LAMBENT RANCH

WATER POLLUTION ABATEMENT PLAN AND SEWAGE COLLECTION SYSTEM

MARCH 2023

03/29/2023

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)
TBPE NO. 455 TBPLS NO. 10048500

March 10, 2023

Texas Commission on Environmental Quality (TCEQ)
Region 13
14250 Judson Road
San Antonio, Texas 78233

RE: Lambent Ranch
Water Pollution Abatement Plan and Sewage Collection System

To Whom It May Concern:

Please find attached one (1) original, one (1) copy, and one (1) digital copy of the Lambent Ranch Water Pollution Abatement Plan (WPAP) and Sewage Collection System (SCS). This WPAP-SCS has been prepared in accordance with the regulations of the Texas Administrative Code (30 TAC 213) and current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan applies to 48.35 acres of a 78.56-acre site as shown in the project limits. The Sewage collection system applies to 3,430 linear feet of sewer main proposed as part of this project. Please review the plan information for the items it is intended to address. If accepted, please provide written approval of the plan in order that construction mat begin at the earliest opportunity.

The appropriate review fees ($8,000 for the WPAP and $1142.00 for the SCS) and application fee are included. Thank you for your assistance with this matter, please call our office if you have questions or require additional information.

Sincerely,

Sean McFarland

Sean McFarland, P.E.
Project Manager
smcfarland@cudeengineers.com

EDWARDS AQUIFER APPLICATION
COVER PAGE

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Lambent Ranch						**2. Regulated Entity No.:**			
3. Customer Name: San Antonio 103 TX LLC						**4. Customer No.:**			
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):**			71.56
9. Application Fee:	$9,142		**10. Permanent BMP(s):**					Batch Detention Basin	
11. SCS (Linear Ft.):	2,284		**12. AST/UST (No. Tanks):**					N/A	
13. County:	Bexar		**14. Watershed:**					Leon 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.)	✔	__	__	__	__
Region (1 req.)	✔	__	__	__	__
County(ies)	__	__	__	__	__
Groundwater Conservation District(s)	✔ Edwards Aquifer Authority ✔ Trinity-Glen Rose	__Edwards Aquifer Authority	__Kinney	__EAA __Medina	__EAA __Uvalde
City(ies) Jurisdiction	__Castle Hills __Fair Oaks Ranch __Helotes __Hill Country Village __Hollywood Park ✔ San Antonio (SAWS) __Shavano Park	__Bulverde __Fair Oaks Ranch __Garden Ridge __New Braunfels __Schertz	NA	__San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

Sean McFarland, P.E.

Print Name of Customer/Authorized Agent

Sean McFarland 03/28/2023

Signature of Customer/Authorized Agent Date

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

GENERAL INFORMATION

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Sean McFarland P.E.

Date: 2/24/23

Signature of Customer/Agent:

Sean McFarland

Project Information

1. Regulated Entity Name: Lambent Ranch
2. County: Bexar
3. Stream Basin: Leon Creek
4. Groundwater Conservation District (If applicable): Edwards Aquifer Authority, Trinity-Glen
5. Edwards Aquifer Zone:

   [X] Recharge Zone
   [ ] Transition Zone

6. Plan Type:

   [X] WPAP
   [X] SCS
   [ ] Modification
   [ ] AST
   [ ] UST
   [ ] Exception Request

7. Customer (Applicant):

Contact Person: Robert Ritzenthaler
Entity: San Antonio 103 TX, LLC
Mailing Address: 835 129th Street NE
City, State: Bradenton, Florida Zip: 34212
Telephone: 210-681-2951 FAX: _____
Email Address: robert@remcapital.com

8. Agent/Representative (If any):

Contact Person: Sean McFarland P.E.
Entity: Cude Engineers
Mailing Address: 4122 Pond Hill Road Suite 101
City, State: San Antonio, Texas Zip: 78231
Telephone: 210-681-2951 FAX: _____
Email Address: smcfarland@cudeengineers.com

9. Project Location:

[X] 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. [X] 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.
From TCEQ's regional office, head north on Judson Road 3.0 miles to Loop 1604. Travel west on Loop 1604 15.5 miles and exit towards Kyle Seale Parkway/Hausman Road/ FM 1560. Continue south on Loop 1604 access road for 1.9 miles. The site is located 0.5 miles north of the Loop 1604 and Bandera Intersection.

11. [X] **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. [X] **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:

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

13. [X] **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.

[X] Survey staking will be completed by this date: When notified by TCEQ of site visit date

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:

- [X] Area of the site
- [X] Offsite areas
- [X] Impervious cover
- [X] Permanent BMP(s)
- [X] 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)
- [X] Other: Existing CPS Transmission and SAWS sewer infrastucture

Prohibited Activities

16. [X] 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. [X] 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:

- [X] For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- [X] 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. [X] 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)
- [X] San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

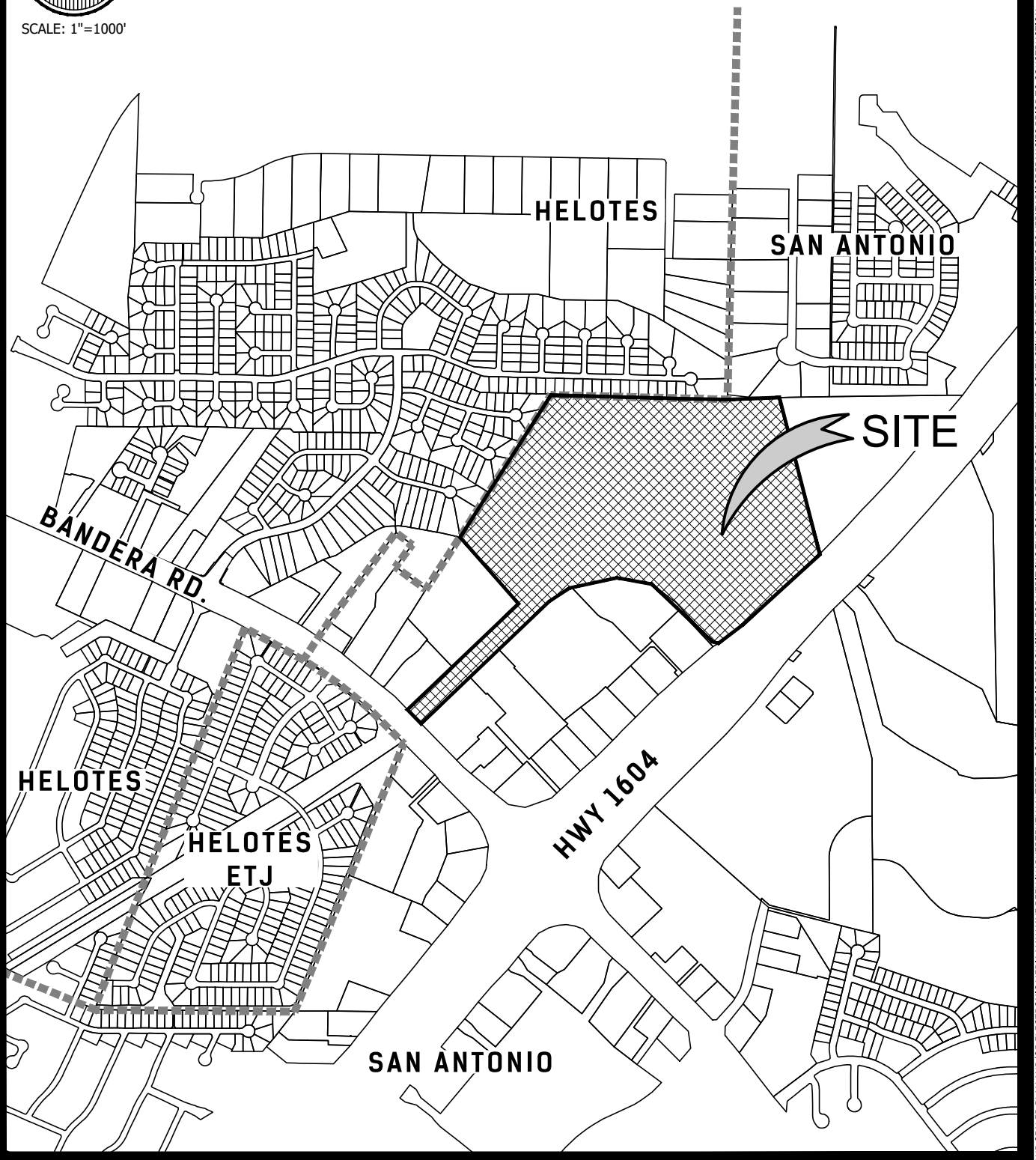
20. [X] Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies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

21. [X] 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

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

SCALE: 1"=1000'



CUDE ENGINEERS
4122 POND HILL RD. • SUITE 101
SAN ANTONIO, TEXAS 78231
TEL 210.681.2951 • FAX 210.523.7112
WWW.CUDEENGINEERS.COM
TBPE REGISTERED ENGINEERING
FIRM #455

LAMBENT RANCH

ATTACHMENT A - ROAD MAP

REF. SHEET NO.: A-1

DATE: 2023-02 **JOB NO.:** 02318.011

P:\02318\011\4-AgencyReview\3-Permits\TCEQ WPAP\1-General Information\SITE - Attch A.dwg 2023/02/23 4:24pm dfeigl

ATTACHMENT B

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HELOTES QUADRANGLE
TEXAS-BEXAR CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Edwards Aquifer Contributing Zone

Edwards Aquifer Recharge Zone

Edwards Aquifer Transition Zone

Edwards Aquifer Contributing Zone
within the Transition Zone

Produced by the United States Geological Survey
Control by USGS and NOS/NOAA
Compiled by Defense Mapping Agency from aerial photographs taken 1952. Revised from aerial photographs taken 1986
Field checked 1986. Map edited 1992
North American Datum of 1927 (NAD 27). Projection and 10 000-foot grid ticks: Texas Coordinate System, south central zone (Lambert Conformal Conic). 1000-meter Universal Transverse Mercator grid, zone 14
The difference between NAD 27 and North American Datum of 1983 (NAD 83) for 7.5 minute intersections is given in USGS Bulletin 1875. The NAD 83 is shown by dashed corner ticks
Red tint indicates areas in which only landmark buildings are shown
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1992 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

TEXAS
QUADRANGLE LOCATION

2998-312

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

HELOTES, TEX.
29098-E6-TF-024
1992
DMA 6243 II SW-SERIES V882

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program

Regulatory Zones

30 TAC Chapter 213- Edwards Aquifer
Effective June 1999

This map was produced by the Groundwater Planning and Assessment Team of the Texas Commission on Environmental Quality to detail the boundaries of the regulatory zones of the Edwards Aquifer Protection Program, as described in Texas Administrative Code Title 30, Part 1, §213.3. No other claims are made to the accuracy or completeness of the data or to its suitability for a particular use. For more information about the Edwards Aquifer Protection Program, please contact the TCEQ Regional Offices in San Antonio or Austin. Printed June 2006.

ATTACHMENT C

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT C
Project Description

The proposed project, Lambent Ranch is a mixed-use containing multi-family residential and commercial development located approximately 0.5 miles north from the Loop 1604 and Bandera Road intersection, in the city of San Antonio, Bexar County, Texas. The proposed mixed-use development consists 815 multi-family residential units and commercial spread over 71.56 acres. Water and sanitary sewer service is to be provided by SAWS (San Antonio Water System). The sewage flows from this development will ultimately flow to and be treated by the Leon Creek Water Recycling Center in southern Bexar County.

GEOLOGICAL ASSESSMENT

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Chris Wickman, P.G. Telephone: (210) 372-1315

Date: November 8, 2022 Fax: (210) 372-1318

Representing: Frost GeoSciences, Inc. #50040 (Name of Company and TBPG or TBPE registration number)

Signature of the Geologist:

Regulated Entity Name: Kamary Commons Tract

Project Information

1. Date(s) Geologic Assessment was performed: October 6, and 7, 2022
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(feet)
Crawford	D	0 to 3 ½
Bexar	D	0 to 2
Patrick	B	0 to 2 ½

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 thicknesses 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'
   Site Geologic Map Scale: 1" = 100'
   Site Soils Map Scale (if more than 1 soil type): 1" = 500'

9. Method of collecting positional data:

   ☒ Global Positioning System (GPS) technology.
   ☒ Other method(s). Please describe method of data collection: 2022 Aerial Photograph

10. ☒ The project site and 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 _____ (#) 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 Chapter 76.

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

Administrative Information

15. ☒ 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. TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

ATTACHMENT A

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Frost GeoSciences

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: Kamary Commons Tract | **PROJECT NUMBER:** FGS-E22217

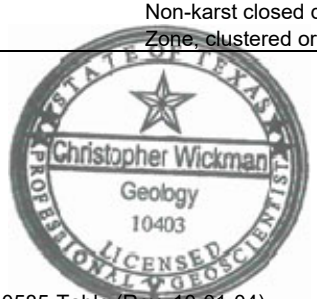
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29° 33' 44.82"	98° 39' 48.01"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-2	29° 33' 44.23"	98° 39' 46.49"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-3	29° 33' 44.09"	98° 39' 43.22"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-4	29° 33' 39.24"	98° 39' 41.86"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-5	29° 33' 32.29"	98° 39' 43.00"	MB	30	Kg	3	3	?	-	-	-	-	X	5	35	35		YES		HILLSIDE
S-6	29° 33' 33.10"	98° 39' 41.96"	MB	30	Kg	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-7	29° 33' 33.14"	98° 39' 41.99"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN
S-8	29° 33' 29.70"	98° 39' 46.43"	MB	30	Kdr	3	3	?	-	-	-	-	X	5	35	35		YES		HILLSIDE
S-9	29° 33' 29.22"	98° 39' 48.70"	F	20	Kdr/Kg	-	-	-	-	-	-	-	X	10	30	30		YES		HILLSIDE
S-10	29° 33' 34.38"	98° 39' 40.41"	MB	30	Kpcm	3	3	?	-	-	-	-	X	5	35	35		YES		FLOODPLAIN

Datum: NAD 83

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	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Floodplain, Streambed



I have read, I understood, and I have followed the Texas Commission on Environmental Quality'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.

Chris Wickman, P.G.

Date: 11/08/2022

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

Sheet 1 of 1

ATTACHMENT B

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

STRATIGRAPHIC COLUMN

EXPLANATION OF HYDROSTRATIGRAPHIC UNITS

Group or Formation	Formal and informal member		Hydrologic unit or Informal hydrostratigraphic unit
Taylor Group (Pecan Gap)		Kpg	Upper Confining Unit (UCU)
Austin Group		Ka	
Eagle Ford Group		Kef	
Buda Limestone		Kb	
Del Rio Clay		Kdr	
Georgetown Formation		Kg	I
Person Formation	Cyclic and marine, undivided	Kpcm	II
	Leached and collapsed	Kplc	III
	Regional dense member	Kprd	IV
Kainer Formation	Grainstone	Kkg	V
	Kirschberg evaporite	Kkke	VI
	Dolomitic	Kkd	VII
	Basal nodular	Kkbn	VIII
Glen Rose Limestone	Upper Glen Rose Limestone	Kgrc	Cavernous
		Kgrcb	Camp Bullis
		Kgrue	Upper evaporite
		Kgruf (Kgrf)	Fossiliferous Upper
		Kgrlf (Kgrf)	Fossiliferous Lower
		Kgrle	Lower evaporite
	Lower Glen Rose Limestone	Kgrb	Bulverde
		Kgrlb	Little Blanco
		Kgrts	Twin Sisters
		Kgrd	Doeppenschmidt
		Kgrr	Rust
		Kgrhc	Honey Creek
Pearsall Formation	Hensell Sand	Kheh	Hensell
	Cow Creek Limestone	Kcccc	Cow Creek
	Hammett Shale	Khah	Hammett

ATTACHMENT C

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

LOCATION

The project site is an approximately 72-acre tract of land located along and northwest of North Loop 1604 access road, approximately 0.35 miles north of the intersection of Loop 1604 and Bandera Road in San Antonio, Texas. An overall view of the area is shown on copies of the site plan, a street map, the U.S.G.S. Topographic Map, the EAA-Edwards Aquifer Recharge Zone and Contributing Zone Map, the FIRM Map, the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, and 2022 aerial photographs at a scale of 1"=500' and 1"=400', as well as an NRCS Web Soil Survey aerial photograph at a scale of 1"=500'. These maps are included as Figures 1 through 10 in Appendix A.

METHODOLOGY

The Geologic Assessment was performed by Chris Wickman, P.G., Senior Geologist and Ethan Levine, Staff Geologist with Frost GeoSciences, Inc. Mr. Wickman is a Licensed Professional Geoscientist in the State of Texas (License # 10403).

Frost GeoSciences, Inc. researched the geology of the area north of the intersection of Loop 1604 and Bandera Road. The research included, but was not limited to, the Geologic Atlas of Texas, San Antonio Sheet, FEMA maps, Edwards Aquifer Recharge Zone Maps, U.S.G.S. 7.5 Minute Quadrangle Maps, the Bureau of Economic Geology-Geologic Atlas of Texas, the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, the Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle, the U.S.G.S. Water-Resources Investigations Report 95-4030, and the U.S.D.A. Soil Survey of Bexar County, Texas.

After reviewing the available information, a field investigation was performed to identify any geologic or man-made Potential Recharge Features (PRFs). A transect spacing of approximately 50 feet, or less depending on vegetation thickness, was used to inspect the project area. A 2022 aerial photograph, in conjunction with a hand-held Garmin GPS 73 Global Positioning System with an Estimated Potential Error ranging from 8 to 10 feet, was used to navigate around the property and identify the locations of PRFs, as recommended in the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The locations of any PRFs noted in the field were marked with blue and white flagging. The flagging is numbered with the same potential recharge feature I.D. # that is used on the Site Geologic Map. The Site Geologic Map, indicating the limits of the project site, and the locations of PRFs and rock outcrops noted on the project site, is included in Appendix C at the end of this report. A copy of a 2022 Aerial Photograph at an approximate scale of 1"=400' indicating the limits of the project site, and the locations of PRFs and rock outcrops noted on the project site, is included on Figure 10 in Appendix A. The Geologic Assessment Form TCEQ-0585, (Rev. 2-11-15), Stratigraphic Column, and the Geologic Assessment Table have been filled with the appropriate information for this project site and are included on pages 1 through 5.

RESEARCH & OBSERVATIONS

7.5 Minute Quadrangle Map Review

According to the U.S.G.S. 7.5 Minute Quadrangle Map, Helotes, Texas Quad (1992), the elevation across the project site ranges from 930 to 960 feet above mean sea level. The project site has a total relief of approximately 30 feet. Runoff from the project site flows to the north, northeast, and east into an unnamed tributary of French Creek and French Creek. The topographic map depicted the project site as wooded vacant land with an overhead high-power electric easement crossing the central portion of the project site. The intersection of Bandera Road and Loop 1604 is located south of the project site. A copy of the U.S.G.S. 7.5 Minute Quadrangle Map indicating the location of the project site is included on Figure 3 in Appendix A.

Bexar County Watersheds Map

According to the Bexar County Watersheds Map (2003), the project site is located within the Upper Salado Creek Watershed Area. A copy of the Bexar County Watersheds Map indicating the location of the project site is included on Figure 4 in Appendix A.

Recharge/Transition Zone

According to the Official Edwards Aquifer Recharge Zone Map, Helotes, Texas Sheet (1992), and the TCEQ website: Edwards Aquifer Viewer – https://tceq.maps.arcgis.com/apps/webappviewer/index.html, the majority of the northern portion of the project site is located within the Recharge Zone of the Edwards Aquifer, while the southern portion occurs in the Transition Zone. A copy of an aerial photograph obtained from TCEQ website: Edwards Aquifer Viewer – https://tceq.maps.arcgis.com/apps/webappviewer/index.html, indicating the location of the project site is included on Figure 5 in Appendix A.

100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the Flood Insurance Map, Community Panel Numbers 48029C0210G and 48029C0220G, dated September 29, 2010, were reviewed to determine if the project site is located in areas prone to flooding. A review of the above-mentioned Panel Nos. indicates the majority of the project site is located within "Zone X". According to the Panel Legend, Zone X represents areas determined to be outside the 0.2% annual chance floodplain. However, the flood panel indicated floodplain associated with French Creek present in the eastern portion of the project site along the eastern site boundary and associated with French Creek Tributary B crossing the southern portion of the project site. These areas along French Creek and the tributary are located in Zones A, AE, and Zone X (shaded) of the 100-year flood. According to the Panel Legend, Zone A, represents areas where no base flood elevations have been determined; Zone AE represents areas determined to be within the 100-year floodplain where base flood elevations have been determined; and Zone X (shaded) are areas determined to be within the 500-year flood, areas within the 100-year flood with depths of less than 1 foot, or with drainage areas of less than one square mile, or as areas protected by levees from the 100-year flood. A copy of the above referenced FIRM panel indicating the location of the project site is included on Figure 6 in Appendix A.

Soils

According to the United States Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of Bexar County (1966) and the USDA NRCS Web Soil Survey (WSS) website: https://websoilsurvey.nrcs.usda.gov, the Site is located on the following soils.

Crawford Clay, 0 to 1 percent slopes (Ca) is typically found in uplands areas, with a few rare occurrences of this soil in valley areas. The surface layer is dark brown or dark reddish brown, noncalcareous, and 8 to 10 inches thick. Wide cracks form in this soil when it dries. The subsurface layers are also clay and noncalcareous. The subsurface soils are redder than the surface soils. During dry times, cracks from the surface layer may extend downward into the subsurface layer. Limestone commonly occurs at a depth of approximately 24 to 36 inches. However, a few areas may have a few inches of limey clay on top of the limestone. Water intake in this soil is slow and water erosion is a hazard. Plow pans are likely to form. This soil has a USDA Texture Classification of Clay. The Unified Classification is MH-CH. The AASHO Classification is A-7. This soil has an average permeability from 0.2 to 0.5 inches/hour.

Crawford and Bexar Stony Soils (Cb) are very dark grayish brown to reddish brown clays. They are stony clay in texture and are shallow to moderately deep over hard limestone. These soils are extensive in the northern part of the county. The surface layer is noncalcareous, about 8 inches thick, and very dark grayish brown or very dark brown. It has fine, subangular blocky and granular structure. When moist, this layer is very firm but breaks easily to a mass of fine clods. When dry, is very hard and contains many large cracks. Angular fragments of chert and limestone are common. These fragments may range in size from a quarter of an inch to 24 inches in diameter. The subsurface layer is dense, angular blocky clay. This layer is neutral or slightly acidic, but it may be limy in the lower parts. It is about 26 inches thick and either overlies a thin layer of yellowish red to pale brown, limy clay or, if the limy layer is lacking, rests on hard, fractured limestone. Crawford soils are naturally well drained. Internal drainage and permeability vary according to moisture content. Water moves rapidly when the soil is dry and cracked, but very slowly when the soil is wet. This soil has a USDA Texture Classification of Cherty Clay Loam to Loam. The Unified Classification is CG or CL. The AASHO Classification is A-2, A-4, or A-6. This soil has an average permeability from 1.0 to 1.5 inches/hour.

Lewisville silty clay, 1 to 3 percent slopes (LvB) consists of moderately deep, dark colored, nearly level alluvial soils. These soils occur mainly on terraces bordering the San Antonio and Medina Rivers and their main tributaries. The surface layer is dark grayish brown and is about 20” thick. It has fine subangular blocky or blocky structure and is firm and crumbly when moist. This layer contains a few fine concretions of lime carbonate. The subsurface layer is limey brown clay and is about 17” thick. It has fine, subangular blocky or blocky structure and is very firm but crumbly when moist. Lewisville soil has slow or medium surface drainage and medium internal drainage. Permeability is slow to moderate. The capacity to hold water is good. Natural fertility is high. The hazard of water erosion is serious on the more sloping parts but is very slight on the nearly level areas. This soil has a USDA Texture Classification of silty clay loam. The Unified Classification is CL. The AASHO Classification is A-6. This soil has an average permeability from 1.0 to 2.0 inches/hour.

Patrick soils, 1 to 3 percent slopes (PaB) consist of shallow, dark colored nearly level and gently sloping soils. These soils occur as terraces along streams that drain the limestone prairies of the county. Typically, the surface layer is clay loam, gravelly clay loam, silty clay, or light clay and is about 12” thick. The surface layer ranges from

dark grayish brown to dark brown in color. The subsurface layer, which is about 5" thick, is brown clay loam, loam, or light clay. This layer also has a granular structure. Permeability is moderate. In the more sloping parts, these soils are susceptible to water erosion. This soil has a USDA Texture Classification of Gravel bed containing loamy soil material. The Unified Classification is GM or GC. The AASHO Classification is A-2. This soil has an average permeability from 2.0 to 5.0 inches/hour.

A copy of the aerial photo (approximate scale: 1"=500') obtained from the Web Soil Survey (WSS) website: https://websoilsurvey.nrcs.usda.gov has been included on Figure 7 in Appendix A.

Narrative Description of the Site Geology

Based on a visual inspection of the ground surface, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to be low. The locations of the PRFs are identified on the 2022 aerial photograph on Figure 10 in Appendix A, and on the Site Geologic Map provided in Appendix C. Color photos of the project site and some of the PRFs are included in Appendix B.

The project site is covered by dense to very dense stand of vegetative cover with a few open grassy areas. A high-power electric easement was observed crossing the central portion of the project site. The eastern and western portions of the project site are covered in dense vegetative cover consisting of ashe juniper, live oak, and mesquite with a scattering of ornamentals and other trees. The central portion of the project site is covered on a dense stand of vegetative cover consisting of white brush, condalia, acacia and other thorny shrubs and bushes. The variations in the vegetative cover on the property are visible in the 2022 aerial photograph on Figures 9 and 10 in Appendix A. A copy of the site layout indicating the boundary of the project site and the elevations is included on the Site Geologic Map in Appendix C of this report.

PRF #S-1, #S-2, #S-3, #S-4, #S-5, #S-6, #S-7, #S-8 and #S-10 are manhole covers associated with a sanitary sewer easement observed along the northern and eastern property lines. Frost GeoSciences rates the relative infiltration of these features as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). These features score a 35 on the sensitivity scale, column 10 in the Geologic Assessment Table on page 5 of this report. Frost GeoSciences, Inc. does not consider the identified manhole covers to be sensitive features.

According to the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, a fault is indicated crossing the southeastern corner of the project site. This fault is designated PRF #S-9. However, no obvious visual indications of this fault were observed at the project site during the site reconnaissance. This area of the fault was and. The area in which the fault crosses the project site was covered in a thick soil layer and has been historically affected by previously placed fill material and gravel. The fault scores a 35 on the sensitivity scale, column 10 in the Geologic Assessment Table on page 5 of this report. Frost GeoSciences, Inc. does not consider the identified fault to be a sensitive feature.

According to the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366 and the Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle the project site is located on the Cyclic and Marine Undivided Member of the Person Formation (Kpcm), the Georgetown Formation (Kg), and the Del Rio Clay (Kdr).

A copy of the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366 is included on Figure 8 in Appendix A. A copy of the Stratigraphic Column highlighting the outcropping formations is included on Page 4 of this report.

Cyclic and Marine Undivided Member of the Edwards Person limestone (Kpcm) consists of pelletal limestones, mudstones, and packstones, as well as milliolid grainstone and occurrences of bedded and large nodules of chert. It is an aquifer bearing geologic layer ranging from 80-90 feet in thickness. This unit is identified by thin grades cycles of massive to thin beds, and typically features crossbeds and caprinids.

Georgetown Formation (kg) consists of reddish-brown and gray to light tan shaley mudstones and wackestones. It is a confining geologic layer ranging from 20 to 30 feet in thickness. This unit is identified by black dendrites, iron nodules, and iron staining and typically features the fossils *Plesioturrilites brazoensis* and *Waconella wacoensis*.

Del Rio Clay (Kdr) consists of fossiliferous blue green to yellowish-brown clays and densely fossiliferous packstones. The primary fossils of interest are *Ilymatogyra arietina*. This unit is a confining geologic layer with little to no porosity and ranges from 40 to 50 feet in thickness. It holds water and may also be identified by the presence of iron nodules.

According to the site plan provided by Cude Engineers, the surveyed elevations on the project site range from 931 to 960 feet. According to this survey, the total relief on the project site is approximately 29 feet. A copy of the site plan indicating the boundary of the project site and the elevations is included on the Site Plan on Figure 1 in Appendix A and the Site Geologic Map in Appendix C of this report.

BEST MANAGEMENT PRACTICES

Based on a visual inspection of the ground surface, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to range from low to moderate. The potential always exists to encounter solution cavities within the subsurface during excavating activities. Frost GeoSciences, Inc. is of the opinion that it is very important for construction personnel to be informed of the potential to encounter cavities in the subsurface that lack a surface expression. Construction personnel should also be informed of the proper protocol to follow in the event a karst feature is encountered during the development of the project site.

DISCLAIMER

This report has been prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04) by a Licensed Texas Professional Geoscientist. All areas of the project site were carefully inspected for features that could contribute to the recharge of the Edwards Aquifer; however, this survey cannot preclude the presence of subsurface karst features that lack surface expression. This report is not intended to be a definitive investigation of all possible geologic or karst features at this site. All conclusions, opinions, and recommendations for Best Management Practices (BMP's) in this report are based on information obtained while researching the project and on the site conditions at the time of our field investigation.

This report has been prepared for the exclusive use of Cude Engineers. This report is based on available known records, a visual inspection of the project site, and the work generally accepted for a Geologic Assessment for Regulated Activities / Developments on the Edwards Aquifer Recharge / Transition Zone, relating to 30 TAC §213.5(b)(3), effective June 1, 1999.

REFERENCES

1. USGS - 7.5 Minute Topographic Quadrangle of Helotes, Texas, 1992

2. E.A.A. Edwards Aquifer Recharge Zone and Contributing Zone Map, Helotes, Texas (2014).

3. Official Edwards Aquifer Recharge Zone Map, Helotes, Texas, 1992

4. The Texas Commission on Environmental Quality (TCEQ) website: Edwards Aquifer Viewer – https://tceq.maps.arcgis.com/apps/webappviewer/index.html.

5. 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, Science Investigations Map 3366, United States Geological Survey.

6. 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, United States Geological Survey.

7. Collins, Edward, W., 2000, Geologic Map of the New Braunfels 30 X 60 Minute Quadrangle, Bureau of Economic Geology, The University of Texas at Austin, Texas.

8. Stein, W.G. and Ozuna, G.B., 1995, Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Recharge Zone, Bexar County, Texas, U.S. Geological Survey Water Resources Investigations 95-4030.

9. Barnes, V.L., 1982, Geologic Atlas of Texas San Antonio Sheet, Bureau of Economic Geology and University of Texas at Austin, Geologic Atlas of Texas.

10. Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, Community Panel Number 48029C0210G and 48029C0220G, dated September 29, 2010

11. United States Department of Agriculture Soil Conservation Service Soil Survey of Bexar County 1966.

12. USDA NRCS Web Soil Survey (WSS) website: https://websoilsurvey.nrcs.usda.gov (2014)

13. TCEQ-0585-Instructions (Rev. 10-1-04), “Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone”.

14. San Antonio Water Systems, Bexar County Watersheds Map, 2004.

ATTACHMENT D

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

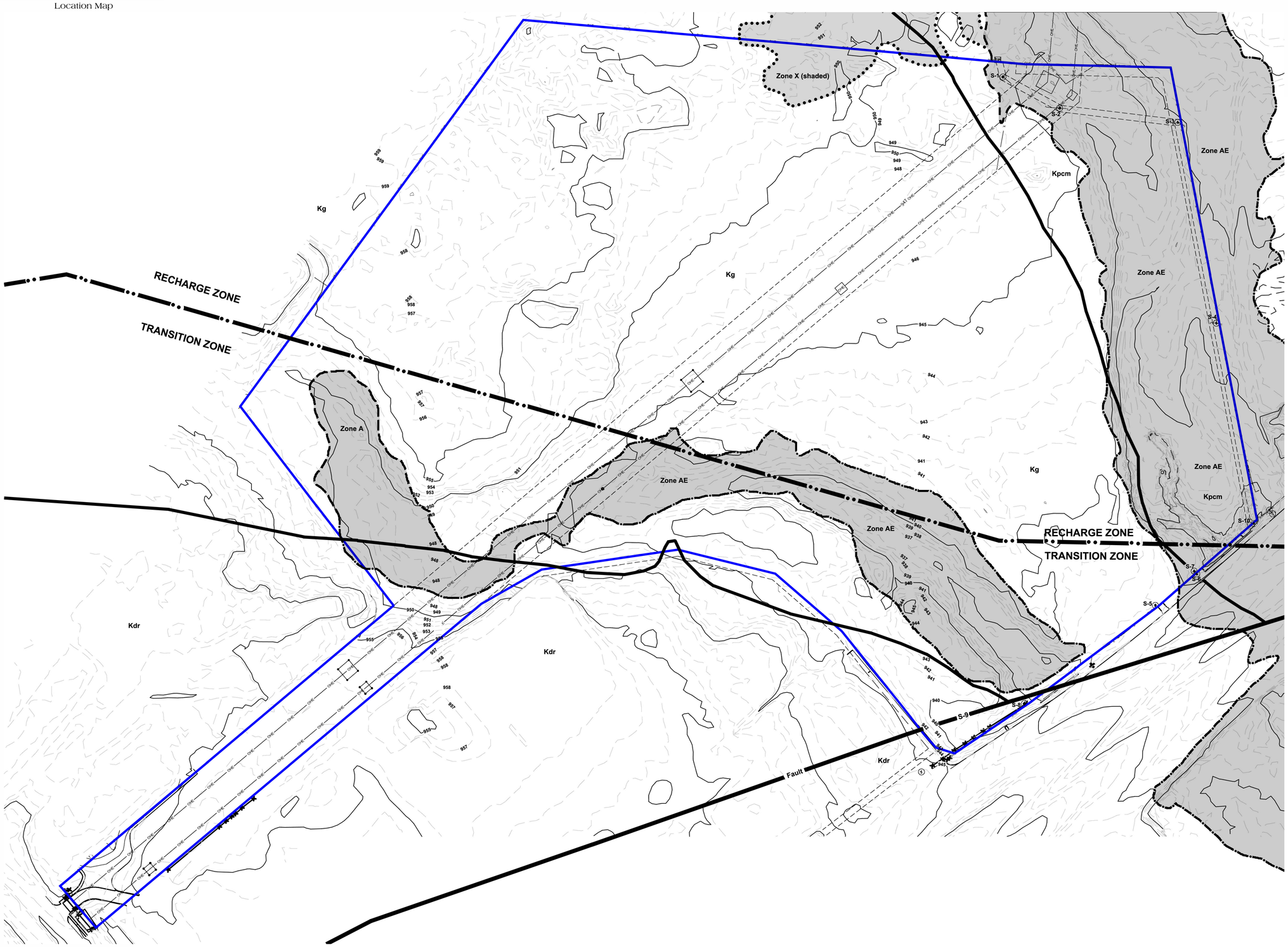
PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Kamary Commons Tract
San Antonio, Texas

Soils Map
Bexar County Soil Survey
NRCS website: websoilsurvey.nrcs.usda.gov

PROJECT NO.: FGS-E22217

DATE: November 8, 2022

Location Map



Frost GeoSciences

Geotechnical ▪ Construction Materials
Geologic ▪ Environmental

13406 Western Oak ▪ Helotes, Texas 78023
Phone: (210) 372-1315 ▪ Fax: (210) 372-1318

Site Geologic Map

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
for the

Kammary Commons
San Antonio, Texas

Frost GeoSciences, Inc. Control # FGS-E22217

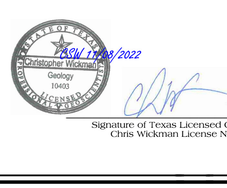
Legend

Kdr - Del Rio Clay
Kg - Georgtown Formation
Kpcm - Cyclic & Marine member Edwards Person limestone

S# - Potential Recharge Feature (PRF)
- Formation Contact
- Fault
- Floodplain Zone A
- Floodplain Zone AE
- Floodplain Zone X (shaded)
- Recharge Zone/Transition Boundary

Floodplain Information Obtained From FIRM: Flood Insurance Rate Map
Bexar County, Texas: Panel #s 48029C0210G & 48029C0220G, Revised 9/29/2010

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report 95-4030 (1995)
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)
U.S. Geological Survey Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas (2016)



CSW 1/18/2022

Signature of Texas Licensed Geoscientist
Chris Wickman License No. 10403

Graphic Scale

100 0 50 100 200

(In Feet)

1 inch = 100 feet
Representative Fraction 1:1200

Contour Interval - 1 feet

WATER POLLUTION ABATMENT PLAN APPLICATION FORM (TCEQ-0584)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Sean McFarland P.E.

Date: 2/24/23

Signature of Customer/Agent:

Sean McFarland

Regulated Entity Name: Lambent Ranch

Regulated Entity Information

1. The type of project is:

   - [ ] Residential: Number of Lots: _____
   - [X] Residential: Number of Living Unit Equivalents: 815
   - [X] Commercial
   - [ ] Industrial
   - [X] Other: Road

2. Total site acreage (size of property): 71.56

3. Estimated projected population: 2,038

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	457,600	÷ 43,560 =	10.50
Parking	322,250	÷ 43,560 =	7.40
Other paved surfaces	272,995	÷ 43,560 =	6.27
Total Impervious Cover	1,052,845	÷ 43,560 =	1,052,845

Total Impervious Cover 24.17 **÷ Total Acreage** 48.35 **X 100 =** 50 **% Impervious Cover**

5. [X] **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. [X] 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.): _____ feet.

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

10. Length of pavement area: _____ feet.

    Width of pavement area: _____ feet.
    L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.
    Pavement area _____ acres ÷ R.O.W. area _____ acres x 100 = _____% 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:

100 % Domestic	75,000 Gallons/day
_____ % Industrial	_____ Gallons/day
_____ % Commingled	_____ Gallons/day

TOTAL gallons/day 75,000 (250 EDU * 300 gpd/edu = 75,000 gpd)

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.

[X] The sewage collection system will convey the wastewater to the Leon Creek Water Recycling Center Treatment Plant. The treatment facility is:

[X] Existing.
[ ] Proposed.

16. [X] 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. [X] The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 100 '.

18. 100-year floodplain boundaries:

[X] 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 DFIRM (Digital Flood Insurance Rate Map for Bexar County, Texas and incorporated areas) Map Number (48029C0210G and 48029C0220G, dated September 29, 2010)

19. [X] 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.

[X] 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:

[X] 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. [X] The drainage patterns and approximate slopes anticipated after major grading activities.

23. [X] Areas of soil disturbance and areas which will not be disturbed.

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

25. [X] Locations where soil stabilization practices are expected to occur.

26. [X] Surface waters (including wetlands).

    [ ] N/A

27. [X] 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. [X] Legal boundaries of the site are shown.

Administrative Information

29. [X] 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. [X] 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

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT A
Factors Affecting Water Quality

Landscaping, vehicular traffic, and various construction activities may affect the quality of storm water originating on the proposed site during and after the development process. These factors may cause small amounts of oil, grease, suspended solids, fertilizers, and pesticides to enter into the stormwater runoff. However, BMPs, both temporary and permanent, have been designed on the basis of the Technical Guidance manual to treat the required volume of storm water runoff.

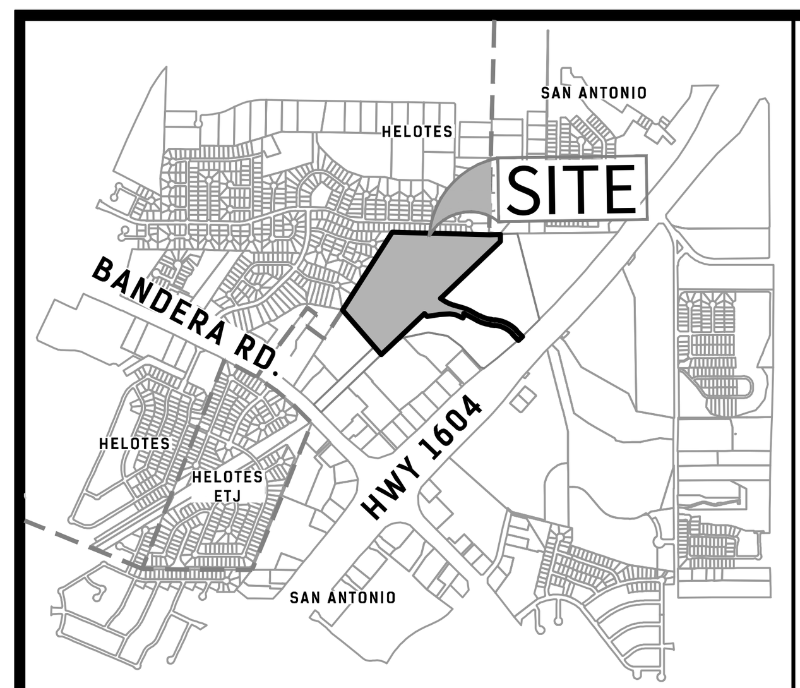
ATTACHMENT B

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT B
Volume and Character of Stormwater

Storm water runoff generated from rooftops, streets, sidewalks, and landscape areas will be of a residential nature and may contain small amounts of oil, grease, suspended solids, fertilizers, and pesticides. Existing BMPs, both temporary and permanent, have been designed on the basis of the Technical Guidance manual to treat the required volume and character of storm water runoff to remove at least 80% of the increased TSS generated by the development.

The runoff coefficient post development is varies from 0.47 for open space areas to 0.96 for commercial areas in accordance with City of San Antonio Unified Development Code. Stormwater from the site flows towards two distinct drainage lows within the site. The first of these two drainage lows is French Creek Tributary B that runs through the site and in an open space area within the limits of the site. The other drainage low is an French Creek that runs along the sites east boundary and across Loop 1604. Flows from the westerly most water quality pond and sheet flows from the multi-family lots on the west end of the site will drain towards French Creek Tributary B while flows from the 2 most easterly water quality ponds and sheet flows from the multi-family lots located in the easterly half of the site will flow to French Creek. Please see the drainage area map for the quantity of these flows located in the temporary stormwater section of this report under attachment "G".



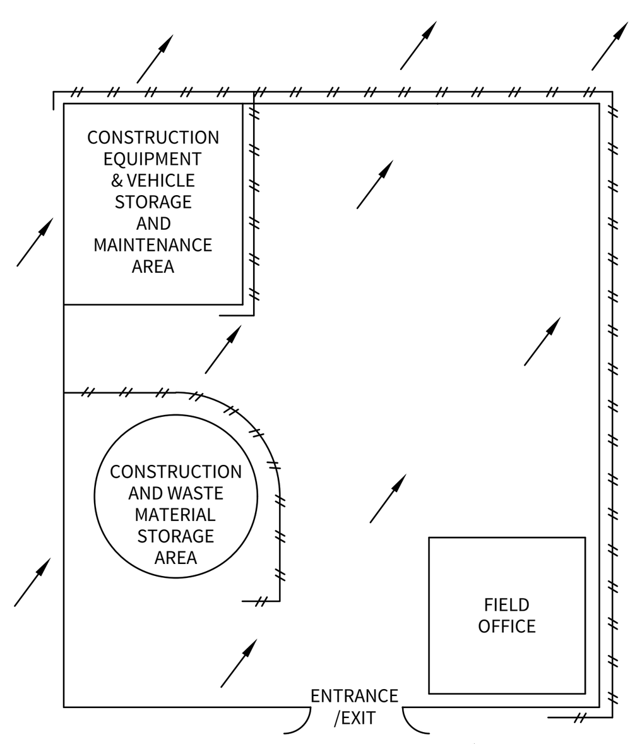
LOCATION MAP
N.T.S.

OWNER/DEVELOPER:
SAN ANTONIO 103 TX, LLC
30 N. GOULD STREET, SUITE R
SHERIDAN, WY 82801
TEL: (941) 225-8481

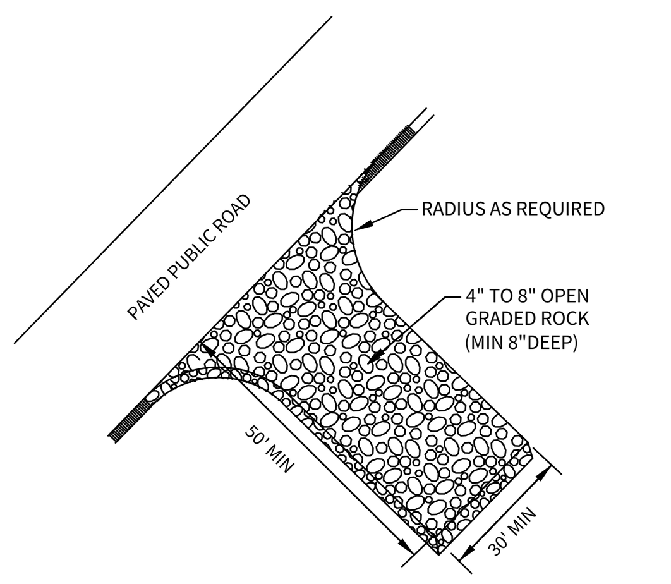
CIVIL ENGINEER:
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112

LEGEND

- PROPERTY LINE
- EXISTING CONTOURS — 930 —
- PROPOSED CONTOURS — 930 —
- BMP ITEM NUMBER 1
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
- SILT FENCE
- FLOW ARROW EX. GROUND
- FLOW ARROW PROP. GROUND
- STAGING AREA
- CONCRETE WASHOUT PIT
- LIMITS OF CONSTRUCTION



TYP. CONSTRUCTION STAGING AREA 1
N.T.S.



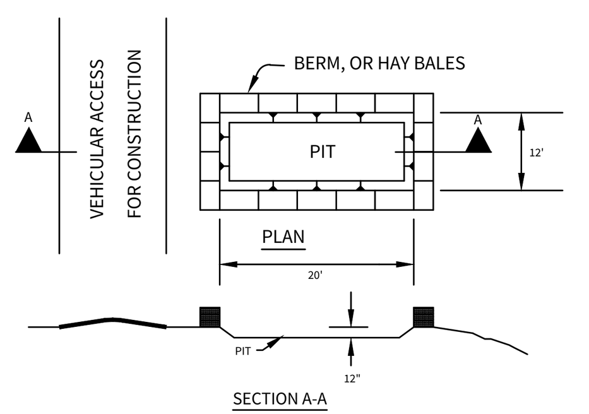
STABILIZED CONSTRUCTION EXIT NOTES:

1. WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ON PUBLIC ROADWAY.
2. THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS MUST BE REMOVED IMMEDIATELY.

TEMPORARY CONSTRUCTION ENTRANCE/EXIT 2
N.T.S.

NOTE:

1. ALL SILT FENCES AND/OR ROCK BERMS AND TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE PLACED AT THE MOST DOWN-GRADIENT POINT OF CONSTRUCTION AS SHOWN ON THIS SITE PLAN. CONTRACTOR SHALL TAKE INTO CONSIDERATION ANY PROPOSED CONSTRUCTION THAT MAY TAKE PLACE AT THESE LOCATIONS. ANY RELOCATION OF SILT FENCE, ROCK BERMS AND/OR TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE AT THE CONTRACTOR'S EXPENSE.
2. CONTRACTOR TO PROVIDE SILT FENCE ALONG BACK OF CURB POST-CONSTRUCTION OF STREET RIGHT-OF-WAY.
3. AREA OF SOIL DISTURBANCES INCLUDE STREET RIGHT-OF-WAYS, UTILITY EASEMENTS & LOTS.
4. THE CITY INSPECTOR HAS THE AUTHORITY TO HAVE THE CONTRACTOR MODIFY THE EROSION CONTROLS AT THE DEVELOPER'S EXPENSE. THE DEVELOPER SHALL BE NOTIFIED OF THESE MODIFICATIONS PRIOR TO COMMENCEMENT OF MODIFICATIONS.
5. INSTALL SILT FENCE "J" HOOKS AS NECESSARY AT AN INTERVAL NO GREATER THAN 50' TO COMPLETE INSTALLATION.
6. ALL SWPPP PERMITS AND TEMPORARY CONTROLS TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. THE SWPPP PLAN AND BMP'S SHOWN ARE INTENDED TO BE PLACED BY THE CONTRACTOR PRIOR TO THE RESPECTIVE WORK TO BE PERFORMED. THE CONTRACTOR WILL BE REQUIRED TO PERFORM ROUTINE INSPECTIONS, MAINTAIN/ADJUST ALL BMP'S, AND LIKEWISE PROVIDE ADDITIONAL BMP'S IF ANY PROVE TO BE INEFFECTIVE AS REQUIRED BY TPDES CONSTRUCTION GENERAL PERMIT TXR150000.



GENERAL NOTES:

- DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY USE.
- IF HAY BALES ARE USED, THEY SHALL BE PLACED IN ACCORDANCE WITH DETAILS SHOWN ON EXHIBIT FOR HAY BALES.
- WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
- WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORMWATER RUNOFF.
- WASHOUT PIT SHALL BE LINED WITH A 10-MIL THICK POLYETHLENE SHEETING FREE OF HOLES, TEARS AND OTHER DEFECTS.

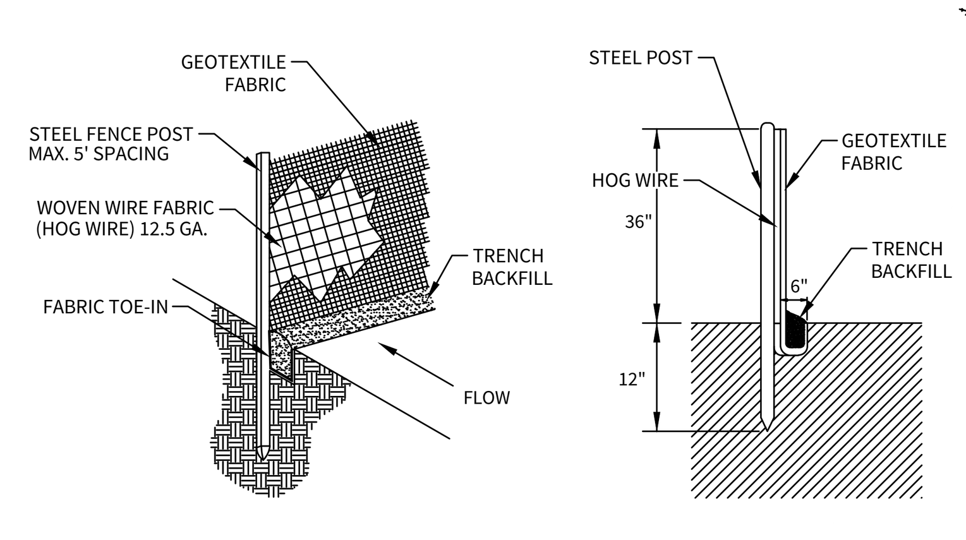
CONCRETE TRUCK WASHOUT PIT 3
N.T.S.

CAUTION!!!

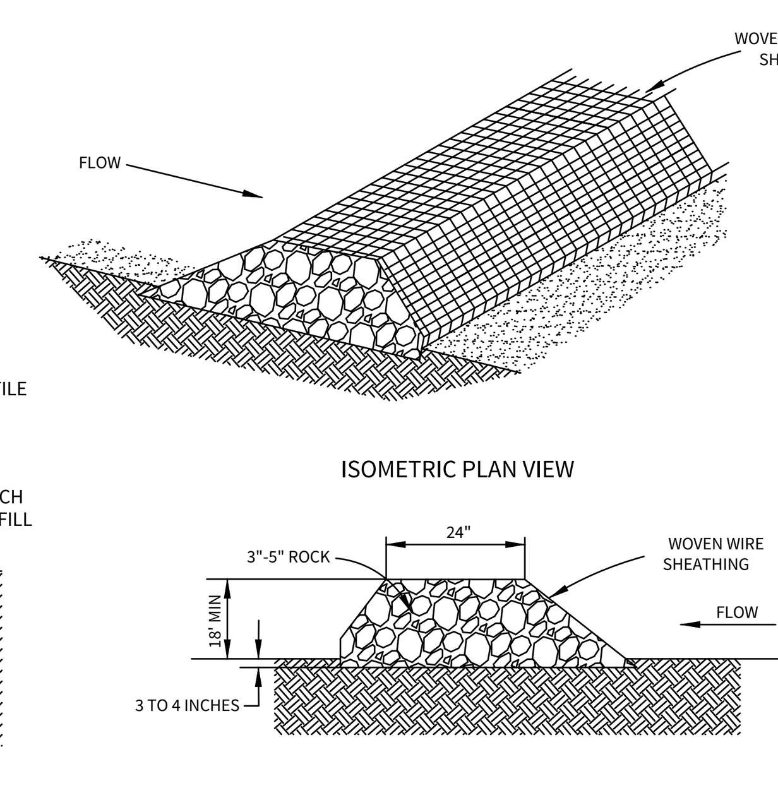
THE CONTRACTOR SHALL BE AWARE THAT UNDERGROUND WATER, SEWER, ELECTRIC AND GAS LINES EXIST ALONG LOOP 1604. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE THESE UTILITIES LOCATED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THIS AREA. ANY DAMAGE DONE TO THESE EXISTING FACILITIES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR.

TRENCH EXCAVATION SAFETY PROTECTION

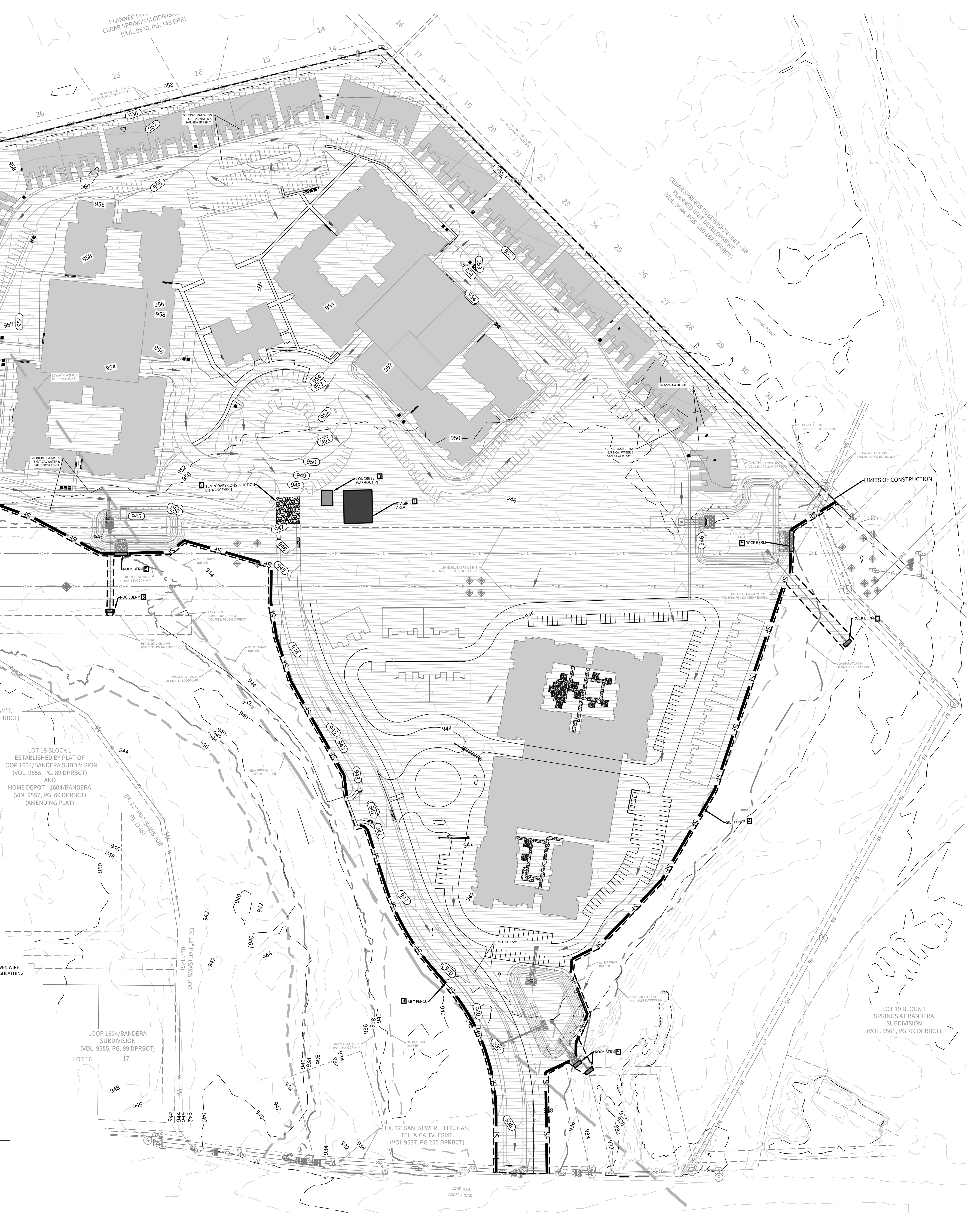
Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures for the project described in the contract documents. The Contractor's implementation of these systems, programs and/or procedures shall provide for adequate trench excavation safety protection that comply with as a minimum, OSHA standards for trench excavations. specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.



STANDARD SILT FENCE 4
N.T.S.



ROCK BERM 5
N.T.S.



CUDEENGINEERS.COM
CUDE ENGINEERS
EST. 1980
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II
STORM WATER POLLUTION PREVENTION PLAN

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
1.
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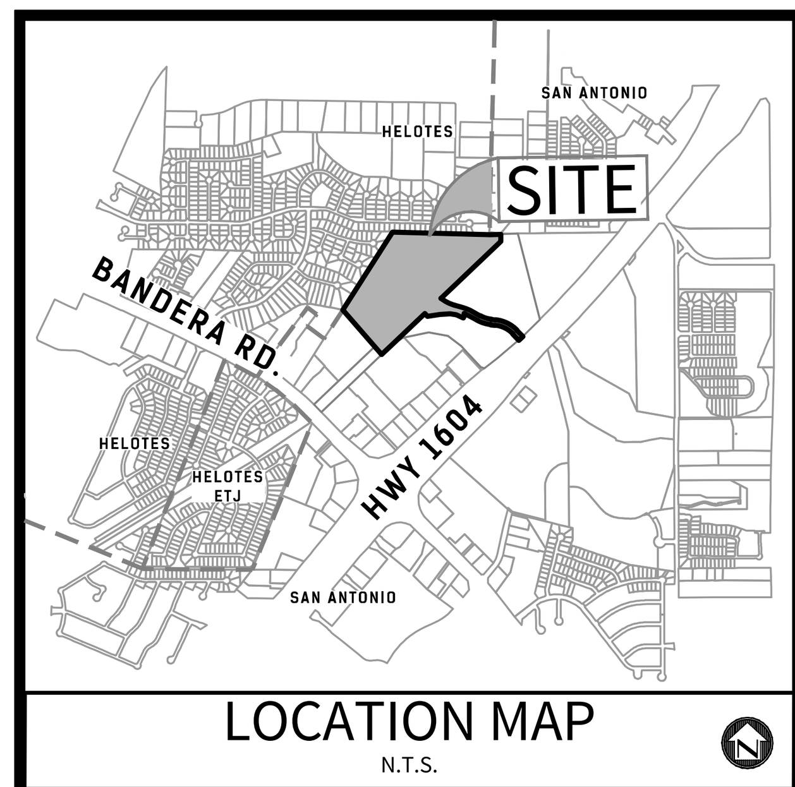
03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C1.00



LEGEND

= SITE BOUNDARY
= DRAINAGE BOUNDARY
= Tc LINE
= ACCUMULATION POINT

OWNER/DEVELOPER:
SAN ANTONIO 103 TX, LLC
30 N. GOULD STREET, SUITE R
SHERIDAN, WY 82801
TEL: (941) 225-8481

CIVIL ENGINEER:
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
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SAN ANTONIO, TX 78231
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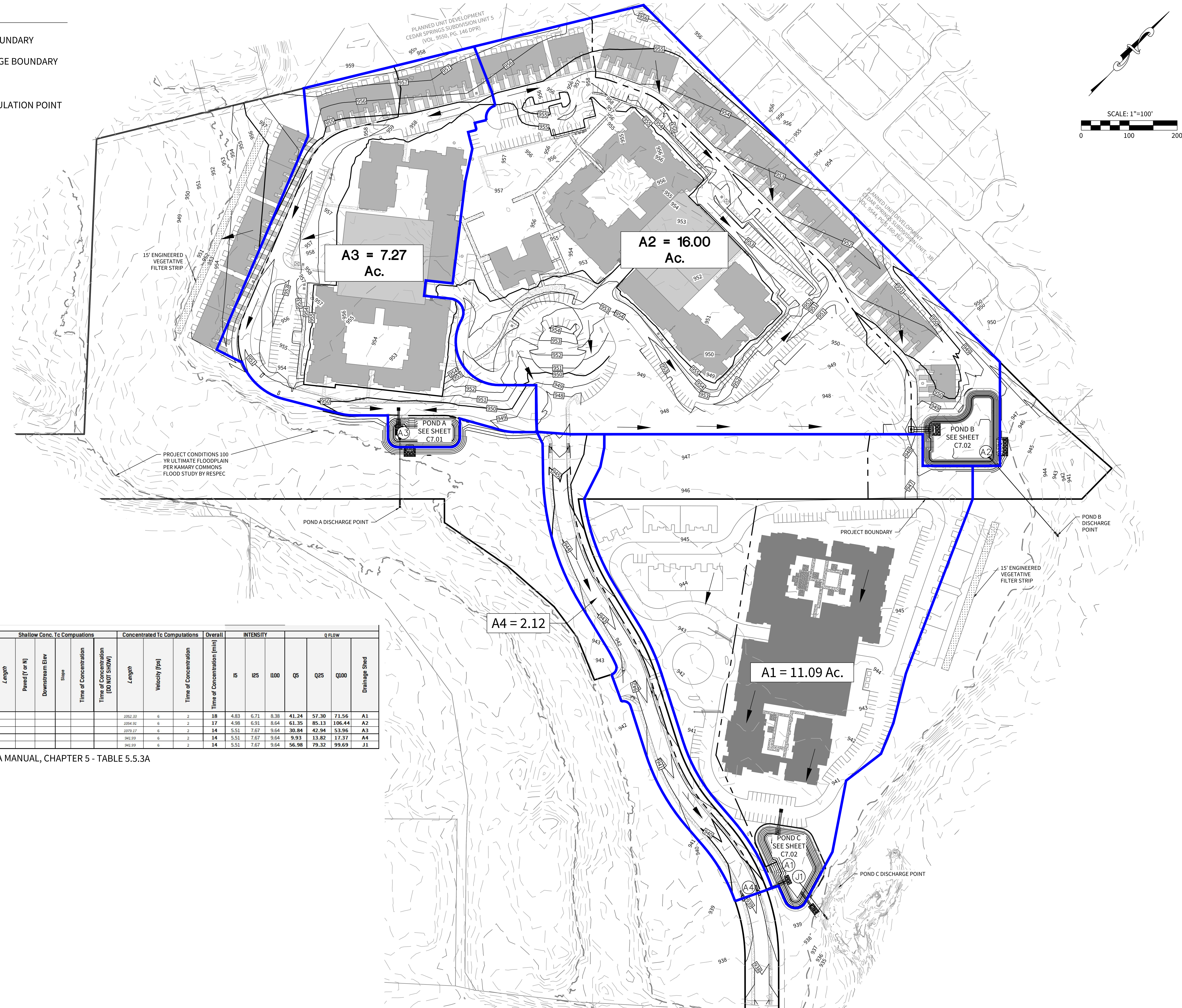

Calculation Summary for Time of Concentrations & Ultimate Flow

HYDROLOGY				Sheet Flow Tc Compuations							Shallow Conc. Tc Compuations						Concentrated Tc Computations			Overall	INTENSITY			Q FLOW			
Drainage Shed	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	Length ‹ 300'	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	Time of Concentration (DO NOT SHOW)	Length	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	Time of Concentration (DO NOT SHOW)	Length	Velocity (fps)	Time of Concentration	Time of Concentration (min)	I5	I25	I100	Q5	Q25	Q100	Drainage Shed
A1	11.09	= A1	0.77	134.46	N	948.13	946.57	1.16%	16.00	16.40							1052.33	6	2	18	4.83	6.71	8.38	41.24	57.30	71.56	A1
A2	16.00	= A2	0.77	112.56	N	955.11	954.00	0.99%	15.00	15.63							1054.91	6	2	17	4.98	6.91	8.64	61.35	85.13	106.44	A2
A3	7.27	= A3	0.77	108.82	N	958.43	955.55	2.65%	12.00	12.44							1079.17	6	2	14	5.51	7.67	9.64	30.84	42.94	53.96	A3
A4	2.12	= A4	0.85	110.68	N	958.43	955.55	2.60%	12.00	12.53							941.99	6	2	14	5.51	7.67	9.64	9.93	13.82	17.37	A4
J1	13.21	= A1 + A4	0.78	110.68	N	958.43	955.55	2.60%	12.00	12.53							941.99	6	2	14	5.51	7.67	9.64	56.98	79.32	99.69	J1

* C-VALUES OBTAINED FROM CoSA UDC STORM WATER DESIGN CRITERIA MANUAL, CHAPTER 5 - TABLE 5.5.3A

CUDEENGINEERS.COM
EST. 1980 CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II

WPAP PLAN/OVERALL DRAINAGE PLAN

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
1.
2.
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03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
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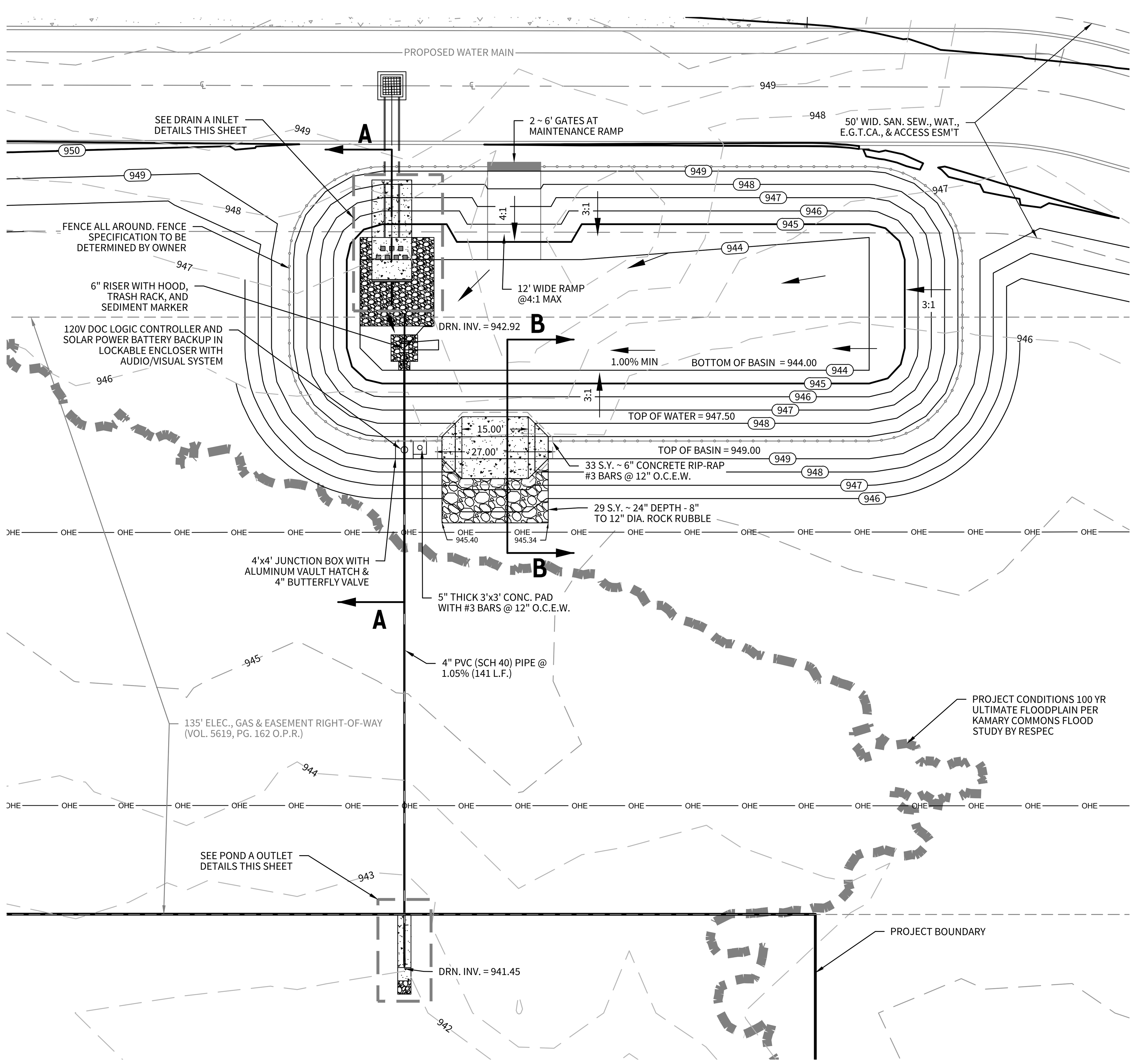
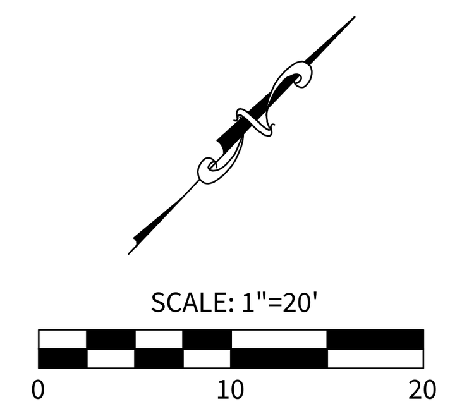
TBPELS No. 10048500

PLAT NO.
23-11800027

C7.00





BASIN DESIGN DATA

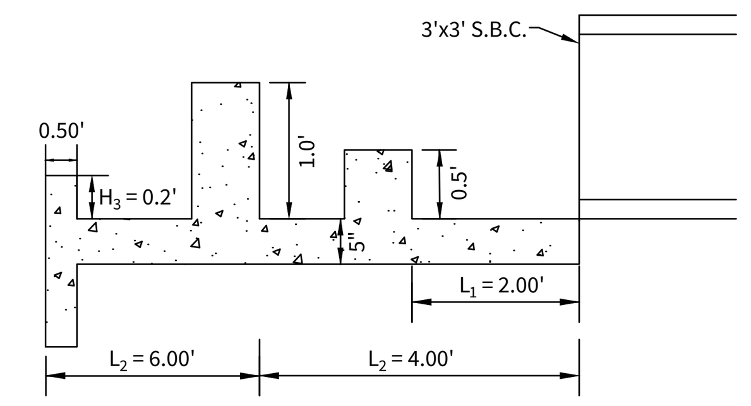
BASIN WATERSHED AREA	=	7.27 AC
RUN OFF DEPTH	=	1.32 INCH
REQUIRED CAPTURE VOLUME	=	14,526 CF
BASIN STORM WATER DEPTH	=	3.5 FT
BASIN CAPTURE VOLUME	=	17,921 CF

OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	42.94 cfs
C	=	3.087
L	=	15 ft
h	=	$(\frac{Q25}{CL})^{2/3}$
h	=	0.96 FT

LEGEND

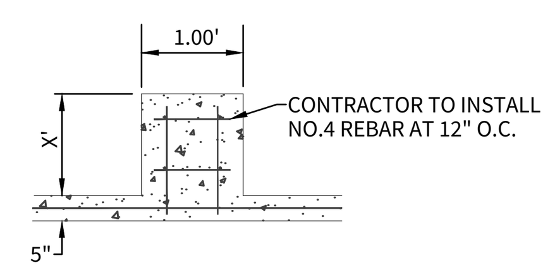
- CONC. RIP RAP
- 12" ROCK RUBBLE
- 710 PROPOSED CONTOUR
- 710 EXISTING CONTOUR
- 3:1 PROPOSED SLOPE
- DRAINAGE FLOW LINE
- CLAY LINER
- FENCE



BAFFLE BLOCK DETAIL

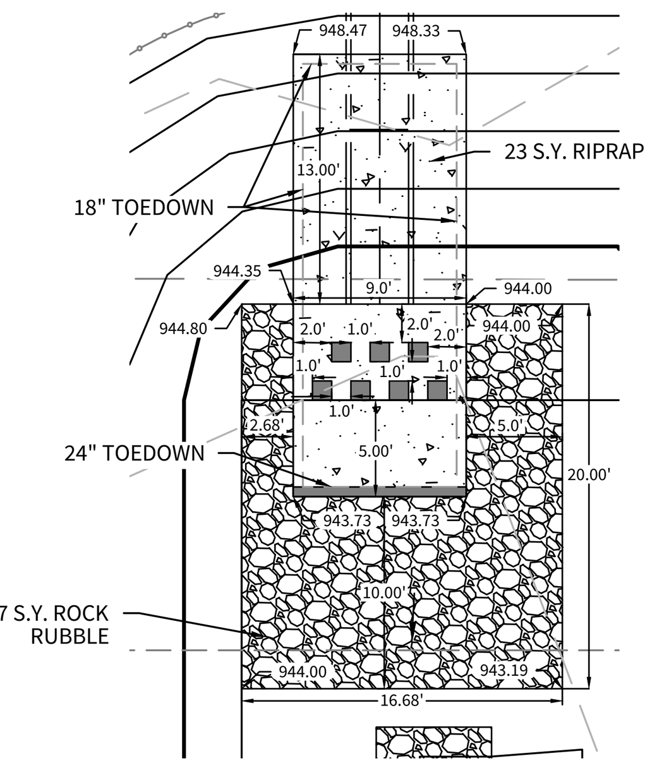
(N.T.S.)

TAILWATER DEPTH = 1.37'
Fr = 1.00
Y_C = 0.862 FT
Y_2 = 2.203 FT
BASIN OUTLET VELOCITY = 5.049 FT/S



BAFFLE BLOCK REINFORCEMENT DETAIL

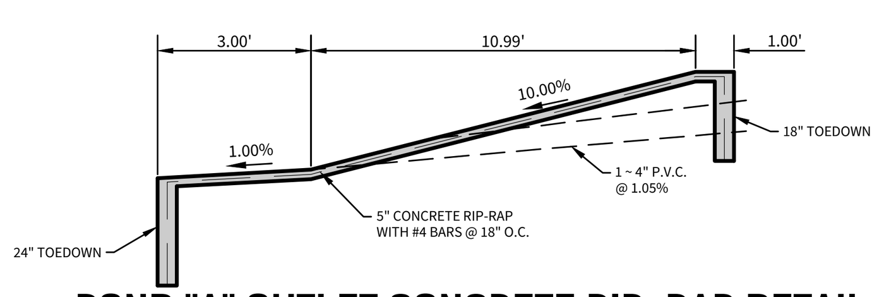
(N.T.S.)



DRAIN A INLET DETAILS

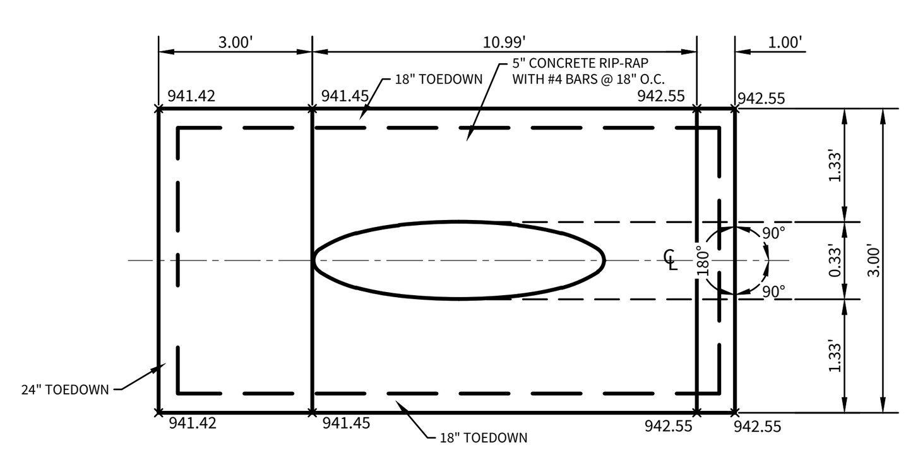
SCALE: 1"=10'

0 10 20



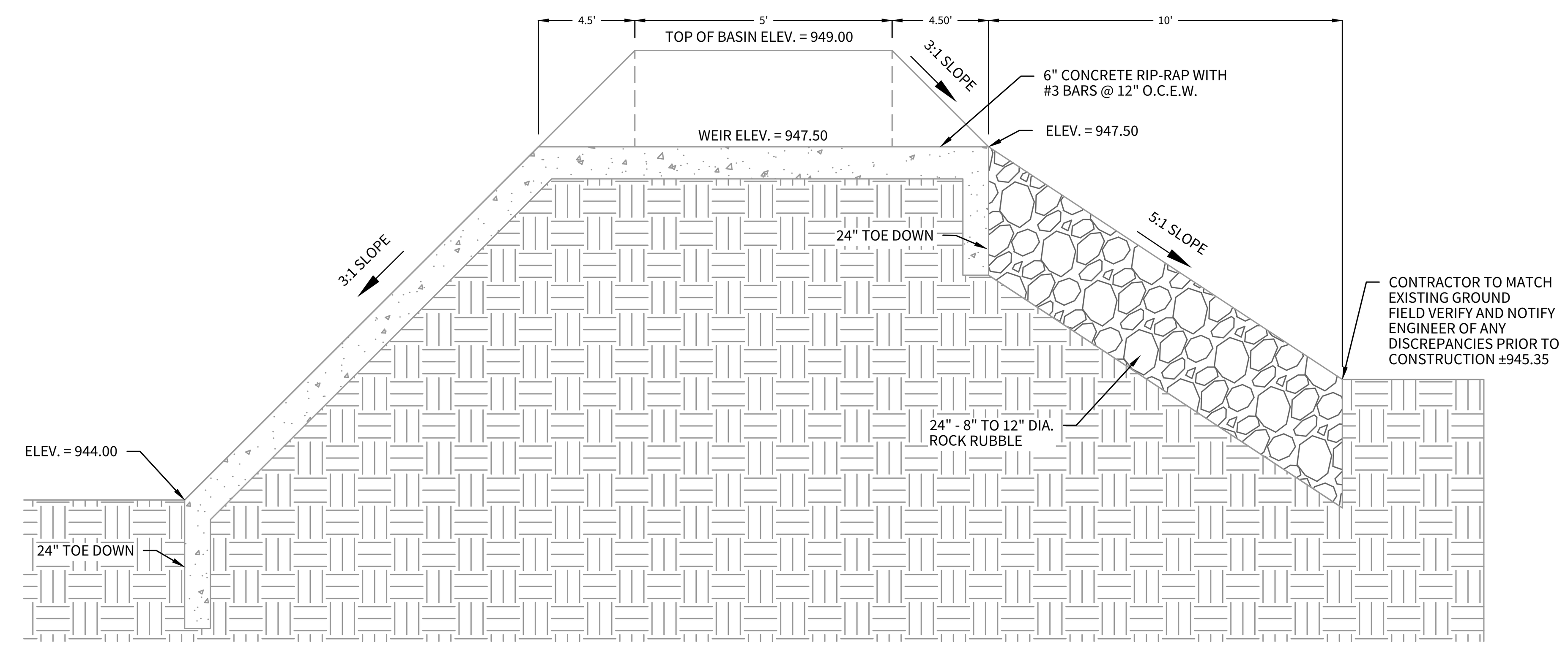
POND "A" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



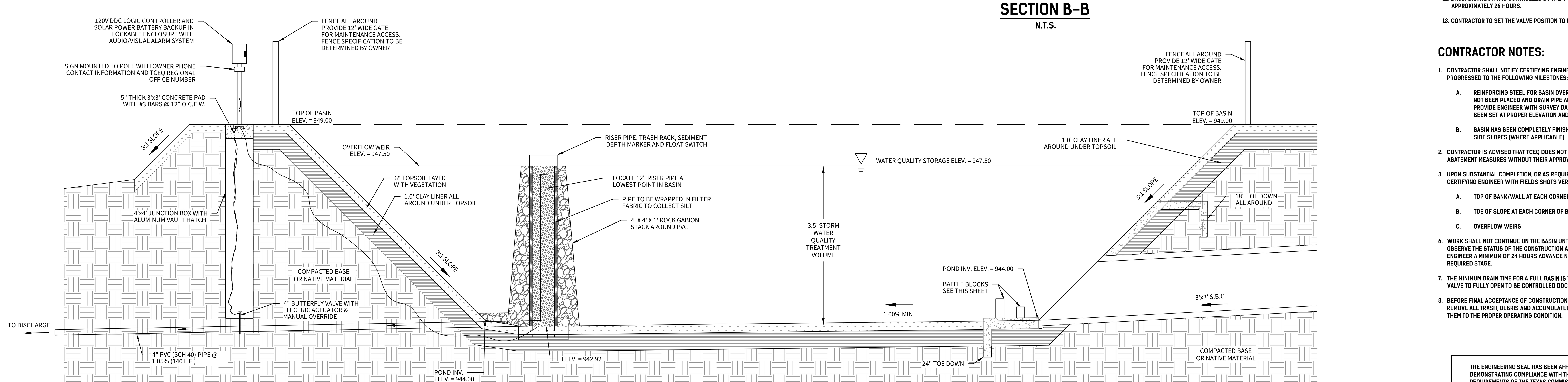
POND "A" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



SECTION B-B

N.T.S.



SECTION A-A

N.T.S.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

1. TSS REMOVAL REQUIRED = 80%
2. TSS REMOVAL PROVIDED BY THIS POND = 2856 LBS
3. WATER QUALITY DRAWDOWN TIME:
   A. 4" CAPACITY AT 1.05% SLOPED OUTFALL = 0.20 CFS
   B. DRAWDOWN TIME = 17,921 CF / 0.20 CFS = 25.5 HOURS

SEQUENCE OF OPERATION:

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO STRT DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 4" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 26 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 4" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTIVATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

NOTES:

1. THE BATCH DETENTION POND FACILITY SHALL ALSO BE USED AS A TEMPORARY SEDIMENT TRAP FOR THE PURPOSES OF THE TEXAS POLLUTION DISCHARGE ELIMINATION SYSTEM CONSTRUCTION PERMIT FOR THIS SITE.
2. CONTRACTOR TO HYDROMULCH ENTIRE DISTURBED LIMITS OF EARTHEN PORTION OF POND. 85% OF POND SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE POND.
3. THE CONTRACTOR SHALL NOTIFY A UTILITY LOCATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF ANY ON-SITE DRAINAGE FACILITIES TO PROTECT ANY UNIDENTIFIED EXISTING UNDERGROUND UTILITY FACILITY FROM DAMAGE OR HARM. THE CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR ANY DAMAGES TO UTILITIES AS A RESULT OF NOT LOCATING UNDERGROUND UTILITY RESOURCES.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE CITY OF SAN ANTONIO, TEXAS.
5. ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK ROCK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.
7. THE OWNER SHALL SPECIFY THE USE OF EITHER A CHAINLINK FENCE, WROUGHT IRON FENCE, OR A WOODEN PRIVACY FENCE. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO INSTALLATION AND CONSTRUCTION.
8. A 6' HIGH FENCE (WOOD, CHAINLINK, OR OTHER DECORATIVE FENCE AS SPECIFIED BY THE OWNER OR BY RESTRICTIVE COVENANT) SHALL BE INSTALLED AT THE TOP OF THE WATER QUALITY BASIN ALONG ALL SIDES. AT THE LOCATION OF THE 12' WIDE (MIN) MAINTENANCE RAMP, A 12 FOOT WIDE GATE (EITHER BEING A SINGLE GATE OR TWO 6' WIDE GATES) WITH LOCK SHALL BE PROVIDED TO ALLOW ACCESS TO THE WATER QUALITY POND.
9. ALL REBAR SPLICES AND LAPS SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS OTHER SPECIFIED.
10. CONTRACTOR SHALL ALERT ENGINEER FOR FIELD OBSERVATION A MIN. OF 72 HOURS PRIOR TO EACH OF THE FOLLOWING EVENTS; DRAIN PIPE INSTALLATION COMPLETION, AND ANY CONCRETE POURS. THE CONTRACTOR SHALL ALSO PROVIDE A MATERIAL SUBMITTAL TO THE ENGINEER FOR REVIEW ON THE FOLLOWING MATERIAL; PERMEABLE GEOTEXTILE FABRIC, CLAY LINER.
11. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
12. BASIN DRAWDOWN IS CONTROLLED BY THE 4" PVC PIPE. BASIN DRAWN DOWN WILL OCCUR IN APPROXIMATELY 26 HOURS.
13. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

CONTRACTOR NOTES:

1. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:
   A. REINFORCING STEEL FOR BASIN OVERFLOW WALL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE. CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.
   B. BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE)
2. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR APPROVAL.
3. UPON SUBSTANTIAL COMPLETION, OR AS REQUIRED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELDS SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:
   A. TOP OF BANK/WALL AT EACH CORNER OF BASIN.
   B. TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
   C. OVERFLOW WEIRS
6. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF THE CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.
7. THE MINIMUM DRAIN TIME FOR A FULL BASIN IS 72 HOURS. CONTRACTOR TO SET BUTTERFLY VALVE TO FULLY OPEN TO BE CONTROLLED DDC CONTROLLER.
8. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS AND ACCUMULATED SILT FORM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

CUDEENGINEERS.COM
CUDE ENGINEERS EST. 1980
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH

WATER POLLUTION ABATEMENT PLAN BATCH DETENTION POND "A"

DATE	03/28/2023
PROJECT NO.	02318.011
DRAWN BY	DAF/MAT
CHECKED BY	CJC/SPM

REVISIONS

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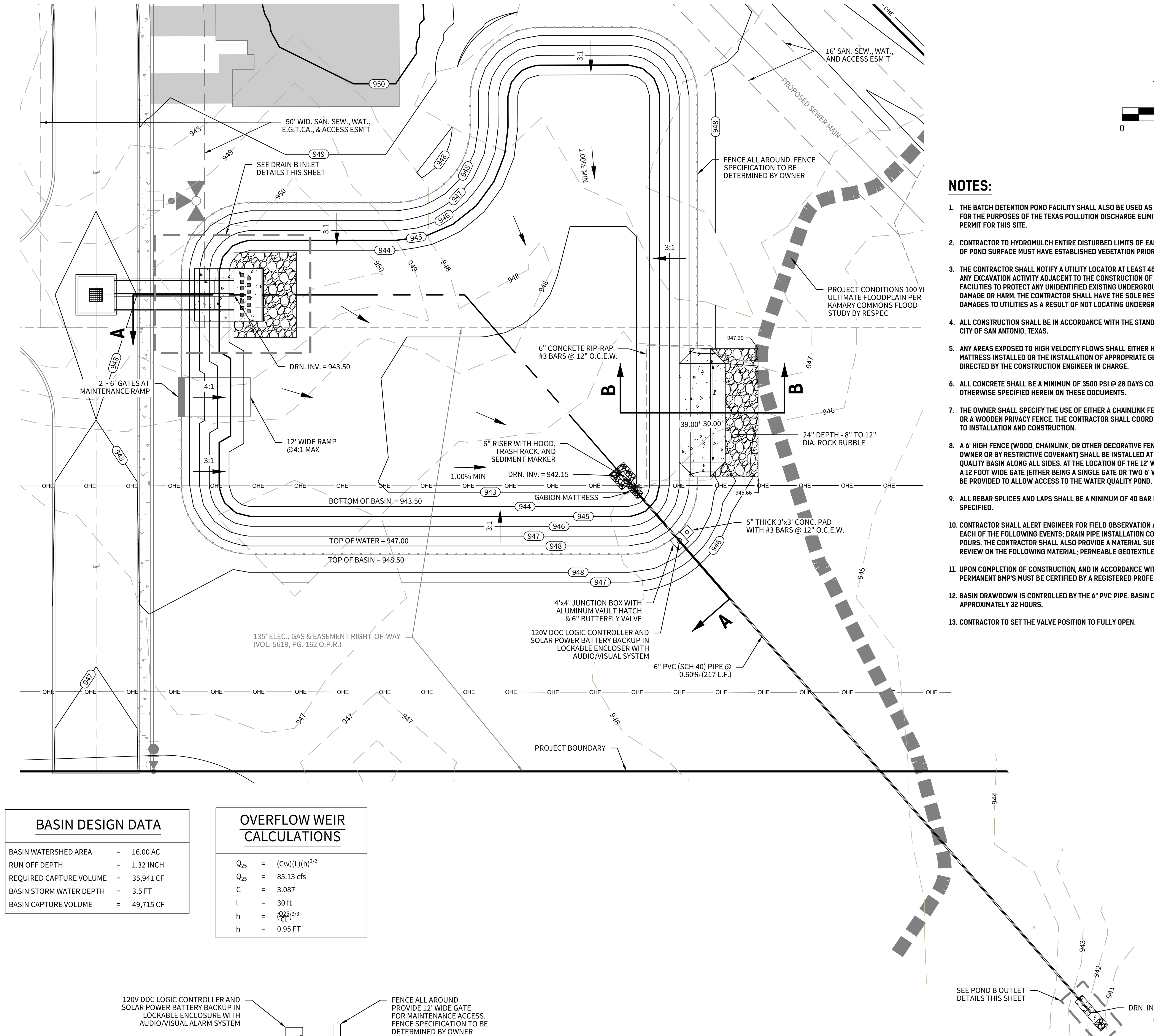
03/29/2023

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C7.01



BASIN DESIGN DATA		
BASIN WATERSHED AREA	=	16.00 AC
RUN OFF DEPTH	=	1.32 INCH
REQUIRED CAPTURE VOLUME	=	35,941 CF
BASIN STORM WATER DEPTH	=	3.5 FT
BASIN CAPTURE VOLUME	=	49,715 CF

OVERFLOW WEIR CALCULATIONS		
Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	85.13 cfs
C	=	3.087
L	=	30 ft
h	=	$(\frac{Q25}{CL})^{2/3}$
h	=	0.95 FT

NOTES:

1. THE BATCH DETENTION POND FACILITY SHALL ALSO BE USED AS A TEMPORARY SEDIMENT TRAP FOR THE PURPOSES OF THE TEXAS POLLUTION DISCHARGE ELIMINATION SYSTEM CONSTRUCTION PERMIT FOR THIS SITE.
2. CONTRACTOR TO HYDROMULCH ENTIRE DISTURBED LIMITS OF EARTHEN PORTION OF POND. 85% OF POND SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE POND.
3. THE CONTRACTOR SHALL NOTIFY A UTILITY LOCATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF ANY ON-SITE DRAINAGE FACILITIES TO PROTECT ANY UNIDENTIFIED EXISTING UNDERGROUND UTILITY FACILITY FROM DAMAGE OR HARM. THE CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR ANY DAMAGES TO UTILITIES AS A RESULT OF NOT LOCATING UNDERGROUND UTILITY RESOURCES.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE CITY OF SAN ANTONIO, TEXAS.
5. ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK ROCK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.
7. THE OWNER SHALL SPECIFY THE USE OF EITHER A CHAINLINK FENCE, WROUGHT IRON FENCE, OR A WOODEN PRIVACY FENCE. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO INSTALLATION AND CONSTRUCTION.
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9. ALL REBAR SPLICES AND LAPS SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS OTHER SPECIFIED.
10. CONTRACTOR SHALL ALERT ENGINEER FOR FIELD OBSERVATION A MIN. OF 72 HOURS PRIOR TO EACH OF THE FOLLOWING EVENTS; DRAIN PIPE INSTALLATION COMPLETION, AND ANY CONCRETE POURS. THE CONTRACTOR SHALL ALSO PROVIDE A MATERIAL SUBMITTAL TO THE ENGINEER FOR REVIEW ON THE FOLLOWING MATERIAL; PERMEABLE GEOTEXTILE FABRIC, CLAY LINER.
11. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
12. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWN DOWN WILL OCCUR IN APPROXIMATELY 32 HOURS.
13. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

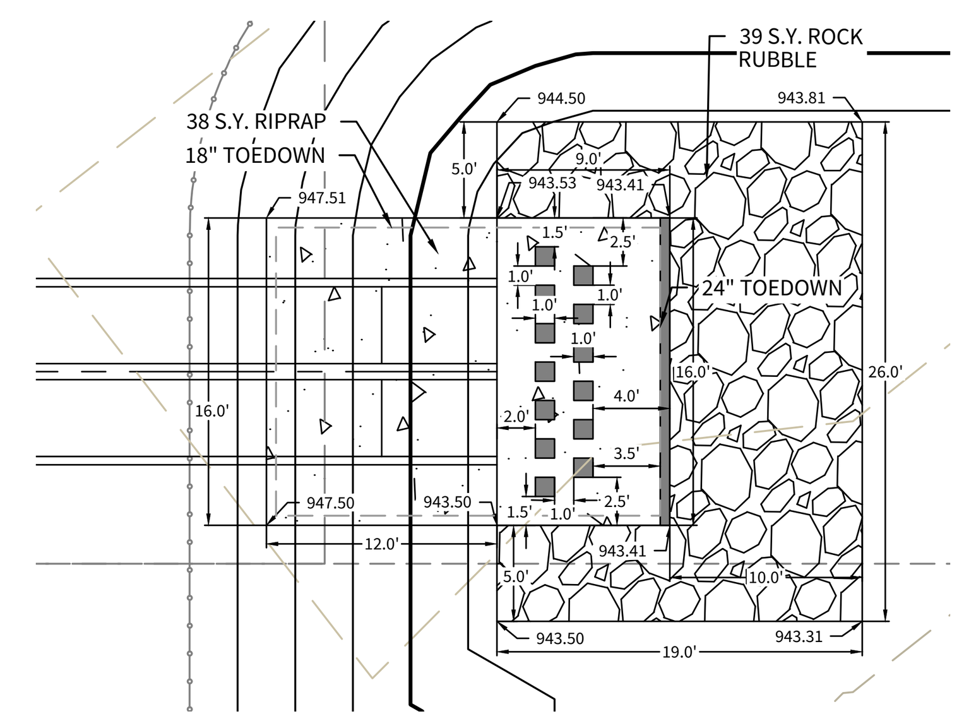
1. TSS REMOVAL REQUIRED = 80%
2. TSS REMOVAL PROVIDED BY THIS POND = 7,262 LBS
3. WATER QUALITY DRAWDOWN TIME:
   A. 6" CAPACITY AT 0.60% SLOPED OUTFALL = 0.44 CFS
   B. DRAWDOWN TIME = 49,715 CF / 0.44 CFS = 31.70 HOURS

SEQUENCE OF OPERATION:

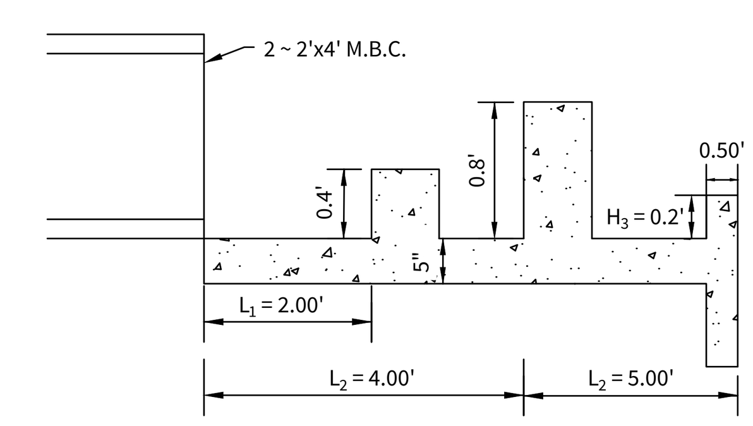
1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO STRT DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 32 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTIVATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

CONTRACTOR NOTES:

1. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:
   A. REINFORCING STEEL FOR BASIN OVERFLOW WALL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE. CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.
   B. BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE)
2. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR APPROVAL.
3. UPON SUBSTANTIAL COMPLETION, OR AS REQUIRED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELDS SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:
   A. TOP OF BANK/WALL AT EACH CORNER OF BASIN.
   B. TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
   C. OVERFLOW WEIRS
6. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF THE CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.
7. THE MINIMUM DRAIN TIME FOR A FULL BASIN IS 72 HOURS. CONTRACTOR TO SET BUTTERFLY VALVE TO FULLY OPEN TO BE CONTROLLED DDC CONTROLLER.
8. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS AND ACCUMULATED SILT FORM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.



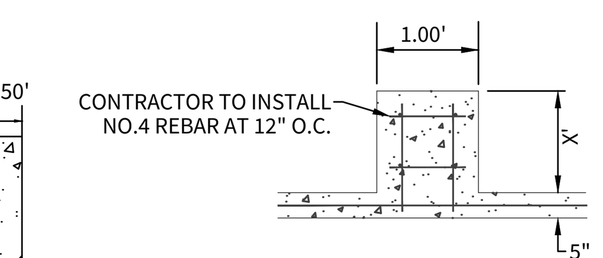
DRAIN B INLET DETAILS



BAFFLE BLOCK DETAIL

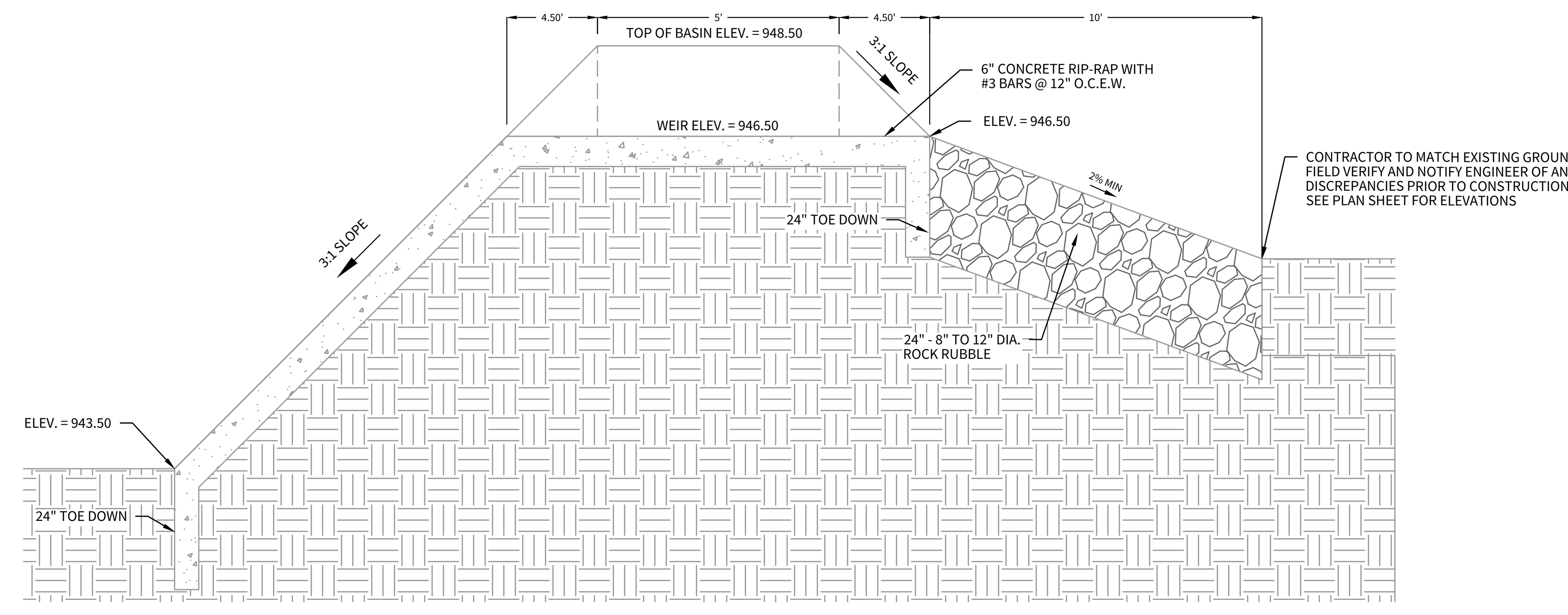
(N.T.S.)

TAILWATER DEPTH = 1.49'
Fr = 1.00
Y_C = 0.94 FT
Y_2 = 1.669 FT
BASIN OUTLET VELOCITY = 5.349 FT/S



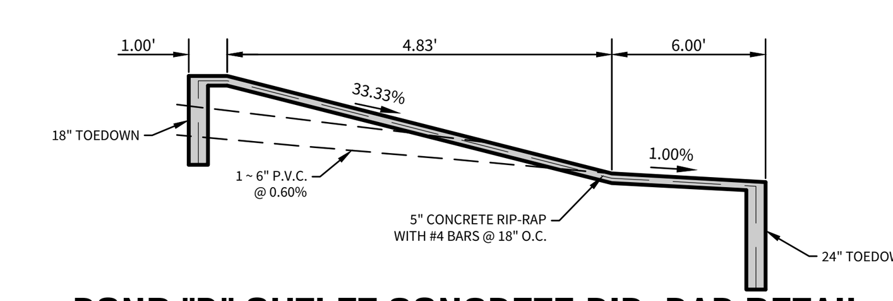
BAFFLE BLOCK REINFORCEMENT DETAIL

(N.T.S.)



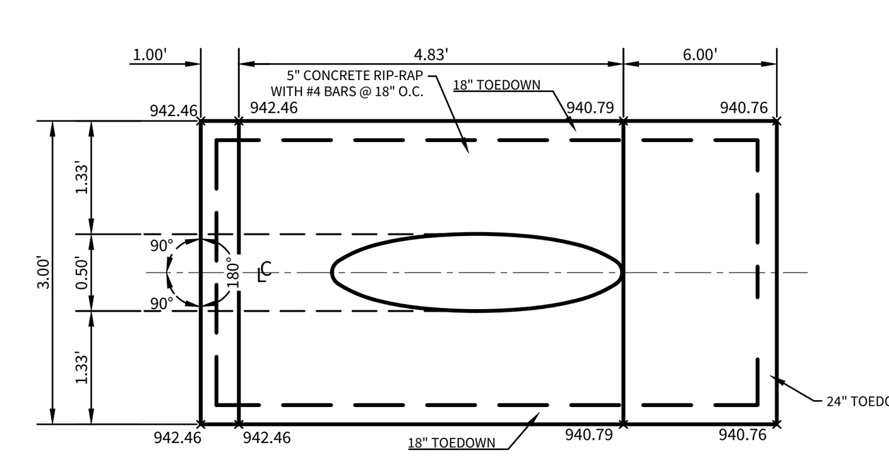
SECTION B-B

N.T.S.



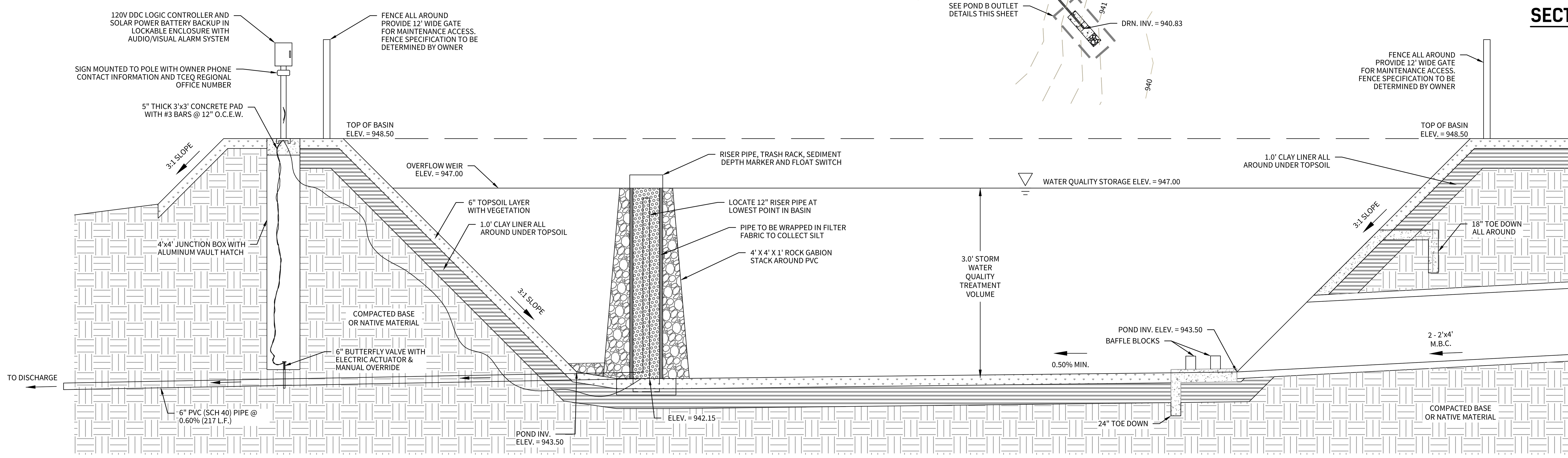
POND "B" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



POND "B" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



SECTION A-A

N.T.S.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

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CUDE ENGINEERS EST. 1980
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH

WATER POLLUTION ABATEMENT PLAN BATCH DETENTION POND "B"

DATE: 03/28/2023
PROJECT NO.: 02318.011
DRAWN BY: DAF/MAT
CHECKED BY: CJC/SPM

REVISIONS
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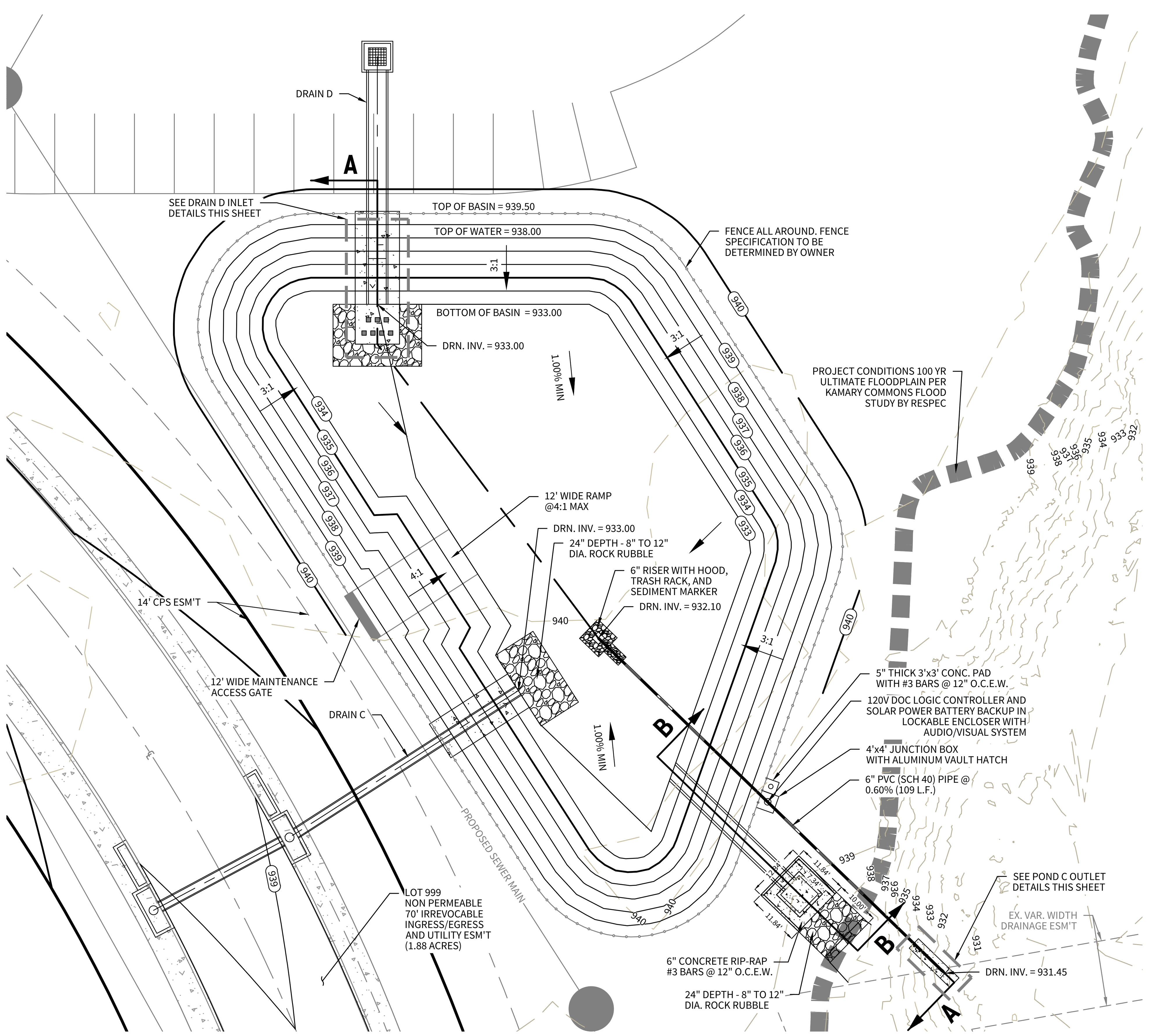
03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C7.02



BASIN DESIGN DATA

BASIN WATERSHED AREA	=	11.09 AC
RUN OFF DEPTH	=	1.38 INCH
REQUIRED CAPTURE VOLUME	=	46,539 CF
BASIN STORM WATER DEPTH	=	5.0 FT
BASIN CAPTURE VOLUME	=	47,558 CF

OVERFLOW 4-WAY WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	69.39 cfs
C	=	3.087
L	=	24 ft
h	=	$(\frac{Q25}{CL})^{2/3}$
h	=	0.96 FT

LEGEND

- CONC. RIP RAP
- 12" ROCK RUBBLE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- 3:1 PROPOSED SLOPE
- DRAINAGE FLOW LINE
- CLAY LINER

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

1. TSS REMOVAL REQUIRED = 80%
2. TSS REMOVAL PROVIDED BY THIS POND = 8,160 LBS
3. WATER QUALITY DRAWDOWN TIME:
   A. 6" CAPACITY AT 0.60% SLOPED OUTFALL = 0.44 CFS
   B. DRAWDOWN TIME = 47,539 CF / 0.44 CFS = 32 HOURS

SEQUENCE OF OPERATION:

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO STRT DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 32 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTIVATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

NOTES:

1. THE BATCH DETENTION POND FACILITY SHALL ALSO BE USED AS A TEMPORARY SEDIMENT TRAP FOR THE PURPOSES OF THE TEXAS POLLUTION DISCHARGE ELIMINATION SYSTEM CONSTRUCTION PERMIT FOR THIS SITE.
2. CONTRACTOR TO HYDROMULCH ENTIRE DISTURBED LIMITS OF EARTHEN PORTION OF POND. 85% OF POND SURFACE MUST HAVE ESTABLISHED VEGETATION PRIOR TO ACCEPTANCE OF THE POND.
3. THE CONTRACTOR SHALL NOTIFY A UTILITY LOCATOR AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION ACTIVITY ADJACENT TO THE CONSTRUCTION OF ANY ON-SITE DRAINAGE FACILITIES TO PROTECT ANY UNIDENTIFIED EXISTING UNDERGROUND UTILITY FACILITY FROM DAMAGE OR HARM. THE CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR ANY DAMAGES TO UTILITIES AS A RESULT OF NOT LOCATING UNDERGROUND UTILITY RESOURCES.
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5. ANY AREAS EXPOSED TO HIGH VELOCITY FLOWS SHALL EITHER HAVE A 6" THICK ROCK GABION MATTRESS INSTALLED OR THE INSTALLATION OF APPROPRIATE GEOTECHNICAL LINER AS DIRECTED BY THE CONSTRUCTION ENGINEER IN CHARGE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3500 PSI @ 28 DAYS COMPRESSIVE STRENGTH UNLESS OTHERWISE SPECIFIED HEREIN ON THESE DOCUMENTS.
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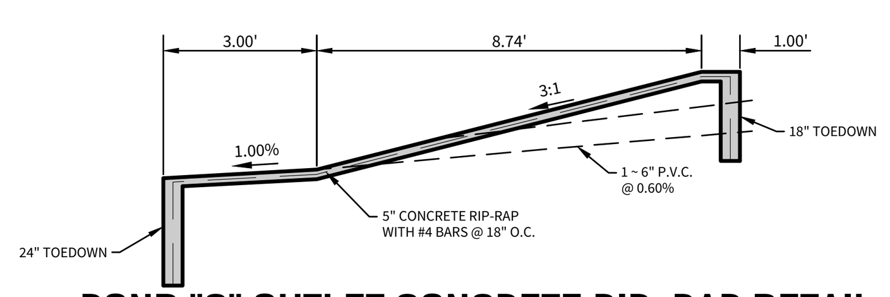
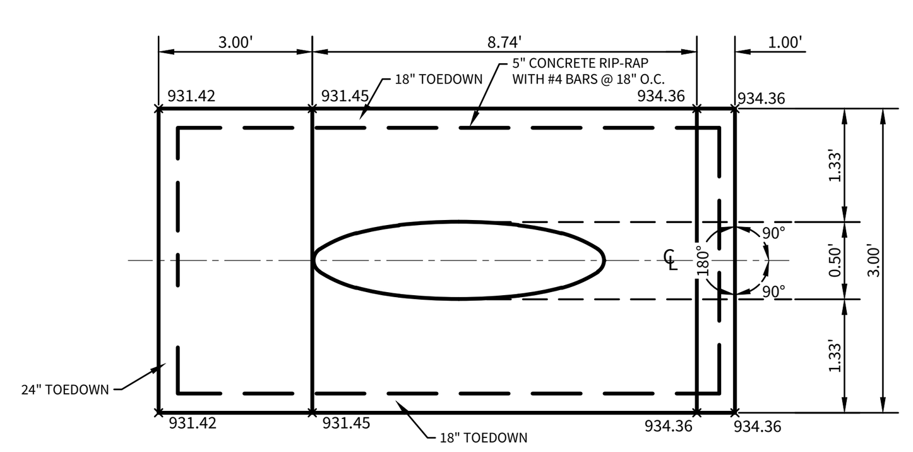
9. ALL REBAR SPLICES AND LAPS SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS OTHER SPECIFIED.
10. CONTRACTOR SHALL ALERT ENGINEER FOR FIELD OBSERVATION A MIN. OF 72 HOURS PRIOR TO EACH OF THE FOLLOWING EVENTS; DRAIN PIPE INSTALLATION COMPLETION, AND ANY CONCRETE POURS. THE CONTRACTOR SHALL ALSO PROVIDE A MATERIAL SUBMITTAL TO THE ENGINEER FOR REVIEW ON THE FOLLOWING MATERIAL; PERMEABLE GEOTEXTILE FABRIC, CLAY LINER.
11. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
12. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWN DOWN WILL OCCUR IN APPROXIMATELY 32 HOURS.
13. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.



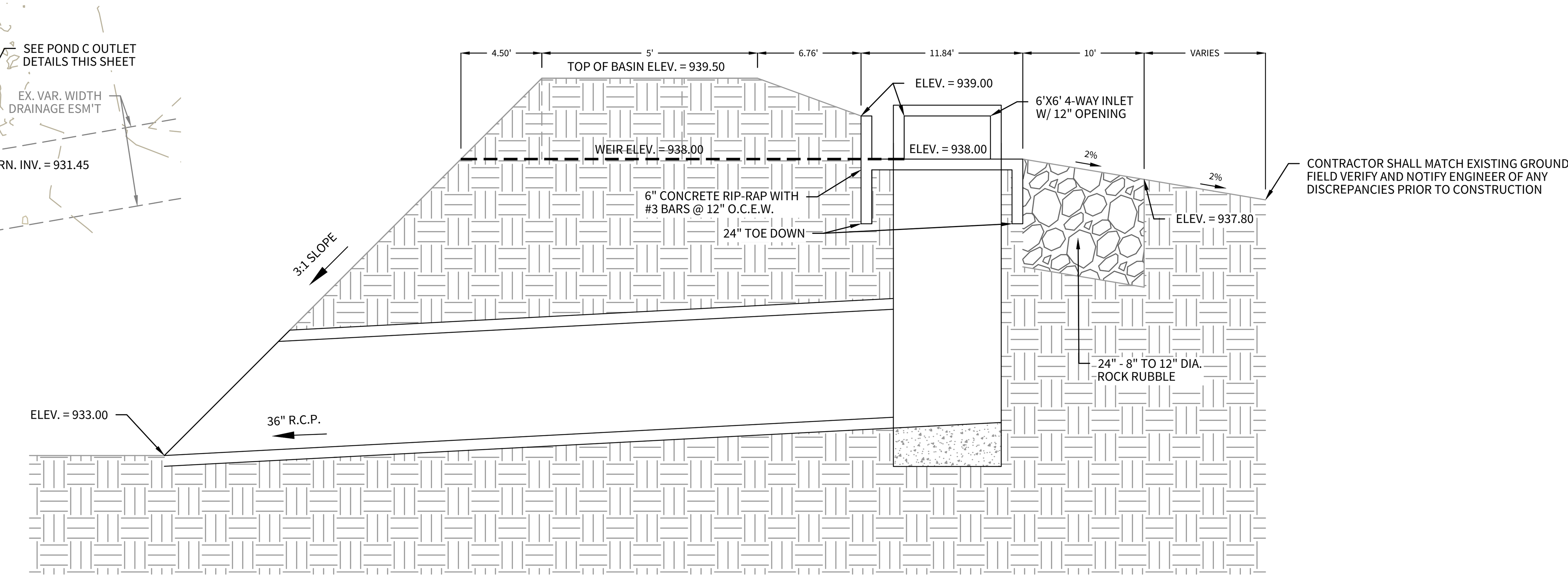
POND "C" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



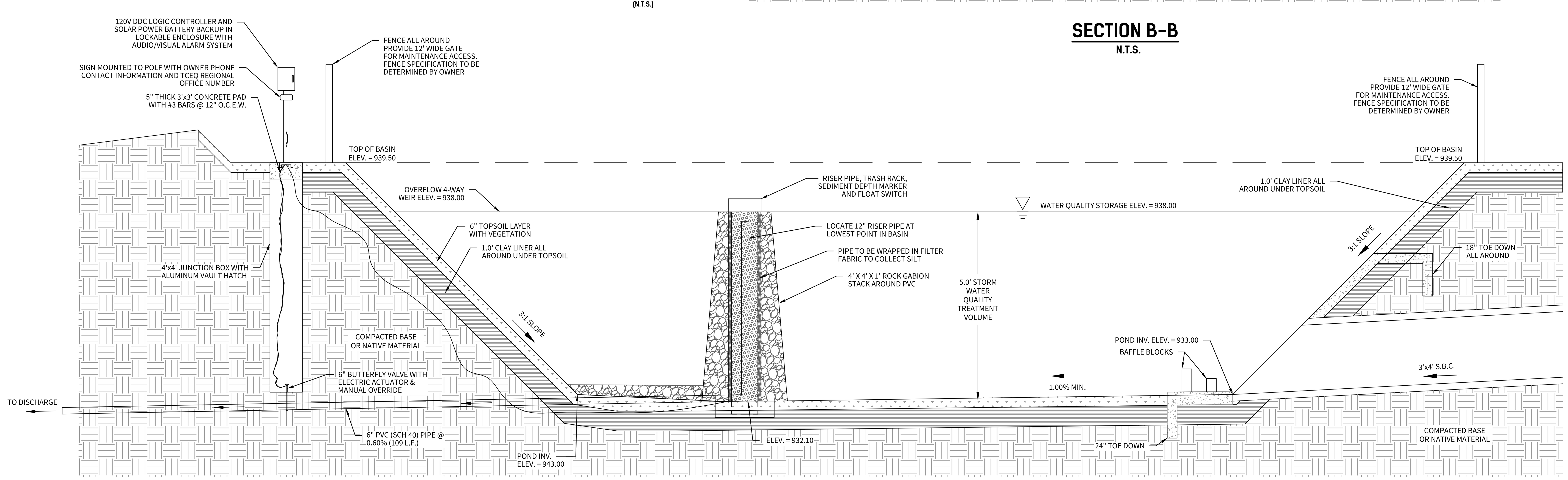
POND "C" OUTLET CONCRETE RIP-RAP DETAIL

(N.T.S.)



SECTION B-B

N.T.S.



SECTION A-A

N.T.S.

CONTRACTOR NOTES:

1. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:
   A. REINFORCING STEEL FOR BASIN OVERFLOW WALL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE. CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.
   B. BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE)
2. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR APPROVAL.
3. UPON SUBSTANTIAL COMPLETION, OR AS REQUIRED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELDS SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:
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   B. TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
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7. THE MINIMUM DRAIN TIME FOR A FULL BASIN IS 72 HOURS. CONTRACTOR TO SET BUTTERFLY VALVE TO FULLY OPEN TO BE CONTROLLED DDC CONTROLLER.
8. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS AND ACCUMULATED SILT FORM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

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San Antonio, Texas 78231
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TERRACES AT LAMBENT RANCH

WATER POLLUTION ABATEMENT PLAN BATCH DETENTION POND "C"

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
DAF/MAT

CHECKED BY
CJC/SPM

REVISIONS
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03/29/2023

CUDE ENGINEERS
TBPELS No. 10048500

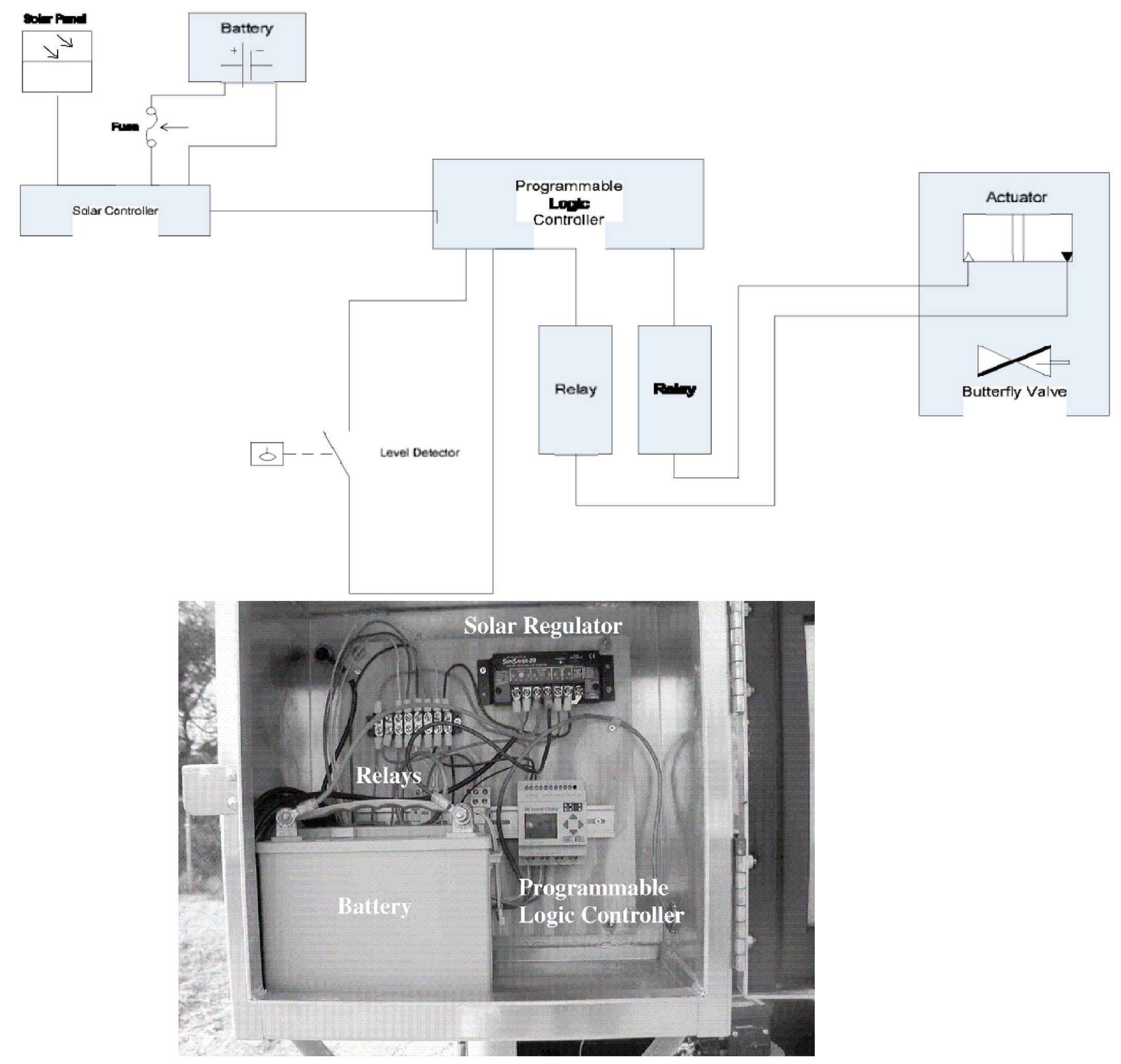
PLAT NO.
23-11800027

C7.03

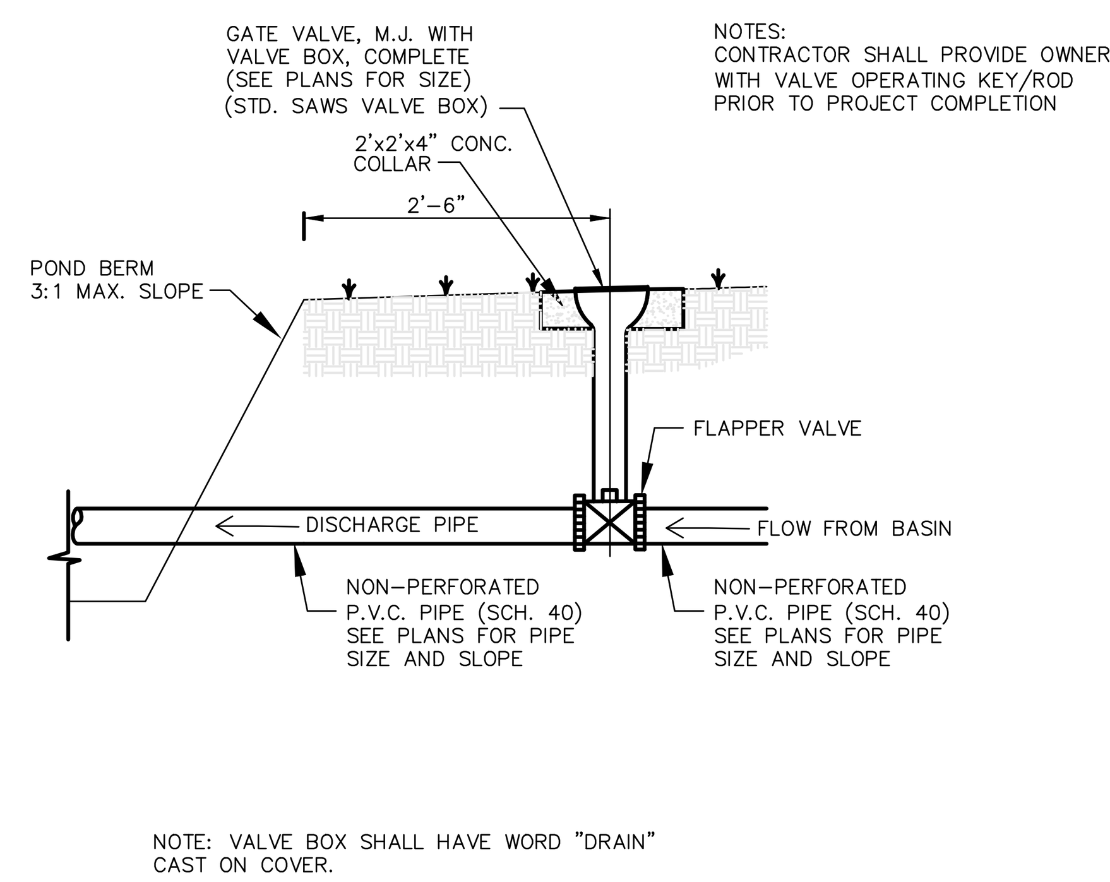
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH

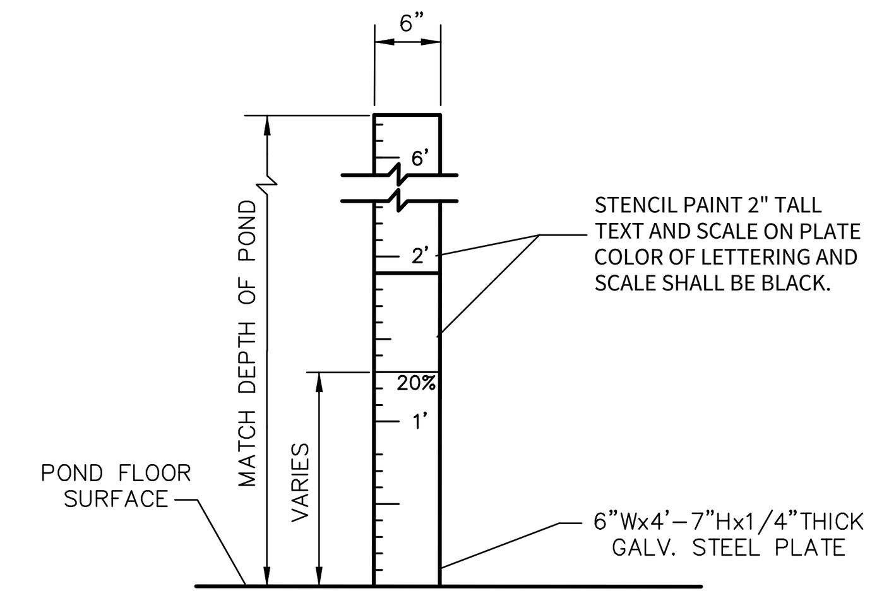
BATCH DETENTION POND DETAILS



1 LOGIC CONTROLLER BOX DETAIL
SCALE: NONE

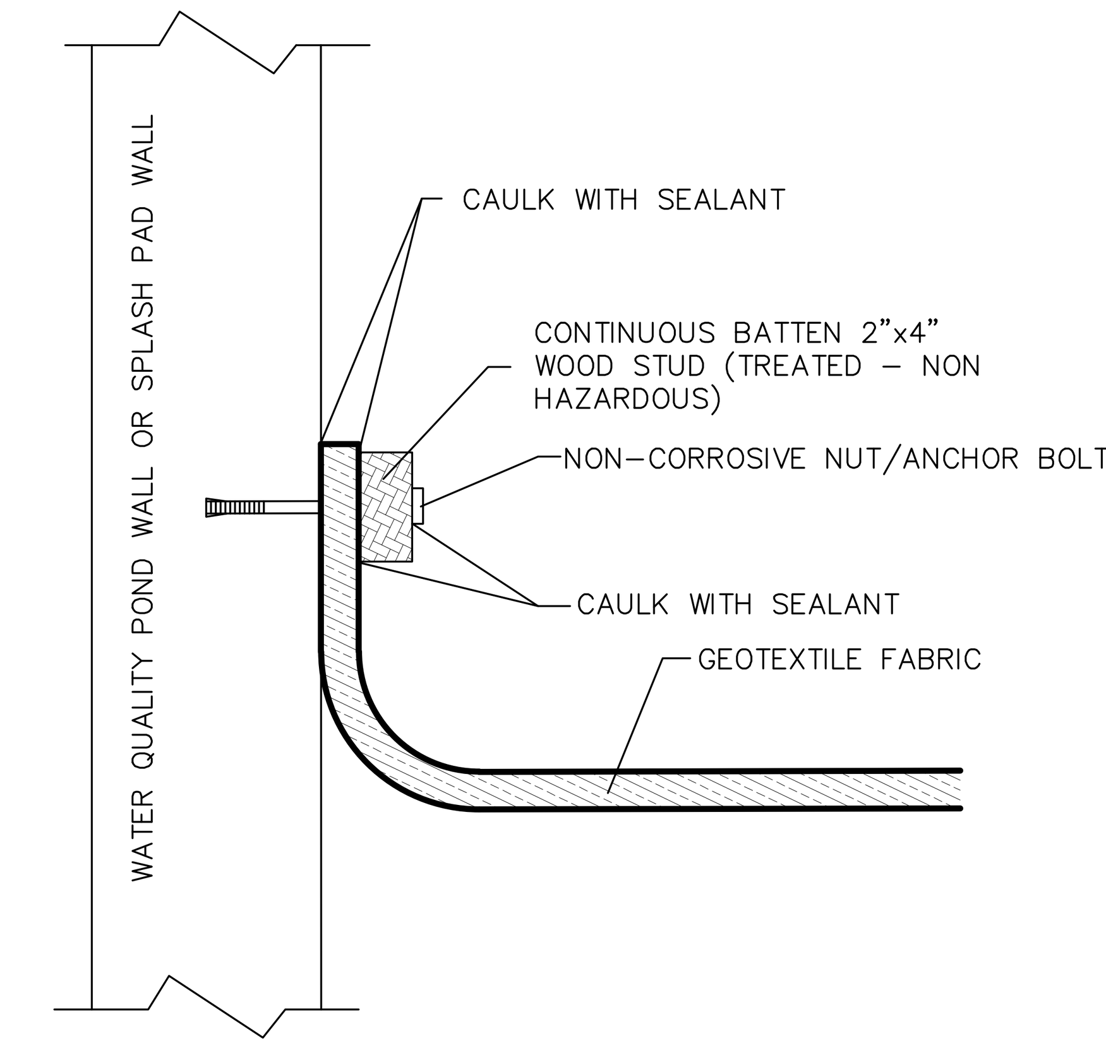


2 GATE VALVE AT POND EXIT
SCALE: NONE

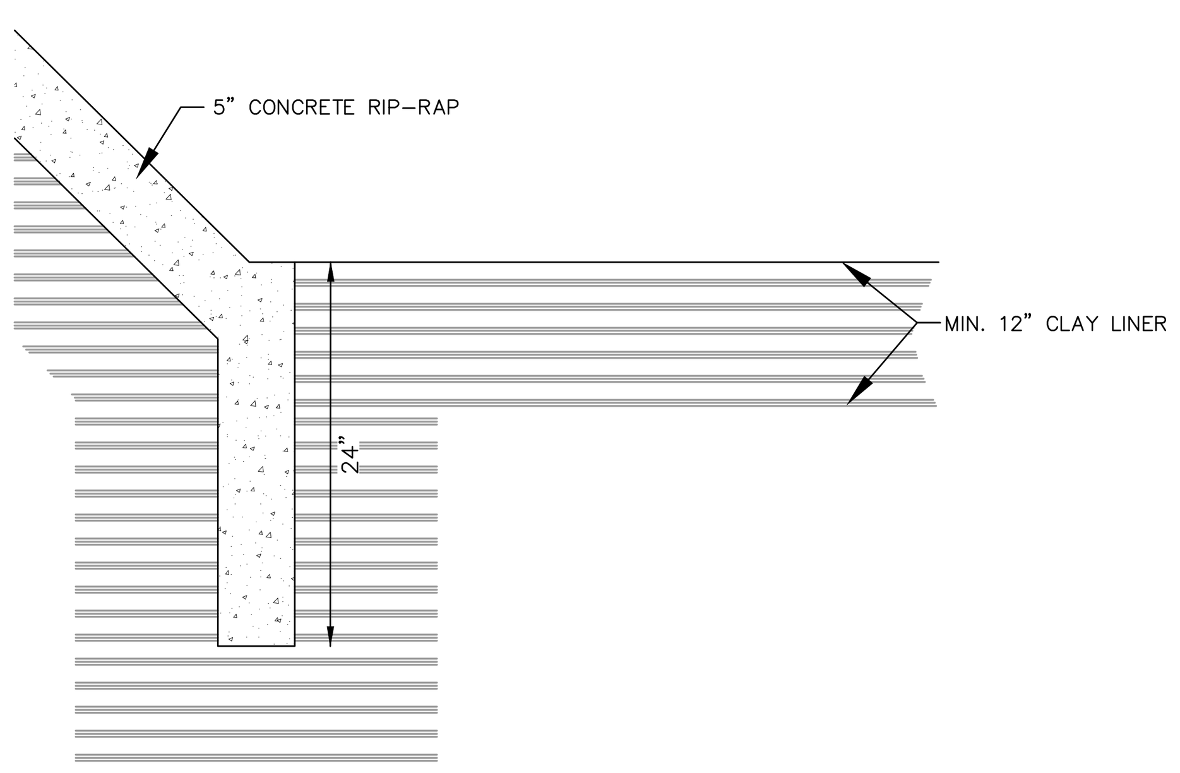


NOTES
1. PRINTED SCALE SHALL BE GRADUATED SHOWING 1/10 FOOT INTERVALS.
2. SIGN MOUNTING SHALL BE PER TxDOT SIGN MOUNTING STANDARDS. REF. TxDOT DETAIL SMD (TY G)-08 FOR SIGN MOUNTING DETAILS.

3 SEDIMENT DEPTH MARKER
SCALE: NONE



4 GEOTEXTILE FABRIC CONNECTION DETAIL
SCALE: NONE

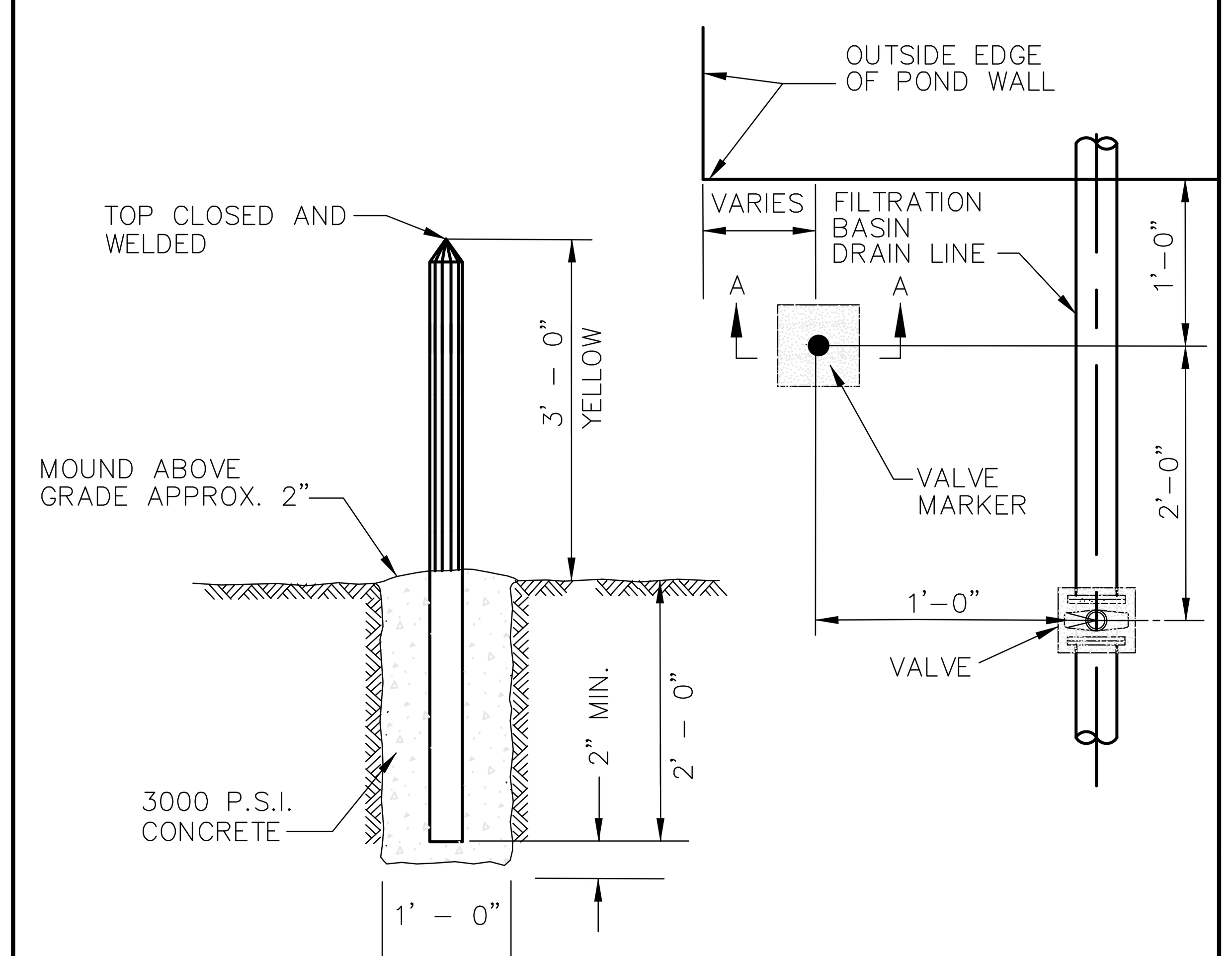


5 CONCRETE/CLAY INTERFACE
SCALE: NONE

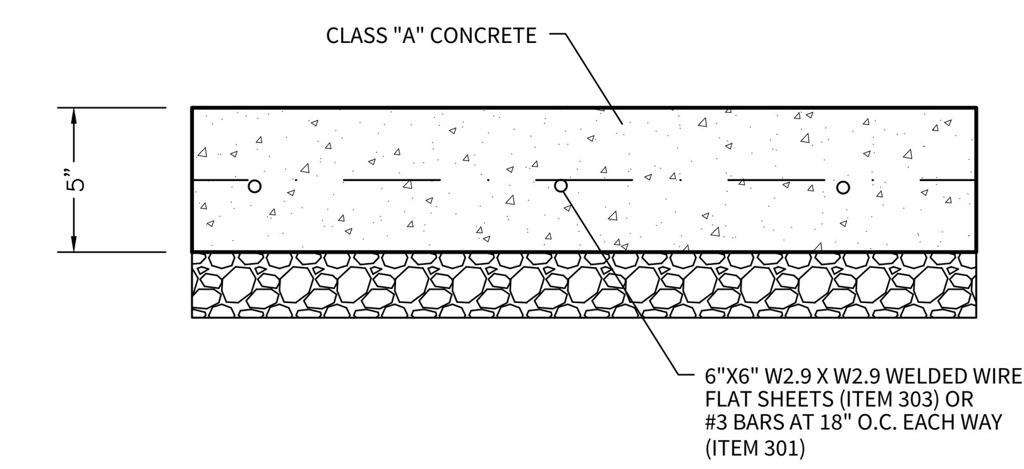
CLAY LINER SPECIFICATIONS

PROPERTY	TEST METHOD	NOTES
PERMEABILITY	ASTM D-2434	0.000001 CM/SEC
PLASTICITY INDEX	ASTM D-423 & D424	NOT LESS THAN 15%
LIQUID LIMIT OF CLAY	ASTM D-2216	NOT LESS THAN 30%
CLAY PARTICLE PASSING	ASTM D-422	NOT LESS THAN 30%
CLAY COMPACTION	ASTM D-2216	95% OF STANDARD PROCTOR DENSITY

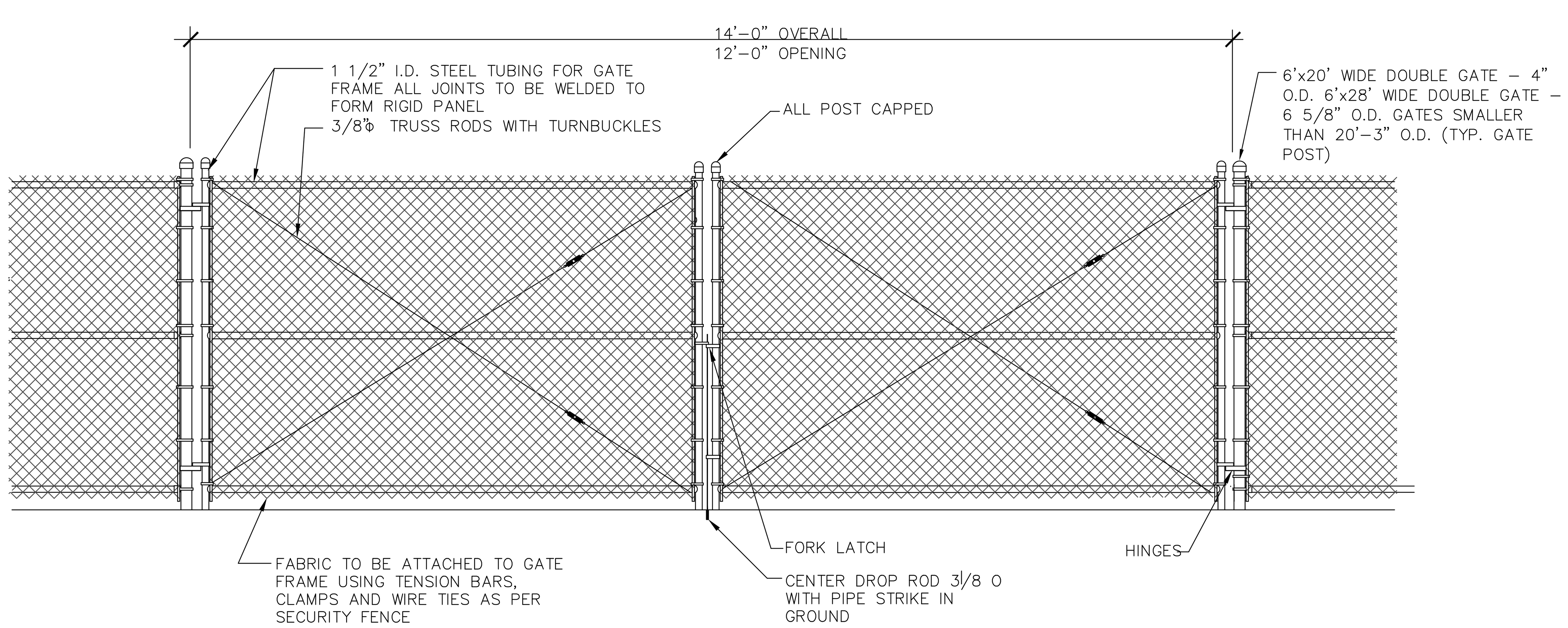
6 CLAY LINER SPECIFICATIONS
SCALE: NONE



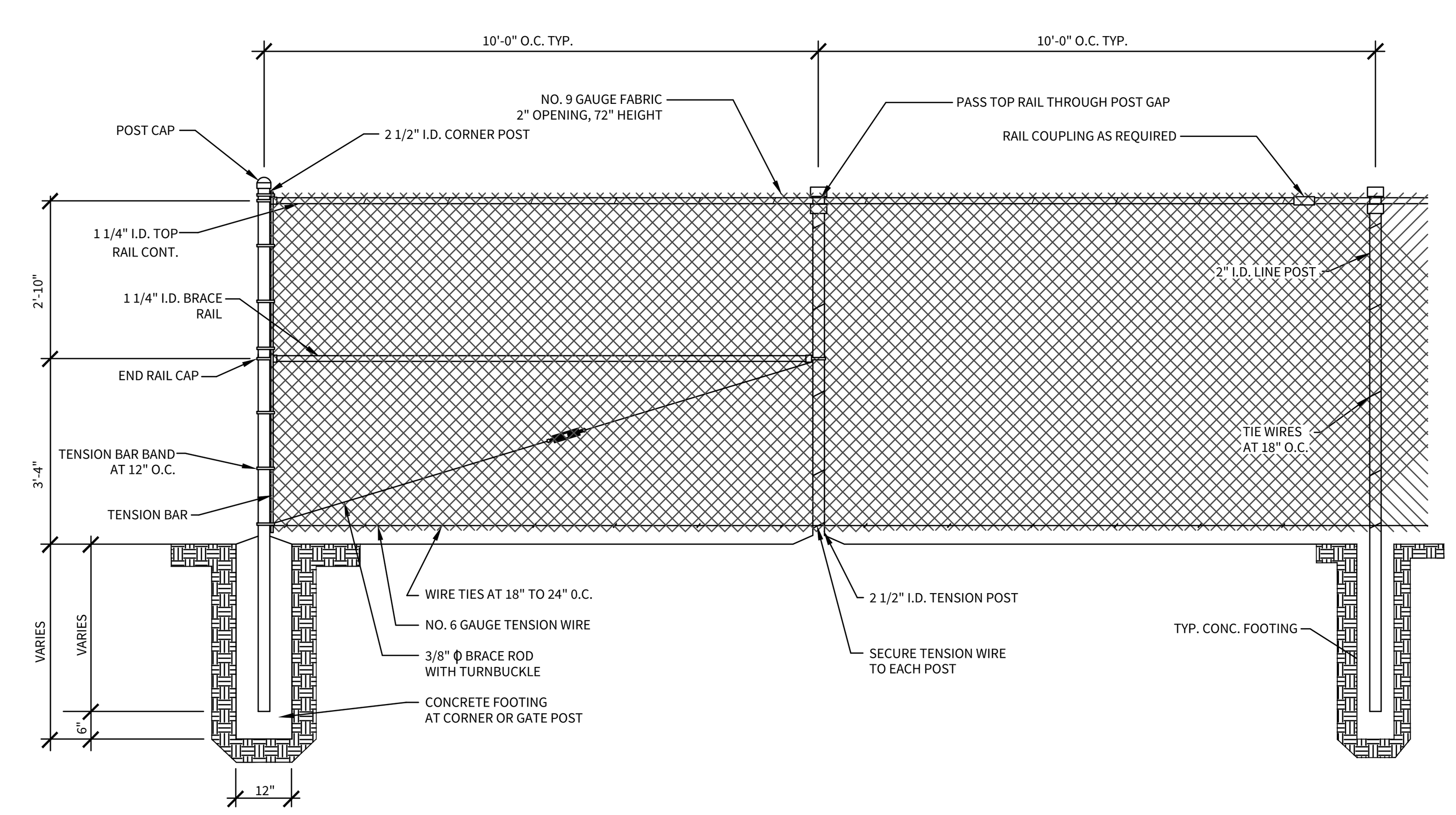
7 VALVE MARKER AND LOCATION
SCALE: NONE



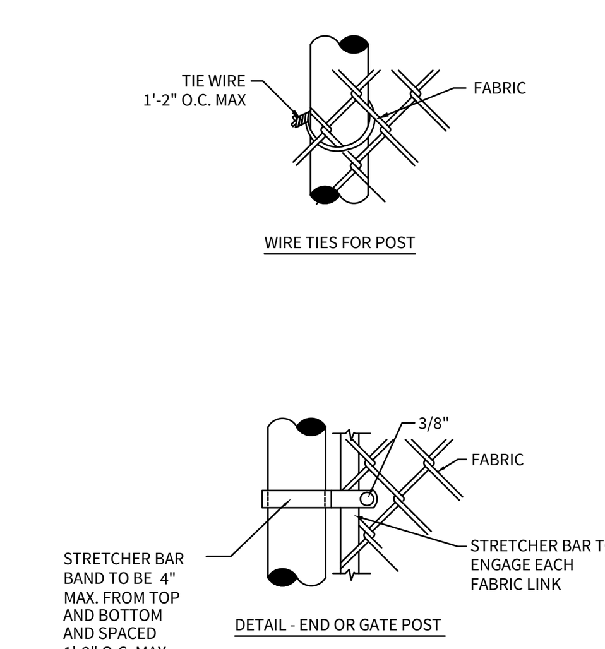
8 CONCRETE RIP-RAP DETAIL
SCALE: NONE



9 CHAIN LINK GATE DETAIL
SCALE: NONE



NOTE:
ALL FENCE MATERIALS & HARDWARE TO BE HOT DIP GALVANIZED. (ALUMINUM WIRE TIES ARE ACCEPTABLE)



10 CHAIN LINK FENCE DETAIL
SCALE: NONE

DATE	03/28/2023
PROJECT NO.	02318.011
DRAWN BY	DAF/MAT
CHECKED BY	CJC/SPM

REVISIONS
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C7.05

ORGANIZED SEWAGE COLLECTION SYSTEM PLAN (TCEQ-0582)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Organized Sewage Collection System Application

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(c), 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.

Regulated Entity Name: Lambent Ranch

1. [X] **Attachment A – SCS Engineering Design Report**. This Engineering Design Report is provided to fulfill the requirements of 30 TAC Chapter 217, including 217.10 of Subchapter A, §§217.51 – 217.70 of Subchapter C, and Subchapter D as applicable, and is required to be submitted with this SCS Application Form.

Customer Information

2. The entity and contact person responsible for providing the required engineering certification of testing for this sewage collection system upon completion (including private service connections) and every five years thereafter to the appropriate TCEQ region office pursuant to 30 TAC §213.5(c) is:

   Contact Person: Robert Ritzenthaler
   Entity: San Antonio 103 TX, LLC
   Mailing Address: 835 129th Street NE
   City, State: Bradenton, Florida Zip: 34212
   Telephone: 210-681-2951 Fax: _____
   Email Address: robert@remcapital.com
   The appropriate regional office must be informed of any changes in this information within 30 days of the change.

3. The engineer responsible for the design of this sewage collection system is:

   Contact Person: Sean McFarland P.E.
   Texas Licensed Professional Engineer's Number: 138893
   Entity: Cude Engineers
   Mailing Address: 4122 Pond Hill Road Suite 101
   City, State: San Antonio, Texas Zip: 78231
   Telephone: 210-681-2951 Fax: _____
   Email Address: smcfarland@cudeengineers.com

Project Information

4. Anticipated type of development to be served (estimated future population to be served, plus adequate allowance for institutional and commercial flows):

   ☐ Residential: Number of single-family lots: _____
   ☒ Multi-family: Number of residential units: 500
   ☐ Commercial
   ☐ Industrial
   ☐ Off-site system (not associated with any development)
   ☐ Other: _____

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

   100 % Domestic — 75,000 gallons/day
   _____ % Industrial — _____ gallons/day
   _____ % Commingled — _____ gallons/day
   Total gallons/day: 75,000 (250 EDU * 300 gpd/EDU = 75,000 gpd)

6. Existing and anticipated infiltration/inflow is 10,500 gallons/day. This will be addressed by: adequate sizing of the sewer main

7. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.

   ☐ The WPAP application for this development was approved by letter dated _____. A copy of the approval letter is attached.
   ☒ The WPAP application for this development was submitted to the TCEQ on concurrently, but has not been approved.
   ☐ A WPAP application is required for an associated project, but it has not been submitted.
   ☐ There is no associated project requiring a WPAP application.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*
6" Gravity	1,264	PVC, SDR 26	ASTM D3034, ASTM D3212
8" Gravity	2,405	PVC, SDR 26	ASTM D3034, ASTM D3212
6" Pressure-rated (160-psi)	20	PVC, SDR 26	ASTM D2241, Class 160, ASTM C1173, ASTM D3139
8" Pressure-rated (160-psi)	40	PVC, SDR 26	ASTM D2241, Class 160, ASTM C1173, ASTM D3139

Total Linear Feet: 2,284

(1) Linear feet - Include stub-outs and double service connections. Do not include private service laterals.
(2) Pipe Material - If PVC, state SDR value.
(3) Specifications - ASTM / ANSI / AWWA specification and class numbers should be included.

9. The sewage collection system will convey the wastewater to the Leon Creek (name) Treatment Plant. The treatment facility is:

   [X] Existing
   [ ] Proposed

10. All components of this sewage collection system will comply with:

   [X] The City of San Antonio standard specifications.
   [ ] Other. Specifications are attached.

11. [X] No force main(s) and/or lift station(s) are associated with this sewage collection system.

   [ ] A force main(s) and/or lift station(s) is associated with this sewage collection system and the **Lift Station/Force Main System Application** form (TCEQ-0624) is included with this application.

Alignment

12. [X] There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.

13. [X] There are no deviations from straight alignment in this sewage collection system without manholes.

   [ ] **Attachment B - Justification and Calculations for Deviation in Straight Alignment without Manholes**. A justification for deviations from straight alignment in this sewage collection system without manholes with documentation from pipe manufacturer allowing pipe curvature is attached.
   [ ] For curved sewer lines, all curved sewer line notes (TCEQ-0596) are included on the construction plans for the wastewater collection system.

Manholes and Cleanouts

14. [X] Manholes or clean-outs exist at the end of each sewer line(s). These locations are listed below: (Please attach additional sheet if necessary)

Table 2 - Manholes and Cleanouts

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
A	C9.02 Of C9.02	24+13.12	MH A-9
	Of		
	Of		
	Of		
	Of		
	Of		
	Of		

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	Of		
	Of		

15. [X] Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.

16. [X] The maximum spacing between manholes on this project for each pipe diameter is no greater than:

Pipe Diameter (inches)	Max. Manhole Spacing (feet)
6 - 15	500
16 - 30	800
36 - 48	1000
≥54	2000

[ ] **Attachment C – Justification for Variance from Maximum Manhole Spacing**. The maximum spacing between manholes on this project (for each pipe diameter used) is greater than listed in the table above. A justification for any variance from the maximum spacing is attached, and must include a letter from the entity which will operate and maintain the system stating that it has the capability to maintain lines with manhole spacing greater than the allowed spacing.

17. [ ] All manholes will be monolithic, cast-in-place concrete.

[X] The use of pre-cast manholes is requested for this project. The manufacturer's specifications and construction drawings, showing the method of sealing the joints, are attached.

Site Plan Requirements

Items 18 - 25 must be included on the Site Plan.

18. [X] The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 50 '.

19. [X] The Site Plan must include the sewage collection system general layout, including manholes with station numbers, and sewer pipe stub outs (if any). Site plan must be overlain by topographic contour lines, using a contour interval of not greater than ten feet and showing the area within both the five-year floodplain and the 100-year floodplain of any drainage way.

20. Lateral stub-outs:

[X] The location of all lateral stub-outs are shown and labeled.
[ ] No lateral stub-outs will be installed during the construction of this sewer collection system.

21. Location of existing and proposed water lines:

☐ The entire water distribution system for this project is shown and labeled.
☒ If not shown on the Site Plan, a Utility Plan is provided showing the entire water and sewer systems.
☐ There will be no water lines associated with this project.

22. 100-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 100-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above of sewer lines.)
☐ After construction is complete, all sections located within the 100-year floodplain will have water-tight manholes. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 3 - 100-Year Floodplain

Line	*Sheet*	*Station*
N/A	of	to
	of	to
	of	to
	of	to

23. 5-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or man-made. (Do not include streets or concrete-lined channels constructed above sewer lines.)
☐ After construction is complete, all sections located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 4 - 5-Year Floodplain

Line	*Sheet*	*Station*
N/A	of	to
	of	to
	of	to
	of	to

24. ☒ Legal boundaries of the site are shown.

25. ☒ The ***final plans and technical specifications*** are submitted for the TCEQ's review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

Items 26 - 33 must be included on the Plan and Profile sheets.

26. [X] All existing or proposed water line crossings and any parallel water lines within 9 feet of sewer lines are listed in the table below. These lines must have the type of pressure rated pipe to be installed shown on the plan and profile sheets. Any request for a variance from the required pressure rated piping at crossings must include a variance approval from 30 TAC Chapter 290.

[ ] There will be no water line crossings.
[ ] There will be no water lines within 9 feet of proposed sewer lines.

Table 5 - Water Line Crossings

Line	*Station or Closest Point*	*Crossing or Parallel*	*Horizontal Separation Distance*	*Vertical Separation Distance*
A	4+41.52	Crossing	-	7'
A	23+98.22	Crossing	-	2'

27. Vented Manholes:

[X] **No part** of this sewer line is within the 100-year floodplain and vented manholes are not required by 30 TAC Chapter 217.
[ ] **A portion** of this sewer line is within the 100-year floodplain and vented manholes will be provided at less than 1500 foot intervals. These water-tight manholes are listed in the table below and labeled on the appropriate profile sheets.
[ ] **A portion** of this sewer line is within the 100-year floodplain and an alternative means of venting shall be provided at less than 1500 feet intervals. A description of the alternative means is described on the following page.
[ ] **A portion** of this sewer line is within the 100-year floodplain; however, there is no interval longer than 1500 feet located within. No vented manholes will be used.

Table 6 - Vented Manholes

Line	*Manhole*	*Station*	*Sheet*
N/A			

Line	*Manhole*	*Station*	*Sheet*

28. Drop manholes:

[X] There are no drop manholes associated with this project.
[ ] Sewer lines which enter new or existing manholes or "manhole structures" higher than 24 inches above the manhole invert are listed in the table below and labeled on the appropriate profile sheets. These lines meet the requirements of 30 TAC §217.55(l)(2)(H).

Table 7 - Drop Manholes

Line	*Manhole*	*Station*	*Sheet*
N/A			

29. Sewer line stub-outs (For proposed extensions):

[X] The placement and markings of all sewer line stub-outs are shown and labeled.
[ ] No sewer line stub-outs are to be installed during the construction of this sewage collection system.

30. Lateral stub-outs (For proposed private service connections):

[ ] The placement and markings of all lateral stub-outs are shown and labeled.
[X] No lateral stub-outs are to be installed during the construction of this sewage collection system.

31. Minimum flow velocity (From Appendix A)

[X] Assuming pipes are flowing full; all slopes are designed to produce flows equal to or greater than 2.0 feet per second for this system/line.

32. Maximum flow velocity/slopes (From Appendix A)

[X] Assuming pipes are flowing full, all slopes are designed to produce maximum flows of less than or equal to 10 feet per second for this system/line.
[ ] **Attachment D – Calculations for Slopes for Flows Greater Than 10.0 Feet per Second.** Assuming pipes are flowing full, some slopes produce flows which are greater than 10 feet per second. These locations are listed in the table below. Calculations are attached.

Table 8 - Flows Greater Than 10 Feet per Second

Line	*Profile Sheet*	*Station to Station*	*FPS*	*% Slope*	*Erosion/Shock Protection*
N/A					

33. Assuming pipes are flowing full, where flows are ≥ 10 feet per second, the provisions noted below have been made to protect against pipe displacement by erosion and/or shock under 30 TAC §217.53(l)(2)(B).

☐ Concrete encasement shown on appropriate Plan and Profile sheets for the locations listed in the table above.
☐ Steel-reinforced, anchored concrete baffles/retards placed every 50 feet shown on appropriate Plan and Profile sheets for the locations listed in the table above.
☒ N/A

Administrative Information

34. ☒ The final plans and technical specifications are submitted for TCEQ review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

35. ☒ Standard details are shown on the detail sheets, which are dated, signed, and sealed by the Texas Licensed Professional Engineer, as listed in the table below:

Table 9 - Standard Details

Standard Details	*Shown on Sheet*
Lateral stub-out marking **[Required]**	DD-854-03 of C9.D1
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	DD-852-01 of C9.D1
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	DD-854-03 of C9.D1
Typical trench cross-sections **[Required]**	DD-804-01 of C9.D1
Bolted manholes **[Required]**	DD-852-07 of C9.D1
Sewer Service lateral standard details **[Required]**	of
Clean-out at end of line **[Required, if used]**	3 of C9.D1
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	N/A of N/A
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	C9.01 of C9.01
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	DD-848-01 of C9.D1

Standard Details	*Shown on Sheet*
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	N/A of N/A

36. [X] All organized sewage collection system general construction notes (TCEQ-0596) are included on the construction plans for this sewage collection system.

37. [X] All proposed sewer lines will be sufficiently surveyed/staked to allow an assessment prior to TCEQ executive director approval. If the alignments of the proposed sewer lines are not walkable on that date, the application will be deemed incomplete and returned.

    [X] Survey staking was completed on this date: When requested prior to TCEQ site visit

38. [X] 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.

39. [X] Any modification of this SCS application will require TCEQ approval, prior to construction, and may require submission of a revised application, with appropriate fees.

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 **Organized Sewage Collection System Application** is hereby submitted for TCEQ review and executive director approval. The system was designed in accordance with the requirements of 30 TAC §213.5(c) and 30 TAC §217 and prepared by:

Print Name of Licensed Professional Engineer: Sean McFarland P.E.

Date: 3/10/2023

Place engineer's seal here:

03/28/2023

Signature of Licensed Professional Engineer:

Sean McFarland

Appendix A-Flow Velocity Table

Flow Velocity (Flowing Full) All gravity sewer lines on the Edwards Aquifer Recharge Zone shall be designed and constructed with hydraulic slopes sufficient to give a velocity when flowing full of not less than 2.0 feet per second, and not greater than 10 feet per second. The grades shown in the following table are based on Manning's formula and an n factor of 0.013 and shall be the minimum and maximum acceptable slopes unless provisions are made otherwise.

Table 10 - Slope Velocity

Pipe Diameter(Inches)	*% Slope required for minimum flow velocity of 2.0 fps*	*% Slope which produces flow velocity of 10.0 fps*
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

**For lines larger than 39 inches in diameter, the slope may be determined by Manning's formula (as shown below) to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.*

$$v = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

Figure 1 - Manning's Formula

Where:

v = velocity (ft/sec)
n = Manning's roughness coefficient (0.013)
Rh = hydraulic radius (ft)
S = slope (ft/ft)

ATTACHMENT A

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

TCEQ Engineering Design Report - 8" Sanitary Sewer Main

For

Lambent Ranch

Organized Sewage Collection System

March 2023

Prepared By:
Cude Engineers, LLC
4122 Pond Hill Road, suite 101
San Antonio, Texas 78231
TBPE Registration Number: 455
TBPLS Registration Number: 10048500

TABLE OF CONTENTS

ATTACHMENTS

PVC PIPE STANDARDS

The American Society for Testing and Materials (ASTM) also known as ASTM International (Reference: www.astm.org) governs the manufacturing specifications for Polyvinyl Chloride (PVC) pipes, including the dimension ratio and water pressure allowable for use of each pipe, through its D-3034 standard. ASTM D-3034 lists its pipe dimensions and pipe classes using the "SDR" mark up, such as SDR-13.5, SDR-21, SDR-26 and SDR-41. The SDR refers to the standard dimension ratio (SDR) of the outside pipe diameter and the wall thickness. This project specifies the use of SDR-26 PVC pipe, which are to meet the ASTM pressure rating of greater than 115 psi and fall in the size category listed below. ASTM D-3034 standards must be meticulously adhered to by all PVC pipe manufacturers and is recognized as the standard during PVC pressure pipe testing and quality checks. Other in-depth information can be found published in Thermoplastic Pressure Pipe Design and Selection UNI-TR-7, by the Uni-Bell PVC Pipe Association.

SDR 26 Pipe Size Matrix (Per ASTM D-3034)			
Size (in)	**O.D. (in)**	**Calc I.D. (in)**	**Thickness (in)**
4	4.215	3.891	0.162
6	6.275	5.793	0.241
8	8.400	7.754	0.323
10	10.500	9.692	0.404
12	12.500	11.538	0.481
15	15.300	14.124	0.588

"This project is proposed the use of flexible pipe materials that will have a minimum structural life of 50 years. This report includes all the calculations and information pertinent to the determination of an adequate structural design of the sewer main. Issues such as odor control and corrosion potential also have been addressed. Due to the PVC material, there will not be a corrosion potential or odor control problem. The proposed pipe is ASTM D3034 and ASTM D2241, which is manufactured from compounds conforming to cell class 12454B in accordance with ASTM-D1784 according to the Northern Pipe Products attachment. Based on this cell class for the material, the PVC pipe will have a tensile strength of 7000 psi and a Modulus of elasticity in tension of 400,000 psi. These values are used later in the equations below. In the future, connections to the main will be recommended that vented manholes be installed to allow for the release of gases prior to the buildup."

PROPOSED TYPE OF PIPE

Type I, Grade I, Polyvinyl Chloride (PVC) Specifications:
Size of Pipe: 8.00 in.

SDR 26 Properties

Pipe Compliance:	ASTM D-3034
Joint Compliance:	ASTM D-3212
Cell Classification:	12454
Minimum Tensile Strength (psi):	7,000
Minimum Modulus of Elasticity (psi):	400,000
Calculated Inner Diameter (in) = (Outer Diameter - 2t)	7.754
Outer Diameter (inch):	8.400
Wall Thickness (inch):	0.323
Mean Pipe Diameter (in) = (Outer Diameter - Thickness)	8.077
Approximate Trenching Width (feet):	2.70
Minimum Pipe Depth (Cover) used (feet):	**5.60**
Maximum Pipe Depth (Cover) used (feet):	**15.00**

FLOW/CAPACITY ANALYSIS

Proposed Waste Water Usage: **187,500.00 GPD**

Q_{max} (As determined in Attachment A) = 0.290 CFS

$$Q_{full} = \frac{1.486}{n} \times A \times R^{\frac{2}{3}} \times \sqrt{S}$$

A = Cross-Sectional Area, (ft2)	=	0.328
S = Slope, decimal, minimum used	=	0.004
R_h = hydraulic radius	=	0.162

For the Specified Pipe at the Minimum Design Slope, the full flow is

Q_{full} = 0.703 CFS

0.290 < 0.703
Design meets TCEQ Guidelines

MINIMUM AND MAXIMUM GRADES FOR PIPES (30 TAC §217.53(l)(2)(A))

Minimum and Maximum Pipe Slopes		
Size of Pipe	Minimum Slope (%)	Maximum Slope (%)
6	0.5	12.35
8	0.33	8.4
10	0.25	6.23
12	0.2	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.3
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*
* For pipes larger than 39 inches in diameter, the slope is determined by Manning's formula to maintain a velocity greater than **2.0 feet per second and less than 10.0 feet per second** when flowing full.		

MINIMUM AND MAXIMUM VELOCITY FOR THE PROPOSED SYSTEM:

So, using 8.00 inch PVC Pipe:

$$V = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

V = velocity (ft/sec)	=	(solve)
n = Manning's coefficient	=	0.013
Calc. Inner Diameter (in)	=	7.754
A = Cross-Sectional Area, ft^2	=	0.328
Wp = Wetted Perimeter, ft	=	2.030
R_h = hydraulic radius, A/Wp	=	0.162
S = slope (ft/ft)	=	0.004

Minimum Slope Used (%): **0.40**

V_{min} = 2.15 ft/sec

2.15 **>** **2.00** ft/sec

Design meets TCEQ Guidelines

Maximum Slope Used (%): **8.34**

V_{max} = 9.81 ft/sec

9.81 **<** **10.00** ft/sec

Design meets TCEQ Guidelines

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E'

Soil type-pipe bedding material (Unified Classification System)	E' for Degree of Compaction of Bedding, in pounds per square inch			
	Dumped	Slight <85% Proctor, <40% relative density	Moderate 85%-95% Proctor, 40%-70% relative density	High, >95% Proctor, >70% relative density
(1)	(2)	(3)	(4)	(5)
Fine-grained Soils (LL>50[b]) Soils with medium to high plasticity CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E'=0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL,with less than 25% coarse-grained particles	50	200	400	1000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL,with more than 25% coarse-grained particles	100	400	1000	2000
Coarse-grained Soils with Fines GM, GC, SM, SC[c] contains more than 12% fines				
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP[c] contains less than 12% fines	200	1000	2000	3000
Crushed Rock	1000	3000	3000	3000
Accuracy in Terms of Percentage Deflection	± 2	± 2	± 1	± 0.5

Taken from: Howard, Amster K. "Soil Reaction for Buried Flexible Pipe"
U.S. Bureau of Reclamation, Denver, CO and the American Society of Civil Engineers.

Modulus of Soil Reaction for the in-situ soil is determined to be = 2000 psi

PIPE BEDDING CLASS

Taken from the American Society for Testing and Material (ASTM) D 2321 and American Association of State Highway and Transportation Officials (AASHTO) M43, and as published on Table 7, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 24.

Pipe Embedment Material						E', psi (kPa) for Degree of Embedment Compaction				
ASTM D 2321*		ASTM D 2487		AASHTO M43 Notation	Min. Std. Proctor Density (%)	Lift Placement Depth	Dumped	Slightly < 85%	Moderate 85% - 95%	High > 95%
Class	Description	Notation	Description							
IA	Open-graded, clean manufactured aggregates	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	5 56	Dumped	18" (0.45 m)	1000 (6,900)	3000 (20,700)	3000 (20,700)	3000 (20,700)
IB	Dense-graded, clean manufactured, processed aggregates	N/A	Angular crushed stone or other Class IA material and stone/sand mixtures; little or no fines							
II	Clean, coarse-grained soils	GW	Well-graded gravel, gravel/sand mixtures; little or no fines	57 6 67	85%	12" (0.30 m)	N/R	1000 (6,900)	2000 (13,800)	3000 (20,700)
		GP	Poorly graded gravel, gravel/sand mixtures; little or no fines							
		SW	Well-graded sands, gravelly sands; little or no fines							
		SP	Poorly graded sands, gravelly sands; little or no fines							
III	Coarse-grained soils with fines	GM	Silty gravels, gravel/sand/silt mixtures	Gravel and sand with <10% fines	90%	9" (0.20 m)	N/R	N/R	1000 (6,900)	2000 (13,800)
		GC	Clayey gravels, gravel/sand/clay mixtures							
		SM	Silty sands, sand/silt mixtures							
		SC	Clayey sands, sand/clay mixtures							

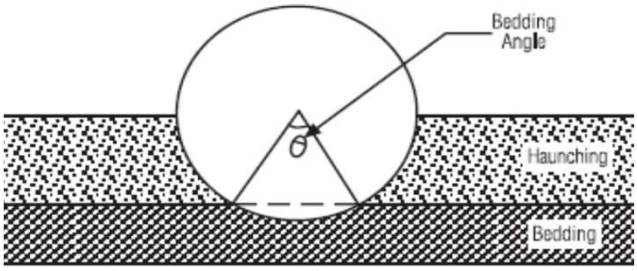
NOTE:

Per TCEQ guidelines, a contractor is allowed to use ASTM D 2321 Bedding Class 1A, 1B, II, or III at no less than 85% percent compaction. To grant the contractor its ability to make the proper judgment of which bedding class to use, the calculations provided in this Engineering Design Report reflect the use of **Bedding Class III, at >95%** compaction, with an E' value of 2000 psi. This provides the "worst case" scenario for the SCS line. All other Bedding Class options will provide an improved value for the zeta factor as well as pipe deflection.

For Bedding Class III, >95% Compaction, E_b = **2000 psi**

PIPE BEDDING ANGLE

As Published on Figure 8 and Table 5, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pgs 18-19.



Bedding Constant Values

Bedding Angle, degrees	Bedding Constant
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083

LIVE LOAD DETERMINATION

Source: AASHTO H20 and E80 Loads and as Published on Table 4, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 14.

Height of Cover (ft)	Live Load Transferred to Pipe, lb/in²			Height of Cover (ft)	Live Load Transferred to Pipe, lb/in²		
	Highway H20[1]	Railway E80[2]	Airport [3]		Highway H20[1]	Railway E80[2]	Airport [3]
1	12.50			14	*	4.17	3.06
2	5.56	26.39	13.14	16	*	3.47	2.29
3	4.17	23.61	12.28	18	*	2.78	1.91
4	2.78	18.40	11.27	20	*	2.08	1.53
5	1.74	16.67	10.09	22	*	1.91	1.14
6	1.39	15.63	8.79	24	*	1.74	1.05
7	1.22	12.15	7.85	26	*	1.39	*
8	0.69	11.11	6.93	28	*	1.04	*
10	*	7.64	6.09	30	*	0.69	*
12	*	5.56	4.76	35	*	*	*
				40	*	*	*

[1] Simulates 20 ton truck + impact
[2] Simulates 80,000 lb/ft railway load + impact
[3] 180,000 lbs. dual tandem gear assembly. 26 inch spacing between tires and 66 inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.
* Negligible live load influence

PRISM LOAD DETERMINATION

Also referred to as the 'dead' load, the prism load is the pressure acting on the pipe by the weight of the soil column above a given section of the pipe. The following prism load columns are industry standards as referenced from Table 3, Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 13.

Table 3
Prism Load Soil Pressure (lbs/in²)

Height of Cover (ft)	Soil Unit Weight (lb/ft³)				
	100	110	120	125	130
1	0.69	0.76	0.83	0.87	0.90
2	1.39	1.53	1.67	1.74	1.81
3	2.08	2.29	2.50	2.60	2.71
4	2.78	3.06	3.33	3.47	3.61
5	3.47	3.82	4.17	4.34	4.51
6	4.17	4.58	5.00	5.21	5.42
7	4.86	5.35	5.83	6.08	6.32
8	5.56	6.11	6.67	6.94	7.22
9	6.25	6.88	7.50	7.81	8.13
10	6.94	7.64	8.33	8.68	9.03
11	7.64	8.40	9.17	9.55	9.93
12	8.33	9.17	10.00	10.42	10.83
13	9.03	9.93	10.83	11.28	11.74
14	9.72	10.69	11.67	12.15	12.64
15	10.42	11.46	12.50	13.02	13.54
16	11.11	12.22	13.33	13.89	14.44
17	11.81	12.99	14.17	14.76	15.35
18	12.50	13.75	15.00	15.63	16.25
19	13.19	14.51	15.83	16.49	17.15
20	13.89	15.28	16.67	17.36	18.06
21	14.58	16.04	17.50	18.23	18.96
22	15.28	16.81	18.33	19.10	19.86
23	15.97	17.57	19.17	19.97	20.76
24	16.67	18.33	20.00	20.83	21.67
25	17.36	19.10	20.83	21.70	22.57
26	18.06	19.86	21.67	22.57	23.47
27	18.75	20.63	22.50	23.44	24.38
28	19.44	21.39	23.33	24.31	25.28
29	20.14	22.15	24.17	25.17	26.18
30	20.83	22.92	25.00	26.04	27.08
31	21.53	23.68	25.83	26.91	27.99
32	22.22	24.44	26.67	27.78	28.89
33	22.92	25.21	27.50	28.65	29.79
34	23.61	25.97	28.33	29.51	30.69
35	24.31	26.74	29.17	30.38	31.60
36	25.00	27.50	30.00	31.25	32.50
37	25.69	28.26	30.83	32.12	33.40
38	26.39	29.03	31.67	32.99	34.31
39	27.08	29.79	32.50	33.85	35.21
40	27.78	30.56	33.33	34.72	36.11
41	28.47	31.32	34.17	35.59	37.01
42	29.17	32.08	35.00	36.46	37.92
43	29.86	32.85	35.83	37.33	38.82
44	30.56	33.61	36.67	38.19	39.72
45	31.25	34.38	37.50	39.06	40.63
46	31.94	35.14	38.33	39.93	41.53
47	32.64	35.90	39.17	40.80	42.43
48	33.33	36.67	40.00	41.67	43.33
49	34.03	37.43	40.83	42.53	44.24
50	34.72	38.19	41.67	43.40	45.14

Note that the Prism Loads are calculated based upon the Marston Theory of Loads, developed by Professor Anson Marston, circa 1913, and is calculated using the formula:

$$P = \frac{\gamma_s * H}{144}$$

This formula determines the earth load on a flexible pipe and is regarded as a conservative approach to determining the dead load placed upon a buried flexible pipe.

At maximum burial depth of 15.00 feet, prism load = 13.33 psi

BUCKLING PRESSURE (ALLOWABLE)

Where:	q_a	=	Allowable buckling pressure (psi)	
	h	=	Height of soil above top of pipe (in) =	180.00 in
	H	=	Depth of burial, feet, from ground surface to top of pipe	
	B'	=	Empirical coefficient of elastic support	
	E_b	=	Modulus of soil reaction for the bedding material (psi)	
	E	=	Modulus of elasticity of the pipe material (psi)	
	I	=	Moment of inertia of the pipe, per linear inch of pipe (in^3)	
	t	=	Pipe wall thickness (in)	
	D	=	Mean Pipe Diameter (in) D =	8.077 in

Solving for the Empirical coefficient of elastic support, given by Luscher in 1966, as referenced on Pg 113 of Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill:

$$B' = \frac{4(h^2 + Dh)}{1.5(2h + D)^2} \qquad I = \left(\frac{t^3}{12}\right) = \left(\frac{inches^3}{in_{linear}}\right) =$$

$$B' = \frac{135415}{203221} = 0.666 \qquad I = \frac{0.0337}{12} = 0.0028$$

Using the Allowable Buckling Pressure Equation as shown in Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill, Pg 112, and an initial factor of safety (SF) of 2.5, the Allowable Buckling Pressure is then:

$$q_a = \frac{1}{FS} * \sqrt{32 * R_w * B' * E_b * \left(E * \frac{I}{D^3}\right)}$$

Where,
$R_W = 1 - 0.33(h_w / h)$

$$q_a = \frac{1}{2.5}\sqrt{\left[\ 32\ \right]\left[\ 1\ \right]\left[\ 0.666\ \right]\left[\ 2000\ \right]\left[400000\ \frac{0.0028}{526.93}\right]}$$

$$q_a = \mathbf{120.61} \quad \mathbf{psi}$$

BUCKLING PRESSURE (INSTALLED CONDITION)

Where:	q_P	=	Pressure applied to pipe under installed conditions (psi)		
	γ_W	=	Specific Weight of Water = 0.0361 (pci)		
	γ_S	=	Specific Weight of Soil (pcf)		
	W_c	=	Vertical Soil Load on the pipe per unit length (lb/in)		
	L_L	=	Live load as determined from chart		
	hw	=	Height of Groundwater above pipe, typically = 0		
	D	=	Mean Pipe Diameter (in)	D =	8.077 in
	t	=	Pipe Wall Thickness (in)	t =	0.323 in

The Vertical Soil Load can be calculated using Equation 6.6 of Uni-Bell's Handbook of PVC Pipe , Ch VI Superimposed Loads on Buried Pipe, Pg 183

$$W_c = H \times \gamma_s \times (D + t)$$

Where: γ_S = 120 Value taken from: Geotechnical Report

$$W_C = \left[\ 15.00\ \right]\left[\ 12\ \text{in/ft}\ \right]\left[\ 120.00\ \right]\left[\frac{1\ \text{ft}^3}{1728\ \text{in}^3}\right]\left[\ 8.40\ \right]$$

W_C = 105.00 lb/in

At Max Pipe Depth (H) of 15.00 ft

Using the Equation on Pg 114 of Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill, Pressure Applied to Pipe under installed conditions at its deepest installed depth (Note, since hw = 0, the Water Buoyancy Factor (Rw) = 1) is calculated to be:

$$q_p = \gamma_w h_w + R_w\left(\frac{W_c}{D}\right) + L_L \quad \text{and } L_L = \ 1.22 \qquad R_W = 1 - 0.33(h_w / h)$$

$$q_P = \ 0.0361 \times 0 + 1 \times \left[\frac{105.00}{8.077}\right] + \ 1.22$$

$$\boldsymbol{q_P = \ 14.22\ \text{psi}}$$

Note: The pressure applied to the pipe under installed conditions is less than the Allowable Buckling Pressure of the specified pipe, (i.e.. $q_a > q_p$) therefore the design is acceptable for installation.

WALL CRUSHING CALCULATION

Where: D_o = outside pipe diameter, in. = 8.4 in

P_c = Compressive stress or hydrostatic design basis (HDB). For typical PVC pipe assume 4,000 psi. For any other pipe material the HDB must be supplied by the pipe manufacturer.

A = surface area of the pipe wall, $in.^2/ft$ = 0.323 $in.^2/ft$

γ_S = specific weight of soil, pcf, = 120 pcf

H = Depth of burial (ft) from ground surface to crown of pipe

Using the Wall Crushing and Wall Thrust equations, as referenced in Plastic Pipe Design Manual published by Vylon Pipe, Pg 14 the Wall Crushing due to compressive stress can be found using the following:

$$P_c = \frac{T}{A} \quad \text{where T, Thrust, is calculated as} \quad T = \frac{P_y D}{2}$$

Substituting the Thrust equation into the Wall Crushing equation:

$$P_c = \frac{\frac{P_y D}{2}}{A} = \frac{P_y D}{2A}$$

From the Marston Equation determining the Prism Load Calculation (See previous section on Prism Load), substitute the equation for P_y:

$$P_c = \frac{\frac{\gamma_s * H}{144} D}{2A} \quad \text{Rearranging this equation, it becomes:} \quad 2AP_c = \frac{\gamma_s * H}{144} D$$

And simplifies to: $288AP_c = \gamma_s HD$

Note that the Surface Area of the Pipe Wall, A, is per unit length in $inches^2$ per foot, a conversion factor (from feet to inches) of 12 must be applied, therefore,

$$24AP_c = \gamma_s HD$$

Solving for H, the equation becomes:

$$H = \frac{24 * P_c * A}{\gamma_s * D_o}$$

(Continued on next page)

Using this equation, and converting all units, solve for “height” of the soil column, or in other words, the depth of burial of the PVC pipe:

$$H = \frac{\left[24 \right] \left[4000 \right] \left[0.323 \times 12 \right]}{120 \times 8.4} = \mathbf{369.14}$$

H = 369.14 feet

Note: The resulting Wall Crushing will occur at a greater depth than the deepest burial depth of the proposed SCS lines, therefore pipe design is acceptable.

DEFLECTION ANALYSIS: LEONHARDT'S ZETA FACTOR

The Leonhardt's Zeta Factor Equation can be calculated using Equation 7.32 of Uni-Bell's Handbook of PVC Pipe , Ch VII Design of Buried PVC Pipe, Pg 268

Where: Do = Pipe Outer Diameter, in = 8.400
B = Trench Width, in, = 32.40 in
E_b = Modulus of soil reaction, bedding material (psi) = 2000
E_n = Modulus of soil reaction for the in-situ soil (psi) = 2000

$$zeta = \frac{1.44}{f + [1.44 - f] \times \left[\frac{E_b}{E'_n}\right]}$$

where,

$$f = \frac{\frac{B}{Do} - 1}{1.154 + 0.444\left[\frac{B}{Do} - 1\right]}$$

$$f = \frac{2.857143}{2.420571} = 1.18036$$

Substituting f into the zeta equation:

$$zeta = \frac{1.44}{[1.180] + [0.260] \times [1.000]}$$

The Leonhardt Zeta factor is then determined as: **1.000**

PIPE STIFFNESS (Figure: 30 TAC §217.53(k)(3))

Using Equation B.1, as directed in 30 TAC §217.53(k)(3), to Calculate the Pipe Stiffness:

$$PS = C \times RSC \times \left(\frac{8.337}{D}\right)$$

Where:	PS	=	Pipe Stiffness, for SDR-26 PVC (psi) = 11:	115 psi
	C	=	Conversion factor =	0.8
	RSC	=	Ring Stiffness Constant	
	D	=	Mean Pipe Diameter (in), D =	8.077 in

The RSC can be supplied by the manufacturer or calculated by rearranging Equation B.1

$$RSC = \frac{PS}{C \times \left(\frac{8.337}{D}\right)}$$

$$RSC = \frac{115}{0.825752}$$

$$RSC = 139.267$$

PREDICTED PIPE DEFLECTION

Using the Modified Iowa Equation, referenced and published by the Uni-Bell PVC Pipe association and found at http://www.uni-bell.org/faq.html, and Equation 14 of Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association Pgs 17, the predicted pipe deflection can be calculated.

Where:	%ΔY/D	=	Predicted % vertical deflection under load		
	P	=	Prism Load, psi		
	K	=	Bedding angle constant, Assumed to =	0.096	
	W'	=	Live Load, psi, =	1.22	At max depth (ft) : 15.00
	DR	=	Dimension Ratio=	26	
	E	=	Modulus of tensile elasticity of the pipe material, psi		
	E'	=	Modulus of Soil Reaction (zeta x Eb) =	2000.00	
	D_L	=	Deflection Lag Factor =	1.5	

And using the Modified Iowa Equation:

$$(\%)\frac{\Delta Y}{D} = \frac{(D_L KP + KW')\times 100}{[2E/(3(DR-1)^3)] + 0.061E'}$$

Where, Prism Load, $P = \frac{\gamma_s * H}{144}$

and/or from previous chart, prism load = 13.33 psi

The Predicted Deflection is determined as:

$$(\%)\frac{\Delta Y}{D} = \frac{\left[\left[1.5 \times 1.280\right] + 0.11712\right] \times 100}{\left[\frac{800000}{46875}\right] + \left[0.061 \times 2000.00\right]} = \mathbf{1.46}\ \%$$

NOTE: **1.46 < 5%,** therefore pipe design is acceptable

A deflection lag factor of 1.0 is typical for new pipes. Over the life of the pipe, the pipe will tend to deflect. Therefore, 1.5 is a conservative factor for the 50 year life.

PIPE STRAIN

Pipe strain is also known as the elongation of the pipe over the original length of the pipe. Under normal loading conditions of the PVC pipe, the variable that affects the elongation or straining of the pipe stems from the either the flexure or deflection (i.e.. bending) of the pipe within the bedding material (i.e. increased or excessive pipe deflection causing the pipe to elongate) or hoop stress within the pipe wall. Please note that pipe strain is not generally known to be the limiting performance factor during pipe failure. For this system, pipe deflection is limited to 5% for a SDR 26 pipe. This 5% deflection value is the industry accepted value placing the pipe within its straining limits. Therefore, as the calculated deflection above is shown to be less than 5%, the pipe and bedding class used in this system is within the acceptable straining limits for this pipe.

However, total Pipe strain is calculated as the combination of the before mentioned hoop stress and the maximum strain due to deflection. Both items are calculated below using Equations 15 and 16 found in Deflection: the Pipe/Soil Mechanism, UNI-TR-1-97, Published by the Uni-Bell PVC Pipe Association (Pgs 28-30):

Where:	$\in_h$	=	Maximum Pipe Strain due to Hoop Stress, in/in	
	P	=	Pressure on the pipe (Live + Prism Loads), psi	
	E	=	Modulus of Elasticity of the Pipe, psi	
	t	=	Pipe Wall thickness (in) =	0.323
	D	=	Pipe Diameter, Outer (in) =	8.400

$$\in_h = \frac{PD}{2tE}$$

Using the maximum cover for both live loads and prism loads as well as the previous unit weight of the soil:

$$\in_h = \frac{\left[\ 1.22\ +\ 13.33\ \right] \times\ 8.400}{2\ \times\ 0.323\ \times\ 400{,}000} = \textbf{4.730E-04}\ \frac{\text{in}}{\text{in}}$$

(*Continued on following page)*

Where:	$\in_f$	=	Maximum Pipe Strain due to Ring Deflection, in/in	
	ΔY	=	Change in vertical pipe diameter under load, in, (numerator in the deflection equation, but in decimal form)	
	t	=	Pipe Wall thickness (in) =	0.323
	D	=	Pipe Diameter, Outer (in) =	8.400
	DR	=	Dimension Ratio, PVC Pipe=	26

$$\in_f = \frac{t}{D}\left[\frac{3\Delta Y / D}{1 - 2\Delta Y / D}\right] = \frac{1}{DR}\left[\frac{3\Delta Y}{D - 2\Delta Y}\right]$$

$$\in_f = \frac{0.323}{8.400} \times \frac{610.992}{8.400 - 407.328} = -0.05889 \frac{\text{in}}{\text{in}}$$

$$\in_{total} = \textbf{-0.0584} \quad \frac{\text{in}}{\text{in}}$$

TCEQ PIPE BEDDING AND TRENCHING REQUIREMENTS (30 TAC 217.54)

These notes are provided in the Construction Documents on **Plan Sheet C9.D2**

a. Pipe Embedment
   1. A rigid pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are A, B, or C, as described in American Society for Testing and Materials (ASTM) C 12, American National Standards Institute (ANSI) A 106.2,Water Environment Federation Manual of Practice No. 9 or American Society of Civil Engineers (ASCE) MOP 37.
   2. A flexible pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are IA, IB, II, or III, as described in ASTM D-2321 or ANSI K65.171.
   3. Debris, large clods, or stones that are greater than six inches in diameter, organic matter, or other unstable materials are prohibited as bedding, haunching, or initial backfill.
   4. Backfill must not disturb the alignment of a collection system pipe.
   5. If trenching encounters significant fracture, fault zones, caves, or solutional modification to the rock strata, an owner must halt construction until an engineer prepares a written report detailing how construction will accommodate these site conditions.

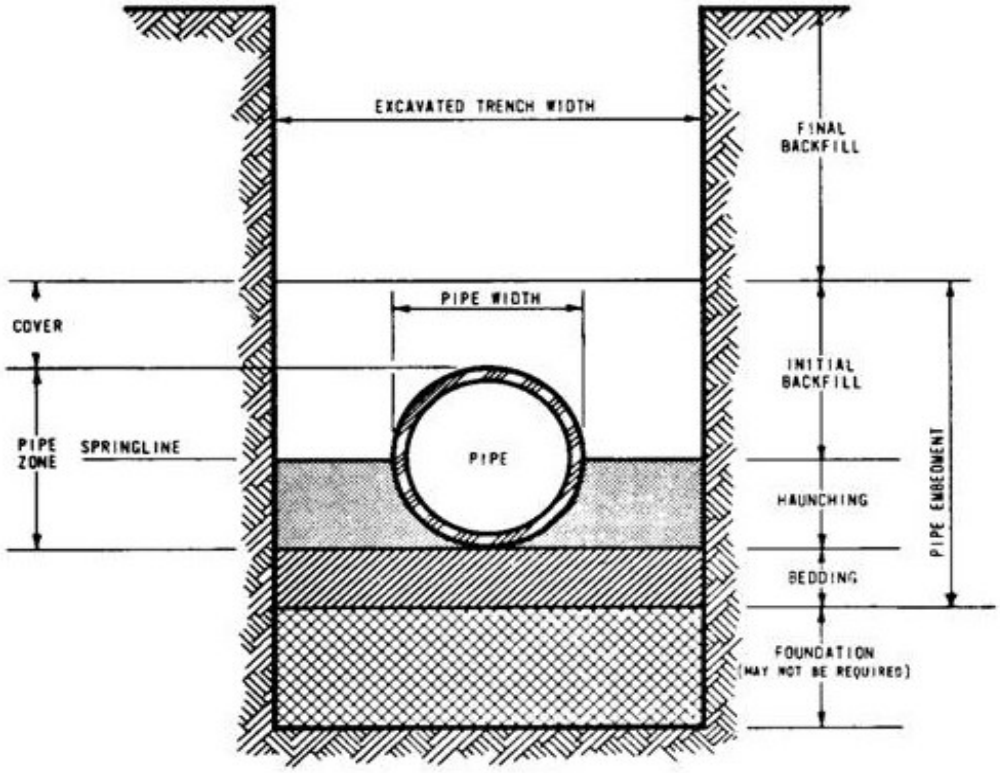
b. Compaction.
   1. Compaction of an embedment envelope must meet the manufacturer's recommendations for the collection system pipe used in a project.
   2. Compaction of an embedment envelope must provide the modulus of soil reaction for the bedding material necessary to ensure a wastewater collection system pipe's structural integrity as required by §217.53 of this title (relating to Pipe Design).
   3. The placement of the backfill above a pipe must not affect the structural integrity of a pipe.

c. Envelope Size.
   1. A minimum clearance of 6.0 inches below and on each side of the bell of all pipes to the trench walls and floor is required.
   2. The embedment material used for haunching and initial backfill must be installed to a minimum depth of 12 inches above the crown of a pipe.

d. Trench Width.

1. The width of a trench must allow a pipe to be laid and jointed properly and must allow the backfill to be placed and compacted as needed.
2. The maximum and minimum trench width needed for safety and a pipe's structural integrity must be included in the report.
3. The width of a trench must be sufficient to properly and safely place and compact haunching materials.
4. The space between a pipe and a trench wall must be wider than the compaction equipment used in the pipe zone.

TRENCH CROSS-SECTION (30 TAC 217.54)



NOTE:

Trenching Details along with 30 TAC 217.54 are annotated in the Construction Documents/Plan Sheets on Sheet C9.D1.

MANHOLE SPECIFICATIONS

30 TAC 217.55 Requirements with design comments:

a. An owner must include manholes in a wastewater collection system at:
    1. All points of change in alignment, grade, or size;
    2. At the intersection of all pipes; and
    3. At the end of all pipes that may be extended at a future date. **(Self explanatory, the SCS line will not be extended therefore no stub-outs**

b. Manholes placed at the end of a wastewater collection system pipe that may be extended in the future must include pipe stub outs with plugs. **(Self explanatory, see item a above)**

c. A clean-out with watertight plugs may be installed in lieu of a manhole at the end of a wastewater collection system pipe if no extensions are anticipated. **(Self explanatory, clean outs not used in-lieu of manholes)**

d. Cleanout installations must pass all applicable testing requirements outlined for gravity collection pipes in §217.57 of this title (relating to Testing Requirements for Installation of Gravity Collection System Pipes). **(Self explanatory, see Item c above)**

e.

A manhole must be made of monolithic, cast-in-place concrete, fiberglass, pre-cast concrete, high-density polyethylene, or equivalent material that provides adequate structural integrity. **See the Pre-Cast Manhole Details following these construction notes)**

f. The use of bricks to adjust a manhole cover to grade or construct a manhole is prohibited. **(Self explanatory, See Details following these notes)**

g. Manholes may be spaced no further apart than the distances specified in the following table for a wastewater collection system with straight alignment and uniform grades, unless a variance based on the availability of cleaning equipment that is capable of servicing greater distances is granted by the executive director. **(Manholes are spaced no greater than 500 L.F. per San Antonio Water Systems specifications)**

Table C.2. - Maximum Manhole Spacing

Pipe Diameter	Maximum Manhole
6-15	500
18-30	800
36-48	1000
54 or larger	2000

h. Tunnels are exempt from manhole spacing requirements because of construction constraints. **(Self explanatory and not applicable)**

i. An intersection of three or more collection pipes must have a manhole. **(Self explanatory and maintained throughout the design of the SCS)**
j. A manhole must not be located in the flow path of a watercourse, or in an area where ponding of surface water is probable. **(Self explanatory and maintained throughout the design of the SCS)**
k. The inside diameter of a manhole must be no less than 48 inches. A manhole diameter must be sufficient to allow personnel and equipment to enter, exit, and work in the manhole and to allow proper joining of the collection system pipes in the manhole wall. **(See Manhole Details following these notes)**
l. Manholes must meet the following requirements for covers, inlets, and bases.
    1. Manhole Covers
        A. A manhole where personnel entry is anticipated requires at least a 30 inch diameter clear opening. (**Covers to have 32" Openings per SAWS Specifications and Notes on Sheet C9.D1)**
        B. A manhole located within a 100-year flood plain must have a means of preventing inflow. **(Self explanatory but not applicable for this project)**
        C. A manhole cover construction must be constructed of impervious material. **(Self explanatory, See Manhole Details following these construction notes)**
        D. A manhole cover that is located in a roadway must meet or exceed the American Association of State Highways and Transportation Officials standard M-306 for load bearing. **(Self explanatory, See Manhole Details)**
    2. Manhole Inverts
        A. The bottom of a manhole must contain a U-shaped channel that is a smooth continuation of the inlet and outlet pipes. **(Self explanatory, see SAWS Details Sheet C9.D1)**
        B. A manhole connected to a pipe less than 15 inches in diameter must have a channel depth equal to at least half the largest pipe's diameter **(Self explanatory, see SAWS Details Sheet C9.D1**)
        C. A manhole connected to a pipe at least 15 inches in diameter but not more than 24 inches in diameter must have a channel depth equal to at least three-fourths of the largest pipe's diameter **(Self explanatory, but not applicable for this project)**
        D. A manhole connected to a pipe greater than 24 inches in diameter must have a channel depth equal to at least the largest pipe's diameter **(Self explanatory, but not applicable for this project)**.

E. A manhole with pipes of different sizes must have the tops of the pipes at the same elevation and flow channels in the invert sloped on an even slope from pipe to pipe. **(Self explanatory, but not applicable for this project).**

F. A bench provided above a channel must slope at a minimum of 0.5 inch per foot. **(Self Explanatory)**

G. An invert must be filleted to prevent solids from being deposited if a wastewater collection system pipe enters a manhole higher than 24 inches above a manhole invert. **(Self Explanatory, but not applicable for this project.)**

H. A wastewater collection system pipe entering a manhole more than 24 inches above an invert must have a drop pipe. **(Self Explanatory, but not applicable for this project.)**

m. The inclusion of steps in a manhole is prohibited. **(Self Explanatory, steps are not included in SAWS manhole Details)**

n. Connections. A manhole-pipe connection must use watertight, size-on-size resilient connectors that allow for differential settlement and must conform to American Society for Testing and Materials C-923. **(Self Explanatory, see SAWS Details Sheet C9.D1 and General Notes)**

o. Venting. An owner must use an alternate means of venting if manholes are at more than 1,500 foot intervals and gasketed manhole covers are required for more than three manholes in sequence. Vents must meet the following requirements: **(Self Explanatory)**

1. Vent design must minimize inflow;
2. Vents must be located above a 100-year flood event elevation; and
3. Tunnels must be vented in compliance with this subsection.

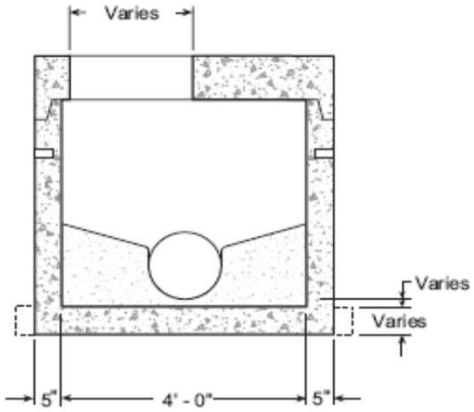
p. Cleanouts. The size of a cleanout must be equal to the size of the wastewater collection system main. **(Self Explanatory)**

Precast Manhole Information:

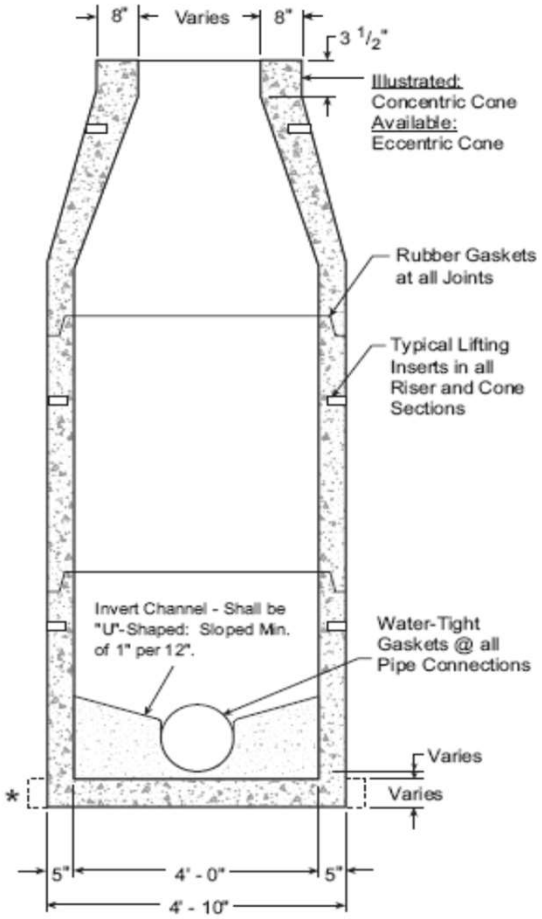
Hanson Pipe and Precast
Hanson Building Products West
300 E John Carpenter Freeway
11th floor
Irving, TX 75062
972.653.5500

San Antonio Metro Area Contact:
210.661.2351
866.426.7661

Precast Manholes



Flattop Illustration
for Shallow Manhole



Section View
4' I.D. Manhole - Regular Base
with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: Max diameter = 32"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Estimated weight of riser and cone sections = 870 lbs. / vt. ft.

* - Extended base is available to meet local requirements.

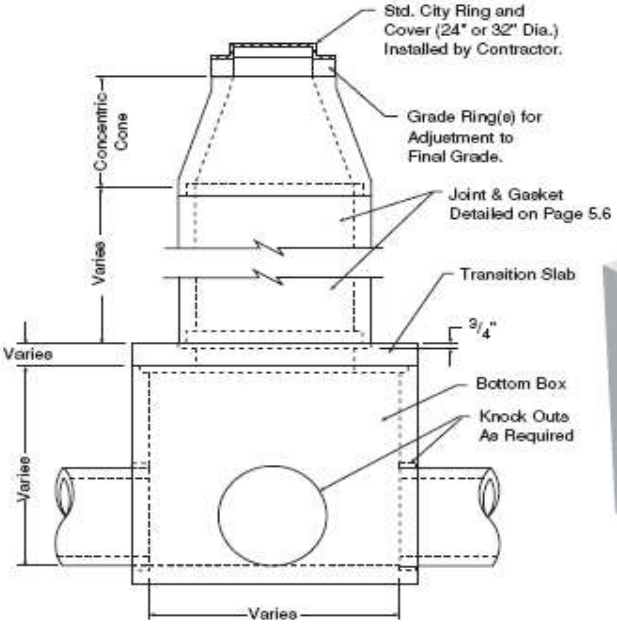
In the event a boot is loose contact your Hanson representative to resolve.

"Manufactured to your specifications."

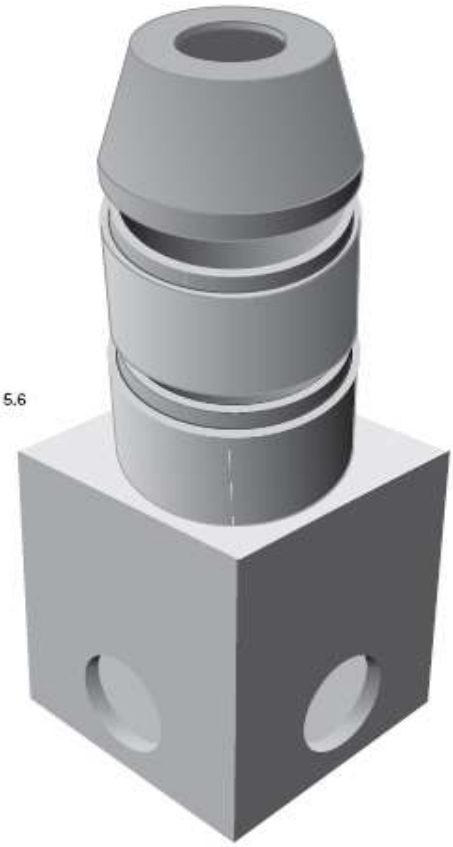
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
4' I.D. Manhole **Regular Base w / Reducing Cone**	All Plants	TX	5.5	07-01-06	Hanson

Precast Manholes



Side View



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

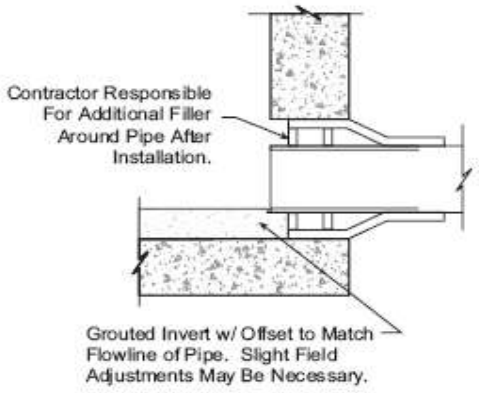
In the event a boot is loose contact your Hanson representative to resolve.

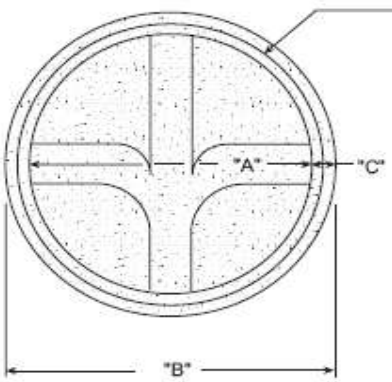
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Type "C" Manhole	Houston San Antonio	TX	5.11	07-01-06	Hanson

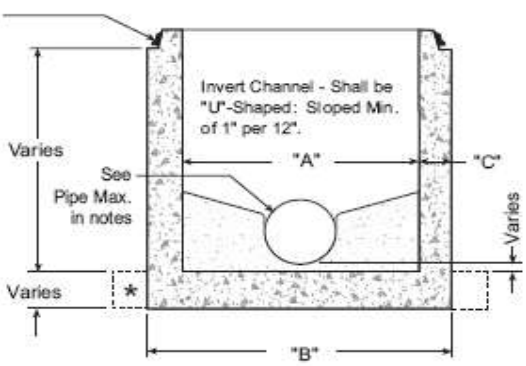
Precast Manholes

For Pipe Entering the Manhole at Excessive Depths Above the Flow Line Out, the Contractor May be Responsible for Grout Work Necessary to Bring Channel up to Flow Line on Inlet Pipe.





Plan View



Section View

Materials & Features

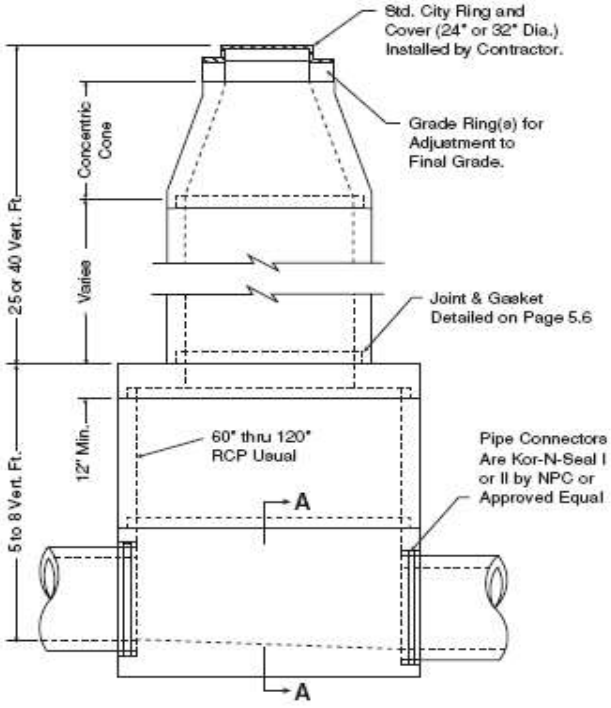
HOLES AS SPECIFIED:
For 4' I.D. max. diameter = 32"
For 5' I.D. max. diameter = 40"
For 6' I.D. max. diameter = 54"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Water-tight gaskets at all pipe connections.
* - Regular base shown: Extended base also available.
In the event a boot is loose contact your Hanson representative to resolve.

Pipe Size	I.D. "A"	O.D. "B"	Wall Thk. "C"
4'	4' - 0"	4' - 10"	5"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

-No Scale-
All dimensions subject to allowable specification tolerances.

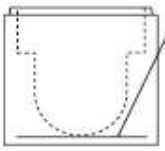
TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Details: 4', 5' & 6' I.D. Precast Regular Manhole Base	All Plants	TX	5.7	07-01-06	Hanson

Precast Manholes



w/ Precast Base

Isometric View



Section A-A

Base Slab Reinforcing

30' Deep Structure
60"ø - 6" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 8" Thick Slab min. - #5 @ 6" ea.way
96"ø - 10" Thick Slab min. - #5 @ 6" ea.way

45' Deep Structure
60"ø - 8" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 10" Thick Slab min. - #5 @ 6" ea.way
96"ø - 12" Thick Slab min. - #5 @ 6" ea.way

All Reinforcing has $1\frac{1}{2}$" cover from top of slab.

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615, Grade 60.

REINFORCING to meet AASHTO HS 20-44 Loading.

DESIGN EQUAL TO OR EXCEEDS ASTM C-478

In the event a boot is loose contact your Hanson representative to resolve.

Note:
- Inverts shall be specifically sized for connecting pipes; and shall be U-Shaped with the min. depth 3/4 of the largest pipe diameter.

-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
30 & 45 Ft. Depth 60" thru 96"Large Base Manhole	Houston San Antonio	TX	5.10	07-01-06	Hanson

ATTACHMENT B
UTILITY SERVICE AGREEMENT

VG-47-2022-20220274434

File Information

FILED IN THE OFFICIAL PUBLIC RECORDS OF BEXAR COUNTY
LUCY ADAME-CLARK, BEXAR COUNTY CLERK

Document Number:	20220274434
Recorded Date:	November 23, 2022
Recorded Time:	11:09 AM
Total Pages:	16
Total Fees:	$82.00

**** THIS PAGE IS PART OF THE DOCUMENT ****

**** Do Not Remove ****

Any provision herein which restricts the sale or use of the described real property because of race is invalid and unenforceable under Federal law

STATE OF TEXAS, COUNTY OF BEXAR

I hereby Certify that this instrument was FILED in File Number Sequence on this date and at the time stamped hereon by me and was duly RECORDED in the Official Public Record of Bexar County, Texas on:
11/23/2022 11:09 AM

COUNTY CLERK BEXAR COUNTY, TEXAS

Lucy Adame-Clark
Lucy Adame-Clark
Bexar County Clerk

UTILITY SERVICE AGREEMENT

STATE OF TEXAS §
§
COUNTY OF BEXAR §

This Utility Service Agreement ("Agreement") is entered into by and between the San Antonio Water System ("SAWS") and San Antonio 103 TX LLC ("Developer") together the Parties ("Parties").

Recitals

Whereas, Developer has requested that SAWS provide Water and Wastewater service (the "Services") to an approximate 71.56-acre tract of land, (the "Kamary Commons Tract" or "Tract"), which is located inside SAWS water CCN, inside SAWS wastewater CCN, and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required; and

Whereas, the Tract is located over the Edwards Aquifer Recharge or Contributing Zone, which is not located within the 5-mile Awareness Zone of Camp Bullis, such Tract being more particularly described in Attachment VI hereto, as accepted by SAWS; and

Whereas, SAWS desires to provide the Services to the Developer pursuant to this Agreement, the SAWS Utility Service Regulations, and all applicable local, state, and federal regulations, as amended.

Now Therefore, The Parties Hereto Agree To The Following Terms and Conditions:

1.00 Interpretation of Agreement.

1.01 The Parties acknowledge that the Services contemplated by this Agreement shall be provided in accordance with the SAWS Utility Service Regulations, Design Criteria, Schedules, Attachments and Instruments thereto, as amended (together "USR"). In the event the specific terms of this Agreement are in conflict with the USR, the specific terms of this Agreement shall apply. The above notwithstanding, for the specific conflicting terms to prevail, the conflict must be expressly noted in the Agreement. The Parties further acknowledge that this Agreement is subject to future acts of the City Council of the City of San Antonio with respect to the adoption or amendment of impact fee ordinances/resolutions.

1.02 The Parties agree that the purpose of this Agreement is the reservation of the designated water supply and /or wastewater discharge capacity for the Tract. Any rights that the Developer claims arise under Chapter 245, Texas Local Government Code, that are related to this Agreement shall comply with the Unified Development Code Article IV, Division 1, Chapter 35-410 and applicable requirements in Article VII, Division 2 *Vested Rights.* If Developer intends to rely on this USA as its application for the purposes of vested rights under Chapter 245, then please contact Development Services Department, Land Entitlement team at 210-207-1111 or 1901 S. Alamo,

Preparer's Initials

San Antonio, TX. 78204. In no event shall the Utility Service Regulations replace or conflict with the City's Unified Development Code, Article IV, Division 1, Chapter 35-410 and applicable requirements in Article VII, Division 2 *Vested Rights.*

2.00 Obligation Conditioned.

The obligation of SAWS to provide the Services is conditioned upon present rules, regulations and statutes of the United States of America and the State of Texas and any court order that directly affects the SAWS' Regional Water Production and Distribution System and/or Regional Wastewater Transportation and Treatment System and/or the utility infrastructure directly servicing the Tract. Developer acknowledges that if the rules, regulations and statutes of the United States of America and/or the State of Texas that are in effect upon the execution date of this Agreement are repealed, revised or amended to such an extent that SAWS becomes incapable of, or prevented from, providing the Services, then no liability of any nature is to be imposed upon SAWS as a result of SAWS' compliance with such legal or regulatory mandates. SAWS agrees that it will use its best efforts to prevent the enactment of such legal or regulatory mandates.

3.00 Term.

3.01 The term of this Agreement shall be seven (7) years from the Effective Date if the Developer complies with the requirements set out in G.C. 19.00 (attached) within the time period therein stated. This Agreement shall automatically expire if Developer fails to comply with the requirements of G.C. 19.00 within the time period therein provided. The term of this Agreement may be extended to fifteen (15) years from the Effective Date, if Developer complies with the requirements to extend the term set forth in G.C. 19.00 within the time period therein stated. Certain obligations of SAWS (described in Section 3.03 below) may survive the expiration of the term of this Agreement, to the extent that Developer has (i) paid all applicable impact fees for the Services at the then-current rate, and (ii) complied with all On-Site and Off-Site utility infrastructure requirements of this Agreement (described in the Special Conditions), including over-sizing requirements.

3.02 To the extent that SAWS' obligations do not survive the expiration of this Agreement, Developer understands and agrees that a new Utility Service Agreement must be entered into with SAWS to receive the Services for the development project that is the subject of this Agreement.

3.03 To the extent that Developer timely pays all applicable impact fees and complies with all On-Site and Off-Site utility infrastructure requirements prior to the expiration of this Agreement, the following obligations will survive expiration of this Agreement:

(i) SAWS' recognition of the EDUs referenced as the subject of this agreement as Guaranteed Capacity.

(ii) SAWS' continued recognition of impact fee credits previously earned by the Developer pursuant to Sections 15.8 and 15.9 of the USR.

Preparer's Initials _____

(iii) SAWS' continued provision of the Services to retail customers located in the Tract, so long as such customers pay for the services and comply with the regulations applicable to individual customers.

4.00 Entire Agreement.

The following documents attached hereto and incorporated herein are as fully a part of this Agreement as if herein repeated in full, together with this Agreement, comprise the Agreement in its entirety:

Attachment I:	General Conditions
Attachment II:	Special Conditions
Attachment III:	Description of Proposed Water and/or Wastewater Infrastructure
Attachment IV:	Board Summary & Recommendation and Resolution (if necessary)
Attachment V:	Developer Water and/or Wastewater Master Plan (if necessary)
Attachment VI:	Engineering Study Including Description of the Tract
Attachment VII:	Lift Station & Force Main Supplemental Agreement (if necessary)
Attachment VIII:	Water Recycling and Conservation Plan (if necessary)

Any of the above attachments that are created and submitted by the Developer as an attachment to this USA shall be limited to providing relevant engineering, planning or managing information for the purposes of setting aside or reserving water and/or wastewater service capacity as specified in the body of this USA, the General Conditions and the Special Conditions. Developer agrees that it will not attempt to rely on, and SAWS does not authorize, any of the contents of any attachments created and submitted by the Developer as a basis for claiming rights under Chapter 245 of the Texas Local Government Code, except as specifically required by Section 1.02 of this USA.

Developer understands that this Agreement, including, its General Conditions, Special Conditions and Attachments, is subject to the Texas Public Information Act; and, therefore, agrees that it will not claim that any of the information contained herein is subject to any third party exception under that Act.

5.00 Developer's Obligations.

The Developer acknowledges and agrees that the capacity provided by this Agreement runs with the land and shall be an appurtenance to the Tract. The Developer acknowledges that recordation of this Agreement in the Real Property Records of the County in which the Tract is located within three (3) years of the Effective Date of this Agreement is required; otherwise, this Agreement will automatically terminate. Developer shall record the Agreement and the delivery of a recorded copy to the Director within three (3) years of the Effective date of this Agreement or before any transfer of property or EDUs as specified in G.C. 20.00, whichever is sooner, is required. The Developer shall maintain records of EDU's remaining on the Tract pursuant to the approved Developer Master Plan. Developer shall provide SAWS with such records upon SAWS written request.

Preparer's Initials

6.00 Indemnity.

TO THE EXTENT ALLOWED BY LAW AND TEXAS CONSTITUTION, THE DEVELOPER FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS SAWS AND ITS SUCCESSOR AND ASSIGNS FROM THE CLAIMS OF THIRD PARTIES ARISING OUT OF SAWS' RECOGNITION OF THE TRANSFER OF CAPACITY UNDER THIS AGREEMENT TO DEVELOPER'S SUBSEQUENT PURCHASERS, SUCCESSORS AND ASSIGNS.

7.00 Notices.

Any notice, request, demand, report, certificate or other instrument which may be required or permitted to be furnished to or served upon the parties shall be deemed sufficiently given or furnished or served if in writing and deposited in the United States mail, registered or certified, return receipt requested, addressed to such party at the address set forth below:

IF TO SAN ANTONIO WATER SYSTEM:

SAN ANTONIO WATER SYSTEM
POST OFFICE BOX 2449
SAN ANTONIO, TEXAS 78298-2449
ATTN: TRACEY B. LEHMANN, P.E., DIRECTOR, DEVELOPMENT ENGINEERING

IF TO DEVELOPER:

San Antonio 103 TX LLC
30 N. Gould Street, Suite R
Sheridan, Wyoming 82801
Attn: Robert Ritzenthaler

8.00 Severability.

If for any reason any one or more paragraph of this Agreement are held legally invalid, such judgment shall not prejudice, affect impair or invalidate the remaining paragraphs of the Agreement as a whole, but shall be confined to the specific sections, clauses, or paragraphs of this contract held legally invalid.

9.00 Effective Date.

The Effective Date of this Agreement shall be the date signed by the authorized representative of the San Antonio Water System.

10.00 Ownership.

By signing this Agreement the Developer represents and warrants that it is the owner of the Tract or has the authority of the Tract owner to develop the area. Any misrepresentation of authority or ownership by Developer shall make this Agreement voidable by SAWS. If the Developer does not own the Tract, then the Developer must provide documentation from the owner of the Tract to show that Developer has the proper authority to develop the Tract.

Preparer's Initials 

ACCEPTED AND AGREED TO IN ALL THINGS:

San Antonio Water System	**Developer**
Signature:	**Signature:**
Print Name: Robert R. Puente	**Print Name:** R. Ritzenthaler
Title: President/Chief Executive Officer	**Title:** Mgr.
Date: 11/18/22	**Date:** 10-20-22

ACKNOWLEDGEMENTS

STATE OF ~~TEXAS,~~ COUNTY OF ~~BEXAR~~ §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Robert Ritzenthaler known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as MANAGER for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 20 **day of** OCT **, 2022.**

(seal)

LISA PIERSIMONI-LEVY
Notary Public - State of Florida
Commission # HH 093396
My Comm. Expires Feb 15, 2025

Notary Public

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Robert R Puente known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as President / CEO for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 18 **day of** November **, 2022.**

(seal)

CAROLINE G. GONZALES
My Notary ID # 130329928
Expires August 13, 2023

Notary Public

Preparer's Initials

GENERAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

G.C.1.00 Definitions.

G.C.1.01 Developer.

Owner of the tract, his subsequent purchasers, successors, and/or assigns.

G.C.1.02 Director of Development Engineering.

The Director of Development Engineering of the San Antonio Water System or his/her designated representative.

G.C. 1.03 Definition of Terms.

Unless defined in the Utility Service Agreement (the "Agreement"), the terms used in this General Conditions of the Utility Service Agreement (the "General Conditions") shall have the same definitions and meaning as those set out in Chapter 2, Definitions, of the Utility Service Regulations ("USR"). In the event a term is specifically defined in the General Conditions, and the definition is in conflict with that found in the USR, and such conflict is acknowledged in the General Conditions, the definition set out in the General Conditions shall apply.

G.C.2.00 Required Submittals.

If determined to be necessary by the Director of Development Engineering ("Director"), the Developer hereby agrees to submit the following documents prior to the execution of the Agreement: Developer Master Plan, Developer Utility Layout, Water Recycling and Conservation Plan, and Engineering Report. The Parties agree that such documents are included instruments to the Agreement. The submittal of such documents is a condition precedent to plat recordation and initiation of Services. Developer shall modify such documents as may be reasonably required by the Director. Such documents shall be updated as required by the Director and the USR.

G.C.3.00 Dedication to SAWS.

The Developer agrees to dedicate, grant, and convey to SAWS all rights, title and interest of Developer in both the Off-Site and On-Site utility infrastructure that the Developer is required to construct under the Special Conditions of the Utility Service Agreement (the "Special Conditions"), and to dedicate, grant, and convey to SAWS easements for such utility infrastructure. Upon written acceptance of Off-Site and On-Site utility infrastructure by SAWS, the infrastructure shall be owned, operated and maintained by SAWS.

G.C.4.00 Design and Construction Requirements.

The design and construction of all Off-Site and On-Site utility infrastructure shall, at a minimum, comply with the requirements established by SAWS, including the USR, the City of San Antonio, the County of Bexar, the State of Texas, and any agency thereof with jurisdiction, including but not limited to the Texas Commission on Environmental Quality and the Texas Department of Health. Off-Site and On-Site utility infrastructure shall be constructed under the inspection of SAWS. Provision of the Services to the Tract shall not commence until the Director has accepted and approved Off-Site and On-Site utility infrastructure in writing.

G.C.5.00 Joint Venture Agreements.

In the event the Developer enters into a Joint Venture Agreement covering the costs for supplying the Services to the Tract, the Developer shall send a copy of such agreement to the attention of the Director.

G.C.6.00 Assignment.

This Agreement may not be assigned in whole or in part; however, Developer may assign, convey or transfer EDU capacity ("EDU capacity transfer") to buyers of portions of the Tract in accordance with the terms in G.C. 20.00.

G.C.7.00 Event of Foreclosure.

In the event Developer's interest in the Tract described in Attachment VI are extinguished by an act of foreclosure, and the foreclosing party has supplied sufficient evidence to SAWS that they are the successor in interest to the Tract as a result of such foreclosure, and that there are no lawsuits pending concerning the Tract, SAWS shall consider the foreclosing party a successor in interest if the foreclosing party executes a utility service agreement with SAWS after the Director determines that the execution of such an agreement will not be adverse to SAWS' interest.

G.C.8.00 Payment for Provision of Utility Service.

In the event payment for the Services provided to a subdivision plat within the Tract is not billed by SAWS, the amount of the monthly fees for the provision of the Services will be those charged to the various customer classifications as set by City Ordinances, with the billing and collection thereof on behalf of SAWS, being the responsibility of the billing utility purveyor. To facilitate this arrangement, Developer is to insert into any utility agreement with whatever utility purveyor is to bill for utility services to a subdivision plat within the Tract, a provision requiring said purveyor to enter into a Contract with SAWS to bill and collect SAWS' monthly utility services fees and transmit said fees to SAWS. The billing utility purveyor shall advise customers that delinquent non-payment of any of SAWS' fees will result in interruption and/or termination of the Services provided by SAWS, in accordance with applicable interruption and termination policies and procedures, as amended. SAWS shall not be obligated to provide the Services to any plat within the Tract unless and until the utility purveyor has executed a contract with SAWS to provide for the billing and collection of the Services provided by SAWS.

G.C.9.00 Enforcement of Industrial Waste Ordinance if Required by SAWS.

The Developer shall cause to be recorded in the Deed and Plat Records of the counties in which the Tract is located, a restrictive covenant covering the entire Tract. This restrictive covenant shall run with the land in the Tract described in Attachment VI. Such covenant shall contain language expressly granting to SAWS the right, should SAWS so elect, to enforce and or otherwise pursue to the extent provided at law or in equity, the provisions of the City's Industrial Waste Ordinance No. 57214, as amended or as may be amended (codified as Chapter 34, Article V, Division 3 of the City Code). SAWS' right shall include, to the extent provided at law or in equity, the right to inspection, sampling and monitoring of the collection system to assure ordinance compliance.

Recordation of the Covenant shall be a condition precedent for SAWS' provision of the Services to any portion of said Tract.

G.C.10.00 Oversizing.

Developer must pay for all mains and other utility facilities needed to serve the Tract. SAWS may require the installation of oversized water mains and wastewater mains and related facilities. SAWS' requirements for over-sizing, if any, are set forth in the Special Conditions. SAWS will execute a trilateral contract with Developer and a contractor for the construction of oversized facilities. Contracts for the construction of oversized facilities must be competitively bid as required by law. All oversizing shall be done in accordance with the USR.

G.C.11.00 Off-Site /On-Site Facilities.

Developer shall construct and install all required Off-Site and On-Site utility infrastructure in accordance with the USR and Special Conditions, at no cost to SAWS. Any specific requirements related to the facilities are set forth in the Special Conditions.

G.C.12.00 Impact Fee Payment.

Developer agrees that the Agreement does not constitute an assessment of impact fees. Developer agrees to pay all applicable impact fees at the time and in the amount prescribed by ordinance or resolution of the City Council of the City of San Antonio and the USR, as amended. An estimate of the impact fees for the development Tract is provided in the Special Conditions. The estimate does not constitute an assessment of impact fees, and the amount of impact fees is subject to change by the City Council of the City of San Antonio as provided by law.

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G.C.13.00 SAWS' Obligation to Supply Service.

To the extent that Developer pays all applicable impact fees and complies with all Off-Site and On-Site utility infrastructure requirements, Developer shall be entitled to the permanent use and benefit of the Services and is entitled to receive immediate service from any existing facilities with actual capacity to serve the development for which impact fees were paid, subject to compliance with other valid regulations. If, after collecting the impact fees, there is no actual capacity in existing facilities to provide the Services, SAWS will provide the Services within a reasonable period of time not to exceed five (5) years, as prescribed by Chapter 395 of the Local Government Code, as amended. In the event Services are required by Developer earlier than the five (5) year period, Developer and SAWS may agree that Developer may construct or finance the capital improvements or facility expansions required to provide Services, and the costs incurred or funds advanced will be credited against impact fees otherwise due from the new development or reimbursed to Developer from impact fees paid from other new developments that will use such capital improvements or facility expansions, which fees shall be collected and reimbursed to Developer at the time the other new development records it plat.

G.C.14.00 Facility Design and Construction.

The Developer shall design and construct all On-Site and Off-Site utility infrastructure described in the Special Conditions, including any oversizing, in accordance with the USR and all applicable local, state and federal requirements. Developer further recognizes that SAWS' approval in all respects as to facility right-of-way adequacy, location, size, grade and invert elevation is a condition precedent to any further obligation of SAWS. Specific design and construction requirements are set forth in the Special Conditions.

G.C.15.00 Use of Capacity by SAWS.

Developer understands that capacity in Off-Site and On-Site utility infrastructure resulting from the Agreement for the Tract may be utilized by SAWS for other tracts requesting service from SAWS. SAWS shall keep accurate records of the capacity provided to the Tract under the Agreement, whether Set-Aside or Guaranteed Capacity, and in no event will Developer be denied capacity as a result of SAWS' utilization of such capacity for another tract. Set-Aside capacity shall not survive the expiration of the Agreement.

G.C.16.00 Utility Master Plan Requirements.

The Developer will prepare a utility master plan, which details the water and/or wastewater systems for the Tract pursuant to the USR, as amended.

G.C.17.00 Phased Utility Master Plans.

If the Developer's water and/or wastewater systems are to be installed in phases or units, the Developer shall submit overall utility master plans to SAWS for review and approval. The overall utility master plan(s) shall be submitted before the first construction phase is submitted for plat approval. The overall utility master plan(s) shall show the development phases or units including the sequence and a timetable for build-out. The Developer shall also provide SAWS with a digital version of the proposed recorded plat, as submitted for plat recordation in a format acceptable to SAWS, for each phase or unit of the devolvement project.

G.C.18.00 Conformance of Plans to Utility Master Plan.

All water and wastewater system facilities to serve the Tract shall be designed and constructed in conformance with the approved utility master plan. Changes in the water and wastewater system design shall be resubmitted to SAWS for written approval.

G.C.19.00 Timing Requirements for Submission of Plans.

Developer shall have three (3) years from the Effective Date of the Agreement to complete and submit the required utility master plan and to start construction of the Off-Site and On-Site utility infrastructure described in the Special Conditions. Developer agrees that the Agreement for the provision of Services shall automatically expire if Developer

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has not submitted a utility master plan and started construction of required Off-Site and On-Site utility infrastructure within three (3) years of the Effective Date of the Agreement, and a new request for the Services must be submitted to SAWS, which SAWS will grant based on then existing policies and regulations. In the event Developer meets the above-mentioned requirements within the three (3) year period provided, the Agreement shall remain in effect for seven (7) years from the Effective Date. If Developer submits a revised Utility Master Plan in accordance with the USR prior to the expiration of the seven (7) year period, the Agreement for the provision of Services may be extended to a maximum term of fifteen (15) years from the Effective Date.

G.C. 20.00 EDU Transfers.

The transfer of EDU capacity outside the original boundaries of this Utility Service Agreement will not be allowed. The San Antonio Water System considers this Agreement to run with the land; however, EDU capacity transfers to subdivided tracts within the Tract of this Agreement are the responsibility of the Developer and approval of such transfers is not required by the San Antonio Water System. The Developer shall maintain an accounting of the EDU capacity that is used by the Developer and/or transferred after the effective date of this Agreement to portions of the Tract. If the Developer sells a portion of the Tract and transfers part of the EDU capacity contained in this Agreement, then that EDU capacity transfer must be included in the deed, bill of sale or instrument conveying the land and the Developer must require the buyer of the land who receives the allocated EDUs to record the instrument effectuating the transfer. Developer may file a Master Development Plan or an EDU Plan, prepared by an engineer, that shows specific EDU capacity allocations within the Tract and shall ensure that the Master Development Plan or EDU Plan is attached to this Agreement and properly recorded. SAWS will recognize the capacity allocations within the Master Development Plan or EDU Plan so long as those allocations are within the parameters of this Agreement. For properties that have areas of unplanned use, the demand will be calculated at four (4) EDUs per acre unless the engineering report specifies otherwise or there is not enough EDU capacity remaining for the Tract to allocate four (4) EDUs per acre.

In no event will the System be responsible to 3rd parties for providing water supply or wastewater discharge capacity beyond the total EDU capacity identified in this Agreement for the Tract. Developer expressly disclaims, releases and holds harmless SAWS from any liability, damages, costs or fees, and agrees to indemnify SAWS for any liability, including, costs and attorney's fees, associated with any dispute related to the transfer of all or a portion of EDU capacity approved for the Tract in this Utility Services Agreement.

G.C. 21.00 Camp Bullis Awareness Zone.

In the event that the Tract is located within, or partially within, the Camp Bullis Awareness Zone, the Developer acknowledges that certain lighting regulations may apply within at least a 3-mile radius of Camp Bullis, commonly referred to as down-lighting or dark sky lighting, and Developer will comply with those regulations. Developer agrees to comply with any local, state or federal law, rule or regulation related to the protection of the environment or endangered species, including but not limited to, any site assessments or surveys and notice to the United States Fish & Wildlife when required by law, rule or regulation. Developer acknowledges that any required assessment, survey or notice shall be current or updated as may be required by law, rule or regulation.

G.C. 22.00 Written Project Information.

The project associated with this Utility Service Agreement is described in the forms submitted by the applicant including but not limited to 1) a cover sheet clearly stating "USA Request" and the project name; 2) the Engineering Report; and 3) a legal description, metes and bounds description, or Master Development Plan (MDP), subdivision plat, or similar document of the Tract.

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SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Kamary Commons, a 71.56-acre tract inside the City of San Antonio limits, is located approximately 2,000 LF northeast of the intersection of Bandera Rd and N Loop 1604 W, as shown in Attachment VI (the "Tract"). The Tract is located over the Edwards Aquifer Recharge or Contributing Zone and is not located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board Action is not required.

The ultimate demand from the proposed development, on SAWS' water infrastructure, shall not exceed 750 equivalent dwelling units (EDUs) of water supply.

S.C.2.00 Infrastructure Requirements.

Water Supply to the Tract will be from Pressure Zone (PZ) 1170. The flow capacity of a 12-inch main is required to supply water to the 71.56-acre Tract, in conformance with SAWS' Utility Service Regulations (USR).

The Developer shall construct a 12-inch main from the existing 12-inch main (Job No. 01-1145) to traverse the Tract, to the existing 24-inch main on N Loop 1604 W, as shown in attachment III.

The Developer shall connect services to the proposed 12-inch main traversing the Tract, the existing 16-inch main (Job No. 87-3127) located on Bandera Rd, the existing 12-inch main (Job No. 20-1204) traversing the Tract, the existing 8-inch and 12-inch mains (Job No. 97-1068) located along the Tract, and/or the existing 12-inch main (Job No. 01-1145) located along the southern boundary of the Tract, as shown in Attachment III.

S.C. 3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Kamary Commons, Utility Service Agreement Engineering Report", by Cude Engineers, dated May 2022 is included as Attachment VI.

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S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer shall acquire any right-of-way or easements, and install all On-Site and Off-Site utility infrastructure required to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless otherwise stated in S.C.3.00 or S.C.4.00. Other On-Site requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Requirement to Install Approved Pressure Regulators and/or Booster Pumps.

The entire Tract is below ground elevation of 985 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

S.C.8.00 Time for Water Impact Fee Assessment and Payment.

Water Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Impact fees will be collected at either the time of plat recordation or connection to the SAWS' water system, at the discretion of the Developer.

S.C.9.00 Water Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on current impact fee rates. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by the San Antonio City Council.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Flow Development	750	$1,188	$891,000
System Development Middle	750	$1,014	$760,500
Water Supply	750	$2,706	$2,029,500
Total			$3,681,000

S.C.10.00 Pro-Rata Charge Requirement.

Developer shall be required to pay a Pro-Rata Charge pursuant to the USR, as amended, prior to connection to the SAWS water system if Developer is tying into a main that is subject to a pro-rata refund.

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SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WASTEWATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Kamary Commons, a 71.56-acre tract inside the City of San Antonio limits, is located approximately 2,000 LF northeast of the intersection of Bandera Rd and N Loop 1604 W, as shown in Attachment VI (the "Tract") and lies within SAWS' Upper Collection and Treatment Area (UCTA). The Tract is located over the Edwards Aquifer Recharge or Contributing Zone and is not located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board Action is not required.

The ultimate demand from the proposed development, on SAWS' wastewater infrastructure, shall not exceed 750 equivalent dwelling units (EDUs) of wastewater discharge.

S.C.2.00 Infrastructure Requirements.

The Tract is situated within SAWS' Upper Collection and Treatment Area (UCTA) and lies within the Upper Leon Creek Watershed. The capacity of an 12-inch gravity main at 0.24 percent minimum slope is required to provide wastewater service to the Tract, in conformance with SAWS' USR.

The Developer may connect a maximum of 750 EDUs of total capacity to a combination of the existing 10-inch gravity sewer main (Job No. 97-1559) on N Loop 1604 W and the existing 18-inch gravity sewer main (Job No. 98-1618) located north of the Tract.

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Kamary Commons, Utility Service Agreement Engineering Report", by Cude Engineers, dated May 2022 is included as Attachment VI.

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S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer will also be required to acquire any right-of-way and easements, install all On-Site and Off-Site utility infrastructure, and upgrade existing lift stations necessary to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site utility infrastructure requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Lift Stations and Force Mains.

Lift stations and force mains are only allowed by prior written supplemental agreement with SAWS. Applicable fees, as set out in the supplemental agreement, must be paid in full prior to service connection. Whenever a lift station is proposed, a Present Value analysis of the lift station vs. gravity solutions, shall be included in the Engineering Report/Study in conformance with the requirements of SAWS' USR.

S.C.8.00 Time for Wastewater Impact Fee Assessment and Payment.

Wastewater Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Wastewater Impact Fees will be collected at either the time of plat recordation or connection to the SAWS wastewater system, at the discretion of the Developer.

S.C.9.00 Wastewater Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on impact fee rates in effect as of the Effective Date of the Agreement. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by action of the San Antonio City Council as permitted by law.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Wastewater Collection Upper	750	$2,800	$2,100,000
Wastewater Treatment Dos Rios/Leon Creek	750	$651	$488,250
Total			$2,588,250

S.C.10.00 Pro-Rata Payment Fee Requirement.

Developer shall be required to pay a pro-rata fee pursuant to the USR, as amended, prior to connection to the wastewater system, if Developer is tapping into a main that is subject to a pro-rata refund.

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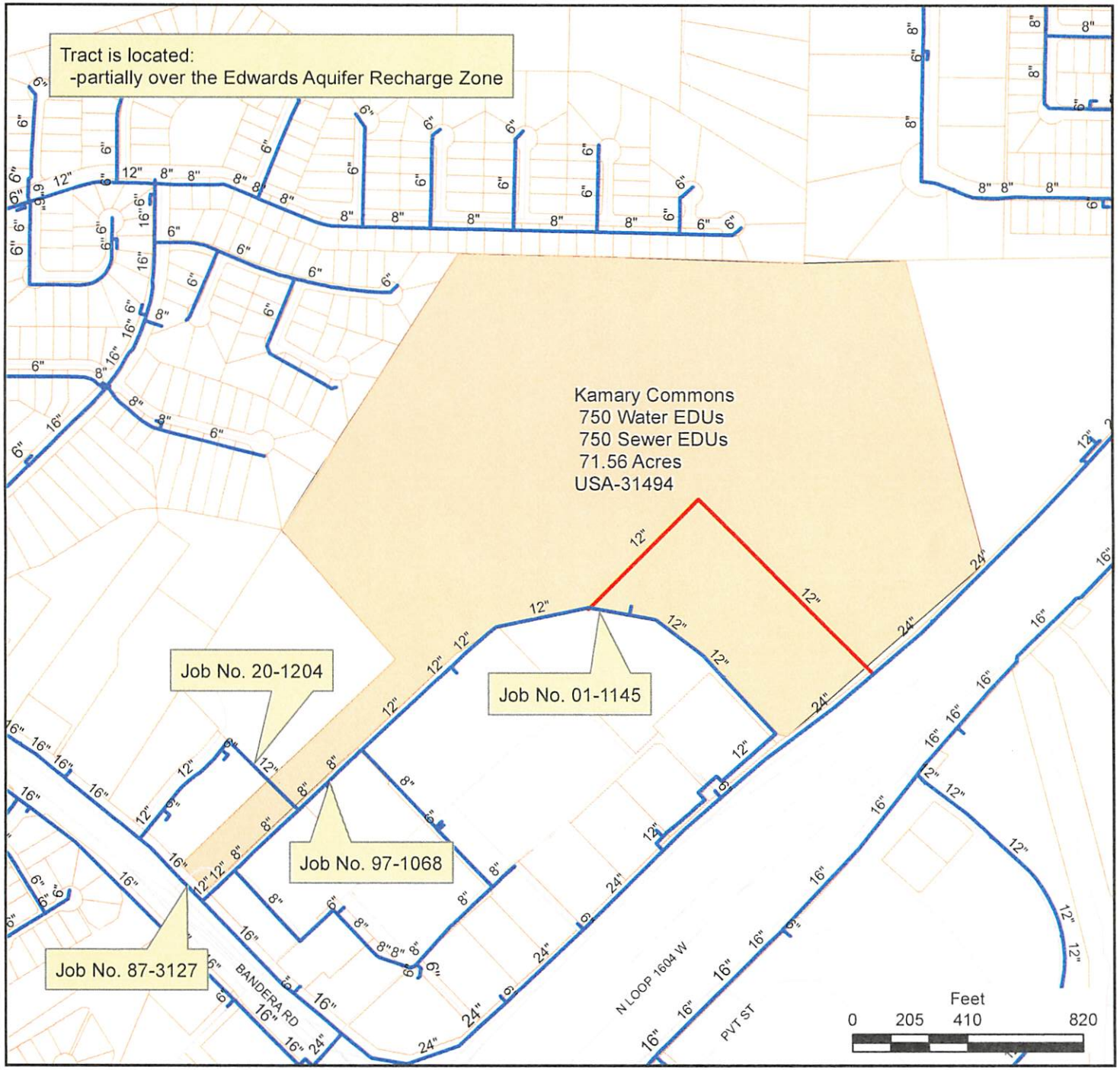


Attachment III:
USA-31494
"Kamary Commons" Tract
Proposed Water Infrastructure Map
71.56 Acres

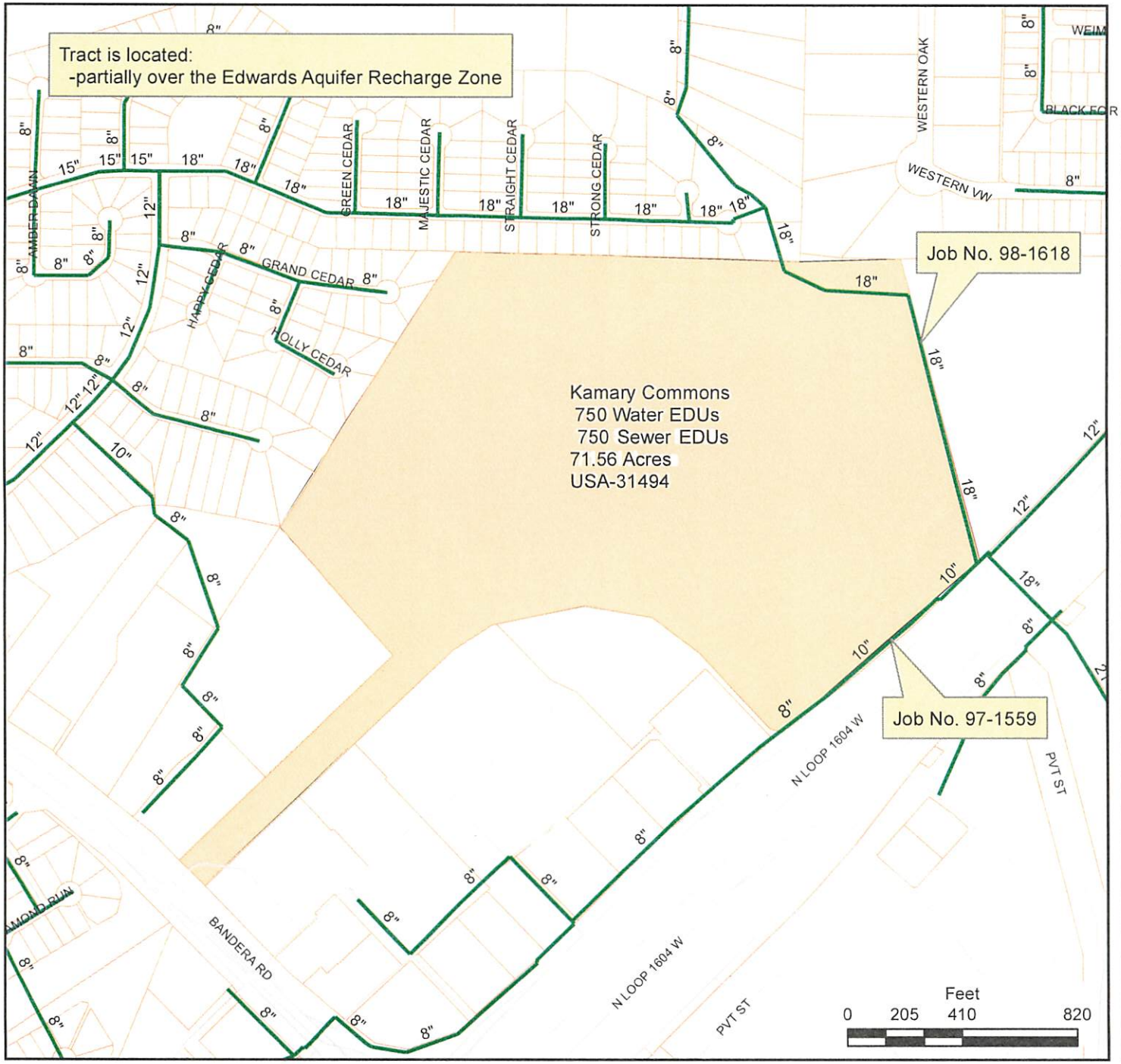
San Antonio Water System

Legend

- Parcels Update
- USA Tract
- Existing Water Main
- Proposed Water Main

Project Location

N



Attachment III:
USA-31494
"Kamary Commons" Tract
Proposed Sewer Infrastructure Map
71.56 Acres

San Antonio Water System

Legend

- Parcels Update
- USA Tract
- Existing Sewer Main

Project Location

ATTACHMENT C

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Texas Commission on Environmental Quality
Organized Sewage Collection System
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, 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, 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 Executive Director, 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, Texas Administrative Code, 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 Executive Director'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, Texas Administrative Code § 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 Executive Director to any part of Title 30 Texas Administrative Code, Chapters 213 and 217, or any other TCEQ applicable regulation.

1. This Organized Sewage Collection System (SCS) must be constructed in accordance with 30 Texas Administrative Code (TAC) §213.5(c), the Texas Commission on Environmental Quality's (TCEQ) Edwards Aquifer Rules and any local government standard specifications.

2. All contractors conducting regulated activities associated with this proposed regulated project must be provided with copies of the SCS plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors must be required to keep on-site copies of the plan and the approval letter.

3. A written notice of construction must be submitted to the presiding 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.

4. Any modification to the activities described in the referenced SCS application following the date of approval may require the submittal of an SCS application to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval.

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 manufacturers specifications. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The applicant must immediately notify the appropriate regional office of the TCEQ of the feature discovered. A geologist's assessment of the location and extent of the feature discovered must be reported to that regional office in writing and the applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the

executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

7. Sewer lines located within or crossing the 5-year floodplain of a drainage way will be protected from inundation and stream velocities which could cause erosion and scouring of backfill. The trench must be capped with concrete to prevent scouring of backfill, or the sewer lines must be encased in concrete. All concrete shall have a minimum thickness of 6 inches.

8. Blasting procedures for protection of existing sewer lines and other utilities will be in accordance with the National Fire Protection Association criteria. Sand is not allowed as bedding or backfill in trenches that have been blasted. If any existing sewer lines are damaged, the lines must be repaired and retested.

9. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.

   The diameter of the manholes must be a minimum of four feet and the manhole for entry must have a minimum clear opening diameter of 30 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC §217.55 are included on Plan Sheet 9 of 9.

   It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. The inclusion of steps in a manhole is prohibited.

10. Where water lines and new sewer line are installed with a separation distance closer than nine feet (i.e., water lines crossing wastewater lines, water lines paralleling wastewater lines, or water lines next to manholes) the installation must meet the requirements of 30 TAC §217.53(d) (Pipe Design) and 30 TAC §290.44(e) (Water Distribution).

11. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: N/A.

    If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: N/A.

    Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §217.54.

12. New sewage collection system lines must be constructed with stub outs for the connection of anticipated extensions. The location of such stub outs must be marked on the ground such that their location can be easily determined at the time of connection of the extensions. Such stub outs must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new stub-outs must be constructed sufficiently to extend beyond the end of the street pavement. All stub-outs must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with stub outs must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.

If no stub-out is present an alternate method of joining laterals is shown in the detail on Plan Sheet 9 of 9. (For potential future laterals).

The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet 9 of 9 and marked after backfilling as shown in the detail on Plan Sheet 9 of 9.

13. Trenching, bedding and backfill must conform with 30 TAC §217.54. The bedding and backfill for flexible pipe must comply with the standards of ASTM D-2321, Classes IA, IB, II or III. Rigid pipe bedding must comply with the requirements of ASTM C 12 (ANSI A 106.2) classes A, B or C.

14. Sewer lines must be tested from manhole to manhole. When a new sewer line is connected to an existing stub or clean-out, it must be tested from existing manhole to new manhole. If a stub or clean-out is used at the end of the proposed sewer line, no private service attachments may be connected between the last manhole and the cleanout unless it can be certified as conforming with the provisions of 30 TAC §213.5(c)(3)(E).

15. All sewer lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:

(a) For a collection system pipe that will transport wastewater by gravity flow, the design must specify an infiltration and exfiltration test or a low-pressure air test. A test must conform to the following requirements:

(1) *Low Pressure Air Test.*

(A) A low pressure air test must follow the procedures described in American Society For Testing And Materials (ASTM) C-828, ASTM C-924, or ASTM F-1417 or other procedure approved by the executive director, except as to testing times as required in Table C.3 in subparagraph (C) of this paragraph or Equation C.3 in subparagraph (B)(ii) of this paragraph.

(B) For sections of collection system pipe less than 36 inch average inside diameter, the following procedure must apply, unless a pipe is to be tested as required by paragraph (2) of this subsection.

(i) A pipe must be pressurized to 3.5 pounds per square inch (psi) greater than the pressure exerted by groundwater above the pipe.

(ii) Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge is computed from the following equation:

Equation C.3 $$T = \frac{0.085 \times D \times K}{Q}$$

Where:

T = time for pressure to drop 1.0 pound per square inch gauge in seconds

K = 0.000419 X D X L, but not less than 1.0

D = average inside pipe diameter in inches

L = length of line of same size being tested, in feet
Q = rate of loss, 0.0015 cubic feet per minute per square foot internal surface

(C) Since a K value of less than 1.0 may not be used, the minimum testing time for each pipe diameter is shown in the following Table C.3:

Pipe Diameter *(inches)*	**Minimum Time** *(seconds)*	**Maximum Length for Minimum Time** *(feet)*	**Time for Longer Length** *(seconds/foot)*
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) An owner may stop a test if no pressure loss has occurred during the first 25% of the calculated testing time.

(E) If any pressure loss or leakage has occurred during the first 25% of a testing period, then the test must continue for the entire test duration as outlined above or until failure.

(F) Wastewater collection system pipes with a 27 inch or larger average inside diameter may be air tested at each joint instead of following the procedure outlined in this section.

(G) A testing procedure for pipe with an inside diameter greater than 33 inches must be approved by the executive director.

(2) *Infiltration/Exfiltration Test.*

(A) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole.

(B) An owner shall use an infiltration test in lieu of an exfiltration test when pipes are installed below the groundwater level.

(C) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of a pipe at an upstream manhole, or at least two feet above existing groundwater level, whichever is greater.

(D) For construction within a 25-year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head as in subparagraph (C) of this paragraph.

(E) If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, an owner shall undertake remedial action in order to reduce

the infiltration or exfiltration to an amount within the limits specified. An owner shall retest a pipe following a remediation action.

(b) If a gravity collection pipe is composed of flexible pipe, deflection testing is also required. The following procedures must be followed:

(1) For a collection pipe with inside diameter less than 27 inches, deflection measurement requires a rigid mandrel.

(A) *Mandrel Sizing.*

(i) A rigid mandrel must have an outside diameter (OD) not less than 95% of the base inside diameter (ID) or average ID of a pipe, as specified in the appropriate standard by the ASTMs, American Water Works Association, UNI-BELL, or American National Standards Institute, or any related appendix.

(ii) If a mandrel sizing diameter is not specified in the appropriate standard, the mandrel must have an OD equal to 95% of the ID of a pipe. In this case, the ID of the pipe, for the purpose of determining the OD of the mandrel, must equal be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe.

(iii) All dimensions must meet the appropriate standard.

(B) *Mandrel Design*.

(i) A rigid mandrel must be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.

(ii) A mandrel must have nine or more odd number of runners or legs.

(iii) A barrel section length must equal at least 75% of the inside diameter of a pipe.

(iv) Each size mandrel must use a separate proving ring.

(C) *Method Options.*

(i) An adjustable or flexible mandrel is prohibited.

(ii) A test may not use television inspection as a substitute for a deflection test.

(iii) If requested, the executive director may approve the use of a deflectometer or a mandrel with removable legs or runners on a case-by-case basis.

(2) For a gravity collection system pipe with an inside diameter 27 inches and greater, other test methods may be used to determine vertical deflection.

(3) A deflection test method must be accurate to within plus or minus 0.2% deflection.

(4) An owner shall not conduct a deflection test until at least 30 days after the final backfill.

(5) Gravity collection system pipe deflection must not exceed five percent (5%).

(6) If a pipe section fails a deflection test, an owner shall correct the problem and conduct a second test after the final backfill has been in place at least 30 days.

16. All manholes must be tested to meet or exceed the requirements of 30 TAC §217.58.

(a) All manholes must pass a leakage test.

(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.

(1) Hydrostatic Testing.

(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.

(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.

(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.

(2) Vacuum Testing.

(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.

(B) No grout must be placed in horizontal joints before testing.

(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.

(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.

(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.

(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.

(G) A test does not begin until after the vacuum pump is off.

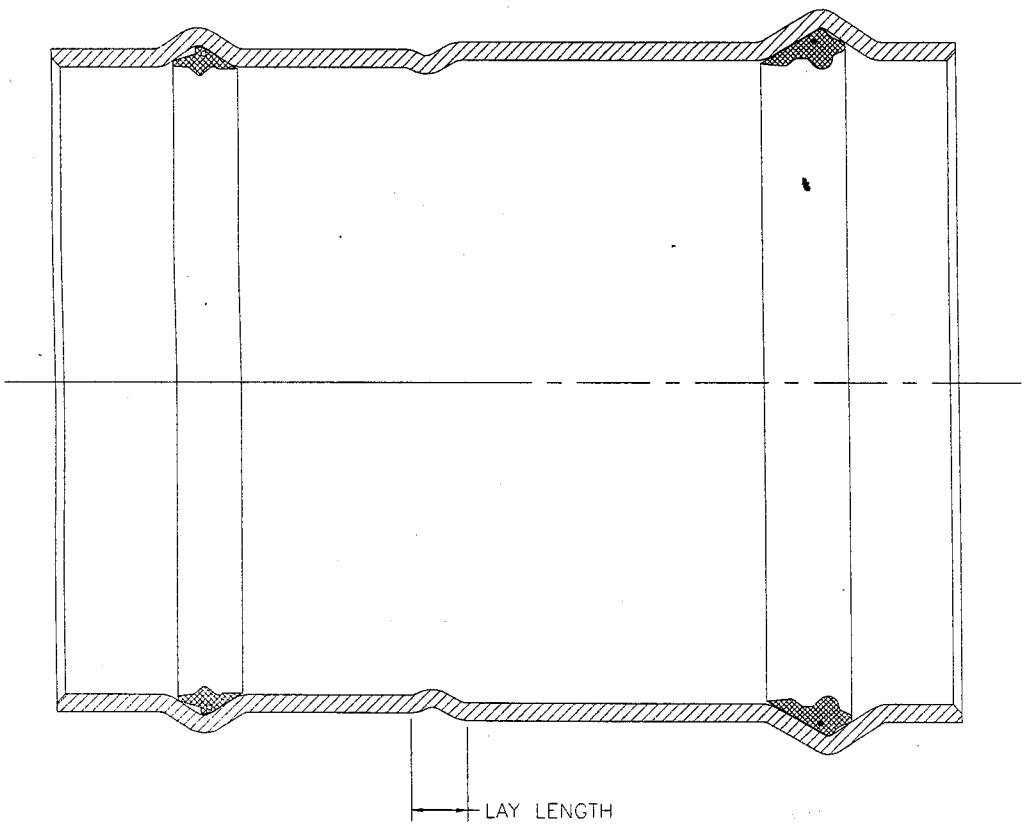
(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

17. All private service laterals must be inspected and certified in accordance with 30 TAC §213.5(c)(3)(I). After installation of and, prior to covering and connecting a private service lateral to an existing organized sewage collection system, a Texas Licensed Professional Engineer, Texas Registered Sanitarian, or appropriate city inspector must visually inspect the private service lateral and the connection to the sewage collection system, and certify that it is constructed in conformity with the applicable provisions of this section. The owner of the collection system must maintain such certifications for five years and forward copies to the appropriate regional office upon request. Connections may only be made to an approved sewage collection system.

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.

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATE BORDER & NOTES	12/7/07	SH



ALL DIMENSIONS ARE APPROXIMATE

PART NUMBER: 4619-0802i

DESCRIPTION: 8" PSM SDR26 X IPS

LAY LENGTH: 1.25"

ITEM	QTY	PART NO.	DESCRIPTION	SPECIFICATION

NACO INDUSTRIES

ADAPTER GxG

DWG BY\DATE	SIZE	WEIGHT\VOLUME	DWG NO.	REV
SH 2/10/98	D		19-2	A
APPD BY\DATE: GB 2/10/98	SCALE 1/1	NEXT ASSY	SHEET 1 OF 1	

Specifcations for Fabricated PVC Pipe Fittings

Fittings:

SDR35 and SDR26 Solvent Weld and Gasketed Sewer PVC Fittings

NACO Industries certifies that our SDR35 and SDR26 Solvent Weld and/or Gasketed PVC (Poly Vinyl Chloride) Fittings meet or exceed the following applicable standards, and/or materials used in the manufacturing process meet or exceed the following applicable standards.

Applicable Specifications:

ASTM D 1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D 3034 – Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
ASTM F 1366 – Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings.
ASTM F 679 – Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings, 18" through 27".
ASTM F 477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

General Specifications:

A tolerance of ± ½" on dimensions should be allowed in the design of piping systems. Lay lengths shall not exceed ± ½" on fittings up to 12" in diameter and ± 1" on fittings 14" in diameter and above.

Elbows, Wyes and all change in direction fittings shall not exceed ± 1° variance in the specified angle.

DO NOT use NACO Industries' fittings to transport or store compressed air or gases, or test thermoplastic piping systems with compressed air or gases.

Specifications for Fabricated PVC Pipe Fittings

Fittings:

IPS (Iron Pipe Size) Class 63, 100, 125, 160 and 200 Pressure Solvent Weld and Gasketed PVC Fittings.

NACO Industries certifies that our IPS (Iron Pipe Size) Class 63, 100, 125, 160 and 200 PVC (Poly Vinyl Chloride) Fittings meet or exceed the following applicable standards, and/or materials used in the manufacturing process meet or exceed the following applicable standards.

Applicable Specifications:

ASTM D 1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D 2241 – Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series).
ASTM D 2564 – Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
ASTM D 2672 – Standard Specification for Joints for IPS PVC Pipe Using Solvent Cements.
ASTM D 2855 – Standard Practice for Making Solvent Cement Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
ASTM D 3139 – Standard Specification for Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals.
ASTM F 477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

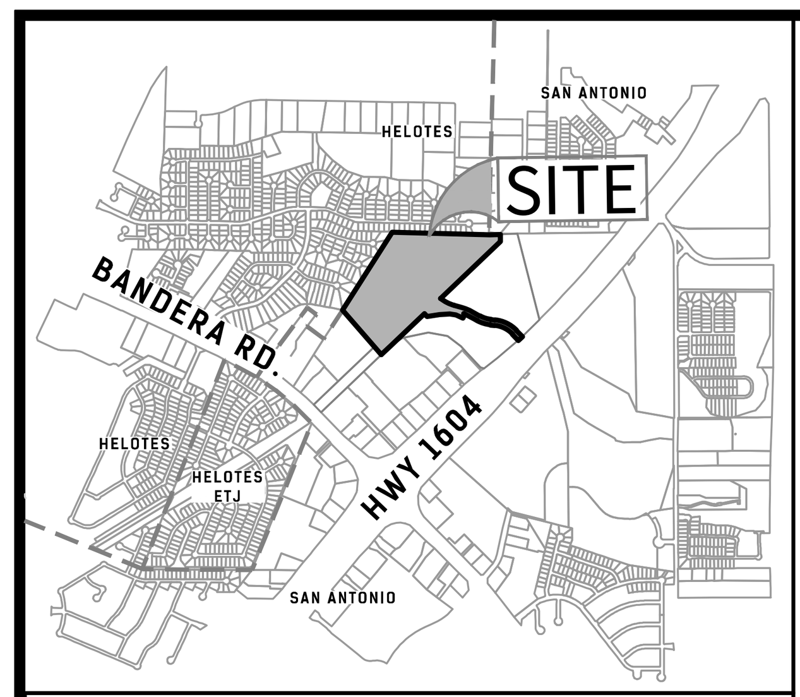
General Specifications:

A tolerance of ± ½" on dimensions should be allowed in the design of piping systems. Lay lengths shall not exceed ± ½" on fittings up to 12" in diameter and ± 1" on fittings 14" in diameter and above.

Elbows, Wyes and all change in direction fittings shall not exceed ± 1° variance in the specified angle.

Standard fabricated fittings shall be tested to a minimum of two times the applicable maximum internal pressure ratings in accordance with ASTM D 1599. When temperatures rise above 73° F, the tensile strength of thermoplastics decreases, thereby derating the pipe or fitting Maximum Internal Pressure. When temperatures fall below 73° F, the tensile strength of thermoplastics' increases, and the impact strength decreases.

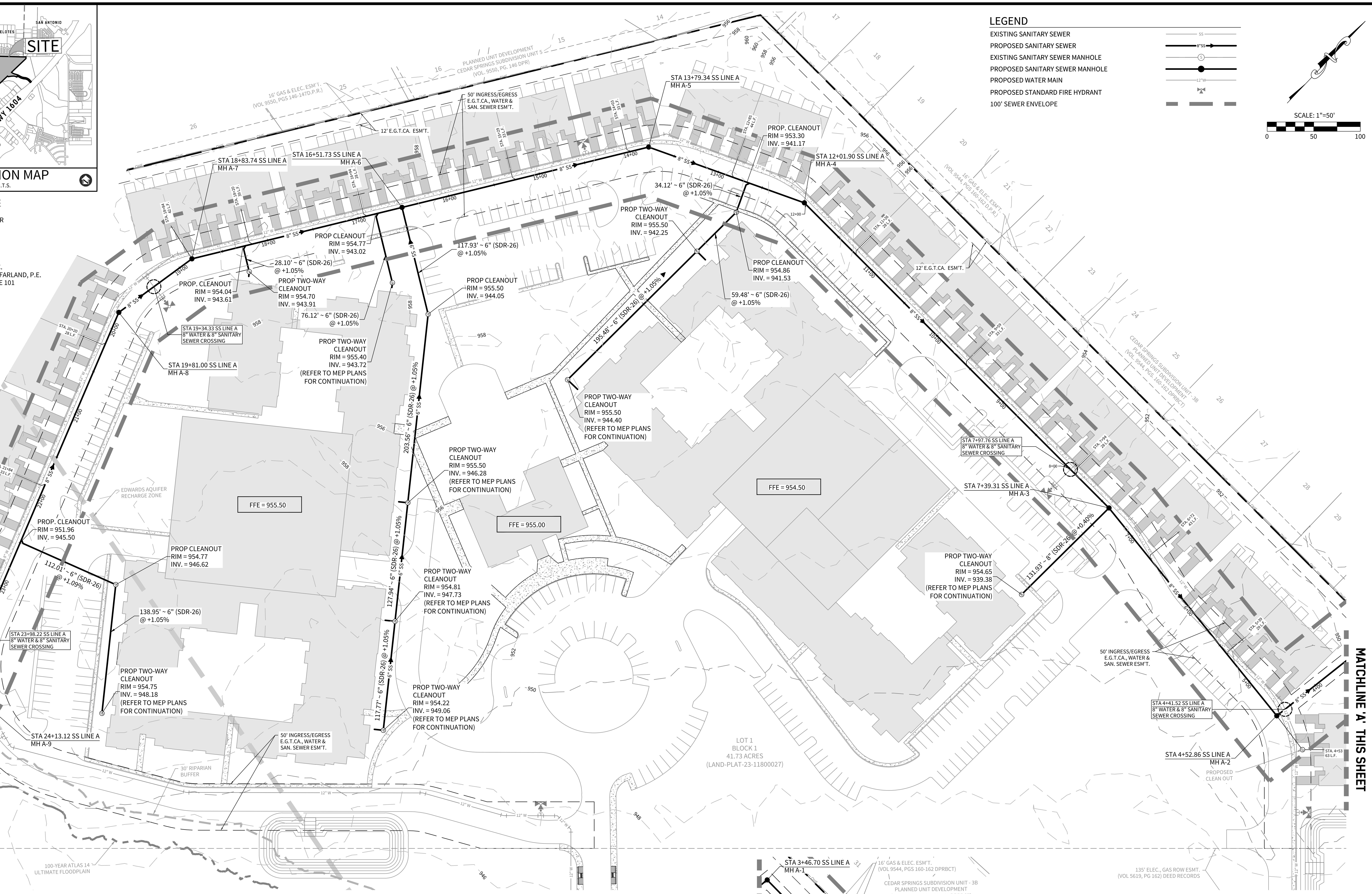
DO NOT use NACO Industries' fittings to transport or store compressed air or gases, or test thermoplastic piping systems with compressed air or gases.



LOCATION MAP
N.T.S.

OWNER/DEVELOPER:
SAN ANTONIO 103 TX, LLC
30 N. GOULD STREET, SUITE R
SHERIDAN, WY 82801
TEL: (941) 225-8481

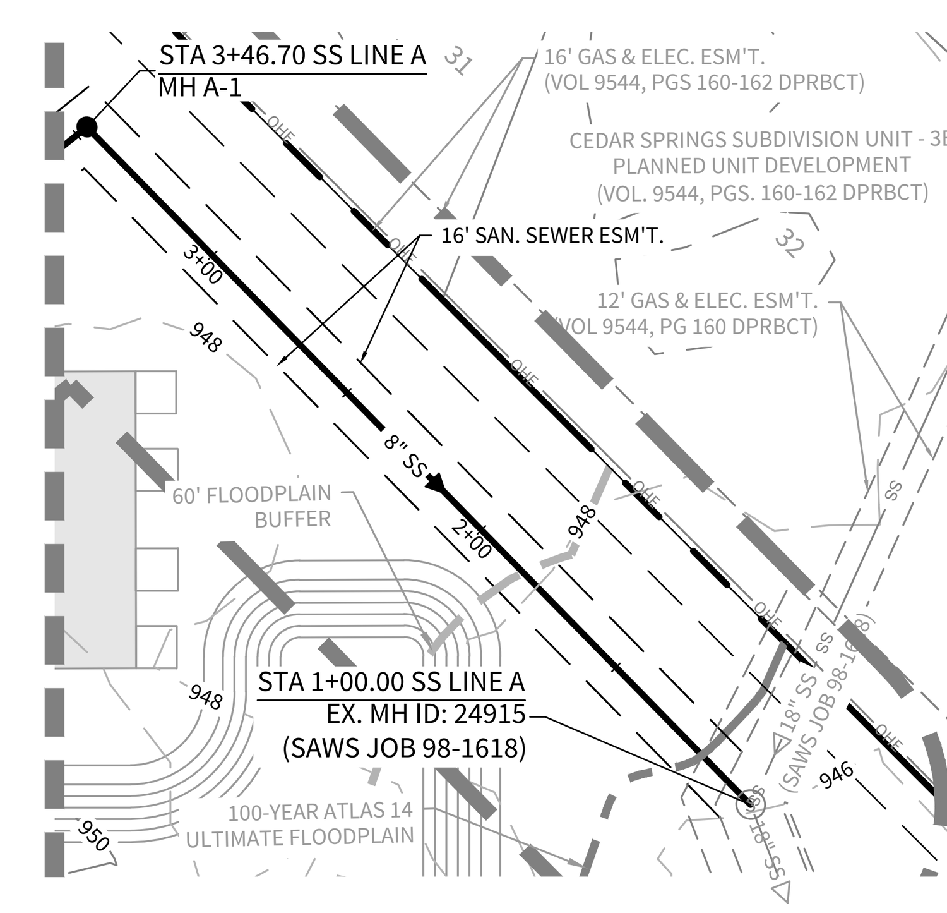
CIVIL ENGINEER:
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



LEGEND

- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER MAIN
- PROPOSED STANDARD FIRE HYDRANT
- 100' SEWER ENVELOPE

SCALE: 1"=50'
0 50 100



CAUTION!!!

THE CONTRACTOR SHALL BE AWARE THAT UNDERGROUND WATER, SEWER, ELECTRIC AND GAS LINES EXIST ALONG LOOP 1604. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE THESE UTILITIES LOCATED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THIS AREA. ANY DAMAGE DONE TO THESE EXISTING FACILITIES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR.

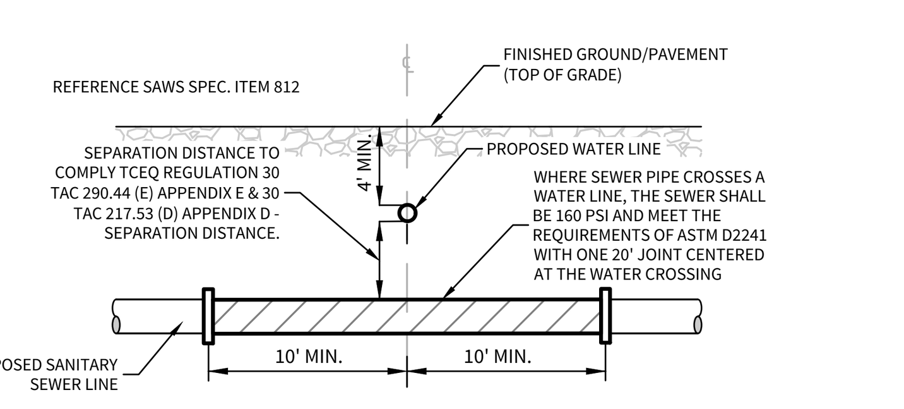
TRENCH EXCAVATION SAFETY PROTECTION

Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures for the project described in the contract documents. the Contractor's implementation of these systems, programs and/or procedures shall provide for adequate trench excavation safety protection that comply with as a minimum, OSHA standards for trench excavations. specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

SEWER/WATER LINE CROSSINGS	
LINE	STATION
"A"	4+41.52
"A"	7+97.76
"A"	19+34.33
"A"	23+98.22

NOTE:

CONTRACTOR TO REFER TO MEP PLANS FOR STUB OUT LOCATIONS AND INVERT INFORMATION PRIOR TO CONSTRUCTION OF SEWER MAIN AND SERVICES. NOTIFY ENGINEER OF ANY DISCREPANCIES



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL
N.T.S.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE SEWER COLLECTION SYSTEM SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF SEWER COLLECTION SYSTEM ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

WEST SEWERSHED – LEON CREEK W.R.C.

Developer's Name	SAN ANTONIO 103 TX, LLC		
Developer's Address	30 N. GOULD STREET, SUITE R		
City	SHERIDAN	State	WYOMING
Zip	82801		
Phone #	(941) 225-8481	Fax #	
Total Acreage	41.74		
SAWS Block Maps	106-628	Total EDUs	250
Total Linear Footage of Pipe	2284 L.F. OF 8" SS -SDR	Plat No.	23-11800027
Number of Lots	1	SAWS Job No.	XX-XXXXXXXX

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EST. 1980
ENGINEERS

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II

OVERALL SEWER PLAN

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
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10.

03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

SAWS JOB NO.
XX-XXXX

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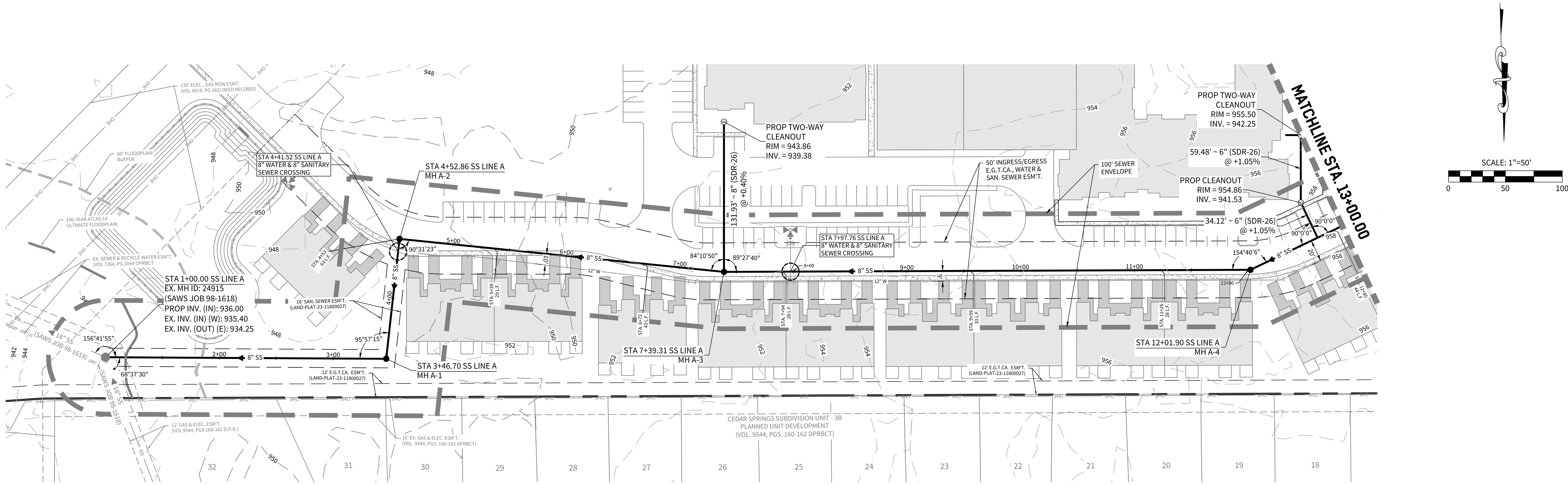
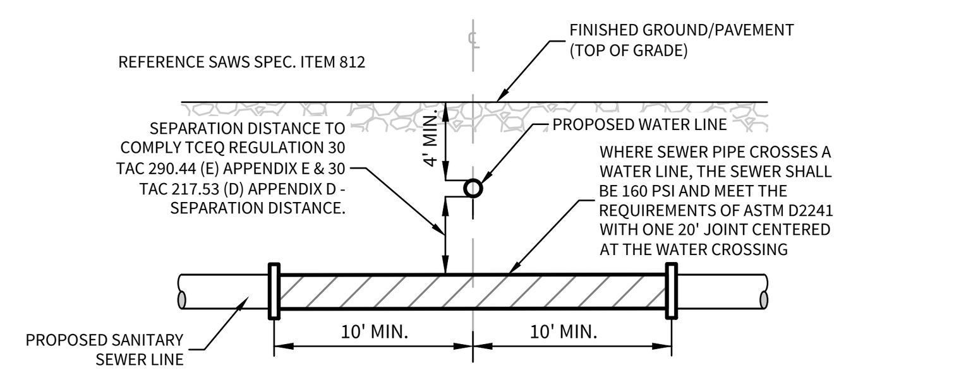
1 OF 1



TRENCH EXCAVATION PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.



TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

LINE 'A'

STA. 1+00.00 TO STA. 13+00.00

CAUTION!!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

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WEST SEWERSHED – LEON CREEK W.R.C.

Developer's Name	SAN ANTONIO 103 TX, LLC		
Developer's Address	30 N. GOULD STREET, SUITE R		
City	SHERIDAN	State	WYOMING
Zip	82801		
Phone #	(941) 225-8481	Fax #	
Total Acreage	41.74		
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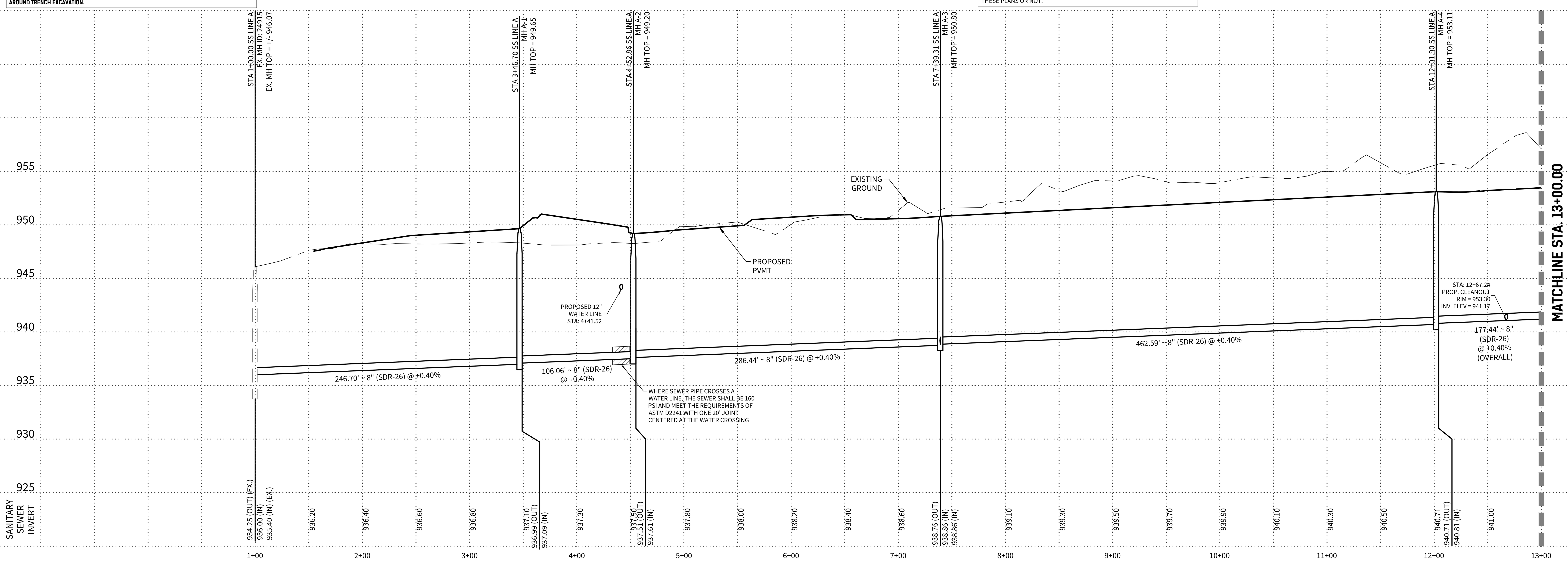
Total Linear Footage of Pipe	2284 L.F. OF 8" SS -SDR	Plat No.	23-11800027
Number of Lots	1	SAWS Job No.	XX-XXXXXXXX

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II

SANITARY SEWER PLAN & PROFILE - LINE 'A'

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
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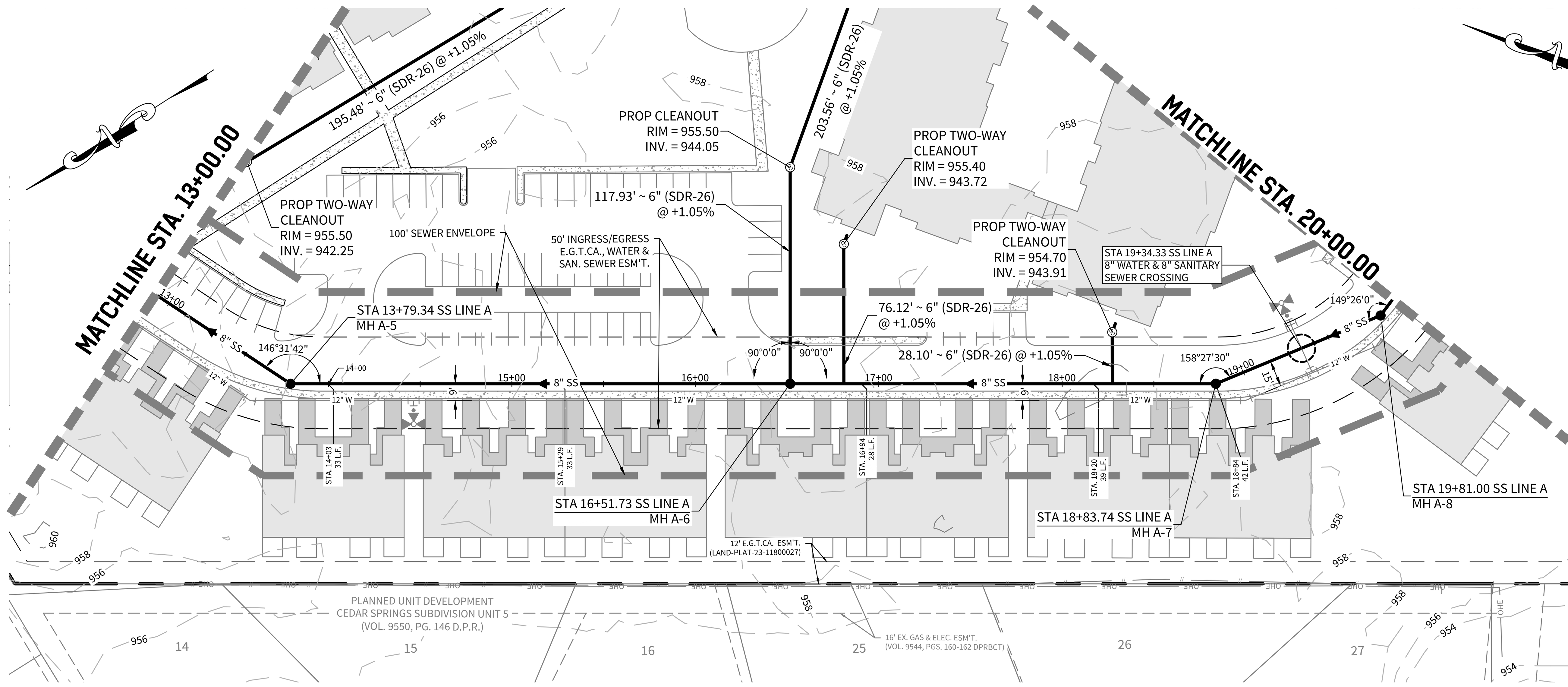
03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

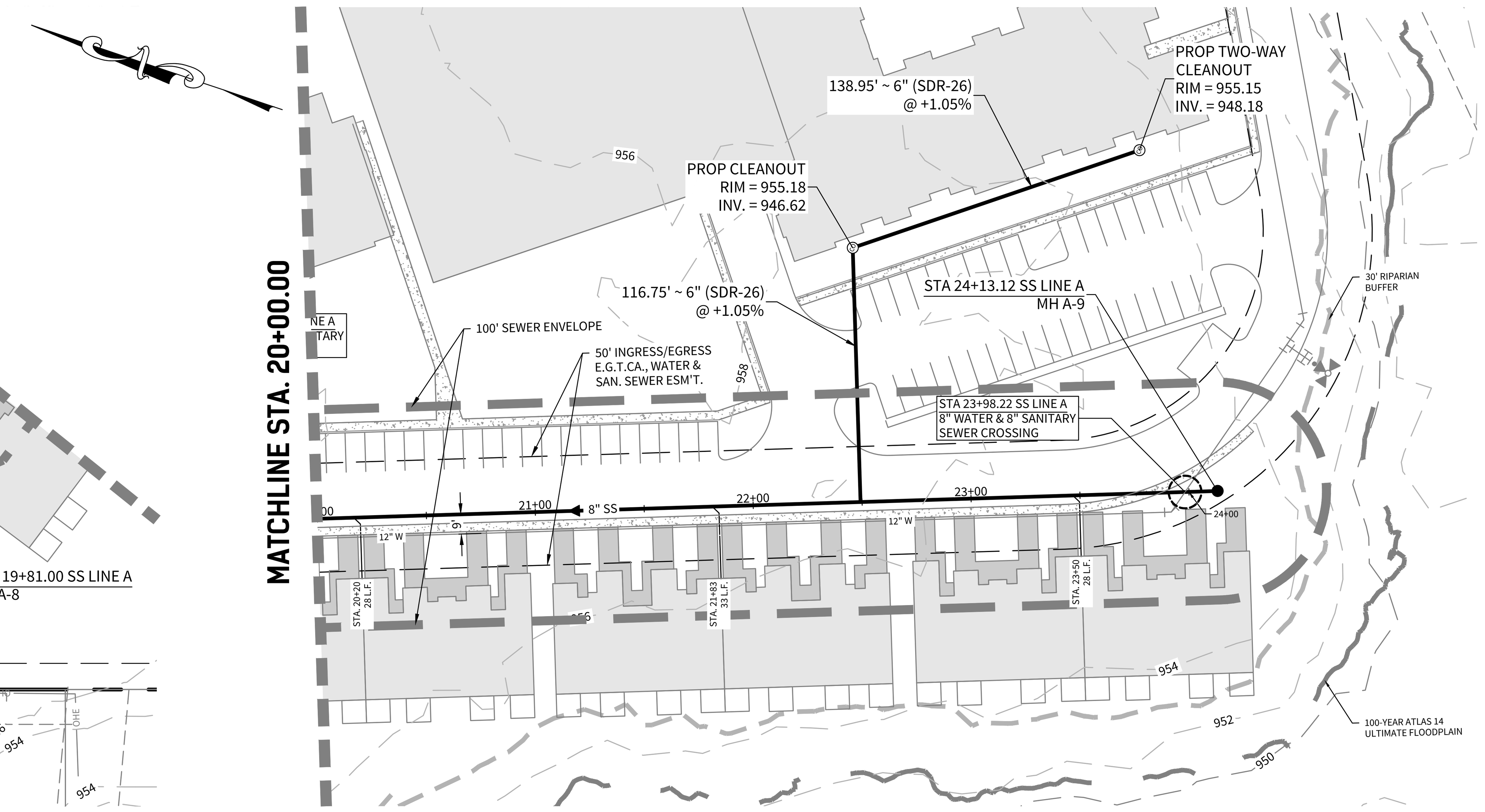
CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

SAWS JOB NO.
XX-XXXX

C9.01





TRENCH EXCAVATION PROTECTION

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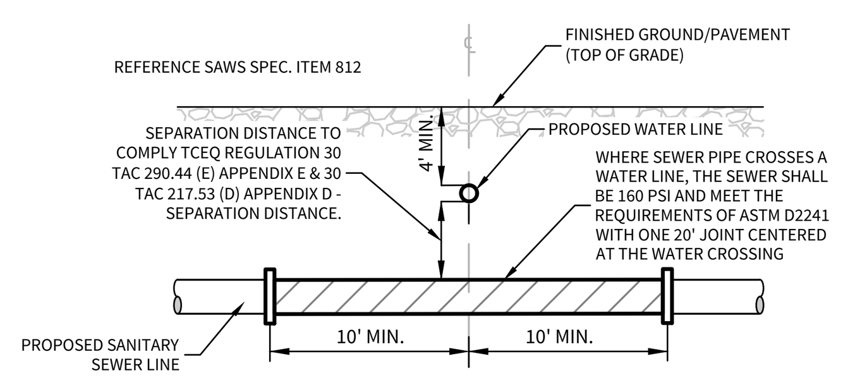

TYPICAL SANITARY SEWER/ WATER CROSSING DETAIL

N.T.S.

LINE 'A'

STA.13+00.00 TO STA. 24+13.12

CAUTION!!!

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WEST SEWERSHED – LEON CREEK W.R.C.

Developer's Name	SAN ANTONIO 103 TX, LLC		
Developer's Address	30 N. GOULD STREET, SUITE R		
City	SHERIDAN	State	WYOMING
Zip	82801		
Phone #	(941) 225-8481	Fax #	
Total Acreage	41.74		
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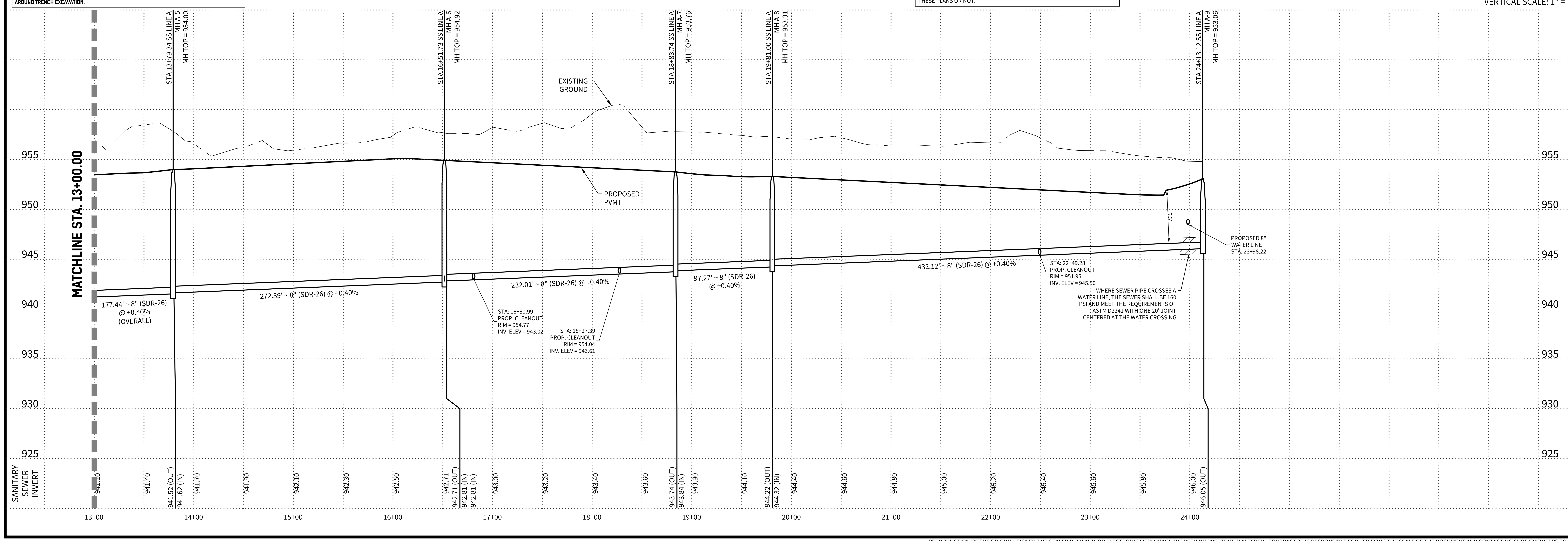
Number of Lots	1	SAWS Job No.	XX-XXXXXXXX

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



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CUDE EST. 1980 ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH
PHASE I & II

SANITARY SEWER PLAN & PROFILE - LINE 'A'

DATE	03/28/2023
PROJECT NO.	02318.011
DRAWN BY	JTW/MAT
CHECKED BY	CJC/SPM

REVISIONS

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03/29/2023

STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.	23-11800027
SAWS JOB NO.	XX-XXXX

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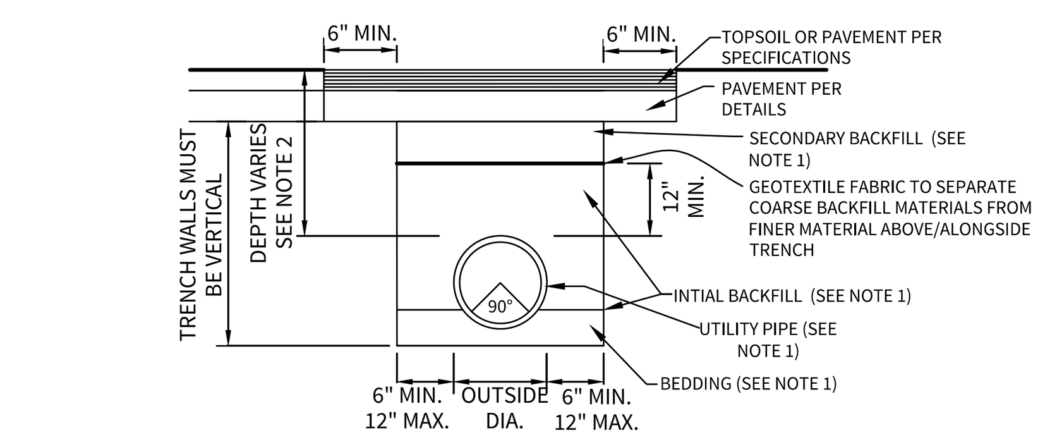
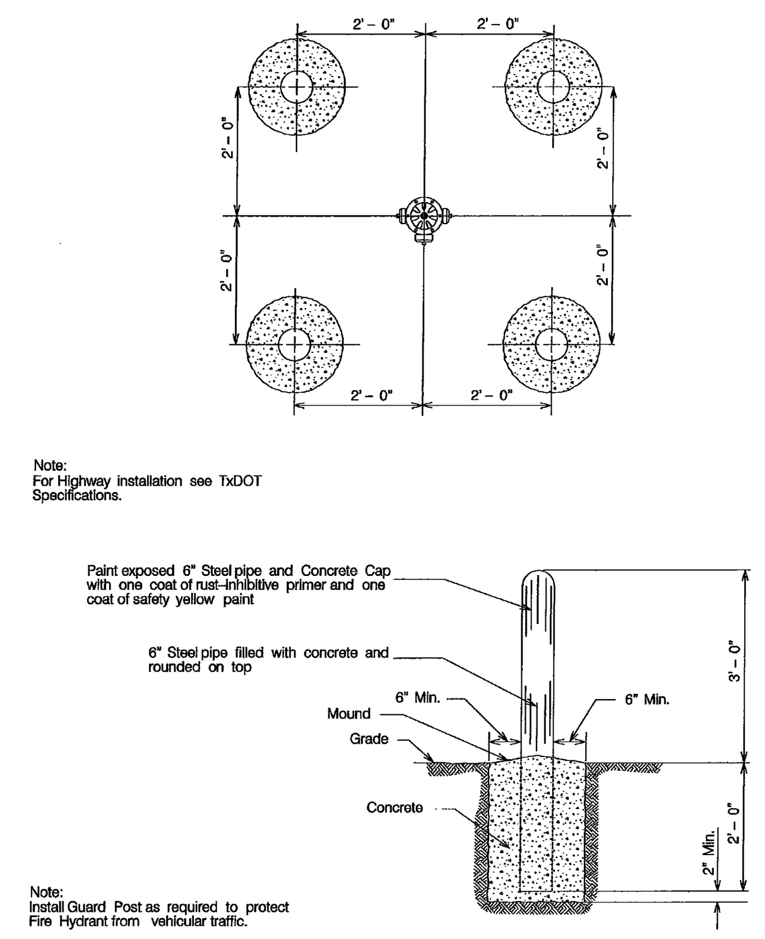


NOTES:

1. BEDDING, INITIAL BACKFILL AND SECONDARY BACKFILL FOR UTILITY PIPES SHALL COMPLY WITH SAN ANTONIO WATER SYSTEM STANDARD CONSTRUCTION SPECIFICATION ITEM NO. 804 "EXCAVATION, TRENCHING AND BACKFILL" * PROJECT SPECIFICATIONS.
2. DEPTH OF BURY FOR ALL WATER MAINS SHALL BE 4'-0". DEPTHS GREATER THAN 48" WILL BE ALLOWED ONLY FOR OFFSETS OR FOR PUBLIC MAINS IN STREETS WITH NO CURRENT STORM DRAIN OR CURBING.
3. FIRE AND DOMESTIC WATER SERVICE LINES CAN BE INSTALLED IN THE SAME TRENCH WITH 8-INCH SPACING BETWEEN OUTSIDE DIAMETERS.
4. MAINTAIN AT LEAST 10 FEET BETWEEN ANY POTABLE WATER MAIN AND SANITARY SEWER MAIN; COMPLY WITH ALL T.C.E.Q. REGULATIONS FOR SEPARATION DISTANCES AND INSTALLATIONS AT CROSSINGS.
5. WHERE WATER MAINS CROSS UNDER CONCRETE, PROVIDE EXPANSION JOINTS IN CONCRETE SET AT 5' TO EITHER SIDE OF PIPE CENTERLINE.

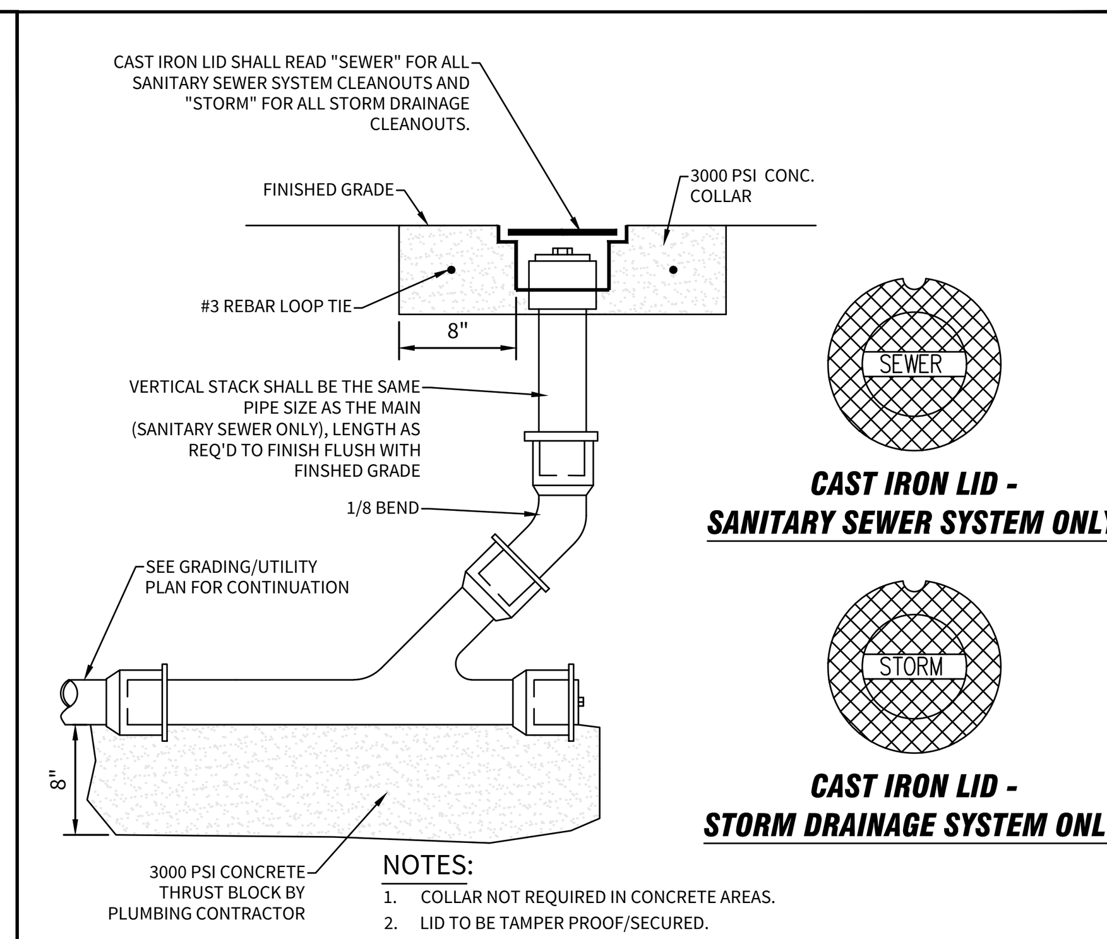
1 UTILITY TRENCH DETAIL

SCALE: NONE



2 FIRE HYDRANT GUARD POST

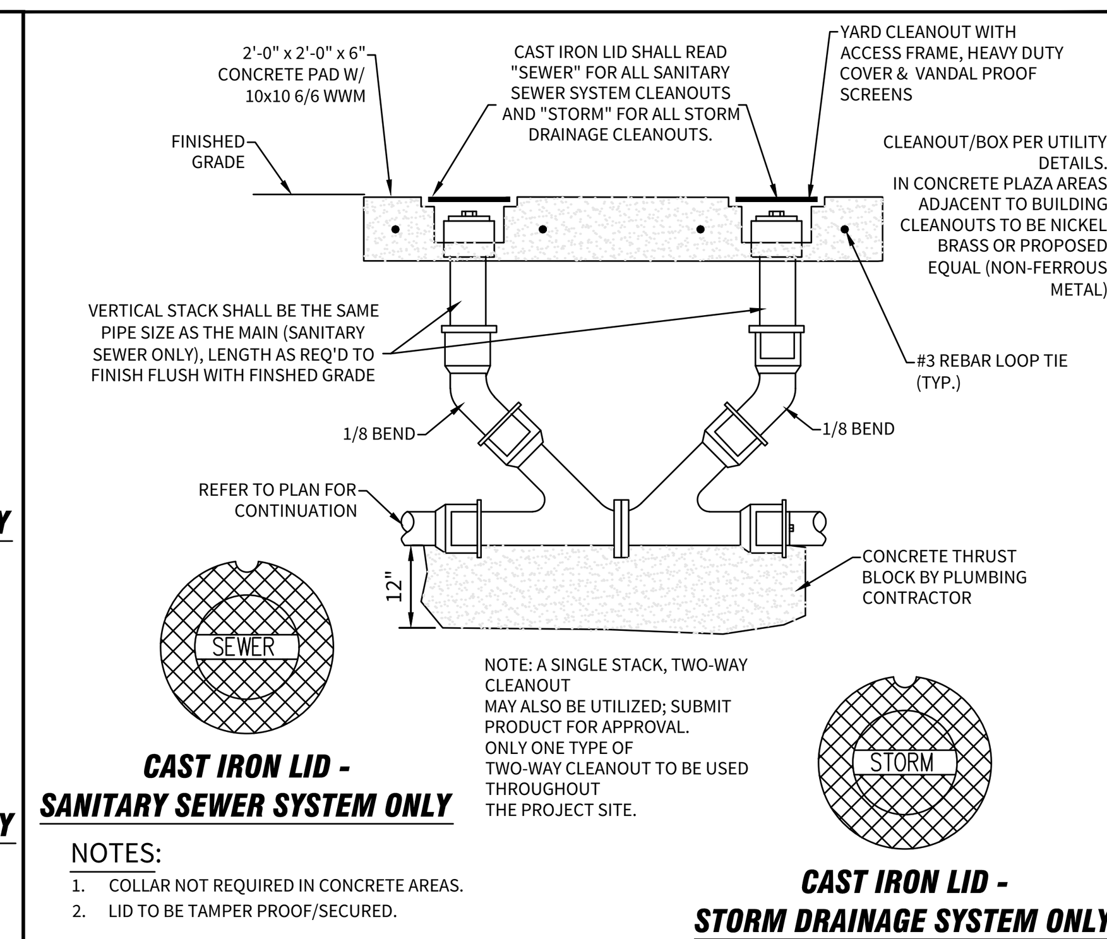
SCALE: NONE



NOTES:
1. COLLAR NOT REQUIRED IN CONCRETE AREAS.
2. LID TO BE TAMPER PROOF/SECURED.

3 ONE-WAY CLEANOUT DETAIL

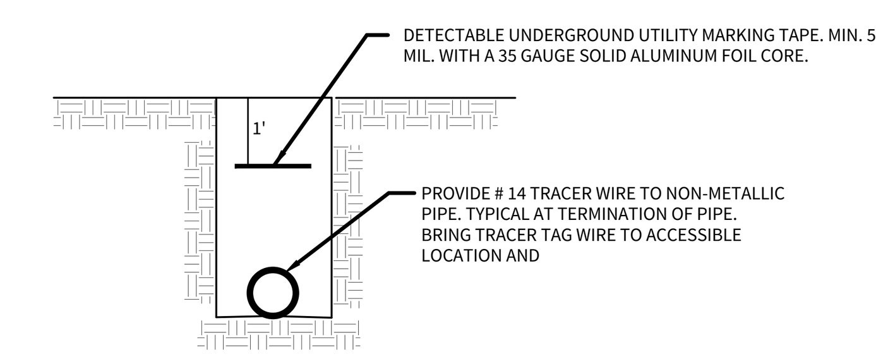
SCALE: NONE



NOTES:
1. COLLAR NOT REQUIRED IN CONCRETE AREAS.
2. LID TO BE TAMPER PROOF/SECURED.

4 TWO-WAY CLEANOUT DETAIL

SCALE: NONE

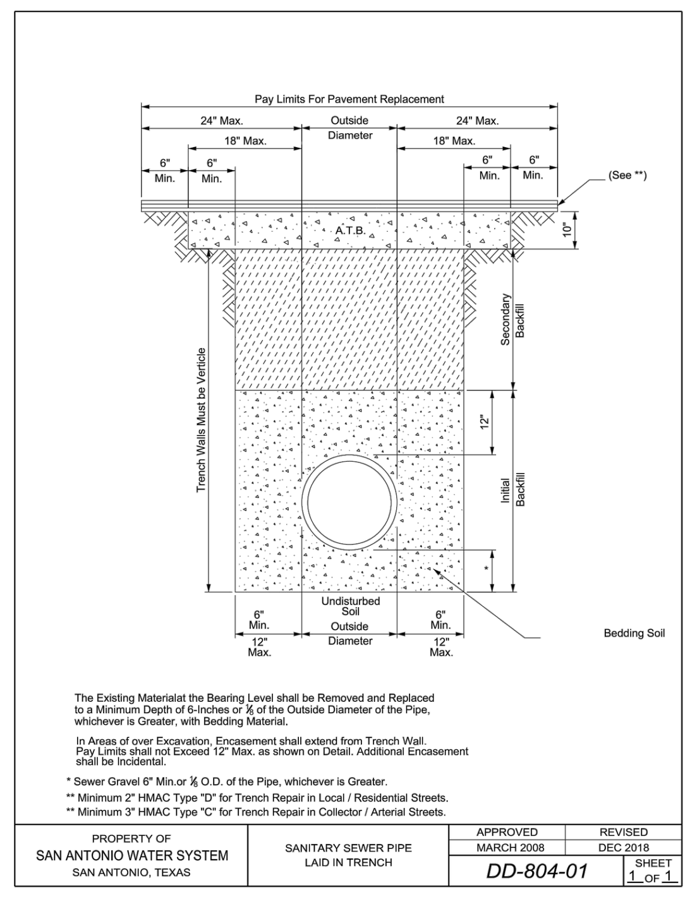


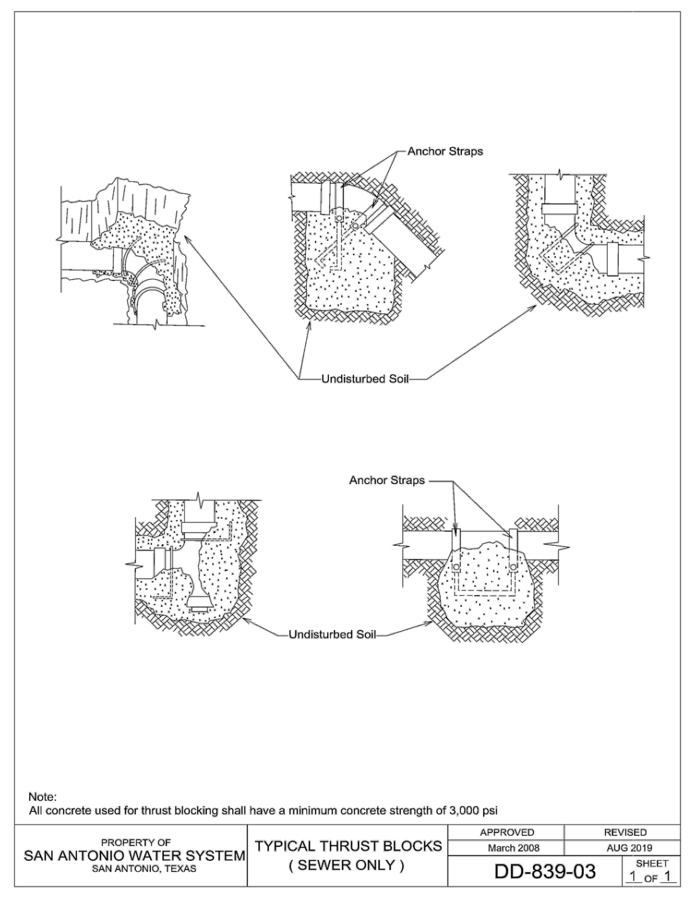
STANDARD COLOR CODE:

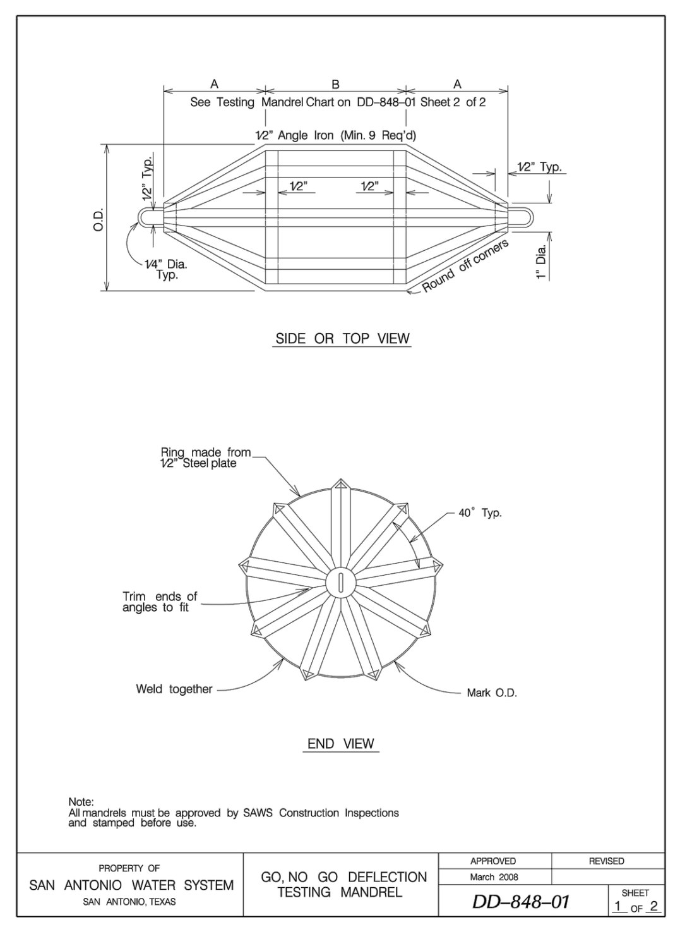
SAFETY RED: ELECTRIC POWER, ELECTRIC SYSTEMS.
HIGH VISIBILITY SAFETY YELLOW: GAS AND OIL
SAFETY ALERT ORANGE: TELEPHONE AND CABLE TELEVISION
SAFETY PRECAUTION BLUE: WATER SYSTEMS.
SAFETY GREEN: SANITARY AND STORM SEWER SYSTEMS.
SAFETY BROWN: FORCE MAINS, RECLAIMED WATER LINES.

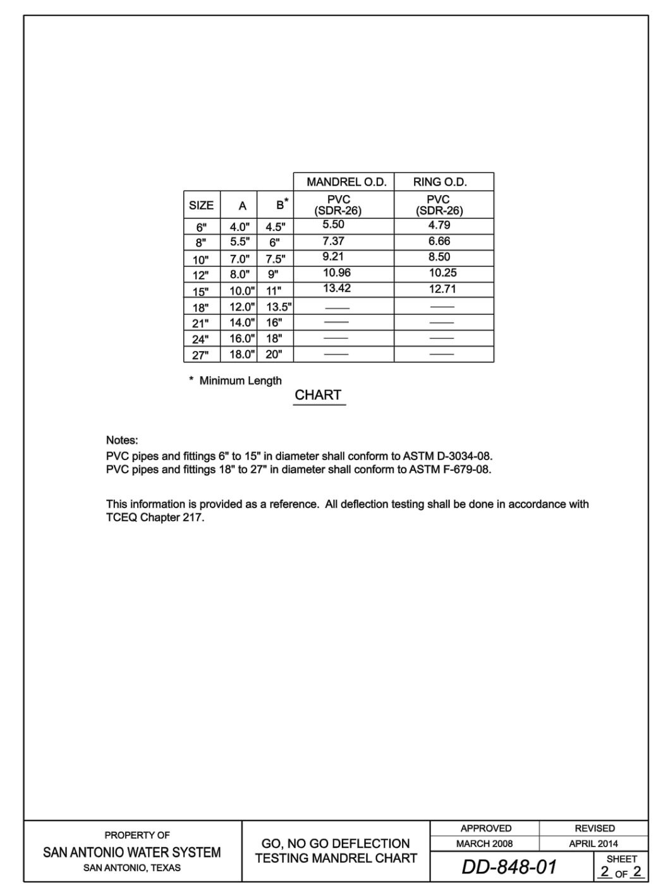
5 UTILITY MARKER TAPE DETAIL

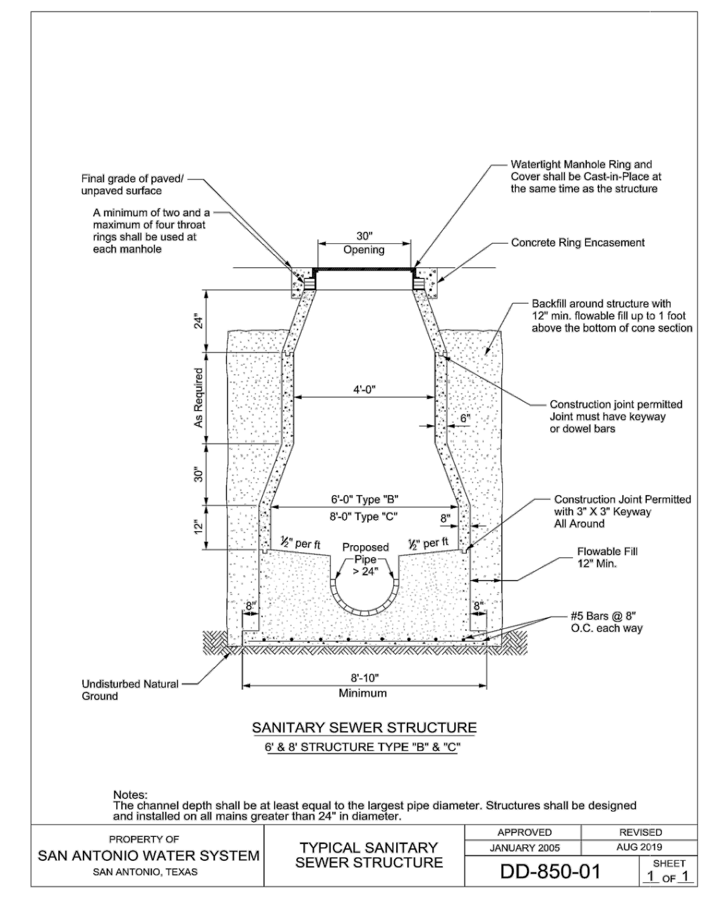
SCALE: NONE

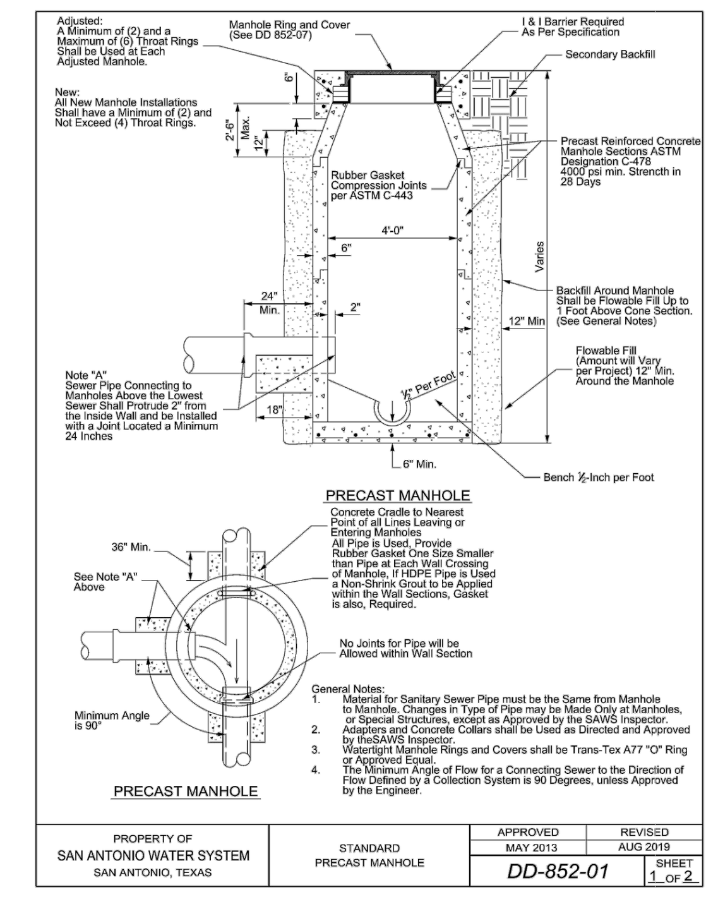


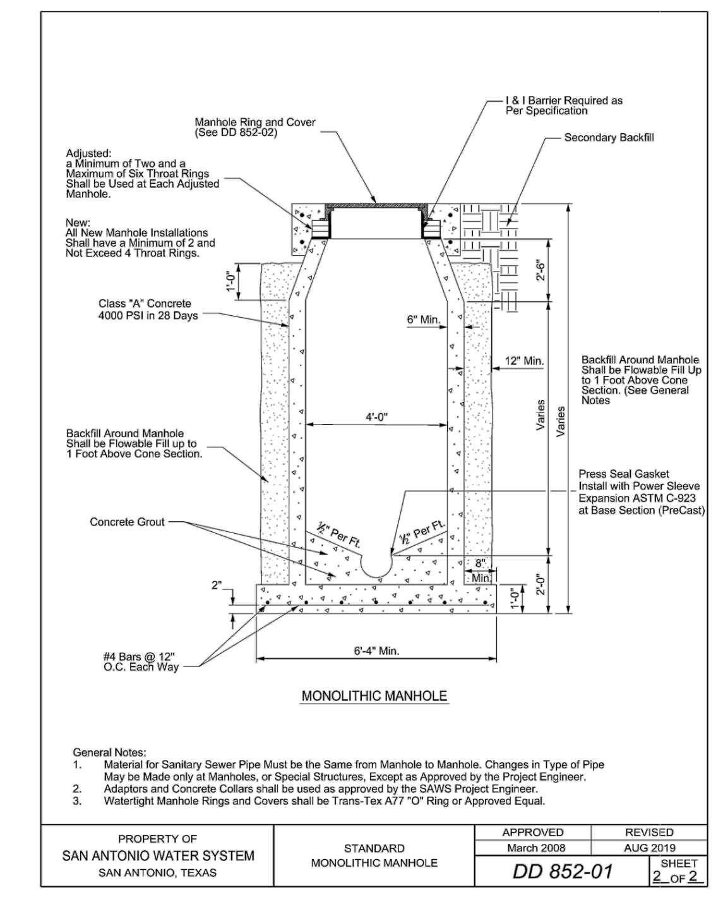


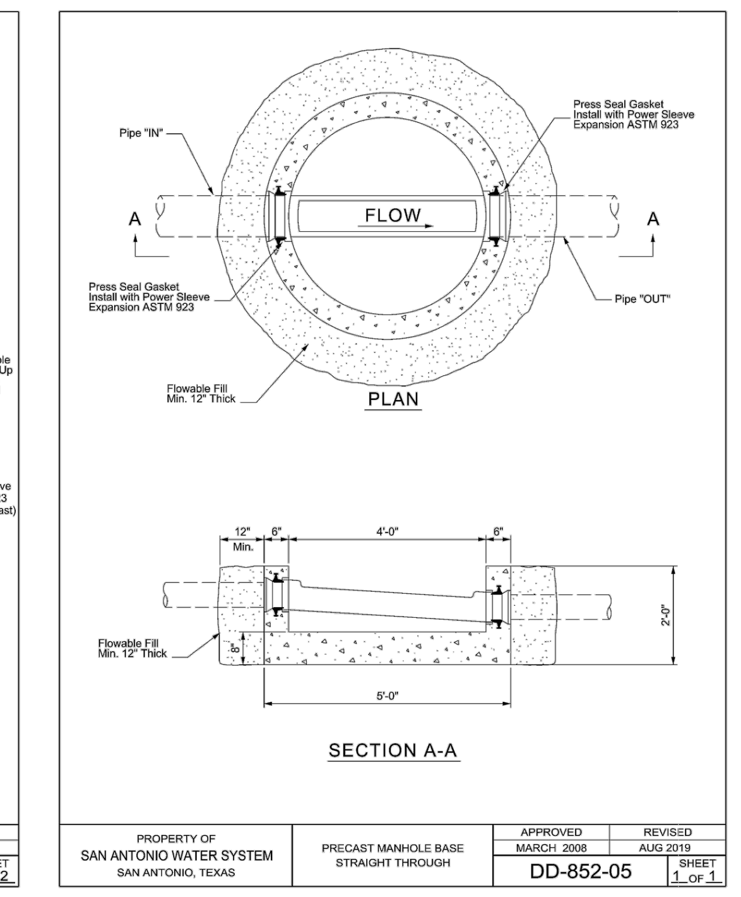


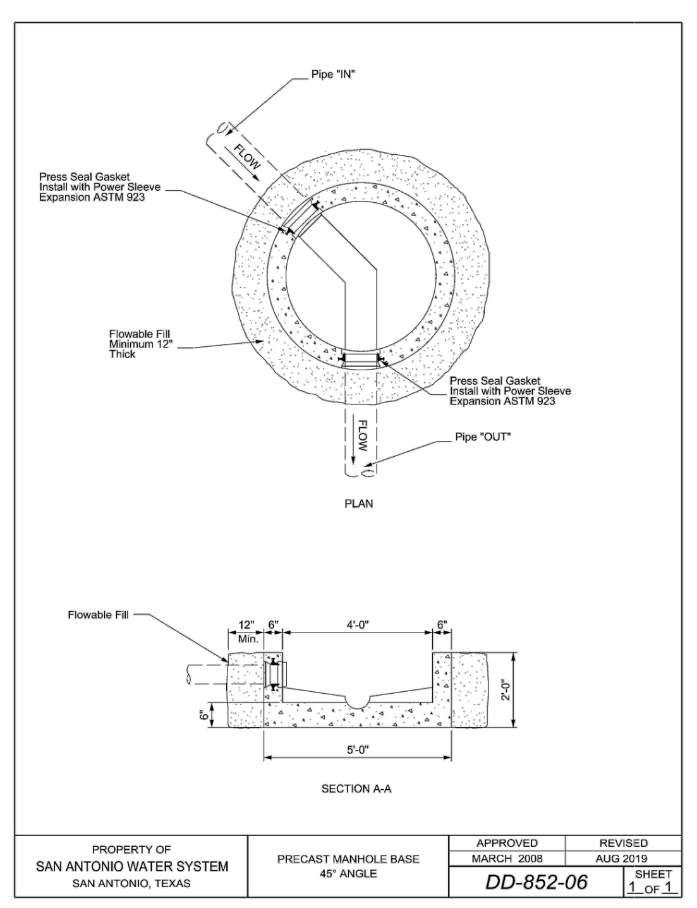


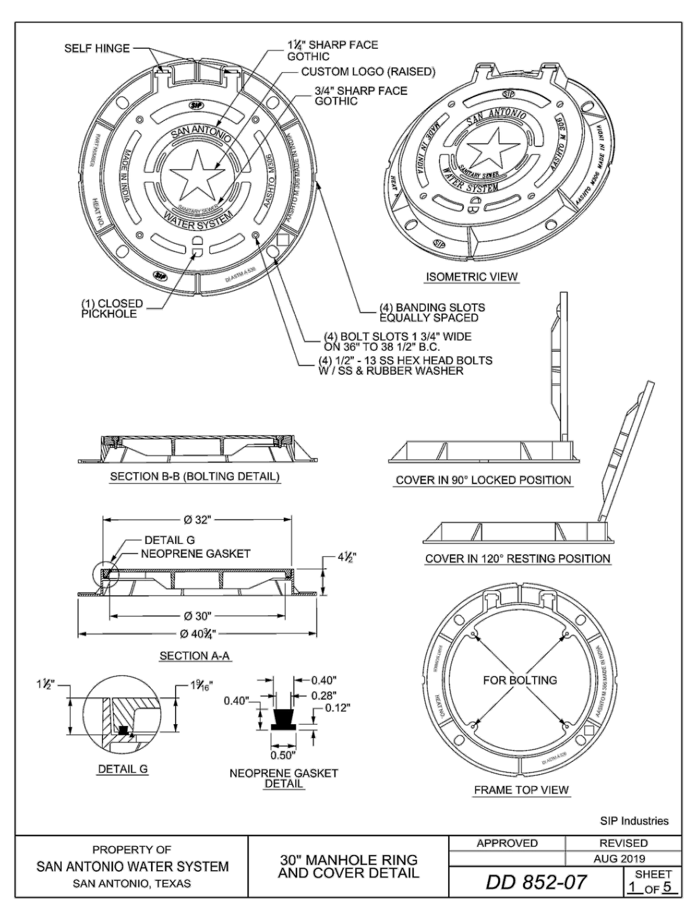


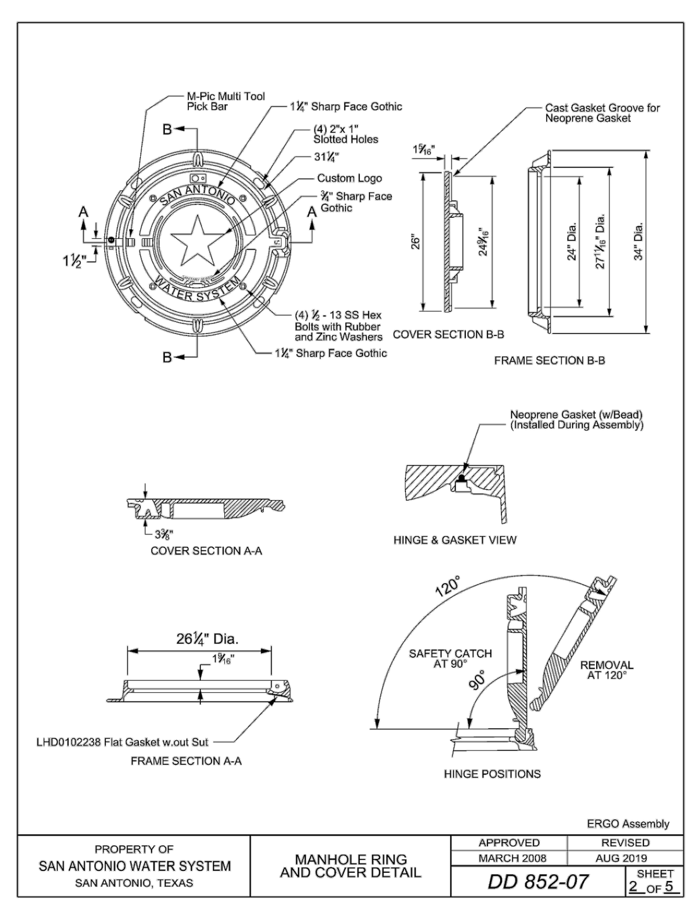


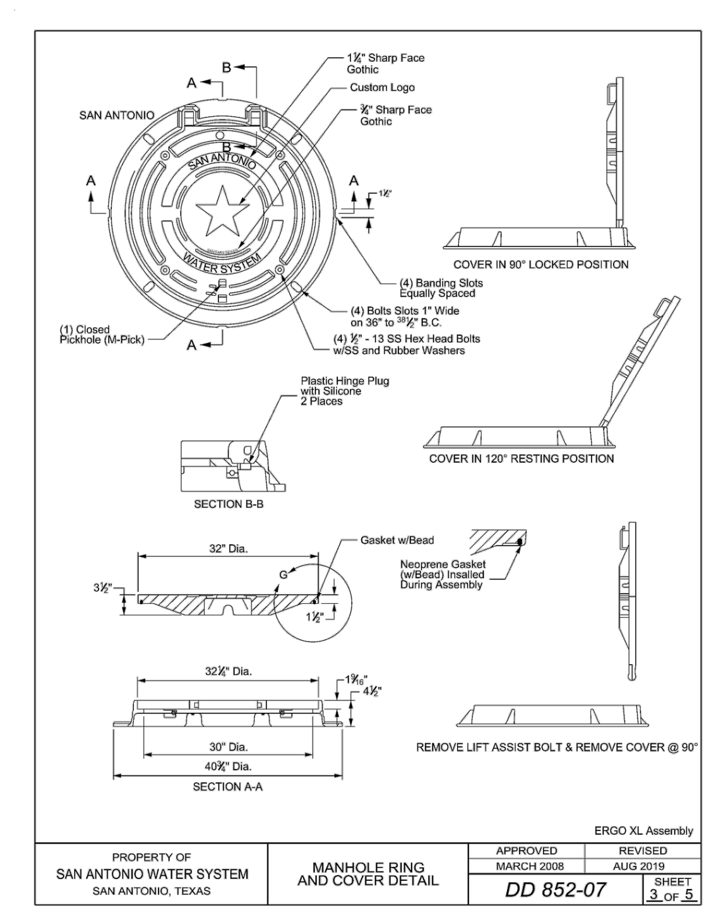


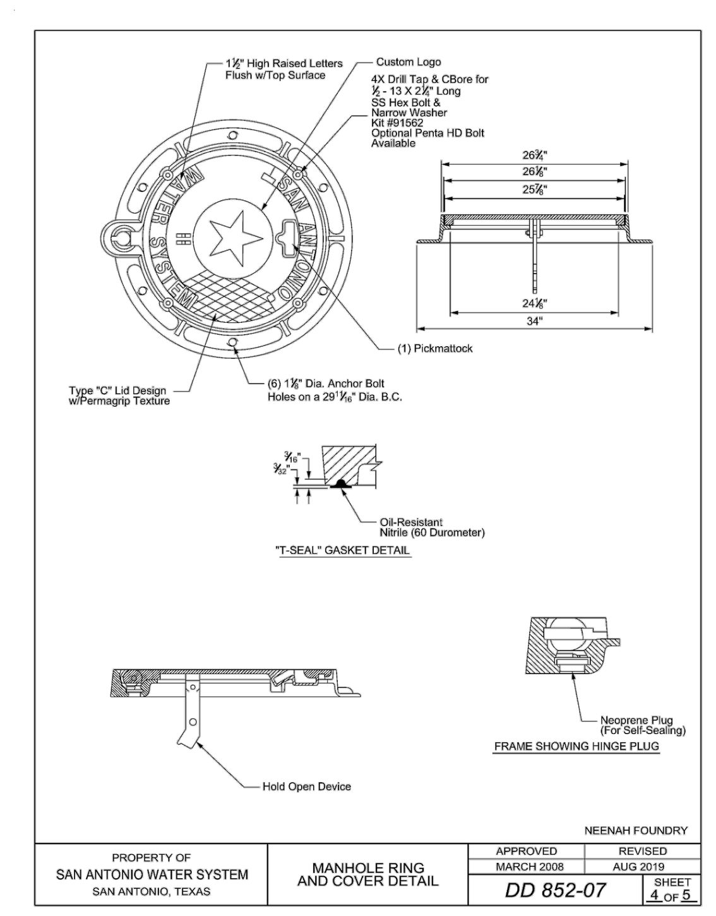


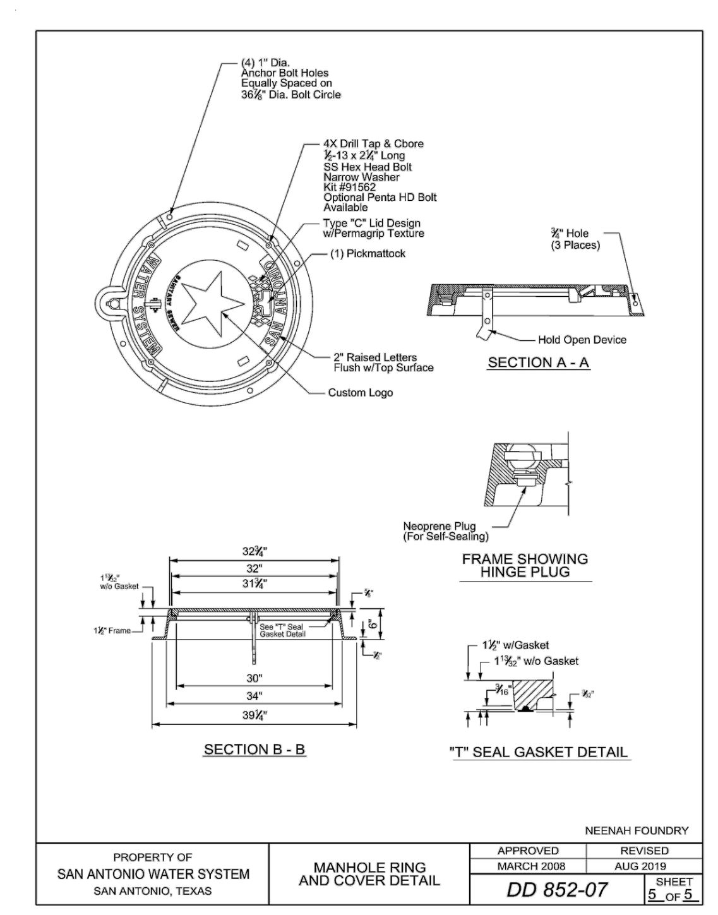


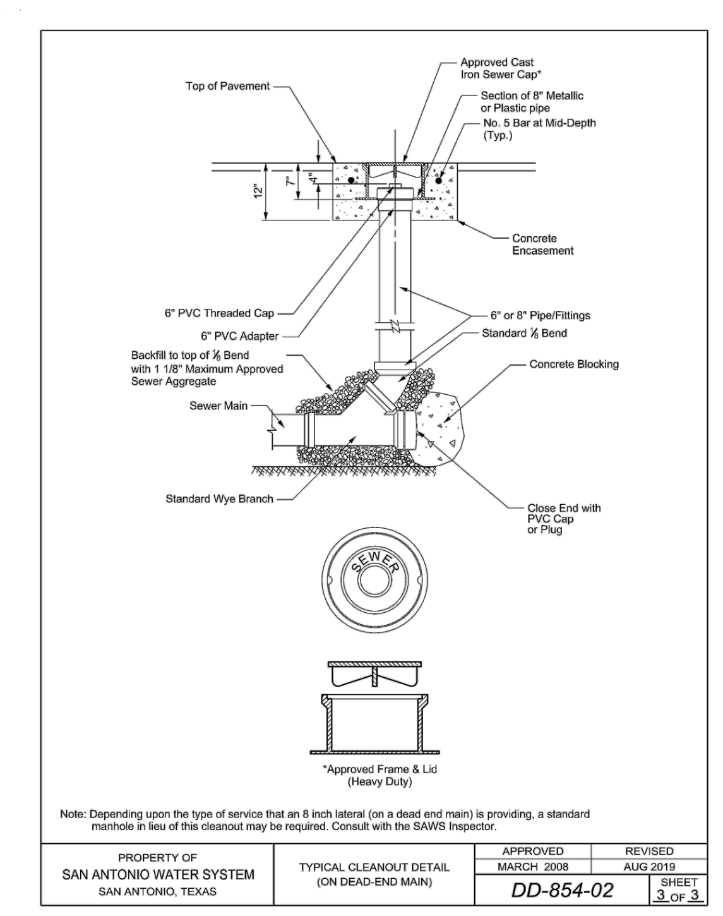


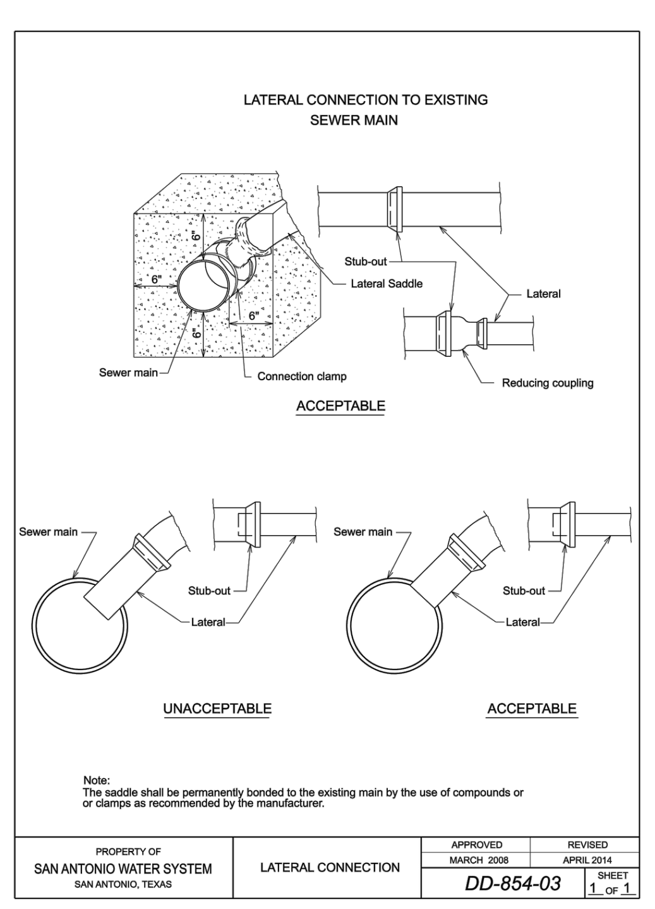


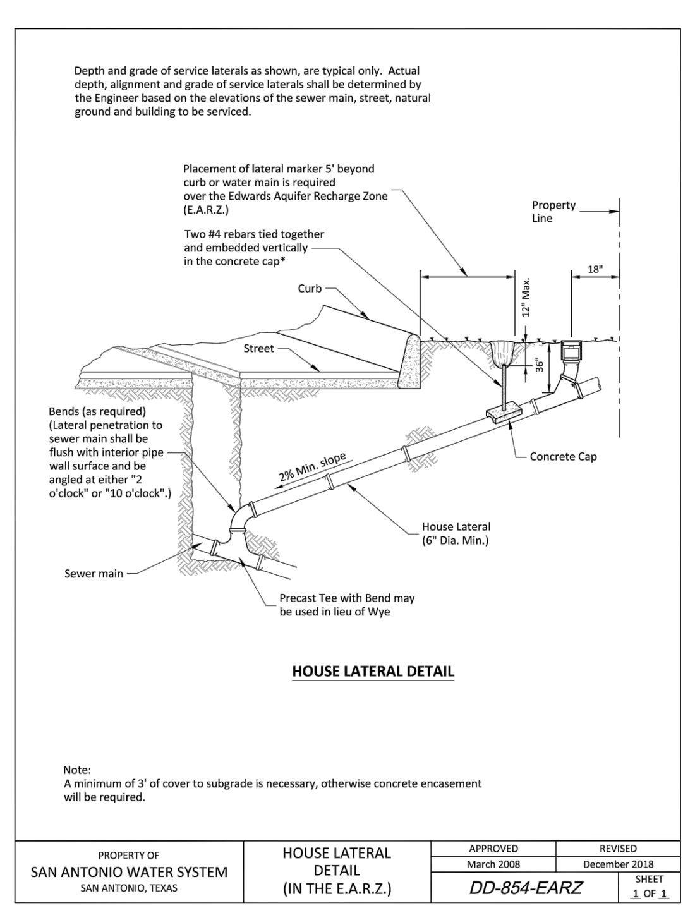


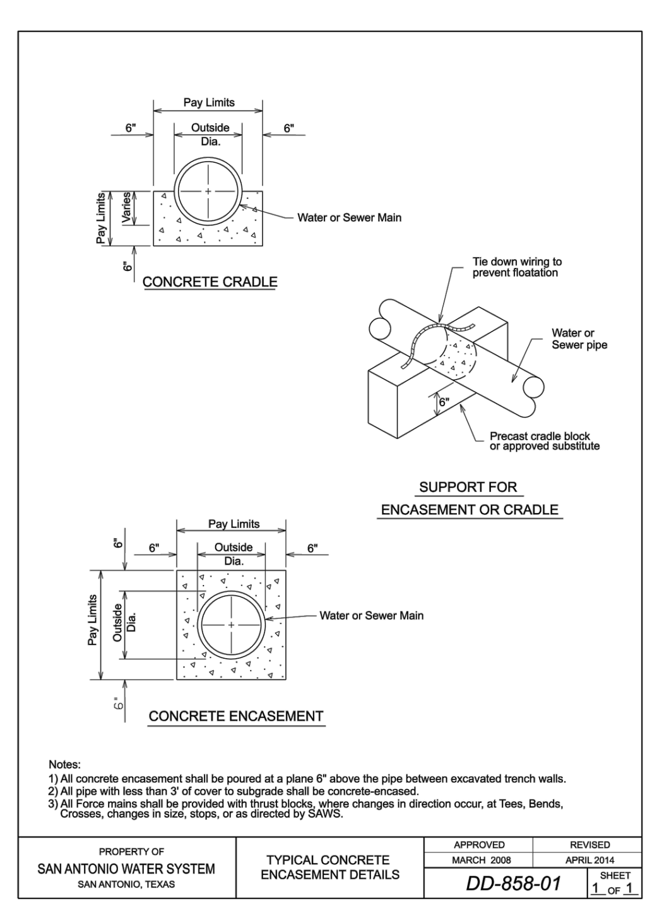


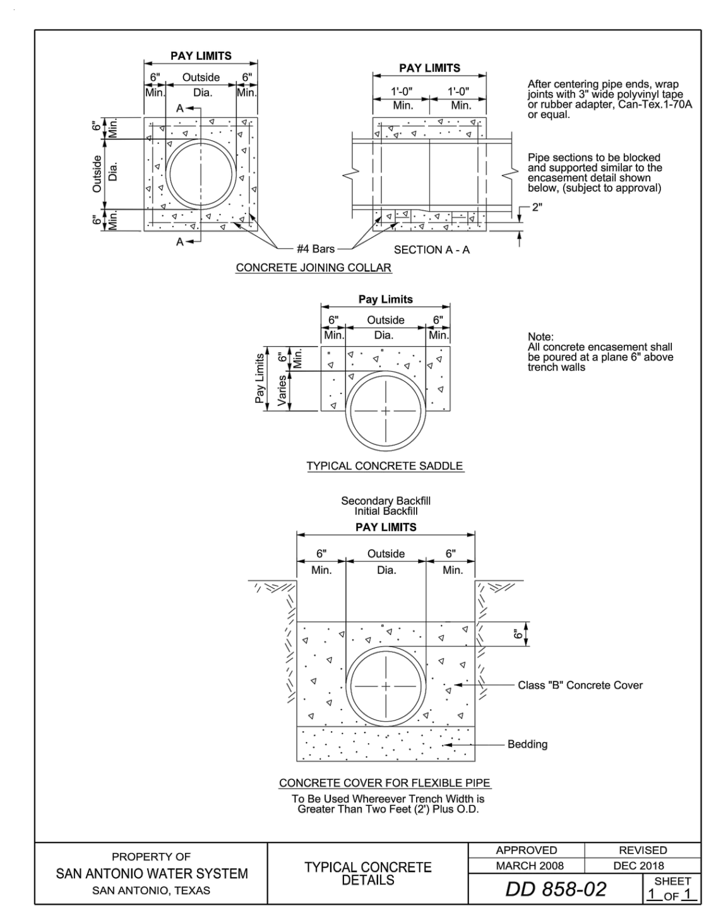


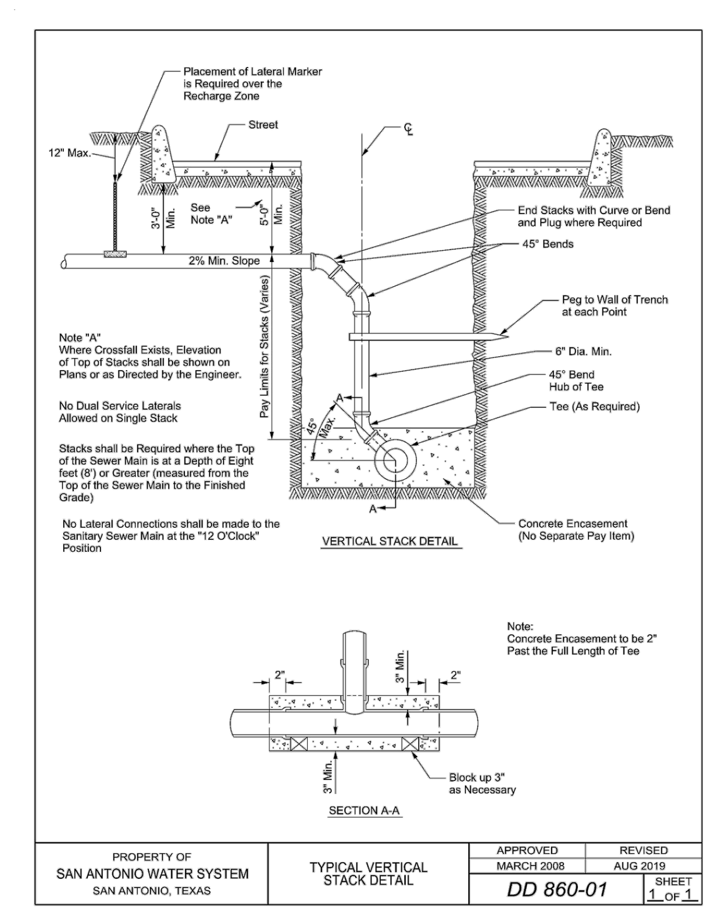


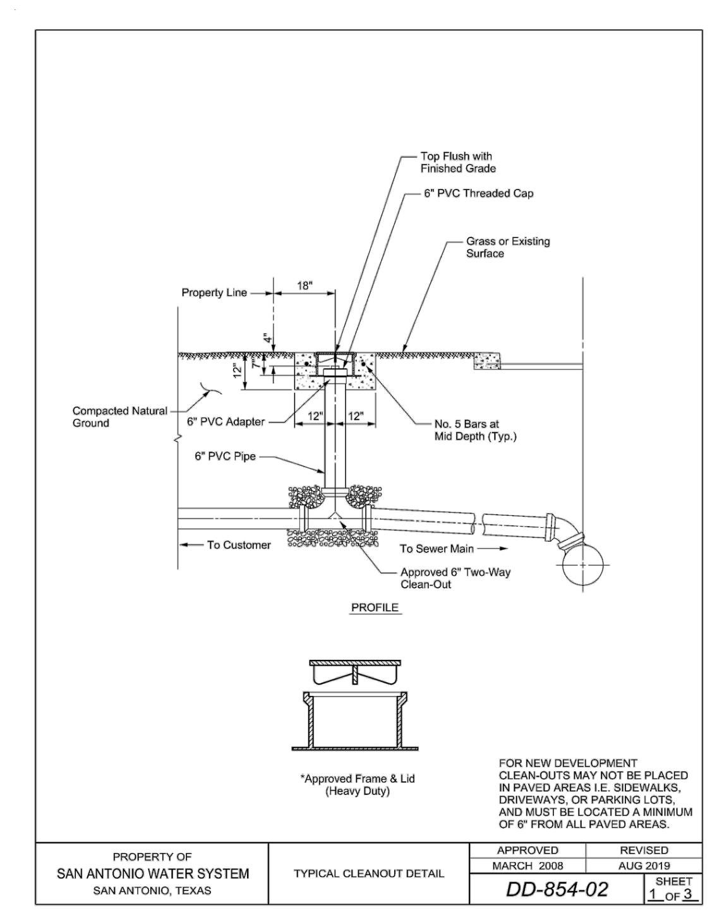


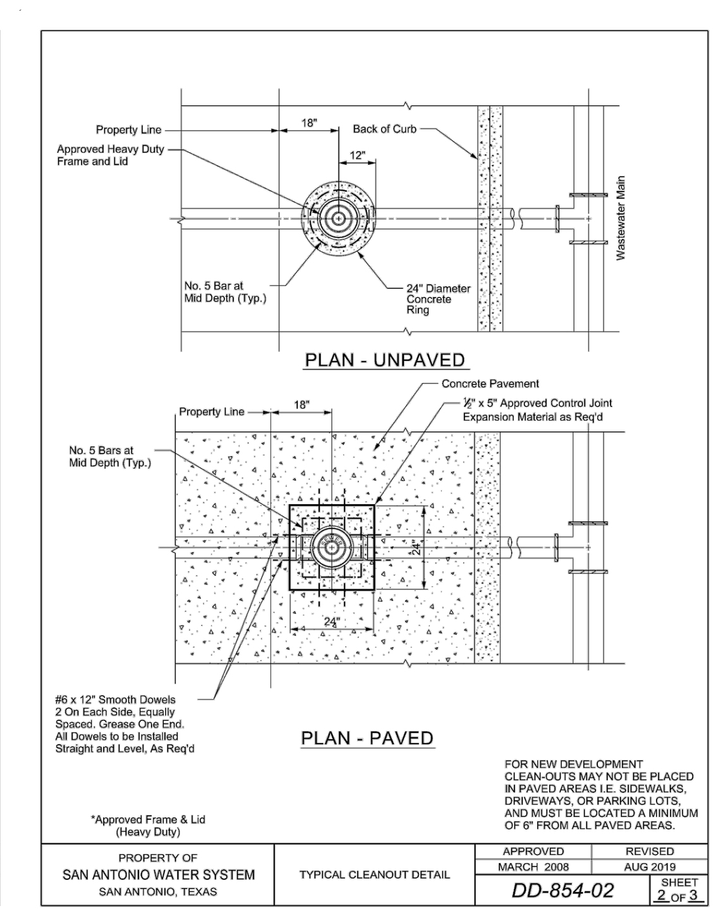












WEST SEWERSHED – LEON CREEK W.R.C.

Developer's Name	SAN ANTONIO 103 TX, LLC		
Developer's Address	30 N. GOULD STREET, SUITE R		
City	SHERIDAN	State	WYOMING
Zip	82801		
Phone #	(941) 225-8481	Fax #	
Total Acreage	41.74		
SAWS Block Maps	106-628	Total EDUs	250
Total Linear Footage of Pipe	2284 L.F. OF 8" SS -SDR	Plat No.	23-11800027
Number of Lots	1	SAWS Job No.	XX-XXXXXXXX

CUDEENGINEERS.COM

CUDE ENGINEERS EST. 1980

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II

SANITARY SEWER DETAILS

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C9.D1

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY ORGANIZED SEWAGE COLLECTION SYSTEM

GENERAL CONSTRUCTION NOTES:

1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROPOSED REGULATED PROJECT MUST BE PROVIDED WITH COPIES OF THE SCS PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING 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.

4. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED SCS APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF AN SCS APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

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 MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

6. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TCEQ OF THE FEATURE DISCOVERED. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THAT REGIONAL OFFICE IN WRITING AND THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

7. SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUST BE CAPPED WITH CONCRETE TO PREVENT SCOURING OF BACKFILL, OR THE SEWER LINES MUST BE ENCASED IN CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES.

8. BLASTING PROCEDURES FOR PROTECTION OF EXISTING SEWER LINES AND OTHER UTILITIES WILL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA. SAND IS NOT ALLOWED AS BEDDING OR BACKFILL IN TRENCHES THAT HAVE BEEN BLASTED. IF ANY EXISTING SEWER LINES ARE DAMAGED, THE LINES MUST BE REPAIRED AND RETESTED.

9. ALL MANHOLES CONSTRUCTED OR REHABILITATED ON THIS PROJECT MUST HAVE WATERTIGHT SIZE ON SIZE RESILIENT CONNECTORS ALLOWING FOR DIFFERENTIAL SETTLEMENT. IF MANHOLES ARE CONSTRUCTED WITHIN THE 100-YEAR FLOODPLAIN, THE COVER MUST HAVE A GASKET AND BE BOLTED TO THE RING. WHERE GASKETED MANHOLE COVERS ARE REQUIRED FOR MORE THAN THREE MANHOLES IN SEQUENCE OR FOR MORE THAN 1500 FEET, ALTERNATE MEANS OF VENTING WILL BE PROVIDED. BRICKS ARE NOT AN ACCEPTABLE CONSTRUCTION MATERIAL FOR ANY PORTION OF THE MANHOLE.

    THE DIAMETER OF THE MANHOLES MUST BE A MINIMUM OF FOUR FEET AND THE MANHOLE FOR ENTRY MUST HAVE A MINIMUM CLEAR OPENING DIAMETER OF 30 INCHES. THESE DIMENSIONS AND OTHER DETAILS SHOWING COMPLIANCE WITH THE COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON PLAN SHEET 9 OF 9.

    IT IS SUGGESTED THAT ENTRANCE INTO MANHOLES IN EXCESS OF FOUR FEET DEEP BE ACCOMPLISHED BY MEANS OF A PORTABLE LADDER. THE INCLUSION OF STEPS IN A MANHOLE IS PROHIBITED.

10. WHERE WATER LINES AND NEW SEWER LINE ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(D) (PIPE DESIGN) AND 30 TAC §290.44(E) (WATER DISTRIBUTION).

11. WHERE SEWERS LINES DEVIATE FROM STRAIGHT ALIGNMENT AND UNIFORM GRADE ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER: N/A .

    IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: N/A.

    SPECIFIC CARE MUST BE TAKEN TO ENSURE THAT THE JOINT IS PLACED IN THE CENTER OF THE TRENCH AND PROPERLY BEDDED IN ACCORDANCE WITH 30 TAC §217.54.

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES.
    IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON PLAN SHEET 9 OF 9. (FOR POTENTIAL FUTURE LATERALS).

    THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET 9 OF 9. AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET 9 OF 9.

13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2) CLASSES A, B OR C.

14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).

15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. THE ENGINEER MUST CERTIFY IN WRITING THAT ALL WASTEWATER LINES HAVE PASSED ALL REQUIRED TESTING TO THE APPROPRIATE REGIONAL OFFICE WITHIN 30 DAYS OF TEST COMPLETION AND PRIOR TO USE OF THE NEW COLLECTION SYSTEM. TESTING METHOD WILL BE:
    (a) FOR A COLLECTION SYSTEM PIPE THAT WILL TRANSPORT WASTEWATER BY GRAVITY FLOW, THE DESIGN MUST SPECIFY AN INFILTRATION AND EXFILTRATION TEST OR A LOW-PRESSURE AIR TEST. A TEST MUST CONFORM TO THE FOLLOWING REQUIREMENTS:
    (1) LOW PRESSURE AIR TEST.

(A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED IN AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) C-828, ASTM C-924, OR ASTM F-1417 OR OTHER PROCEDURE APPROVED BY THE EXECUTIVE DIRECTOR, EXCEPT AS TO TESTING TIMES AS REQUIRED IN TABLE C.3 IN SUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(II) OF THIS PARAGRAPH.

(B) FOR SECTIONS OF COLLECTION SYSTEM PIPE LESS THAN 36 INCH AVERAGE INSIDE DIAMETER, THE FOLLOWING PROCEDURE MUST APPLY, UNLESS A PIPE IS TO BE TESTED AS REQUIRED BY PARAGRAPH (2) OF THIS SUBSECTION.
    (i) A PIPE MUST BE PRESSURIZED TO 3.5 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE PRESSURE EXERTED BY GROUNDWATER ABOVE THE PIPE.

    (ii) ONCE THE PRESSURE IS STABILIZED, THE MINIMUM TIME ALLOWABLE FOR THE PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED FROM THE FOLLOWING EQUATION:

EQUATION C.3
$$T = \frac{0.085 \times D \times K}{Q}$$

WHERE:
T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS
K = 0.000419 X D X L, BUT NOT LESS THAN 1.0
D = AVERAGE INSIDE PIPE DIAMETER IN INCHES
L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET
Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE FOOT INTERNAL SURFACE

(C) SINCE A K VALUE OF LESS THAN 1.0 MAY NOT BE USED, THE MINIMUM TESTING TIME FOR EACH PIPE DIAMETER IS SHOWN IN THE FOLLOWING TABLE C.3:

Pipe Diameter	Minimum Time	Length for Minimum	Time for Longer Length
(inches)	(seconds)	(feet)	(seconds)
6	340	398	0.855(L)
8	454	298	1.520(L)
10	567	239	2.374(L)
12	680	199	3.419(L)
15	850	159	5.342(L)
18	1020	133	7.693(L)
21	1190	114	10.471(L)
24	1360	100	13.676(L)
27	1530	88	17.309(L)
30	1700	80	21.369(L)
33	1870	72	25.856(L)

(D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.
(E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF A TESTING PERIOD, THEN THE TEST MUST CONTINUE FOR THE ENTIRE TEST DURATION AS OUTLINED ABOVE OR UNTIL FAILURE.
(F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.
(G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR.
    (2) INFILTRATION/EXFILTRATION TEST.
(A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE.
(B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST WHEN PIPES ARE INSTALLED BELOW THE GROUNDWATER LEVEL.
(C) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE, OR AT LEAST TWO FEET ABOVE EXISTING GROUNDWATER LEVEL, WHICHEVER IS GREATER.
(D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH (C) OF THIS PARAGRAPH.
(E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER TO REDUCE THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION.
    (b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:
    (1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.

(A) MANDREL SIZING.
    (i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS ASSOCIATION, UNI-BELL, OR AMERICAN NATIONAL STANDARDS INSTITUTE, OR ANY RELATED APPENDIX.
    (ii) IF A MANDREL SIZING DIAMETER IS NOT SPECIFIED IN THE APPROPRIATE STANDARD, THE MANDREL MUST HAVE AN OD EQUAL TO 95% OF THE ID OF A PIPE. IN THIS CASE, THE ID OF THE PIPE, FOR THE PURPOSE OF DETERMINING THE OD OF THE MANDREL, MUST EQUAL BE THE AVERAGE OUTSIDE DIAMETER MINUS TWO MINIMUM WALL THICKNESSES FOR OD CONTROLLED PIPE AND THE AVERAGE INSIDE DIAMETER FOR ID CONTROLLED PIPE.
    (iii) ALL DIMENSIONS MUST MEET THE APPROPRIATE STANDARD.
(B) MANDREL DESIGN.
    (i) A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTIC MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
    (ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS
    (iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER OF A PIPE.
    (iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING.
(C) METHOD OPTIONS
    (i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.
    (ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.
    (iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOMETER OR A MANDREL WITH REMOVABLE LEGS OR RUNNERS ON A CASE-BY-CASE BASIS.
    (2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL DEFLECTION.
    (3) A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.
    (4) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.
    (5) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).
    (6) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE PROBLEM AND CONDUCT A SECOND TEST AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS.

16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC §217.58.
    (a) ALL MANHOLES MUST PASS A LEAKAGE TEST.
    (b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR.
    (1) HYDROSTATIC TESTING.
(A) THE MAXIMUM LEAKAGE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.
(B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO A MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.
(C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.
    (2) VACUUM TESTING.
(A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.
(B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.
(C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.
(D) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.
(E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
(F) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.
(G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.
(H) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.

17. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.5(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.

AUSTIN REGIONAL OFFICE (REGION 11)	SAN ANTONIO REGIONAL OFFICE (REGION 13)
12100 PARK 35 CIRCLE, BUILDING A	14250 JUDSON ROAD
AUSTIN, TEXAS 78753-1808	SAN ANTONIO, TEXAS 78233-4480
PHONE (512) 339-2929	PHONE (210) 490-3096
FAX (512) 339-3795	FAX (210) 545-4329

SAWS SEWER NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:

    A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT (210) 233-2014. PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.
    B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.
    C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.
    D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) AND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.
    E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.
    F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS.

    SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA, TCEQ AND/OR ANY OTHER FEDERAL, STATE OR LOCAL AGENCIES.

    NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.

2. IF BYPASS PUMPING IS REQUIRED, THE CONTRACTOR SHALL PERFORM SUCH WORK IN ACCORDANCE WITH SAWS STANDARD SPECIFICATION FOR WATER AND SANITARY SEWER CONSTRUCTION, ITEM NO. 864, “BYPASS PUMPING”.

3. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT (210) 233-2973 AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.

4. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241, TAC 217.53 AND TCEQ 290.44(E)(4)(B). CONTRACTOR SHALL CENTER A 20’ JOINT OF 160 PSI PRESSURE RATED PVC AT THE PROPOSED WATER CROSSING.

5. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECT’S IMPROVEMENTS. (NSPI)

6. SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER: ALL SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER, RECYCLED WATER, PETROLEUM PRODUCTS, OR CHEMICALS MUST BE REPORTED IMMEDIATELY TO THE SAWS INSPECTOR ASSIGNED TO THE COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP). THIS REQUIREMENT APPLIES TO EVERY SPILL, OVERFLOW, OR DISCHARGE REGARDLESS OF SIZE.

7. MANHOLE AND ALL PIPE TESTING (INCLUDING THE TV INSPECTION) MUST BE PERFORMED AND PASSED PRIOR TO FINAL FIELD ACCEPTANCE BY SAWS CONSTRUCTION INSPECTION DIVISION, AS PER THE SAWS SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.

8. ALL PVC PIPE OVER 14 FEET OF COVER SHALL BE EXTRA STRENGTH WITH MINIMUM PIPE STIFFNESS OF 115 PSI

6 BAGGED GRAVEL INLET FILTER NOTES N.T.S.

1. THE GRAVEL BAG MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, POLYAMIDE OR COTTON BURLAP WOVEN FABRIC, MINIMUM UNIT WEIGHT 4 OZ/YD 2 , MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70 PERCENT.
2. THE BAG LENGTH SHOULD BE 24 INCHES, WIDTH SHOULD BE 18 INCHES AND THICKNESS SHOULD BE 6 INCHES.
3. THE GRAVEL BAGS SHOULD BE FILLED WITH ¾" GRAVEL .
4. WHEN A GRAVEL BAG IS FILLED WITH GRAVEL, THE OPEN END OF THE GRAVEL BAG SHOULD BE STAPLED OR TIED WITH NYLON OR POLY CORD.
5. THE GRAVEL BAGS SHOULD BE PLACED AS SHOWN ON THE DETAIL. THE GRAVEL BAGS SHALL BE STACKED TO FORM A CONTINUOUS BARRIER AROUND THE INLETS. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.
6. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
7. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.
8. 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.
9. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

SAWS GENERAL NOTES:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

    A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) “DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM”, TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND “PUBLIC DRINKING WATER”, TAC TITLE 30 PART 1 CHAPTER 290.
    B. CURRENT TXDOT “STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE”.
    C. CURRENT “SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION”.
    D. CURRENT CITY OF SAN ANTONIO “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”.
    E. CURRENT CITY OF SAN ANTONIO “UTILITY EXCAVATION CRITERIA MANUAL” (UECM).

2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK UNTIL THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPROVED COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE EXPENSE OF THE CONTRACTORS AND/OR THE DEVELOPER.

3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.

4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING ANY WORK.

5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR’S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

SAWS UTILITY LOCATES:	HTTP://WWW.SAWS.ORG/SERVICE/LOCATES
COSA DRAINAGE	(210) 207-0724 OR (210) 207-6026
COSA TRAFFIC SIGNAL OPERATIONS	(210) 206-8480
COSA TRAFFIC SIGNAL DAMAGES	(210) 207-3951
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005 OR 811

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF THE PROJECT’S CONSTRUCTION.

8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT REQUIREMENTS.
9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY’S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

10. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. COMPACTION NOTE (ITEM 804): THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUCTION INSPECTION DIVISION.

§217.58. TESTING REQUIREMENTS FOR MANHOLES.

(a) ALL MANHOLES MUST PASS A LEAKAGE TEST.
(b) AN OWNER SHALL TEST EACH MANHOLE, AFTER ASSEMBLY AND BEFORE BACKFILLING, FOR LEAKAGE USING HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR ANY OTHER METHOD APPROVED IN WRITING BY THE EXECUTIVE DIRECTOR. A MANHOLE MUST BE TESTED SEPARATELY AND INDEPENDENTLY FROM THE COLLECTION SYSTEM PIPES.
(1) HYDROSTATIC TESTING.
    (A) THE MAXIMUM LEAKAGE RATE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.
    (B) TO PERFORM A HYDROSTATIC TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO THE MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.
    (C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.
(2) VACUUM TESTING. AN OWNER MUST PERFORM VACUUM TESTING ACCORDING TO EITHER SUBPARAGRAPH (A) OR (B) OF THIS PARAGRAPH. IF A MANHOLE FAILS THE VACUUM TEST, THE OWNER MUST APPLY GROUT TO THE EXTERIOR OF THE EXCAVATED MANHOLE BEFORE RETESTING THE MANHOLE.
    (A) TEXAS TEST.
        (i) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.
        (ii) GROUT MAY NOT BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.
        (iii) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.
        (iv) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.
        (v) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL MUST BE INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
        (vi) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.
        (vii) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.
        (viii) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.
    (B) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) TEST. THE OWNER MAY REQUIRE MANHOLE TESTING THAT MEETS THE REQUIREMENTS OF ASTM D1244-11.

§217.333 SUBCHAPTER M SAFETY - CONFINED SPACES

(a) A DESIGN MUST, TO THE EXTENT PRACTICABLE, AVOID CONFINED SPACES AS DEFINED IN 29 FEDERAL CODE OF REGULATIONS §1910.146.
(b) A VENTILATING MANHOLE MUST BE EQUIPPED WITH A CONNECTION FOR A PORTABLE VENTILATOR.
(c) A CONFINED SPACE ENTRY MUST BE CONDUCTED ACCORDING TO THE REQUIREMENTS OF 29 CODE OF FEDERAL REGULATIONS §1910.146.

§217.53 PIPE DESIGN

(D) SEPARATION DISTANCES.
(1) COLLECTION SYSTEM PIPES MUST BE INSTALLED IN TRENCHES SEPARATE FROM WATER SUPPLY TRENCHES.
(2) WHEREVER POSSIBLE, A COLLECTION SYSTEM PIPE MUST BE LOCATED BELOW A WATER SUPPLY PIPE. IF A COLLECTION SYSTEM PIPE CANNOT BE LOCATED BELOW A WATER SUPPLY PIPE, THE OWNER MUST JUSTIFY IN THE ENGINEERING REPORT WHY IT IS NOT POSSIBLE TO LOCATE THE COLLECTION SYSTEM PIPE BELOW THE PUBLIC WATER SUPPLY PIPE.
(3) WHEREVER POSSIBLE, COLLECTION SYSTEM PIPES AND MANHOLES MUST BE LOCATED AT LEAST NINE FEET FROM ALL WATER SUPPLY PIPES. IF A COLLECTION SYSTEM PIPE OR MANHOLE CANNOT BE LOCATED AT LEAST NINE FEET AWAY FROM A WATER SUPPLY PIPE, THE OWNER MUST JUSTIFY IN THE ENGINEERING REPORT WHY IT IS NOT POSSIBLE TO PROVIDE AT LEAST NINE FEET OF SEPARATION. TABLE C.1. IN FIGURE: 30 TAC §217.53(D)(3) PROVIDES A REFERENCE TO PARAGRAPHS IN THIS SUBSECTION THAT APPLY IF A COLLECTION SYSTEM PIPE OR MANHOLE CANNOT BE LOCATED AT LEAST NINE FEET AWAY FROM A WATER SUPPLY PIPE.
(4) IF A COLLECTION SYSTEM PIPE IS LOCATED ABOVE A WATER SUPPLY PIPE AND RUNS PARALLEL TO THE WATER SUPPLY PIPE, EACH PORTION OF THE COLLECTION SYSTEM PIPE WITHIN NINE FEET OF THE WATER SUPPLY PIPE MUST BE ENCASED. THE CASING PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PER SQUARE INCH (PSI) PRESSURE CLASS PIPE THAT:
    (A) ENCASES THE ENTIRE LENGTH OF COLLECTION SYSTEM PIPE THAT IS WITHIN NINE FEET OF THE WATER SUPPLY PIPE;
    (B) IS SEALED AT BOTH ENDS WITH CEMENT GROUT OR A MANUFACTURED SEAL;
    (C) IS AT LEAST TWO NOMINAL SIZES LARGER THAN THE WASTEWATER COLLECTION PIPE; AND
    (D) IS SUPPORTED BY SPACERS BETWEEN THE COLLECTION SYSTEM PIPE AND THE ENCASING PIPE AT A MAXIMUM OF FIVE-FOOT INTERVALS.
(5) IF A COLLECTION SYSTEM PIPE CROSSES ABOVE A WATER SUPPLY PIPE, EACH PORTION OF THE COLLECTION SYSTEM PIPE WITHIN NINE FEET OF THE WATER SUPPLY PIPE MUST EITHER BE ENCASED IN A CASING PIPE ACCORDING TO SUBPARAGRAPH (A) OF THIS PARAGRAPH, OR MUST BE CONSTRUCTED USING AT LEAST 150 PSI PRESSURE CLASS PIPE ACCORDING TO SUBPARAGRAPH (B) OF THIS PARAGRAPH.
    (A) A CASING PIPE FOR A COLLECTION SYSTEM PIPE THAT CROSSES ABOVE A WATER SUPPLY PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS PIPE THAT IS:
        (i) SEALED AT BOTH ENDS WITH CEMENT GROUT OR A MANUFACTURED SEAL;
        (ii) AT LEAST TWO NOMINAL SIZES LARGER THAN THE WASTEWATER COLLECTION PIPE; AND
        (iii) SUPPORTED BY SPACERS BETWEEN THE COLLECTION SYSTEM PIPE AND THE ENCASING PIPE AT A MAXIMUM OF FIVE-FOOT INTERVALS.
    (B) A COLLECTION SYSTEM PIPE THAT CROSSES ABOVE A WATER SUPPLY PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS, CORROSION-RESISTANT, NON-BRITTLE PIPE AND MUST USE MANUFACTURER-APPROVED ADAPTERS. GASKETED JOINTS, COMPRESSION JOINTS, AND OTHER NON-BONDED JOINTS MUST BE DESIGNED TO SEAL AT ATMOSPHERIC PRESSURE.

5 HIGH–SERVICE ROCK BERM N.T.S.

INSTALLATION:

– CLEAR THE GROUND OF DEBRIS, ROCKS OR VEGETATION THAT WILL INTERFERE WITH INSTALLATION.
– PLACE WOVEN WIRE FABRIC ON THE GROUND ALONG THE PROPOSED INSTALLATION LOCATION WITH ENOUGH OVERLAP TO COMPLETELY ENCIRCLE THE FINISHED SIZE OF THE BERM.
– INSTALL THE SILT FENCE ALONG THE CENTER OF THE PROPOSED BERM PLACEMENT.
– PLACE THE ROCK ALONG THE CENTER OF THE WIRE AND BOTH SIDES OF THE SILT FENCE TO THE DESIGNATED HEIGHT.
– WRAP THE STRUCTURE WITH THE PREVIOUSLY PLACED WIRE MESH SECURELY SO THE STRUCTURE RETAINS IT'S SHAPE.
– SECURE WITH TIE WIRE.
– THE ROCK BERM SHALL BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

INSPECTION AND MAINTENANCE GUIDELINES:

– INSPECTION SHALL BE MADE WEEKLY AND AFTER EACH RAINFALL EVENT BY THE CONTRACTOR. FOR THE INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHALL BE MADE ON ROCK BERM.
– REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER. REPAIR ANY LOOSE WIRE SHEATHING.
– THE BERM SHALL BE RESHAPED AS NEEDED DURING INSPECTION.
– THE BERM SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

ADDITIONAL NOTES:
a) PRIORITIZATION OF DOCUMENTS:
    1. PLANS
    2. SPECIFICATIONS
    3. SPECIAL CONDITIONS
    4. TECHNICAL CONDITIONS

b) CONTRACTOR IS RESPONSIBLE FOR ADHERING TO ALL CONSTRUCTION DOCUMENTS, INCLUDING ALL APPLICABLE SAFETY AND PERMIT REQUIREMENTS.

c) SAN ANTONIO WATER SYSTEM CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS

    1. FOR SEPARATION DISTANCE REQUIREMENTS BETWEEN SEWER MAINS & WATER MAINS, SEE THE 30 TAC §217.53 PIPE DESIGN NOTES INCLUDED ON THIS SHEET.
    2. CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL SHALL BE USED.
    3. PLAN & PROFILE MUST SHOW TYPE OF CROSSING AND MATERIAL TO USE.

2 SILT FENCE DETAIL N.T.S.

1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NON WOVEN FABRIC. THE FABRIC WIDTH SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN 2 , ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NO. 30.
2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y–BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT 2 , AND BRINDELL HARDNESS EXCEEDING 140.
3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12.5 GAUGE MINIMUM.
4. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 1 FOOT DEEP AND SPACED NOT MORE THAN 5 FEET ON CENTER.
5. LAY OUT FENCING DOWN–SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.
6. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN–SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.
7. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
8. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3–FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.
9. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
10. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES, OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE OLD FENCE.
11. REPLACE ANY TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.
12. 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.

NOTE: CONTRACTOR SHALL ADJUST STORM WATER POLLUTION PREVENTION PLAN CONTROLS AS NECESSARY TO PROMOTE EROSION CONTROL IN AND AROUND DESIGNATED STAGING AREA.

3 TYP. CONSTRUCTION STAGING AREA N.T.S.

4 CONCRETE TRUCK WASHOUT PIT N.T.S.

GENERAL NOTES:
1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.
2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

GENERAL NOTES
1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMODATE A TRUCK WASHING AREA WHEN SHOWN ON THE CONSTRUCTION DRAWING. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.
5. STONE MATERIAL SHALL CONSIST OF 3 TO 5 INCH OPEN GRADED ROCK AND SHALL BE PLACED IN A LAYER OF AT LEAST 8 INCHES THICKNESS.

1 TEMPORARY CONSTRUCTION ENTRANCE/EXIT NOTES N.T.S.

1. THE AGGREGATE SHOULD CONSIST OF 4 TO 8 INCH WASHED STONE OVER A STABLE FOUNDATION.
2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8 INCHES.
3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD 2 , A MULLEN BURST RATING OF 140 LB/IN 2, AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.
4. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.
5. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.
6. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.
7. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.
8. PLACE STONE TO DIMENSIONS AND GRADE SHOWN. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.
9. 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.
10. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON TO PUBLIC RIGHTS–OF–WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
11. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
12. 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.
13. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE.

CUDEENGINEERS.COM

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH
PHASE I & II

SANITARY SEWER GENERAL NOTES

DATE
03/28/2023
PROJECT NO.
02318.011
DRAWN BY
JTW/MAT
CHECKED BY
CJC/SPM

REVISIONS
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10.

03/29/2023
SEAN P. McFARLAND
138893

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C9.D2

1 OF 1

P:\02318\011\2-DWG\4-Plans\Phase I Plans\C9.D2_SewerDetails.dwg 2023/03/28 11:57am jwatkins

TEMPORARY STORMWATER SECTION
(TCEQ-0602)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Sean McFarland P.E.

Date: 2/24/23

Signature of Customer/Agent:

Sean McFarland

Regulated Entity Name: Lambent Ranch

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:

   [X] The following fuels and/or hazardous substances will be stored on the site: Construction Staging Area

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

   [X] 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.

[X] 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. [X] **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. [X] 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. [X] **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. [X] **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.

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

   [X] 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. [X] 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: Upper Leon 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. [X] **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:

- [X] 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.
- [X] 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.
- [X] A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
- [X] 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. [X] 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.
   - [X] There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. [X] **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. [X] **Attachment G - Drainage Area Map**. A drainage area map supporting the following requirements is attached:

    - [X] 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. [X] 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. [X] Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

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

21. [X] 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. [X] 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

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT "A"
SPILL RESPONSE ACTIONS

Spill Prevention and Control

The objective of this section is to describe measures to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

(1) Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills. Employees should also be aware of when spill must be reported to the TCEQ. Information available in 30 TAC 327.4 and 40 CFR 302.4.

(2) Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.

(3) Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).

(4) Establish a continuing education program to indoctrinate new employees.

(5) Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

(1) To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.

(2) Store hazardous materials and wastes in covered containers and protect from vandalism.

(3) Place a stockpile of spill cleanup materials where it will be readily accessible.

(4) Train employees in spill prevention and cleanup.

(5) Designate responsible individuals to oversee and enforce control measures.

(6) Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.

(7) Do not bury or wash spills with water.

(8) Store and dispose of used clean up 'materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.

(9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.

(10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.

(11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.

(12) Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

(1) Clean up leaks and spills immediately.

(2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.

(3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

(1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.

(2) Use absorbent materials on small spills rather than hosing down or burying the spill.

(3) Absorbent materials should be promptly removed and disposed of properly.

(4) Follow the practice below for a minor spill:

(5) Contain the spread of the spill.

(6) Recover spilled materials.

(7) Clean the contaminated area and properly dispose of contaminated materials.

Semi-significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

(3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.

(4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.

(5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

(1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.

(2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

(3) Notification should first be made by telephone and followed up with a written report.

(4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.

(5) Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at: https://www.tceq.texas.gov/remediation/corrective_action/spill.html

Vehicle and Equipment Maintenance

(1) If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.

(2) Regularly inspect onsite vehicles and equipment for leaks and repair immediately.

(3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.

(4) Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.

(5) Place drip pans or absorbent materials under paving equipment when not in use.

(6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.

(7) Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.

(8) Oil filters disposed of in trashcans or dumpsters can leak 03 and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters. '

(9) Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you &think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

(1) If fueling must occur on site, use designated areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.

(2) Discourage “topping off” of fuel tanks.

(3) Always use secondary containment, such as a drain pan, when fueling to catch spills/leaks.

Spill Response Actions

In the event that a spill of hydrocarbons or hazardous substances does occur, the contractor shall be required to maintain a sufficient stockpile of sand material in the staging area. This sand material shall be used to immediately isolate and provide containment of the spill by constructing dikes. Furthermore, this sand material shall act as an absorbent material that can be disposed of offsite and out of the Recharge Zone during clean-up operations. The contractor, in the event of a spill, shall also notify the owner who shall contact TCEQ. All contaminated soils resulting from an accidental release will be required to be removed and disposed of in accordance with all local, state and federal regulations.

ATTACHMENT B

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT B
Potential Sources of Contamination

Potential Source Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle dripping.

Preventive Measure — Vehicle maintenance, when possible, will be performed within a construction staging area specified by the General Contractor.

Potential Source Miscellaneous trash and litter from construction workers and material wrappings.

Preventive Measure — Trash containers will be placed throughout the site to encourage proper trash disposal.

Potential Source Construction debris.

Preventive Measure — Construction debris will be monitored daily by contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring immediate attention will be addressed on a case-by-case basis.

Potential Source Stormwater contamination from excess application of fertilizers, herbicides, and pesticides.

Preventive Measure — Fertilizers, herbicides and pesticides will be applied only when necessary and in accordance with manufacturers directions.

Potential Source Soil and mud from construction vehicle tires as they leave the site.

Preventive Measure — A temporary construction entrance/exit shall be utilized as vehicles leave the site. Any soil, mud, etc. carried from the project onto public roads shall be cleaned up within 24 hours.

Potential Source Sediment from soil, sand, gravel and excavated materials stockpiled on site.

Preventive Measure — Silt fence shall be installed on the down gradient side of all stockpiled materials. Reinforced rock berms shall be installed at all downstream discharge locations.

ATTACHMENT C

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT C
Sequence of Major Activities

Sequence Item	Description	Approximate Acres Disturbed
1.	Site clearing/grubbing	71.56 Acres
2.	Site grading	
3.	Construction of street, sanitary sewer, water lines, batch detention basin	
4.	Installation of parking areas, roadways, sidewalks	
5.	Final grading, structure building and soil stabilization	

ATTACHMENT D

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT D
Temporary Best Management Practices and Measures

1. Temporary Construction Entrance/Exit – A stabilized pad of crushed stone located at any point where traffic will be entering or leaving the construction site from a public R.O.W., street, alley, sidewalk or parking area. It shall be a minimum of 50 feet long, 12 feet wide and 8 inches thick. The rock shall be 4" to 8" in size.

2. Silt Fence – A barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. Silt fences shall be installed on the down gradient side of the proposed areas to be disturbed that have a drainage area of 2 or less acres.

3. Bagged Gravel Inlet Filter – Sandbags filled with washed pea gravel and stacked to form a continuous barrier about 1 foot high around the inlets.

4. Rock Berms – A sediment trap consisting of 3" to 5" diameter rock wrapped in a woven wire sheathing. The berm shall have a minimum height of 36" and a minimum top width of 2 feet. A rock berm shall be placed at locations of the concentrated flows where the drainage area is between 2 and 5 acres.

5. Temporary Seeding – Temporary seeding of disturbed areas shall be performed if disturbed areas are expected to have no construction activity for a period of at least 21 days.

<u>Sequence of installation during construction process</u>

1. The Temporary Construction Entrance/Exit (Item 1) shall be installed prior to disturbing any soil except at the location of the Temporary Construction Entrance/Exit. It shall stay in place and be maintained until the end of the infrastructure construction.

2. Silt fence (Item 2) shall be installed along the western boundary of the site prior to any disturbance of the site.

3. Bagged gravel inlet filters (Item 3) shall be placed around all grate inlets following installation.

4. Rock berms (Item 4) shall be installed around the perimeter of the project at natural low points following rough grading of the site and shall be removed

once grading to the on-site stormwater drainage system with bagged gravel inlet filters in sump is complete. Rock berms will also be utilized at the outlet of the pond while it is being constructed.

5. De-watering activities in the WQP as necessary during pond construction activities.

The TBMPs and measures utilized for the proposed project to prevent pollution of storm water, groundwater, and surface water during the construction phase are the following:

1. Temporary Construction Entrance/Exit
2. Silt Fence
3. Bagged Gravel Inlet Filters
4. Rock Berm

Upgradient Surface water, Groundwater, and Storm water

As the scope of this report is limited to Lambent Ranch site, there is surface water, ground water, or storm water originating from upgradient of the limits of the WPAP. Lambent Ranch receives surface water from the back of lots of single-family homes to the north of the property. This surface water will be conveyed to French Creek within a swale.

Onsite Surface water, Groundwater, and Storm water

Temporary BMPs utilized on the proposed project site to prevent pollution of onsite surface water, groundwater, and storm water are silt fences acting as barriers to prevent pollution of stormwater.

Prevention of Pollutants Entering Surface Streams, Sensitive Features, and the Aquifer

Temporary BMPs utilized on the proposed project site to prevent pollution of surface streams, sensitive features, and the aquifer are temporary construction entrance/exit, bagged gravel inlet filters, silt fence, and rock berms. The construction entrance/exit provides a stable exit from the construction site and keeps sediment and mud off public roads. The other TBMPs delineated act in like manner as previously described to protect surface streams, sensitive features, and the aquifer.

ATTACHMENT F

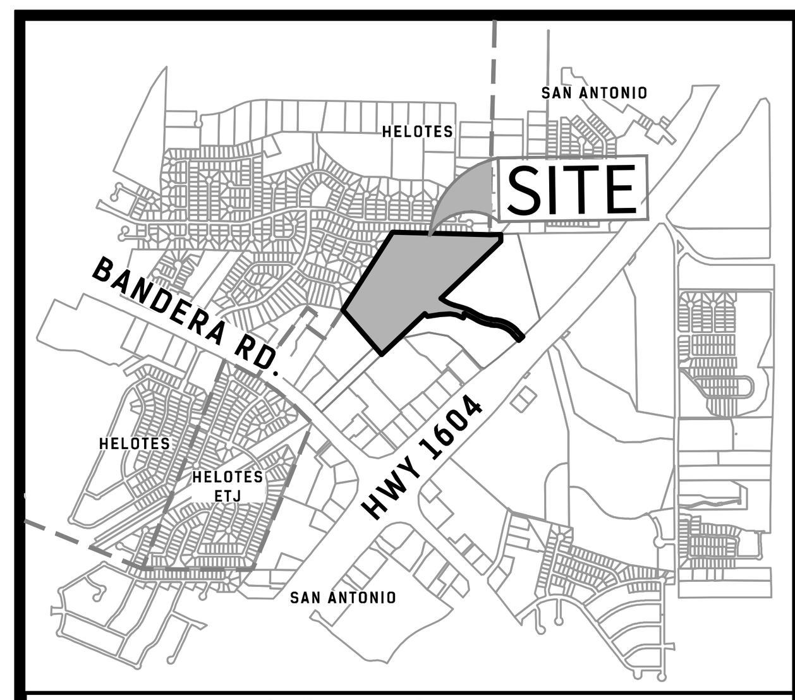
M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT F
Structural Practices

Runoff discharge of pollutants from exposed areas of the site will be limited through the utilization of temporary BMPs. Prior to leaving the site, flows containing pollutant discharges will be treated by a silt fence, bagged gravel inlet filters, or rock berms which will limit the amount of pollutants leaving the site.

ATTACHMENT G

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)



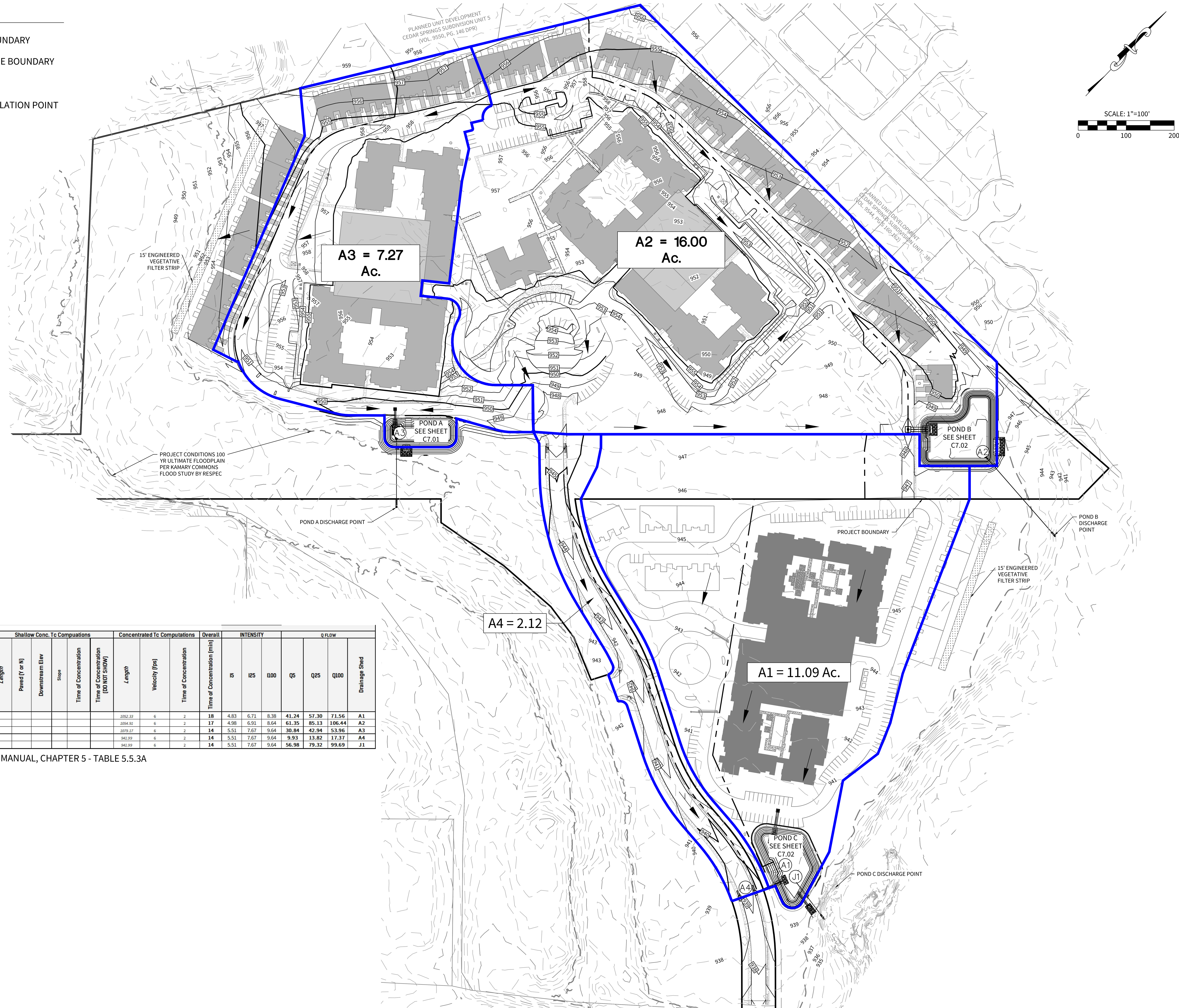
LOCATION MAP
N.T.S.

LEGEND

= SITE BOUNDARY
= DRAINAGE BOUNDARY
= Tc LINE
(XX) = ACCUMULATION POINT

OWNER/DEVELOPER:
SAN ANTONIO 103 TX, LLC
30 N. GOULD STREET, SUITE R
SHERIDAN, WY 82801
TEL: (941) 225-8481

CIVIL ENGINEER:
M.W. CUDE ENGINEERS, L.L.C.
CONTACT PERSON: SEAN McFARLAND, P.E.
4122 POND HILL ROAD, SUITE 101
SAN ANTONIO, TX 78231
TEL: (210) 681-2951
FAX: (210) 523-7112



Calculation Summary for Time of Concentrations & Ultimate Flow

HYDROLOGY				Sheet Flow Tc Compuations							Shallow Conc. Tc Compuations						Concentrated Tc Computations			Overall	INTENSITY			Q FLOW			
Drainage Shed	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	Length < 300'	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	Time of Concentration (DO NOT SHOW)	Length	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	Time of Concentration (DO NOT SHOW)	Length	Velocity (fps)	Time of Concentration	Time of Concentration (min)	I5	I25	I100	Q5	Q25	Q100	Drainage Shed
A1	11.09	= A1	0.77	134.46	N	948.13	946.57	1.16%	16.00	16.40							1052.33	6	2	18	4.83	6.71	8.38	41.24	57.30	71.56	A1
A2	16.00	= A2	0.77	112.56	N	955.11	954.00	0.99%	15.00	15.63							1054.91	6	2	17	4.98	6.91	8.64	61.35	85.13	106.44	A2
A3	7.27	= A3	0.77	108.82	N	958.43	955.55	2.65%	12.00	12.44							1079.17	6	2	14	5.51	7.67	9.64	30.84	42.94	53.96	A3
A4	2.12	= A4	0.85	110.68	N	958.43	955.55	2.60%	12.00	12.53							941.99	6	2	14	5.51	7.67	9.64	9.93	13.82	17.37	A4
J1	13.21	= A1 + A4	0.78	110.68	N	958.43	955.55	2.60%	12.00	12.53							941.99	6	2	14	5.51	7.67	9.64	56.98	79.32	99.69	J1

* C-VALUES OBTAINED FROM CoSA UDC STORM WATER DESIGN CRITERIA MANUAL, CHAPTER 5 - TABLE 5.5.3A

CUDEENGINEERS.COM
CUDE EST. 1980 ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

TERRACES AT LAMBENT RANCH PHASE I & II

WPAP PLAN/OVERALL DRAINAGE PLAN

DATE
03/28/2023

PROJECT NO.
02318.011

DRAWN BY
JTW/MAT

CHECKED BY
CJC/SPM

REVISIONS
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

03/29/2023
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

CUDE ENGINEERS
TBPELS No. 10048500

PLAT NO.
23-11800027

C7.00

ATTACHMENT I

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Lambent Ranch
ATTACHMENT I

INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures every fourteen days and within 24 hours after a storm event greater than 0.5 inches of rainfall. An inspection report that summarizes the scope of the inspection, names and qualifications of personnel conducting the inspection, date of the inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water TPDES data for a period of three years after the date o the inspection. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over 6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, and (6) concrete truck rinse-out pit for signs of potential failure. Deficiencies noted during the inspection will be corrected and documented within seven (7) calendar days following the inspection or before the next anticipated storm even t if practicable.

Lambent Ranch
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Pollution Prevention Measure	Inspected	Corrective Action	
		Description	Date Completed
General			
Revegetation			
Erosion/Sediment Controls			
Vehicle Exits			
Material Areas			
Equipment Areas			
Concrete Rinse			
Construction Debris			
Trash Receptacles			
Infrastructure			
Roadway Clearing			
Utility Clearing			
Roadway Grading			
Utility Construction			
Drainage Construction			
Roadway Base			
Roadway Surfaces			
Site Cleanups			
Building			
Clearing for Building			
Foundation Grading			
Utility Construction			
Foundation Construction			
Building Construction			
Site Grading			
Site Cleanup			

**Indicate N/A where measure does not apply.*

By my signature below, I certify that all items are acceptable and the project site is in compliance with SWPPP.

Inspector's Name _____ Inspector's Signature _____

Name of Owner/Operator (Firm) _____ Date _____

Lambent Ranch
ATTACHMENT I

Note: Inspector is to attach a brief statement of his qualifications to this report.

Lambent Ranch
ATTACHMENT I

PROJECT MILESTONE DATES

Date when major site grading activities begin:

Construction Activity	Date

Dates when construction activities temporarily or permanently cease on all or a portion of the project:

Construction Activity	Date

Date when stabilization measures are initiated:

Stabilization Activity	Date

ATTACHMENT I
Inspection and Maintenance for BMPs

Temporary Sediment Control Fences

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 silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.

Rock Berm/High Service Rock Berm

1. Inspections should be made weekly and after each rainfall by the responsible party.
2. Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt of in an approved manner.
3. Repair any loose wire sheathing.
4. The berm should be reshaped as needed during inspection.
5. The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.
6. The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

Temporary Construction Entrance and Exits

1. The entrance should be maintained in a condition, which will prevent tracking or following 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 on to public rights-of-ways 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 ant storm drain, ditch, or water course by using approved methods.

Bagged Gravel Inlet Filters

1. Inspections 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 reached a depth of 3 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not eride.
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.

Documentation Procedures

1. A copy of the inspection report is located on the following page.
2. The inspection report must be maintained on site at all times.
3. The inspection report is incorporated as part of the WPAP. The contractor is responsible for completing and updating the form in compliance with TCEQ rules.

ATTACHMENT J

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT J
Schedule of Interim and Permanent Soil Stabilization Practices

1. 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 temporarily 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 site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

2. Permanent seeding of individually disturbed areas shall be performed when infrastructure construction has been completed.

3. Permanent sodding and mulching of landscape areas shall occur at or near the completion of the project.

4. During construction, contractors shall, to the maximum extent possible, limit their construction activities to areas of construction as noted on the plans in an attempt to preserve as much natural vegetation as possible.

Seeding & Mulching Specifications

1. All seed must meet requirements of the Texas Seed Law including the labeling requirements. These labels shall show purity, germination, name and type of seed. Seed furnished shall be of the previous season's crop for the date of the project, and the date of analysis shown on each bag shall be within nine (9) months of the time of use on the project. Bermuda grass shall be hulled and treated and have a purity of 95% and germination of no less than 90%. Each variety of seed shall be furnished and delivered in separate bags or containers. A sample of each variety of seed shall be furnished for analysis and testing when directed by the Owner.

2. Annual Rye grass will be free of Johnson grass, field bindweed, dodder seed, and free of other seed to the limits allowable under the Federal Seed Act and applicable Texas Seed Law. Annual Rye grass will be added into slurry between October 1 through March 15.

3. Wood Cellulose Fiber Mulch. Wood cellulose fiber mulch shall be natural cellulose fiber mulch produced from grinding clean, whole wood chips, or fiber produced from ground newsprint with a labeled ash content not to exceed 7%. The mulch shall be designed for use in conventional mechanical planting, hydraulic planting of seed or hydraulic mulching of grass seed, either alone or with fertilizer and other additives. The mulch shall be that when applied, the material shall form a strong, moisture-retaining mat without the need of an asphalt binder. The mulch material will also be dyed with a green color to assist in determining coverage and to provide an immediate pleasing appearance. The wood cellulose fiber is also required to be dispersed rapidly in water to form homogeneous slurry and remain in such state when agitated in the hydraulic mulching unit with specified materials.

4. Straw Mulch or Hay Mulch. Straw mulch shall be oat, wheat, or rice straw. Hay mulch shall be prairie grass, Bermuda grass or other hay as approved by the Owner. The straw mulch or hay mulch shall be free of Johnson grass or other noxious weeds and foreign materials. It shall be kept in a dry condition and shall not be molded or rotted.

Optimum Planting Dates	Common Names	Rate, lbs./acre
February 1 – May 1	Bermuda Grass	1.5
September 1 – November 30	Tall Fescue	4.0
	Oats	21.0*
	Wheat (Red, Winter)	30.0
September 1 – November 30	Hairy Vetch	8.0
May 1 – August 31	Foxtail Millet	30.0

1.3.10 Hydraulic Mulch

Hydraulic mulch consists of applying a mixture of shredded wood fiber or a hydraulic matrix, and a stabilizing emulsion or tackifier with hydro-mulching equipment, which temporarily protects exposed soil from erosion by raindrop impact or wind. Hydraulic mulch is suitable for soil disturbed areas requiring temporary protection until permanent stabilization is established, and disturbed areas that will be re-disturbed following an extended period of inactivity. It is not appropriate for slopes of 3:1 or steeper or for use in channels.

Wood fiber hydraulic mulches are generally short lived and need 24 hours to dry before rainfall occurs to be effective. May require a second application in order to remain effective for an entire rainy season.

Materials:

Hydraulic Mulches: Wood fiber mulch can be applied alone or as a component of hydraulic matrices. Wood fiber applied alone is typically applied at the rate of 2,000 to 4,000 lb/acre. Wood fiber mulch is manufactured from wood or wood waste from lumber mills or from urban sources.

Hydraulic Matrices: Hydraulic matrices include a mixture of wood fiber and acrylic polymer or other tackifier as binder. Apply as a liquid slurry using a hydraulic application machine (i.e., hydro seeder) at the following minimum rates, or as specified by the manufacturer to achieve complete coverage of the target area: 2,000 to 4,000 lb/acre wood fiber mulch, and 5 to 10% (by weight) of tackifier (acrylic copolymer, guar, psyllium, etc.)

Bonded Fiber Matrix: Bonded fiber matrix (BFM) is a hydraulically applied system of fibers and adhesives that upon drying forms an erosion resistant blanket that promotes vegetation, and prevents soil erosion. BFMs are typically applied at rates from 3,000 lb/acre to 4,000 lb/acre based on the manufacturer's recommendation. A biodegradable BFM is composed of materials that are 100% biodegradable. The binder in the BFM should also be biodegradable and should not dissolve or disperse upon re-wetting. Typically, biodegradable BFMs should not be applied immediately before, during or immediately after rainfall if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Installation:

(1) Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where other methods are impractical.

(2) To be effective, hydraulic matrices require 24 hours to dry before rainfall occurs.

(3) Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

Inspection and Maintenance Guidelines:

(1) Mulched areas should be inspected weekly and after each rain event to locate and repair any damage.

(2) Areas damaged by storms or normal construction activities should be regraded and hydraulic mulch reapplied as soon as practical.

1.3.11 Sod

Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors.

The advantages of properly installed sod include:

- Immediate erosion control.
- An instant green surface with no dust or mud.
- Nearly year-round establishment capability.
- Less chance of failure than seed.
- Freedom from weeds.
- Quick use of the sodded surface.
- The option of buying a quality-controlled product with predictable results.

It is initially more costly to install sod than to seed. However, this cost is justified in places where sod can perform better than seed in controlling erosion. In swales and waterways where concentrated flow will occur, properly pegged sod is preferable to seed because there is no lag time between installation and the time when the channel is protected by vegetation. Drop inlets, which will be placed in grassed areas, can be kept

free of sediment, and the grade immediately around the inlet can be maintained, by framing the inlet with sod strips.

Sod can be laid during times of the year when seeded grass may fail, so long as there is adequate water available for irrigation in the early weeks. Ground preparation and proper maintenance are as important with sod as with seed. Sod is composed of living plants and those plants must receive adequate care in order to provide vegetative stabilization on a disturbed area.

Materials:

(1) Sod should be machine cut at a uniform soil thickness of ¾ inch (± ¼ inch) at the time of cutting. This thickness should exclude shoot growth and thatch.

(2) Pieces of sod should be cut to the supplier's standard width and length, with a maximum allowable deviation in any dimension of 5%. Torn or uneven pads should not be acceptable.

(3) Standard size sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp on one end of the section.

(4) Sod should be harvested, delivered, and installed within a period of 36 hours.

Site Preparation:

(1) Prior to soil preparation, areas to be sodded should be brought to final grade in accordance with the approved plan.

(2) The surface should be cleared of all trash, debris and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.

(3) Fertilize according to soil tests. Fertilizer needs can be determined by a soil testing laboratory or regional recommendations can be made by county agricultural extension agents. Fertilizer should be worked into the soil to a depth of 3 inches with a disc, springtooth harrow or other suitable equipment. On sloping land, the final harrowing or discing operation should be on the contour.

General Installation (VA Dept of Conservation, 1992):

(1) Sod should not be cut or laid in excessively wet or dry weather. Sod also should not be laid on soil surfaces that are frozen.

(2) During periods of high temperature, the soil should be lightly irrigated immediately prior to laying the sod, to cool the soil and reduce root burning and dieback.

(3) The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other. Lateral joints should be staggered to promote more uniform growth and strength. Care should be exercised to ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause drying of the roots (see Figure 1-22).

(4) On slopes 3:1 or greater, or wherever erosion may be a problem, sod should be laid with staggered joints and secured by stapling or other approved methods. Sod should be installed with the length perpendicular to the slope (on the contour).

(5) As sodding of clearly defined areas is completed, sod should be rolled or tamped to provide firm contact between roots and soil.

(6) After rolling, sod should be irrigated to a depth sufficient that the underside of the sod pad and the soil 4 inches below the sod is thoroughly wet.

(7) Until such time a good root system becomes developed, in the absence of adequate rainfall, watering should be performed as often as necessary to maintain moist soil to a depth of at least 4 inches.

(8) The first mowing should not be attempted until the sod is firmly rooted, usually 2-3 weeks. Not more than one third of the grass leaf should be removed at any one cutting.

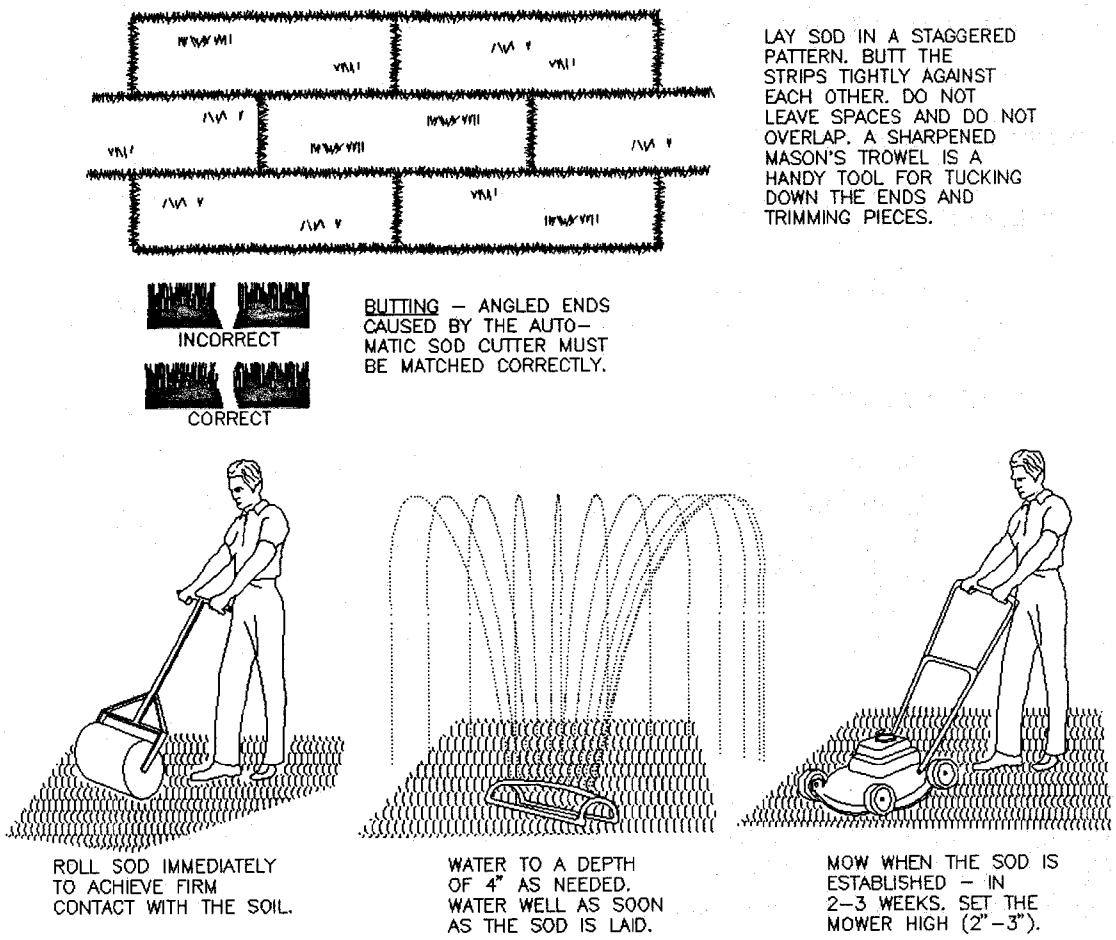

Figure 1-22 Proper Sod Installation Techniques (VA Dept. of Conservation, 1992)

Installation in Channels:

(1) Sod strips in waterways should be laid perpendicular to the direction of flow. Care should be taken to butt ends of strips tightly (see Figure 1-23).

(2) After rolling or tamping, sod should be pegged or stapled to resist washout during the establishment period. Mesh or other netting may be pegged over the sod for extra protection in critical areas.

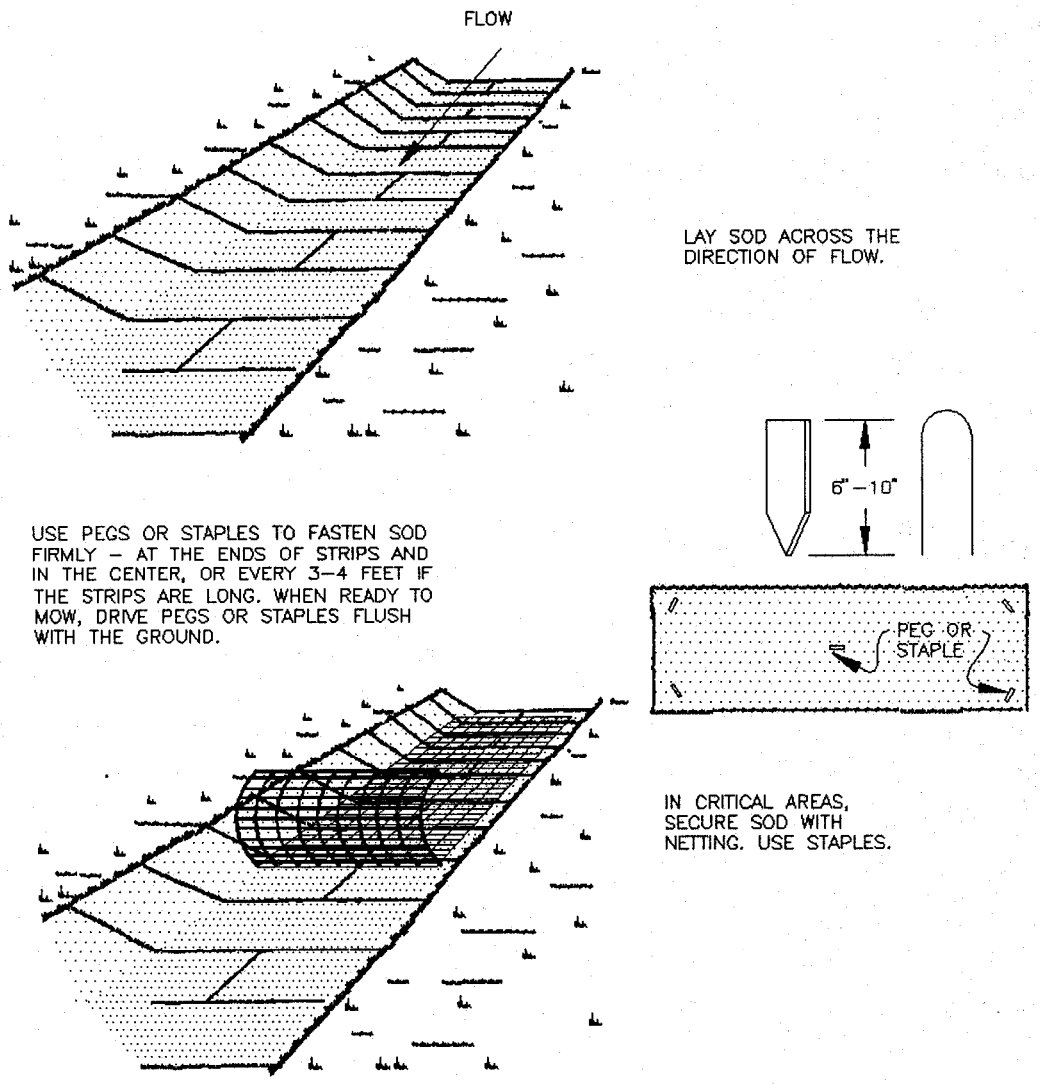

Figure 1-23 Installation of Sod in a Channel (VA Dept. of Conservation, 1992)

Inspection and Maintenance Guidelines:

(3) Sod should be inspected weekly and after each rain event to locate and repair any damage.

(4) Damage from storms or normal construction activities such as tire ruts or disturbance of swale stabilization should be repaired as soon as practical.

PERMANENT STORMWATER SECTION
(TCEQ-0600)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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: Sean McFarland P.E.

Date: 2/24/23

Signature of Customer/Agent

Sean McFarland

Regulated Entity Name: Lambent Ranch

Permanent Best Management Practices (BMPs)

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

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

   [ ] N/A

2. [X] 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.

   [X] 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. [X] **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:

    [X] Prepared and certified by the engineer designing the permanent BMPs and measures
    [X] Signed by the owner or responsible party
    [X] Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
    [X] 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.

    [X] N/A

13. [X] **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. [X] 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. [X] 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 B

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT B
BMPs for Upgradient Stormwater

The site will not require any permanent BMPs for up-gradient storm water runoff.

Three (3) proposed batch detention basins (Basin “A”, Basin “B”, Basin “C”) and two (2) proposed fifteen-foot (15’) engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT C

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT C
BMPs for On-site Stormwater

Permanent BMPs proposed for pollution abatement of the subdivision campus comprises of the following:

- 2 Areas of Vegetated Filter Strip (Engineered and Natural)
- 3 Water Quality Ponds

Three (3) proposed batch detention basins (Basin “A”, Basin “B”, Basin “C”) and two (2) proposed fifteen-foot (15’) engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT D

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT D
BMPs for Surface Streams

There are surface streams adjacent to the site but not within the limits of the proposed WPAP. There are no additional BMP's that are required for surface streams.

Three (3) proposed batch detention basins (Basin "A", Basin "B", Basin "C") and two (2) proposed fifteen-foot (15') engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT F

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT F
Construction Plans

Please refer to the Exhibits Section of this application for the Water Pollution Abatement Site Plans.

ATTACHMENT G

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

PERMANENT POLLUTION ABATEMENT MEASURES
MAINTENANCE SCHEDULE AND MAINTENANCE PROCEDURES

This document has been prepared to provide a description and schedule for the performance of maintenance of permanent pollution abatement measures. Maintenance measures to be performed will be dependent on what permanent pollution abatement measures are incorporated into the project. The project specific water pollution abatement plan should be reviewed to determine what permanent pollution abatement measures are incorporated into a project.

It should also be noted that the timing and procedures presented herein are general guidelines, adjustment to the timing and procedures may have to be made depending on project specific characteristics as well as weather related conditions.

Where a project is occupied by the owner, the owner may provide for maintenance with his own skilled forces or contract for recommended maintenance of Permanent Best Management Practices. Where a project is occupied or leased by a tenant, the owner shall require tenants to contract for such maintenance services either through a leas agreement, property owners association covenants, or other binding document.

I understand that I am responsible for maintenance of the Permanent Pollution Abatement Measures included in this project until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property or ownership is transferred.

I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule.

3/28/23

Robert Ritzenthaler
Manager
San Antonio 103 TX LLC

Date

INSPECTION AND MAINTENANCE SCHEDULE FOR PERMANENT POLLUTION ABATEMENT MEASURES

Recommended Frequency	Task to be Performed													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
After Significant Rainfall	✓							✓	✓	✓				
Biannually*	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓

At least one biannual inspection must occur during or immediately after a rainfall event.
✓ Indicates maintenance procedure that applies to this specific site.

See description of maintenance task to be performed on the following pages. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather related conditions.

A written record should be kept of inspection reports and maintenance performed.

Task No. & Description	***Included in this project***	
1. Check Depth of Vegetation	Yes	~~No~~
2. Check Depth of Silt Deposit in Basin	Yes	~~No~~
3. Removal of Debris and Trash	Yes	~~No~~
4. Cut-off Valve	Yes	~~No~~
5. Inlet Splash Pad	Yes	~~No~~
6. Underdrain System	Yes	~~No~~
7. Structural Integrity	Yes	~~No~~
8. Discharge Pipe	Yes	~~No~~
9. Drawdown Time	Yes	~~No~~
10. Vegetated Filter Strips	Yes	~~No~~
11. For Pump Stations	~~Yes~~	No
12. For Pump Stations	~~Yes~~	No
13. For Pump Stations	~~Yes~~	No
14. Visually Inspect Security Fencing for Damage or Breach	Yes	~~No~~

MAINTENANCE PROCEDURES FOR PERMANENT POLLUTION ABATEMENT MEASURES

1. Check Depth of Vegetation. Vegetation in the basin shall not exceed 18-inches in depth. When vegetation needs to be cut, it shall be cut to an approximately 4-inch height. *A written record should be kept of inspection results and maintenance performed.*

2. Check Depth of Silt Deposit in Basin. Top of cleanouts shall be set 4-inches above sand layer. When silt has accumulated to top of cleanouts, the silt shall be removed the top 2 inches of the sand medial shall also be removed and replaced with clean silica based sand. *A written record should be kept of inspection results and maintenance performed.*

3. Removal of Debris and Trash. The basin and inlet structure shall be checked for the accumulations o debris and trash such as brush, limbs, leaves, paper cups, aluminum cans, plastic bottles, etc. Accumulated trash and debris shall be raked or collected from the basin and inlet structure and disposed of properly. *A written record should be kept of inspection results and maintenance performed.*

4. Cut-off Valve. The cut-off valve shall be turned to confirm full opening and full closure. Prior to operating the valve, the valve setting shall be checked to determine the position to which the valve is to be returned (which should limit drawdown time of the basin between 24-hours and 48-hours). Count should be kept of number of turns to open and close the valve so that the valve can be reset to the starting position. Defects in the operation of the cut-off valve shall be corrected within 7 working days. *A written record should be kept of inspection results and maintenance performed*

5. Inlet Splash Pad. The filter area around the inlet splash pad shall be checked for erosion and for the condition of the rock rubble. Erosion or disturbance of the rock rubble should be corrected by removing the rock rubble, restoring missing sand media to appropriate depth and replacement of the rock rubble. If the condition persists in subsequent inspections, the size of the rock rubble should be increased. Rubble should be placed to a density that minimizes the amount of exposed sand between the rock rubble. Deficiencies should be corrected within seven working days. *A written record should be kept of inspection results and maintenance performed.*

6. Underdrain System. The underdrain system shall be visually inspected for the accumulation of silt in the pipe system. The pipe clean-outs shall have the caps removed and visually inspected for accumulation of silt deposits. If silt deposits appear to have accumulated so as to significantly reduce the drain capacity of the pipes then maintenance shall be performed. When silt deposits have accumulated to the stage described above, the clean-outs and drainpipes can be flushed with a high-pressure water flushing process.

Clean-out caps must be replaced onto the clean-outs after maintenance so as to avoid the possibility of short circuiting the filtering process. Sediment accumulation at outlet pipe or in wet well due to flushing shall be removed and disposed of properly. *A written record should be kept of inspection results and maintenance performed.*

7. Structural Integrity. In addition to Items 1 through 6 the following are measures which should be reviewed during a check of structural integrity:
   - Observe the height of the confining berm for visible signs of erosion or potential breach. Signs of erosion should be corrected within 2 weeks or immediately in case of emergency conditions. Corrective measures include, but are not limited to, addition of topsoil or appropriate soil material so as to restore the original berm height of the sand filter basin. Restored areas shall be protected through placement of block sod in a checkerboard pattern.
   - Bypass of filter process. This condition can manifest itself in several ways. One way is by visually inspecting the clean-outs for accumulation of silt as described in Item 6. Significant accumulations of silt could be a sign of a torn filter fabric. Observations should be made over several inspection cycles to determine whether the condition persists. A second non-intrusive way of making observations for structural condition would be to visually look for collapsed or depressed areas along the edge of the filter media interface with basin side slope. If condition exists, corrective action should be performed within 15 working days. Removal of sand and replacement of filter fabric and/or pipe and gravel may be necessary. *A written record should be kept of inspection results and maintenance performed.*

8. Discharge Pipe. The basin discharge pipe shall be checked for accumulation of silt, debris or other obstructions which could block flow. Soil accumulations, vegetative overgrowth and other blockages should be cleared from the pipe discharge point. Erosion at the point of discharge shall be monitored. If erosion occurs, the addition of rock rubble to disperse the flow should be accomplished. *A written record should be kept of inspection results and maintenance performed.*

9. Drawdown Time. Drawdown time of 30 hours is required for sand filtration basin.

10. Vegetated Filter Strips. Vegetation height for native grasses shall be limited to no more than 18-inches. When vegetation exceeds that height, the filter strip shall be cut to a height of approximately 4 inches. Turf grass shall be limited to a height of 4-inches with regular maintenance that utilizes a mulching mower. Trash and debris shall be removed from filter strip prior to cutting. Check filter strip for signs of concentrated flow and erosion. Areas of filter strip showing signs of erosion shall be repaired by scarifying the eroded area, reshaping, regarding and placement of block sod in a checkerboard pattern

over the affected area. *A written record should be kept of inspection results and maintenance performed*

11. For Pump Stations. Check wet well discharge pipe to confirm flow through the pump system. If flow is not present, allow sufficient time for pump to cycle on and off. If flow does not occur, the wet well should be checked for the level of water. The wet well should be opened and the on/off float switches should be moved up and down to activate the pump. If the pump does not start, a repair technician shall be called into repair the malfunction within 5 working days. *A written record should be kept of inspection results and maintenance performed*

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12. For Pump Stations. Check the wet well for accumulation for trash, debris and silt. Trash and debris shall be removed and disposed of properly. Silt depth can be checked by probing the bottom of the wet well with a stick or PVC pipe. Silt accumulations should be removed when silt collects to a depth of 6 inches over the entire wet well bottom. Silt can be removed by vacuum pump method. If silt buildup continues, underdrain system shall be inspected. *A written record should be kept of inspection results and maintenance performed.*

13. For Pump Stations. Visually check aboveground pump wiring and connections for damage. Damaged or loose connections should be repaired within 5 working days. *A written record should be kept of inspection results and maintenance performed.*

14. Visually Inspect Security Fencing for Damage or Breach. Check maintenance access gates for property operation. Damage to fencing or gates shall be repaired within 5 working days. *A written record should be kept of inspection results and maintenance performed.*

15. Inspections. BMP facilities must be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. During each inspection, erosion areas inside and downstream of the BMP must be identified and repaired or revegetated immediately. With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) must be identified and repaired immediately. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage.

16. Sediment Removal. Remove sediment from the inlet structure and sedimentation chamber when sediment buildup reaches a depth of 6 inches or when the proper functioning of inlet and outlet structures is impaired. Sediment should be cleared from the inlet structure at least every year and from the sedimentation basin at least every 5 years.

17. Media Replacement. Maintenance of the filter media is necessary when the drawdown time exceeds 48 hours. When this occurs, the upper layer of sand should be removed and replaced with new material meeting the original specifications. Any discolored sand should also be removed and replaced. In filters that have been regularly maintained, this should be limited to the top 2 to 3 inches.

18. Debris and Litter Removal. Debris and litter will accumulate near the sedimentation basin outlet device and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the control device or riser.

19. Filter Underdrain. Clean underdrain piping network to remove any sediment buildup as needed to maintain design drawdown time.

20. Mowing. Grass areas in and around sand filters must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. Vegetation on the pond embankments should be mowed as appropriate to prevent the establishment of woody vegetation.

ATTACHMENT G
Inspection, Maintenance, Repair and Retrofit Plan

Vegetative Filter Strips

Once a vegetated area is well established, little additional maintenance is generally necessary. The key to establishing a viable vegetated feature is the care and maintenance it receives in the first few months after it is planted. Once established, all vegetated BMPs require some basic maintenance to insure the health of the plants including:

- *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 4 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 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. Depending on the type of pollutants accumulated, some sediments may be

considered hazardous waste or toxic material, and are therefore subject to restrictions for disposal.

- *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.

Sand Filter Systems

Intermittent sand filters require a high degree of maintenance compared to other BMPs. Regular, routine maintenance is essential to effective, long-lasting performance. Neglect or failure to service the filters on a regular basis will lead to poor performance and eventual costly repairs. It is recommended that sand filter BMPs be inspected on a quarterly basis and after large storms for the first year of operation. This intensive monitoring is intended to ensure proper operation and provide maintenance personnel with a feel for the operational characteristics of the filter. Subsequent inspections can be limited to semi-annually or more often if deemed necessary (Young et al., 1996).

Certain construction and maintenance practices are essential to efficient operation of the filter. The biggest threat to any filtering system is exposure to heavy sediment loads that clog the filter media. Construction within the watershed should be complete prior to exposing the filter to stormwater runoff. All exposed areas should be stabilized to minimize sediment loads. Runoff from any unstabilized construction areas should be treated via a separate sediment system that bypasses the filter media.

Another important consideration in constructing the filter bed, is to ensure that the top of the media is completely level. The filter design is based on the use of the entire filter media surface area; a sloped filter surface would result in disproportionate use of the filter media.

Other recommended maintenance guidelines include:

- *Inspections.* BMP facilities must be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. During each inspection, erosion areas inside and downstream of the BMP must be identified and repaired or revegetated immediately. With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls,

etc.) must be identified and repaired immediately. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage.

- *Sediment Removal*. Remove sediment from the inlet structure and sedimentation chamber when sediment buildup fills the 20% volume allocated for sediment accumulation, or when the proper functioning of inlet and outlet structures is impaired. Sediment should be cleared from the inlet structure at least every year, and from the sedimentation basin at least every 5 years. Silt accumulated on the surface of the filter media should be removed when it has reached a depth of about 0.5 inch or the drainage time has increased to more than 48 hours.

- *Media Replacement*. More extensive maintenance of the filter media is required when the draw-down time begins to exceed the target time of 48 hours. Non-routine maintenance or corrective maintenance should be performed when the draw-down time exceeds 72 hours. When this occurs, the upper layer of geotechnical material and gravel ballast should be removed and replaced with new materials meeting the original specifications. Any discolored sand should also be removed and replaced. In filters that have been regularly maintained, this should be limited within the top 2 to 3 inches.

- *Debris and Litter Removal.* Debris and litter will accumulate near the sedimentation basin outlet device and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the control device or riser.

- *Filter Underdrain.* Clean underdrain piping network to remove any sediment buildup every 2 years, or as needed to maintain design drawdown time.

- *Mowing.* Grass areas in and around sand filters must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas.

ATTACHMENT I

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

ATTACHMENT I
Measures for Minimizing Surface Stream Contamination

Silt fence has been specified downstream of the areas of proposed soil disturbance to provide pollution abatement of onsite flows. Bagged gravel filters will be utilized to minimize contamination entering storm drainage facilities. Rock berms will be implemented to abate sediment contamination for drainage facilities exiting the site. Temporary BMPs will be maintained and kept onsite until re-growth of the natural vegetation occurs to provide the required soil stabilization in the event any areas are more than minimally disturbed. If required, appropriate seeding measures will be employed.

AGENT AUTHORIZATION FORM

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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

I Robert Ritzenthaler,
Print Name

Owner,
Title - Owner/President/Other

of San Antonio 103 TX, L.L.C.,
Corporation/Partnership/Entity Name

have authorized Cude Engineers, L.L.C.
Print Name of Agent/Engineer

of Cude Engineers, L.L.C.
Print Name of Firm

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

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Applicant's Signature

3/28/23
Date

THE STATE OF Texas §

County of Collin §

BEFORE ME, the undersigned authority, on this day personally appeared Robert Ritzenthaler 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 28th day of March, 2023.

JENNIFER UKEN
Notary ID #129702829
My Commission Expires
April 20, 2025

NOTARY PUBLIC

Jennifer Uken
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 4/20/25

FEE FORM

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Lambent Ranch

Regulated Entity Location: 0.5 miles north of Loop 1604 and Bandera Road intersection

Name of Customer: San Antonio 103 TX LLC

Contact Person: Robert Ritzenthaler Phone: 210-681-2951

Customer Reference Number (if issued):CN _____

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	71.56 Acres	$ 8,000
Sewage Collection System	2,284 L.F.	$ 1,142
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: Sean McFarland Date: 03/28/2023

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)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

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 606121986		**RN** 111704367

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	3/29/2023

☒ 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:*
San Antonio 103 TX, LLC	

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
0804711974	32086147454	88-3880582	

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees	**13. Independently Owned and Operated?**
☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher	☒ **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:	835 129th St. NE							
	City	Bradenton	**State**	FL	**ZIP**	34212	**ZIP + 4**	2803

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	robert@remcapital.com

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

(941) 225-8481		( ) -

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.)*

Lambent Ranch

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

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

25. Description to Physical Location:	Approximately 0.50 miles north of Loop 1604 and Bandera Road Intersection				
26. Nearest City			**State**	**Nearest ZIP Code**	
San Antonio			TX	78023	

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:	29.56079		**28. Longitude (W) In Decimal:**	-98.66431	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	33	38.84	98	39	51.50

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)
1522	1623	236116	237110

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

Construction of multi-family development

34. Mailing Address:	**835 129th Street NE**							
	City	**Bradenton**	**State**	**FL**	**ZIP**	**34212**	**ZIP + 4**	**2803**
35. E-Mail Address:	**robert@remcapital.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(941) 225-8481		( ) -

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:	Matthew Trinkle	**41. Title:**	EIT

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(210 **)** 681-2951		**( ) -**	mtrinkle@cudeengineers.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:	Cude Engineers	**Job Title:**	Project Manager	
Name *(In Print):*	Sean McFarland, P.E.		**Phone:**	**(** 210 **)** 681- **2951**
Signature:	Sean McFarland		**Date:**	2/24/2023

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 606121986		**RN** 111704367

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	3/29/2023

☒ 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:*
San Antonio 103 TX, LLC	

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
0804711974	32086147454	88-3880582	

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees	**13. Independently Owned and Operated?**
☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher	☒ **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:	835 129th St. NE							
	City	Bradenton	**State**	FL	**ZIP**	34212	**ZIP + 4**	2803

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	robert@remcapital.com

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

(941) 225-8481		( ) -

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.)*

Lambent Ranch

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

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

25. Description to Physical Location:	Approximately 0.50 miles north of Loop 1604 and Bandera Road Intersection				
26. Nearest City			**State**	**Nearest ZIP Code**	
San Antonio			TX	78023	

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:	29.56079		**28. Longitude (W) In Decimal:**	-98.66431	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	33	38.84	98	39	51.50

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)
1623	1522	236116	237110

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

Construction of multi-family development

34. Mailing Address:	**835 129th Street NE**						
	City	**Bradenton**	**State**	**FL**	**ZIP**	**34212**	**ZIP + 4**	**2803**
35. E-Mail Address:	**robert@remcapital.com**						

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(941) 225-8481		( ) -

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:	Matthew Trinkle	**41. Title:**	EIT

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(210 **)** 681-2951		**( ) -**	mtrinkle@cudeengineers.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:	Cude Engineers	**Job Title:**	Project Manager	
Name *(In Print):*	Sean McFarland, P.E.		**Phone:**	**(** 210 **)** 681- **2951**
Signature:	Sean McFarland		**Date:**	2/24/2023

POLLUTANT LOAD AND REMOVAL CALCULATIONS

03/28/2023

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Lambent Ranch
Date Prepared: 3/28/2023

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

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

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

where:

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

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

County =	Bexar	
Total project area included in plan * =	50.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	22.82	acres
Total post-development impervious cover fraction * =	0.45	
P =	30	inches

$L_{M\ TOTAL\ PROJECT}$ = **18621** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **3**

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

Drainage Basin/Outfall Area No. =	**1**	
Total drainage basin/outfall area =	**7.27**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**3.50**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.48**	
$L_{M\ THIS\ BASIN}$ =	**2856**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	**Extended Detention**	
Removal efficiency =	**91**	percent

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

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

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

where:

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

A_C =	**7.25**	acres
A_I =	**3.50**	acres
A_P =	**3.75**	acres
L_R =	**3361**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**2856**	lbs.
F =	**0.85**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-3

Rainfall Depth =	**1.32**	inches
Post Development Runoff Coefficient =	**0.35**	
On-site Water Quality Volume =	**12096**	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	2419	
Total Capture Volume (required water quality volume(s) x 1.20) =	14515	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	**Enter determined permeability rate or assu**
Irrigation area =	NA	square feet	
	NA	acres	

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	14515	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Lambent Ranch
Date Prepared: 3/28/2023

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where:

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

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

County =	Bexar	
Total project area included in plan * =	50.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	22.82	acres
Total post-development impervious cover fraction * =	0.45	
P =	30	inches

$L_{M\ TOTAL\ PROJECT}$ = **18621** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **3**

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

Drainage Basin/Outfall Area No. =	**2**	
Total drainage basin/outfall area =	**16.00**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**8.90**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.56**	
$L_{M\ THIS\ BASIN}$ =	**7262**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	**Extended Detention**	
Removal efficiency =	**91**	percent

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

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

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

where:

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

A_C =	**16.00**	acres
A_I =	**8.90**	acres
A_P =	**7.10**	acres
L_R =	**8511**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**7262**	lbs.
F =	**0.85**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-3

Rainfall Depth =	**1.32**	inches
Post Development Runoff Coefficient =	**0.39**	
On-site Water Quality Volume =	**29951**	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	5990	
Total Capture Volume (required water quality volume(s) x 1.20) =	35941	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	**Enter determined permeability rate or assu**
Irrigation area =	NA	square feet	
	NA	acres	

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	35941	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Lambent Ranch
Date Prepared: 3/28/2023

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where:

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

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

County =	Bexar	
Total project area included in plan * =	50.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	22.82	acres
Total post-development impervious cover fraction * =	0.45	
P =	30	inches

$L_{M\ TOTAL\ PROJECT}$ = **18621** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **3**

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

Drainage Basin/Outfall Area No. =	**3**	
Total drainage basin/outfall area =	**13.21**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**10.19**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.77**	
$L_{M\ THIS\ BASIN}$ =	**8315**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	**Extended Detention**	
Removal efficiency =	**91**	percent

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

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

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

where:

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

A_C =	**13.21**	acres
A_I =	**10.19**	acres
A_P =	**3.02**	acres
L_R =	**9670**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**8315**	lbs.
F =	**0.86**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-3

Rainfall Depth =	**1.38**	inches
Post Development Runoff Coefficient =	**0.59**	
On-site Water Quality Volume =	**38782**	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	7756	
Total Capture Volume (required water quality volume(s) x 1.20) =	46539	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	**Enter determined permeability rate or assu**
Irrigation area =	NA	square feet	
	NA	acres	

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	46539	cubic feet