WATER POLLUTION ABATEMENT PLAN

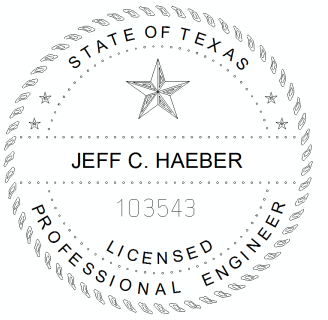
FOR

EVANS ROAD PHASE I

IN

SAN ANTONIO, TEXAS 78259

PREPARED FOR
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT
100 W Houston St
15th Floor
SAN ANTONIO, TEXAS 78283



04/25/2025

APRIL 2025

QUIDDITY ENGINEERING

912 South Capital Of Texas Hwy, Suite 300
Austin, Texas 78746
Tel: 512.441.9493
Fax: 512.445.2286

912 South Capital of Texas Hwy, Suite 300
Austin, Texas 78746
Tel: 512.441.9493
Fax: 512.445.2286

April 25, 2025

Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, Texas 78753

Re: Water Pollution Abatement Plan
Evans Road Phase I
San Antonio, Texas

To whom it may concern:

On behalf of our client, City of San Antonio Public Works Department, we are pleased to submit this Water Pollution Abatement Plan for your consideration. Please find enclosed the following items for your review:

1. Edwards Aquifer Application Cover Page (TCEQ-20705)
2. General Information Form (TCEQ-0587)
3. Geologic Assessment Form (TCEQ-0585)
4. Water Pollution Abatement Plan Application Form (TCEQ-0584)
5. Temporary Stormwater Section (TCEQ-0602)
6. Permanent Stormwater Section (TCEQ-0600)
7. Agent Authorization Form (TCEQ-0599)
8. Application Fee Form (TCEQ-0574)
9. Core Data Form (TCEQ-10400)

If you have any questions about any of the items included in this submittal, please call.

Sincerely,

Jeff C. Haeber, P.E.

Water Pollution Abatement Plan

FOR

EVANS ROAD PHASE I

TABLE OF CONTENTS

DESCRIPTION

Edwards Aquifer Application Cover Page (TCEQ-20705)

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

1. 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: **Evans Road Improvements**							**2. Regulated Entity No.:**		
3. Customer Name: City of San Antonio							**4. Customer No.: 600130652**		
5. Project Type: **(Please circle/check one)**	New		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential				**8. Site (acres):**		9.61
9. Application Fee:	$5,000		**10. Permanent BMP(s):**					Stormceptor Vegetative Filter Strip	
11. SCS (Linear Ft.):			**12. AST/UST (No. Tanks):**						
13. County:	Bexar		**14. Watershed:**					Salado Creek	

Application Distribution

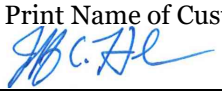
Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which 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.)	___	___	___
Region (1 req.)	___	___	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer ___Hays Trinity ___Plum Creek	___Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___Austin ___Buda ___Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	___Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

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

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. Jeff C. Haeber, PE
Print Name of Customer/Authorized Agent  04/25/2025
Signature of Customer/Authorized Agent Date

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

General Information Form

(TCEQ-0587)

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (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. This **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Jeff C. Haeber, PE

Date: 04/25/2025

Signature of Customer/Agent:

Project Information

1. Regulated Entity Name: Evans Road Phase I
2. County: Bexar
3. Stream Basin: Salado Creek
4. Groundwater Conservation District (If applicable): Edwards Aquifer Authority, Trinity-Glen Rose
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

   ☒ WPAP
   ☐ SCS
   ☐ Modification
   ☐ AST

☐ UST ☐ Exception Request

7. Customer (Applicant):

Contact Person: Sean Strong
Entity: City of San Antonio Public Works Department
Mailing Address: P.O. Box 839966
City, State: San Antonio, Texas Zip: 78283-3966
Telephone: (210) 207-8037 FAX: (210) 207-7196
Email Address: sean.strong@sanantonio.gov

8. Agent/Representative (If any):

Contact Person: Jeff C. Haeber, PE
Entity: Quiddity Engineering, LLC
Mailing Address: 912 South Capital Of Texas HWY, Suite 300
City, State: Austin, TX Zip: 78746
Telephone: (512) 441-9493 FAX: _____
Email Address: JHaeber@quiddity.com

9. Project Location:

☒ The project site is located inside the city limits of San Antonio.
☐ The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
☐ The project site is not located within any city's limits or ETJ.

10. ☒ The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

The main project limits consist of both the eastbound and westbound directions of Evans Road between Roan Park and Masonwood Drive/Caliza Drive. An incidential area includes East Elm Creek (175 LF downstream Evans Road to 80 LF upstream Evans Road. The site is in the City of San Antonio city limits and Bexar County.

11. ☒ **Attachment A – Road Map**. A road map showing directions to and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

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

☒ Project site boundaries.
☒ USGS Quadrangle Name(s).
☒ Boundaries of the Recharge Zone (and Transition Zone, if applicable).
☒ Drainage path from the project site to the boundary of the Recharge Zone.

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

    ☒ Survey staking will be completed by this date: 9/2/25

14. ☒ **Attachment C – Project Description**. Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:

    ☒ Area of the site
    ☒ Offsite areas
    ☒ Impervious cover
    ☒ Permanent BMP(s)
    ☒ Proposed site use
    ☒ Site history
    ☒ Previous development
    ☒ Area(s) to be demolished

15. Existing project site conditions are noted below:

    ☐ Existing commercial site
    ☐ Existing industrial site
    ☐ Existing residential site
    ☒ Existing paved and/or unpaved roads
    ☐ Undeveloped (Cleared)
    ☒ Undeveloped (Undisturbed/Uncleared)
    ☐ Other: _____

Prohibited Activities

16. ☒ I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

    (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);

    (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;

    (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;

    (4) The use of sewage holding tanks as parts of organized collection systems; and

    (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).

    (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17. ☒ I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:

(1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);

(2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and

(3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

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

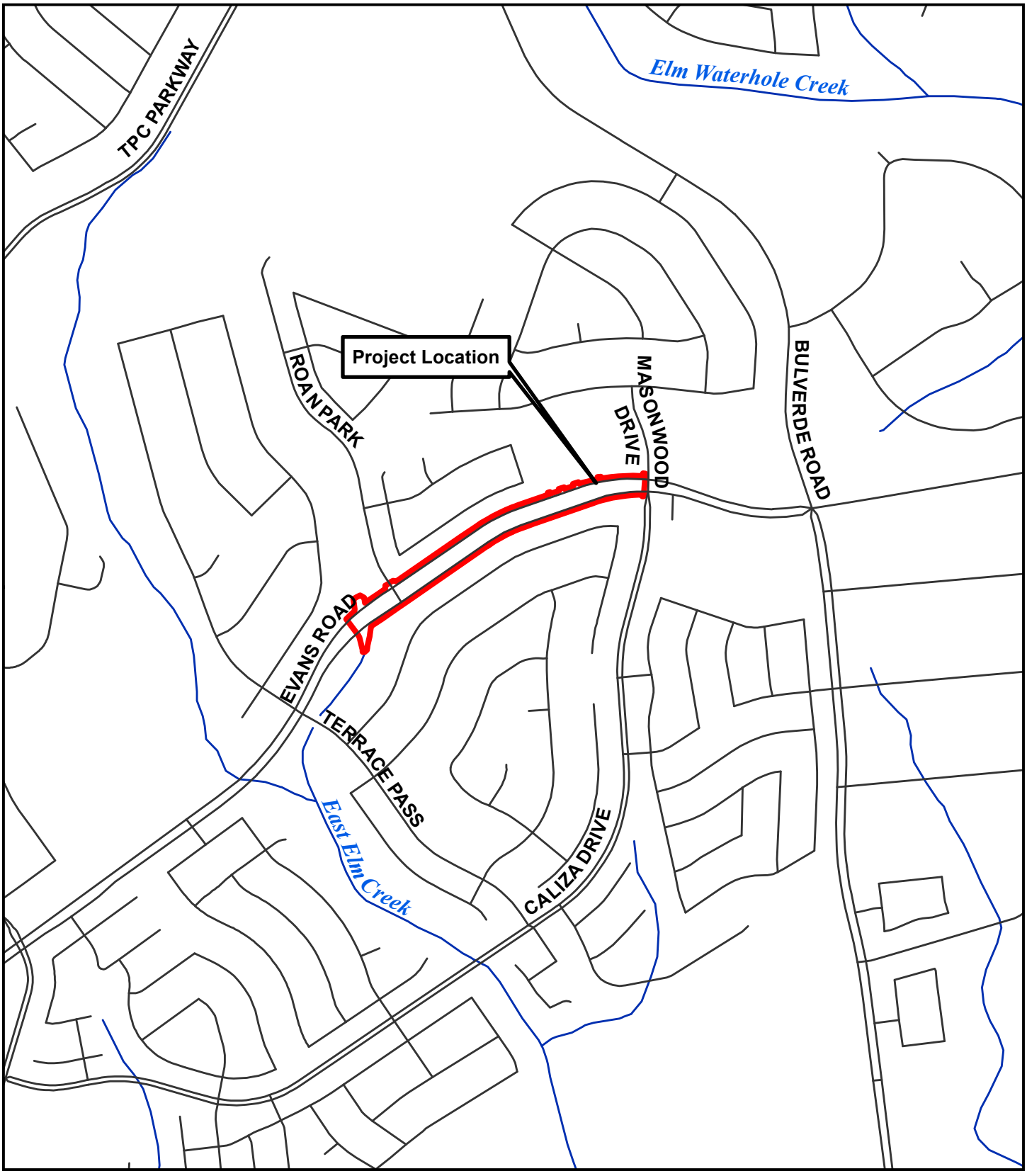
☒ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
☐ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
☐ For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
☐ A request for an exception to any substantive portion of the regulations related to the protection of water quality.
☐ A request for an extension to a previously approved plan.

19. ☒ Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:

☐ TCEQ cashier
☐ Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
☒ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

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

21. ☒ No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.



ATTACHMENT A - ROAD MAP

EVANS ROAD PHASE I

1 inch = 1,000 feet

APRIL 2025

Job No. S0010-0084-03

QUIDDITY

Texas Board of Professional Engineers and Land Surveyors Registration Nos. F-23290 & 10046100
912 South Capital Of Texas Hwy, Suite 300 - Austin, TX 78746 - 512.441.9493

Attachment B

USGS / Edwards Recharge Zone Map

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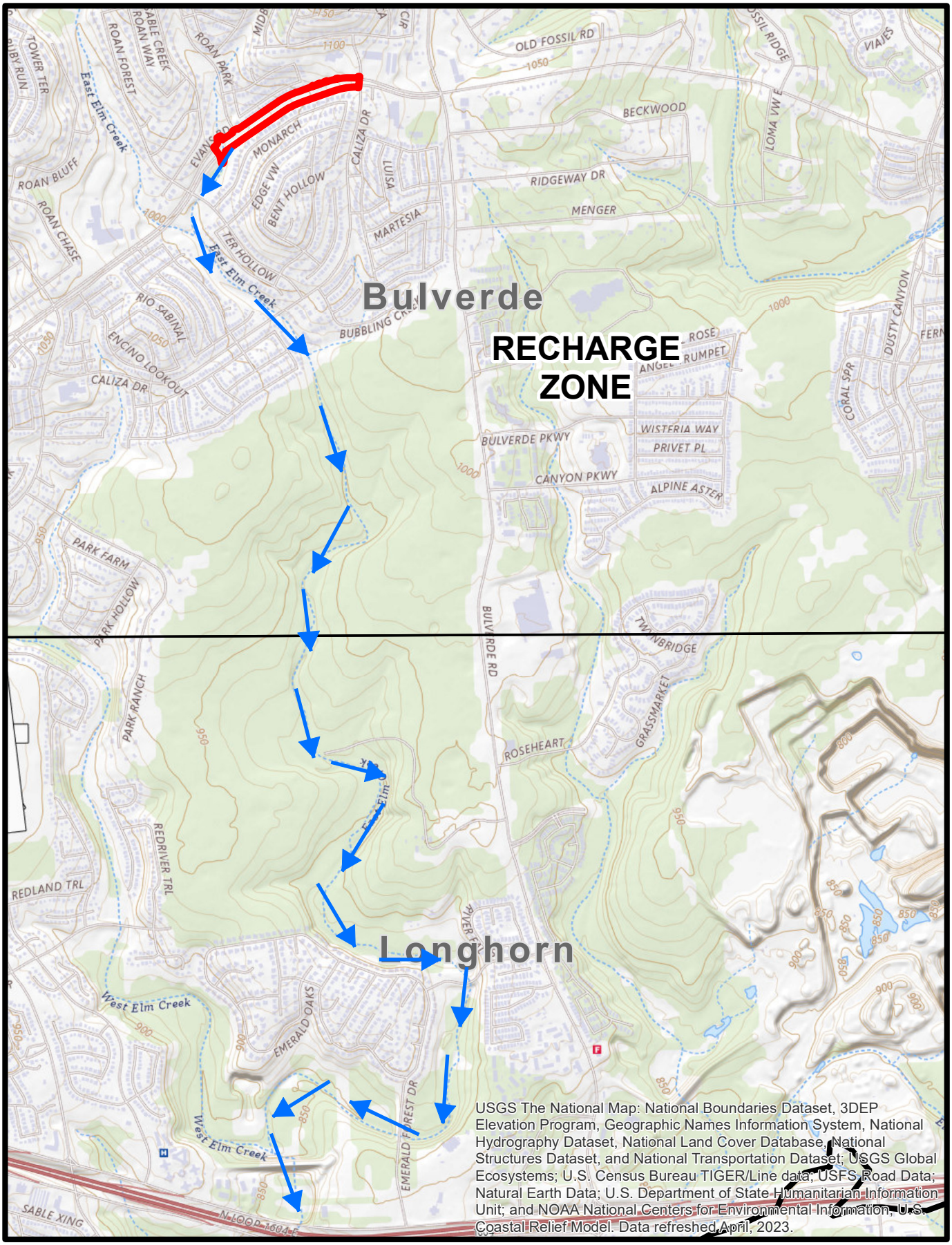
Attachment B
USGS/Edwards Recharge Zone Map

BULVERDE QUADRANGLE & LONGHORN QUADRANGLE



N
W E
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0 2,000

1 inch = 2,000 feet

Legend

- Aquifer Zone Boundary
- Project Limits
- Flow Path

Evans Road Phase I
Sheet 1

QUIDDITY

Attachment B
USGS/Edwards Recharge Zone Map

LONGHORN QUADRANGLE

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed April, 2023.

N
W E
S

0 2,000

1 inch = 2,000 feet

Legend

- Aquifer Zone Boundary
- Project Limits
- Flow Path

Evans Road Phase I
Sheet 2

QUIDDITY

Attachment C

PROJECT DESCRIPTION

Project Area

The scope of the Evans Road Phase I project includes the full-depth reconstruction of Westbound Evans Road and the milling and overlay of Eastbound Evans Road between Roan Park (West) to Masonwood Drive/Caliza Drive (East) (See Attachment A – Road Map). The project will typically consist of an 8' sidewalk along the westbound direction, and a 6' sidewalk along the eastbound direction. Curb and gutter will be installed along the edge of pavement, and stamped concrete will be placed between the sidewalk and back of curb for both directions. The proposed westbound roadway will drain towards the median at a 2% cross slope for most of the project limits.

The main goal of the project is to incorporate a drainage solution that intercepts offsite discharge, primarily from 3559 E Evans Road (Ismaili Jamatkhana), and reduces street ponding widths during the 25-Year storm event. The roadway project is located within the Salado Creek Watershed and the Edward Aquifer's Recharge Zone (RZ). The area surrounding the Evans Road is fully developed and includes single family homes and a religious facility (Ismaili Jamatkhana), which drains to the Evans Road ROW.

The added impervious cover resulting from the Evans Road improvements is primarily for pedestrian (sidewalk widening) and drainage infrastructure (concrete riprap for new inlets and drop structure). The change in impervious cover is minimal for the full-depth reconstruction of Westbound Evans Road and the milling and overlay of Eastbound Evans Road. No additional roadway lanes are proposed to be constructed. As a result of the increase in impervious cover (0.47 acres) resulting from the proposed improvements, the Evans Road project proposes stormwater quality facilities to achieve load removal within the project area.

Site History and Previous Development

Evans Road has existed as an automobile road since post-1984. There has been a significant increase in residential development surrounding the site since the early 2000s. The existing Evans Road runoff discharges into a wide vegetated median, along the project limits, through seven existing curb slots between Roan Park (West) to Masonwood Drive/Caliza Drive (East).

The existing project area is at risk from adverse flooding issues within the roadway, especially along westbound Evans Road near the two pond outfalls from 3559 E Evans Road (Ismaili Jamatkhana) and at the intersection with Masonwood Drive. The two existing East Elm Creek culvert crossings (westbound and eastbound) at Evans Road are overtopping during the Atlas-14 100-Year storm event. Additionally, the existing culvert crossing at Roan Park overtops in both the Atlas-14 25-Year and 100-Year storm events.

Offsite Areas

Based on 2021 Central Texas LiDAR and existing development conditions, offsite runoff stems from the single-family neighborhoods surrounding Evans Road (north and south), the Ismaili Jamatkhana Mosque (north), Masonwood Drive (north), and Caliza Drive (south). Runoff from the residential properties will drain towards Evans Road and will be captured by either a curb inlet or armored curb slot. 3559 E Evans Road (Ismaili Jamatkhana) contributes a significant amount of runoff due to the amount of impervious cover and contains two pond facilities (existing sedimentation/filtration basins) that direct runoff onto westbound Evans Road in existing conditions. In

general, the grassy median is the low within the Evans Road ROW. The combined offsite and onsite runoff is channelized within the grassy median and flows westward towards the intersection at Roan Park, which ultimately outfalls into East Elm Creek

Impervious Cover

The existing Evans Road was built post 1984 and discharges into a wide grassy median along the project limits through seven existing curb slots (proposed to be removed and replaced). The added impervious cover resulting from the Evans Road improvements is primarily for pedestrian (sidewalk widening) and drainage infrastructure (concrete riprap for new inlets and drop structure). The change in impervious cover is minimal for the full-depth reconstruction of Westbound Evans Road and the milling and overlay of Eastbound Evans Road.

Overall, there is a slight increase in impervious cover due to the street rehabilitation, proposed sidewalk improvements, and proposed concrete riprap at the outfalls and culvert crossings. The existing site contains 3.99 acres of impervious cover, while the proposed conditions will contain 4.46 acres of impervious cover. Impervious cover proposed in the right-of-way will include reconstructed roadway pavement, proposed curb and gutter, widened sidewalks, concrete riprap, and new stamped concrete.

Proposed Site Use & Drainage Improvements

The proposed site will include roadway reconstruction and drainage improvements along Evans Road. Proposed grading within the median is minimized to preserve the existing trees.

The proposed improvements for Westbound Evans Road include curb inlets, area inlets along 3559 E Evans Road (Ismaili Jamatkhana), armored curb slots, and a storm sewer system (System A) that ranges in size between 24”-48” RCP that outfalls into the median immediately east of Roan Park. Three area inlets are proposed to capture the concentrated amount of offsite runoff prior to entering the ROW and connect to proposed System A. Additionally, a junction box is proposed at the eastern pond outfall to connect directly to the proposed System A trunk line. The extent of drainage improvements for Eastbound Evans Road involves improving the existing armor curb slots and constructing two additional armor curb slot locations further to the east (up gradient).

Overall, the proposed ponding widths are shown to be reduced for both Westbound and Eastbound Evans Road for the Atlas-14 25-Year storm event.

Improvements to the East Elm Creek culvert crossings at Evans Road (Westbound and Eastbound) are incidental and incorporated into the limits for this project. The improvements include adding two culvert boxes, widening the concrete drop structure, and channel grading to improve the hydraulic level of service for the culvert crossings.

Permanent Best Management Practices

Since there is slight increase in impervious cover, additional stormwater treatment is needed for the concentrated runoff at the proposed storm outfalls into the median. As part of this project, the median and existing trees within it are sought to be impacted as little as possible.

A Stormceptor and Vegetative Filter Strip (VFS) will be implemented according to the TCEQ Edwards Aquifer Guidance Manual. A Stormceptor type STC4800 will be placed within the median just upstream of the culvert crossing at Roan Park. Curb inlets A-01 and B-01 will contribute to a dedicated storm sewer system (System W) that conveys flow to the Stormceptor for treatment. The Stormceptor will outfall to a proposed swale within the

median that directs flow to culvert crossing CC-01. The VFS will be placed beside a 42' armored curb slot, identified as A-00, along Westbound Evans Road. The proposed location of the Stormceptor and VFS are placed such that no BMPs are in series.

The intent of the proposed Stormceptor and VFS is to treat onsite loads to achieve sufficient Total Suspended Solids (TSS) Load removal. The two (2) existing private sedimentation/filtration ponds located at 3559 E Evans Road (Ismaili Jamatkhana) and the existing grassy median were not utilized to achieve the required TSS Load removal. Due to the steep longitudinal slope of the existing terrain, the grassy median did not satisfy the TCEQ design requirements to be classified as a grassy swale.

Geologic Assessment

(TCEQ-0585)

Attachment A

GEOLOGIC ASSESSMENT

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Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/Transition Zones and Relating to 30 TAC §213.5(b)(3), 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

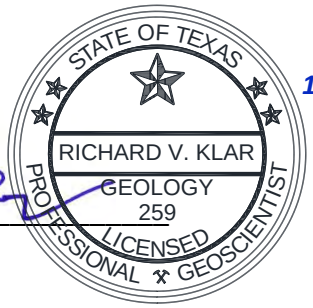
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Richard V. Klar, P.G. Telephone: 210-699-9090

Date: January 19, 2024 Fax: 210-699-6426

Representing: Raba Kistner, Inc., TBPG Firm #50220 on behalf of Quiddity.
(Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



1/19/24

Regulated Entity Name: City of San Antonio 2022 Bond Program: Evans Road Phase 1, East Elm Creek to Masonwood Drive, Water and Sanitary Sewer Utility Adjustments Plan

Project Information

1. Dates Geologic Assessment was performed: August 23, 2023
2. Type of Project:

☒ WPAP ☐ AST
☐ SCS ☐ UST

3. Location of Project:

☒ Recharge Zone
☐ Transition Zone
☐ Contributing Zone within the Transition Zone

4. ☒ **Attachment A – Geologic Assessment Table**. Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.

5. ☒ Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the Site Geologic Map or a separate soils map.

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness
Eckrant very cobbly clay, 5 to 15 percent slopes (TaC)	D	~1 to 2 feet
Crawford, stony and Bexar soils, 0 to 5 percent slopes (Cb)	D	~1.5 to 3 feet

** Soil Group Definitions (Abbreviated)*

A. Soils having a high infiltration rate when thoroughly wetted.
B. Soils having a moderate infiltration rate when thoroughly wetted.
C. Soils having a slow infiltration rate when thoroughly wetted.
D. Soils having a very slow infiltration rate when thoroughly wetted

6. ☒ **Attachment B – Stratigraphic Column**. A stratigraphic column showing formations, members, and thickness is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.

7. ☒ **Attachment C – Site Geology**. A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.

8. ☒ **Attachment D – Site Geologic Map(s).** The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1":400'.

Applicant's Site Plan Scale: 1" = 100'
Project Geologic Map Scale: 1" = 100'
Site Soils Map Scale (if more than 1 soil type): 1" = 150'

9. Method of collecting positional data:

☒ Global Positioning System (GPS) technology.
☐ Other method(s). Please describe method of data collection: ___

10. ☒ The project site boundaries are clearly shown and labeled on the Site Geologic Map.

11. ☒ Surface geologic units are shown and labeled on the Site Geologic Map.

12. ☒ Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.

☐ Geologic or manmade features were not discovered on the project site during the field investigation.

13. ☒ The Recharge Zone boundary is shown and labeled, if appropriate.

14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.

☒ There are four (4) test holes present on the project site and the locations are shown and labeled. (Check all of the following that apply.)

☒ The test holes are not in use and have been properly abandoned.
☐ The well or test hole is not in use and will be properly abandoned.
☐ The well is in use and complies with 16 TAC Chapter 76.

☐ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

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

ATTACHMENTS

ATTACHMENT A

GEOLOGIC ASSESSMENT TABLE
(TCEQ-0585-TABLE)

COMMENTS TO GEOLOGIC ASSESSMENT TABLE

SOIL PROFILE

PROJECT SOILS MAP

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: ***City of San Antonio 2022 Bond Program: Evans Road Phase I (East Elm Creek to Masonwood Drive), San Antonio, Bexar County, Texas*** *(**RKI** Project No. ASF23-055-00)*

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29°38'44.75"N	98°26'7.65"W	MB (W)	30	Kek	3,270	2	~6-8					X	6	36	✓		✓		Hilltop
S-2	29°38'52.61"N	98°25'51.26"W	MB (G)	30	Kek	2,525	2	~2-4					X	6	36	✓		✓		Hilltop
S-3	29°38'45.81"N	98°26'6.22"W	MB (C)	30	Kek	8,415	2	~2-4					X	6	36	✓		✓		Hilltop
S-4	29°38'52.63"N	98°25'45.83"W	MB (E)	30	Kek	4,620	2	~2-4					X	6	36	✓		✓		Hilltop
S-5	29°38'51.93"N	98°25'45.93"W	MB (T)	30	Kek	650	2	~1-2					X	6	36	✓		✓		Hilltop
S-6	29°38'49.66"N	98°25'59.31"W	MB (SS)	30	Kek	1,470	2	~8-10					X	6	36	✓		✓		Hilltop
S-7	29°38'44.99"N	98°26'6.10"W	MB (SD)	30	Kek	1,795	2	~4-6					X	6	36	✓			✓	Hilltop
S-8	29°38'43.48"N	98°26'7.47"W	MB (GEO, B-4)	30	Kek	0.3	0.3	10					Z	5	35	✓		✓		Hilltop
S-9	29°38'46.52"N	98°26'4.52"W	MB (GEO, B-5)	30	Kek	0.3	0.3	10					Z	5	35	✓		✓		Hilltop
S-10	29°38'50.46"N	98°25'53.64"W	MB (GEO, B-6)	30	Kek	0.3	0.3	10					Z	5	35	✓		✓		Hilltop
S-11	29°38'53.01"N	98°25'47.30"W	MB (GEO, B-7)	30	Kek	0.3	0.3	10					Z	5	35	✓		✓		Hilltop
S-12	29°38'46.68"N	98°26'3.42"W	F	20	Kek	2,341	10		NE-SW	10			F	8	38	✓			✓	Hilltop/Drainage
S-13	29°38'47.92"N	98°26'0.75"W	F	20	Kek	414	10		NE-SW	10			F	8	38	✓			✓	Hilltop/Drainage
S-14	29°38'43.96"N	98°26'8.44"W	F	20	Kek	134	10		NE-SW	10			F	8	38	✓			✓	Hilltop/Drainage

*** DATUM:** ***NAD83***

Features: W=water utility; G=natural gas utility; C=communications utility; E=electrical utility; T=traffic signal utility; SS=sanitary sewer; SD=storm drain system; GEO = Geotechnical boring and identifier
Formation: Kek=Kainer Formation

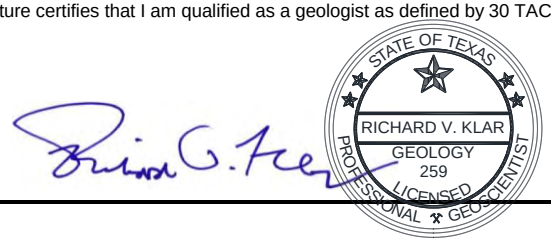
2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	*Granular bedding materials for residential utility improvements* ***(Features S-1 through S-7).***
Z	*Soil cuttings with granular bentonite and concrete cap for geotechnical borings* ***(Features S-8 through S-11)***

12 TOPOGRAPHY

Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Natural Resource Conservation Commission's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.
My signature certifies that I am qualified as a geologist as defined by 30 TAC 213.



Date: ###

Sheet 1 of 1

TCEQ-0585-Table (Rev. 10-01-04)

COMMENTS TO GEOLOGIC ASSESSMENT TABLE
City of San Antonio 2022 Bond Program: Evans Road Phase I
East Elm Creek to Masonwood Drive
San Antonio, Bexar County, Texas

The locations of the following features are indicated on the ***Project Geologic Map*** provided as ***Attachment D*** of this report.

Manmade Features in Bedrock (MB)

Feature S-1 (Water Utility Trench)

Feature S-1 consists of trenches for an existing potable water utility owned by San Antonio Water System (SAWS) located along the north and south borders of the Evans Road right of way (ROW), with crossings across Evans Road along the west side of Masonwood Drive and west of the Roan Park intersection. The locations of these trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations of fire hydrants, paint markings, valves, and meters. Based on the provided plans and typical conditions, the water utility consists of 12- and 20-inch lines assumed to be installed to depths of approximately 6 to 8 feet terminating in limestone bedrock. The estimated length of the trenches is approximately 3,270 feet within the Project.

Feature S-2 (Natural Gas Utility Trench)

Feature S-2 consists of trenches for an existing natural gas utility owned by City Public Service (CPS) Energy located along the north and south borders of Evans Road. The locations of these trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations consisting of paint markings and valves. Based on the provided plans and typical conditions, the natural gas utility consists of 2-, 4-, and 6-inch lines assumed to be installed approximately 2 to 4 feet into the soil and terminating in limestone bedrock. The estimated length of the trenches is approximately 2,525 feet within the Project.

Features S-3 (Communications Utility Trenches)

Feature S-3 consists of trenches for existing communications utilities owned by Google Fiber, AT&T, and Spectrum. The utility trenches are located the north and south borders of the Evans Road ROW, crossing Evans Road along the west edge of Masonwood Drive. The locations of theses trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations of utility access points and markers. Based on the provided plans and typical conditions, the communications utility trenches are assumed to be installed to depths of approximately 2 to 4 feet terminating in limestone bedrock. The estimated length of the trenches is approximately 8,415 feet within the Project.

Features S-4 (Electrical Utility Trenches)

Feature S-4 consists of trenches for an existing electrical utility owned by CPS Energy. The trenches are located along the both sides of the median along Evans Road. The locations of these trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations of utility access points, light poles, and paint markings. Based on the provided plans and typical conditions, the electrical utility trenches are assumed to be installed to depths of approximately 2 to 4 feet terminating in limestone bedrock. The estimated length of the trenches is approximately 4,620 feet within the Project.

Feature S-5 (Traffic Signal Utility Trenches)

Feature S-5 consists of trenches for existing traffic signal utilities owned by the City of San Antonio. The trenches cross Evans Road at the intersection with Masonwood Drive and at the intersection with Roan Park. The locations of these trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations of access points and traffic signal poles. Based on the provided plans and typical conditions, the traffic signal utility trenches are assumed to be installed to depths of approximately 1 to 2 feet within the soil and terminating in limestone bedrock. The estimated length of the trenches is approximately 650 feet within the Project.

Feature S-6 (Sanitary Sewer Trenches)

Feature S-6 consists of trenches for an existing sanitary sewer utility owned by SAWS. The trenches extend along the westbound lane of Evans Road, crossing the Evans Road ROW just west of Roan Park and near the center of the Project. The locations of these trenches are based on plans provided by Quiddity on August 21, 2023 as well as field observations of manways. Based on the provided plans and typical conditions, the sanitary sewer utility trenches are assumed to be installed to depths of approximately 8 to 10 feet terminating in limestone bedrock. The estimated length of the trenches is approximately 1,470 feet within the Project.

Feature S-7 (Storm Drain System)

Feature S-7 consists of culverts and trenches for an existing storm drain utility owned by the City of San Antonio. Inlets are spaced along the borders of the median at five locations between Roan Park and Masonwood Drive, with two 24-inch diameter metal culverts encased in concrete beneath the crossover west of Masonwood Drive, and a box culvert approximately 25 feet wide where Roan Park crosses Evans Road. Stormwater flows from inlets into the storm drain system or across the median along Evans Road, then into East Elm Creek, which flows to the southeast. The estimated length of the trenches is approximately 1,795 feet within the Project.

Additionally, two concrete bridges with box culverts are installed across East Elm Creek, one for the westbound lane with a concrete apron extending from approximately 25 feet northwest of the roadway into the creek, and the second for the eastbound lane. The base of the box culverts extends approximately 6 feet below ground surface terminating in bedrock. The culverts extend approximately 60 feet across East Elm Creek within the Project at respective locations.

Features S-8 through S-11

Features S-8 through S-11 consist of plugged geotechnical borings installed to support the proposed development on November 17, 2022 by Rock Engineering and Testing Laboratory, LLC (RETL). RETL drilled a total of seven borings using a truck-mounted drilling rig to depths of 10 feet below ground surface intersecting bedrock. Three of these (Borings B-1 through B-3) are southwest of the Project and four were drilled within the Project (Borings B-4 through B-7). According to boring log data, a clayey sand stratum 1 to 3.5 feet thick was encountered at the surface, corresponding to the Eckrant and Crawford and Bexar soil series, underlain by up to 2 feet of weathered limestone corresponding to the weathered top of the

bedrock. Bedrock was encountered at depths of 1 to 6 feet, consisting of hard tan limestone (i.e., the Kainer Formation). Shallow groundwater was not observed during drilling operations. Based on the referenced geotechnical borings logs and observations in conjunction with field reconnaissance activities, the borings were effectively plugged using soil cuttings with granular bentonite and abandoned following completion of drilling activities.

Faults (F)

Features S-12 through S-14

Feature S-12 consists of a published fault reported by Clark, Golab, and Morris (2016). This feature is described as an inferred normal fault trending approximately northeast-southwest in the vicinity of the median along Evans Road that juxtaposes limestone rock units of the Dolomitic Member and Basal Nodular Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. Assuming that the fault is present in the shallow subsurface, its length is estimated to be approximately 2,341 feet within the Project.

Feature S-13 consists of a published fault reported by Clark, Golab, and Morris (2016). This feature is described as an inferred normal fault trending approximately northeast-southwest crossing the southwest portion of the Project and terminating at ***Feature S-12*** from the southwest. It juxtaposes limestone rock units of the Dolomitic Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. Assuming that the fault is present in the shallow subsurface, its length is estimated to be approximately 414 feet within the Project.

*Probable contact in the vicinity of the mapped fault **(Feature S-12)** between the Basal Nodular Member and Dolomitic Member of the Kainer Formation at the median near the center of the Project Corridor (view to the south).*

Feature S-14 consists of a published fault reported by Clark, Golab, and Morris (2016). This feature is described as an inferred normal fault trending approximately northeast-southwest crossing the westbound lane of Evans Road at the west end of the Project, terminating at ***Feature S-12*** from the northwest. It juxtaposes limestone rock units of the Basal Nodular Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. Assuming that the fault is present in the shallow subsurface, its length is estimated to be approximately 134 feet within the Project.

Direct evidence of faulting (i.e., a fault plane, fractures, or striations) was not observed in the vicinity of the mapped faults or in the surrounding area. Outcrops were generally weathered and solution-enlarged fractures were generally not observed in conjunction with bedrock exposed at the surface or in road cuts within or adjacent to the Project Corridor. A potential formation contact was observed within the Evans

Road median near the center of the Project Corridor between the Basal Nodular Member and Dolomitic Member of the Kainer Formation, which corresponds to the mapped location of the main fault extending through the Project Corridor (***Feature S-12***). A single small solution-enlarged fracture outcrop was observed at this location with the oriented northeast at 42 degrees, consistent with the mapped fault trend. In addition to field reconnaissance efforts to locate the mapped faults, **RKI** inspected historical aerial photography of the area via Google Earth from years 1995 to 2023. No evidence of faulting or pervasive lineations were observed in the photographs. However, Evans Road and the surrounding area consists of a developed suburban corridor with pavements and sidewalks that obscure evidence of faulting.

SOIL PROFILE
City of San Antonio 2022 Bond Program: Evans Road Phase I
East Elm Creek to Masonwood Drive
San Antonio, Bexar County, Texas

SOIL SERIES	THICKNESS IN PROJECT CORRIDOR	DESCRIPTION
Eckrant	**~1 to 2 feet**	***Eckrant very cobbly clay, 5 to 15 percent slopes (TaC):*** these soils form on ridges and consists of shallow very cobbly clay. The parent material is residuum weathered from limestone. The surface layer is very dark grayish-brown, calcareous clay loam about 5 to 12 inches thick with limestone fragments within the layer and covering the surface. The subsurface layer is hard fractured limestone about 8 to 10 inches thick, with cracks and spaces filled with dark grayish-brown clay loam, underlain by hard limestone bedrock. Soils are well drained with high runoff potential and moderately low to moderately high permeability (0.06 to 0.57 inch/hour) and low capacity to hold water. Water erosion is a hazard.
Crawford and Bexar	**~1.5 to 3 feet**	***Crawford, stony and Bexar soils, 0 to 5 percent slopes (Cb):*** Crawford soils make up about 51 percent and Bexar soils make up about 36 percent. These soils form on hillslopes and typically consist of shallow to moderately deep stony clays. The parent material is residuum weathered from limestone. Crawford soils have a surface layer that is very dark gray to reddish-brown, noncalcareous stony clay about 8 to 9 inches thick, and containing chert and limestone fragments. The subsurface layer is more brown or reddish-brown, is about 26 inches thick, and consists of dense clay that may be limy in the lower part, and contains few chert fragments. The subsurface layer is underlain by hard fractured limestone. Bexar soils have a surface layer consisting of cherty clay loam to gravelly loam about 14 to 22 inches thick. The subsoil is cherty clay ranging from 6 to 14 inches thick. Soils are well drained with very high runoff potential and very low to moderately low permeability (0.00 to 0.06 inch/hour) that varies according to moisture content (i.e., water moves rapidly when the soil is dry and very slowly when wet).

The preceding table was prepared based on information provided in the *Soils Survey of Bexar County, Texas (1966)*, the *NRCS Web Soil Survey (2019)*, and a geotechnical report prepared by Rock Engineering & Testing Laboratory, LLC (2023). The Project area primarily consists of a developed suburban corridor consisting of a divided roadway with a median and impervious pavements, and native soils were not directly observable where obscured by pavements. Field observations along the Evans Road median and adjacent to the Project are consistent with the mapped soil types. As presented on the attached ***Project Geologic Map***, native soils mapped at the Project consist of Eckrant very cobbly clay, 5 to 15 percent slopes (TaC) and Crawford, stony and Bexar soils, 0 to 5 percent slopes (Cb). The Project is primarily underlain by TaC soils, with Cb soils at the southwest end in the vicinity of East Elm Creek. The Eckrant and Crawford and Bexar soils are classified

as Group D, having a low to moderate capacity to transmit infiltrating precipitation. Soils primarily consist of very cobbly clay and stony clay, with published permeability values ranging from 0.00 to 0.57 inch per hour.

The geotechnical report prepared by Rock Engineering & Testing Laboratory, LLC (2023) was reviewed to evaluate soil and rock conditions within the Project Corridor, which were generally found to consist of a thin surficial layer of gravelly clay and clayey sand with limestone gravel, underlain by weathered limestone over hard bedrock at depths of 2 to 6 feet. Based on boring log information, Cb soils consist of brown clayey sand with weathered limestone to depths of 4 feet with light reddish-brown weathered limestone from 4 to 6 feet. TaC soils consist of dark brown to light brown clayey sand with weathered limestone to depths of 2 to 3.5 feet.

1/19/24

STATE OF TEXAS
RICHARD V. KLAR
GEOLOGY
259
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TBPE Firm F-3257 / TBPG #50220

PROJECT SOILS MAP

CITY OF SAN ANTONIO 2022 BOND PROGRAM:
EVANS ROAD PHASE 1
EAST ELM CREEK TO MASONWOOD DRIVE
WATER AND SANITARY SEWER UTILITY ADJUSTMENTS PLAN
SAN ANTONIO, BEXAR COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF23-055-00
ISSUE DATE:	1/19/2024
DRAWN BY:	LAW
CHECKED BY:	HEH
REVIEWED BY:	RVK

SHEET
1 of 1

Sources:
1. Inferred faults taken from Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic framework and hydrostratigraphy of the Edwards and Trinity aquifers within northern Bexar and Comal Counties,
2. Soil type obtained from Natural Resources Conservation Service (NRCS), June 11, 2020 based on the Soil Survey of Bexar County, United States Department of Agriculture, 1962, Reissued June 1991.
3. Basemap obtained from Environmental Systems Research Institute (ESRI), 2022.
4. Geotechnical boring locations obtained from the Subsurface Exploration, Laboratory Testing Program, and Pavement Evaluation prepared by Rock Engineering and Testing Laboratory, LLC (RETL), Project Number: G222818-R1, report dated January 26, 2023.
5. Utilities provided by Quiddity on August 21, 2023 (TRG-SUE-QUID2305.00-EVANS RD-2022 COSA BOND-WORKING.dgn).

NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes

ATTACHMENT B

STRATIGRAPHIC COLUMN

STRATIGRAPHIC COLUMN
City of San Antonio 2022 Bond Program: Evans Road Phase I
East Elm Creek to Masonwood Drive
San Antonio, Bexar County, Texas

STRATIGRAPHIC FORMATION	THICKNESS	DESCRIPTION
Kainer Formation (Kek)		
Grainstone Member (Kkg)	40-50 feet	Miliolid, skeletal fragmented grainstone, mudstone, wackestone; chert (beds and nodules); crossbedded and ripple marked. ***Not present at the Project.***
Kirschberg Evaporite Member (Kkke)	40-60 feet	Highly altered crystalline limestone, chalky mudstone, occasional grainstone associated with tidal channels; chert (beds and nodules), coarse-grained spar, breccia, travertine; boxwork porosity with neospar and travertine framing. ***Mapped along the south edge of Project. Fractured outcrops observed along the south portion of the Evans Road median, extending from the center to the east end of the Project.***
Dolomitic Member (Kkd)	90-120 feet	Chert (absent in lower 20 feet), dolomitic mudstone, wackestone, packstone, grainstone; massively bedded, light gray, *Toucasia* sp. abundant. ***Mapped along the north edge and southwest portion of Project. Outcrops observed in road cuts along the north edge of Evans Road near the east end of the Project and in patchy outcrops along the north edge of the Evans Road median, extending from the center to the east end of the Project.***
Basal Nodular Member (Kkbn)	40-50 feet	Shaly, nodular, burrowed mudstone, wackestone, packstone, miliolid grainstone, dolomite, contains dark, spherical textural features locally known as BRBs; *Ceratostreon texana, Caprina* sp. miliolids, and gastropods. ***Mapped along the north edge of the west portion of the Project. Outcrops observed along the west bank of East Elm Creek, with patchy outcrops observed along the north portion of the Evans Road median at the west end of the Project.***

Note: Stratigraphic Column for the Project was adapted from Clark, Golab, and Morris (2016).

ATTACHMENT C

NARRATIVE OF PROJECT SPECIFIC GEOLOGY

PROJECT GEOLOGY NARRATIVE
City of San Antonio 2022 Bond Program: Evans Road Phase I
East Elm Creek to Masonwood Drive
San Antonio, Bexar County, Texas

Introduction

The following is a project-specific discussion of existing geological conditions and potential recharge features for the Edwards Aquifer identified for the Evans Road Phase I Project, which will be constructed as part of the 2022 Bond Program for the City of San Antonio. The subject improvements corridor consists of approximately 2,450 linear feet located along Evans Road, between East Elm Creek and Masonwood Drive, located west of the intersection of Bulverde Road and Evans Road in the north-central sector of San Antonio, Bexar County, Texas (hereinafter referred to as Project). The Project is approximately 150 feet wide and comprises the active roadway and associated right-of-way (ROW) for the referenced Evans Road segment. **RKI** understands that Project improvements will include complete reconstruction and widening of existing traffic lanes to be completed as part of the City of San Antonio 2022 Bond Program.

This assessment was performed by **Raba Kistner, Inc. (RKI)** on behalf of Quiddity, pursuant to applicable Edwards Aquifer Protection Program (EAPP) Rules as specified in *Title 30 of the Texas Administrative Code, Section 213 (30 TAC §213*, *effective April 24, 2008).* This assessment report is in the format required by the Texas Commission on Environmental Quality (TCEQ) for the Geologic Assessment and was prepared in accordance with the revised *Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585)*, which are applicable to submittals received by the TCEQ after October 1, 2004.

This geologic assessment report documents conditions observed by **RKI** within the Project boundaries on August 23, 2023.

Project Description

Project Location. The Project area is primarily residential within a developed suburban corridor in the north-central sector of San Antonio, which includes paved multi-lane roadways with associated sidewalks, traffic signals, and utility improvements. This segment of Evans Road curves northeast toward Bulverde Road and is oriented approximately southwest-northeast. The west end of the Project is at East Elm Creek and the east end is at the intersection with Masonwood Drive and Caliza Drive. Adjacent properties to the north include the Pinion Creek and Encino Ranch residential subdivisions and the Ismaili Jamatkhana (church) located at the northwest corner of Masonwood Drive and Evans Road. Commercial properties (i.e., Texas Family Roofing and Morningstar Mini-Storage) and a vacant lot are adjacent to the northeast, and residential properties of the Terraces at Encino Park subdivision are adjacent to the south.

Based on review of official maps published by the Texas Commission on Environmental Quality (TCEQ), the Project is located fully within the Edwards Aquifer Recharge Zone (EARZ). As such, the performance of a geologic assessment is required to facilitate planned WPAP construction activities in accordance with applicable provisions set forth in the EAPP rules.

Left image: General view along the westbound lane of Evans Road just west of Masonwood Drive (view to the west). Right image: General view along the eastbound lane of Evans Road just west of Roan Park (view to the northeast).

Topography and Drainage. Topographic information for the Project was obtained from the *Bulverde, Texas Topographic Quadrangle Ma*p prepared by the United States Geological Survey (USGS, 2022) and 1-foot topographic contours provided by the City of San Antonio (CoSA, 2023). Based on these references, the Project consists of gently sloping hilltop topography, with a maximum elevation of approximately 1,086 feet relative to mean sea level (MSL) at the east end and a minimum elevation of approximately 1,006 feet at the west end where it terminates at East Elm Creek. As indicated by topographic contours presented on the ***Project Geologic Map***, the local surface drainage patterns for the Project are to the southwest as sheet flow along roadways and curbs into stormwater inlets connected to the storm drain system located along Evans Road, or across the Evans Road median with flow directed into culverts with ultimate drainage to East Elm Creek.

Left image: Box culvert where Roan Park crosses the median of Evans Road near the southwest end of the Project (view to the east). Right image: general view of the Evans Road median on the southwest portion of the Project where erosion has exposed bedrock (view to the northeast).

A review of the Flood Insurance Rate Map FIRM 48029C0145G, produced by the Federal Emergency Management Agency (September 29, 2010) indicates that the Project is fully located within Zone X, an area of minimal flood hazard. The flood zone associated with East Elm Creek just southwest of the Project is designated as Zone A, Special Flood Hazard Areas without Base Flood Elevation.

Historical Property Use. Although research pertaining to past operations and historical land use activities within the Project was beyond the scope of this assessment, historical aerial imagery was reviewed to evaluate historical land use and the presence of lineations that could indicate the presence of faulting. The following aerial photographs were reviewed using Google Earth™: 1995, 2003-2005, 2008, 2010, and 2012-2023. Based on this review, Evans Road has consisted of a divided paved roadway prior to 1995, with minor roadway improvements between 2008 and 2021. Urban development of the surrounding properties (i.e., residential subdivisions and the church) occurred between 2003 and 2008. No evidence of faulting was observed in the historical aerial photographs.

Classification of Recharge Features. As further described herein, features identified and discussed below include eleven manmade features (i.e., potable water, natural gas, communications, electrical, traffic signal, sanitary sewer, storm water utilities, and geotechnical borings) and three normal faults. The significance of these features was assessed using definitions and guidance provided in *Instructions to Geologists (TCEQ-0585-Instructions, revised October 1, 2004)*. All features within the Project that met the criteria presented in this reference were mapped. The characteristics of all mapped features and the assessments of these features, as defined by the TCEQ, are presented in the attached ***Geologic Assessment Table (TCEQ-0585)***.

Stratigraphy

As presented in the attached ***Stratigraphic Column***, information pertaining to the lithologies and thickness of geologic units underlying the Project was taken from Clark, Golab, and Morris (2016). As taken from this reference and presented on the ***Project Geologic Map***, the Project is directly underlain by the Kirschberg Evaporite Member, Dolomitic Member, and Basal Nodular Member of the Kainer Formation, which are described as follows:

- Kirschberg Evaporite Member – Kainer Formation (Kkke): highly altered crystalline limestone with chalky mudstone and chert, coarse-grained spar, breccia and boxwork porosity with neospar and travertine framing.
- Dolomitic Member – Kainer Formation (Kkd): Dolomitic mudstone and crystalline limestone consisting of wackestone, packstone and grainstone that is massively bedded and has chert (except in the lower 20 feet) and abundant rudists (*Toucasia* sp).
- Basal Nodular Member – Kainer Formation (Kkbn): shaly nodular limestone, burrowed mudstone, wackestone, packstone, and miliolid grainstone that contains dark spherical features and fossils (*Ceratostreon texana, Caprina* sp. miliolids, and gastropods).

Based on field mapping observations and review of published references, the SITE is underlain by the Kirschberg Evaporite Member, Dolomitic Member, and Basal Nodular Member of Kainer Formation as presented on the ***Project Geologic Map***. Three inferred normal faults are mapped within the Project

boundaries (Clark, Golab, and Morris, 2016), juxtaposing stratigraphically lower units of the Kainer Formation (Kkbn and Kkd) with stratigraphically higher units (Kkd and Kkke). The Dolomitic Member underlies the northeast and southwest portions of the Project, the Basal Nodular Member underlies the northwest portion in the vicinity of East Elm Creek, and the Kirschberg Evaporite Member underlies the southeast portion.

Left image: Weathered outcrop of the Dolomitic Member of the Kainer Formation on the north side of Evans Road just west of Masonwood Road (view to the northwest). Right image: Weathered vuggy exposures of the Kirschberg Evaporite Member of the Kainer Formation on the south side of the Evans Road median near the center of the Project (view to the north).

Exposed bedrock was observed at various locations where not covered by impervious pavements or landscaping associated with development of the Project area, as described in the following bullets. Field observations are generally consistent with published geologic maps.

- Weathered outcrops of the Dolomitic Member associated with road cuts were observed along the north edge of Evans Road extending west from Masonwood Drive to the outflow of the retention pond just south of the Ismaili Jamatkhana.
- Weathered exposures of the Dolomitic Member with vugs were also observed along the north side of Evans Road between the retention pond and the west-most driveway of the Jamatkhana.
- Within the median along Evans Road, the Dolomitic Member consisted of patchy outcrops and exposed bedrock with karren texture.
- A potential contact between members of the Kainer Formation was observed within the median of Evans Road near the center of the Project, which corresponds to the mapped location of the main fault extending through the Project Corridor (***Feature S-12***). This consists of flat patchy outcrops of the Basal Nodular Member on the northwest side of the Evans Road median juxtaposed with weathered outcrops of the Dolomitic Member on the southeast side of the Evans Road median.
- Bedrock of the Basal Nodular Member was also exposed in the creek bed of East Elm Creek north of the bridge crossing Evans Road.

- The Kirschberg Evaporite Member consisted of weathered exposures with multiple small vugs and a “honeycomb” texture as well as small patchy outcrops and large gravel-sized to small boulder-sized float rock at the surface.

In conjunction with field reconnaissance, a small outcrop of the Kainer Formation was identified on the median of Evans Road in the vicinity of the contact between the Dolomitic Member and the Kirschberg Evaporite Member, as shown on the ***Project Geologic Map***. The outcrop coincides with ***Feature S-12*** and contains superficial “V” shaped solution-enlarged fracture that measures approximately 2-feet by 6-feet in plan view. It has a fracture opening within the outcrop that measures approximately 5 inches in aperture and extends 12 inches in depth. It appears that this fracture is erosional in nature, with no evidence of connection to the subsurface. The long axis is oriented approximately northeast (42 degrees), consistent with the trend of the fault ***(Feature S-12)***. Due to its location on a hillside and the small aperture dimensions, this feature is considered to have a low infiltration potential. No connection to void space within the underlying bedrock, channeling or preferential flow was observed for this feature

Field observations of rock outcrops and bedrock exposures within the Project area are generally consistent with the mapped geology by Clark, Golab, and Morris (2016).

Structure

This Project is located within the Balcones Fault Zone and, as such, is expected to exhibit a similar structural trend. The Balcones Fault Zone generally consists of a northeast-southwest trending, *en echelon* normal fault system, which juxtaposes Upper Cretaceous lithologies in the southeast with Lower Cretaceous lithologies in the northwest. As a result of this large-scale regional faulting, minor internal fault sequences and fractures exist within this zone which generally follow the same structural trend and accommodate localized displacement.

Based on review of historical aerial photographs, published geologic map (Clark, Golab, and Morris, 2016), and as previously discussed herein three faults associated with the Balcones Fault Zone cross the Project oriented approximately northeast-southwest and juxtaposing members of the Kainer Formation with the younger units downthrown to the southeast. The faults trend approximately northeast-southwest in approximately the same orientation as Evans Road, as indicated on the ***Project Geologic Map***. Three faults were identified based on the geologic map by Clark, Golab, and Morris (2016) within the boundaries of the Project Corridor that may potentially serve to enhance the transmission of surface runoff to the subsurface, as described below:

- ***Feature S-12:*** consists of an inferred normal fault trending northeast-southwest and oriented in approximately the same direction as Evans Road (measured azimuth of 64 degrees). This normal fault juxtaposes the Dolomitic Member and Basal Nodular Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. The fault was not directly observed, but was inferred from a contact observed on the Evans Road median near the center of the Project Corridor and changes in rock outcrops within and adjacent to the Project Corridor, as well as review of published maps. Fault throw is estimated to range from approximately 40 to 60 feet based on the topography and thickness of the Kainer Formation members.

- ***Feature S-13:*** consists of an inferred normal fault trending approximately northeast-southwest (measured azimuth of 45 degrees) crossing the southwest portion of the Project and terminating at ***Feature S-12*** from the southwest. It juxtaposes the Dolomitic Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. No indications of faulting were observed for this feature and its presence is based solely on review of published maps and changes in geology observed in the vicinity of the Project Corridor. Fault throw is estimated to range from approximately 20 to 50 feet based on the topography and thickness of the Kainer Formation members.

- ***Feature S-14:*** consists of an inferred normal fault trending approximately northeast-southwest (measured azimuth of 69 degrees) and crossing the westbound lane of Evans Road at the west end of the Project, terminating at ***Feature S-12*** from the northwest. It juxtaposes the Basal Nodular Member of the Kainer Formation to the northwest with the Dolomitic Member and Kirschberg Evaporite Member of the Kainer Formation to the southeast. No indications of faulting were observed for this feature and its presence is based on review of published maps. Fault throw is estimated to range from approximately 20 to 30 feet based on topography and the thickness of the Kainer Formation members.

Manmade Features

As presented on the ***Project Geologic Map***, seven features were identified that may potentially serve to enhance the transmission of surface runoff to the subsurface. The features consist of trenches for existing drainage improvements and underground utilities including the following: potable water, natural gas, communications, electrical, traffic signal, sanitary sewer, and storm drain. All of these features meet the criteria for assessment as manmade features in bedrock. Information regarding the locations of the existing manmade features was taken from field observations and plans provided by Quiddity on August 21, 2023. The following features were identified:

Feature S-1 consists of trenches for an existing potable water utility owned by San Antonio Water System (SAWS) that extends along both edges of Evans Road.

Feature S-2 consists of trenches for an existing natural gas utility owned by City Public Service (CPS) Energy along both edges of Evans Road.

Feature S-3 consists of trenches for existing communications utilities owned by Google Fiber, AT&T, and Spectrum along both edges of Evans Road.

Feature S-4 consists of trenches for an existing electrical utility owned by CPS Energy. The trenches are located along the both sides of the median along Evans Road.

Feature S-5 consists of trenches for existing traffic signal utilities owned by the City of San Antonio. The trenches cross Evans Road at the intersection with Masonwood Drive at the east end of the Project and at the intersection with Roan Park near the west end of the Project.

Feature S-6 consists of trenches for a sanitary sewer utility owned by SAWS that extend along the westbound lane of Evans Road and cross the Evans Road ROW just west of Roan Park and near the center of the Project.

Feature S-7 consists of a storm drain utility owned by the City of San Antonio that includes trenches, inlets and culverts along the median of Evans Road, as well as concrete bridges where East Elm Creek crosses Evans Road.

Features S-8 through S-11 consist of plugged geotechnical borings installed by Rock Engineering and Testing Laboratory, LLC in November 2022. These were reportedly installed to maximum total depths of approximately 10 feet. According to boring log data, a clayey sand stratum 1 to 3.5 feet thick was encountered at the surface, corresponding to the Eckrant and Crawford and Bexar soil series, underlain by up to 2 feet of weathered limestone corresponding to the weathered top of the bedrock. Bedrock was encountered at depths of 1 to 6 feet, consisting of hard tan limestone (i.e., the Kainer Formation). These logging observations are generally consisting with mapped soil and rock types. No shallow groundwater was observed during drilling operations. These features are collectively classified as not sensitive as they have been plugged and no longer exist.

Although not directly observable, it is inferred that the trenches for these subgrade installations are backfilled in accordance with standard construction practices that include the use of structural fill soils (e.g., base course materials, limestone gravel, compacted clay soils, etc.) overlain by native or fill soils, depending upon location and surface improvements. The trenches were not observed in conjunction with any naturally-occurring recharge features. Although the backfilled trenches may exhibit somewhat greater relative infiltration rate than the surrounding soil/rock strata underlying the project boundaries, these manmade features are collectively classified as not sensitive, having a low potential of preferentially transmitting fluids into the Edwards Aquifer. This classification is based upon the point assignment criteria presented in the ***Geologic Assessment Table (TCEQ-0585)*** and professional judgment.

Potential for Fluid Migration to the Edwards Aquifer

Based on a review of the Project geology, topography and drainage conditions, and the results of our mapping efforts, the overall potential for rapid fluid movement (i.e. surface-derived flow) to the Edwards Aquifer via infiltration is considered to be low to moderate. The following assessment findings support this conclusion:

- The majority of the Project is composed of existing roadways with impervious pavements and associated drainage improvements that convey storm water to existing drainage improvements along Evans Road.

- The Project is underlain by the Eckrant and Crawford and Bexar soils, which range in thickness from approximately 0.5 to 3 feet based on published data and field observations, and are classified as Hydrologic Soil Group D, having a high runoff potential when thoroughly wet and slow to moderate infiltration rate. Due to the impervious cover provided by the paved roadway and landscaping improvements, exposure of limestone bedrock is generally limited to the Evans Road median at the center of the Project Corridor reducing the potential for rapid infiltration.

- No features were identified that can be attributed to karstification of limestone terrain. There were no natural karst features observed in the vicinity of any the observed manmade features, which would increase the potential for rapid infiltration. Manmade features present within the Project (***Features S-1 through S-11***) are collectively classified as not sensitive based on consideration of construction details and application of point assignment criteria and professional judgment.

- No direct evidence and minimal indirect evidence of the mapped faults (***Feature S-12, S-13, and S-14***) was observed within or surrounding the Project and no discrete recharge features with direct connection to the subsurface were identified in association with these faults. Although infiltration along the inferred fault trace may occur, it is classified as not sensitive based upon the lack of discrete recharge openings along the fault trace and reported low relative infiltration rate of overlying soil cover.

Given the presence of a karst-bearing formation (i.e. the Kainer Formation of the Edwards Limestones), it is possible that karst features are present in the shallow subsurface. If features are discovered in conjunction with future phases of land development (i.e., earthwork, excavation), it is recommended that a qualified geoscientist be consulted to assess, determine the level of sensitivity, and provide recommendations for protective measures, if warranted.

References

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ATTACHMENT D

FEATURE POSITION TABLE
(GPS COORDINATES)

PROJECT GEOLOGIC MAP

FEATURE POSITION TABLE

City of San Antonio 2022 Bond Program: Evans Road Phase I

East Elm Creek to Masonwood Drive

Water and Sewer Utility Adjustments Plan

San Antonio, Bexar County, Texas

RKI Project No. ASF23-055-00

Feature Designation	Feature Type	Date Collected	North Latitude	West Longitude	UTM Northing (meters)	UTM Easting (meters)
S-1	SAWS water utility trench	8/23/2023	29°38'44.75"N	98°26'7.65"W	3279667	554641
S-2	CPS Energy natural gas utility trench	8/23/2023	29°38'52.61"N	98°25'51.26"W	3279912	555081
S-3	Google/AT&T/Spectrum communications utility trench	8/23/2023	29°38'45.81"N	98°26'6.22"W	3279700	554680
S-4	CPS Energy electrical utility trench	8/23/2023	29°38'52.63"N	98°25'45.83"W	3279913	555227
S-5	COSA traffic signal utility trench	8/23/2023	29°38'51.93"N	98°25'45.93"W	3279891	555225
S-6	SAWS sanitary sewer utility trench	8/23/2023	29°38'49.66"N	98°25'59.31"W	3279820	554865
S-7	COSA storm drain system	8/23/2023	29°38'44.99"N	98°26'6.10"W	3279675	554683
S-8	Geotechnical Boring B-4	11/17/2022	29°38'43.48"N	98°26'7.47"W	3279628	554647
S-9	Geotechnical Boring B-5	11/17/2022	29°38'46.52"N	98°26'4.52"W	3279722	554725
S-10	Geotechnical Boring B-6	11/17/2022	29°38'50.46"N	98°25'53.64"W	3279845	555017
S-11	Geotechnical Boring B-7	11/17/2022	29°38'53.01"N	98°25'47.30"W	3279924	555187
S-12	Normal fault (inferred)	8/23/2023	29°38'46.68"N	98°26'3.42"W	3279727	554755
S-13	Normal fault (inferred)	8/23/2023	29°38'47.92"N	98°26'0.75"W	3279766	554827
S-14	Normal fault (inferred)	8/23/2023	29°38'43.96"N	98°26'8.44"W	3279643	554620

1/19/24

STATE OF TEXAS
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GEOLOGY
259
LICENSED
PROFESSIONAL GEOSCIENTIST

Kkd
ROAN PARK
IMPALA PEAK
RESIDENTIAL
PINON CREEK
GAZELLE RANGE
1030
E EVANS RD
MATCHLINE
S-6
(Sanitary Sewer)
(Gas-S-2)
U
D
Fractured Bedrock
Patchy Outcrop
(Electric-S-4)
Weathered Float Rock
S-13
(Fault)
Fractured Bedrock
Kkke
Kkbn
S-9
(Plugged Geotechnical Boring, B-5)
S-12
(Fault)
U
D
S-3
(Communications)
East Elm Creek
Detention Pond
S-7
(Storm Drain)
S-1
(Water)
(Traffic Signals-S-5)
RESIDENTIAL
TERRACES AT ENCINO PARK
MONARCH
1020
1040
S-14
(Fault)
S-8
(Plugged Geotechnical Boring, B-4)
Kkd
Kkd
Kkd
1010
Patchy Outcrop and Float Rock
100-Year Floodplain
N
W
E
S
0
50
100
FEET
1 INCH = 100 FEET

Legend

- Evans Road PROJECT Corridor
- WPAP GA Feature

Existing Utility/Storm Drain System (Quiddity, 2023)

- W — Water
- FO-C — Communication
- SS — Sanitary Sewer
- G — Gas
- SD — Storm Drain System
- Plugged Geotechnical Boring (RETL, 2023)
- 100-Year Floodplain
- 10-Foot USGS Contour
- Inferred Fault. U and D indicate upthrown and downthrown sides, respectively
- Geology Contact (Clark, Golab & Morris, 2016)
  - Kainer Formation
    - Kkbn = Basal Nodular Member
    - Kkke = Kirschberg Evaporite Member
    - Kkd = Dolomitic Member

Sources:
1. 100-year floodplain obtained from the Flood Emergency Management Agency (FEMA) Fire Insurance Rate Map (FIRM), Panel No. 48029C0145G, effective date, September 29, 2010.
2. Geology/inferred faults taken from Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic framework and hydrostratigraphy of the Edwards and Trinity aquifers within northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, scale 1:24,000, pamphlet, https://doi.org/10.3133/sim3366,
3. Basemap obtained from Environmental Systems Research Institute (ESRI), 2022.
4. Geotechnical boring locations obtained from the Subsurface Exploration, Laboratory Testing Program, and Pavement Evaluation prepared by Rock Engineering and Testing Laboratory, LLC (RETL), Project Number: G222818-R1, report dated January 26, 2023.
5. Utilities provided by Quiddity on August 21, 2023 (TRG-SUE-QUID2305.00-EVANS RD-2022 COSA BOND-WORKING.dgn).

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PROJECT GEOLOGIC MAP

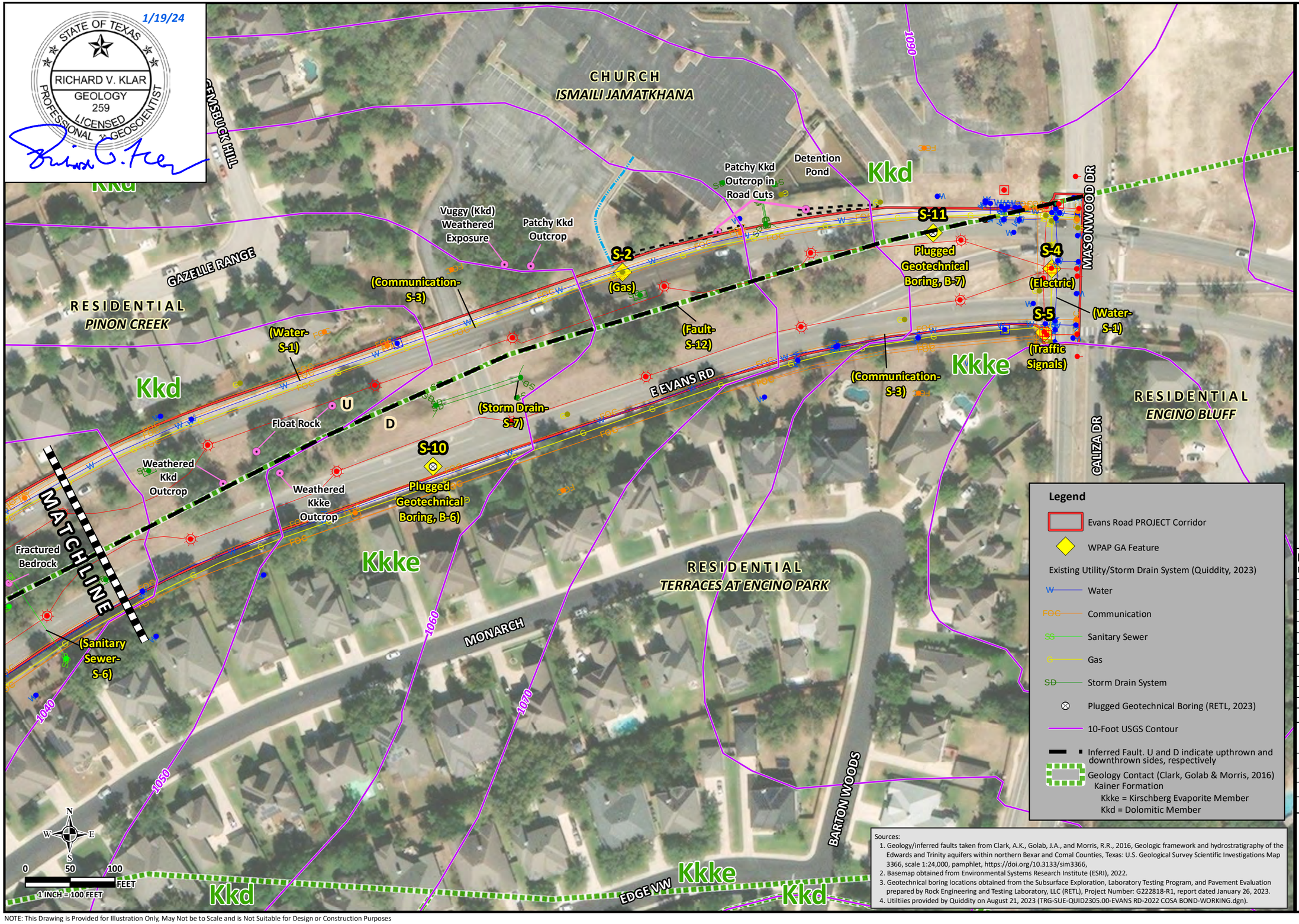
CITY OF SAN ANTONIO 2022 BOND PROGRAM:
EVANS ROAD PHASE 1
EAST ELM CREEK TO MASONWOOD DRIVE
WATER AND SANITARY SEWER UTILITY ADJUSTMENTS PLAN
SAN ANTONIO, BEXAR COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF23-055-00
ISSUE DATE:	1/19/2024
DRAWN BY:	LAW
CHECKED BY:	HEH
REVIEWED BY:	RVK

SHEET
1 of 2



Legend

- Evans Road PROJECT Corridor
- WPAP GA Feature

Existing Utility/Storm Drain System (Quiddity, 2023)

- W — Water
- FOC — Communication
- SS — Sanitary Sewer
- G — Gas
- SD — Storm Drain System
- ⊗ — Plugged Geotechnical Boring (RETL, 2023)
- 10-Foot USGS Contour
- Inferred Fault. U and D indicate upthrown and downthrown sides, respectively
- Geology Contact (Clark, Golab & Morris, 2016)
  - Kainer Formation
    - Kkke = Kirschberg Evaporite Member
    - Kkd = Dolomitic Member

Sources:

1. Geology/inferred faults taken from Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic framework and hydrostratigraphy of the Edwards and Trinity aquifers within northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, scale 1:24,000, pamphlet, https://doi.org/10.3133/sim3366,
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PROJECT GEOLOGIC MAP

CITY OF SAN ANTONIO 2022 BOND PROGRAM:
EVANS ROAD PHASE 1
EAST ELM CREEK TO MASONWOOD DRIVE
WATER AND SANITARY SEWER UTILITY ADJUSTMENTS PLAN
SAN ANTONIO, BEXAR COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.: ASF23-055-00

ISSUE DATE:	1/19/2024
DRAWN BY:	LAW
CHECKED BY:	HEH
REVIEWED BY:	RVK

SHEET 2 of 2

NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes

Water Pollution Abatement Plan Application (TCEQ-0584)

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating 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. This **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Jeff C. Haeber, PE

Date: 04/25/2025

Signature of Customer/Agent:

Regulated Entity Name: Evans Road Phase I

Regulated Entity Information

1. The type of project is:

   ☐ Residential: Number of Lots:_____
   ☐ Residential: Number of Living Unit Equivalents:_____
   ☐ Commercial
   ☐ Industrial
   ☒ Other:Public street

2. Total site acreage (size of property):9.61 acres

3. Estimated projected population:N/A

4. The amount and type of impervious cover expected after construction are shown below:

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops		÷ 43,560 =	
Parking		÷ 43,560 =	
Other paved surfaces	194,174	÷ 43,560 =	4.46
Total Impervious Cover	194,174	÷ 43,560 =	4.46

Total Impervious Cover 4.46 **÷ Total Acreage** 9.61 **X 100 =** 46.4**% Impervious Cover**

5. ☒ **Attachment A - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.

6. ☒ Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only

Complete questions 7 - 12 if this application is exclusively for a road project.

7. Type of project:

☐ TXDOT road project.
☐ County road or roads built to county specifications.
☒ City thoroughfare or roads to be dedicated to a municipality.
☐ Street or road providing access to private driveways.

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

☐ Concrete
☒ Asphaltic concrete pavement
☐ Other: _____

9. Length of Right of Way (R.O.W.): 2,492 feet.

Width of R.O.W.: 167.9 feet.
L x W = 418,407 Ft^2 ÷ 43,560 Ft^2/Acre = 9.61 acres.

10. Length of pavement area: 2,492 feet.

Width of pavement area: 77.9 feet.
L x W = 193,628 Ft^2 ÷ 43,560 Ft^2/Acre = 4.45 acres.
Pavement area 4.46 acres ÷ R.O.W. area 9.61 acres x 100 = 46.4% impervious cover.

11. ☐ A rest stop will be included in this project.

☒ A rest stop will not be included in this project.

12. ☒ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

13. ☒ **Attachment B - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

14. The character and volume of wastewater is shown below:

0% Domestic	_____Gallons/day
0% Industrial	_____Gallons/day
0% Commingled	_____Gallons/day
TOTAL gallons/day 0	

15. Wastewater will be disposed of by:

☐ On-Site Sewage Facility (OSSF/Septic Tank):

☐ **Attachment C - Suitability Letter from Authorized Agent**. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☐ Sewage Collection System (Sewer Lines):

☐ Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

☐ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

☐ The SCS was previously submitted on_____.

☐ The SCS was submitted with this application.

☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

☐ The sewage collection system will convey the wastewater to the _____ (name) Treatment Plant. The treatment facility is:

☐ Existing.
☐ Proposed.

16. ☐ All private service laterals will be inspected as required in 30 TAC §213.5.

Site Plan Requirements

Items 17 – 28 must be included on the Site Plan.

17. ☒ The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 100'.

18. 100-year floodplain boundaries:

☒ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
☐ No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA FIRM Panel 48029C0145G, Effective Date - Sep. 29, 2010

19. ☐ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, open space, etc. are shown on the plan.

☒ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):

☐ There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

☐ The wells are not in use and have been properly abandoned.
☐ The wells are not in use and will be properly abandoned.
☐ The wells are in use and comply with 16 TAC §76.

☒ There are no wells or test holes of any kind known to exist on the project site.

21. Geologic or manmade features which are on the site:

☐ All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.
☒ No sensitive geologic or manmade features were identified in the Geologic Assessment.
☐ **Attachment D - Exception to the Required Geologic Assessment**. A request and justification for an exception to a portion of the Geologic Assessment is attached.

22. ☒ The drainage patterns and approximate slopes anticipated after major grading activities.

23. ☒ Areas of soil disturbance and areas which will not be disturbed.

24. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.

25. ☒ Locations where soil stabilization practices are expected to occur.

26. ☒ Surface waters (including wetlands).

☐ N/A

27. ☒ Locations where stormwater discharges to surface water or sensitive features are to occur.

☐ There will be no discharges to surface water or sensitive features.

28. ☒ Legal boundaries of the site are shown.

Administrative Information

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

30. ☒ Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

Attachment A

FACTORS AFFECTING SURFACE WATER QUALITY

Potential sources of sediment to stormwater runoff include:

- Clearing, grading, and excavation activities, primarily un-stabilized areas; paving operations, demolition and debris disposal; dewatering operations, drilling, material delivery, storage and use landscaping operation.

Only inert material as defined by 30 TAC 330.2 will be used as fill material.

Potential pollutants other than sediment include the following materials and substances that could be expected to be present on-site during construction:

- Heavy metals – from concrete additives, concrete washout, material delivery, storage and use, and hazardous substances/ waste spills
- pH (Acids and Bases) – from concrete washout, painting and cleaning, drilling, material delivery, storage and use, and hazardous waste spills, and sanitary/septic waste
- Paints and Solvents - from concrete washout and waste, painting, concrete polishing, cleaning products, material delivery and use, and hazardous waste spills, and sanitary/septic waste
- Trash, Debris, and Solids – from clearing and grading, paving, concrete wash waste, construction painting and cleaning, demolition, drilling and blasting, material delivery storage and use, landscaping, and general construction
- Petroleum Based Products – from material delivery storage and use, hazardous waste spills, vehicle and equipment use on site, and vehicle and equipment fueling and maintenance and storage
- Pesticides/Herbicides – from material delivery, storage and use, hazardous waste spills, vehicle use, storage, service and maintenance
- Fertilizer/Nutrients – from painting, cleaning products, dewatering, material delivery and storage, spills during landscaping operation, sanitary/septic waste

Potential sources of post construction stormwater runoff include:

- Sediment – coarse and fine from vehicle and equipment use on site
- Trash, Debris, and Solids – from potable use
- Petroleum Based Products – from hazardous material spills, vehicle and equipment use on site

Attachment B

VOLUME AND CHARACTER OF STORMWATER

The project area, between Roan Park (West) to Masonwood Drive/Caliza Drive (East), is part of the Edwards Aquifer Recharge Zone and the Salado Creek watershed. The offsite drainage patterns will not be altered by the proposed improvements. Offsite runoff will enter the project limits and drain to proposed area inlets, curb inlets, and armored curb slots along the reconstructed Evans Road. The amount of onsite impervious area will increase from 3.99 acres to 3.45 acres (+/-0.47 acres). Impervious cover proposed in the project will include reconstructed roadway pavement, proposed curb and gutter, widened sidewalks, new stamped concrete, and concrete riprap for inlet/outlet protection.

The existing Evans Road was built post 1984 and discharges into a wide grassy median along the project limits through seven existing curb slots (proposed to be removed). The proposed storm inlets and storm systems are designed using the Atlas-14 25-year discharges. The proposed storm sewer systems (System A and System W) will be used to convey runoff captured by the inlets and outfall into the median just east of Roan Park, which ultimately outfalls into East Elm Creek to the west of the Roan Park culvert crossing.

System A includes proposed area inlets and curb inlets, located primarily near Masonwood Drive and 3559 E Evans Road (Ismaili Jamatkhana). These inlets described are intended to capture the concentrated amount of offsite runoff prior to entering Evans Road to ultimately reduce pavement ponding. The existing curb slots (Westbound and Eastbound) are proposed to be removed and improved.

The total TSS removal required for the project [L_m] is based on the onsite impervious area that contributes to the median. The project limits consist of approximately 4.45 acres of impervious area which produces a load removal requirement of 379.6 lbs.

A Contech Stormceptor will be used to treat onsite loads from drainage areas A-01 and B-01 within Storm System W to achieve 353.4 lbs of Total Suspended Solids (TSS) Load removal [L_R]. Additionally, a Vegetative Filter Strip (VFS) will be placed along Westbound Evans Road to treat onsite loads from drainage area A-00 to achieve 46.8 lbs of TSS Load removal. The total onsite impervious area contributing to the BMPs and their provided TSS load removal is shown in the table below. The total TSS removal required for the project is **379.6 LB**, while the total TSS removal provided by the BMPs is **400.2 LB**.

TREATMENT OPTION	CONTRIBUTING DRAINAGE AREAS	ONSITE CONTRIBUTING AREA (AC)	ONSITE IMPERVIOUS AREA (AC)	L_R (LBS)
STORMCEPTOR (4800 GAL)	A-01 & B-01	0.450	0.425	353.4
VEGETATIVE FILTER STRIP	A-00	0.055	0.053	46.8
			L_R (TSS Load Removal) Total=	***400.2***

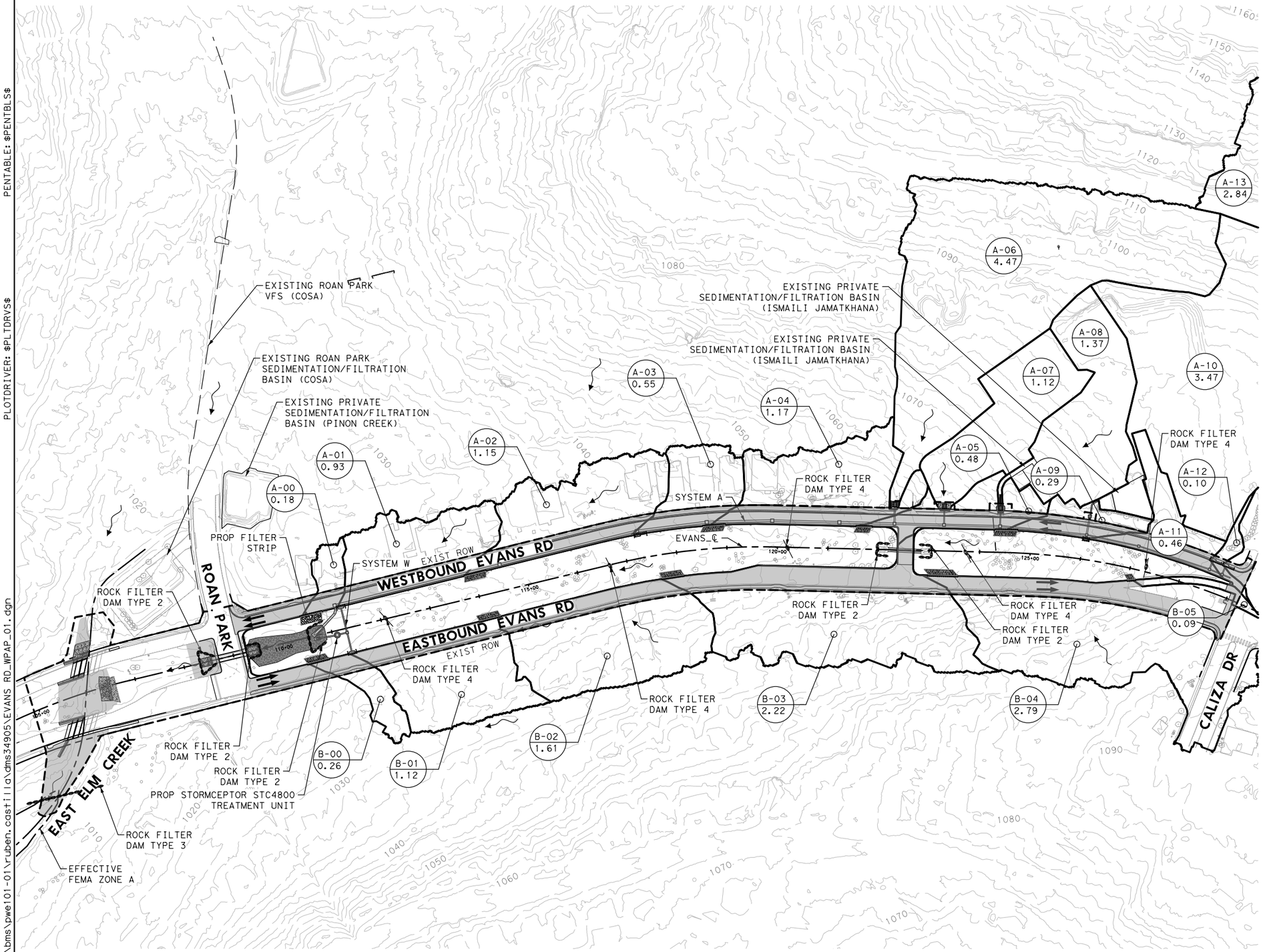
There are two (2) existing private sedimentation/filtration ponds located within 3559 E Evans Road (Ismaili Jamatkhana). These existing offsite basins discharge into the proposed Evans Road Storm System A. The proposed locations of the Stormceptor and VFS are placed such that no BMPs are in series.

As a note, the proposed drainage improvements include armored curb slots, allowing Evans Road to discharge directly into the median. As part of this project, the median and existing trees are sought to be impacted as little as possible. The use of continuous curb slots to allow sheet flow across vegetative filter strips (VFS) would require extensive median grading and would be unfavorable.

Attachment C

SUITABILITY LETTER FROM AUTHORIZED AGENT

The project area will not generate wastewater. The Suitability Letter from an Authorized Agent is not applicable for this project.



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LEGEND:

- EXISTING ROW
- FLOW DIRECTION
- X99 / X.XX — DRAINAGE AREA NUMBER AREA IN ACRES
- DRAINAGE AREA BOUNDARY
- EXISTING 2′ CONTOURS
- STORMCEPTOR CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP
- PROJECT AREA BOUNDARY

BMP SIZING

TOTAL PROJECT AREA = 9.61 AC

EXISTING IMPERVIOUS/PERVIOUS = 3.99/5.62 ACRES
PROPOSED IMPERVIOUS/PERVIOUS = 4.46/5.15 ACRES
TOTAL TSS REMOVAL REQUIRED = 384.8 LB

STORMCEPTOR TSS REMOVAL PROVIDED = 353.4 LB
VEGETATED FILTER STRIP TSS REMOVAL PROVIDED = 46.8 LB
TOTAL TSS REMOVAL PROVIDED = 400.2 LB

NOTE:

1. CONTRIBUTING BASINS TO PROP STORMCEPTOR INCLUDE: A-01, B-01
2. CONTRIBUTING BASINS TO PROP VFS INCLUDE: A-00
3. NO TREATMENT SELECTED FOR THE OTHER CONTRIBUTING PROJECT AREA BASINS
4. BOTH EXISTING PRIVATE SEDIMENTATION/FILTRATION BASINS(ISMAILI JAMATKHANA) CONTRIBUTE DIRECTLY TO STORM SYSTEM A
5. THE FILTER STRIP (IN DIRECTION OF FLOW) AT A-00 SHOULD BE A MINIMUM OF 15 FEET
6. TEMPORARY BMPS INCLUDE ROCK FILTER DAMS AND CURB INLET GRAVEL FILTER

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WATER POLLUTION ABATEMENT PLAN

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 181 OF 330

Temporary Stormwater Section

(TCEQ-0602)

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); 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. This **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Jeff C. Haeber, PE

Date: 04/25/2025

Signature of Customer/Agent:

Regulated Entity Name: Evans Road Phase I

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

   ☐ The following fuels and/or hazardous substances will be stored on the site: _____

   These fuels and/or hazardous substances will be stored in:

   ☐ Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.

☒ Fuels and hazardous substances will not be stored on the site.

2. ☒ **Attachment A - Spill Response Actions**. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.

3. ☒ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

4. ☒ **Attachment B - Potential Sources of Contamination**. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

5. ☒ **Attachment C - Sequence of Major Activities**. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.

   ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.

   ☒ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.

6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: East Elm Creek

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

7. ☒ **Attachment D – Temporary Best Management Practices and Measures**. TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.

☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.

☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.

☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.

8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.

☐ **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.

☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. ☒ **Attachment F - Structural Practices**. A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.

10. ☒ **Attachment G - Drainage Area Map**. A drainage area map supporting the following requirements is attached:

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

☒ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.

11. ☐ **Attachment H - Temporary Sediment Pond(s) Plans and Calculations**. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.

☒ N/A

12. ☒ **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.

13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.

14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.

16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. ☒ **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices**. A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. ☒ Records must be kept at the site of 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.

19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.

21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.

22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

Attachment A

SPILL RESPONSE ACTIONS

From TCEQ Section 30 TAC 327.5.

1. The responsible person shall immediately abate and contain the spill or discharge and cooperate fully with the executive director and the local incident command system. The responsible person shall also begin reasonable response actions which may include, but are not limited to, the following actions:
    - arrival of the responsible person or response personnel hired by the responsible person at the site of the discharge or spill;
    - initiating efforts to stop the discharge or spill;
    - minimizing the impact to the public health and the environment;
    - neutralizing the effects of the incident;
    - removing the discharged or spilled substances; and
    - managing the wastes.
2. Upon request of the local government responders or the executive director, the responsible person shall provide a verbal or written description, or both, of the planned response actions and all actions taken before the local governmental responders or the executive director arrive. When the agency on-scene coordinator requests this information, it is subject to possible additional response action requirements by the executive director. The information will serve as a basis for the executive director to determine the need for:
    - further response actions by the responsible person;
    - initiating state funded actions for which the responsible person may be held liable to the maximum extent allowed by law; and
    - subsequent reports on the response actions.
3. Except for discharges or spills occurring during the normal course of transportation about which carriers are required to file a written report with the U.S. Department of Transportation under 49 CFR §171.16, the responsible person shall submit written information, such as a letter, describing the details of the discharge or spill and supporting the adequacy of the response action, to the appropriate TNRCC regional manager within 30 working days of the discovery of the reportable discharge or spill. The regional manager has the discretion to extend the deadline. The documentation shall contain one of the following items:
    - A statement that the discharge or spill response action has been completed and a description of how the response action was conducted. The statement shall include the initial report information required by § 327.3(c) of this title (relating to Notification Requirements). The executive director may request additional

information. Appropriate response actions at any time following the discharge or spill include use of the Texas Risk Reduction Program rules in Chapter 350 of this title (relating to Texas Risk Reduction Program).

- A request for an extension of time to complete the response action, along with the reasons for the request. The request shall also include a projected work schedule outlining the time required to complete the response action. The executive director may grant an extension up to six months from the date the spill or discharge was reported. Unless otherwise notified by the appropriate regional manager or the Emergency Response Team, the responsible person shall proceed according to the terms of the projected work schedule.
- A statement that the discharge or spill response action has not been completed nor is it expected to be completed within the maximum allowable six month extension. The statement shall explain why completion of the response action is not feasible and include a projected work schedule outlining the remaining tasks to complete the response action. This information will also serve as notification that the response actions to the discharge or spill will be conducted under the Texas Risk Reduction Program rules in Chapter 350 of this title (relating to Texas Risk Reduction Program).

Numbers for Spill Response:

State of Texas 24-Hour Spill-Reporting Hotline and the State Emergency Response Commission

Phone: 1-800-832-8224

Texas Commission on Environmental Quality (San Antonio Office)

Hours: Monday – Friday, 8:00 a.m. – 5:00 p.m.

Address: 14250 Judson Rd San Antonio, TX 78233

Main Line: 210-490-3096

US EPA National Response Center

Phone: 1-800-424-8802

Emergency Response Teams

Phone: 911

Attachment B

POTENTIAL SOURCES OF CONTAMINATION

Potential pollutants other than sediment include the following materials and substances that could be expected to be present on-site during construction:

- Heavy Metals – from concrete additives, concrete washout, material delivery, storage and use, and hazardous substance/waste spills
- pH (Acids and Bases) – from concrete washout, painting and cleaning, drilling, material delivery, storage and use, hazardous waste spills, and sanitary/septic waste.
- Paints and Solvents – from concrete washout and waste, painting, concrete polishing, cleaning products, material delivery and use, hazardous waste spills, and sanitary/septic waste.
- Trash, Debris and Solids – from clearing and grading, paving, concrete wash waste, construction painting and cleaning, demolition, drilling and blasting, material delivery storage and use, landscaping, and general construction.
- Petroleum Based Products – from material delivery storage and use, hazardous waste spills, vehicle and equipment use on site, and vehicle and equipment fueling and maintenance and storage.
- Pesticides/Herbicides – from material delivery, storage and use, hazardous waste spills, vehicle use, storage, service and maintenance.
- Fertilizers/Nutrients – from painting, cleaning products, dewatering, material delivery and storage, spills during landscaping operation, sanitary/septic waste.

Potential sources of post construction stormwater runoff include:

- Sediment – coarse and fine from vehicle and equipment use on site.
- Heavy Metals – dissolved and particulate from vehicle use on the site.
- Trash, Debris and Solids – from public use.
- Petroleum Based Products – from hazardous material spills, vehicle and equipment use on site.

Attachment C

SEQUENCE OF MAJOR ACTIVITIES

1. Pull all necessary permits.
2. Construct temporary construction exits as needed or directed by the engineer; estimated disturbed area 0.02 acres.
3. Install all temporary erosion, sedimentation controls and tree protection fencing on site and offsite; estimated disturbed area 9.61 acres.
4. Maintain and inspect erosion controls; estimated disturbed area 9.61 acres.
5. Demolish existing structures on site; estimated disturbed area 3.40 acres.
6. Begin clearing and grubbing operations; clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where building is planned to commence within 14 days after clearing and grubbing; estimated disturbed area 3.40 acres.
7. Install underground utilities, including storm sewer and water lines with all related appurtenances, and any related site work; estimated disturbed area 3.40 acres.
8. Finalize pavement sub grade preparation, and install base/gravel material as required for pavement; estimated disturbed area 3.40 acres.
9. Install asphalt for paving, curb and gutter and sidewalks; estimated disturbed area 3.40 acres.
10. Complete all underground installation within the right-of-way; estimated disturbed area 3.40 acres.
11. Complete permanent erosion control and stabilize all disturbed areas through the restoration of site vegetation; estimated disturbed area 3.40 acres.
12. Perform final site cleanup; estimated disturbed area 9.61 acres.
13. Remove all temporary erosion controls; estimated disturbed area 9.61 acres.

Attachment D

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

Temporary BMP's are designed in accordance with the TCEQ Technical Guidance on Best Management Practices manual (RG-348 Revised July 2005).

Temporary erosion and sediment control methods are proposed for construction-generated pollution for on-site storm water and are to be installed prior to commencing earth disturbing activities.

- Temporary seeding and planting of all unpaved areas. Temporary seeding is used to protect earthen sediment control practices and to stabilize denuded areas that will not be brought to final grade for several weeks or months. Temporary seeding can provide a nurse crop for permanent vegetation, provide residue for soil protection and seedbed preparation, and help prevent dust production during construction.
- Mulching exposed areas. Surface mulch is the most effective, practical means of controlling erosion on disturbed areas before establishing vegetation. Mulch protects the soil surface, reduces runoff velocity, increases infiltration, slows soil moisture loss, helps prevent soil crusting and sealing, moderates soil temperatures, and improves the microclimate for seed germination.
- Soil Roughening by normal tilling, disking, harrowing, or use of a cultipacker-seeder. Roughening a sloping bare soil surface with horizontal depressions helps control erosion by aiding the establishment of vegetable cover with seed, reducing runoff velocity, and increasing infiltration. The depressions also trap sediment on the face of the slope.
- Construction site stormwater runoff and sediment control by use of silt fencing and inlet protection.
- Dust Control (frequent watering to minimize wind erosion during construction). To minimize dust on construction sites, it is important to schedule construction activities, so the least amount of soil is disturbed at any one time.

Attachment E

REQUEST TO TEMPORARILY SEAL A FEATURE

Attachment E is not applicable to this project. There are no naturally occurring sensitive features that need to be sealed.

Attachment F

STRUCTURAL PRACTICES

1. Perimeter protection using reinforced silt fencing. A silt fence is a permeable barrier erected on small disturbed areas to capture sediment from sheet flow. It is made of a filter fabric buried at the bottom, the fabric restricts flow rate, forming a sedimentation pool at the approach to the inlet or downstream conveyance.

2. Stabilized construction entrance/exit points. During wet weather, unstabilized staging/laydown areas become muddy and are virtually unusable. These areas generate sediment and cause work disruption.

3. Proper grading and stabilization of construction routes often saves money for the Contractor by improving the overall efficiency of the construction operation while reducing potential erosion problems. Gravel Curb Inlet Protection. Inlet protection provides a means of preventing suspended soil particles from entering storm water catch basins prior to the placement of impervious surfaces. This is achieved by surrounding catch basins with a porous filter media to dissipate surface flow velocities, thereby allowing settlement of soil particles from turbid runoff prior to entering the catch basin.

4. Temporary Gravel and Wire Mesh Inlet Sediment Filter. Inlet protection provides a means of preventing suspended soil particles from entering storm water catch basins prior to the placement of impervious surfaces. This is achieved by surrounding area inlets with a porous filter media to dissipate surface flow velocities, thereby allowing settlement of soil particles from turbid runoff prior to entering the area inlet.

5. Concrete Wash Area. Washout areas create an impervious swale with perimeter protection which stores excess concrete materials until removed from the site.

Attachment G

DRAINAGE AREA MAP

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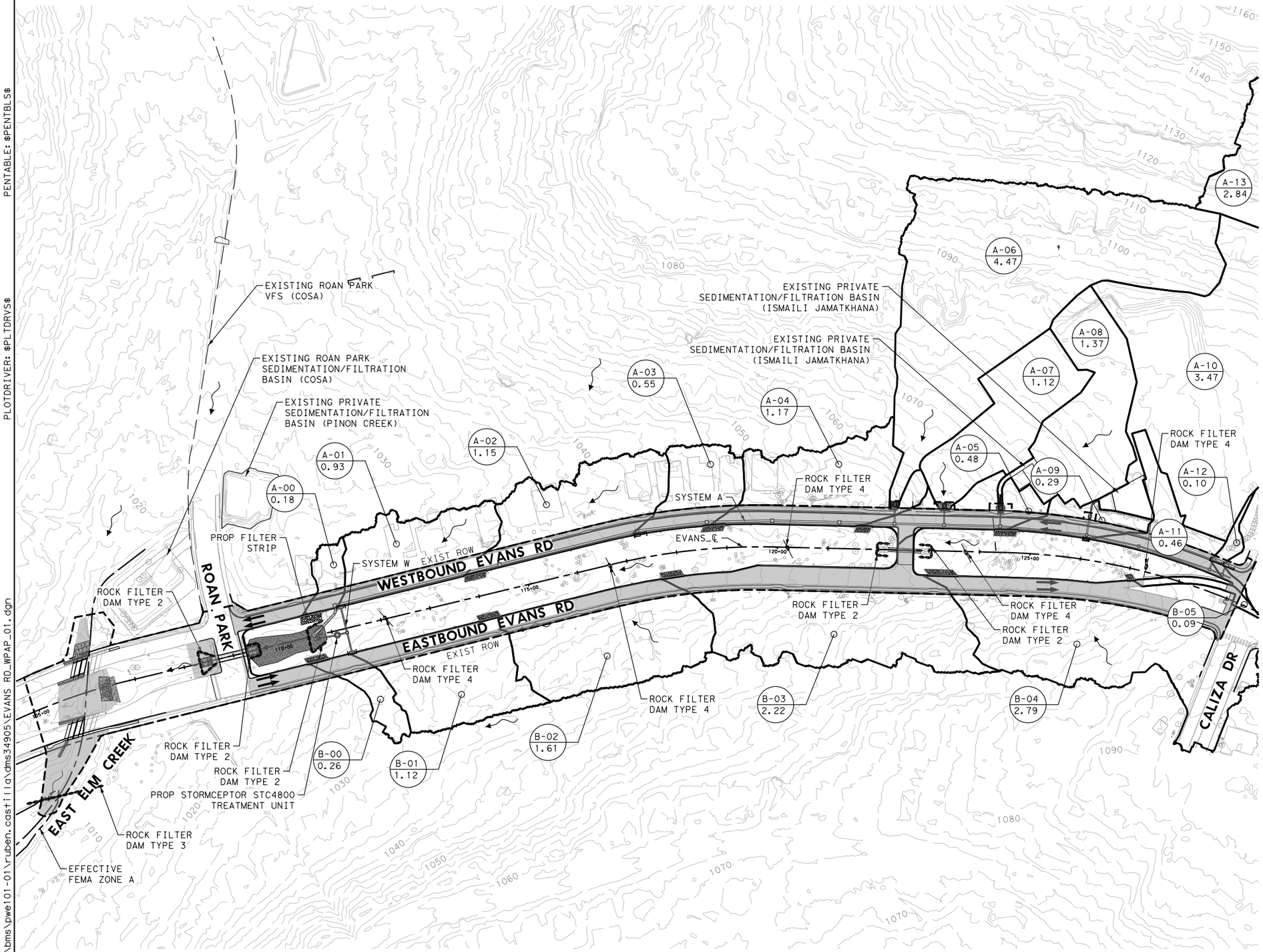

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N

LEGEND:

- EXISTING ROW
- FLOW DIRECTION
- X99 / X.XX — DRAINAGE AREA NUMBER AREA IN ACRES
- DRAINAGE AREA BOUNDARY
- EXISTING 2′ CONTOURS
- STORMCEPTOR CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP
- PROJECT AREA BOUNDARY

BMP SIZING

TOTAL PROJECT AREA = 9.61 AC

EXISTING IMPERVIOUS/PERVIOUS = 3.99/5.62 ACRES
PROPOSED IMPERVIOUS/PERVIOUS = 4.46/5.15 ACRES
TOTAL TSS REMOVAL REQUIRED = 384.8 LB

STORMCEPTOR TSS REMOVAL PROVIDED = 353.4 LB
VEGETATED FILTER STRIP TSS REMOVAL PROVIDED = 46.8 LB
TOTAL TSS REMOVAL PROVIDED = 400.2 LB

NOTE:

1. CONTRIBUTING BASINS TO PROP STORMCEPTOR INCLUDE: A-01, B-01
2. CONTRIBUTING BASINS TO PROP VFS INCLUDE: A-00
3. NO TREATMENT SELECTED FOR THE OTHER CONTRIBUTING PROJECT AREA BASINS
4. BOTH EXISTING PRIVATE SEDIMENTATION/FILTRATION BASINS(ISMAILI JAMATKHANA) CONTRIBUTE DIRECTLY TO STORM SYSTEM A
5. THE FILTER STRIP (IN DIRECTION OF FLOW) AT A-00 SHOULD BE A MINIMUM OF 15 FEET
6. TEMPORARY BMPS INCLUDE ROCK FILTER DAMS AND CURB INLET GRAVEL FILTER

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WATER POLLUTION ABATEMENT PLAN

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 181 OF 330

Attachment H

TEMPORARY SEDIMENT POND PLANS AND CALCULATIONS

Attachment H is not applicable to this project. There are no proposed Temporary Sediment Pond Plans for the project. Erosion and sediment controls other than sedimentation basins or sediment traps within each disturbed drainage area will be used.

Attachment I

INSPECTION AND MAINTENANCE FOR BMPS

The following list of items outlines and dictates Inspection and Maintenance for BMPs practices. Inspection and maintenance guidelines come from TCEQ RG-348.

In addition to these measures the contractor will be subject to the provisions of the TCEQ General Permit Number TXR 150000 relating to discharges from construction activities.

Temporary Construction Entrance/Exit

1. The entrance should be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment.
2. All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor.
3. When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way.
4. When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
5. All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

Silt Fence

1. Inspect all fencing weekly, and after any rainfall.
2. Remove sediment when buildup reaches 6 inches.
3. Replace any torn fabric or install a second line of fencing parallel to the torn section.
4. Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points.
5. When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of the silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.

Check Dams

1. Check dams should be inspected and checked for sediment accumulation after each runoff-producing storm event.
2. Sediment should be removed when it reaches one half of the original height of the measure.
3. Regular inspections should be made to insure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam should be corrected immediately.

Inlet Protection

1. Inspection should be made weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor.
2. Remove sediment when buildup reaches a depth of 3 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode.
3. Check placement of device to prevent gaps between device and curb.
4. Inspect filter fabric and patch or replace if torn or missing.
5. Structures should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.

Attachment J

SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

Onsite construction activities shall be conducted in accordance with the SWPPP for the project which included the provisions of the TPDES General Permit Discharge Waste N. TXR150000. This permit requires the following:

Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of the site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is preclude by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

Interim Stabilization Measures will include one of the following methods.

1. Temporary Vegetation
2. Installation of blankets or matting material
3. Hydraulic Mulch
4. Sod

The interim and permanent stabilization will be installed in accordance with the standard specifications for the county or city having jurisdiction over the project, whichever is more stringent. If the governing entity does not have specifications for these items, the work shall be completed in compliance with the procedures and specifications outlined in the current Technical Guidance Manual published by the TCEQ.

Permanent Stabilization measures will include one of the following methods:

1. Permanent Vegetation including landscape planting with trees, shrubs, or ground cover.
2. Installation of blankets or matting material
3. Hydromulch
4. Grass Sodding
5. Rock or concrete riprap
6. Slopes that are steeper than 3:1 should be covered with appropriate soil stabilization matting as described in the following section to prevent loss of soil and seed.

Table 1-4 Temporary Seeding for Bexar, Comal, Kinney, Medina, and Uvalde Counties (Northcutt, 1993)

Dates	Climate	Species (lb/ac)	
Sept. 1 to Nov. 30	Temporary Cool Season	Tall Fescue	4.0
		Oats	21.0
		Wheat (Red, Winter)	30.0
		Total	55.0
Sept. 1 to Nov. 30	Cool Season Legume	Hairy Vetch	8.0
May 1 to Aug. 31	Temporary Warm Season	Foxtail Millet	30.0

Permanent Stormwater Section

(TCEQ-0600)

Permanent Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(Ii), (E), and (5), 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. This **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Jeff C. Haeber, PE

Date: 04/25/2025

Signature of Customer/Agent

Regulated Entity Name: Evans Road Phase I

Permanent Best Management Practices (BMPs)

Permanent best management practices and measures that will be used during and after construction is completed.

1. ☒ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.

   ☐ N/A

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

   ☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: _____

☐ N/A

3. ☒ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.

   ☐ N/A

4. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

   ☐ The site will be used for low density single-family residential development and has 20% or less impervious cover.
   ☐ The site will be used for low density single-family residential development but has more than 20% impervious cover.
   ☒ The site will not be used for low density single-family residential development.

5. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

   ☐ **Attachment A - 20% or Less Impervious Cover Waiver**. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.
   ☐ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
   ☒ The site will not be used for multi-family residential developments, schools, or small business sites.

6. ☒ **Attachment B - BMPs for Upgradient Stormwater**.

☒ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.

☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.

☐ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

7. ☒ **Attachment C - BMPs for On-site Stormwater**.

☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.

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

8. ☒ **Attachment D - BMPs for Surface Streams**. A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.

☐ N/A

9. ☒ The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.

☒ The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.

☐ **Attachment E - Request to Seal Features**. A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.

10. ☒ **Attachment F - Construction Plans**. All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:

☒ Design calculations (TSS removal calculations)

☒ TCEQ construction notes

☐ All geologic features

☒ All proposed structural BMP(s) plans and specifications

☐ N/A

11. ☒ **Attachment G - Inspection, Maintenance, Repair and Retrofit Plan**. A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:

    ☒ Prepared and certified by the engineer designing the permanent BMPs and measures
    ☒ Signed by the owner or responsible party
    ☒ Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
    ☒ A discussion of record keeping procedures

    ☐ N/A

12. ☐ **Attachment H - 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

13. ☒ **Attachment I -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 velocities, and other in-stream effects caused by the regulated activity, which increase erosion that results in water quality degradation.

    ☐ N/A

Responsibility for Maintenance of Permanent BMP(s)

Responsibility for maintenance of best management practices and measures after construction is complete.

14. ☒ 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 having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.

    ☐ N/A

15. ☒ A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.

    ☐ N/A

Attachment A

20% OR LESS IMPERVIOUS COVER WAIVER

The impervious cover of this site is greater than 20%. A 20% or less impervious cover waiver is not being requested as part of this plan.

Attachment B

BMPS FOR UPGRADIENT STORMWATER

There are currently no existing permanent BMPs to convey upgradient discharge onsite. A Contech Stormceptor will be utilized to collect pollutants that enter the proposed storm sewer system. Treatment for the existing offsite runoff is not proposed for the project.

Additionally, the eastbound and westbound directions are separated by a 100' wide grassy median that directs runoff to East Elm Creek. This vegetative cover within the median is proposed to be maintained and will be effective in preventing pollution of surface water and ground water originating upgradient and flowing across the site. Attachment F (Construction Plans) show the treated/untreated areas.

TREATMENT SELECTED	DRAINAGE AREA	POST DEVELOPMENT CONDITON		TSS REMOVED WITH SELECTED BMP (LBS)
		ONSITE CONTRIBUTING AREA (AC.)	ONSITE IMPERVIOUS AREA (AC.)	
STORMCEPTOR (4800GAL)	A-01, B-01	0.450	0.425	353.43
FILTER STRIP	A-00	0.055	0.053	46.76

Attachment C

BMPS FOR ON-SITE STORMWATER

Permanent BMP's are designed in accordance with the TCEQ Technical Guidance on Best Management Practices manual (RG-348 Revised July 2005). Permanent structural practices consist of Stormceptors along Evans Road to serve the roadway sections that are sloped towards the grassy median. See the *Storm Drain Plan & Profile* sheets and *Water Pollution Abatement Plan* sheets in the construction plans for more details.

TSS Removal and BMP Sizing

The increase in impervious area is (+/-) 0.47 acres within the 9.61 acre project site.

The Construction Plans under Attachment F show the drainage basins and treated/untreated areas, along with the total suspended solids (TSS) summary. The total TSS required to be removed due to the proposed development is 384.8 lbs. The total removed TSS by the proposed Stormceptor and Vegetated Filter Strip is 400.2 lbs.

Attachment D

BMPS FOR SURFACE STREAMS

Vegetative Filter Strip (VFS) and one (1) Contech Stormceptor will be used to treat stormwater runoff that ultimately discharges to East Elm Creek. Refer to Attachment F (Construction Plans) for construction details and TSS calculations.

Attachment E

REQUEST TO SEAL FEATURES

There are no “sensitive” features on-site, and a request to seal a feature is not a part of this WPAP.

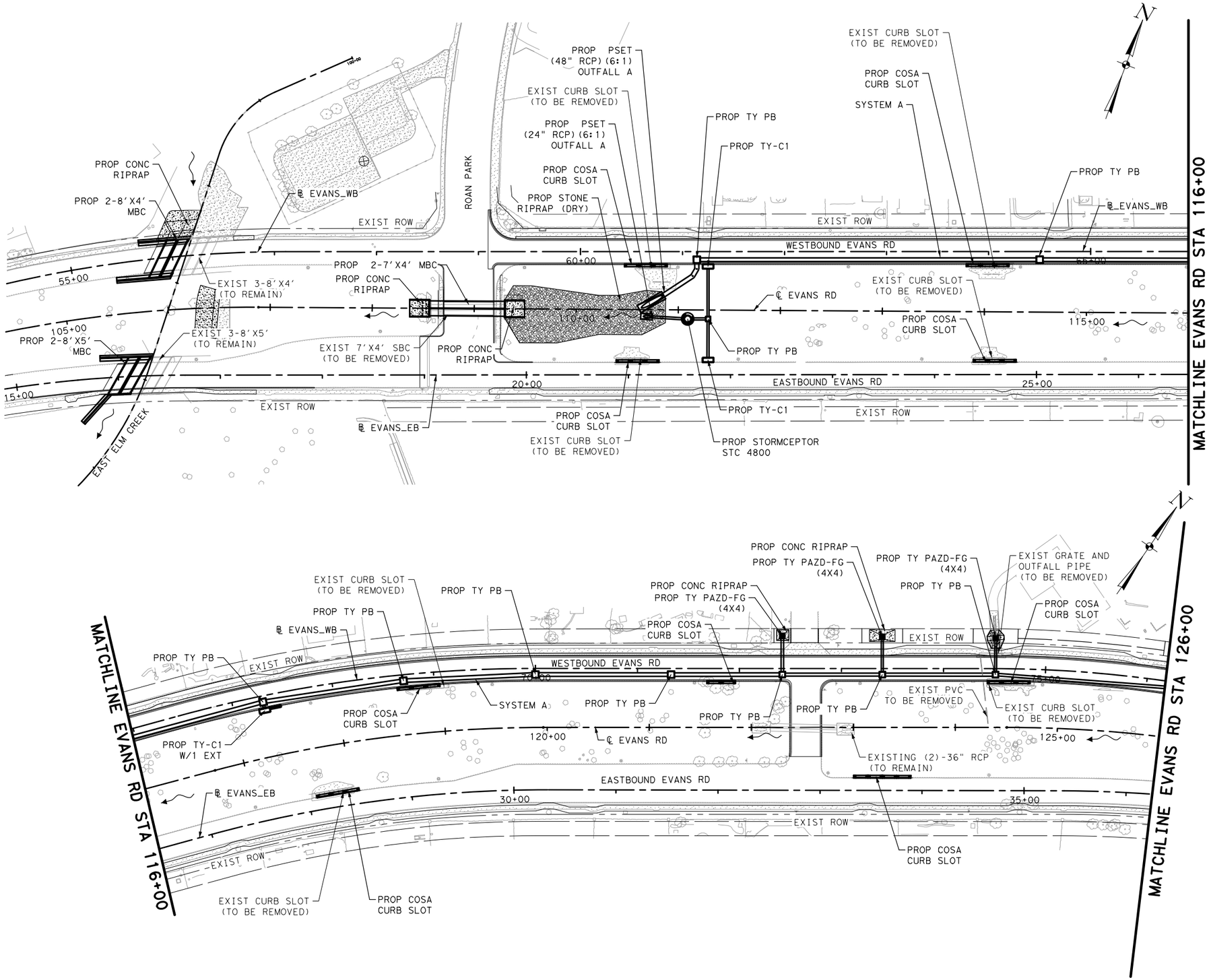
Attachment F

CONSTRUCTION PLANS

The scope of the Evans Road Phase I project includes the full-depth reconstruction of Westbound Evans Road and the milling and overlay of Eastbound Evans Road between Roan Park (West) to Masonwood Drive/Caliza Drive (East). The project incorporates a drainage solution to reduce pavement ponding and to intercept offsite discharge along Westbound Evans Road, primarily at 3559 E Evans Road (Ismaili Jamatkhana) and Masonwood Drive. Proposed grading and modifications to the vegetated median is minimized to preserve the existing trees.

Vegetative Filter Strip (VFS) and one (1) Contech Stormceptor are proposed for the project to treat storm water discharges. The proposed Impervious Cover includes reconstructed pavement, curb and gutter, widened sidewalks, and riprap along Evans Road. The table below summarizes the proposed impervious cover. Plan sheets that include the calculations and details for the proposed permanent BMPs are attached.

Proposed Impervious Cover Summary		
Site Area	9.61	ac.
Proposed Impervious Cover	4.46	ac.
Proposed Pervious Cover	5.15	ac.
Proposed Percent Impervious Cover	46.4	%



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STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

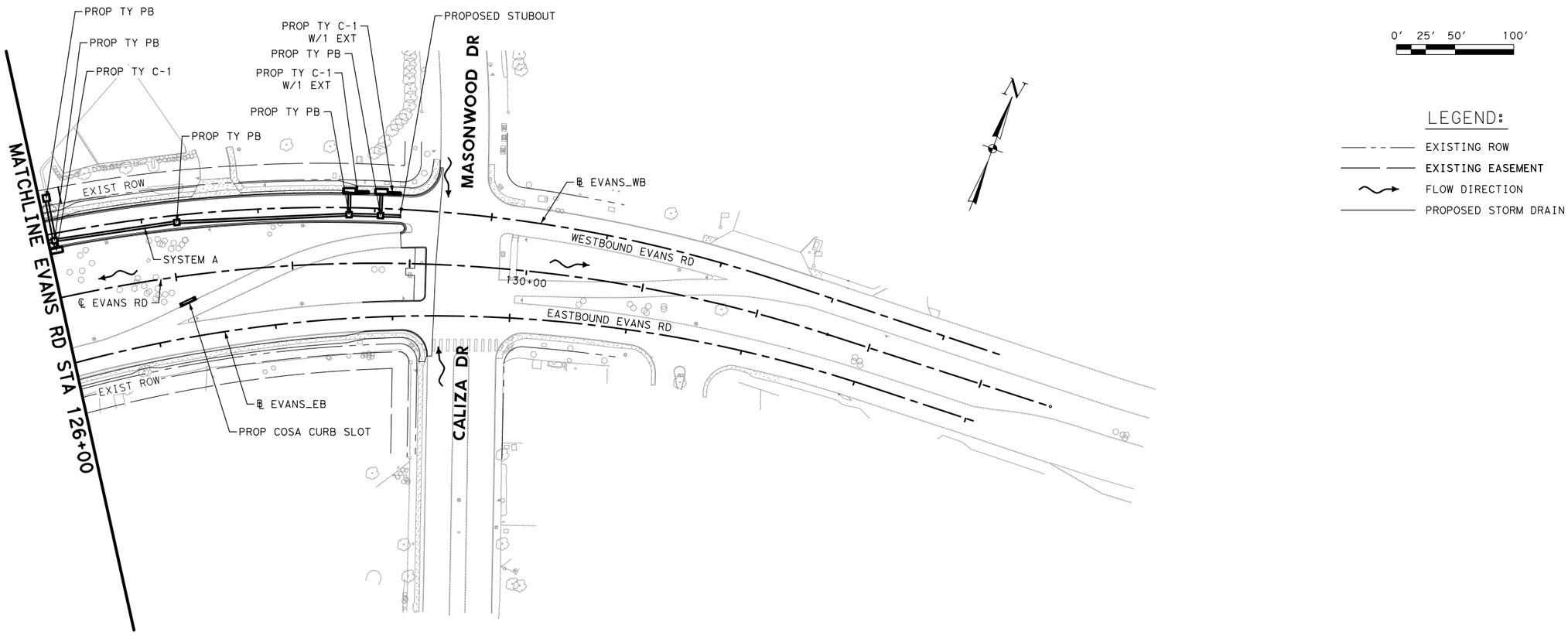
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

DRAINAGE SYSTEM LAYOUT

BEGIN TO STA 126+00 SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 154 OF 330



STATE OF TEXAS
RUBEN A. CASTILLA
150047
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EVANS RD PHASE 1

DRAINAGE SYSTEM LAYOUT

STA 126+00 TO END — SHEET 02 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 155 OF 330

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TIME OF CONCENTRATION

NRCS-TR-55 METHOD

DRAINAGE AREA ID	DRAINAGE AREA (AC)	SHEET FLOW					SHALLOW CONCENTRATED FLOW				OPEN CHANNEL FLOW					PIPE FLOW			t_c	
		L_w	S_w	P_2	n_s	t_s	L_w	S_w	K	t_w	L_w	S_w	n_c	R	t_c	L_p	S_p	t_p		
		SHEET FLOW LENGTH (FT)	SHEET FLOW SLOPE (FT/FT)	2-YR, 24-HR RAINFALL DEPTH (IN.)	OVERLAND ROUGHNESS COEFF.	SHEET FLOW TRAVEL TIME (HR)	SHALLOW CONC. FLOW LENGTH (FT)	SHALLOW CONC. FLOW SLOPE (FT/FT)	PAVED (20.32) / UNPAVED (16.13)	SHALLOW CONC. FLOW TIME (HR)	CHANNEL FLOW LENGTH (FT)	CHANNEL FLOW SLOPE (FT/FT)	CHANNEL MANNING'S ROUGHNESS COEFF.	HYDRAULIC RADIUS (FT)	CHANNEL FLOW (HR)	Pipe flow length (ft)	Assumed Velocity (ft/s)	Pipe time (hr)	TIME OF CON. (MIN)	
A-00	0.18	55	0.050	4.04	0.41	0.140	45	0.050	16.13	0.003	-					-			8.71	
							32	0.041	20.32	0.002										
A-01	0.93	50	0.044	4.04	0.41	0.136	148	0.014	16.13	0.021	-					-			10.39	
							179	0.024	20.32	0.016										
A-02	1.15	55	0.053	4.04	0.41	0.137	133	0.030	16.13	0.013	-					-			10.32	
							287	0.031	20.32	0.022										
A-03	0.55	50	0.045	4.04	0.41	0.135	97	0.063	16.13	0.007	-					-			9.17	
							144	0.031	20.32	0.011										
A-04	1.17	70	0.083	4.04	0.41	0.138	119	0.073	16.13	0.008	-					-			9.85	
							253	0.035	20.32	0.018										
A-05	0.48	100	0.094	4.04	0.15	0.078	212	0.045	20.32	0.014	-					-			5.52	
A-06	4.47	85	0.117	4.04	0.41	0.141	591	0.041	16.13	0.050	-					-			12.44	
							317	0.070	20.320	0.016										
A-07	1.12	100	0.052	4.04	0.011	0.012	308	0.057	16.13	0.022	-					-			5.00	*
A-08	1.37	100	0.015	4.04	0.011	0.020	149	0.062	20.32	0.008	126	0.088	0.013	0.35	0.002	-			5.00	*
A-09	0.29	42	0.091	4.04	0.15	0.040	219	0.064	20.32	0.012	-					-			5.00	*
A-10	3.47	65	0.069	4.04	0.41	0.140	90	0.114	16.13	0.005	-					178	6	0.008	10.81	
							367	0.033	20.320	0.027										
A-11	0.46	100	0.059	4.04	0.15	0.094	227	0.055	20.32	0.013	-					-			6.45	
A-12	0.10	100	0.026	4.04	0.15	0.131	69	0.073	16.13	0.004	-					-			8.15	
A-13	2.84	90	0.140	4.04	0.41	0.137	216	0.103	16.13	0.012	-					-			12.33	
							852	0.042	20.320	0.057										
B-00	0.26	45	0.036	4.04	0.41	0.136	142	0.076	16.13	0.009	-					-			8.94	
							65	0.038	20.320	0.005										
B-01	1.12	55	0.047	4.04	0.41	0.143	159	0.055	16.13	0.012	-					-			10.58	
							243	0.024	20.320	0.022										
B-02	1.61	55	0.055	4.04	0.41	0.135	158	0.048	16.13	0.012	-					-			10.28	
							312	0.031	20.320	0.024										
B-03	2.22	65	0.067	4.04	0.41	0.142	172	0.096	16.13	0.010	-					-			11.40	
							518	0.033	20.320	0.039										
B-04	2.79	55	0.049	4.04	0.41	0.141	124	0.095	16.13	0.007	-					-			10.53	
							453	0.050	20.320	0.028										
B-05	0.09	100	0.022	4.04	0.011	0.017	176	0.275	20.32	0.005	-					-			5.00	*
COMBINED (ROAN PARK)	30.45	40	0.032	4.04	0.15	0.058	-				1824	0.038	0.050	0.533	0.133	95	6	0.004	11.70	

DISCHARGE

RUNOFF COMPUTATION - RATIONAL METHOD

DRAINAGE AREA ID	DRAINAGE AREA (AC)	PROP C	TC (MIN)	PROP I 25YR (IN/HR)	PROP I 100YR (IN/HR)	PROP Q 25YR (CFS)	PROP Q 100YR (CFS)
A-00	0.18	0.77	8.71	9.34	11.82	1.28	1.62
A-01	0.93	0.75	10.39	8.75	11.06	6.15	7.77
A-02	1.15	0.75	10.32	8.78	11.09	7.64	9.66
A-03	0.55	0.75	9.17	9.17	11.60	3.78	4.79
A-04	1.17	0.74	9.85	8.93	11.30	7.75	9.80
A-05	0.48	0.72	5.52	10.82	13.64	3.72	4.69
A-06	4.47	0.67	12.44	8.12	10.24	24.41	30.78
A-07	1.12	0.85	5.00	11.14	14.01	10.58	13.30
A-08	1.37	0.92	5.00	11.14	14.01	14.09	17.72
A-09	0.29	0.72	5.00	11.14	14.01	2.31	2.91
A-10	3.47	0.78	10.81	8.62	10.89	23.39	29.54
A-11	0.46	0.82	6.45	10.31	13.03	3.87	4.89
A-12	0.10	0.65	8.15	9.55	12.09	0.59	0.75
A-13	2.84	0.76	12.33	8.15	10.28	17.62	22.21
B-00	0.26	0.75	8.94	9.25	11.71	1.82	2.30
B-01	1.12	0.74	10.58	8.70	10.99	7.18	9.07
B-02	1.61	0.74	10.28	8.79	11.11	10.42	13.18
B-03	2.22	0.75	11.40	8.44	10.65	14.10	17.80
B-04	2.79	0.73	10.53	8.71	11.01	17.85	22.55
B-05	0.09	0.97	5.00	11.14	14.01	0.94	1.19
COMBINED (ROAN PARK)	30.45	0.72	11.70	8.34	10.53	182.49	230.33

NOTES:

1. BASINS MARKED WITH "*" INDICATE THAT THE BASIN UTILIZED A MINIMUM TC OF 5 MINUTES.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

HYDROLOGIC DATA SHEETS

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC CHKD. BY: JA	SHEET NO.: 156 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE:4/24/2025 9:27:20 AM USER:R_Castilla
FILE:c:\bms\pwe101-01\ruben.castilla\dms34905\EVANS RD_DRAINAGE HYDRAULIC DATA_01.dgn

SYSTEM-A INLET COMPUTATIONS

INLET									CURB INLET DESIGN														
INLET ID	REFERENCE CHAIN	STATION	OFFSET (FT)	TYPE	PROFILE TYPE	DISCHARGE Q (CFS)	ADDED CARRY OVER (CFS)	Q INTERCEPTED (CFS)	LENGTH REQUIRED (FT)	ACTUAL LENGTH (FT)	DEPRESSION DEPTH (FT)	DEPRESSION WIDTH (FT)	LONG. SLOPE (%)	CROSS SLOPE (FT/FT)	MANNING'S n-VALUE	ALLOW. POND WIDTH (FT)	ACTUAL POND WIDTH (FT)	MAX PONDED DEPTH (FT)	COMPUTED PONDED DEPTH (FT)	CAPACITY (CFS)	CARRY OVER INLET ID	CARRY OVER FLOW (CFS)	REMARKS
A-00	EVANS_WB	60+50.00	12.8	ARMOR CURB 42' TOTAL	On Grade	1.28	2.33	3.62	16.90	28.25	0.21	2.00	1.38	0.02	0.018	24.00	11.50	0.48	0.23	3.62			INLET NEAREST INTERSECTION WITH ROAN PARK
A-01	EVANS_WB	61+25.00	12.8	TY-1 10' INLET	On Grade	6.15	0.03	6.19	23.89	10.00	0.21	2.00	1.75	0.02	0.018	12.00	13.46	0.24	0.27	3.86	A-00	2.33	INLET CONTRIBUTES TO STORMCEPTOR (SYSTEM W)
A-02	EVANS_WB	63+85.00	12.8	ARMOR CURB 42' TOTAL	On Grade	7.64	0.02	7.66	29.68	28.25	0.21	2.00	2.63	0.02	0.018	24.00	13.51	0.48	0.27	7.63	A-01	0.03	
A-03	EVANS_WB	67+30.00	12.8	TY-1 10' INLET W/ 1EXT	On Grade	3.78	0.13	3.91	21.15	20.00	0.21	2.00	3.03	0.02	0.018	24.00	10.22	0.48	0.20	3.89	A-02	0.02	
A-04	EVANS_WB	68+70.00	12.8	ARMOR CURB 42' TOTAL	On Grade	7.75	0.23	7.98	31.40	28.25	0.21	2.00	3.03	0.02	0.018	24.00	13.36	0.48	0.27	7.85	A-03	0.13	
A-05	EVANS_WB	71+75.00	12.8	ARMOR CURB 28' TOTAL	On Grade	3.72		3.72	23.92	18.83	0.21	2.00	5.63	0.02	0.018	24.00	8.94	0.48	0.18	3.49	A-04	0.23	
A-06	EVANS_WB	72+42.00	-32.0	PAZD TY-FG 4'x4' W/ 4'X4' GRATE	Sag	24.40		24.40						0.50	0.013	12.00	2.46	1.00	1.23	22.02			AREA INLET IN DRAINAGE EASEMENT
A-07	EVANS_WB	73+40.00	-31.0	PAZD TY-FG 4'x4' W/ 4'X4' GRATE	Sag	10.57		10.57						0.50	0.013	12.00	1.11	1.00	0.55	22.02			AREA INLET IN DRAINAGE EASEMENT
A-08	EVANS_WB	74+51.00	-30.0	PAZD TY-FG 4'x4' W/ 4'X4' GRATE	Sag	14.08		14.08						0.50	0.013	12.00	1.34	1.00	0.67	22.02			AREA INLET IN DRAINAGE EASEMENT
A-09	EVANS_WB	74+50.00	12.8	ARMOR CURB 42' TOTAL	On Grade	2.32	2.26	4.58	21.55	28.25	0.21	2.00	2.23	0.02	0.018	24.00	11.49	0.48	0.23	4.58	A-05		
A-11	EVANS_WB	76+24.00	12.8	TY-1 10' INLET	On Grade	3.87	1.15	5.01	28.01	10.00	0.21	2.00	5.60	0.02	0.018	24.00	10.01	0.48	0.20	2.75	A-09	2.26	
A-12	EVANS_WB	78+78.00	-12.8	TY 1 10' INLET W/ 1EXT	On Grade	0.59	6.76	7.35	31.06	20.00	0.21	2.00	3.56	0.02	0.018	24.00	12.57	0.48	0.25	6.20	A-11	1.15	
A-13	EVANS_WB	79+05.00	-12.8	TY 1 10' INLET W/ 1EXT	On Grade	17.62		17.62	48.43	20.00	0.21	2.00	3.12	0.02	0.018	24.00	17.87	0.48	0.36	10.87	A-12	6.76	INLET NEAREST INTERSECTION WITH MASONWOOD DR

NOTES:

1. Q INTERCEPTED FLOW COMBINES THE SUBBASIN RUNOFF AND CARRYOVER RUNOFF THAT APPROACHES THE INLET.
2. THE MAXIMUM ALLOWABLE PONDING WIDTH IN THE ROADWAY IS SET SUCH THAT ONE (1) LANE IN EACH DIRECTION SHALL REMAIN PASSABLE WITH A FLOW DEPTH NOT TO EXCEED 0.30 FEET IN THE PASSABLE LANE DURING A 25-YEAR STORM EVENT AND THE MAXIMUM DEPTH TO NOT EXCEED SEVEN (7) INCHES. IN MOST CASES, THE MAXIMUM ALLOWABLE PONDING WIDTH BASED ON 2% CROSS SLOPE WOULD BE THE FULL STREET WIDTH (24').
3. THE MAXIMUM ALLOWABLE PONDING WIDTHS FOR THE AREA ZONE DRAINS WERE BASED ON CROSS SECTIONS OF THE SURROUNDING PROPOSED RIPRAP.
4. INLETS AND PIPES WERE DESIGNED FOR THE 25-YEAR STORM EVENT. STORM SEWER CALCULATIONS WERE PERFORMED IN GEOPAK DRAINAGE V8i.
5. STANDARD 10' EXTENSION WILL BE USED FOR TY-1 INLETS WITH EXTENSION.
6. THE TAILWATER CONDITION USED FOR THE HGL CALCULATIONS FOR SYSTEM A WAS THE AVERAGE OF CRITICAL DEPTH AND THE RISE (HEIGHT) OF THE STORM DRAIN CONDUIT.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

HYDRAULIC DATA SHEETS

SHEET 01 OF 05

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 157 OF 330

SYSTEM-A CONVEYANCE COMPUTATIONS

LINK ID	FROM	TO	INVERT UPSTREAM (FT)	INVERT DOWNSTREAM (FT)	DRAINAGE AREA (ACRES)	WEIGHTED RUNOFF "C"	DESIGN T_c (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)	CAPACITY (CFS)	ACTUAL LENGTH (FT)	DIAMETER (FT)	SLOPE (%)	MANNING N VALUE	OUTLET VELOCITY (FT/S)	UNIFORM VELOCITY (FT/S)	HGL UPSTREAM 25YR (FT)	HGL DOWNSTREAM 25YR (FT)	EGL UPSTREAM 25YR (FT)	EGL DOWNSTREAM 25YR (FT)	UPSTREAM JUNCTION LOSS (FT)
AL-03	A-03	AJ-03	1030.58	1030.51	0.55	0.75	9.2	9.17	3.89	34.4	3.75	2.00	2.00	0.013	5.65	6.89	1031.53	1031.05	1031.65	1031.55	0.02
AL-05	A-06	AJ-06	1044.30	1044.13	4.47	0.67	12.4	8.12	24.40	31.2	33.50	2.50	0.50	0.013	4.97	6.61	1047.28	1046.77	1047.67	1048.25	0.38
AL-07	A-07	AJ-07	1049.05	1048.73	1.12	0.85	5.0	11.14	10.57	24.3	32.50	2.00	1.00	0.013	6.85	7.09	1050.82	1049.71	1050.92	1050.44	0.18
AL-08	A-08	AJ-08	1052.38	1051.75	1.37	0.92	5.0	11.14	14.08	34.4	31.50	2.00	2.00	0.013	4.48	9.87	1054.53	1054.13	1054.89	1055.28	0.31
AL-09	A-10	AJ-09	1058.32	1058.00	3.47	0.78	10.8	8.62	23.39	44.1	32.50	2.50	1.00	0.013	4.77	8.60	1060.91	1060.49	1061.31	1061.76	0.35
AL-10	A-11	AJ-09	1062.04	1061.90	0.46	0.82	6.5	10.31	2.75	42.1	4.75	2.00	3.00	0.013	5.81	7.20	1062.80	1062.31	1062.95	1062.84	0.01
AL-13	A-12	AJ-11	1072.17	1072.00	0.10	0.65	8.2	9.55	6.20	24.3	16.75	2.00	1.00	0.013	2.29	6.15	1073.66	1073.61	1073.77	1074.32	0.06
AL-15	A-13	AJ-13	1072.97	1072.80	2.84	0.76	12.3	8.15	10.87	24.3	16.75	2.00	1.00	0.013	6.71	7.14	1074.77	1073.83	1074.87	1074.53	0.19
AT-00	AE-01	OUTA	1014.61	1014.30	14.38	0.76	13.9	7.71	82.18	146.6	34.73	4.00	0.90	0.013	6.95	11.32	1018.06	1017.86	1018.96	1018.61	0.24
AT-01	AE-02	AE-01	1014.68	1014.61	14.38	0.76	13.9	7.71	82.18	146.6	7.98	4.00	0.90	0.013	7.12	11.32	1018.25	1018.06	1019.07	1018.96	0.19
AT-01B	AJ-01	AE-02	1014.74	1014.69	14.38	0.76	13.9	7.71	82.18	146.6	6.00	4.00	0.90	0.013	6.95	11.32	1018.30	1018.25	1019.08	1019.07	0.05
AT-02	AJ-02	AJ-01	1019.98	1015.36	14.38	0.76	13.9	7.71	82.18	128.1	330.00	3.50	1.40	0.013	13.27	13.36	1023.01	1017.51	1024.52	1020.25	0.11
AT-04	AJ-03	AJ-02	1026.22	1022.39	14.38	0.76	13.9	7.71	82.18	128.1	273.57	3.50	1.40	0.013	13.22	13.36	1029.92	1024.55	1031.43	1027.26	0.78
AT-06	AJ-04	AJ-03	1031.99	1030.12	13.83	0.76	13.3	7.88	80.75	128.1	133.31	3.50	1.40	0.013	12.77	13.27	1035.04	1032.31	1036.52	1034.85	0.16
AT-07	AJ-05	AJ-04	1036.49	1034.39	13.83	0.76	13.3	7.88	80.75	141.1	123.37	3.50	1.70	0.013	13.52	14.30	1039.53	1036.48	1041.01	1039.32	0.13
AT-08	AJ-05B	AJ-05	1039.98	1037.82	13.83	0.76	13.3	7.88	80.75	141.1	127.00	3.50	1.70	0.013	13.55	14.30	1042.99	1039.90	1044.47	1042.76	0.10
AT-08B	AJ-06	AJ-05B	1043.12	1041.36	13.83	0.76	13.3	7.88	80.75	141.1	103.50	3.50	1.70	0.013	13.33	14.30	1046.77	1043.47	1048.25	1046.23	0.75
AT-09	AJ-07	AJ-06	1046.81	1045.42	9.36	0.80	13.1	7.92	57.35	87.9	93.00	3.00	1.50	0.013	11.90	12.51	1050.07	1047.35	1051.40	1049.55	0.73
AT-10	AJ-08	AJ-07	1051.22	1049.63	8.24	0.80	13.0	7.97	50.12	87.9	105.98	3.00	1.50	0.013	11.63	12.13	1054.13	1051.39	1055.28	1053.49	0.53
AT-11	AJ-09	AJ-08	1057.50	1054.15	6.87	0.77	12.8	8.03	40.40	62.4	167.52	2.50	2.00	0.013	12.55	12.78	1060.49	1055.71	1061.76	1058.16	0.77
AT-12	AJ-10	AJ-09	1065.15	1061.90	2.94	0.76	12.4	8.13	16.93	43.5	101.45	2.00	3.20	0.013	11.96	12.31	1066.83	1062.83	1067.54	1065.05	0.06
AT-13	AJ-11	AJ-10	1071.90	1066.89	2.94	0.76	12.4	8.13	16.93	45.5	143.19	2.00	3.50	0.013	12.56	12.71	1073.61	1067.78	1074.32	1070.23	0.09
AT-14	AJ-13	AJ-11	1072.80	1072.00	2.84	0.76	12.3	8.15	10.87	45.5	22.87	2.00	3.50	0.013	9.51	11.28	1074.23	1072.78	1074.72	1074.19	0.11

SYSTEM-A DISCHARGE COMPUTATIONS

DRAINAGE AREA		WEIGHTED AVG C VALUE	T. CALC	INTENSITY I25	DISCHARGE Q25
ID	(ACRES)		(MIN)	(IN / HR)	(CFS)
A-00	0.18	0.77	8.71	9.34	1.28
A-01	0.93	0.75	10.39	8.75	6.15
A-02	1.15	0.75	10.32	8.78	7.64
A-03	0.55	0.75	9.17	9.17	3.78
A-04	1.17	0.74	9.85	8.93	7.75
A-05	0.48	0.72	5.52	10.82	3.72
A-06	4.47	0.67	12.44	8.12	24.41
A-07	1.12	0.85	5.00	11.14	10.58
A-08	1.37	0.92	5.00	11.14	14.09
A-09	0.29	0.72	5.00	11.14	2.31
A-10	3.47	0.78	10.81	8.62	23.39
A-11	0.46	0.82	6.45	10.31	3.87
A-12	0.10	0.65	8.15	9.55	0.59
A-13	2.84	0.76	12.33	8.15	17.62

NOTES:

1. Q INTERCEPTED FLOW COMBINES THE SUBBASIN RUNOFF AND CARRYOVER RUNOFF THAT APPROACHES THE INLET.
2. THE MAXIMUM ALLOWABLE PONDING WIDTH IN THE ROADWAY IS SET SUCH THAT ONE (1) LANE IN EACH DIRECTION SHALL REMAIN PASSABLE WITH A FLOW DEPTH NOT TO EXCEED 0.30 FEET IN THE PASSABLE LANE DURING A 25-YEAR STORM EVENT AND THE MAXIMUM DEPTH TO NOT EXCEED SEVEN (7) INCHES. IN MOST CASES, THE MAXIMUM ALLOWABLE PONDING WIDTH BASED ON 2% CROSS SLOPE WOULD BE THE FULL STREET WIDTH (24').
3. THE MAXIMUM ALLOWABLE PONDING WIDTHS FOR THE AREA ZONE DRAINS WERE BASED ON CROSS SECTIONS OF THE SURROUNDING PROPOSED RIPRAP.
4. INLETS AND PIPES WERE DESIGNED FOR THE 25-YEAR STORM EVENT. STORM SEWER CALCULATIONS WERE PERFORMED IN GEOPAK DRAINAGE V8i.
5. THE TAILWATER CONDITION USED FOR THE HGL CALCULATIONS FOR SYSTEM A WAS THE AVERAGE OF CRITICAL DEPTH AND THE RISE (HEIGHT) OF THE STORM DRAIN CONDUIT.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

HYDRAULIC DATA SHEETS

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 158 OF 330

SYSTEM-B INLET COMPUTATIONS

INLET ID	REFERENCE CHAIN	STATION	OFFSET (FT)	TYPE	PROFILE TYPE	DISCHARGE Q (CFS)	ADDED CARRY OVER (CFS)	Q INTERCEPTED (CFS)	CURB INLET DESIGN: LENGTH REQUIRED (FT)	ACTUAL LENGTH (FT)	DEPRESSION DEPTH (FT)	DEPRESSION WIDTH (FT)	LONG. SLOPE (%)	CROSS SLOPE (FT/FT)	MANNING'S n-VALUE	ALLOW. POND WIDTH (FT)	ACTUAL POND WIDTH (FT)	MAX PONDED DEPTH (FT)	COMPUTED PONDED DEPTH (FT)	CAPACITY (CFS)	CARRY OVER INLET ID	CARRY OVER FLOW (CFS)	REMARKS
B-00	EVANS_EB	20+95.00	-12.8	ARMOR CURB 28' TOTAL	On Grade	1.82	6.94	8.76	29.44	28.25	0.21	2.00	2.60	0.02	0.018	24.00	12.70	0.48	0.31	8.73	FLOWS WEST ON EASTBOUND EVANS ROAD TO ROAN PARK	0.03	INLET NEAREST INTERSECTION WITH ROAN PARK
B-01	EVANS_EB	21+78.00	-12.8	TY-1 10' INLET	On Grade	7.18	3.65	10.83	45.65	10.00	0.21	2.00	2.93	0.01	0.018	24.00	20.74	0.48	0.25	3.89	B-00	6.94	INLET CONTRIBUTES TO STORMCEPTOR (SYSTEM W)
B-02	EVANS_EB	24+45.00	-12.8	ARMOR CURB 28' TOTAL	On Grade	10.42	8.59	19.02	47.05	28.25	0.21	2.00	2.99	0.02	0.018	24.00	16.99	0.48	0.39	15.37	B-01	3.65	
B-03	EVANS_EB	28+15.00	-12.8	ARMOR CURB 28' TOTAL	On Grade	14.10	5.64	19.75	76.30	28.25	0.21	2.00	2.90	0.01	0.018	24.00	24.00	0.48	0.28	11.16	B-02	8.59	
B-04	EVANS_EB	33+40.00	-12.8	ARMOR CURB 56' TOTAL	On Grade	17.82	0.16	17.99	79.32	37.67	0.21	2.00	3.36	0.01	0.018	24.00	24.00	0.48	0.26	12.34	B-03	5.64	NEW LOCATION BY MEDIAN CROSS STREET
B-05	EVANS_EB	37+30.00	-29.6	ARMOR CURB 14' TOTAL	On Grade	0.94		0.94	15.06	9.42	0.21	2.00	6.20	0.01	0.018	12.00	8.64	0.24	0.08	0.78	B-04	0.16	NEW LOCATION IN TURN LANE TO MASONWOOD DR

SYSTEM-B DISCHARGE COMPUTATIONS

DRAINAGE AREA ID	DRAINAGE AREA (ACRES)	WEIGHTED AVG C VALUE	T. CALC (MIN)	INTENSITY I-25 (IN / HR)	DISCHARGE Q25 (CFS)
B-00	0.26	0.75	8.94	9.25	1.82
B-01	1.12	0.74	10.58	8.70	7.18
B-02	1.61	0.74	10.28	8.79	10.42
B-03	2.22	0.75	11.40	8.44	14.10
B-04	2.79	0.73	10.53	8.71	17.82
B-05	0.09	0.97	5.00	11.14	0.94

SYSTEM-W CONVEYANCE COMPUTATIONS

LINK ID	FROM	TO	INVERT UPSTREAM (FT)	INVERT DOWNSTREAM (FT)	DRAINAGE AREA (ACRES)	WEIGHTED RUNOFF "C"	DESIGN T_c (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)	CAPACITY (CFS)	ACTUAL LENGTH (FT)	DIAMETER (FT)	SLOPE (%)	MANNING N VALUE	OUTLET VELOCITY (FT/S)	UNIFORM VELOCITY (FT/S)	HGL UPSTREAM 25YR (FT)	HGL DOWNSTREAM 25YR (FT)	EGL UPSTREAM 25YR (FT)	EGL DOWNSTREAM 25YR (FT)	UPSTREAM JUNCTION LOSS (FT)
WL-01	WJ-02	OUTW	1014.54	1014.22	2.05	0.75	10.7	8.67	7.66	24.3	32.06	2.00	1.00	0.013	2.44	6.50	1016.65	1016.49	1016.74	1016.58	0.12
WL-02	WJ-01	WJ-02	1014.69	1014.54	2.05	0.75	10.7	8.67	7.66	24.3	15.00	2.00	1.00	0.013	2.44	6.50	1016.69	1016.65	1016.78	1016.74	0.02
WL-03	B-01	WJ-01	1016.49	1015.40	1.12	0.74	10.6	8.69	3.89	42.1	36.34	2.00	3.00	0.013	7.63	7.97	1017.44	1015.84	1017.57	1016.75	0.02
WL-04	A-01	WJ-01	1015.88	1014.69	0.93	0.75	10.4	8.76	3.86	38.5	47.58	2.00	2.50	0.013	7.29	7.43	1016.83	1015.14	1016.94	1015.97	0.02

NOTES:

1. Q INTERCEPTED FLOW COMBINES THE SUBBASIN RUNOFF AND CARRYOVER RUNOFF THAT APPROACHES THE INLET.
2. THE MAXIMUM ALLOWABLE PONDING WIDTH IN THE ROADWAY IS SET SUCH THAT ONE (1) LANE IN EACH DIRECTION SHALL REMAIN PASSABLE WITH A FLOW DEPTH NOT TO EXCEED 0.30 FEET IN THE PASSABLE LANE DURING A 25-YEAR STORM EVENT AND THE MAXIMUM DEPTH TO NOT EXCEED SEVEN (7) INCHES. IN MOST CASES, THE MAXIMUM ALLOWABLE PONDING WIDTH BASED ON 2% CROSS SLOPE WOULD BE THE FULL STREET WIDTH (24').
3. THE MAXIMUM ALLOWABLE PONDING WIDTHS FOR THE AREA ZONE DRAINS WERE BASED ON CROSS SECTIONS OF THE SURROUNDING PROPOSED RIPRAP.
4. INLETS AND PIPES WERE DESIGNED FOR THE 25-YEAR STORM EVENT. STORM SEWER CALCULATIONS WERE PERFORMED IN GEOPAK DRAINAGE V8i.
5. THE TAILWATER CONDITION USED FOR THE HGL CALCULATIONS FOR SYSTEM W WAS THE HEADWATER ELEVATION OF THE PROPOSED CROSSING AT ROAN PARK.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

HYDRAULIC DATA SHEETS

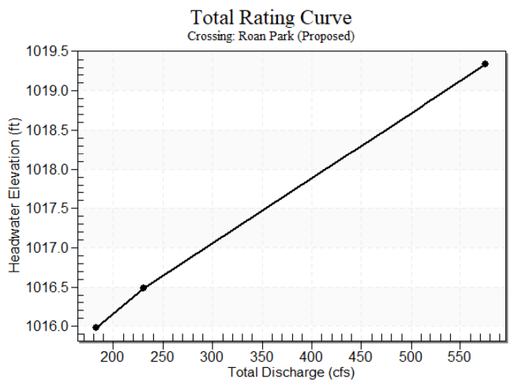
100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 159 OF 330

CC-01 (ROAN PARK): HY-8 (v7.60) PROPOSED CULVERT ANALYSIS

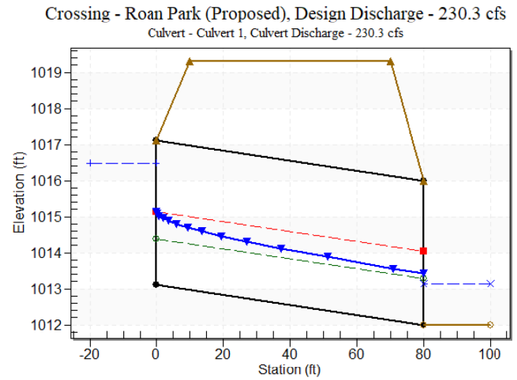
Table 1 - Summary of Culvert Flows at Crossing: Roan Park (Proposed)

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1015.99	25yr	182.47	182.47	0.00	1
1016.49	100yr	230.30	230.30	0.00	1
1018.42	Overtopping	403.37	403.37	0.00	Overtopping

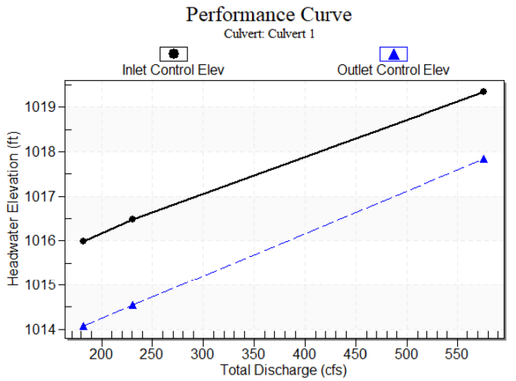
Rating Curve Plot for Crossing: Roan Park (Proposed)



Water Surface Profile Plot for Culvert: Culvert 1



Culvert Performance Curve Plot: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 1013.10 ft
Outlet Station: 80.00 ft
Outlet Elevation: 1012.00 ft
Number of Barrels: 2

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box
Barrel Span: 7.00 ft
Barrel Rise: 4.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Square Edge (0° flare) Wingwall
Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Roan Park (Proposed))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
182.47	1013.01	1.01	8.63	5.85	1.70
230.30	1013.14	1.14	9.35	6.61	1.73

Tailwater Channel Data - Roan Park (Proposed)

Tailwater Channel Option: Irregular Channel

Roadway Data for Crossing: Roan Park (Proposed)

Roadway Profile Shape: Irregular Roadway Shape (coordinate
Roadway Surface: Paved
Roadway Top Width: 60.00 ft

Table 2 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)
25yr	182.47	182.47	1015.99	2.886	0.968	1-S2n	1.095	1.741	1.192	1.009	10.935
100yr	230.30	230.30	1016.49	3.389	1.454	1-S2n	1.279	2.033	1.418	1.139	11.601

****

Straight Culvert

Inlet Elevation (invert): 1013.10 ft, Outlet Elevation (invert): 1012.00 ft

Culvert Length: 80.01 ft, Culvert Slope: 0.0138

****

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

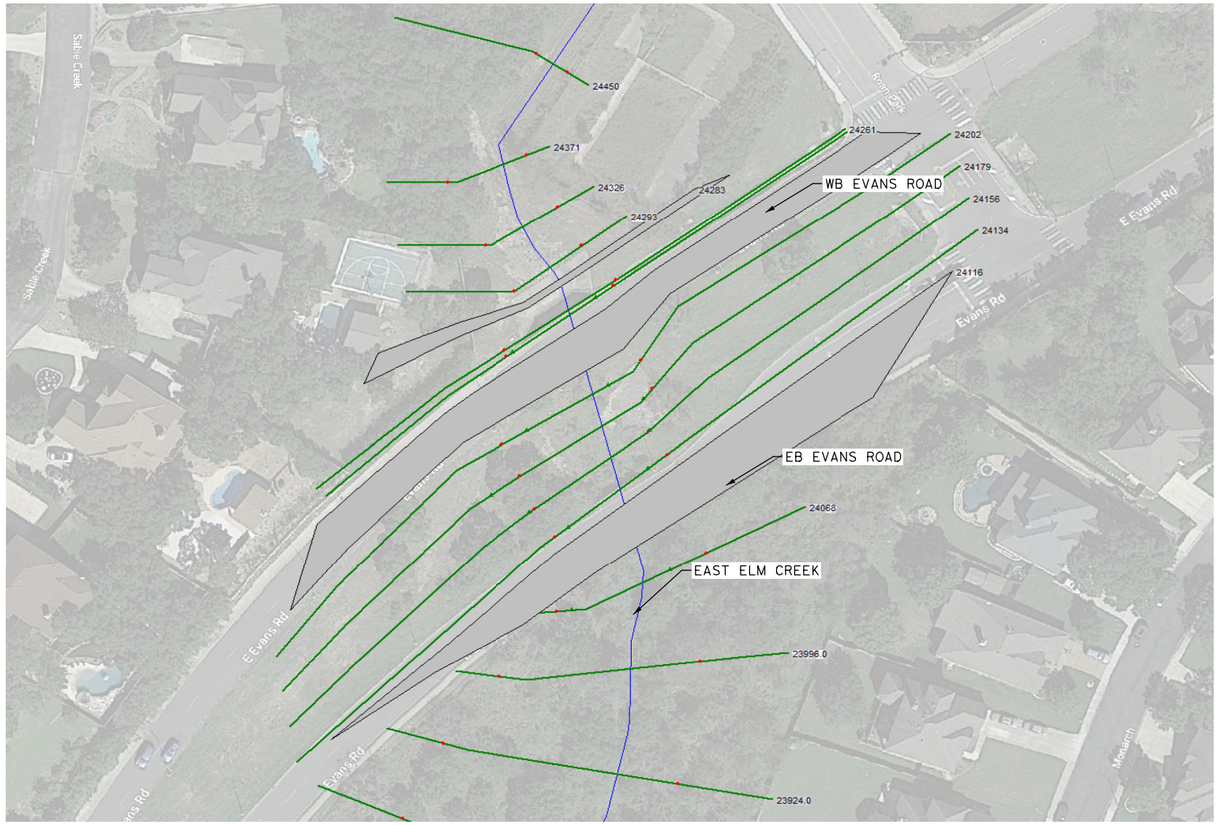
HYDRAULIC DATA SHEETS
CC-01 (ROAN PARK)

SHEET 04 OF 05

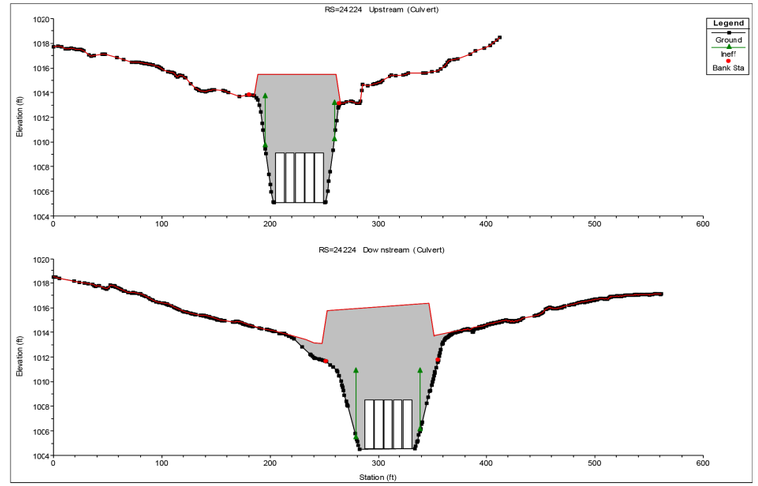
100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 160 OF 330

HEC-RAS (V5.0.7) PROPOSED CULVERT ANALYSIS

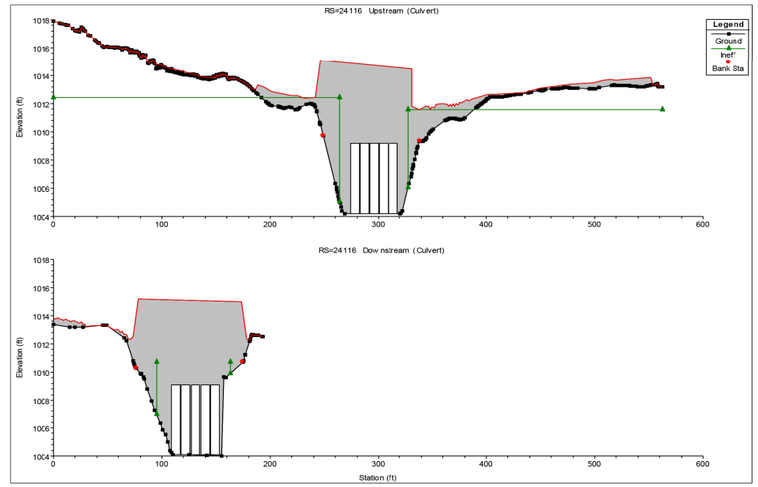
HEC-RAS CROSS SECTION LAYOUT (EAST ELM CREEK)



WB EVANS RD CULVERT PROFILE



EB EVANS RD CULVERT PROFILE



HEC-RAS EXISTING OUTPUT

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
24293	Q25	929	1010.93	1014.92	1014.37	1015.41	0.008442	5.79	176.17	88.61	0.63
24293	Q100	1167	1010.93	1015.26	1014.69	1015.83	0.008443	6.28	207.34	92.21	0.64
24283		Inl Struct									
24261	Q25	929	1005.81	1014.81		1014.89	0.000051	2.26	479.87	180.24	0.16
24261	Q100	1167	1005.81	1015.14		1015.25	0.000067	2.67	543.66	205.46	0.19
24258	Q25	929	1005.84	1014.82	1008.71	1014.89	0.000045	2.2	511.49	173.27	0.15
24258	Q100	1167	1005.84	1015.14	1009.16	1015.24	0.000059	2.61	570.01	184.81	0.18
24224		Culvert	(WB Evans Rd)								
24202	Q25	929	1006.84	1012.02	1010.73	1012.27	0.005253	4.07	230.8	101.98	0.44
24202	Q100	1167	1006.84	1012.78	1011.03	1013.01	0.003406	3.89	314.31	116.95	0.37
24179	Q25	929	1005.55	1012.06	1009.39	1012.15	0.000857	2.2	423.1	164.87	0.19
24179	Q100	1167	1005.55	1012.83	1009.69	1012.91	0.000613	2.09	582.04	278.71	0.17
24156	Q25	929	1005.71	1012.04	1009.25	1012.13	0.001058	2.4	438.04	400.33	0.21
24156	Q100	1167	1005.71	1012.85	1009.63	1012.88	0.000329	1.5	914.14	431.88	0.12
24134	Q25	1150	1005.12	1011.82	1009.01	1012.05	0.002618	4.06	340.85	175.62	0.33
24134	Q100	1444	1005.12	1012.68	1009.5	1012.83	0.00162	3.38	562.83	248.34	0.27
24116		Culvert	(EB Evans Rd)								
24068	Q25	1150	1004.35	1009.73	1008	1010.19	0.008516	5.45	210.93	66.17	0.47
24068	Q100	1444	1004.35	1010.18	1008.47	1010.77	0.009573	6.19	233.47	69.6	0.5
23996	Q25	1288	1003.98	1008.82		1009.33	0.016256	5.77	223.29	79.47	0.61
23996	Q100	1617	1003.98	1009.22		1009.84	0.017574	6.31	256.43	84.63	0.64
23924	Q25	1288	1003.35	1008.42		1008.61	0.005357	3.55	362.34	116.28	0.36
23924	Q100	1617	1003.35	1008.79		1009.04	0.005984	3.98	406.64	119.78	0.38

HEC-RAS PROPOSED OUTPUT

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
24293	Q25	929	1010.92	1014.39	1013.74	1014.89	0.008872	5.68	168.57	82.26	0.63
24293	Q100	1167	1010.92	1014.75	1014.1	1015.33	0.008727	6.16	198.93	86.82	0.64
24283		Inl Struct									
24261	Q25	929	1005.81	1010.69	1008.04	1010.86	0.000173	3.34	278.08	64.93	0.28
24261	Q100	1167	1005.81	1012.17	1008.36	1012.32	0.000109	3.09	377.79	69.57	0.23
24258	Q25	929	1005.1	1010.71	1007.3	1010.84	0.000103	2.87	323.3	66.01	0.23
24258	Q100	1167	1005.1	1012.19	1007.64	1012.31	0.000069	2.79	417.69	70.49	0.19
24224		Culvert	(WB Evans Rd)								
24202	Q25	929	1004.49	1009.98	1006.55	1010.11	0.00081	2.87	323.2	85.07	0.22
24202	Q100	1167	1004.49	1010.95	1006.86	1011.05	0.000704	2.53	461.64	92.11	0.2
24179	Q25	929	1004.39	1009.99	1006.42	1010.07	0.000654	2.28	408.19	101.66	0.19
24179	Q100	1167	1004.39	1010.95	1006.73	1011.03	0.000554	2.27	519.44	125.18	0.18
24156	Q25	929	1004.3	1009.97	1006.32	1010.05	0.000661	2.29	405.43	118.8	0.19
24156	Q100	1167	1004.3	1010.93	1006.62	1011.01	0.000548	2.37	494.82	151.07	0.18
24134	Q25	1150	1004.19	1009.85	1006.47	1010.01	0.000992	3.24	354.52	98.64	0.24
24134	Q100	1444	1004.19	1010.78	1006.82	1010.97	0.000933	3.49	414.01	116.59	0.24
24116		Culvert	(EB Evans Rd)								
24068	Q25	1150	1004.02	1009.18	1006.65	1009.43	0.002255	3.98	289.11	71.68	0.32
24068	Q100	1444	1004.02	1009.66	1007.05	1009.98	0.002595	4.53	318.59	75.98	0.36
23996	Q25	1288	1003.75	1008.73	1007.06	1009.1	0.007994	4.92	261.66	77.86	0.47
23996	Q100	1617	1003.75	1009.14	1007.51	1009.6	0.009299	5.49	294.68	83.46	0.51
23924	Q25	1288	1003.35	1008.42	1006.55	1008.6	0.004881	3.46	372.77	116.27	0.34
23924	Q100	1617	1003.35	1008.79	1006.86	1009.03	0.005505	3.88	417.13	119.78	0.37

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

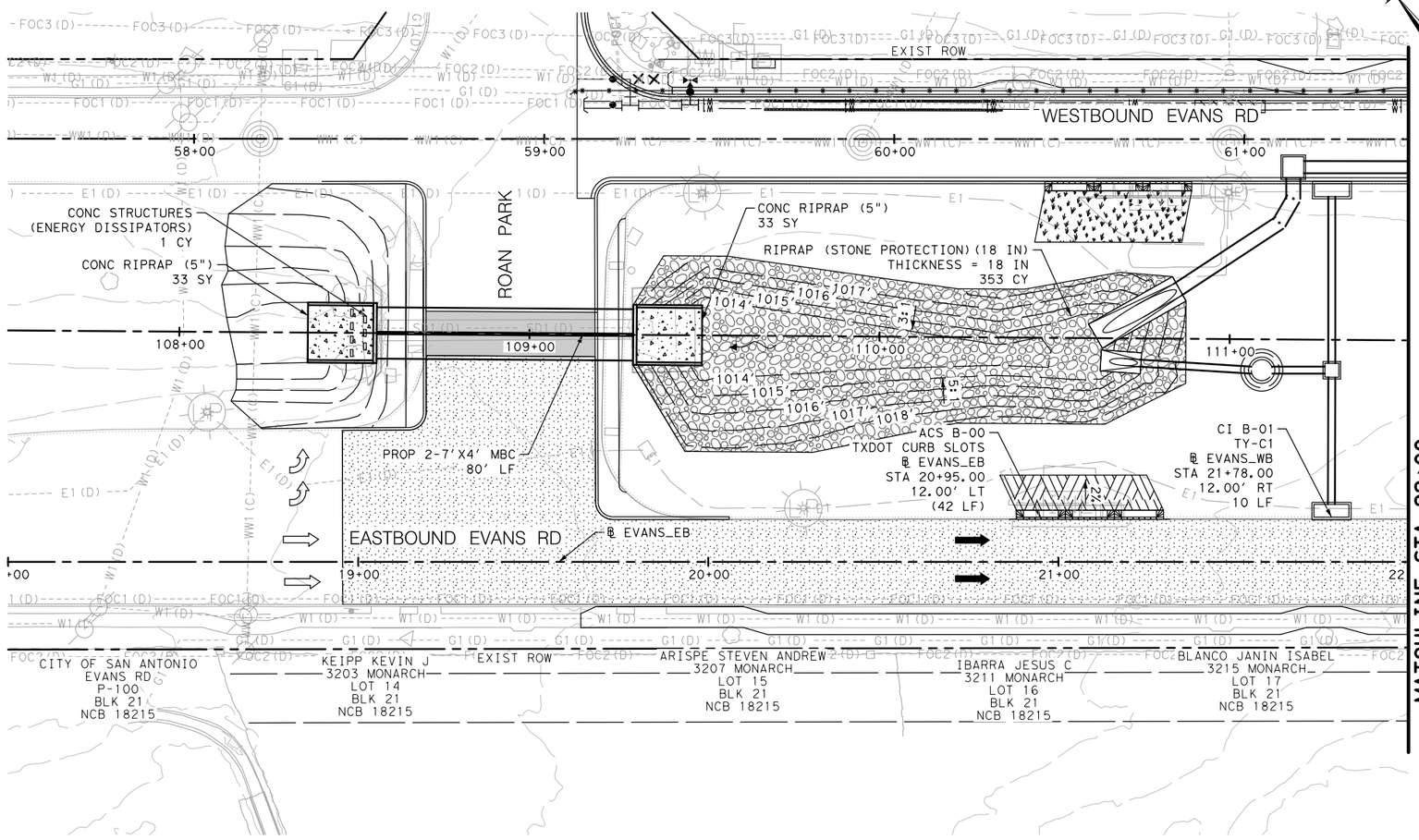
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

HYDRAULIC DATA SHEETS
CC-02 & CC-03

SHEET 05 OF 05

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 161 OF 330



LEGEND:

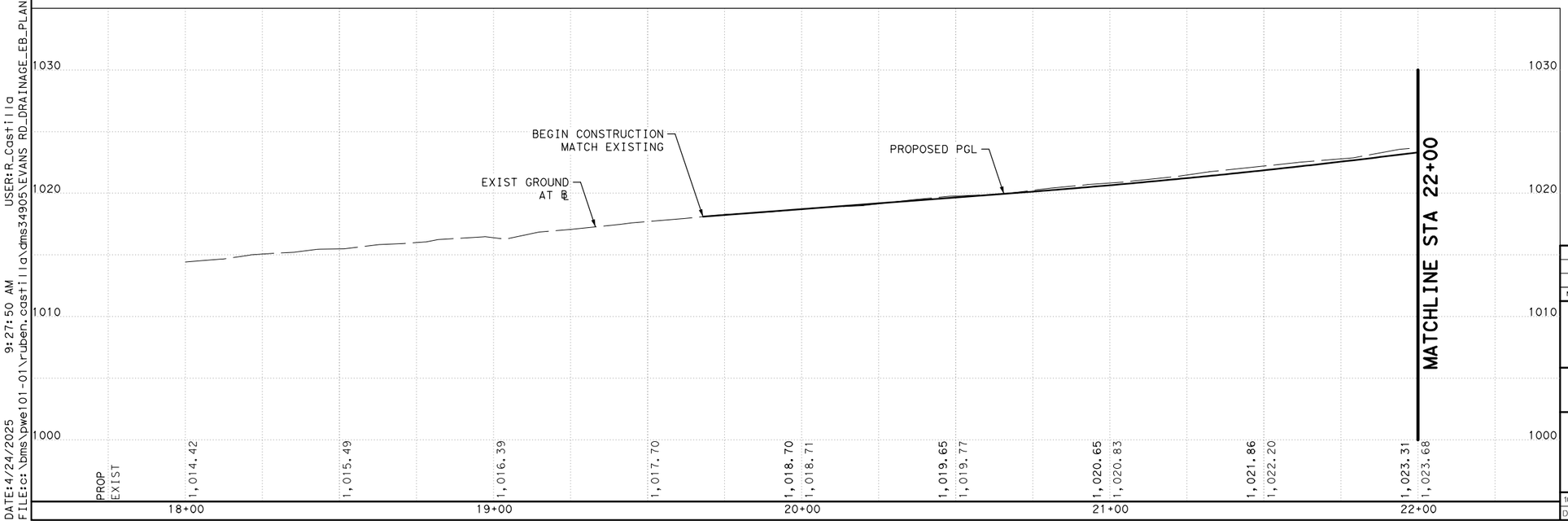
- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

EASTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
307.1	CONCRETE STRUCTURE (ENERGY DISSIPATORS)	CY	1
403.7	INLET TYPE I (COMPLETE) (10 FT)	EA	1
505.1	CONCRETE RIPRAP (5" THICK)	SY	66
432-6033	RIPRAP (STONE PROTECTION) (18 IN)	CY	353
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3



HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
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150047
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4/24/2025

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

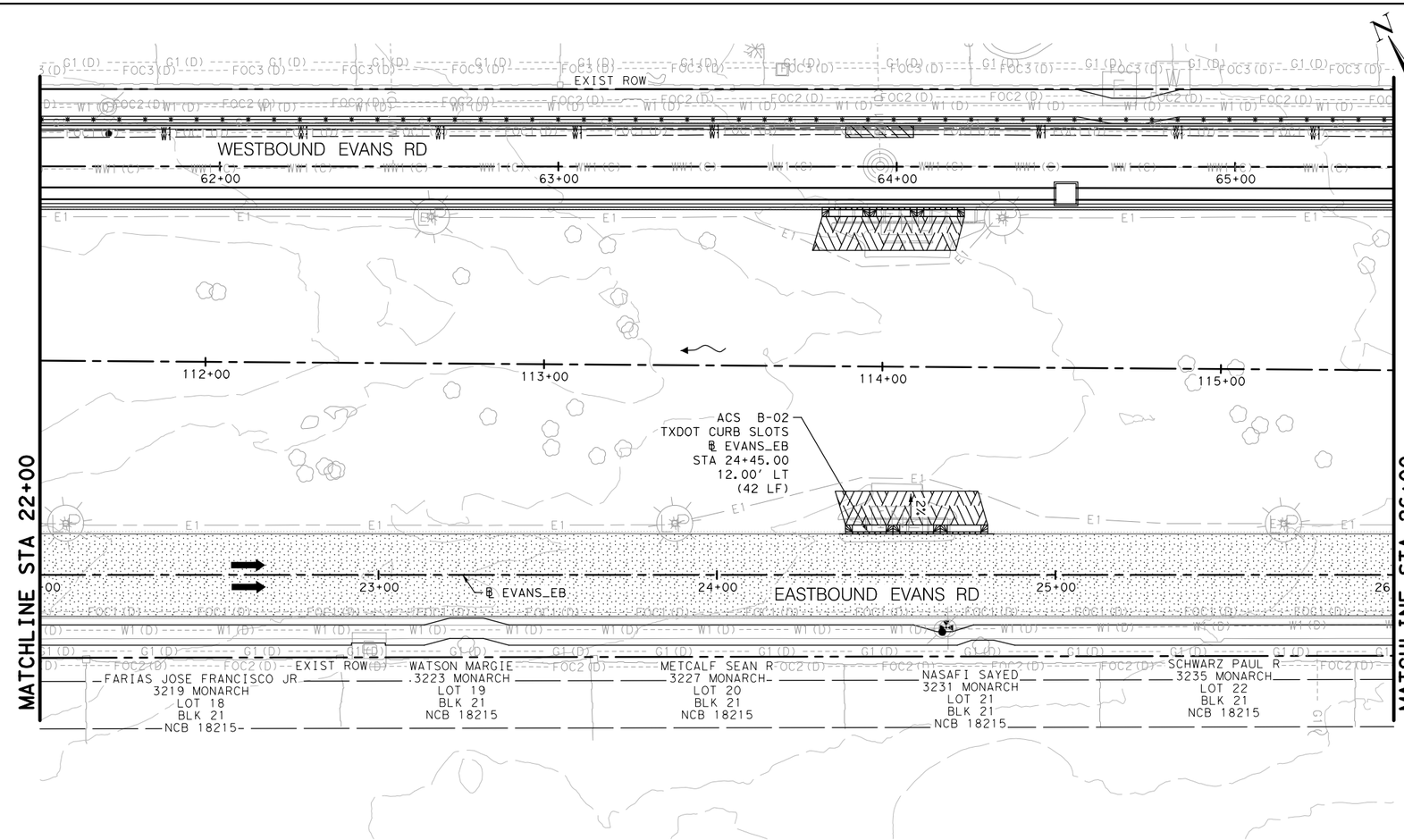
EVANS RD PHASE 1

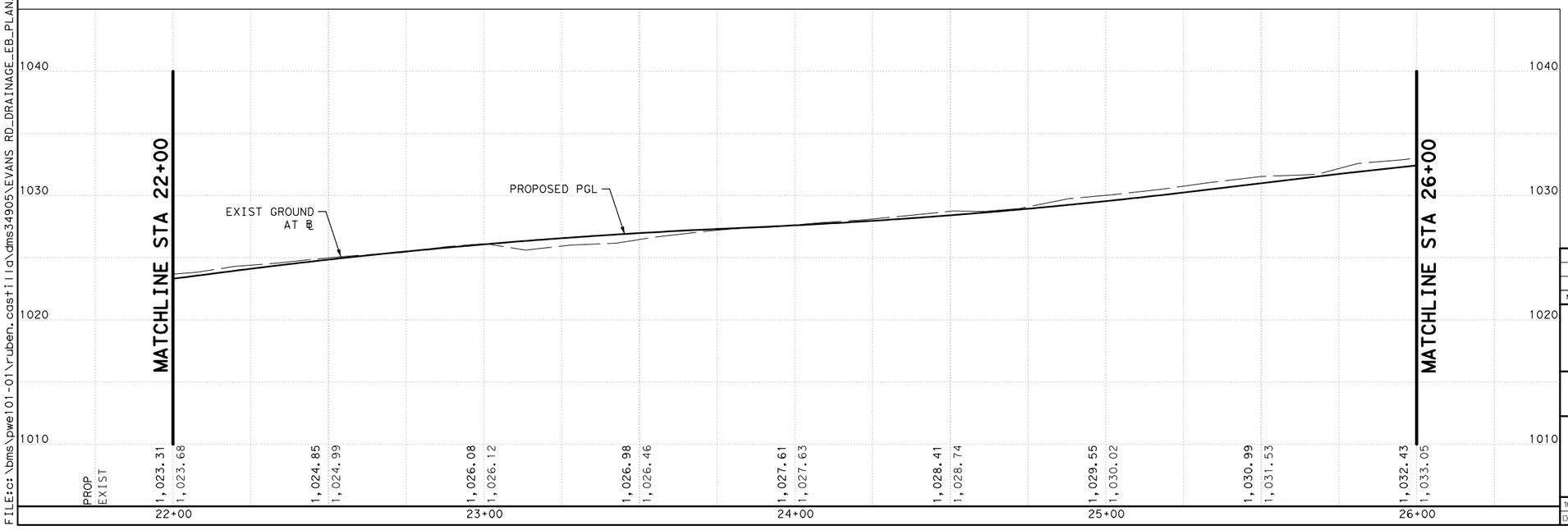
EASTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

BEGIN PROJECT TO STA 22+00 — SHEET 01 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 162 OF 330

DATE:4/24/2025 9:27:50 AM USER:R_Castilla
FILE:c:\bms\pwe101-01\ruben.castilla\dms34905\EVANS RD_DRAINAGE_EB_PLAN_AND_PROF_01.dgn PLOTDRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$





LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

EASTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
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4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

EASTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 22+00 TO STA 26+00 SHEET 02 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 163 OF 330

DATE:4/24/2025 9:27:52 AM USER:R_Castilla
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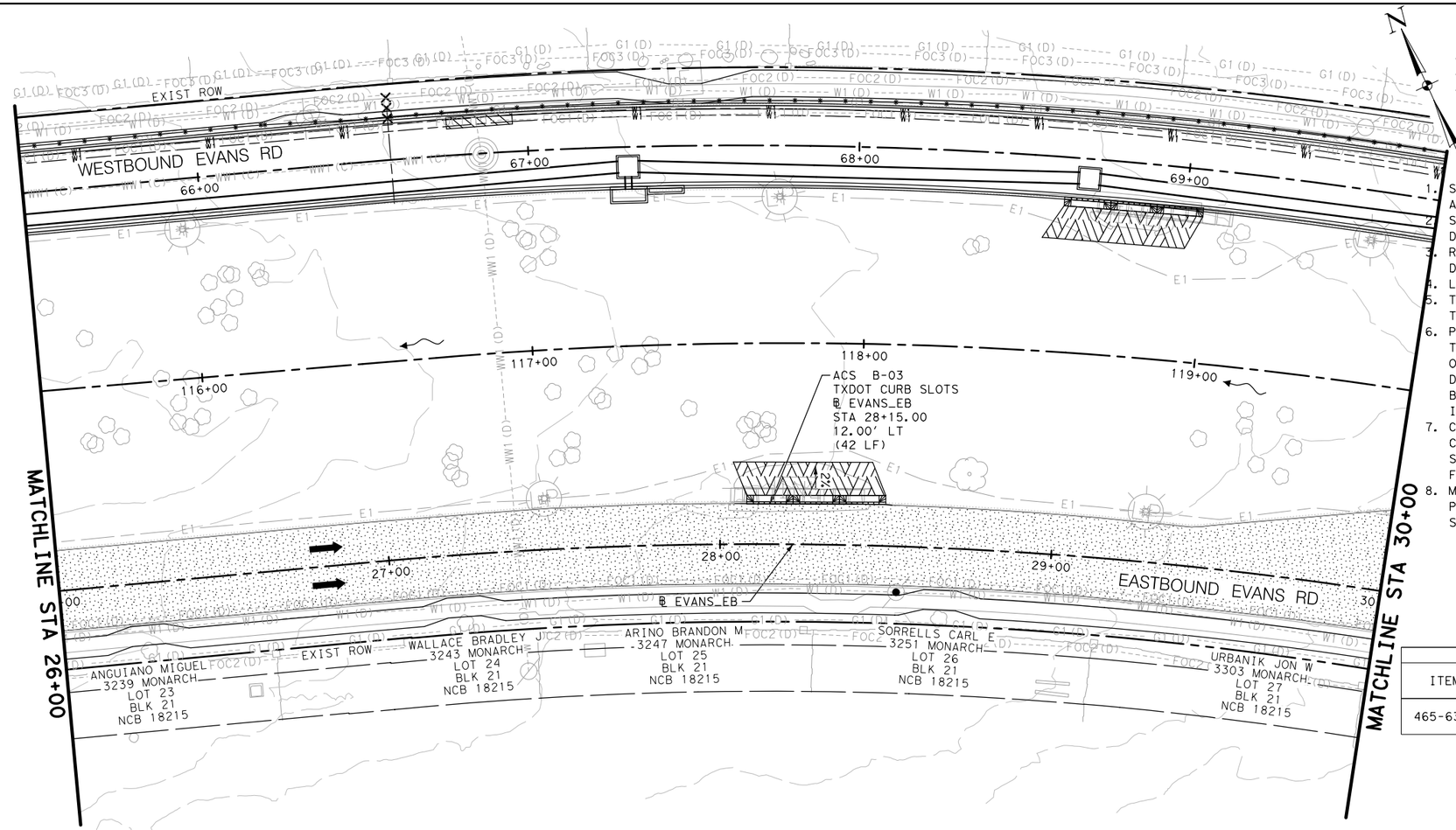

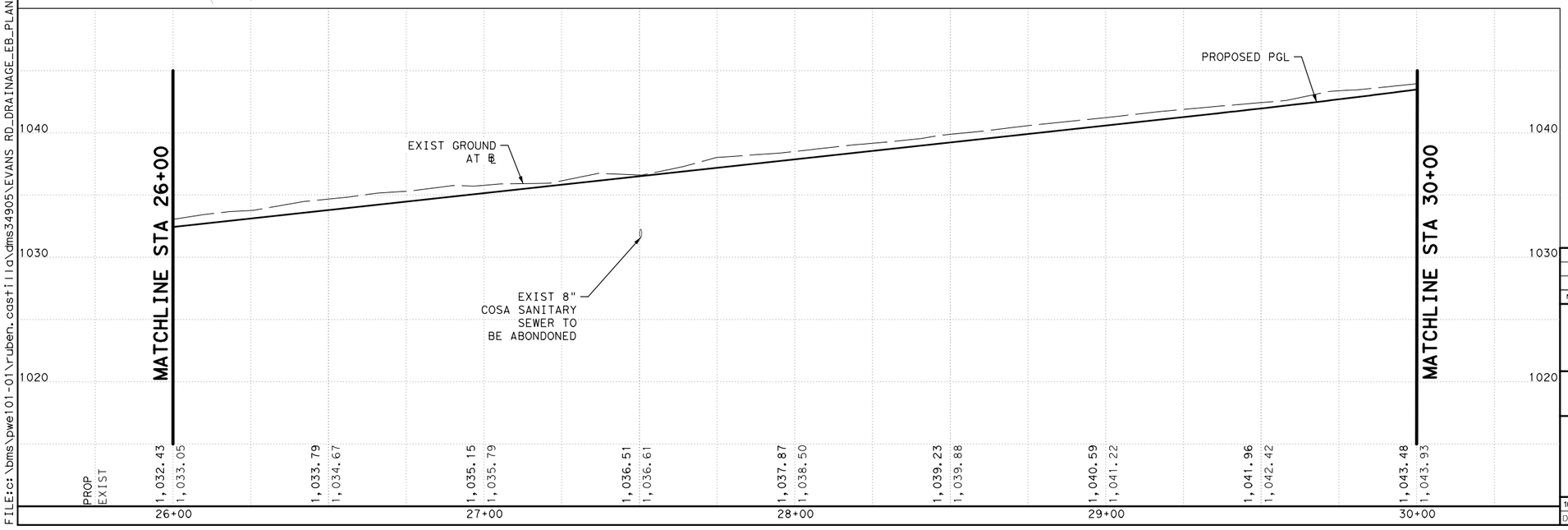

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
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3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

EASTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

EASTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 26+00 TO STA 30+00 — SHEET 03 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 164 OF 330

DATE:4/24/2025 9:27:53 AM USER:R_Castilla
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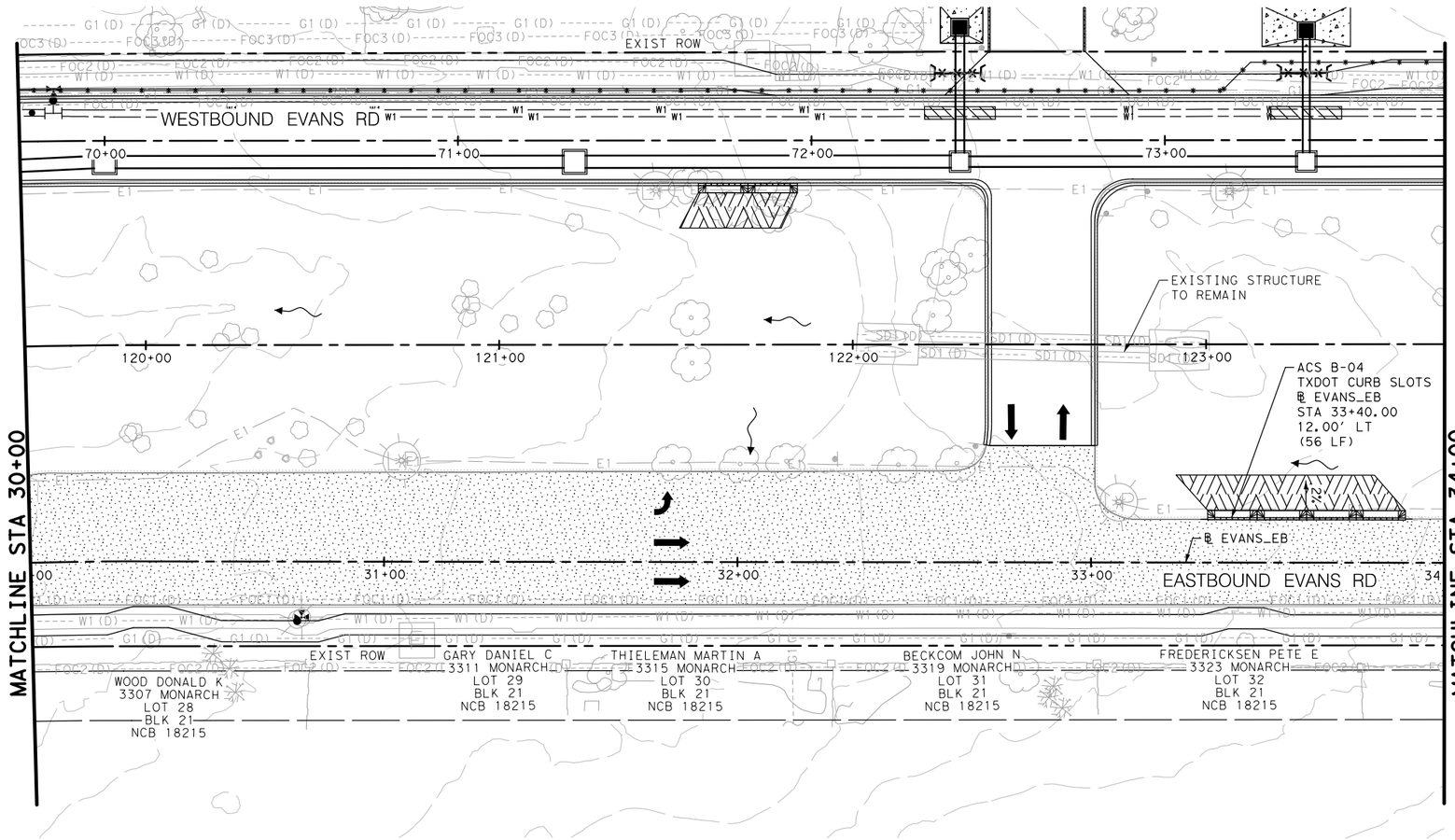

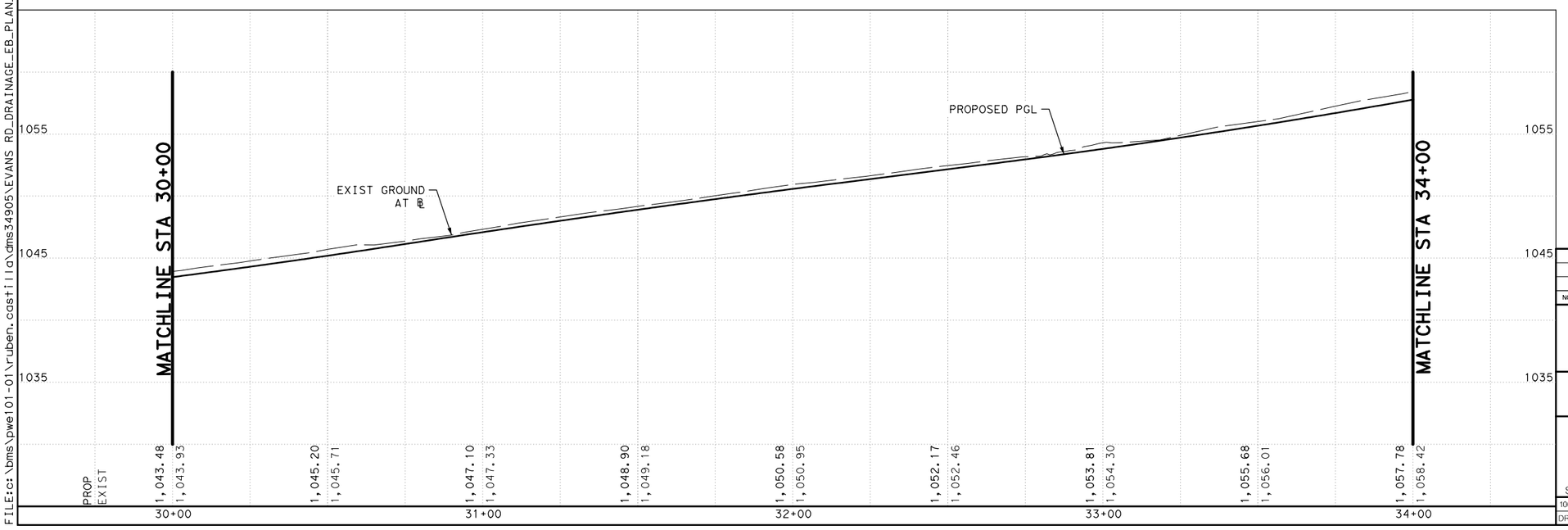

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP(DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

EASTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	4

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

EASTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 26+00 TO STA 30+00 SHEET 04 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4242025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 165 OF 330

DATE:4/24/2025 9:27:55 AM USER:R_Castilla
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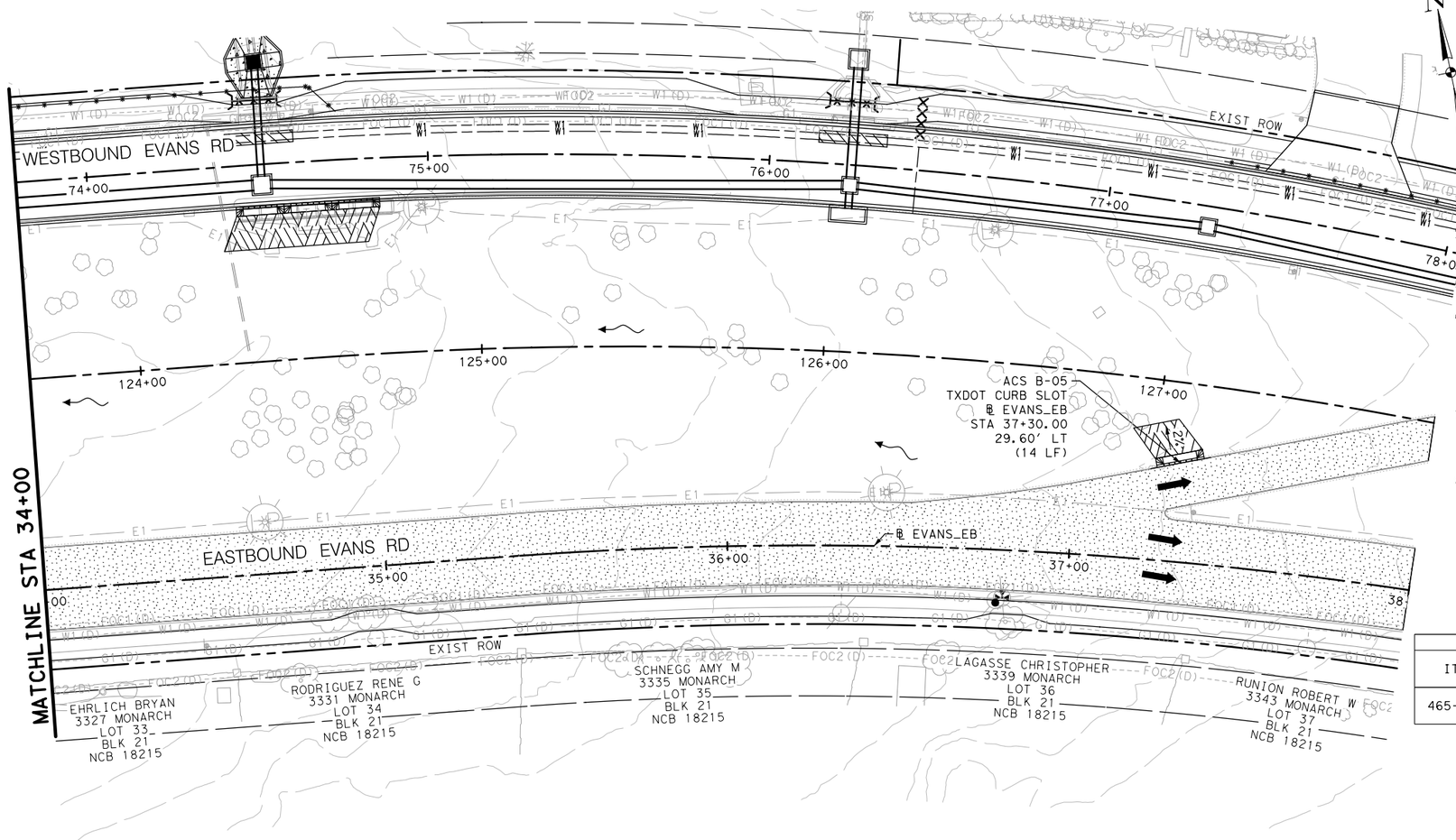

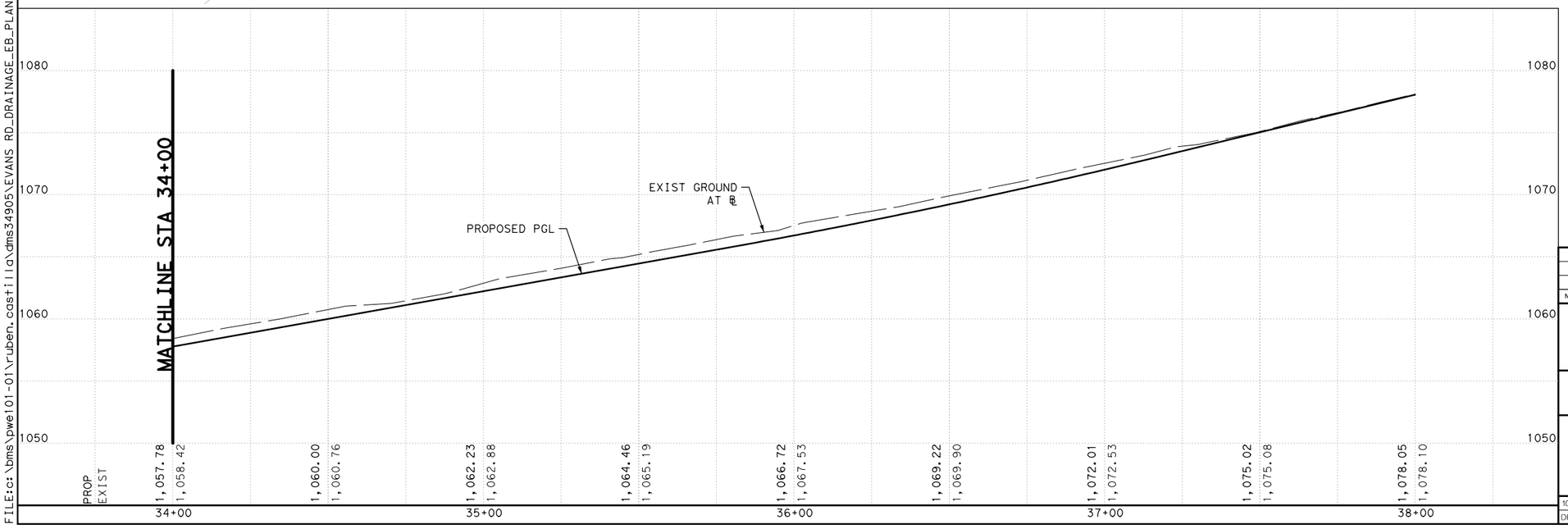

N

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 — PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
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7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

EASTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	1

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

EASTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 34+00 TO STA 38+00 — SHEET 05 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 166 OF 330

DATE:4/24/2025 9:27:56 AM
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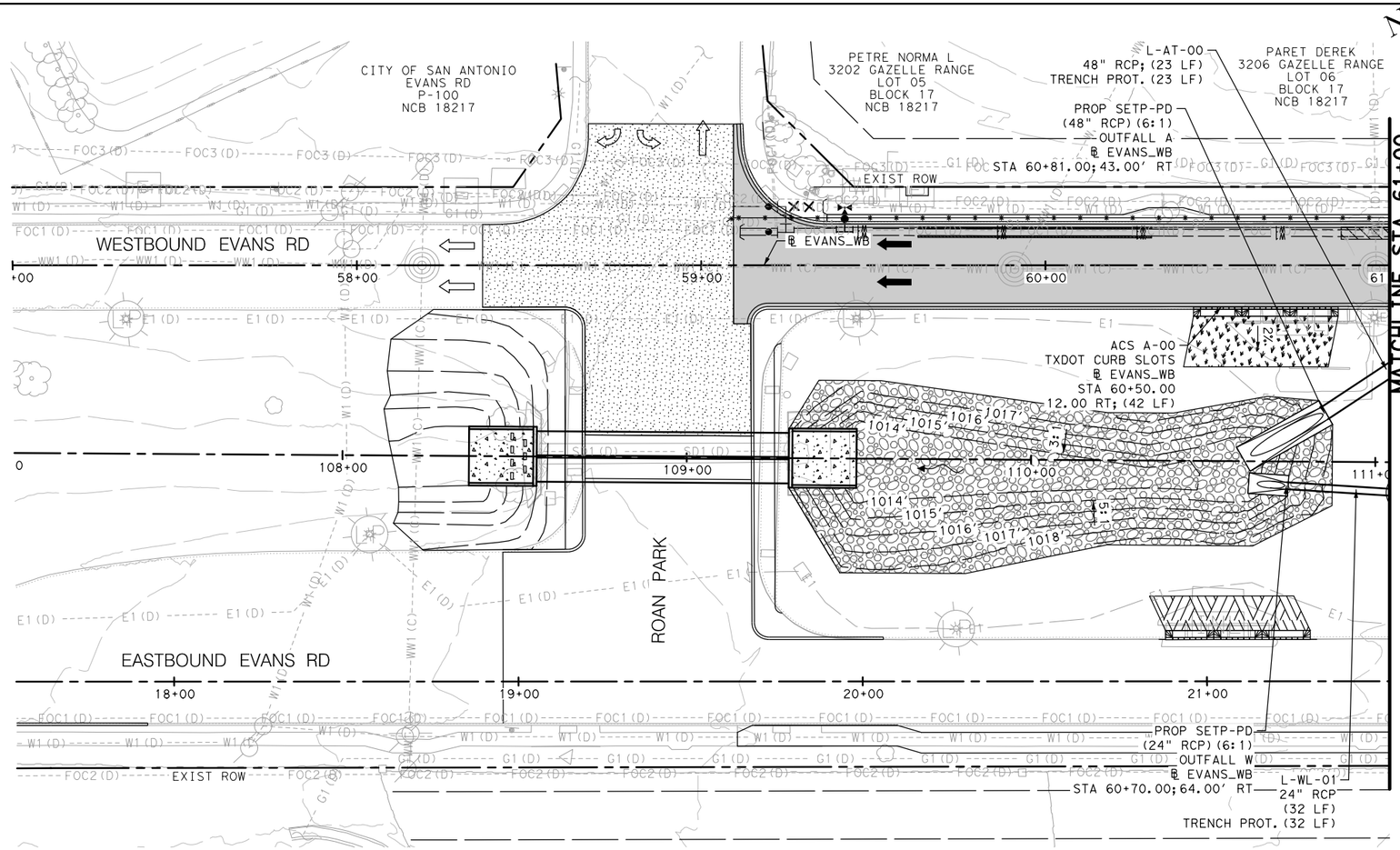
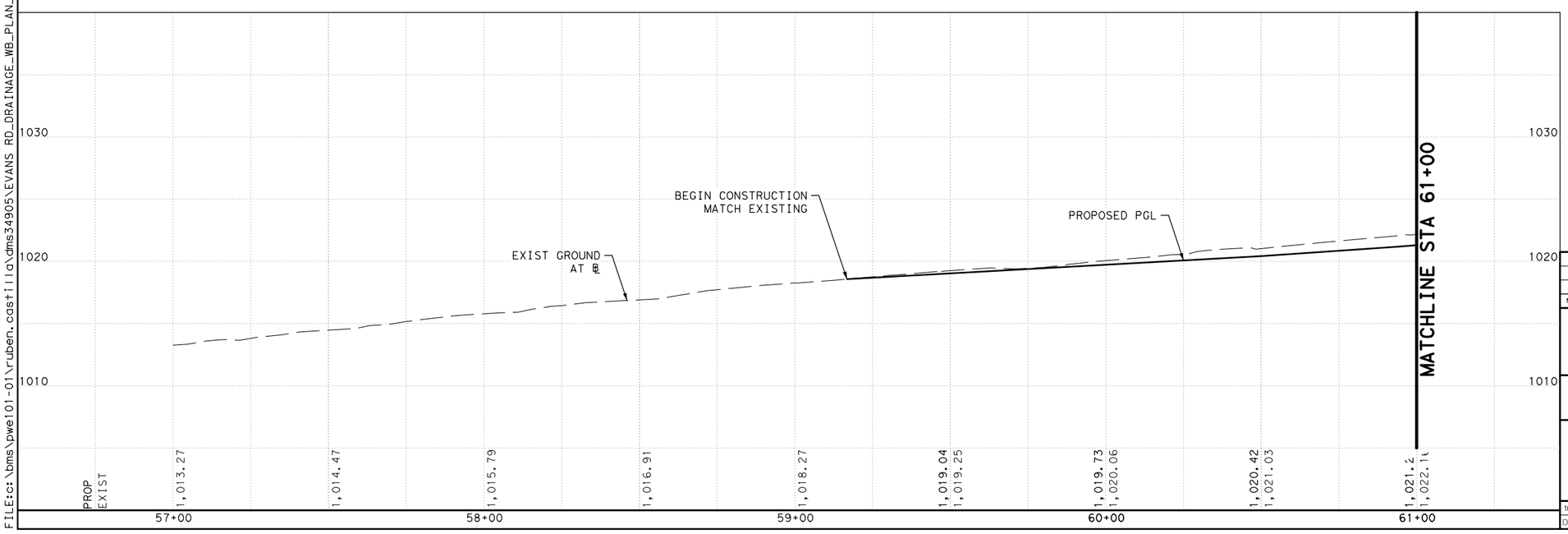
PENTABLE: $PENTBLS$





LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2′ CONTOURS
- PROPOSED 1′ CONTOURS
- W1 — PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
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7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III) (24" DIA)	LF	32
401.1	REINFORCED CONCRETE PIPE (CLASS III) (48" DIA)	LF	23
401.4	SAFETY END TREATMENT (TYPE II) (24" DIA)	EA	1
401.4	SAFETY END TREATMENT (TYPE II) (48" DIA)	EA	1
550.1	TRENCH EXCAVATION SAFETY PROTECTION	LF	55
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3

HORZ 0′ 10′ 20′ 40′
VERT 0′ 5′ 10′

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

BEGINNING OF PROJECT TO STA 62+00.00 — SHEET 06 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 167 OF 330

PLOTDRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$
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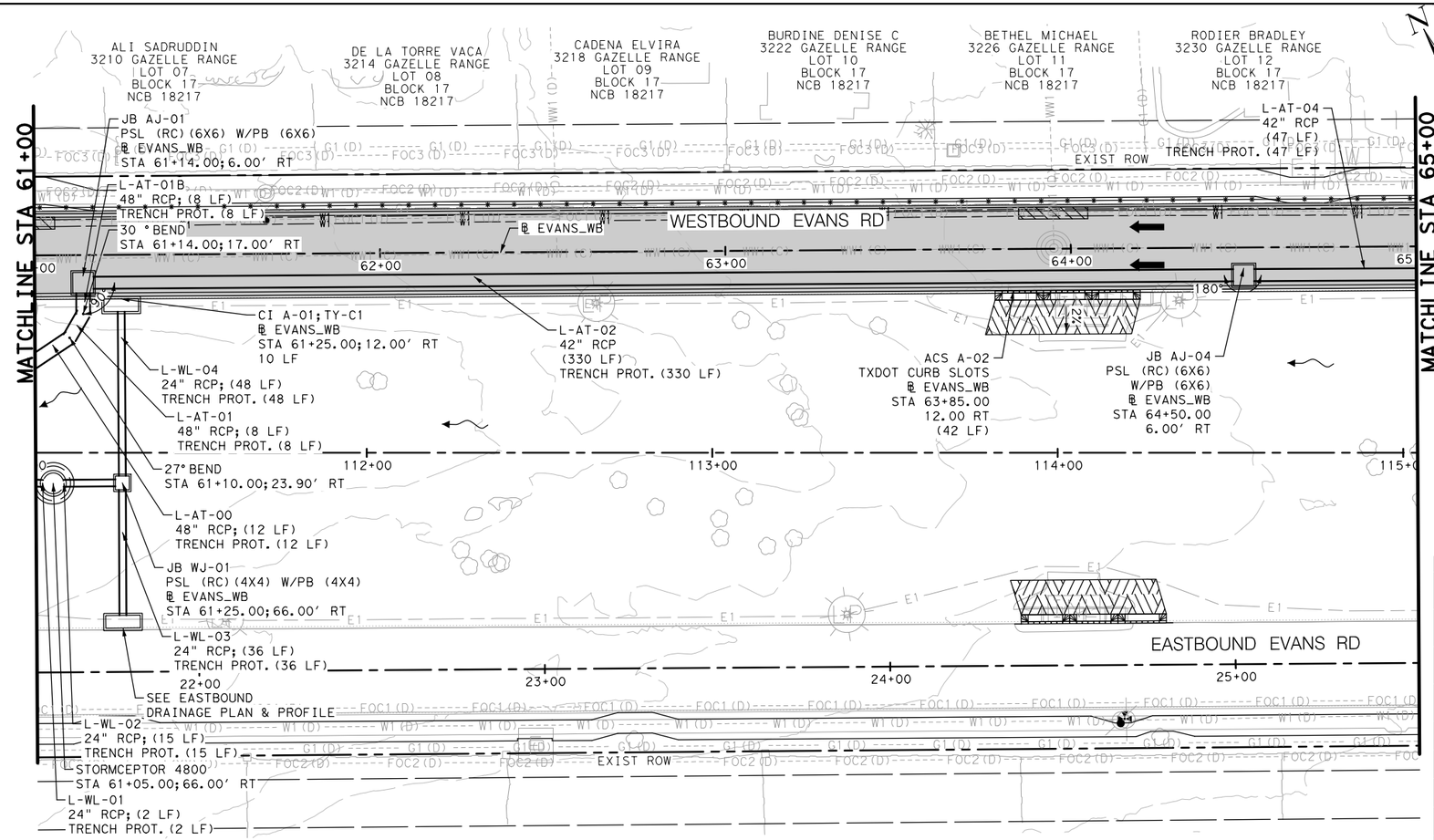

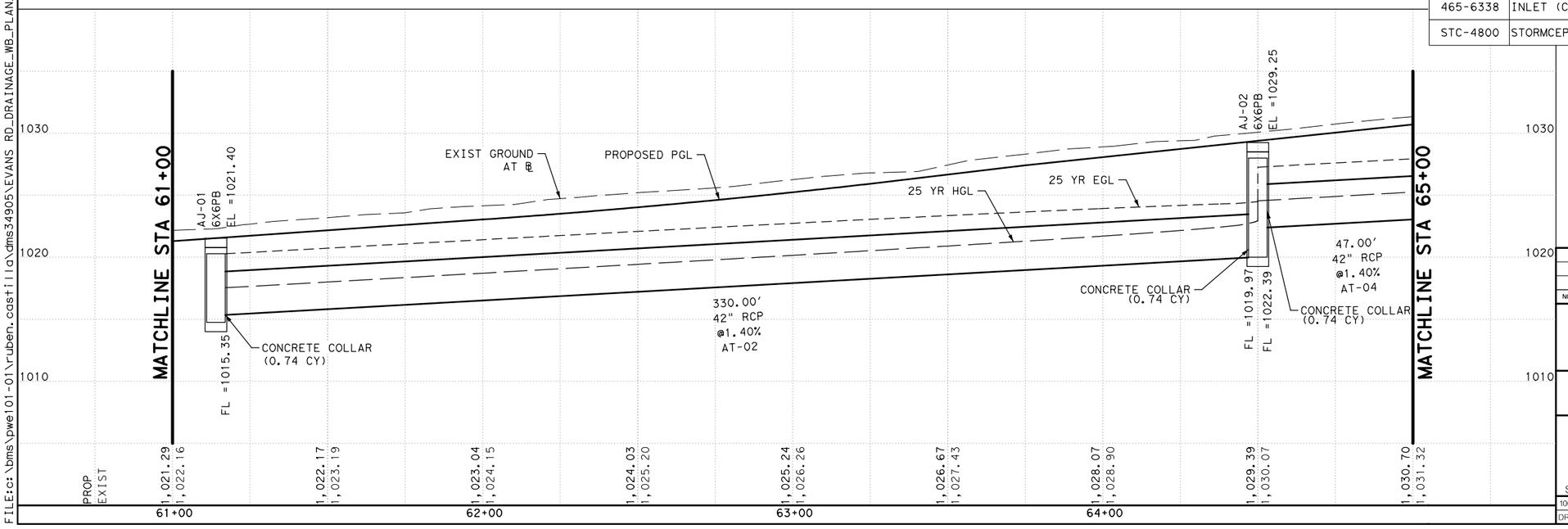

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III)(24" DIA)	LF	101
401.1	REINFORCED CONCRETE PIPE (CLASS III)(42" DIA)	LF	377
401.1	REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)	LF	28
403.7	INLET TYPE I (COMPLETE)(10 FT)	EA	1
407.4	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS	CY	5
550.1	TRENCH EXCAVATION SAFETY PROTECTION	LF	506
465-6071	INLET(COMPL)(PSL)(RC)(4FTX4FT)	EA	1
465-6076	INLET(COMPL)(PSL)(RC)(6FTX6FT)	EA	2
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3
STC-4800	STORMCEPTOR 4800-DTL	EA	1

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 61+00 TO STA 65+00 SHEET 07 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4/24/2025	
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 168 OF 330

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PLOTDRIVER: $PLTDRVS$
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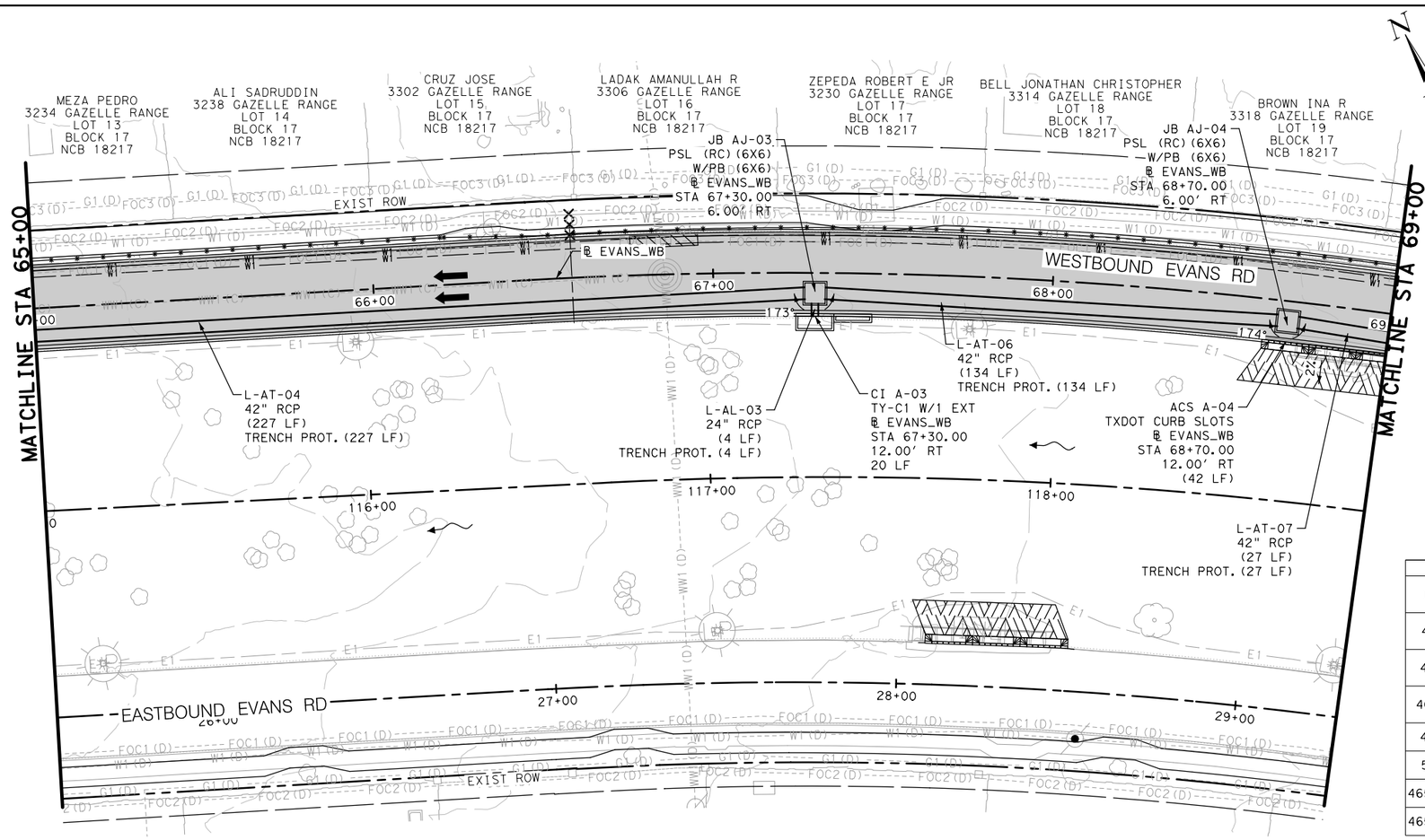

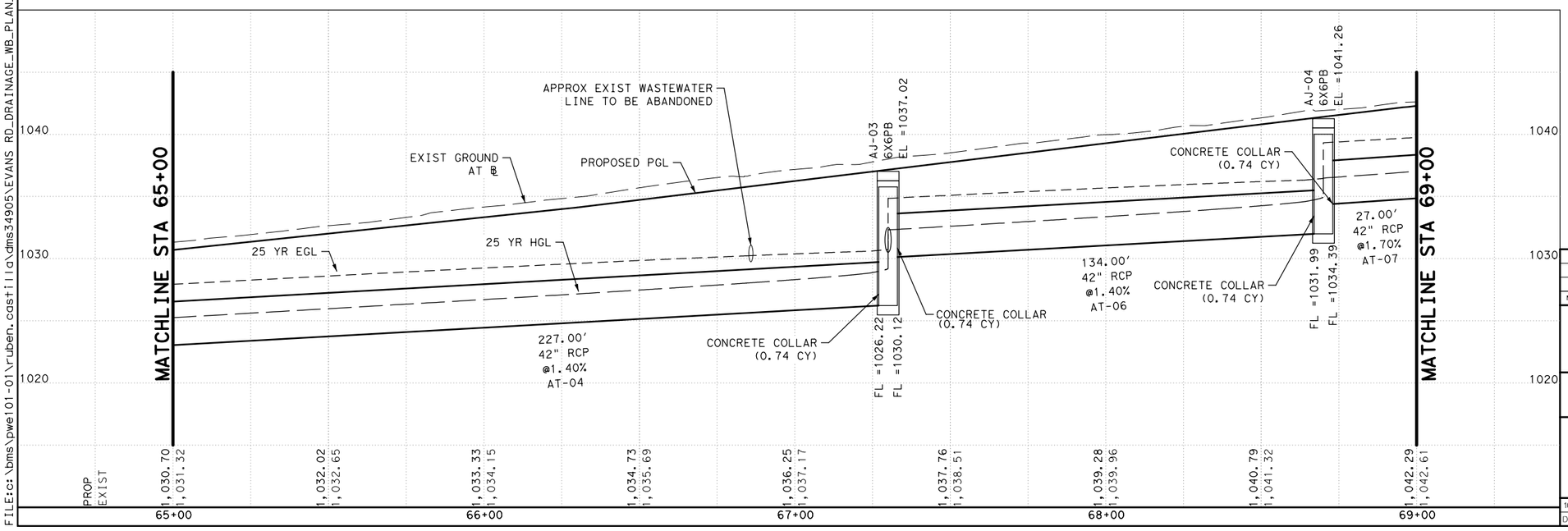

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III) (42" DIA)	LF	392
403.7	INLET TYPE I (COMPLETE) (10 FT)	EA	1
403.14	INLET EXTENSIONS (10')	EA	1
407.4	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS	CY	4
550.1	TRENCH EXCAVATION SAFETY PROTECTION	LF	392
465-6076	INLET (COMPL) (PSL) (RC) (6FTX6FT)	EA	2
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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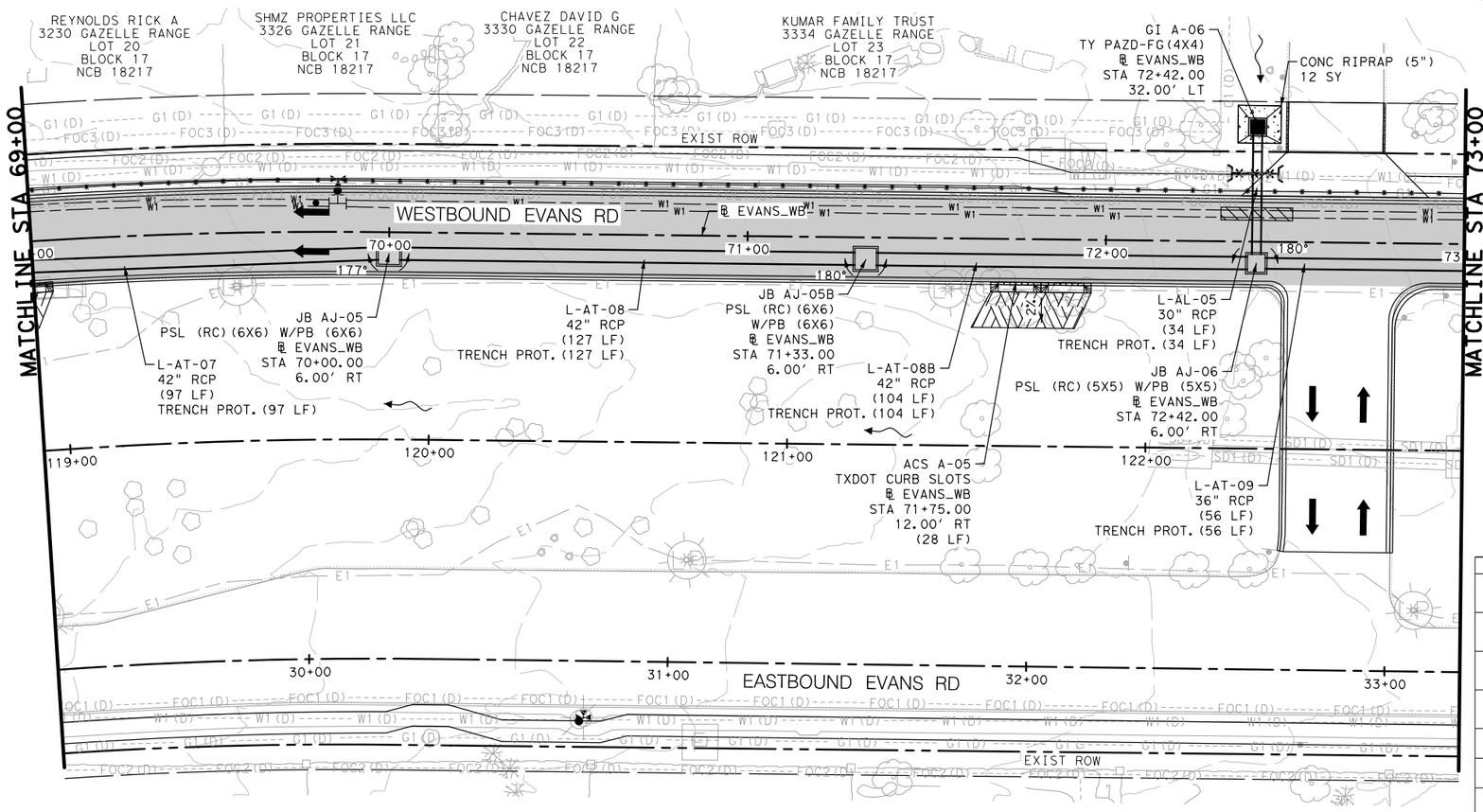
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 65+00 TO STA 69+00 SHEET 08 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 169 OF 330



LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP(DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

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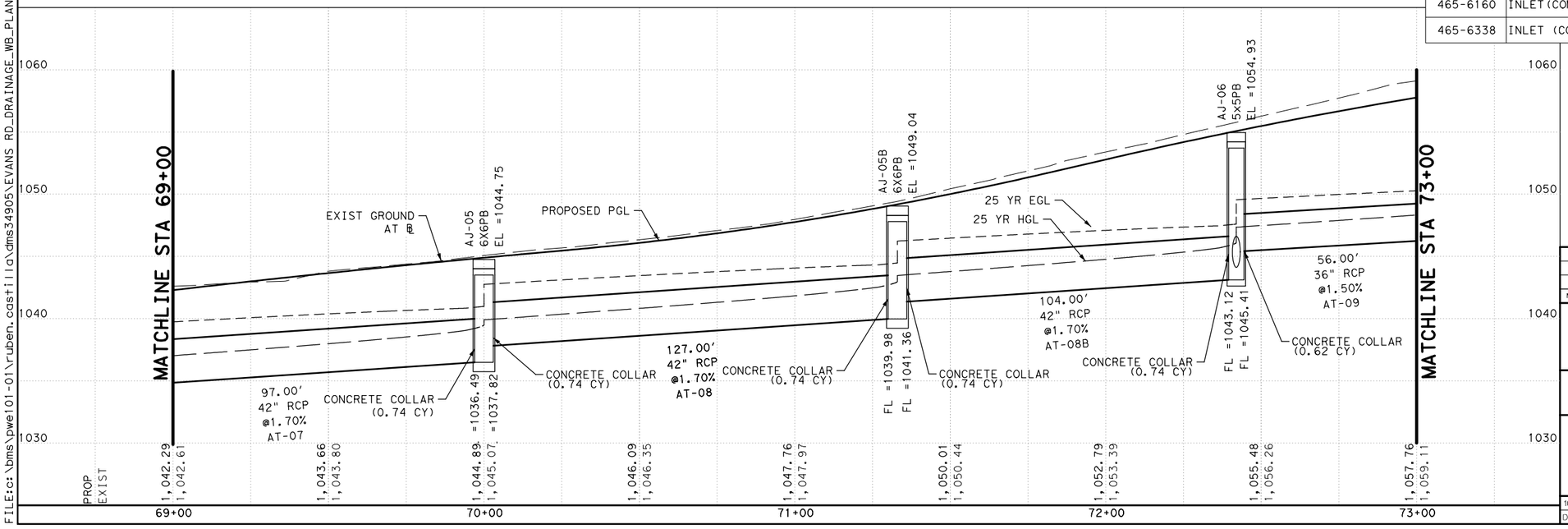
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III)(30" DIA)	LF	34
401.1	REINFORCED CONCRETE PIPE (CLASS III)(36" DIA)	LF	56
401.1	REINFORCED CONCRETE PIPE (CLASS III)(42" DIA)	LF	328
407.4	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS	CY	5
505.1	CONCRETE RIPRAP (5" THICK)	SY	12
550.10	TRENCH EXCAVATION SAFETY PROTECTION	LF	418
465-6074	INLET(COMPL)(PSL)(RC)(5FTX5FT)	EA	1
465-6076	INLET(COMPL)(PSL)(RC)(6FTX6FT)	EA	2
465-6160	INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	EA	1
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	2



HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

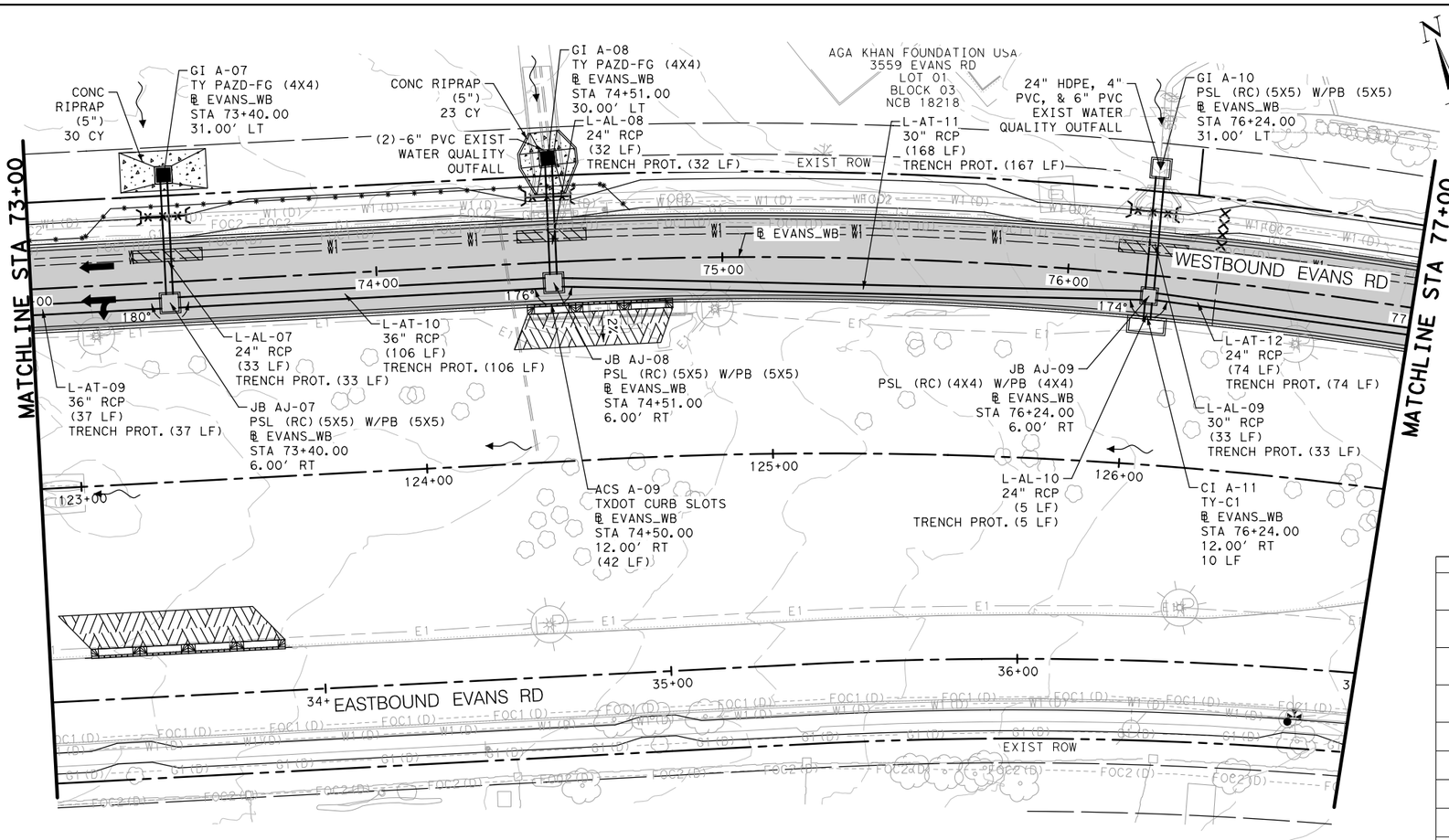
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

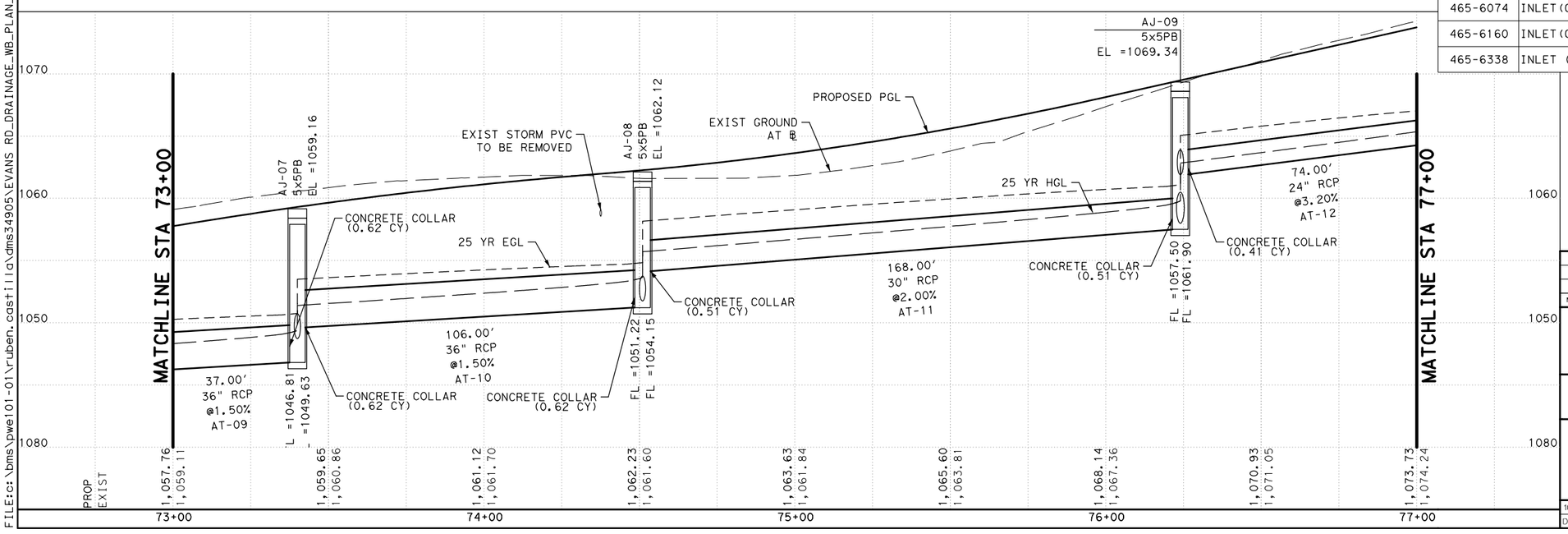
EVANS RD PHASE 1

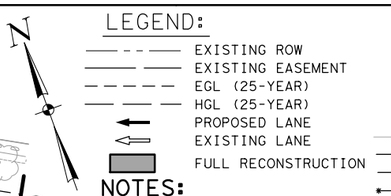
WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 69+00 TO STA 73+00 SHEET 09 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 170 OF 330







NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III) (24" DIA)	LF	144
401.1	REINFORCED CONCRETE PIPE (CLASS III) (30" DIA)	LF	201
401.1	REINFORCED CONCRETE PIPE (CLASS III) (36" DIA)	LF	143
403.7	INLET TYPE I (COMPLETE) (10 FT)	EA	1
407.4	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS	CY	7
505.1	CONCRETE RIPRAP (5" THICK)	SY	53
550.1	TRENCH EXCAVATION SAFETY PROTECTION	LF	488
465-6071	INLET (COMPL) (PSL) (RC) (4FTX4FT)	EA	1
465-6074	INLET (COMPL) (PSL) (RC) (5FTX5FT)	EA	3
465-6160	INLET (COMPL) (PAZD) (FG) (4FTX4FT-4FTX4FT)	EA	2
465-6338	INLET (COMPL) (ARMOR CURB SLOT)	EA	3

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

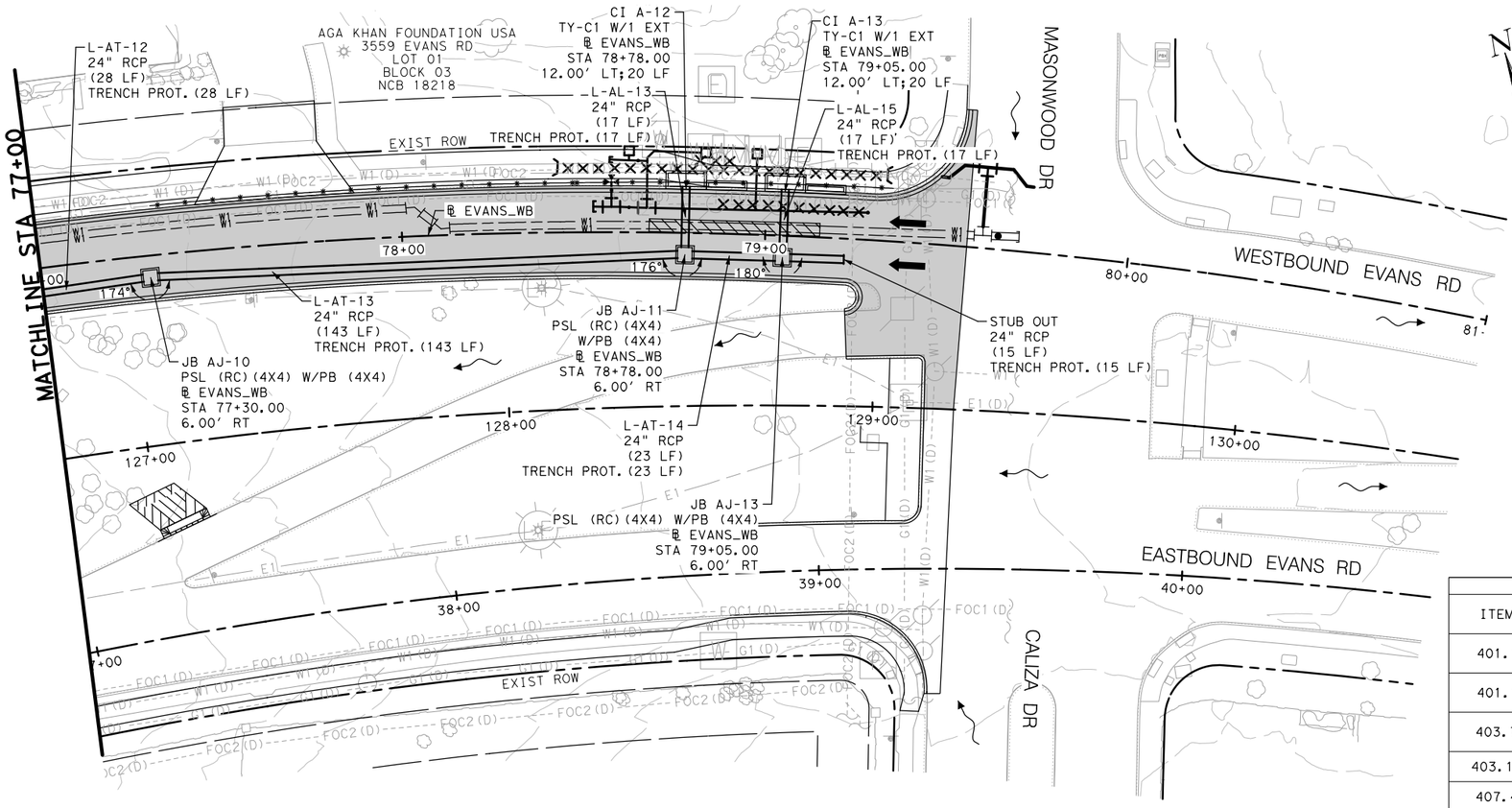
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 73+00 TO STA 77+00 SHEET 10 OF 11

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4/24/2025	
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 171 OF 330



LEGEND:

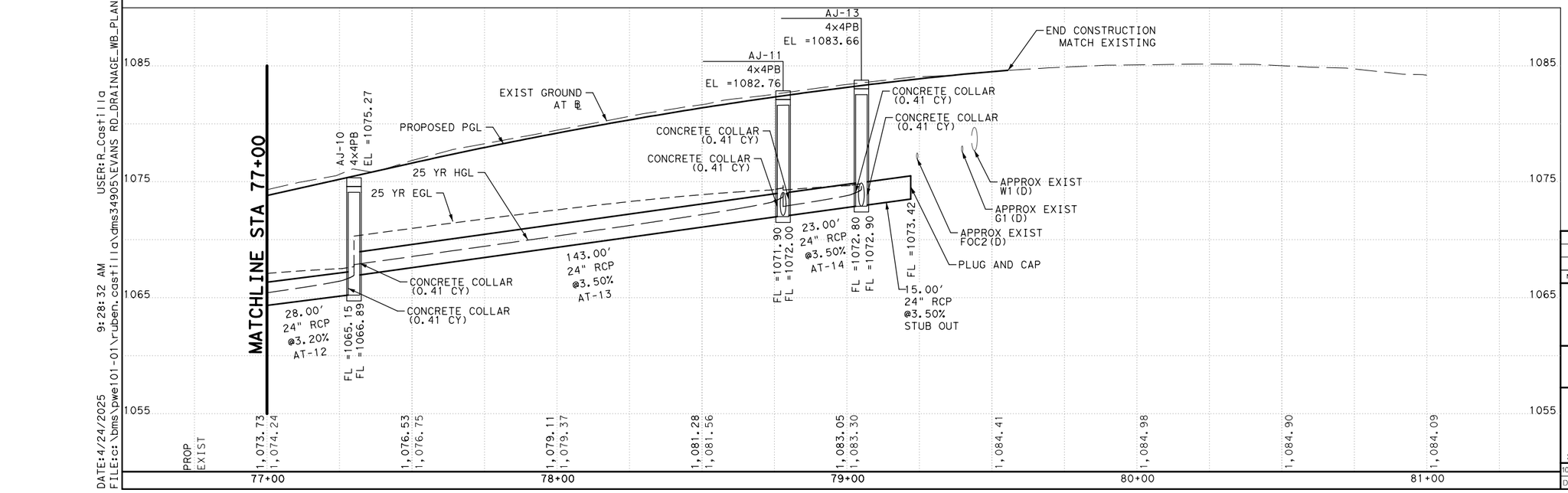
- EXISTING ROW
- EXISTING EASEMENT
- EGL (25-YEAR)
- HGL (25-YEAR)
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- VEGETATIVE FILTER STRIP
- PROPOSED STONE RIPRAP (DRY)
- PROPOSED CONCRETE RIPRAP
- INLET GRADING
- FLOW DIRECTION
- EXISTING 2' CONTOURS
- PROPOSED 1' CONTOURS
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. STATION AND OFFSET CALLOUTS FOR CURB INLETS AND CURB SLOTS ARE LOCATED AT FACE OF THE CURB.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER OF DRAINAGE STRUCTURE.
3. REGRADE GROUND BEHIND ARMOR CURB SLOT TO ALLOW POSITIVE DRAINAGE WITHIN MEDIAN. SEE DETAIL ON SHEET 178
4. LOCKING MANHOLE LIDS MUST BE USED FOR ALL PROPOSED MANHOLES.
5. THE LOCATION OF ANY EXISTING LINES SHOWN ON THESE PLANS IS THE BEST AVAILABLE AND MAY NOT BE ACCURATE.
6. PROPOSED UNDERGROUND STORM DRAINAGE INFRASTRUCTURE SHALL BE TELEVISED BY CITY FORCES AFTER COMPLETION. PROVIDE A MINIMUM OF 4-WEEKS NOTICE PRIOR TO INITIAL PAVEMENT OPERATIONS. ANY DEFECTS IN MATERIALS OR WORKMANSHIP IDENTIFIED BY CCTB SHALL BE CORRECTED PRIOR TO FINAL ACCEPTANCE OF STORM DRAINAGE INFRASTRUCTURE BY TCI.
7. CONTRACTOR SHALL INSTALL A CONCRETE COLLAR ON ALL PIPE CONDUIT CONNECTIONS TO EXISTING AND PROPOSED STRUCTURES. SEE SHEET NO209 , "PIPE AND BOX GROUTED CONNECTIONS", FOR COLLAR DETAILS.
8. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410. MUD SLABS ARE SUBSIDIARY TO ITEM 403.7.

WESTBOUND DRAINAGE SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
401.1	REINFORCED CONCRETE PIPE (CLASS III) (24" DIA)	LF	243
401.1	REINFORCED CONCRETE PIPE (PLUG)	EA	1
403.7	INLET TYPE I (COMPLETE) (10 FT)	EA	2
403.14	INLET EXTENSIONS (10')	EA	2
407.4	CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLAR	CY	4
550.1	TRENCH EXCAVATION SAFETY PROTECTION	LF	243
465-6071	INLET (COMPL) (PSL) (RC) (4FTX4FT)	EA	3



HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WESTBOUND EVANS RD STORM DRAIN PLAN & PROFILE

STA 77+00 TO END — SHEET 11 OF 11

100 % SUBMITTAL	PROJECT NO.:23-03901 & 23-03931	DATE: 4/24/2025	
DRWN. BY:DO	DSGN. BY:RC	CHKD. BY:JA	SHEET NO.: 172 OF 330

DATE:4/24/2025 9:28:32 AM
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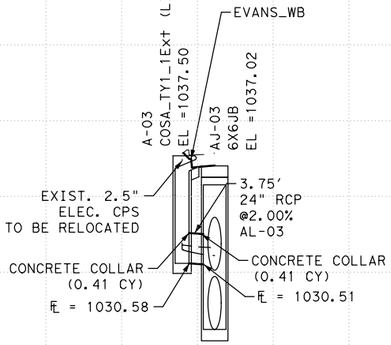
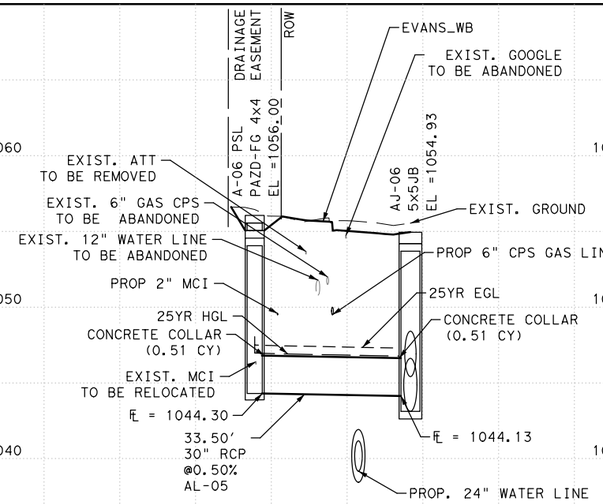


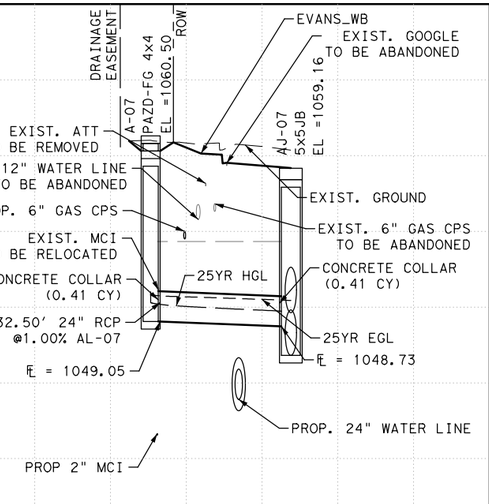
LATERAL AL-03

℄ EVANS_WB STA 67+30.00



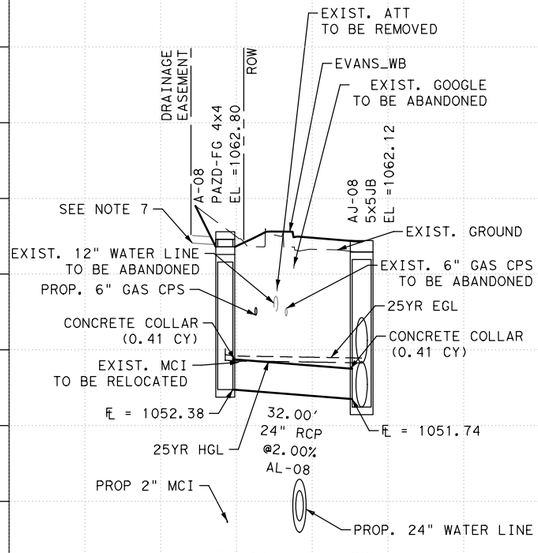
LATERAL AL-05

℄ EVANS_WB STA 72+42.00



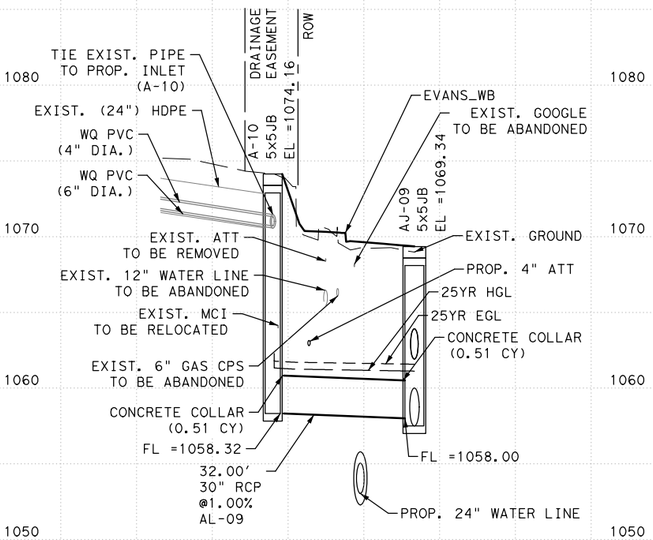
LATERAL AL-07

℄ EVANS_WB STA 73+40.00



LATERAL AL-08

℄ EVANS_WB STA 74+51.00



LATERAL AL-09

℄ EVANS_WB STA 76+24.00

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

LEGEND:

- EXISTING ROW
- PROPOSED EASEMENT
- PROPOSED GROUND
- EXISTING GROUND
- EGL (25-YEAR)
- HGL (25-YEAR)

NOTES:

1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER TO CENTER OF DRAINAGE STRUCTURE.
3. LENGTH FOR PAY, AS SHOWN IN QUANTITY SUMMARIES, IS FROM INSIDE WALL TO INSIDE WALL OF DRAINAGE STRUCTURE.
4. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MUST BE VERIFIED BY CONTRACTOR.
5. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410.
6. SEE RIPRAP SHEETS FOR PLAN VIEW OF PVC CONNECTION.
7. CONTRACTOR TO VERIFY TWO (6" DIA.)EXISTING WATER QUALITY PVC LOCATIONS AND MITER TO SLOPE AS NEEDED.
8. SEE SHEET 185 FOR STORMCEPTOR DETAIL.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

STORM DRAIN LATERALS

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 173 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE:4/24/2025 9:28:34 AM USER:R_Castilla
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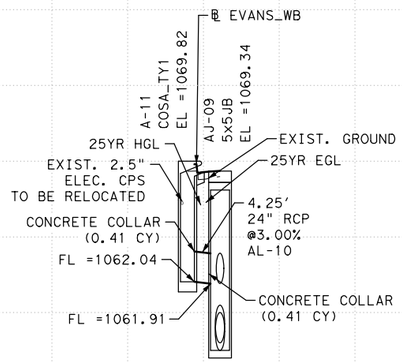
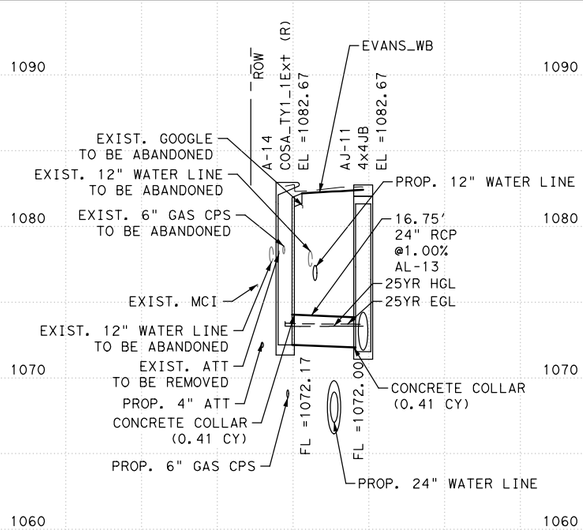


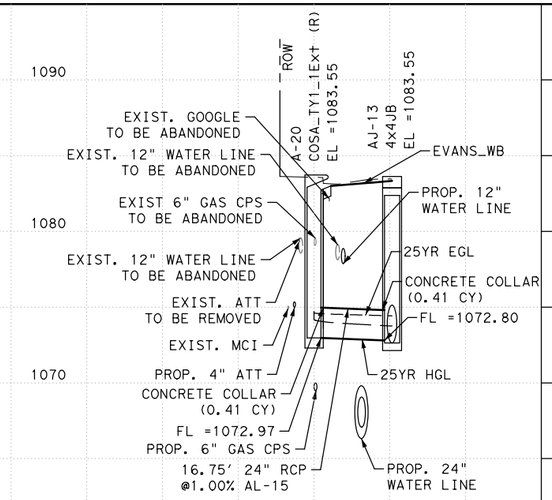
LATERAL AL-10

℄ EVANS_WB STA 76+24.00



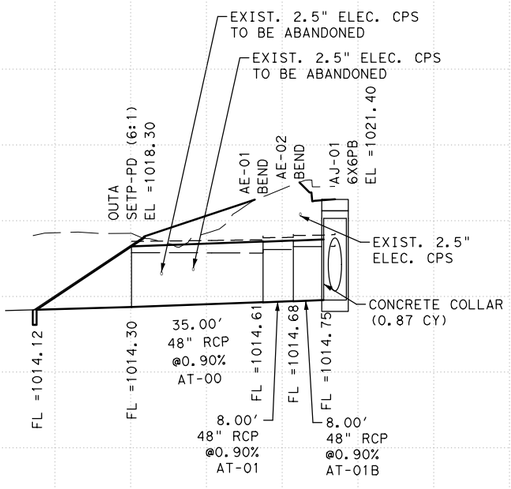
LATERAL AL-13

℄ EVANS_WB STA 78+78.00



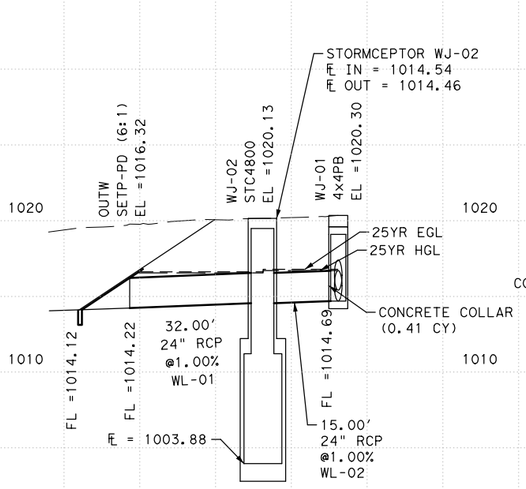
LATERAL AL-15

℄ EVANS_WB STA 79+05.00



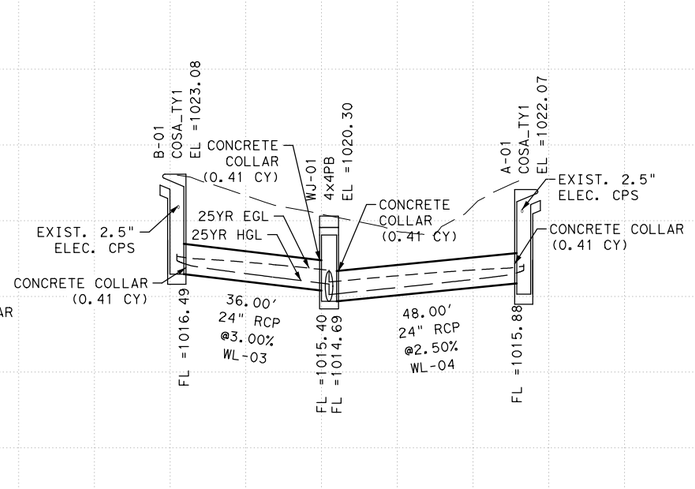
LATERALS AT-00, AT-01, & AT-01B

℄ EVANS_WB STA 61+80.00



LATERAL WL-01 & WL-02

℄ EVANS_WB STA 61+00.00



LATERAL WL-03 & WL-04

℄ EVANS_WB STA 61+25.00

HORZ 0' 10' 20' 40'
VERT 0' 5' 10'

LEGEND:

- EXISTING ROW
- PROPOSED EASEMENT
- PROPOSED GROUND
- EXISTING GROUND
- EGL (25-YEAR)
- HGL (25-YEAR)

NOTES:

1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
2. STORM SEWER LENGTHS AND SLOPES SHOWN ARE FROM CENTER TO CENTER OF DRAINAGE STRUCTURE.
3. LENGTH FOR PAY, AS SHOWN IN QUANTITY SUMMARIES, IS FROM INSIDE WALL TO INSIDE WALL OF DRAINAGE STRUCTURE.
4. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MUST BE VERIFIED BY CONTRACTOR.
5. MINIMUM 4" DEPTH CLEAN GRAVEL SUBGRADE FILLER TO BE PLACED PER "PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS" AND SPEC ITEM 410.
6. SEE RIPRAP SHEETS FOR PLAN VIEW OF PVC CONNECTION.
7. CONTRACTOR TO VERIFY TWO (6" DIA.)EXISTING WATER QUALITY PVC LOCATIONS AND MITER TO SLOPE AS NEEDED.
8. SEE SHEET 185 FOR STORMCEPTOR DETAIL.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

STORM DRAIN LATERALS

SHEET 02 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4/24/2025	
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 174 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE:4/24/2025 9:28:35 AM USER:R_Castilla
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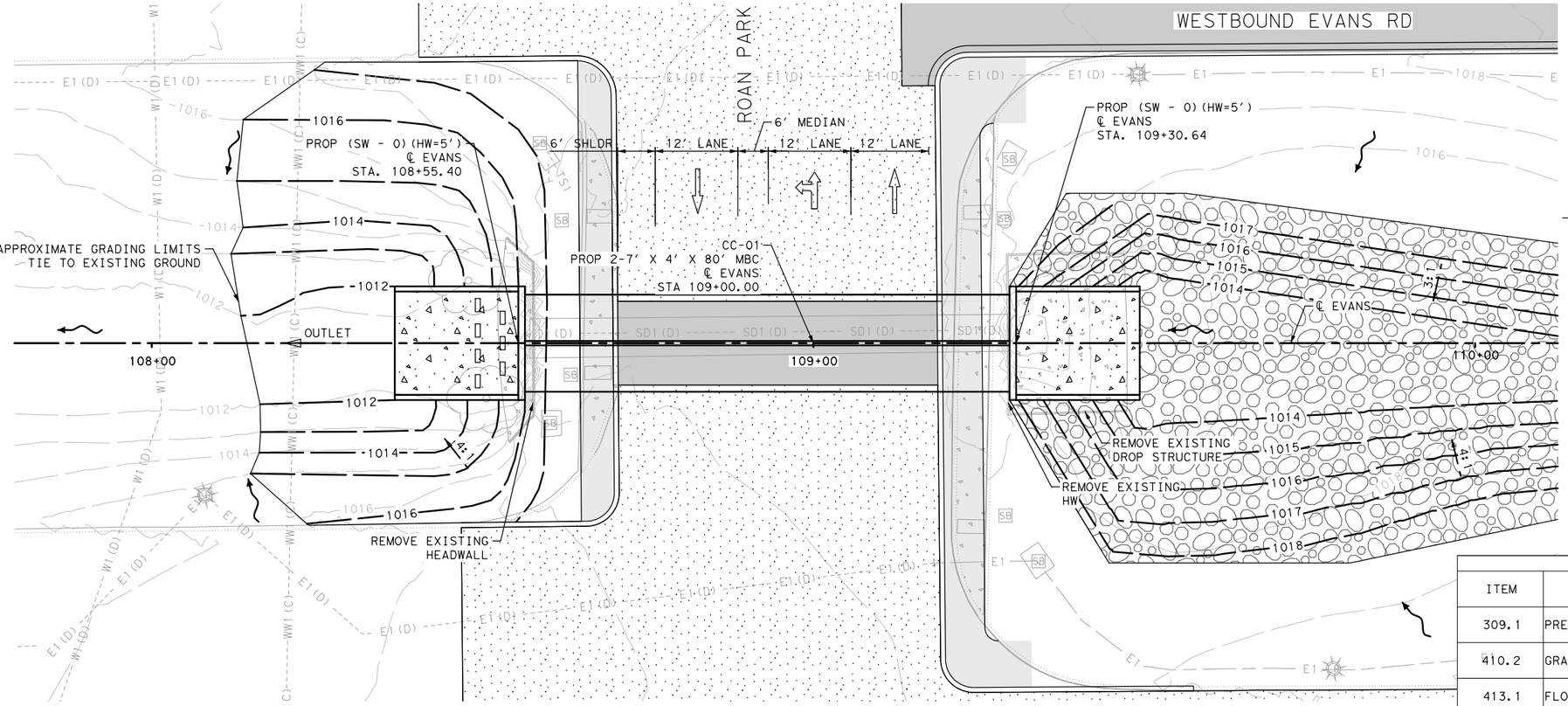


HORZ 0' 5' 10' 20'
VERT 0' 5'

LEGEND:

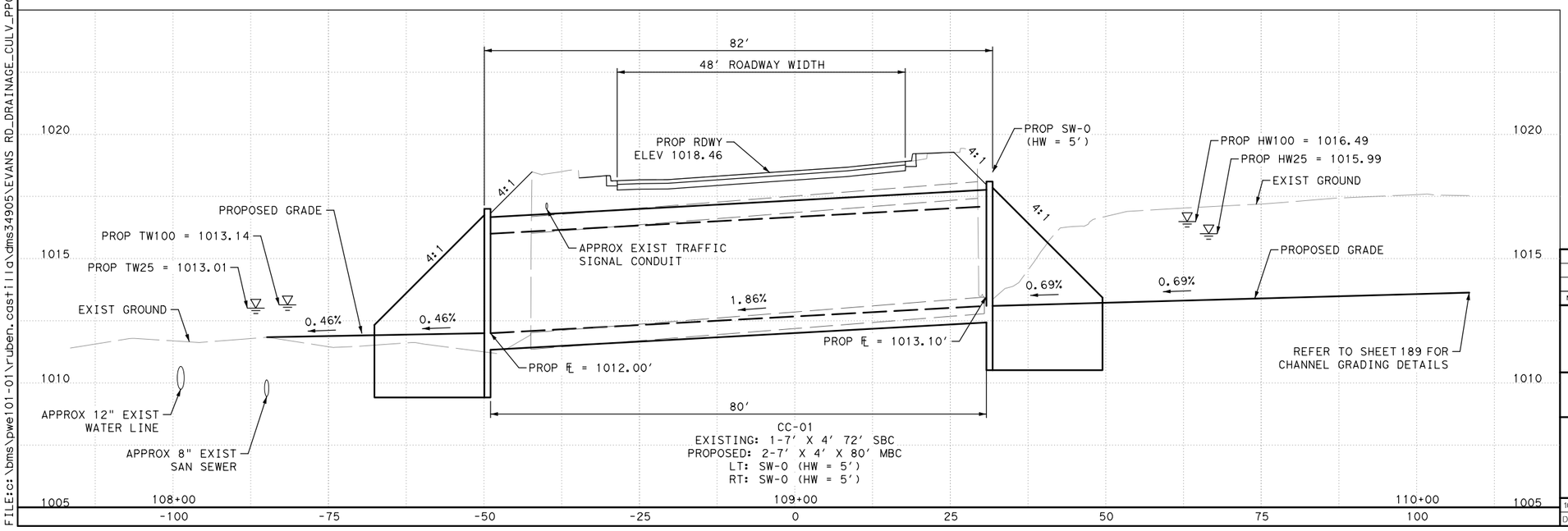
- HGL
- EXISTING LANE
- FLOW DIRECTION
- EXISTING 1' CONTOURS
- PROPOSED 1' CONTOURS
- W1 — PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. REFER TO GRADING PLAN SHEETS FOR MEDIAN GRADING DETAILS.
2. CONTRACTOR SHALL INSTALL A MUD SLAB (CLASS B CONC)(6" MIN THICKNESS) AT THE BOTTOM OF AN EXCAVATION FOR THE PLACEMENT OF MULTIPLE INLETS. MULTIPLE BOXES, OR OTHER STRUCTURES, MUD SLAB SHALL BE SUBSIDIARY TO THE RESPECTIVE STRUCTURE PAY ITEM.
3. FOR RIPRAP DETAILS SEE SHEET 187 - 189
4. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MUST BE VERIFIED BY CONTRACTOR.
5. EXIST NBI NUMBER: 15-015-0-B114-78-001

DRAINAGE CULVERT SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
309.1	PRECAST REINFORCED CONCRETE BOX CULVERTS (7' X 4')	LF	160
410.2	GRAVEL SUBGRADE FILLER	CY	10
413.1	FLOWABLE FILL (LOW STRENGTH)	CY	28
505.1	CONCRETE RIPRAP (5" THICK)	SY	88
466-6208	WINGWALL (SW - 0) (HW=5 FT)	EA	2



STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

CULVERT LAYOUT
CC-01

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 175 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
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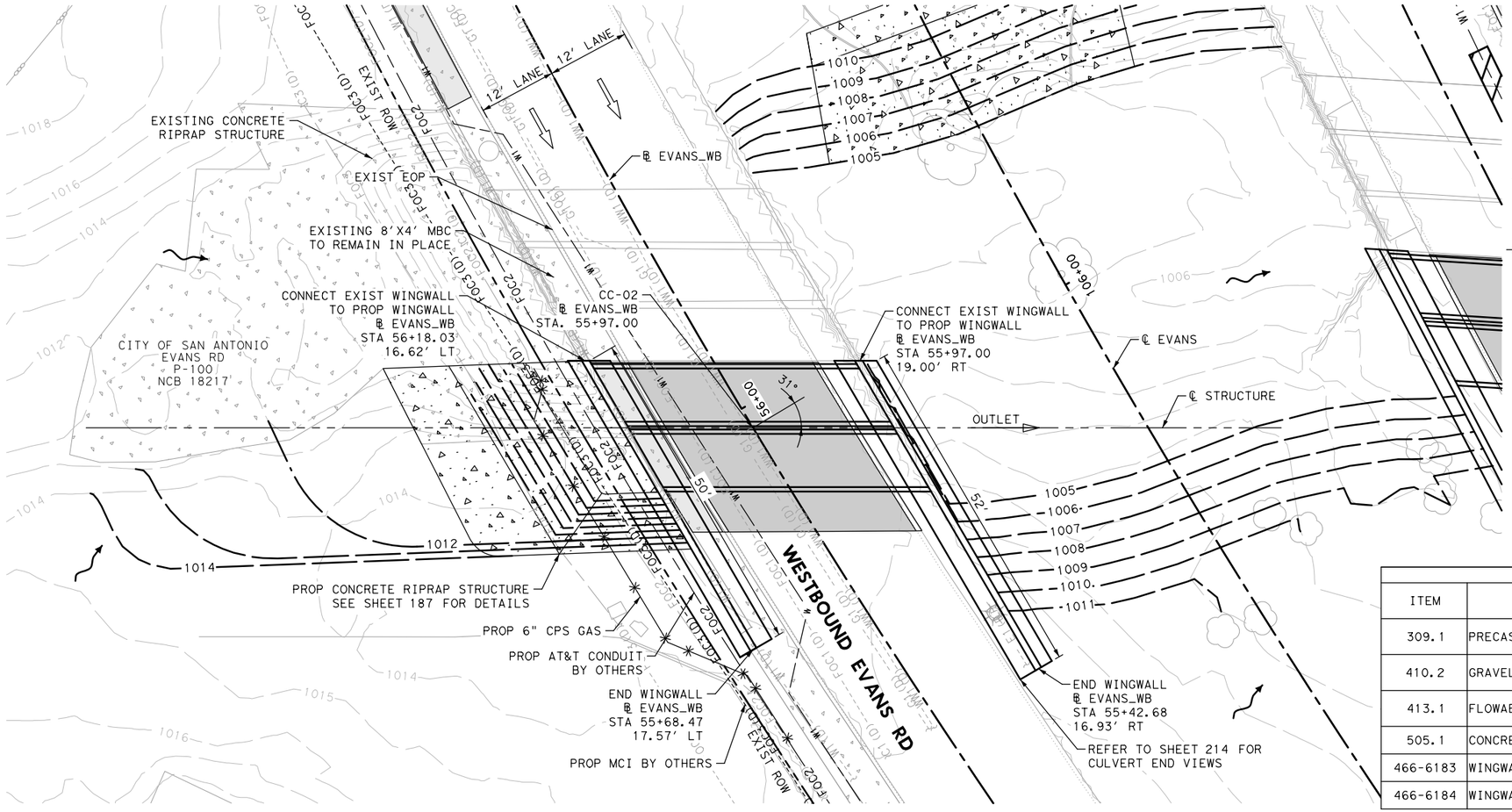
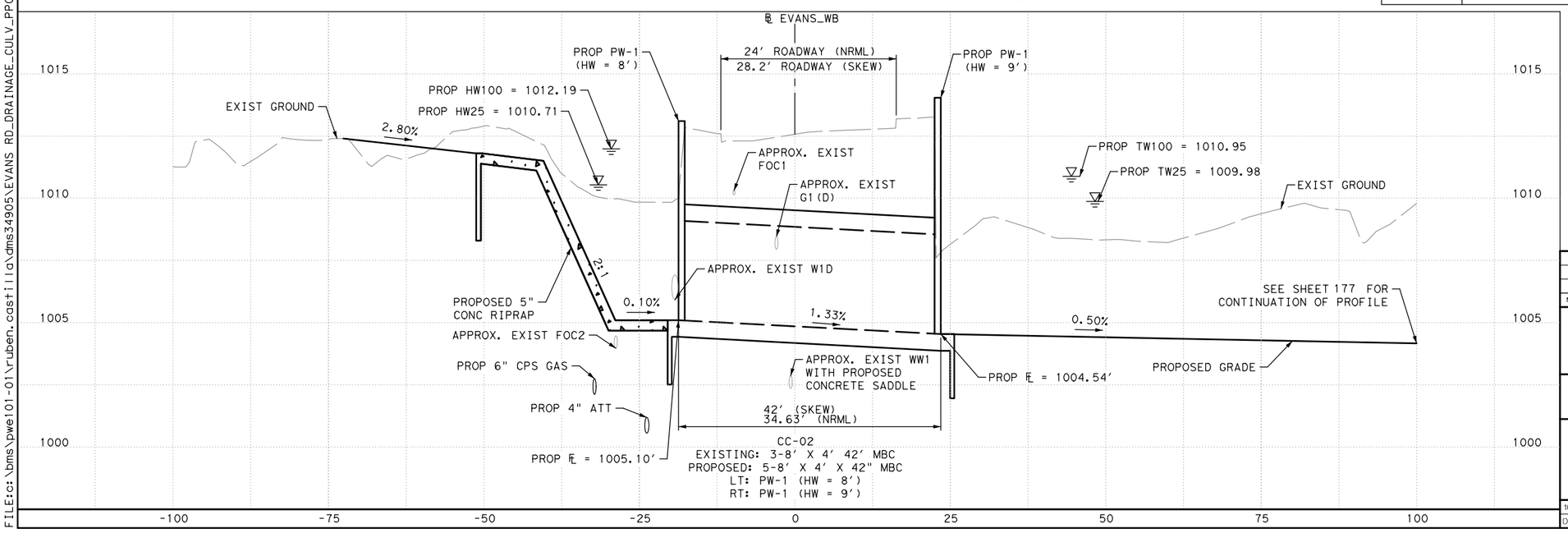


NOTES:

1. REFER TO GRADING PLAN SHEETS FOR MEDIAN GRADING DETAILS.
2. CONTRACTOR SHALL INSTALL A MUD SLAB (CLASS B CONC)(6" MIN THICKNESS) AT THE BOTTOM OF AN EXCAVATION FOR THE PLACEMENT OF MULTIPLE INLETS. MULTIPLE BOXES, OR OTHER STRUCTURES, MUD SLAB SHALL BE SUBSIDIARY TO THE RESPECTIVE STRUCTURE PAY ITEM.
3. FOR RIPRAP DETAILS SEE SHEET 187 - 189
4. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MUST BE VERIFIED BY CONTRACTOR.
5. EXIST NBI NUMBER: 15-015-0-B114-78-001
6. PROPOSED 24" WATER IN 42" STEEL CASING IS 3' BELOW BOTTOM OF CULVERT.
7. PROPOSED SAWS WATER, AT&T AND MCI RELOCATIONS ARE OUT OF PROFILE VIEW RANGE.

DRAINAGE CULVERT SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
309.1	PRECAST REINFORCED CONCRETE BOX CULVERTS (8' X 4')	LF	84
410.2	GRAVEL SUBGRADE FILLER	CY	13
413.1	FLOWABLE FILL (LOW STRENGTH)	CY	89
505.1	CONCRETE RIPRAP (5" THICK)	SY	100
466-6183	WINGWALL (PW - 1) (HW=8 FT)	EA	1
466-6184	WINGWALL (PW - 1) (HW=9 FT)	EA	1



STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

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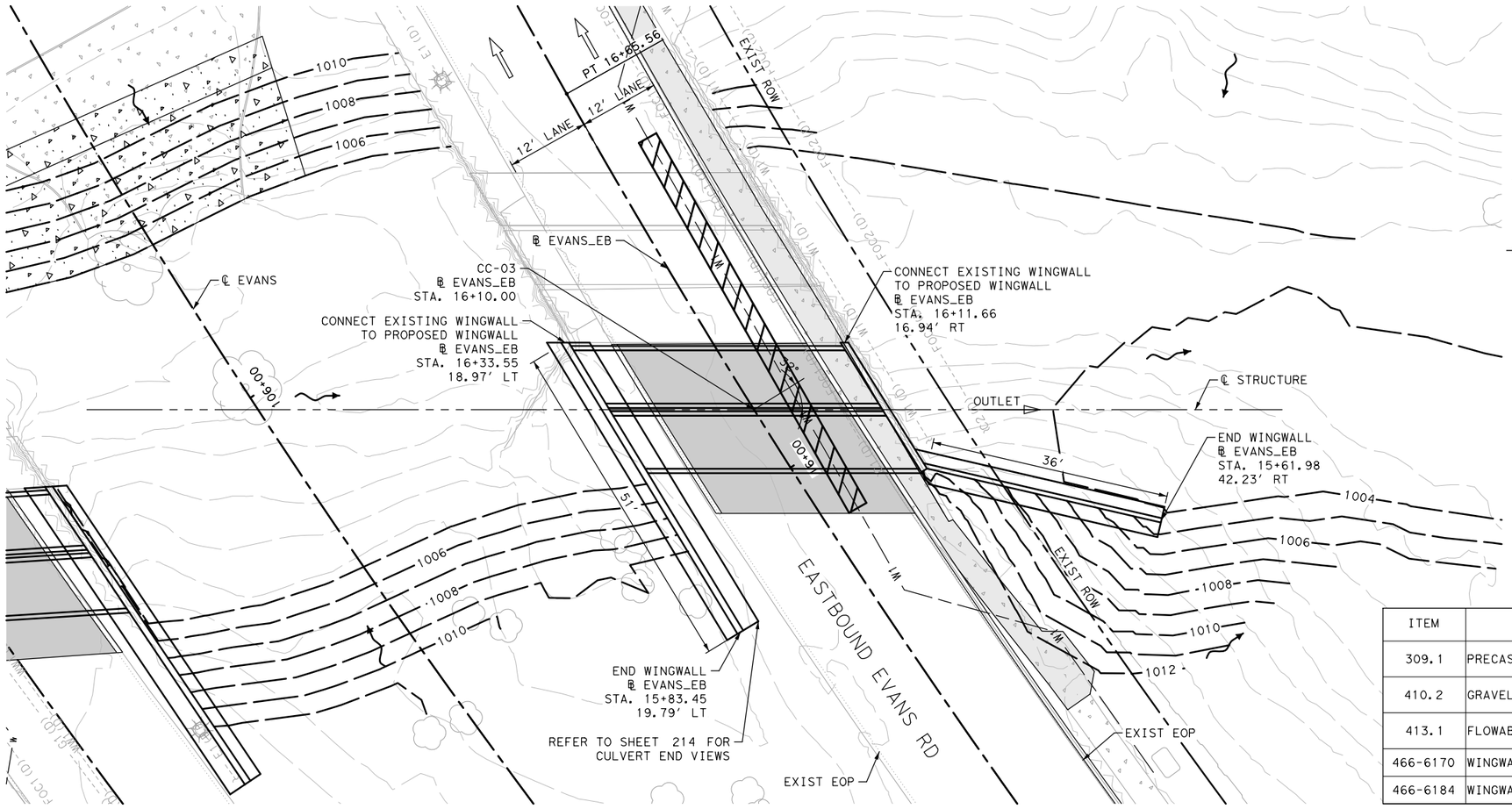
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

CULVERT LAYOUT
CC-02

SHEET 01 OF 01

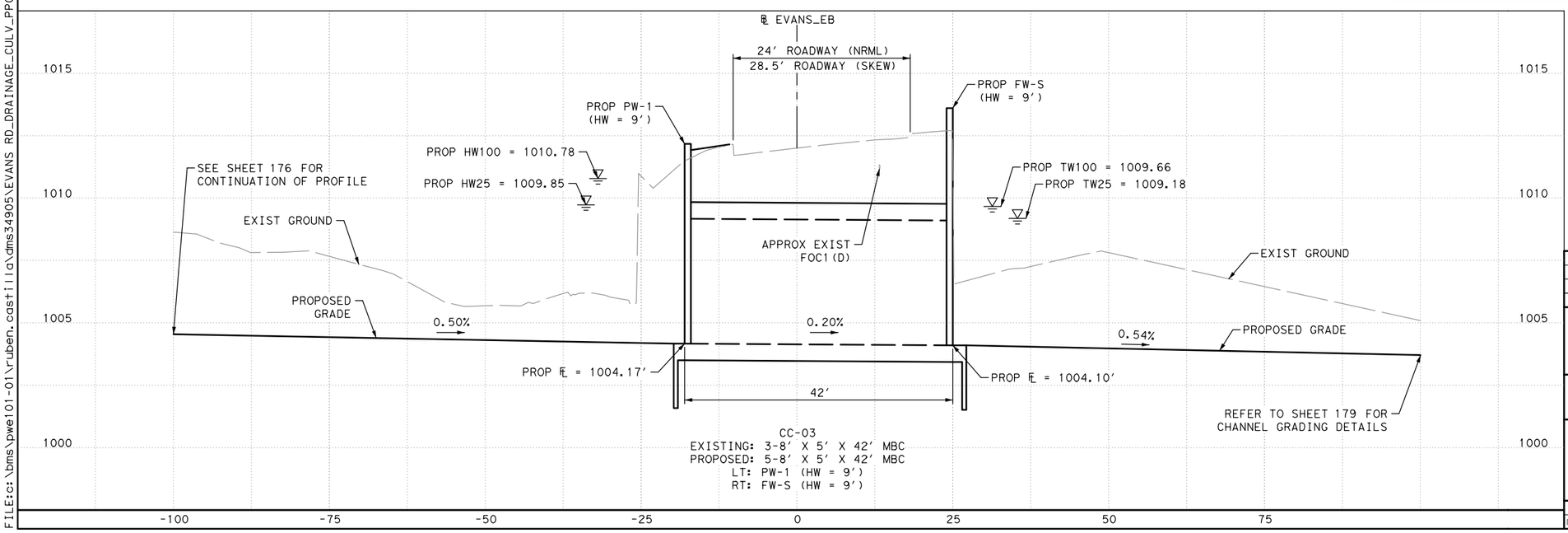
100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 176 OF 330



NOTES:

1. REFER TO GRADING PLAN SHEETS FOR MEDIAN GRADING DETAILS.
2. CONTRACTOR SHALL INSTALL A MUD SLAB (CLASS B CONC)(6" MIN THICKNESS) AT THE BOTTOM OF AN EXCAVATION FOR THE PLACEMENT OF MULTIPLE INLETS. MULTIPLE BOXES, OR OTHER STRUCTURES, MUD SLAB SHALL BE SUBSIDIARY TO THE RESPECTIVE STRUCTURE PAY ITEM.
3. FOR RIPRAP DETAILS SEE SHEET 187 - 189
4. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS MUST BE VERIFIED BY CONTRACTOR.
5. EXIST NBI NUMBER: 15-015-0-B114-78-002
6. PROPOSED 20" WATER IN 42" STEEL CASING IS 3' BELOW BOTTOM OF CULVERT.
7. PROPOSED SAWS WATER AND GOOGLE RELOCATIONS ARE OUT OF PROFILE VIEW RANGE.

ITEM	DESCRIPTION	UNIT	SHEET QTY
309.1	PRECAST REINFORCED CONCRETE BOX CULVERTS (8' X 5')	LF	84
410.2	GRAVEL SUBGRADE FILLER	CY	13
413.1	FLOWABLE FILL (LOW STRENGTH)	CY	90
466-6170	WINGWALL (FW - S) (HW=9 FT)	EA	1
466-6184	WINGWALL (PW - 1) (HW=9 FT)	EA	1



CC-03
EXISTING: 3-8' X 5' X 42' MBC
PROPOSED: 5-8' X 5' X 42' MBC
LT: PW-1 (HW = 9')
RT: FW-S (HW = 9')

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4/24/2025

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PUBLIC WORKS DEPARTMENT

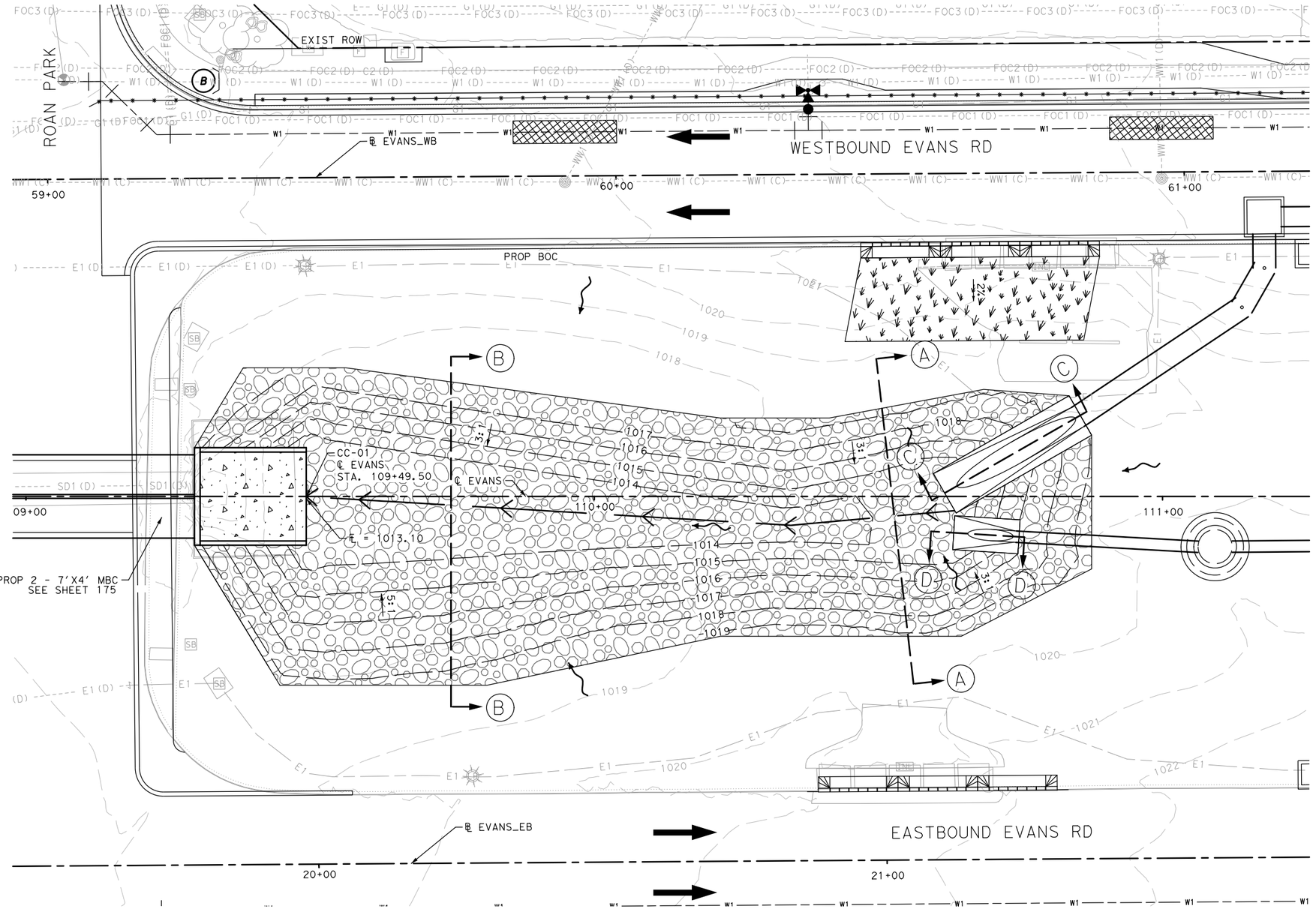
EVANS RD PHASE 1

CULVERT LAYOUT
CC-03

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4/24/2025	
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 177 OF 330

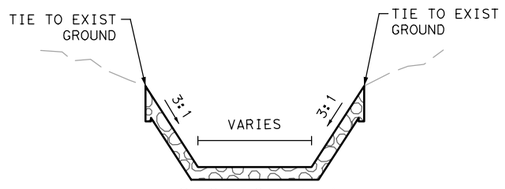
PLOTDRIVER: $PLTDRVS$
PENTABLE: $PENTBLS$
DATE:4/24/2025 9:28:40 AM USER:R.Castilla
FILE:c:\bms\pwe101-01\ruben.castilla\dms34905\EVANS RD_DRAINAGE_CULV_PP03.dgn



NOTES:

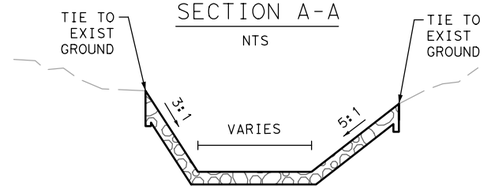
1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.

2. CONTRACTOR TO VERIFY EXISTING GROUND ELEVATIONS PRIOR TO BEGINNING WORK.



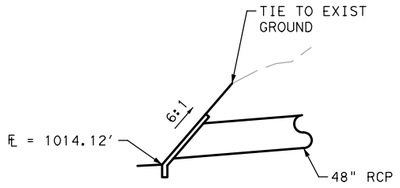
SECTION A-A

NTS



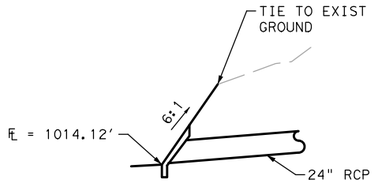
SECTION B-B

NTS



SECTION C-C

NTS



SECTION D-D

NTS

DRAINAGE GRADING PLAN SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
105.1	CHANNEL EXCAVATION	CY	566

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4/24/2025

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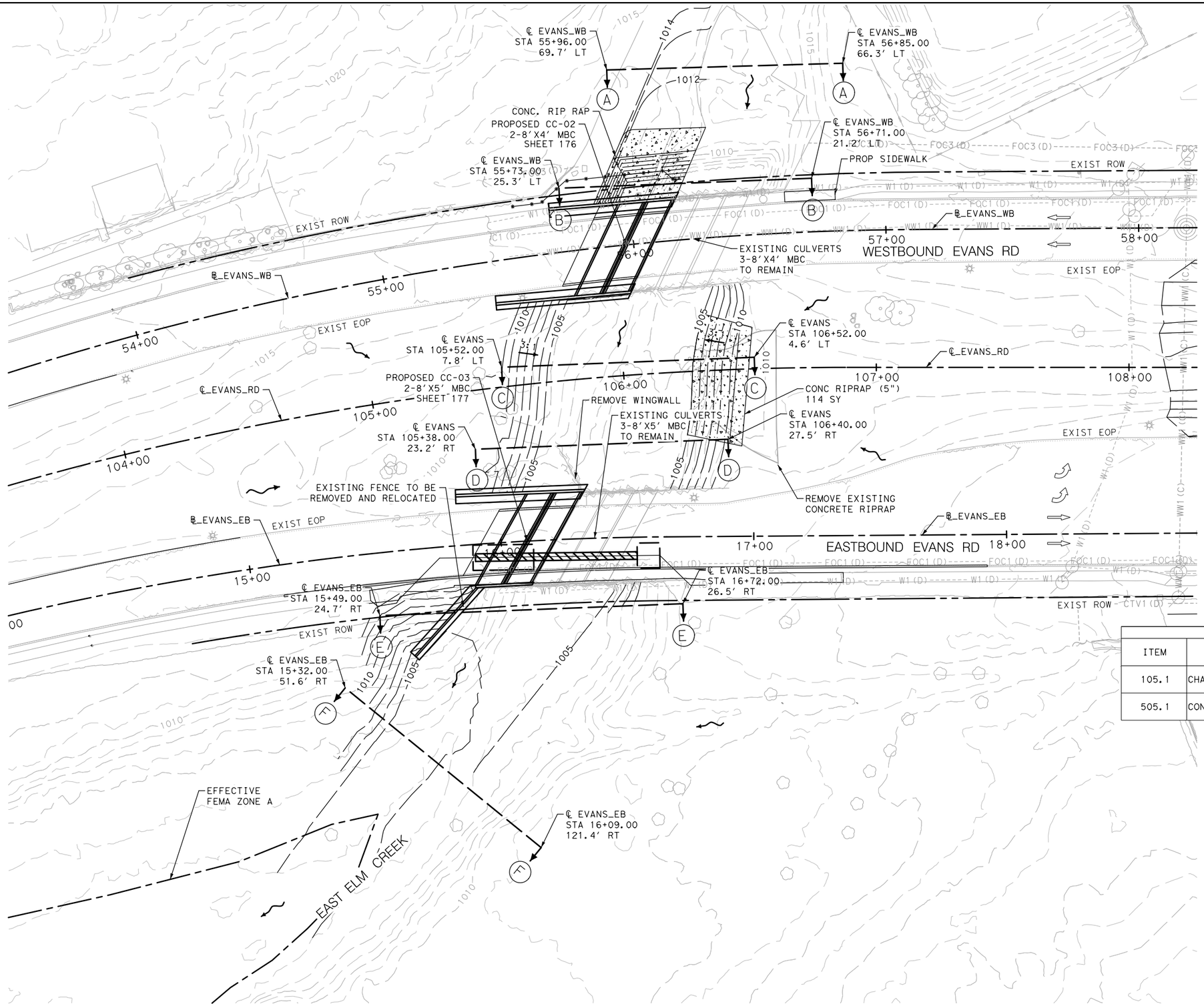
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

CC-01
GRADING PLAN

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 178 OF 330



0' 10' 20' 40'

LEGEND:

- EXISTING ROW
- EXISTING EASEMENT
- PROPOSED LANE
- FLOW DIRECTION
- EXISTING 1' CONTOURS
- PROPOSED 1' CONTOURS
- PROPOSED WATER LINE
- PROPOSED GAS LINE
- PROPOSED CONCRETE RIPRAP

NOTES:

1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.

2. CONTRACTOR TO VERIFY EXISTING GROUND ELEVATIONS PRIOR TO BEGINNING WORK.

3. REFER TO "EAST ELM CREEK X-SECTIONS" SHEET.

DRAINAGE GRADING PLAN SUMMARY

ITEM	DESCRIPTION	UNIT	SHEET QTY
105.1	CHANNEL EXCAVATION	CY	1365
505.1	CONCRETE RIPRAP (5" THICK)	SY	213

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PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

EAST ELM CREEK GRADING PLAN

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 179 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE:4/24/2025 9:28:43 AM USER:R_Castilla
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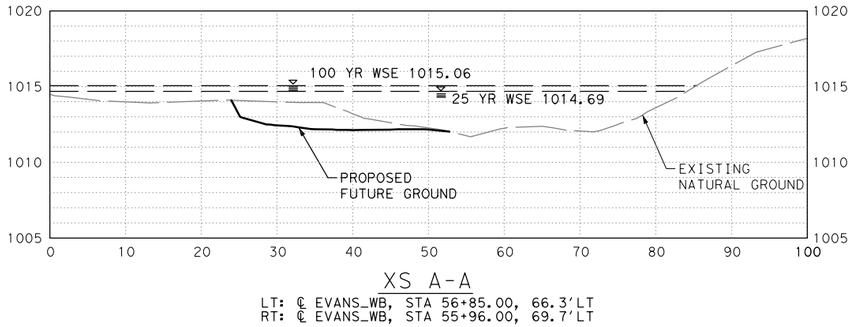
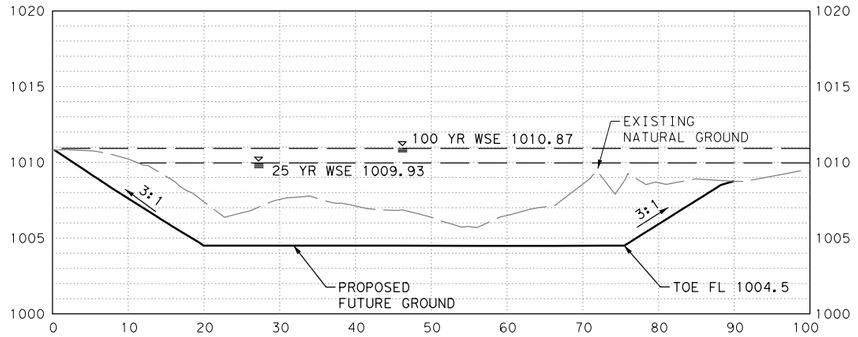


XS A-A

LT: ℄ EVANS_WB, STA 56+85.00, 66.3'LT
RT: ℄ EVANS_WB, STA 55+96.00, 69.7'LT

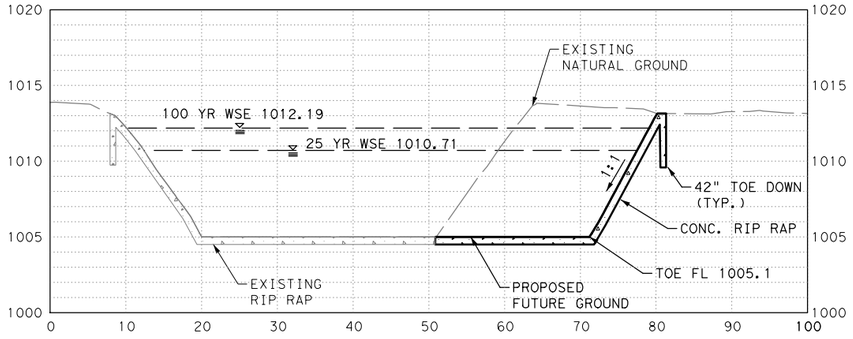


XS D-D

LT: ℄ EVANS, STA 106+40.00, 27.5'LT
RT: ℄ EVANS, STA 105+38.00, 23.2'LT

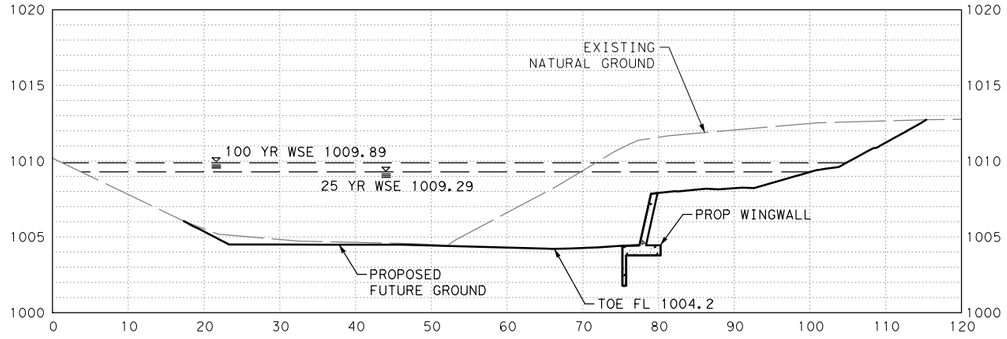
LEGEND:

PROPOSED SURFACE
EXISTING SURFACE



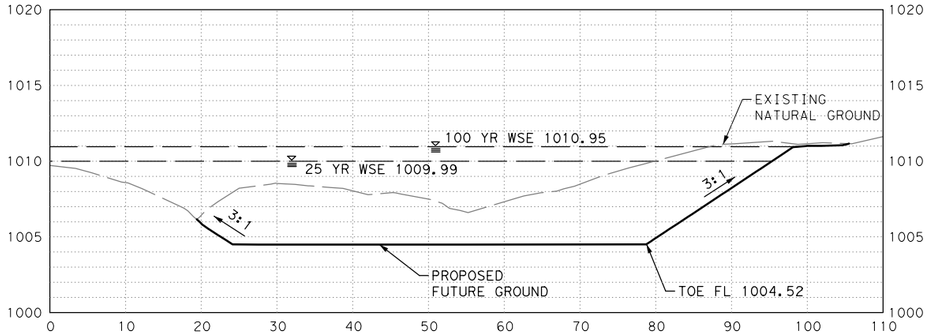
XS B-B

LT: ℄ EVANS_WB, STA 56+71.00, 21.2'LT
RT: ℄ EVANS_WB, STA 55+73.00, 25.3'LT



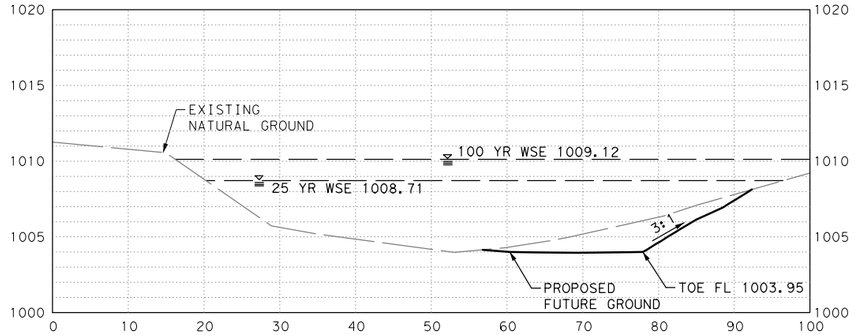
XS E-E

LT: ℄ EVANS_EB, STA 16+72.00, 26.5'RT
RT: ℄ EVANS_EB, STA 15+49.00, 24.7'RT



XS C-C

LT: ℄ EVANS, STA 106+52.00, 4.6'LT
RT: ℄ EVANS, STA 105+52.00, 7.8'LT



XS F-F

LT: ℄ EVANS_EB, STA 16+09.00, 121.4'RT
RT: ℄ EVANS_EB, STA 15+32.00, 51.6'RT

HORZ 0' 10' 20'
VERT 0' 5' 10'

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RUBEN A. CASTILLA
150047
LICENSED
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4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

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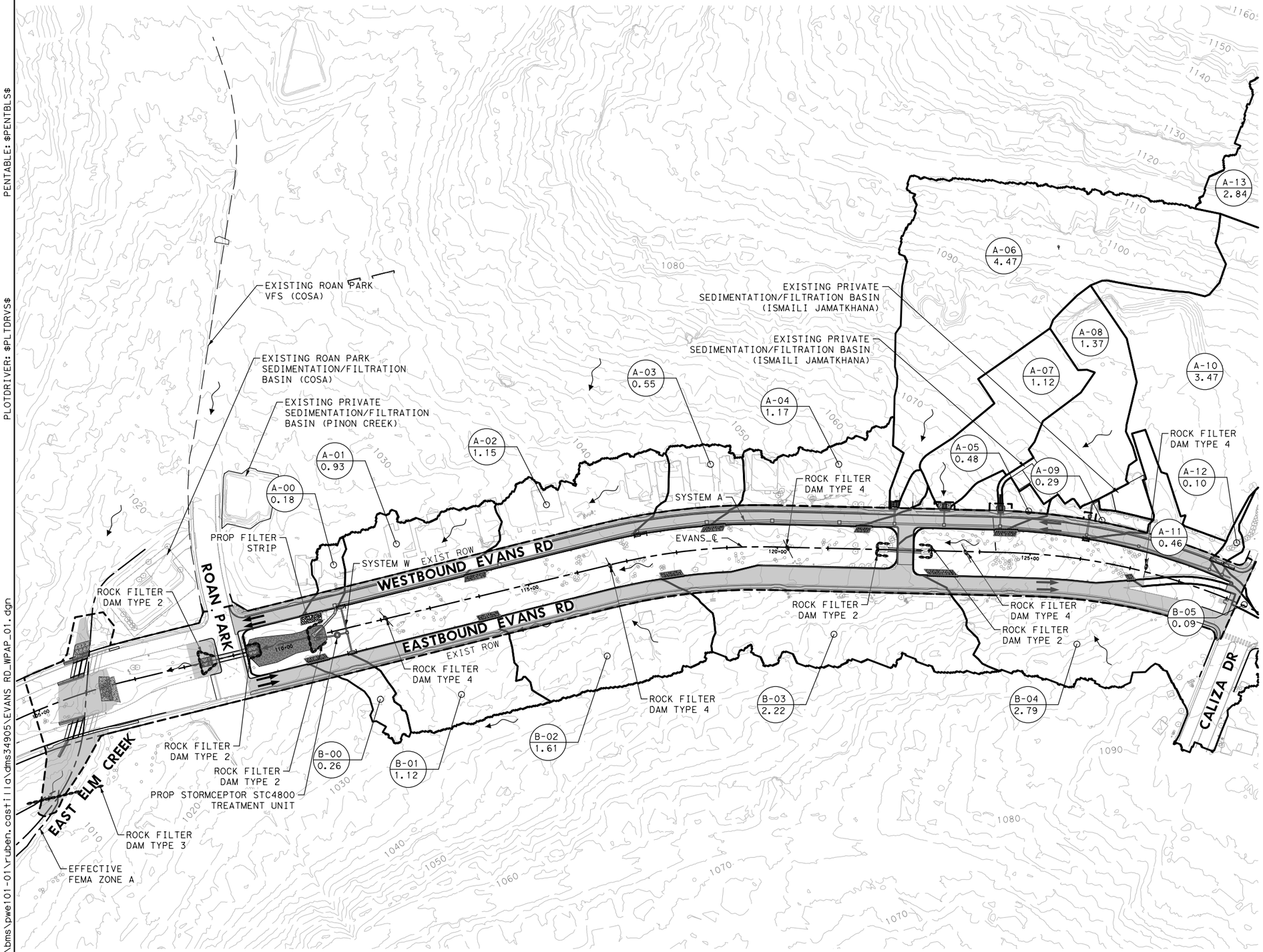
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

ELM CREEK X-SECTIONS

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 180 OF 330



0′ 50′ 100′ 200′

N

LEGEND:

- EXISTING ROW
- FLOW DIRECTION
- X99 / X.XX — DRAINAGE AREA NUMBER AREA IN ACRES
- DRAINAGE AREA BOUNDARY
- EXISTING 2′ CONTOURS
- STORMCEPTOR CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP CONTRIBUTING AREA
- VEGETATIVE FILTER STRIP
- PROJECT AREA BOUNDARY

BMP SIZING

TOTAL PROJECT AREA = 9.61 AC

EXISTING IMPERVIOUS/PERVIOUS = 3.99/5.62 ACRES
PROPOSED IMPERVIOUS/PERVIOUS = 4.46/5.15 ACRES
TOTAL TSS REMOVAL REQUIRED = 384.8 LB

STORMCEPTOR TSS REMOVAL PROVIDED = 353.4 LB
VEGETATED FILTER STRIP TSS REMOVAL PROVIDED = 46.8 LB
TOTAL TSS REMOVAL PROVIDED = 400.2 LB

NOTE:

1. CONTRIBUTING BASINS TO PROP STORMCEPTOR INCLUDE: A-01, B-01
2. CONTRIBUTING BASINS TO PROP VFS INCLUDE: A-00
3. NO TREATMENT SELECTED FOR THE OTHER CONTRIBUTING PROJECT AREA BASINS
4. BOTH EXISTING PRIVATE SEDIMENTATION/FILTRATION BASINS(ISMAILI JAMATKHANA) CONTRIBUTE DIRECTLY TO STORM SYSTEM A
5. THE FILTER STRIP (IN DIRECTION OF FLOW) AT A-00 SHOULD BE A MINIMUM OF 15 FEET
6. TEMPORARY BMPS INCLUDE ROCK FILTER DAMS AND CURB INLET GRAVEL FILTER

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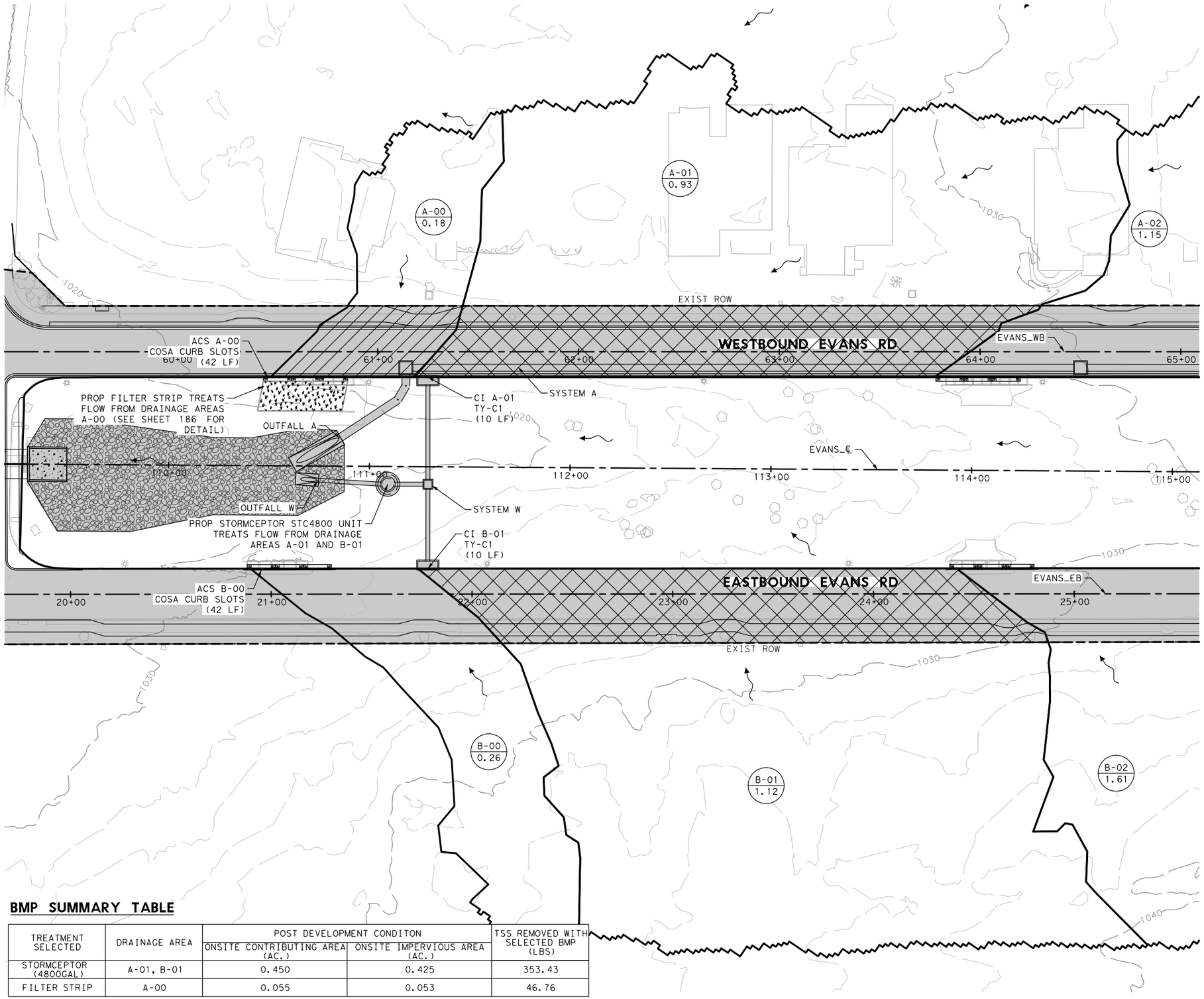
EVANS RD PHASE 1

WATER POLLUTION ABATEMENT PLAN

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 181 OF 330



BMP SIZING

TOTAL PROJECT AREA = 9.61 AC

EXISTING IMPERVIOUS/PERVIOUS = 3.99/5.62 ACRES
PROPOSED IMPERVIOUS/PERVIOUS = 4.46/5.15 ACRES
TOTAL TSS REMOVAL REQUIRED = 384.8 LB

STORMCEPTOR TSS REMOVAL PROVIDED = 353.4 LB
VEGETATED FILTER STRIP TSS REMOVAL PROVIDED = 46.8 LB
TOTAL TSS REMOVAL PROVIDED = 400.2 LB

NOTE:

1. CONTRIBUTING BASINS TO PROP STORMCEPTOR INCLUDE: A-01, B-01
2. CONTRIBUTING BASINS TO PROP VFS INCLUDE: A-00
3. NO TREATMENT SELECTED FOR THE OTHER CONTRIBUTING PROJECT AREA BASINS
4. BOTH EXISTING PRIVATE SEDIMENTATION/FILTRATION BASINS(ISMAILI JAMATKHANA) CONTRIBUTE DIRECTLY TO STORM SYSTEM A
5. THE FILTER STRIP (IN DIRECTION OF FLOW) AT A-00 SHOULD BE A MINIMUM OF 15 FEET
6. TEMPORARY BMPS INCLUDE ROCK FILTER DAMS AND CURB INLET GRAVEL FILTER

BMP SUMMARY TABLE

TREATMENT SELECTED	DRAINAGE AREA	POST DEVELOPMENT CONDITON		TSS REMOVED WITH SELECTED BMP (LBS)
		ONSITE CONTRIBUTING AREA (AC.)	ONSITE IMPERVIOUS AREA (AC.)	
STORMCEPTOR (4800GAL)	A-01, B-01	0.450	0.425	353.43
FILTER STRIP	A-00	0.055	0.053	46.76

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EVANS RD PHASE 1

WATER POLLUTION ABATEMENT PLAN

SHEET 02 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 182 OF 330

Texas Commission on Environmental Quality
Water Pollution Abatement Plan
General Construction Notes

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director (ED), nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code (TAC), Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the ED, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, TAC, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the ED's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, TAC § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the ED to any part of Title 30 TAC, Chapters 213 and 217, or any other TCEQ applicable regulation

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any regulated 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 must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.

3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.

4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.

5. 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 approved plans and 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.

6. 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.

7. Sediment must be removed from the sediment traps or sedimentation basins not later than

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

WATER POLLUTION ABATEMENT PLAN
GENERAL NOTES

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 183 OF 330

when it occupies 50% of the basin's design capacity.

8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.

9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization 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.

11. The following records shall 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.

12. The holder of any approved Edward Aquifer protection plan 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 water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

    B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;

    C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office 12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

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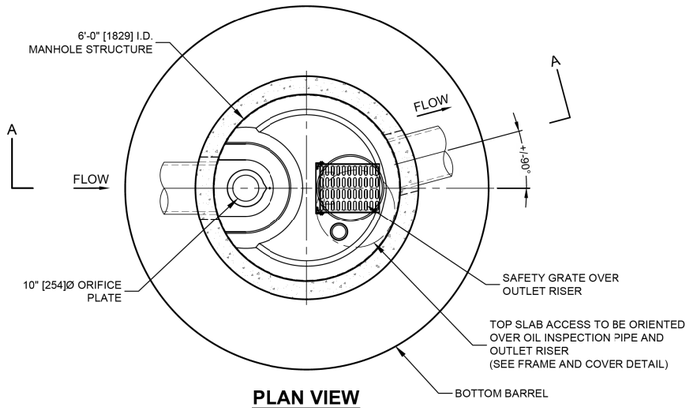
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

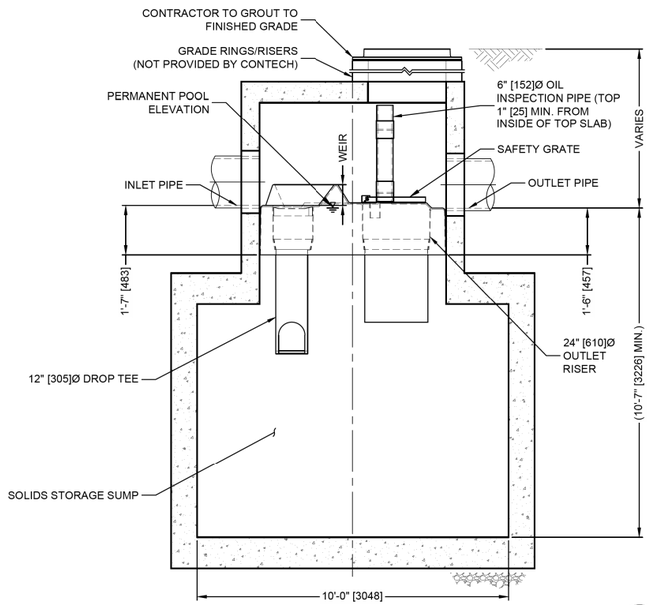
WATER POLLUTION ABATEMENT PLAN
GENERAL NOTES

SHEET 02 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 184 OF 330



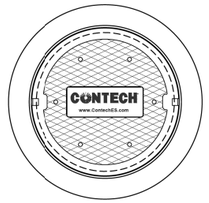
PLAN VIEW
TOP SLAB NOT SHOWN



SECTION A-A

STORMCEPTOR DESIGN NOTES

THE STANDARD STC4800 CONFIGURATION IS SHOWN.



FRAME AND COVER
(MAY VARY)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMCEPTOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STORMCEPTOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMCEPTOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMCEPTOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

Stormceptor®
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

STC4800
STORMCEPTOR
STANDARD DETAIL

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
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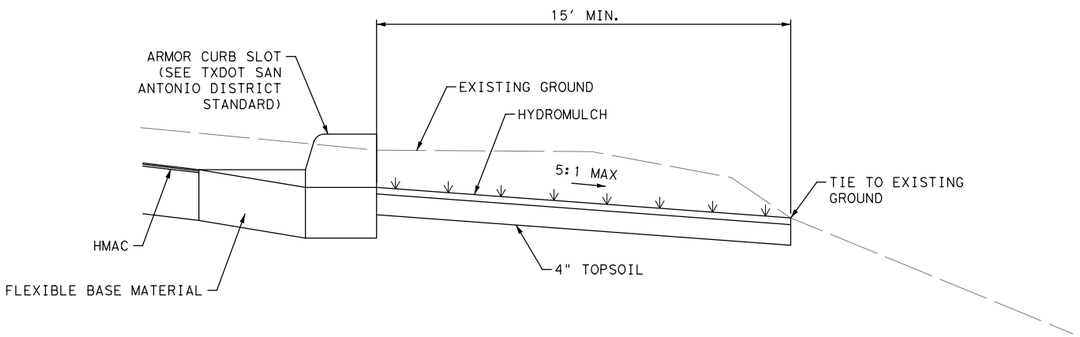
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

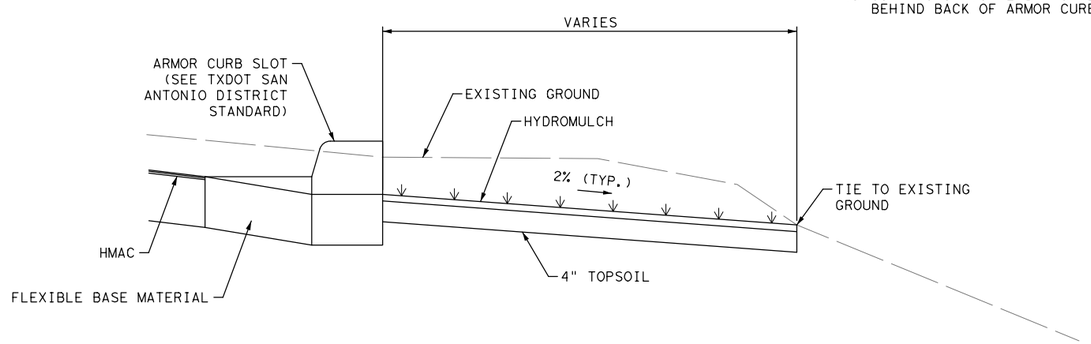
WATER POLLUTION ABATEMENT PLAN DETAILS

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 185 OF 330



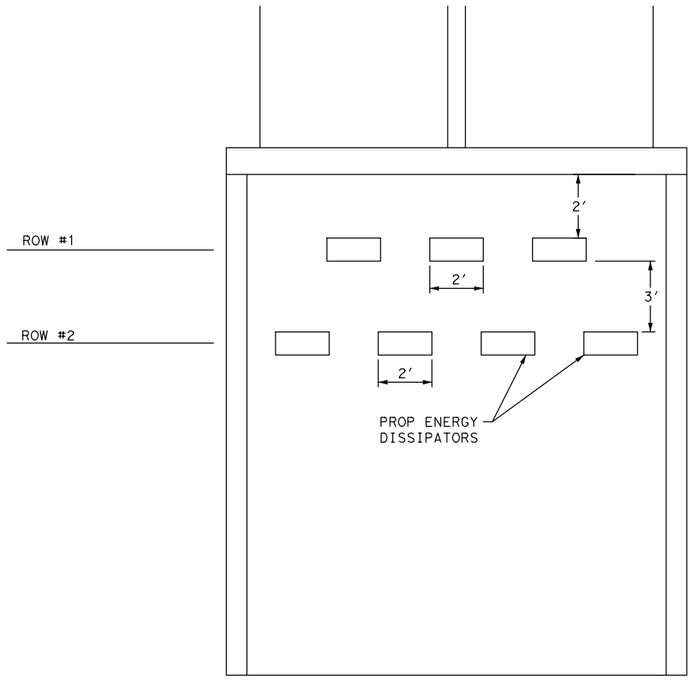
ENGINEERED VEGETATIVE FILTER STRIP (AT A-00)



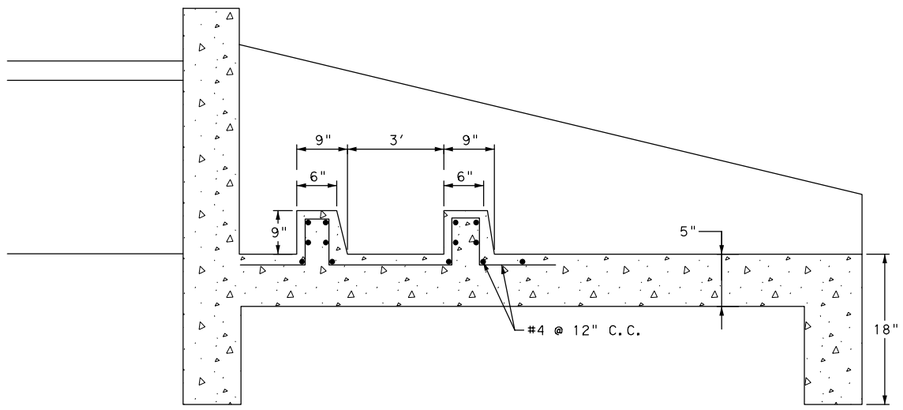
BACK OF ARMOR CURB SLOT TYPICAL SECTION

NOTES:

1. CONTRACTOR TO VERIFY GRADING LIMITS BEHIND BACK OF ARMOR CURB SLOTS.



ENERGY DISSIPATOR DETAIL: PLAN VIEW



ENERGY DISSIPATOR DETAIL: SIDE VIEW

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EVANS RD PHASE 1

MISCELLANEOUS DRAINAGE DETAILS

SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 186 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE: 4/24/2025 9:29:00 AM USER: R_Castilla
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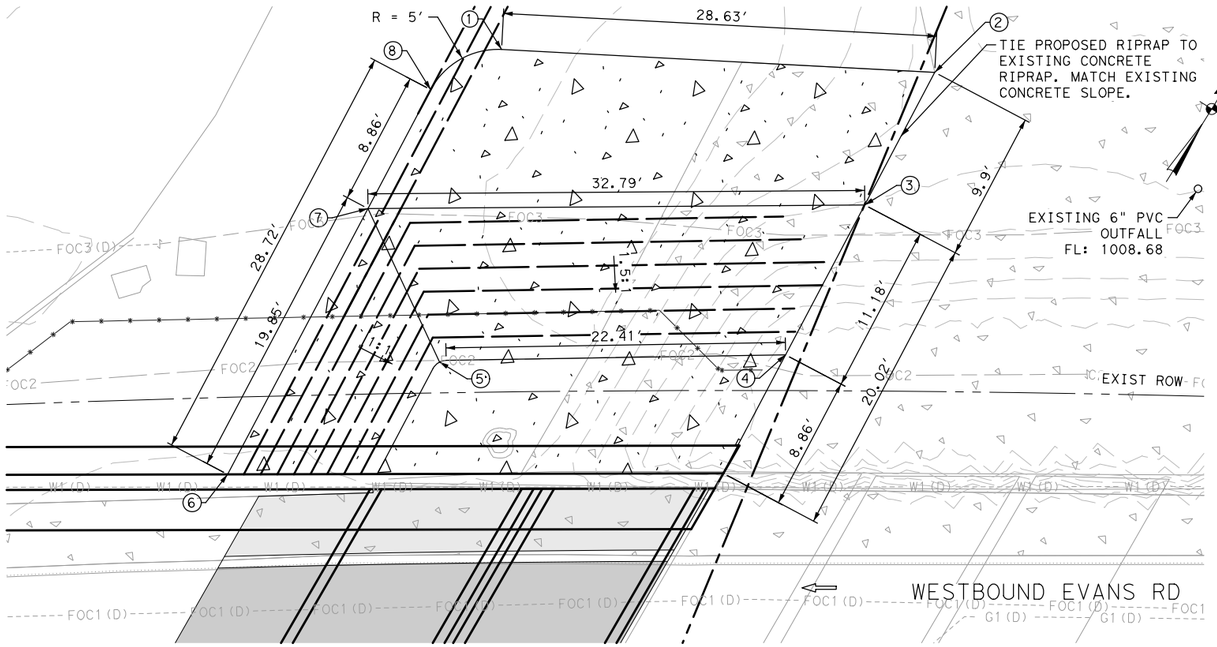


CC-02: UPSTREAM CONCRETE STRUCTURE GRADING

SCALE: 1" = 10'

CC-02

POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
1	EVANS_WB	LT	56+04	45.1	1013.6
2	EVANS_WB	LT	56+32	43.6	1012.4
3	EVANS_WB	LT	56+27	34.8	1011.1
4	EVANS_WB	LT	56+22	24.9	1005.1
5	EVANS_WB	LT	56+00	24.5	1005.1
6	EVANS_WB	LT	55+86	17.4	1014.0
7	EVANS_WB	LT	55+95	34.8	1014.0
8	EVANS_WB	LT	56+00	42.6	1014.0

A-06

POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
9	EVANS_WB	LT	72+37	38.0	1056.5
10	EVANS_WB	LT	72+49	38.0	1057.0
11	EVANS_WB	LT	72+49	27.5	1057.0
12	EVANS_WB	LT	72+37	27.5	1056.0

A-07

POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
13	EVANS_WB	LT	73+28	38.0	1061.3
14	EVANS_WB	LT	73+53	38.0	1061.5
15	EVANS_WB	LT	73+53	26.5	1060.5
16	EVANS_WB	LT	73+28	26.5	1060.5

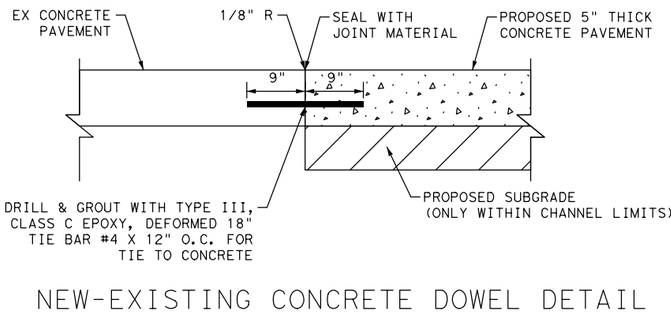
LEGEND:

0' 2.5' 5' 10'

- EXISTING ROW
- EASEMENT
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- PROPOSED CONCRETE RIP-RAP
- PROPOSED STONE RIP-RAP (DRY)
- W1 — PROPOSED WATER LINE
- PROPOSED GAS LINE

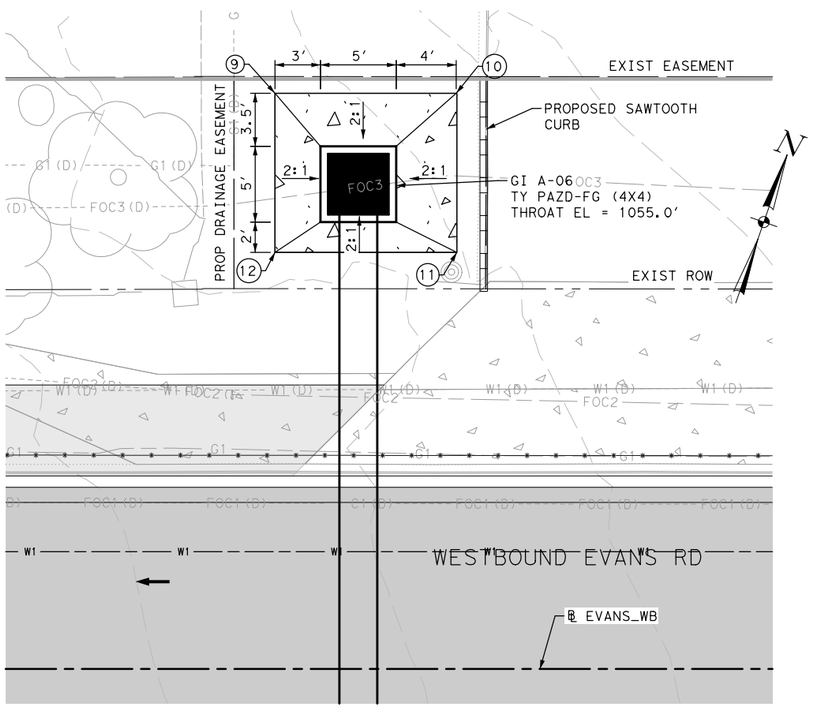
NOTES:

1. REFER TO COSA CONCRETE CHANNEL RIP-RAP STANDARDS ON SHEET 200 FOR DETAILS.



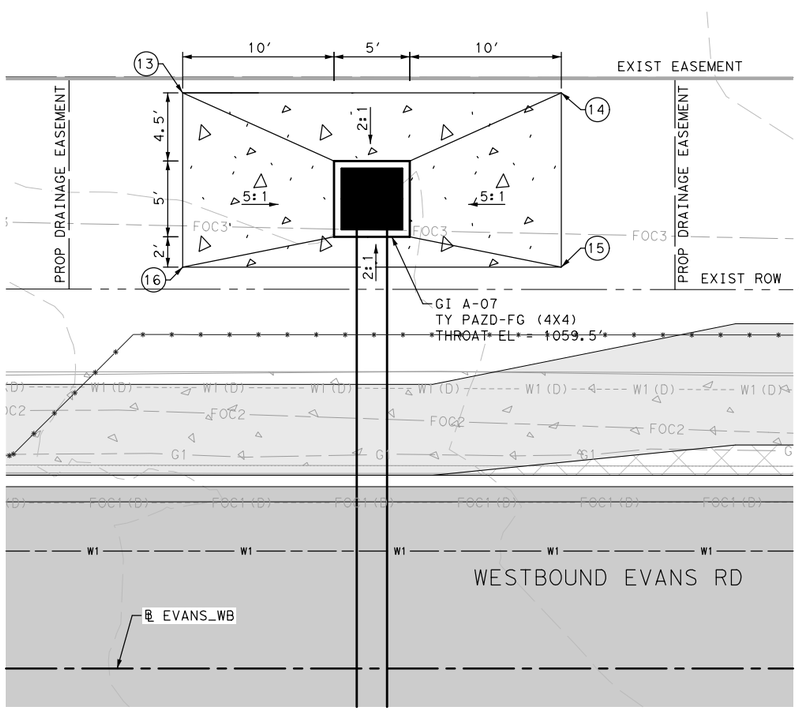
NEW-EXISTING CONCRETE DOWEL DETAIL

NTS



A-06: TXDOT PAZD (W/4'X4' FG) INLET GRADING

SCALE: 1" = 10'



A-07: TXDOT PAZD (W/4'X4' FG) INLET GRADING

SCALE: 1" = 10'

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EVANS RD PHASE 1

CONCRETE RIPRAP DETAILS

SHEET 01 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 187 OF 330

PENTABLE: $PENTBLS$
PLOTDRIVER: $PLTDRVS$
DATE:4/24/2025 9:29:02 AM USER:R_Castilla
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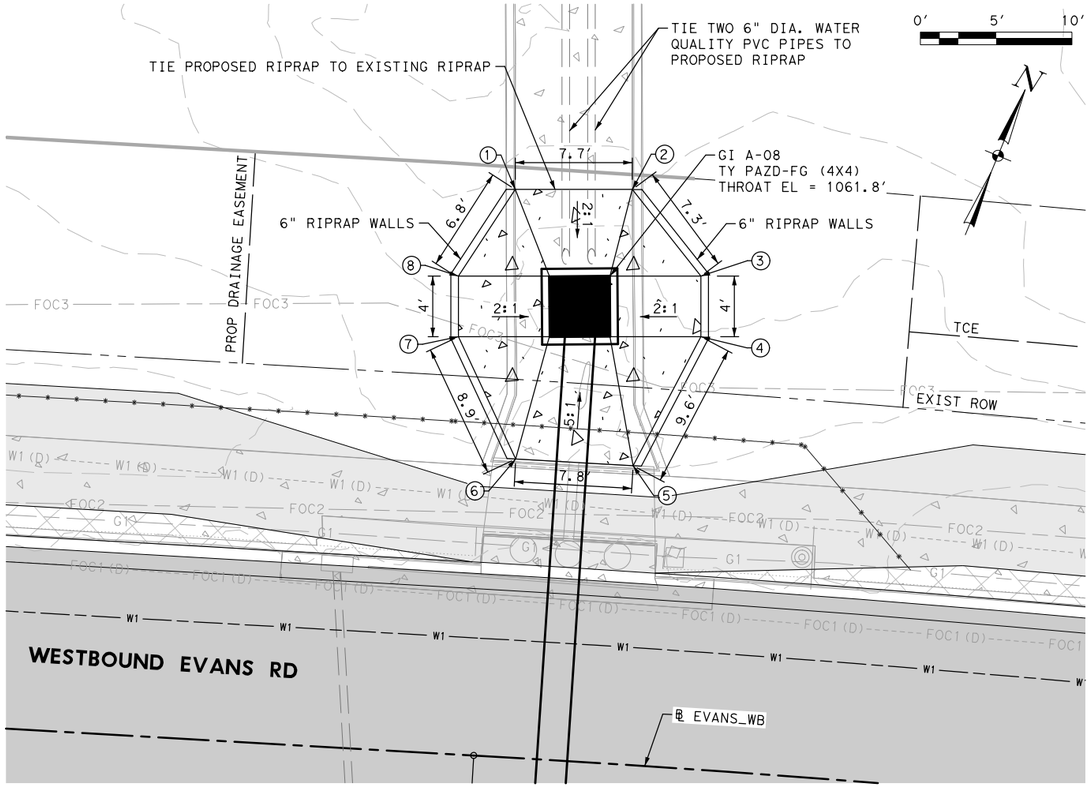


A-08: TXDOT PAZD (W/4'X4' FG) INLET GRADING

A-08

POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
1	EVANS_WB	LT	74+46	37.5	1064.5
2	EVANS_WB	LT	74+54	37.9	1064.5
3	EVANS_WB	LT	74+59	32.5	1064.2
4	EVANS_WB	LT	74+59	28.5	1063.7
5	EVANS_WB	LT	74+55	19.7	1062.8
6	EVANS_WB	LT	74+47	19.7	1062.8
7	EVANS_WB	LT	74+43	27.5	1063.7
8	EVANS_WB	LT	74+43	31.5	1064.2

RIPRAP OUTFALL

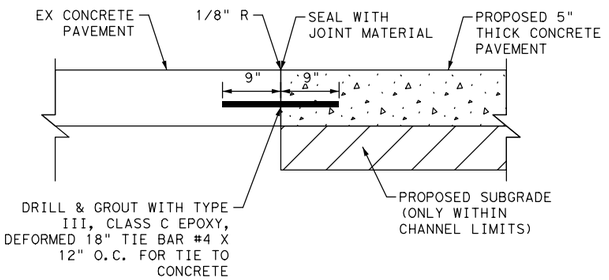
POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
9	EVANS	LT	106+51	16.4	1010.3
10	EVANS	RT	106+46	30.4	1010.3
11	EVANS	RT	106+41	29.2	1010.0
12	EVANS	RT	106+24	25.0	1005.0
13	EVANS	LT	106+33	22.4	1005.0
14	EVANS	LT	106+47	17.9	1010.0

LEGEND:

- EXISTING ROW
- EASEMENT
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- PROPOSED CONCRETE RIP-RAP
- PROPOSED STONE RIP-RAP (DRY)
- W1 — PROPOSED WATER LINE
- PROPOSED GAS LINE

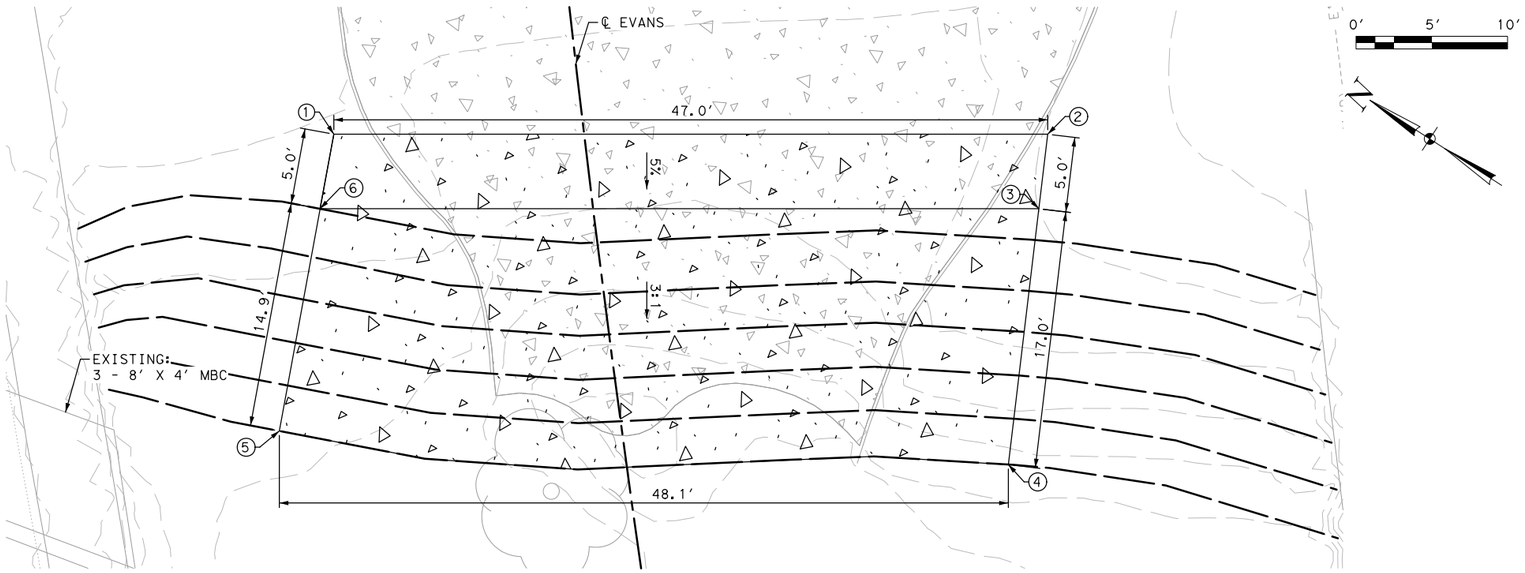
NOTES:

1. REFER TO COSA CONCRETE CHANNEL RIP-RAP STANDARDS ON SHEET 200 FOR DETAILS.



NEW-EXISTING CONCRETE DOWEL DETAIL

NTS



RIPRAP OUTFALL: MEDIAN GRADING BETWEEN CC-02 & CC-03

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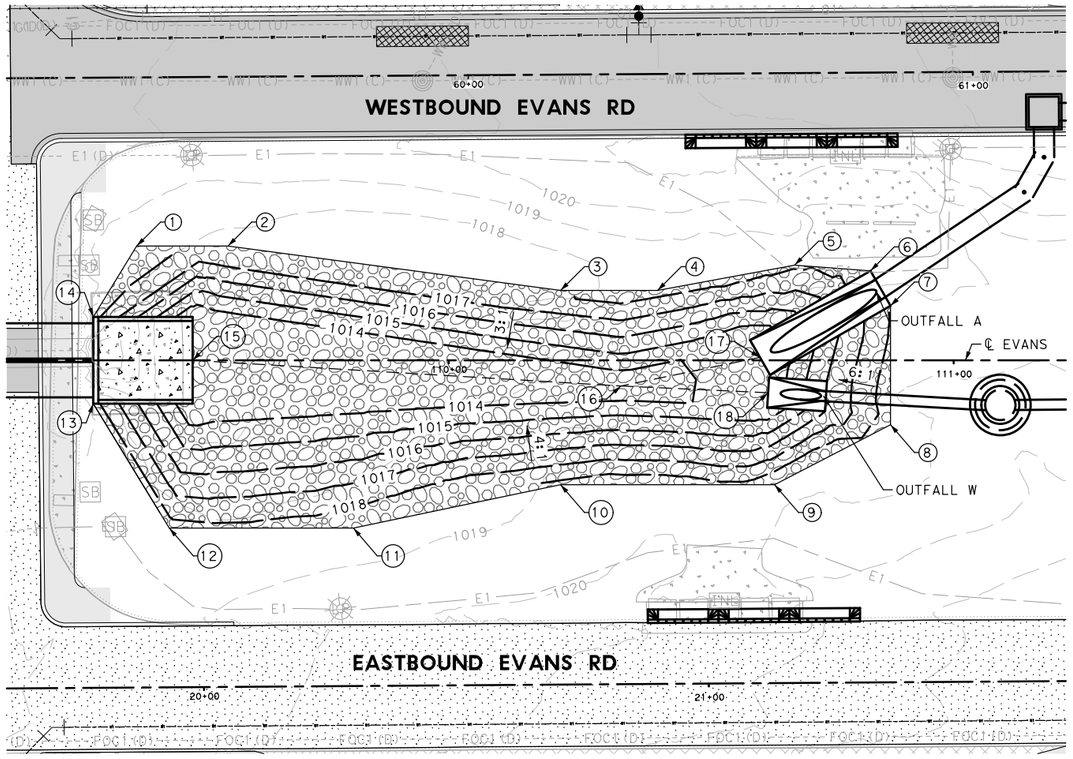
EVANS RD PHASE 1

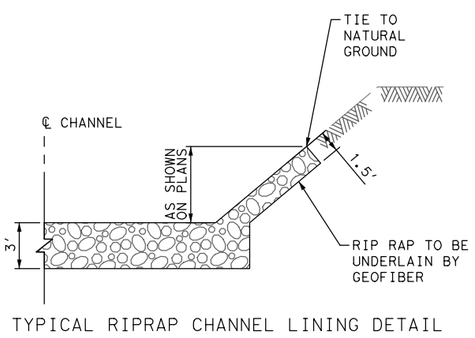
CONCRETE RIPRAP DETAILS

SHEET 02 OF 02

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 188 OF 330



OUTFALL A & OUTFALL W: MEDIAN GRADING



TYPICAL RIPRAP CHANNEL LINING DETAIL

Table 1
In-Place Protection Riprap Gradation Requirements

Size	Maximum Size (lb.)	90% Size[1] (lb.)	50% Size[2] (lb.)	8% Size[3] Minimum (lb.)
12 in.	200	80–180	30–75	3
15 in.	320	170–300	60–165	20
18 in.	530	290–475	105–220	22
21 in.	800	460–720	175–300	25
24 in.	1,000	550–850	200–325	30
30 in.	2,600	1,150–2,250	400–900	40

Table 2
Protection Riprap Stone Size[1]

Size	Dmax (in.)	D90 (in.)	D50 (in.)	D8 (in.)
12 in.	13.76	10.14–13.29	7.31–9.92	3.39
15 in.	16.10	13.04–15.75	9.21–12.91	6.39
18 in.	19.04	15.58–18.36	11.10–14.21	6.59
21 in.	21.85	18.17–21.09	13.16–15.75	6.88
24 in.	23.53	19.28–22.29	13.76–16.18	7.31
30 in.	32.36	24.65–30.84	17.34–22.72	8.05

1. Based on a Specific Gravity of 2.5 and using the following equation for the intermediate axis diameter D = {(12*W)/(Gs*62.4*0.85)}$^{1/3}$

Table 3
Protection Riprap Bedding Material Gradation Requirements

Sieve Size (Sq. Mesh)	% by Weight Passing
3"	100
1-1/2"	50–80
3/4"	20–60
#4	0–15
#10	0–5

GEOFABRIC MATERIAL NOTES:

A. PROVIDE GEOFABRIC FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS, COMPOSED OF AT LEAST 95 PERCENT BY WEIGHT POLYESTERS OR POLYOLEFINS. THESE FIBERS SHALL BE FORMED INTO A STABLE NETWORK SUCH THTAT THE FILAMENTS OR YARNS RETAIN THEIR DIMENSIONAL STABILITY RELATIVE TO EACH OTHER, INCLUDING THE EDGES. MATERIAL SHALL BE RESISTANT TO DETERIORATION FROM ULTRAVIOLET RADIATION, HEAT EXPOSURE AND COMMONLY ENCOUNTERED SOIL CHEMICALS, MILDEW, ROT AND INSECTS.

GEOFABRIC INSTALLATION NOTES:

A. DO NOT LEAVE THE GEOFIBER EXPOSED TO THE SUN LONGER THAN THE MANUFACTURER RECOMMENDS TO MINIMZE DAMAGE DUE TO ULTRAVIOLET RADIATION. DO NOT INSTALL A GEOFABRIC IF IT HAS BEEN REMOVED FROM ITS PROTECTIVE COVERING LONGER THAN THE MANUFACTURER RECOMMENDS.
B. FOR PLACEMENT OF GEOFABRIC, FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS AND AT A MINIMUM:
   1. PLACE THE GEOFABRIC DIRECTLY ON THE PREPARED AREA. LAY THE GEOFABRIC SMOOTHLY ON THE SUBGRADE TO MINIMIZE TENSION, STRESS, FOLDS AND WRINKLES.
   2. AFTER PLACEMENT, DO NOT UNNECESSARILY WALK ON OR DISTURB THE GEOFABRIC UNLESS REQUIRED TO PRESERVE CONTACT WITH THE SUBGRADE. EQUIPMENT IS NOT ALLOWED ON THE UNPROTECTED GEOFABRIC. PROTECT THE GEOFABRIC FROM CLOGGING, PENETRATIONS, TEARS AND OTHER DAMAGE DURING INSTALLATION.
   3. PLACE THE GEOFABRIC STRIPS FROM DOWNSTREAM TO UPSTREAM. OVERLAP SUCCESSIVE GEOFABRIC SHEETS SUCH THAT THE UPSTREAM SHEET IS PLACED OVER THE DOWNSTREAM SHEET AND/OR THE UPSLOPE OVER THE DOWNSLOPE.
   4. OVERLAP ADJOINING GEOFABRIC SECTIONS A MINIMUM OF 2 FEET.
   5. REPLACE OR REPAIR ANY GEOFABRIC DAMAGED DURING THE PLACEMENT OF RIPRAP OR OTHER MATERIALS AT NO ADDITIONAL COST TO THE CITY. PLACE A GEOFIBER PATCH OF THE SAME MATERIAL OVER THE AREA AND EXTEND A MINIMUM OF 3 FEET BEYOND THE PERIMETER OF THE TEAR AND/OR DAMAGE. ORIENT THE PATCH MATERIAL SO THAT ITS FIBERS ARE ALIGNED WITH THE DAMAGED GEOFIBERS.

RIPRAP MATERIAL NOTE:

A. PROVIDE RIPRAP CONSISTING OF BROKEN CONCRETE OR NATURAL STONE. PROVIDE RIPRAP THAT IS DENSE, DURABLE AND HARD MATERIAL FREE FROM CRACKS, SEAMS AND OTHER DEFECTS WHICH WOULD INCREASE DETERIORATION FROM HANDLING AND NATURAL CAUSES.
B. RIPRAP CONSISTING OF NATURAL STONE, SHALL HAVE A WEIGHT LOSS OF NOT MORE THAN EIGHTEEN (18) PERCENT AFTER FIVE (5) CYCLES OF MAGNESIUM SULFATE SOLUTION AS TESTED PER ASTM D 5240, TEST METHOD FOR TESTING ROCK SLABS TO EVALUATE SOUNDNESS OF RIPRAP BY USE OF SODIUM SULFATE OR MAGNESIUM SULFATE.
C. SHAPE AND DIMENSIONS.
   1. PROVIDE RIPRAP IN CUBIC FORM, RATHER THAN ELONGATED (FLAT) SHAPES.
   2. PROVIDE RIPRAP WITH A MINIMUM THICKNESS OF 18 INCHES.
   3. NO MORE THAN 25 PERCENT SHALL HAVE A LENGTH GREATER THAN 2-1/2 TIMES THE WIDTH OR THICKNESS. NO LENGTH SHALL EXCEED 3 TIMES THE WIDTH OR THICKNESS.
D. DO NOT PROVIDE SPALLS, FRAGMENTS AND CHIPS EXCEEDING 5 PERCENT BY WEIGHT. THE DIMENSION AND SHAPE LIMITATIONS DO NOT APPLY TO THIS PORTION OF THE RIPRAP.
E. WHERE BROKEN CONCRETE IS USED, CUT EXPOSED METAL FLUSH WITH THE SURFACE PRIOR TO PLACING THE RIPRAP.
F. PROVIDE RIPRAP CONFORMING TO THE FOLLOWING TABLES, WHEN TESTED USING METHOD A, AS OUTLINED IN ASTM D 5519, STANDARD TEST METHODS FOR PARTICLE SIZE ANALYSIS OF NATURAL AND MAN-MADE MATERIAL

LEGEND:

0′ 15′ 30′

- EXISTING ROW
- EASEMENT
- PROPOSED LANE
- EXISTING LANE
- FULL RECONSTRUCTION
- PROPOSED CONCRETE RIP-RAP
- PROPOSED STONE RIP-RAP (DRY)
- W1 PROPOSED WATER LINE
- PROPOSED GAS LINE

NOTES:

1. RIPRAP SHALL BE PLACED IN ACCORDANCE WITH TXDOT SPECIFICATION 432, RIPRAP. FILL RIPRAP VOIDS.

POINT	CL	LT/RT	STATION	OFFSET (FT)	ELEV. (FT)
1	EVANS	LT	109+38	22.7	1018.6
2	EVANS	LT	109+56	22.7	1017.7
3	EVANS	LT	110+22	13.8	1017.9
4	EVANS	LT	110+41	13.8	1018.4
5	EVANS	LT	110+69	18.9	1018.5
6	EVANS	LT	110+84	17.7	1019.3
7	EVANS	LT	110+88	10.8	1019.3
8	EVANS	RT	110+88	12.8	1019.9
9	EVANS	RT	110+65	24.6	1019.8
10	EVANS	RT	110+22	24.6	1019.1
11	EVANS	RT	109+81	33.2	1018.6
12	EVANS	RT	109+45	33.2	1018.3
13	EVANS	RT	109+30	8.5	1018.0
14	EVANS	LT	109+30	8.6	1018.0
15	EVANS	-	109+49	0.0	1013.1
16	EVANS	RT	110+34	5.0	1013.8
17	EVANS	LT	110+62	0.7	1014.1
18	EVANS	RT	110+63	6.3	1014.1

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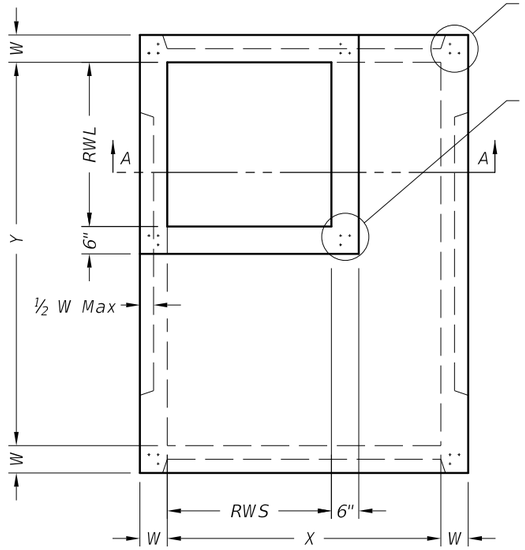
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

STONE RIPRAP DETAILS

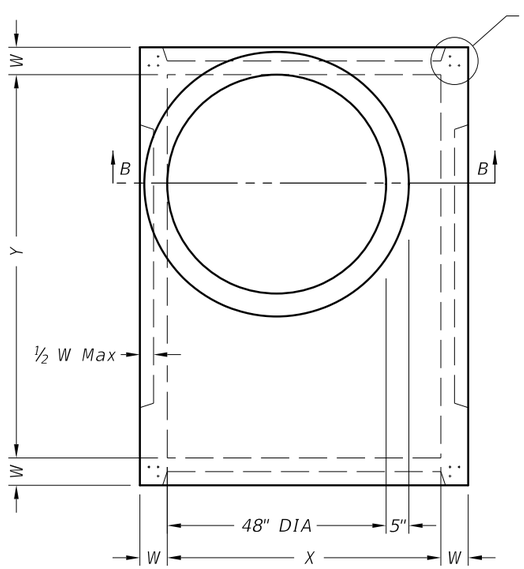
SHEET 01 OF 01

100% SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY: DO	DSGN. BY: RC	CHKD. BY: JA	SHEET NO.: 189 OF 330



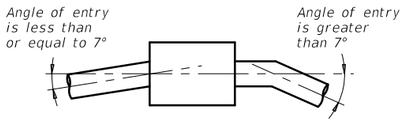
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



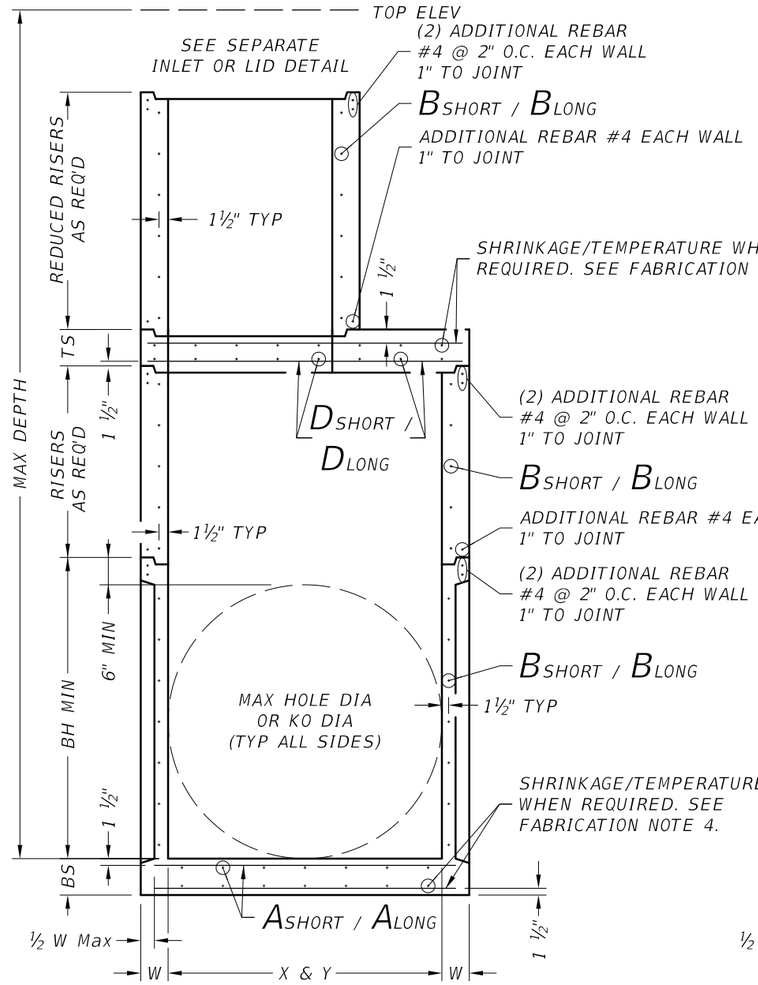
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



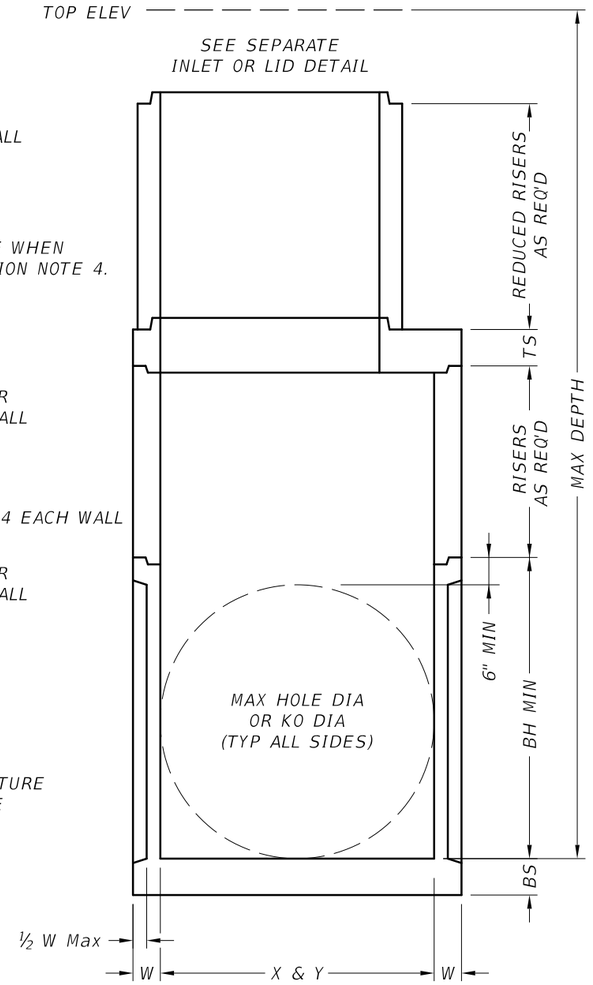
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

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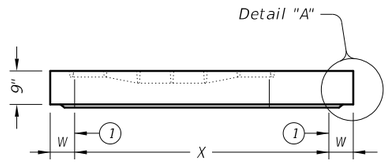
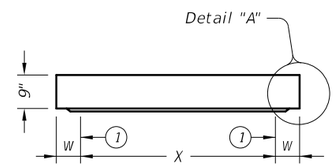
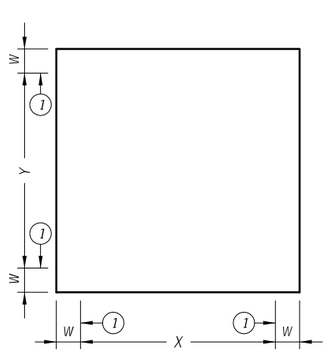


STYLE 'FG'



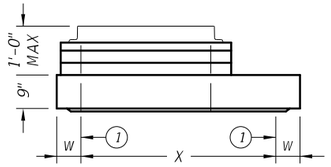
ELEVATION VIEW



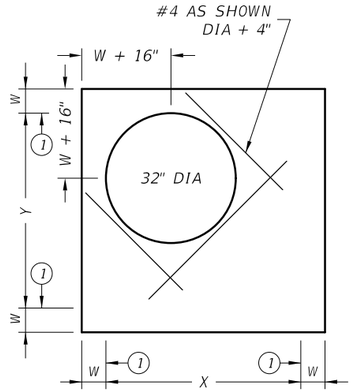
PLAN VIEW

NO OPENINGS

STYLE 'SL'



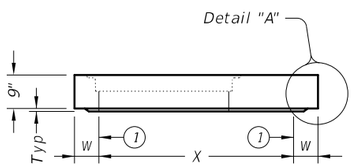
ELEVATION VIEW



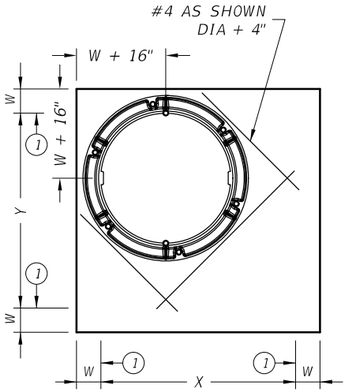
PLAN VIEW

SHIP LOOSE RING & COVER

STYLE 'RH'



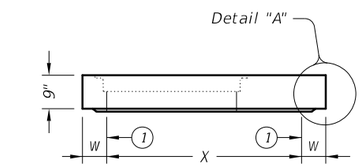
ELEVATION VIEW



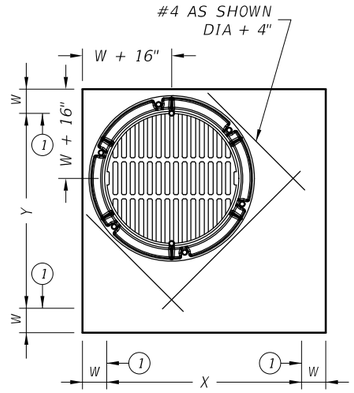
PLAN VIEW

32" DIA CAST-IN RING & COVER

STYLE 'RC'



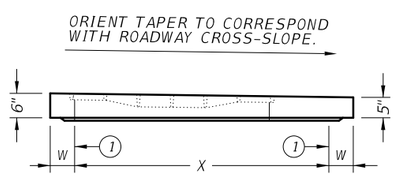
ELEVATION VIEW



PLAN VIEW

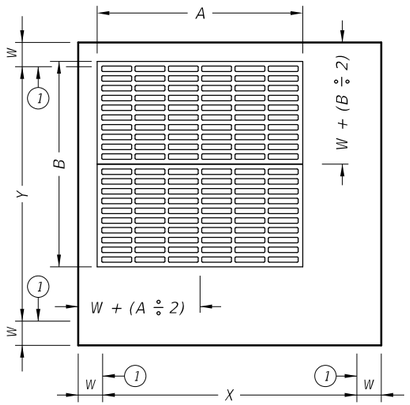
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



STYLE 'SFG'

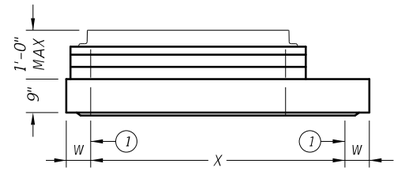
ELEVATION VIEW



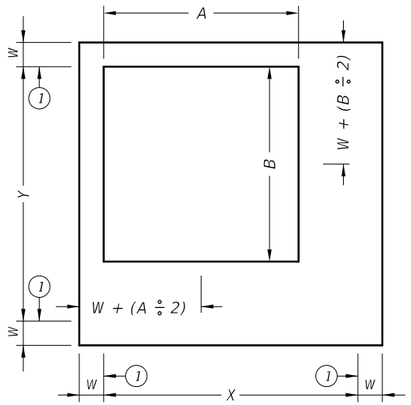
PLAN VIEW

CAST-IN FRAME & GRATE

STYLES 'FG' & 'SFG'



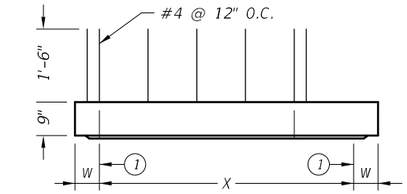
ELEVATION VIEW



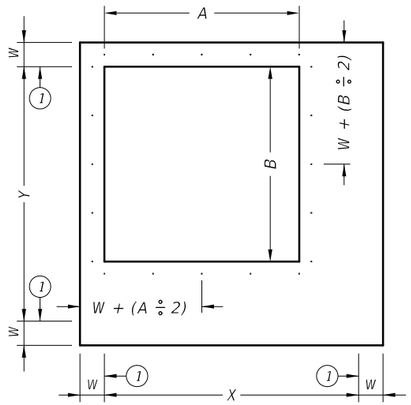
PLAN VIEW

SHIP LOOSE FRAME & GRATE

STYLE 'SH'



ELEVATION VIEW



PLAN VIEW

EXPOSED REBAR

STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

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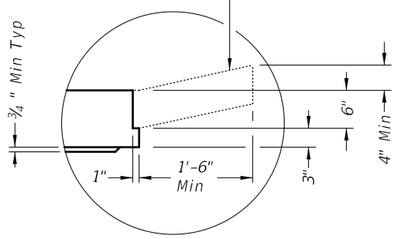
Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation | Bridge Division Standard

PRECAST SLAB LID

PSL

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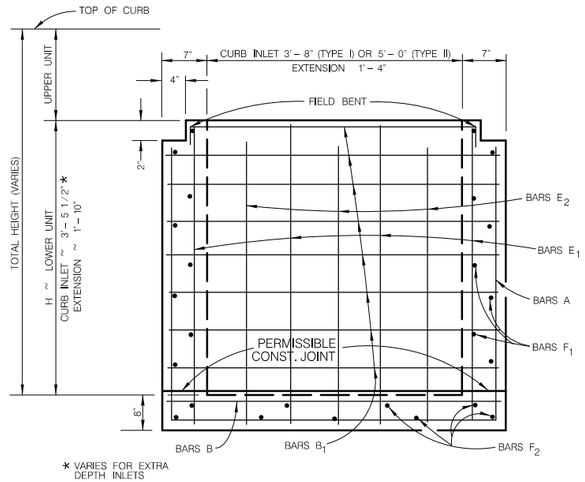
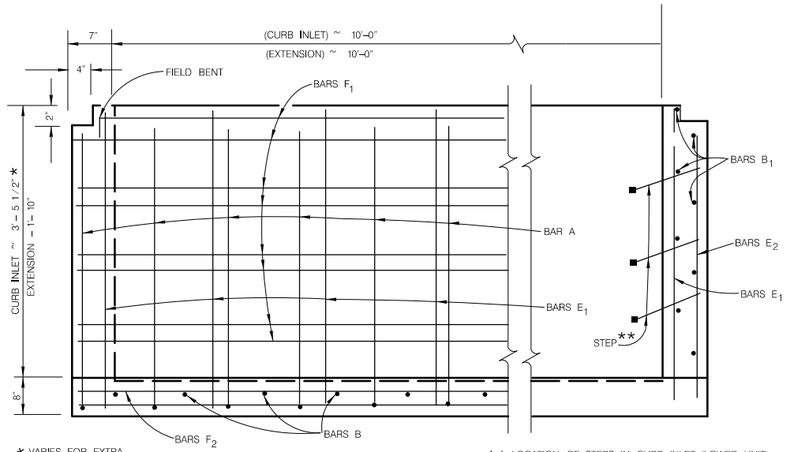


* VARIES FOR EXTRA DEPTH INLETS

SECTION A–A



* VARIES FOR EXTRA DEPTH INLETS

SECTION B–B

** LOCATION OF STEPS IN CURB INLET (LOWER UNIT) ONLY, WILL BE DETERMINED BY THE LOCATION OF RING COVER PLACEMENT. STEPS @ 15" O.C.

REINFORCING STEEL

LOWER UNIT 10'X 3'–8" (TYPE I)

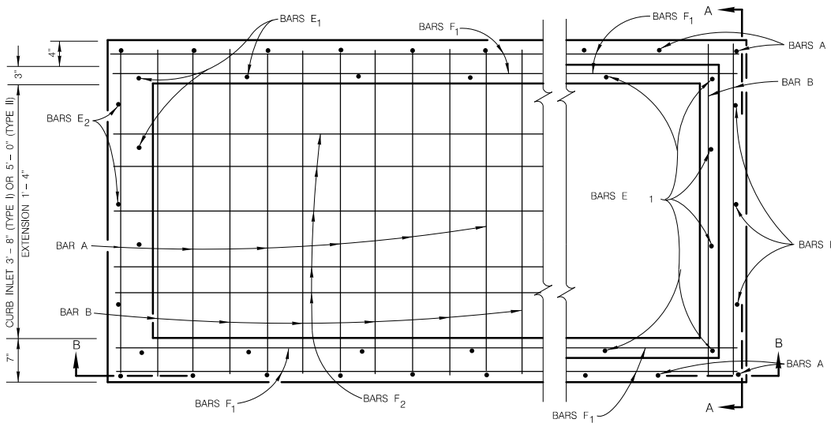
BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	4'–6"
B_1	VARIES	#4	12"	4'–6"
E_1	20	#4	18"±	VARIES
E_2	6	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'–10"
F_2	9	#4	—	10'–10"

LOWER UNIT 10'X 5'–0" (TYPE II)

BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	5'–10"
B_1	VARIES	#4	12"	5'–10"
E_1	22	#4	18"±	VARIES
E_2	8	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'–10"
F_2	11	#4	—	10'–10"

GENERAL NOTES

1. 5' INLETS AND 5' EXTENSIONS MUST BE IN ACCORDANCE WITH THE LATEST TXDOT CURB INLET TYPE "C" AND EXTENSION TYPE E (IL–C).
2. TYPE C–II INLET TO BE USED ONLY WHEN STORM DRAIN PIPE IS IN–LINE WITH CURB INLET AND APPROVED BY THE ENGINEER.
3. QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.
4. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
5. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
6. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1 1/2".
7. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A–615, GRADE 60 REQUIREMENTS.
8. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
9. DEPRESSION SLAB SHALL RECEIVE A WOOD FLOAT FINISH.
10. FACE OF INLET TO CONFORM TO FACE OF CURB LINE.
11. ALL BARS INTERCEPTING MANHOLE RING & COVER SHALL BE CUT OR BENT.
12. PAYMENT FOR ALL EXCAVATION, BACK–FILLING, CONCRETE, REINFORCING STEEL, RING AND COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN THE UNIT COST OF ITEM 403 "STORM SEWER JUNCTION BOXES AND INLETS".
13. CAST IRON MANHOLE RING AND COVER TO BE PLACED NEXT TO OUTLET PIPE, EXCEPT FOR VERTICAL OUTLET PIPE IN WHICH CASE MANHOLE RING AND COVER WILL BE OFFSET.
14. GALVANIZED BOLTS, NUTS, WASHERS, PLATES AND GASKETS ARE SUBSIDIARY TO INLETS.
15. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS, WHEN USING PRECAST UNITS.
16. ALL BARS AT PIPE BLOCKOUT LOCATIONS SHALL BE CUT OR BEND.
17. ALL LOWER UNITS SHALL RECEIVE INVERT MORTAR SHAPING.
18. PIPE BLOCKOUTS IN INLET WALLS SHOULD NOT EXCEED 3" BEYOND THE OUTER SHELL OF THE PIPE, TAKING INTO ACCOUNT THE SKEW OF THE PIPE AS NECESSARY. CONSTRUCTION JOINT MAY BE RAISED A MAXIMUM OF 6".



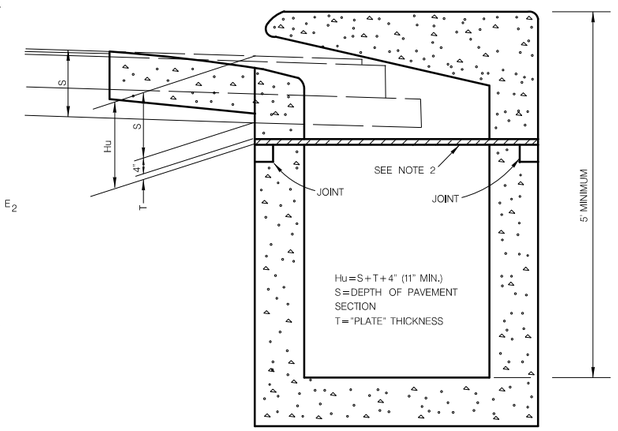
FLOOR STEEL

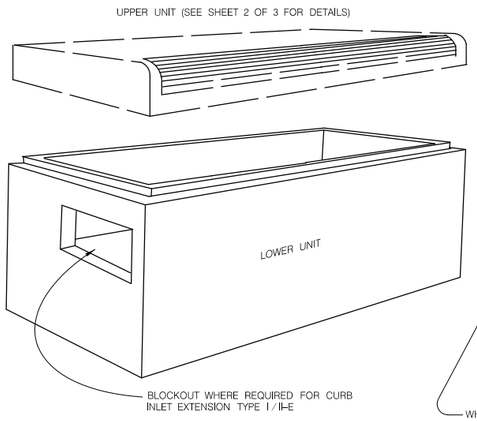
WALL STEEL

PHASE CONSTRUCTION

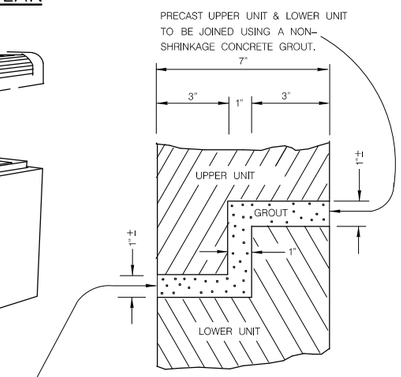
NOTES FOR PHASE CONSTRUCTION (WHEN DIRECTED BY THE ENGINEER):

1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A DEPTH "Hu" BELOW THE INLET AND EXTENSION GUTTER LINE ELEVATION.
2. CAP THE CURB INLET AND EXTENSION WITH A STEEL PLATE APPROVED BY THE ENGINEER AND CONSTRUCT THE ROADWAY OVER THE PLATE.
3. AFTER THE ROADWAY IS COMPLETED, BUT PRIOR TO THE FINAL HMAC OVERLAY, SAW CUT THE PAVEMENT, REMOVE THE PLATE AND COMPLETE THE UPPER PORTION OF THE CURB INLET AND /OR EXTENSION.



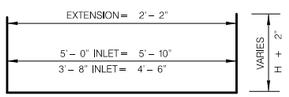


PLAN



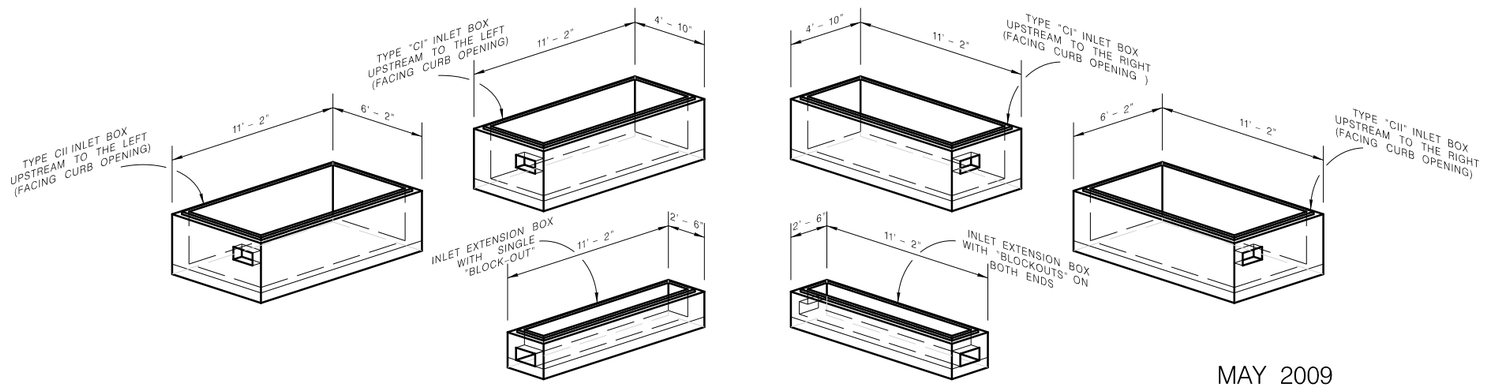
JOINT DETAIL

WHEN USING PRECAST UPPER UNIT, THIS SPACE IS FOR MAKING MINOR HORIZONTAL AND VERTICAL ADJUSTMENTS TO ACCOMODATE A FIT BETWEEN THE UPPER AND LOWER UNIT THAT ALLOWS FOR A MATCH LINE AND GRADE BETWEEN THE ROADWAY CURB AND THE UPPER UNIT OF THE INLET.



BARS A

(LOWER UNIT)



CONCRETE INLET BOX CONFIGURATIONS (LOWER UNITS)

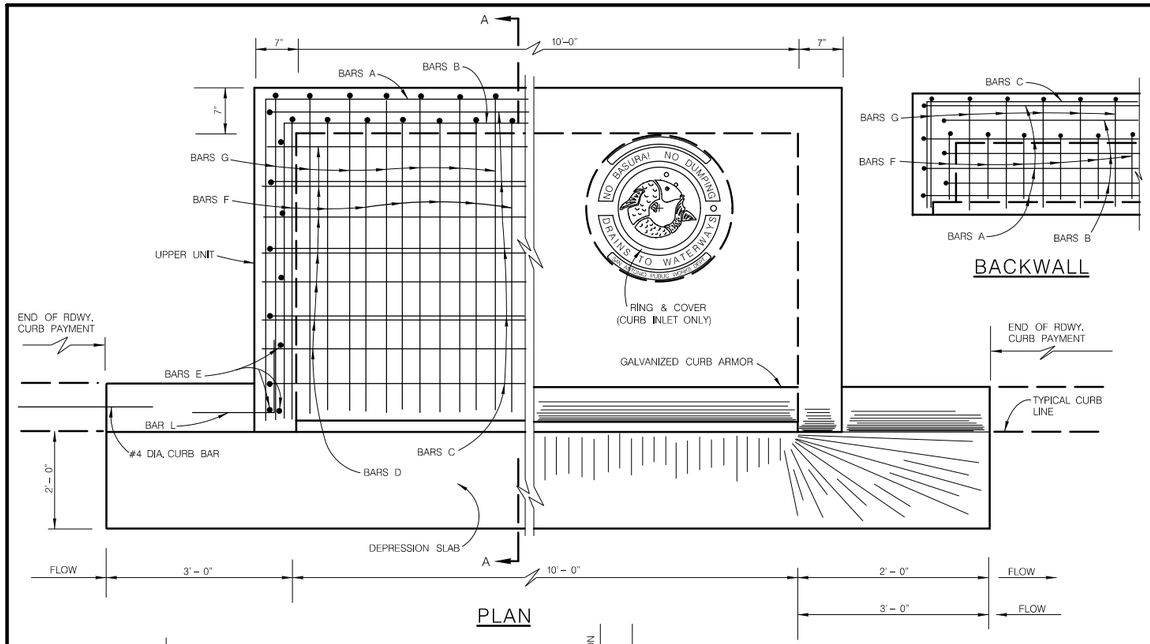
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS

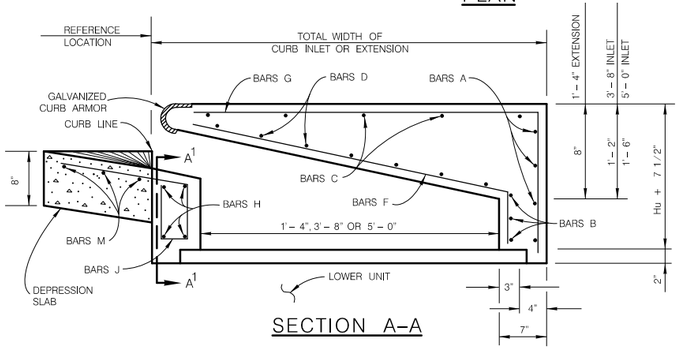
SHEET 1 OF 3

90 % SUBMITTAL	PROJECT NO.: 23–03901 & 23–03931	DATE: 4242025
DRWN. BY:	DSGN. BY:	CHKD. BY:

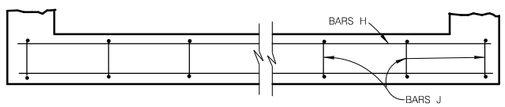


PLAN

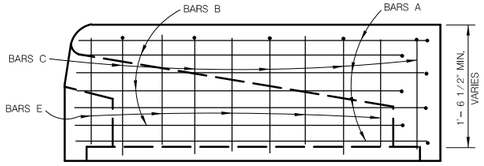
BACKWALL



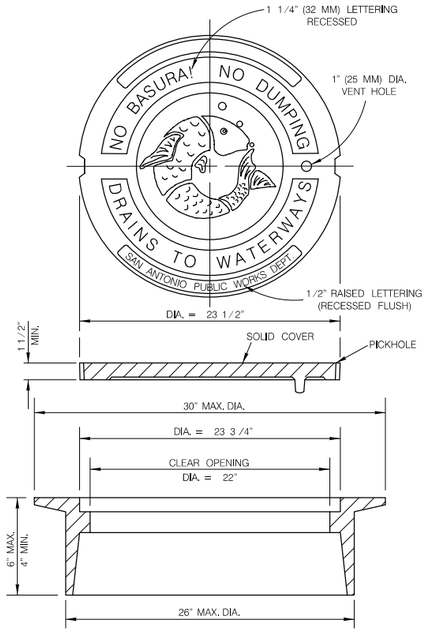
SECTION A-A



SECTION $A^1 - A^1$



END WALL



MANHOLE LID & RING DETAIL (ITEM 409)

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT.".
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 260 LBS.

SEE SHEET 1 OF 3 FOR GENERAL NOTES.

REINFORCING STEEL (FOR Hu=11")

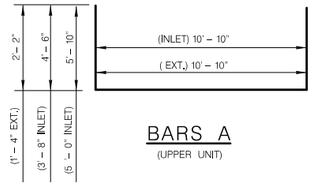
UPPER UNIT 10' X 3'-8" (TYPE I)					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	19'-10"	53
B	3	#4	—	18'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	6"	10'-10"	51
E	12	#4	11"	1'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
TOTAL WEIGHT					620 LBS.

UPPER UNIT 10' X 5' (TYPE II)					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	22'-6"	60
B	3	#4	—	21'-6"	43
C	7	#4	11"	13'-2"	62
D	11	#4	6"	10'-10"	80
E	16	#4	11"	1'-2"	13
F	21	#6	6"	5'-8"	179
G	22	#6	6"	7'-0"	231
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
TOTAL WEIGHT					759 LBS.

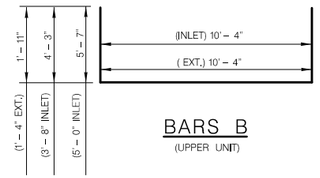
CLASS "A" CONCRETE QUANTITIES (FOR Hu = 11")

DEPRESSION SLAB	C.Y.
10' INLET	0.7
10' EXTENSION	0.7

UPPER UNIT (ONLY)		C.Y.
10' X 3'-8"	CURB INLET	1.9
10' X 5'-0"	CURB INLET	2.7
10'	EXTENSION	1.0



BARS A (UPPER UNIT)



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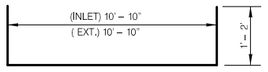

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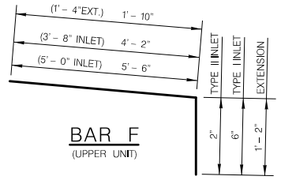
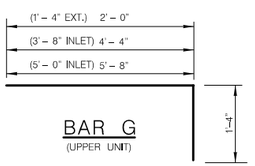
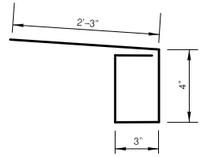


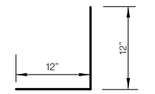
BAR F (UPPER UNIT)



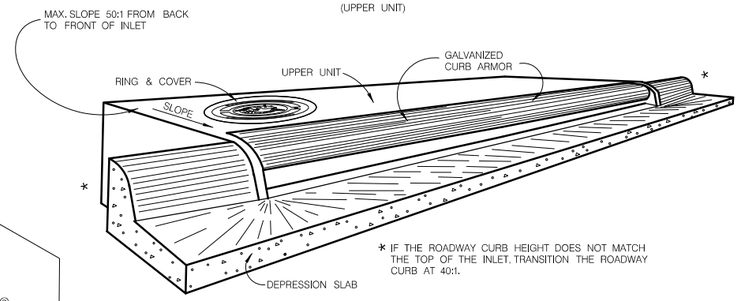
BAR G (UPPER UNIT)

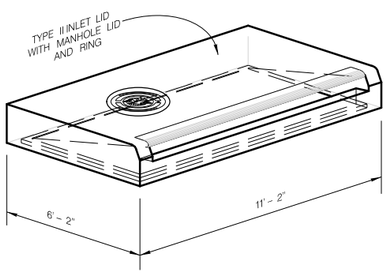


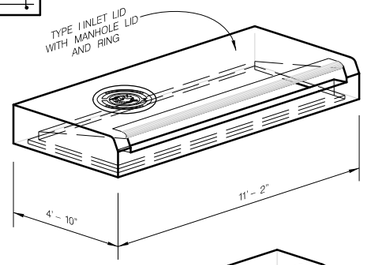
BAR J (UPPER UNIT)

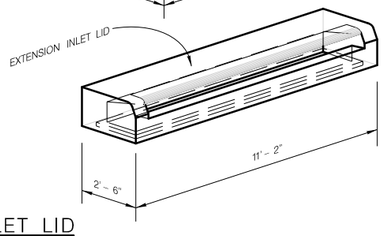


BAR L (UPPER UNIT)

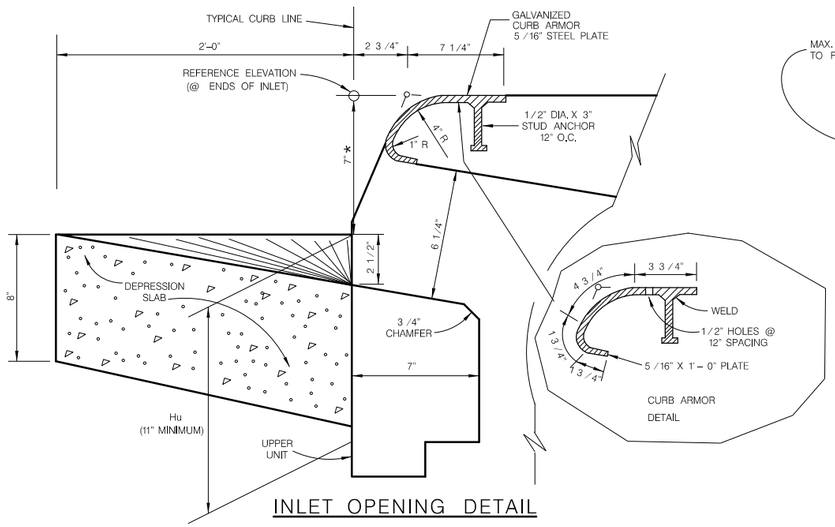








CONCRETE INLET LID CONFIGURATIONS (UPPER UNITS)



INLET OPENING DETAIL

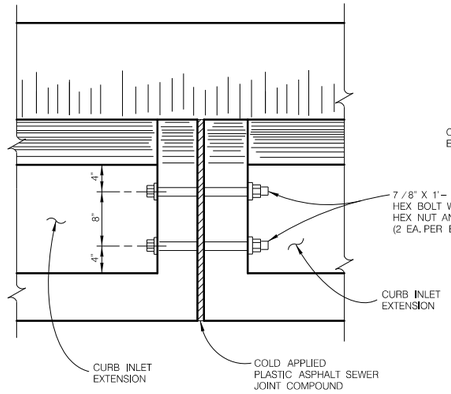
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

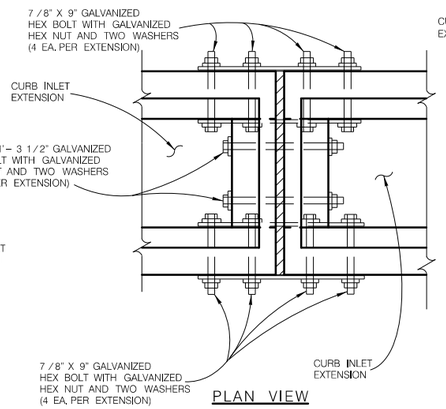
TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS

SHEET 2 OF 3

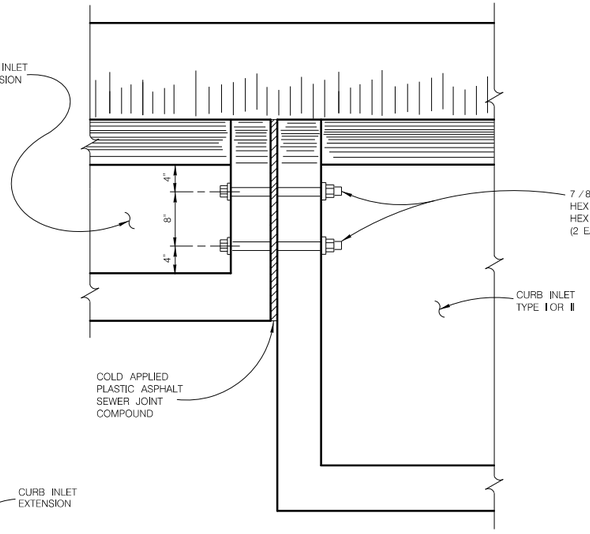
90 % SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4242025
DRWN. BY:	DSGN. BY:	CHKD. BY: SHEET NO.:194 OF 329



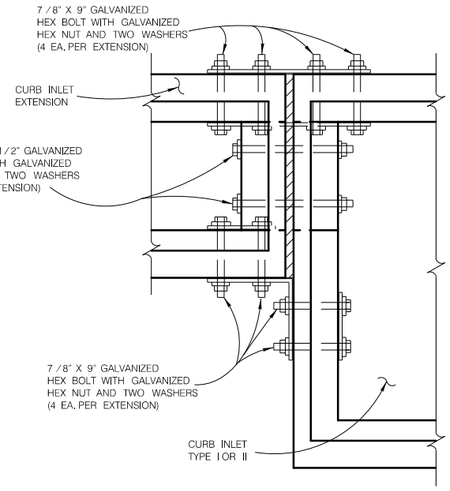
PLAN VIEW



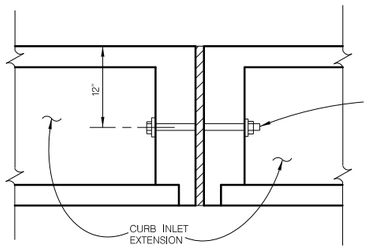
PLAN VIEW



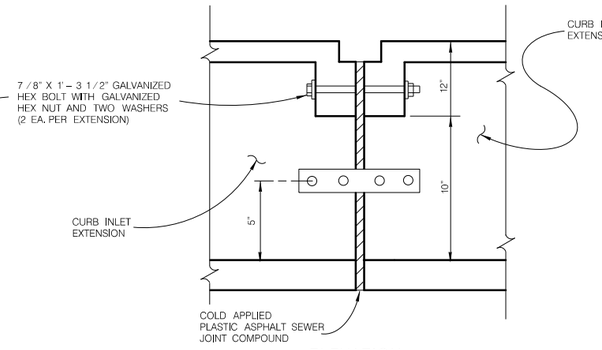
PLAN VIEW



PLAN VIEW



ELEVATION



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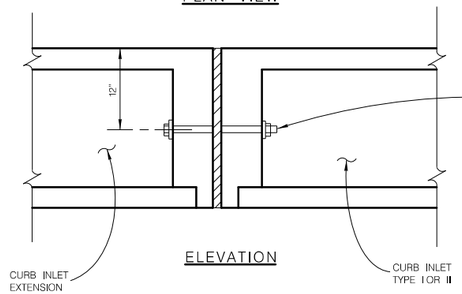

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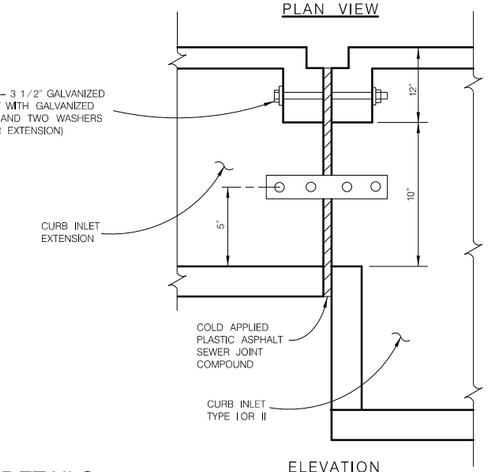


ELEVATION

UPPER UNIT EXTENSION (FOR Hu = 11")					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	15'-2"	41
B	3	#4	—	14'-2"	28
C	3	#4	11"	13'-2"	26
D	3	#4	6"	10'-10"	22
E	8	#4	11"	1'-2"	6
F	21	#6	6"	2'-0"	63
G	22	#6	6"	3'-4"	110
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
REINFORCING STEEL				LBS.	387
CLASS "A" CONCRETE				C.Y.	1.0

LOWER UNIT EXTENSION					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	12	#4	12"	6'-2"	49
B	11	#4	12"	2'-2"	16
B_1	3	#4	12"	2'-2"	4
E_1	18	#4	18" ±	2'-3"	27
E_2	4	#4	18" ±	2'-1"	6
F_1	16	#4	12" ±	10'-10"	116
F_2	5	#4	—	10'-10"	36
REINFORCING STEEL				LBS.	254
CLASS. "A" CONCRETE				C.Y.	1.4

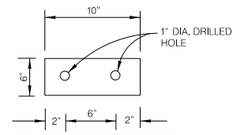
GENERAL NOTES

1. WHEN INLET EXTENSIONS ARE REQUIRED FOR ON GRADE INLETS THE EXTENSION(S) SHALL BE PLACED ON THE UPSTREAM END OF THE INLET.
2. FOR CURB INLET EXTENSION REINFORCING STEEL, NOTES & VARIOUS OTHER APPLICABLE DETAILS NOT FOUND ON THIS SHEET, REFER TO SHEETS 1 & 2.

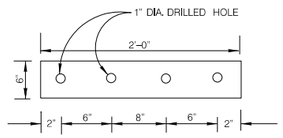
UPPER UNIT

INLET BOLTING DETAILS

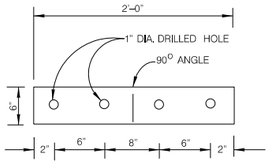
SHOWING EXTENSION TO EXTENSION



3/8" X 6" X 10" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET 2 EACH REQUIRED



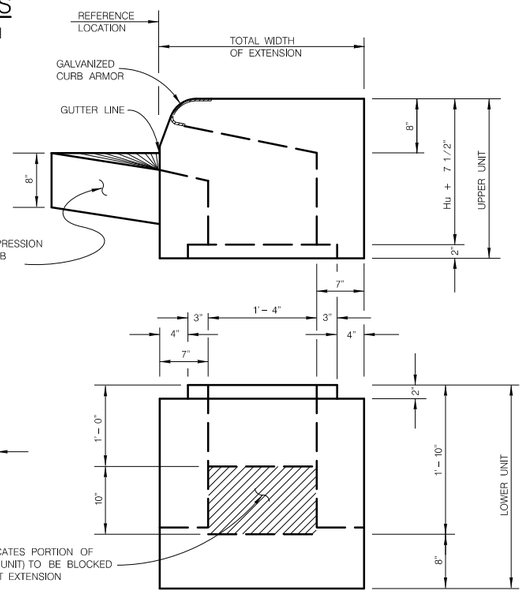
3/8" X 6" X 24" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET 2 EACH REQUIRED
BOLTING EXTENSION TO EXTENSION 4 EACH REQUIRED



3/8" X 6" X 24" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET 1 EACH REQUIRED

PLATES

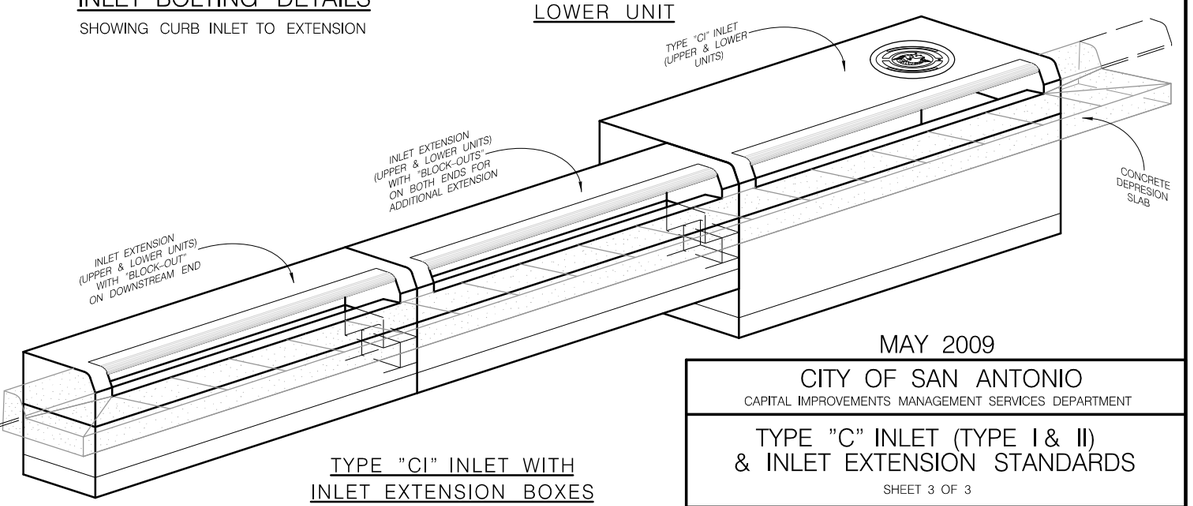
LOWER UNIT



SECTION A-A CURB INLET EXTENSION TYPE E

INLET BOLTING DETAILS

SHOWING CURB INLET TO EXTENSION



TYPE "CI" INLET WITH INLET EXTENSION BOXES

MAY 2009

CITY OF SAN ANTONIO

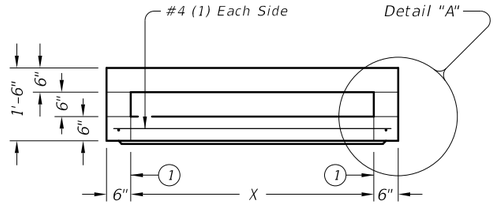
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS

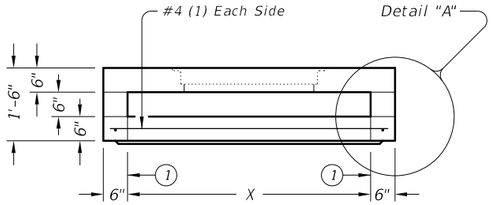
SHEET 3 OF 3

90 % SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931	DATE: 4242025
DRWN. BY:	DSGN. BY:	CHKD. BY:
		SHEET NO.: 195 OF 329

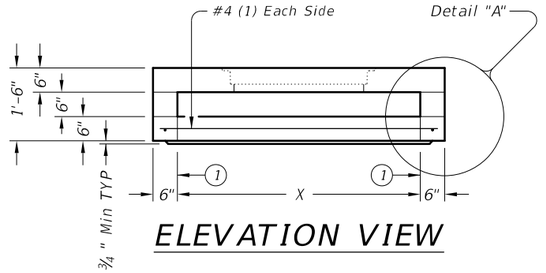
DATE:
FILE:



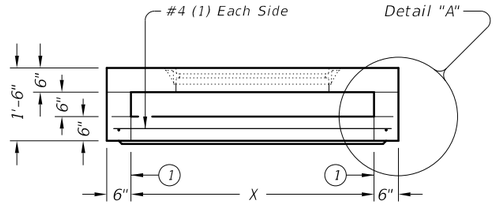
ELEVATION VIEW



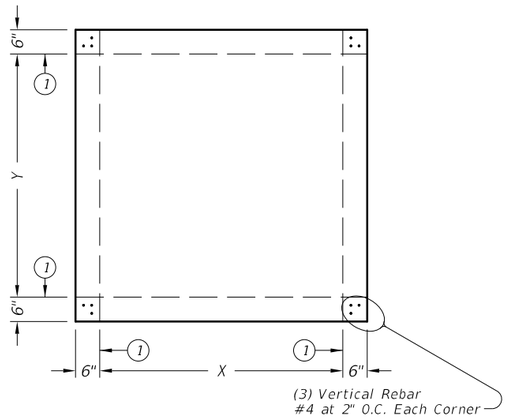
ELEVATION VIEW



ELEVATION VIEW



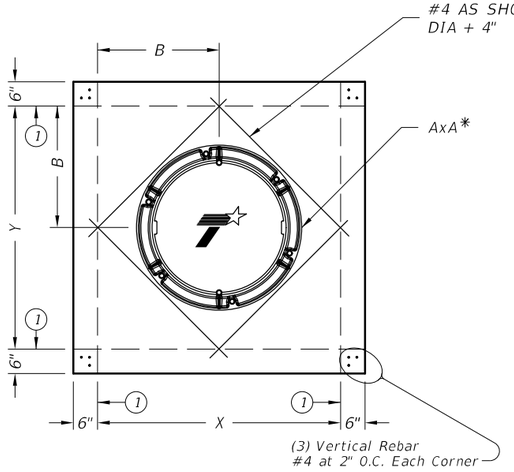
ELEVATION VIEW



PLAN VIEW

NO OPENINGS

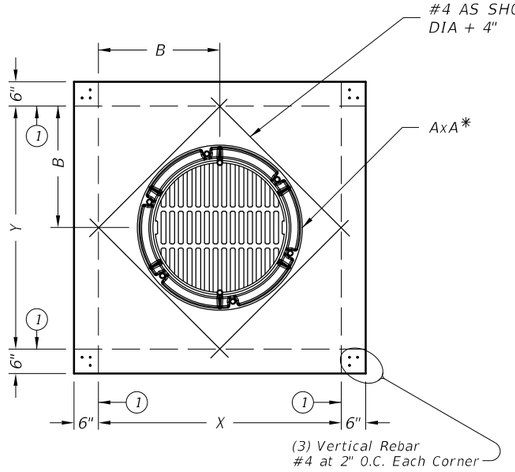
STYLE 'SL'



PLAN VIEW

32" DIA CAST-IN RING & COVER

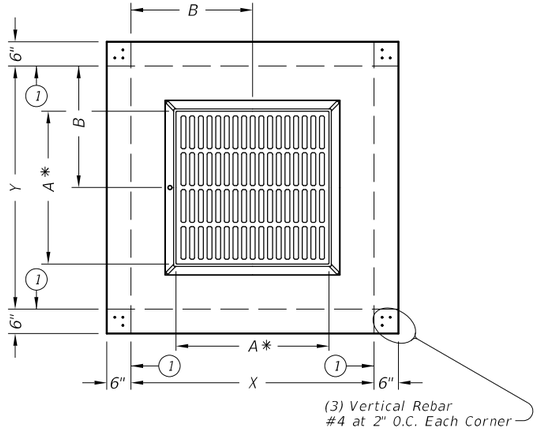
STYLE 'RC'



PLAN VIEW

32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW

CAST-IN FRAME & GRATE

STYLE 'FG'

(1) Matches inside face of wall of precast base or riser below inlet.

Style	Size (X x Y)	A x A *	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

* Nominal frame/grate or ring/cover size.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

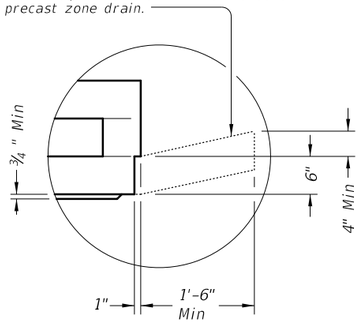
INSTALLATION NOTES:

1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

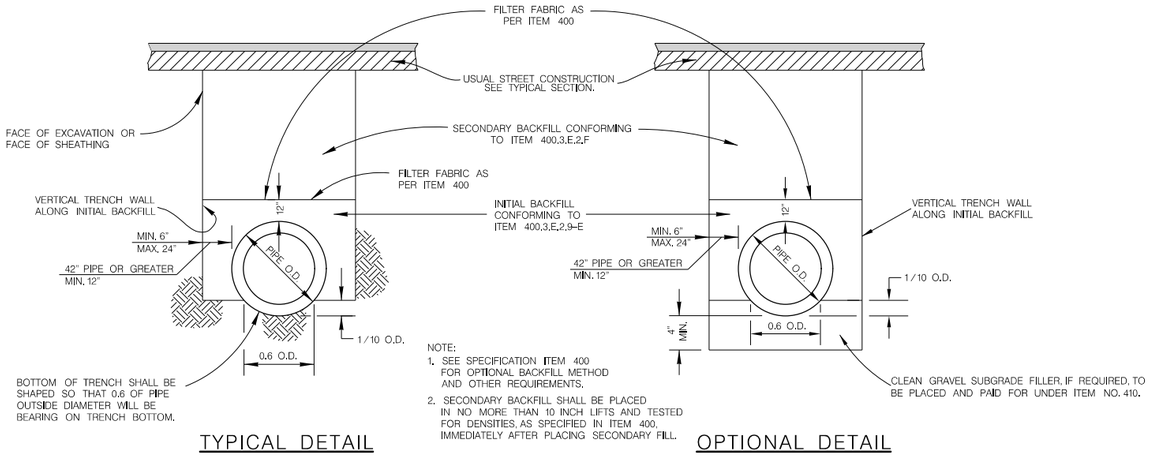
Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN

PAZD

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				196

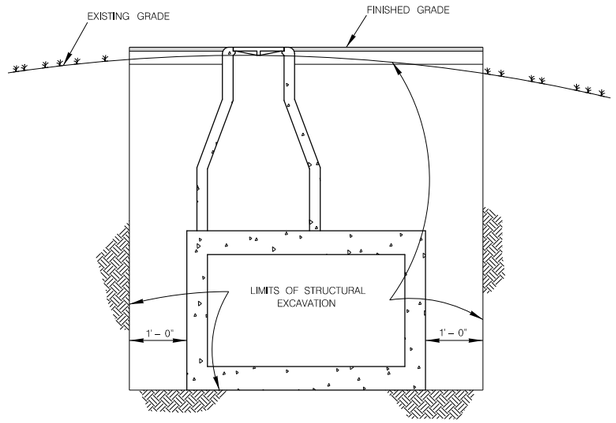


TYPICAL DETAIL

NOTE:
1. SEE SPECIFICATION ITEM 400 FOR OPTIONAL BACKFILL METHOD AND OTHER REQUIREMENTS.
2. SECONDARY BACKFILL SHALL BE PLACED IN NO MORE THAN 10 INCH LIFTS AND TESTED FOR DENSITIES, AS SPECIFIED IN ITEM 400, IMMEDIATELY AFTER PLACING SECONDARY FILL.

OPTIONAL DETAIL

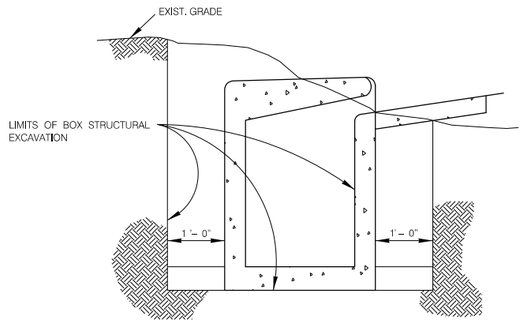
PIPE BEDDING & BACKFILL DETAILS



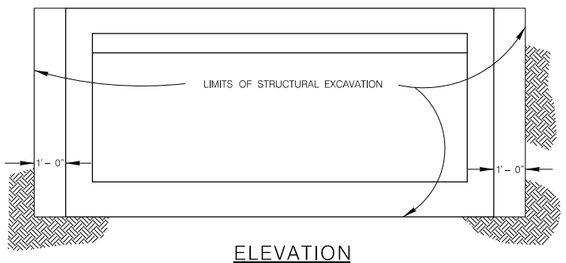
COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR JUNCTION BOX – ITEM 403.

STRUCTURAL EXCAVATION AT JUNCTION BOXES

NO SCALE



SIDE VIEW

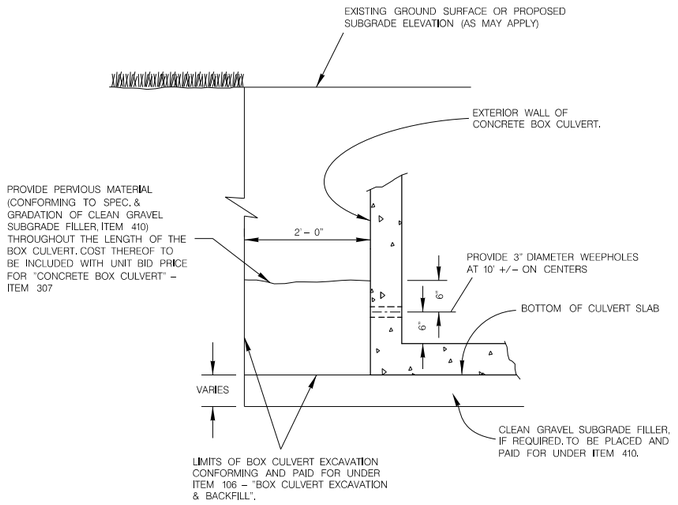


ELEVATION

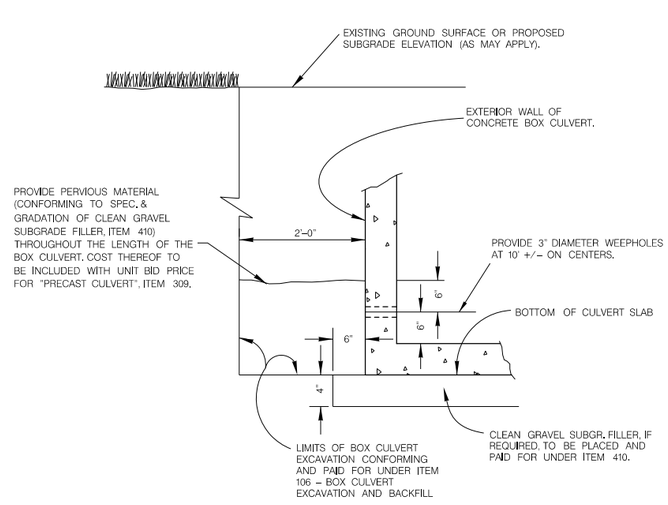
COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR INLETS – ITEM 403.

STRUCTURAL EXCAVATIONS AT DRAINAGE INLETS

NO SCALE



CAST-IN-PLACE BOX CULVERT



PRECAST BOX CULVERT

CONCRETE BOX CULVERT

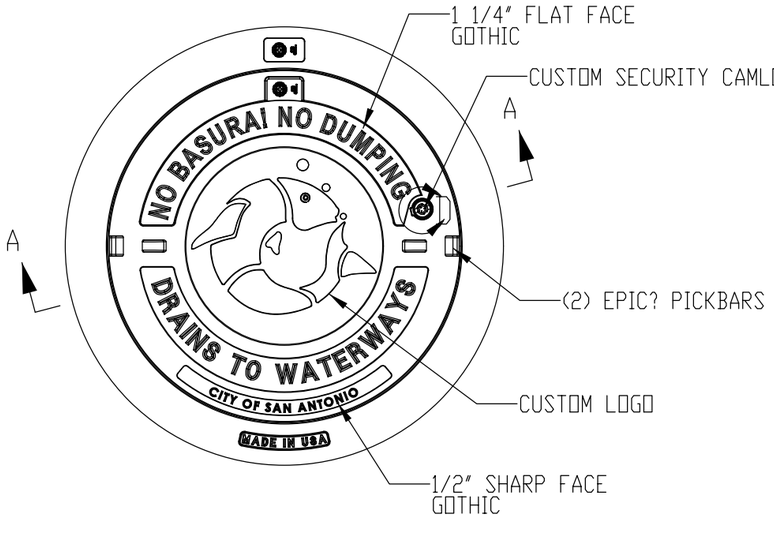
MAY 2009

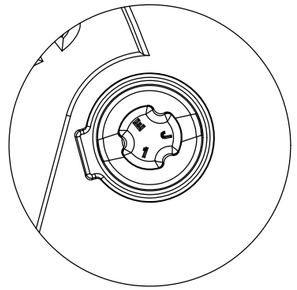
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS

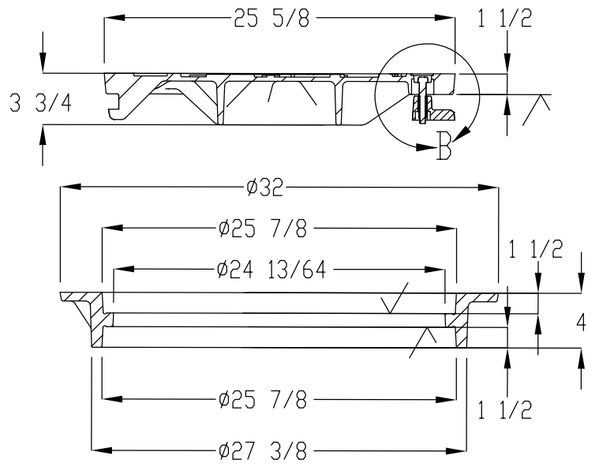
90 % SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4242025
DRWN. BY: R.S. HOSSAIN	DSGN. BY:	CHKD. BY:	SHEET NO.: 197 OF 329

1854Z 1854A4 Assembly

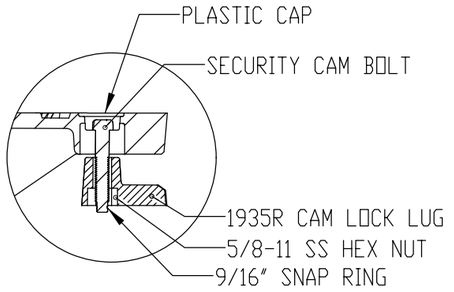




DETAIL D
SCALE 1 : 2



SECTION A-A



DETAIL B
SCALE 1 : 6

Product Number
00185480A02

Design Features
-Materials
  Frame
    Gray Iron (CL35B)
  Cover
    Ductile Iron (70-50-05)
-Design Load
  Heavy Duty
-Open Area
  n/a
-Coating
  Undipped
-✓ Designates Machined Surface

Certification
-
-ASTM A48
-ASTM A536
-Country of Origin: USA

Major Components
00185411
00185480

Drawing Revision
5/14/2014 Designer: MAH
9/11/2014 Revised By: MAH

Disclaimer
Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

Contact
800 626 4653
ejco.com

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED PROFESSIONAL ENGINEER
4/24/2025

NO.	REVISION	DRAWN	APPROVED	DATE

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
601 Northwest Loop 410, Suite 453 •San Antonio, Texas 78216 •210.494.5511

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

EVANS RD PHASE 1

1854Z 1854A4 ASSEMBLY

SHEET 01 OF 01

90 % SUBMITTAL	PROJECT NO.: 23-03901 & 23-03931		DATE: 4/24/2025
DRWN. BY:	DSGN. BY:	CHKD. BY:	SHEET NO.: 198 OF 329

PLOTDRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$
DATE:4/24/2025 9:11:43 AM USER:R_Castilla
FILE:c:\bms\pwe101-01\ruben.castilla\dms38305\7.1854Z 1854A4 ASSEMBLY.dgn

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

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY) (5)	Class "C" Conc (Wingwall) (3) (CY) (5)	Total Wingwall Area (5) (SF)
CL EVANS STA.109+00 (Lt)	2 ~ 7'x 4'	2'	SCP-7	SW-0	0°	4:1	8"	8"	0.583'	5.000'	N/A	N/A	18.667'	N/A	N/A	4.3	0.4	6.4	100
CL EVANS STA.109+00 (Rt)	2 ~ 7'x 4'	2'	SCP-7	SW-0	0°	4:1	8"	8"	0.583'	5.000'	N/A	N/A	18.667'	N/A	N/A	4.3	0.4	6.4	100
CL EVANS WB STA.55+97 (Lt)	2 ~ 8'x 4'	3'	MC-8-13	PW-1	30°	3:1	8"	7"	3.667'	8.333'	N/A	N/A	28.868'	20.496'	N/A	0.0	1.4	15.4	240
CL EVANS WB STA.55+97 (Rt)	2 ~ 8'x 4'	3'	MC-8-13	PW-1	30°	3:1	8"	7"	4.667'	9.333'	N/A	N/A	32.332'	20.496'	N/A	0.0	1.8	19.5	302
CL EVANS EB STA.16+10 (Lt)	2 ~ 8'x 5'	5'	MC-8-13	PW-1	30°	3:1	8"	7"	3.000'	8.667'	N/A	N/A	30.022'	20.496'	N/A	0.0	1.2	18.2	260
CL EVANS EB STA.16+10 (Rt)	2 ~ 8'x 5'	5'	MC-8-13	FW-S	30°	3:1	8"	7"	3.583'	9.000'	26.000'	26.000'	36.770'	20.496'	N/A	0.0	1.4	8.8	146

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

(5) Concrete quantities for crossings CC-02 & CC-03 have been reduced to account only for the extension of the existing wingwalls.

STATE OF TEXAS
RUBEN A. CASTILLA
150047
LICENSED
PROFESSIONAL ENGINEER
4/24/2025

Texas Department of Transportation

Bridge Division Standard

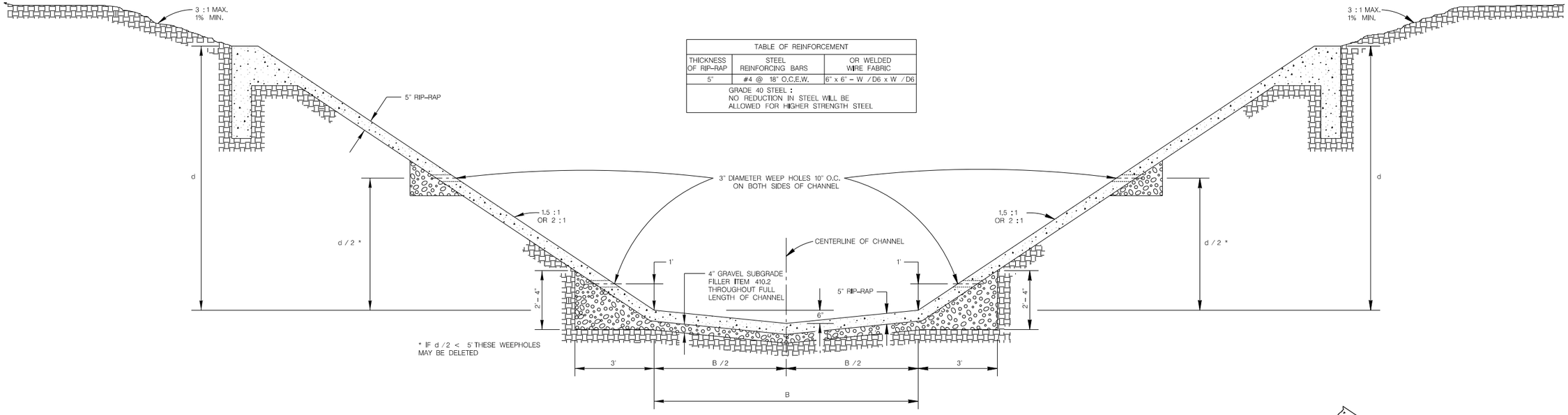
BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: 8.CD-BCS-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				199

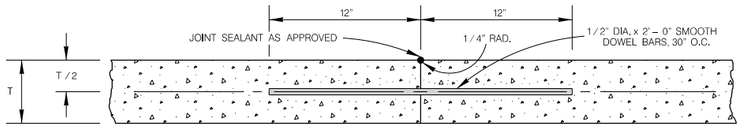
DATE:
FILE:

TABLE OF REINFORCEMENT		
THICKNESS OF RIP–RAP	STEEL REINFORCING BARS	OR WELDED WIRE FABRIC
5"	#4 @ 18" O.C.E.W.	6" x 6" – W /D6 x W /D6
GRADE 40 STEEL : NO REDUCTION IN STEEL WILL BE ALLOWED FOR HIGHER STRENGTH STEEL		



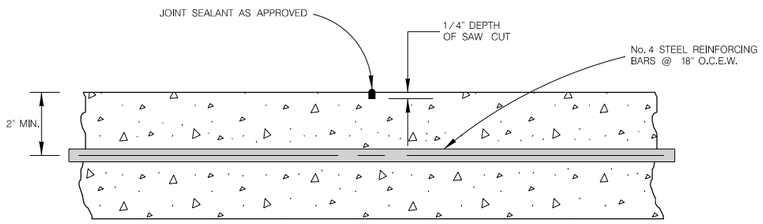
TYPICAL CHANNEL SECTION LOOKING DOWNSTREAM

SCALE : 1" = 4'



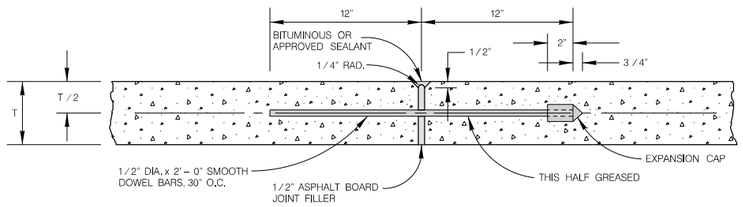
CONVERSE CONTRACTION OR CONSTRUCTION JOINT

SCALE : 1" = 1'



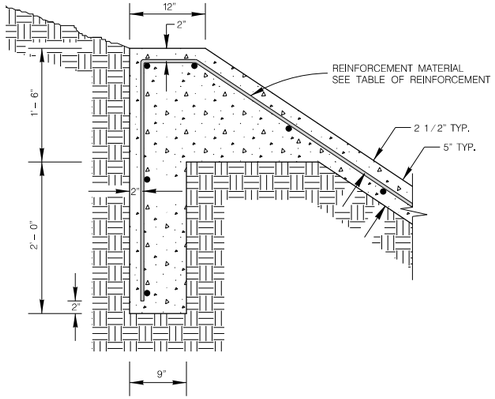
"SAW CUT" CONTRACTION JOINT

SCALE : 1" = 6"



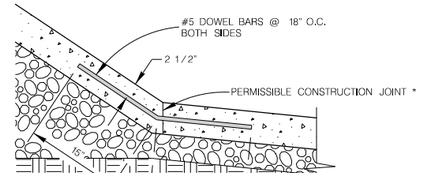
TRANSVERSE EXPANSION JOINT

SCALE : 1" = 1'



REINFORCEMENT DETAIL TOE–DOWN

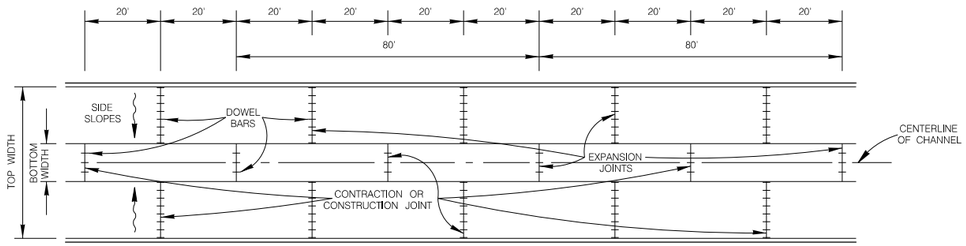
SCALE : 1" = 2'



* THIS JOINT MUST BE A VERTICAL JOINT AS SHOWN

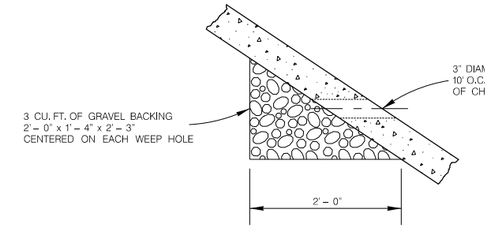
ALL SECTIONS

SCALE : 1" = 2'



EXPANSION AND CONTRACTION JOINTS FOR CONCRETE CHANNEL LINING

SCALE : 1" = 40'



WEEP HOLES DETAILS FOR SIDE SLOPES

SCALE : 1" = 2'

GENERAL NOTES

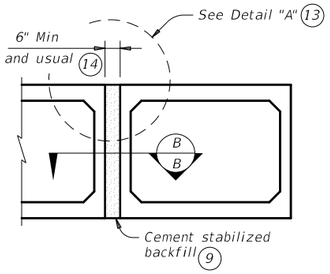
1. CONCRETE FOR CHANNEL RIP–RAP SHALL BE CLASS "A" 3000 P.S.I.
2. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS UNLESS OTHERWISE SHOWN.
3. ALL REINFORCEMENT STEEL SHALL MEET ASTM DESIGNATIONS AS CALLED FOR IN THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".
4. NEW RIP–RAP SHOULD BE ATTACHED TO EXISTING RIP–RAP BY NO. 4 BARS DOWELED 6" INTO EXISTING RIP–RAP. THESE BARS ARE TO BE SPACED 18" O.C. AND HAVE A LENGTH OF 18".

MAY 2009

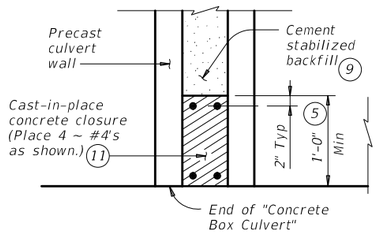
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPICAL CONCRETE CHANNEL RIP–RAP STANDARDS

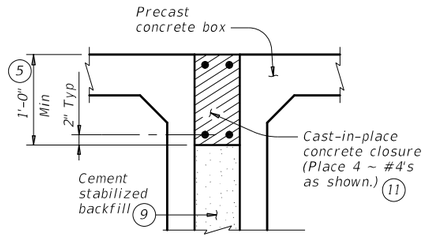
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY:	SHEET NO.: 200 OF 329



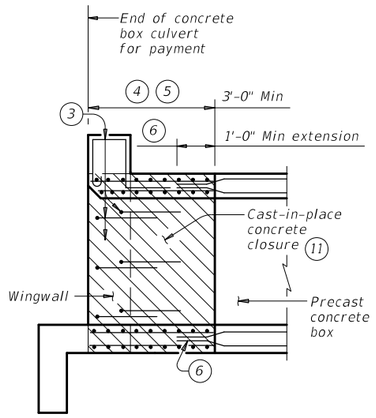
MULTIPLE UNIT PLACEMENT



SECTION B-B

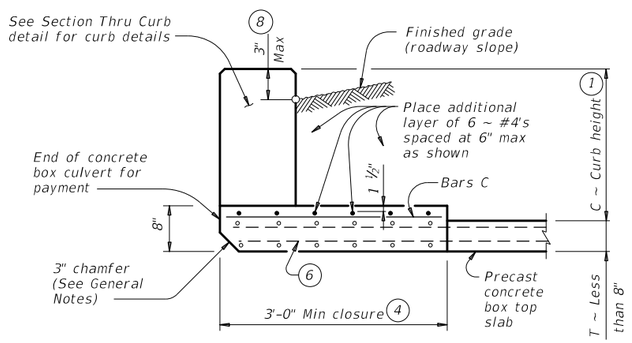


DETAIL "A" (13)

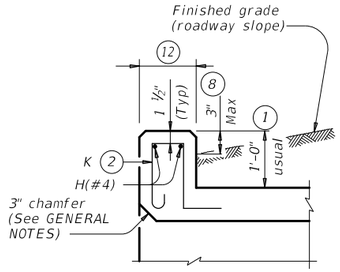


WINGWALL CONNECTION

(Also applies to safety end treatment.)

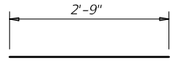


SECTION THRU TOP SLABS LESS THAN 8"



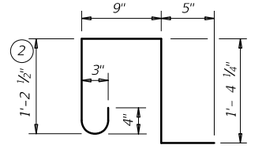
SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)

(Spa = 1'–0" Max)



BARS K (#4)

(Spa = 1'–0" Max)
(Length = 4'–2")

1. 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast–in–place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'–0" Min cast–in–place closure in the top slab, bottom slab, and exterior wall. See Section B–B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'–0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box." No payment will be made for any additional material in the gap between adjacent boxes.

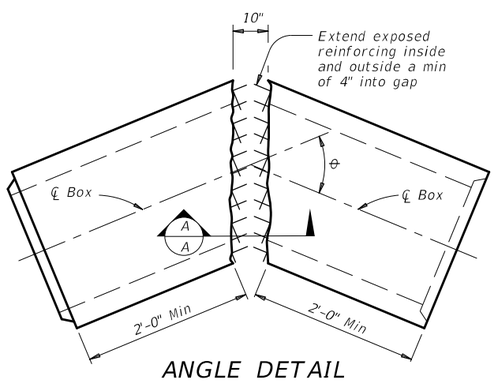
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

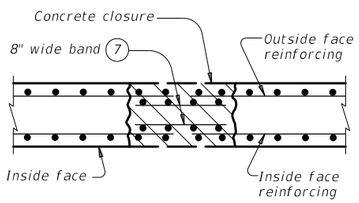
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

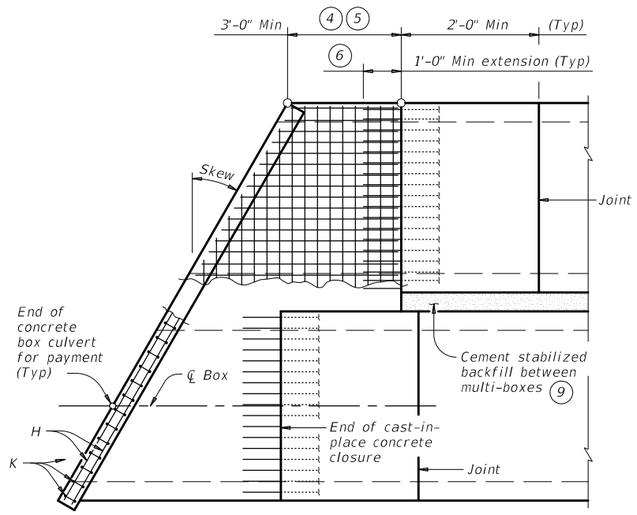
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out–to–out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE:	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				201

DATE:
FILE:

DATE:
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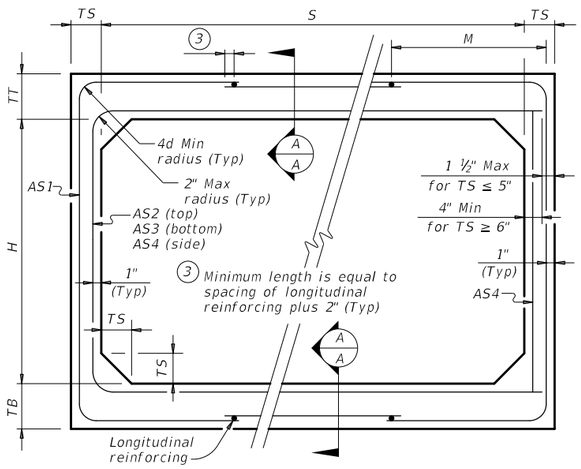
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
7	3	8	8	8	< 2	–	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	–	–	–	9.6
7	3	8	8	8	3 – 5	43	0.19	0.19	0.19	0.19	–	–	–	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	–	–	–	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	–	–	–	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	–	–	–	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	–	–	–	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	–	–	–	9.6
7	4	8	8	8	< 2	–	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	–	–	–	10.4
7	4	8	8	8	3 – 5	43	0.19	0.22	0.19	0.19	–	–	–	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	–	–	–	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	–	–	–	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	–	–	–	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	–	–	–	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	–	–	–	10.4
7	5	8	8	8	< 2	–	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	–	–	–	11.2
7	5	8	8	8	3 – 5	43	0.19	0.24	0.21	0.19	–	–	–	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	–	–	–	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	–	–	–	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	–	–	–	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	–	–	–	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	–	–	–	11.2
7	6	8	8	8	< 2	–	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	–	–	–	12.0
7	6	8	8	8	3 – 5	47	0.19	0.25	0.23	0.19	–	–	–	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	–	–	–	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	–	–	–	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	–	–	–	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	–	–	–	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	–	–	–	12.0
7	7	8	8	8	< 2	–	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	–	–	–	12.8
7	7	8	8	8	3 – 5	59	0.19	0.27	0.25	0.19	–	–	–	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	–	–	–	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	–	–	–	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	–	–	–	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	–	–	–	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	–	–	–	12.8

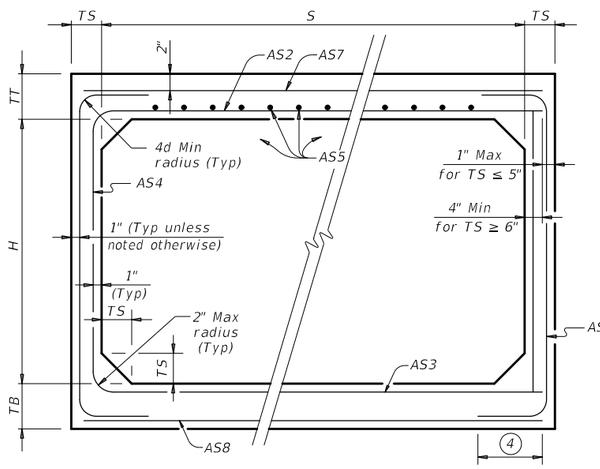
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

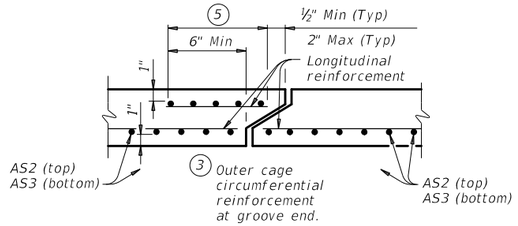
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)."

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

7'-0" SPAN

SCP-7

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
				202

DATE:
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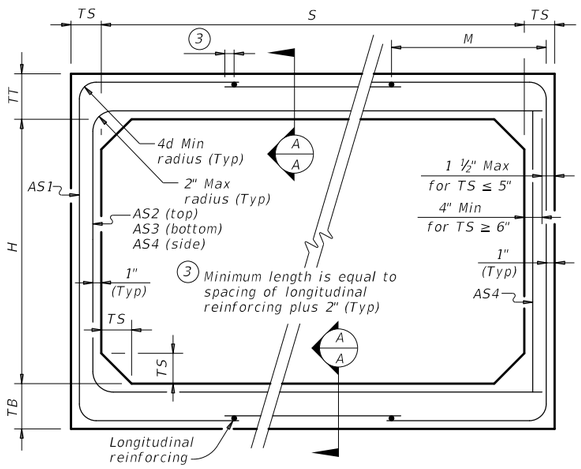
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
8	3	8	8	8	< 2	–	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	–	–	–	10.4
8	3	8	8	8	3 – 5	50	0.28	0.23	0.24	0.19	–	–	–	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	–	–	–	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	–	–	–	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	–	–	–	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	–	–	–	10.4
8	4	8	8	8	< 2	–	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	–	–	–	11.2
8	4	8	8	8	3 – 5	50	0.25	0.27	0.27	0.19	–	–	–	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	–	–	–	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	–	–	–	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	–	–	–	11.2
8	5	8	8	8	< 2	–	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	–	–	–	12.0
8	5	8	8	8	3 – 5	45	0.23	0.29	0.30	0.19	–	–	–	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	–	–	–	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	–	–	–	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	–	–	–	12.0
8	6	8	8	8	< 2	–	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	–	–	–	12.8
8	6	8	8	8	3 – 5	50	0.21	0.32	0.33	0.19	–	–	–	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	–	–	–	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	–	–	–	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	–	–	–	12.8
8	7	8	8	8	< 2	–	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	–	–	–	13.6
8	7	8	8	8	3 – 5	55	0.19	0.34	0.35	0.19	–	–	–	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	–	–	–	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	–	–	–	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	–	–	–	13.6
8	8	8	8	8	< 2	–	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	–	–	–	14.4
8	8	8	8	8	3 – 5	65	0.19	0.36	0.38	0.19	–	–	–	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	–	–	–	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	–	–	–	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	–	–	–	14.4

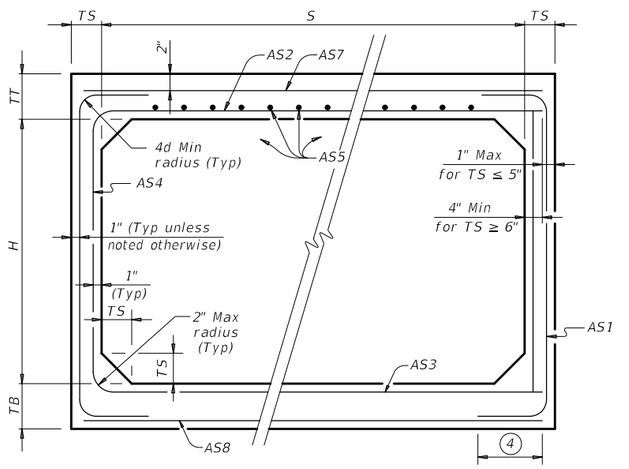
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

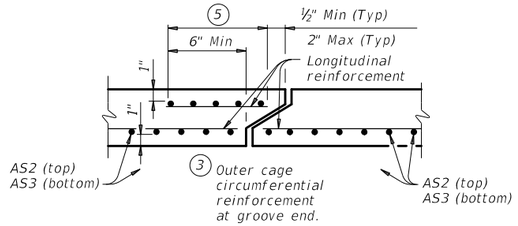
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

8'-0" SPAN

SCP-8

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
				203

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C – 0.250'
Lw = (Hw – 0.333') (SL)

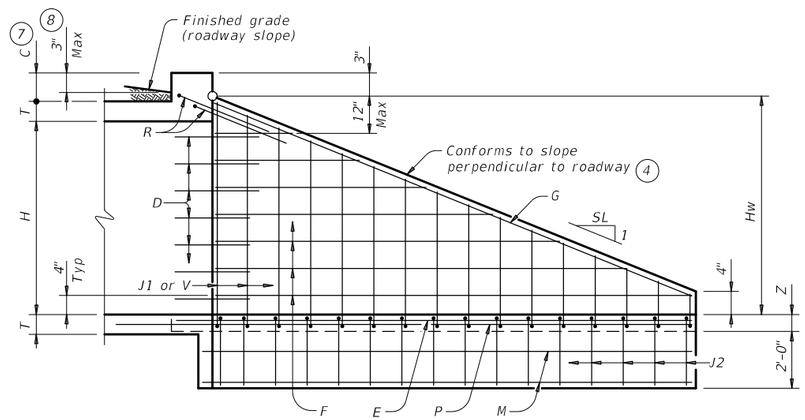
For cast–in–place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N – 1) (0.5')

Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

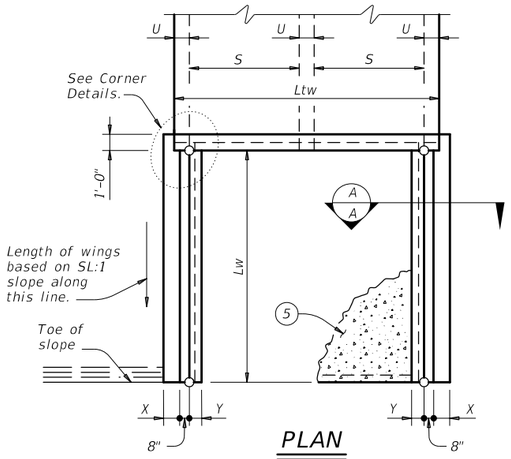
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



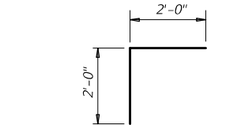
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

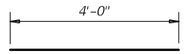


PLAN

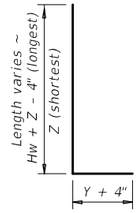
(Showing dimensions.)



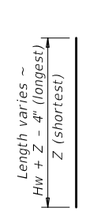
BARS R



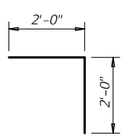
BARS D



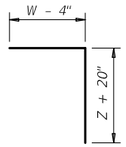
BARS J1



BARS V



BARS L



BARS J2

(1) Extend Bars P 3'–0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'–6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B–B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

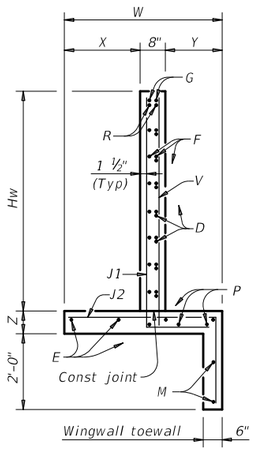
MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

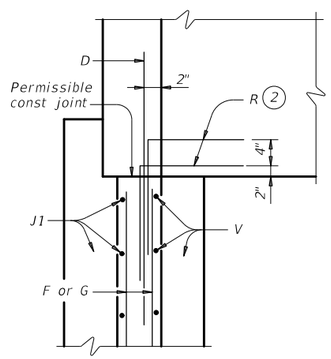
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

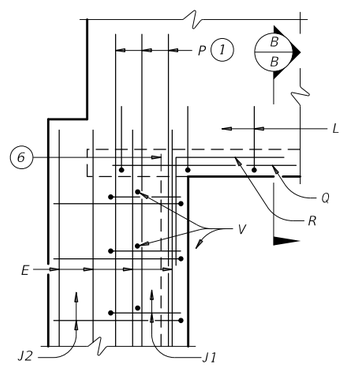
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



SECTION A-A

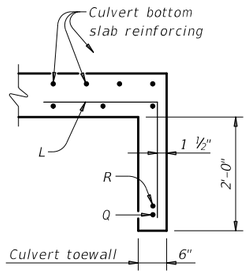


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS



SECTION B-B (5)

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS

SW-0

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				204

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C – 0.250'
A = (Hw – 0.333') (SL)
B = (A) tangent (30°)
Lw = (A) ÷ cosine (30°)

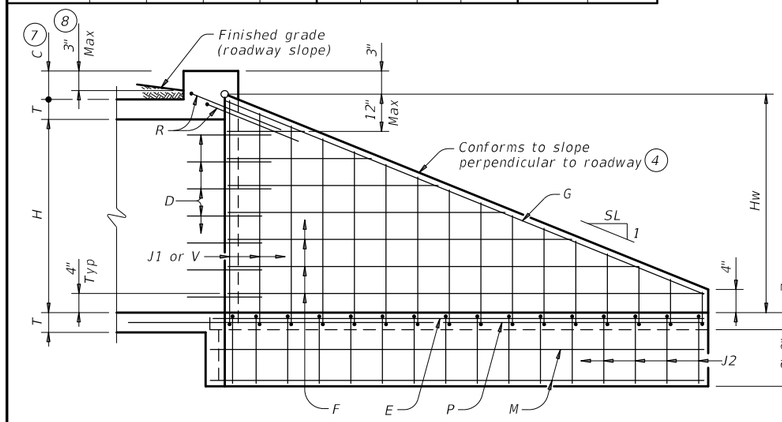
For cast–in–place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N – 1) (0.5')

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

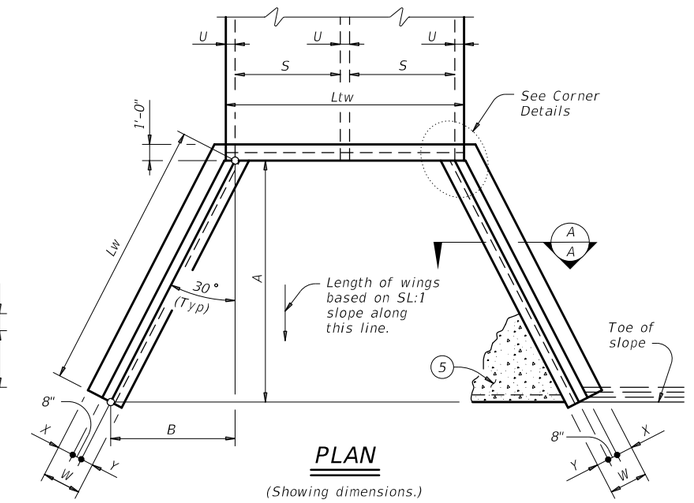
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



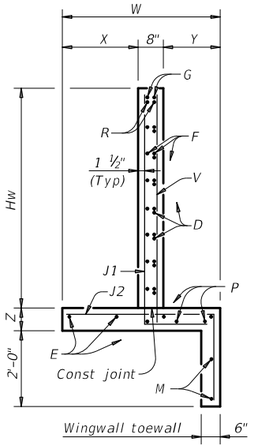
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

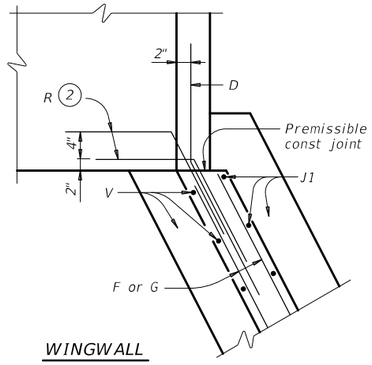


PLAN

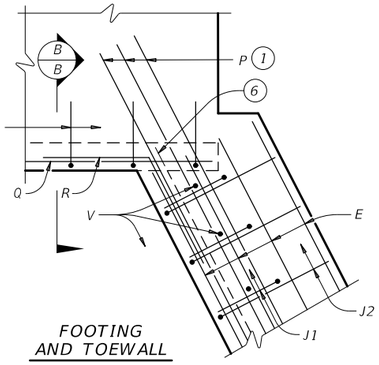
(Showing dimensions.)



SECTION A-A



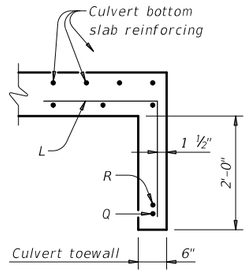
WINGWALL



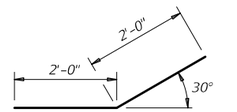
FOOTING AND TOEWALL

CORNER DETAILS

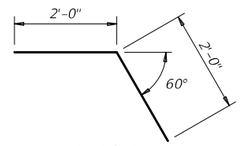
(Culvert and culvert toewall reinforcing not shown for clarity.)



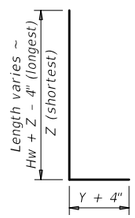
SECTION B-B (5)



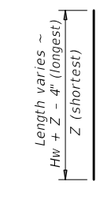
BARS D



BARS R



BARS J1



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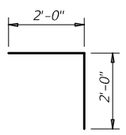
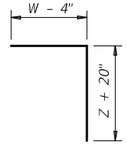


BARS L



BARS J2

(1) Extend Bars P 3'–0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'–6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B–B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				205

DATE:
FILE:

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333')(SL)
B = (A) [tangent (θ + 15°)]
Lw = (A) ÷ [cosine (θ + 15°)]

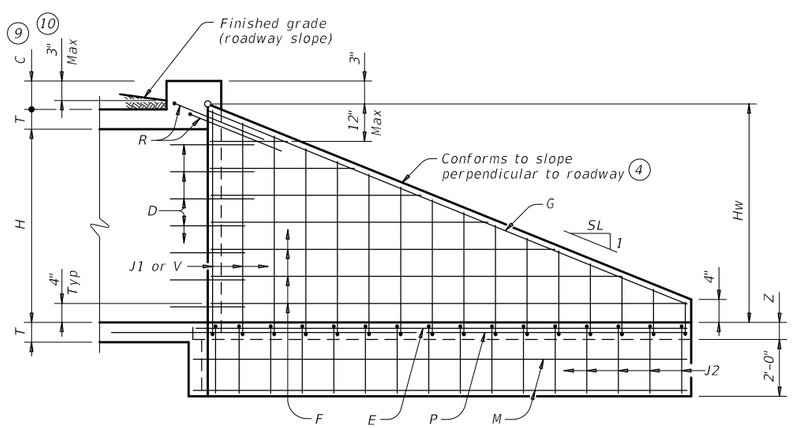
For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine θ

For precast culverts:
Ltw = [(N) (2U + S) + (N - 1) (0.5')] ÷ cosine θ

Total wingwall area (two wings ~ SF) = 0.5 (Hw + 0.333') (Lw + A)

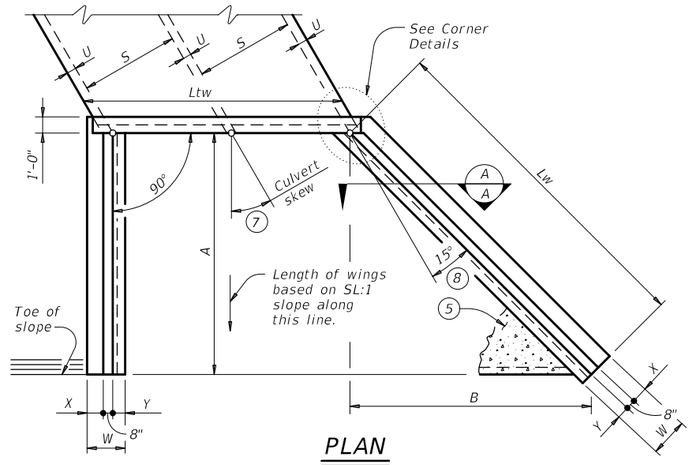
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
A = Length of short wingwalls
Lw = Length of long wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
θ = Culvert skew

See applicable box culvert standard sheet for H, S, T, and U values.



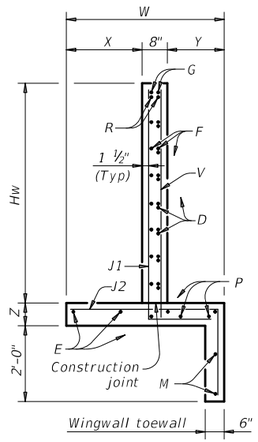
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

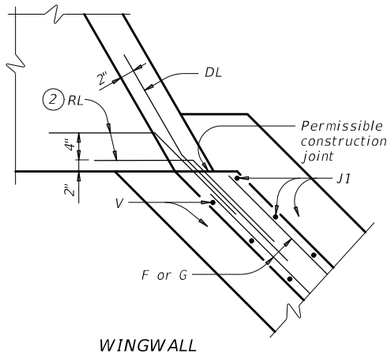


PLAN

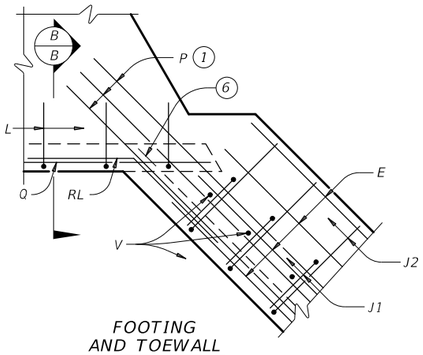
(Showing dimensions and 30° skew.)



SECTION A-A



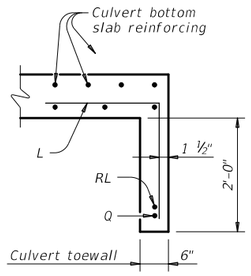
WINGWALL



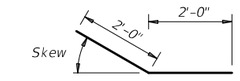
FOOTING AND TOEWALL

CORNER DETAILS

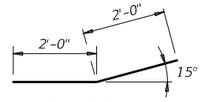
(Culvert and culvert toewall reinforcing not shown for clarity.)



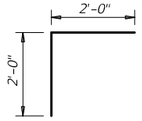
SECTION B-B 5



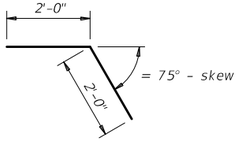
BARS DS
(Short wing)



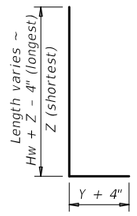
BARS DL
(Long wing)



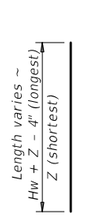
BARS RS
(Short wing)



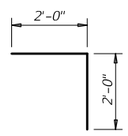
BARS RL
(Long wing)



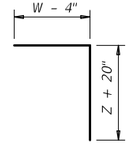
BARS J1



BARS V



BARS L



BARS J2

1. Extend Bars P 3'-0" minimum into bottom slab of box culvert.
2. Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by 0.5 x (A + Lw).
4. Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
5. When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
6. At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
7. Applicable values of skew are: 15°, 30°, and 45°.
8. Typical wingwall angle for all skews.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR SKEWED BOX CULVERTS

FW-S

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				206

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

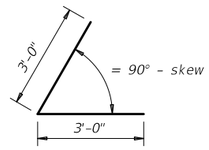
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

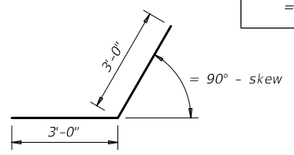
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

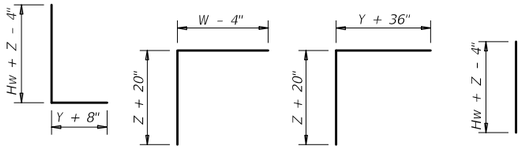
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

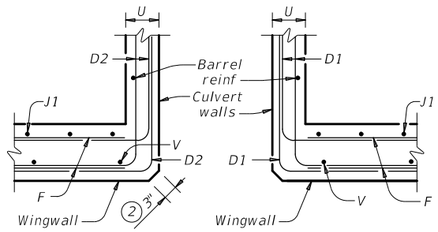
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

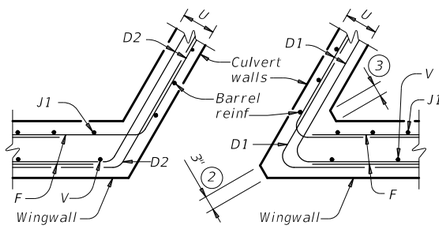
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

See applicable box culvert standard sheet for S, H, T, and U values.



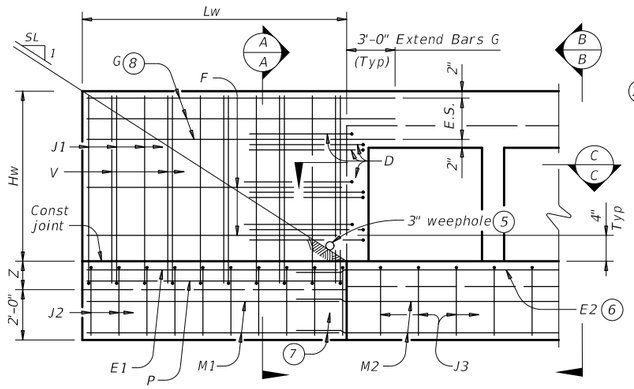
SECTION C-C - PW-1



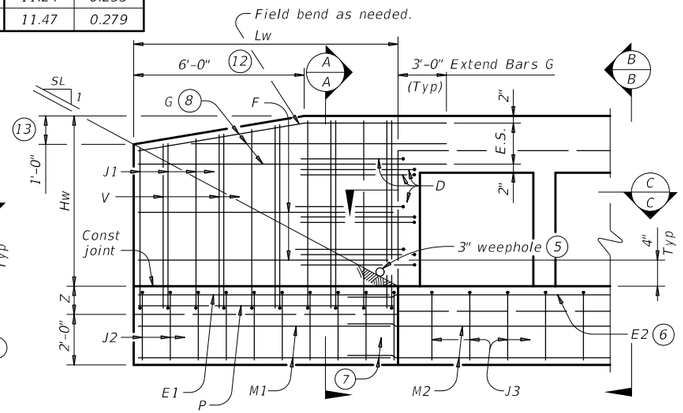
SECTION C-C - PW-2

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

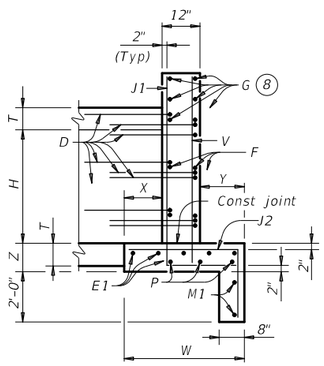
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.



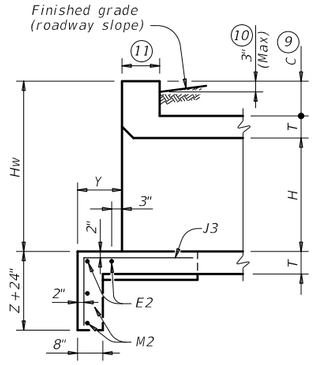
PARTIAL ELEVATION - PW-1



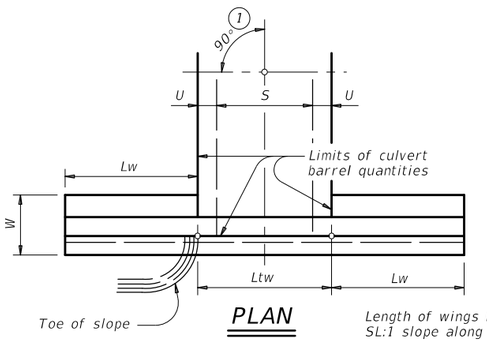
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

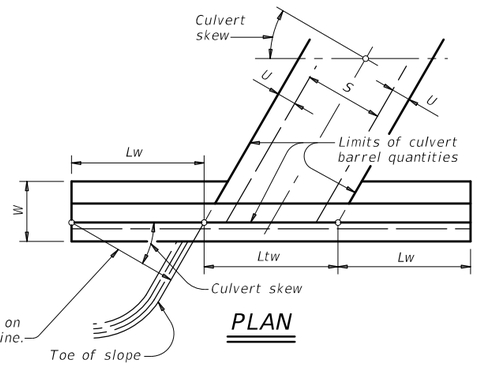


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation

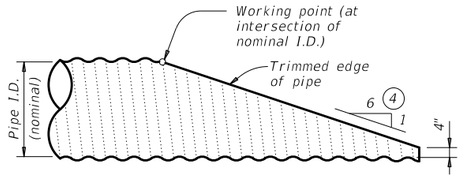
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				207

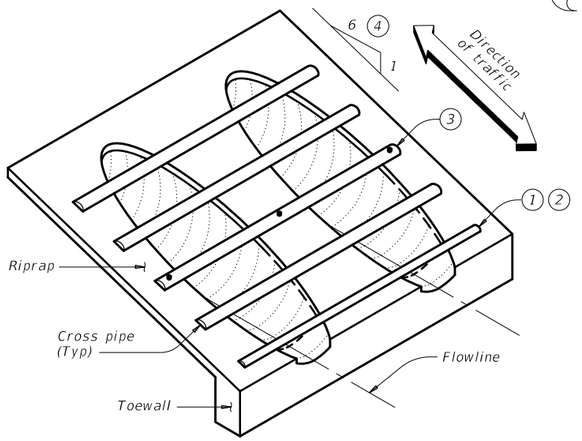
DATE:
FILE:



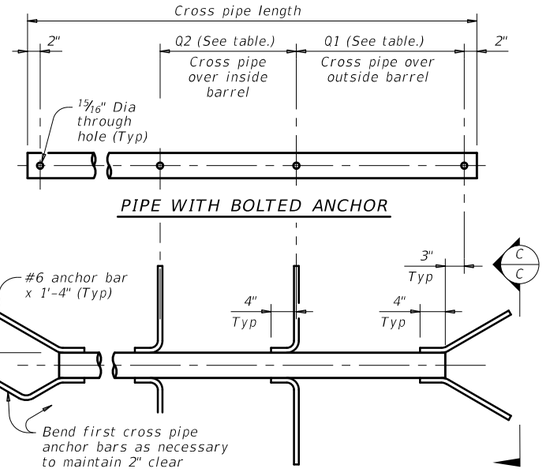
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

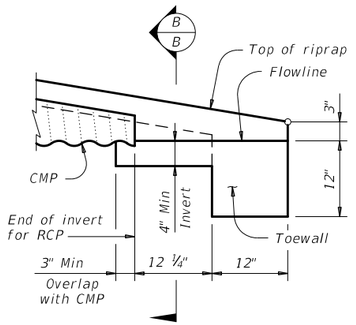
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

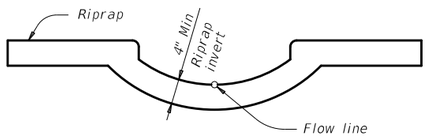


CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' – 9"	N/A	2' – 1"	1' – 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' – 11"	N/A	2' – 5"	2' – 2"		
18"	0.8	1' – 2"	N/A	2' – 10"	2' – 8"		
21"	0.9	1' – 4"	N/A	3' – 2"	3' – 1"		
24"	0.9	1' – 7"	N/A	3' – 6"	3' – 7"		
27"	1.0	1' – 8"	N/A	3' – 10"	3' – 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' – 10"	N/A	4' – 2"	4' – 4"	2 or more pipe culverts	
33"	1.2	1' – 11"	4' – 2"	4' – 5"	4' – 8"	All pipe culverts	
36"	1.3	2' – 1"	4' – 5"	4' – 9"	5' – 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' – 4"	4' – 11"	5' – 5"	5' – 10"		
48"	1.7	2' – 7"	5' – 5"	6' – 0"	6' – 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' – 0"	5' – 11"	6' – 9"	7' – 6"		
60"	2.2	3' – 3"	6' – 5"	7' – 4"	8' – 3"		
66"	2.4	3' – 3"	6' – 11"	7' – 10"	8' – 9"		
72"	2.7	3' – 4"	7' – 5"	8' – 5"	9' – 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

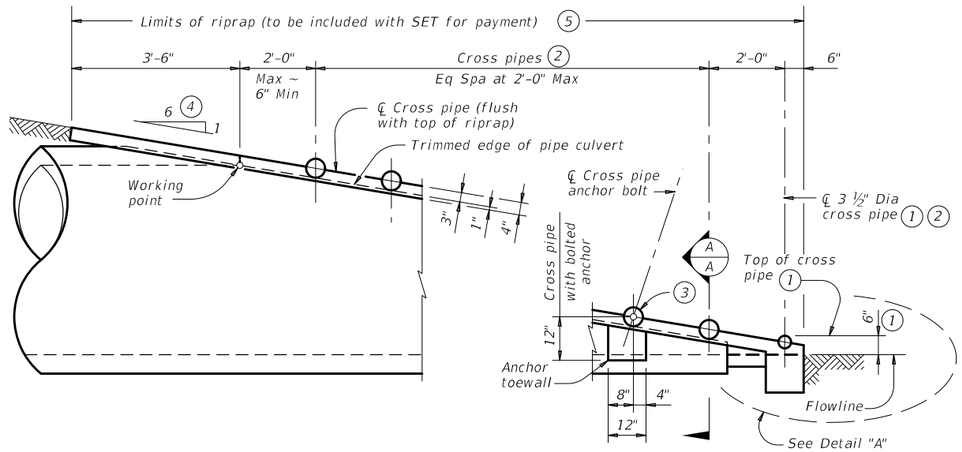
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

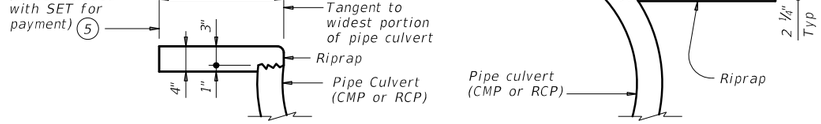
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap."

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



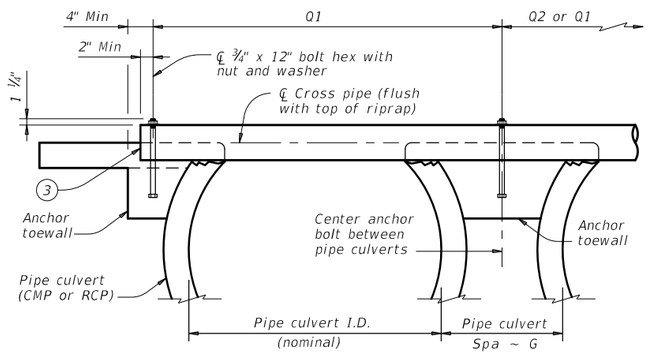
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 72" DIA PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE:	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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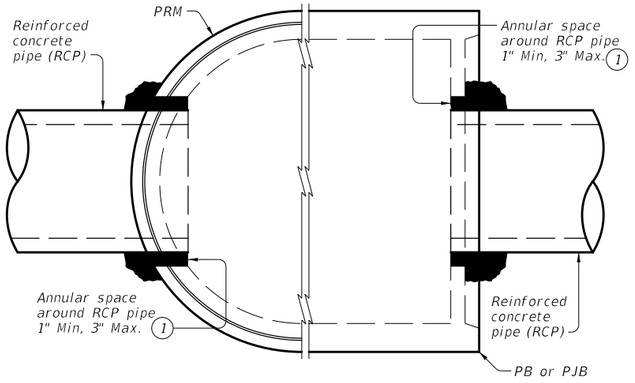
	DIST	COUNTY		SHEET NO. 208

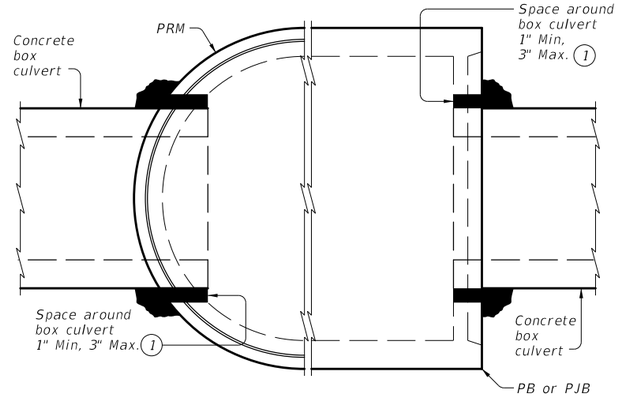
DATE:
FILE:



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

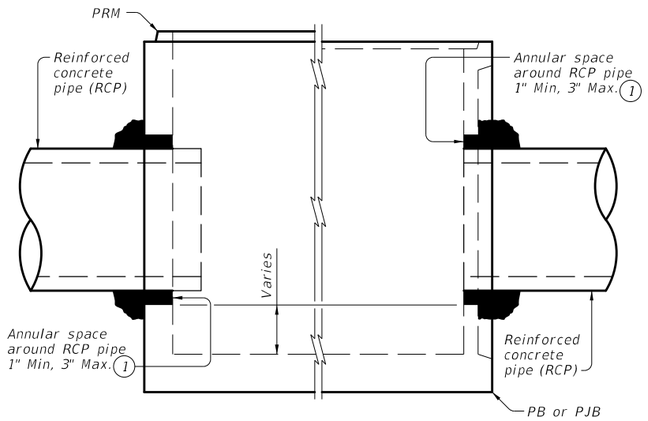
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

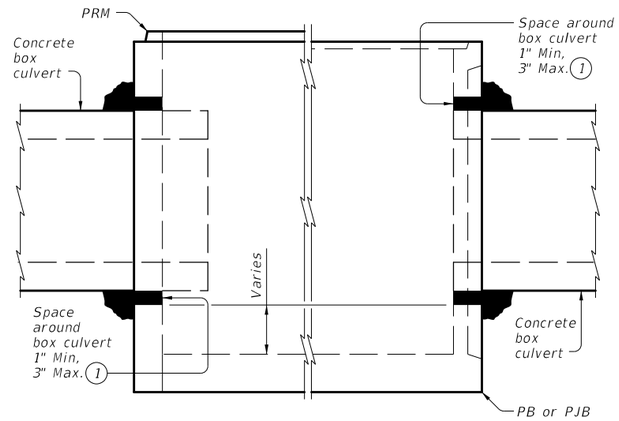
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

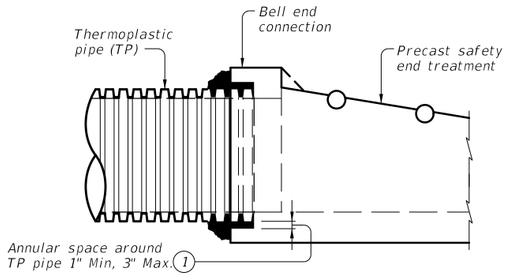
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application."

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application."

GENERAL NOTES:

See applicable standards for notes and details not shown:

- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains."

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe."

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE:	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				209

DATE:
FILE:

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

		MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB												
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
	Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

Texas Department of Transportation

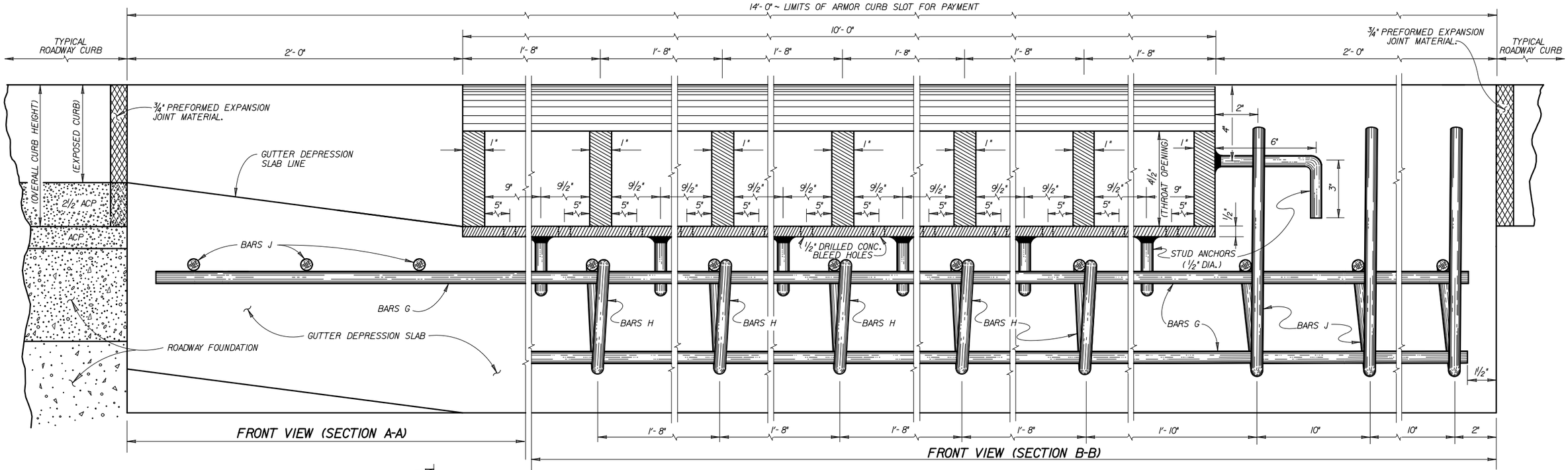
Bridge Division Standard

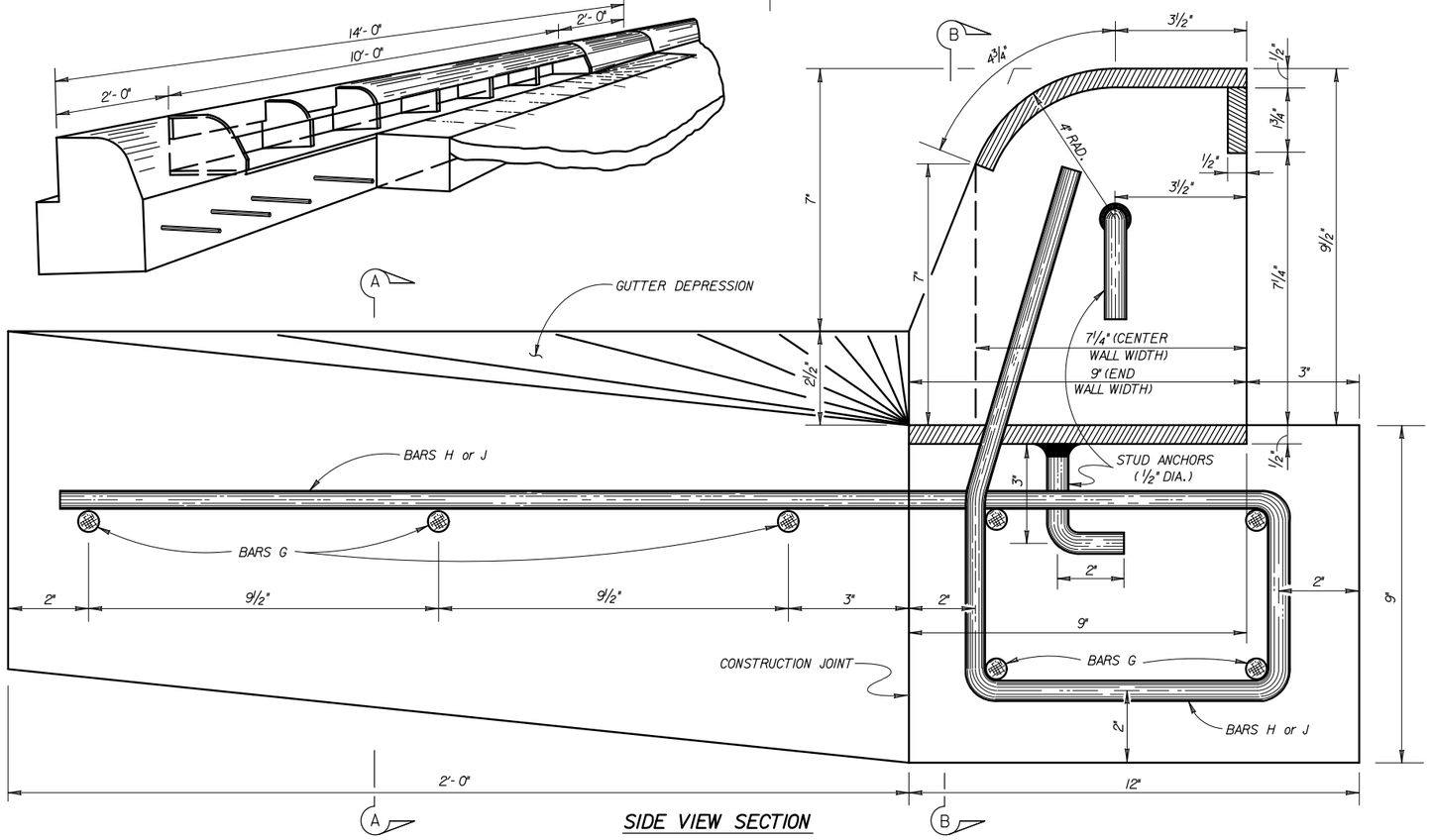
DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

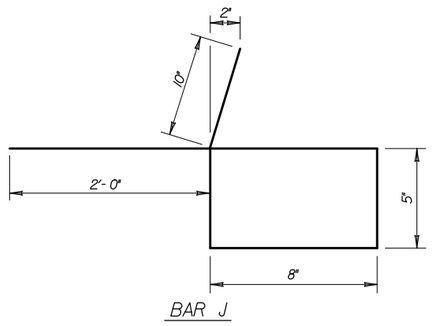
PDD

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				210

DATE:
FILE:







ESTIMATED QUANTITIES
FOR REINFORCING STEEL & CONCRETE

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
G	7	#4	SHOWN	13'-9"	64
H	5	#4	1'-8"	4'-6"	15
J	6	#4	8"	5'-0"	20
TOTAL WEIGHT *				LBS.	99
CONCRETE FOR FOUNDATION *				C.Y.	0.47
CONCRETE FOR GUTTER DEPRESSION *				C.Y.	0.78

STRUCTURAL STEEL FOR ARMOR CURB SLOT		
STUD ANCHORS (1/2" DIA.)	LBS.	3.5
STEEL PLATE	LBS.	451
TOTAL WEIGHT *	LBS.	454.5

* FOR CONTRACTORS INFO ONLY.

GENERAL NOTES:

ALL CONCRETE SHALL BE CL."A".

ALL STEEL SHALL BE ASTM A36.

ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.

ALL SIDES OF ARMOR CURB SLOT AND STUD ANCHORS SHALL BE 1/4" FILLET WELDS.

ALL EXPOSED STRUCTURAL STEEL (ARMOR) SHALL BE GALVANIZED UNDER ITEM 445.

ALL EXPOSED EDGES ON ARMOR CURB SHALL RECEIVE A 1/8" BEVEL.

THE SHAPE OF THE TYPICAL ROADWAY CURB SHALL TRANSITION TO THE ARMOR CURB AS APPROVED BY THE ENGINEER.

ARMOR CURB SLOT
WITH CONCRETE FOUNDATION
SAN ANTONIO DISTRICT STANDARDS

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			211
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

10/95
REV. 07/01
REV. 12/04

STRUCTURE DESIGN
/BRIDGE/STDS/ARMORCURB.DGN

Attachment G

INSPECTION, MAINTENANCE, REPAIR, and RETROFIT PLAN

This project area is currently being inspected and maintained by a municipality (City of San Antonio) and will continue as such after project completion. The storm water discharge from the site will be captured by Vegetative Filter Strip (VFS) and one (1) Contech Stormceptor for the removal of TSS. Ultimately, the BMP discharges into the Evans Road median and conveys westward to East Elm Creek. See attached Inspection and Maintenance Plan.

Vegetative Filter Strip

The following guidelines should be used to develop the maintenance plan for the vegetative filter strips BMP (TCEQ Technical Guidance on Best Management Practices 3.5.8).

- *Pest Management.* An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

- *Seasonal Mowing and Lawn Care.* If the filter strip is made up of turf grass, it should be mowed as needed to limit vegetation height to 18 inches, using a mulching mower (or removal of clippings). If native grasses are used, the filter may require less frequent mowing, but a minimum of twice annually. Grass clippings and brush debris should not be deposited on vegetated filter strip areas. Regular mowing should also include weed control practices, however herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients. Irrigation of the site can help assure a dense and healthy vegetative cover.

- *Inspection.* Inspect filter strips at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The strip should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and 3-91 restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

- *Debris and Litter Removal.* Trash tends to accumulate in vegetated areas, particularly along highways. Any filter strip structures (i.e. level spreaders) should be kept free of obstructions to reduce floatables being flushed downstream, and for aesthetic reasons. The need for this practice is determined through periodic inspection, but should be performed no less than 4 times per year.

- *Sediment Removal.* Sediment removal is not normally required in filter strips, since the vegetation normally grows through it and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip preventing uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.

- *Grass Reseeding and Mulching.* A healthy dense grass should be maintained on the filter strip. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during filter strip establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Corrective maintenance, such as weeding or replanting should be done more frequently in the first two to three years after installation to ensure stabilization. Dense vegetation may require irrigation immediately after planting, and during particularly dry periods, particularly as the vegetation is initially established.

Stormceptor

The following guidelines should be used to develop the maintenance plan for the Stormceptors BMP (TCEQ Technical Guidance on Best Management Practices 3.5.17).

- *Monitoring.* Monitoring the Stormceptor unit requires a dipstick tube equipped with a ball valve (typically a Sludge Judge or Core Pro). A normal monitoring scenario requires removal of the manhole cover and lowering the dipstick tube through the oil port into the bottom treatment chamber. Make sure the dipstick tube goes completely to the bottom. Lift the dipstick tube out of the unit and keep it in a vertical position and read the level of sediment and oils from the gauge on the dipstick. Record pollutant levels on your "Stormceptor Monitoring / Maintenance Plan Summary". Remove all trash and debris engaged with the trash screen. If the sediment in the dipstick tube exceeds the levels indicated on Table 2 or any free oil is present, maintenance of the Stormceptor is required. Please skip to "Stormceptor Maintenance". Upon completing the recording of pollutant levels, the dipstick tube is then drained back into the inlet side of the Stormceptor. This ensures that the pollutants in the dipstick tube do not leave the unit.

Table 2 – Stormceptor® Maximum Pollutant Levels

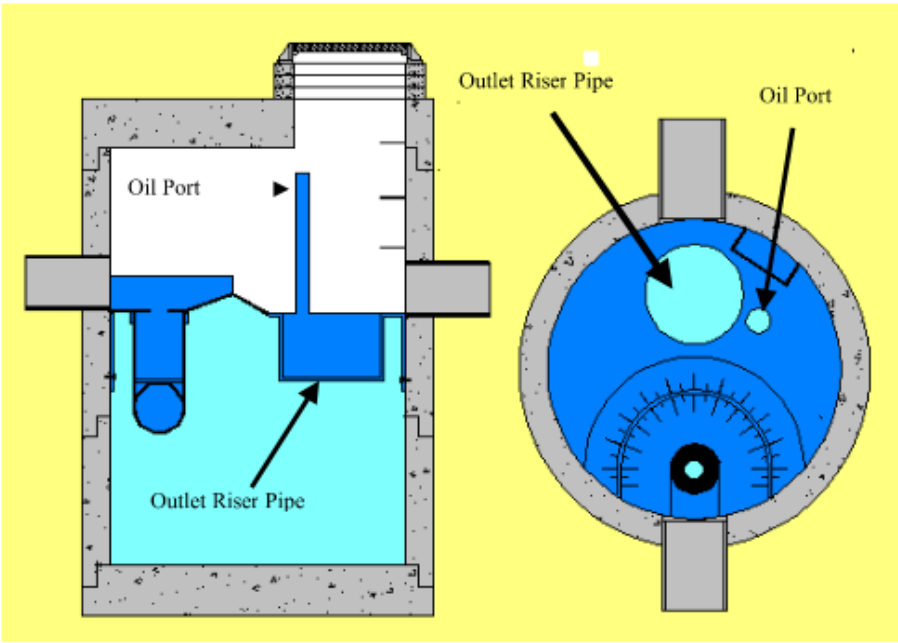
Model	Down Pipe Orifice	Sediment Depth	Sediment Capacity (ft^3)
STC 450i	4"	8"	9
STC 900	6"	8"	19
STC 1200	6"	10"	25
STC 1800	6"	15"	37
STC 2400	8"	12"	49
STC 3600	8"	17"	75
STC 4800	10"	15"	101
STC 6000	10"	18"	123
STC 7200	12"	15"	149
STC 11000	10"	17"	224*
STC 13000	10"	20"	268*
STC 16000	12"	17"	319*

* Total both structures combined

- *Maintenance.* Maintenance of the Stormceptor system is recommended at least once a year or when dictated by the pollutant levels referenced in Table 2. It is imperative that the Stormceptor be maintained regularly to ensure proper operation of the unit. Maintenance is accomplished when the owner contacts a representative of the vacuum service industry, a well-established sector of the service industry that cleans underground tanks, sewers, and catch basins. Cost to clean the Stormceptor will vary based on the size of the unit and transportation distances. If you need assistance for cleaning a Stormceptor unit, please contact your local Rinker Materials representative, or the Stormceptor Information Line at (800) 909-7763.

  Typically, the Vacuum Service representative will maintain the Stormceptor by first removing the manhole. The vacuum service will first remove the oil through the oil port. If the vacuum cannot remove the oils through the oil port (i.e. the vacuum service hose diameter is larger than the 6" oil port opening) water can be removed through the outlet pipe until such time that the oils can be removed. Typically, your vacuum service representative will recycle the oils at their facility. Sediments in the Stormceptor can be removed by inserting the vacuum service hose into the bottom treatment chamber via the outlet pipe. In most areas the sediment, once dewatered at the vacuum service facility, can be disposed of in a sanitary landfill. Once the floatables and sediments have been removed from the Stormceptor, all remaining water in the unit must be removed. The unit is then required to be filled with clean water to the top of the riser / drop pipe. This completes the maintenance process. All waste should be disposed of in manner that complies with local, state, and federal laws and regulations pertaining to their specific situation and/or facility.

  Once Maintenance has been completed, document the information on the "Stormceptor Monitoring / Maintenance Plan Summary" sheet. Attach a copy of the manifest from the applicable vacuum service.



Monitoring / Maintenance Completion - Summary

Name: Sean Strong

Company: City of San Antonio Public Works Department

Company Address: P.O. Box 839966

City, State, Zip: San Antonio, Texas

Telephone Number: (210) 207-8037

Engineer: Jeff C. Haeber (Quiddity Engineering, LLC)

Engineer Address: 912 South Capital Of Texas HWY, Suite 300

City, State, Zip: Austin, TX, 78746

Telephone Number: (512) 441-9493

Property Owner: Jessica Shirley-Saenz

*Stormceptor Model: STC4800

Monitoring / Maintenance Table

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Oil Depth (inches)												
Sediment Depth (inches)												
Completed By:												
Date												
Floatables (Optional)												

I hereby certify that the monitoring and maintenance of the Stormceptor unit was completed in accordance with the directions of the Stormceptor monitoring / maintenance plan.

Jessica M. Shirley-Saenz

Signature of Property Owner or Designee

**Note – This form must be completed for both chambers of the STC 11000, STC 13000, and STC 16000.

An amended copy of this document will be provided to the Texas Commission on Environmental Quality within thirty (30) days of any changes in the following information.

Responsible Party: City of San Antonio Public Works Department

Owner Contact: Jessica M. Shirley-Saenz

Address: P.O. Box 839966

City, State, Zip: San Antonio, Texas

Telephone Number: (210) 207-2209

Jessica M. Shirley-Saenz
Signature of Owner

04/18/2025
Date

Signature of Owner's Agent

04/25/2025
Date

Attachment H

PILOT-SCALE FIELD TESTING

TCEQ Technical Guidance Manual was used to design the permanent BMPs for this site and no pilot field testing is required.

Attachment I

MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

The added impervious cover resulting from the Evans Road improvements is primarily for pedestrian (sidewalk widening) and drainage infrastructure (concrete riprap for new inlets and drop structure). The change in impervious cover is minimal for the full-depth reconstruction of Westbound Evans Road and the milling and overlay of Eastbound Evans Road. No additional roadway lanes are proposed to be constructed.

This site is adjacent to the East Elm Creek crossing just west of Roan Park. Vegetative Filter Strip (VFS) and one (1) Contech Stormceptor will be implemented in the project area to treat and are designed to meet the TSS removal requirements. During construction, on site erosion controls will mitigate sediment transport off site. The existing vegetation within the Evans Road median will be minimally impacted during construction and will help prevent surface stream contamination.

The proposed site plan and improvements will have minimal impact on the existing site condition and surrounding property. The design, analysis, and their applicability as presented herein is based on and limited by the weather data available for this area. This development, with recommended improvements if constructed per the site development plans prepared by Quiddity Engineering, LLC., is deemed not to increase existing endangerment to life or property in the surrounding area and no adverse impacts to existing drainage patterns.

Agent Authorization Form

(TCEQ-0599)

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

I Sean D. Strong, PE,
Print Name

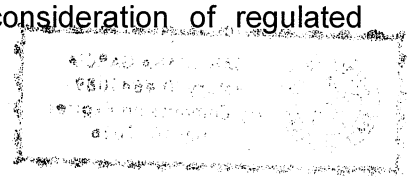
Project Manager,
Title - Owner/President/Other

of City of San Antonio,
Corporation/Partnership/Entity Name

have authorized Jeff C. Haeber, PE
Print Name of Agent/Engineer

of Quiddity Engineering, LLC
Print Name of Firm

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



I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Sean P. Strong, PE
Applicant's Signature

4/10/25
Date

THE STATE OF Texas §

County of Bexar §

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

GIVEN under my hand and seal of office on this 10th day of April, 2025.

San Juana Garcia
NOTARY PUBLIC

SAN JUANA GARCIA
Notary ID #6430891
My Commission Expires
July 10, 2026

San Juana Garcia
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: July 10, 2026

Application Fee Form

(TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Evans Road Phase I
Regulated Entity Location: Evans Road between Roan Park and Masonwood Drive
Name of Customer: City of San Antonio Public Works Department
Contact Person: Sean Strong Phone: (210) 207-8037
Customer Reference Number (if issued):CN 600130652
Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☒ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☐ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	9.61 Acres	$ 5,000.00
Sewage Collection System	L.F.	$
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 04/25/2025

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

Core Data Form

(TCEQ-10400)

TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

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

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

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

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 600130652		**RN**

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

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

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

City of San Antonio, Texas

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

11. Type of Customer:

☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☒ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees

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

13. Independently Owned and Operated?

☐ **Yes** ☒ **No**

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

☐ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:

P.O. Box 839966

City	San Antonio	**State**	TX	**ZIP**	78283	**ZIP + 4**	3966

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
(210) 207-6342		(210) 207-7196

SECTION III: Regulated Entity Information

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

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

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

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

Evans Road Phase I

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

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

25. Description to Physical Location:	Along the right-of-way of Evans Road from Masonwood Dr/Caliza Dr to East Elm Creek (about 300 LF west of Roan Park).				
26. Nearest City			**State**	**Nearest ZIP Code**	
San Antonio			TX	78258	

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

27. Latitude (N) In Decimal:	29.63889		**28. Longitude (W) In Decimal:**	98.44361	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	38	20	98	26	37

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
1610		23731	

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

Municipality (City of San Antonio)

34. Mailing Address:								
	City		**State**		**ZIP**		**ZIP + 4**	
35. E-Mail Address:								

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

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
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Jeff C. Haeber, PE	**41. Title:**	Manager – Hydrology & Hydraulics

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512 **)** 441-9493		**( )** -	JHaeber@quiddity.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:	Quiddity Engineering, LLC	**Job Title:**	Manager – Hydrology & Hydraulics
Name *(In Print):*	Jeff C. Haeber, PE	**Phone:**	**(** 512 **)** 441- **9493**
Signature:		**Date:**	04/25/2025