EILAN TRACT 11

Water Pollution Abatement Plan and Sewage Collection System Application





November 25, 2024

Ms. Monica Reyes Texas Commission on Environmental Quality (TCEQ) Region 13 14250 Judson Road San Antonio, Texas 78233-4480

Re: Eilan Tract 11 Water Pollution Abatement Plan and Sewage Collection System Application

Dear Ms. Reyes:

Please find included herein the Eilan Tract 11 Water Pollution Abatement Plan and Sewage Collection System Application. This Water Pollution Abatement Plan 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 Sewage Collection System Application has been prepared to be consistent with the regulations of the Texas Administrative Code (30 TAC 213, 217 and 290) and current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan applies to an approximate 18.40-acre site (19.572 ac legal limit) as identified by the project limits. This Sewage Collection System Application applies to the 2,096.15 linear feet of sewer main as proposed by this project. Please review the plan information for the items it is intended to address. If acceptable, please provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Appropriate review fees (\$6,500 and \$1,048.08) and fee application are included. If you have questions or require additional information, please do not hesitate to contact me at your earliest convenience.



EILAN TRACT 11

Water Pollution Abatement Plan and Sewage Collection System Application



November 2024



EDWARDS AQUIFER APPLICATION COVER PAGE (TCEQ-20705)

Texas Commission on Environmental Quality Edwards Aquifer Application Cover Page

Our Review of Your Application

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

Administrative Review

1. <u>Edwards Aquifer applications</u> 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: <u>http://www.tceq.texas.gov/field/eapp</u>.

- 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:				2. Regulated Entity No.:					
3. Customer Name:			4. Customer No.:						
5. Project Type: (Please circle/check one)	New	(Modif	fication	\triangleright	Exter	nsion	Exception	
6. Plan Type: (Please circle/check one)	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: (Please circle/check one)	Resider	ntial	Non-r	residen	tia		8. Sit	e (acres):	
9. Application Fee:			10. P	ermai	nent I	BMP(s):		
11. SCS (Linear Ft.):			12. A	ST/US	ST (N	o. Tar	nks):		
13. County:			14. W	/aters	hed:				

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

	Sa	an 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.
Andrew Belton, P.E.
Print Name of Customer/Authorized Agent

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Signature of Customer/Authorized Agent

2	12	2
	Date	

**FOR TCEQ INTERNAL USE ONLY	**		
Date(s)Reviewed:		Date Administratively Complete:	
Received From:	Correct Number of Copies:		
Received By:	Distribut	ion Date:	
EAPP File Number:	Complex:		
Admin. Review(s) (No.):	No. AR R	Rounds:	
Delinquent Fees (Y/N):	Review T	'ime Spent:	
Lat./Long. Verified: SOS Customer Verification:		tomer Verification:	
Agent Authorization Complete/Notarized (Y/N):	Fee	Payable to TCEQ (Y/N):	
Core Data Form Complete (Y/N):	Check:	Signed (Y/N):	
Core Data Form Incomplete Nos.:		Less than 90 days old (Y/N):	

GENERAL INFORMATION FORM (TCEQ-0587)

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) Effective June 1, 1999

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

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

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Andrew Belton, P.E.



Project Information

- 1. Regulated Entity Name: Eilan Tract 11
- 2. County: Bexar
- 3. Stream Basin: Leon Creek
- 4. Groundwater Conservation District (If applicable): Edwards Aquifer; Trinity Glen Rose
- 5. Edwards Aquifer Zone:

Recharge Zone

6. Plan Type:

\boxtimes	WPAP
\boxtimes	SCS



TCEQ-0587 (Rev. 02-11-15)

	UST	Exception Request
7.	Customer (Applicant):	
	Contact Person: <u>Pretlow Riddick</u> Entity: <u>Eilan Tract 11, LLC</u> Mailing Address: <u>14160 N Dallas Pkwy, Ste 750</u> City, State: <u>Dallas, Texas</u> Telephone: <u>(214) 393-4101</u> Email Address: <u>priddick@criteriondp.com</u>	Zip: <u>75254</u> FAX:
8.	Agent/Representative (If any):	
	Contact Person: <u>Andrew Belton, P.E.</u> Entity: <u>Pape-Dawson Consulting Engineers, LLC</u> Mailing Address: <u>2000 NW Loop 410</u> City, State: <u>San Antonio, Texas</u> Telephone: <u>(210) 375-9000</u> Email Address: <u>abelton@pape-dawson.com</u>	Zip: <u>78213</u> FAX: <u>(210) 375-9010</u>
9.	Project Location:	
	 The project site is located inside the city limits of The project site is located outside the city limits jurisdiction) of The project site is not located within any city's 	of <u>San Antonio</u> . s but inside the ETJ (extra-territorial limits or ETJ.
10.	The location of the project site is described below detail and clarity so that the TCEQ's Regional st boundaries for a field investigation.	ow. The description provides sufficient aff can easily locate the project and site
	From TCEQ's Regional Office, travel north on Ju 1604. Travel westbound on N Loop 1604 fo north on I-10 for 0.9 miles to La Cantera Pk onto La Cantera Terrace. The project site is your left.	idson Rd for 2.6 miles toward N Loop r 12.3 miles, exiting for I-10 W. Travel wy. Travel 0.6 miles before turning right located at 18710 La Cantera Terrace, on
11.	Attachment A – Road Map. A road map showi project site is attached. The project location an the map.	ng directions to and the location of the disite boundaries are clearly shown on
12.	Attachment B - USGS / Edwards Recharge Zon USGS Quadrangle Map (Scale: 1" = 2000') of the The map(s) clearly show:	e Map. A copy of the official 7 ½ minute e Edwards Recharge Zone is attached.

Project site boundaries.
 USGS Quadrangle Name(s).
 Boundaries of the Recharge Zone (and Transition Zone, if applicable).

Drainage path from the project site to the boundary of the Recharge Zone.

- 13. The TCEQ must be able to inspect the project site or the application will be returned. Sufficient survey staking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of the regulated activities and the geologic or manmade features noted in the Geologic Assessment.
 - Survey staking will be completed by this date: when advised
- 14. Attachment C Project Description. Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:
 - Area of the site Offsite areas Impervious cover Permanent BMP(s) Proposed site use Site history
 - Previous development
 - Area(s) to be demolished
- 15. Existing project site conditions are noted below:
 - Existing commercial site
 - Existing industrial site
 - Existing residential site
 - Existing paved and/or unpaved roads
 - Undeveloped (Cleared)
 - Undeveloped (Undisturbed/Uncleared)
 - Other: _____

Prohibited Activities

- 16. I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:
 - (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);
 - (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;
 - (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;
 - (4) The use of sewage holding tanks as parts of organized collection systems; and
 - (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).
 - (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

- 17. I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:
 - (1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);
 - (2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and
 - (3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

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

- For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
- For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
- A request for an exception to any substantive portion of the regulations related to the protection of water quality.
- A request for an extension to a previously approved plan.
- 19. Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:

TCEQ cashier

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

- 20. Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
- 21. No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.

ATTACHMENT A

EILAN TRACT 11 Water Pollution Abatement Plan





ATTACHMENT B

EILAN TRACT 11 Water Pollution Abatement Plan





Sheet 1 Of 2 ATTACHMENT B



GENERAL LOCATION MAP - CASTLE HILLS, TX QUAD; HELOTES, TX QUAD Pape-Dawson Engineers, Inc.

USGS/EDWARDS RECHARGE ZONE MAP Sheet 2 Of 2 ATTACHMENT B

ATTACHMENT C

EILAN TRACT 11 Water Pollution Abatement Plan Modification

Attachment C – Project Description

The Eilan Tract 11 Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the Eilan Subdivision WPAP approved by the Texas Commission on Environmental Quality (TCEQ) on November 9, 2009 (EAPP ID No 13-07083102B). This plan proposes the construction of a multi-family residential development on an 18.4-acre project limits (19.572 ac legal limit) within the overall 119-acre mixed use development. The proposed site is located within both the Edwards Aquifer Recharge and Contributing Zones at 18710 La Cantera Terrace, approximately 0.5 miles northwest of La Cantera Pkwy and I-10 intersection, in San Antonio, Texas. The site is undeveloped and bound to the east by an existing road and commercial development. The site lies within the Leon Creek watershed and does not contain the 100-year floodplain. There are no naturally occurring sensitive geological features identified in the Geologic Assessment.

This WPAP proposes limited demolition of existing curb and sidewalk, additional clearing, grading, excavation, installation of utilities and drainage improvements, construction of fourteen (14) multi-family buildings and one (1) clubhouse with associated parking and drives. The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are three (3) existing sand filtration basins (B, D & E) (EAPP ID No 13-07083102B), which are designed and constructed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site. Approximately 9.62 acres of additional impervious cover, or 52.3% of the 18.4-acre project limits, are proposed for construction in this WPAP MOD. No modifications are proposed to the existing PBMPs. Please see the Treatment Summary table attached with this application.

The Sewage Collection System (SCS) Application proposes the construction of approximately 2,096.15 linear feet (LF) of sanitary sewer main to serve the residential development over the Edwards Aquifer Recharge Zone. The proposed alignment will consist of approximately 2,011.15 LF of 8-inch (8") polyvinyl chloride (PVC), SDR 26 gravity sewer main and 85 LF of 8-inch (8") PVC, SDR 26 160-psi pressure rated sewer main centered over waterline crossings. Regulated activities proposed include excavation, construction of sewer mains, manholes, backfill, and compaction. Approximately 4.82 acres may be disturbed as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans; however additional grading will disturb approximately 18.4 acres for the overall development of the site.

Potable water service is to be provided by the San Antonio Water System (SAWS). The proposed development will generate approximately 34,400 gallons per day (average flow) of domestic wastewater based on the assumption of 344 units (344 units x 0.5 EDU/unit x 200 gpd/EDU = 34,400 gpd). Wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center operated by SAWS.



GEOLOGIC ASSESSMENT FORM (TCEQ-0585)

Geologic Assessment for Approximately 43.43-acre Eilan Property, San Antonio, Bexar County, Texas

NOVEMBER 2020

PREPARED FOR

Pape-Dawson Engineers, Inc.

PREPARED BY

SWCA Environmental Consultants

Texas Board of Professional Geoscientists, Firm Registration No. 50159

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GEOLOGIC ASSESSMENT FOR THE APPROXIMATELY 43.43 ACRE EILAN PROPERTY, SAN ANTONIO, BEXAR COUNTY, TEXAS

Prepared for

Pape-Dawson Engineers, Inc. 2000 NW Loop 410 San Antonio, Texas 78213

Prepared by

Philip Pearce, P.G. Ben Dilly, G.I.T. SWCA ENVIRONMENTAL CONSULTANTS Texas Board of Professional Geoscientists, Firm Registration No. 50159 4949 N. Loop 1604 W., Suite 235 San Antonio, TX 78249 www.swca.com

SWCA Project Number 63543

November 2020



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Texas Commission on Environmental Quality (TCEQ) FormsATTACHMENT A Geologic Assessment TableATTACHMENT B Stratigraphic ColumnATTACHMENT C Narrative Description of Site GeologyATTACHMENT D Site Geologic and Soil Unit Maps

Appendix B

Site Photographs

FIGURES

Figure	1. Project Are	ea location map	2
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1 INTRODUCTION

This narrative Geologic Assessment accompanies the Texas Commission on Environmental Quality (TCEQ) Geologic Assessment form TCEQ-0585 completed for the 43.43-acre Eilan Property (Project Area) located in northern San Antonio, Bexar County, Texas (Figure 1).

2 METHODOLOGY

SWCA scientists conducted a field survey October 9 and 13, 2020. The pedestrian survey was completed by walking parallel transects spaced approximately 50 feet apart as directed by the TCEQ in the <u>Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones</u> (Rev. 10-01-04). Closer spacing was used where vegetation inhibited clear observation. The SWCA scientists carefully examined all potential karst features, including depressions, holes, and animal burrows, for subsurface extent evidence. SWCA used several techniques for this effort, including probing with a digging implement to determine the thickness and consistency of fill material and feeling for air flow which may indicate the presence of a sub-surface void space. Other techniques included recording notable feature site characteristics such as vegetation types or a semi-circular burrow mound produced by small mammal activity. Surveys were limited by dense brush throughout the property.

3 **RESULTS**

3.1 Site Overview

The Project Area lies within the Recharge Zone of the Edwards Aquifer (TCEQ 2020). The property appears on the Castle Hills, Texas USGS 7.5-minute topographic quadrangle map (USGS 1992) (Figure 1). Topography on the property has a total relief of approximately 130 feet, with elevations ranging from approximately 1,070 to 1,200 feet above mean sea level. Surface water runoff flows into unnamed tributaries of Leon Creek. Leon Creek is present east of the property, east of Interstate Highway 10. The Project Area consists of six parcels that surround the Eilan mixed-use commercial and residential development. The parcels are primarily wooded, with some cleared areas. Parking lots have been constructed on one parcel.



Figure 1. Project Area location map.

3.2 Geology

The dolomitic (Kekd) and basal nodular (Kekbn) members of the Kainer Formation and the upper member of the Glen Rose Formation (Kgru) outcrop onsite (Collins 2000, Blome et al. 2005). A Stratigraphic Column is included as Attachment B within Appendix A.

The Project Area occurs along the Balcones Fault Zone (BFZ) within the Edwards Aquifer Recharge Zone. Structural down-warping occurred with the Gulf of Mexico's ancestral formation during the middle Tertiary. The earth's crust was stretched in response and the BFZ formed along a zone of weakness, which currently marks the boundary between the Edwards Plateau and the Gulf Coastal Plain in central Texas. This zone is characterized by a series of northeast trending, predominantly normal, nearly vertical, en echelon faults. One fault is mapped within the property (Collins 2000).

The Project Area is within the Edwards Aquifer Recharge Zone (EARZ). Recharge into the Edwards Aquifer primarily occurs in areas where the Edwards Group and Georgetown Formation are exposed at the surface. Most recharge is from direct infiltration via precipitation and streamflow loss. Recharge occurs predominantly along secondary porosity features such as faults, fractures, and karst features (caves, solution cavities, sinkholes, etc.). Karst features are commonly formed along joints, fractures, and bedding plane surfaces in the Edwards Group and Georgetown Formation.

3.3 Soils

There are two dominant soil types within the Project Area as mapped by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS 2020). These soil types are described below:

Eckrant cobbly clay, 1 to 8 percent slopes (TaB): Eckrant cobbly clay typically occurs on ridges. The parent material consists of residuum weathered from limestone. In a typical profile, the soil layer is 0 to 4 inches of cobbly clay, 4 to 11 inches very cobbly clay, and 11 to 80 inches of bedrock. Depth to a restrictive layer is 4 to 20 inches to bedrock. The soil is well drained. The minimum depth to a water table is greater than 6 feet. This soil does not meet hydric criteria.

Eckrant-Rock outcrop association, 8 to 30 percent slopes (TaD): Eckrant-Rock outcrop association typically occurs on ridges. The parent material consists of residuum weathered from limestone. In a typical profile, the soil layer is 0 to 7 inches of very cobbly clay, 7 to 12 inches extremely cobbly clay, and 12 to 80 inches of bedrock. Depth to a restrictive layer is 4 to 20 inches to bedrock. The soil is well drained. The minimum depth to a water table is greater than 6 feet. This soil does not meet hydric criteria.

Project Area mapped soil units are presented in Attachment D.

3.4 Site Hydrogeologic Assessment

The overall potential for fluid migration to the Edwards Aquifer for the site appears relatively low compared to background infiltration rates due to the presence of no sensitive geologic recharge features. The depth to water in the Edwards Aquifer below ground surface in the vicinity of the site appears to range from approximately 220 to 400 feet below land surface based on water levels measured in nearby State Well No. 68-28-102 (Texas Water Development Board 2020).

The predominant trend of the Project Area is N64 °E, based on the trend of the one fault identified on site.

SWCA identified six geologic features on site, which are described below.

F-101 The feature is horizontal solution cavity located in a creek bed. The feature's opening is 16 feet long by 3 feet high (Photograph 1, Appendix B). The solution cavity extends horizontally for 12 feet into the creek bed. The entire extent of the feature can be seen from the opening. Due to the feature being elevated from the creek bed, the probability of rapid infiltration is low (Photograph 1,2, Appendix B).

F-102 The feature consists of a non-karst closed depression located on a hillside (Photograph 3,4, Appendix B). The feature measures approximately 3.0 feet long by 3.0 feet wide by 2.0-foot-deep. The infill consists of loose cobbles, soft soil, and organic matter. The feature appears to be the result of removal of a tree and possible animal burrowing. Due to the non-karst origin the probability of rapid infiltration is low.

F-103 This feature is an erosional feature created by mass wasting. The feature is a void that developed along the upslope edge of a large block of limestone on a hillside (Photograph 5,6, Appendix B). The limestone block measuring approximately 20 feet by 15 feet by 4 feet thick has become detached from the hillside and moved downslope a foot or two. The void created by the separation of the block from the hillside has been widened by tree roots and mammals have burrowed along the backside of the block and beneath the block. Because the non-karst void is limited to the soil-filled space between the large block and the hillside and does not extend into bedrock, the probability of rapid infiltration is low.

F-104 The feature consists of a non-karst closed depression located on a hillside (Photograph 7,8, Appendix B). The feature measures approximately 2.0 feet long by 1.5 feet wide by 0.8-foot-deep. The infill consists of loose cobbles and organic matter. The feature appears to be the result of removal of a tree and possible animal burrowing. Due to the non-karst origin the probability of rapid infiltration is low.

F-105 The feature consists of a man-made feature in bedrock that is a groundwater well that was plugged on September 15, 2007, according to Texas Water Development Board records. Six-inch steel casing is present within a concrete well pad measuring 2.5 feet by 2.5 feet. Due to the plugged status of the well, the probability of rapid infiltration is low (Photograph 9,10, Appendix B).

F-106 Feature F-106 is a fault mapped by Collins (1994) that crosses a portion of the site. The only direct evidence of the fault observed on the ground during the site visit was the presence of slightly tilted beds near feature F-101. Due to a lack of field evidence of enhanced permeability where the fault crosses the Project Area the probability of infiltration is considered low.

4 REFERENCES

- Blome, C.D., Faith, J.R., Pedraza, D.E., Ozuna, G.B., Cole, J.C., Clark, A.K., Small, T.A., and Morris, R.R. 2005. Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas. U.S. Geological Survey SIM-2873, scale 1:200,000.
- Collins, E.W. 1994. Geologic Map of the Castle Hills Quadrangle, Texas. University of Texas at Austin, Bureau of Economic Geology Open-File Map STATEMAP Study Area 5, scale 1:24,000.
- Natural Resource Conservation Service (NRCS). 2020. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/. Accessed November 2020.

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APPENDIX A

Texas Commission on Environmental Quality (TCEQ) Forms

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: <u>Philip C. Pearce,</u> <u>P.G.</u>

Telephone: 210.877.2847

Fax: 210.877.2848

Date: November 13, 2020

Representing: <u>SWCA Environmental Consultants (TBPG Firm Registration #50159)</u> (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Regulated Entity Name: 43.43 Acre Eilan Property

Project Information

- 1. Date(s) Geologic Assessment was performed: <u>8 and 13 October 2020</u>
- 2. Type of Project:

\times	WPAP
	SCS

AST
UST

3. Location of Project:

\leq	Rech	nar	ge	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, InfiltrationCharacteristics and Thickness

Soil Name	Group*	Thickness(feet)
Eckrant cobbly		
clay, 1 to 8		
percent slopes	D	0-2
Eckrant Rock		
outcrop, 8 to 30		
percent slopes	D	0-2

Soil Name	Group*	Thickness(feet)

- * Soil Group Definitions (Abbreviated) A. Soils having a high infiltration
 - rate when thoroughly wetted.
 - B. Soils having a moderate infiltration rate when thoroughly wetted.
 - C. Soils having a slow infiltration rate when thoroughly wetted.
 - D. Soils having a very slow infiltration rate when thoroughly wetted.
- 6. Attachment B Stratigraphic Column. A stratigraphic column showing formations, members, and 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. X 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'' = 200'Site Geologic Map Scale: 1'' = 200'Site Soils Map Scale (if more than 1 soil type): 1'' = 625'

- 9. Method of collecting positional data:
 - Global Positioning System (GPS) technology.
 - Other method(s). Please describe method of data collection: _____

- 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 $\underline{1}$ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
 - \boxtimes 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. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
ATTACHMENT A

Geologic Assessment Table

GEOL	OGIC ASSE	SSMENT T	ABLE				PRO		NAME:	43.4	13-Ac	re Eil	an P	roperty						
	LOCATIC	NC				FEAT	JRE C	HARA	CTERIST	ICS					EVAI	-UATI	ONF	HYSIC,	AL SE	TTING
1A	18 *	1C*	2A	2B	е		4		5	5A	9	7	8A	88	6	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIN	ENSIONS (FE	ET)	TREND (DEGREES)	DOM	ENSITY A NO/FT)	PERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITI	VITY C	ATCHMENT AR (ACRES)	EA TOPO	IGRAPHY
						×	٢	z		10						<40	≥40	<1.6 ≥1.	6	
F-101	29.611446°	-98.610419°	SC	20	Kgru	16	12	3		0			C,0	5	25	×		×	Cliff	
F-102	29.610781°	-98.609097°	C	5	Kek	ю	3	2	N23°W	0			C,F	5	10	×		×	Hillsi	de
F-103	29.609177°	-98.609904°	0	5	Kek	2	1	4	N68°W	0			0	5	10	×		×	Hillsi	de
F-104	29.607078°	-98.608726°	СD	5	Kek	2	1.5	0.8	N70°E	10			C,0	5	20	×		×	Hillsi	de
F-105	29.61222°	-98.608056°	MB	30	Kek	0.5	0.5			0			×	5	35	×		×	Hillsi	de
F-106	29.611667°	-98.610278°	ш	20	Kek		1350		N64°E	10			0	5	35	×		×	Drair	nage
* DATUM:	: NAD 83																			
2A TYPE		ТҮРЕ			2B POINTS						8A INFI	-LING								
U	Cave				30		z	None, e	xposed bed	rock										
sc	Solution cavity				20		с	Coarse	- cobbles, b	reakdo	wn, san	d, grave	_							
ļ										:										

* DATUM	: <u>NAD 83</u>				
2A TYPE	ТҮРЕ	2B POINTS			
U	Cave	30	2	_	None, expo
sc	Solution cavity	20	0		Coarse - co
SF	Solution-enlarged fracture(s)	20	0	~	Loose or sc
ш	Fault	20	ш.		Fines, com
0	Other natural bedrock features	5	/		Vegetation.
MB	Manmade feature in bedrock	30	<u> </u>	S	Flowstone,
SW	Swallow hole	30	~		Other mate
HS	Sinkhole	20			
СD	Non-karst closed depression	5			
z	Zone, clustered or aligned features	30	-	Cliff, Hil	ltop, Hillsid

oft mud or soil, organics, leaves, sticks, dark colors pacted clay-rich sediment, soil profile, gray or red colors

Give details in narrative description

cements, cave deposits rials

le, Drainage, Floodplain, Streambed **12 TOPOGRAPHY**

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

A

Sheet 1 of 1



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

ATTACHMENT B

Stratigraphic Column

Stratigraphic Column

Note: The shaded areas represent the lithology that outcrops on the property.¹

				Navarro and Taylor Gro	ups, undivided; 600 feet thick
seous				Austin Group; 130-150	feet thick
c Creta	Upper Confining			Eagle Ford Group; 30-5	0 feet thick
Upper	Units			Buda Limestone; 40-50	feet thick
				Del Rio Clay; 40-50 fee	t thick
	I			Georgetown Formation	10-40 feet thick
	II			Person Formation;	Cyclic and Marine member, undivided
	III	quifer	luifer	170-200 feet thick	Leached and Collapsed member, undivided
aceous	IV	ards Ac	Group		Regional Dense member
er Creta	V	Edwa	Edwa Edwards	Kainer Formation;	Grainstone member
Low	VI			260-310 feet thick	Kirschberg Evaporite member
	VII				Dolomitic member
	VIII				Basal Nodular member
	Lowe Confi Units	r ning		Upper member of Glen	Rose Formation; 350-500 feet thick

¹ Blome, C.D., Faith, J.R., Pdraza, D.E, Ozuna, G.B, Cole, J.C., Clark, A.K., Small, T.A., and Morris, R.R. 2005. Geologic map of the Edwards aquifer recharge zone, south-central-Texas. U.S. Geological Survey SIM-2873. Scale 1:200,000.

ATTACHMENT C

Narrative Description of Site Geology

PLEASE REFER TO SECTION 3.2 OF THIS REPORT FOR GEOLOGIC NARRATIVE DESCRIPTION

ATTACHMENT D

Site Geologic and Soil Unit Maps





TaB- Eckrant cobbly clay, 1 to 5 percent slopes TaD - Eckrant-Rock outcrop complex, 15 to 60 percent slopes Pt - Pits and Quarries, 1 to 90 percent slopes

EILAN GEOLOGIC ASSESSMENT



Bexar County, TX USGS 7.5' Quadrangle: Castle Hills, TX, 29098-E5

NAD 1983 UTM Zone 14N

Base Map: ESRI ArcGIS Online, accessed November 2020

> Updated: 11/5/2020 Project No. 63543 File: 63543 Fig 2 Soils Map



310 620 Feet 75 150



APPENDIX B

Site Photographs



Photo 1: Photo of Feature F-101.



Photo 2: Photo of Feature F-101.



Photo 3: Photo of Feature F-102.



Photo 4: Photo of Feature F-102.



Photo 5: View of Feature F-103.



Photo 6. View of block of rock that has become slightly detached from the hillside. Feature F-103 is on the upslope side of the block on the far side of the yellow case. F-103 connects with the burrow that can be seen extending beneath the block of rock in the foreground of the photograph.



Photo 7: View of Feature F-104.



Photo 8: View of Feature F-104.



Photo 9: View of Feature F-105.



Photo 10: View of Feature F-105.

MODIFICATION OF A PREVIOUSLY APPROVED WATER POLLUTION ABATEMENT PLAN (TCEQ-0590)

Modification of a Previously Approved Plan

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Transition Zone and Relating to 30 TAC 213.4(j), 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 request for a **Modification of a Previously Approved Plan** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Customer/Agent: Andrew Belton, P.E.

Date: 122 24 Signature of Customer/Agent:

Project Information

 Current Regulated Entity Name: <u>Eilan Subdivision</u> Original Regulated Entity Name: <u>Eilan Tract 11</u> Regulated Entity Number(s) (RN): <u>105332647</u> Edwards Aquifer Protection Program ID Number(s): <u>13-07083102B</u>

The applicant has not changed and the Customer Number (CN) is:

The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. X Attachment A: Original Approval Letter and Approved Modification Letters. A copy of the original approval letter and copies of any modification approval letters are attached.

3. A modification of a previously approved plan is requested for (check all that apply):

Physical or operational modification of any water pollution abatement structure(s)
including but not limited to ponds, dams, berms, sewage treatment plants, and
diversionary structures;

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

Development of land previously identified as undeveloped in the original water pollution abatement plan;

Physical modification of the approved organized sewage collection system;

Physical modification of the approved underground storage tank system;

Physical modification of the approved aboveground storage tank system.

4. Summary of Proposed Modifications (select plan type being modified). If the approved plan has been modified more than once, copy the appropriate table below, as necessary, and complete the information for each additional modification.

WPAP Modification	Approved Project	Proposed Modification
Summary		
Acres	<u>119</u>	<u>18.4 (19.572 legal)</u>
Type of Development	<u>Commercial</u>	<u>Commercial</u>
Number of Residential		
Lots		
Impervious Cover (acres)	<u>49.75</u>	9.62 additional
Impervious Cover (%	<u>42.03</u>	<u>52.2</u>
Permanent BMPs	4 sand flter basins	3 existing sand filter basins
Other		
SCS Modification	Approved Project	Proposed Modification
Summary		
Linear Feet		
Pipe Diameter		
Other		

AST Modification	Approved Project	Proposed Modification
Summary		
Number of ASTs		
Volume of ASTs		
Other		
UST Modification	Approved Project	Proposed Modification
UST Modification Summary	Approved Project	Proposed Modification
UST Modification Summary Number of USTs	Approved Project	Proposed Modification
UST Modification Summary Number of USTs Volume of USTs	Approved Project	Proposed Modification

- 5. Attachment B: Narrative of Proposed Modification. A detailed narrative description of the nature of the proposed modification is attached. It discusses what was approved, including any previous modifications, and how this proposed modification will change the approved plan.
- 6. Attachment C: Current Site Plan of the Approved Project. A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is attached. A site plan detailing the changes proposed in the submitted modification is required elsewhere.
 - The approved construction has not commenced. The original approval letter and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
 - The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
 - The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.

The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.

- The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.
- 7. The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
 - Acreage has not been added to or removed from the approved plan.
- 8. 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.

ATTACHMENT A

Bryan W. Shaw, Ph.D., *Chairman* Buddy Garcia, *Commissioner* Carlos Rubinstein, *Commissioner* Mark R. Vickery, P.G., *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 9, 2009

Ms. Carmen Taveras-Cruz Wereldhave USA-San Antonio, L.P. 3 Manhattan Ville Purchase, NY 10577

Re: <u>Edwards Aquifer</u>, Bexar County NAME OF PROJECT Eilan Subdivision, located approximately 1.2 miles north of Loop 1604 and its intersection with IH 10, San Antonio, Texas TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer Edwards Aquifer Protection Program ID No. 2708.08, Investigation No. 775919, Regulated Entity No. RN105332647

Dear Ms. Taveras-Cruz:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP Modification for the above-referenced project submitted to the San Antonio Regional Office by Pape-Dawson Engineers, Inc. on behalf of Wereldhave USA-San Antonio, L.P. on August 27, 2009. Final review of the WPAP was completed after additional material was received on November 4, 2009. As presented to the TCEQ, the Temporary and Permanent Best. Management Practices (BMPs) and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were scaled, signed and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Edwards Aquifer Protection Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10 percent of the construction has commenced on the project or an extension of time has been requested.

BACKGROUND

The WPAP for the 119 acre site was approved by letter dated November 9, 2007. Special conditions included a requirement to revise exhibits to show appropriate sensitive feature protection around two sensitive features that lie within a 31 acre permeable area (undisturbed) easement. Hiking trails were approved for the easement on condition that they were made by hand clearing of vegetation only. Phase 1 approved for the construction was to include an access road from La Cantera Parkway, a marketing center, two of the construction was to include an access road from La Cantera Parkway, a marketing center, two office buildings, multi-family residential buildings, a hotel, a plaza with retail shops, roads, parking lots, and sidewalks. Phase 2 of the construction was to include additional multi-family residential buildings, a grocery store, an amphitheater, roads, parking lots, and sidewalks.

REPLY TO: REGION 13 • 14250 JUDSON RD. • SAN ANTONIO, TEXAS 78233-4480 • 210-490-3096 • FAX 210-545-4329

P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • Internet address: www.tceq.state.tx.us

Ms. Taveras-Cruz Page 2 November 9, 2009

PROJECT DESCRIPTION

The commercial project site which is under construction has an area of approximately 119 acres, the same as in the original approval. About 80 acres lie in the Edwards Aquifer Recharge Zone. The remaining 39 acres lie within the Edwards Aquifer Contributing Zone. About 31 acres, along the western and northern part of the site (in the Recharge Zone), will be left undisturbed as part of a permeable area easement. The development of the remaining part of the site will consist of twenty-six buildings, including 18 multifamily residential buildings. Proposed changes to the approved plan include a decrease of impervious cover from 59.59 acres (50.07 percent) to 49.75 acres (42.03 percent). Site plan and drainage areas are also modified. Uncaptured impervious cover increases from 0.87 acre to 2.73 acres. Basin A has been removed in this modification and the drainage area will now be accounted for in Watershed B. Watershed C (Basin C) is replaced by watersheds C1 and C2 (Basins C1 and C2). Watersheds B, D, and E are revised and their respective basins are also redesigned and relocated. Project wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center owned by the San Antonio Water System.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, five partial sedimentation/filtration basins were designed using the TCEQ technical guidance document, *Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices* (2005), and will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 40,596.00 pounds of total suspended solids (TSS) generated from 49.75 acres of impervious cover.

Basin B (Watershed B w/overreatment) is sized to capture the first 2.00 inches of stormwater run-off from 12.96 acres of new impervious cover within a 19.65 acre catchment area, providing a total capture volume of 80,556 cubic feet (80,076 cubic feet required) to treat 11,162.88 pounds of total suspended solids (TSS). It is sized to compensate for the treatment of 0.72 acres of impervious cover (587.52 pounds of TSS) not otherwise treated. The filtration system will contain 9,866 square feet of sand (8,008 square feet required), which is 18 inches thick.

Basin C1 (Watershed C1 w/overtreatment) is sized to capture the first 2.00 inches of stormwater run-off from 6.63 acres of new impervious cover within a 7.23 acre catchment area, providing a total capture volume of 47,360 cubic feet (47,160 cubic feet required) to treat 5,671.20 pounds of TSS. It is sized to compensate for the treatment of 0.32 acres of impervious cover (261.12 pounds of TSS) not otherwise treated. The filtration system will contain 5,744 square feet of sand (4,716 square feet required), which is 18 inches thick.

Basin C2 (Watershed C2 w/overtreatment) is sized to capture the first 2.60 inches of stormwater run-off from 10.4 acres of impervious cover within a 18.18 acre catchment area, providing a total capture volume of \$2,560 cubic feet (\$2,554 cubic feet required) to treat 9,277.92 pounds of TSS. It is sized to compensate for the treatment of 0.97 acres of impervious cover (791.52 pounds of TSS) not otherwise treated. The filtration system will contain 10,320 square feet of sand (\$,255 square feet required), which is 18 inches thick.

Basin D (Watershed D w/overtreatment) is sized to capture the first 1.80 inches of stormwater run-off from 9.99 acres of impervious cover within a 10.88 acre catchment area, providing a total capture volume of 64,900 cubic feet (63,954 cubic feet required) to treat 8,453.76 pounds of TSS. It is sized to compensate for the treatment of 0.37 acres of impervious cover (301.92 pounds of TSS) not otherwise treated. The filtration system will contain 7,892 square feet of sand (6,395 square feet required), which is

18 inches thick.

Ms. Taveras-Cruz Page 3 November 9, 2009

III.

Basin E (Watershed E w/overtreatment) is sized to capture the first 2.20 inches of stormwater run-off from 7.04 acres of impervious cover within a 7.75 acre catchment area, providing a total capture volume of 55,456 cubic feet (55,086 cubic feet required) to treat 6,030.24 pounds of TSS. It is sized to compensate for the treatment of 0.35 acres of impervious cover (285.60 pounds of TSS) not otherwise treated. The filtration system will contain 6,932 square feet of sand (5,509 square feet required), which is 18 inches thick.

The approved measures are presented to meet the required 80 percent removal of the increased load in TSS caused by the project.

GEOLOGY

According to the geologic assessment included with the application, the dolomitic and basal nodular members of the Kainer Formation (Edwards Group) and the upper member of the Glen Rose Formation outcrop at the site. The boundary between the Edwards Aquifer Recharge Zone and the Contributing Zone roughly follows the contact between the formations. Nine features were noted in the geologic assessment included with the application. Two of the features, a solution cavity and a sinkhole, were ranked as sensitive. Both of the features are located within the 31 acre easement that is to remain undisturbed. Both features are also upslope from regulated activities and more than 50 feet from the boundary of the easement. Seven recharge features were reported discovered by construction activities between April and December, 2008. The seven features were to be closed with concrete appropriatelysized fill. The San Antonio Regional Office did not conduct a site assessment for this review.

SPECIAL CONDITIONS

This modification is subject to all Special and Standard Conditions listed in the WPAP approval Ĩ. letter dated November 9, 2007.

Each permanent pollution abatement measures shall be operational prior to occupancy of the IJ. facilities and/or commercial or public activity in their respective watershed.

All sediment and/or media removed from the water quality basin during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

STANDARD CONDITIONS

Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements 1. in 30 TAC Chapter 213 may result in administrative penalties.

The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved 2. plan. Additional and separate approvals, permits, registrations and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the v. : · · specifics of the plan.

In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality. 3.

and a second second

Prior to Commencement of Construction:

Ms. Taveras-Cruz Page 4 November 9, 2009

- 4. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, ICEQ-0625) that you may use to deed record the approved WPAP is enclosed.
- 5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
- 6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
- 7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
 - Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
- 9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

During Construction:

8.

- 10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
- 11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to

Ms. Taveras-Cruz Page 5 November 9, 2009

12.

installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.

If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the San Antonio Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.

- 13. Two water wells exist on the site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.
- 14. If sediment escapes the construction site, the 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). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
- 15. Intentional discharges of sediment laden storm water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.

16. The following records shall be maintained and made available to the executive director upon request: the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.

17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

- 18. 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 San Antonio Regional Office within 30 days of site completion.
- 19. The applicant shall be 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. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

Ms. Taveras-Cruz Page 6 November 9, 2009

- 20. Upon legal transfer of this property, the new owner is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
- 21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
- 22. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact Alan G. Jones of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4074.

Sincerely,

Mark R. Vickery, P.G.) Executive Director Texas Commission on Environmental Quality

MRV/AGJ/eg

cc:

Enclosures: Deed Recordation Affidavit, Form TCEQ-0625 Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

Mr. Charles P. "Frosty" Forster, P.E., P.G., Pape-Dawson Engineers, Inc.

Mr. Scott Halty, San Antonio Water System

Mr. Scott Hany, Ban Fintenno de Aquifer Authority Ms. Velma Danielson, Edwards Aquifer Authority Ms. Renee Green, P.E., Bexar County Public Works

TCEQ Central Records, Building F, MC 212

ATTACHMENT B

EILAN 11 Water Pollution Abatement Plan Modification

Attachment B – Narrative of Proposed Modification

The Eilan Tract 11 Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the Eilan Subdivision WPAP approved by the Texas Commission on Environmental Quality (TCEQ) on November 9, 2009 (EAPP ID No 13-07083102B). This plan proposes the construction of a multi-family residential development on an 18.4-acre project limits (19.572 ac legal limit) within the overall 119-acre mixed use development. The proposed site is located within both the Edwards Aquifer Recharge and Contributing Zones at 18710 La Cantera Terrace, approximately 0.5 miles northwest of La Cantera Pkwy and I-10 intersection, in San Antonio, Texas. The site is undeveloped and bound to the east by an existing road and commercial development. The site lies within the Leon Creek watershed and does not contain the 100-year floodplain. There are no naturally occurring sensitive geological features identified in the Geologic Assessment.

This WPAP proposes limited demolition of existing curb and sidewalk, additional clearing, grading, excavation, installation of utilities and drainage improvements, construction of fourteen (14) multi-family buildings and one (1) clubhouse with associated parking and drives. The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are three (3) existing sand fitration basins (B, D & E) which are designed and constructed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site. Approximately 9.62 acres of additional impervious cover, or 52.3% of the 18.4-acre project limits, are proposed for construction in this WPAP MOD. No modifications are proposed to the existing PBMPs. Please see the Treatment Summary table attached with this application.

The Sewage Collection System (SCS) Application proposes the construction of approximately 2,096.15 linear feet (LF) of sanitary sewer main to serve the residential development over the Edwards Aquifer Recharge Zone. The proposed alignment will consist of approximately 2,011.15 LF of 8-inch (8") polyvinyl chloride (PVC), SDR 26 gravity sewer main and 85 LF of 8-inch (8") PVC, SDR 26 160-psi pressure rated sewer main centered over waterline crossings. Regulated activities proposed include excavation, construction of sewer mains, manholes, backfill, and compaction. Approximately 4.82 acres may be disturbed as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans; however additional grading will disturb approximately 18.4 acres for the overall development of the site.

Potable water service is to be provided by the San Antonio Water System (SAWS). The proposed development will generate approximately 34,400 gallons per day (average flow) of domestic wastewater based on the assumption of 344 units (344 units x 0.5 EDU/unit x 200 gpd/EDU = 34,400 gpd). Wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center operated by SAWS.

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ATTACHMENT C



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WATER POLLUTION ABATEMENT PLAN APPLICATION FORM (TCEQ-0584)

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b), Effective June 1, 1999

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

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

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Andrew Belton, P.E.

Date: 12 3 24 Signature of Customer/Agent:

Regulated Entity Name: Eilan Tract 11

Regulated Entity Information

- 1. The type of project is:
 - Residential: Number of Lots:____
 - Residential: Number of Living Unit Equivalents:<u>172</u>
 - Commercial
 - Industrial
 - Other:_____
- 2. Total site acreage (size of property):18.40
- 3. Estimated projected population: 688 (2 person per unit)
- 4. The amount and type of impervious cover expected after construction are shown below:

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	174,862	÷ 43,560 =	4.01
Parking	185,921	÷ 43,560 =	4.27
Other paved surfaces	58,467	÷ 43,560 =	1.34
Total Impervious Cover	419,250	÷ 43,560 =	9.62

Table 1 - Impervious Cover Table

Total Impervious Cover 9.62 + Total Acreage 18.4 X 100 = 52.3% Impervious Cover

- 5. Attachment A Factors Affecting Surface Water Quality. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.
- 6. Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only

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

7. Type of project:

TXDOT road project.

County road or roads built to county specifications.

City thoroughfare or roads to be dedicated to a municipality.

Street or road providing access to private driveways.

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

Concrete
Asphaltic concrete pavement
Other:

9. Length of Right of Way (R.O.W.): _____ feet.

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

10. Length of pavement area: _____ feet.

Width of pavement area: _____ feet. L x W = ____ $Ft^2 \div 43,560 Ft^2/Acre = ____ acres.$ Pavement area _____ acres \div 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:

<u>100</u> % Domestic	Gallons/day
% Industrial	Gallons/day
% Commingled	
<u>34,400</u> Gallons/day	
TOTAL gallons/day <u>34,400 (344 units x 0.5</u>	EDU/unit x 200 gpd/EDU)

15. Wastewater will be disposed of by:

On-Site Sewage Facility (OSSF/Septic Tar	ık):
--	------

Attack	hment C - Suitability Letter from Authorized Agent. An on-site sewage facility
will be	e used to treat and dispose of the wastewater from this site. The appropriate
licensi	ing authority's (authorized agent) written approval is attached. It states that
the la	nd is suitable for the use of private sewage facilities and will meet or exceed
the re	equirements for on-site sewage facilities as specified under 30 TAC Chapter 285
relatir	ng to On-site Sewage Facilities.
relatir	ng 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_____.

- \boxtimes The SCS was submitted with this application.
 - The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.
The sewage collection system will convey the wastewater to the <u>Leon Creek</u> (name) Treatment Plant. The treatment facility is:

\times	Existing.
	Proposed

16. \square 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. \square The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = <u>200</u>'.

18. 100-year floodplain boundaries:

Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.

 \boxtimes 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): <u>DFIRM (Digital Flood Insurance Rate Map for Bexar County, Texas and Incorporated Areas)</u> Panel No. 48029C0230G, Dated 9/29/2010

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

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

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

\boxtimes	There are <u>1</u> (#) wells present on the project site and the locations are shown and
	labeled. (Check all of the following that apply)

 \boxtimes The wells are not in use and have been properly abandoned.

The wells are not in use and will be properly abandoned.

The wells are in use and comply with 16 TAC §76.

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

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

All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.

No sensitive geologic or manmade features were identified in the Geologic Assessment.

Attachment D - Exception to the Required Geologic Assessment. A request and justification for an exception to a portion of the Geologic Assessment is attached.

- 22. The drainage patterns and approximate slopes anticipated after major grading activities.
- 23. 🖂 Areas of soil disturbance and areas which will not be disturbed.
- 24. 🔀 Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
- 25. \boxtimes Locations where soil stabilization practices are expected to occur.
- 26. Surface waters (including wetlands).

N/A

- 27. Locations where stormwater discharges to surface water or sensitive features are to occur.
 - There will be no discharges to surface water or sensitive features.
- 28. 🛛 Legal boundaries of the site are shown.

Administrative Information

- 29. Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
- 30. Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

ATTACHMENT A

EILAN TRACT 11 Water Pollution Abatement Plan Modification

Attachment A – Factors Affecting Water Quality

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site during construction include:

- Soil erosion due to the clearing of the site;
- Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle drippings;
- Hydrocarbons from asphalt paving operations;
- Miscellaneous trash and litter from construction workers and material wrappings;
- Concrete truck washout.
- Potential overflow/spills from portable toilets

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site after development include:

- Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings;
- Dirt and dust which may fall off vehicles; and
- Miscellaneous trash and litter.



ATTACHMENT B

EILAN TRACT 11 Water Pollution Abatement Plan Modification

Attachment B – Volume and Character of Stormwater

Stormwater runoff will increase as a result of this development. For a 25-year storm event, the overall project will generate approximately 162 cfs. The runoff coefficient for the site changes from approximately 0.53 before development to 0.75 after development. Values are based on the Rational Method using runoff coefficients per the City of San Antonio Unified Development Code.



ORGANIZED SEWAGE COLLECTION SYSTEM PLAN (TCEQ-0582)

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: Eilan Tract 11

 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

 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: Jeff BrownEntity: San Antonio Water SystemMailing Address: 2800 US Hwy 281City, State: San Antonio, TexasZip: 78212Telephone: 210-233-3605Email Address: _____The appropriate regional office must be informed of any changes in this informationwithin 30 days of the change.

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

Contact Person: Andrew Belton, P.E. Texas Licensed Professional Engineer's Number: <u>121688</u> Entity: <u>Pape-Dawson Consulting Engineers, LLC.</u> Mailing Address: <u>2000 NW Loop 410</u> City, State:<u>San Antonio, Texas</u> Telephone:<u>210-375-9000</u> Email Address:abelton@pape-dawson.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:
\boxtimes	Multi-family: Number of residential units: 344
	Commercial
	Industrial
	Off-site system (not associated with any development)
	Other:

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

<u>100</u> % Domestic	<u>34,400</u> gallons/day
% Industrial	gallons/day
% Commingled	gallons/day
Total gallons/day: <u>34,400 GPD (k</u>	pased on 0.5 EDU/unit x 344 units x 200 GPD/EDU)

- 6. Existing and anticipated infiltration/inflow is <u>600</u> gallons/day. This will be addressed by: <u>adequate sizing of the sewer main</u>.
- 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 $\frac{11/9}{2009}$. A copy of the approval letter is attached.
 - The WPAP application for this development was submitted to the TCEQ on _____, 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)
8"(non-rated)	1822.09	PVC, SDR 26	ASTM D3034. ASTM D3212
8" Pressure rated (160 psi)	100	PVC, SDR 26	ASTM D 2241, Class 160 ASTM D3139, ASTM C1173

Total Linear Feet: 1,922.09

- (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 Water Recycling Center (name) Treatment Plant. The treatment facility is:



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

 \boxtimes The City of San Antonio standard specifications. Other. Specifications are attached.

11. 🖂 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. There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.
- 13. 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)

Line	Shown on Sheet	Station	Manhole or Clean- out?
"A1"	C5.01 Of	3+08.89	M.H. "A1-3"
"A2"	C5.01 Of	2+93.15	M.H. "A2-3"
"A2A"	C5.01 Of	2+61.56	M.H. "A2A-1"
"A3"	C5.02 Of	2+68.68	M.H. "A1-2"

Table 2 - Manholes and Cleanouts

Line	Shown on Sheet	Station	Manhole or Clean- out?
"B1"	C5.03 Of	9+89.77	M.H. "B1-8"
"B2"	C5.03 Of	4+00.04	M.H. "B2-3"
	Of		

- 15. Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.
- 16. 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.
 - 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. \square The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = <u>200</u>'.

19. 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:
 - \bigotimes 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:
 - \boxtimes 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. \boxtimes 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. 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
"A1"	1+43.97	Crossing	-	0.40
"A2"	2+16.04	Crossing	-	4.4
"A2A"	2+35.67	Crossing	-	0.53
"B1"	2+93.07	Crossing	-	6.5
"B1"	9+49.88	Crossing	-	5.0

27. Vented Manholes:

- 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:

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(I)(2)(H).

Table 7 - Drop Manholes

Line	Manhole	Station	Sheet
SEE ATTACHED			

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

] 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.

No lateral stub-outs are to be installed during the construction of this sewage collection system.

31. Minimum flow velocity (From Appendix A)

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)
 - 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	Secon	d

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

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(I)(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:

Standard Details	Shown on Sheet
Lateral stub-out marking [Required]	C6.40 of DD-854- ERZD
Manhole, showing inverts comply with 30 TAC §217.55(I)(2) [Required]	C6.40 of DD-852- 01
Alternate method of joining lateral to existing SCS line for potential future connections [Required]	C6.40 of DD-854- 03
Typical trench cross-sections [Required]	C6.40 of DD-804- 01
Bolted manholes [Required]	C6.40 of DD-852- 07
Sewer Service lateral standard details [Required]	C6.40 of DD-854- ERZD

Table 9 - Standard Details

Standard Details	Shown on Sheet
Clean-out at end of line [Required, if used]	N/A of
Baffles or concrete encasement for shock/erosion protection [Required, if flow velocity of any section of pipe >10 fps]	N/A of
Detail showing Wastewater Line/Water Line Crossing [Required, if crossings are proposed]	N/A of
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) [Required, if Flexible Pipe is used]	C6.40 of DD-848- 01
Drop manholes [Required, if a pipe entering a manhole is more than 24 inches above manhole invert]	N/A of

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

- 37. 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.
 - Survey staking was completed on this date: When advised by TCEQ of site inspection
- 38. 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. 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: <u>Andrew Belton, P.E.</u>

Date:

Place engineer's seal here:



Signature of Licensed Professional Engineer:

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.

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

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
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)

EILAN TRACT 11 Organized Sewage Collection System Application (TCEQ-0582)

Line	Manhole	Station	Sheet
"A1"	M.H. "A1-3"	3+08.89	C5.01
"A2"	M.H. "A2-1"	1+15.00	C5.01
"A2"	M.H. "A2-2"	2+26.04	C5.01
"B1"	M.H. "B1-1"	1+00.00	C5.02
"B1"	M.H. "B1-2"	3+16.55	C5.02
"B1"	M.H. "B1-7"	8+71.41	C5.03
"B2"	M.H. "B2-2"	2+56.38	C5.03
"B2"	M.H. "B2-3"	4+00.04	C5.03

Table 7 – Drop Manholes



ATTACHMENT A (Engineering Design Report)

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INTRODUCTION

This Engineering Design Report has been prepared to comply with the Texas Commission on Environmental Quality's Design Criteria for Domestic Wastewater Systems (30 TAC 217), and regulations over the Edwards Aquifer Recharge Zone (30 TAC 213). Please note, throughout this application, the more stringent of SAWS, CoSA or TCEQ regulations shall apply.

PROJECT INFORMATION

The Eilan Tract 11 Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the Eilan Subdivision WPAP approved by the Texas Commission on Environmental Quality (TCEQ) on November 9, 2009 (EAPP ID No 13-07083102B). This plan proposes the construction of a multi-family residential development on an 18.4-acre project limits (19.572 ac legal limit) within the overall 119-acre mixed use development. The proposed site is located within both the Edwards Aquifer Recharge and Contributing Zones at 18710 La Cantera Terrace, approximately 0.5 miles northwest of La Cantera Pkwy and I-10 intersection, in San Antonio, Texas. The site is undeveloped and bound to the east by an existing road and commercial development. The site lies within the Leon Creek watershed and does not contain the 100-year floodplain. There are no naturally occurring sensitive geological features identified in the Geologic Assessment.

The Sewage Collection System (SCS) Application proposes the construction of approximately 1,922.09 linear feet (LF) of sanitary sewer main to serve the residential development over the Edwards Aquifer Recharge Zone. The proposed alignment will consist of approximately 1,822.09 LF of 8-inch (8") polyvinyl chloride (PVC), SDR 26 gravity sewer main and 100 LF of 8-inch (8") PVC, SDR 26 160-psi pressure rated sewer main centered over waterline crossings. Regulated activities proposed include excavation, construction of sewer mains, manholes, backfill, and compaction. Approximately 4.82 acres may be disturbed as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans; however additional grading will disturb approximately 18.4 acres for the overall development of the site.

Potable water service is to be provided by the San Antonio Water System (SAWS). The proposed development will generate approximately 34,400 gallons per day (average flow) of domestic wastewater



based on the assumption of 344 units (344 units x 0.5 EDU/unit x 200 gpd/EDU = 34,400 gpd). Wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center operated by SAWS. Refer to included application and EDR for details. Wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center operated by SAWS.

Please refer to Sheet C5.00 of the attached sewer plans, which shows the proposed service area and its topographic features. This system is designed to have a minimum structural life of 50 years. Safety considerations are the responsibility of the contractor.

GRAVITY SANITARY SEWER PIPING: FLOW & CAPACITY ANALYSIS

Basis for average flow used for design of collection system (check one or more):

Per Capita Contributions:	
Service Connections:	✓
Land Area and Use:	✓
Fixture Analysis:	

Odor Control

Odor Control is not necessary on this project as it is a gravity line and there will be no conditions where sewage is standing and will become septic.

Flow Calculation

 Peaking Factor used for design:
 2.5

 Peaking Factor is based on:
 SAWS Specifications for peak dry weather flow (from SAWS USR 11.3.1)

Total EDUs = 172

* The total number of EDUs includes flow from both currently proposed and anticipated future construction, as based on SAWS criteria.

1 EDU = 200 gallons per day (average sewage flow)

= 500 gallons per day (peak flow)
 Infiltration = 600 gallons per acre served
 Avg. Flow = <u>172</u> EDUs x (200 gpd/EDU) + [(600 gpd/acre) x 18.4 acres] = <u>45,440</u> gpd = <u>31.56</u> gpm
 Peak Flow = <u>172</u> EDUs x (500 gpd/EDU) + [(600 gpd/acre) x 18.4 acres] = <u>97,040</u> gpd = <u>67.39</u> gpm

Please note that capacities are determined using Manning's equation for pipes flowing full with an "n" value of 0.013. A reference for Manning's Equation can be found in "The Uni-Bell Handbook of PVC Pipe: Design and Construction".

Capacity Calculation

Characteristics of 8" ASTM D3034, SDR 26, PVC Sewer Pipe: Nominal Size = 8" Outer Diameter (D_o) = 8.40" Minimum Wall Thickness (t) = 0.323" Inner Diameter (D_i) = 7.754"

<u>Characteristics of 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe:</u> Nominal Size = 8" Outer Diameter (D_o) = 8.625" Minimum Wall Thickness (t) = 0.332" Inner Diameter (D_i) = 7.961"

Manning's Equation: Q = (k/n)(A)(R^{2/3})(S^{1/2}) v = Q/A

Where:

Q = Discharge (cfs) k = Constant [(1.49 ft^{1/3})/sec.]

n = *Manning's* roughness coefficient (unitless)

A = Flow area (ft²)

- R = Hydraulic Radius (ft)
- = A/P = Cross sectional area of flow (ft^2)/Wetted perimeter (ft.)
- S = Slope (ft/ft)
- v = Velocity of flow (ft/s)
- n = 0.013 [as required by 30 TAC 213.53 A(i)]

Calculations for 8" ASTM D3034, SDR 26, PVC Sewer Pipe: $A = \pi(D_i^2)/4 = \pi(7.754 \text{ in})^2/4 = 47.17 \text{ in}^2 = 0.33 \text{ ft}^2$ $P = \pi(D_i) = \pi(7.754 \text{ in}) = 24.35 \text{ in} = 2.03 \text{ ft}$ $R = A/P = 0.33 \text{ ft}^2/2.03 \text{ ft} = 0.16 \text{ ft}$ S = 0.005 $Q = [(1.49 \text{ ft}^{1/3}/\text{sec})/0.013](0.33 \text{ ft}^2)(0.16 \text{ ft})^{2/3}(0.005)^{1/2}$ $Q = 0.79 \text{ cfs} = 353 \text{ gpm} = Q_{full}$ $v = 0.79 \text{ cfs}/0.33 \text{ ft}^2 =$ **2.4 \text{ ft/s** $}$ Qmax = 0.79 cfs (0.90)(7.48 gallons/1 cf)(60 sec/1 min.) =**318 gpm**

<u>Calculations for 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe:</u> $A = \pi(D_i^2)/4 = \pi(7.961 \text{ in})^2/4 = 49.76 \text{ in}^2 = 0.35 \text{ ft}^2$ $P = \pi(D_i) = \pi(7.961 \text{ in}) = 25.01 \text{ in} = 2.08 \text{ ft}$ $R = A/P = 0.35 \text{ ft}^2/2.08 \text{ ft} = 0.17 \text{ ft}$ S = 0.005 $Q = [(1.49 \text{ ft}^{1/3}/\text{sec})/0.013](0.35 \text{ ft}^2)(0.17 \text{ ft})^{2/3}(0.005)^{1/2}$ $Q = 0.85 \text{ cfs} = 380 \text{ gpm} = Q_{\text{full}}$ $v = 0.85 \text{ cfs}/0.35 \text{ ft}^2 = 2.45 \text{ ft/s}$ Q max = 0.85 cfs (0.90)(7.48 gallons/1 cf)(60 sec/1 min.) = 342 gpm

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Nominal Main Size (in)	Outer Diameter (in)	Minimum Slope (%)	Area (ft²)	Hydraulic Radius (A/P) ft	R ^{2/3}	S ^{1/2}	Q-Full (cfs)	Max Pipe (%)	Velocity (ft/s)	Q-Max (gpm)
8	8.40	0.5	0.33	0.16	0.29	0.07	0.79	90	2.40	318
8	8.625	0.5	0.35	0.17	0.31	0.07	0.85	90	2.45	342

Conclusion

The proposed 8" pipe (NR) with a minimum slope of 0.5% has sufficient capacity to convey the projected average and peak flows.

GENERAL STRUCTURAL COMPONENTS

Project Materials (Pipe and Joints):

Nominal Pipe Diameter (in)	Linear Feet	Pipe Material	National Standard Specification for Pipe Material	National Standard for Pipe Joints
8	1,922.09	PVC SDR 26	ASTM D3034	ASTM D3212
8 pressure rated	100	PVC SDR 26	ASTM 2241, Class 160	ASTM D3139 ASTM C1173

Note: Section 217.53 (j)(4) requires a minimum pipe diameter of 6 inches for all gravity sanitary sewer collection system piping.

Watertight, size on size resilient connectors conforming to ASTM C-923 have been specified for connecting pipe to manholes. See SAWS Standard Specification for Construction Detail DD-852-01.

Where a collection system parallels a water supply pipe and a nine-foot separation distance cannot be achieved, Section 217.53 (d)(3)(A)(i) requires a collection system pipe be constructed of cast iron, ductile

iron, or PVC meeting ASTM specifications with at least a 150 pounds per square inch (psi) rating for both the pipe and joints. The proposed project will comply with these requirements.

Where a collection system pipe crosses a water supply line and a nine-foot separation distance cannot be achieved, Section 217.53(d)(3)(B)(i) requires the collection system pipe be constructed of cast iron, ductile iron, or PVC with a minimum pressure rating of 150 psi. The proposed project will comply with this requirement and that of 217.53(d)(3)(B)(iii).

Project Materials (Bedding):

The specified bedding will comply with ASTM D2321-11 Class I, II or III for materials and densification. A minimum of 6 inches of bedding is required for all pipe.

Pipe Diameter (in)	Pipe Material	Bedding Class
8	PVC	Class I & Class III

The selection of bedding class is based on SAWS detail DD-804-01 for sanitary sewer pipe laid in a trench. Initial backfill for the pipe sizes shown above will be Class I. Secondary backfill will be Class III. See Table 2 of ASTM D2321-11 "Soil Classes" in Appendix A of this subsection.

Project Materials (Manholes):

Section 217.55 (f) prohibits the use of bricks to adjust a manhole cover to grade or construct a manhole. The proposed project will comply with this requirement.

The inside diameter of a manhole must be no less than 48 inches.

Section 217.55 (n) requires watertight, size-on-size resilient connectors that allow for differential settlement and must conform to American Society for Testing and Materials C-923. The proposed project complies with this requirement.

Under 30 TAC 213.5(C)(3)(A), all manholes over the Recharge Zone must be watertight, with watertight rings and covers. The proposed project complies with this requirement. The materials specified for manhole construction are **precast concrete**.

Project Materials (Manhole Covers):

Manhole covers must be constructed of impervious materials. If personnel entry is required, a minimum 30-inch diameter clear opening must be provided. Inclusion of steps in a manhole is prohibited. If a manhole must be located within a 100-year flood plain, then a means of preventing inflow is required. 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.

Under 30 TAC 213.5 (c)(3)(A), all manholes over the Edwards Aquifer Recharge Zone must be watertight, with watertight rings and covers. This proposed project complies with this requirement.

Minimum and Maximum Slopes

Note: All pipes are designed with a slope that will provide a velocity of at least 2 ft/s flowing full, as calculated using Manning's equation with an "n" value of 0.013. Additionally, the collection system is designed to ensure that, with pipes flowing full, the velocities will be less than 10 feet per second.

The following are the minimum and maximum slopes for each pipe diameter:Pipe Diameter:**8" (NR)**Min. Slope:**0.50%**Max. Slope:**8.4%**

Backfill

Note: The backfill will be free of stones greater than 6 inches in diameter and free of organic or any other unstable material. See SAWS Item No. 804 for additional specifications.

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Trenching

Note: The trench width will be minimized while still allowing adequate width for proper compaction of backfill, and while still ensuring that at least 6 inches of backfill exists below and on each side of the pipe. The trench walls will be vertical to at least one foot above the pipe.

Trenching will occur over the Recharge Zone and will comply with 30 TAC 213.5.

Minimum and Maximum Trench Width

Based on SAWS Standard Drawing DD-804-01 and 30 TAC 217.54:

Pipe Diameter: <u>8" (NR)</u> Min. Trench Width: <u>22"</u> Max. Trench Width: <u>34"</u> Pipe Diameter: <u>8" (160 psi)</u> Min. Trench Width: <u>23"</u> Max. Trench Width: <u>35"</u>

These trench widths account for the bell diameter.

Corrosion Prevention

Proposed collection system components (pipes, manholes, etc.) will not be susceptible to deterioration through the corrosive effects of an anaerobic sewage environment. The interior of the manholes, however, are to be coated with a SAWS approved sewer structural coating per SAWS April 2014 Standard Specifications (Item No. 852, Section 852.3, Item 5). Epoxy coating specifically approved. The epoxy coating on the interior walls of the manhole provide interior corrosion protection.

Manholes (General)

Note: Manholes are provided at all changes in size, grade or alignment of pipe, at the intersection of all pipes and at the end of all lines that may be extended at a future date. A clean-out with watertight plugs may be installed instead of a manhole if no extensions are anticipated. Clean outs must pass all testing requirements outlined for gravity collection pipes.

The project complies with the maximum manhole spacing allowed by the TCEQ:

Pipe Diameter (in)	Max. Manhole Spacing (ft)
6 - 15	500
18 - 30	800
36 - 48	1000
54 or larger	2000

Manhole Spacing:

Pipe Diameter: **8**" Max. Spacing: **240.62 LF**

See SAWS Standard Specification in Appendix B for additional manhole specifications.

Manholes (Inverts)

The bottom of a manhole must contain a U-shaped channel, which is a smooth continuation of the inlet, and outlet pipes. The bench above the channel must be sloped a minimum of 0.5 inches per foot. See SAWS detail DD-852-01, which complies with these requirements. Note, 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.

Manholes (Ventilation)

Vented manholes are not proposed for this SCS. When required every third manhole will be vented to minimize inflow. Please see SAWS Detail DD-852-02 when proposed.

FLEXIBLE PIPE COMPUTATIONS

Please note, all flexible pipe computations are based on engineering principles and practices for the design of buried PVC pipe systems. Equations used can be found in "The Uni-Bell PVC Pipe Association Handbook of PVC Pipe: Design and Construction". Please note, the equations used may be in a different format than

shown in the Uni-Bell Handbook. Throughout this application "160 psi" pipe refers to the pressure rating of the ASTM 2241, Class 160, SDR 26 pipe used throughout the SCS.

Live Load Calculations

Minimum burial depth without concrete encasement is three (3) feet. Based on Table 6-6 Live Loads on PVC pipe (from Uni-Bell Handbook for PVC) for this sewer line would be 4.17 psi.

Buckling Pressure Calculations

This area of the Edwards Aquifer is unsaturated; consequently, there are no anticipated areas where sewer pipe will be placed below the water table. The value of hw=0 as there will be no height or time period of perched water or groundwater above the pipe crowns of the proposed sewer line.

The value of H for use in these calculations is twenty-three (23) feet as it exceeds the maximum burial depth for this line. The value of γ_s equals 143 pcf is a conservative value based on a dry unit weight of 135 pcf and a moisture content of 6%. This value is conservative as it corresponds to saturated unit weights of commonly used backfill materials. Please see information from Raba-Kistner provided in Appendix C.

Allowable Buckling Pressure:

$$q_{a} = 0.4 * \sqrt{32 * R_{w} * B' * E_{b} * (E * I / D^{3})}$$

$$q_{a} = 0.4 \sqrt{32 * 1 * 0.53 * 400 * (400,000 * 0.003 / 8.08^{3})} = 47.97 \ psi(8"PVC \ SDR26, NR)$$

$$q_{a} = 0.4 * \sqrt{32 * 1 * 0.53 * 400 * (400,000 * \frac{0.003}{8.29^{3}})} = 48.05 \ psi(8"PVC \ SDR26, PR)$$

$$\begin{split} R_w &= 1 - 0.33 * (h_w/h) & \mbox{ Equation 2} \\ R_w &= 1 - 0.33 * (0/240) = 1 \end{split}$$

 $B' = \frac{1}{1 + 4^* e^{-0.065}}$

Equation 3



$$B' = \frac{1}{1 + 4 * e^{-.065 * 23}} = 0.53$$

$$I = 12^3 * (inches^4/linear inch)$$

 $I = 0.323^{3}/12 = 0.003in^{3} (8'' PVC SDR 26, NR)$ $I = 0.332^{3}/12 = 0.003in^{3} (8'' PVC SDR 26, PR)$

$$D = D_o - t$$

Equation 5

Equation 4

D = 8.40 inches - 0.323 inches = 8.08 inches (8"PVC SDR 26, NR) D = 8.625 inches - 0.332 inches = 8.29 inches (8" PVC SDR 26, PR)

Where:

q_a = Allowable buckling pressure, pounds per square inch (psi)

h = Height of soil surface above top of pipe in inches (in)

- h_w = Height of water surface above top of pipe in inches (in) (groundwater elevation)
- R_w = Water buoyancy factor. If hw = 0, Rw = 1. If $0 \le hw \le h$ (groundwater elevation is between the top of the pipe and the ground surface), calculate Rw with Equation 2
- H = Depth of burial in feet (ft) from ground surface to crown 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)
- Moment of inertia of the pipe wall cross section per linear inch of pipe, inch4/linear inch =
 inch3. For solid wall pipe, "I" can be calculated with Equation 4
- t = Pipe structural wall thickness (in)
- D = Mean pipe diameter (in)
- D_o = Pipe outer diameter (in)

Pressure Under Installed Conditions

$$\begin{split} q_{p} &= \gamma_{w} * h_{w} + R_{w} * (W_{c}/D) + L_{l} & \textit{Equation 6} \\ q_{p} &= 0.361 * 0 + 1 * (191.86/8.08) + 4.17 = 27.92 \text{ psi } (8'' \text{ PVC SDR 26, NR}) \\ q_{p} &= 0.361 * 0 + 1 * (197.00/8.29) + 4.17 = 27.92 \text{ psi } (8'' \text{ PVC SDR 26, PR}) \end{split}$$

Where:

- q_p = Pressure applied to pipe under installed conditions (psi)
- γ_w = 0.0361 pounds per cubic inch (pci), specific weight of water
- W_c = Vertical soil load on the pipe per unit length in pounds per linear inch (lb/in)
- L_I = Live load (lbs)

$$\begin{split} W_c &= \gamma_s * H * (D+t)/144 & \textit{Equation 7} \\ W_c &= 143 * 23 * (8.08 + 0.323)/144 = 191.86 \ \text{lb/in}^2 (8'' \ \text{PVC SDR 26, 1NR}) \\ W_c &= 143 * 23 * (8.29 + 0.322)/144 = 197.00 \ \text{lb/in}^2 (8'' \ \text{PVC SDR 26, PR}) \end{split}$$

- γs = Specific weight of soil in pounds per cubic foot (pcf)
- D = Mean pipe diameter (in)

Pipe Diameter: <u>8" (NR)</u> Pipe Material: <u>PVC, SDR 26</u>	qa: <u>47.97</u>	q _p : <u>27.92</u>
Pipe Diameter: <u>8" (PR)</u> Pipe Material: <u>PVC, SDR 26</u>	q _a : <u>48.05</u>	qբ: <u>27.92</u>

Since $q_a \ge q_p$, the specific pipe is acceptable for the proposed installation.

Wall Crushing Calculations

No portion of the proposed SCS is located in the 5-year floodplain.

$$H = (24 * P_{c} * A)/(\gamma_{s} * D_{o})$$

$$A = t(in) \times 12(in/ft)$$
Equation 9



H=(24*4,000*3.876)/(143*8.4) = 309.77(8" PVC SDR 26, NR) $A = 0.323(in) \times 12(in/ft) = 3.876$

- D_o = outside pipe diameter, 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 [conversion factor of 12 applied to change from ft. to in.]
- γ_s = specific weight of soil in pounds per cubic foot (pcf)
- H = Depth of burial in feet (ft) from ground surface to crown of pipe.
- 24 = conversions and coefficients

Installation Temperature Effects

Flexible pipe will be installed under favorable ambient conditions, per pipe manufacturer's specifications.

Tensile Strength

The information below is from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" Table 2.1 pages 14-15. This applies to all PVC SDR-26 pipe.

Pipe Material: <u>PVC SDR 26</u> Tensile Strength: <u>7,000</u> Cell Class (PVC only) <u>12454</u>

Strain

The conditions of this installation are such that strain-related failure will not be a problem. Strain is generally not a performance-limiting factor for buried PVC pipe or a design-limiting criterion for PVC pipes according to the Uni-Bell Handbook of PVC Pipe (Chapter VII, Pages 255 and 257). As pipe deflection will be below 5%, strain-related failure is not anticipated.

Modulus of Soil Reaction

The modulus of soil reaction for the bedding material, E_{b} , is **<u>400 psi</u>**.

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class III material was chosen. As the secondary backfill (Class III) has a lower Modulus of Soil Reaction than initial backfill (Class I), its value was used in the calculations that follow. Class III on Table 2 corresponds to coarse-grained soils with fines (GM, GC, SM or SC) and sandy or gravelly fine-grained soils (CL or ML). On Table 7.3, coarse-grained soils with fines at a slight compaction have an E' equal to 400 psi.

The modulus of soil reaction for the in-situ soil, E'n, is 3,000 psi

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D 2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class I material was chosen, which includes crushed rock as shown on Table 2. Compacted crushed rock on Table 7.3 has an E' equal to 3,000 psi. Values in Table 7.3 are based on empirical data and derived from laboratory and field tests for buried pipe.

Bedding to in-situ soil modulus of soil reaction ratio = $E_b/E'_n = \frac{400 \text{ psi/3,000 psi} = 0.13}{100 \text{ psi} = 0.13}$

Zeta Calculation

Where native soil is significantly weaker than bedding material, or where predicted deflection approaches 5%, the effect of native soil must be quantified using Leonhardt's Zeta factor. If the ration of bedding modulus to soil modulus is not equal to 1.0, a zeta factor must be calculated by using the equations below, where zeta is a factor, which corrects for the effect of in-situ soil on pipe stability (Uni-Bell Handbook of Pipe, page 267). To calculate zeta, directly use the formulas below. The calculations that are done to determine the zeta factors for the different pipe diameters must be included with this submittal.
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$$zeta = \frac{1.44}{f + (1.44 - f)^* (E_b / E_{n'})}$$
Equation 10
$$zeta = \frac{1.44}{1.22 + (1.44 - 1.22) * 0.13} = 1.15(8'' \text{ PVC SDR 26, NR})$$

$$zeta = \frac{1.44}{1.22 + (1.44 - 1.22) * 0.13} = 1.15(8'' \text{ PVC SDR 26, PR})$$

$$f = \frac{b' d_a \cdot l}{1.154 + 0.444 * (b' d_a - 1)}$$
Equation 11
$$f = \frac{(34/8.40) - 1}{1.154 + 0.444 * ((34/8.40) - 1)} = 1.22(8'' \text{ PVC SDR 26, NR})$$

$$f = \frac{(35/8.625) - 1}{1.154 + 0.444 * ((35/8.625) - 1)} = 1.22(8'' \text{ PVC SDR 26, PR})$$

Where:

f = Pipe/trench width coefficient

b = Trench width (in)

- d_a = Pipe diameter (in)
- E_b = Modulus of soil reaction for the bedding material (psi)
- E'_n = Modulus of soil reaction for the in-situ soil (psi)

Pipe Diameter: <u>8" (NR)</u>	Trench Width: 34 "	Zeta: 1.15
Pipe Diameter: 8" (NR)	Trench Width: 35"	Zeta: 1.15

Pipe Stiffness

Ps is based on National Reference Standards and manufacturer's data. Please see Table 7.1 of the "The Uni-Bell Handbook of PVC Pipe: Design and Construction" listing the pipe stiffness of 8" PVC SDR 26 as 115 psi for E = 400,000 psi.

Pipe Diameter: <u>8"</u> Pipe Material: <u>PVC SDR 26</u> Ps: <u>115 psi</u>

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Deflection

Maximum allowable deflection in installed lines is 5% (per 30 TAC 217), as determined by the deflection analysis and verified by a mandrel test. It is recommended that the percent of vertical deflection is below this range; however, a 7.5% deflection limit (recommended by ASTM D3034) provides a conservative factor of safety against structural failure (Handbook of PVC Pipe, page 249).

Note: Per Table 7.2 attached in Appendix A of the SCS Application, K = 0.096 when the bedding angle is

90 degrees. A bedding angle of 90 degrees is required as shown on SAWS detail DD-804-01. Live load (L_i) effects are negligible at bury depths below 10 ft, therefore, not accounted in the calculations below.

$$\Delta Y/D(\%) = \frac{K^*(L_p + L_1)^*100}{(0.149^*P_s) + (0.061^*zeta^*E_b)}$$
Equation 12
$$\Delta Y/D(\%) = \frac{0.096^*(22.84 + 0)^*100}{(0.149^*115) + (0.061^*1.15^*400)} = 4.84\%(8'' \text{ PVC SDR 26, NR})$$

$$\Delta Y/D(\%) = \frac{0.096^*(22.84 + 0)^*100}{(0.149^*115) + (0.061^*1.15^*400)} = 4.84\%(8'' \text{ PVC SDR 26, PR})$$

$$L_p = \frac{\gamma_s * H}{144}$$
 Equation 13
 $L_p = \frac{143 * 23}{144} = 22.84 \text{ psi}$

- $\Delta Y/D$ = Predicted % vertical deflection under load
- $\Delta Y = Change in vertical pipe diameter under load$
- D = Undeflected mean pipe diameter (in)
- K = Bedding angle constant
- γ_s = Unit weight of soil (pcf)
- H = Depth of burial (ft) from ground surface to crown of pipe

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L_p = Prism load (psi)

Type of Pipe Material	P _s (psi)	Zeta Factor Assumed or	E _b (psi)	% Deflection
8" PVC SDR 26	115	1.15	400	4.84
8" PVC SDR 26 (PR)	115	1.15	400	4.84

All pipes proposed for this project have a maximum predicted deflection below 5.0%

Signature, Seal and Date of the Texas Professional Engineer Below:

ANDREW J. BELTON 21688

APPENDIX A (TABLES)

TABLE 6.6LIVE LOADS ON PVC PIPEFrom Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

Height	Live Load Transferred to Pipe, lb/in ²		Live Load Transferred to Pipe, Ib/in ² Height Live Load Transferred to Pipe, Ib			o Pipe, lb/in²	
of Cover (ft)	Highway H20 ¹	Railway E80 ²	Airport ³	of Cover (ft)	Highway H20 ¹	Railway E80 ²	Airport 3
					4	4.47	2.06
1	12.50			14	Ť	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 traffic + impact (Source: ASTM A 796)

² Simulates 80,000 lb/ft railway load + impact (Source: ASTM A 796)

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.

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FIGURE 7.4 BEDDING ANGLE From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)



TABLE 7.2VALUES OF BEDDING CONSTANT, K

BEDDING ANGLE (DEGREES)	<u>K</u>
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083



TABLE 7.3

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E' (For Initial Flexible Pipe Deflection) From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

	E' for Degree of Compaction of Bedding, in pounds per square inch			ding,
		Slight,	Moderate,	High,
		< 85%	85%-95%	>95%
		Proctor,	Proctor,	Proctor,
		<40%	40%-70%	>70%
Soil type-pipe bedding material		relative	relative	relative
(Unified Classification System ^a)	Dumped	density	density	density
(1)	(2)	(3)	(4)	(5)
Fine-grained Soils (LL>50) ^b				
Soils with medium to high plasticity,	No dat	a available; c	onsult a com	petent
СН, МН, СН-МН	soils e	engineer; Oth	erwise 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	1,000
Fine-grained Soils (LL<50)				
Soils with medium to no plasticity, CL,				
ML, ML-CL, with more than 25%				
coarse-grained particles	100	400	1,000	2,000
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	1,000	2,000	3,000
Crushed Rock	1,000	3,000	3,000	3,000
Accuracy in Terms of Percentage Deflection ^d	± 2	± 2	±1	±0.5
^a ASTM Designation D 2487, USBR Designation E	-3.			
^b LL = Liquid limit.				
°Or any borderline soil beginning with one of th	ese symbols	(i.e. GM-GC,	GC-SC).	

 d For \pm 1% accuracy and predicted deflection of 3%, actual deflection would be between 2% and 4%

Note: Values applicable only for fills less than 50 ft (15 m). Table does not include any safety factor. For use in predicting initial deflections only, appropriate Deflection Lag Factor must be applied for long-term deflections. If bedding falls on the borderline between two compaction categories, select lower E' value or average the two values. Percentage Proctor based on laboratory maximum dry density from test standards using about 12,500 ft-lb/cu ft (598,000 J/m³) (ASTM D 698, AASHTO T-99, USBR Designation E-11). 1 psi = 6.9 kPa.

SOURCE: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver, Colorado. Reprinted with permission from American Society of Civil Engineers.



SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

			, , ,			
	Criteria for Assigning Group Symb	ools and Group Names I	Jsing Laboratory Tests ^A		S	oil Classification
					Group Symbol	Group Name ^B
Coarse-Grained Soils	Gravels	Clean gravels	$C \ge 4$ and $1 \le Cc \le 3^C$		GW	Well-graded gravel ^D
More than 50% retained on No. 200 sieve	More than 50% of coarse fraction retained on No. 4 sieve	Less than 5% of fines ^E	Cu < 4 and/or 1> Cc>3 ^C		GP	Poorly graded gravel ^D
	-	Gravels with	Fines classify as ML or MH		GM	Silty gravel ^{DFG}
		more than 12% fines ^E	Fines classify as CL or CH		GC	Clayey gravel ^{DFG}
	Sands	Clean sands	$Cu \ge 6$ and $1 \le Cc \le 3^C$		SW	Well-graded sand ^H
	50% or more of coarse fraction passes on No. 4 sieve	Less than 5% fines [/]	Cu < 6 and/or 1 > Cc > 3 ^C		SP	Poorly graded sand ^H
	-	Sand with fines	Fines classify as ML or MH		SM	Silty sand ^{FGH}
	-	More than 12% fines [/]	Fines classify as CL or CH		SC	Clayey sand ^{FGH}
Fine-Grained Soils	Silts and clays	Inorganic	PI > 7 and plots on or above "A" line ^{J}		CL	Lean clay ^{KLM}
50% or more passes the No. 200 Sieve	Liquid limit less than 50	-	PI < 4 and plots below "A" line ^J		ML	silt ^{KLM}
	-	Organic	Liquid Limit-Oven dried	<0.75	OL	Organic clay ^{KLMN}
		-	Liquid Limit-Not dried	_		Organic silt ^{KLMO}
	Silts and clays	Inorganic	PI plots on or above "A" line	_	СН	Fat clay ^{KLM}
	Liquid limit 50 or more	-	Plots below "A" line		MH	Elastic silt ^{KLM}
	-	Organic	Liquid Limit-Oven Dried	<0.75	OH	Organic clay ^{KLMP}
		-	Liquid Limit-Not Dried			Organic silt ^{KLMQ}
Highly organic soils	Primarily organic matter, dark in c	olor, and organic odor			PT	peat

TABLE 1 Soil Classification Chart (see Classification D2487)

^A Based on the material passing the 3-in. (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

 C Cu = D₆₀ / D₁₀

 $Cc = \frac{(D_{30})^2}{2}$ $D_{10}xD_{60}$

D10xD60

^D If soil contains \geq 15 % sand, add "with sand" to group name.

^EGravels with 5 to 12 % fines require dual symbols:

GW-GM well-graded gravel with silt:

- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

^F If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^G If fines are organic, add "with organic fines" to group name.

^{*H*} If soil contains \geq 15 % gravel, add "with gravel" to group name. 'Sands with 5 to 12 % fines require dual symbols:

SW-SM well graded sand with silt

SW-SC well-graded sand with slav

SP-SM poorly graded sand with silt

SP-SC poorly graded sand with clay

^J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay (see Test Method D4318).

^K If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel", whichever is predominant.

^L If soil contains \geq 30 % plus No. 200, predominantly sand, add "sandy" to group name.

^M If soil contains \ge 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI \geq 4 and plots on or above "A" line.

^o PI < 4 or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

	TABLE 2 Soll Classes	
Soil Group ^{A,B}	Soil Class	American Association of State Highway and Transportation Officials (AASHTO) Soil Groups ^C
Crushed rock, angular ^{<i>D</i>} , 100% passing 1-1/2 in. sieve, =15 %<br passing #4 sieve, = 25 % passing 3/8<br in. sieve and = 12 % passing #200<br sieve	Class I	
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with = 12<br % passing #200 sieve ^{<i>E,F</i>}	Class II	A1, A3
Coarse grained soils with fines: GM, GC, SM, SC or any soil beginning with one of these symbols, containing > 12 % passing #200 sieve; Sandy or gravelly fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with >/= 30 % retained on #200 sieve	Class III	A-2-4, A-2-5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve
Fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with <30 % retained on #200 sieve	Class IV	A-2-7, or A-4, or A-6 soils with 30% or less retained on #200 sieve
MH, CH, OL, OH, PT	Class V Not for use as embedment	A5, A7

TABLE 2 Soil Classes

^A See Classification D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

^{*B*} Limits may be imposed on the soil group to meet project or local requirements if the specified soil remains within the group. For example, some project applications require a Class I material with minimal fines to address specific structural or hydraulic conditions and the specification may read "Use Class I soil with a maximum of 5% passing the #200 sieve."

^c AASHTO M145, Classification of Soils and Soil Aggregate Mixtures.

^D All particle face shall be fractured.

^{*E*} Materials such as broken coral, shells, and recycled concrete, with $\leq = 12\%$ passing a No. 200 sieve, are considered to be Class II materials. These materials should only be used when evaluated and approved by the Engineer.

^{*F*} Uniform fine sands (SP) with more than 50% passing a No. 100 sieve (0.006 in., 0.15 mm) are very sensitive to moisture and should not be used as backfill unless specifically allowed in the contract documents. If use of these materials is allowed, compaction and handling procedures should follow the guidelines for Class III materials.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 3 Recommendations for Installation and Use of Soils and Aggregates for Foundation and Pipe-Zone Embedment

Soil Class ^A	Class I ^B	Class II	Class III	Class IV
General Recommendations and Restrictions	Acceptable and common where no migration is probable or when combined with a geotextile filter media. Suitable for use as a drainage blanket and under drain where adjacent material is suitably graded or when used with a geotextile filter fabric (see X1.8).	Where hydraulic gradient exists check gradation to minimize migration. Clean groups are suitable for use as a drainage blanket and underdrain (see Table 2). Uniform fine sands (SP) with more than 50 % passing a #100 sieve (0.006 in., 0.15 mm) behave like silts and should be treated as Class IV soils.	Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.	Difficult to achieve high-soil stiffness. Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.
Foundation	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above.	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above. Install and compact in 12 in. (300 mm) maximum layers.	Suitable for replacing over- excavated trench bottom as restricted above. Install and compact in 6 in. (150 mm) maximum layers.	Suitable for replacing over- excavated trench bottom as restricted above. Install and compact in 6-in (150 mm) maximum layers.
Pipe Embedment	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Difficult to place and compact in the haunch zone.	Suitable as restricted above. Difficult to place and compact in the haunch zone.
Embedment Compaction: Min Recommended Percent Compaction, SPD ^D	See Note ^C	85 % (SW and SP soils) For GW and GP soils See Note ^E	90 %	95 %
Relative Compactive Effort Required to Achieve Minimum Percent Compaction	Low	Moderate	High	Very high
Compaction Methods	Vibration or impact	Vibration or impact	Impact	Impact
Required Moisture Control	None	None	Maintain near optimum to minimize compactive effort	Maintain near optimum to minimize compactive effort

 ^A Class V materials are unsuitable as embedment. They may be used as final backfill as permitted by the engineer.
 ^B Class I materials have higher stiffness than Class II materials, but data on specific soil stiffness of placed, uncompacted Class I materials can be taken equivalent to Class II materials compacted to 95% of maximum standard Proctor density (SPD95), and the soil stiffness of compacted Class I materials can be taken equivalent to Class II materials compacted to 100% of maximum standard Proctor density (SPD95). Even if placed uncompacted (that is, dumped), Class I materials should always be worked into the haunch zone to assure completed placement.

PAPE-DAWSON ENGINEERS

^c Suitable compaction typically achieved by dumped placement (that is, uncompacted but worked into haunch zone to ensure complete placement).

^D SPD is standard Proctor density as determined by Test Method D698.
 ^E Place and compact GW and GP soils with at least two passes of compaction equipment.



APPENDIX B (SOIL UNIT WEIGHT VALUES)



January 14, 2009

Raba-Kistner Consultants, Inc. 12821 W. Golden Lane P.O. Box 690287, San Antonio, TX 78269-0287 (210) 699-9090 • FAX (210) 699-6426 www.rkci.com

Charles P. "Frosty" Forster, P.E., P.G. Pape Dawson Engineers 555 East Ramsey San Antonio, Texas 78216

RE: Soil Unit Weight Values for Backfill Materials Various Projects San Antonio, Texas

Dear Mr. Forster:

Raba-Kistner Consultants Inc. (R-K) is pleased to submit this letter providing general guidance for selecting design soil unit weights for use in utility trench design.

In general, the following table contains a list of the frequently used trench backfill materials in the San Antonio area. The table also contains approximate values for the soil dry unit weight, moist unit weight and saturated unit weight for these materials assuming 90 to 95 percent compaction utilizing a standard Proctor (ASTM D 698.)

MATERIAL DESCRIPTION	DRY UNIT WEIGHT, PCF	MOIST UNIT WEIGHT, PCF	SATURATED UNIT WEIGHT, PCF
TxDOT TEX-113E Type A, Gr. 1 or 2	130	137	143
TxDOT TEX-113E Type A, Gr. 3 thru 5	128	135	143
Limestone Millings	115	124	134
Gravelly Clay	110	120	132
Clay	100	120	127
Clayey Sand	95	106	123
Gravel (Clean)	115	120	134
Sand (Clean)	92	98	120
Pit Run Gravel	127	137	142

We appreciate the opportunity to be of service to you. If you have any questions or need additional assistance, please call.

Very truly yours, **RABA-KISTNER C** Chris L. Schultz, P Senior Vice Presider

CLS/mem

APPENDIX C (STANDARD SPECS AND PRE-CAST MANHOLES SPECS)























(1)

"O"-Ring Gasket



Carefully clean all dirt & foreign objects from the joining surface of the bell or groove end of pipe.

Carefully clean spigot or tongue end of pipe, including the gasket recess. Inspect the bell and spigot ends of each section to make sure they are free from cracks, chips or voids that will interfere with gasket.

Improperly prepared bell and spigot surfaces may prevent homing of the pipe or keep the gasket from sealing.



IMPORTANT

Fit the gasket carefully, equalizing the rubber gasket stretch by running a smooth, round object (inserted between the gasket & spigot) around the entire circumference several times.

Unequal stretch could cause bunching of the gasket and may cause leaks in the joint or crack the bell.

Profile Gasket

- Manhole sections should be handed with extreme caution to avoid chipping of the bell or spigot ends. Proper lifting devices must be used on all sections.
- Inspect gasket sealing area for any voids or rough edges that may interfere with the seal.
- 3. Place the 4-G Gasket in the step of the spigot. (Making sure that the pointed end of the gasket is toward the end of the pipe as shown in Fig A.)
- 4. **IMPORTANT** Equalize the stretch on the gasket by pulling the sealing lube away from the spigot at least one inch and then releasing the gasket. Repeat this every three or four inches around the circumference of the pipe. Equalization of stretch makes sure that the gasket has the same stretched crosssection and tension throughout. **Do not iube the gasket or spigot end of the pipe.**
- Remove all dirt and other foreign matter from the inside surface of the bell. Apply lube to the inner surface of the bell including the



Lubricate bell joint surface liberally, covering entire inside surface using proper pipe gasket lubricant.



Lubricate the gasket throughly before it is placed on the spigot or tongue.

Bell and Gasket not lubricated or improperly lubricated may cause the gasket to roll and leak or possibly damage the bell.



Align the bell & spigot to be joined. Before homing the joint, check that the gasket is in contact with the bell end entrance taper around the entire circumference.

Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.

Improper alignment can dislodge gasket, causing leaks or possibly breaking the bell.

lead-in taper surface on the outer edge of the bell. Align spigot with the bell. Gasket should touch lead-in taper around the entire circumference before pushing the pipe home.

- Push the manhole section carefully, until the spigot is all the way home. (Fig B) Do not force sections together. If sections do not seat properly. unstack and contact your Hanson Sales Representative.
- 7. Every manhole will not come home exactly the same. Differences in application, consistency of lubricants, dimensions in the spigot and groove will cause variations in installation. If joining problems arise, please contact the manhole manufacturer immediately rather than forcing manhole sections together with subsequent damage to the manhole.
- All testing should be performed prior to backfill of the manhole. Problems can not be detected after the manhole is backfilled. <u>Testing the manhole after backfill voids all</u> warranties.



<u>Fig. A</u>



<u>Note:</u> Manholes in excess of 30' in depth must be vacuum tested prior to backfill. The loads presented by soils and possible groundwater at 30' in addition to the load from the vacuum may exceed the design capacity of the pipe to manhole connector.

TITLE		PLANT	STATE	SECT ON .PAGE	DATE	
O-Ring & Profile Gasket Installation on Manholes	AI	II P'ants	тх	5.14	C8-15-C6	Hanson
Contact Hanson	Go to I	ndex				EXIT





30 TAC 217 regulations will apply where more stringent than the following SAWS Specifications

Specification 852: Sanitary Sewer Manholes

https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 852%20Sanitary%20Sewer%20Manholes.pdf

Specification 854: Sanitary Sewer Laterals

https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 854%20Sanitary%20Sewer%20Laterals.pdf

Specification 804: Excavation, Trenching and Backfill

https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 804%20Excavation%20Trenching%20and%20Backfill.pdf



TEMPORARY STORMWATER SECTION (TCEQ-0602)

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

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

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

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Andrew Belton, P.E.

Date: 12 3 24

Signature of Customer/Agent:

Regulated Entity Name: Eilan Tract 11

Project Information

Potential Sources of Contamination

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

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

The following fuels and/or hazardous substances will be stored on the site: <u>construction</u> <u>staging area</u>

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

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

TCEQ-0602 (Rev. 02-11-15)

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

- Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.
- Fuels and hazardous substances will not be stored on the site.
- 2. Attachment A Spill Response Actions. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.
- 3. Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
- 4. Attachment B Potential Sources of Contamination. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

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

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

- For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
- 6. Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: <u>Leon Creek</u>

Temporary Best Management Practices (TBMPs)

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

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

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

- 11. Attachment H Temporary Sediment Pond(s) Plans and Calculations. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.
 - 🖂 N/A
- 12. Attachment I Inspection and Maintenance for BMPs. A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.
- 13. All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
- 14. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).
- 15. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.
- 16. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

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

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

- 18. Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
- 19. Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

- 20. \square All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
- 21. If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
- 22. Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

ATTACHMENT A

EILAN TRACT 11 Water Pollution Abatement Plan Modification

Attachment A – Spill Response Actions

In the event of an accidental leak or spill:

- Spill must be contained and cleaned up immediately.
- Spills will not be merely buried or washed with water.
- Contractor shall take action to contain spill. Contractor may use sand or other absorbent material stockpiled on site to absorb spill. Absorbent material should be spread over the spill area to absorb the spilled product.
- In the event of an uncontained discharge the contractor shall utilize onsite equipment to construct berms downgradient of the spill with sand or other absorbent material to contain and absorb the spilled product.
- Spill containment/absorbent materials along with impacted media must be collected and stored in such a way so as not to continue to affect additional media (soil/water). Once the spill has been contained, collected material should be placed on poly or plastic sheeting until removed from the site. The impacted media and cleanup materials should be covered with plastic sheeting and the edges weighed down with paving bricks or other similarly dense objects as the material is being accumulated. This will prevent the impacted media and cleanup materials from becoming airborne in windy conditions or impacting runoff during a rain event. The stockpiled materials should not be located within an area of concentrated runoff such as along a curb line or within a swale.
- Contaminated soils and cleanup materials will be sampled for waste characterization. When the analysis results are known the contaminated soils and cleanup materials will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.
- The contractor will be required to notify the owner, who will in turn contact TCEQ to notify them in the event of a significant hazardous/reportable quantity spill. Additional notifications as required by the type and amount of spill will be conducted by owner or owner's representative.

In the event of an accidental significant or hazardous spill:

The contractor will be required to report significant or hazardous spills in reportable quantities to:

- 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. https://www.tceq.texas.gov/response/spills/spill_rq.html
- 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.


- Notification should first be made by telephone and followed up with a written report.
- 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.
- Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.
- Contaminated soils will be sampled for waste characterization. When the analysis results are known the contaminated soils will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.

Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 1.4.16. Contractor shall review this section.



ATTACHMENT B

Attachment B – Potential Sources of Contamination

Other potential sources of contamination during construction include:

Potential Source	Preventative Measure
Asphalt products used on this project.	After placement of asphalt, emulsion or coatings, the contractor will be responsible for immediate cleanup should an unexpected rain occur. For the duration of the asphalt product curing time, the contractor will maintain standby personnel and equipment to contain any asphalt wash-off should an unexpected rain occur. The contractor will be instructed not to place asphalt products on the ground within 48 hours of a forecasted rain.
Oil, grease, fuel, and hydraulic fluid contamination	 Vehicle maintenance when possible, will be
from construction equipment and vehicle dripping.	 performed within the construction staging area. Construction vehicles and equipment shall be checked regularly for leaks and repaired immediately.
Accidental leaks or spills of oil, petroleum products,	 Contractor to incorporate into regular safety
and substances listed under 40 CFR parts 110, 117,	meetings, a discussion of spill prevention and
and 302 used or stored temporarily on site.	appropriate disposal procedures.
	 contractor's supermendent or representative overseer shall enforce proper spill prevention and control measures.
	 Hazardous materials and wastes shall be stored in covered containers and protected from
	vandalism.
	 A stockpile of spill cleanup materials shall be stored on site where it will be readily accessible.
Miscellaneous trash and litter from construction	 Trash containers will be placed throughout the
workers and material wrappings.	site to encourage proper trash disposal.
Construction debris.	 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
Caille (Querfleur of more from a sately to the	Case-by-case basis.
spills/overflow of waste from portable tollets	 Portable tollets will be placed away from high- traffic vehicular areas and storm drain inlats
	 Portable toilets will be placed on a level ground
	surface.
	Portable toilets will be inspected regularly for
	leaks and will be serviced and sanitized at time
	intervals that will maintain sanitary conditions.



ATTACHMENT C

Attachment C – Sequence of Major Activities

The sequence of major activities which disturb soil during construction on this site will be divided into two stages. The first is site preparation that will include installation of TBMPS, limited demolition, clearing and grubbing of vegetation where applicable. This will disturb approximately 18.40 acres. The second is construction that will include construction of multi-family residential buildings with associated parking and drives, landscaping and site cleanup. This will disturb approximately 18.40 acres. Approximately 4.82 acres of the project site may be disturbed for this SCS installation, including excavation, construction of sewer mains, backfill, and compaction.



ATTACHMENT D

Attachment D – Temporary Best Management Practices and Measures

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.

No upgradient water will cross the site stormwater will be intercepted and routed around the site via storm drains. All TBMPs are adequate for the drainage areas they serve.

b. 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.

Site preparation, which is the initiation of all activity on the project, will disturb the largest amount of soil. Therefore, before any of this work can begin, the clearing and grading contractor will be responsible for the installation of all on-site control measures. The methodology for pollution prevention of on-site stormwater will include: (1) erection of silt fences along the downgradient boundary of construction activities for temporary erosion and sedimentation controls, (2) installation of rock berms with silt fencing downgradient from areas of concentrated stormwater flow for temporary erosion control, (3) Installation of gravel bags and drain inlet protection at inlets and downgradient areas of construction activities for sediment control (4) installation of stabilized construction entrance/exit(s) to reduce the dispersion of sediment from the site, and (5) installation of construction staging area(s).

Prior to the initiation of construction, all previously installed control measures will be repaired or reestablished for their designed or intended purpose. This work, which is the remainder of all activity on the project, may also disturb additional soil. The construction contractor will be responsible for the installation of all remaining on-site control measures that includes installation of the concrete truck washout pit(s), as construction phasing warrants.

Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features.

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

There are no sensitive features or surface stream on or near the project limits. Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features.



d. 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.

BMP measures utilized in this plan are intended to allow stormwater to continue downstream after passing through the BMPs. This will allow stormwater runoff to continue downgradient to streams or features that may exist downstream of the site.



ATTACHMENT F

Attachment F – Structural Practices

The following structural measures will be installed prior to the initiation of site preparation activities:

- Erection of silt fences along the downgradient boundary of construction activities and rock berms with silt fence for secondary protection, as located on Exhibit 1 and illustrated in Exhibit 2.
- Installation of gravel bags and drain inlet protection at inlets and downgradient areas of construction activities, as located on Exhibit 1 and illustrated in Exhibit 2.
- Installation of stabilized construction entrance/exit(s) and construction staging area(s), as located on Exhibit 1, and illustrated on Exhibit 2.

The following structural measures will be installed at the initiation of construction activities or as appropriate based on the construction sequencing:

• Installation of concrete truck washout pit(s), as required and located on Exhibit 1 and illustrated on Exhibit 2.



ATTACHMENT G

Attachment G – Drainage Area Map

No more than ten (10) acres will be disturbed within a common drainage area at one time as construction of civil infrastructure (utilities, roads, drainage, etc.) will precede building construction and the site is divided into sub-watersheds. All TBMPs utilized are adequate for the drainage areas served.



ATTACHMENT I

INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures weekly and within 24 hours after a storm event. 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 Notice of Termination (NOT) has been filed. 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, (6) concrete truck rinse-out pit for signs of potential failure, (7) embankment, spillways, and outlet of sediment basin (where applicable) for erosion damage, and (8) sediment basins (where applicable) for evidence that basin has accumulated 50% of its volume in silt. Deficiencies noted during the inspection will be corrected and documented within seven calendar days following the inspection or before the next anticipated storm event if practicable.

Contractor shall review Sections 1.3 and 1.4 of TCEQ's Technical Guidance Manual for additional BMP inspection and maintenance requirements.



Pollution		Corrective Action Required						
Prevention Measure	Inspected Compliance	Description (use additional sheet if necessary)	Date Completed					
Best Management Practices								
Natural vegetation buffer strips								
Temporary vegetation								
Permanent vegetation								
Sediment control basin								
Silt fences								
Rock berms								
Gravel filter bags								
Drain inlet protection								
Other structural controls								
Vehicle exits (off-site tracking)								
Material storage areas (leakage)								
Equipment areas (leaks, spills)								
Concrete washout pit (leaks, failure)								
General site cleanliness								
Trash receptacles								
Evidence of Erosion								
Site preparation								
Roadway or parking lot construction								
Utility construction								
Drainage construction								
Building construction								
Major Observations								
Sediment discharges from site								
BMPs requiring maintenance								
BMPs requiring modification								
Additional BMPs required								

_ A brief statement describing the qualifications of the inspector is included in this SWP3.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

"I further certify I am an authorized signatory in accordance with the provisions of 30 TAC §305.128."

Inspector's Name

Inspector's Signature

Date



PROJECT MILESTONE DATES

Date when	maior	site	grading	activities	begin:
			0 0		~~~~

Construction Activity		Date	
Installation of BMPs			
Dates when construction activities temporarily or perman	nently	cease on all or a portion of the project	ct:
Dates when stabilization measures are initiated:			
Stabilization Activity		Date	
Removal of BMPs			

ATTACHMENT J

Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

Interim on-site stabilization measures, which are continuous, will include minimizing soil disturbances by exposing the smallest practical area of land required for the shortest period of time and maximizing use of natural vegetation. As soon as practical, all disturbed soil will be stabilized as per project specifications in accordance with pages 1-35 to 1-60 of TCEQ's Technical Guidance Manual (TGM) RG-348 (2005). Mulching, netting, erosion blankets and seeding are acceptable.

Stabilization measures will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and except as provided below, will be initiated no more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within twenty-one (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 seasonably arid conditions, stabilization measures must be initiated as soon as practicable.



PERMANENT STORMWATER SECTION (TCEQ-0600)

Permanent Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(Ii), (E), and (5), Effective June 1, 1999

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

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

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Andrew Belton, P.E.

Date: 12324 Signature of Customer/Agent

Regulated Entity Name: Eilan Tract 11

Permanent Best Management Practices (BMPs)

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

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

_____N/A

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

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

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

N/A

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

N/A

- 4. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
 - The site will be used for low density single-family residential development and has 20% or less impervious cover.
 - The site will be used for low density single-family residential development but has more than 20% impervious cover.
 - The site will not be used for low density single-family residential development.
- 5. The executive director may waive the requirement for other permanent BMPs for multifamily 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.
8.	Attachment D - BMPs for Surface Streams. A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
	□ N/A
9.	The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
	 The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed. Attachment E - Request to Seal Features. A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10.	Attachment F - Construction Plans. All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
	 Design calculations (TSS removal calculations) TCEQ construction notes All geologic features All proposed structural BMP(s) plans and specifications
	□ N/A

11. 🔀	Attachment G - Inspection, Maintenance, Repair and Retrofit Plan. A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:
	Prepared and certified by the engineer designing the permanent BMPs and measures
	🔀 Signed by the owner or responsible party
	Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
	A discussion of record keeping procedures
] N/A
12.	Attachment H - Pilot-Scale Field Testing Plan. Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.
\ge] N/A
13. 🔀	Attachment I -Measures for Minimizing Surface Stream Contamination. A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the

creation of stronger flows and in-stream velocities, and other in-stream effects caused

N/A

degradation.

Responsibility for Maintenance of Permanent BMP(s)

by the regulated activity, which increase erosion that results in water quality

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

14. The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.

N/A

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

🖂 N/A

ATTACHMENT B

Attachment B – BMPs for Upgradient Stormwater

No upgradient stormwater will flow across the project limits.

The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are three (3) existing sand filtration basins (B, D & E) which were designed and constructed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.



ATTACHMENT C

Attachment C – BMPs for On-Site Stormwater

The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are three (3) existing sand filtration basins (B, D & E) which were designed and constructed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.



ATTACHMENT D

Attachment D – BMPs for Surface Streams

The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are three (3) existing sand filtration basins (B, D & E) which were designed and constructed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.



ATTACHMENT F

Attachment F – Construction Plans

Please refer to the Exhibits Section of this application for the Water Pollution Abatement Site Plans.

ATTACHMENT G

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 on 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 in to 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 but may not be altered without TCEQ approval.

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 lease 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.

Pretlow Riddick, Authorized Agent Eilan Property Owners Association, Inc.

6/21/21

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 Rainfall	1							√	\checkmark	\checkmark	\checkmark		\checkmark	
Biannually*	V	V	V	V	V	V	V	V	\checkmark	\checkmark	V	V	√	√

*At least one biannual inspection must occur during or immediately after a rainfall event. $\sqrt{Indicates}$ 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 but may not be altered without TCEQ approval.

A written record should be kept of inspection results and maintenance performed.

	Task No. & Description	Included in thi	<u>s project</u>
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	¥es	No
12.	For Pump Stations	¥es	No
13.	For Pump Stations	¥es	No
14.	Visually Inspect Security Fencing for Damage or Breach	Yes	04

MAINTENANCE PROCEDURES FOR PERMANENT POLLUTION ABATEMENT MEASURES

Note: Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 3.5.

- 1. <u>Check Depth of Vegetation</u>. 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. <u>Check Depth of Silt Deposit in Basin</u>. 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 two (2) inches of the sand media shall also be removed and replaced with clean, silica-based washed sand meeting ASTM C33 specifications [0.0165 inch (#40 sieve) to 0.0469 inch (#16 sieve)]. Silt/sediment shall be cleared from the inlet structure at least every year and from the basin at least every five (5) years. Any sand discolored as a result of apparent impact by petroleum hydrocarbon or hazardous materials should also be removed and replaced. Written record should be kept of inspection results and maintenance performed.
- 3. <u>Removal of Debris and Trash</u>. The basin and inlet structure shall be checked for the accumulation of 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. *Written record should be kept of inspection results and maintenance performed*.
- 4. <u>Cut-off Valve</u>. 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. <u>Inlet Splash Pad</u>. 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. <u>Underdrain System</u>. 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 the maintenance performed.

- 7. <u>Structural Integrity</u>. 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 identified and repaired immediately. 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 solid block sod.
 - 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 corrective measures taken.
- 8. <u>Discharge Pipe</u>. 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 corrective measures taken
- 9. <u>Drawdown Time</u>. This characteristic can be a sign of the need for maintenance. The minimum drawdown time is 24 hours. If drawdown time is less than 24 hours, the gate valve shall be checked and partially closed to limit the drawdown time. Extensive drawdown time greater than 48 hours may indicated blockage of the sand media, the underdrain system and/or the discharge pipe. Corrective actions should be performed and completed within 15 working days. A written record of the inspection findings and corrective actions performed should be made.
- 10. <u>Vegetated Filter Strips</u>. Vegetation height for native grasses shall be limited to no more than 18inches. 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, regrading and placement of solid block sod over the affected area. A written record of the inspection findings and corrective actions performed should be made
- 11. <u>For Pump Stations</u>. 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


EILAN II Water Pollution Abatement Plan Modification

switches should be moved up and down to activate the pump. If the pump does not start, a repair technician shall be called in to repair the malfunction within 5 working days. A written record of the inspection findings and corrective actions performed should be made

- 12. <u>For Pump Stations</u>. 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 three (3) 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. <u>For Pump Stations</u>. 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 the maintenance performed*.
- 14. <u>Visually Inspect Security Fencing for Damage or Breach</u>. Check maintenance access gates for proper 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*.

ATTACHMENT I

EILAN TRACT 11 Water Pollution Abatement Plan Modification

Attachment I – Measures for Minimizing Surface Stream Contamination

Any points where discharge from the site is concentrated and erosive velocities exist will include appropriately sized energy dissipators to reduce velocities to non-erosive levels.



AGENT AUTHORIZATION FORM (TCEQ-0599)

Agent Authorization Form For Required Signature Edwards Aquifer Protection Program Relating to 30 TAC Chapter 213 Effective June 1, 1999 Pretlow Riddick 1 Print Name Manager Title - Owner/President/Other of _____ Eilan Tract 11. LLC Corporation/Partnership/Entity Name Pape-Dawson Consulting Engineers, LLC have authorized Print Name of Agent/Engineer of Pape-Dawson Consulting Engineers, LLC Print Name of Firm

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

I also understand that:

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

SIGNATURE PAGE:

Applicant's Signature

2024 (3

THE STATE OF Terras §

County of Dreeas §

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

GIVEN under my hand and seal of office on this day of Norman .

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 01/20/2023



APPLICATION FEE FORM (TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality									
Name of Proposed Regulated Entity: <u>Eilan Tract 11</u>									
Regulated Entity Location: 18710 La Cantera Terrace, San ANtonio, TX 78256									
Name of Customer: Eilan Tract 11, LLC									
Contact Person: Pretlow Riddick	Phor	ne: <u>(214) 393-4101</u>							
Customer Reference Number (if issued):CN									
Regulated Entity Reference Number	er (if issued):RN <u>10533</u>	2647							
Austin Regional Office (3373)									
Hays Williamson									
Travis									
San Antonio Regional Office (3362	2)								
🖂 Bexar	Medina	U U	valde						
Comal	Kinney								
Application fees must be paid by c	heck, certified check, o	or money order, payab	le to the Texas						
Commission on Environmental Quality. Your canceled check will serve as your receipt. This									
form must be submitted with you	r fee payment. This p	ayment is being submi	itted to:						
Austin Regional Office		an Antonio Regional O	office						
			ince						
Mailed to: TCEQ - Cashier	$\boxtimes c$	overnight Delivery to: 1	CEQ - Cashier						
Revenues Section	1	.2100 Park 35 Circle							
Mail Code 214	В	Building A, 3rd Floor							
P.O. Box 13088	A	Austin, TX 78753							
Austin, TX 78711-3088	(1	512)239-0357							
Site Location (Check All That Appl	y):								
🔀 Recharge Zone	Contributing Zone	🗌 Transi	tion Zone						
Type of Plan	ו	Size	Fee Due						
Water Pollution Abatement Plan, C	Contributing Zone								
Plan: One Single Family Residentia	l Dwelling	Acres	\$						
Water Pollution Abatement Plan, C	Contributing Zone								
Plan: Multiple Single Family Reside	Acres	\$							
Water Pollution Abatement Plan, C	18.40 of 19.572								
Plan: Non-residential	legal limit Acres	\$ 6,500							
Sewage Collection System	2,096.15 L.F.	\$ 1,048.08							
Lift Stations without sewer lines	Acres	\$							
Underground or Aboveground Stor	rage Tank Facility	Tanks	\$						
Piping System(s)(only)		Each	\$						
Exception	Each	\$							

Type of Plan	Size	Fee Due
Extension of Time	Each	\$
Signature:	Date: Valslay	

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	Eao
P10ject	Acres	ree
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6,500
	100 < 500	\$8,000
	≥ 500	\$10,000
Non-residential (Commercial, industrial, institutional,	< 1	\$3,000
multi-family residential, schools, and other sites	. 1 < 5	\$4,000
where regulated activities will occur)	5 < 1.0	\$5,000
	10 < 40	\$6,500
	40 < 100	\$8,000
	≥ 100	\$10,000

Organized Sewage Collection Systems and Modifications

	Cost per Linear	Minimum Fee-
Project	Foot	Maximum Fee
Sewage Collection Systems	\$0.50	\$650 - \$6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

	Cost per Tank or	Minimum Fee-
Project	Piping System	Maximum Fee
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

Exception Requests

Project	Fee			
Exception Request	\$500			

Extension of Time Requests

Project	Fee
Extension of Time Request	\$150

CORE DATA FORM (TCEQ-10400)



TCEQ Core Data Form

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

SECTION I: General Information

	1. UU											
1. Reason for Submission (If other is checked please describe in space provided.)												
🛛 New Pe	rmit, Regis	tration or Authori	zation (Core I	Data Fo	orm sho	ould be	subm	itted v	vith the p	orogram applicatio	n.)	
Renewa	l (Core Da	ta Form should b	e submitted v	vith the	renew	al form)		Other			
2. Customer Reference Number (<i>if issued</i>) Follow this link to search						3. Re	egulated	Entity Reference	e Number (i	if issued)		
CN				for CN <u>Ce</u>	<u>l or RN</u> entral Re	numbe egistry*	<u>rs in</u> * -	RN	N 1053	32647		
SECTION	II: Cu	stomer Info	ormation									
4. General C	4. General Customer Information 5. Effective Date for Customer In							matio	n Updat	es (mm/dd/yyyy)		
New Cust	tomer ı Legal Naı	me (Verifiable wit	h the Texas S	Update ecretar	to Cus ry of St	stomer ate or	Inform Texas	ation Comp	otroller o	Change in f Public Accounts)	Regulated E	Entity Ownership
The Custo	mer Nar	ne submitted	here may l	be up	dated	auto	matio	cally	based	on what is cu	rrent and	active with the
Texas Sec	retary o	f State (SOS)	or Texas C	ompt	roller	of Pu	ublic	Acco	ounts (CPA).		
6. Customer	Legal Na	me (If an individual	l, print last nam	e first: e	eg: Doe,	John)		<u> </u>	f new Cu	istomer, enter previ	ous Custom	er below:
Eilan Trac	et 11, LI	LC										
7. TX SOS/C	PA Filing	Number	8. TX State	Tax ID) (11 digit	ts)		9. Federal Tax ID (9 digits) 10. DUNS Number (if applicable				S Number (if applicable)
08037733	99		3207605	7457			8	85-3265946				
11. Type of C	Customer:	🛛 Corporati	on			Individ	ual	Partnership: General Limited				
Government:	🗌 City 🔲	County 🗌 Federal 🗌] State 🗌 Othe	r		Sole P	ropriet	etorship 🗌 Other:				
12. Number	of Employ	rees						13. Independently Owned and Operated?				
⊠ 0-20 ∟	21-100	101-250	251-500		501 ar	nd high	er					
14. Custome	er Role (Pro	oposed or Actual) -	- as it relates to	the Reg	gulated	Entity li	isted or	n this fo	orm. Plea	se check one of the	following	
Owner	nal Licens	ee 🗌 Respo	tor Insible Party		⊠ 0' □ Va	wner & oluntar	, Opera y Clea	ator nup A	pplicant	Other:		
	14160	N Dallas Pk	wy, Ste 75	0								
15. Mailing Address:))									
	City	Dallas		S	state	TX		ZIP	752	54	ZIP + 4	
16. Country	Mailing In	formation (if outsi	de USA)				17. E	-Mail	Addres	S (if applicable)		1
							pric	ldick	@crit	eriondp.com		
18. Telephor	ne Numbe	r		19. E	xtensi	on or (Code			20. Fax Numbe	r (if applical	ble)
(214) 393-4101									()	-		

SECTION III: Regulated Entity Information

 21. General Regulated Entity Information (If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)

 New Regulated Entity
 Update to Regulated Entity Name

 Update to Regulated Entity
 Update to Regulated Entity Name

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency 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.)

Eilan Tract 11

23. Street Address of	18710	La Cantera Te	errace						
the Regulated Entity: (<u>No PO Boxes)</u>	City	SanAntoni	o State	TX	ZIP	78256	ZIP + 4		
24. County	Bexar								
		Enter Physical Lo	ocation Descrip	tion if no st	reet addres	ss is provided.			
25. Description to Physical Location:									
26. Nearest City	No. Carl					State	Nea	rest ZIP Code	
27. Latitude (N) In Deci	mal:	29.610156	N	28.	Longitude ((W) In Decimal:	-98.6091	63 W	
Degrees	Minutes	Seconds		Degr	ees	Minutes		Seconds	
29	36		36.6		-98		36 33.0		
29. Primary SIC Code (4	4 digits) 30	. Secondary SIC	Code (4 digits)	31. Prima (5 or 6 dig	ary NAICS	Code 32. 3 (5 or	Secondary NA 6 digits)	ICS Code	
1522	10	523		236116			237110		
33. What is the Primary	/ Business	of this entity?	Do not repeat the SI	C or NAICS de	scription.)				
Multi-family Resid	dential								
				14160 N Da	allas Pkwy,	Ste 750			
34. Mailing	-								
Address:	City	Dallas	State	ТХ	ZIP	75254	Z.IP + 4		
35. E-Mail Address	s:			priddi	ck@criteric	ondp.com			
36. Teleph	none Numb	er	37. Extens	ion or Code	e	38. Fax N	umber (if appl	icable)	
()	-					() -		
. TCEQ Programs and I m. See the Core Data Form	D Numbers	Check all Programs for additional guidar	s and write in the p nce.	permits/registr	ation number	rs that will be affecte	ed by the updates	submitted on thi	
Dam Safety	Distri	cts	Edwards Ad	quifer	Emiss	sions Inventory Air	Industria	l Hazardous Was	

Municipal Solid Waste	New Source Review Air	□ OSSF	Petroleum Storage Tank	D PWS
Sludge	Storm Water	🔲 Title V Air	Tires	Used Oil
Uvoluntary Cleanup	Waste Water	Wastewater Agriculture	U Water Rights	Other:

SECTION IV: Preparer Information

40. Name:	Jean Autrey, P.E., CESS	WI	41. Title:	Program Manager
42. Tele	phone Number 43. Ext./Code	44. Fax Number	45. E-Mail	Address
(210)	375-9000	() -	jautrey(@pape-dawson.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:	Pape-Dawson Consulti	ng Engineers, LLC	Job Title:	Vice President	
Name (In Print):	Andrew Belton, P.E.	Λ	-	Phone:	(210) 375- 9000
Signature:		men D		Date:	12324

POLLUTANT LOAD AND REMOVAL CALCULATIONS

EILAN Tract 11

Treatment Summary by Watershed

Watershed	Watershed Area (ac.)	Previously Approved Impervious Cover (ac.)	Existing Impervious cover (ac.)	Proposed Impervious Cover (ac.)	Total Impervious cover (ac)**	РВМР	Required TSS Removal Annually (Ibs)	Designed TSS Removed Annually (Ibs)
В	19.750	12.960	9.670	1.900	11.570	Water Quality Basin "B" (EAPP ID No 13- 07083102B).	9,441	11,163
D	12.290	10.083	4.540	4.300	8.840	Water Quality Basin "D" (EAPP ID No 13- 07083102B).	7,213	8,530
E	16.730	7.040	1.750	3.420	5.170	Water Quality Basin "E" (EAPP ID No 13- 07083102B).	4,219	6,087
TOTAL	48.77	30.08	15.96	9.620	25.580		20,873	25,780

*Basin D watershed and IC were previously updated in Eilan II

**this will be the total after this approval which is below the previously approved

Updated Treatment Table

Basin	Designed Capture Volume (cf)	Required Volume for Design (cf)	Designed Sand Area (sf)	Required Sand Area (sf)	REVISED WATERSHED (ac)	IMPERVIOUS COVER (ac)	Previously- approved Overtreat (ac)	Required treatement for total IC & OT (Ibs)	Required treatement for Approved IC & OT (Ibs)
В	80,556	79,983	9,866	7,998	19.75	11.570	0.720	10,029	11,163
D	64,900	62,920	7,892	6,292	12.29	10.083	0.370	8,530	8,530
E	55,456	46,191	6,932	4,619	16.73	5.170	0.420	4,561	6,087

Texas Commission on Environmental Quality Project Name: Eilan Tract 11 TSS Removal Calculations 04-20-2009 **Date Prepared:** 11/13/2024 Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the c 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 t 1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-3 Page 3-29 Equation 3.3: L_M = 27.2(A_N x P) L_{M TOTAL PROJECT} = Required TSS removal resulting from the proposed development = 8 where: 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 Bexar County = Total project area included in plan * = 18.40 acres Predevelopment impervious area within the limits of the plan* = 0.00 acres Total post-development impervious area within the limits of the plan* = 9.62 acres Total post-development impervious cover fraction * = 0.52 30 inches 7850 lbs. L_{M TOTAL PROJECT} = * The values entered in these fields should be for the total project area. Number of drainage basins / outfalls areas leaving the plan area = 3



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

Drainage Basin/Outfall Area No. =	Basin B	
Total drainage basin/outfall area =	19.750 0.00	acres
Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area =	12.960 0.66	acres
L _{M THIS BASIN} =	10575	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = <mark>Sa</mark> i	Proposed BMP = Sand Filter			
Removal efficiency =	89	percent		
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 =	19.750	acres
A _I =	12.960	acres
A _P =	6.79	acres
L _R =	12071	lbs

Desired L _{M THIS BASIN} =	11163	lbs.		
F =	0.92			
6. Calculate Capture Volume required by the BMP Type for this drainage ba	asin / outfall	area.	Calculations from RC	G-348
Rainfall Depth =	2.00	inches		
Post Development Runoff Coefficient = On-site Water Quality Volume =	0.46 66653	cubic feet		
	Calculations	from RG-348	Pages 3-36 to 3-37	
Off-site area draining to BMP = Off-site Impervious cover draining to BMP = Impervious fraction of off-site area = Off-site Runoff Coefficient =	0.00 0.00 0 0.00	acres acres		
Off-site Water Quality Volume =	0	cubic feet		
Storage for Sediment =	13331			
Total Capture Volume (required water quality volume(s) x 1.20) = The following sections are used to calculate the required water quality volume	79983 ume(s) for th	cubic feet	ИР.	
9. Filter area for Sand Filters	Designed as	Required in R	G-348	Pages 3-58 to 3-6
9A. Full Sedimentation and Filtration System				

Minimum filter basin area =	3703	square feet
Maximum sedimentation basin area = Minimum sedimentation basin area =	33326 8332	square feet For minimum water depth of 2 feet square feet For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	79983	cubic feet
Minimum filter basin area =	6665	square feet
Maximum sedimentation basin area = Minimum sedimentation basin area =	26661 1666	square feet For minimum water depth of 2 feet square feet For maximum water depth of 8 feet

Project Name: Eilan Tract 11 TSS Removal Calculations 04-20-2009 Date Prepared: 11/13/2024 Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cu 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 Pages 3-27 to 3 Calculations from RG-348 1. The Required Load Reduction for the total project: Page 3-29 Equation 3.3: L_M = 27.2(A_N x P) L_{M TOTAL PROJECT} = Required TSS removal resulting from the proposed development = where: 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 * = 18.40 acres Predevelopment impervious area within the limits of the plan* = 0.00 acres Total post-development impervious area within the limits of the plan* = 9.62 acres Total post-development impervious cover fraction * = 0.52 P≔ 30 inches LM TOTAL PROJECT = 7850 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



Texas Commission on Environmental Quality

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

Drainage Basin/Outfall Area No. = Basin D

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area =	12.290 0.00 10.083 0.82	acres acres acres
L _{M THIS BASIN} =	8228	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	Sand Filter	
Removal efficiency =	89	percent
4. Calculate Maximum TSS Load Removed (L _R) for this Drainage Basin by th	ne selected	BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$

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} = 12.290 acres

~ C -	12.290	acres
A _I =	10.083	acres
A _P =	2.21	acres
L _R =	9347	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall	area			
Desired L _{M THIS BASIN} =	8530	lbs.		additional for OT 302
F =	• 0.91			
6. Calculate Capture Volume required by the BMP Type for this drainage ba	asin / outfall	area.	Calculations from RC	G-348
Rainfall Depth =	- 1.80	inches		
Post Development Runoff Coefficient = On-site Water Quality Volume =	0.65 52433	cubic feet		
	Calculations	from RG-348	Pages 3-36 to 3-37	
			J. J	
Off-site area draining to BMP =	0.00	acres		
Un-site impervious cover draining to BMP =	0.00	acres		
Off-site Runoff Coefficient =	. 0.00			
Off-site Water Quality Volume =	• 0	cubic feet		
Storage for Sediment =	10487			
Total Capture Volume (required water quality volume(s) x 1.20) =	62920	cubic feet		
The following sections are used to calculate the required water quality vol	ume(s) for th	e selected BMI	Р.	
The values for BMP Types not selected in cell C45 will show NA.				
9. Filter area for Sand Filters	Designed as	s Required in R	G-348	Pages 3-58 to 3

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	62920	cubic feet	
Minimum filter basin area =	2913	square feet	
Maximum sedimentation basin area = Minimum sedimentation basin area =	26217 6554	square feet square feet	For minimum water depth of 2 feet For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	62920	cubic feet	
Minimum filter basin area =	5243	square feet	
Maximum sedimentation basin area = Minimum sedimentation basin area =	20973 1311	square feet square feet	For minimum water depth of 2 feet For maximum water depth of 8 feet

Texas Commission on Environmental Quality Project Name: Eilan Tract 11 TSS Removal Calculations 04-20-2009 Date Prepared: 11/13/2024 Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cursor o 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 Calculations from RG-348 Pages 3-27 to 3 1. The Required Load Reduction for the total project: Page 3-29 Equation 3.3: L_M = 27.2(A_N x P) LM TOTAL PROJECT = Required TSS removal resulting from the proposed development = where: 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 *= 18.40 acres Predevelopment impervious area within the limits of the plan * == 0.00 acres Total post-development impervious area within the limits of the plan* = 9.62 acres Total post-development impervious cover fraction * = 0.52 P =30 inches 7850 lbs. LM TOTAL PROJECT * The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 3



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

Drainage Basin/Outfall Area No. = Basin E

Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area =	16.730 0.00 7.040	acres acres acres
Post-development impervious fraction within drainage basin/outfall area =	0.42	
L _{M THIS BASIN} =	5745	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	Sand Filter	
Removal efficiency =	89	percent
4. Calculate Maximum TSS Load Removed (L _R) for this Drainage Basin by th	ne selected	BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$

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} = 16.730 acres

A _C –	10.730	acres
A _I =	7.040	acres
A _P =	9.69	acres
L _R =	6643	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall	area			
Desired L _{M THIS BASIN} =	6087	lbs.		additional for O ⁻ 343
F =	0.92			
6. Calculate Capture Volume required by the BMP Type for this drainage ba	asin / outfall	area.	Calculations from RG	9-348
Rainfall Depth = Post Development Runoff Coefficient =	2.00 0.32	inches		
On-site Water Quality Volume =	38492	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 = Off-site Water Quality Volume =	0.00	cubic feet		
Storage for Sediment =	7698			
Total Capture Volume (required water quality volume(s) x 1.20) =	46191	cubic feet		
The following sections are used to calculate the required water quality volu	ume(s) for th	e selected BMI	P .	
9. Filter area for Sand Filters	Designed as	Required in R	G-348	Pages 3-58 to 3

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	46191	cubic feet	
Minimum filter basin area =	2138	square feet	
Maximum sedimentation basin area = Minimum sedimentation basin area =	19246 4812	square feet square feet	For minimum water depth of 2 feet For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	46191	cubic feet
Minimum filter basin area =	3849	square feet
Maximum sedimentation basin area = Minimum sedimentation basin area =	15397 962	square feet For minimum water depth of 2 feet square feet For maximum water depth of 8 feet

EXHIBITS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER POLLUTION ABATEMENT PLAN GENERAL CONSTRUCTION NOTES

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE: - THE NAME OF THE APPROVED PROJECT; THE ACTIVITY START DATE; AND

- THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.

3. IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.

4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED

6. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.

7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.

LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.

9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.

10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.

11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: - THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;

- THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
- THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

14250 JUDSON ROAD

12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

- A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT
- PLANTS, AND DIVERSIONARY STRUCTURES; ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER:
- C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN. SAN ANTONIO REGIONAL OFFICE

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION. 2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED

IN THE FIELD. 3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL

MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

7. STORM WATER POLLUTION PREVENTION STRUCTURES SHOULD BE CONSTRUCTED WITHIN THE SITE BOUNDARIES. SOME OF THESE FEATURES MAY BE SHOWN OUTSIDE THE SITE BOUNDARIES ON THIS PLAN FOR VISUAL CLARITY.

8. AS SOON AS PRACTICAL, ALL DISTURBED SOIL THAT WILL NOT BE COVERED BY IMPERVIOUS COVER SUCH AS PARKWAY AREAS, EASEMENT AREAS, EMBANKMENT SLOPES, ETC. WILL BE STABILIZED PER APPLICABLE PROJECT SPECIFICATIONS.

9. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS. 10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE

WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED IN ACCORDANCE WITH TPDES REQUIREMENTS. 11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND

BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.

12. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

13. DASHED BOUNDARY - - DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE UNLESS OTHERWISE NOTED. Imagery @ 2016, CAPCOG, Digital Globe, Texas Orthoimagery Program, USDA Farm Service Agenc

15. CPS ENERGY MAY FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND MAY BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.



	TEMPO	RARY BMP MOD
DATE	SIGNATURE	DES



PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL. INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

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.

INSTALLATION IN CHANNELS

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 ABOVE).

. 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.

OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE

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.

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

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.

NSPECTION AND MAINTENANCE GUIDELINES SOD SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.

. DAMAGE FROM STORMS OR NORMAL CONSTRUCTION ACTIVITIES SUCH AS TIRE RUTS OR DISTURBANCE OF SWALE STABILIZATION SHOULD BE REPAIRED AS SOON AS PRACTICAL.

IS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE© UNLESS OTHERWISE NOTED. Imagery © 2016, CAPCOG, Digital Globe, Texas Orthoimagery Program, USDA Farm Service Agency.

SOD INSTALLATION DETAIL

NOT-TO-SCALE

ISOMETRIC PLAN VIEW

ROCK BERMS

THE PURPOSE OF A ROCK BERM IS TO SERVE AS A CHECK DAM IN AREAS OF CONCENTRATED FLOW, TO INTERCEPT SEDIMENT-LADEN RUNOFF, DETAIN THE SEDIMENT AND RELEASE THE WATER IN SHEET FLOW. THE ROCK BERM SHOULD BE USED WHEN THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 5 ACRES. ROCK BERMS ARE USED IN AREAS WHERE THE VOLUME OF RUNOFF IS TOO GREAT FOR A SILT FENCE TO CONTAIN. THEY ARE LESS EFFECTIVE FOR SEDIMENT REMOVAL THAN SILT FENCES, PARTICULARLY FOR FINE PARTICLES, BUT ARE ABLE TO WITHSTAND HIGHER FLOWS THAN A SILT FENCE. AS SUCH, ROCK BERMS ARE OFTEN USED IN AREAS OF CHANNEL FLOWS (DITCHES, GULLIES, ETC.). ROCK BERMS ARE MOST EFFECTIVE AT REDUCING BED LOAD IN CHANNELS AND SHOULD NOT BE SUBSTITUTED FOR OTHER EROSION AND SEDIMENT CONTROL MEASURES FARTHER UP THE WATERSHED.

INSPECTION AND MAINTENANCE GUIDELINES

. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.

REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION.

3. REPAIR ANY LOOSE WIRE SHEATHING.

I. 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.

SECTION "A-A'

MATERIALS

THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOAT RINGS.

2. CLEAN, OPEN GRADED 3-INCH TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5-INCH TO 8-INCH DIAMETER ROCKS MAY BE USED.

INSTALLATION

1. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

2. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET MINIMUM WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER.

3. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM TO A HEIGHT NOT LESS THAN 18".

4. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH TIE WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAP AT LEAST 2 INCHES, AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.

5. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE

6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

COMMON TROUBLE POINTS

. INSUFFICIENT BERM HEIGHT OR LENGTH (RUNOFF QUICKLY ESCAPES OVER THE TOP OR AROUND THE SIDES OF BERM).

2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).

SILT FENCE

A SILT FENCE IS A BARRIER CONSISTING OF GEOTEXTILE FABRIC SUPPORTED BY METAL POSTS TO PREVENT SOIL AND SEDIMENT LOSS FROM A SITE. WHEN PROPERLY USED, SILT FENCES CAN BE HIGHLY EFFECTIVE AT CONTROLLING SEDIMENT FROM DISTURBED AREAS. THEY CAUSE RUNOFF TO POND, ALLOWING HEAVIER SOLIDS TO SETTLE OUT. IF NOT PROPERLY INSTALLED, SILT FENCES ARE NOT LIKELY TO BE EFFECTIVE.

THE PURPOSE OF A SILT FENCE IS TO INTERCEPT AND DETAIN WATER-BORN SEDIMENT FROM UNPROTECTED AREAS OF A LIMITED EXTENT. SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHOULD REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OF DRAINAGE WAY. IF CONCENTRATED FLOW OCCURS AFTER INSTALLATION, CORRECTIVE ACTION MUST BE TAKEN SUCH AS PLACING A ROCK BERM IN THE AREAS OF CONCENTRATED FLOW.

SILT FENCING WITHIN THE SITE MAY BE TEMPORARILY MOVED DURING THE DAY TO ALLOW CONSTRUCTION ACTIVITY PROVIDED IT IS REPLACED AND PROPERLY ANCHORED TO THE GROUND AT THE END OF THE DAY. SILT FENCES ON THE PERIMETER OF THE SITE OR AROUND DRAINAGE WAYS SHOULD NOT BE MOVED AT ANY TIME.

MATERIALS

SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NUMBER 30.

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 WEIGHT 1.25 LB/FT, AND BRINDELL HARDNESS EXCEEDING 140.

3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

INSTALLATION

1. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF 1-FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.

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 1/4 ACRE/100 FEET OF FENCE.

3. 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.

4. 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.

5. 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

6. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

COMMON TROUBLE POINTS FENCE NOT INSTALLED ALONG THE CONTOUR CAUSING WATER TO

CONCENTRATE AND FLOW OVER THE FENCE. 2. FABRIC NOT SEATED SECURELY TO GROUND (RUNOFF PASSING UNDER

FENCE).

3. FENCE NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND SIDES)

4. FENCE TREATING TOO LARGE AN AREA, OR EXCESSIVE CHANNEL FLOW (RUNOFF OVERTOPS OR COLLAPSES FENCE).

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECT ALL FENCING WEEKLY, AND AFTER RAINFALL 2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.

3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

4. REPLACE OR REPAIR 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. TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.

WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

CURB

SILT FENCE DETAIL

NOT-TO-SCALE

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES:

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG-348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG-348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG-348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) PERMANENT BMPS FOR THIS SITE INCLUDE THREE (3) EXISTING SAND FILTER BASINS "B" "D" AND "E". THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE SITE IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).

5.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 1.0% TO 12%.

PERMANENT POLLUTION ABATEMENT MEASURES:

1.) SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.

2.) THREE (3) EXISTING SAND FILTER BASINS "B" "D" AND "E" WILL SERVE AS THE PERMANENT BEST MANAGEMENT PRACTICE (BMP) FOR DRAINAGE AREAS.

3.) ENERGY DISSIPATORS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.

NOTES:

 CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION FOR SOIL STABILIZATION PRIOR TO SITE CLOSEOUT.
 ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

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ment Summar	y by Watershed	1						
Watershed	Watershed Area (ac.)	Previously Approved Impervious Cover (ac.)	Existing Impervious cover (ac.)	Proposed Impervious Cover (ac.)	Total Impervious cover (ac)	PBMP	Required TSS Removal Annually (Ibs)	Designed TSS Removed Annually (lbs)
В	19.750	12.960	9.670	1.900	11.570	Water Quality Basin "B"	9,441	11,163
D	12.290	10.083	4.540	4.300	8.840	Water Quality Basin "D"	7,213	8,530
E	16.730	7.040	1.750	3.420	5.170	Water Quality Basin "E"	4,219	6,030
TOTAL	48.77	30.08	15.96	9.620	25.580		20,873	25,723

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6" SS STUBOUT TOP=1139.00 1145 BLDG NO. 1 1150 000 M.H. "A2-1" NW=1132.24 REF. MEP FOR CONT. 1100 STA: 1+15.00 STA: 1+15.00 13 LF 6" SS © 1% BLDG NO. 2 100 100 1100 169 LF 8" SS © 0.5% 170 1100 169 LF 8" SS © 0.5% 170 1100 169 LF 8" SS © 0.5% 170 1100 1132.11 2469 1100 1132.11 2469 1100 169 LF 8" SS © 0.5% 170 1100 1132.11 2469 1135 1130 1130 1100 1131.06 9 LF 6" SS © 1% 1100 1130.96 LA CANTERA TERRACE SSMH SS TOP=1133.07 1100 1130.96 LA CANTERA TERRACE SSMH SS INV=1132.20 1100 1130.96 LA CANTERA TERRACE SSMH SS INV=1132.00 1100 1130.96 LA CANTERA TERRACE INV(NI)=1132.007/25 SD INV=1123.60 1100 11132.007/25 STA: 2168 68 STA: 2168 68
Δ INV(IN)=1132.00 ⁷ / ₂₂ INV(OUT)=1131.90 STA: 2+68.68

SS LINE B1

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3'-0"

TCEQ - 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 TH CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

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 2 SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND 2 MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. THESE 3 CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN 3 PERMANENTLY STABILIZED.

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 (G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 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 (A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST 8. ON ANY MANHOLES TO BE ABANDONED, THE RINGS AND COVER SHALL BE 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 (B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST 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 ____ OF ____

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 NCE CLOSER THAN NINE FEET (LE., 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:

IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: ____

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 <u>\$217.54</u>

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH (4) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT 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 16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 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 (b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR

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

LATERALS). THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON (B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL THE PLAN AND PROFILE SHEETS ON PLAN SHEET ___ OF ___ AND MARKED AFTER

BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET ___ OF ___. 13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE (2) VACUUM TESTING. 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 (C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT (E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION. 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 (G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF. CERTIFY IN WRITING THAT ALL WASTEWATER LINES HAVE PASSED ALL REQUIRED TESTING TO THE APPROPRIATE REGIONAL OFFICE WITHIN 30 DAYS OF TEST 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:

(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 INSUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(II) OF THIS PARAGRAPH

(1) LOW PRESSURE AIR TEST.

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(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 FROM THE FOLLOWING EQUATION:

> EQUATION C.3 WHERE: T = (0.085 * D * K)/Q

T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS

 $K = 0.000419 \times D \times L$, 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 3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING (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:

PE DIAMETER NCHES)	MIN. TIME (SECONDS) 340 454	LENGTH FOR MIN. (FEET) 398 298	TIME, LONGER LENGTH (SECONDS) 0.855(L) 1.520(L)
)	567	239	2.374(L)
-	680	199	3.419(L)
<u>,</u>	850	159	5.342(L)
5	1020	133	7.693(L)
	1190	114	10.471(L)
1	1360	100	13.676(L)
7	1530	88	17.309(L)
)	1700	80	21.369(L)
3	1870	72	25.856(L)

6. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE (D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE 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.

INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR. (2) INFILTRATION/EXFILTRATION TEST

- HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE
- 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
- PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH STRENGTH, MINIMUM PIPE STIFFNESS OF 115 PSI. (C) OF THIS PARAGRAPH.
- (b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION
- TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.
- (A) MANDREL SIZING 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.
- A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTI 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.) METHOD OPTIONS.
- AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.) 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. A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR
- MINUS 0.2% DEFLECTION. (3) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.
- (5) 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.
- TAC §217.58. (a) ALL MANHOLES MUST PASS A LEAKAGE TEST
- HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR. (1) HYDROSTATIC TESTING.
- SHOWN IN THE DETAIL ON PLAN SHEET ___ OF ___. (FOR POTENTIAL FUTURE (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.
 - 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. (A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND
 - MANHOLF (B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.
 - MOVEMENT WHILE A VACUUM IS DRAWN. EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.
 - AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO
- PERFORM A VALID TEST. AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. THE ENGINEER MUST (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. COMPLETION AND PRIOR TO USE OF THE NEW COLLECTION SYSTEM. TESTING 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 CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION

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

ADDITIONAL MISCELLANEOUS SAWS NOTES

PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED 1. THIS PROJECT IS WITHIN THE EDWARDS AQUIFER RECHARGE ZONE. ALL 28. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO THE SAN MATERIAL AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION. CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) 29. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE AND COMPLY WITH CURRENT SPECIFICATIONS. PLANS BUT NOT INCLUDED ON THE BID SCHEDULE. THIS INCIDENTAL WORK 2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK WILL BE REQUIRED AND SHALL BE INCLUDED UNDER THE PAY ITEM TO WHICH UNTIL THEY OBTAIN A COPY OF THE APPROVED G.C.P. FROM THE CONSULTANT IT RELATES. AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO 30. THE DEVELOPER DEDICATES THE SANITARY SEWER MAINS UPON COMPLETION PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE BY THE DEVELOPER AND ACCEPTANCE BY THE SAN ANTONIO WATER SYSTEM. INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS.

> LATERALS, SHOWN IN THESE PLANS ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES 48 HOURS PRIOR TO EXCAVATION AND TO PROTECT THE SAME DURING CONSTRUCTION.

SAN ANTONIO WATER SYSTEM (WATER, SEWER & RECYCLED WATER) DRAINAGE TELEPHONE CITY PUBLIC SERVICE CABLE TV

VALERO ENERGY CO.

SEWERS AT ALL TIMES DURING CONSTRUCTION.

CONSTRUCTION SPECIFICATIONS AND PERMIT.

TRENCH EXCAVATION SAFETY PROTECTION 4. THE CONTRACTOR SHALL MAINTAIN SERVICE TO ALL EXISTING SANITARY CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, 5. ALL WORK IN TEXAS HIGHWAY DEPARTMENT AND BEXAR COUNTY SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE 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. THE CONTRACTOR'S 6. DUE TO FEDERAL REGULATIONS TITLE 49. PART 192,181. CITY PUBLIC TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE (E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF SERVICE MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION, SAFETY PROTECTION THAT CONTRACTOR MUST PROTECT AND WORK AROUND GAS VALVES THAT ARE IN COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. HE PROJECT AREAS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY 7. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AT LEAST FOUR INCHES ABOVE THE FINISHED GRADE OF THE SURROUNDING AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

GROUND EXCEPT WHEN LOCATED IN PAVED AREAS. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.

NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 SALVAGED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, ITEM 862, AND THE HOLE BACKFILLED TO THE SATISFACTION OF THE INSPECTOR.

> THE USE OF ASBESTOS CEMENT PIPE WILL BE PROHIBITED UNDER THIS CONTRACT. ALL DUCTILE IRON PIPE USED IN THIS SYSTEM SHALL BE CORROSION PROTECTED ON BOTH THE INTERIOR AND EXTERIOR SURFACES. ALL CORROSION PROTECTION SHALL BE APPLIED AND INSTALLED IN SUCH A MANNER AS TO MAINTAIN A CONTINUOUSLY PROTECTED SURFACE AFTER FINAL PIPE INSTALLATION.

I. WHERE A SEWER MAIN CROSSES OVER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE (9) FEET, ALL PORTIONS OF THE SEWER MAIN EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF 10. ALL PVC SEWER PIPE WITH OVER 14 FEET OF COVER SHALL BE EXTRA WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED USING 150 PSI PRESSURE RATED DUCTILE IRON, CAST IRON OR PVC PIPE AND JOINED WITH EQUALLY PRESSURE RATED PRESSURE RING GASKET CONNECTIONS OF (E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM 11. SEWER PIPE CONNECTIONS TO PRE-CAST MANHOLES WILL BE COMPRESSION CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER JOINTS AS APPROVED BY SAWS, MECHANICAL JOINT "BOOT TYPE" CONNECTIONS DUCTILE IRON MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE AT TO REDUCE THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS ALONE WILL NOT BE ALLOWED. "BOOT TYPE" JOINTS MAY BE USED IN LEAST EIGHTEEN (18) FEET IN LENGTH MAY BE CENTERED ON THE WATER MAIN SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION. CONJUNCTION WITH COMPRESSION JOINTS AS APPROVED BY SAWS. ANY IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM)

CHANGES FROM THESE METHODS MUST BE APPROVED BY SAWS.

II. WHERE A SEMI-RIGID OR RIGID SEWER MAIN CROSSES UNDER A WATER MAIN 12. ALL RESIDENTIAL SEWER SERVICE LATERAL SHALL BE EXTENDED TO AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET BUT GREATER THAN PROPERTY LINE AND CAPPED AND SEALED. (ITEM. NO. DD-854-01) TWO FEET, THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF 13. WHERE REQUIRED, CONCRETE ENCASEMENT SHALL BE PLACED FOR FULL THE SEWER WITHIN NINE FEET OF THE WATER MAIN. WIDTH OF THE TRENCH TO A PLANE 6" ABOVE THE TOP OF THE PIPE, WITH PAY LIMITS AS SHOWN ON THE ITEM NO. DD-858-01.

WHERE A SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN TWO FEET, THE SEWER MAIN SHALL BE . A MINIMUM OF 3 FEET OF COVER IS TO BE MAINTAINED OVER THE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM SANITARY SEWER MAIN AND LATERALS AT SUBGRADE, OTHERWISE CONCRETE PRESSURE RATING OF 150 PSI WITHIN NINE FEET OF THE WATER MAIN. SHALL ENCASEMENT WILL BE REQUIRED. HAVE A SEGMENT OF SEWER PIPE CENTERED ON THE WATER MAIN, SHALL BE PLACED NO CLOSER THAN SIX INCHES BETWEEN OUTER DIAMETERS. AND SHALL 15. NO BLASTING SHALL BE PERFORMED WITHIN 75 FEET OF EXISTING UTILITIES. BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON 16. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE OF A LENGTH UPON PROJECT COMPLETION. THE CONTRACTOR SHALL NOT PERMANENTLY GREATER THAN EIGHTEEN (18) FEET MAY BE CENTERED ON THE WATER MAIN IN PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM) OBTAINING AN APPROVAL FLOOD PLAIN DEVELOPMENT PERMIT.

ABATEMENT PLAN FROM THE TCEQ.

AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S V. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED ANY CLOSER THAN IMPLEMENTATION OF THE SYSTEM, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED ADDITIONAL GENERAL NOTES EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE 1. PROJECT SPECIFICATIONS TAKE PRECEDENCE OVER PROJECT PLANS AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION. 19. EROSION AND SEDIMENTATION CONTROLS

A. THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND ENVIRONMENTAL 2. CONTRACTOR IS RESPONSIBLE FOR ALL SITE SAFETY CONSIDERATIONS. PROTECTION AGENCY (EPA) REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION OF SEWER COLLECTION SYSTEMS. DEVELOPER PROFILE SHEETS.

- SEDIMENTATION CONTROLS.
- DISCHARGED FROM THE SITE.

EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A 20. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY THE SAN ANTONIO WATER SYSTEM.

21. PLACEMENT OF SUCH CONTROLS SHALL BE IN ACCORDANCE WITH THE FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED (D) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE CONSTRUCTION PLANS. ACTUAL LOCATIONS MAY VARY SLIGHTLY FROM THE PLANS, BUT WILL BE VERIFIED BY THE ENGINEER/INSPECTOR IN THE FIELD PRIOR TO SEWER LINE CONSTRUCTION. THE CONTRACTOR AND CITY INSPECTOR SHALL INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY SIGNIFICANT RAINFALL TO INSURE SIGNIFICANT DISTURBANCE TO THE STRUCTURES HAS NOT OCCURRED. SEDIMENT DEPOSITED AFTER A SIGNIFICANT RAINFALL SHALL BE REMOVED FROM THE SITE OR PLACED IN AN APPROVED DESIGNATED SOIL DISPOSAL AREA.

22. A DEFLECTION TEST SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TEST SHALL BE CONDUCTED AFTER INITIAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. (ITEM NO. 849) 23. ALL MAINS MUST PASS AIR TESTING PER ITEM NO. 849 IN THE STANDARD

24. ALL MAINS MUST COMPLY WITH ITEM NO. 868 OF SEWER MAIN CLEANING 25. WATER JETTING THE BACKFILL WITHIN A STREET WILL NOT BE PERMITTED. SANITARY SEWER TRENCHES SUBJECT TO TRAFFIC SHALL CONFORM TO THE AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND SAWS ITEM 804.

26. SANITARY SEWER MAIN CONNECTIONS MADE DIRECTLY TO EXISTING MANHOLES WILL REQUIRE SUCCESSFUL TESTING OF THE MANHOLES IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS ITEM 849.

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17. THE CONTRACTOR SHALL NOT PLACE ANY MATERIALS ON THE RECHARGE ZONE OF THE EDWARDS AQUIFER WITHOUT AN APPROVED WATER POLLUTION

TRENCHES. THE ROCK BERM OR SILT FENCES SHALL BE INSTALLED IN A NECESSARY DOCUMENTED TEST RESULTS. MANNER SUCH THAT ANY RAINFALL RUNOFF SHALL BE FILTERED. HAY BALES SHALL NOT BE USED FOR TEMPORARY EROSION AND

ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS MUST BE INSTALLED PRIOR TO CONSTRUCTION, SHALL BE MAINTAINED DURING CONSTRUCTION. AND SHALL BE REMOVED WHEN VEGETATION IS ESTABLISHED AND THE CONSTRUCTION AREA IS STABILIZED. ADDITIONAL PROTECTION MAY BE NECESSARY IF EXCESSIVE SOLIDS ARE BEING

SPECIFICATIONS PRIOR TO ACCEPTANCE BY THE SAN ANTONIO WATER SYSTEM.

27. AFTER CONSTRUCTION, TESTING WILL BE DONE BY T.V. CAMERA BY THE CONTRACTOR AND OBSERVED BY INSPECTOR. AND WASTEWATER ENGINEERING PERSONNEL AS THE CAMERA IS RUN THROUGH THE LINES. ANY ABNORMALITIES, SUCH AS BROKEN PIPE OR MISALIGNED JOINTS, MUST BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE.

THE SAN ANTONIO WATER SYSTEM WILL OWN AND MAINTAIN SAID SANITARY 3. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES, TO INCLUDE SERVICE SEWER MAINS WHICH ARE LOCATED WITHIN THIS PARTICULAR SUBDIVISION. (AS APPLICABLE)

> 31. THE DEVELOPER WILL BE RESPONSIBLE FOR THE LIFT STATION MAINTENANCE FEE IN EFFECT AT THE TIME OF CERTIFICATION. THE CURRENT LIFT STATION MAINTENANCE FEE PER LIFT STATION WILL BE COLLECTED PRIOR TO PLAT RECORDATION.

32. WORK COMPLETED BY THE CONTRACTOR WHICH HAS NOT RECEIVED A GENERAL CONSTRUCTION PERMIT OR THE CONSENT OF THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.

(NOTE MUST BE ON ALL PLAN & PROFILE SHEETS)

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

IV. WHERE A SEWER MAIN PARALLELS A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET, THE SEWER MAIN SHALL BE BELOW THE WATER MAIN, SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI FOR BOTH PIPE AND JOINTS FOR A DISTANCE OF NINE FEET BEYOND THE POINT OF CONFLICT, SHALL 18. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE MAINTAIN A MINIMUM SEPARATION DISTANCE BETWEEN OUTER DIAMETERS OF OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF TWO FEET VERTICALLY AND FOUR FEET HORIZONTALLY, AND SHALL BE JOINED ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED

NINE FEET TO WATER MAINS.

SPECIAL CONDITIONS TAKE PRECEDENCE OVER SPECIFICATIONS AND PLANS. ADDENDUMS TAKE PRECEDENCE OVER ALL.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION OR AUTHORIZED REPRESENTATIVE SHALL PROVIDE EROSION AND ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY SEDIMENTATION CONTROL AS NOTED ON THE PROJECT'S PLAN AND A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTER, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY B. AT A MINIMUM THESE CONTROLS SHALL CONSIST OF ROCK BERMS AND/OR MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS SILT FENCES CONSTRUCTED PARALLEL TO AND DOWN GRADIENT FROM THE WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL

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