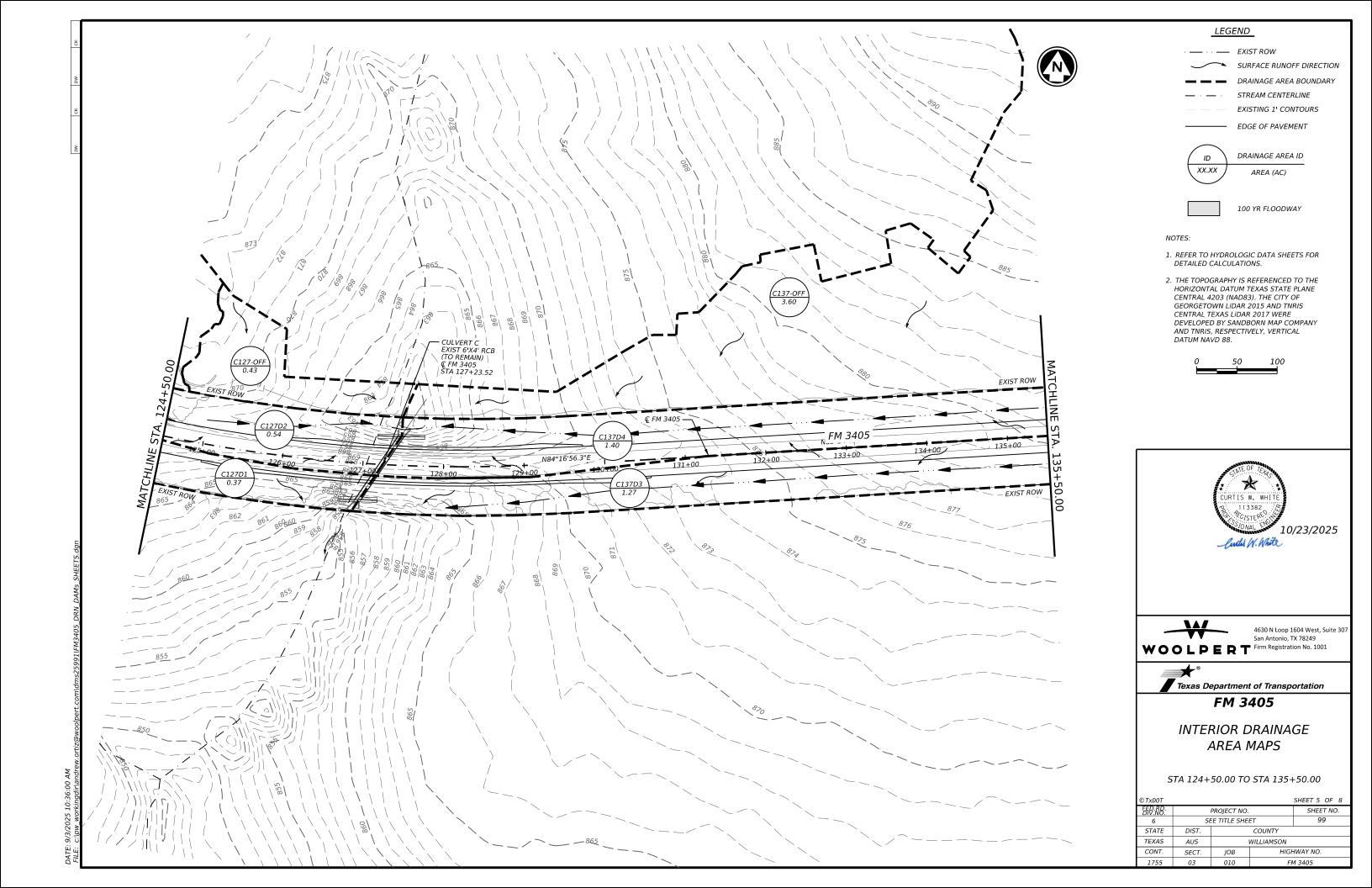
INTERIOR DRAINAGE

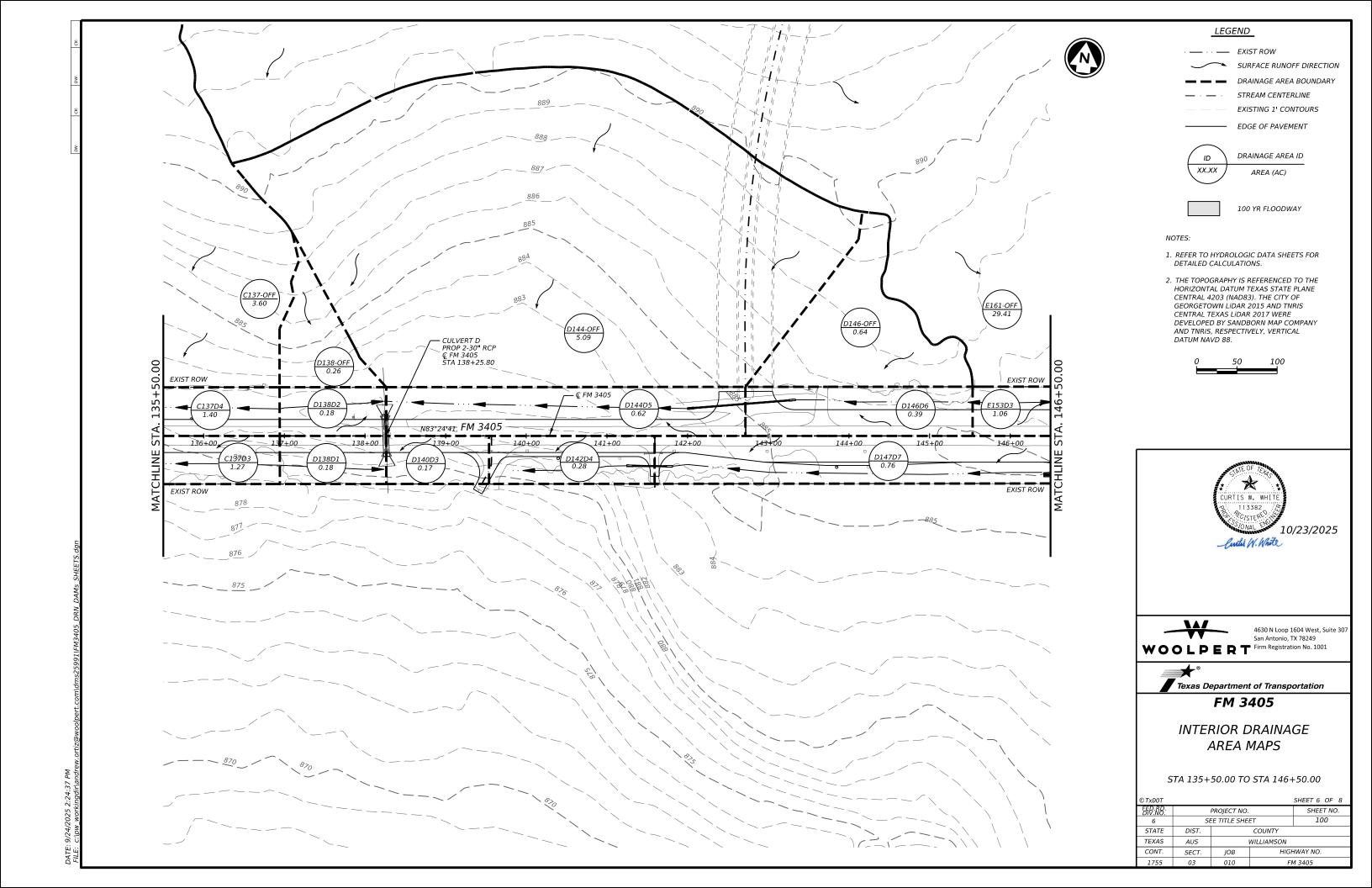
TxD0T				SHEET 2 OF 8
FP:R8:		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHE	ET	96
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT	IOB	HIGH	IWAY NO.

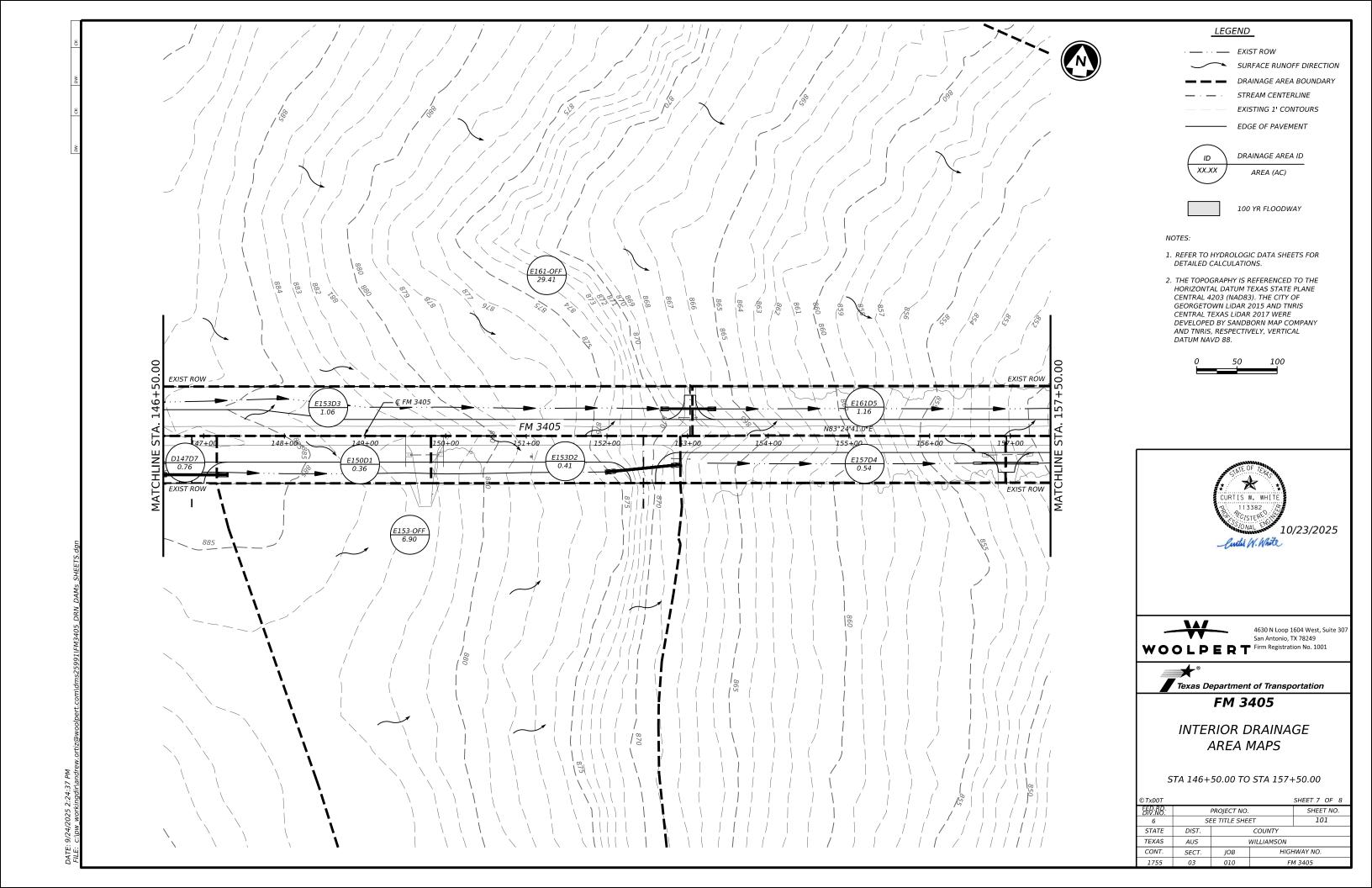
1755 03 010

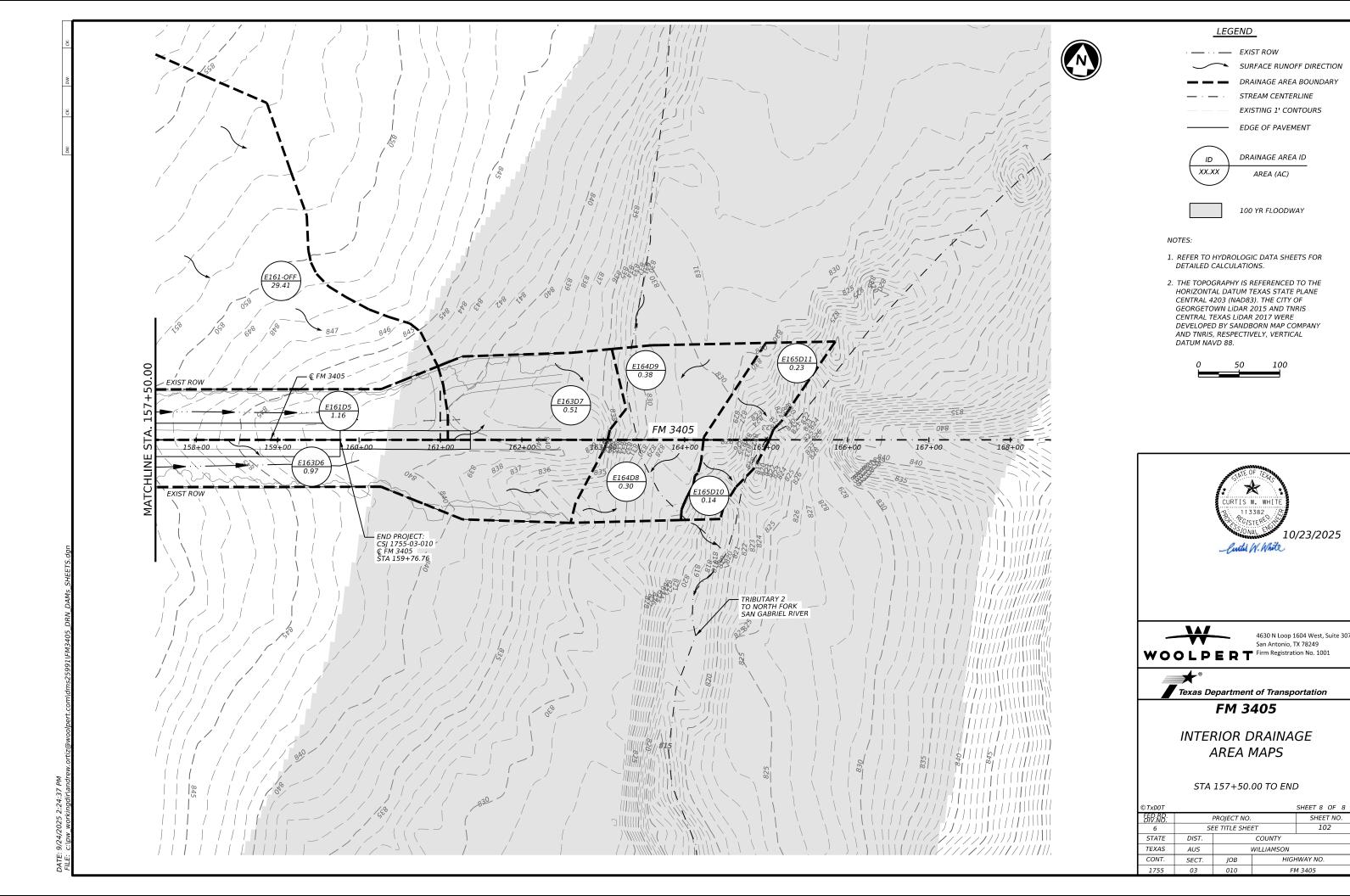












	Rational Method - Existing Conditions - Hydrology																			
	Land	Use	Time of Co	ncentration	Aı	rea				I (in/hr)							k Flow Values			
Name	C-Value	% Imp	t, (min)	t, (hr)	Area (sf)	Area (ac)	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR	Q2-YR	5 Q5-YR	10 Q10-YR	25 Q25-YR	50 Q50-YR	100 Q100-YR	500 Q500-YR
A100-OFF	0.26	2.23	14.59	0.243	87,488	2.01	4.21	5.31	6.26	7.62	8.71	9.85	12.70	2.23	2.82	3.33	4.05	4.63	5.23	6.74
A100D3	0.54	34.99	10.00	0.167	69,192	1.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	4.23	5.32	6.25	7.56	8.61	9.68	12.27
A101D4	0.56	38.37	10.00	0.167	43,237	0.99	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.73	3.44	4.04	4.89	5.56	6.25	7.93
A102D5	0.49	25.13	10.00	0.167	16,775	0.39	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.92	1.16	1.36	1.65	1.88	2.11	2.68
A102D6	0.47	22.58	10.00	0.167	7,603	0.17	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.41	0.51	0.60	0.73	0.83	0.93	1.18
A103-OFF	0.46	45.11	10.00	0.167	34,380	0.79	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.77	2.23	2.62	3.17	3.61	4.05	5.14
A103D7	0.45	17.38	10.00	0.167	6,902	0.16	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.35	0.44	0.51	0.62	0.71	0.79	1.01
A103D8	0.49	25.39	10.00	0.167	3,798	0.09	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.21	0.26	0.31	0.37	0.43	0.48	0.61
A106D10	0.46	20.08	10.00	0.167	15,960	0.37	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.83	1.04	1.22	1.48	1.69	1.89	2.40
A106D9	0.50	27.01	10.00	0.167	13,883	0.32	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.78	0.98	1.15	1.39 73.53	1.59	1.78	2.26
A111-OFF A111D11	0.40 0.45	38.00 18.27	15.61 10.00	0.260 0.167	1,080,980 32,972	24.82 0.76	4.08 4.91	5.15 6.17	6.08 7.25	7.41 8.78	8.48 9.99	9.60 11.23	12.40 14.24	40.49 1.67	51.11 2.11	60.34 2.47	2.99	84.14 3.41	95.25 3.83	123.08 4.86
A117-OFF	0.40	38.00	10.00	0.167	56,099	1.29	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.53	3.18	3.74	4.52	5.15	5.79	7.34
A117 017	0.46	20.63	10.00	0.167	68,858	1.58	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.60	4.52	5.31	6.43	7.32	8.23	10.43
A117D13	0.46	20.36	10.00	0.167	34,054	0.78	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.77	2.23	2.62	3.17	3.61	4.06	5.14
A91-OFF	0.25	0.00	10.00	0.167	6,612	0.15	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.19	0.23	0.28	0.33	0.38	0.43	0.54
A91D1	0.66	56.29	10.00	0.167	13,353	0.31	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.99	1.25	1.47	1.78	2.02	2.27	2.88
A94D2	0.59	43.69	10.00	0.167	52,124	1.20	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.47	4.36	5.12	6.20	7.05	7.93	10.06
B120D1	0.48	23.77	10.00	0.167	14,143	0.32	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.77	0.96	1.13	1.37	1.56	1.75	2.22
B121-OFF	0.40	38.00	10.00	0.167	69,201	1.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.12	3.92	4.61	5.58	6.35	7.14	9.05
B121D2	0.48	23.29	10.00	0.167	7,857	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.42	0.53	0.63	0.76	0.86	0.97	1.23
B121D3	0.46	19.19	10.00	0.167	25,533	0.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.31	1.65	1.94	2.34	2.67	3.00	3.80
B124-OFF	0.40	38.00	10.00	0.167	46,787	1.07	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.11	2.65	3.12	3.77	4.29	4.82	6.12
B124D4 B124D5	0.46 0.46	19.58 20.29	10.00	0.167 0.167	16,289 17,299	0.37 0.40	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24 14.24	0.84 0.90	1.06 1.13	1.24 1.33	1.50 1.61	1.71 1.83	1.92 2.06	2.44
C125-OFF	0.40	38.00	10.00	0.167	14,621	0.40	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.90	0.83	0.97	1.18	1.83	1.51	1.91
C123-OFF	0.40	38.00	10.00	0.167	18,703	0.43	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.84	1.06	1.25	1.51	1.72	1.93	2.45
C127D1	0.38	5.27	10.00	0.167	16,168	0.37	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.69	0.87	1.02	1.23	1.40	1.58	2.00
C127D2	0.56	37.40	10.00	0.167	23,546	0.54	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.48	1.85	2.18	2.64	3.00	3.37	4.28
C137-OFF	0.38	33.30	13.04	0.217	156,997	3.60	4.42	5.57	6.56	7.97	9.10	10.27	13.17	6.07	7.65	9.02	10.96	12.51	14.12	18.11
C137D3	0.44	17.08	10.00	0.167	55,526	1.27	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.78	3.49	4.10	4.97	5.65	6.35	8.06
C137D4	0.47	22.64	10.00	0.167	61,027	1.40	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.26	4.10	4.82	5.84	6.64	7.47	9.47
D138-OFF	0.25	0.55	10.00	0.167	11,387	0.26	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.32	0.41	0.48	0.58	0.66	0.74	0.94
D138D1	0.47	22.64	10.00	0.167	7,867	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.42	0.53	0.62	0.75	0.86	0.96	1.22
D138D2	0.44	15.56	10.00	0.167	7,978	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.39	0.49	0.58	0.70	0.80	0.90	1.14
D140D3 D142D4	0.51 0.52	29.64 31.43	10.00	0.167 0.167	7,584 12,181	0.17 0.28	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24 14.24	0.44 0.72	0.55 0.90	0.65 1.06	0.78 1.28	0.89 1.46	1.00	1.27 2.08
D142D4 D144-OFF	0.25	0.00	10.00	0.182	239,894	5.51	4.91	5.98	7.23	8.52	9.99	10.92	13.90	6.54	8.23	9.68	11.73	13.36	15.04	19.14
D144D5	0.45	17.87	10.00	0.167	33,184	0.76	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.68	2.11	2.48	3.00	3.41	3.84	4.86
D146-OFF	0.25	0.00	13.02	0.217	9,602	0.22	4.42	5.57	6.56	7.98	9.11	10.28	13.18	0.24	0.31	0.36	0.44	0.50	0.57	0.73
D146D6	0.45	18.46	10.00	0.167	10,974	0.25	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.56	0.70	0.83	1.00	1.14	1.28	1.62
D147D7	0.49	25.21	10.00	0.167	32,896	0.76	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.81	2.28	2.68	3.24	3.69	4.14	5.26
E150D1	0.51	28.92	10.00	0.167	15,592	0.36	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.89	1.13	1.32	1.60	1.82	2.05	2.59
E153-OFF	0.27	4.97	16.90	0.282	300,567	6.90	3.93	4.96	5.87	7.16	8.20	9.29	12.05	7.31	9.24	10.91	13.32	15.25	17.29	22.42
E153D2	0.50	26.75	10.00	0.167	18,070	0.41	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.01	1.27	1.50	1.81	2.06	2.32	2.94
E153D3	0.44	16.08	10.00	0.167	46,176	1.06	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.28	2.87	3.37	4.08	4.64	5.22	6.62
E157D4	0.50	27.29	10.00	0.167	23,517	0.54	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.33	1.67	1.96	2.37	2.70	3.03	3.84
E161-OFF E161D5	0.25 0.44	0.00 16.90	38.90 10.00	0.648 0.167	1,281,149 50,740	29.41 1.16	2.48 4.91	3.16 6.17	3.76 7.25	4.64 8.78	5.37 9.99	6.16 11.23	8.27 14.24	18.23 2.53	23.20 3.19	27.65 3.74	34.15 4.53	39.49 5.15	45.31 5.79	60.81 7.35
E161D5 E163D6	0.44	21.79	10.00	0.167	42,402	0.97	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.53	2.82	3.74	4.53	4.57	5.14	6.51
E163D6 E163D7	0.44	15.93	10.00	0.167	22,322	0.51	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.10	1.38	1.63	1.97	2.24	2.52	3.19
E164D8	0.42	13.32	10.00	0.167	12,953	0.30	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.62	0.78	0.91	1.10	1.26	1.41	1.79
E164D9	0.39	6.59	10.00	0.167	16,622	0.38	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.72	0.91	1.07	1.29	1.47	1.66	2.10
E165D10	0.46	19.33	10.00	0.167	6,021	0.14	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.31	0.39	0.46	0.55	0.63	0.71	0.90
E165D11	0.39	7.62	10.00	0.167	9,898	0.23	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.44	0.55	0.65	0.78	0.89	1.00	1.27

- 1. HYDROLOGY WAS BASED ON NOAA ATLAS 14 RAINFALL.
- 2. NRCS AND RATIONAL HYDROLOGIC METHODS WERE UTILIZED FOR THE HYDROLOGIC ANALYSIS.
- 3. THE RATIONAL METHOD WAS USED FOR BASINS WITH AREAS SMALLER THAN 200 ACRES AND THE NRCS METHOD WAS USED FOR BASINS WITH AREAS GREATER THAN 200 ACRES.
- 4. CURVE NUMBERS WERE ADJUSTED BASED ON HAILEY AND MCGILL (1983) ADJUSTMENTS, FROM 79.76 TO 72.79 (CROSSING AREA A) & 81.15 TO 74.44 (CROSSING AREA E).
- 5. THE SOFTWARE USED TO CALCULATE THE PEAK FLOWS FOR DAS GREATER THAN 200 ACRES IS HEC-HMS (V4.9).
- 6. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR <u>DAVID ZWERNEMANN, P.E, CFM</u> ON <u>07/23/2025</u>.





4630 N Loop 1604 West, Suite 307



FM 3405

HYDROLOGIC DATA SHEET

EXISTING INTERIOR DRAINAGE AREAS

SHEET 1 OF 1

© IXDUI	SHEET 1 OF 1										
<i>F51</i> ₽: <i>R</i> 18:		PROJECT NO.		SHEET NO.							
6	SE	E TITLE SHE	ET	103							
STATE	DIST.		COUNTY								
TEXAS	AUS		WILLIAMSON								
CONT.	SECT.	JOB	JOB HIGHWAY NO.								
1755	03	010 FM 3405									

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	Lanc	l Use	Time of Co	ncentration	Area			Kationai	месноа - Ргор	I (in/hr)	s - Hyarology					Pea	k Flow Values	(cfs)		
Name						4 (2.2)	2.1/5	5.40	10.1/5		50.1/0	100 1/0	500 1/5	2	5	10	25	50	100	500
	C-Value	% Imp	t, (min)	t, (hr)	Area (sf)	Area (ac)	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR	Q2-YR	Q5-YR	Q10-YR	Q25-YR	Q50-YR	Q10-YR	Q500-YR
A100-OFF	0.26	2.26	14.59	0.243	87,488	2.01	4.21	5.31	6.26	7.62	8.71	9.85	12.70	2.24	2.82	3.33	4.05	4.63	5.24	6.75
A100D3	0.58	40.96	10.00	0.167	69,192	1.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	4.49	5.64	6.63	8.02	9.13	10.26	13.01
A101D4	0.58 0.54	41.04	10.00	0.167	43,237	0.99	4.91	6.17	7.25	8.78	9.99	11.23	14.24 14.24	2.81	3.53	4.15	5.02	5.71	6.42	8.14
A102D5 A102D6	0.54	33.86 29.07	10.00	0.167 0.167	16,775 7,603	0.39 0.17	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24	1.01 0.44	1.28 0.55	1.50 0.65	1.81 0.78	2.06 0.89	2.32 1.00	2.94 1.27
A103-OFF	0.46	45.12	10.00	0.167	34,380	0.79	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.77	2.23	2.62	3.17	3.61	4.05	5.14
A103D7	0.45	17.40	10.00	0.167	6,902	0.16	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.35	0.44	0.51	0.62	0.71	0.79	1.01
A103D8	0.49	25.39	10.00	0.167	3,798	0.09	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.21	0.26	0.31	0.37	0.43	0.48	0.61
A106D10	0.46	20.09	10.00	0.167	15,960	0.37	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.83	1.04	1.22	1.48	1.69	1.89	2.40
A106D9	0.50	27.01	10.00	0.167	13,883	0.32	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.78	0.98	1.15	1.39	1.59	1.78	2.26
A111-OFF	0.40	38.00	15.61	0.260	1,080,980	24.82	4.08	5.15	6.08	7.41	8.48	9.60	12.40	40.49	51.11	60.34	73.53	84.14	95.25	123.08
A111D11	0.51	28.92	10.00	0.167	32,972	0.76	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.89	2.38	2.80	3.38	3.85	4.33	5.49
A117-OFF	0.40	38.00	10.00	0.167	56,099	1.29	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.53	3.18	3.74	4.52	5.15	5.79	7.34
A117D12	0.53	33.20	10.00	0.167	68,858	1.58	4.91	6.17	7.25	8.78	9.99	11.23	14.24	4.13	5.20	6.11	7.39	8.41	9.45	11.99
A117D13 A91-OFF	0.54 0.25	34.62 0.00	10.00	0.167 0.167	34,054 6,612	0.78 0.15	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24 14.24	2.07 0.19	2.61 0.23	3.06 0.28	3.71 0.33	4.22 0.38	4.74 0.43	6.02 0.54
A91-0FF A91D1	0.23	56.29	10.00	0.167	13,353	0.13	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.19	1.25	1.47	1.78	2.02	2.27	2.88
A94D2	0.59	43.69	10.00	0.167	52,124	1.20	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.47	4.36	5.12	6.20	7.05	7.93	10.06
B120D1	0.56	37.91	10.00	0.167	14,143	0.32	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.89	1.12	1.32	1.59	1.81	2.04	2.58
B121-OFF	0.40	38.00	10.00	0.167	69,201	1.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.12	3.92	4.61	5.58	6.35	7.14	9.05
B121D2	0.56	38.54	10.00	0.167	7,857	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.50	0.63	0.74	0.89	1.01	1.14	1.44
B121D3	0.54	33.81	10.00	0.167	25,533	0.59	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.54	1.94	2.28	2.76	3.14	3.53	4.47
B124-OFF	0.40	38.00	10.00	0.167	46,787	1.07	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.11	2.65	3.12	3.77	4.29	4.82	6.12
B124D4	0.54	34.31	10.00	0.167	16,289	0.37	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.99	1.24	1.46	1.77	2.01	2.26	2.87
B124D5	0.54	33.87	10.00	0.167	17,299	0.40	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.05	1.31	1.55	1.87	2.13	2.39	3.03
C125-OFF	0.40	38.00	10.00	0.167	14,620	0.34	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.66	0.83	0.97	1.18	1.34	1.51	1.91
C127-OFF C127D1	0.40 0.47	38.00 22.40	10.00	0.167 0.167	18,703 16,168	0.43 0.37	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24 14.24	0.84 0.86	1.06 1.08	1.25 1.27	1.51 1.54	1.72 1.75	1.93 1.97	2.45 2.50
C127D1	0.62	48.35	10.00	0.167	23,546	0.54	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.63	2.06	2.42	2.92	3.33	3.74	4.74
C137-OFF	0.38	33.30	13.04	0.217	156,997	3.60	4.42	5.57	6.56	7.97	9.10	10.27	13.17	6.07	7.65	9.02	10.96	12.51	14.12	18.11
C137D3	0.53	32.04	10.00	0.167	55,526	1.27	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.29	4.14	4.87	5.89	6.70	7.53	9.55
C137D4	0.55	36.06	10.00	0.167	61,027	1.40	4.91	6.17	7.25	8.78	9.99	11.23	14.24	3.77	4.74	5.57	6.74	7.67	8.63	10.94
D138-OFF	0.25	0.55	10.00	0.167	11,387	0.26	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.32	0.41	0.48	0.58	0.66	0.74	0.94
D138D1	0.56	37.98	10.00	0.167	7,867	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.50	0.62	0.73	0.89	1.01	1.13	1.44
D138D2	0.52	30.38	10.00	0.167	7,978	0.18	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.47	0.58	0.69	0.83	0.95	1.06	1.35
D140D3	0.59	42.76	10.00	0.167	7,584	0.17	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.50	0.63	0.74	0.89	1.02	1.14	1.45
D142D4 D144-OFF	0.59 0.25	44.26 0.00	10.00	0.167 0.182	12,181 221.551	0.28 5.09	4.91 4.75	6.17 5.98	7.25 7.03	8.78 8.52	9.99 9.70	11.23 10.92	14.24 13.90	0.81 6.04	1.02 7.60	1.20 8.94	1.46 10.83	1.66 12.34	1.86 13.89	2.36 17.68
D144-0FF D144D5	0.23	30.27	10.91	0.182	26,989	0.62	4.73	6.17	7.03	8.52	9.70	10.92	13.90	1.57	1.98	2.32	2.81	3.20	3.59	4.56
D146-OFF	0.25	0.00	13.02	0.217	27,944	0.64	4.42	5.57	6.56	7.98	9.11	10.28	13.18	0.71	0.89	1.05	1.28	1.46	1.65	2.11
D146D6	0.54	34.99	10.00	0.167	17.169	0.39	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.05	1.32	1.55	1.88	2.14	2.40	3.04
D147D7	0.57	39.63	10.00	0.167	32,896	0.76	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.11	2.65	3.11	3.77	4.28	4.82	6.11
E150D1	0.59	43.20	10.00	0.167	15,592	0.36	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.03	1.30	1.53	1.85	2.10	2.36	3.00
E153-OFF	0.27	4.99	16.90	0.282	300,567	6.90	3.93	4.96	5.87	7.16	8.20	9.29	12.05	7.31	9.24	10.92	13.32	15.26	17.30	22.43
E153D2	0.58	42.36	10.00	0.167	18,070	0.41	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.19	1.49	1.75	2.12	2.42	2.72	3.44
E153D3	0.52	30.88	10.00	0.167	46,177	1.06	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.71	3.40	4.00	4.84	5.50	6.19	7.85
E157D4	0.58	42.69	10.00	0.167	23,517	0.54	4.91	6.17	7.25	8.78	9.99	11.23	14.24	1.55	1.95	2.29	2.77	3.15	3.55	4.50
E161-OFF	0.25	0.00	38.90	0.648	1,281,149	29.41	2.48	3.16	3.76	4.64	5.37	6.16	8.27	18.23	23.20	27.65	34.15	39.49	45.31	60.81
E161D5	0.52	30.37	10.00	0.167	50,740	1.16	4.91	6.17	7.25	8.78	9.99	11.23	14.24	2.96	3.72	4.37	5.29	6.02	6.76	8.58
E163D6	0.51	28.94 17.61	10.00	0.167	42,402 22,322	0.97 0.51	4.91 4.91	6.17 6.17	7.25 7.25	8.78 8.78	9.99 9.99	11.23 11.23	14.24 14.24	2.43 1.12	3.06 1.41	3.60	4.35 2.01	4.95 2.29	5.57 2.57	7.06 3.26
E163D7 E164D8	0.45 0.42	17.61	10.00	0.167 0.167	12,953	0.30	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.62	0.78	1.66 0.91	1.10	1.26	1.41	1.79
E164D9	0.39	6.59	10.00	0.167	16,622	0.38	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.02	0.78	1.07	1.10	1.47	1.41	2.10
E165D10	0.46	19.33	10.00	0.167	6,021	0.14	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.31	0.39	0.46	0.55	0.63	0.71	0.90
E165D11	0.39	7.62	10.00	0.167	9,898	0.23	4.91	6.17	7.25	8.78	9.99	11.23	14.24	0.44	0.55	0.65	0.78	0.89	1.00	1.27

- 1. HYDROLOGY WAS BASED ON NOAA ATLAS 14 RAINFALL.
- 2. NRCS AND RATIONAL HYDROLOGIC METHODS WERE UTILIZED FOR THE HYDROLOGIC ANALYSIS.
- 3. THE RATIONAL METHOD WAS USED FOR BASINS WITH AREAS SMALLER THAN 200 ACRES AND THE NRCS METHOD WAS USED FOR BASINS WITH AREAS GREATER THAN 200 ACRES.
- 4. CURVE NUMBERS WERE ADJUSTED BASED ON HAILEY AND MCGILL (1983) ADJUSTMENTS, FROM 79.76 TO 72.79 (CROSSING AREA A) & 81.15 TO 74.44 (CROSSING AREA E).
- 5. THE SOFTWARE USED TO CALCULATE THE PEAK FLOWS FOR DAS GREATER THAN 200 ACRES IS HEC-HMS (V4.9).
- 6. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DAVID ZWERNEMANN, P.E, CFM ON <u>07/23/2025</u>.





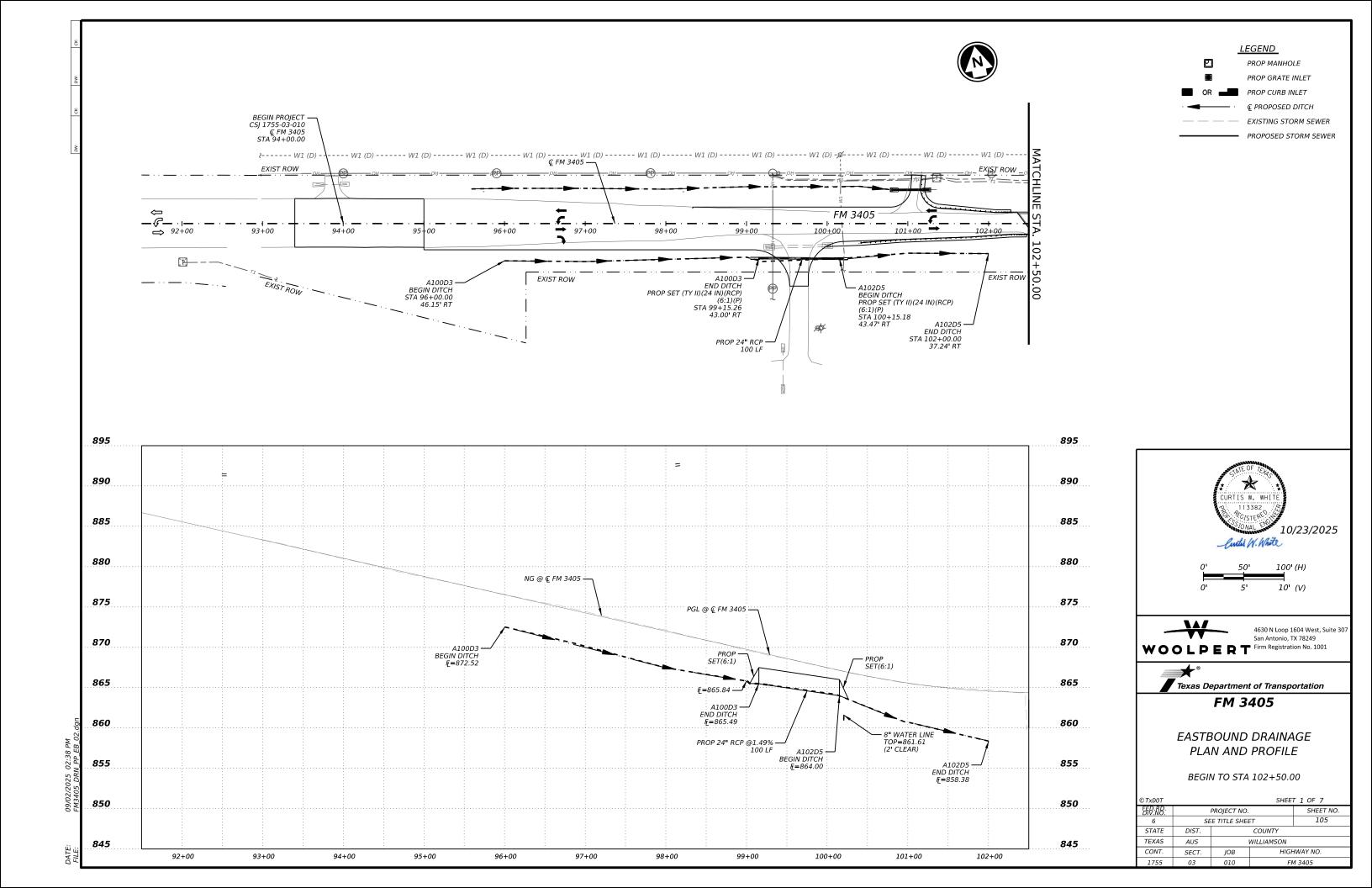


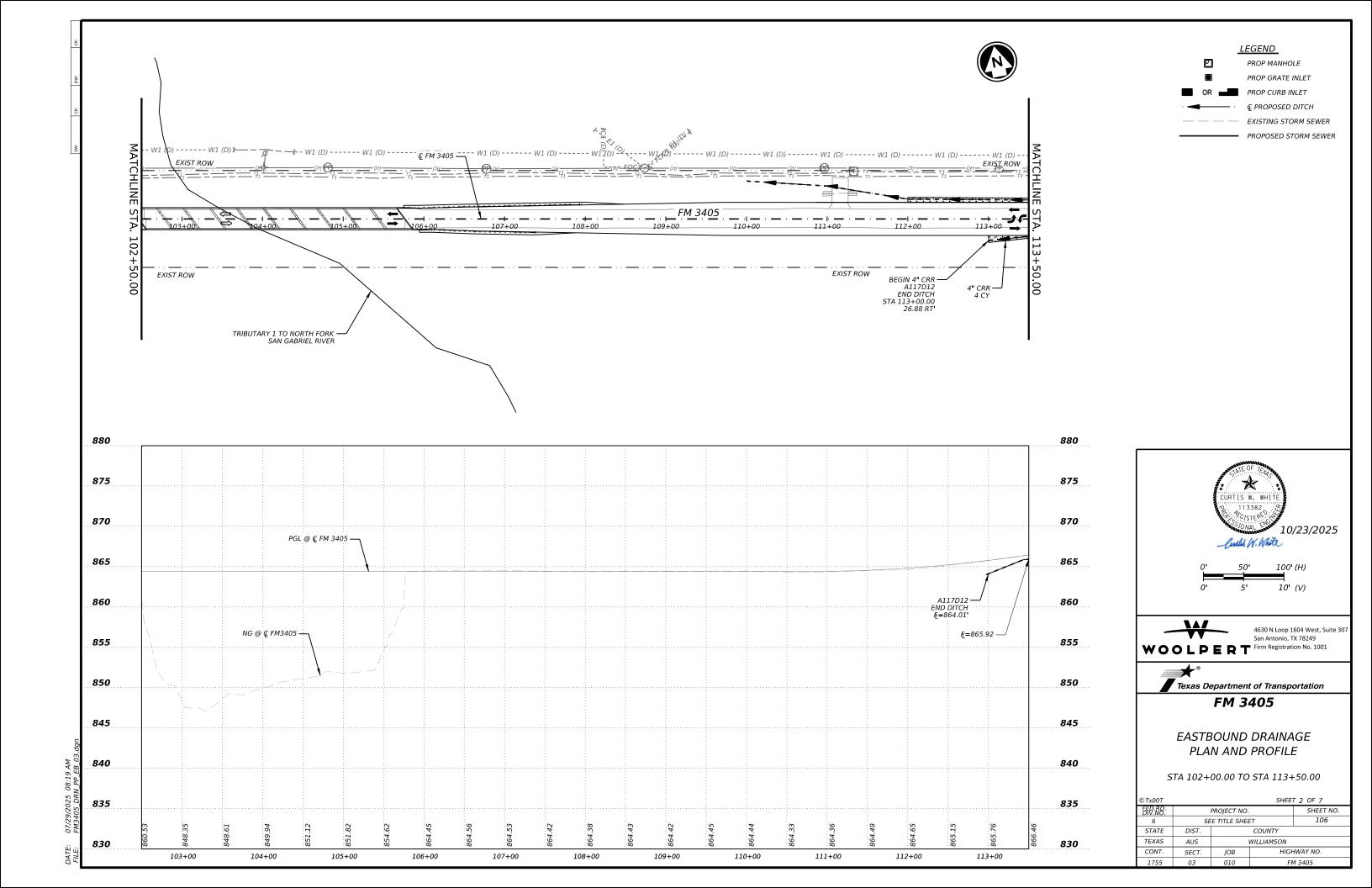
FM 3405

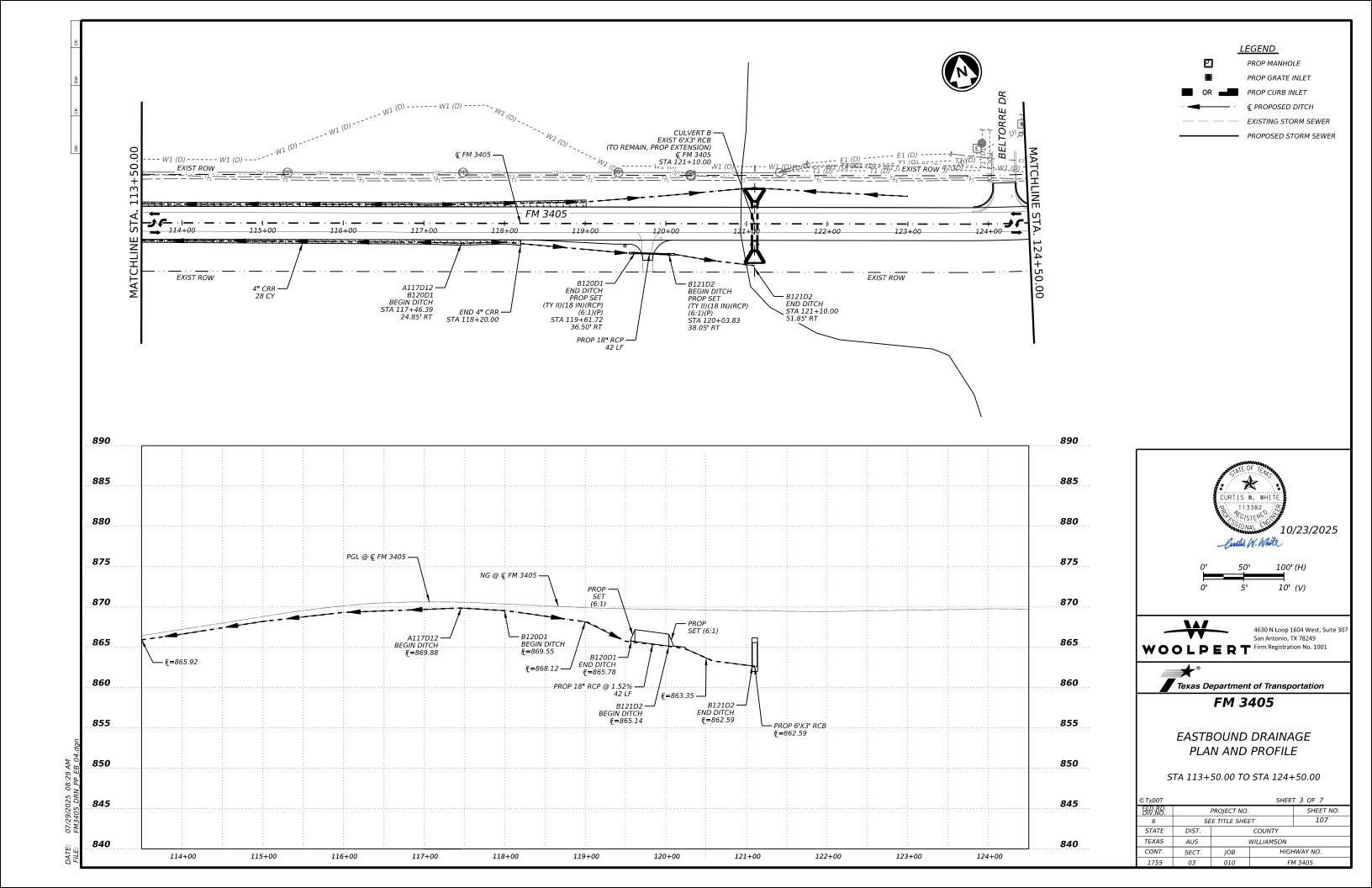
HYDROLOGIC DATA SHEET

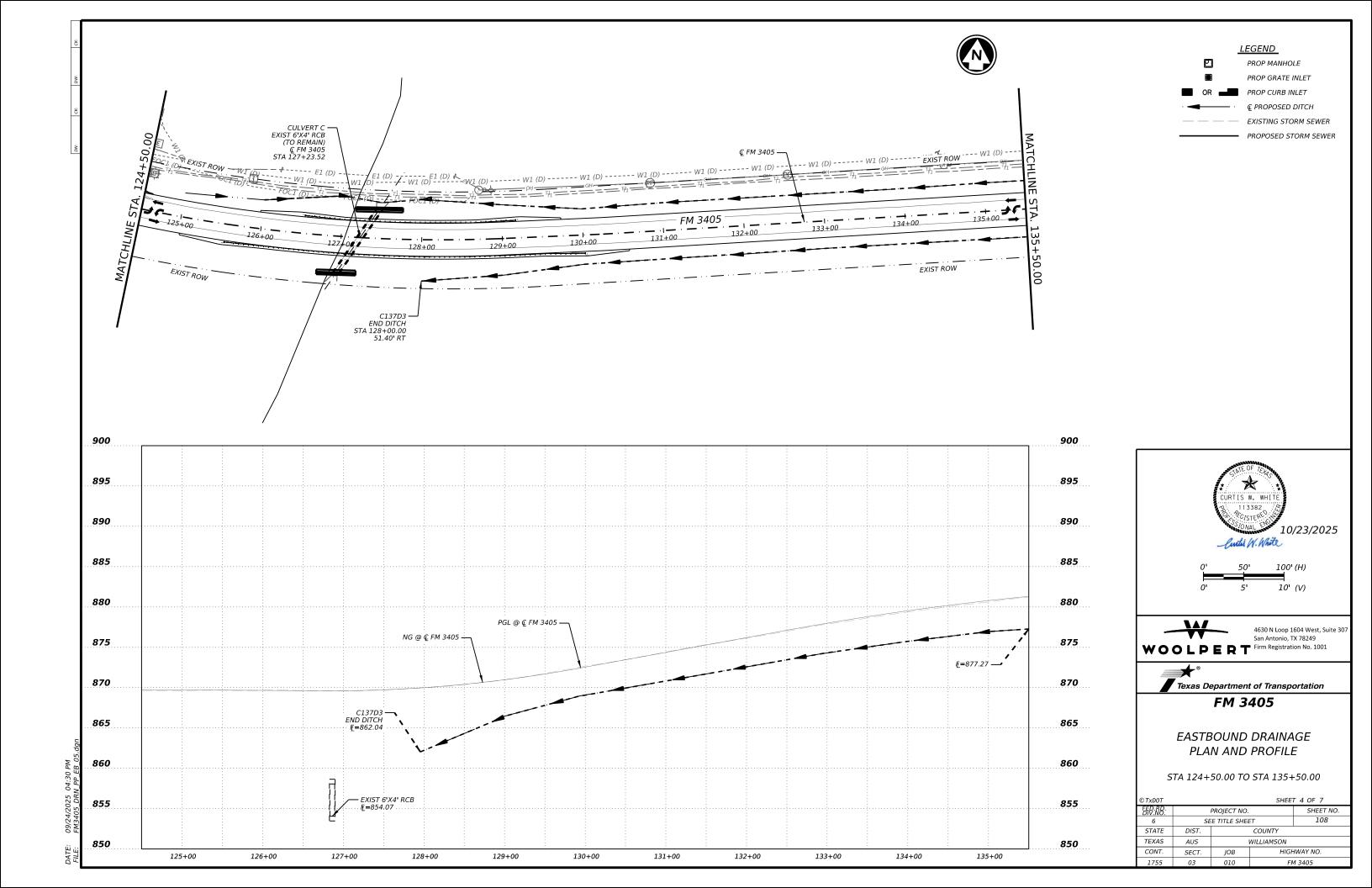
PROPOSED INTERIOR DRAINAGE AREAS

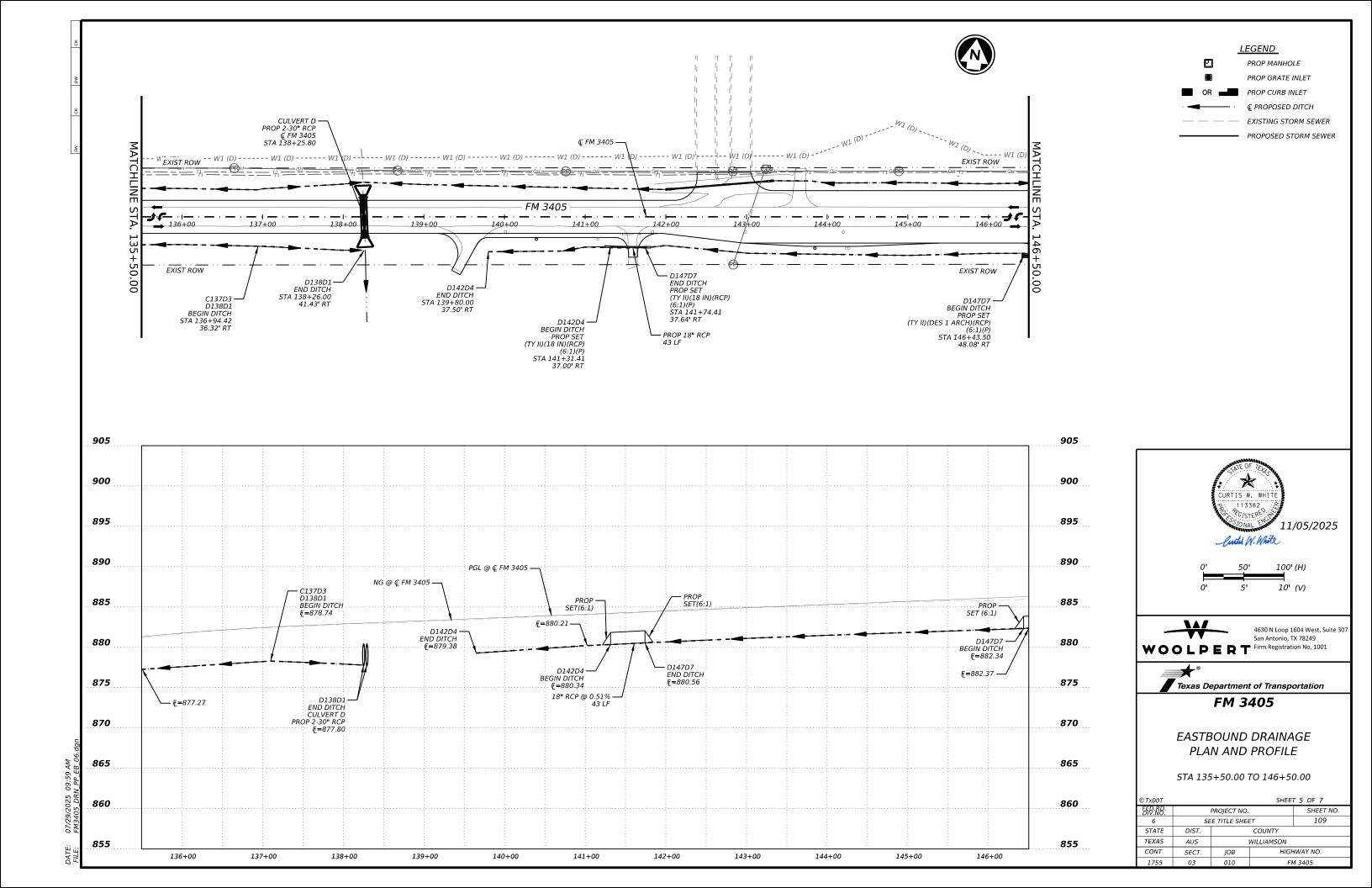
©IXDUI			SHEET I OF I	
<i>₽₽₽:₽8:</i>		PROJECT NO.	SHEET NO.	
6	SE	E TITLE SHE	ET	104
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	HWAY NO.
1755	03	010	FI	1 3405

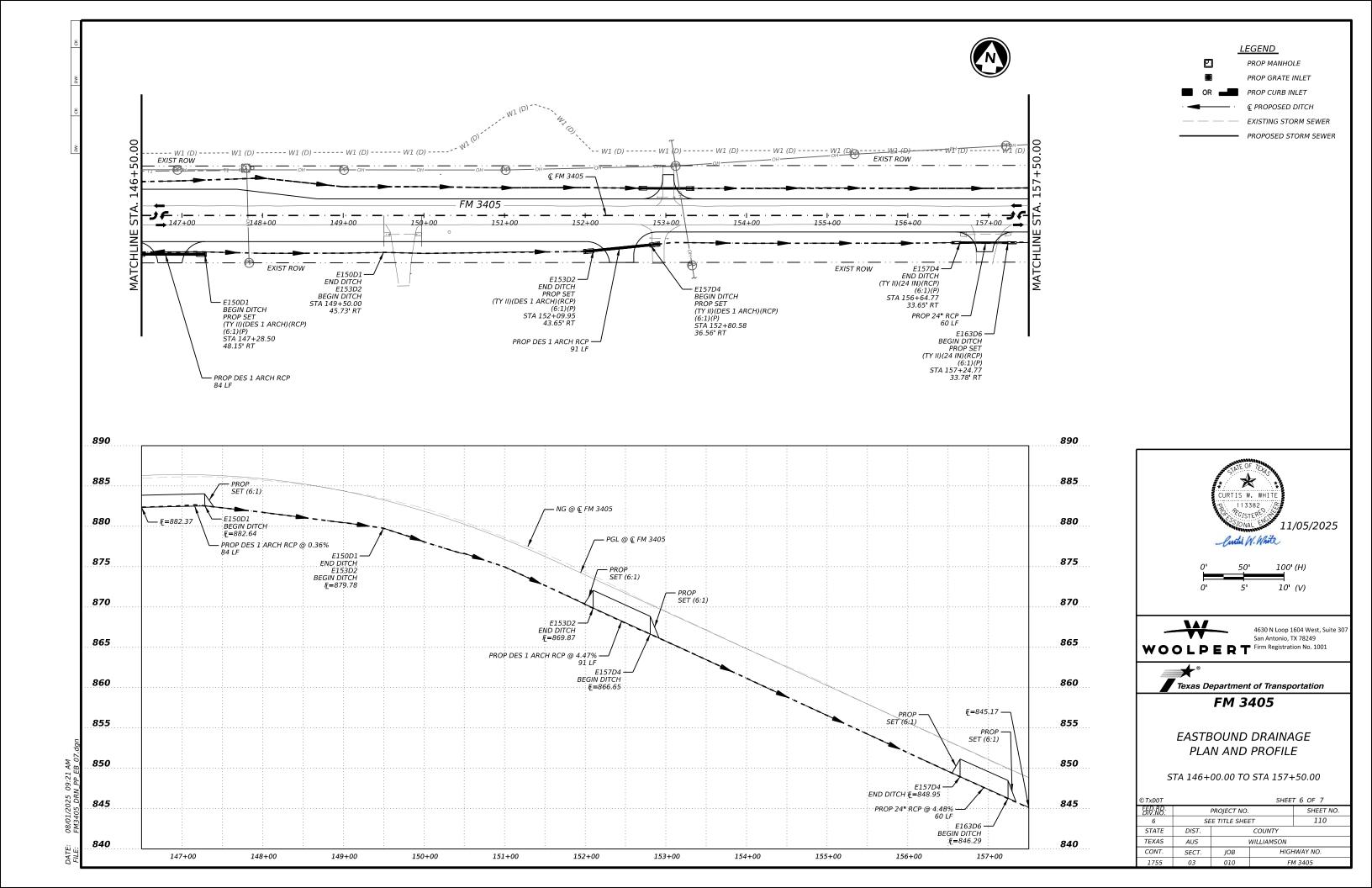


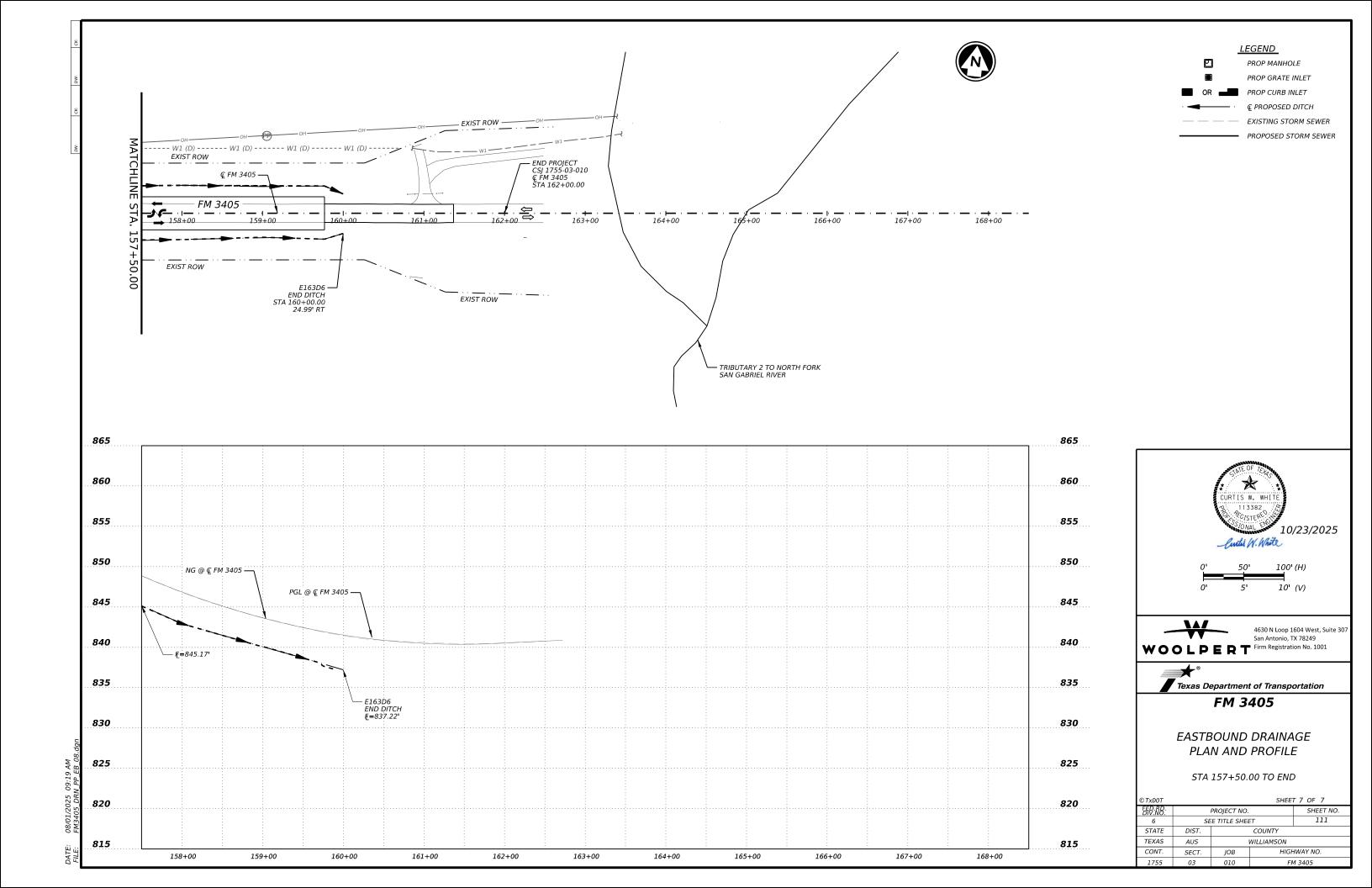


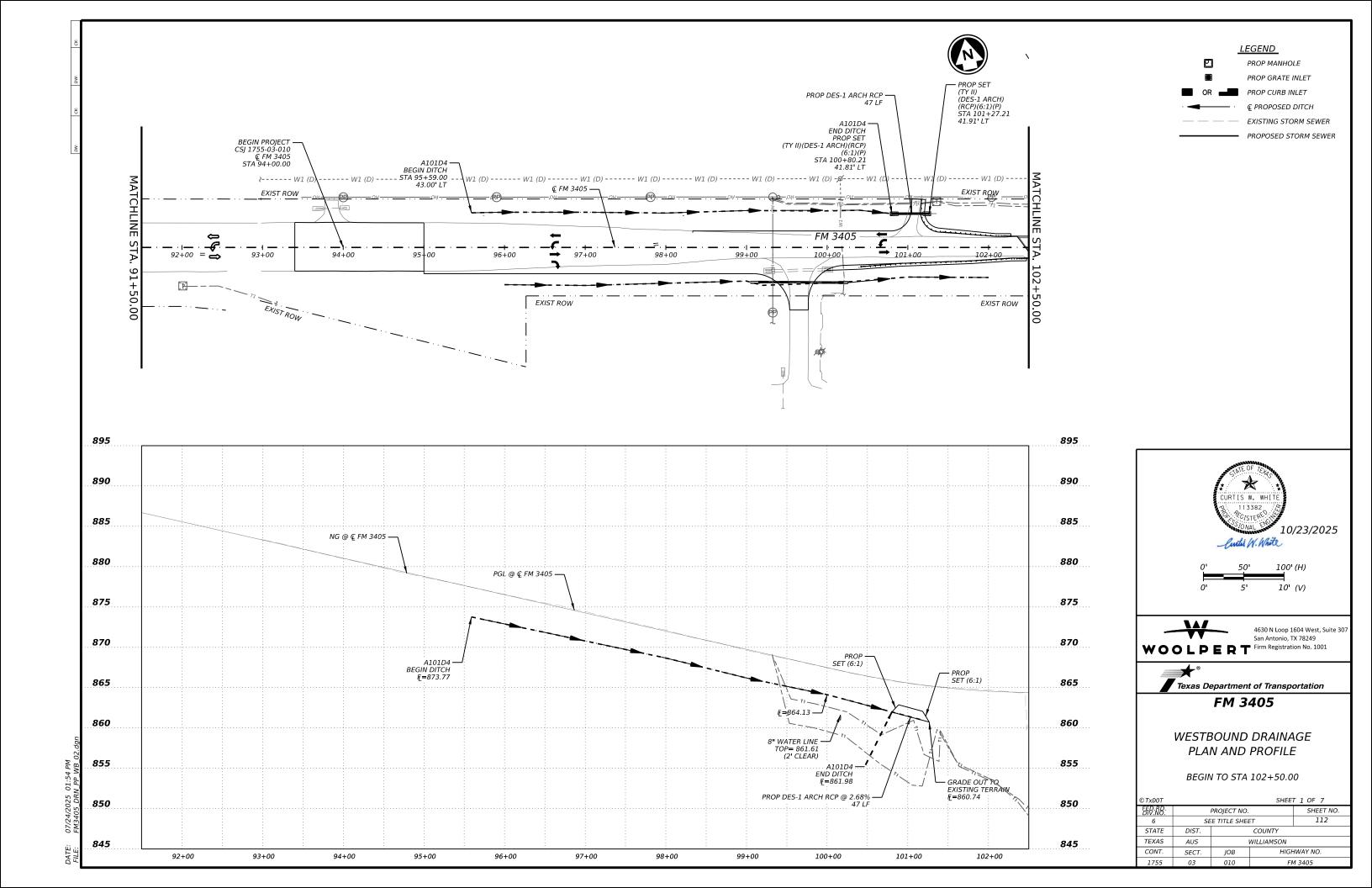


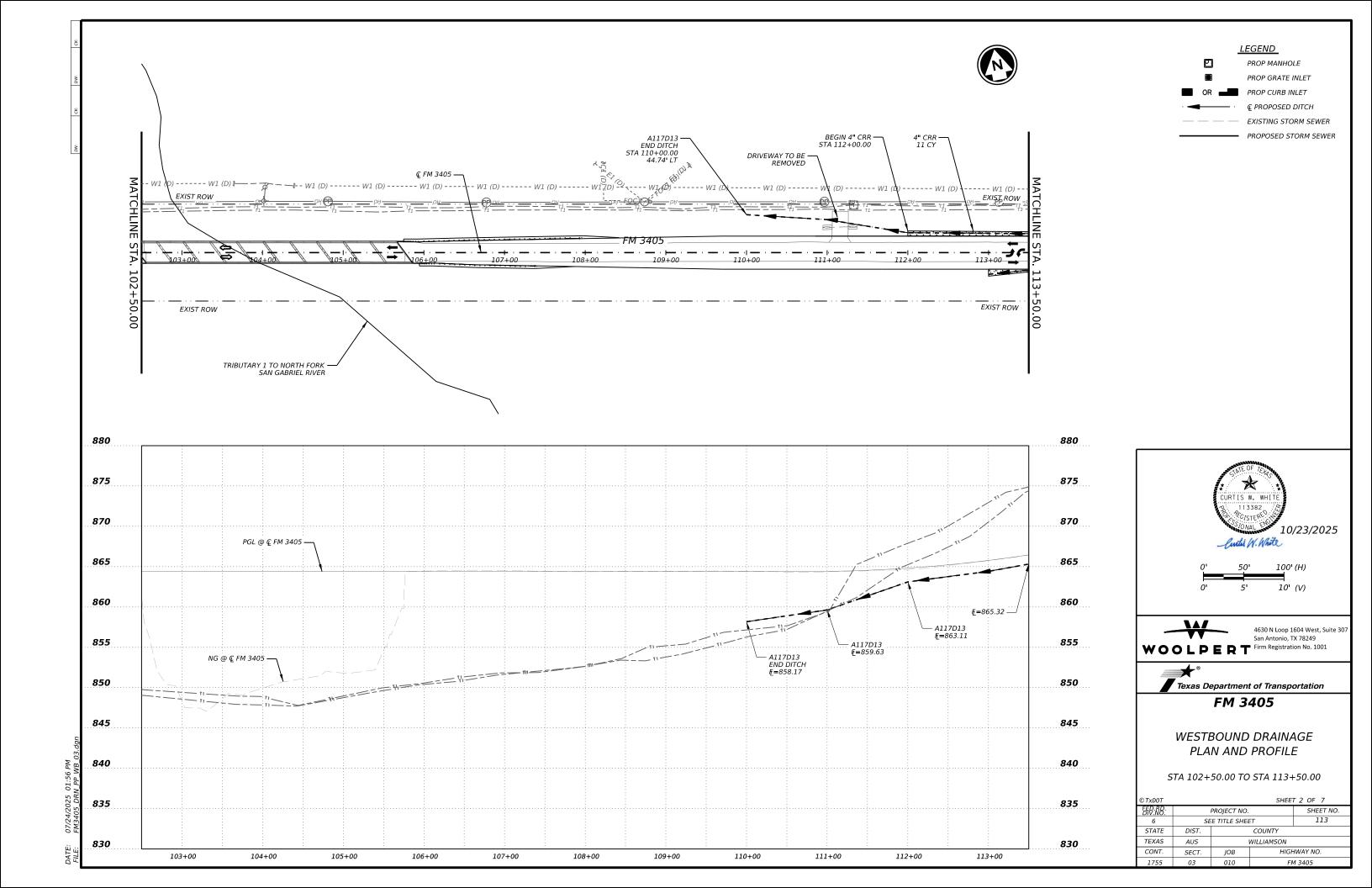


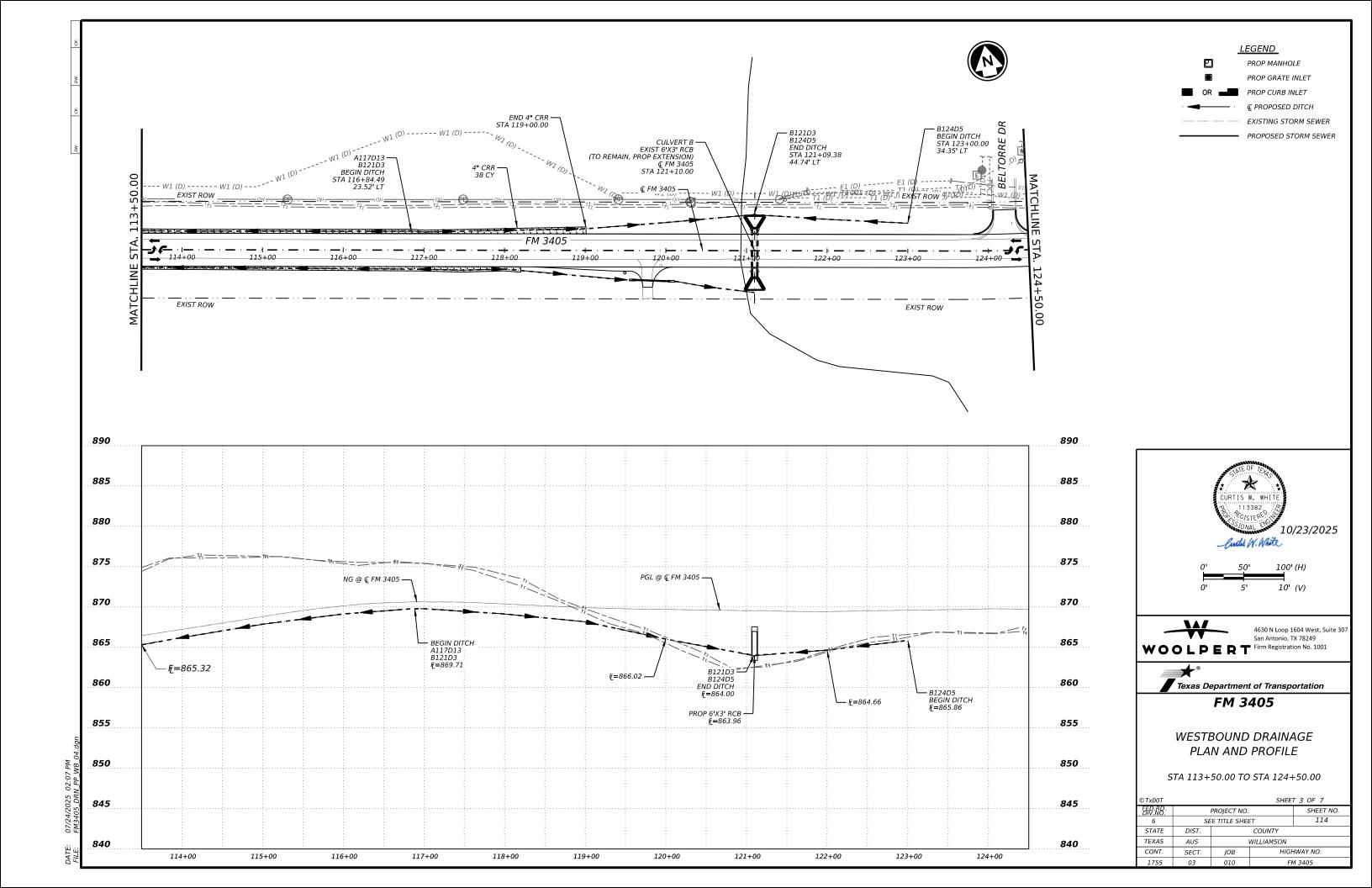


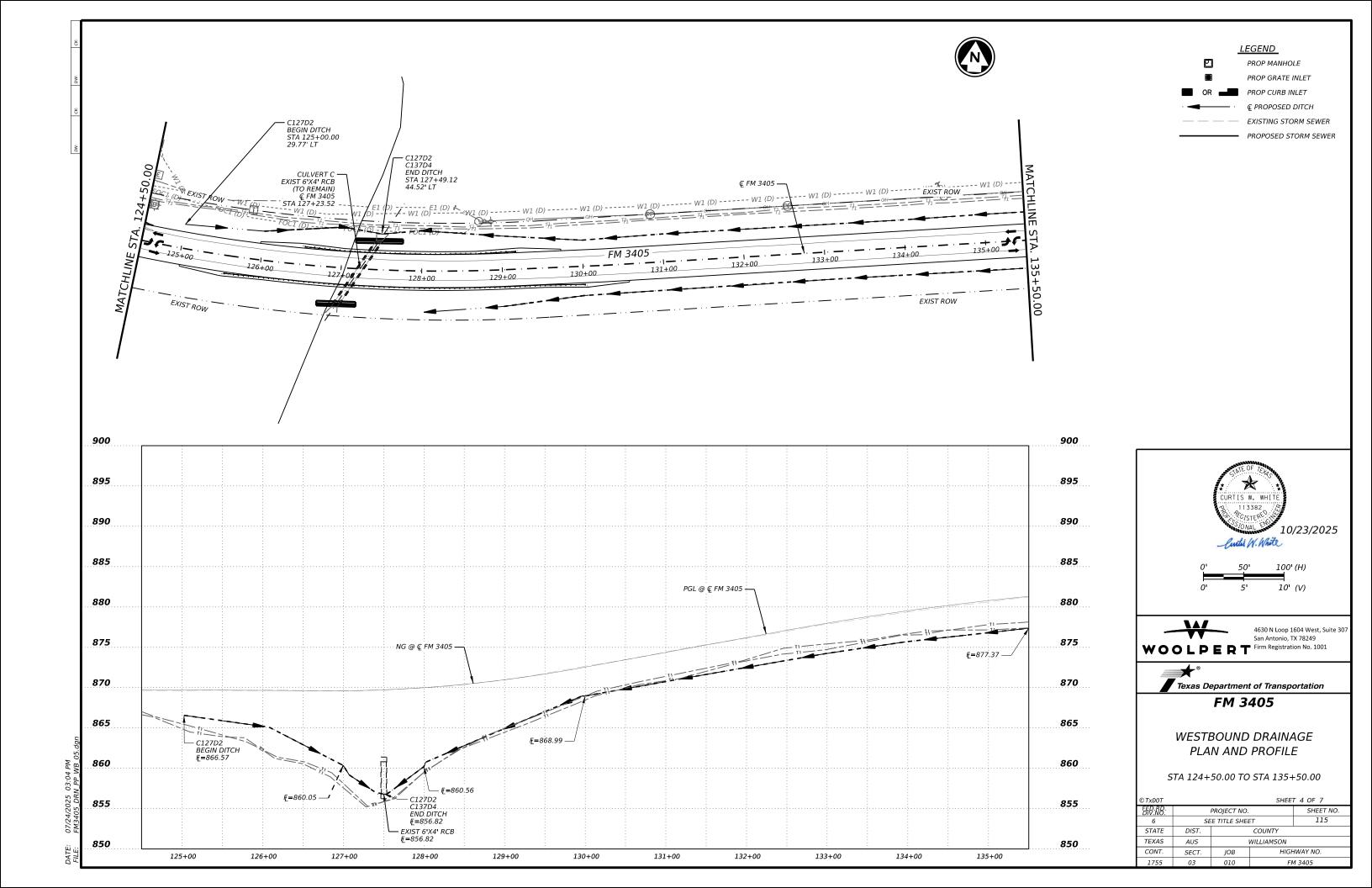


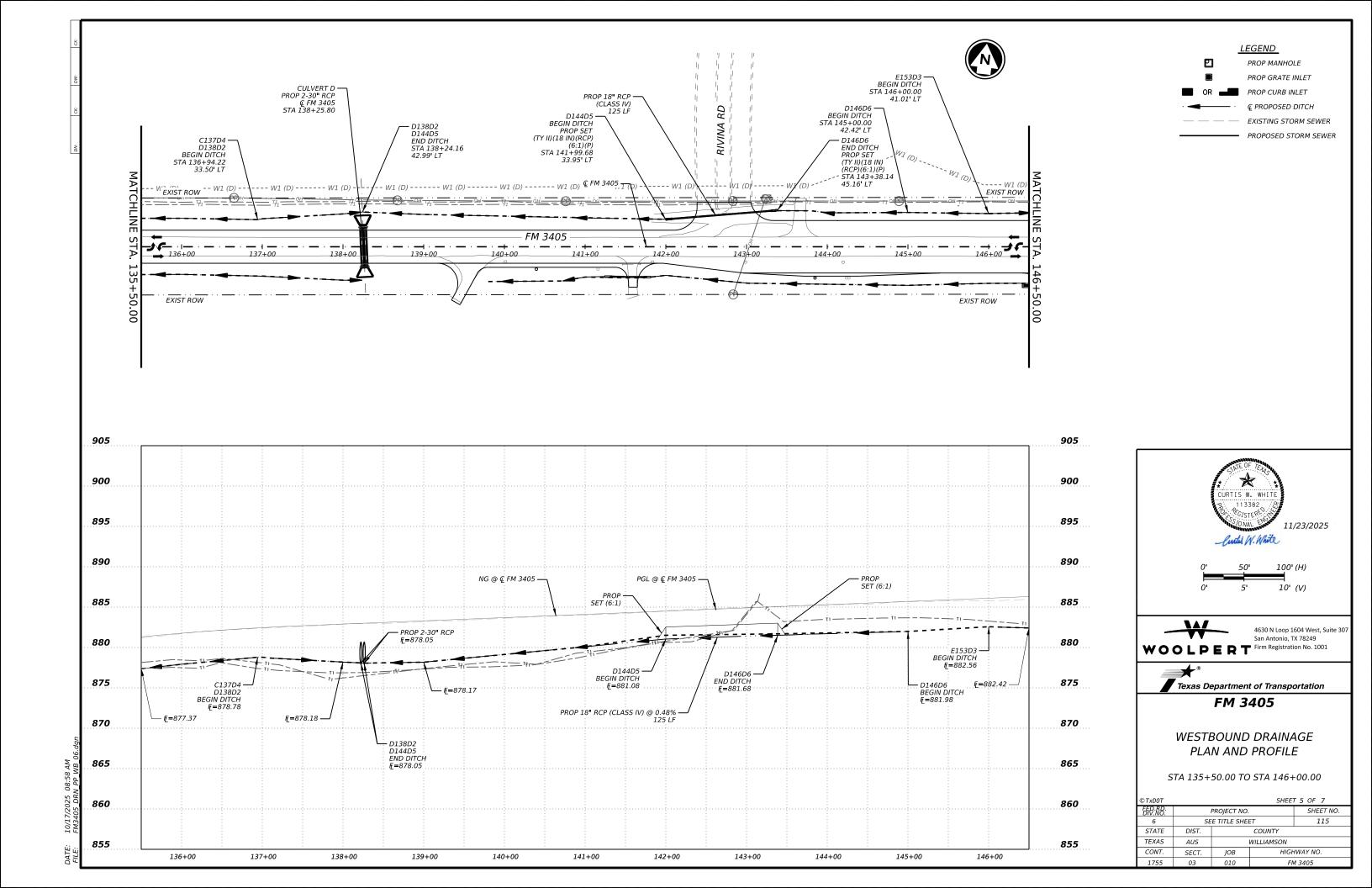


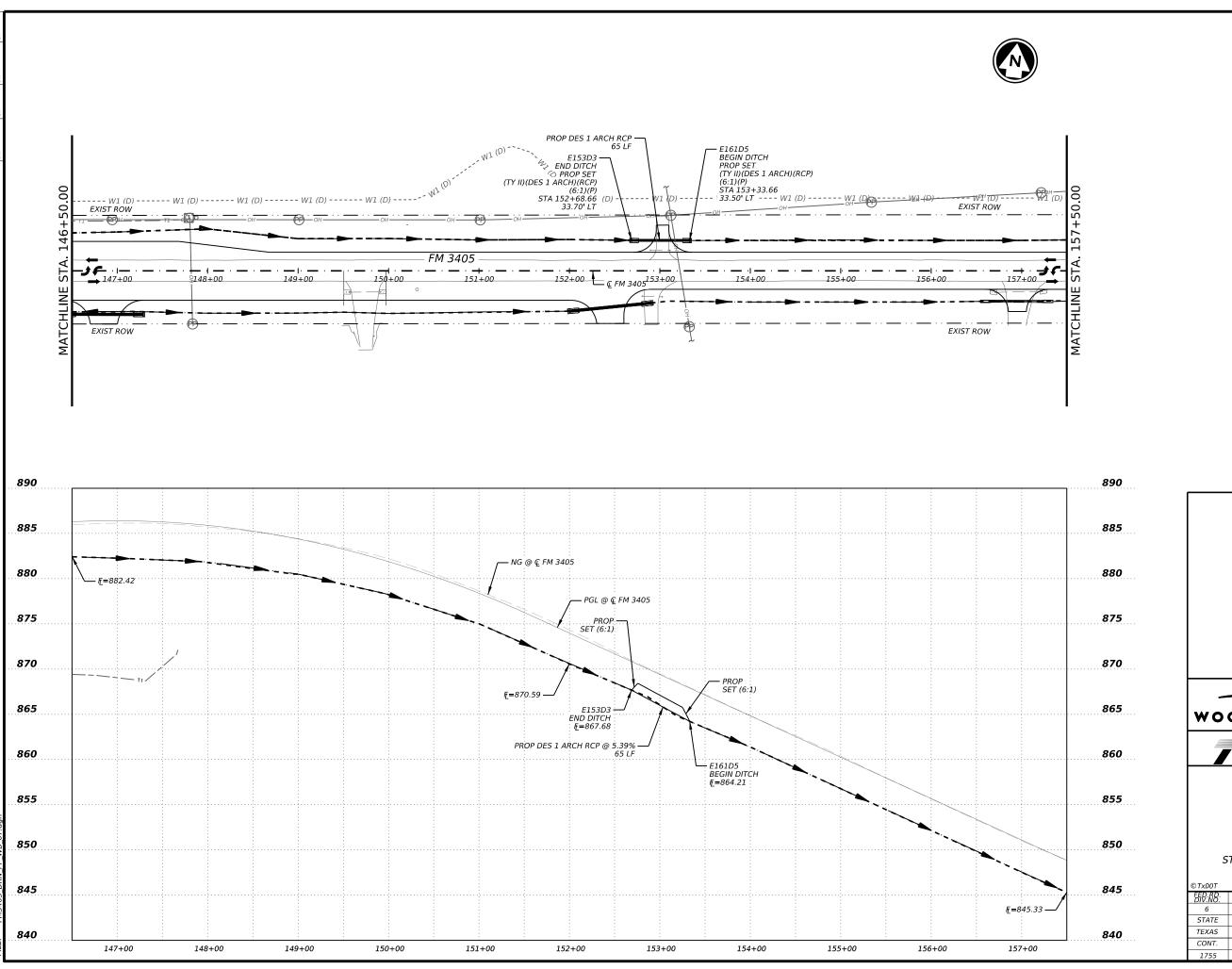












LEGEND

PROP MANHOLE PROP GRATE INLET

PROP CURB INLET

€ PROPOSED DITCH

EXISTING STORM SEWER

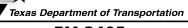
PROPOSED STORM SEWER

CURTIS W. WHIT 113382 10/23/2025 -Cuti W. White 100' (H)



4630 N Loop 1604 West, Suite 307

10' (V)

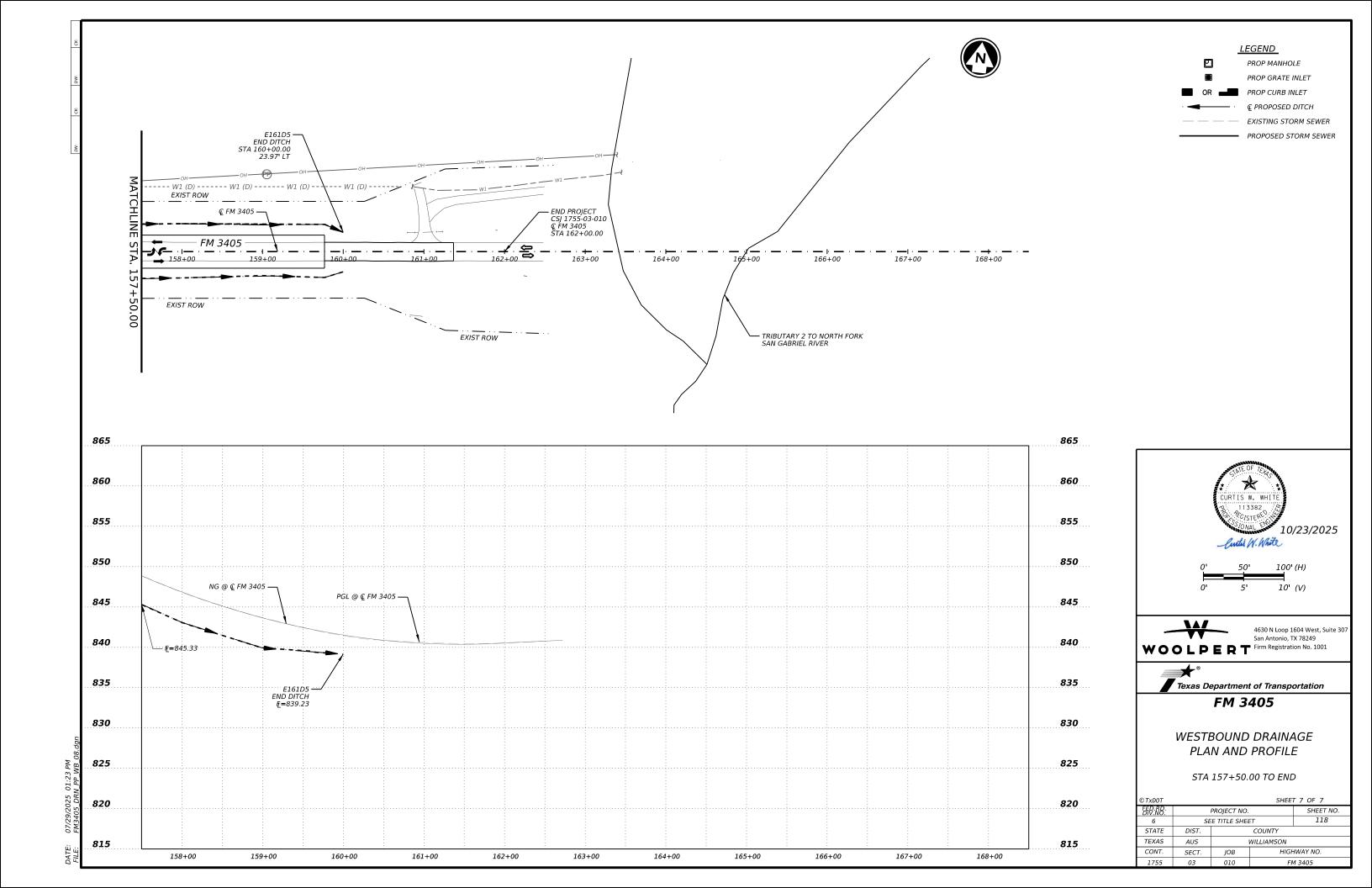


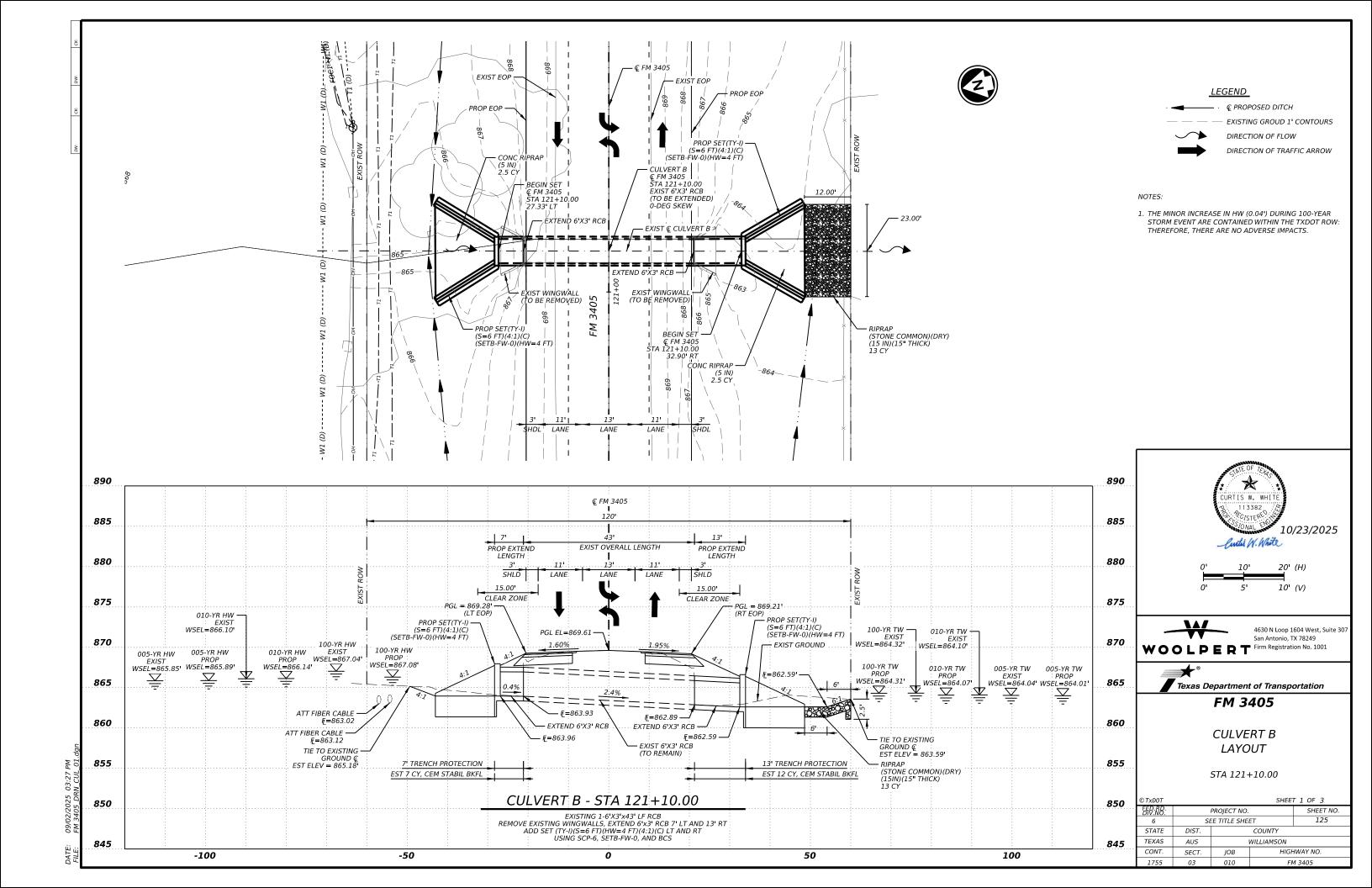
FM 3405

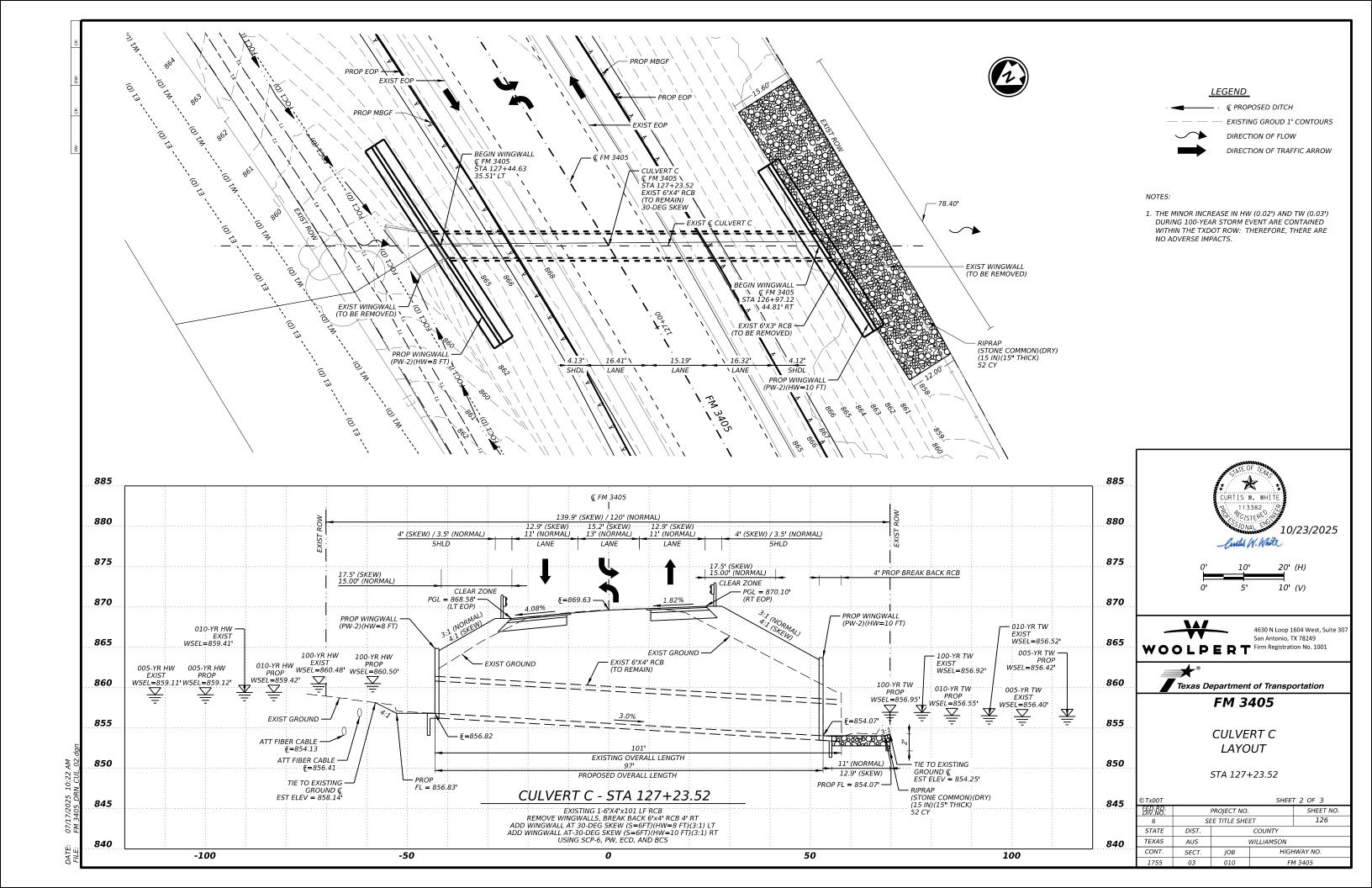
WESTBOUND DRAINAGE PLAN AND PROFILE

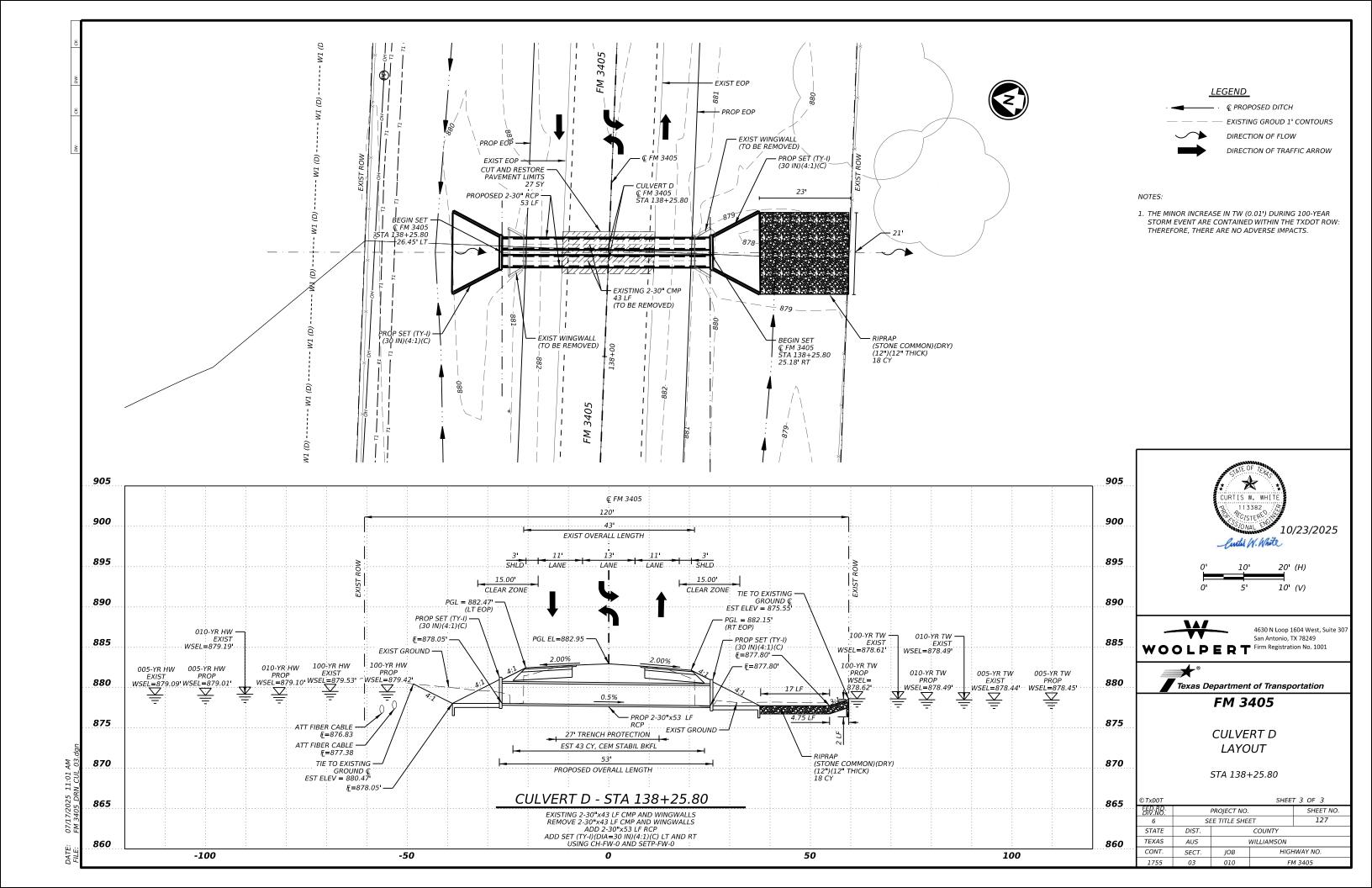
STA 146+50.00 TO STA 157+50.00

© TxD0T	SHEET 6 OF 7										
<i>55₽:88:</i>		PROJECT NO.		SHEET NO.							
6	SE	E TITLE SHEL	ΞT	117							
STATE	DIST.		COUNTY								
TEXAS	AUS		WILLIAMSON								
CONT.	SECT.	JOB	JOB HIGHWAY NO.								
1755	03	010 FM 3405									









		10/ 0.55	OCTING CHILLEDT ANALYSIS SHIP	MADY TABLE								
		H1-8 EX										
TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (ft)	INLET DEPTH CONTROL (FT)	OUTLET DEPTH CONTROL (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)			OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)	TAILWATER ELEVATION (FT)
37.89	37.89	865.55	1.62	0.14	1-52n	0.58	1.07	0.65	1.07	9.72	3.17	863.96
48.44	48.44	865.85	1.92	0.41	1-S2n	0.67	1.26	0.78	1.15	10.37	3.37	864.04
57.99	57.99	866.10	2.17	0.65	1-S2n	0.76	1.43	0.89	1.21	10.83	3.53	864.10
72.06	72.06	866.45	2.52	1.01	1-S2n	0.87	1.65	1.05	1.36	11.43	3.00	864.25
83.75	83.75	866.73	2.80	1.32	1-S2n	0.97	1.82	1.18	1.39	11.83	3.15	864.28
96.66	96.66	867.04	3.11	1.69	5-S2n	1.06	2.00	1.32	1.43	12.22	3.30	864.32
	37.89 48.44 57.99 72.06 83.75	DISCHARGE (CFS) DISCHARGE (CFS) 37.89 37.89 48.44 48.44 57.99 57.99 72.06 72.06 83.75 83.75	TOTAL CULVERT HEADWATER ELEVATION (ft) 37.89 37.89 865.55 48.44 48.44 865.85 57.99 57.99 866.10 72.06 72.06 866.45 83.75 83.75 866.73	TOTAL CULVERT HEADWATER DEPTH CONTROL (FT) 37.89 37.89 865.55 1.62 48.44 48.44 865.85 1.92 57.99 57.99 866.10 2.17 72.06 72.06 866.45 2.52 83.75 83.75 866.73 2.80	DISCHARGE (CFS) DISCHARGE (CFS) HEAVWAILER CONTROL (FT) CONTROL (FT)	TOTAL DISCHARGE (CFS) CULVERT DISCHARGE (CFS) HEADWATER ELEVATION (t) INLET DEPTH CONTROL (FT) OUTLET DEPTH CONTROL (FT) FLOW CONTROL (FT) 37.89 37.89 865.55 1.62 0.14 1-52n 48.44 48.44 865.85 1.92 0.41 1-52n 57.99 57.99 866.10 2.17 0.65 1-52n 72.06 72.06 866.45 2.52 1.01 1-52n 83.75 83.75 866.73 2.80 1.32 1-52n	TOTAL CULVERT HEADWATER DEPTH CONTROL (FT) DEPTH TOPE DEPTH CONTROL (FT) TOPE DEPTH TOP	TOTAL CULVERT HEADWATER DEPTH CONTROL (FT) DEPTH DEPTH	TOTAL CULVERT HEADWATER DEPTH CONTROL (FT) DEPTH FLOW DEPTH (FT) DEPTH (FT)	TOTAL CULVERT HEADWATER DEPTH CONTROL (FT) FLOW NORMAL CRITICAL DEPTH (FT) D	TOTAL CUIVERT HEADWATER DEPTH CONTROL (FT) DEPTH DEPTH DEPTH DEPTH TOSCHARGE (CFS) DISCHARGE (CFS)	TOTAL CULVERT HEADWATER ELEVATION (t) NET CONTROL (FT) DEPTH CONTROL (FT) DEPTH TOPETH CONTROL (FT) DEPTH TOPETH TOPETH (FT) DEPTH

ROADWAY DATA FOR CROSSING: CULVERT B ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY SURFACE: PAVED

ROADWAY TOP WIDTH, FT:

NEL	EXIST R	DADWAY PROF	ILE ALONG E
INING'S N 0.04	NUMBER	STATION (FT)	ELEVATION
0.04	1	11700	870.42
0.04	2	11800	870.20
0.04	3	11900	869.64
0.04	4	12000	869.51
0.04	5	12100	869.29
	6	12200	860 12

TOTAL RATING CURVE

		TOTA	L DISCHARGE (CFS)	
	EXI	STING CULVE	RT FLOW TAB	LE	
STORM EVENTS	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATION
2 year	865.55	37.89	37.89	0.00	1
5 year	865.85	48.44	48.44	0.00	1
10 year	866.10	57.99	57.99	0.00	1
25 year	866.45	72.06	72.06	0.00	1
50 year	866.73	83.75	83.75	0.00	1
100 year	867.04	96.66	96.66	0.00	1
Overtopping	869.12	165.07	165.07	0.00	Overtopping

CULVERT TYPE: STRAIGHT

INLET ELEVATION (INVERT), FT: 863.93 OUTLET ELEVATION (INVERT), FT: 862.89 CULVERT LENGTH, FT: CULVERT SLOPE: 0.024 SITE DATA - CULVERT B - EXIST CULVERT DATA SUMMARY - CULVERT B - EXIST SITE DATA OPTION: CULVERT INVERT DATA BARREL SHAPE: CONCRETE BOX

INLET STATION, FT: BARREL SPAN, FT INLET ELEVATION, FT: BARREL RISE, FT: OUTLET STATION, FT: 43 BARREL MATERIAL: CONCRETE OUTLET ELEVATION, FT: 862.89 EMBEDMENT, IN:

> BARREL MANNING'S N: 0.013 CULVERT TYPE:

INLET CO

INLET DE

OUTLET ELEVATION (INVERT), FT: 862.59

CULVERT SLOPE, SECTION 1: 0.0043

CULVERT DATA SUMMARY - CULVERT B - PROP

UPPER SECTION MANNING'S N: 0.013

LOWER SECTION MANNING'S N: 0.013

CONCRETE BOX

CONCRETE

CONCRETE

SINGLE BROKEN-BACK

SQUARE EDGE (30-75º FLARE) WINGWALL (Ke=0.4)

CULVERT SLOPE, SECTION 2: 0.024

STRAIGHT
SQUARE EDGE (30-75º FLARE) WINGWALL (Ke=0.4)
NO

0.00	866.17	0.04
43.98	865.30	0.04
87.95	864.96	0.04
100.94	864.83	0.04
117.94	864.19	0.04
142.92	864.15	0.04
152.92	863.25	0.04
157.91	863.13	0.04
158.91	862.89	0.04
162.91	863.72	0.04
173.90	863.90	0.04
215.88	865.49	0.04
229.87	866.10	0.04
246.86	867.27	0.04
252.86	867.60	0.04

TAILWATER CHANNEL DATA - CULVERT B

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL

'-8 PROPOSED CUI VERT	ANI AYSIS -	FM	3405 -	CULV	FRT

			HY-8 PROP	OSED CULVERT ANLAYSIS - FM 3	405 - CULVERT B								
			HY-8 PR	OPOSED CULVERT ANALYSIS SU	MMARY TABLE								
STORM EVENTS	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (ft)	INLET DEPTH CONTROL (FT)	OUTLET DEPTH CONTROL (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)	TAILWATER ELEVATION (FT)
2 year	38.02	38.02	865.59	1.63	1.05	1-52n	1.02	1.08	0.63	1.34	10.04	3.21	863.93
5 year	48.61	48.61	865.89	1.93	1.11	1-S2n	1.20	1.27	0.76	1.42	10.70	3.41	864.01
*10 year	58.20	58.20	866.14	2.18	1.18	1-52n	1.35	1.43	0.87	1.48	11.21	3.57	864.07
25 year	72.31	72.31	866.49	2.53	1.31	1-52n	1.57	1.65	1.02	1.64	11.83	3.02	864.23
50 year	84.04	84.04	866.77	2.81	1.44	1-52n	1.75	1.83	1.14	1.68	12.26	3.16	864.27
100 year	97.00	97.00	867.08	3.12	1.60	5-52n	1.93	2.01	1.28	1.72	12.68	3.31	864.31
*DESIGN STORM EVENT						•		_	•				

CULVERT TYPE:

BREAK STATION, FT:

INLET STATION, FT:

INLET ELEVATION, FT:

BREAK STATION, FT: BREAK ELEVATION, FT:

OUTLET STATION, FT:

OUTLET ELEVATION, FT:

BREAK ELEVATION, FT:

INLET ELEVATION (INVERT), FT: 863.96

CULVERT LENGTH, FT: 63.00 SITE DATA - CULVERT B - PROP SITE DATA OPTION:

863.93

863.96

863.93

862.59

CULVERT INVERT DATA BARREL SHAPE:

BARREL SPAN, FT

BARREL RISE, FT:

CULVERT TYPE:

INLET CONFIGURATION: INLET DEPRESSION:

UPPPER SECTION MATERIAL: LOWER SECTION MATERIAL:

NUMBER OF BARRELS:

TAILWATER CHANNEL DATA - CULVERT B TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL

ROADWAY DATA FOR CROSSING	CHIVEDT
ROADWAY PROFILE SHAPE:	IRREGULAR
ROADWAY SURFACE:	PAVED
ROADWAY TOP WIDTH, FT:	41

IRREGULAR TAILWATER CHANNEL							
STATION (FT)	ELEVATION (FT)	MANNING'S N					
0.00	866.17	0.04					
43.98	865.30	0.04					
87.95	864.96	0.04					
100.94	864.83	0.04					
117.94	864.19	0.04					
142.92	864.15	0.04					
152.92	863.25	0.04					
157.91	863.13	0.04					
158.91	862.59	0.04					
162.91	863.72	0.04					
173.90	863.90	0.04					
215.88	865.49	0.04					
229.87	866.10	0.04					
246.86	867.27	0.04					
252.86	867.60	0.04					

PROP ROADWAY PROFILE ALONG EOP								
NUMBER	STATION (FT)	ELEVATION (FT)						
1	11700	870.32						
2	11800	870.14						
3	11900	869.59						
4	12000	869.46						
5	12100	869.25						
6	12200	868.93						
7	12300	869.04						
8	12400	869.19						

_	CROSSING CULVERT B - 121+13.00 - PROP	
864.30		
864.25		
864.20		
864.15 864.10		
864.10		
864.05		
864.00		
863.95		
_	40 50 60 70 80 90 TOTAL DISCHARGE (CFS)	10
	AD COOCED CHILVEST SI CHILTING	

TOTAL RATING CURVE

STORM	PROPOSED CULVERT FLOW TABLE							
Syear 865.89 48.61 48.61 0.00 1 10 year 866.14 58.20 58.20 0.00 1 25 year 866.49 72.31 72.31 0.00 1 50 year 866.77 84.04 84.04 0.00 1 100 year 867.08 97.00 97.00 0.00 1		ELEVATION	DISCHARGE	DISCHARGE	DISCHARGE	ITERATION		
10 year 866.14 58.20 58.20 0.00 1 25 year 866.49 72.31 72.31 0.00 1 50 year 866.77 84.04 84.04 0.00 1 100 year 867.08 97.00 97.00 0.00 1	2 year	865.59	38.02	38.02	0.00	1		
25 year 866.49 72.31 72.31 0.00 1 50 year 866.77 84.04 84.04 0.00 1 100 year 867.08 97.00 97.00 0.00 1	5 year	865.89	48.61	48.61	0.00	1		
50 year 866.77 84.04 84.04 0.00 1 100 year 867.08 97.00 97.00 0.00 1	10 year	866.14	58.20	58.20	0.00	1		
100 year 867.08 97.00 97.00 0.00 1	25 year	866.49	72.31	72.31	0.00	1		
	50 year	866.77	84.04	84.04	0.00	1		
Overtopping 868.93 159.04 159.04 0.00 Overtopping	100 year	867.08	97.00	97.00	0.00	1		
	Overtopping	868.93	159.04	159.04	0.00	Overtopping		

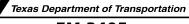




1755 03 010

4630 N Loop 1604 West, Suite 307

FM 3405



FM 3405

CULVERT - B HYDRAULIC DATA

© TxD0T				SHEET 1 OF 1		
<i>E5₽:R8:</i>		PROJECT NO.		SHEET NO.		
6	SE	E TITLE SHEET		SEE TITLE SHEET		128
STATE	DIST.	COUNTY				
TEXAS	AUS	WILLIAMSON				
CONT.	SECT.	JOB HIGHWAY NO.				

TOTAL DISCHARGE (CFS) CULVERT DISCHARGE (CFS) FLOW TYPE DESIGN STORM EVENT

CULVERT TYPE: STRAIGHT
INLET ELEVATION (INVERT), FT 856.82
CULVERT LENGTH, FT: 101
SITE DATA - CULVERT C - EXIST
SITE DATA OPTION.: CULVERT
INLET STATION, FT: 0
INLET ELEVATION, FT: 856.82
OUTLET STATION, FT: 101 OUTLET ELEVATION (INVERT), FT 853.91 CULVERT SLOPE: 0.03 CULVERT DATA SUMMARY - CULVERT C - EXIST CONCRETE BOX

CULVERT INVERT DATA BARREL SHAPE:
0 BARREL SPAN, FT
856.82 BARREL RISE, FT:
101 BARREL MATERIAL: CONCRETE OUTLET ELEVATION, FT: 853.91 EMBEDMENT, IN: 0

BARREL MANNING'S N: CULVERT TYPE: INLET CONFIGURATION: NUMBER OF BARRELS:

0.013 STRAIGHT SQUARE EDGE (30-75º FLARE) WINGWALL (Ke=0.4) NO INLET DEPRESSION:

IRREGU	LAR TAILWATER (HANNEL
STATION (FT)	ELEVATION (FT)	MANNING'S N
0.00	864.03	0.12
50.83	860.53	0.12
72.75	859.19	0.12
104.64	857.05	0.12
107.62	856.99	0.12
111.57	856.38	0.12
125.39	854.87	0.12
130.33	853.91	0.12
134.28	855.67	0.12
139.22	855.62	0.12

EXIST ROADWAY PROFILE ALONG EOP			
NUMBER	STATION (FT)	ELEVATION (FT)	
1	12400	869.36	
2	12500	868.86	
3	12600	868.94	
4	12700	868.97	
5	12800	869.26	
6	12900	870.51	
7	13000	872.38	
8	13100	874.16	
9	13200	875.81	
10	13300	877.53	
11	13400	879.18	
12	13500	880.28	
13	13600	881.37	
14	13700	882.17	

ROADWAY DATA FOR CROSSING: CULVERT C ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY SURFACE: PAVED ROADWAY TOP WIDTH, FT: 24

EVENTS DISCHARGE (CFS) DISCHARGE (CFS) ELEVATION (TF) CONTROL (FT) CONTROL (FT) OFFIN (FT) DEPTH (FTS) (FTS) (FTS) (FTS)														
SIONN TOTAL TOTA														
5 year 64.11 64.11 859.12 2.30 -0.20 1.52n 0.77 1.52 0.82 2.35 12.99 1.79 856.4 **10 year 76.62 76.62 859.42 2.60 0.01 1.52n 0.06 1.72 0.94 2.48 13.56 1.88 856.5 25 year 94.97 94.97 859.83 3.01 0.32 1.52n 1.00 1.98 1.11 2.64 14.31 1.99 856.4					DEPTH	DEPTH				DEPTH	ER	VELOCITY	VELOCITY	TAILWATER ELEVATION (FT)
*10 year 76.62 76.62 859.42 2.60 0.01 1.52n 0.86 1.72 0.94 2.48 13.56 1.88 856.5 25 year 94.97 94.97 859.83 3.01 0.32 1.52n 1.00 1.98 1.11 2.64 14.31 1.99 856.7	2 year	50.25	50.25	858.76	1.94	-0.43	1-52n	0.66	1.30	0.69	2.20	12.08	1.68	856.27
25 year 94.97 94.97 859.83 3.01 0.32 1-S2n 1.00 1.98 1.11 2.64 14.31 1.99 856.7	5 year	64.11	64.11	859.12	2.30	-0.20	1-52n	0.77	1.52	0.82	2.35	12.99	1.79	856.42
	*10 year	76.62	76.62	859.42	2.60	0.01	1-52n	0.86	1.72	0.94	2.48	13.56	1.88	856.55
50 year 110.16 110.16 860.15 3.33 0.59 1-52n 1.10 2.19 1.24 2.76 14.85 2.08 856.8	25 year	94.97	94.97	859.83	3.01	0.32	1-52n	1.00	1.98	1.11	2.64	14.31	1.99	856.71
	50 year	110.16	110.16	860.15	3.33	0.59	1-52n	1.10	2.19	1.24	2.76	14.85	2.08	856.83
100 year 126.84 126.84 860.50 3.68 0.90 1-52n 1.21 2.40 1.38 2.88 15.31 2.16 856.9	100 year	126.84	126.84	860.50	3.68	0.90	1-52n	1.21	2.40	1.38	2.88	15.31	2.16	856.95

CULVERT TYPE: STRAIGHT
INLET ELEVATION (INVERT), FT 856.82
CULVERT LENGTH, FT: 97
SITE DATA - CULVERT C - PROP
SITE DATA OPTION: CULVERT II
INLET STATION, FT: 0
INLET ELEVATION, FT: 97.00
 STRAIGHT

 1 856.82
 OUTLET ELEVATION (INVERT), FT 854.07

 97
 CULVERT SLOPE:
 0.03

 P
 CULVERT DATA SUMMARY - CULVERT C - PROP

 CULVERT INVERT DATA BARREL SHAPE:
 CONCRETE BOX

 0
 BARREL SPAN, FT
 6

 856.82
 BARREL RISE, FT:
 4

 97.00
 BARREL MATERIAL:
 CONCRETE

OUTLET ELEVATION, FT: 854.07 EMBEDMENT, IN:

NUMBER OF BARRELS: 0.013

BARREL MANNING'S N: CULVERT TYPE: INLET CONFIGURATION: INLET DEPRESSION: 0.013 STRAIGHT SQUARE EDGE (30-75° FLARE) WINGWALL (Ke=0.4) NO

	LAR TAILWATER (
STATION (FT)	ELEVATION (FT)	MANNING'S N
0.00	864.03	0.12
50.83	860.53	0.12
72.75	859.19	0.12
104.64	857.05	0.12
107.62	856.99	0.12
111.57	856.38	0.12
125.39	854.87	0.12
130.33	854.07	0.12
134.28	855.67	0.12
139.22	855.62	0.12
144.15	855.89	0.12
160.94	857.29	0.12
211.76	861.44	0.12
217.74	861.74	0.12
280.13	863.90	0.12

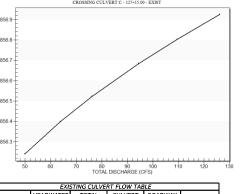
TAILWATER CHANNEL DATA - CULVERT C TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL

PROP ROADWAY PROFILE ALONG EOP				
NUMBER	STATION (FT)	ELEVATION (FT)		
1	12400	869.19		
2	12500	868.70		
3	12600	868.74		
4	12700	868.70		
5	12800	868.79		
6	12900	870.10		
7	13000	872.14		
8	13100	874.11		
9	13200	875.74		
10	13300	877.47		
11	13400	879.00		
12	13500	880.20		
13	13600	881.29		
14	13700	882.05		

ROADWAY DATA FOR CROSSING: CULVERT C ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY SURFACE: PAVED ROADWAY TOP WIDTH, FT: 41

630.9	
856.8 -	
NO 856.7	
- EVAT	
HEADWATER ELEVATION (FT)	
856.5	
856.4	
856.3	/
50	60 70 80 90 100 110 120 130 TOTAL DISCHARGE (CFS)
	PROPOSED CULVERT FLOW TABLE
STORM	HEADWATER TOTAL CULVERT ROADWAY

	PRO.	POSED CULVE	RT FLOW TA	BLE	
STORM EVENTS	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATION
2 year	858.76	50.25	50.25	0	1
5 year	859.12	64.11	64.11	0	1
10 year	859.42	76.62	76.62	0	1
25 year	859.83	94.97	94.97	0	1
50 year	860.15	110.16	110.16	0	1
100 year	860.50	126.84	126.84	0	1
Overtopping	868.70	374.32	374.32	0	Overtopping



TOTAL RATING CURVE

TOTAL DISCHARGE (CFS)							
EXISTING CULVERT FLOW TABLE							
STORM EVENTS	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATION		
2 year	858.75	49.97	49.97	0	1		
5 year	859.11	63.76	63.76	0	1		
10 year	859.41	76.20	76.20	0	1		
25 year	859.81	94.45	94.45	0	1		
50 year	860.14	109.55	109.55	0	1		
100 year	860.48	126.14	126.14	0	1		
Overtopping	868.86	377.45	377.45	0	Overtopping		

TOTAL RATING CURVE





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Texas Department of Transportation

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CULVERT - C HYDRAULIC DATA

© TxD0T				SHEET 1 OF 1
<i>55₽:88:</i>		PROJECT NO.		SHEET NO.
6	SE	E TITLE SHE	ET	129
STATE	DIST.	COUNTY		
TEXAS	AUS	WILLIAMSON		
CONT.	SECT.	JOB HIGHWAY NO.		
1755	0.2	010 5M 2405		

HEADWATER ELEVATION (ft) FLOW TYPE

CULVERT TYPE: STRAIGHT INLET ELEVATION (INVERT), FT: 878.03

CULVERT LENGTH, FT: SITE DATA - CULVERT D - EXIST SITE DATA OPTION: INLET STATION, FT:

INLET ELEVATION, FT:

OUTLET ELEVATION (INVERT), FT: 877.82 CULVERT SLOPE: 0.005
CULVERT DATA SUMMARY - CULVERT D - EXIST
BARREL SHAPE: CIRCULAR
DIAMETER, FT: 2.5 CORRUGATED STEEL BARREL MATERIAL:

OUTLET STATION, FT: 43 EMBEDMENT, IN:

878.03

BARREL MANNING'S N: OUTLET ELEVATION, FT: 877.82 0.024 NUMBER OF BARRELS:

CULVERT TYPE: INLET CONFIGURATION: INLET DEPRESSION: STRAIGHT SQUARE EDGE WITH HEADWALL (Ke=0.5) NO TAILWATER CHANNEL DATA - CULVERT D TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL

ROADWAY DATA FOR CROSSING: CULVERT D ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY SURFACE: PAVED ROADWAY TOP WIDTH, FT: 24

IRREGU	LAR TAILWATER C	HANNEL
STATION (FT)	ELEVATION (FT)	MANNING'S N
0.00	880.63	0.04
2.00	880.63	0.04
13.98	880.75	0.04
68.90	880.19	0.04
85.88	879.82	0.04
88.86	879.52	0.04
96.83	877.94	0.04
97.83	877.82	0.04
103.81	878.32	0.04
108.79	878.57	0.04
119.75	879.37	0.04
120.74	879.38	0.04
145.65	879.26	0.04
185.49	879.41	0.04
210.36	879 42	0.04

NUMBER	STATION (FT)	ELEVATIO
NUMBER	STATION (FT)	(FT)
1	13700.00	882.17
2	13800.00	882.64
3	13900.00	882.96
4	14000.00	883.50
5	14100.00	883.75
6	14200.00	884.35
7	14300.00	884.76
8	14400.00	885.04
9	14500.00	885.30
10	14600.00	885.57
11	14700.00	885.82

	TOTAL RATING CURVE CROSSING CULVERT D - 138-28.00 - EXIST
878.62	
878.60	
878.58	
878.56	
878.54	
878.52	
878.50	
878.48	
878.46	
878.44	
878.42	
878.40	
878.38	7 8 9 10 11 12 13 14 15 16 TOTAL DISCHARGE (CFS)

TOTAL DISCHARGE (CFS)							
	EX	ISTING CULVE	ERT FLOW TA	BLE			
STORM EVENTS	HEADWATER ELEVATION (FT)	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATION		
2 year	878.97	6.81	6.81	0	1		
5 year	879.09	8.63	8.63	0	1		
10 year	879.19	10.24	10.24	0	1		
25 year	879.33	12.55	12.55	0	1		
50 year	879.43	14.43	14.43	0	1		
100 year	879.53	16.44	16.44	0	1		
Overtopping	882.64	67.65	67.65	0	Overtopping		

STORM EVENTS CULVERT DISCHARGE (CFS) FLOW TYPE

CULVERT TYPE: STRAIGHT
INLET ELEVATION (INVERT), FT: 8.05
CULVERT LENGTH, FT: 578
STE DATA - CULVERT D - PROP
STE DATA OPTION: CULVERT I
INLET STRION, FT: 0
INLET STRION, FT: 878.05

OUTLET STATION, FT:

53.00 EMBEDMENT, IN:

OUTLET ELEVATION, FT: NUMBER OF BARRELS: BARREL MANNING'S N: CULVERT TYPE: INLET CONFIGURATION: INLET DEPRESSION: 877.80 2 0.013 SQUARE EDGE WITH HEADWALL (Ke=0.5) NO

TAILWATER CHANNEL DATA - CULVERT D
TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL

ROADWAY DATA FOR CROSSING: CULVERT D ROADWAY PROFILE SHAPE: IRREGULAR ROADWAY SURFACE: PAVED ROADWAY TOP WIDTH, FT: 41

IRREGULAR TAILWATER CHANNEL						
STATION (FT)	ELEVATION (FT)	MANNING'S N				
0.00	880.63	0.04				
2.00	880.63	0.04				
13.98	880.75	0.04				
68.90	880.19	0.04				
85.88	879.82	0.04				
88.86	879.52	0.04				
96.83	877.94	0.04				
97.83	877.80	0.04				
103.81	878.32	0.04				
108.79	878.57	0.04				
119.75	879.37	0.04				
120.74	879.38	0.04				
145.65	879.26	0.04				
185.49	879.41	0.04				
219.36	879.42	0.04				

PROP ROADWAY PROFILE ALONG EOP						
NUMBER	STATION (FT)	ELEVATION (FT)				
1	13700	882.05				
2	13800	882.54				
3	13900	882.82				
4	14000	883.29				
5	14100	883.64				
6	14200	884.24				
7	14300	884.64				
8	14400	884.99				
9	14500	885.28				
10	14600	885.45				
11	14700	885.77				

	CROSSING CULVERT D - 138+28.00 - PROP
878.62	
878.60	
878.58	
878.56	
878.54	
878.54	
878.50	
878.48	
878.46	
878.44	
878.42	
878.40	/
670.40	
7	8 9 10 11 12 13 14 15 16 17 TOTAL DISCHARGE (CFS)

TOTAL PATING CURVE

PROPOSED CULVERT FLOW TABLE								
STORM EVENTS	HEADWATER ELEVATION (FT)		CULVERT DISCHARGE (CFS)	ROADWAY DISCHARGE (CFS)	ITERATION			
2 year	878.90	7.13	7.13	0	1			
5 year	879.01	9.03	9.03	0	1			
10 year	879.10	10.71	10.71	0	1			
25 year	879.22	13.13	13.13	0	1			
50 year	879.31	15.09	15.09	0	1			
100 year	879.42	17.19	17.19	0	1			
Overtopping	882.54	75.46	75.46	0	Overtopping			





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CULVERT - D HYDRAULIC DATA

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FED-RD.	

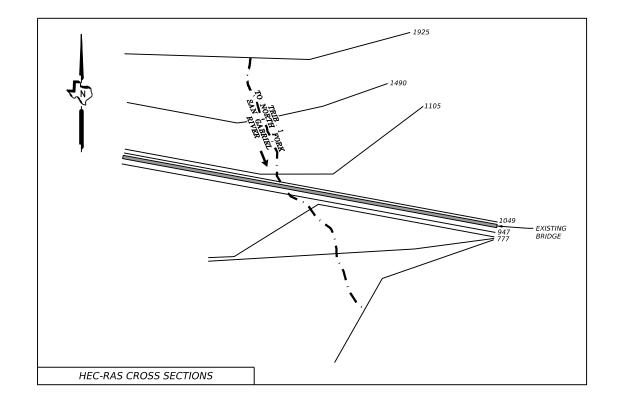
SHEET 1 OF 1
SHEET NO.
130

@ IXDUI				SHEET TOT T	
FFP:RB:		PROJECT NO.		SHEET NO.	
6	SE	SEE TITLE SHEET 130			
STATE	DIST.				
TEXAS	AUS				
CONT.	SECT.	JOB	HIGH	IWAY NO.	
1755	03	010 FM 3405			

				HEC-RAS HYDRAULIC ANAL	YSIS RESULTS				
REACH	RIVER STA	PROFILE	DISTANCE	PLAN	Q TOTAL	W.S. ELEV	CRIT W.S.	VEL CHNL	FLOW AREA
			(FT)		(CFS)	(FT)	(FT)	(FT/S)	(SQ FT)
REACH 1	1925	25-YR	435	CROSSING_A_EXISTING	4786.16	861.36		8.46	962.74
REACH 1	1925	25-YR	435	CROSSING_A_PROPOSED	4786.16	861.36		8.46	962.74
REACH 1	1925	50-YR	435	CROSSING_A_EXISTING	6065.70	862.03		9.21	1156.11
REACH 1	1925	50-YR	435	CROSSING_A_PROPOSED	6065.70	862.03		9.21	1156.11
REACH 1	1925	100-YR	435	CROSSING_A_EXISTING	7524.07	862.72		9.94	1363.00
REACH 1	1925	100-YR	435	CROSSING_A_PROPOSED	7524.07	862.72		9.94	1363.00
REACH 1	1490	25-YR	385	CROSSING_A_EXISTING	4786.16	858.84		8.49	929.10
REACH 1	1490	25-YR	385	CROSSING A PROPOSED	4786.16	858.84		8.49	929.10
REACH 1	1490	50-YR	385	CROSSING_A_EXISTING	6065.70	859.57		8.90	1136.54
REACH 1	1490 1490	50-YR 100-YR	385 385	CROSSING_A_PROPOSED	6065.70 7524.07	859.57 860.32		8.90 9.29	1136.54 1365.30
REACH 1	1490	100-1R 100-YR	385	CROSSING_A_EXISTING CROSSING_A_PROPOSED	7524.07	860.32		9.29	1365.30
KEACH 1	1490	100-1K	363	CROSSING_A_FROPOSED	7324.07	000.32		9.29	1303.30
REACH 1	1105	25-YR	56	CROSSING A EXISTING	4786.16	857.77		5.26	1566.41
REACH 1	1105	25-YR	56	CROSSING A PROPOSED	4786.16	857.77		5.26	1566.41
REACH 1	1105	50-YR	56	CROSSING A EXISTING	6065.70	858.70		5.30	1970.62
REACH 1	1105	50-YR	56	CROSSING A PROPOSED	6065.70	858.70		5.30	1970.62
REACH 1	1105	100-YR	56	CROSSING A EXISTING	7524.07	859.58		5.46	2365.74
REACH 1	1105	100-YR	56	CROSSING_A_PROPOSED	7524.07	859.58		5.46	2365.74
REACH 1	1049	25-YR	51	CROSSING_A_EXISTING	4786.16	856.46	854.25	6.33	1180.13
REACH 1	1049	25-YR	51	CROSSING_A_PROPOSED	4786.16	856.46	854.25	6.33	1180.13
REACH 1	1049	50-YR	51	CROSSING_A_EXISTING	6065.70	857.32	854.83	6.85	1395.52
REACH 1	1049	50-YR	51	CROSSING_A_PROPOSED	6065.70	857.32	854.83	6.85	1395.52
REACH 1	1049	100-YR	51	CROSSING_A_EXISTING	7524.07	858.03	855.40	7.62	1577.46
REACH 1	1049	100-YR	51	CROSSING_A_PROPOSED	7524.07	858.03	855.40	7.62	1577.46
REACH 1	998				BRIDGE				
REACH 1	947	25-YR	F1	CROSSING A EXISTING	4786.16	856.11		2.00	1428.31
REACH 1	947	25-1R 25-YR	51 51	CROSSING_A_EXISTING CROSSING A PROPOSED	4786.16	856.11		3.89 3.89	1428.31
REACH 1	947	50-YR	51	CROSSING_A_PROPOSED CROSSING A EXISTING	6065.70	856.93		4.36	1633.04
REACH 1	947	50-YR	51	CROSSING A PROPOSED	6065.70	856.93		4.36	1633.04
REACH 1	947	100-YR	51	CROSSING_A_EXISTING	7524.07	857.57		4.96	1792.57
REACH 1	947	100-YR	51	CROSSING_A_PROPOSED	7524.07	857.57		4.96	1792.57
REACH 1	777	25-YR	170	CROSSING_A_EXISTING	4786.16	853.96	853.96	10.89	776.16
REACH 1	777	25-YR	170	CROSSING_A_PROPOSED	4786.16	853.96	853.96	10.89	776.16
REACH 1	777	50-YR	170	CROSSING A EXISTING	6065.70	854.43	854.43	12.13	946.90
REACH 1	777	50-YR	170	CROSSING_A_PROPOSED	6065.70	854.43	854.43	12.13	946.90
REACH 1	777	100-YR	170	CROSSING_A_EXISTING	7524.07	855.26	855.26	12.10	1353.65
REACH 1	777	100-YR	170	CROSSING_A_PROPOSED	7524.07	855.26	855.26	12.10	1353.65
REACH 1	423	25-YR	354	CROSSING_A_EXISTING	4786.16	851.67	851.67	7.50	1023.05
REACH 1	423	25-YR	354	CROSSING_A_PROPOSED	4786.16	851.67	851.67	7.50	1023.05
REACH 1	423	50-YR	354	CROSSING_A_EXISTING	6065.70	851.86	851.86	8.22	1177.90
REACH 1	423	50-YR	354	CROSSING_A_PROPOSED	6065.70	851.86	851.86	8.22	1177.90
REACH 1	423 423	100-YR	354	CROSSING A PROPOSED	7524.07	852.12	852.10	8.56	1382.39
REACH 1	423	100-YR	354	CROSSING_A_PROPOSED	7524.07	852.12	852.10	8.56	1382.39
REACH 1	0	25-YR	423	CROSSING A EXISTING	4786.16	850.01	849.40	6.69	1393.02
REACH 1	0	25-TR 25-YR	423	CROSSING_A_EXISTING CROSSING A PROPOSED	4786.16	850.01	849.40	6.69	1393.02
REACH 1	0	50-YR	423	CROSSING A EXISTING	6065.70	850.42	849.74	6.93	1655.15
REACH 1	0	50-YR	423	CROSSING_A_PROPOSED	6065.70	850.42	849.74	6.93	1655.15
REACH 1	0	100-YR	423	CROSSING A EXISTING	7524.07	850.82	850.11	7.15	1912.68
REACH 1	0	100-YR	423	CROSSING_A_PROPOSED	7524.07	850.82	850.11	7.15	1912.68
			•				•	•	•

- NOTES:

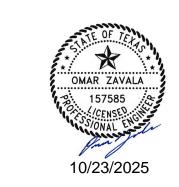
 1. REFER TO THE EXTERIOR DRAINAGE AREA MAP SHEET FOR THE DRAINAGE AREA ASSOCIATED TO THE BRIDGE CROSSING.
- 2. REFER TO THE HYDROLOGIC DATA SHEET FOR THE HYDROLOGIC PARAMETERS & CALCULATION ASSOCIATED TO THE BRIDGE CROSSING.
- 3. THE BRIDGE IS LOCATED AT STA 104+00.
- 4. THE BRIDGE IS LOCATED IN FEMA FLOOD ZONE A, MAP NUMBER 48491C0275E, EFFECTIVE DATE 09/26/2008.
- 5. HEC-RAS VERSION 6.4.1 IS UTILIZED FOR THE HYDRAULIC ANALYSIS.
- 6. THE PROJECT DATA/ WATER SURFACE ELEVATIONS (WSE) IS REFERENCED TO NAVD 1988 VERTICAL DATUM.
- 7. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DAVID ZWERNEMANN, P.E, CFM ON 07/23/2025:



DRAINAGE AREA: 6.54 SQ.MILES (4184.74 ACRES) BRIDGE LENGTH: 288.75 FT CN: 72.79 LAG TIME: 119.27 MIN TIME OF CONCENTRATION: 198.78 MIN

EXISTING BRIDGE INFORMATION

BRIDGE LENGTH: 330.83 FT LOW CHORD ELEVATION: 862.60 FT (NAVD 88) UNDER PRESSURE FLOW (YES/NO): NO







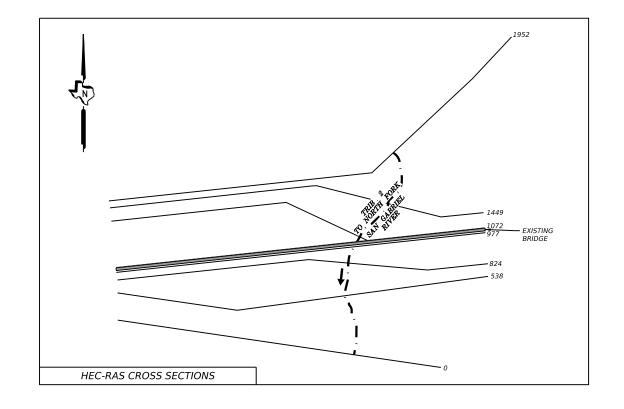
FM 3405

BRIDGE HYDRAULIC DATA CROSSING A

© TxD0T				SHEET 1 OF 1
<i>550:88:</i>		PROJECT NO.	SHEET NO.	
6	SE	E TITLE SHE	131	
STATE	DIST.		COUNTY	
TEXAS	AUS		WILLIAMSON	
CONT.	SECT.	JOB	HIGH	IWAY NO.
1755	03	010	FN	1 3405

HYDRAULIC CALCULATION HEC-RAS

- 1. REFER TO THE EXTERIOR DRAINAGE AREA MAP SHEET FOR THE DRAINAGE AREA ASSOCIATED TO THE BRIDGE CROSSING.
- 2. REFER TO THE HYDROLOGIC DATA SHEET FOR THE HYDROLOGIC PARAMETERS & CALCULATION ASSOCIATED TO THE BRIDGE CROSSING.
- 3. THE BRIDGE IS LOCATED AT STA 164+50.
- 4. THE BRIDGE IS LOCATED IN FEMA FLOOD ZONE A, MAP NUMBER 48491C0275E, EFFECTIVE DATE 09/26/2008.
- 5. HEC-RAS VERSION 6.4.1 IS UTILIZED FOR THE HYDRAULIC ANALYSIS.
- 6. THE PROJECT DATA/ WATER SURFACE ELEVATIONS (WSE) IS REFERENCED TO NAVD 1988 VERTICAL DATUM.
- 7. H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINSTRATOR DAVID ZWERNEMANN, P.E, CFM ON 07/23/2025.



HYDROLOGIC SUMMARY

DRAINAGE AREA: 6.33 SO.MILES (4049.45 ACRES) BRIDGE LENGTH: 288.75 FT

CN: 74.44

LAG TIME: 127.28 MIN TIME OF CONCENTRATION: 212.13 MIN

EXISTING BRIDGE INFORMATION

BRIDGE LENGTH: 288.75 FT NO. OF SPANS: 9

LOW CHORD ELEVATION: 839.33 FT (NAVD 88) UNDER PRESSURE FLOW (YES/NO): NO







FM 3405

BRIDGE HYDRAULIC DATA CROSSING E

© TxD0T				SHEET 1 OF 1	
<i>E5₽:R8:</i>		PROJECT NO.			
6	SEE TITLE SHEET			132	
STATE	DIST.		COUNTY		
TEXAS	AUS		WILLIAMSON		
CONT.	SECT.	JOB HIGHWAY NO.			
1755	0.2	010 5M 3405			

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 soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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):

1755-03-010

1.2 PROJECT LIMITS:

From: 0.104 MI E OF RONALD REAGAN BLVD

To: 0.0228 MI W OF GEORGETOWN HIGHTS DR.

1.3 PROJECT COORDINATES:

,(Long) -97.850082 BEGIN: (Lat) 30.704289

__,(Long)_ -97.828465 END: (Lat) 30.703325

1.4 TOTAL PROJECT AREA (Acres): 40.30

1.5 TOTAL AREA TO BE DISTURBED (Acres): 8.638

1.6 NATURE OF CONSTRUCTION ACTIVITY:

WIDEN LANE(S), CONSTRUCT PAVED SHOULDERS (1-4 FT.), INSTALL CONTINUOUS TURN LANE, PROFILE EDGELINE/CENTERLINE MARKINGS

1.7 MAJOR SOIL TYPES:

Soil Type	Description		
+			

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

туре	Sneet #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
- X Grading operations, excavation, and embankment
- X Excavate and prepare subgrade for proposed pavement widenina
- Remove existing culverts, safety end treatments (SETs)
- 🛮 Remove existing metal beam guard fence (MBGF), bridge rail
- X Install proposed pavement per plans
- 🗴 Install culverts, culvert extensions, SETs
- X Install mow strip, MBGF, bridge rail
- X Place flex base

Other:

- Rework slopes, grade ditches
- Blade windrowed material back across slopes
- X Revegetation of unpaved areas
- X Achieve site stabilization and remove sediment and erosion control measures

Other:			
_			

Other:			

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- X 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
- ▼ Transported soils from offsite vehicle tracking
- X Construction debris and waste from various construction
- X Contaminated water from excavation or dewatering pump-out
- X Sanitary waste from onsite restroom facilities
- ▼ Trash from various construction activities/receptacles
- X Long-term stockpiles of material and waste

□ Other: _			
	·	 	
☐ Other: _			

1.11 RECEIVING WATERS:

Tributaries

X

Other:

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

Classified Waterbody

_

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- X Post Construction Site Notice
- X Submit NOI/CSN to local MS4
- X Perform SWP3 inspections

Other:

- X Maintain SWP3 records and update to reflect daily operations
- X Complete and submit Notice of Termination to TCEQ
- 🛚 Maintain SWP3 records for 3 years

□ Other			
•			

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control

X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)

X Post Construction Site Notice

X Submit NOI/CSN to local MS4

X Maintain schedule of major construction activities

X Install, maintain and modify BMPs

X Complete and submit Notice of Termination to TCEQ

X Maintain SWP	3 records	for	3	years
□ Other:				

Other:		
Other:		

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

MS4 Entity



STORMWATER POLLUTION PREVENTION PLAN (SWP3)



* July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.		PROJECT NO.					
6		SEE TITLE SHEET					
STATE		STATE DIST.	COUNTY				
TEXA	S	AUS	WILL	IAMSON			
CONT.		SECT.	JOB	HIGHWAY NO.			
<i>175</i> :	55 03		010, ETC FM 34		05		

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
X □ Temporary Seeding□ X Permanent Planting, Sodding or Seeding
l
□ □ Biodegradable Erosion Control Logs X □ Rock Filter Dams/ Rock Check Dams
□ □ Vertical Tracking
□ □ Interceptor Swale
□ X 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 □ Powetering Controls
□ □ Dewatering Controls □ □ Inlet Protection
★ □ Rock Filter Dams/ Rock Check Dams
□ □ Sandbag Berms
□ □ Stabilized Construction Exit
□ □ Floating Turbidity Barrier
□ □ Vegetated Buffer Zones
🗴 🗆 Vegetated Filter Strips
□ □ 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
a state dance foot of otorago per dore 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:

Туре	Stati	ioning
	From	То

Refer to the Environmental 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
☐ Daily street sweeping
□ 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:

2.6 VEGETATED BUFFER ZONES:

Other:

Other:

Other: ___

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	Statio	ning
Туре	From	То

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 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

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE: Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.



STORMWATER POLLUTION **PREVENTION PLAN (SWP3)**



* July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.		SHEET NO.			
6		SEE TITLE SHEET			
STATE		STATE DIST.	COUNTY		
TEXA	S	AUS	WILLIAMSON		
CONT.		SECT.	JOB HIGHWAY NO.		٧0.
1755 03 010, ETC FM 34		05			

Stone Outlet Sediment Traps Sand Filter Systems

Grassy Swales

Sediment Basins

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.

Required Action No Action Required Action No.

2.

IV. VEGETATION RESOURCES

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

Required Action ☐ No Action Required

Action No

- 1. Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.
- 2. To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover.
- 3. The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- 4. The use of seed mix that contains seeds from only regional ecotype native
- 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. Contractors will be informed to avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
- 2. Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas.
- 3. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- 4. Project staging areas, stockpiles, temporary construction easements, and other project related sites should be situated in previously disturbed areas to avoid or minimize impacts to sensitive or unique habitats including intact native vegetation, floodplains, riparian corridors, wetlands, playa lakes, and habitat for wildlife species.

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.

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

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

of all product spills.

* 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)?

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)?

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

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 Actio
Action No	

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required

Required Action

- Project is located within the Edwards Aquifer Recharge Zone. A TCEQ approved contributing zone plan (CZP) is required before start of construction.
- 2. Comply with CZP and CZP approval letter.
- 3. Maintain copies of the CZP and CZP approval letter onsite or immediately available during construction.

LIST OF ABBREVIATIONS

BMP: Best Management Practice

CCP: Construction General Permit

DSHS: Texas Department of State Health Services

FHWA: Federal Highway Administration MOA: Memorandum of Agreement

Memorandum of Understanding

Municipal Separate Stormwater Sewer System MBTA: Migratory Bird Treaty Act NOT: Notice of Termination

NWP: Nationwide Permit NOI: Notice of Intent

Spill Prevention Control and Countermeasure Storm Water Pollution Prevention Plan Pre-Construction Notification

Project Specific Location Texas Commission on Environmental Quality TPDES: Texas Pollutant Discharge Elimination System

Texas Parks and Wildlife Department TxDOT: Texas Department of Transportation Threatened and Endangered Species

USACE: U.S. Army Corps of Engineers USFWS: U.S. Fish and Wildlife Service



ENVIRONMENTAL PERMITS. ISSUES AND COMMITMENTS

EPIC

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ℂTxDOT: February 2015	CONT	SECT	JOB		н	GHWAY
REVISIONS 12-12-2011 (DS)	1755	03	010		FM	3405
05-07-14 ADDED NOTE SECTION IV.	DIST		COUNTY			SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	AUS		WILLIAM	SON		187

— · · — EXISTING ROW

— PROP EDGE OF PAVEMENT

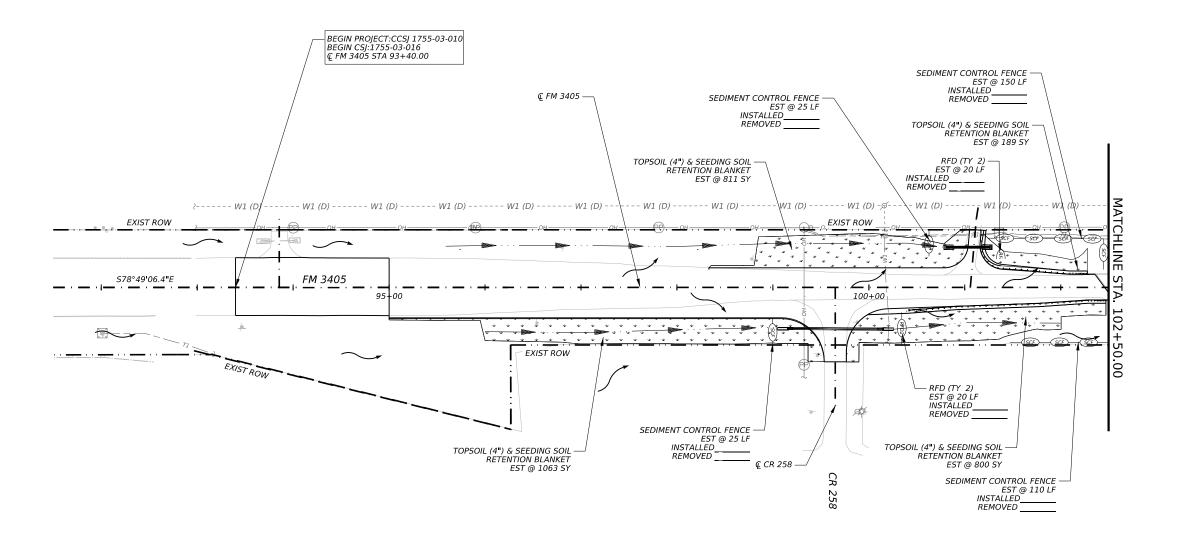
— RFDI)— ROCK FILTER DAM (TY1)

— RFD2— ROCK FILTER DAM (TY2)

— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET







4630 N Loop 1604 West, Suite 307 San Antonio, TX 78249



FM 3405

SWP3 LAYOUTS

STA 93+40.00 TO STA 102+50.00

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F5P:R8:	PROJECT NO.			SHEET NO.
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— PROP EDGE OF PAVEMENT

— RFDI)— ROCK FILTER DAM (TY1)

— RFD2 — ROCK FILTER DAM (TY2)

— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET





4630 N Loop 1604 West, Suite 307 San Antonio, TX 78249

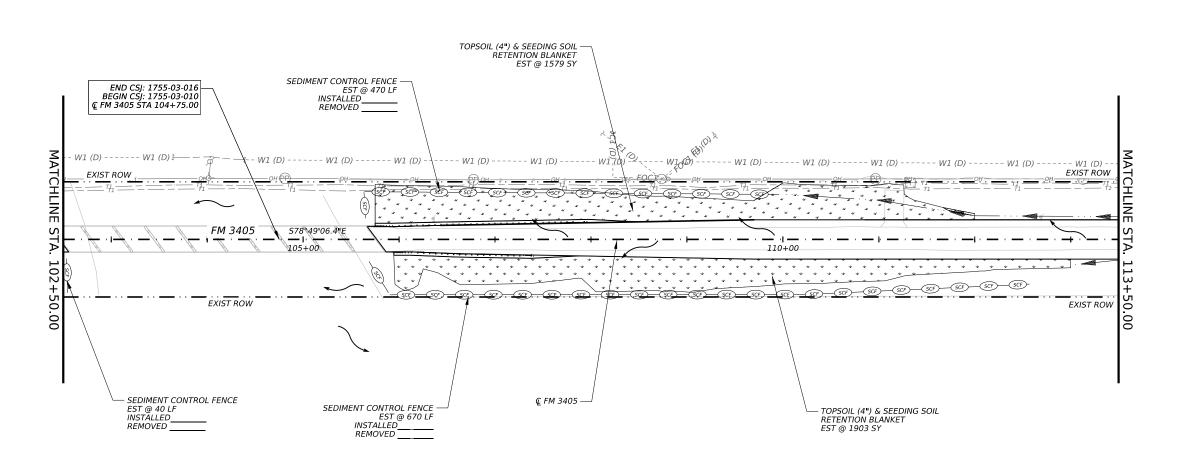
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SW3P LEGEND

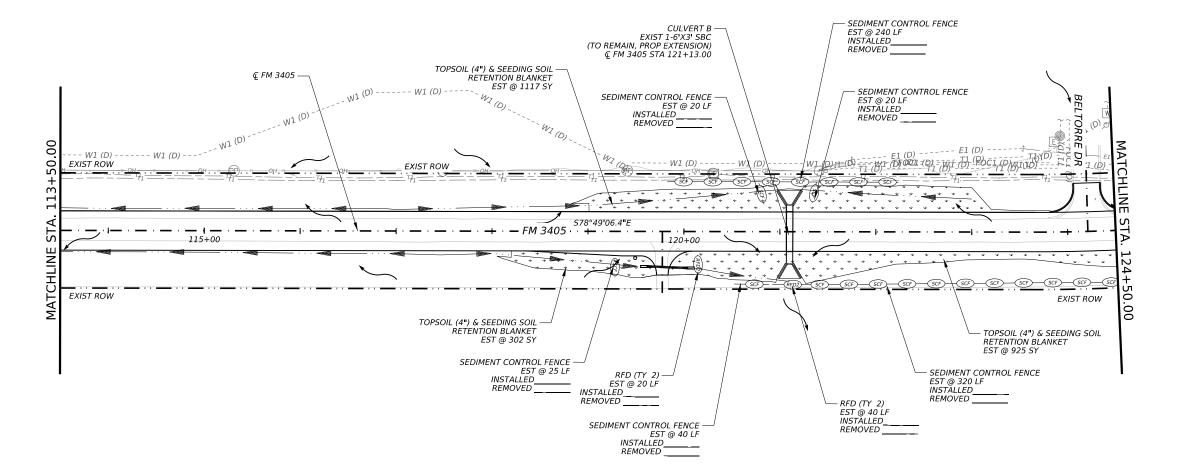
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— RFD2— ROCK FILTER DAM (TY2)

— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET







4630 N Loop 1604 West, Suite 307 San Antonio, TX 78249

HIGHWAY NO.



FM 3405

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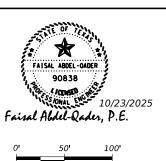
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— RFD2 — ROCK FILTER DAM (TY2)

— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET





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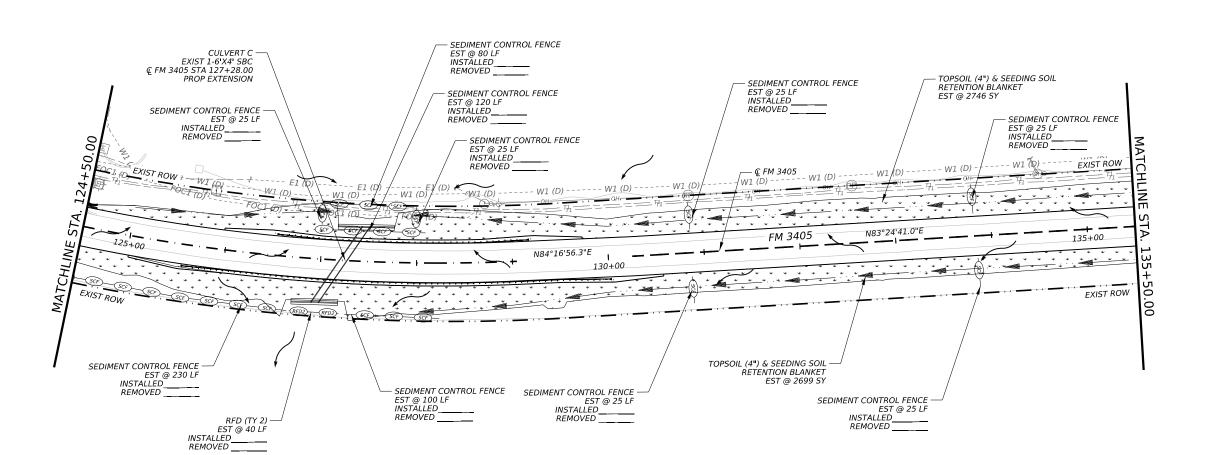
Texas Department of Transportation

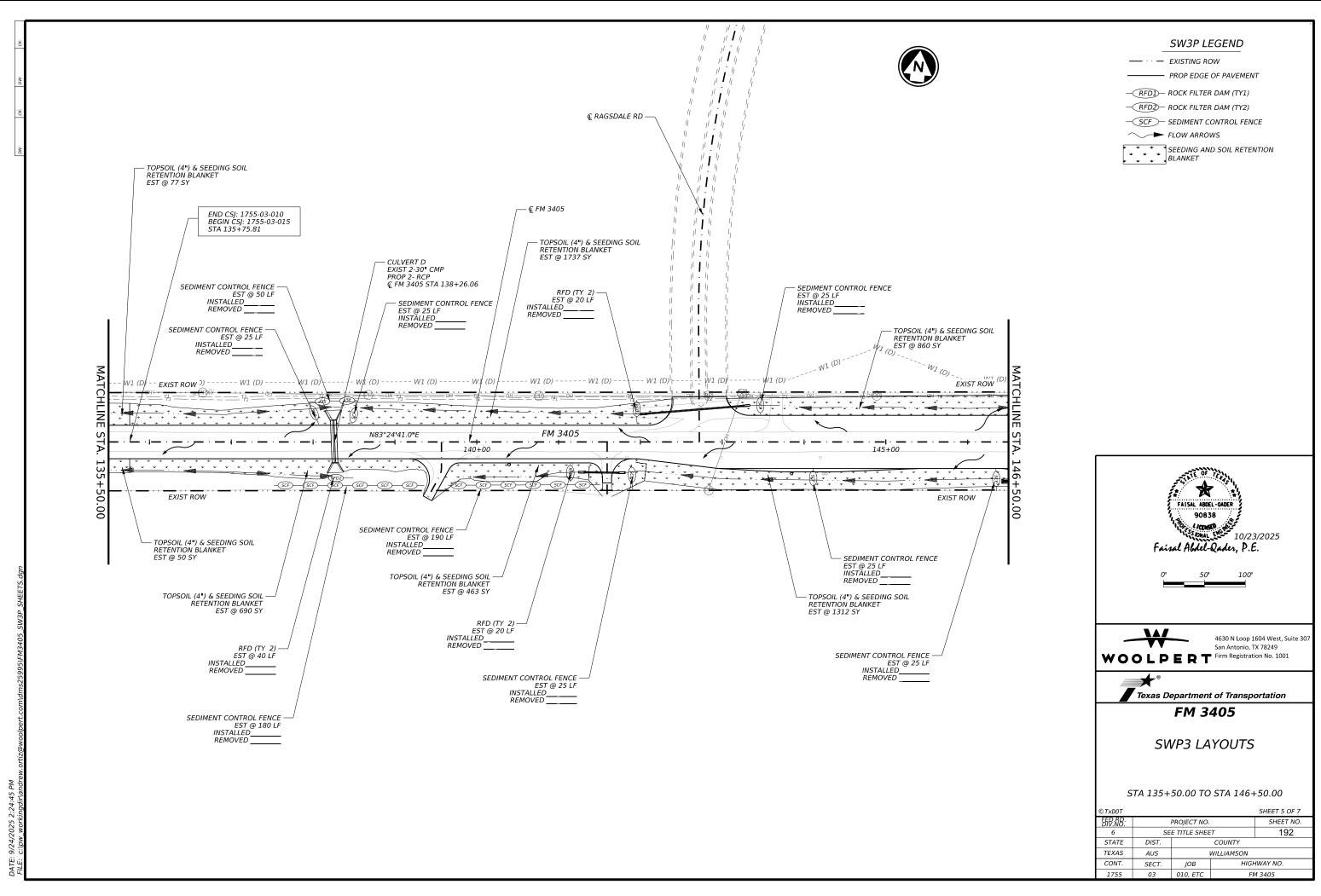
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— RFD2— ROCK FILTER DAM (TY2)

— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET





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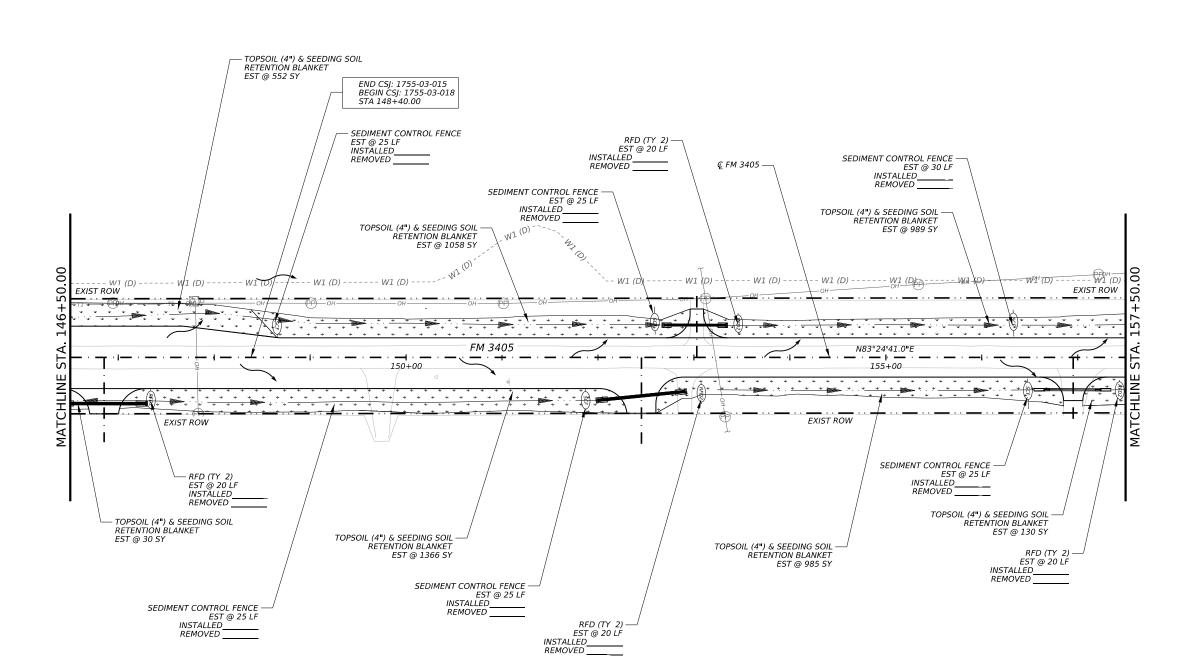
Texas Department of Transportation

FM 3405

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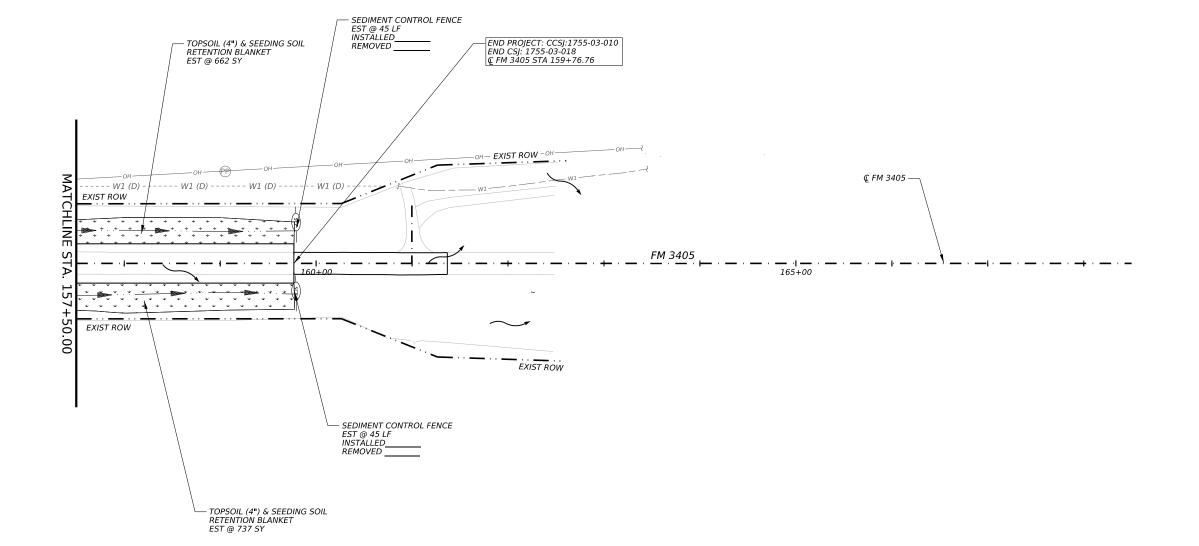
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— SCF — SEDIMENT CONTROL FENCE

FLOW ARROWS

SEEDING AND SOIL RETENTION BLANKET









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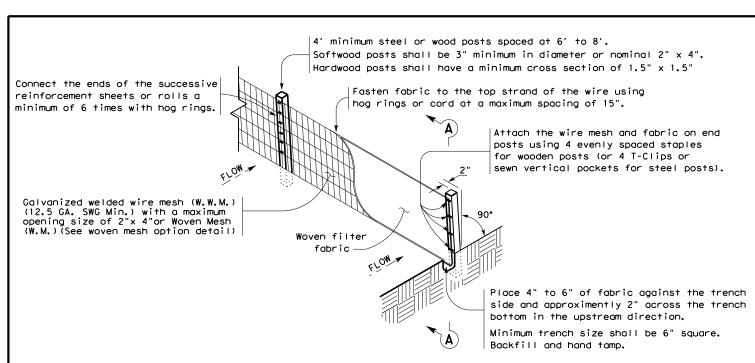


FM 3405

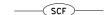
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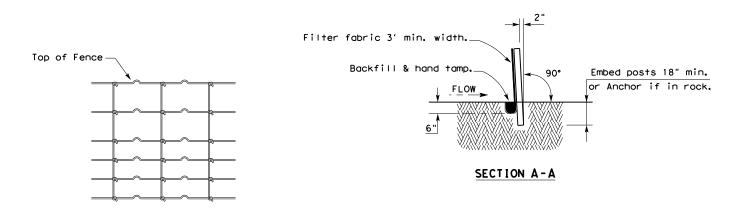
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TEMPORARY SEDIMENT CONTROL FENCE





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.

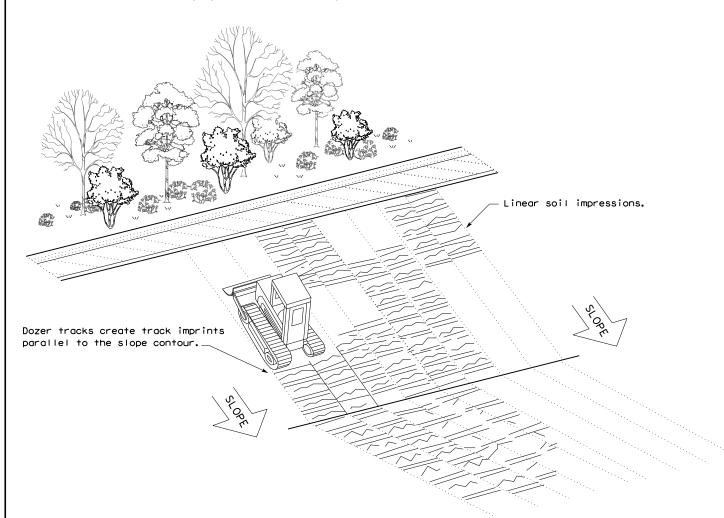
Sediment control fence should be sized to filter a maximum flow through rate of 100 ${\sf GPM/FT}^2$. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

LEGEND

Sediment Control Fence

GENERAL NOTES

- 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



Standard

TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES
FENCE & VERTICAL TRACKING

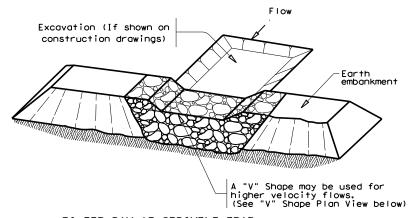
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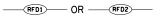
TYPE 4 (SACK GABIONS)

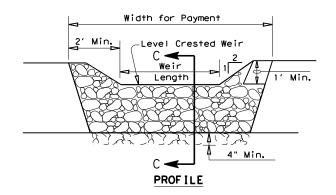
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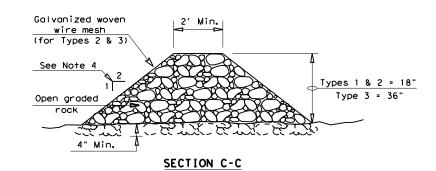
SECTION A-A



FILTER DAM AT SEDIMENT TRAP







ROCK FILTER DAM USAGE GUIDELINES

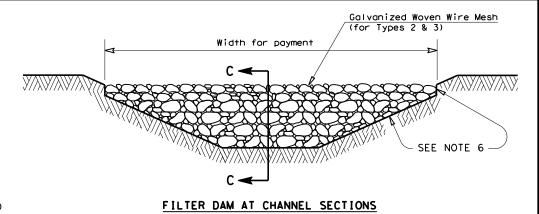
Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 $\mbox{CPM/FT}^2$ of cross sectional area. A 2 year storm frequency may be used to calculate 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 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.



GENERAL NOTES

- 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.
- 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.
- Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
- 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

PLAN SHEET LEGEND





Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

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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 approval 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



Austin District Standard

TCEQ REQUIREMENTS FOR THE CONTRIBUTING ZONE OF THE EDWARDS AQUIFER

(DISTURBING 5 OR MORE ACRES)

TCF0-C7-19(AUS)

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REVISIONS 10/14: REQUIREMENTS AND ADDRESS	1755	03	010	F	FM 3405	
UPDATED 21/16: REQUIREMENTS UPDATED	DIST		COUNTY		SHEET NO.	
24/19: UPDATED RELEASE YEAR	AUS		WILLIAMSON		197	

Attachment H - Inspection, Maintenance, Repair, and Retrofit Plan

Highway: FM 3405 CSJ 1755-03-010

Limits: FM 3405 from 0.348 mi east of Ronald Reagan Blvd to 0.228 mi west of Georgetown **Heights Drive Williamson County**

These maintenance guidelines were prepared at the request of the Texas Commission on Environmental Quality (TCEO) with regard to their approval of a Contributing Zone Plan for the above referenced project. These quidelines apply to the portions of the project that are subject to the Edwards Aquifer Rules.

Pest management: Any vegetated areas that have noxious vegetation, insects or other pests will be remedied with the minimum amount of a 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 include the areas of grassy swales, will be moved by contract. The cutting height is usually 5-7 inches for all areas.

Inspection cycles: Maintenance forces will review roadways and roadsides on a regular basis, most of which are visited within a weekly cycle. Drainage ditches and structures are inspected after large storms with consideration for any damage to grass cover, litter accumulation, or erosion. 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 a priority basis.

<u>Debris and litter removal</u>: 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 an outside contractor. Areas documented as trouble spots are scheduled on a priority basis.

Sediment removal: The removal or accumulated sediment will occur before it adversely affects the intended performance of any drainage design. Sedimentation or excessive deposition of silt should not normally occur in grassy swale areas. However, they will be monitored for spills, sediment or any other deleterious material that may originate from other areas beyond the State right-of-way. Records and diaries are maintained for the ongoing activities performed by state forces and their contractors.

Repair and Retrofit: If minor repairs are needed to water quality controls, their components, or parts, it can be done with maintenance or contracted personnel. Major repairs or retrofits however, must come through the Design section or consultants for engineering data and structural approval.

The TxDOT Maintenance Supervisor may be contacted for questions that pertain to the maintenance of this roadway. He has approved these guidelines and signed below.

Mr. Douglas Havins _____ Douglas C. Havins _____ Date__ 11-19-2025 **Maintenance Supervisor TxDOT**

Georgetown Area Office

2727 South Austin Ave Georgetown, Texas 78626 (512) 930-4700

Attachment J: Measures for Minimizing Surface Stream Contamination

The following temporary BMPs and measures will prevent pollution of surface water that originates onsite or flows off-site including pollution caused by contaminated stormwater runoff from the site:

- Temporary sediment control fence
- Temporary Rock Filter Dam
- Stabilized construction entrance and exit
- Construction sequencing to reduce disturbed area
- Temporary vegetative stabilization

Details for quantities, placement, maintenance and inspection of the temporary BMPs and practices are shown in the construction plan set in SWP3 and EPIC sheets.

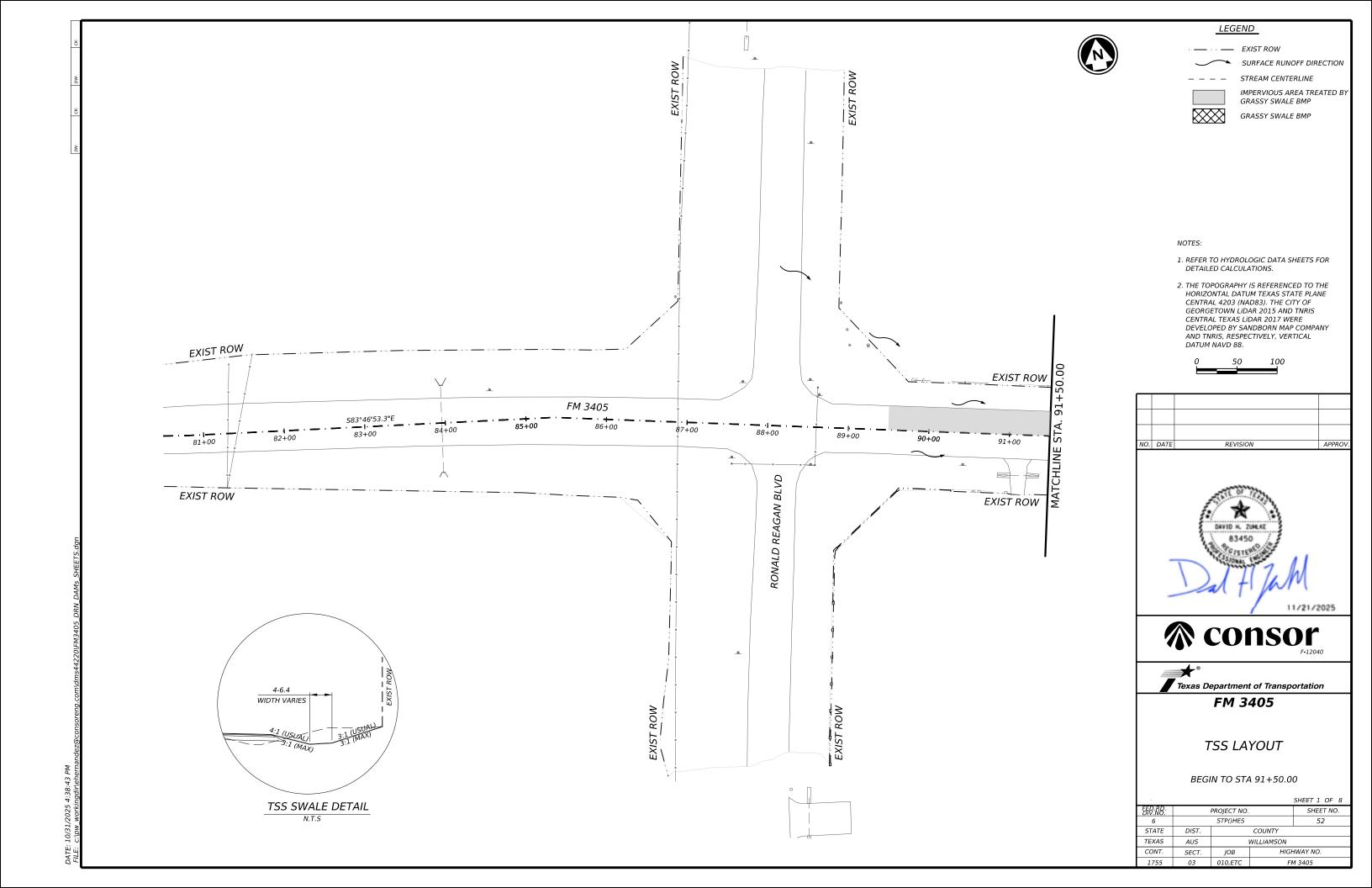
Attachment K: Volume and Character of Stormwater

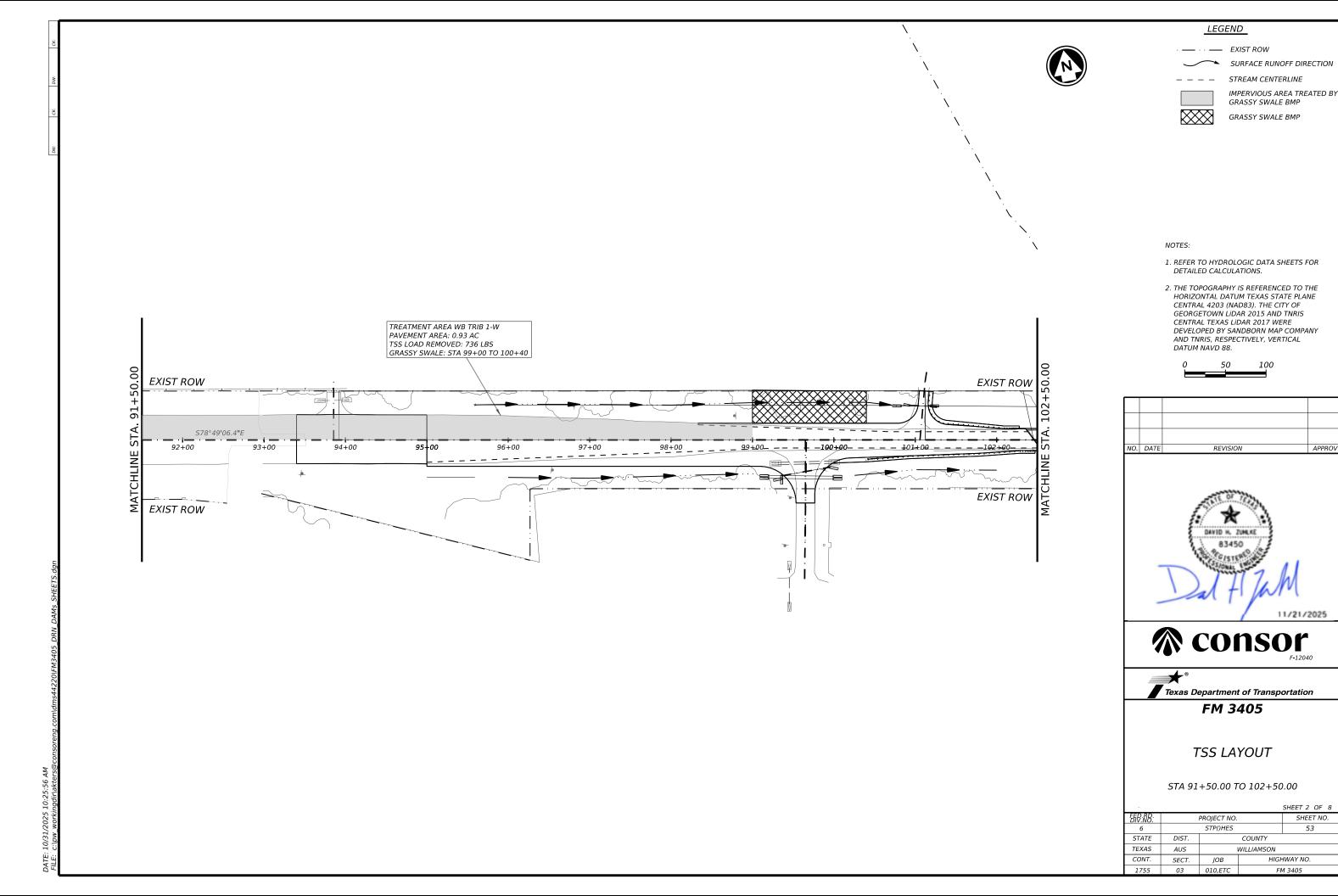
The proposed project is located within the Edwards Aquifer Contributing Zone. The project outfalls to Tributary 1 & 2 To North Fork San Gabriel River. The project has off-site drainage area flowing thought the project limits as well as on-site (interior) drainage areas.

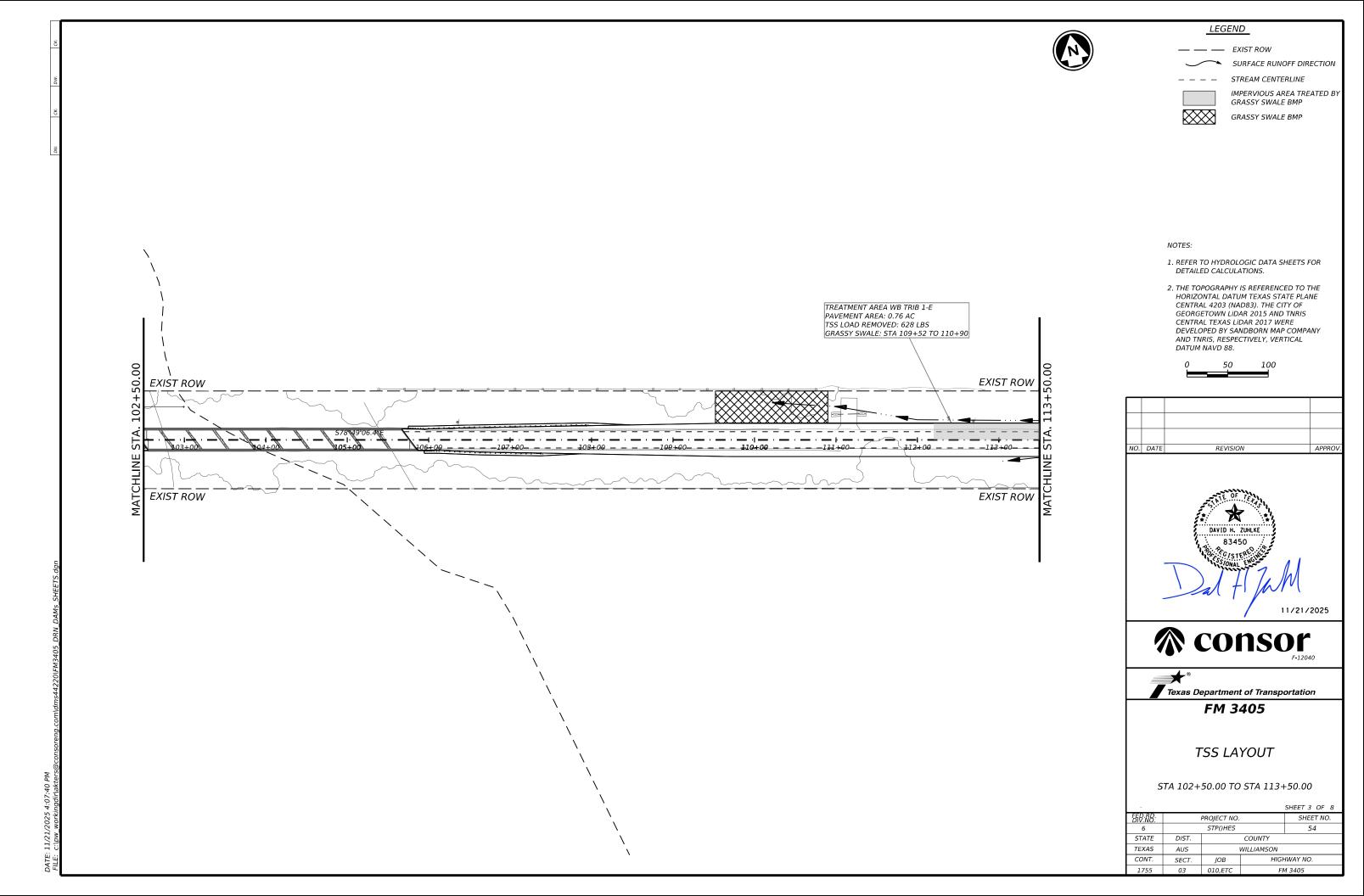
Grassy swales to provide permanent BMP for TSS removal. Flow calculations for the 2-, 5-, 10-,25-, 50-, 100- and 500-year storm events for existing and proposed conditions may be reviewed in the construction plans on pages titled "Hydrologic Data Sheet for Existing Interior Drainage Areas" and Hydrologic Data Sheet for Proposed Interior Drainage Areas".

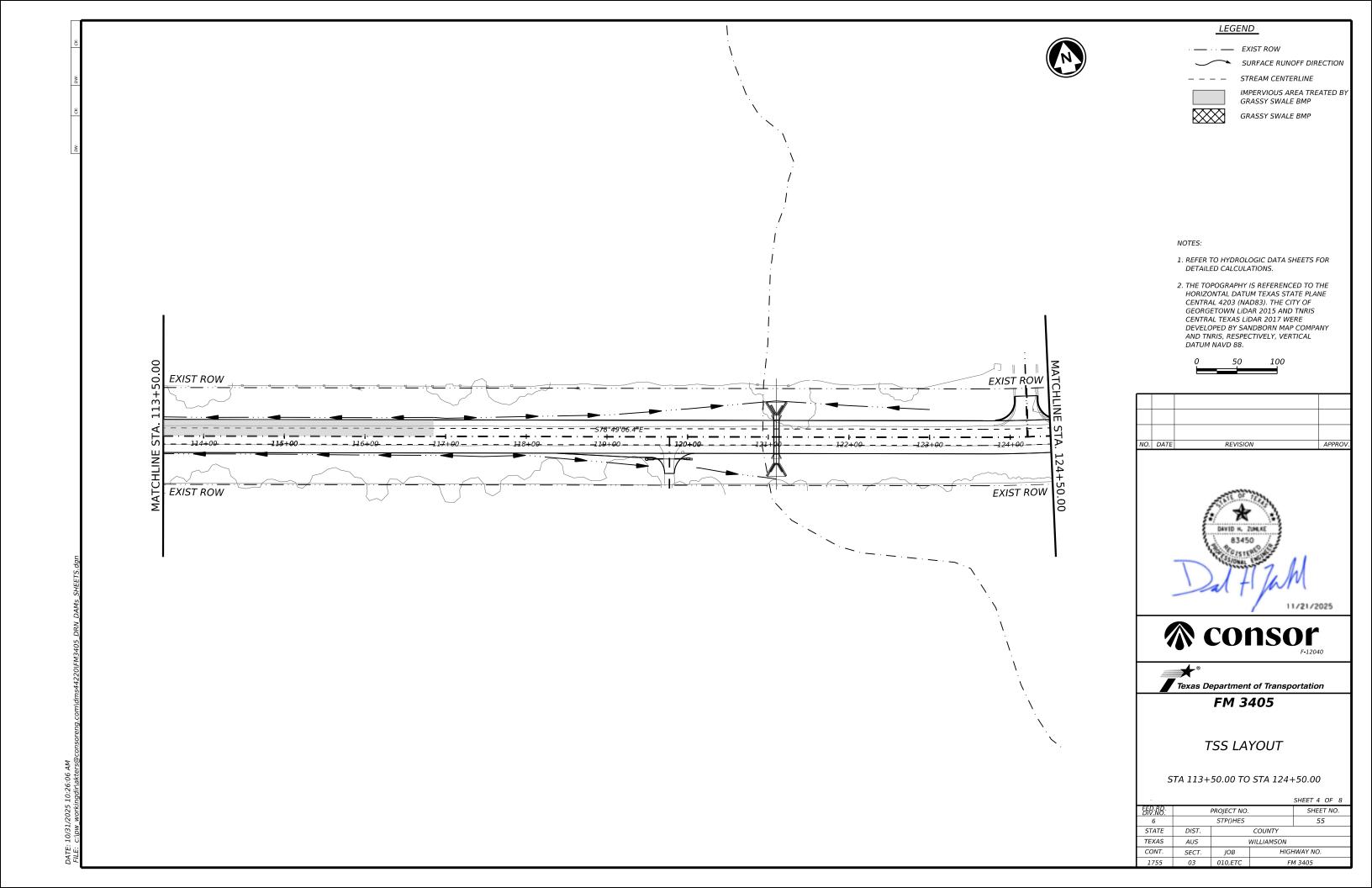
Pre-construction runoff coefficient: 0.48

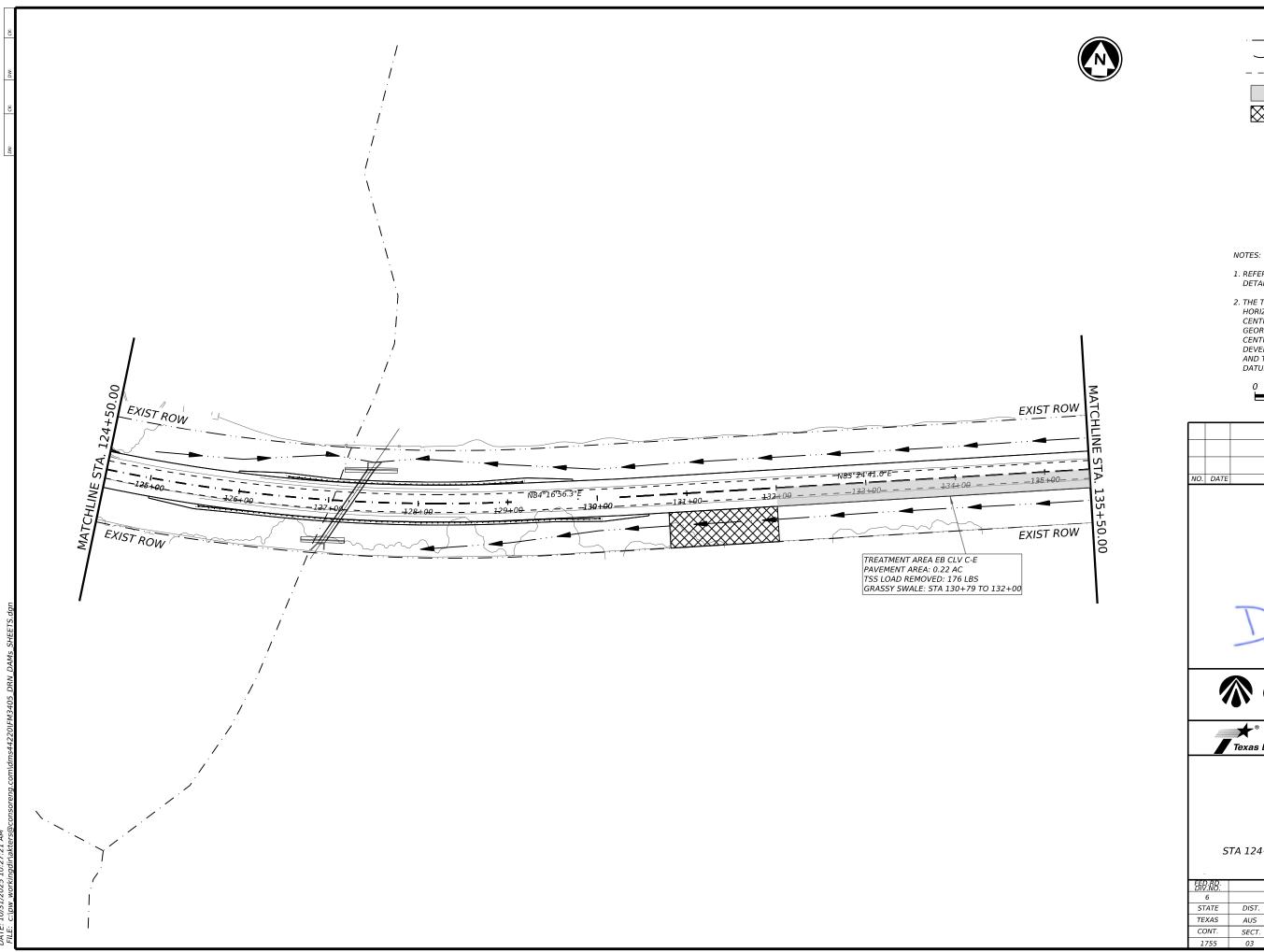
Post-construction runoff coefficient: 0.55











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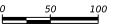
SURFACE RUNOFF DIRECTION STREAM CENTERLINE

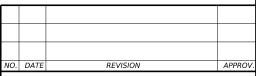


IMPERVIOUS AREA TREATED BY

GRASSY SWALE BMP GRASSY SWALE BMP

- 1. REFER TO HYDROLOGIC DATA SHEETS FOR DETAILED CALCULATIONS.
- 2. THE TOPOGRAPHY IS REFERENCED TO THE HORIZONTAL DATUM TEXAS STATE PLANE CENTRAL 4203 (NAD83). THE CITY OF GEORGETOWN LIDAR 2015 AND TNRIS CENTRAL TEXAS LIDAR 2017 WERE DEVELOPED BY SANDBORN MAP COMPANY AND TNRIS, RESPECTIVELY, VERTICAL DATUM NAVD 88.









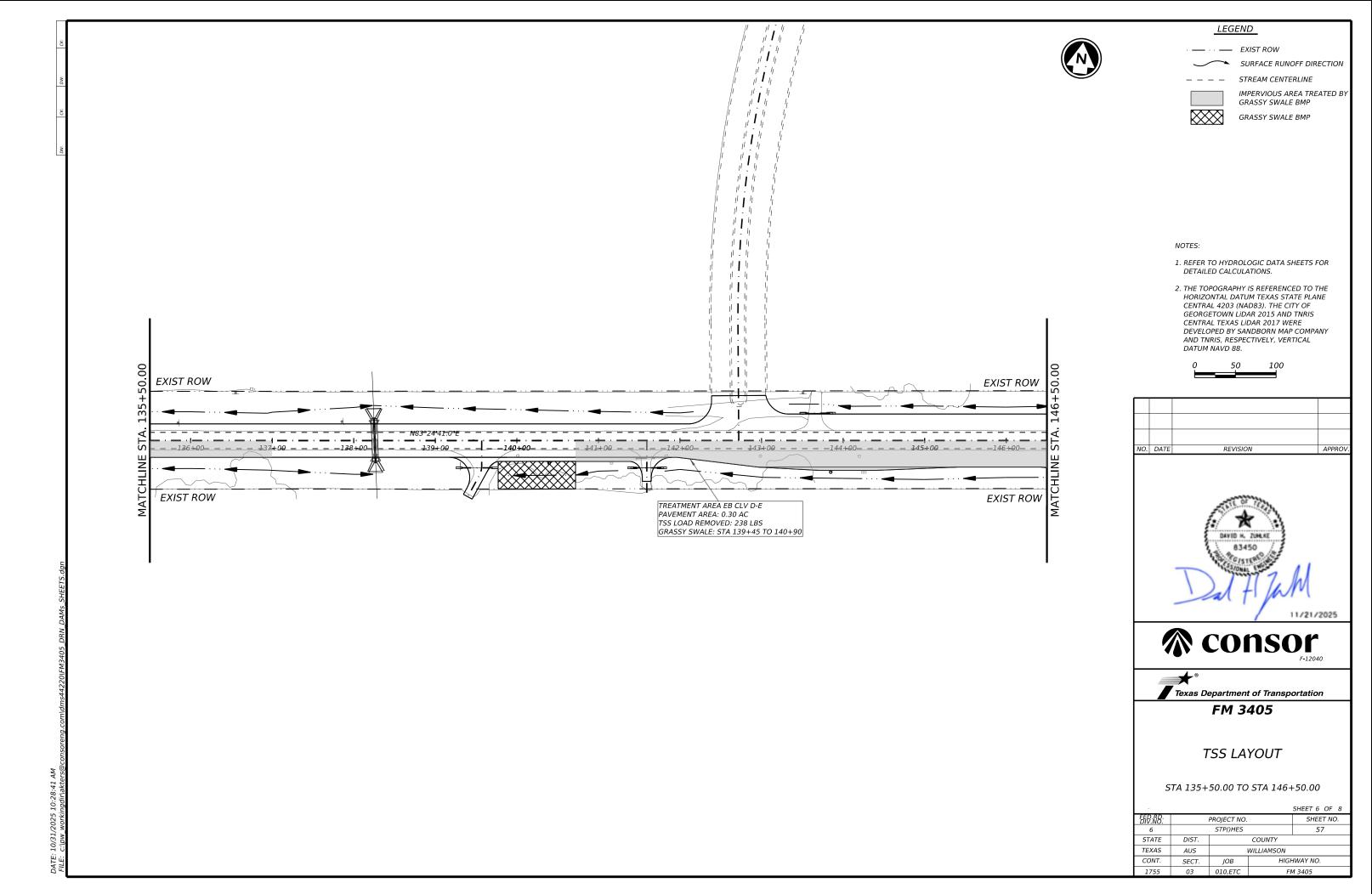


FM 3405

TSS LAYOUT

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SURFACE RUNOFF DIRECTION

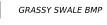


STREAM CENTERLINE



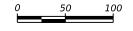
IMPERVIOUS AREA TREATED BY GRASSY SWALE BMP

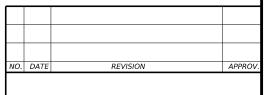




NOTES:

- 1. REFER TO HYDROLOGIC DATA SHEETS FOR DETAILED CALCULATIONS.
- 2. THE TOPOGRAPHY IS REFERENCED TO THE HORIZONTAL DATUM TEXAS STATE PLANE CENTRAL 4203 (NAD83). THE CITY OF GEORGETOWN LIDAR 2015 AND TNRIS CENTRAL TEXAS LIDAR 2017 WERE DEVELOPED BY SANDBORN MAP COMPANY AND TNRIS, RESPECTIVELY, VERTICAL DATUM NAVD 88.









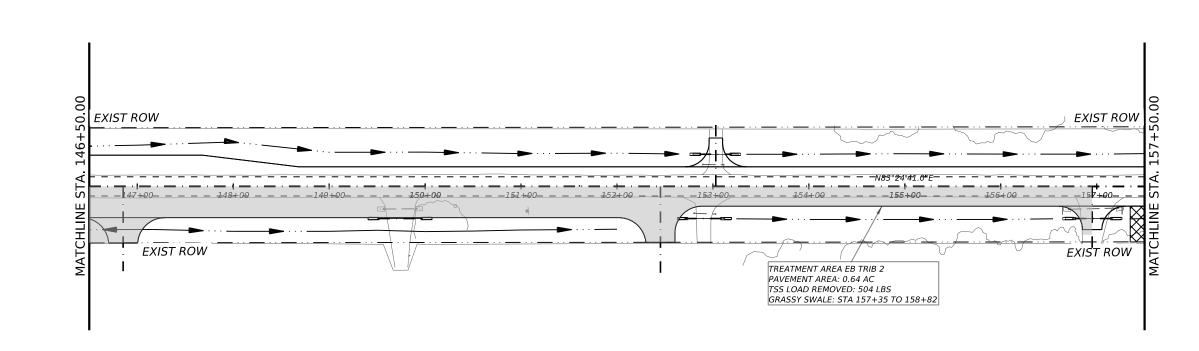


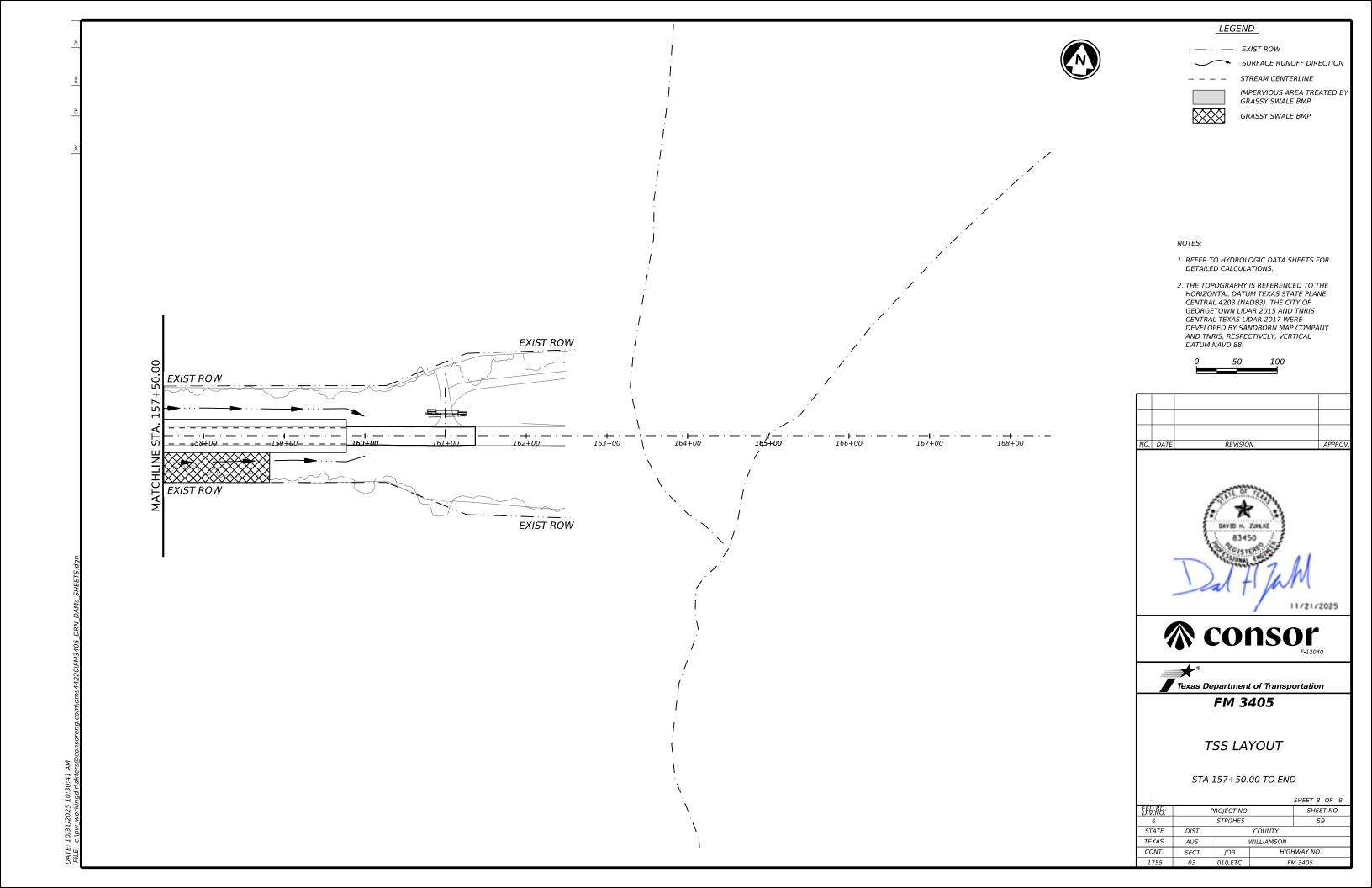
FM 3405

TSS LAYOUT

STA 146+50.00 TO STA 157+50.00

				SHEET 7 OF 0				
5P:R8:		PROJECT NO.		SHEET NO.				
6		STP()HES		58				
STATE	DIST.		COUNTY					
TEXAS	AUS		WILLIAMSON					
CONT.	SECT.	JOB	HIGHWAY NO.					
1755	03	010 FTC	FM 3405					





	TCEQ REQUIREMENTS FOR THE EDWARDS AQUIFER CONTRIBUTING ZONE 1755-03-010													
BEGIN STA	END STA	END STA DISTANCE EXIST PVMT PROP PVMT PRE DEV POST DEV AVG ANNUAL TSS REMOVAL												
	WIDTH WIDTH IMPERVIOUS IMPERVIOUS PRECIPITATION													
	AREA AREA													
FT FT FT AC AC IN LBS								LBS						
93+40.00	159+76.76	6636.76	93+40.00 159+76.76 6636.76 20-60 27-63 5.19 7.71 32 2176											

	BMP PROVIDED FOR THE EDWARDS AQUIFER CONTRIBUTING ZONE											
ABATEMENT	ABATEMENT BEGIN STA END STA EB/WB IMPERVIOUS PROPOSED BMP AVG ANNUAL MIN SWALE											
AREA ID				AREA	BMP	EFFECIENCY	PRECIPITATION	LENGTH	REMOVED			
				AC		%	IN	FT	L_R			
EB CLV C-E	132+00	137+05	EB	0.22	Grassy Swale	70	32	121	176			
EB CLV D-E	140+90	147+10	EB	0.30	Grassy Swale	70	32	145	238			
EB TRIB 2	147+10	156+92	EB	0.64	Grassy Swale	70	32	145	504			
WB TRB 1-W	89+45	99+00	WB	0.93	Grassy Swale	70	32	139	736			
WB TRB 1 -E	112+20	116+82	WB	0.76	Grassy Swale	70	32	138	628			
TOTAL			_	_		_	-		2282			



TSS Removal Calculations 04-20-2009

Project Name: FM 3405 Date Prepared: 9/30/2025

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

Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

Pages 3-27 to 3-30

 $L_{\text{M TOTAL PROJECT}} = \text{Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$

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 = Total project area included in plan 19.76 acres Predevelopment impervious area within the limits of the plan Total post-development impervious area within the limits of the plan

Total post-development impervious cover fraction inches

> 2176 lbs. L_{M TOTAL PROJECT} =

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

Number of drainage basins / outfalls areas leaving the plan area = 18

$\underline{\textbf{2. Drainage Basin Parameters (This information should be provided for each basin):}}\\$

Drainage Basin/Outfall Area No. = EB CLV CE

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area = acres 0.32 L_{M THIS BASIN} =

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale Removal efficiency = 70 percent

Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips 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_P = (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 = 0.69 acres 0.22 acres $A_P =$ 0.47 acres 176 lbs

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

Desired $L_{M THIS BASIN} =$ 176

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 = 4.00 inches Post Development Runoff Coefficient = 0.27 On-site Water Quality Volume = 2682 cubic feet

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

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

> Storage for Sediment = 536

Total Capture Volume (required water quality volume(s) x 1.20) = cubic feet DAVID H. ZUHLKE 11/21/2025

Designed as Required in RG-348 Pages 3-51 to 3-54 15. Grassy Swales

Design parameters for the swale:

0.69 acres 0.22 acres 1.1 in/hr 0.0175 ft/ft 4 0.33 ft Drainage Area to be Treated by the Swale = A = Impervious Cover in Drainage Area = Rainfall intensity = i = Swale Slope =
Side Slope (z) =
Design Water Depth = y =
Weighted Runoff Coefficient = C = 0.46 A_{CS} = cross-sectional area of flow in Swale = 0.74 sf

 $P_{W} = \text{Wetted Perimeter} = \\ R_{H} = \text{hydraulic radius of flow cross-section} = A_{Cs}/P_{W} = \\ n = \text{Manning's roughness coefficient} = \\ \end{cases}$ 3.66 feet 0.20 feet 0.2

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

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

 $b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy =$ 0.94 feet

> Q = CiA = 0.35 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.47 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 140.91 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 = 0.35 cfs

Manning's Equation Q = Swale Width= 1.01 cfs 6.00 ft Error 1 = -0.66

Instructions are provided to the right (green comments).

Flow Velocity 0.47 ft/s Minimum Length = 140.91 ft

Instructions are provided to the right (blue comm

Design Width = Error 2 = -0.37

4 ft 0.72 cfs 0.33 ft 0.41 cfs 121.58 ft Design Width =
Design Discharge =
Design Depth =
Flow Velocity =
Minimum Length =

TSS Removal Calculations 04-20-2009

Project Name: FM 3405 Date Prepared: 9/30/2025

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1. The Required Load Reduction for the total project:

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

 $L_{\text{M TOTAL PROJECT}} = \text{Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$

A_N = Net increase in impervious area for the project P = Average annual precipitation, inches

Calculations from RG-348

Site Data: Determine Required Load Removal Based on the Entire Project

County = Total project area included in plan 19.76 acres Predevelopment impervious area within the limits of the plan Total post-development impervious area within the limits of the plan

Total post-development impervious cover fraction inches

> 2176 lbs. L_{M TOTAL PROJECT} =

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

Number of drainage basins / outfalls areas leaving the plan area = 18

$\underline{\textbf{2. Drainage Basin Parameters (This information should be provided for each basin):}}\\$

Drainage Basin/Outfall Area No. = EB CLV D-E

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area = 0.30 acres L_{M THIS BASIN} =

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale Removal efficiency = 70 percent

Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips 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_P = (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

0.76 A_C = acres 0.30 acres $A_P =$ 0.46 acres 238 lbs

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

Desired $L_{M THIS BASIN} =$ 238

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 = 4.00 inches Post Development Runoff Coefficient = On-site Water Quality Volume = 3359 cubic feet

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

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

> Storage for Sediment = 672

Total Capture Volume (required water quality volume(s) x 1.20) = cubic feet 11/21/2025

DAVID H. ZUHLKE

Designed as Required in RG-348 Pages 3-51 to 3-54 15. Grassy Swales

Design parameters for the swale:

0.76 acres 0.30 acres 1.1 in/hr 0.025 ft/ft 4 0.33 ft Drainage Area to be Treated by the Swale = A = Impervious Cover in Drainage Area = Rainfall intensity = i = Swale Slope =
Side Slope (z) =
Design Water Depth = y =
Weighted Runoff Coefficient = C = 0.49 A_{CS} = cross-sectional area of flow in Swale = 0.73 sf

 $P_{W} = \text{Wetted Perimeter} = \\ R_{H} = \text{hydraulic radius of flow cross-section} = A_{Cs}/P_{W} = \\ n = \text{Manning's roughness coefficient} = \\ \end{cases}$ 3.62 feet 0.20 feet 0.2

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

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

 $b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy =$ 0.90 feet

> Q = CiA = 0.41 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.56 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 168.42 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 = 0.41 cfs

Manning's Equation Q = Swale Width= 1.21 cfs 6.00 ft Error 1 = -0.80

Instructions are provided to the right (green comments).

Flow Velocity 0.56 ft/s Minimum Length = 168.42 ft

Instructions are provided to the right (blue comm

4 ft 0.86 cfs 0.33 ft 0.48 cfs Design Width = Error 2 = -0.45

Design Width =
Design Discharge =
Design Depth =
Flow Velocity =
Minimum Length = 145.31 ft

TSS Removal Calculations 04-20-2009

Project Name: FM 3405 Date Prepared: 9/30/2025

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1. The Required Load Reduction for the total project: Calculations from RG-348

Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

Pages 3-27 to 3-30

 $L_{\text{M TOTAL PROJECT}} = \text{Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$

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 = Total project area included in plan 19.76 acres Predevelopment impervious area within the limits of the plan Total post-development impervious area within the limits of the plan

Total post-development impervious cover fraction inches

> 2176 lbs. L_{M TOTAL PROJECT} =

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

Number of drainage basins / outfalls areas leaving the plan area = 18

$\underline{\textbf{2. Drainage Basin Parameters (This information should be provided for each basin):}}\\$

Drainage Basin/Outfall Area No. = EB TRIB 2

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area = acres 0.49 L_{M THIS BASIN} =

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale Removal efficiency = 70 percent

Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Wet Vault

11/21/2025

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_P = (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

1.31 A_C = acres 0.64 acres $A_P =$ 0.67 acres 504 lbs

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

Desired $L_{M THIS BASIN} =$ 504

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 = 4.00 inches Post Development Runoff Coefficient = 0.35 On-site Water Quality Volume = cubic feet

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

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

> Storage for Sediment = 1336

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

Designed as Required in RG-348 Pages 3-51 to 3-54 15. Grassy Swales

Design parameters for the swale:

1.31 acres 0.64 acres 1.1 in/hr 0.025 ft/ft 4 0.33 ft Drainage Area to be Treated by the Swale = A = Impervious Cover in Drainage Area = Rainfall intensity = i = Swale Slope =
Side Slope (z) =
Design Water Depth = y =
Weighted Runoff Coefficient = C = 0.53 A_{CS} = cross-sectional area of flow in Swale = 1.36 sf

 $P_{W} = \text{Wetted Perimeter} = \\ R_{H} = \text{hydraulic radius of flow cross-section} = A_{CS}/P_{W} = \\ n = \text{Manning's roughness coefficient} = \\ \end{cases}$ 5.53 feet 0.25 feet 0.2

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

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

 $b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy =$ 2.80 feet

> Q = CiA = 0.76 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.56 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 168.42 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 = 0.76 cfs

1.21 cfs 6.00 ft Manning's Equation Q = Swale Width= Error 1 = -0.44

Instructions are provided to the right (green comments).

Flow Velocity 0.56 ft/s Minimum Length = 168.42 ft

Instructions are provided to the right (blue comm

Design Width = Error 2 = -0.10

4 ft 0.86 cfs 0.33 ft 0.48 cfs Design Width =
Design Discharge =
Design Depth =
Flow Velocity =
Minimum Length = 145.31 ft

TSS Removal Calculations 04-20-2009

Project Name: FM 3405 Date Prepared: 9/30/2025

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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 x P)

 $L_{\text{M TOTAL PROJECT}} = \text{ Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$

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 = Total project area included in plan 19.76 acres Predevelopment impervious area within the limits of the plan Total post-development impervious area within the limits of the plan

Total post-development impervious cover fraction inches

> 2176 lbs. L_{M TOTAL PROJECT} =

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

Number of drainage basins / outfalls areas leaving the plan area = 18

$\underline{\textbf{2. Drainage Basin Parameters (This information should be provided for each basin):}}\\$

Drainage Basin/Outfall Area No. = WB TRIB 1-W

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area = acres 0.43 L_{M THIS BASIN} =

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale Removal efficiency = 70 percent

Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Wet Vault

11/21/2025

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_P = (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 = 2.15 acres 0.93 acres $A_P =$ 1.22 acres 736 lbs

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

Desired $L_{M THIS BASIN} =$ 736

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 = 4.00 inches Post Development Runoff Coefficient = 0.32 On-site Water Quality Volume = 10073 cubic feet

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

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

> Storage for Sediment = 2015

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

Designed as Required in RG-348 Pages 3-51 to 3-54 15. Grassy Swales

Design parameters for the swale:

2.15 acres 0.93 acres 1.1 in/hr 0.0211 ft/ft 4 0.33 ft Drainage Area to be Treated by the Swale = A = Impervious Cover in Drainage Area = Rainfall intensity = i = Swale Slope =
Side Slope (z) =
Design Water Depth = y =
Weighted Runoff Coefficient = C = 0.51 A_{CS} = cross-sectional area of flow in Swale = 2.33 sf

 $P_{W} = \text{Wetted Perimeter} = \\ R_{H} = \text{hydraulic radius of flow cross-section} = A_{Cs}/P_{W} = \\ n = \text{Manning's roughness coefficient} = \\ \end{cases}$ 8.45 feet 0.28 feet 0.2

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

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

 $b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy =$ 5.73 feet

> Q = CiA = 1.20 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.52 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 154.73 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 = 1.20 cfs

1.11 cfs 6.00 ft Manning's Equation Q = Swale Width= Error 1 = 0.09

Instructions are provided to the right (green comments).

Flow Velocity 0.52 ft/s 154.73 ft Minimum Length =

Instructions are provided to the right (blue comm

Design Width = Error 2 = 0.00

6.4 ft 1.20 cfs 0.33 ft 0.47 cfs 139.61 ft Design Width =
Design Discharge =
Design Depth =
Flow Velocity =
Minimum Length =

TSS Removal Calculations 04-20-2009

Project Name: FM 3405 Date Prepared: 9/30/2025

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Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

Pages 3-27 to 3-30

 $L_{\text{M TOTAL PROJECT}} = \text{ Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$

A_N = Net increase in impervious area for the project P = Average annual precipitation, inches

Calculations from RG-348

Site Data: Determine Required Load Removal Based on the Entire Project

County = Total project area included in plan 19.76 acres Predevelopment impervious area within the limits of the plan Total post-development impervious area within the limits of the plan

Total post-development impervious cover fraction inches

> 2176 lbs. L_{M TOTAL PROJECT} =

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

Number of drainage basins / outfalls areas leaving the plan area = 178

$\underline{\textbf{2. Drainage Basin Parameters (This information should be provided for each basin):}}\\$

Drainage Basin/Outfall Area No. = WB TRIB 1-E

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area = acres 0.37 L_{M THIS BASIN} =

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Grassy Swale Removal efficiency = 70 percent

Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Wet Vault

11/21/2025

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_P = (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

0.81 A_C = acres 0.81 acres $A_P =$ 0.00 acres 628 lbs

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

Desired $L_{M THIS BASIN} =$ 628

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 = 4.00 inches Post Development Runoff Coefficient = 0.82 On-site Water Quality Volume = cubic feet

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

Off-site area draining to BMP = acres Off-site Impervious cover draining to BMP = 0.51 acres Impervious cover draining to BMP =
Impervious fraction of off-site area =
Off-site Runoff Coefficient =
Off-site Water Quality Volume = 0.40 0.30 cubic feet 5706

> Storage for Sediment = 3061

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

Designed as Required in RG-348 Pages 3-51 to 3-54 15. Grassy Swales

Design parameters for the swale:

2.07 acres 0.76 acres 1.1 in/hr 0.0227 ft/ft 4 0.33 ft Drainage Area to be Treated by the Swale = A = Impervious Cover in Drainage Area = Rainfall intensity = i = Swale Slope =
Side Slope (z) =
Design Water Depth = y =
Weighted Runoff Coefficient = C = 0.48 A_{CS} = cross-sectional area of flow in Swale = 2.05 sf

 $P_{W} = \text{Wetted Perimeter} = \\ R_{H} = \text{hydraulic radius of flow cross-section} = A_{Cs}/P_{W} = \\ n = \text{Manning's roughness coefficient} = \\ \end{cases}$ 7.60 feet 0.27 feet 0.2

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

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

 $b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy =$ 4.88 feet

> Q = CiA = 1.09 cfs

To calculate the flow velocity in the swale:

V (Velocity of Flow in the swale) = Q/A_{CS} = 0.53 ft/sec

To calculate the resulting swale length:

L = Minimum Swale Length = V (ft/sec) * 300 (sec) = 160.48 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 = 1.09 cfs

Manning's Equation Q = Swale Width= 1.15 cfs 6.00 ft Error 1 = -0.06

Instructions are provided to the right (green comments).

Flow Velocity 0.53 ft/s 160.48 ft Minimum Length =

Instructions are provided to the right (blue comm

Design Width = Error 2 = 0.27

1/4/1900 ft 0.82 cfs 0.33 ft 0.46 cfs 138.46 ft Design Width =
Design Discharge =
Design Depth =
Flow Velocity =
Minimum Length =

Agent Authorization Form

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

I	Lorena Roque Martinez, P.G.	
	Print Name	
	Austin District Environmental Project Planner	
	Title - Owner/President/Other	
of	Texas Department of Transportation	
	Corporation/Partnership/Entity Name	
have authorized	David Zuhlke. P.E.	
	Print Name of Agent/Engineer	
of	Consor Engineering	
	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	11/19/202 Date	<u></u>
THE STATE OF§		
County of§		
BEFORE ME, the undersigned auth to me to be the person whose cam me that (s)he executed same for the	ne is subscribed to the foregoing in	nstrument, and acknowledged to
GIVEN under my hand and seal of	office on this day of	·
	NOTARY PUBLIC	
	Typed or Printed Name of Noter	
	MY COMMISSION EXPIRES: _	
		1/2/20 M/1/20
		8 h/
		12/20



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.*)

Renewal (Core Dato Form should be submitted with the renewal form) Other	New Permit, Registration or Auth	orization (Core Data Form	should be subm	tted with	the progi	ram application.)			
CN 600916712	Renewal (Core Data Form should	be submitted with the ren	ewal form)		0	ther			
ECTION 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 on Individual, print last name first: eg: Doe, John) Inew Customer, enter previous Customer below: Individual	2. Customer Reference Number (ij	-			3. Reg	gulated Entity Ref	ference	Number (if is	ssued)
A. General Customer Information S. Effective Date for Customer Information Updates (mm/dd/yyyy)									
New Customer	SECTION II: Custo	mer Inform	<u>ation</u>						
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: 7. TX SOS/CPA Filling Number	4. General Customer Information	5. Effective D	Date for Custon	ner Infor	mation	Updates (mm/dd/	уууу)		
(SOS) or Texas Comptroller of Public Accounts (CPA). 6. Customer Legal Name (If an individual, print lost name first: eg: Doe, John) If new Customer, enter previous Customer below: 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:		- ·		mptroller			ity Own	ership	
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John) If new Customer, enter previous Customer below: T. TX SOS/CPA Filing Number 8. TX State Tax ID (11 digits) 9. Federal Tax ID (9 digits) 10. DUNS Number (If applicable)			tomatically ba	sed on w	hat is c	urrent and active	with th	ne Texas Secr	retary of State
7. TX SOS/CPA Filing Number 8. TX State Tax ID (11 digits) 9. Federal Tax ID applicable) 11. Type of Customer:									
11. Type of Customer:	6. Customer Legal Name (If an indiv	vidual, print last name firs	t: eg: Doe, John)			<u>If new Customer,</u>	enter pre	evious Custom	<u>er below:</u>
11. Type of Customer:									
Government: City County Federal Local State Other Sole Proprietorship Other: 12. Number of Employees 0-20	7. TX SOS/CPA Filing Number	8. TX State Ta	ax ID (11 digits)				D		Number (if
Government: City County Federal Local State Other Sole Proprietorship Other: 12. Number of Employees 0-20	11. Type of Customer:	Corporation			Individ	lual	Partne	∟ ership: ☐ Gen	eral 🗌 Limited
0-20	Government: City County Fe	ederal 🗌 Local 🔲 State [Other		Sole Pi	roprietorship	Ot	her:	
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following Owner	12. Number of Employees					13. Independer	itly Ow	ned and Ope	erated?
Operator	0-20 21-100 101-250	251-500 501 a	nd higher			☐ Yes	☐ No		
Occupational Licensee Responsible Party VCP/BSA Applicant 2727 SOUTH AUSTIN AVE 15. Mailing Address: City Georgetown State TX ZIP 78627 ZIP + 4	14. Customer Role (Proposed or Act	rual) – as it relates to the R	Regulated Entity I	isted on th	is form.	Please check one of	the follo	owing	
15. Mailing Address: City Georgetown State TX ZIP 78627 ZIP + 4		_	•	:		Other:			
City Georgetown State TX ZIP 78627 ZIP + 4		AVE							
	Address:			1					
16. Country Mailing Information (if outside USA) 17. E-Mail Address (if applicable)	City Georgetov	vn	State TX		ZIP	78627		ZIP + 4	
	16. Country Mailing Information (if outside USA)		17. E	-Mail Ac	ddress (if applicable	e)		

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				() -			
Regul	ated Ent	ity Inform	mation					
tity Inform	ation (If 'New Reg	gulated Entity" is sele	ected, a new p	ermit applicatior	is also required.)			
Update to	Regulated Entity	Name Update	to Regulated	Entity Information	on			
ne submitte	ed may be upda	ted, in order to mo	eet TCEQ Coi	e Data Standa	rds (removal of o	organization	al endings such	
e (Enter nan	ne of the site wher	re the regulated action	on is taking plo	ice.)				
ı to GT Heigh	nts CSJ 1755-03-01	.0						
City		State		ZIP		ZIP + 4		
	1			<u> </u>				
	If no Stre	et Address is prov	ided, fields 2	5-28 are requi	red.			
ENA 240E fo	and Danield Daniel	a ta CT llaiabta						
FIVI 3405 Tr	om konald keagar	i to GT Heights						
				St	ate	Nea	rest ZIP Code	
				TX		7860	2	
-	-	-		Oata Standards	. (Geocoding of t	the Physical	Address may be	
titude (N) In Decimal: 30.704689		28. Longit		ongitude (W) I	ude (W) In Decimal:		-97.85135	
Minutes		Seconds	Degre	ees	Minutes		Seconds	
30. Secondary SIC Code		Code	31. Filliary NAICS Code		32. Secondary NAICS Code			
(4 digits)		(5 or 6 digits)		(5 or 6 d	(5 or 6 digits)			
usiness of	this entity? (D	o not reneat the SIC	or NAICS descr	intion)				
u3111C33 01	tins energy: (D	o not repeat the Sic (or NAICS descr	iption.y				
							T	
City		State		ZIP		ZIP + 4		
							I	
		37. Extension o	r Code	38. Fax	Number (if applice	able)		
	city Information Update to the submitted and to GT Height City FM 3405 from the submitted and the sub	Lity Information (If 'New Regard	Litty Information (If 'New Regulated Entity" is selected by Information (If 'New Regulated Entity" is selected as the submitted may be updated, in order to make the submitted may be updated, in order to make the site where the regulated action to GT Heights CSJ 1755-03-010 City	tity Information (If 'New Regulated Entity" is selected, a new producted Entity Information (If 'New Regulated Entity" is selected, a new producted Incompleted to Regulated Entity Name	Update to Regulated Entity Name Update to Regulated Entity Information in Esubmitted may be updated, in order to meet TCEQ Core Data Standards to GT Heights CSJ 1755-03-010 It to GT Heights CSJ 1755-03-010 If no Street Address is provided, fields 25-28 are requirated and may be added/updated to meet TCEQ Core Data Standards is where none have been provided or to gain accuracy). It is graphed and may be added/updated to meet TCEQ Core Data Standards is where none have been provided or to gain accuracy). It is a 30.704689 Seconds Degrees 30. Secondary SIC Code (5 or 6 digits) usiness of this entity? (Do not repeat the SIC or NAICS description.)	itity Information (If 'New Regulated Entity" is selected, a new permit application is also required.) Update to Regulated Entity Name	tity information (if 'New Regulated Entity' is selected, a new permit application is also required.) Update to Regulated Entity Name Update to Regulated Entity Information	

19. Extension or Code

18. Telephone Number

20. Fax Number (if applicable)

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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 ☐ New Source OSSF Petroleum Storage Tank ☐ PWS Review Air Sludge Storm Water ☐ Title V Air ☐ Tires Used Oil ☐ Voluntary Cleanup ■ Wastewater ■ Wastewater Agriculture ■ Water Rights Other: **SECTION IV: Preparer Information** 40. Name: David Zuhlke 41. Title: Tech Practice Mgr,Water Resources 42. Telephone Number 43. Ext./Code 44. Fax Number 45. E-Mail Address (713) 299-5271 N/A -N/A david.zuhlke@consoreng.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: Job Title: **Consor Engineering** Tech Practice Mgr,Water Resources Name (In Print): David Zuhlke Phone: (713)299-5271 Signature: David Zuhlke Date: 11/21/2025

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