4S RANCH PHASE 5

Contributing Zone Application

October 2020

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October 2020

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

October 2, 2020

Mr. Robert Sadlier
Texas Commission on Environmental Quality (TCEQ)
Region 13
14250 Judson Road
San Antonio, Texas 78233-4480

Re: 4S Ranch Phase 5
Contributing Zone Plan Modification Application

Dear Mr. Sadlier:

Please find attached one (1) original, one (1) digital, and one (1) copy of the 4S Ranch Phase 5 Contributing Zone Plan Modification Application. This Contributing Zone Plan Application has been prepared in accordance with the Texas Administrative Code (30 TAC 213) and current policies for development over the Edwards Aquifer Contributing Zone.

This Contributing Zone Plan Application applies to an approximately 144.66-acre site as identified by the project limits. 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 ($8,000) and fee application form are included. If you have questions or require additional information, please do not hesitate to contact me at your earliest convenience.

Sincerely,
Pape-Dawson Engineers, Inc.

Trey Dawson, P.E. 10/5/2020
Sr. Vice President

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

Attachments

P:\85\47\71\Word\Reports\CZP\2020 - CZP Cover Letter.docx

EDWARDS AQUIFER APPLICATION COVER PAGE (TCEQ-20705

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

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

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.

6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

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

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

Mid-Review Modifications

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

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

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

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

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

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

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

1. Regulated Entity Name: 4S Ranch Phase 5						**2. Regulated Entity No.:**		105628622	
3. Customer Name: Lennar Homes of Texas Land and Construction, Ltd.						**4. Customer No.:**		602412207	
5. Project Type: (Please circle/check one)	New		Modification			Extension		Exception	
6. Plan Type: (Please circle/check one)	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: (Please circle/check one)	Residential		Non-residential				**8. Site (acres):**		144.66
9. Application Fee:	$8,000		**10. Permanent BMP(s):**					Water Quality Basins and VFS	
11. SCS (Linear Ft.):			**12. AST/UST (No. Tanks):**						
13. County:	Comal		**14. Watershed:**					Cibolo Creek	

Application Distribution

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

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

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

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	__	__	__
Region (1 req.)	__	__	__
County(ies)	__	__	__
Groundwater Conservation District(s)	__Edwards Aquifer Authority __Barton Springs/ Edwards Aquifer __Hays Trinity __Plum Creek	__Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	__Austin __Buda __Dripping Springs __Kyle __Mountain City __San Marcos __Wimberley __Woodcreek	__Austin __Bee Cave __Pflugerville __Rollingwood __Round Rock __Sunset Valley __West Lake Hills	__Austin __Cedar Park __Florence __Georgetown __Jerrell __Leander __Liberty Hill __Pflugerville __Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	__	✓	__	__	__
Region (1 req.)	__	✓	__	__	__
County(ies)	__	✓	__	__	__
Groundwater Conservation District(s)	__ Edwards Aquifer Authority __Trinity-Glen Rose	✓ Edwards Aquifer Authority	__Kinney	__EAA __Medina	__EAA __Uvalde
City(ies) Jurisdiction	__Castle Hills __Fair Oaks Ranch __Helotes __Hill Country Village __Hollywood Park __San Antonio (SAWS) __Shavano Park	✓ Bulverde __Fair Oaks Ranch __Garden Ridge __New Braunfels __Schertz	NA	__San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. Trey Dawson, P.E.
Print Name of Customer/Authorized Agent
10/2/2020 Signature of Customer/Authorized Agent Date

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

CONTRIBUTING ZONE PLAN MODIFICATION (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: Trey Dawson, P.E.

Date: 10/2/2020

Signature of Customer/Agent:

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

Project Information

1. Current Regulated Entity Name: 4S Ranch Phase 5
   Original Regulated Entity Name: 4S Ranch Phase 1
   Regulated Entity Number(s) (RN): 105628622
   Edwards Aquifer Protection Program ID Number(s): 13-15082002; 13000917
   ☒ The applicant has not changed and the Customer Number (CN) is: 602412207
   ☐ The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. ☒ **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 Summary	***Approved Project***	***Proposed Modification***
Acres	SEE ATTACHED	_____
Type of Development	_____	_____
Number of Residential Lots	_____	_____
Impervious Cover (acres)	_____	_____
Impervious Cover (%	_____	_____
Permanent BMPs	_____	_____
Other	_____	_____

SCS Modification Summary	***Approved Project***	***Proposed Modification***
Linear Feet	_____	_____
Pipe Diameter	_____	_____
Other	_____	_____

AST Modification Summary	***Approved Project***	***Proposed Modification***
Number of ASTs	_____	_____
Volume of ASTs	_____	_____
Other	_____	_____

UST Modification Summary	***Approved Project***	***Proposed Modification***
Number of USTs	_____	_____
Volume of USTs	_____	_____
Other	_____	_____

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

4S RANCH PHASE 5
Modification of a Previously Approved Plan (TCEQ-0590)

Attachment A – CZP Modification Summary

CZP Modification Summary	Approved Project (10/30/2015)	Approved Modification (5/4/2017)
Acres	*87.75 of 753.6*	*22.47 of 753.6*
Type of Development	*Residential (Phase I)*	*Amenity Center*
Number of Residential Lots	*202*	*0*
Impervious Cover (acres)	*34.41*	*3.61*
Impervious Cover (%)	*39.22%*	*16.1%*
Permanent BMPs	*Two (2) water quality basins and six (6) fifteen-foot (15') engineered vegetative filter strips (VFS)*	*One (1) Batch Detention basin, one (1) fifteen-foot (15') engineered VFS, two (2) fifty-foot (50') natural VFS*

CZP Modification Summary	Approved Modification (9/18/2017)	Approved Modification (11/2/2017)
Acres	*15.33 of 753.6*	*164.94 of 753.6*
Type of Development	*WWTP*	*Residential (Phase 2)*
Number of Residential Lots	*0*	*332*
Impervious Cover (acres)	*2.71*	*37.15*
Impervious Cover (%)	*17.7%*	*22.5%*
Permanent BMPs	*one (1) fifty-foot (50') natural VFS*	*One (1) sand filter basin (Basin "C"), one (1) Batch Detention basin (Basin "C"), two (2) fifteen-foot (15') engineered VFS (#7 and #8), one (1) fifteen-foot (15') engineered VFS (#5), and one (1) Water Quality Basin "B"*

CZP Modification Summary	Approved Modification (8/3/2018)	Approved Modification (4/16/19)
Acres	*92.98 of 753.6*	*8.36 of 753.6*
Type of Development	*Residential (Phase 3)*	*Soccer Field and Road*
Number of Residential Lots	*362*	
Impervious Cover (acres)	*36.75*	*1.07 (0.3 onsite)*
Impervious Cover (%)	*39.5%*	*12.8%*
Permanent BMPs	*One (1) existing batch detention basin (Basin "C"), one (1) proposed Batch Detention basin (Basin "D"), and one (1) existing Water Quality Basin "B"*	*One (1) existing sand filter basin (Basin "B"), one (1) fifteen-foot (15') engineered VFS*

4S RANCH PHASE 5
Modification of a Previously Approved Plan (TCEQ-0590)

CZP Modification Summary	Approved Modification *(6/7/19)*	Approved Modification *(4/2/20)*
Acres	***33.09 of 753.6***	***127.74 of 753.6***
Type of Development	***Residential (Unit-6B)***	***Residential (Phase 4)***
Number of Residential Lots	***78***	***404***
Impervious Cover (acres)	***11.70***	***45.20 (proposed) + 1.85 (previously approved) = 47.05 (total)***
Impervious Cover (%)	***35.4%***	***36.83%***
Permanent BMPs	***one (1) existing batch detention basin (Basin "C"), and three (3) proposed fifteen-foot (15') engineered vegetative filter strips (VFS) (#9 - #11)***	***four (4) proposed batch detention basins ("E," "F," "G" and "H")***

CZP Modification Summary	Proposed Modification *(10/6/2020)*
Acres	***144.66 of 753.6***
Type of Development	***Residential (Phase 5)***
Number of Residential Lots	***567***
Impervious Cover (acres)	***47.31***
Impervious Cover (%)	***32.7%***
Permanent BMPs	***two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS***

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 7, 2019

Mr. Richard Mott
Lennar Homes of Texas Land and Construction, Ltd.
1922 Dry Creek Way STE 101
San Antonio, Texas 78259-1840

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: 4S Ranch Unit 6B & Mustang Vista Phase 3; Located approximately 1.5 miles east of Mustang Vista and Stahl Lane intersection; ETJ of Bulverde, Texas

TYPE OF PLAN: Request for Modification of an Approved Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer

Regulated Entity No. RN105628622; Additional ID No. 13000917

Dear Mr. Mott:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP Modification for the above-referenced project submitted to the San Antonio Regional Office by Pape-Dawson Engineers, Inc. on behalf of Lennar Homes of Texas Land and Construction, Ltd. on April 25, 2019. Final review of the CZP Modification was completed after additional material was received on May 30, 2019. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected 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 sealed, 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

4S Ranch Phase 1 (13-15082002) was approved by letter dated October 30, 2015 and had a project area of 87.75 acres within a larger 753.6-acre site. The project included clearing, grading, excavation, installation of utilities and drainage improvements, streets, sidewalks, and homes. The impervious cover was approved to be 34.41 acres. Two single chamber sedimentation filtration basins and six engineered vegetative filter strips (VFS) were approved to treat stormwater generated by the project.

4S Ranch Amenity Center (13000321) was approved by letter dated May 4, 2017 and had a project area of 22.47 acres within the overall 753.6-acre site. The project included clearing, grading, excavation, installation of utilities and drainage improvements, parking, sidewalks, walking trails, an amenity center building, outdoor pool, and park with recreational pond. The impervious cover was approved to be 3.61 acres. One batch detention basin, one engineered VFS, and two natural VFS were approved to treat stormwater generated by the project.

4S Ranch WWTP (RN106753437, 13000473) was approved by letter dated September 18, 2017 and had a project area of 15.33 acres with 2.71 acres of impervious cover. The existing sand filter basin "B," one natural VFS and an engineered VFS were approved to treat stormwater generated by the project.

4S Ranch Phase 2 (13000510) was approved by letter dated November 2, 2017 and had a project area of 164.94 acres within the overall 753.6-acre site. The project included clearing, grading, excavation, installation of utilities, drainage improvements, and the construction of 332 single-family residential units with associated streets, driveways, and sidewalks. The impervious cover was approved to be 37.15 acres. The existing sand filter basin "B", a new sand filter basin "C", a new batch detention basin "C", and two new engineered VFS were approved to treat stormwater generated by the project.

4S Ranch Phase 3 (13000682) was approved by letter dated August 3, 2018 and had a project area of 92.98 acres within the overall 753.6-acre site. The project included the construction of 362 single-family residential lots, with clearing, grading, excavation, installation of utilities and drainage improvements, streets, turn lanes, sidewalks and addition of a turn lane within the right-of-way of Stahl Road. The impervious cover was approved to be 36.75 acres. One new batch detention basin "D", the existing sand filter basin "B", and the existing batch detention basin "C" were approved to treat stormwater generated by the project.

4S Ranch Soccer Fields and US Highway 281 Improvements (13000841) was approved by letter dated April 16, 2019 and had a project area of approximately 8.36 acres, with 5.76 acres within the overall 753.6-acres 4S development and 2.60 acres within the US Highway 281 right-of-way. The project included clearing, grading excavation, installation of utilities and drainage improvements, turn lanes, sidewalks, and sport fields with associated parking within the 5.76 acres of the 4S development. The project included turn lane improvements within the 2.60 acres of the US Highway 281 right-of-way. The total amount of impervious cover was 1.07 acres. One new engineered VFS and the existing sand filter basin "B" were approved to treat stormwater generated by the project.

PROJECT DESCRIPTION

The proposed project will have a total area of approximately 33.09 acres within the overall 753.6-acre 4S development. It will include clearing, grading, excavation, installation of utilities and drainage improvements, streets, sidewalks and a total of 78 single-family residential lots. The project also proposes the widening of a 0.4-acre section of road previously approved with the 4S Ranch WWTP (13000473). The total amount of new impervious cover will be 11.70 acres (35.36 percent) within the total 33.09 acres. Project wastewater will be disposed of by conveyance to the existing 4S Ranch Wastewater Treatment facility owned by Stahl Lane, Ltd.

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, three new engineered vegetative filter strips and the existing batch detention basin "C", designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be utilized to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 10,502 pounds of TSS generated from the 11.70 acres of new impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

SPECIAL CONDITIONS

I. This modification is subject to all Special and Standard Conditions listed in the CZP approval letter dated October 30, 2015, and subsequent modifications dated May 4, 2017, November 2, 2017, August 3, 2018 and April 16, 2019.

II. All permanent pollution abatement measures shall be operational prior to occupancy of the facilities within their respective drainage areas.

III. 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

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.
2. 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 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 specifics of the plan.
3. 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.

Prior to Commencement of Construction:

4. 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 Contributing Zone Plan and this notice of approval shall be maintained at the project location until all regulated activities are completed.
5. Any modification to the activities described in the referenced CZP 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.
6. 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 name of the approved plan and file number for the regulated activity, the date on which the regulated activity will commence, and the name of the prime contractor with the name and telephone number of the contact person.
7. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved Storm Water Pollution Prevention Plan (SWPPP) 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.

During Construction:

8. During the course of regulated activities related to this project, the applicant or his 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.

9. 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 significantly reduced. 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).

10. Intentional discharges of sediment laden 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.

11. 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.

12. 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.

13. 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 installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 5, above.

<u>After Completion of Construction:</u>

14. Owners of permanent BMPs and measures must insure that the 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 San Antonio Regional Office within 30 days of site completion.

15. 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. Such 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 the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

16. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Contributing Zone Plan. If the new owner intends to commence any new regulated activity on the site, a new Contributing Zone 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.

17. A Contributing Zone 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 Contributing Zone 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.

18. 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.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Dianne Pavlicek-Mesa, P.G. of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4074.

Sincerely,

Lillian Butler
for

Robert Sadlier, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality

RCS/dpm

Enclosures: Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

cc: Mr. Trey Dawson, P.E., Pape-Dawson Engineers, Inc.
Mr. Thomas Hornseth, P.E., Comal County Engineer
Mr. Roland Ruiz, Edwards Aquifer Authority
The Honorable Bill Krawietz, City of Bulverde
Mr. H. L. Saur, Comal Trinity Groundwater Conservation District

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Bobby Janecka, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 2, 2020

Mr. Brian Barron
Lennar Homes of Texas Land and Construction, Ltd.
1922 Dry Creek Way STE 101
San Antonio, Texas 78259-1840

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: 4S Ranch Phase 4; Located approximately 1.5 miles east of Mustang Vista and Stahl Lane intersection; ETJ of Bulverde, Texas

TYPE OF PLAN: Request for Modification of an Approved Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer

Regulated Entity No. RN105628622; Additional ID No. 13001054

Dear Mr. Barron:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP Modification for the above-referenced project submitted to the San Antonio Regional Office by Pape-Dawson Engineers, Inc. on behalf of Lennar Homes of Texas Land and Construction, Ltd. on January 3, 2020. Final review of the CZP Modification was completed after additional material was received on February 18, 2020 and March 19, 2020. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected 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 sealed, 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 original CZP for 4S Ranch Phase 1 was approved by letter dated October 30, 2015 and had a project area of 87.75 acres within a larger 753.6-acre site. Phased residential development has taken place under various CZP Modifications approved by letters dated May 4, 2017, September 18, 2017 (Wastewater Treatment Plant), November 2, 2017, August 3, 2018, April 16, 2019, and April 7, 2019.

PROJECT DESCRIPTION

The proposed project will have a total area of approximately 127.74 acres within the overall 753.6-acre 4S development. It will include clearing, grading, excavation, installation of utilities and drainage improvements, streets, sidewalks, amenity center and a total of 404 single-family residential lots. The total amount of existing (1.85 acres) and new (45.20 acres) impervious cover requiring treatment will be 47.05 acres (36.83 percent). Project wastewater will be disposed of by conveyance to the existing 4S Ranch Wastewater Treatment facility owned by Stahl Lane, Ltd.

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, four batch detention basins (E, F, G and H), designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 42,232 pounds of TSS generated from the 47.05 acres of impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

SPECIAL CONDITIONS

I. This modification is subject to all Special and Standard Conditions listed in the CZP approval letter dated October 30, 2015, and subsequent modifications dated May 4, 2017, September 18, 2017 (Wastewater Treatment Plant), November 2, 2017, August 3, 2018, April 16, 2019, and April 7, 2019.

II. All permanent pollution abatement measures shall be operational prior to occupancy of the facilities within their respective drainage areas.

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

STANDARD CONDITIONS

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.
2. 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 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 specifics of the plan.
3. 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.

Prior to Commencement of Construction:

4. 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 Contributing Zone Plan and this notice of approval shall be maintained at the project location until all regulated activities are completed.
5. Any modification to the activities described in the referenced CZP 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.

6. 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 name of the approved plan and file number for the regulated activity, the date on which the regulated activity will commence, and the name of the prime contractor with the name and telephone number of the contact person.

7. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved Storm Water Pollution Prevention Plan (SWPPP) 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.

<u>During Construction:</u>

8. During the course of regulated activities related to this project, the applicant or his 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.

9. 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 significantly reduced. 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).

10. Intentional discharges of sediment laden 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.

11. 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.

12. 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.

13. 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 installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 5, above.

<u>After Completion of Construction:</u>

14. Owners of permanent BMPs and measures must ensure that the 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 San Antonio Regional Office within 30 days of site completion.

15. 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. Such 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 the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
16. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Contributing Zone Plan. If the new owner intends to commence any new regulated activity on the site, a new Contributing Zone 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.
17. A Contributing Zone 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 Contributing Zone 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.
18. 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.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Dianne Pavlicek-Mesa, P.G. of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4074.

Sincerely,

Robert Sadlier, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality

RCS/dpm

Enclosures: Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

cc: Mr. Trey Dawson, P.E., Pape-Dawson Engineers, Inc.
Mr. Thomas Hornseth, P.E., Comal County Engineer
Mr. Roland Ruiz, Edwards Aquifer Authority
Mr. H. L. Saur, Comal Trinity Groundwater Conservation District
The Honorable Bill Krawietz, City of Bulverde

Change in Responsibility for Maintenance on Permanent Best Management Practices and Measures

The applicant is no longer responsible for maintaining the permanent best management practice (BMP) and other measures. The project information and the new entity responsible for maintenance is listed below.

Customer: _____

Regulated Entity Name: _____

Site Address: _____

City, Texas, Zip: _____

County: _____

Approval Letter Date: _____

BMPs for the project: _____

New Responsible Party: _____

Name of contact: _____

Mailing Address: _____

City, State: _____ Zip: _____

Telephone: _____ FAX: _____

_____ _____

Signature of New Responsible Party Date

I acknowledge and understand that I am assuming full responsibility for maintaining all permanent best management practices and measures approved by the TCEQ for the site, until another entity assumes such obligations in writing or ownership is transferred.

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

ATTACHMENT B

4S RANCH PHASE 5
Modification of a Previously Approved Plan (TCEQ-0590)

Attachment B –Modification Summary

This Contributing Zone Plan Modification (CZP MOD) for 4S Ranch Phase 5 proposes the construction of a single-family residential unit on approximately 144.66 acres. The project site is located within the extraterritorial jurisdiction of the City of Bulverde in Comal County, Texas. The proposed 144.66-acre project area is part of a larger planned development on a 753.6-acre tract which was previously used as a ranch and partially developed with previously-cleared portions for agricultural uses. The site is located entirely over the Edwards Aquifer Contributing Zone.

The original CZP for 4S Ranch Phase 1 was approved by letter dated October 30, 2015, for a project area of 87.75 acres within a larger 753.6-acre site. Phased residential development has taken place under various CZP modifications approved by letters dated May 4, 2017; September 18, 2017 (WWTP); November 2, 2017; August 3, 2018; April 16, 2019; June 7, 2019; and April 2, 2020. Please refer to modification section for additional details.

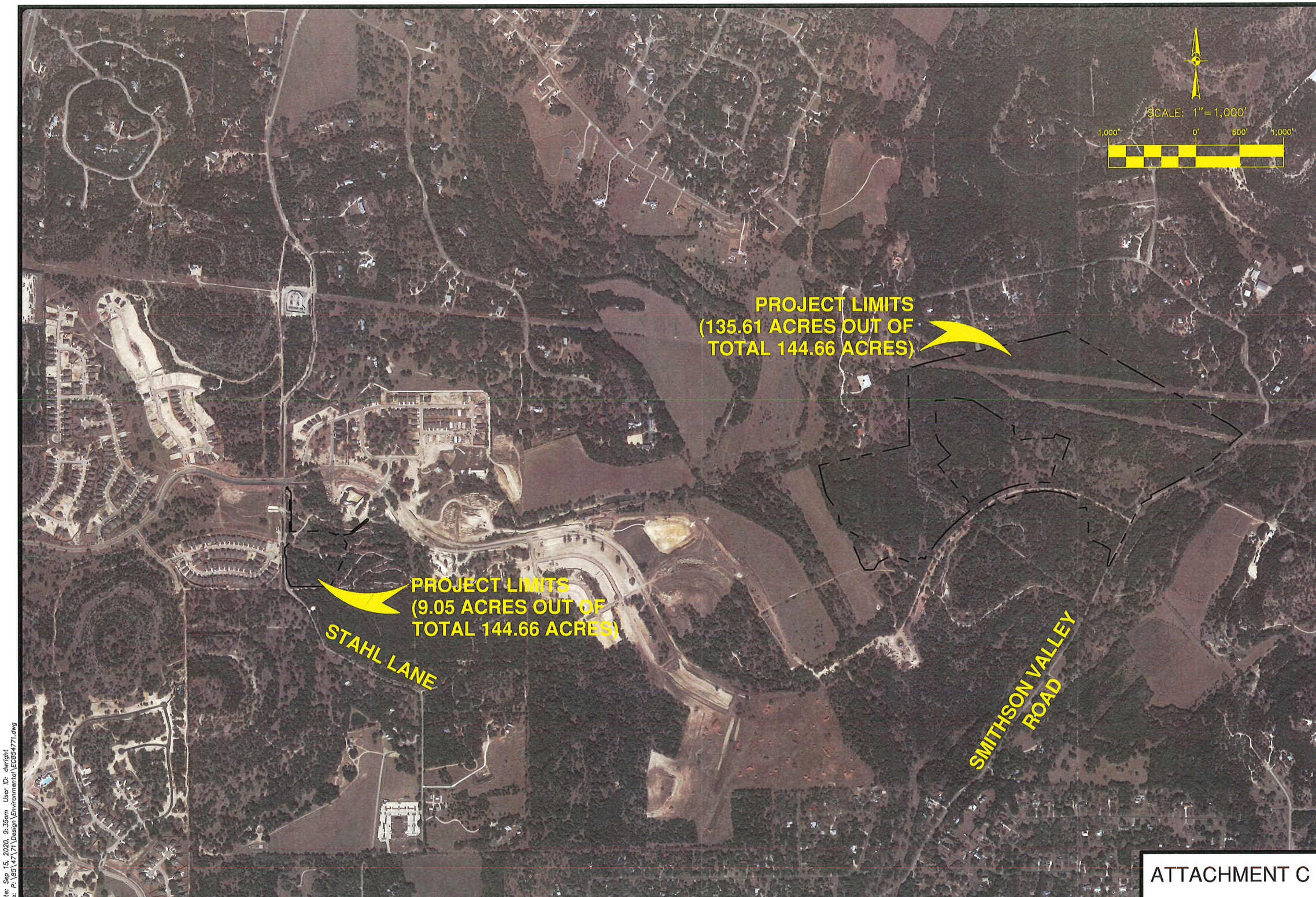
This CZP proposes clearing, grading, excavation, installation of utilities and drainage improvements, streets, sidewalks, and homes. There are a total of 567 single-family residential lots proposed for construction ranging from 2,900 – 4,100 square feet (SF) of impervious cover per lot for the house pad, driveway, sidewalk, and some with a concrete patio. Approximately 47.31 acres of impervious cover are proposed for this project. This plan does not propose any modification to the previously-approved Water Quality Basins "E", "F", "G", and "H".

Upgradient stormwater from undeveloped residential areas within the overall 4S Ranch subdivision will cross the project limits and has been accounted for treatment within the onsite PBMP's. The permanent BMPs for this CZP are two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS, which have been designed 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. Please see included TSS Treatment Summary Table for additional details of previously-approved and proposed Impervious cover with associated treatment.

Since this project is located entirely over the Edwards Aquifer Contributing Zone, a Geological Assessment was not conducted and is not required by 30 TAC 213 regulations. Therefore, no naturally-occurring sensitive features are known to exist on the site.

*Potable water will be supplied by the Canyon Lake Water Supply Company (CLWSC). The proposed development will generate approximately 98,400 gallons per day (average flow) of domestic wastewater (1 edu/lot*240gpd/edu*567 lots = 136,080 gpd). Wastewater will be disposed of by conveyance to the 4S Ranch Wastewater Treatment facility (WQ0015095001) owned by Stahl Lane, Ltd.*

ATTACHMENT C



PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5

BULVERDE, TEXAS

EXISTING CONDITIONS EXHIBIT

ATTACHMENT C

JOB NO.	8547-71
DATE	SEPT. 2020
DESIGNER	DW
CHECKED	JA
DRAWN	DW
SHEET	1 of 1

Date: Sep 15, 2020, 9:35am User ID: dwright
File: P:\85\47\71\Design\Environmental\EC854771.dwg

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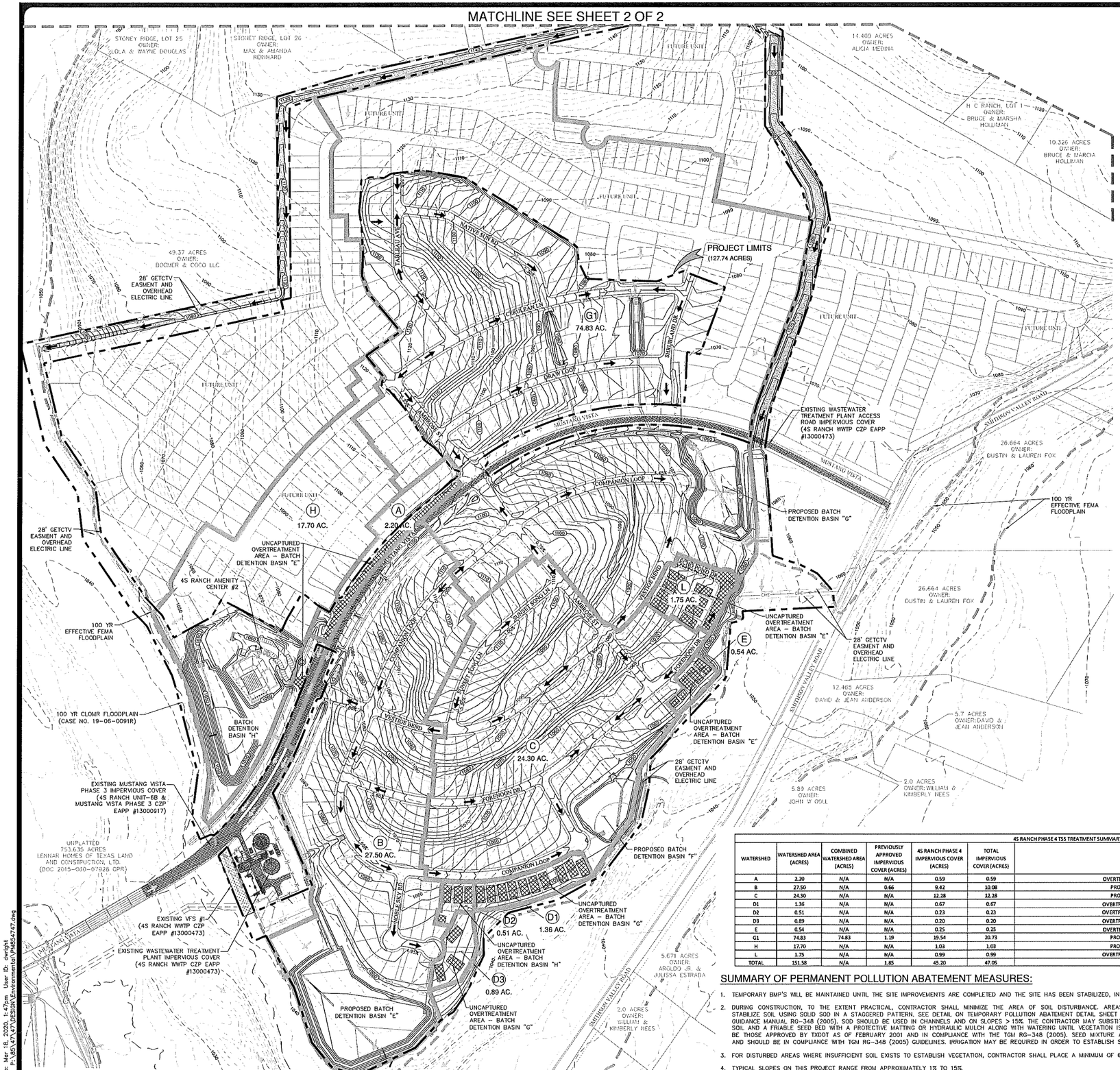

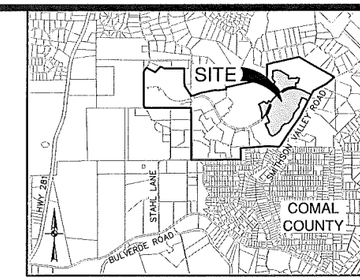

LOCATION MAP

NOT-TO-SCALE

0' 200' 400' 600'

SCALE: 1"= 200'

LEGEND

- PROJECT BOUNDARY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR (1040)
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR (1030)
- DRAINAGE AREA (AF)
- EXISTING DIRECTION OF FLOW
- PROPOSED DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY
- OVERTREATMENT AREA
- PREVIOUSLY APPROVED IMPERVIOUS COVER
- 100 YR FLOODPLAIN

PERMANENT POLLUTION ABATEMENT MEASURES:

1. PERMANENT BMP'S FOR THIS SITE INCLUDE FOUR BATCH DETENTION BASINS. THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE 127.74 ACRES IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).
2. SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.
3. ENERGY DISSIPATORS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.

NOTES:

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

4S RANCH PHASE 4 TSS TREATMENT SUMMARY

WATERSHED	WATERSHED AREA (ACRES)	COMBINED WATERSHED AREA (ACRES)	PREVIOUSLY APPROVED IMPERVIOUS COVER (ACRES)	4S RANCH PHASE 4 IMPERVIOUS COVER (ACRES)	TOTAL IMPERVIOUS COVER (ACRES)	BMP	REQUIRED TSS REMOVAL (LBS./YR)	DESIGNED TSS REMOVAL (LBS./YR)
A	2.20	N/A	N/A	0.59	0.59	OVERTREATMENT BATCH DETENTION BASIN "E"	530	-
B	27.50	N/A	0.66	9.42	10.08	PROPOSED BATCH DETENTION BASIN "E"	9,048	10,702
C	24.30	N/A	N/A	12.28	12.28	PROPOSED BATCH DETENTION BASIN "F"	11,023	11,075
D1	1.36	N/A	N/A	0.67	0.67	OVERTREATMENT BATCH DETENTION BASIN "G"	601	-
D2	0.51	N/A	N/A	0.23	0.23	OVERTREATMENT BATCH DETENTION BASIN "H"	206	-
D3	0.89	N/A	N/A	0.20	0.20	OVERTREATMENT BATCH DETENTION BASIN "G"	180	-
E	0.54	N/A	N/A	0.25	0.25	OVERTREATMENT BATCH DETENTION BASIN "E"	224	-
G1	74.83	74.83	1.19	19.54	20.73	PROPOSED BATCH DETENTION BASIN "G"	18,607	20,735
H	17.70	N/A	N/A	1.03	1.03	PROPOSED BATCH DETENTION BASIN "H"	925	1,333
L	1.75	N/A	N/A	0.99	0.99	OVERTREATMENT BATCH DETENTION BASIN "E"	889	-
TOTAL	151.58	N/A	1.85	45.20	47.05		42,232	43,845

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. TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 1% TO 15%.

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

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

EXHIBIT 3A

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
2/19/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 4. COMAL CO. WCID NO.6
BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN
PERMANENT POLLUTION PREVENTION PLAN

PLAT NO.
JOB NO. 8547-47
DATE NOVEMBER 2019
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 1 OF 2

Date: Mar 18, 2020, 1:47pm User ID: dwright
File: P:\85\47\47\DESIGN\Environmental\PM852747.dwg

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CONTRIBUTING ZONE PLAN APPLICATION (TCEQ-10257)

Contributing Zone Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Contributing Zone to the Edwards Aquifer and Relating to 30 TAC §213.24(1), 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 **Contributing Zone Plan Application** is hereby submitted for TCEQ review and Executive Director approval. The application was prepared by:

Print Name of Customer/Agent: Trey Dawson, P.E.

Date: 10/2/2020

Signature of Customer/Agent:

_____

Regulated Entity Name: 4S Ranch Phase 5

Project Information

1. County: Comal
2. Stream Basin: Cibolo Creek
3. Groundwater Conservation District (if applicable): Edwards Aquifer
4. Customer (Applicant):

   Contact Person: Brian Barron
   Entity: Lennar Homes of Texas Land and Construction, Ltd.
   Mailing Address: 1922 Dry Creek Way, Suite 101
   City, State: San Antonio, Texas Zip: 78259
   Telephone: (210) 403-6200 Fax: _____
   Email Address: Brian.Barron@lennar.com

5. Agent/Representative (If any):

Contact Person: Trey Dawson, P.E.
Entity: Pape-Dawson Engineers, Inc.
Mailing Address: 2000 NW Loop 410
City, State: San Antonio, Texas Zip: 78213
Telephone: (210) 375-9000 Fax: (210) 375-9010
Email Address: TreyDawson@pape-dawson.com

6. Project Location:

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

7. ☒ The location of the project site is described below. Sufficient detail and clarity has been provided so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

From TCEQ's regional office, travel approximately 2.5 miles north on Judson Road to Loop 1604. Turn left onto Loop 1604 and travel approximately 5 miles to U.S. Hwy 281. Exit toward onto U.S. 281N and travel north approximately 9.3 miles to exit for FM 1863/Bulverde. Turn right on FM 1863 E and travel approximately 2.3 miles, then turn left on Stahl Lane. Travel 1.6 miles north on Stahl Lane to 4S Ranch subdivision. The project site is located approximately 1.7 miles east of Mustang Vista and Stahl Lane, Bulverde, TX .

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

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

☒ Project site boundaries.
☒ USGS Quadrangle Name(s).

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

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

☐ Area(s) to be demolished

11. 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/Not cleared)
☐ Other: _____

12. The type of project is:

☒ Residential: # of Lots: 567
☐ Residential: # of Living Unit Equivalents: _____
☐ Commercial
☐ Industrial
☒ Other: _____

13. Total project area (size of site): 144.66 Acres

Total disturbed area: 144.66 Acres

14. Estimated projected population: 1,701 (assumed 3 persons/lot)

15. The amount and type of impervious cover expected after construction is complete is shown below:

Table 1 - Impervious Cover

Impervious Cover of Proposed Project	***Sq. Ft.***	***Sq. Ft./Acre***	***Acres***
Structures/Rooftops	1,176,065	÷ 43,560 =	27.00
Parking	691,734	÷ 43,560 =	15.88
Other paved surfaces	192,945	÷ 43,560 =	4.43
Total Impervious Cover	2,060,744	÷ 43,560 =	47.31

Total Impervious Cover 47.31 **÷ Total Acreage** 144.66 **X 100 =** 32.7**% Impervious Cover**

16. ☒ **Attachment D - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water quality is attached. If applicable, this includes the location and description of any discharge associated with industrial activity other than construction.

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

For Road Projects Only

Complete questions 18 - 23 if this application is exclusively for a road project.

☒ N/A

18. 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.

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

    ☐ Concrete
    ☐ Asphaltic concrete pavement
    ☐ Other: _____

20. Right of Way (R.O.W.):

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

21. Pavement Area:

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

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

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

23. ☐ 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

24. ☒ **Attachment E - 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 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

25. ☐ Wastewater is to be discharged in the contributing zone. Requirements under 30 TAC §213.6(c) relating to Wastewater Treatment and Disposal Systems have been satisfied.

☒ N/A

26. Wastewater will be disposed of by:

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

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

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

☒ Sewage Collection System (Sewer Lines):
The sewage collection system will convey the wastewater to the 4S Ranch (name) Treatment Plant. The treatment facility is:

☒ Existing.
☐ Proposed.

☐ N/A

Permanent Aboveground Storage Tanks(ASTs) ≥ 500 Gallons

Complete questions 27 - 33 if this project includes the installation of AST(s) with volume(s) greater than or equal to 500 gallons.

☒N/A

27. Tanks and substance stored:

Table 2 - Tanks and Substance Storage

AST Number	*Size (Gallons)*	*Substance to be Stored*	*Tank Material*
1			
2			
3			

AST Number	*Size (Gallons)*	*Substance to be Stored*	*Tank Material*
4			
5			

Total x 1.5 = _____ Gallons

28. ☐ The AST will be placed within a containment structure that is sized to capture one and one-half (1 1/2) times the storage capacity of the system. For facilities with more than one tank system, the containment structure is sized to capture one and one-half (1 1/2) times the cumulative storage capacity of all systems.

☐ **Attachment G - Alternative Secondary Containment Methods**. Alternative methods for providing secondary containment are proposed. Specifications showing equivalent protection for the Edwards Aquifer are attached.

29. Inside dimensions and capacity of containment structure(s):

Table 3 - Secondary Containment

Length (L)(Ft.)	*Width(W)(Ft.)*	*Height (H)(Ft.)*	*L x W x H = (Ft3)*	*Gallons*

Total: _____ Gallons

30. Piping:

☐ All piping, hoses, and dispensers will be located inside the containment structure.
☐ Some of the piping to dispensers or equipment will extend outside the containment structure.
☐ The piping will be aboveground
☐ The piping will be underground

31. ☐ The containment area must be constructed of and in a material impervious to the substance(s) being stored. The proposed containment structure will be constructed of: _____.

32. ☐ **Attachment H - AST Containment Structure Drawings**. A scaled drawing of the containment structure is attached that shows the following:

☐ Interior dimensions (length, width, depth and wall and floor thickness).
☐ Internal drainage to a point convenient for the collection of any spillage.
☐ Tanks clearly labeled
☐ Piping clearly labeled

☐ Dispenser clearly labeled

33. ☐ Any spills must be directed to a point convenient for collection and recovery. Spills from storage tank facilities must be removed from the controlled drainage area for disposal within 24 hours of the spill.

    ☐ In the event of a spill, any spillage will be removed from the containment structure within 24 hours of the spill and disposed of properly.

    ☐ In the event of a spill, any spillage will be drained from the containment structure through a drain and valve within 24 hours of the spill and disposed of properly. The drain and valve system are shown in detail on the scaled drawing.

Site Plan Requirements

Items 34 - 46 must be included on the Site Plan.

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

    Site Plan Scale: 1" = 200'.

35. 100-year floodplain boundaries:

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

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

    The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA (Flood Insurance Rate Map for Comal County, Texas, and Incorporated areas) Panel Number 48091C0220F, dated September 2, 2009.

36. ☒ 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, etc. are shown on the site plan.

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

37. ☒ A drainage plan showing all paths of drainage from the site to surface streams.

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

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

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

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

42. ☐ Surface waters (including wetlands).

☒ N/A

43. ☐ Locations where stormwater discharges to surface water.

☒ There will be no discharges to surface water.

44. ☒ Temporary aboveground storage tank facilities.

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

45. ☐ Permanent aboveground storage tank facilities.

☒ Permanent aboveground storage tank facilities will not be located on this site.

46. ☒ Legal boundaries of the site are shown.

Permanent Best Management Practices (BMPs)

Practices and measures that will be used during and after construction is completed.

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

☐ N/A

48. ☒ 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

49. ☒ 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

50. 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.

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

- ☐ **Attachment I - 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.

52. ☒ **Attachment J - 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.

53. ☒ **Attachment K - BMPs for On-site Stormwater.**

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

54. ☒ **Attachment L - BMPs for Surface Streams**. A description of the BMPs and measures that prevent pollutants from entering surface streams is attached.

☐ N/A

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

☐ N/A

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

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

☐ N/A

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

☒ N/A

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

☐ N/A

Responsibility for Maintenance of Permanent BMPs and Measures after Construction is Complete.

59. ☒ 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.

60. ☒ 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.

Administrative Information

61. ☒ 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.

62. ☒ Any modification of this Contributing Zone Plan may require TCEQ review and Executive Director approval prior to construction, and may require submission of a revised application, with appropriate fees.

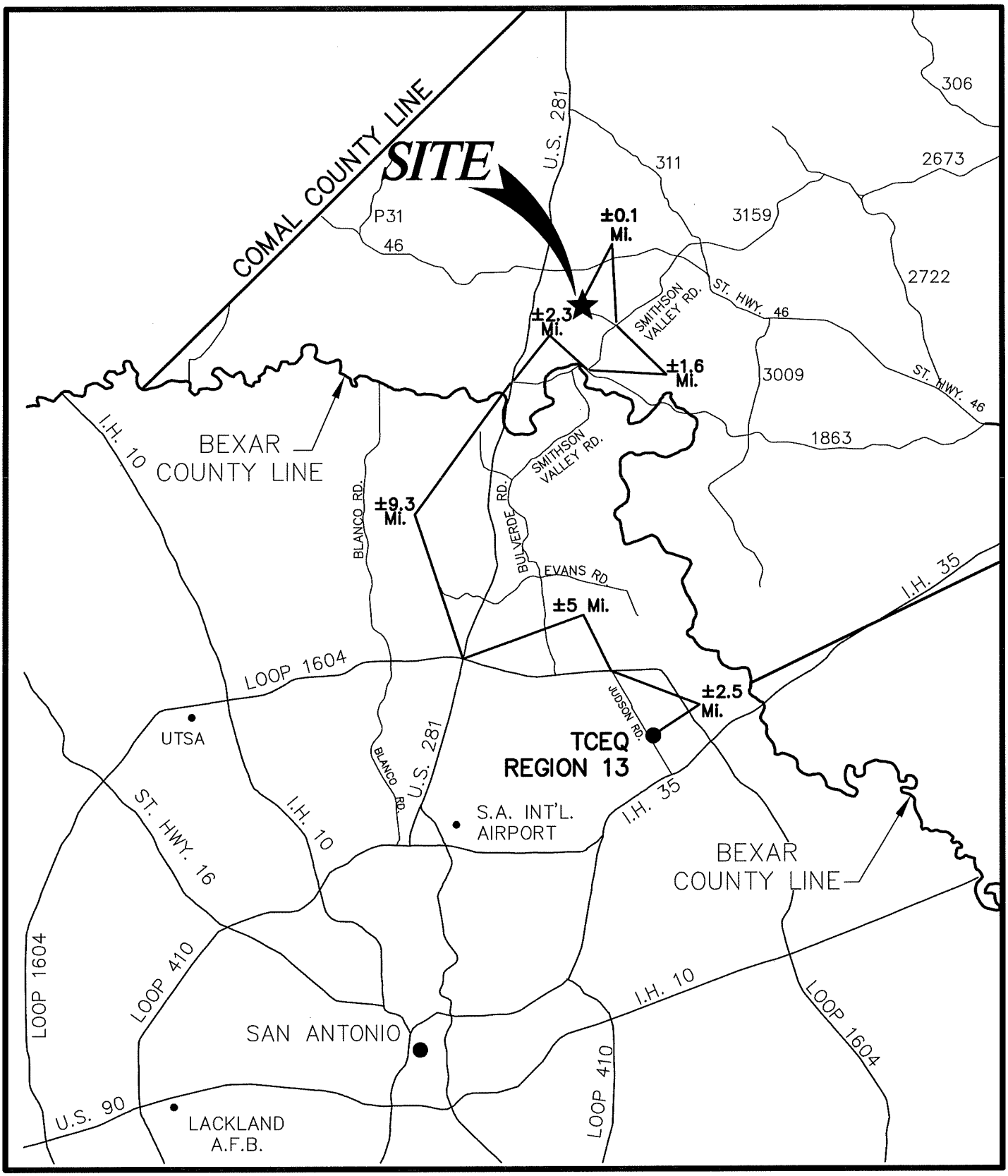
63. ☒ The site description, controls, maintenance, and inspection requirements for the storm water pollution prevention plan (SWPPP) developed under the EPA NPDES general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) of the technical report. All requirements of 30 TAC §213.24(1-5) have been met by the SWPPP document.

☒ The Temporary Stormwater Section (TCEQ-0602) is included with the application.

ATTACHMENT A

4S RANCH PHASE 5
Contributing Zone Plan

NOT TO SCALE



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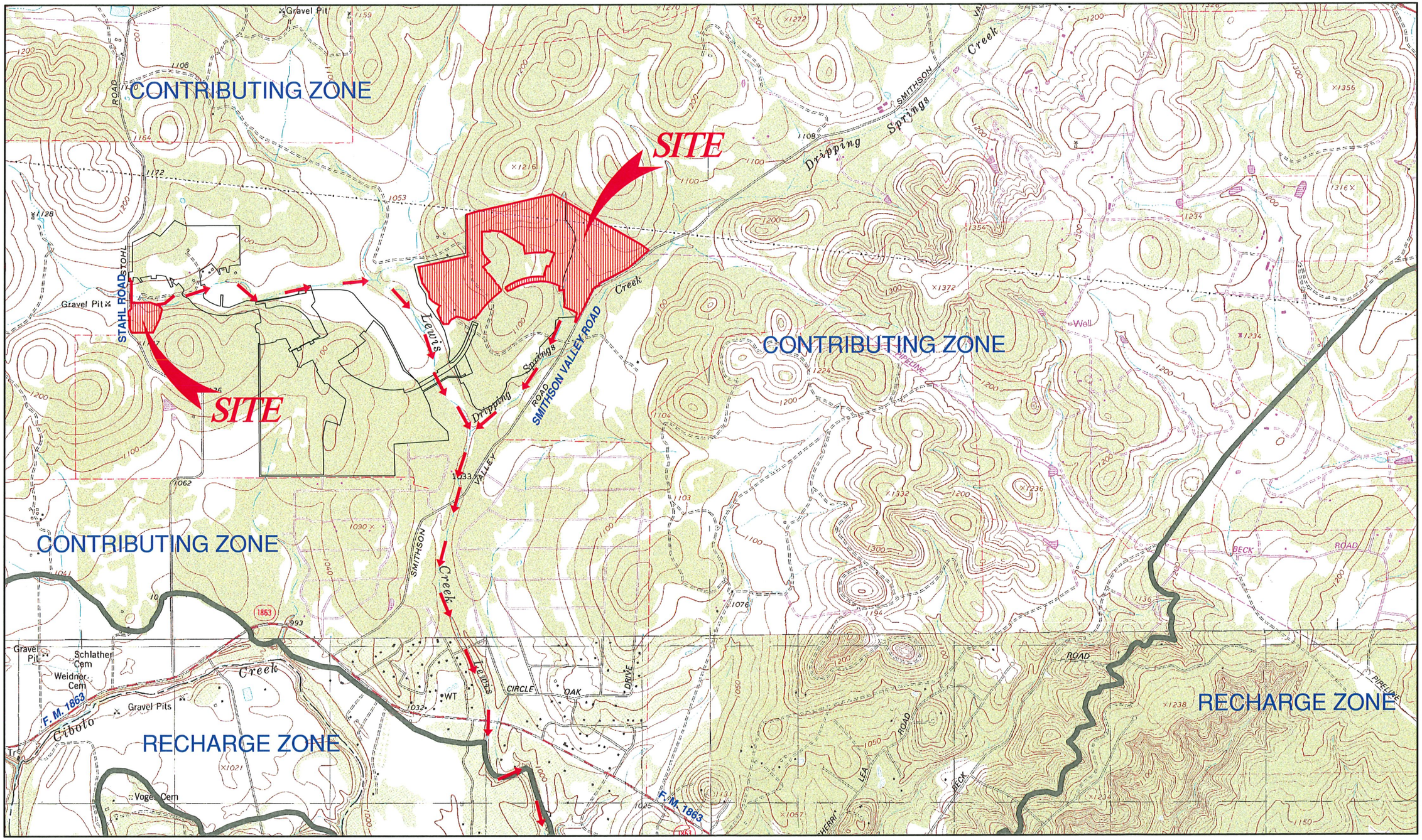
ATTACHMENT A
Road Map

ATTACHMENT B

4S RANCH PHASE 5
Contributing Zone Plan

N

SCALE: 1" = 2000'



ANHALT, TX QUAD; BATCAVE, TX QUAD; BULVERDE TX QUAD;
LONGHORN, TX QUAD; SCHERTZ, TX QUAD; SMITHSON VALLEY, TX QUAD

DRAINAGE FLOW → →

Pape–Dawson Engineers, Inc.

MATCHLINE See Sheet 2 of 4

USGS/EDWARDS RECHARGE ZONE MAP
Sheet 1 Of 4
ATTACHMENT B

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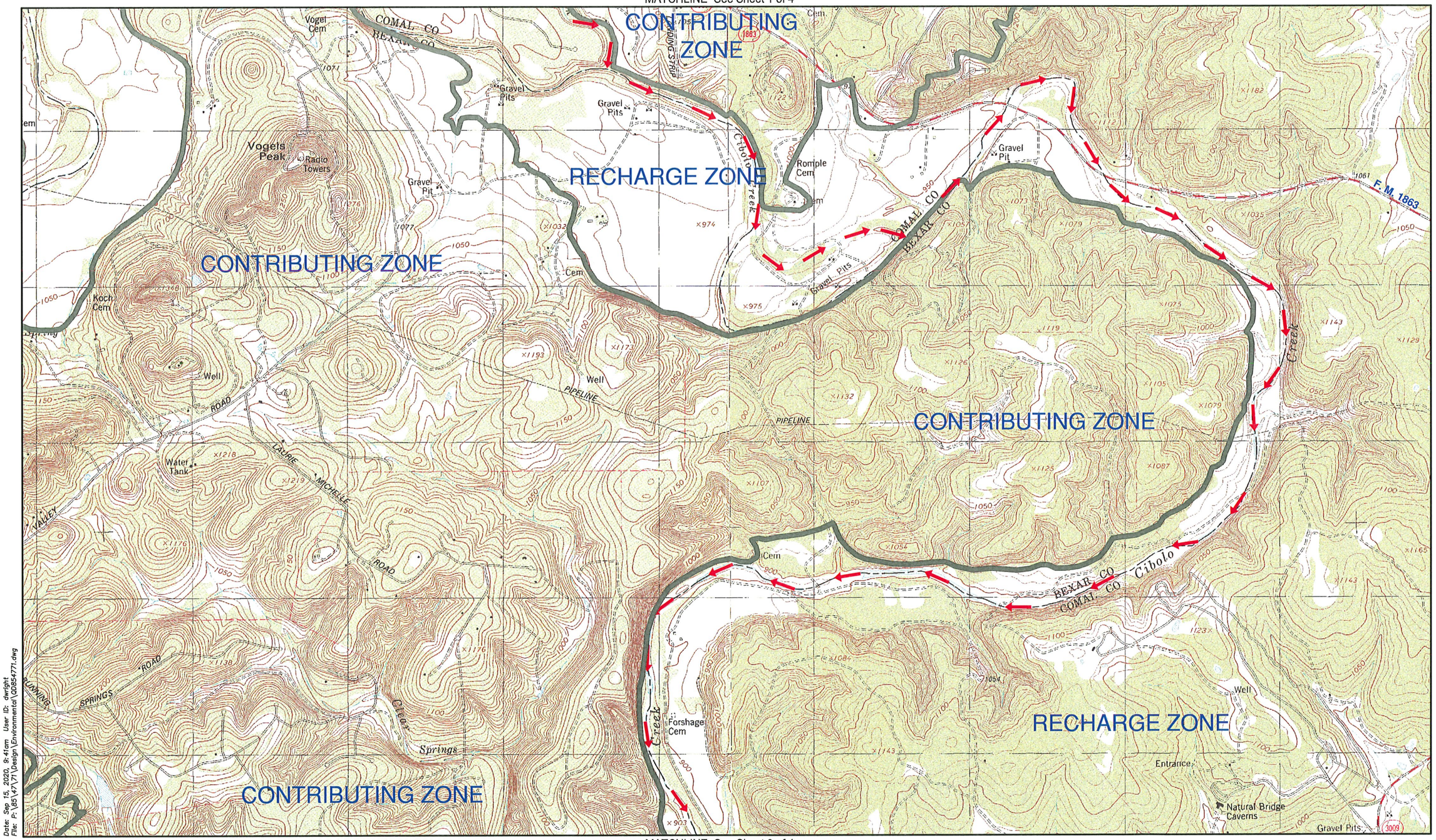
4S RANCH PHASE 5
Contributing Zone Plan

N

SCALE: 1" = 2000'

MATCHLINE See Sheet 1 of 4



MATCHLINE See Sheet 3 of 4

ANHALT, TX QUAD; BATCAVE, TX QUAD; BULVERDE TX QUAD;
LONGHORN, TX QUAD; SCHERTZ, TX QUAD; SMITHSON VALLEY, TX QUAD

DRAINAGE FLOW → →

Pape–Dawson Engineers, Inc.

USGS/EDWARDS RECHARGE ZONE MAP
Sheet 2 Of 4
ATTACHMENT B

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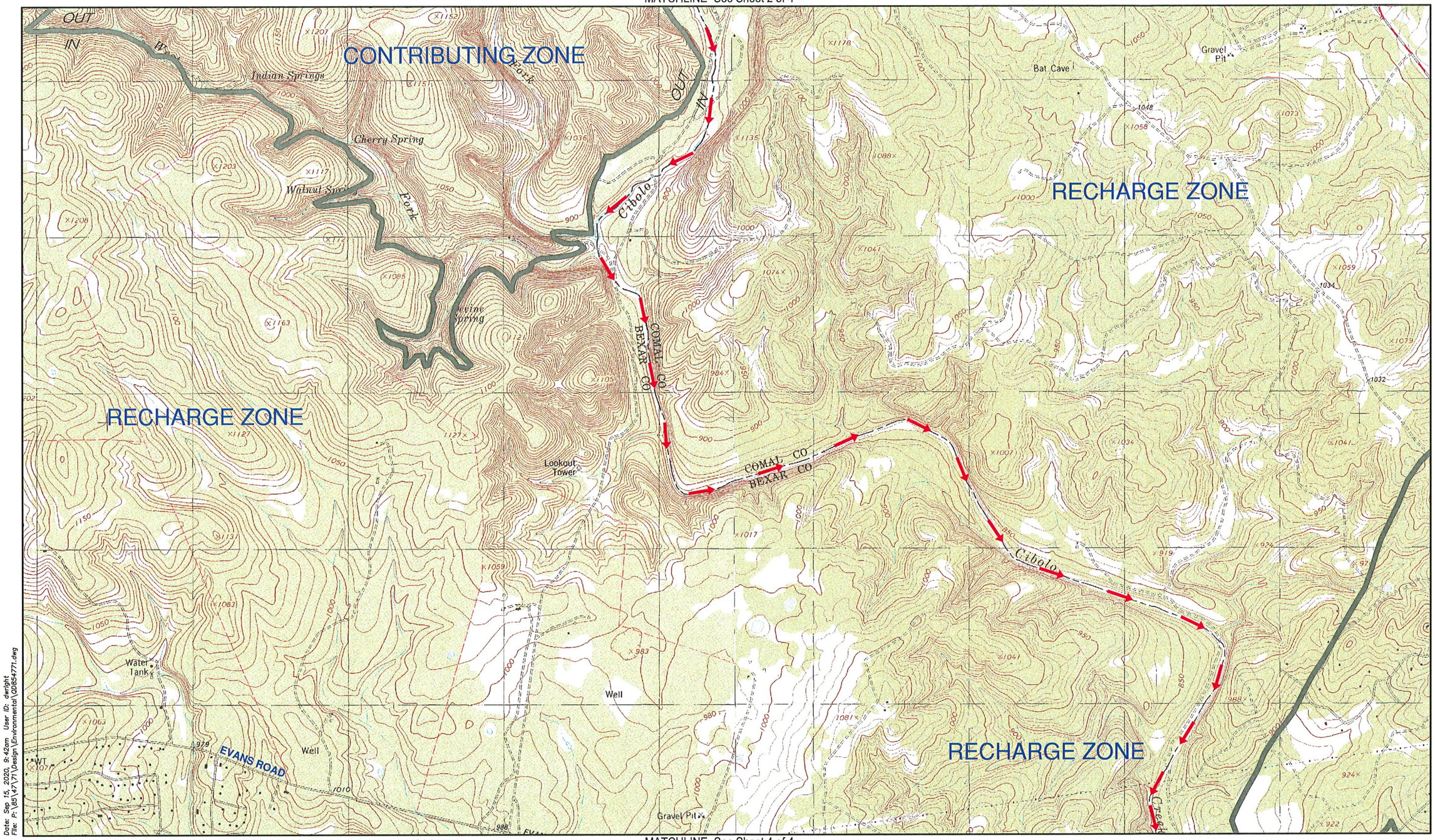
4S RANCH PHASE 5
Contributing Zone Plan

N

SCALE: 1" = 2000'

MATCHLINE See Sheet 2 of 4



MATCHLINE See Sheet 4 of 4

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ANHALT, TX QUAD; BATCAVE, TX QUAD; BULVERDE TX QUAD;
LONGHORN, TX QUAD; SCHERTZ, TX QUAD; SMITHSON VALLEY, TX QUAD

DRAINAGE FLOW → →

Pape–Dawson Engineers, Inc.

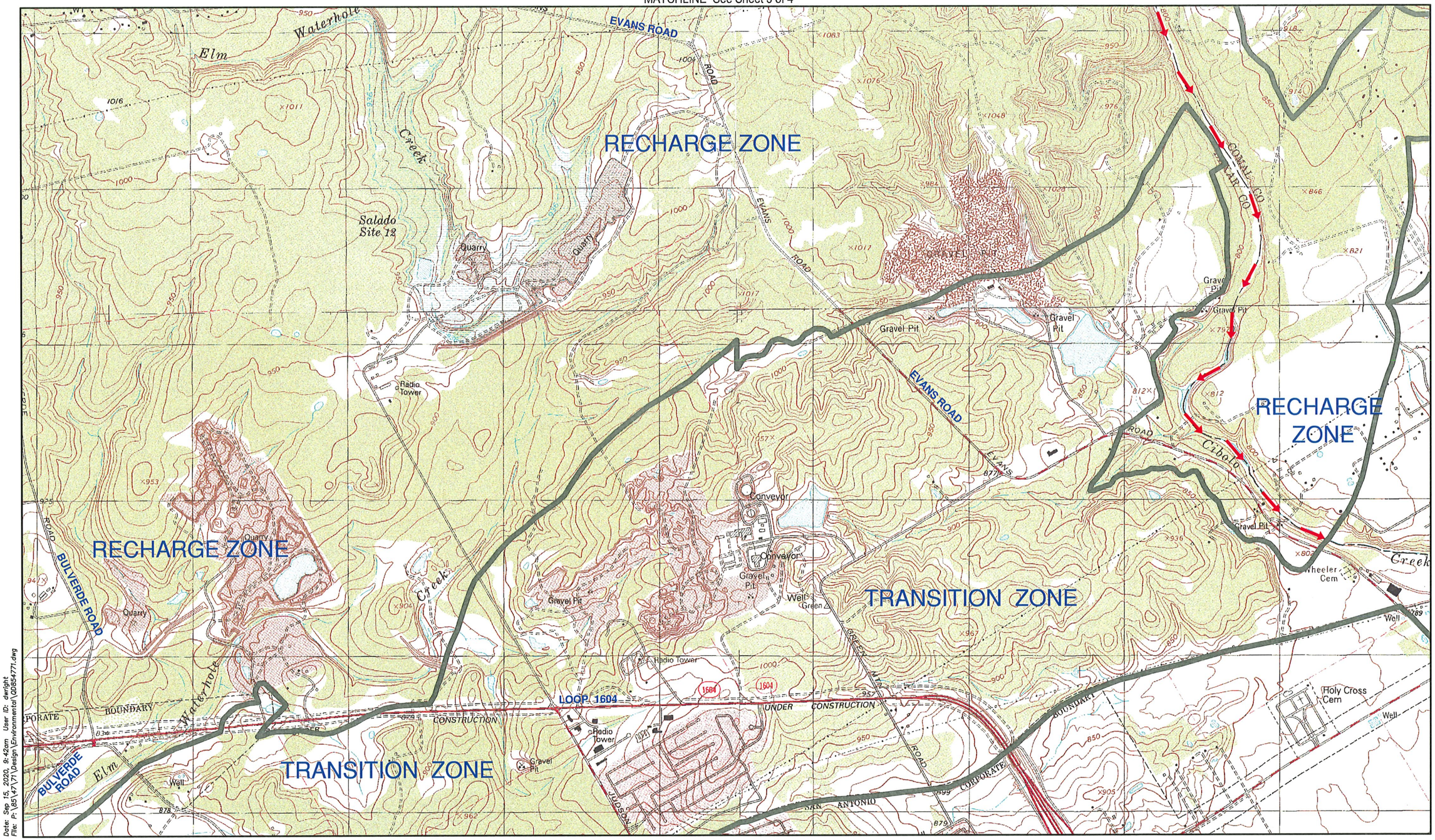
USGS/EDWARDS RECHARGE ZONE MAP
Sheet 3 Of 4
ATTACHMENT B

4S RANCH PHASE 5
Contributing Zone Plan

N

SCALE: 1" = 2000'

MATCHLINE See Sheet 3 of 4



ANHALT, TX QUAD; BATCAVE, TX QUAD; BULVERDE TX QUAD;
LONGHORN, TX QUAD; SCHERTZ, TX QUAD; SMITHSON VALLEY, TX QUAD

DRAINAGE FLOW → →

Pape–Dawson Engineers, Inc.

USGS/EDWARDS RECHARGE ZONE MAP
Sheet 4 Of 4
ATTACHMENT B

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ATTACHMENT C

4S RANCH PHASE 5
Contributing Zone Plan Application (TCEQ-10257)

Attachment C – Project Narrative

This Contributing Zone Plan Modification (CZP MOD) for 4S Ranch Phase 5 proposes the construction of a single-family residential unit on approximately 144.66 acres. The project site is located within the extraterritorial jurisdiction of the City of Bulverde in Comal County, Texas. The proposed 144.66-acre project area is part of a larger planned development on a 753.6-acre tract which was previously used as a ranch and partially developed with previously-cleared portions for agricultural uses. The site is located entirely over the Edwards Aquifer Contributing Zone.

The original CZP for 4S Ranch Phase 1 was approved by letter dated October 30, 2015, for a project area of 87.75 acres within a larger 753.6-acre site. Phased residential development has taken place under various CZP modifications approved by letters dated May 4, 2017; September 18, 2017 (WWTP); November 2, 2017; August 3, 2018; April 16, 2019; June 7, 2019; and April 2, 2020. Please refer to modification section for additional details.

This CZP proposes clearing, grading, excavation, installation of utilities and drainage improvements, streets, sidewalks, and homes. There are a total of 567 single-family residential lots proposed for construction ranging from 2,900 – 4,100 square feet (SF) of impervious cover per lot for the house pad, driveway, sidewalk, and some with a concrete patio. Approximately 47.31 acres of impervious cover are proposed for this project. This plan does not propose any modification to the previously-approved Water Quality Basins "E", "F", "G", and "H".

Upgradient stormwater from undeveloped residential areas within the overall 4S Ranch subdivision will cross the project limits and has been accounted for treatment within the onsite PBMP's. The permanent BMPs for this CZP are two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS, which have been designed 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. Please see included TSS Treatment Summary Table for additional details of previously-approved and proposed Impervious cover with associated treatment.

Since this project is located entirely over the Edwards Aquifer Contributing Zone, a Geological Assessment was not conducted and is not required by 30 TAC 213 regulations. Therefore, no naturally-occurring sensitive features are known to exist on the site.

*Potable water will be supplied by the Canyon Lake Water Supply Company (CLWSC). The proposed development will generate approximately 98,400 gallons per day (average flow) of domestic wastewater (1 edu/lot*240gpd/edu*567 lots = 136,080 gpd). Wastewater will be disposed of by conveyance to the 4S Ranch Wastewater Treatment facility (WQ0015095001) owned by Stahl Lane, Ltd.*

ATTACHMENT D

Attachment D– Factors Affecting Surface 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 E

4S RANCH PHASE 5
Contributing Zone Plan Application (TCEQ-10257)

Attachment E– 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 8,136 cfs. The runoff coefficient for the site changes from approximately 0.55 before development to 0.60 after development. Values are based on the Rational Method using runoff coefficients per the City of Bulverde building Code.

ATTACHMENT J

Attachment J – BMPs for Upgradient Stormwater

Upgradient stormwater from undeveloped residential areas within the overall 4S Ranch subdivision will cross the project limits.

The permanent BMPs for this CZP are two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS, which have been designed 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 K

4S RANCH PHASE 5
Contributing Zone Plan Application (TCEQ-10257)

Attachment K – BMPs for Onsite Stormwater

The permanent BMPs for this CZP are two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS, which have been designed 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. See exhibits section for additional details.

ATTACHMENT L

Attachment L – BMPs for Surface Streams

The permanent BMPs for this CZP are two (2) existing batch detention basins (Basins "G" and "H"), three (3) proposed batch detention basins (Basins "J," "K," and "L"), and four (4) proposed fifteen-foot (15') engineered VFS, which have been designed 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 M

4S RANCH PHASE 5
Contributing Zone Plan Application (TCEQ-10257)

Attachment M – Construction Plans

Construction of three (3) proposed batch detention basins (Basins "J", "K" and "L") are proposed in this CZP. Please refer to the Exhibits Section of this application for the Contributing Zone Plan Site Plans.

ATTACHMENT N

4S RANCH PHASE 5
Contributing Zone Plan Application (TCEQ-10257)

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 into a project.

It should also be noted that the timing and procedures presented herein are general guidelines, adjustment to the timing and procedures may have to be made depending on project specific characteristics as well as weather related conditions 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.

Richard Mott
Signature
Lennar Homes of Texas Land
and Development, Ltd.

9/23/2020
Date

INSPECTION AND MAINTENANCE SCHEDULE
FOR
PERMANENT POLLUTION ABATEMENT MEASURES

Recommended Frequency	Task to be Performed												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
After Rainfall	√							√			√		√
Biannually*	√	√	√	√	√	√	√	√	√	√	√	√	√

At least one biannual inspection must occur during or immediately after a rainfall event.
√Indicates maintenance procedure that applies to this specific site.

See description of maintenance task to be performed on the following pages. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather-related conditions 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 this project***	
1. Mowing	**Yes**	~~No~~
2. Litter and Debris Removal	**Yes**	~~No~~
3. Erosion Control	**Yes**	~~No~~
4. Level Sensor	**Yes**	~~No~~
5. Nuisance Control	**Yes**	~~No~~
6. Structural Repairs and Replacement	**Yes**	~~No~~
7. Discharge Pipe	**Yes**	~~No~~
8. Detention and Drawdown Time	**Yes**	~~No~~
9. Sediment Removal	**Yes**	~~No~~
10. Logic Controller	**Yes**	~~No~~
11. Vegetated Filter Strips	**Yes**	~~No~~
12. Visually Inspect Security Fencing for Damage or Breach	**Yes**	~~No~~
13. Recordkeeping for Inspections, Maintenance, and Repairs	**Yes**	~~No~~

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.

Inspections. Inspections should take place a minimum of twice a year. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. The remaining inspections should occur between storm events so that manual operation of the valve and controller can be verified. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. The outlet structure and the trash screen should be inspected for signs of clogging. Debris and sediment should be removed from the orifice and outlet(s) as described in previous sections. Debris obstructing the valve should be removed. During each inspection, erosion areas inside and downstream of this BMP should be identified and repaired/revegetated immediately. *A written record should be kept of inspection results and corrective measures taken*

1. Mowing. The basin, basin side-slopes, and embankment of the basin must be mowed to prevent woody growth and control weeds. A mulching mower should be used, or the grass clippings should be caught and removed. Mowing should take place at least twice a year, or more frequently if vegetation exceeds 18 inches in height. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas.

2. Litter and Debris Removal. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin. Particular attention should be paid to floatable debris around the outlet structure. The outlet should be checked for possible clogging or obstructions and any debris removed.

3. Erosion control. The basin side slopes and embankment all may periodically suffer from slumping and erosion. To correct these problems, corrective action, such as regrading and revegetation, may be necessary. Correction of erosion control should take place whenever required based on the periodic inspections.

4. Level Sensor. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin.

5. Nuisance Control. Standing water or soggy conditions may occur in the basin. Some standing water may occur after a storm event since the valve may close with 2 to 3 inches of water in the basin. Some flow into the basin may also occur between storms due to spring flow and residential water use that enters the storm sewer system. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.).

6. Structural Repairs and Replacement. With each inspection, any damage to structural elements of the basin (pipes, concrete drainage structures, retaining walls, etc.) should be identified and repaired immediately. An example of this type of repair can include patching of cracked concrete, sealing of voids, removal of vegetation from cracks and joints. The various inlet/outlet structures in a basin will eventually deteriorate and must be replaced. *A written record should be kept of inspection results and corrective measures taken*

7. Discharge Pipe. The basin discharge pipe shall be checked for accumulation of silt, debris or other obstructions which could block flow. Soil accumulations, vegetative overgrowth and other blockages should be cleared from the pipe discharge point. Erosion at the point of discharge shall be monitored. If erosion occurs, the addition of rock rubble to disperse the flow should be accomplished. *A written record should be kept of inspection results and corrective measures taken*

8. Detention and Drawdown Time. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. 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 actuator valve shall be checked and partially closed to limit the drawdown time. Extensive drawdown time greater than 48 hours may indicated blockage of 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.*

9. Sediment Removal. A properly designed batch detention basin will accumulate quantities of sediment over time. The accumulated sediment can detract from the appearance of the facility and reduce the pollutant removal performance of the facility. The sediment also tends to accumulate near the outlet structure and can interfere with the level sensor operation. Sediment shall be removed from the basin at least every 5 years, when sediment depth exceeds 6 inches, when the sediment interferes with the level sensor or when the basin does not drain within 48 hours. Care should be taken not to compromise the basin lining during maintenance.

10. Logic Controller. The Logic Controller should be inspected as part of the twice-yearly investigations. Verify that the external indicators (active, cycle in progress) are operating properly by turning the controller off and on, and by initiating a cycle by triggering the level sensor in the basin. The valve should be manually opened and closed using the open/close switch to verify valve operation and to assist in inspecting the valve for debris. The solar panel should be inspected and any dust or debris on the panel should be carefully removed. The controller and all other circuitry and wiring should be inspected for signs of corrosion, damage from insects, water leaks, or other damage. At the end of the inspection, the controller should be reset.

11. Vegetated Filter Strips. Vegetation height for native grasses shall be limited to no more than 18-inches. When vegetation exceeds that height, the filter strip shall be cut to a height of approximately 4 inches. Turf grass shall be limited to a height of 4-inches with regular maintenance that utilizes a mulching mower. Trash and debris shall be removed from filter

strip prior to cutting. Check filter strip for signs of concentrated flow and erosion. Areas of filter strip showing signs of erosion shall be repaired by scarifying the eroded area, reshaping, 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*

12. Visually Inspect Security Fencing for Damage or Breach. 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.*

13. Recordkeeping Procedures for Inspections, Maintenance, Repairs, and Retrofits.
    - Written records shall be kept by the party responsible for maintenance or a designated representative.
    - Written records shall be retained for a minimum of five years.

ATTACHMENT P

Attachment P - 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.

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: Trey Dawson, P.E.

Date: 10/2/2020

Signature of Customer/Agent:

Regulated Entity Name: 4S Ranch Phase 5

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: located within the construction staging area in compliance with 30TAC§213.

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

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

- ☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.
- ☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.

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

2. ☒ **Attachment A - Spill Response Actions**. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.
3. ☒ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
4. ☒ **Attachment B - Potential Sources of Contamination**. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

5. ☒ **Attachment C - Sequence of Major Activities**. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.
   - ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.
   - ☒ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Cibolo Creek

Temporary Best Management Practices (TBMPs)

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

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

- ☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
- ☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
- ☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
- ☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.

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

   - ☐ **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
   - ☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.

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

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

    - ☒ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
    - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
    - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
    - ☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

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

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

☐ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.

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

Administrative Information

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

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

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

ATTACHMENT A

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

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.
  - 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 • ***Asphalt products used on this project.***

Preventative Measure
- ***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.***

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

Preventative Measure
- ***Vehicle maintenance when possible will be performed within the construction staging area.***
- ***Construction vehicles and equipment shall be checked regularly for leaks and repaired immediately.***

Potential Source • ***Accidental leaks or spills of oil, petroleum products and substances listed under 40 CFR parts 110, 117, and 302 used or stored temporarily on site.***

Preventative Measure
- ***Contractor to incorporate into regular safety meetings, a discussion of spill prevention and appropriate disposal procedures.***
- ***Contractor's superintendent 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.***

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

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

Potential Source • ***Construction debris.***

Preventive Measure	■	*Construction debris will be monitored daily by contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring immediate attention will be addressed on a case by case basis.*
Potential Source	•	*Spills/Overflow of waste from portable toilets*
Preventative Measure	■	*Portable toilets will be placed away from high traffic vehicular areas and storm drain inlets.*
	■	*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

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

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 TBMP's as illustrated on Exhibit 1, clearing and grubbing of vegetation where applicable. This will disturb approximately 144.66-acres. Portions of the project limits have been previously developed or cleared as part of prior approvals. The second is construction that will include construction of streets, sidewalks, homes, new pavement areas, PBMPs, landscaping and site cleanup. This will disturb approximately 144.66-acres. Home construction will be based on market demand and not concurrent with civil infrastructure.

ATTACHMENT D

Attachment D – Temporary Best Management Practices and Measures

a. 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.

Upgradient stormwater from undeveloped areas within the overall 4S subdivision will cross the project limits. All TBMPs are adequate for the drainage areas served.

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 includes: (1) excavation of sedimentation ponds for sediment control within large disturbed watersheds. (2) erection of silt fences along the downgradient boundary of construction activities for temporary erosion and sedimentation controls, (3) installation of rock berms with silt fencing downgradient from areas of concentrated stormwater flow for temporary erosion control, (4) placement of earthen berms and gravel bag berms along channels and the downgradient boundary of construction activities for temporary erosion and sedimentation controls, (5) installation of stabilized construction entrance/exit(s) to reduce the dispersion of sediment from the site, and (6) 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 as construction phasing warrants that include installation of the concrete truck washout pit(s) and placement of gravel filter bags for use in inlet protection and to prevent sediment migration off-site.

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 the aquifer, surface streams and/or sensitive features that may exist downstream of the site.

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

As this site is entirely over the Edwards Aquifer Contributing Zone, a Geologic Assessment was not conducted and is not required; therefore, no sensitive features were identified. Dripping Springs Creek crosses the project limits on the southeastern border along Smithson Valley Road. Surface streams will be protected by establishing a silt fence boundary along the disturbed area in order to contain sediment in the area.

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.

Since the project is located entirely over the Edwards Contributing Zone, a Geologic Assessment was not conducted and is not required by 30 TAC 213 regulations. Therefore, no naturally-occurring sensitive features are known to exist on the site. 30 TAC 213(f)(2) only applies to projects over the Edwards Recharge Zone.

ATTACHMENT F

Attachment F – Structural Practices

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

- ***Excavation and construction of temporary sediment ponds as located on Exhibit 1 and illustrated in Exhibit 2.***
- ***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 inlet protection at downgradient inlets of construction activities, as located on Exhibit 1 and illustrated in Exhibit 2.***
- ***Placement of earthen berms and gravel bag berms along channels and the downgradient boundary 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 gravel filter bags, concrete truck washout pit(s), as required and located on Exhibit 1 and illustrated on Exhibit 2.***

ATTACHMENT G

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

Attachment G – Drainage Area Map

Please refer to the Exhibits Section of this application for the Contributing Zone Plan Drainage Area Map.

ATTACHMENT H

Attachment H – Temporary Sediment Pond(s) Plans and Calculations

The proposed batch detention basins will be used as temporary sediment ponds during site construction for each respective watershed. A temporary basin will be converted to a permanent basin after paving is complete within the watershed for that basin and final stabilization is achieved for 70% of the unpaved areas and areas not covered by permanent structures within the watershed for that basin.

Prior to final acceptance by the owner, the contractor will remove trash, debris and accumulated silt from each batch detention basin and re-establish them to proper operating condition. Additional sizing requirements may be necessary for the City of Bulverde. Check dams and additional sediment traps utilizing earthen and gravel bag berms are proposed as located on Exhibit 1 and illustrated on Exhibit 2.

Per RG-348, Pg. 1-104, Section 1.4.13 - Sediment Basins, 'Basin Design and Construction' Item (1), a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained. The two-year, 24-hour storm depth used for this calculation was taken from City of Bulverde Storm Drainage Design Criteria Manual (January 2019), Section 3 - Rainfall, Subsection 3.2.1.1, Table 3.2. The information was derived from Atlas 14, Volume 11 precipitation frequency estimates.

Minimum required volume:

Basin "G"

Approximately 26.78 acres disturbed x $\frac{4.12\ inches\ (Rainfall\ Depth)}{12\ inches/foot}$ ***= 9.194 acre-ft (442,090 cf)***

Proposed basin capacity is approximately 11.160 acre-ft (486,130 cf)

Volume of proposed basin exceeds required.

Basin "H"

Approximately 9.98 acres disturbed.

Per RG-348, Pg. 1-104, Section 1.4.13 - Sediment Basins, 'Basin Design and Construction' Item (1) and TXR150000 Part III, Section F, Part 2(c)(i)(A)(1) sedimentation basins are required for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A temporary sedimentation basin is not required for this portion of the project since the disturbed area does not exceed ten (10) acres.

Basin "J"

Approximately 16.64 acres disturbed x $\frac{4.12\ inches\ (Rainfall\ Depth)}{12\ inches/foot}$ ***= 5.713 acre-ft (306,270 cf)***

Proposed basin capacity is approximately 8.114 acre-ft (353,446 cf)

Volume of proposed basin exceeds required.

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

Basin "K"

Approximately 18.48 acres disturbed x $\frac{4.12\ inches\ (Rainfall\ Depth)}{12\ inches/foot}$ ***= 6.345 acre-ft (165,702 cf)***

Proposed basin capacity is approximately 12.440 acre-ft (541,886 cf)

Basin "L"

Approximately 4.22 acres disturbed.

Per RG-348, Pg. 1-104, Section 1.4.13 - Sediment Basins, 'Basin Design and Construction' Item (1) and TXR150000 Part III, Section F, Part 2(c)(i)(A)(1) sedimentation basins are required for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A temporary sedimentation basin is not required for this portion of the project since the disturbed area does not exceed ten (10) acres.

Temporary Sedimentation Basin Volume Check *(See RG-348, Pg. 1-104, Section 1.4.13 - Sediment Basins and TXR150000 Part III, Section F, Part (c)(i)(A) - Sedimentation Basins)*

Phase	Temporary Structure	Top of Berm Elevation (ft)	Volume Provided (AC-ft)	Disturbed Area (AC)	Rainfall Depth (in)*	Volume Required (AC-ft)	Meets Requirements?
Phase 5	SEDIMENTATION BASIN G	1,063.00	11.160	26.78	4.12	9.194	Yes
	SEDIMENTATION BASIN H**	1,052.90	8.584	9.98	4.12	3.426	Yes
	SEDIMENTATION BASIN J	1,060.10	8.114	16.64	4.12	5.713	Yes
	SEDIMENTATION BASIN K	1,063.70	12.440	18.48	4.12	6.345	Yes
	SEDIMENTATION BASIN L**	1,098.80	1.702	4.22	4.12	1.449	Yes

**Two-year, 24-hour storm depth taken from City of Bulverde Storm Drainage Design Criteria Manual (January 2019), Section 3 - Rainfall, Subsection 3.2.1.1, Table 3.2. The information was derived from Atlas 14, Volume 11 precipitation frequency estimates.*

***Per RG-348, Pg. 1-104, Section 1.4.13 - Sediment Basins, 'Basin Design and Construction' Item (1)) and TXR150000 Part III, Section F, Part 2(c)(i)(A)(1) sedimentation basins are required for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A temporary sedimentation basin is not required for this portion of the project since the disturbed area does not exceed ten (10) acres.*

Sedimentation Basin Emergency Spillway - Design Flowrates (Rational Method Q=CiA)					
Basin	10-Year, 3-Hour Storm Depth (in)*	Intensity (in/hr) - i	Contributing Drainage Area (AC) - A	Runoff Coefficient - C**	Design Flowrate (ft^3/s) - Q=CiA
G	4.21	1.403	26.78	0.55	20.67
J	4.21	1.403	16.64	0.55	12.84
K	4.21	1.403	18.48	0.55	14.26

**Ten-year, 3-hour storm depth taken from City of Bulverde Storm Drainage Design Criteria Manual (January 2019), Section 3 - Rainfall, Subsection 3.2.1.1, Table 3.2. The information was derived from Atlas 14, Volume 11 precipitation frequency estimates.*

***Cultivated or range (Grass cover is less than 50% of area) at 5% slope. Runoff coefficient = 0.55.*

Sedimentation Basin Data

Basin G						
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)	Total Storage (CF)
0.0	1053.5	0	0.000	0.000	0.000	0
0.5	1054	2730	0.063	0.016	0.016	683
1.5	1055	17480	0.401	0.232	0.248	10788
2.5	1056	35400	0.813	0.607	0.855	37228
3.5	1057	52475	1.205	1.009	1.863	81165
4.5	1058	60995	1.400	1.302	3.166	137900
5.0	1058.5	62680	1.439	0.710	3.876	168819
5.5	1059	64360	1.478	0.729	4.605	200579
6.5	1060	67825	1.557	1.517	6.122	266671
7.5	1061	71330	1.638	1.597	7.719	336249
7.8	1061.3	72730	1.670	0.496	8.215	357858
8.0	1061.5	73065	1.677	0.335	8.550	372437
8.5	1062	74900	1.719	0.849	9.399	409429
10	1063	78530	1.803	1.761	11.160	486144

Basin H						
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)	Total Storage (CF)
0	1045	0	0.000	0.000	0.000	0
1	1046	17735	0.407	0.204	0.204	8868
2	1047	42700	0.980	0.694	0.897	39085
3	1048	47190	1.083	1.032	1.929	84030
4	1049	51840	1.190	1.137	3.066	133545
5	1050	56680	1.301	1.246	4.311	187805
6	1051	61960	1.422	1.362	5.673	247125
7	1052	66921	1.536	1.479	7.153	311566
7.9	1052.9	71675	1.645	1.432	8.584	373934
8	1053	72130	1.656	0.165	8.749	381124
9	1054	77275	1.774	1.715	10.464	455826

Basin J						
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)	Total Storage (CF)
0	1050	0	0.000	0.000	0.000	0
1	1051	12895	0.296	0.148	0.148	6448
2	1052	30665	0.704	0.500	0.648	28228
3	1053	32860	0.754	0.729	1.377	59990
4	1054	35120	0.806	0.780	2.157	93980
5	1055	37440	0.860	0.833	2.990	130260
6	1056	39840	0.915	0.887	3.877	168900
7	1057	42305	0.971	0.943	4.820	209973
8	1058	44810	1.029	1.000	5.820	253530
9	1059	47425	1.089	1.059	6.879	299648
10	1060	50095	1.150	1.119	7.998	348408
10.1	1060.1	50355	1.156	0.115	8.114	353430
11	1061	52740	1.211	1.065	9.179	399823
11.5	1061.5	54085	1.242	0.613	9.792	426529

Sedimentation Basin Data

Basin K						
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)	Total Storage (CF)
0	1056	0.000	0.000	0.000	0.000	0
1	1057	9320	0.214	0.107	0.107	4660
2	1058	40305	0.925	0.570	0.677	29473
3	1059	80520	1.848	1.387	2.063	89885
4	1060	91480	2.100	1.974	4.038	175885
5	1061	95455	2.191	2.146	6.183	269353
6	1062	99495	2.284	2.238	8.421	366828
7	1063	103595	2.378	2.331	10.752	468373
7.7	1063.7	106445	2.444	1.688	12.440	541887
8	1064	107760	2.474	0.738	13.178	574017
9	1065	111990	2.571	2.522	15.700	683892

Basin L						
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)	Total Storage (CF)
0	1091	0.000	0.000	0.000	0.000	0
1	1092	6505	0.149	0.075	0.075	3253
2	1093	7540	0.173	0.161	0.236	10275
3	1094	8650	0.199	0.186	0.422	18370
4	1095	9815	0.225	0.212	0.634	27603
5	1096	11045	0.254	0.239	0.873	38033
6	1097	12340	0.283	0.268	1.142	49725
7	1098	13695	0.314	0.299	1.440	62743
7.8	1098.8	14830	0.340	0.262	1.702	74152
8	1099	15115	0.347	0.069	1.771	77147
8.8	1099.8	16410	0.377	0.289	2.061	89757

Weir Elevation (Permanent Basins)
100-YR UD WSEL (Permanent Basins)
Top of Berm Elevation (Temp Basins)

Silt Removal Depth (ft)			
Basin	Basin Invert (ft)	Maximum Sediment Storage Elevation (ft)	Silt Removal Depth (ft)
G	1,053.50	1,059.00	5.50
J	1,050.00	1,056.00	6.00
K	1,056.00	1,061.00	5.00

Note: Per RG-348, Pg. 1-106, Section 1.4.13 - Inspection and Maintenance Guidelines, Subsection (3), accumulated silt should be removed and the basin should be re-graded to its original dimensions at such point that the capacity of the impoundment has been reduced to 75% of its original storage capacity. However, Per RG-348, Pg. 1-107, Section 1.4.13 - Basin Design and Construction, Subsection (12) the maximum sediment storage elevation is defined as 'the point measured from the bottom of the riser pipe equal to 1/2 the volume of the basin.' The maximum sediment storage elevation is used in the calculation above since it is a more conservative approach (silt is being removed more often)

Riser Pipe Hole Sizing											
Basin	PVC Pipe Size (in.)	Volume Provided (acre-ft)	Volume Provided (ft^3)	1/2 Volume of Basin (ft^3)	Contour Elevation below 1/2 Volume (ft)	Surface Area at 1/2 Volume of Basin - A_s (ft^2)	Coefficient of Contraction - C_d	Head of Water Above the Hole - h (ft)	Area of the De-Watering Hole - A_o (ft^2)	Area of a 1-inch Perforated Hole (ft^2)	Number of 1-inch Perforated Holes Req'd
G	15	11.160	486,144	243,072	1,059.00	64,360	0.6	4.0	0.219	0.022	11
J	15	8.114	353,430	176,715	1,056.00	39,840	0.6	4.1	0.137	0.022	7
K	15	12.440	541,887	270,943	1,061.00	95,455	0.6	2.7	0.267	0.022	13

(12) The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to ½ the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows:

$$A_o = \frac{A_s \times \sqrt{2h}}{C_d \times 980{,}000}$$

Where:

A_o = Area of the de-watering hole, ft^2
A_s = Surface area of the basin, ft^2
C_d = Coefficient of contraction, approximately 0.6
h = head of water above the hole, ft

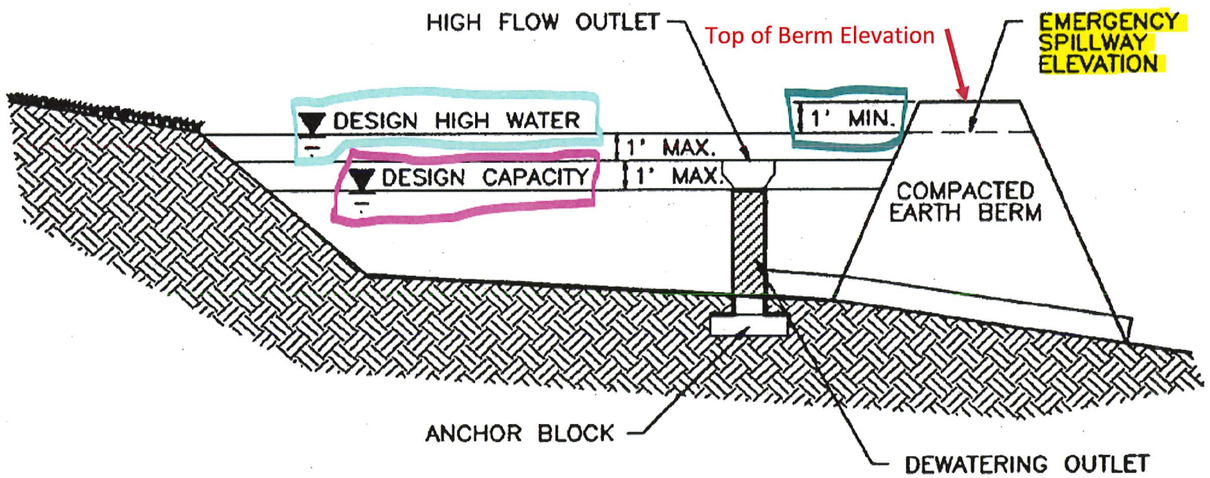
Perforating the riser with multiple holes with a combined surface area equal to A_o is acceptable.

Sedimentation Basin Emergency Spillway Sizing ($Q=C_w*L*h^{2/3}$)										
Basin	Design Flowrate (ft^3/s)	Coefficient (C_w)	Length (ft) - L	Height (ft) - h	Top of Berm Elevation (ft)	Freeboard (ft)*	Emergency Spillway Elevation (ft)**	Design High Water (ft)	Temporary Top of Riser Pipe Elevation (ft)**	Permanent Top of Riser Pipe Elevation (ft)
G	20.67	3.087	10	0.77	1,063.00	1.0	1,061.20	1,061.97	1,060.20	1,058.50
J	12.84	3.087	10	0.56	1,060.10	3.5	1,056.00	1,056.56	1,055.00	1,055.00
K	14.26	3.087	8	0.69	1,063.70	1.0	1,062.00	1,062.69	1,061.00	1,061.00

One (1) foot of freeboard is required per RG-348, Pg. 1-106, Section 1.4.13 - Sediment Basins, Subsection (4)

***Shown as 'Design Capacity' in RG-348, Pg. 1-105, Section 1.4.13 - Sediment Basins, Figure 1-41. Per RG-348, Pg. 1-107, Section 1.4.13 - Sediment Basins, Subsection (10), the top of the riser should be 12 inches below the elevation of the emergency spillway.*

Basin	Temporary Riser Pipe Height (ft)	Permanent Riser Pipe Height (ft)
G	6.70	5.00
J	5.00	5.00
K	5.00	5.00



CROSS SECTION
N.T.S

ATTACHMENT I

Attachment I – Inspection and Maintenance for BMPs

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 date of the inspection. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over 6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, (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.

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

Pollution Prevention Measure	Inspected	Corrective Action	
		Description	Date Completed
General			
Revegetation			
Erosion/sediment controls			
Vehicle exits			
Material areas			
Equipment areas			
Concrete rinse			
Construction debris			
Trash receptacles			
Infrastructure			
Roadway clearing			
Utility clearing			
Roadway grading			
Utility construction			
Drainage construction			
Roadway base			
Roadway surfaces			
Site cleanups			
Building			
Clearing for building			
Foundation grading			
Utility construction			
Foundation construction			
Building construction			
Site grading			
Site cleanup			

Indicate N/A where measure does not apply.

By my signature below, I certify that all items are acceptable and the project site is in compliance with SWPPP.

Inspector's Name _____ Inspector's Signature _____

Name of Owner/Operator (Firm) _____ Date _____

Note: Inspector is to attach a brief statement of his qualifications to this report.

4S RANCH PHASE 5
Temporary Stormwater Section (TCEQ-0602)

PROJECT MILESTONE DATES

Date when major site grading activities begin:

Construction Activity	Date

Dates when construction activities temporarily or permanently cease on all or a portion of the project:

Construction Activity	Date

Dates when stabilization measures are initiated:

Stabilization Activity	Date

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.

COPY OF NOTICE OF INTENT (NOI) (TCEQ-20022)

TCEQ Office Use Only
Permit No:
CN:
RN:

Notice of Intent (NOI) for an Authorization for Stormwater Discharges Associated with Construction Activity under TPDES General Permit TXR150000

IMPORTANT INFORMATION

Please read and use the General Information and Instructions prior to filling out each question in the NOI form.

Use the NOI Checklist to ensure all required information is completed correctly. **Incomplete applications delay approval or result in automatic denial.**

Once processed your permit authorization can be viewed by entering the following link into your internet browser: http://www2.tceq.texas.gov/wq_dpa/index.cfm or you can contact TCEQ Stormwater Processing Center at 512-239-3700.

ePERMITS

Effective September 1, 2018, this paper form must be submitted to TCEQ with a completed electronic reporting waiver form (TCEQ-20754).

To submit an NOI electronically, enter the following web address into your internet browser and follow the instructions: https://www3.tceq.texas.gov/steers/index.cfm

APPLICATION FEE AND PAYMENT

The application fee for submitting a paper NOI is $325. The application fee for electronic submittal of a NOI through the TCEQ ePermits system (STEERS) is $225.

Payment of the application fee can be submitted by mail or through the TCEQ ePay system. The payment and the NOI must be mailed to separate addresses. To access the TCEQ ePay system enter the following web address into your internet browser: http://www.tceq.texas.gov/epay.

Provide your payment information for verification of payment:

- If payment was mailed to TCEQ, provide the following:
  - Check/Money Order Number:
  - Name printed on Check:
- If payment was made via ePay, provide the following:
  - Voucher Number:
  - A copy of the payment voucher is attached to this paper NOI form.

RENEWAL (This portion of the NOI is not applicable after June 3, 2018)

Is this NOI for a renewal of an existing authorization? ☐ Yes ☐ No

If Yes, provide the authorization number here: TXR15

NOTE: If an authorization number is not provided, a new number will be assigned.

SECTION 1. OPERATOR (APPLICANT)

a) If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? CN

(Refer to Section 1.a) of the Instructions)

b) What is the Legal Name of the entity (applicant) applying for this permit? (The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

c) What is the contact information for the Operator (Responsible Authority)?

Prefix (Mr. Ms. Miss):

First and Last Name: Suffix:

Title: Credentials:

Phone Number: Fax Number:

E-mail:

Mailing Address:

City, State, and Zip Code:

Mailing Information if outside USA:

Territory:

Country Code: Postal Code:

d) Indicate the type of customer:

☐ Individual
☐ Limited Partnership
☐ General Partnership
☐ Trust
☐ Sole Proprietorship (D.B.A.)
☐ Corporation
☐ Estate
☐ Federal Government
☐ County Government
☐ State Government
☐ City Government
☐ Other Government
☐ Other:

e) Is the applicant an independent operator? ☐ Yes ☐ No

(If a governmental entity, a subsidiary, or part of a larger corporation, check No.)

f) Number of Employees. Select the range applicable to your company.

☐ 0–20 ☐ 251–500

☐ 21–100 ☐ 501 or higher

☐ 101–250

g) Customer Business Tax and Filing Numbers: (**Required** for Corporations and Limited Partnerships. **Not Required** for Individuals, Government, or Sole Proprietors.)

State Franchise Tax ID Number:

Federal Tax ID:

Texas Secretary of State Charter (filing) Number:

DUNS Number (if known):

SECTION 2. APPLICATION CONTACT

Is the application contact the same as the applicant identified above?

☐ Yes, go to Section 3

☐ No, complete this section

Prefix (Mr. Ms. Miss):

First and Last Name: Suffix:

Title: Credential:

Organization Name:

Phone Number: Fax Number:

E-mail:

Mailing Address:

Internal Routing (Mail Code, Etc.):

City, State, and Zip Code:

Mailing information if outside USA:

Territory:

Country Code: Postal Code:

SECTION 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) If this is an existing permitted site, what is the Regulated Entity Number (RN) issued to this site? RN 105628622

(Refer to Section 3.a) of the Instructions)

b) Name of project or site (the name known by the community where it's located): 4S Ranch Phase 5

c) In your own words, briefly describe the type of construction occurring at the regulated site (residential, industrial, commercial, or other): Single-Family Residential

d) County or Counties (if located in more than one): Comal

e) Latitude: 29.771137 Longitude: -98.385301

f) Site Address/Location

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete *Section A*.

If the site does not have a physical address, provide a location description in *Section B*. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

Section A:

Street Number and Name:

City, State, and Zip Code:

Section B:

Location Description: Approx. 1.7 miles east of Mustang Vista and Stahl Lane intersection

City (or city nearest to) where the site is located: Bulverde, TX

Zip Code where the site is located: 78163

SECTION 4. GENERAL CHARACTERISTICS

a) Is the project or site located on Indian Country Lands?

☐ Yes, do not submit this form. You must obtain authorization through EPA Region 6.

☒ No

b) Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

☐ Yes. Note: The construction stormwater runoff may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA Region 6.

☒ No

c) What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site? **1521**

d) What is the Secondary SIC Code(s), if applicable? 1611

e) What is the total number of acres to be disturbed? 144.66

f) Is the project part of a larger common plan of development or sale?

☒ Yes

☐ No. The total number of acres disturbed, provided in e) above, must be 5 or more. If the total number of acres disturbed is less than 5, do not submit this form. See the requirements in the general permit for small construction sites.

g) What is the estimated start date of the project? May 1, 2021

h) What is the estimated end date of the project? December 30, 2022

i) Will concrete truck washout be performed at the site? ☒ Yes ☐ No

j) What is the name of the first water body(ies) to receive the stormwater runoff or potential runoff from the site? Upper Cibolo Creek

k) What is the segment number(s) of the classified water body(ies) that the discharge will eventually reach? 1908

l) Is the discharge into a Municipal Separate Storm Sewer System (MS4)?

☒ Yes ☐ No

If Yes, provide the name of the MS4 operator: City of Bulverde

Note: The general permit requires you to send a copy of this NOI form to the MS4 operator.

m) Is the discharge or potential discharge from the site within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, as defined in 30 TAC Chapter 213?

☒ Yes, complete the certification below.

☐ No, go to Section 5

I certify that the copy of the TCEQ-approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) that is included or referenced in the Stormwater Pollution Prevention Plan will be implemented. ☒ Yes

SECTION 5. NOI CERTIFICATION

a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). ☐ Yes

b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. ☐ Yes

c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. ☐ Yes

d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the Construction General Permit (TXR150000). ☐ Yes

Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3, provided all obligations are confirmed by at least one operator.

SECTION 6. APPLICANT CERTIFICATION SIGNATURE

Operator Signatory Name:

Operator Signatory Title:

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 that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature (use blue ink): _____ Date: _____

NOTICE OF INTENT CHECKLIST (TXR150000)

Did you complete everything? Use this checklist to be sure!

Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

Confirm each item (or applicable item) in this form is complete. This checklist is for use by the applicant to ensure a complete application is being submitted. **Missing information may result in denial of coverage under the general permit.** (See NOI process description in the General Information and Instructions.)

APPLICATION FEE

If paying by check:

☐ Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)

☐ Check number and name on check is provided in this application.

If using ePay:

☐ The voucher number is provided in this application and a copy of the voucher is attached.

RENEWAL

☐ If this application is for renewal of an existing authorization, the authorization number is provided.

OPERATOR INFORMATION

☐ Customer Number (CN) issued by TCEQ Central Registry

☐ Legal name as filed to do business in Texas. (Call TX SOS 512-463-5555 to verify.)

☐ Name and title of responsible authority signing the application.

☐ Phone number and e-mail address

☐ Mailing address is complete & verifiable with USPS. www.usps.com

☐ Type of operator (entity type). Is applicant an independent operator?

☐ Number of employees.

☐ For corporations or limited partnerships - Tax ID and SOS filing numbers.

☐ Application contact and address is complete & verifiable with USPS. http://www.usps.com

REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

☒ Regulated Entity Number (RN) (if site is already regulated by TCEQ)

☒ Site/project name and construction activity description

☒ County

☒ Latitude and longitude http://www.tceq.texas.gov/gis/sqmaview.html

☒ Site Address/Location. Do not use a rural route or post office box.

GENERAL CHARACTERISTICS

☒ Indian Country Lands –the facility is not on Indian Country Lands.

☒ Construction activity related to facility associated to oil, gas, or geothermal resources

☒ Primary SIC Code that best describes the construction activity being conducted at the site. www.osha.gov/oshstats/sicser.html

☒ Estimated starting and ending dates of the project.

☒ Confirmation of concrete truck washout.

☒ Acres disturbed is provided and qualifies for coverage through a NOI.

☒ Common plan of development or sale.

☒ Receiving water body or water bodies.

☒ Segment number or numbers.

☒ MS4 operator.

☒ Edwards Aquifer rule.

CERTIFICATION

☐ Certification statements have been checked indicating Yes.

☐ Signature meets 30 Texas Administrative Code (TAC) §305.44 and is original.

Instructions for Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

By Regular Mail:
TCEQ
Stormwater Processing Center (MC228)
P.O. Box 13087
Austin, Texas 78711-3087

By Overnight or Express Mail:
TCEQ
Stormwater Processing Center (MC228)
12100 Park 35 Circle
Austin, TX

Application Fee:

The application fee of $325 is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit. Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

Mailed Payments:

Use the attached General Permit Payment Submittal Form. The application fee is submitted to a different address than the NOI. Read the General Permit Payment Submittal Form for further instructions, including the address to send the payment.

ePAY Electronic Payment: http://www.tceq.texas.gov/epay

When making the payment you must select Water Quality, and then select the fee category "General Permit Construction Storm Water Discharge NOI Application". You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

TCEQ Contact List:

Application - status and form questions:	512-239-3700,
swpermit@tceq.texas.gov Technical questions:	512-239-4671, swgp@tceq.texas.gov
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- **Administrative Review**: Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(es) on the form must be verified with the US Postal service as receiving regular mail delivery. Do not give an overnight/express mailing address.

- **Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- **Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.

  or

  Denial of Coverage: If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site http://www.tceq.texas.gov. Search using keyword TXR150000.

Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated project or site changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number, if one has not already been assigned to this customer or site.

For existing customers and sites, you can find the Customer Number and Regulated Entity Number by entering the following web address into your internet browser: http://www15.tceq.texas.gov/crpub/ or you can contact the TCEQ Stormwater Processing Center at 512-239-3700 for assistance. On the website, you can search by your permit number, the Regulated Entity (RN) number, or the Customer Number (CN). If you do not know these numbers, you can select "Advanced Search" to search by permittee name, site address, etc.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For this permit, a Notice of Change form must be submitted to the program area.

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

Renewal of General Permit. Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit

number is required. If the permit number is not provided or has been terminated, expired, or denied, a new permit number will be issued.

Section 1. OPERATOR (APPLICANT)

a) Customer Number (CN)

TCEQ's Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

If the applicant is an existing TCEQ customer, the Customer Number is available at the following website: http://www15.tceq.texas.gov/crpub/. If the applicant is not an existing TCEQ customer, leave the space for CN blank.

b) Legal Name of Applicant

Provide the current legal name of the applicant. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, as filed in the county. You may contact the SOS at 512-463-5555, for more information related to filing in Texas. If filed in the county, provide a copy of the legal documents showing the legal name.

c) Contact Information for the Applicant (Responsible Authority)

Provide information for the person signing the application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: https://tools.usps.com/go/ZipLookupAction!input.action.

The phone number should provide contact to the applicant.

The fax number and e-mail address are optional and should correspond to the applicant.

d) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for an authorization.

Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

Partnership

A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). If the customer is a 'General Partnership' or 'Joint Venture' filed in the county (not filed with TX SOS), the legal name of each partner forming the 'General Partnership' or 'Joint Venture' must be provided. Each 'legal entity' must apply as a co-applicant.

Trust or Estate

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

Sole Proprietorship (DBA)

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

1. be under the person's name
2. have its own name (doing business as or DBA)
3. have any number of employees.

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

Corporation

A customer that meets all of these conditions:

1. is a legally incorporated entity under the laws of any state or country
2. is recognized as a corporation by the Texas Secretary of State
3. has proper operating authority to operate in Texas

The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

Government

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization is not recognized as the 'legal name'.

Other

This may include a utility district, water district, tribal government, college district, council of governments, or river authority. Provide the specific type of government.

e) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

f) Number of Employees

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

g) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

State Franchise Tax ID Number

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter the Tax ID number.

Federal Tax ID

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

TX SOS Charter (filing) Number

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512-463-5555.

DUNS Number

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

Section 2. APPLICATION CONTACT

Provide the name and contact information for the person that TCEQ can contact for additional information regarding this application.

Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) Regulated Entity Number (RN)

The RN is issued by TCEQ's Central Registry to sites where an activity is regulated by TCEQ. This is not a permit number, registration number, or license number. Search TCEQ's Central Registry to see if the site has an assigned RN at http://www15.tceq.texas.gov/crpub/. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, an RN may already be assigned for the larger site. Use the RN assigned for the larger site.

If the site is found, provide the assigned RN and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

b) Name of the Project or Site

Provide the name of the site or project as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

c) Description of Activity Regulated

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

d) County

Provide the name of the county where the site or project is located. If the site or project is located in more than one county, provide the county names as secondary.

e) Latitude and Longitude

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to: http://www.tceq.texas.gov/gis/sqmaview.html.

f) Site Address/Location

If a site has an address that includes a street number and street name, enter the complete address for the site in *Section A*. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street number and street name, provide a complete written location description in *Section B*. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and zip code of the site location.

Section 4. GENERAL CHARACTERISTICS

a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA Region 6, Dallas. Do not submit this form to TCEQ.

b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas (RRC) and may need to obtain authorization from EPA Region 6.

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the RRC's jurisdiction must be authorized by the EPA and the RRC, as applicable. Activities under RRC jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the RRC; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The RRC also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the RRC. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the RRC prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

For more information about the jurisdictions of the RRC and the TCEQ, read the Memorandum of Understanding (MOU) between the RRC and TCEQ at 16 Texas Administrative Code, Part 1, Chapter 3, Rule 3.30, by entering the following link into an internet browser:
http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30 or contact the TCEQ Stormwater Team at 512-239-4671 for additional information.

c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 – Construction of Single Family Homes
- 1522 – Construction of Residential Buildings Other than Single Family Homes
- 1541 – Construction of Industrial Buildings and Warehouses
- 1542 – Construction of Non-residential Buildings, other than Industrial Buildings and Warehouses
- 1611 – Highway and Street Construction, except Highway Construction
- 1622 – Bridge, Tunnel, and Elevated Highway Construction

- 1623 – Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, enter the following link into your internet browser: http://www.osha.gov/pls/imis/sicsearch.html or you can contact the TCEQ Small Business and Local Government Assistance Section at 800-447-2827 for assistance.

d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave this blank if not applicable. For help with SIC Codes, enter the following link into your internet browser: http://www.osha.gov/pls/imis/sicsearch.html or you can contact the TCEQ Small Business and Environmental Assistance Section at 800-447-2827 for assistance.

e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at 512-239-4671 or by email at swgp@tceq.texas.gov.

f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on what a common plan of development is, refer to the definition of "Common Plan of Development" in the Definitions section of the general permit or enter the following link into your internet browser: www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html

For further information, go to the TCEQ stormwater construction webpage enter the following link into your internet browser: www.tceq.texas.gov/goto/construction and search for "Additional Guidance and Quick Links". If you have any further questions about the Common Plan of Development you can contact the TCEQ Stormwater Team at 512-239-4671 or the TCEQ Small Business and Environmental Assistance at 800-447-2827.

g) Estimated Start Date of the Project

This is the date that any construction activity or construction support activity is initiated at the site. If renewing the permit provide the original start date of when construction activity for this project began.

h) Estimated End Date of the Project

This is the date that any construction activity or construction support activity will end and final stabilization will be achieved at the site.

i) Will concrete truck washout be performed at the site?

Indicate if you expect that operators of concrete trucks will washout concrete trucks at the construction site.

j) Identify the water body(s) receiving stormwater runoff

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

k) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Enter the following link into your internet browser to find the segment number of the classified water body where stormwater will flow from the site: www.tceq.texas.gov/waterquality/monitoring/viewer.html or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

You may also find the segment number in TCEQ publication GI-316 by entering the following link into your internet browser: www.tceq.texas.gov/publications/gi/gi-316 or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at 512-239-4671 for further assistance.

l) Discharge into MS4 - Identify the MS4 Operator

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at 512-239-4671.

m) Discharges to the Edwards Aquifer Recharge Zone and Certification

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer by entering the following link into an internet browser: www.tceq.texas.gov/field/eapp/viewer.html or by contacting the TCEQ Water Quality Division at 512-239-4671 for assistance.

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site-specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

Section 5. NOI CERTIFICATION

Note: Failure to indicate Yes to all of the certification items may result in denial of coverage under the general permit.

a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. Electronic applications submitted through ePermits have immediate provisional coverage. You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site by entering the following link into an internet browser: www.tceq.texas.gov/goto/construction or you may contact the TCEQ Stormwater processing Center at 512-239-3700 for assistance.

b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512-463 5555, for more information related to filing in Texas.

c) Understanding of Notice of Termination

A permittee shall terminate coverage under the Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

Section 6. APPLICANT CERTIFICATION SIGNATURE

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

If you are a corporation:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

If you are a municipality or other government entity:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the TCEQ's Environmental Law Division at 512-239-0600.

30 Texas Administrative Code

§305.44. Signatories to Applications

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the

corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

Texas Commission on Environmental Quality
General Permit Payment Submittal Form

Use this form to submit your Application Fee only if you are mailing your payment.

Instructions:

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- *Do not mail this form with your NOI form.*
- *Do not mail this form to the same address as your NOI.*

Mail this form and your check to either of the following:

By Regular U.S. Mail
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

By Overnight or Express Mail
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

Fee Code: GPA General Permit: TXR150000

1. Check or Money Order No:
2. Amount of Check/Money Order:
3. Date of Check or Money Order:
4. Name on Check or Money Order:
5. NOI Information:

   If the check is for more than one NOI, list each Project or Site (RE) Name and Physical Address exactly as provided on the NOI. **Do not submit a copy of the NOI with this form, as it could cause duplicate permit application entries!**

   If there is not enough space on the form to list all of the projects or sites the authorization will cover, then attach a list of the additional sites.

   Project/Site (RE) Name: 4S Ranch Phase 4

   Project/Site (RE) Physical Address: Approx. 1.5 miles east of Mustang Vista and Stahl Lane intersection, Bulverde, TX 78163

Staple the check or money order to this form in this space.

AGENT AUTHORIZATION FORM (TCEQ-0599)

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

I ***Brian Barron***,
Print Name

Vice President,
Title - Owner/President/Other

of ***Lennar Homes of Texas Land and Development, Ltd.***,
Corporation/Partnership/Entity Name

have authorized ***Pape-Dawson Engineers, Inc.***
Print Name of Agent/Engineer

of ***Pape-Dawson Engineers, Inc.***
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

10/7/19
Date

THE STATE OF Texas §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared Brian Barron 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 7th day of October, 2019.

RENESE COLLIER
Notary Public, State of Texas
Comm. Expires 05-15-2021
Notary ID 125299461

Renese Collier
NOTARY PUBLIC

Renese Collier
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 5/15/21

APPLICATION FEE FORM (TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: 4S Ranch Phase 5
Regulated Entity Location: Approx. 1.7 miles east of Mustang Vista and Stahl Lane, Bulverde, TX
Name of Customer: Lennar Homes of Texas Land and Construction, Ltd.
Contact Person: Brian Barron Phone: (210) 403-6200
Customer Reference Number (if issued):CN 602412207
Regulated Entity Reference Number (if issued):RN 105628622

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☒ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☐ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☐ Recharge Zone ☒ Contributing Zone ☐ Transition Zone

Type of Plan	*Size*	*Fee Due*
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	144.66 Acres	$ 8,000
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	$
Sewage Collection System	L.F.	$
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 10/2/2020

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

CORE DATA FORM
(TCEQ-10400)

TCEQ

TCEQ Core Data Form

TCEQ Use Only

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

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

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

2. Customer Reference Number *(if issued)*		3. Regulated Entity Reference Number *(if issued)*
CN 602412207	Follow this link to search for CN or RN numbers in Central Registry**	RN 105628622

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

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

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

Lennar Homes of Texas Land and Construction, Ltd.

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

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?
☒ Yes ☐ No

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

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:

1922 Dry Creek Way
Suite 101

City	San Antonio	State	TX	ZIP	78259	ZIP + 4	1840

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*
	Brian.Barron@lennar.com

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

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 Information

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.)*

4S Ranch Phase 5

23. Street Address of the Regulated Entity: *(No PO Boxes)*	Not yet assigned							
	City		**State**		**ZIP**		**ZIP + 4**	
24. County	Comal							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Approx 1.7 miles east of Mustang Vista and Stahl Lane intersection

26. Nearest City	**State**	**Nearest ZIP Code**
Bulverde	Texas	78163

27. Latitude (N) In Decimal:	29.771137		**28. Longitude (W) In Decimal:**	-98.385301	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	46	16.1	98	23	07.1

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
1521	1611	236115	237110

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

One phase of a single-family residential subdivision

34. Mailing Address:	1922 Dry Creek Way						
	Suite 101						
	City	San Antonio	**State**	TX	**ZIP**	78259	**ZIP + 4** 1840

35. E-Mail Address:	Brian.Barron@lennar.com

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(210)403- 6200		( ) -

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

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

SECTION IV: Preparer Information

40. Name:	Jean Autrey, P.E. CESSWI	**41. Title:**	Project Engineer

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(210)375-9000		(210) 375-9010	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 Engineers, Inc.	**Job Title:**	Sr. Vice President
Name*(In Print)* :	Trey Dawson, P.E.	**Phone:**	(210) 375 9000
Signature:		**Date:**	10/2/2020

EXHIBITS

POLLUTANT LOAD AND REMOVAL CALCULATIONS

Outlet Pipe Sizing (Manning's Equation for Pipes Flowing Full)							
Basin	Volume Provided (acre-ft)	Volume Provided (ft^3)	Pipe Size (in.)	Pipe Capacity (ft^3/s)	Pipe Slope (%)	Velocity (fps)	Time to Drawdown (hours)
G	11.160	486,144	15	6.387	0.70	5.20	21
J	8.114	353,430	15	5.398	0.50	3.36	18
K	12.440	541,887	15	5.398	0.50	2.44	28

Note: Per RG-348, Pg. 1-107, Section 1.4.13 - Basin Design and Construction, Subsection (10), the riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-year, 3-hour storm. An emergency spillway is being provided for the above basins. The riser pipes are sized for 4.12 inches (2-year, 24-hour storm) which is a greater depth than 2.69 inches (2-year, 3-hour storm) and are therefore appropriately sized.

4S RANCH PHASE 5 BASIN SUMMARY					
BASIN NAME	REQUIRED VOLUME (ft^3)	DESIGNED CAPTURE VOLUME (ft^3)	REQUIRED TSS REMOVAL PLUS OVERTREATMENT (LBS./YR)	DESIGNED TSS REMOVAL (LBS./YR)	REMAINING TSS AVAILABLE (LBS./YR)
E	127,529	154,158	10,702	10,702	-
F	50,365	51,488	11,075	11,075	0
G	164,775	168,838	29,815	29,815	(0)
H	86,225	187,787	7,335	7,335	0
J	117,557	130,244	10,676	10,676	-
K	120,585	269,331	10,676	10,676	-
L	25,922	38,028	2,328	2,328	-
TOTAL	692,958	999,874	82,607	82,607	0

Table 8. Detention Basin Data

Batch Detention Basin E					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1040	0	0.000	0.000	0.000
1	1041	17735	0.407	0.204	0.204
2	1042	83460	1.916	1.162	1.365
2.95	1042.95	115890	2.660	2.174	3.539
3	1043	117040	2.687	0.134	3.673
4	1044	131465	3.018	2.852	6.525
5	1045	138790	3.186	3.102	9.627
6	1046	147210	3.379	3.283	12.910
7	1047	157040	3.605	3.492	16.402
7.1	1047.1	158745	3.644	0.362	16.765
8	1048	166995	3.834	3.365	20.130
8.15	1048.15	168675	3.872	0.578	20.708

Notes:

1. Weir elevation = 1042.95
2. 100-year WSEL= 1047.1
3. Required water quality volume for batch detention basin = 2.928 acre-ft (127,529 ft^3), 3.539 acre-ft provided.
4. 20% of Batch Detention Basin E calculated required volume = 1.2 x 16.765 AC-FT = 20.118 AC-FT. Provided volume of Batch Detention Basin E = 20.708 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Batch Detention Basin F					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1044	0	0.000	0.000	0.000
1	1045	14165	0.325	0.163	0.163
2	1046	36410	0.836	0.581	0.743
2.5	1046.5	40080	0.920	0.439	1.182
3	1047	42740	0.981	0.475	1.657
4	1048	47400	1.088	1.035	2.692
5	1049	51700	1.187	1.138	3.830
5.3	1049.3	52870	1.214	0.360	4.190
6	1050	56175	1.290	0.876	5.066

Notes:

1. Weir elevation = 1046.5
2. 100-year WSEL= 1049.3
3. Required water quality volume for batch detention basin = 1.156 acre-ft (50,365 ft^3), 1.182 acre-ft provided.
4. 20% of Batch Detention Basin F calculated required volume = 1.2 x 4.190 AC-FT = 5.028 AC-FT. Provided volume of Batch Detention Basin F = 5.066 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Table 8. Detention Basin Data

Batch Detention Basin G					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0.0	1053.5	0	0.000	0.000	0.000
0.5	1054	2730	0.063	0.016	0.016
1.5	1055	17480	0.401	0.232	0.248
2.5	1056	35400	0.813	0.607	0.855
3.5	1057	52475	1.205	1.009	1.863
4.5	1058	60995	1.400	1.302	3.166
5.0	1058.5	62680	1.439	0.710	3.876
5.5	1059	64360	1.478	0.729	4.605
6.5	1060	67825	1.557	1.517	6.122
7.5	1061	71330	1.638	1.597	7.719
7.8	1061.3	72730	1.670	0.496	8.215
8.0	1061.5	73065	1.677	0.335	8.550
8.5	1062	74900	1.719	0.849	9.399
9.5	1063	78530	1.803	1.761	11.160

Notes:

1. Weir elevation = 1058.5
2. 100-year WSEL= 1061.5
3. Required water quality volume for batch detention basin = 3.783 acre-ft (164,775 ft^3), 3.876 acre-ft provided.
4. 20% of Batch Detention Basin G calculated required volume = 1.2 x 8.550 AC-FT = 10.260 AC-FT. Provided volume of Batch Detention Basin G = 11.160 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Batch Detention Basin H					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1045	0	0.000	0.000	0.000
1	1046	17735	0.407	0.204	0.204
2	1047	42700	0.980	0.694	0.897
3	1048	47190	1.083	1.032	1.929
4	1049	51840	1.190	1.137	3.066
5	1050	56680	1.301	1.246	4.311
6	1051	61960	1.422	1.362	5.673
7	1052	66921	1.536	1.479	7.153
7.9	1052.9	71675	1.645	1.432	8.584
8	1053	72130	1.656	0.165	8.749
9	1054	77275	1.774	1.715	10.464

Notes:

1. Weir elevation = 1050.0
2. 100-year WSEL= 1052.9
3. Required water quality volume for batch detention basin = 1.979 acre-ft (86,225 ft^3), 4.311 acre-ft provided.
4. 20% of Batch Detention Basin H calculated required volume = 1.2 x 8.584 AC-FT = 10.301 AC-FT. Provided volume of Batch Detention Basin H = 10.464 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Table 8. Detention Basin Data

Batch Detention Basin J					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1050	0	0.000	0.000	0.000
1	1051	12895	0.296	0.148	0.148
2	1052	30665	0.704	0.500	0.648
3	1053	32860	0.754	0.729	1.377
4	1054	35120	0.806	0.780	2.157
5	1055	37440	0.860	0.833	2.990
6	1056	39840	0.915	0.887	3.877
7	1057	42305	0.971	0.943	4.820
8	1058	44810	1.029	1.000	5.820
9	1059	47425	1.089	1.059	6.879
10	1060	50095	1.150	1.119	7.998
10.1	1060.1	50355	1.156	0.115	8.114
11	1061	52740	1.211	1.065	9.179
11.5	1061.5	54085	1.242	0.613	9.792

Notes:

1. Weir elevation = 1056.25
2. 100-year WSEL= 1060.1
3. Required water quality volume for batch detention basin = 2.699 acre-ft (117,557 ft^3), 2.990 acre-ft provided.
4. 20% of Batch Detention Basin J calculated required volume = 1.2 x 8.114 AC-FT = 9.737 AC-FT. Provided volume of Batch Detention Basin J = 9.792 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Batch Detention Basin K					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1056	0	0.000	0.000	0.000
1	1057	9320	0.214	0.107	0.107
2	1058	40305	0.925	0.570	0.677
3	1059	80520	1.848	1.387	2.063
4	1060	91480	2.100	1.974	4.038
5	1061	95455	2.191	2.146	6.183
6	1062	99495	2.284	2.238	8.421
7	1063	103595	2.378	2.331	10.752
7.7	1063.7	106445	2.444	1.688	12.440
8	1064	107760	2.474	0.738	13.178
9	1065	111990	2.571	2.522	15.700

Notes:

1. Weir elevation = 1061.0
2. 100-year WSEL= 1063.7
3. Required water quality volume for batch detention basin = 2.768 acre-ft (120,585 ft^3), 6.183 acre-ft provided.
4. 20% of Batch Detention Basin J calculated required volume = 1.2 x 12.440 AC-FT = 14.928 AC-FT. Provided volume of Batch Detention Basin K = 15.700 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Table 8. Detention Basin Data

Batch Detention Basin L					
Stage	Elevation	Contour Area (SF)	Contour Area (AC)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1091	0	0.000	0.000	0.000
1	1092	6505	0.149	0.075	0.075
2	1093	7540	0.173	0.161	0.236
3	1094	8650	0.199	0.186	0.422
4	1095	9815	0.225	0.212	0.634
5	1096	11045	0.254	0.239	0.873
6	1097	12340	0.283	0.268	1.142
7	1098	13695	0.314	0.299	1.440
7.8	1098.8	14830	0.340	0.262	1.702
8	1099	15115	0.347	0.069	1.771
8.8	1099.8	16410	0.377	0.289	2.061

Notes:

1. Weir elevation = 1097.0
2. 100-year WSEL= 1098.8
3. Required water quality volume for batch detention basin = 0.595 acre-ft (25,922 ft^3), 0.873 acre-ft provided.
4. 20% of Batch Detention Basin J calculated required volume = 1.2 x 1.702 AC-FT = 2.042 AC-FT. Provided volume of Batch Detention Basin J = 2.061 AC-FT. Meets the 20% additional volume required by the City of Bulverde Drainage Manual.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "E"**
Date Prepared: **9/14/2020**

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

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**B**	
Total drainage basin/outfall area =	**27.50**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**10.08**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.37**	
$L_{M\ THIS\ BASIN}$ =	**9048**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

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

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

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

where:

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

A_C =	**27.50**	acres
A_I =	**10.08**	acres
A_P =	**17.42**	acres
L_R =	**10756**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**10702**	lbs.
F =	**0.99**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	**3.66**	inches
Post Development Runoff Coefficient =	**0.29**	
On-site Water Quality Volume =	**106274**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**21255**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**127529**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	**127529**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "F"**
Date Prepared: **9/14/2020**

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

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**C**	
Total drainage basin/outfall area =	**24.30**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**12.28**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.51**	
$L_{M\ THIS\ BASIN}$ =	**11023**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

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

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

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

where:

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

A_C =	**24.30**	acres
A_I =	**12.28**	acres
A_P =	**12.02**	acres
L_R =	**12954**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**11075**	lbs.
F =	**0.85**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	**1.32**	inches
Post Development Runoff Coefficient =	**0.36**	
On-site Water Quality Volume =	**41970**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**8394**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**50365**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	**50365**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "G"**
Date Prepared: **9/14/2020**

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

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
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PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**G1**	
Total drainage basin/outfall area =	**74.61**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**31.39**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.42**	
$L_{M\ THIS\ BASIN}$ =	**28176**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

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

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

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

where:

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

A_C =	**74.61**	acres
A_I =	**31.39**	acres
A_P =	**43.22**	acres
L_R =	**33316**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	29815	lbs.
F =	0.89	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.60	inches
Post Development Runoff Coefficient =	0.32	
On-site Water Quality Volume =	137312	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	27462	
Total Capture Volume (required water quality volume(s) x 1.20) =	164775	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	164775	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "H"**
Date Prepared: **9/14/2020**

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
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PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**H**	
Total drainage basin/outfall area =	**18.16**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**6.92**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.38**	
$L_{M\ THIS\ BASIN}$ =	**6211**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

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

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

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

where:

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

A_C =	**18.16**	acres
A_I =	**6.92**	acres
A_P =	**11.24**	acres
L_R =	**7372**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**7335**	lbs.
F =	**0.99**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	**3.66**	inches
Post Development Runoff Coefficient =	**0.30**	
On-site Water Quality Volume =	**71854**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**14371**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**86225**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	**86225**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "J"**
Date Prepared: **9/14/2020**

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**M**	
Total drainage basin/outfall area =	**21.42**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**10.18**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.48**	
$L_{M\ THIS\ BASIN}$ =	**9138**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	**Extended Detention**	
Removal efficiency =	**91**	percent

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

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

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

where:

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

A_C =	**21.42**	acres
A_I =	**10.18**	acres
A_P =	**11.24**	acres
L_R =	**10760**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**10676**	lbs.
F =	**0.99**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	**3.66**	inches
Post Development Runoff Coefficient =	**0.34**	
On-site Water Quality Volume =	**97964**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**19593**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**117557**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	**117557**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "K"**
Date Prepared: **9/14/2020**

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
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112792
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PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**S**	
Total drainage basin/outfall area =	**23.53**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**10.12**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.43**	
$L_{M\ THIS\ BASIN}$ =	**9084**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

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

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

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

where:

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

A_C =	**23.53**	acres
A_I =	**10.12**	acres
A_P =	**13.41**	acres
L_R =	**10733**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	10676	lbs.
F =	0.99	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	3.66	inches
Post Development Runoff Coefficient =	0.32	
On-site Water Quality Volume =	100488	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	20098	
Total Capture Volume (required water quality volume(s) x 1.20) =	120585	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =	NA	cubic feet

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =	120585	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **BASIN "L"**
Date Prepared: **9/14/2020**

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
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112792
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10/5/2020

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

Drainage Basin/Outfall Area No. =	**T**	
Total drainage basin/outfall area =	**4.90**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**2.21**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.45**	
$L_{M\ THIS\ BASIN}$ =	**1984**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	**Extended Detention**	
Removal efficiency =	**91**	percent

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

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

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

where:

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

A_C =	**4.90**	acres
A_I =	**2.21**	acres
A_P =	**2.69**	acres
L_R =	**2340**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = **2328** lbs.

F = **0.99**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	**3.66**	inches
Post Development Runoff Coefficient =	**0.33**	
On-site Water Quality Volume =	**21602**	cubic feet

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

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**4320**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**25922**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **25922** cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **R1 - VFS #1**
Date Prepared: **9/14/2020**

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

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

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

where:

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

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

County =	Comal	
Total project area included in plan * =	144.66	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	94.68	acres
Total post-development impervious cover fraction * =	0.65	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	**84985**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**R1**	
Total drainage basin/outfall area =	**2.62**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**1.26**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.48**	
$L_{M\ THIS\ BASIN}$ =	**1131**	lbs.

3. Indicate the proposed BMP Code for this basin.

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

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

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

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

where:

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

A_C =	**2.62**	acres
A_I =	**1.26**	acres
A_P =	**1.36**	acres
L_R =	**1243**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	1131	lbs.
F =	0.91	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.80	inches
Post Development Runoff Coefficient =	0.35	
On-site Water Quality Volume =	5944	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	1189	
Total Capture Volume (required water quality volume(s) x 1.20) =	7133	cubic feet

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

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **R2 - VFS #2**
Date Prepared: **9/14/2020**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**84985**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**R2**	
Total drainage basin/outfall area =	**0.52**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.27**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.52**	
$L_{M\ THIS\ BASIN}$ =	**242**	lbs.

3. Indicate the proposed BMP Code for this basin.

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

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

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

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

where:

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

A_C =	**0.52**	acres
A_I =	**0.27**	acres
A_P =	**0.25**	acres
L_R =	**266**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	242	lbs.
F =	0.91	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.80	inches
Post Development Runoff Coefficient =	0.37	
On-site Water Quality Volume =	1251	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	250	
Total Capture Volume (required water quality volume(s) x 1.20) =	1502	cubic feet

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

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **R3 - VFS #3**
Date Prepared: **9/14/2020**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

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

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

where:

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

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

County =	**Comal**	
Total project area included in plan * =	**144.66**	acres
Predevelopment impervious area within the limits of the plan * =	**0.00**	acres
Total post-development impervious area within the limits of the plan* =	**94.68**	acres
Total post-development impervious cover fraction * =	**0.65**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**84985**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**R3**	
Total drainage basin/outfall area =	**1.00**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.40**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.40**	
$L_{M\ THIS\ BASIN}$ =	**359**	lbs.

3. Indicate the proposed BMP Code for this basin.

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

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

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

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

where:

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

A_C =	**1.00**	acres
A_I =	**0.40**	acres
A_P =	**0.60**	acres
L_R =	**397**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	359	lbs.
F =	0.90	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.70	inches
Post Development Runoff Coefficient =	0.31	
On-site Water Quality Volume =	1894	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	379	
Total Capture Volume (required water quality volume(s) x 1.20) =	2273	cubic feet

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

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **O - VFS #4**
Date Prepared: **9/14/2020**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

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

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

where:

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

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

County =	Comal	
Total project area included in plan * =	144.66	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	94.68	acres
Total post-development impervious cover fraction * =	0.65	
P =	33	inches

$L_{M\ TOTAL\ PROJECT}$ = **84985** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **25**

STATE OF TEXAS
EUGENE H. DAWSON, III
112792
LICENSED
PROFESSIONAL ENGINEER

10/5/2020

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

Drainage Basin/Outfall Area No. =	**O**	
Total drainage basin/outfall area =	**1.88**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.72**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.38**	
$L_{M\ THIS\ BASIN}$ =	**646**	lbs.

3. Indicate the proposed BMP Code for this basin.

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

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

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

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

where:

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

A_C =	**1.88**	acres
A_I =	**0.72**	acres
A_P =	**1.16**	acres
L_R =	**716**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	646	lbs.
F =	0.90	

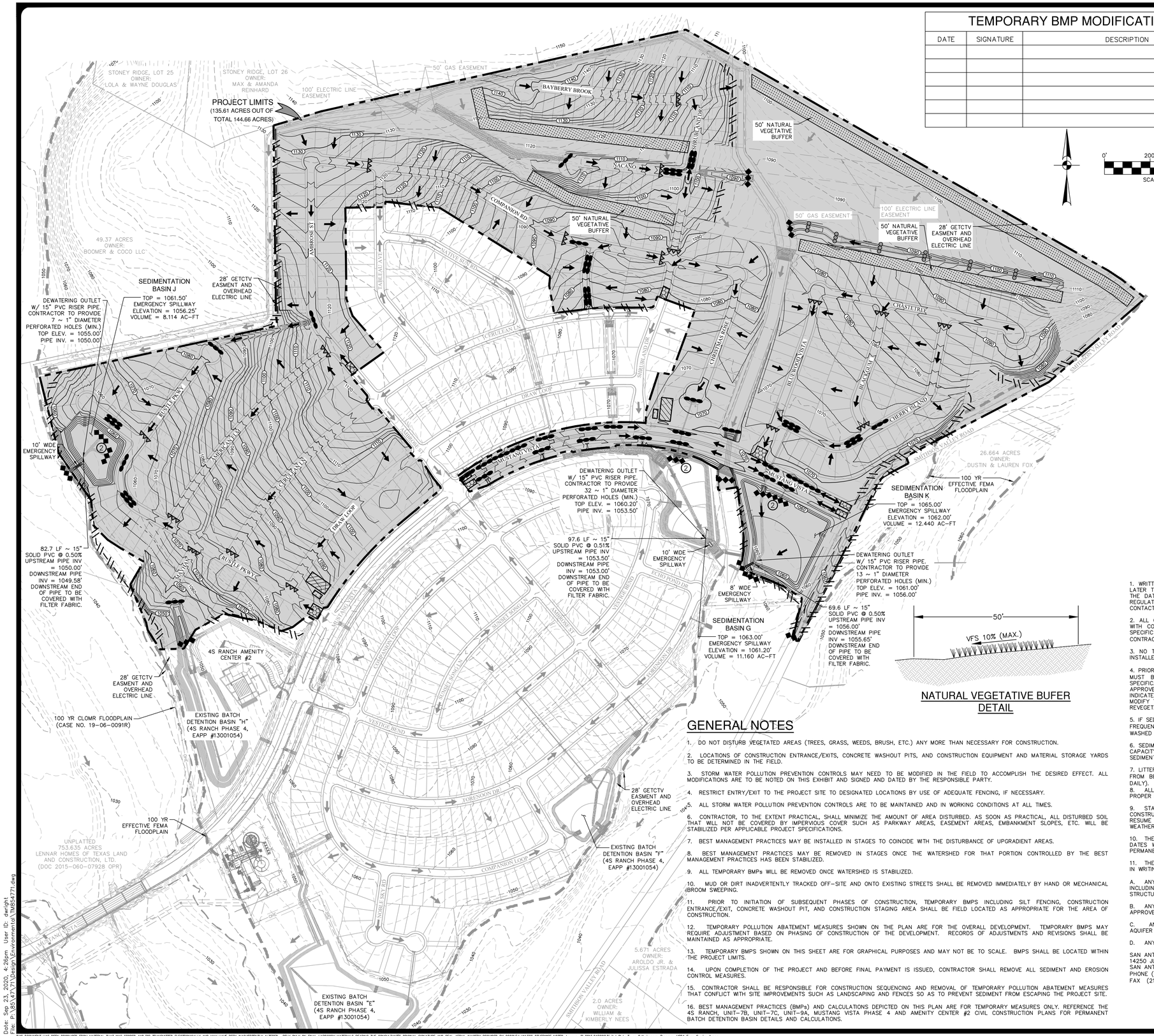
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.70	inches
Post Development Runoff Coefficient =	0.30	
On-site Water Quality Volume =	3466	cubic feet

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

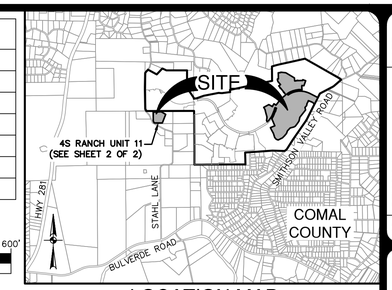
Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	693	
Total Capture Volume (required water quality volume(s) x 1.20) =	4159	cubic feet

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



TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION



LOCATION MAP

NOT-TO-SCALE

LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR (976)
- PROPOSED CONTOUR (970)
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- PHASE 1 ROCK BERM (BERMS ARE TO SPAN ACROSS ENTIRE CHANNEL AND WEIR WIDTHS)
- PHASE 2 ROCK BERM (BERMS ARE TO BE INSTALLED DOWNSTREAM OF CULVERT CROSSINGS AND WITHIN CHANNELS AS SHOWN AFTER THE PROPOSED DRAINAGE IMPROVEMENT UPSTREAM OF THE BERM IS CONSTRUCTED.) (2)
- GRAVEL FILTER BAGS
- EARTHEN BERM W/POLYLINER AND SPILLWAY (BERMS ARE TO SPAN ACROSS PROPOSED STREET SECTION APPROX. 30-FEET WIDE FROM CURB TO CURB)
- GRAVEL BAG BERM (CAN BE REMOVED ONCE CHANNEL IS STABILIZED OR RIP-RAP IS IN PLACE)
- GRATE INLET PROTECTION
- SEDIMENT CONTROL ROLLS
- LIMITS OF DISTURBED AREA
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- NATURAL VEGETATIVE BUFFER

NATURAL VEGETATIVE BUFER DETAIL

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. LOCATIONS OF CONSTRUCTION ENTRANCE/EXITS, CONCRETE WASHOUT PITS, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARDS 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. CONTRACTOR, TO THE EXTENT PRACTICAL, SHALL MINIMIZE THE AMOUNT OF AREA DISTURBED. 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.

7. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS.

8. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED.

9. ALL TEMPORARY BMPs WILL BE REMOVED ONCE WATERSHED IS STABILIZED.

10. MUD OR DIRT INADVERTENTLY TRACKED OFF-SITE AND ONTO EXISTING STREETS SHALL BE REMOVED IMMEDIATELY BY HAND OR MECHANICAL (BROOM SWEEPING.

11. PRIOR TO INITIATION OF SUBSEQUENT PHASES OF CONSTRUCTION, TEMPORARY BMPS INCLUDING SILT FENCING, CONSTRUCTION ENTRANCE/EXIT, CONCRETE WASHOUT PIT, AND CONSTRUCTION STAGING AREA SHALL BE FIELD LOCATED AS APPROPRIATE FOR THE AREA OF CONSTRUCTION.

12. TEMPORARY POLLUTION ABATEMENT MEASURES SHOWN ON THE PLAN ARE FOR THE OVERALL DEVELOPMENT. TEMPORARY BMPS MAY REQUIRE ADJUSTMENT BASED ON PHASING OF CONSTRUCTION OF THE DEVELOPMENT. RECORDS OF ADJUSTMENTS AND REVISIONS SHALL BE MAINTAINED AS APPROPRIATE.

13. TEMPORARY BMPS SHOWN ON THIS SHEET ARE FOR GRAPHICAL PURPOSES AND MAY NOT BE TO SCALE. BMPS SHALL BE LOCATED WITHIN THE PROJECT LIMITS.

14. UPON COMPLETION OF THE PROJECT AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES.

15. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SEQUENCING AND REMOVAL OF TEMPORARY POLLUTION ABATEMENT MEASURES THAT CONFLICT WITH SITE IMPROVEMENTS SUCH AS LANDSCAPING AND FENCES SO AS TO PREVENT SEDIMENT FROM ESCAPING THE PROJECT SITE.

16. BEST MANAGEMENT PRACTICES (BMPs) AND CALCULATIONS DEPICTED ON THIS PLAN ARE FOR TEMPORARY MEASURES ONLY. REFERENCE THE 4S RANCH, UNIT-7B, UNIT-7C, UNIT-9A, MUSTANG VISTA PHASE 4 AND AMENITY CENTER #2 CIVIL CONSTRUCTION PLANS FOR PERMANENT BATCH DETENTION BASIN DETAILS AND CALCULATIONS.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CONTRIBUTING ZONE PLAN
GENERAL CONSTRUCTION NOTES

1. WRITTEN CONSTRUCTION NOTIFICATION SHOULD BE PROVIDED TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION SHOULD INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR WITH THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT SHOULD BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED CONTRIBUTING ZONE PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTOR(S) SHOULD KEEP COPIES OF THE APPROVED PLAN AND APPROVAL LETTER ON-SITE.

3. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM MAY BE INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL.

4. PRIOR TO COMMENCING CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE SWPPP SECTION OF THE APPROVED EDWARDS AQUIFER CONTRIBUTING ZONE PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.

5. 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).

6. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.

7. 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).

8. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE AND STORED ON-SITE MUST HAVE PROPER E&S CONTROLS INSTALLED.

9. 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.

10. THE FOLLOWING RECORDS SHOULD BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

11. THE HOLDER OF ANY APPROVED CONTRIBUTING ZONE 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 BEST MANAGEMENT PRACTICES OR STRUCTURE(S), INCLUDING BUT NOT LIMITED TO TEMPORARY OR PERMANENT PONDS, DAMS, BERMS, SILT FENCES, AND DIVERSIONARY STRUCTURES;

B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED;

C. ANY CHANGE THAT WOULD SIGNIFICANTLY IMPACT THE ABILITY TO PREVENT POLLUTION OF THE EDWARDS AQUIFER AND HYDROLOGICALLY CONNECTED SURFACE WATER; OR

D. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED IN A CONTRIBUTING ZONE PLAN AS UNDEVELOPED.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329

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

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

EXHIBIT 1A

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5. COMAL CO. WCID NO.6

BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN

TEMPORARY POLLUTION PREVENTION PLAN

PLAT NO.
JOB NO. 8547-71
DATE SEPTEMBER 2020
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 1 OF 2

Date: Sep 23, 2020, 4:26pm User ID: dwright
File: P:\85\47\71\Design\Environmental\TM854771.dwg

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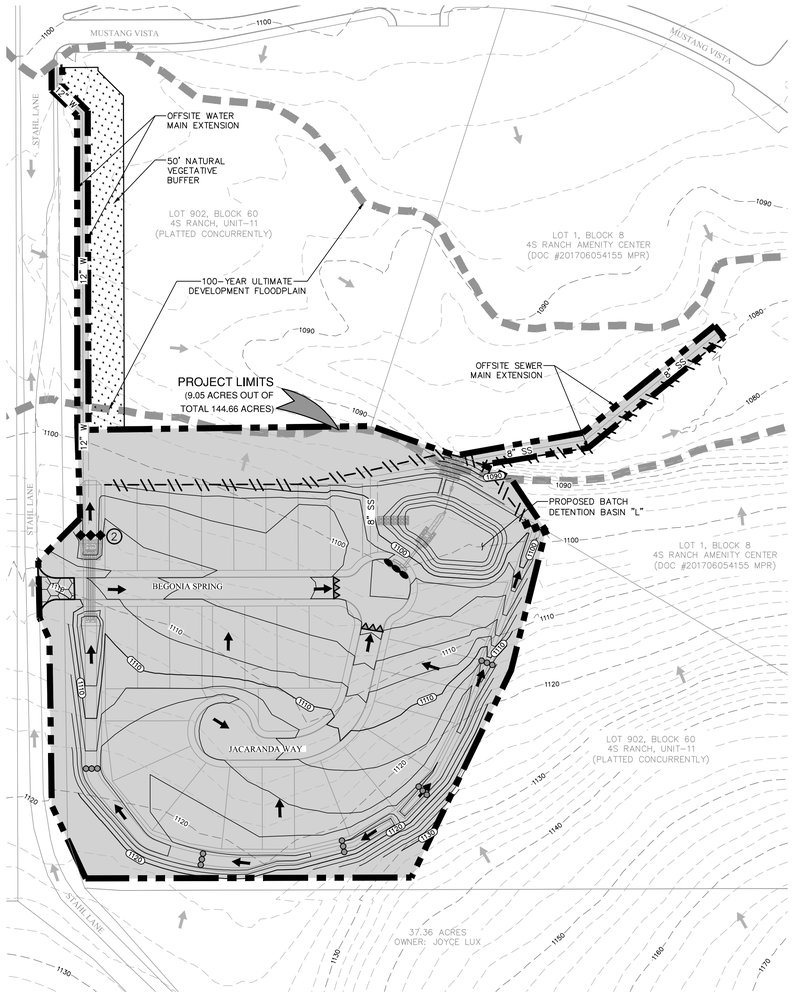
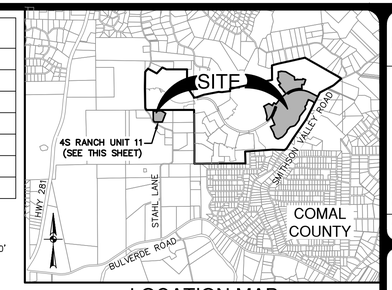


4S RANCH UNIT 11

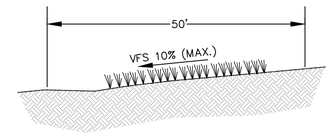
TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION



LOCATION MAP
NOT-TO-SCALE

0' 100' 200' 300'
SCALE: 1"= 100'



NATURAL VEGETATIVE BUFER DETAIL

LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR (976)
- PROPOSED CONTOUR (970)
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- PHASE 1 ROCK BERM (BERMS ARE TO SPAN ACROSS ENTIRE CHANNEL AND WEIR WIDTHS)
- PHASE 2 ROCK BERM (BERMS ARE TO BE INSTALLED DOWNSTREAM OF CULVERT CROSSINGS AND WITHIN CHANNELS AS SHOWN AFTER THE PROPOSED DRAINAGE IMPROVEMENT UPSTREAM OF THE BERM IS CONSTRUCTED.) (2)
- GRAVEL FILTER BAGS
- EARTHEN BERM W/POLYLINER AND SPILLWAY (BERMS ARE TO SPAN ACROSS PROPOSED STREET SECTION APPROX. 30-FEET WIDE FROM CURB TO CURB)
- GRAVEL BAG BERM (CAN BE REMOVED ONCE CHANNEL IS STABILIZED OR RIP-RAP IS IN PLACE)
- GRATE INLET PROTECTION
- SEDIMENT CONTROL ROLLS
- LIMITS OF DISTURBED AREA
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CONTRIBUTING ZONE PLAN
GENERAL CONSTRUCTION NOTES

1. WRITTEN CONSTRUCTION NOTIFICATION SHOULD BE PROVIDED TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION SHOULD INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR WITH THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT SHOULD BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED CONTRIBUTING ZONE PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTOR(S) SHOULD KEEP COPIES OF THE APPROVED PLAN AND APPROVAL LETTER ON-SITE.

3. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM MAY BE INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL.

4. PRIOR TO COMMENCING CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE SWPPP SECTION OF THE APPROVED EDWARDS AQUIFER CONTRIBUTING ZONE PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.

5. 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).

6. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.

7. 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).

8. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE AND STORED ON-SITE MUST HAVE PROPER E&S CONTROLS INSTALLED.

9. 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.

10. THE FOLLOWING RECORDS SHOULD BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

11. THE HOLDER OF ANY APPROVED CONTRIBUTING ZONE 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 BEST MANAGEMENT PRACTICES OR STRUCTURE(S), INCLUDING BUT NOT LIMITED TO TEMPORARY OR PERMANENT PONDS, DAMS, BERMS, SILT FENCES, AND DIVERSIONARY STRUCTURES;

B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED;

C. ANY CHANGE THAT WOULD SIGNIFICANTLY IMPACT THE ABILITY TO PREVENT POLLUTION OF THE EDWARDS AQUIFER AND HYDROLOGICALLY CONNECTED SURFACE WATER; OR

D. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED IN A CONTRIBUTING ZONE PLAN AS UNDEVELOPED.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233–4480
PHONE (210) 490–3096
FAX (210) 545–4329

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. LOCATIONS OF CONSTRUCTION ENTRANCE/EXITS, CONCRETE WASHOUT PITS, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARDS 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. CONTRACTOR, TO THE EXTENT PRACTICAL, SHALL MINIMIZE THE AMOUNT OF AREA DISTURBED. 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.

7. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS.

8. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED.

9. ALL TEMPORARY BMPs WILL BE REMOVED ONCE WATERSHED IS STABILIZED.

10. MUD OR DIRT INADVERTENTLY TRACKED OFF-SITE AND ONTO EXISTING STREETS SHALL BE REMOVED IMMEDIATELY BY HAND OR MECHANICAL BROOM SWEEPING.

11. PRIOR TO INITIATION OF SUBSEQUENT PHASES OF CONSTRUCTION, TEMPORARY BMPS INCLUDING SILT FENCING, CONSTRUCTION ENTRANCE/EXIT, CONCRETE WASHOUT PIT, AND CONSTRUCTION STAGING AREA SHALL BE FIELD LOCATED AS APPROPRIATE FOR THE AREA OF CONSTRUCTION.

12. TEMPORARY POLLUTION ABATEMENT MEASURES SHOWN ON THE PLAN ARE FOR THE OVERALL DEVELOPMENT. TEMPORARY BMPS MAY REQUIRE ADJUSTMENT BASED ON PHASING OF CONSTRUCTION OF THE DEVELOPMENT. RECORDS OF ADJUSTMENTS AND REVISIONS SHALL BE MAINTAINED AS APPROPRIATE.

13. TEMPORARY BMPS SHOWN ON THIS SHEET ARE FOR GRAPHICAL PURPOSES AND MAY NOT BE TO SCALE. BMPS SHALL BE LOCATED WITHIN THE PROJECT LIMITS.

14. UPON COMPLETION OF THE PROJECT AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES.

15. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SEQUENCING AND REMOVAL OF TEMPORARY POLLUTION ABATEMENT MEASURES THAT CONFLICT WITH SITE IMPROVEMENTS SUCH AS LANDSCAPING AND FENCES SO AS TO PREVENT SEDIMENT FROM ESCAPING THE PROJECT SITE.

16. BEST MANAGEMENT PRACTICES (BMPs) AND CALCULATIONS DEPICTED ON THIS PLAN ARE FOR TEMPORARY MEASURES ONLY. REFERENCE THE 4S RANCH, UNIT-7B, UNIT-7C, UNIT-9A, MUSTANG VISTA PHASE 4 AND AMENITY CENTER #2 CIVIL CONSTRUCTION PLANS FOR PERMANENT BATCH DETENTION BASIN DETAILS AND CALCULATIONS.

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

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

EXHIBIT 1B

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112792
LICENSED
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4S RANCH PHASE 5. COMAL CO. WCID NO.6
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Date: Sep 23, 2020, 4:28pm User ID: dwright
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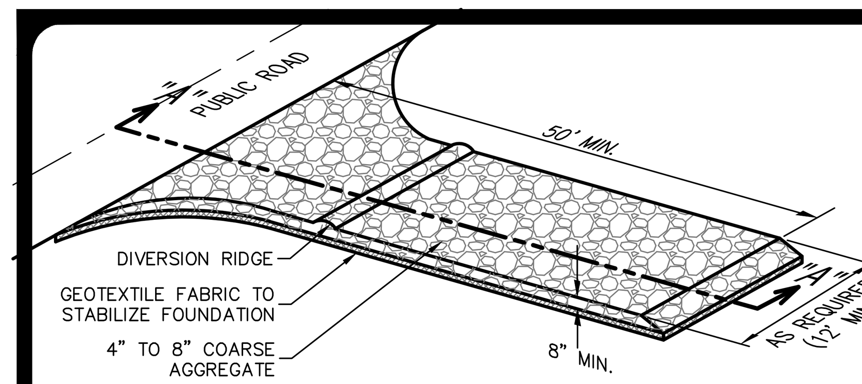
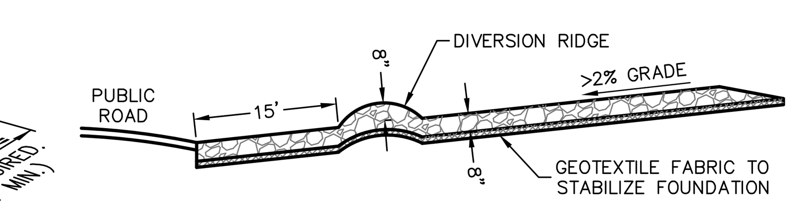


SCHEMATIC OF TEMPORARY CONSTRUCTION ENTRANCE/EXIT



SECTION "A-A" OF A CONSTRUCTION ENTRANCE/EXIT

MATERIALS
1. THE AGGREGATE SHOULD CONSIST OF 4-INCH TO 8-INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.

2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8-INCHES.

3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD², A MULLEN BURST RATING OF 140 LB/IN², AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.

4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4-INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

INSTALLATION
1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.

2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.

3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.

4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6-INCHES TO 8-INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.

5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.

6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.

7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN.

8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

COMMON TROUBLE POINTS
1. INADEQUATE RUNOFF CONTROL-SEDIMENT WASHES ONTO PUBLIC ROAD.

2. STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL.

3. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC-EXTEND PAD BEYOND THE MINIMUM 50-FOOT LENGTH AS NECESSARY.

4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD.

5. UNSTABLE FOUNDATION – USE GEOTEXTILE FABRIC UNDER PAD AND/OR IMPROVE FOUNDATION DRAINAGE.

INSPECTION AND MAINTENANCE GUIDELINES
1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.

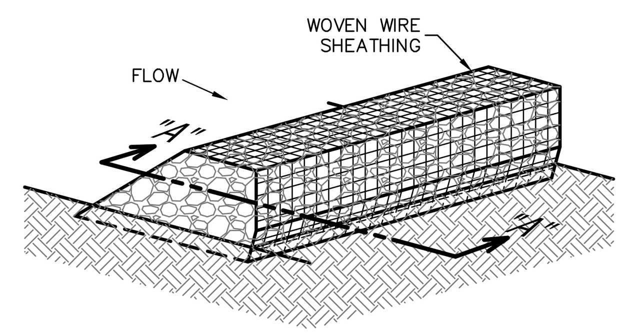
3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

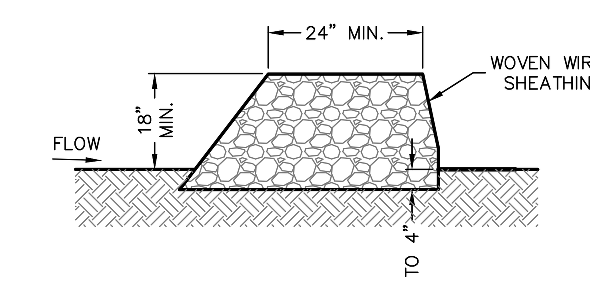
5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

NOT-TO-SCALE



ISOMETRIC PLAN VIEW



SECTION "A-A"

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

2. 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.

4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.

5. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

MATERIALS
1. 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.

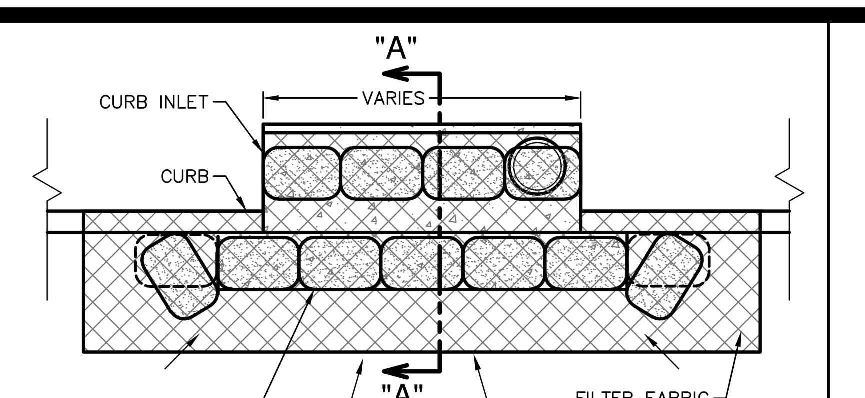
6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

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

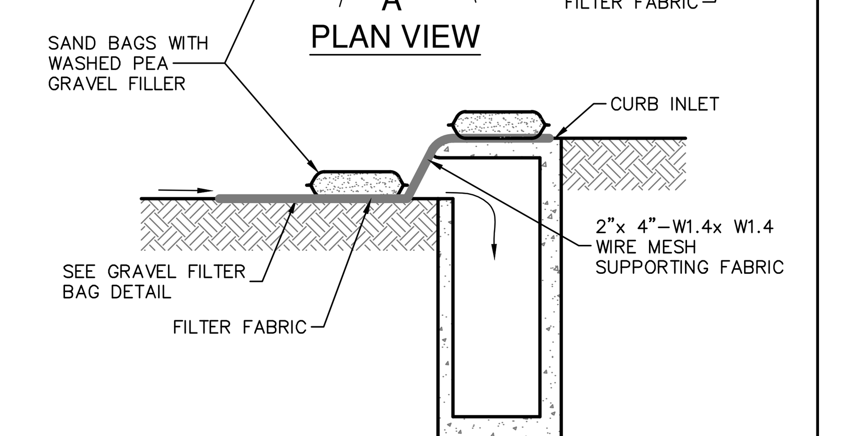
2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).

ROCK BERM DETAIL

NOT-TO-SCALE



PLAN VIEW



SECTION "A-A"

GENERAL NOTES
1. CONTRACTOR TO INSTALL 2"x4"-W1.4xW1.4 WIRE MESH SUPPORTING FILTER FABRIC OVER THE INLET OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR WIRE TIES AT THIS LOCATION. SAND BAGS FILLED WITH WASHED PEA GRAVEL SHOULD BE PLACED ON TOP OF WIRE MESH ON TOP OF THE INLET AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SANDBAGS FILLED WITH WASHED PEA GRAVEL SHOULD ALSO BE PLACED ALONG THE GUTTER AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SAND BAGS TO BE TIGHTLY ABUTTED AGAINST EACH OTHER TO FORM A CONTINUOUS BARRIER AROUND INLETS.

2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.

INSPECTION AND MAINTENANCE GUIDELINES
1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

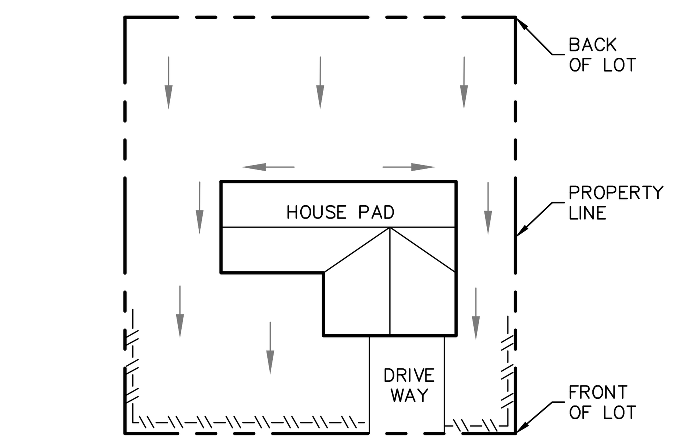
3. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.

4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.

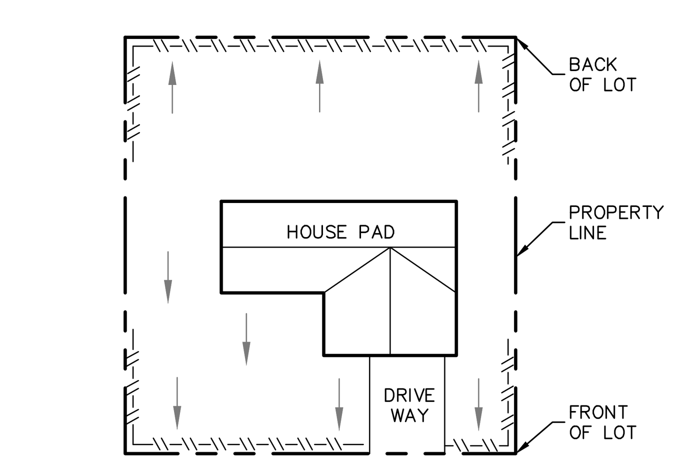
5. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

BAGGED GRAVEL CURB INLET PROTECTION DETAIL

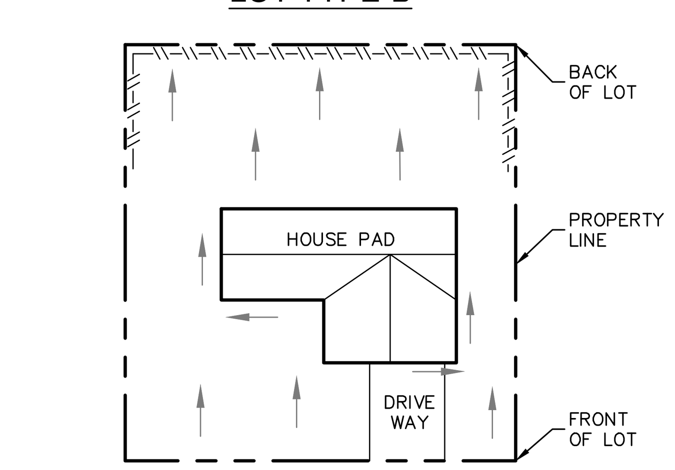
NOT-TO-SCALE



LOT TYPE-A



LOT TYPE-B



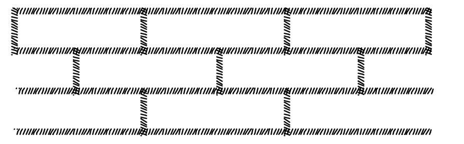
LOT TYPE-C

NOTE: SILT FENCE TO BE INSTALLED PER THESE DETAILS AND LOCATED ON THE DOWNGRADIENT SIDE OF EACH LOT LINE OR LIMITS OF CLEARING AS GENERALLY SHOWN ON THE OVERALL SITE PLAN.

LEGEND
—\\—\\—\\— SILT FENCE
← DRAINAGE FLOW

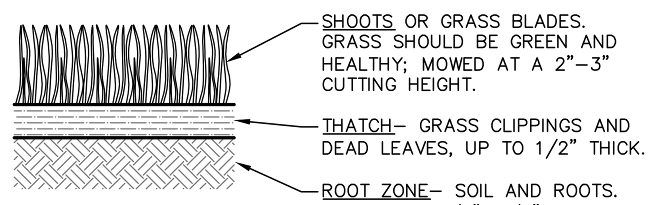
TYPICAL HOUSE LOT LAYOUTS

NOT-TO-SCALE



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.

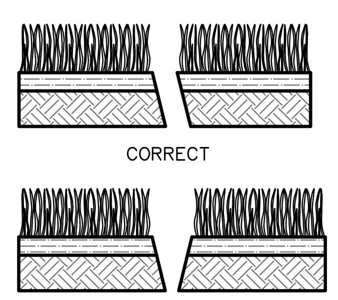


APPEARANCE OF GOOD SOD

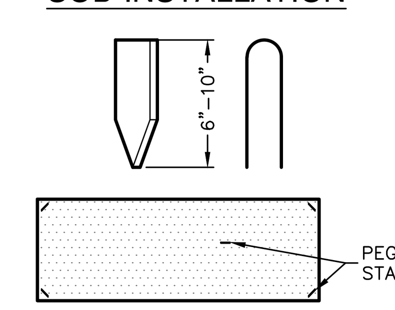
NOTES:
1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

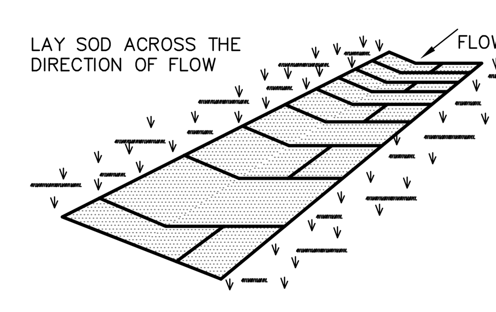
3. MOW WHEN THE SOD IS ESTABLISHED – IN 2-3 WEEKS. SET THE MOWER HIGH (2"-3").

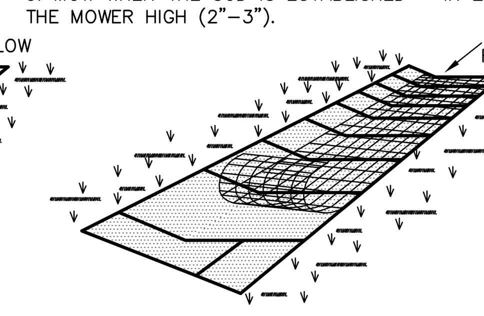


SOD INSTALLATION



USE PEGS OR STAPLES TO FASTEN SOD FIRMLY – AT THE ENDS OF STRIPS AND IN THE CENTER, OR EVERY 3-4 FEET IF THE STRIPS ARE LONG. WHEN READY TO MOW, DRIVE PEGS OR STAPLES FLUSH WITH THE GROUND.





IN CRITICAL AREAS, SECURE SOD WITH NETTING. USE STAPLES.

MATERIALS
1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

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

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS
1. SOD STRIPS IN WATERWAYS SHOULD BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY (SEE FIGURE ABOVE).

2. AFTER ROLLING OR TAMPING, SOD SHOULD BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.

GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)
1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS (SEE FIGURE ABOVE).

4. ON SLOPES 3:1 OR GREATER, OR WHEREVER EROSION MAY BE A PROBLEM, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. AFTER ROLLING, SOD SHOULD BE IRRIGATED TO A DEPTH SUFFICIENT THAT THE UNDERSIDE OF THE SOD PAD AND THE SOIL 4 INCHES BELOW THE SOD IS THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

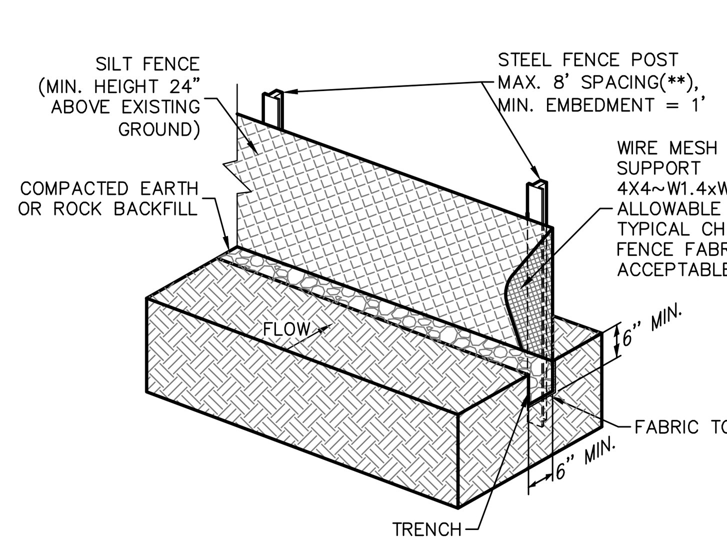
8. THE FIRST MOWING SHOULD NOT BE ATTEMPTED UNTIL THE SOD IS FIRMLY ROOTED, USUALLY 2-3 WEEKS. NOT MORE THAN ONE THIRD OF THE GRASS LEAF SHOULD BE REMOVED AT ANY ONE CUTTING.

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

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

SOD INSTALLATION DETAIL

NOT-TO-SCALE



ISOMETRIC PLAN VIEW

**STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 1-FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET. (RG-348, SECTION 1.4.3)

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 OR 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
1. 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.

2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM 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.

2. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.

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
1. 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.

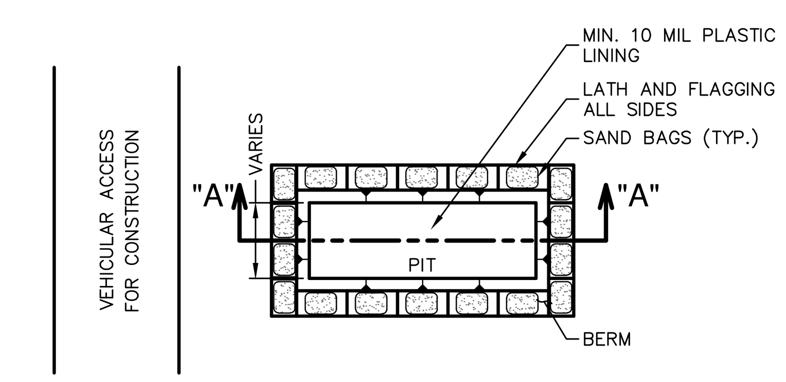
3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

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

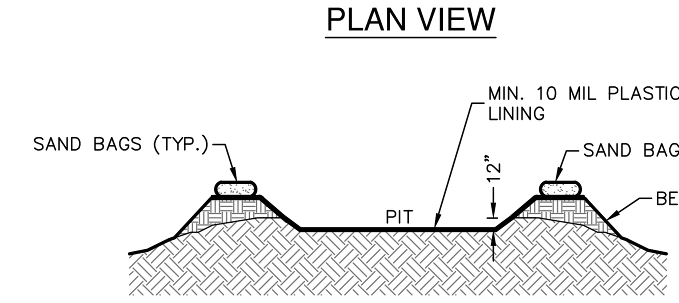
5. WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

SILT FENCE DETAIL

NOT-TO-SCALE



PLAN VIEW



SECTION "A-A"

GENERAL NOTES
1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.

2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.

3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

4. LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES OR WATER BODIES.

5. TEMPORARY CONCRETE WASHOUT FACILITY SHOULD BE CONSTRUCTED WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

MATERIALS
PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

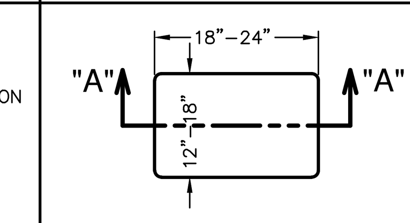
MAINTENANCE
1. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHOULD BE REMOVED AND DISPOSED OF.

2. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF.

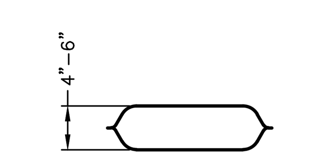
3. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

CONCRETE TRUCK WASHOUT PIT DETAIL

NOT-TO-SCALE



PLAN VIEW



SECTION "A-A"

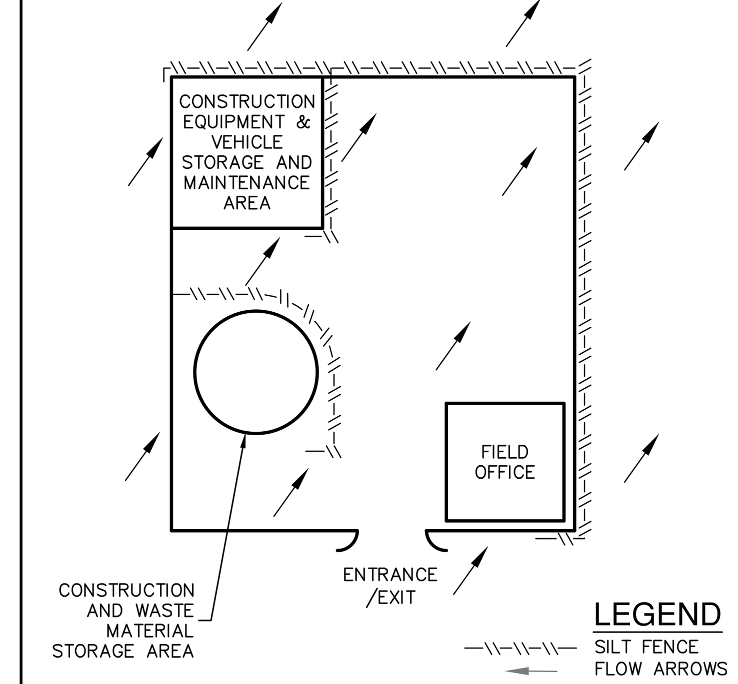
NOTES:
1. THE FILTER BAG MATERIAL SHALL BE MADE OF POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN FABRIC, MIN. UNIT WEIGHT OF 4 OUNCES/SY, HAVE A MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70%.

2. THE FILTER BAG SHALL BE FILLED WITH CLEAN, MEDIUM WASHED PEA GRAVEL TO COARSE GRAVEL (0.31 TO 0.75 INCH DIAMETER).

3. SAND SHALL NOT BE USED TO FILL THE FILTER BAGS.

GRAVEL FILTER BAG DETAIL

NOT-TO-SCALE



LEGEND
—\\—\\—\\— SILT FENCE
← FLOW ARROWS

CONSTRUCTION STAGING AREA

NOT-TO-SCALE

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

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

EXHIBIT 2A

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5. COMAL CO. WCID NO.6
BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN
TEMPORARY POLLUTION PREVENTION PLAN

PLAT NO.
JOB NO. 8547-71
DATE SEPTEMBER 2020
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 1 OF 2

Date: Sep 23, 2020, 4:29pm User ID: dwright
File: P:\85\47\71\Design\Environmental\TM854771.dwg

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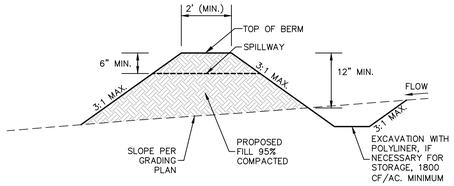
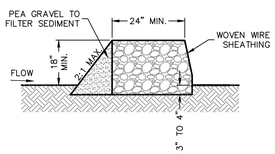


EARTHEN BERM W/ POLYLINER AND SPILLWAY

NOT TO SCALE

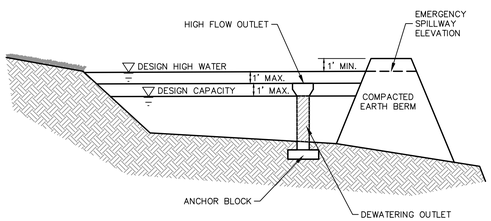
NOTE: EARTHEN BERMS ARE TO SPAN ACROSS PROPOSED STREET SECTION (APPROX. 30-FEET WIDE) FROM CURB TO CURB



ROCK BERM W/ PEA GRAVEL

NOT TO SCALE

SEDIMENTATION BASIN DETAILS



CROSS SECTION

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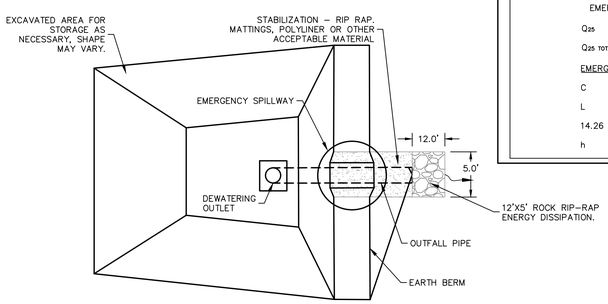


PLAN VIEW

NOT TO SCALE

SEDIMENTATION BASIN "G" DESIGN DATA

MAX. BASIN DISTURBED AREA	=	26.78 ACRES
DESIGN RAINFALL DEPTH	=	4.12 IN
SEDIMENTATION VOL. REQ'D	=	9.194 AC-FT
PROVIDED VOLUME	=	11.160 AC-FT

SEDIMENTATION BASIN "J" DESIGN DATA

MAX. BASIN DISTURBED AREA	=	16.64 ACRES
DESIGN RAINFALL DEPTH	=	4.12 IN
SEDIMENTATION VOL. REQ'D	=	5.713 AC-FT
PROVIDED VOLUME	=	8.114 AC-FT

SEDIMENTATION BASIN "K" DESIGN DATA

MAX. BASIN DISTURBED AREA	=	18.48 ACRES
DESIGN RAINFALL DEPTH	=	4.12 IN
SEDIMENTATION VOL. REQ'D	=	6.345 AC-FT
PROVIDED VOLUME	=	12.440 AC-FT

EMERGENCY SPILLWAY CALCULATIONS - BASIN G

EMERGENCY SPILLWAY = 1061.20

$Q_{25} = (Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL} =$ 15.81 cfs

EMERGENCY SPILLWAY CALCULATION:

C = 20.67

L = 10 ft

$20.67 = (3.087)(10.0)(h)^{3/2}$

h = 0.77 ft --> 1061.20 + 0.77 = 1061.97 ft

EMERGENCY SPILLWAY CALCULATIONS - BASIN J

EMERGENCY SPILLWAY = 1056.00

$Q_{25} = (Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL} =$ 12.84 cfs

EMERGENCY SPILLWAY FLOW CALCULATION:

C = 3.087

L = 10 ft

$12.84 = (3.087)(10.0)(h)^{3/2}$

h = 0.56 ft --> 1056.00 + 0.56 = 1056.56 ft

EMERGENCY SPILLWAY CALCULATIONS - BASIN K

EMERGENCY SPILLWAY = 1062.00

$Q_{25} = (Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL} =$ 14.26 cfs

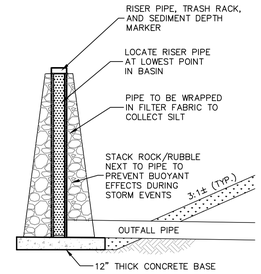
EMERGENCY SPILLWAY FLOW CALCULATION:

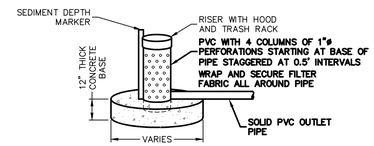
C = 3.087

L = 8 ft

$14.26 = (3.087)(8.0)(h)^{3/2}$

h = 0.69 ft --> 1062.00 + 0.69 = 1062.69 ft





OUTLET STRUCTURE DETAIL

NOT TO SCALE

SEDIMENTATION BASIN NOTES

1. THE 48-HOUR DRAWDOWN TIME WILL BE ACHIEVED BY USING A RISER PIPE PERFORATED AT THE POINT MEASURED FROM THE BOTTOM OF THE RISER PIPE EQUAL TO ½ THE VOLUME OF THE BASIN. THIS IS THE MAXIMUM SEDIMENT STORAGE ELEVATION.

2. THE BASIN SHOULD INCLUDE A PERMANENT STAKE TO INDICATE THE SEDIMENT LEVEL IN THE POOL AND MARKED TO INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME (NOT THE TOP OF THE STAKE). RISER PIPES ARE TO BE CLEARLY MARKED AND PERFORATED WITH DE-WATERING HOLES AT THE FOLLOWING ELEVATIONS:

TEMPORARY SEDIMENTATION BASIN G: 1059.00
TEMPORARY SEDIMENTATION BASIN J: 1056.00
TEMPORARY SEDIMENTATION BASIN K: 1061.00

3. DE-WATERING HOLES ARE TO HAVE A MINIMUM AREA (A_o) OF THE FOLLOWING:

BASIN G MINIMUM DE-WATERING HOLE AREA: 0.219 SF (11~1" PERFORATED HOLES OR EQUAL AREA)
BASIN J MINIMUM DE-WATERING HOLE AREA: 0.137 SF (7~1" PERFORATED HOLES OR EQUAL AREA)
BASIN K MINIMUM DE-WATERING HOLE AREA: 0.267 SF (13~1" PERFORATED HOLES OR EQUAL AREA)

PERFORATING THE RISER WITH MULTIPLE HOLES WITH A COMBINED SURFACE AREA EQUAL TO A_o IS ACCEPTABLE. HOLES ARE TO BE EVENLY SPACED AROUND THE RISER PIPE FROM THE BOTTOM OF THE PIPE UP TO THE ELEVATION NOTED ABOVE.

4. ACCUMULATED SILT SHOULD BE REMOVED AND THE BASIN SHOULD BE RE-GRADED TO ITS ORIGINAL DIMENSIONS WHEN THE SILT REACHES THE FOLLOWING DEPTH AS MEASURED FROM THE BOTTOM OF THE SEDIMENT DEPTH MARKER:

BASIN G: 5.5 FT (MAX. SEDIMENT DEPTH MINUS BASIN INVERT = 1059.00' – 1053.50' = 5.5 FT)
BASIN J: 6.0 FT (MAX. SEDIMENT DEPTH MINUS BASIN INVERT = 1056.00' – 1050.00' = 6.0 FT)
BASIN K: 5.0 FT (MAX. SEDIMENT DEPTH MINUS BASIN INVERT = 1061.00' – 1056.00' = 5.0 FT)

5. THE TOP OF THE RISER PIPE SHOULD REMAIN OPEN AND BE GUARDED WITH A TRASH RACK AND ANTI-VORTEX DEVICE.

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

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EXHIBIT 2B

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5. COMAL CO. WCID NO.6

BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN

TEMPORARY POLLUTION PREVENTION PLAN

PLAT NO.
JOB NO. 8547-71
DATE SEPTEMBER 2020
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 2 OF 2

Date: Sep 23, 2020, 4:29pm User ID: dwright
File: P:\85\47\71\Design\Environmental\TM854771.dwg

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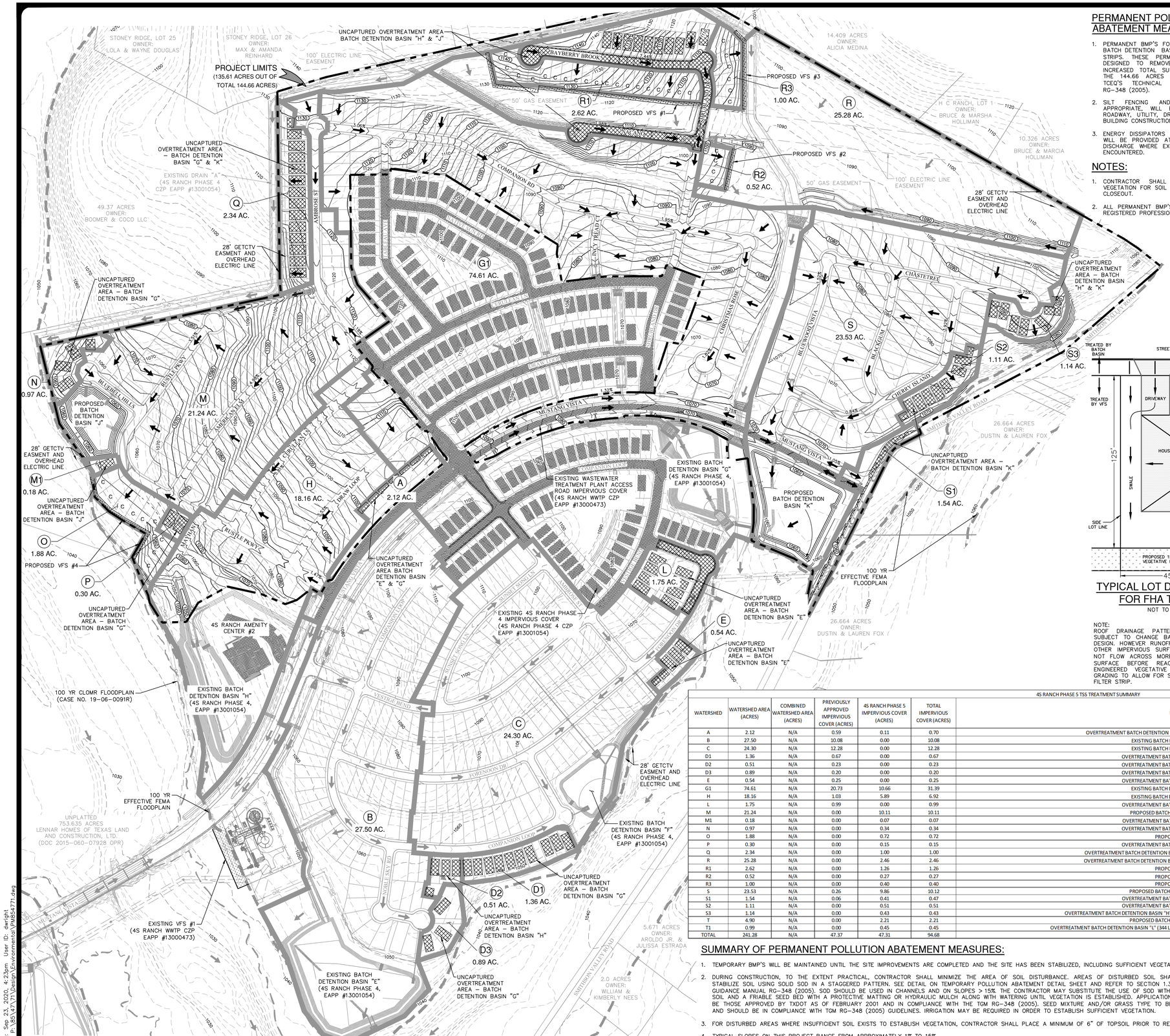
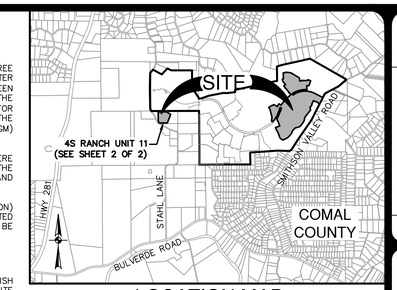


PERMANENT POLLUTION ABATEMENT MEASURES:

1. PERMANENT BMP'S FOR THIS SITE INCLUDE THREE BATCH DETENTION BASINS FOUR VEGETATIVE FILTER STRIPS. THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE 144.66 ACRES IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).
2. SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.
3. ENERGY DISSIPATORS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.

NOTES:

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



LOCATION MAP

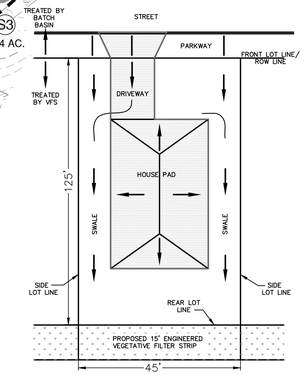
NOT-TO-SCALE

0' 200' 400' 600'

SCALE: 1"= 200'

LEGEND

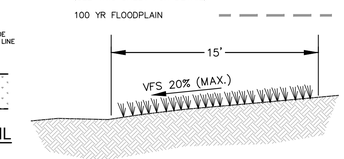
- PROJECT BOUNDARY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR (1040)
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR (1040)
- DRAINAGE AREA (AF)
- EXISTING DIRECTION OF FLOW
- PROPOSED DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY
- OVERTREATMENT AREA
- PREVIOUSLY APPROVED IMPERVIOUS COVER
- VEGETATIVE FILTER STRIP (VFS)
- FHA TYPE C LOT (SEE THIS SHEET FOR DETAIL) (C)
- 100 YR FLOODPLAIN



TYPICAL LOT DRAINAGE DETAIL FOR FHA TYPE C LOTS

NOT TO SCALE

NOTE:
ROOF DRAINAGE PATTERN IS APPROXIMATE AND SUBJECT TO CHANGE BASED ON FINAL HOUSE PAD DESIGN. HOWEVER RUNOFF FROM DRIVEWAY, ROOF OR OTHER IMPERVIOUS SURFACES WITHIN THE LOT WILL NOT FLOW ACROSS MORE THAN 72' OF IMPERVIOUS SURFACE BEFORE REACHING THE PROPOSED 15' ENGINEERED VEGETATIVE FILTER STRIP. FINAL LOT GRADING TO ALLOW FOR SHEET FLOW OVER VEGETATIVE FILTER STRIP.



ENIGEERED VEGETATIVE FILTER STRIP DETAIL

4S RANCH PHASE 5 TSS TREATMENT SUMMARY

WATERSHED	WATERSHED AREA (ACRES)	COMBINED WATERSHED AREA (ACRES)	PREVIOUSLY APPROVED IMPERVIOUS COVER (ACRES)	4S RANCH PHASE 5 IMPERVIOUS COVER (ACRES)	TOTAL IMPERVIOUS COVER (ACRES)	BMP	REQUIRED TSS REMOVAL (LBS./YR)	DESIGNED TSS REMOVAL (LBS./YR)
A	2.12	N/A	0.59	0.11	0.70	OVERTREATMENT BATCH DETENTION BASIN "E" (541 LBS./YR) & "G" (87 LBS./YR)	628	
B	27.50	N/A	10.08	0.00	10.08	EXISTING BATCH DETENTION BASIN "E"	9,048	10,702
C	24.30	N/A	12.28	0.00	12.28	EXISTING BATCH DETENTION BASIN "F"	11,023	11,075
D1	1.36	N/A	0.67	0.00	0.67	OVERTREATMENT BATCH DETENTION BASIN "G"	601	
D2	0.51	N/A	0.23	0.00	0.23	OVERTREATMENT BATCH DETENTION BASIN "H"	206	
D3	0.89	N/A	0.20	0.00	0.20	OVERTREATMENT BATCH DETENTION BASIN "G"	180	
E	0.54	N/A	0.25	0.00	0.25	OVERTREATMENT BATCH DETENTION BASIN "E"	224	
G1	74.61	N/A	20.73	10.66	31.39	EXISTING BATCH DETENTION BASIN "G"	28,176	29,815
H	18.16	N/A	1.03	5.89	6.92	EXISTING BATCH DETENTION BASIN "H"	6,211	7,335
L	1.75	N/A	0.99	0.00	0.99	OVERTREATMENT BATCH DETENTION BASIN "E"	889	-
M	21.24	N/A	0.00	10.11	10.11	PROPOSED BATCH DETENTION BASIN "J"	9,075	10,676
M1	0.18	N/A	0.00	0.07	0.07	OVERTREATMENT BATCH DETENTION BASIN "J"	63	
N	0.97	N/A	0.00	0.34	0.34	OVERTREATMENT BATCH DETENTION BASIN "G"	305	
O	1.88	N/A	0.00	0.72	0.72	PROPOSED VFS #4	646	712
P	0.30	N/A	0.00	0.15	0.15	OVERTREATMENT BATCH DETENTION BASIN "G"	135	
Q	2.34	N/A	0.00	1.00	1.00	OVERTREATMENT BATCH DETENTION BASIN "G" (327 LBS./YR) & "K" (571 LBS./YR)	898	
R	25.28	N/A	0.00	2.46	2.46	OVERTREATMENT BATCH DETENTION BASIN "H" (903 LBS./YR) & "J" (1305 LBS./YR)	2,208	
R1	2.62	N/A	0.00	1.26	1.26	PROPOSED VFS #1	1,131	1,237
R2	0.52	N/A	0.00	0.27	0.27	PROPOSED VFS #2	242	264
R3	1.00	N/A	0.00	0.40	0.40	PROPOSED VFS #3	359	395
S	23.53	N/A	0.26	9.86	10.12	PROPOSED BATCH DETENTION BASIN "K"	9,084	10,676
S1	1.54	N/A	0.06	0.41	0.47	OVERTREATMENT BATCH DETENTION BASIN "K"	422	
S2	1.11	N/A	0.00	0.51	0.51	OVERTREATMENT BATCH DETENTION BASIN "K"	458	
S3	1.14	N/A	0.00	0.43	0.43	OVERTREATMENT BATCH DETENTION BASIN "H" (11 LBS./YR) & "I" (233 LBS./YR) & "K" (142 LBS./YR)	386	-
T	4.90	N/A	0.00	2.21	2.21	PROPOSED BATCH DETENTION BASIN "L"	1,984	2,328
T1	0.99	N/A	0.00	0.45	0.45	OVERTREATMENT BATCH DETENTION BASIN "L" (344 LBS./YR), "F" (52 LBS./YR), "G" (5 LBS./YR), & "H" (3 LBS./YR)	404	
TOTAL	241.28	N/A	47.37	47.31	94.68		84,985	85,215

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. TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 1% TO 15%.

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

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EXHIBIT 3A

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5. COMAL CO. WCID NO.6

BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN

PERMANENT POLLUTION PREVENTION PLAN

PLAT NO.
JOB NO. 8547-71
DATE JULY 2020
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 1 OF 2

Date: Sep 23, 2020, 4:23pm User ID: dwright
File: P:\85\47\71\Design\Environmental\PM854771.dwg

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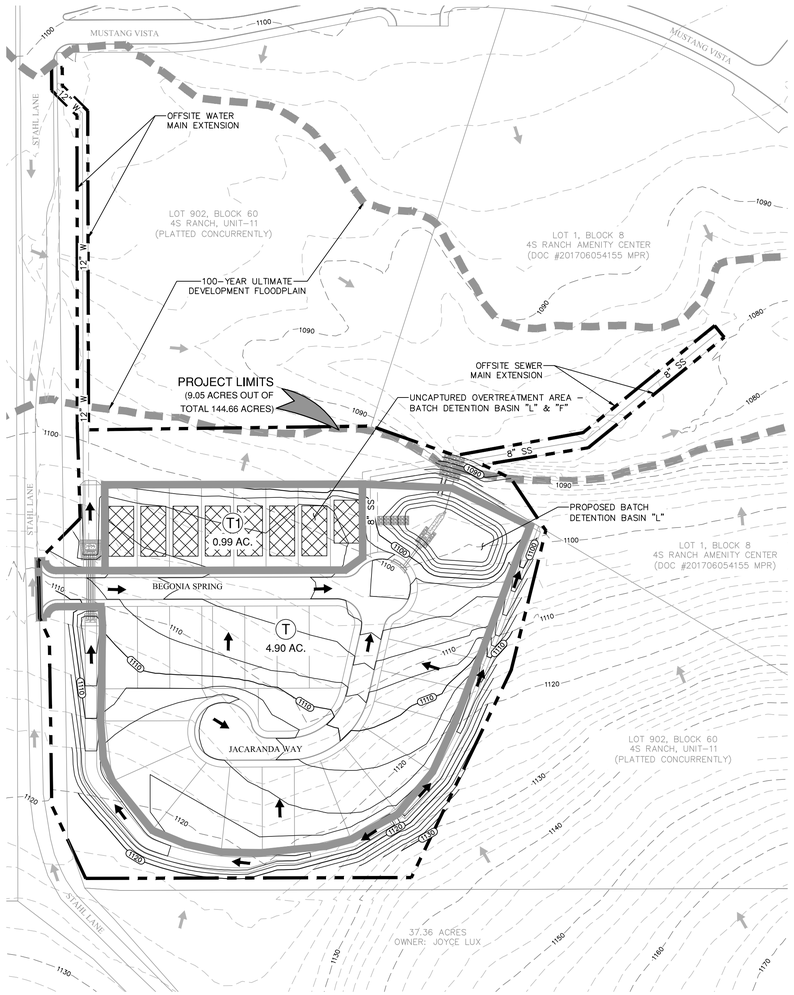

4S RANCH UNIT 11

PERMANENT POLLUTION ABATEMENT MEASURES:

1. PERMANENT BMP'S FOR THIS SITE INCLUDE THREE BATCH DETENTION BASINS FOUR VEGETATIVE FILTER STRIPS. THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE 144.66 ACRES IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).
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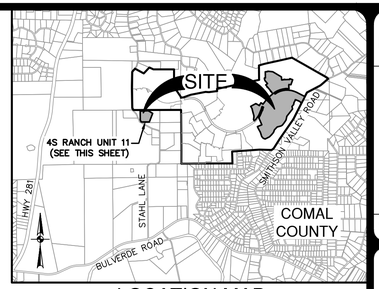

LOCATION MAP

NOT-TO-SCALE

0' 100' 200' 300'

SCALE: 1"= 100'

LEGEND

- PROJECT BOUNDARY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR (1040)
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR (1040)
- DRAINAGE AREA (AF)
- EXISTING DIRECTION OF FLOW
- PROPOSED DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY
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- VEGETATIVE FILTER STRIP (VFS)
- FHA TYPE C LOT (SEE THIS SHEET FOR DETAIL) (C)
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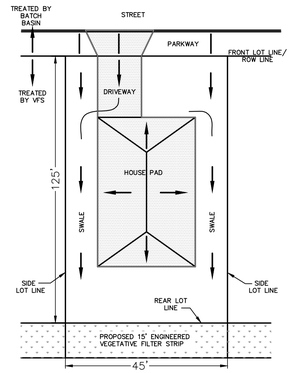

TYPICAL LOT DRAINAGE DETAIL FOR FHA TYPE C LOTS

NOT TO SCALE

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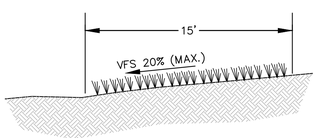

ENIGEERED VEGETATIVE FILTER STRIP DETAIL

4S RANCH PHASE 5 TSS TREATMENT SUMMARY

WATERSHED	WATERSHED AREA (ACRES)	COMBINED WATERSHED AREA (ACRES)	PREVIOUSLY APPROVED IMPERVIOUS COVER (ACRES)	4S RANCH PHASE 5 IMPERVIOUS COVER (ACRES)	TOTAL IMPERVIOUS COVER (ACRES)	BMP	REQUIRED TSS REMOVAL (LBS./YR)	DESIGNED TSS REMOVAL (LBS./YR)
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S	23.53	N/A	0.26	9.86	10.12	PROPOSED BATCH DETENTION BASIN "K"	9,084	10,676
S1	1.54	N/A	0.06	0.41	0.47	OVERTREATMENT BATCH DETENTION BASIN "K"	422	
S2	1.11	N/A	0.00	0.51	0.51	OVERTREATMENT BATCH DETENTION BASIN "K"	458	
S3	1.14	N/A	0.00	0.43	0.43	OVERTREATMENT BATCH DETENTION BASIN "H" (11 LBS./YR) & "J" (233 LBS./YR) & "K" (142 LBS./YR)	386	-
T	4.90	N/A	0.00	2.21	2.21	PROPOSED BATCH DETENTION BASIN "L"	1,984	2,328
T1	0.99	N/A	0.00	0.45	0.45	OVERTREATMENT BATCH DETENTION BASIN "L" (344 LBS./YR), "F" (52 LBS./YR), "G" (5 LBS./YR), & "H" (3 LBS./YR)	404	
TOTAL	241.28	N/A	47.37	47.31	94.68		84,985	85,215

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.
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EXHIBIT 3B

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 5. COMAL CO. WCID NO.6
BULVERDE, TEXAS
CONTRIBUTING ZONE PLAN

PERMANENT POLLUTION PREVENTION PLAN

PLAT NO. _____
JOB NO. 8547-71
DATE JULY 2020
DESIGNER DW
CHECKED BS DRAWN DW
SHEET 2 OF 2

Date: Sep 23, 2020, 4:24pm User ID: dwright
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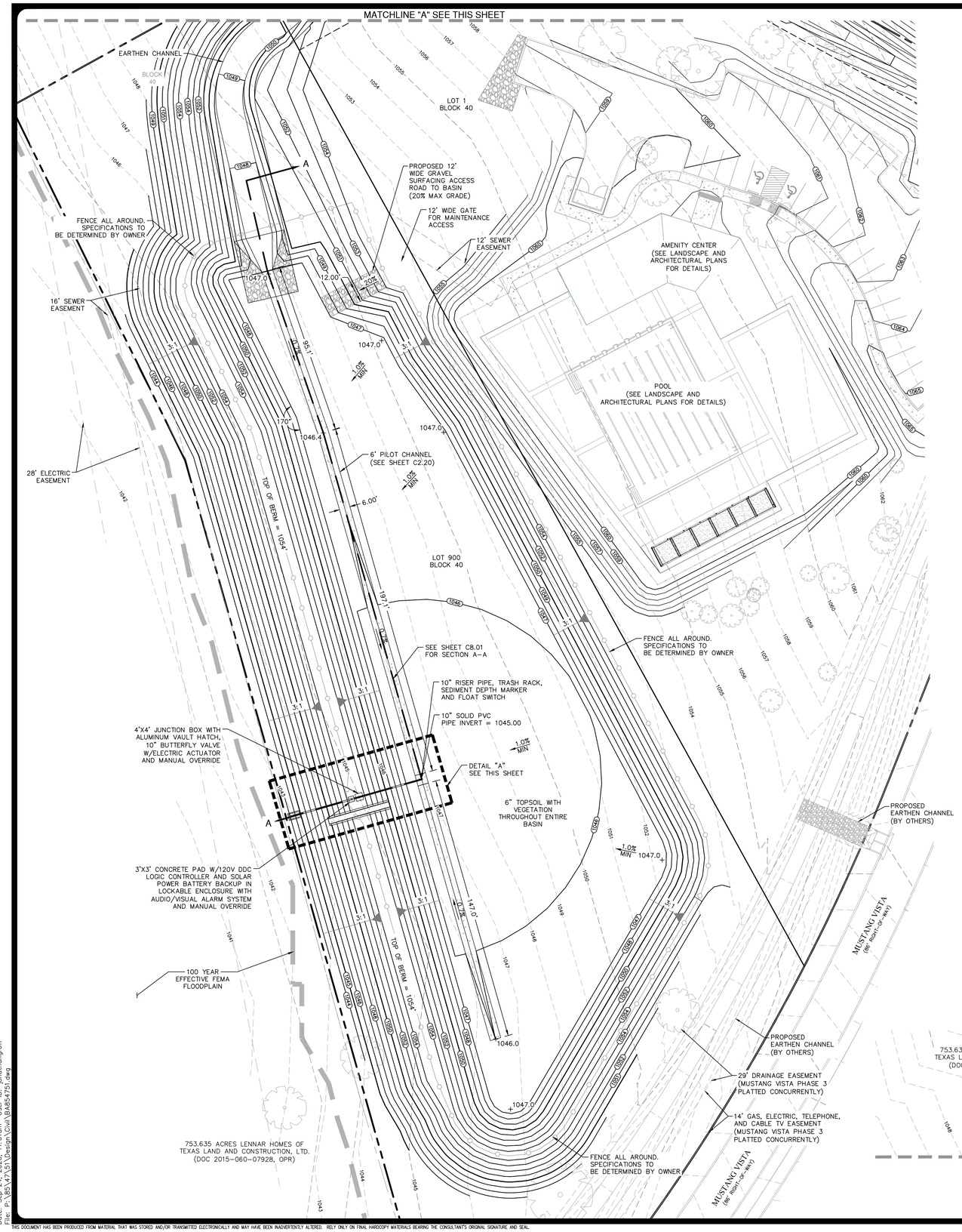
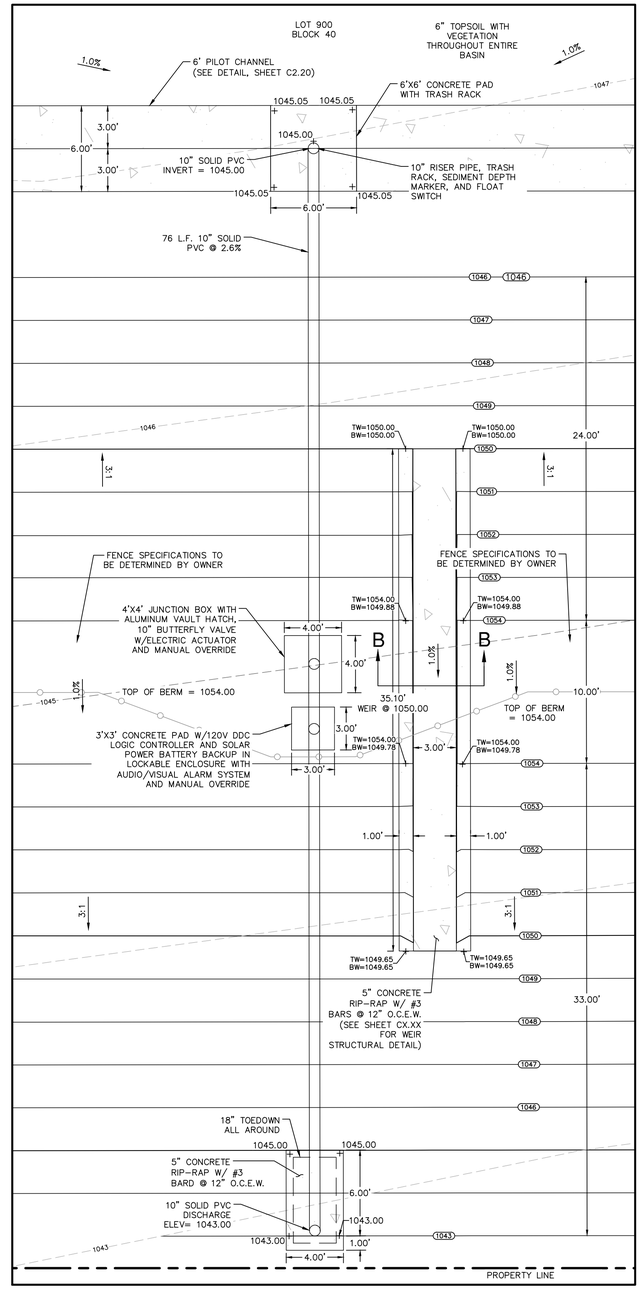
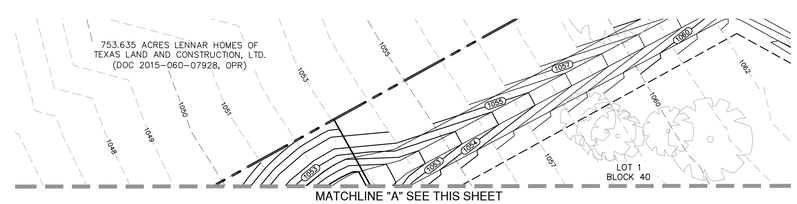




DETAIL "A"
SCALE: 1"= 5'



SCALE: 1"= 30'
0' 30' 60' 90'

LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR

OVERFLOW WEIR CALCULATIONS

WEIR ELEV= 1050.00

Q_{25} = $(Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL}$= 17.9 cfs

WEIR FLOW CALCULATION:

C = 3.087

L = 3 ft

17.9 = $(3.087)(3)(h)^{3/2}$

h = 1.6 ft --> 1050.0 + 1.6 = 1051.6 ft

WATER QUALITY BASIN DESIGN DATA

BASIN WATERSHED AREA	=	791,050 SF (18.16 AC.)
RUN OFF DEPTH	=	3.66 INCH (3.66 IN. – UD)
REQUIRED CAPTURE VOLUME	=	24,055 CF (0.552 AC-FT)
REQUIRED CAPTURE VOL. (UD)	=	86,225 CF (1.979 AC-FT)
BASIN STORM WATER DEPTH	=	5.00 FT (AVG.)
BASIN CAPTURE VOLUME	=	187,787 CF (4.311 AC-FT)
BASIN CAPTURE VOLUME (UD)	=	187,787 CF (4.311 AC-FT)

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).

5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.

6. BASIN DRAWDOWN IS CONTROLLED BY THE 10" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 12 HOURS.

7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY CLOSED.

8. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

9. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 10" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 10" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

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

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

EXHIBIT 10

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

MUSTANG VISTA PHASE 4 & AMENITY CENTER #2
COMAL CO. WCID NO. 6
BULVERDE, TEXAS
BATCH DETENTION BASIN "H"

PLAT NO.
JOB NO. 8547-53
DATE JANUARY 2020
DESIGNER DW
CHECKED BG DRAWN TC
SHEET C8.00

Date: Sep 24, 2020, 11:01am User ID: jonathangroff
File: P:\85\47\51\Design Civil\BA854751.dwg

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GRADING AND DRAINAGE GENERAL NOTES:

1. ALL GRADES AND CONTOURS SHOWN ARE FINAL, TOP OF FINISHED SURFACE ELEVATIONS.

2. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.

3. NO ABRUPT CHANGE OF GRADE SHALL OCCUR.

4. ALL DISTURBED AREAS SHALL BE REVEGETATED, BY THE CONTRACTOR, IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND LANDSCAPING PLANS.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.

6. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT WHERE NOT SPECIFICALLY COVERED IN THE PROJECT SPECIFICATIONS SHALL CONFORM TO ALL APPLICABLE CITY OF SAN ANTONIO SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL, OR BETTER CONDITION, TO ANY DAMAGES DONE TO EXISTING BUILDINGS, UTILITIES, PAVEMENT, CURBS, SIDEWALKS OR DRIVEWAYS.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL NECESSARY UTILITY COMPANIES FOR PROVIDING TEMPORARY UTILITY SERVICES DURING CONSTRUCTION.

9. THE CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT AT NEW PAVEMENT AND CURB JUNCTURES. NO JAGGED OR IRREGULAR CUTS IN PAVEMENT WILL BE ALLOWED OR ACCEPTED.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL PERMITS, TESTS, APPROVALS, AND ACCEPTANCES REQUIRED TO COMPLETE CONSTRUCTION OF THIS PROJECT.

11. ALL EXCAVATION IS UNCLASSIFIED.

12. SEE CIVIL DETAIL SHEETS FOR APPLICABLE DETAILS.

13. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL SPECIFICATIONS AND CONTRACT INFORMATION.

14. REFER TO GEOTECHNICAL REPORT FOR SUBSURFACE INFORMATION AND CONSTRUCTION INFORMATION.

15. ALL PROPOSED SPOT ELEVATIONS HAVE BEEN TRUNCATED TO SAVE SPACE ON THIS PLAN.

CONTRACTOR NOTES:

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a.) REINFORCING STEEL FOR BASIN WALL OR RIPRAP LINER HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN AND RISER PIPE IS IN PLACE. WHERE EPDM LINER IS USED, CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE LINER HAS BEEN SET AT PROPER ELEVATION AND GRADE.

b.) BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

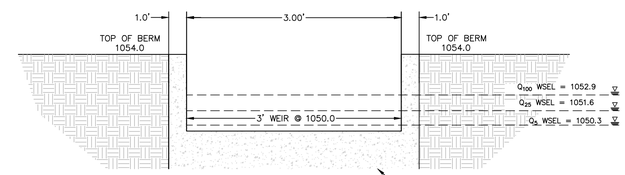
- TOP OF BANK/WALL AT EACH CORNER OF BASIN
- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

NOTES:

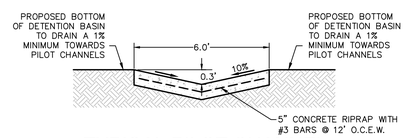
1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.



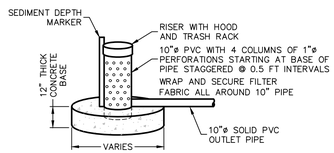
SECTION B-B

NOT TO SCALE



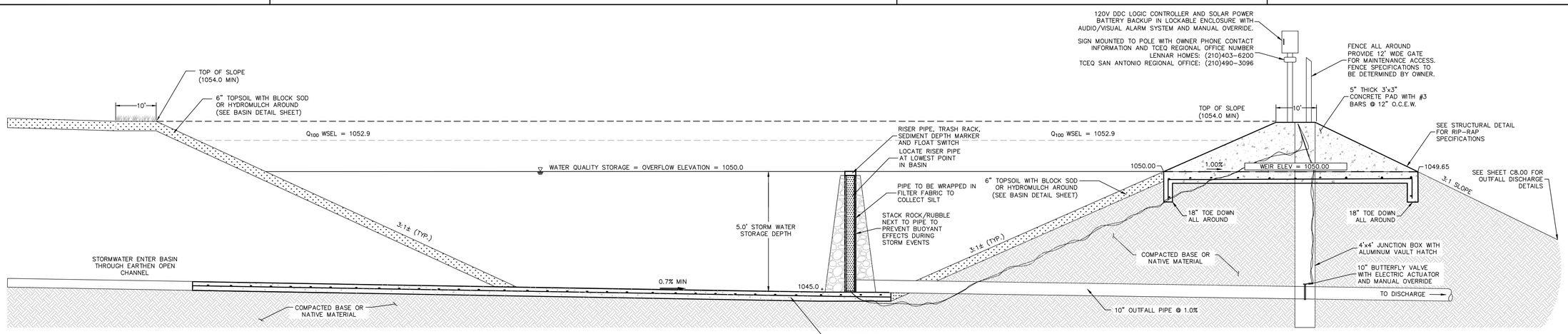
TYPICAL PILOT CHANNEL

NOT TO SCALE



OUTLET STRUCTURE DETAIL

NOT TO SCALE



SECTION "A-A"

N.T.S.

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

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

EXHIBIT 11

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

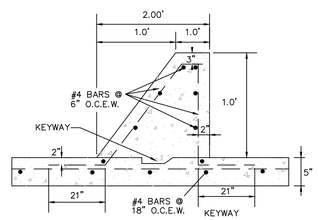
MUSTANG VISTA PHASE 4 & AMENITY CENTER #2
COMAL CO. WCID NO. 6
BULVERDE, TEXAS
BATCH DETENTION BASIN "H" DETAILS

PLAT NO.
JOB NO. 8547-53
DATE JANUARY 2020
DESIGNER DW
CHECKED BG DRAWN TC
SHEET C8.01

Date: Sep 24, 2020, 9:35am User ID: jonathangroff
File: P:\85\47\51\Design\Civil\BA854751.dwg

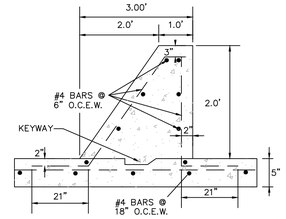
SCALE: 1"= 40'

0' 40' 80' 120'



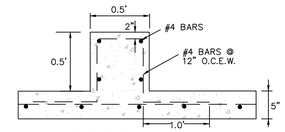
DETENTION BASIN "G" BAFFLE BLOCK 1 DETAIL

NOT TO SCALE



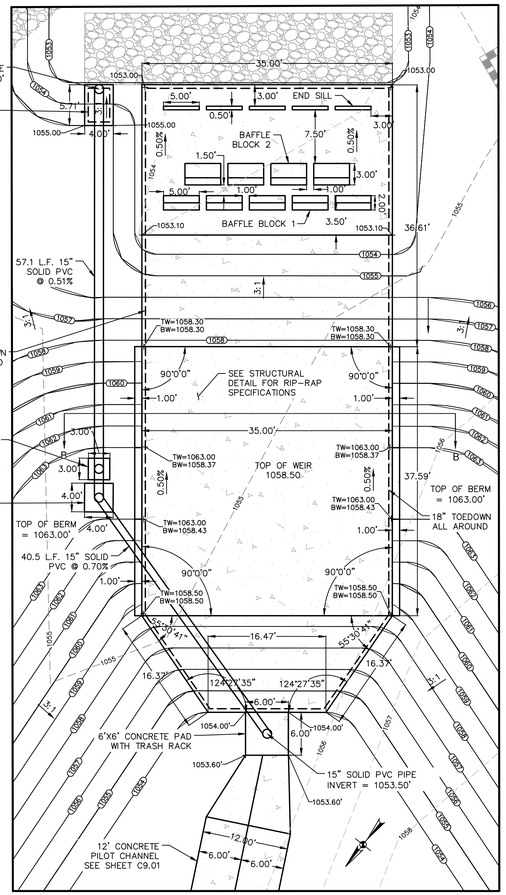
DETENTION BASIN "G" BAFFLE BLOCK 2 DETAIL

NOT TO SCALE



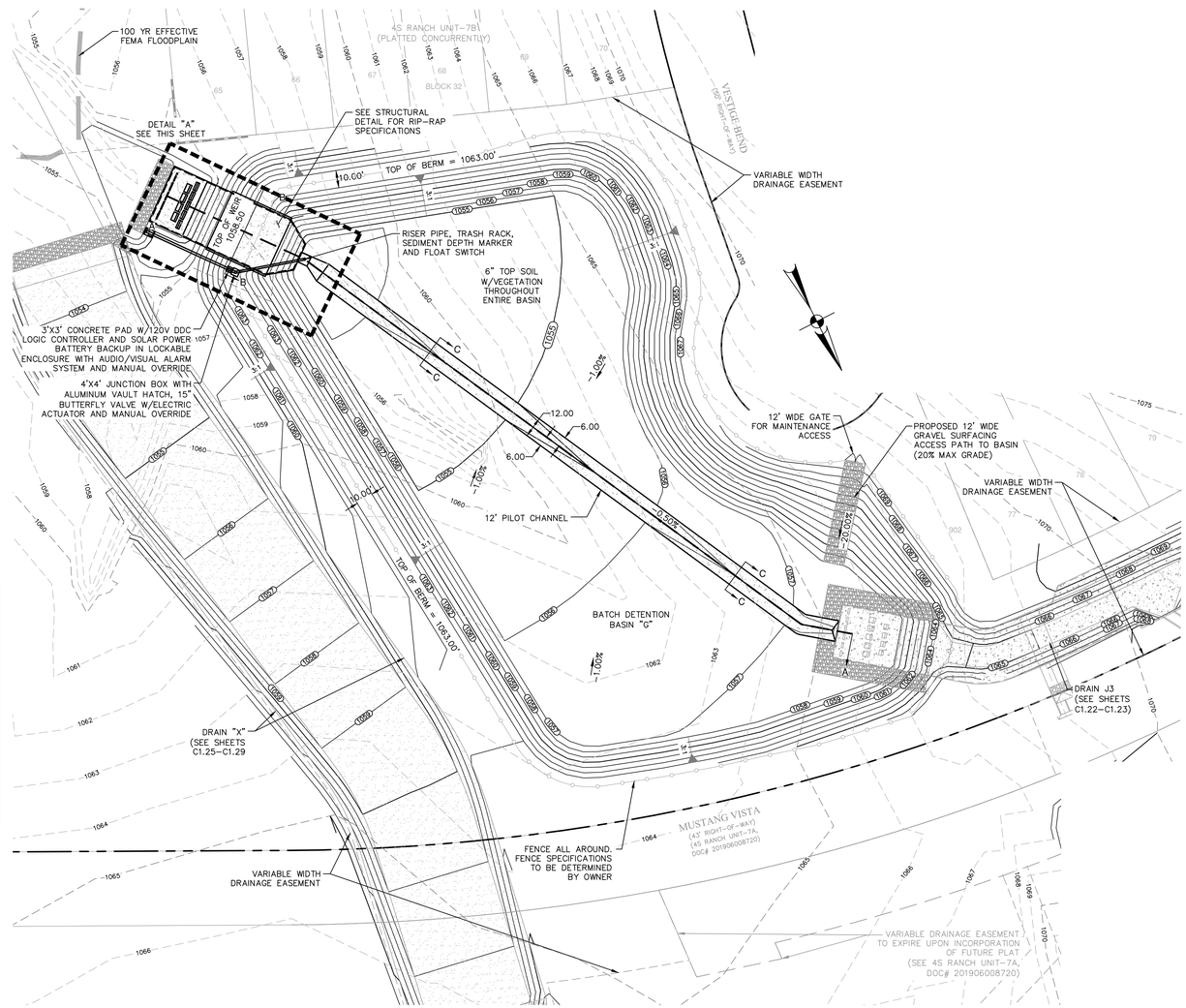
DETENTION BASIN "G" END SILL BLOCK DETAIL

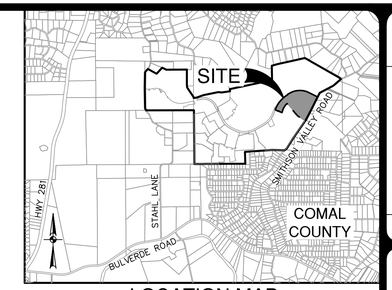
NOT TO SCALE



DETAIL "A"

SCALE: 1"=10'





LOCATION MAP

NOT-TO-SCALE

LEGEND

- 1049 — EXISTING 1' CONTOUR
- 1050 — EXISTING 5' CONTOUR
- (1049) — PROPOSED 1' CONTOUR
- (1050) — PROPOSED 5' CONTOUR

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.
2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.
4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).
5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.
6. BASIN DRAWDOWN IS CONTROLLED BY THE 15" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 9 HOURS.
7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY CLOSED.
8. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.
9. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 15" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 9 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 15" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

OVERFLOW WEIR CALCULATIONS

WEIR ELEV= 1058.50

Q_{25} = $(C_w)(L)(h)^{3/2}$

$Q_{25\ TOTAL}$= 560.7 cfs

WEIR FLOW CALCULATION:

C = 3.087

L = 35 ft

560.7 = $(3.087)(35)(h)^{3/2}$

h = 3.00 ft --> 1058.50 + 3.00 = 1061.50 ft

WATER QUALITY BASIN DESIGN DATA

BASIN WATERSHED AREA	=	3,250,012 SF (74.61 AC.)
RUN OFF DEPTH	=	2.00 INCH (1.32 IN. - UD)
REQUIRED CAPTURE VOLUME	=	160,454 CF (3.683 AC-FT)
REQUIRED CAPTURE VOL. (UD)	=	164,775 CF (3.783 AC-FT)
BASIN STORM WATER DEPTH	=	5.00 FT (AVG.)
BASIN CAPTURE VOLUME	=	168,838 CF (3.876 AC-FT)
BASIN CAPTURE VOLUME (UD)	=	168,838 CF (3.876 AC-FT)

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

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

EXHIBIT 8

NO.	REVISION	DATE

STATE OF TEXAS — EUGENE H. DAWSON III — 112792 — LICENSED PROFESSIONAL ENGINEER — 9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 4, UNIT-9A, COMAL CO. WCID NO. 6

BULVERDE, TEXAS

DETENTION BASIN G

PLAT NO.

JOB NO. 8547-61

DATE JUNE 2020

DESIGNER JG

CHECKED DW DRAWN TC/JR

SHEET C9.00

Date: Sep 24, 2020, 10:58am User ID: jonathangroff
File: P:\85\47\61\Design\Civil\BA854761.dwg

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GRADING AND DRAINAGE GENERAL NOTES:

1. ALL GRADES AND CONTOURS SHOWN ARE FINAL, TOP OF FINISHED SURFACE ELEVATIONS.

2. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.

3. NO ABRUPT CHANGE OF GRADE SHALL OCCUR.

4. ALL DISTURBED AREAS SHALL BE REVEGETATED, BY THE CONTRACTOR, IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND LANDSCAPING PLANS.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.

6. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT WHERE NOT SPECIFICALLY COVERED IN THE PROJECT SPECIFICATIONS SHALL CONFORM TO ALL APPLICABLE CITY OF BULVERDE SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL, OR BETTER CONDITION, TO ANY DAMAGES DONE TO EXISTING BUILDINGS, UTILITIES, PAVEMENT, CURBS, SIDEWALKS OR DRIVEWAYS.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL NECESSARY UTILITY COMPANIES FOR PROVIDING TEMPORARY UTILITY SERVICES DURING CONSTRUCTION.

9. THE CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT AT NEW PAVEMENT AND CURB JUNCTURES. NO JAGGED OR IRREGULAR CUTS IN PAVEMENT WILL BE ALLOWED OR ACCEPTED.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL PERMITS, TESTS, APPROVALS, AND ACCEPTANCES REQUIRED TO COMPLETE CONSTRUCTION OF THIS PROJECT.

11. ALL EXCAVATION IS UNCLASSIFIED.

12. SEE CIVIL DETAIL SHEETS FOR APPLICABLE DETAILS.

13. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL SPECIFICATIONS AND CONTRACT INFORMATION.

14. REFER TO GEOTECHNICAL REPORT FOR SUBSURFACE INFORMATION AND CONSTRUCTION INFORMATION.

15. ALL PROPOSED SPOT ELEVATIONS HAVE BEEN TRUNCATED TO SAVE SPACE ON THIS PLAN.

CONTRACTOR NOTES:

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a.) REINFORCING STEEL FOR BASIN WALL OR RIPRAP LINER HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN AND RISER PIPE IS IN PLACE. WHERE EPDM LINER IS USED, CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE LINER HAS BEEN SET AT PROPER ELEVATION AND GRADE.

b.) BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

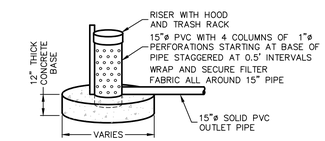
- TOP OF BANK/WALL AT EACH CORNER OF BASIN
- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

NOTES:

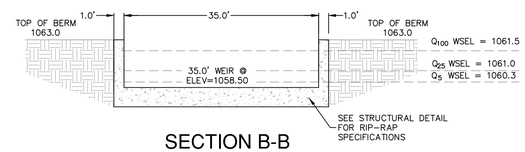
1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.



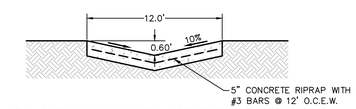
OUTLET STRUCTURE DETAIL

NOT TO SCALE



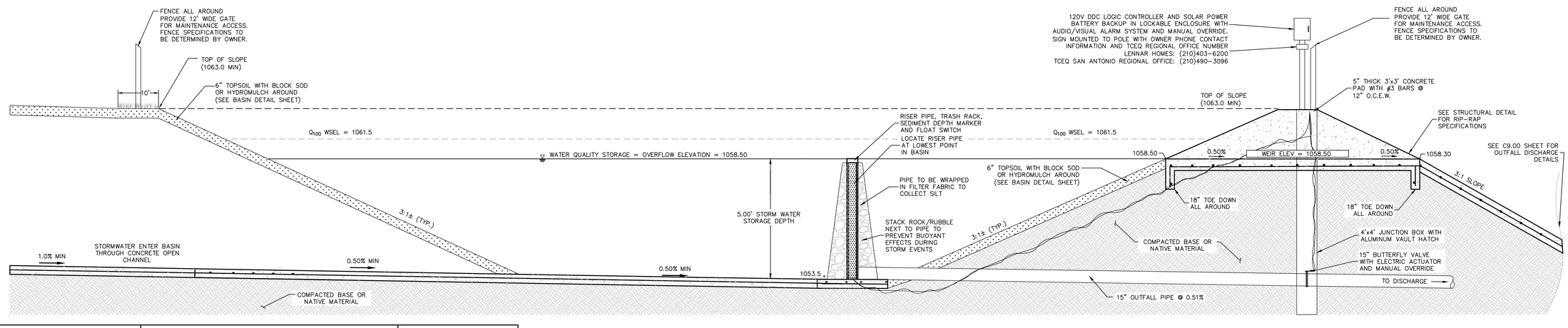
SECTION B-B

NOT TO SCALE



PILOT CHANNEL SECTION 'C-C'

NOT TO SCALE



SECTION A-A

N.T.S.

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

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

EXHIBIT 9

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 4, UNIT-9A, COMAL CO. WCID NO. 6

BULVERDE, TEXAS

DETENTION BASIN G DETAILS

PLAT NO.
JOB NO. 8547-61
DATE JUNE 2020
DESIGNER JG
CHECKED DW DRAWN TC/JR
SHEET C9.01

Date: Sep 24, 2020, 9:43am User ID: jonathangroff
File: P:\85\47\61\Design\Civil\BA854761.dwg

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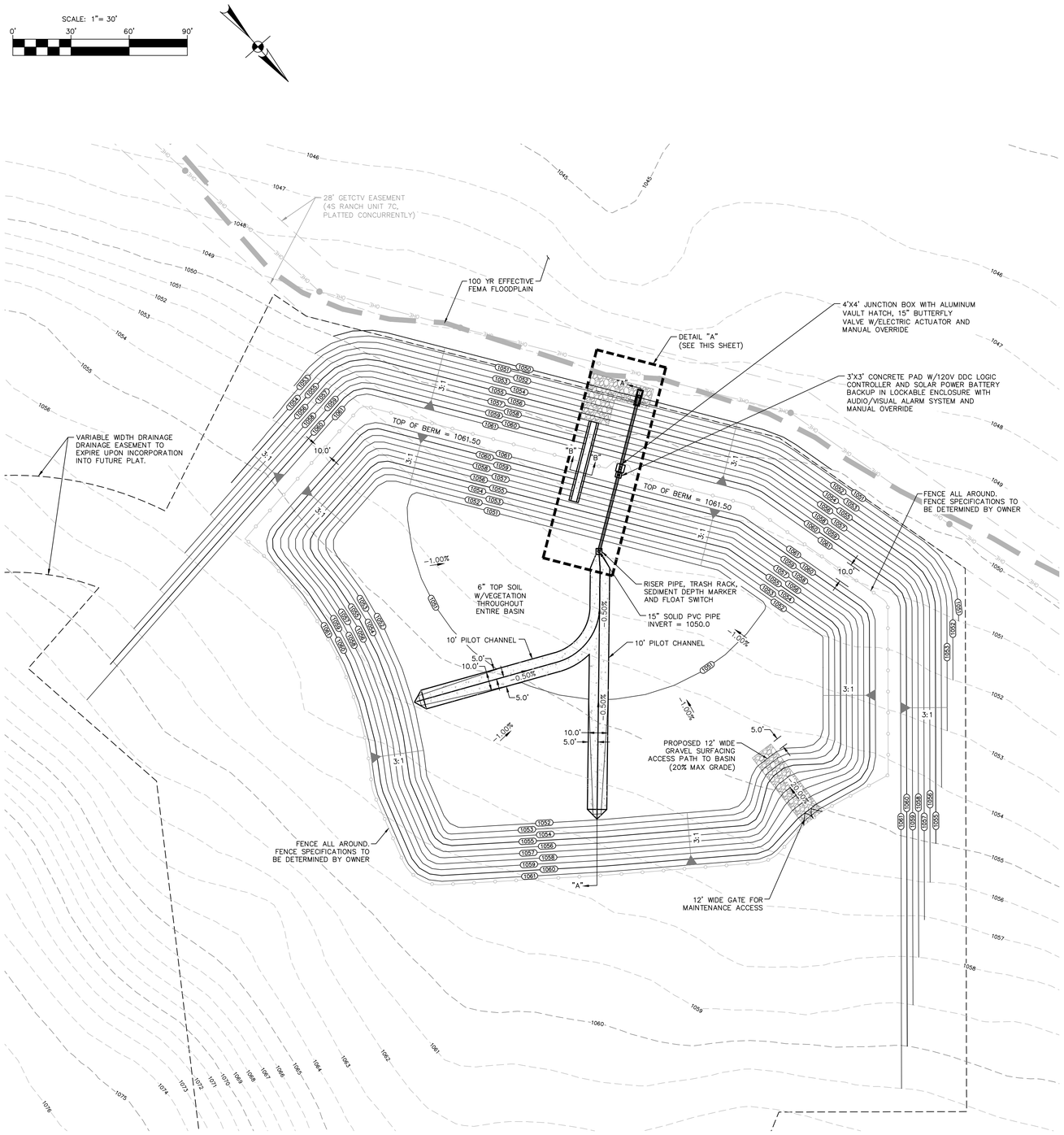
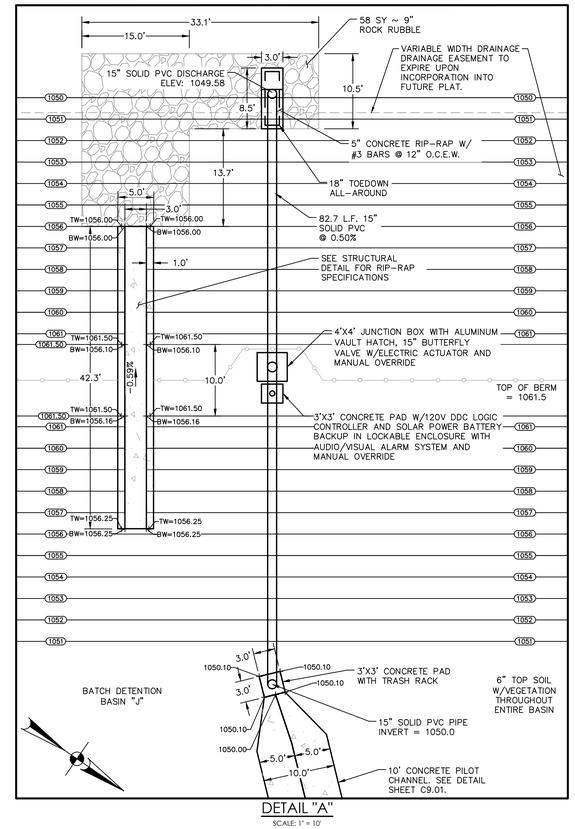
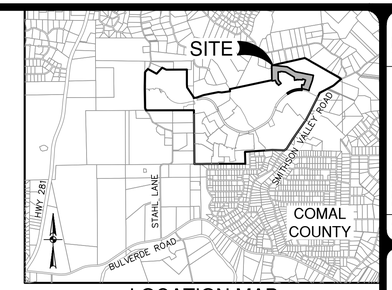




DETAIL "A"

SCALE: 1" = 10'



LOCATION MAP

NOT-TO-SCALE

LEGEND

- 1049 — EXISTING 1' CONTOUR
- 1050 — EXISTING 5' CONTOUR
- 1049 — PROPOSED 1' CONTOUR
- 1050 — PROPOSED 5' CONTOUR

OVERFLOW WEIR CALCULATIONS

WEIR ELEV= 1056.25

$Q_{25} = (Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL} =$ 30.5 cfs

WEIR FLOW CALCULATION:

C = 3.087

L = 3 ft

$30.5 = (3.087)(3)(h)^{3/2}$

h = 2.21 ft --> 1056.25 + 2.21 = 1058.46 ft

WATER QUALITY BASIN DESIGN DATA

BASIN WATERSHED AREA	=	933,055 SF (21.42 AC.)
RUN OFF DEPTH	=	3.66 INCHES
REQUIRED CAPTURE VOLUME	=	117,557 CF (2.699 AC-FT)
BASIN STORM WATER DEPTH	=	4.25 FT (AVG.)
BASIN CAPTURE VOLUME	=	130,244 CF (2.990 AC-FT)

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).

5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.

6. BASIN DRAWDOWN IS CONTROLLED BY THE 15" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 7 HOURS.

7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY CLOSED.

8. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

9. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 15" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 7 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 15" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

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

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

EXHIBIT 4

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 4, UNIT-9B/9C & MUSTANG VISTA PHASE 5, COMAL CO. WCID NO. 6
BULVERDE, TEXAS

BATCH DETENTION BASIN "J"

PLAT NO.	-
JOB NO.	8547-63
DATE	JULY 2020
DESIGNER	DW/JG
CHECKED	DRAWN TC
SHEET	C9.00

Date: Sep 24, 2020, 11:31am User ID: jonathangroff
File: P:\85\47\63\Design\Civil\BA854763_BASIN_J.dwg

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GRADING AND DRAINAGE GENERAL NOTES:

1. ALL GRADES AND CONTOURS SHOWN ARE FINAL, TOP OF FINISHED SURFACE ELEVATIONS.

2. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.

3. NO ABRUPT CHANGE OF GRADE SHALL OCCUR.

4. ALL DISTURBED AREAS SHALL BE REVEGETATED, BY THE CONTRACTOR, IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND LANDSCAPING PLANS.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.

6. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT WHERE NOT SPECIFICALLY COVERED IN THE PROJECT SPECIFICATIONS SHALL CONFORM TO ALL APPLICABLE CITY OF BULVERDE SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL, OR BETTER CONDITION, TO ANY DAMAGES DONE TO EXISTING BUILDINGS, UTILITIES, PAVEMENT, CURBS, SIDEWALKS OR DRIVEWAYS.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL NECESSARY UTILITY COMPANIES FOR PROVIDING TEMPORARY UTILITY SERVICES DURING CONSTRUCTION.

9. THE CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT AT NEW PAVEMENT AND CURB JUNCTURES. NO JAGGED OR IRREGULAR CUTS IN PAVEMENT WILL BE ALLOWED OR ACCEPTED.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL PERMITS, TESTS, APPROVALS, AND ACCEPTANCES REQUIRED TO COMPLETE CONSTRUCTION OF THIS PROJECT.

11. ALL EXCAVATION IS UNCLASSIFIED.

12. SEE CIVIL DETAIL SHEETS FOR APPLICABLE DETAILS.

13. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL SPECIFICATIONS AND CONTRACT INFORMATION.

14. REFER TO GEOTECHNICAL REPORT FOR SUBSURFACE INFORMATION AND CONSTRUCTION INFORMATION.

15. ALL PROPOSED SPOT ELEVATIONS HAVE BEEN TRUNCATED TO SAVE SPACE ON THIS PLAN.

CONTRACTOR NOTES:

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a.) REINFORCING STEEL FOR BASIN WALL OR RIPRAP LINER HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN AND RISER PIPE IS IN PLACE. WHERE EPDM LINER IS USED, CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE LINER HAS BEEN SET AT PROPER ELEVATION AND GRADE.

b.) BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

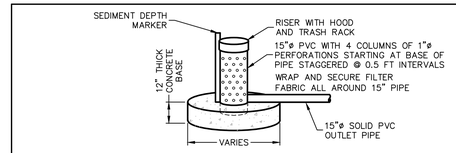
- TOP OF BANK/WALL AT EACH CORNER OF BASIN
- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

NOTES:

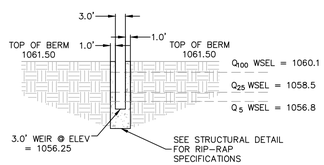
1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.



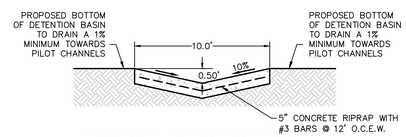
OUTLET STRUCTURE DETAIL

NOT TO SCALE



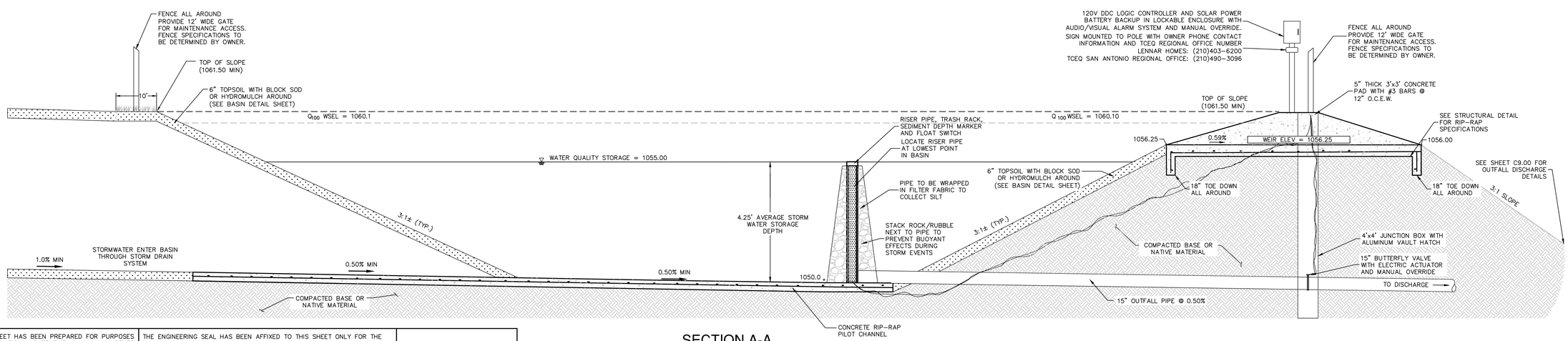
SECTION B-B

NOT TO SCALE



TYPICAL PILOT CHANNEL

NOT TO SCALE



SECTION A-A

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EXHIBIT 5

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH PHASE 4, UNIT-9B/9C & MUSTANG VISTA PHASE 5, COMAL CO. WCID NO. 6
BULVERDE, TEXAS

BATCH DETENTION BASIN "J" DETAILS

PLAT NO. -
JOB NO. 8547-63
DATE JULY 2020
DESIGNER DW/JG
CHECKED DRAWN TC
SHEET C9.01

Date: Sep 24, 2020, 12:01pm User ID: jonathangroff
File: P:\85\47\63\Design\Civil\BA854763 BASIN J.dwg

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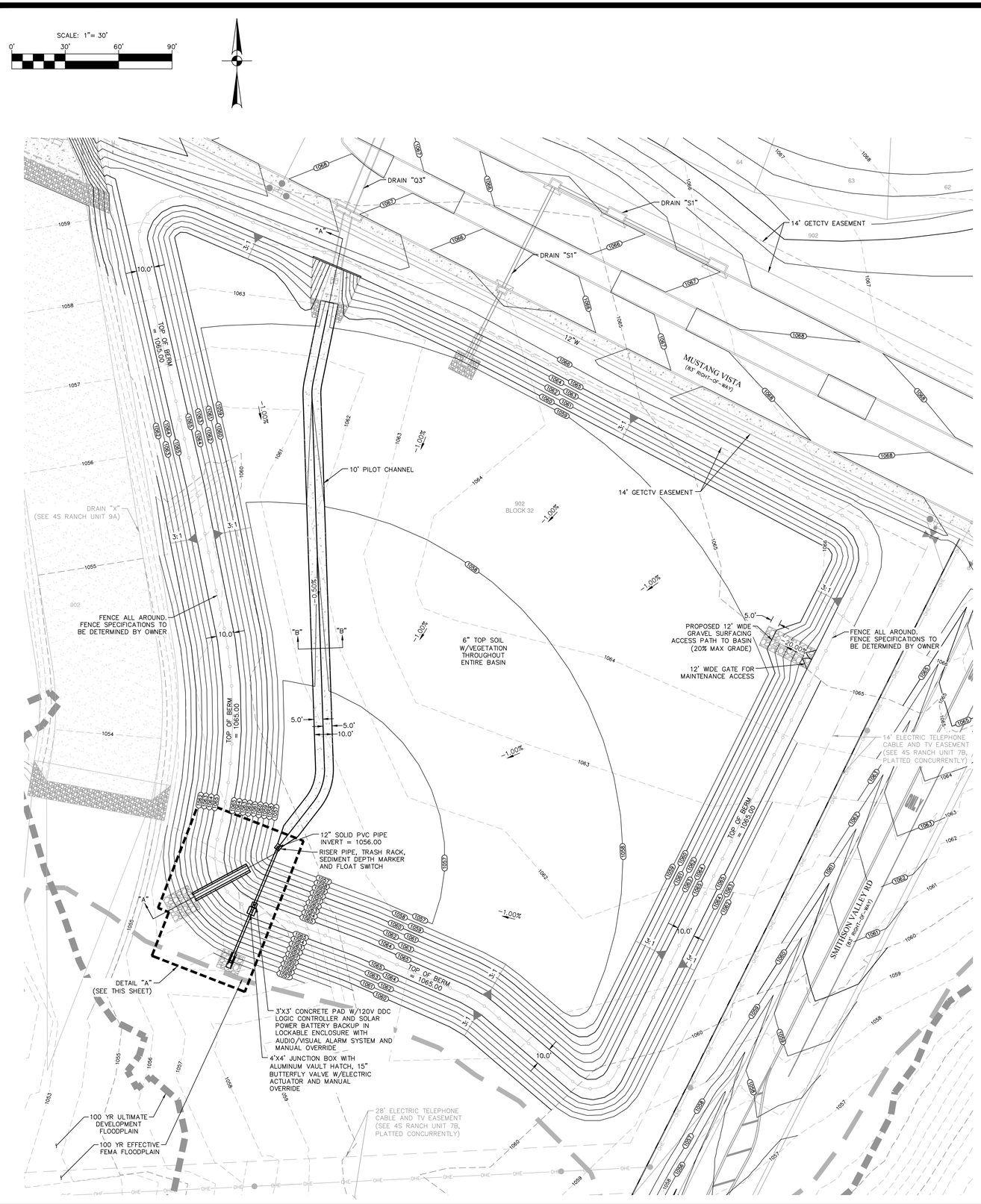
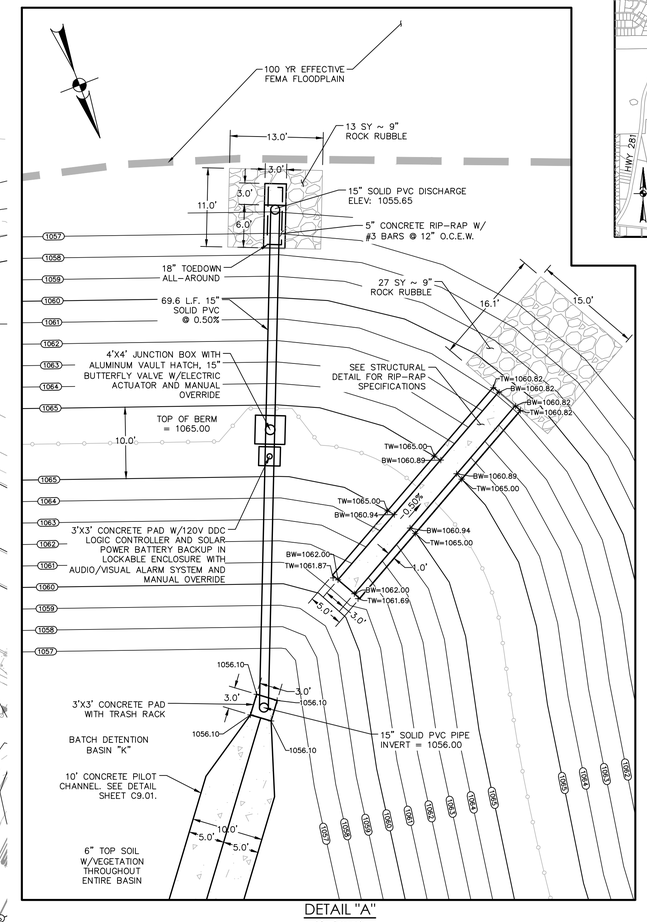
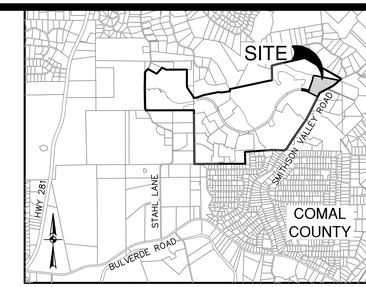




DETAIL "A"

SCALE: 1" = 10'



LOCATION MAP

NOT-TO-SCALE

LEGEND

- 1049 — EXISTING 1' CONTOUR
- 1050 — EXISTING 5' CONTOUR
- (1049) — PROPOSED 1' CONTOUR
- (1050) — PROPOSED 5' CONTOUR

OVERFLOW WEIR CALCULATIONS

WEIR ELEV= 1061.00

$Q_{25} = (Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL} =$ 15.8 cfs

WEIR FLOW CALCULATION:

C = 3.087

L = 3 ft

$15.8 = (3.087)(3)(h)^{3/2}$

h = 1.43 ft --> 1061.00 + 1.43 = 1062.43 ft

WATER QUALITY BASIN DESIGN DATA

BASIN WATERSHED AREA	=	1,024,967 SF (23.53 AC.)
RUN OFF DEPTH	=	3.66 INCHES
REQUIRED CAPTURE VOLUME	=	120,585 CF (2.768 AC-FT)
BASIN STORM WATER DEPTH	=	3.50 FT (AVG.)
BASIN CAPTURE VOLUME	=	269,331 CF (6.183 AC-FT)

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).

5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.

6. BASIN DRAWDOWN IS CONTROLLED BY THE 15" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 14 HOURS.

7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY CLOSED.

8. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

9. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 15" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 14 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 15" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

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

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EXHIBIT 6

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH, UNIT-10A & MUSTANG VISTA PHASE 6, COMAL CO. WCID NO. 6

BULVERDE, TEXAS

BATCH DETENTION BASIN "K"

PLAT NO. -

JOB NO. 8547-71

DATE SEPTEMBER 2020

DESIGNER DW/JG

CHECKED DRAWN TC

SHEET C9.00

Date: Sep 24, 2020, 11:22am User ID: jonathangroff
File: P:\85\47\71\Design\Civil\BA854771 BASIN K.dwg

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GRADING AND DRAINAGE GENERAL NOTES:

1. ALL GRADES AND CONTOURS SHOWN ARE FINAL, TOP OF FINISHED SURFACE ELEVATIONS.

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3. NO ABRUPT CHANGE OF GRADE SHALL OCCUR.

4. ALL DISTURBED AREAS SHALL BE REVEGETATED, BY THE CONTRACTOR, IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND LANDSCAPING PLANS.

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2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

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b.) BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

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4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

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- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

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1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

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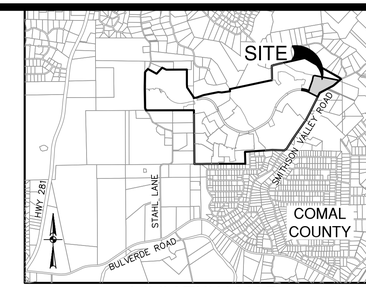
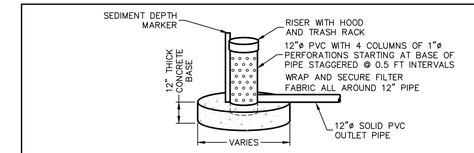


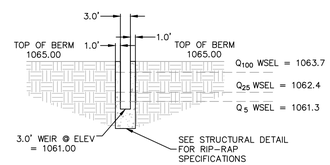
LOCATION MAP

NOT-TO-SCALE



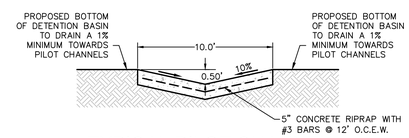
OUTLET STRUCTURE DETAIL

NOT TO SCALE



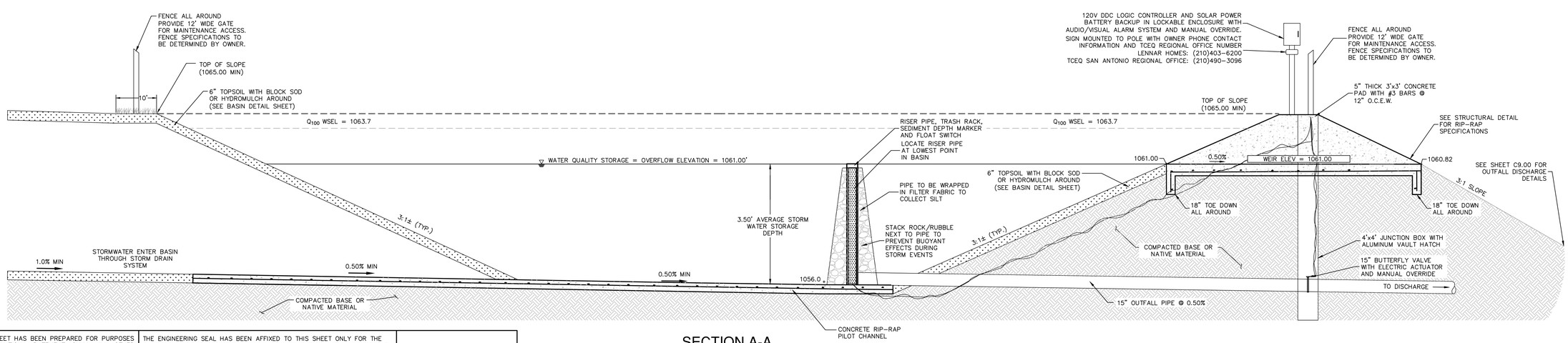
SECTION B-B

NOT TO SCALE



TYPICAL PILOT CHANNEL

NOT TO SCALE



SECTION A-A

N.T.S.

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

EXHIBIT 7

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH, UNIT-10A & MUSTANG VISTA PHASE 6,
COMAL CO. WCID NO. 6
BULVERDE, TEXAS

BATCH DETENTION BASIN "K" DETAILS

PLAT NO. -
JOB NO. 8547-71
DATE SEPTEMBER 2020
DESIGNER DW/JG
CHECKED DRAWN TC
SHEET C9.01

Date: Sep 24, 2020, 11:22am User ID: jonathangraff
File: P:\85\47\71\Design\Civil\BA854771 BASIN K.dwg

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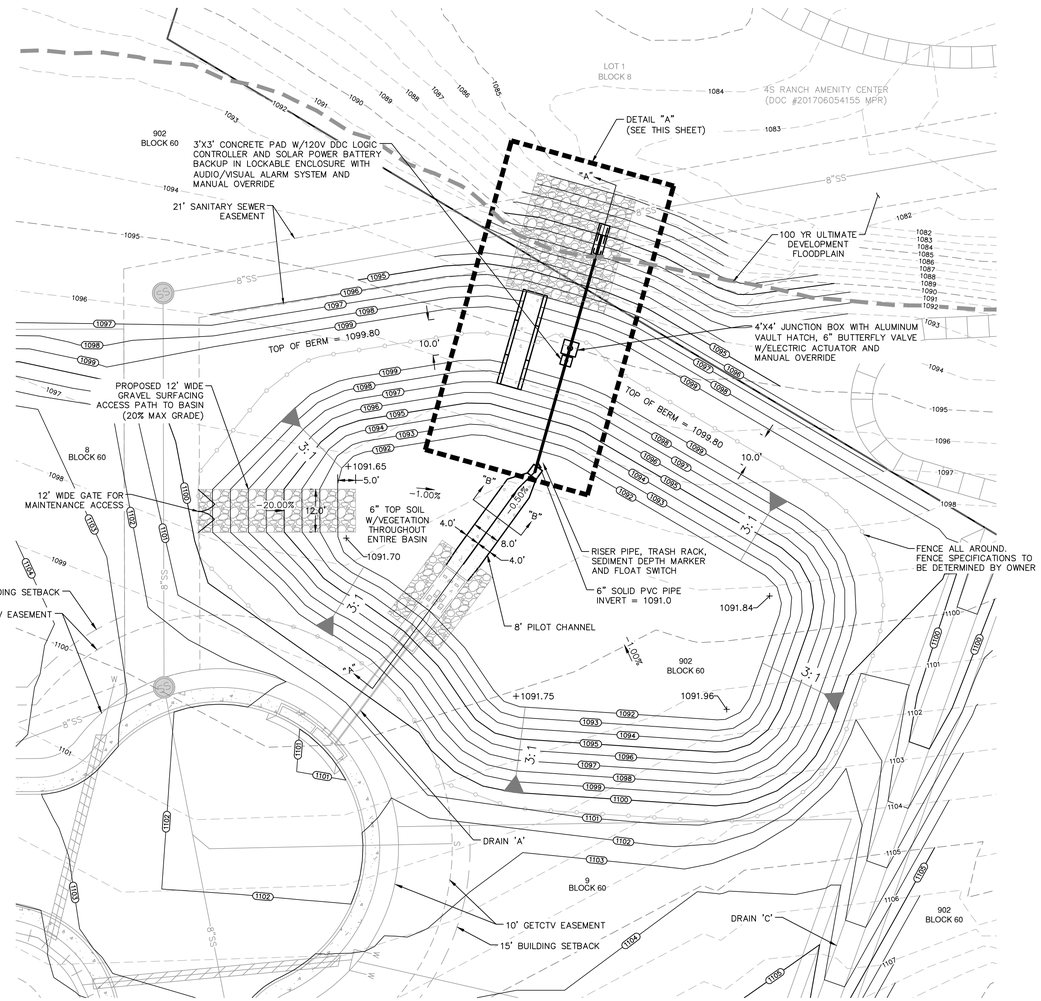
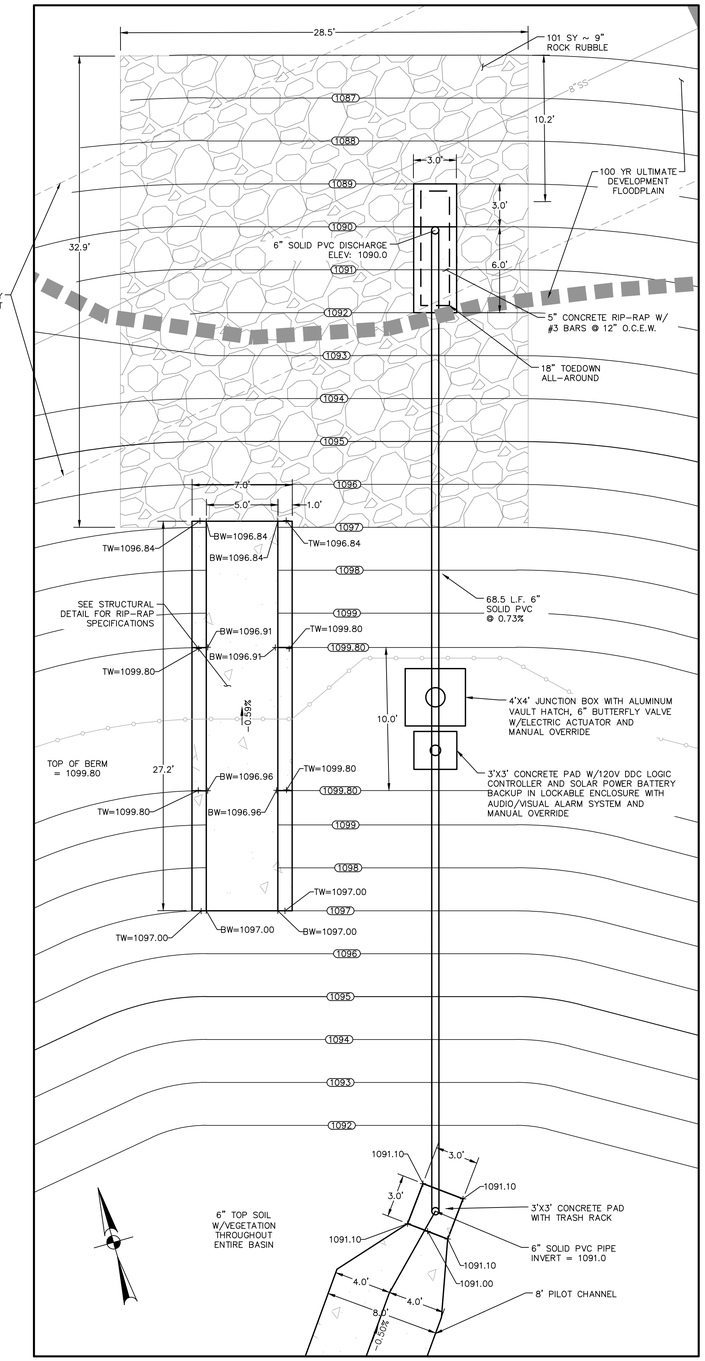
SCALE: 1"= 20'

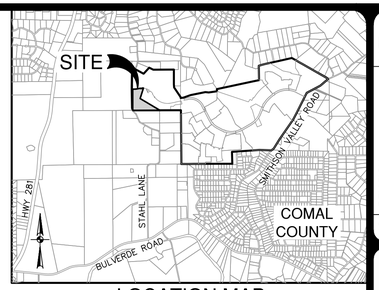
0' 20' 40' 60'





DETAIL "A"

SCALE: 1" = 5'



LOCATION MAP

NOT-TO-SCALE

LEGEND

- 1049 — EXISTING 1' CONTOUR
- 1050 — EXISTING 5' CONTOUR
- 1049 — PROPOSED 1' CONTOUR
- 1050 — PROPOSED 5' CONTOUR

OVERFLOW WEIR CALCULATIONS

WEIR ELEV= 1097.00

Q_{25} = $(Cw)(L)(h)^{3/2}$

$Q_{25\ TOTAL}$= 26.7 cfs

WEIR FLOW CALCULATION:

C = 3.087

L = 5 ft

26.7 = $(3.087)(5)(h)^{3/2}$

h = 1.44 ft --> 1097.00 + 1.44 = 1098.44 ft

WATER QUALITY BASIN DESIGN DATA

BASIN WATERSHED AREA	=	213,444 SF (4.90 AC.)
RUN OFF DEPTH	=	3.66 INCHES
REQUIRED CAPTURE VOLUME	=	25,922 CF (0.595 AC-FT)
BASIN STORM WATER DEPTH	=	4.90 FT (AVG.)
BASIN CAPTURE VOLUME	=	38,028 CF (0.873 AC-FT)

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).

5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.

6. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 13 HOURS.

7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY CLOSED.

8. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASIN PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

9. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASIN) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 13 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

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EXHIBIT 8

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH, UNIT-11, COMAL CO. WCID NO. 6

BULVERDE, TEXAS

BATCH DETENTION BASIN L

PLAT NO. -

JOB NO. 8547-73

DATE OCTOBER 2020

DESIGNER DW/JG

CHECKED ____ DRAWN TC

SHEET C9.00

Date: Sep 24, 2020, 10:41am User ID: jonathangroff
File: P:\85\47\73\Design\Civil\BA854773 BASIN L.dwg

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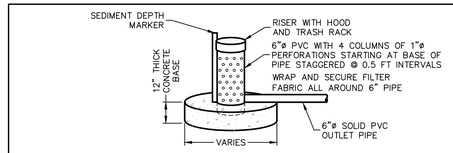
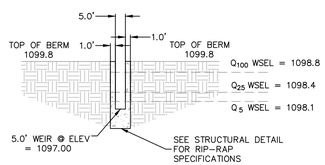


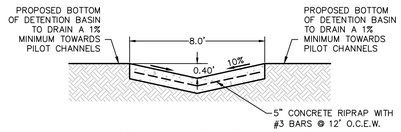
OUTLET STRUCTURE DETAIL

NOT TO SCALE



SECTION B-B

NOT TO SCALE



TYPICAL PILOT CHANNEL

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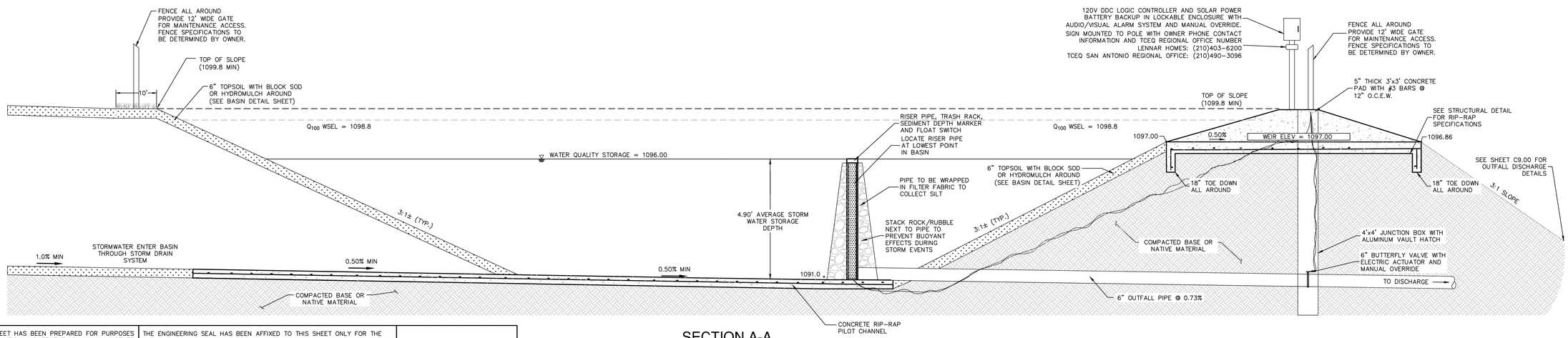

SECTION A-A

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EXHIBIT 9

NO.	REVISION	DATE

STATE OF TEXAS
EUGENE H. DAWSON III
112792
LICENSED
PROFESSIONAL ENGINEER
9/23/2020

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

4S RANCH, UNIT-11, COMAL CO. WCID NO. 6

BULVERDE, TEXAS

BATCH DETENTION BASIN L DETAILS

PLAT NO. -
JOB NO. 8547-73
DATE OCTOBER 2020
DESIGNER DW/JG
CHECKED DRAWN TC
SHEET C9.01

Date: Sep 24, 2020, 10:51am User ID: jonathangroff
File: P:\85\47\73\Design\Civil\BA8547T3 BASIN L.dwg

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