LA CANTERA RESORT & SPA

Water Pollution Abatement Plan Modification

October 2023

PAPE-DAWSON ENGINEERS

Transportation | Water Resources | Land Development | Surveying | Environmental

PAPE-DAWSON ENGINEERS

October 2, 2023

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

Re: La Cantera Resort & Spa
Water Pollution Abatement Plan Modification

Dear Ms. Butler:

Please find included herein the La Cantera Resort & Spa Water Pollution Abatement Plan Modification. This Water Pollution Abatement Plan Modification has been prepared in accordance with the regulations of the Texas Administrative Code (30 TAC 213) and current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan Modification applies to an approximate 330.29-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 ($10,000) and fee application 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

Thomas M. Carter, P.E.
Senior Vice President

Attachments

P:\124\30\10\Word\Reports\WPAP\230922a1.docx

LA CANTERA RESORT & SPA

Water Pollution Abatement Plan Modification

October 2023

10/2/23

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: La Cantera Resort & Spa						**2. Regulated Entity No.:** 102747714			
3. Customer Name: LCR Hotel, LLC						**4. Customer No.:**			
5. Project Type: **(Please circle/check one)**	New		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential			**8. Site (acres):**		330.29	
9. Application Fee:	$10,000		**10. Permanent BMP(s):**			WQ basins, VFS, Jellyfish filter			
11. SCS (Linear Ft.):			**12. AST/UST (No. Tanks):**						
13. County:	Bexar		**14. Watershed:**			Upper Leon Creek			

Application Distribution

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

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

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

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	☐	☐	☐
Region (1 req.)	☐	☐	☐
County(ies)	☐	☐	☐
Groundwater Conservation District(s)	☐ Edwards Aquifer Authority ☐ Barton Springs/ Edwards Aquifer ☐ Hays Trinity ☐ Plum Creek	☐ Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	☐ Austin ☐ Buda ☐ Dripping Springs ☐ Kyle ☐ Mountain City ☐ San Marcos ☐ Wimberley ☐ Woodcreek	☐ Austin ☐ Bee Cave ☐ Pflugerville ☐ Rollingwood ☐ Round Rock ☐ Sunset Valley ☐ West Lake Hills	☐ Austin ☐ Cedar Park ☐ Florence ☐ Georgetown ☐ Jerrell ☐ Leander ☐ Liberty Hill ☐ Pflugerville ☐ Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	✔	☐	☐	☐	☐
Region (1 req.)	✔	☐	☐	☐	☐
County(ies)	✔	☐	☐	☐	☐
Groundwater Conservation District(s)	✔ Edwards Aquifer Authority ✔ Trinity-Glen Rose	☐ Edwards Aquifer Authority	☐ Kinney	☐ EAA ☐ Medina	☐ EAA ☐ Uvalde
City(ies) Jurisdiction	☐ Castle Hills ☐ Fair Oaks Ranch ☐ Helotes ☐ Hill Country Village ☐ Hollywood Park ✔ San Antonio (SAWS) ☐ Shavano Park	☐ Bulverde ☐ Fair Oaks Ranch ☐ Garden Ridge ☐ New Braunfels ☐ Schertz	NA	☐ San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. Thomas M. Carter, P.E. Print Name of Customer/Authorized Agent Signature of Customer/Authorized Agent Date: 10/2/23

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

GENERAL INFORMATION FORM (TCEQ-0587)

General Information Form

Texas Commission on Environmental Quality

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

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

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

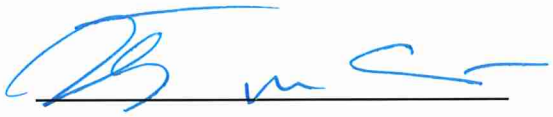
Signature

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

Print Name of Customer/Agent: Thomas M. Carter, P.E.

Date: 10/2/23

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: La Cantera Resort & Spa
2. County: Bexar
3. Stream Basin: Upper Leon Creek
4. Groundwater Conservation District (If applicable): Edwards Aquifer; Trinity Glen-Rose
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

   ☒ WPAP
   ☐ SCS
   ☒ Modification
   ☐ AST
   ☐ UST
   ☐ Exception Request

7. Customer (Applicant):

   Contact Person: Joe Ward
   Entity: LCR Hotel, LLC
   Mailing Address: 16641 La Cantera Pkwy
   City, State: San Antonio, TX Zip: 78256
   Telephone: (210) 558-6500 FAX: _____
   Email Address: jward@ohanare.com

8. Agent/Representative (If any):

   Contact Person: Thomas M. Carter, 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: tcarter@pape-dawson.com

9. Project Location:

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

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

    From TCEQ's Regional office, travel 2.5 miles north on Judson Road to Loop 1604. Proceed west on Loop 1604 approximately 13.9 miles. Take the exit toward La Cantera Parkway and proceed along the Loop 1604 frontage road approximately 0.5 miles. Turn right onto La Cantera Parkway and proceed north approximately 0.5 miles and turn left onto Resort Drive. The site will be located approximately 0.4 miles west of La Cantera Parkway on Resort Drive.

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

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

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

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

    ☒ Survey staking will be completed by this date: when advised by TCEQ

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

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

15. Existing project site conditions are noted below:

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

Prohibited Activities

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

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

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

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

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

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

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

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

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

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

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

Administrative Information

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

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

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

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

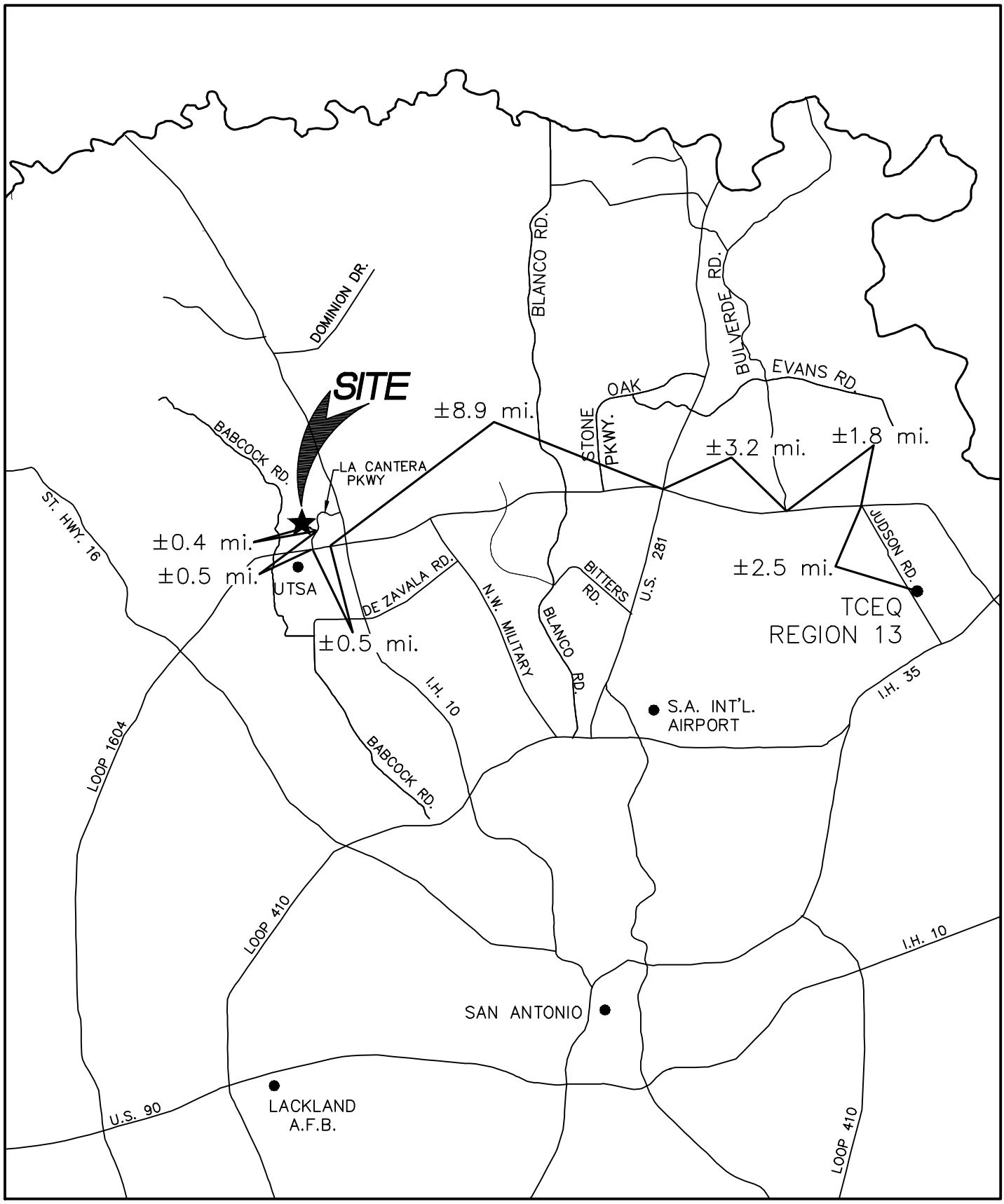
20. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies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

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

ATTACHMENT A

LA CANTERA RESORT & SPA
Water Pollution Abatement Plan - Modification

NOT TO SCALE



Pape-Dawson Consulting Engineers, LLC

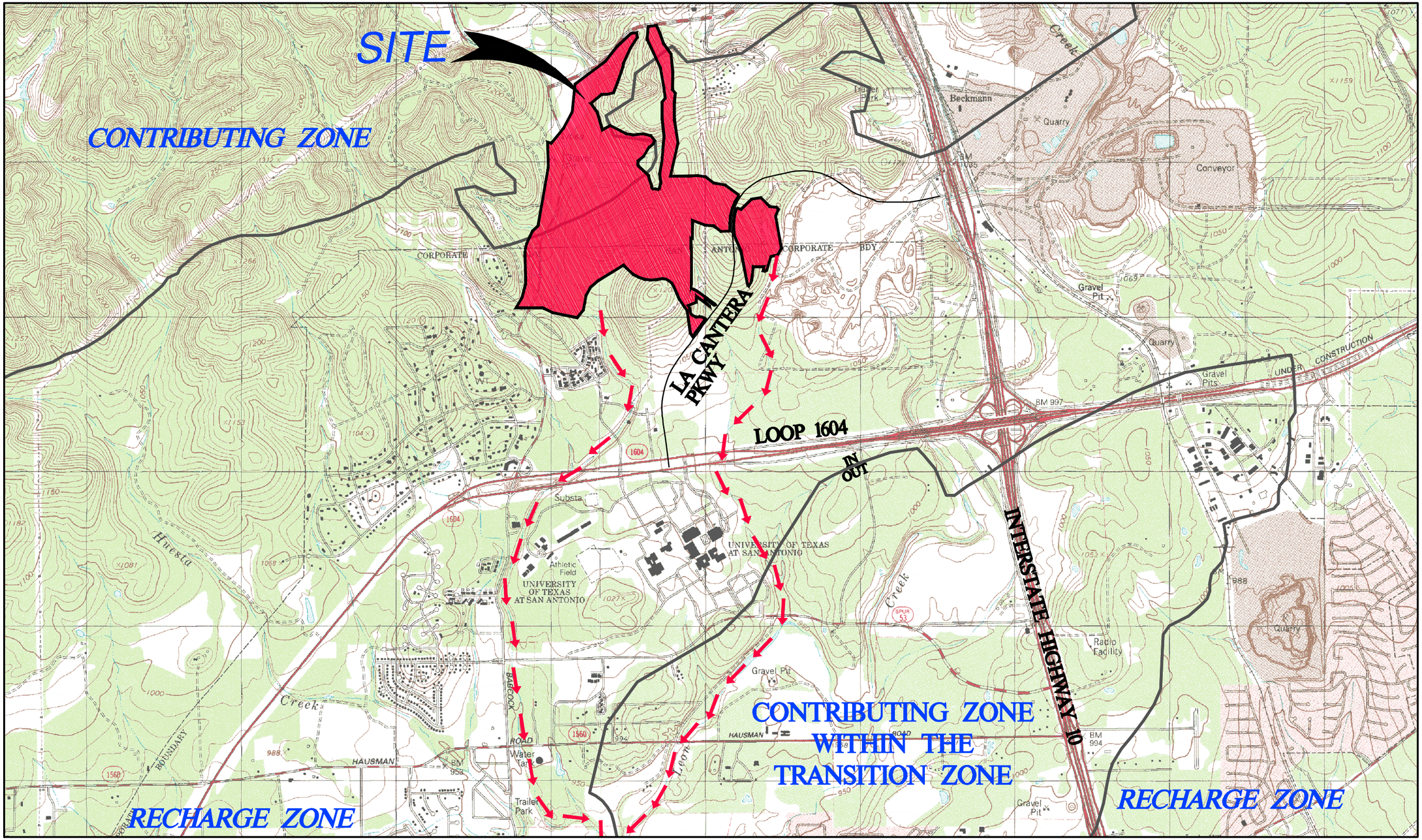
Date: Sep 18, 2023, 6:01pm User ID: mcushman
File: P:\124\30\10\Design\Environmental\WPAP\RM1243010.dwg

ATTACHMENT A
Road Map

ATTACHMENT B

LA CANTERA RESORT & SPA
Water Pollution Abatement Plan - Modification

N
SCALE: 1" = 2000'



Date: Aug 16, 2023, 10:47am User ID: mcuthman
File: P:\124\30\10\Design\Environmental\WPAP\QD124330 10.dwg

HELOTES TX, QUADRANGLE,
CASTLE HILLS TX, QUADRANGLE
→ → Drainage Flow
Pape-Dawson Consulting Engineers, LLC

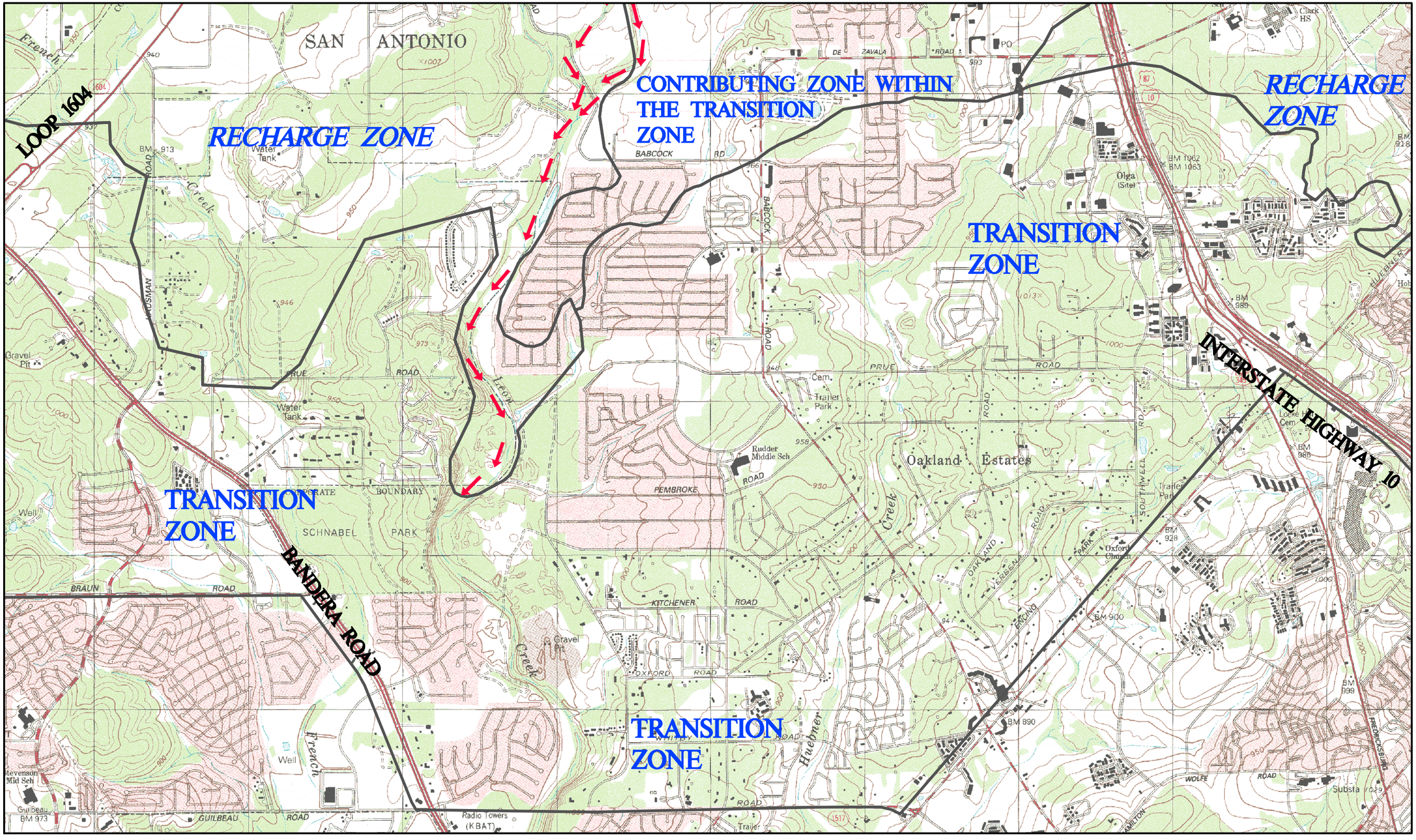
MATCHLINE See Sheet 2 of 2

USGS/EDWARDS RECHARGE ZONE MAP
Sheet 1 Of 2
Attachment B

LA CANTERA RESORT & SPA - EVENT BARN
Water Pollution Abatement Plan - Modification

N
SCALE: 1" = 2000'

MATCHLINE See Sheet 1 of 2



HELOTES TX, QUADRANGLE,
CASTLE HILLS TX, QUADRANGLE
→ → Drainage Flow
Pape-Dawson Consulting Engineers, LLC

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

Date: Aug 16, 2023, 10:48am User ID: mcushman
File: P:\124\30\10\Design\Environmental\WPAP\201243010.dwg

ATTACHMENT C

Attachment C – Project Description

The La Cantera Resort & Spa Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the previously approved Resort Course at La Cantera WPAP MOD approved on May 23, 2019 (EAPP ID No. 13000870), which included the associated La Cantera Resort Hotel and other related amenities. This site is located northwest of the intersection of Loop 1604 W and La Cantera Parkway on 330.29 acres within the city limits of San Antonio, Bexar County, Texas. The site lies over the Edwards Aquifer Recharge Zone and Contributing Zone. The existing development consists of an eighteen (18) hole championship golf course, golf cart paths, golf course restrooms and snack buildings, a resort hotel, casita village, clubhouse, golf course maintenance facility, restaurant, sidewalks, connecting drives and associated parking lots. These improvements are all located within the original golf course WPAP boundary but were permitted under separate WPAP applications throughout each phase of development; the approved Resort Course at La Cantera WPAP MOD (EAPP ID No. 13000870) simplified the entire development with one project boundary and treatment summary – totaling 40.51 acres of impervious cover, or 12.3% of the 330.29- acre project limits, and twenty-three (23) PBMPs, as follows:

- Three (3) sedimentation/detention basins connected to one (1) central retention/irrigation lake for the overall retention/irrigation system
- One (1) separate sedimentation/detention basin connected to the Fiesta Texas drainage infrastructure
- One (1) batch detention basin
- Two (2) sand filter basins, one of which is also connected to the central retention/irrigation lake
- Existing grate/curb inlets with oil skimming booms
- Fourteen (14) engineered vegetative filter strips

All existing PMBPs within the project limits, including those for the resort hotel, the Villas, the clubhouse, the maintenance facility and entry drive, will continue to function as approved, unless affected by the proposed modifications referenced herein. All exiting drainage patterns are also being maintained but have minor alterations based of some grading improvements . All grandfathered PBMPs and modified PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site, in accordance with the LCR Technical Manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015), and in accordance with the TCEQ/s TGM RG-348 (2005), respectively. All upgradient areas depicted in the exhibits herein will contribute to stormwater runoff to the site that is accepted by onsite drainage infrastructure and either bypassed or routed to existing basins that are sized to account for the upgradient flow. All upgradient areas are either undeveloped or contribute treated stormwater runoff that is part of an approved WPAP. All proposed and existing storm water systems that convey upgradient runoff will be appropriately sized to capture and convey said runoff for the 25-year storm event at non-erosive velocities that are less than six (6) feet per second (fps).

This La Cantera Resort & Spa WPAP MOD proposes the construction of an event facility, mass grading, and the remediation of several PBMPs and watershed designations, as follows:

- The six-inch (6') force main at Basin "B" has been abandoned, and treatment will no longer be provided by Basin "B". The previously approved 0.36-acres of impervious cover in Watershed "B" will now be treated via overtreatment.

- Expansion of a kids' pool area in Watershed "D" proposes 0.57 acres of additional impervious cover to the previously approved 11.31 acres of impervious cover; however, updated survey shows 0.75 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 11.13 total acres. Basin "D" will still provide treatment for this area and remain unchanged.
- Expansion of an existing spa in Watershed "E" proposes 0.15 acres of additional impervious cover to the previously approved 3.55 acres of impervious cover; however, updated survey shows 0.43 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 3.27 total acres. Re-grading is proposed near the existing Villas to re-route the runoff towards existing fairway inlets. Basin "E" will still provide treatment for this area and remain unchanged.
- Proposed tennis courts and expansion of existing clubhouse in Watershed "F" propose 0.53 acres of additional impervious cover to the previously approved 10.98 acres of impervious cover; however, updated survey shows 1.13 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 10.38 total acres. The retrofitting of Basin "F" to a batch detention basin, as previously approved, has been complete, and will continue to provide treatment for this watershed.
- Clearing, grading, excavation for installation of utilities and drainage improvements, parking and hardscapes are proposed for the construction of the event facility within Watershed "F-1". Approximately 1.28 acres of impervious cover is proposed for this construction. The proposed Permanent Best Management Practice for this watershed is one (1) Jellyfish filter, which is 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 this area.
- Updated survey for Watershed "G" shows 0.05 acres of impervious cover of the previously approved 0.53 acres have not been constructed. The net post-development impervious cover is 0.48 acres. No changes are proposed for this watershed, and the area will still be treated via overtreatment.
- The proposed re-grading of Watershed "E" changes the drainage area of Watershed "I", and updated survey shows 1.88 acres of impervious cover have not been constructed. The net post-development impervious cover is 0.31 acres, which will still be treated via overtreatment.
- Updated survey for Watershed "K" shows an increase of 0.03 acres of impervious cover, which will be treated via overtreatment. The engineered VFS for this watershed will remain unchanged.
- The guardhouse in Watershed "L" has changed locations with a new connection to the roundabout, and the adjusted adjacent watersheds, which resulted in approximately 0.05 acres of increase in existing impervious cover. The existing BMPs will remain unchanged and provide treatment for the increase.

In summary, approximately 4.24 acres of impervious cover have been removed from the plan following updated survey. This WPAP MOD proposes the construction of an additional 2.53 acres of impervious cover, for a net decrease of 1.71 acres overall; therefore, the total post-development impervious cover is 38.80 acres, or 11.7% of the overall 330.29-acre project limits. There are twenty-two (22) existing, previously approved PBMPs (ID 13000870) within the project limits to remain, including two (2) lined detention/sedimentation basins, one (1) retention irrigation basin, one (1) batch detention basin, two (2)

sand filter basins, one (1) lined detention/sedimentation basin treated offsite by Fiesta Texas Basin 5, vacuum sweeping and oil booms, and fourteen (14) engineered fifteen-foot (15') vegetative filter strips (VFS). All grandfathered PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site in accordance with the LCR Technical Manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015) and in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005), respectively. The proposed additional Permanent Best Management Practices (PBMPs) for stormwater treatment under this WPAP MOD is one (1) Jellyfish filter, which is designed in accordance with the TCEQ's TGM RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site. Please see the Treatment Summary Table attached with this application.

At ultimate development, this project will generate the same amount of average wastewater flow, approximately 81,000 gallons per day (gpd). Wastewater service for the area is provided by the San Antonio Water System (SAWS) with conveyance to the existing Leon Creek Water Recycling Center. Potable water service is provided by SAWS. Makeup irrigation for the golf course is provided by onsite privately owned water wells.

GEOLOGIC ASSESSMENT FORM (TCEQ-0585)

Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), Effective June 1, 1999

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

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

Signature

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

Print Name of Geologist: Henry Stultz III Telephone: 210-375-9000

Date: January 10, 2019 Fax: 210-375-9090

Representing: Pape-Dawson Engineers, Inc.
Texas Board of Professional Geoscientists No. 50351 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Regulated Entity Name: LA CANTERA WEST GOLF COURSE

Project Information

1. Date(s) Geologic Assessment was performed: April 12, 2018, April 20, 2018, May 1-4, 2018, August 23, 2018,
2. Type of Project:
   - ☒ WPAP
   - ☐ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☐ Transition Zone

☐ Contributing Zone within the Transition Zone

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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
Crawford and Bexar stony soils (Cb)	D	0-4
Eckrant cobbly clay, 1 to 5 percent slopes (TaB)	D	1-2
Eckrant-Rock outcrop complex, 15 to 60 percent slope (TaD)	D	1-2

Soil Name	Group*	Thickness(feet)

** Soil Group Definitions (Abbreviated)*

A. Soils having a high infiltration rate when thoroughly wetted.

B. Soils having a moderate infiltration rate when thoroughly wetted.

C. Soils having a slow infiltration rate when thoroughly wetted.

D. Soils having a very slow infiltration rate when thoroughly wetted.

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

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

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

   Applicant's Site Plan Scale: 1" = 200'
   Site Geologic Map Scale: 1" = 200'
   Site Soils Map Scale (if more than 1 soil type): 1" = 800'

9. Method of collecting positional data:

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

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

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

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

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

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

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

    ☒ There are 2 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
    ☐ The wells are not in use and have been properly abandoned.
    ☒ The wells are not in use and will be properly abandoned.
    ☐ The wells are in use and comply with 16 TAC Chapter 76.
    ☐ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

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

ATTACHMENT A

EOLOGIC ASSESSMENT TABLE | PROJECT NAME: **LA CANTERA WEST GOLF COURSE**

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILLING	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
	N	W				X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29.59763°	-98.62668°	MB	30	Kgr/Kek	<2000							C,F	20	50		X	X		Hillside
S-2	29.61164°	-98.62398°	MB	30	Kgr			Unk					N,X	35	65		X	X		Hillside
S-3	29.61143°	-98.62409°	CD	5	Kgr	80	50	5					F,X	5	15	X		X		Hillside
S-5	29.61089°	-98.62551°	SC	20	Kgr	3	0.5	1.5	N30W				F,O	20	40		X		X	Floodplain
S-6	29.60399°	-98.62787°	MB	30	Kgr			Unk					N,X	35	65		X	X		Hillside
S-7	29.61229°	-98.61907°	F	20	Kgr/Kek	<2000			N57E	10	2	0.05	F,FS	5	35	X			X	Hillside/Flooplain
S-8	29.60892°	-98.61871°	F	20	Kgr/Kek	<2000			N63E	10	1	0.05	F,FS	5	35	X			X	Hillside/Flooplain
S-9	29.59796°	-98.62809°	F	20	Kgr/Kek	<2000			N62E	10	1	0.05	F,FS	5	35	X			X	Hillside/Flooplain
S-10	29.59736°	-98.62585°	F	20	Kek	<2000			N73E	10	2	0.05	F,FS	5	35	X			X	Hillside/Flooplain

** DATUM: NAD 83

Note: Only those geologic and man-made features within the area of the assessment are included. Therefore, the features may not be numbered sequentially.

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

8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

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

Date January 10, 2019

ATTACHMENT B

LA CANTERA WEST GOLF COURSE
Stratigraphic Column

Period	Epoch	Group	Formation	Member	Thickness	Lithology	Hydro-logic Unit	Hydrostratigraphic Unit	Hydrologic Function	Porosity	Cavern Development
Cretaceous	Early Cretaceous	Edwards	Person	Regional dense	20–24	Dense, shaly limestone; oyster shell mudstone and iron wackestone; wispy iron staining; chert nodules rarer than in the rest of the chert-bearing Edwards Group	Edwards Aquifer	IV	Confining	FR, CV	Very few; only vertical fracture enlargement
			Kainer	Grainstone	40–50	Hard, dense limestone that consists mostly of a tightly cemented miliolid ir skeletal fragment grainstone; contains interspersed chalky mudstone and wackestone; chert as beds and nodules; crossbedding and ripple marks are common primarily at the contact with the overlying regional dense bed		V	Aquifer	IP, IG, BU, FR, BP, CV	Few
				Kirsch-berg Evaporite	40–50	Highly altered crystalline limestone and chalky mudstone with occasional grainstone associated with tidal channels; chert as beds and nodules, boxwork molds are common, matrix recrystallized to a coarse graine spar; intervals of collapse breccia and travertine deposits		VI	Aquifer	IG, MO, VUG, FR, BR, CV	Probably extensive cave development
				Dolomitic	90–120	Hard, dense to granular, dolomitic limestone; chert as beds and nodules (absent in lower 20 ft); *Toucasia* sp. abundant; lower three-fourths composed of sucrosic dolomites and grainstones with hard, dense limestones interspersed; upper one-fourth composed mostly of hard, dense mudstone, wackestone, packstone, grainstone, and recrystallized dolomites with bioturbated beds		VII	Aquifer	IP, IC, IG, MO, BU, VUG, FR, BP, CV	Caves related to structure or bedding planes
				Basal nodular	40–50	Moderately hard, shaly, nodular, burrowed mudstone to miliolid grainstone that also contains dolomite; contains dark, spherical textural features known as black rotund bodies; *Ceratostreon texana* , *Caprina* sp., miliolids, and gastropods		VIII	Aquifer, confining unit in areas without caves	IP, MO, BU, BP, FR, CV	Large lateral caves at surface
		Trinity	Glen Rose Limestone	Upper Glen Rose	0–120 (absent in northern Comal Co.)	Alternating resistant and nonresistant beds of blue shale, nodular marl, and impure, fossiliferous limestone; gray to yellowish gray; stair-step topography; contains two distinct evaporite zones; distinct *Corbula* sp. bed marks the contact with the underlying lower member of the Glen Rose Limestone; *Orbitulina texana*	Upper Trinity Lower confining unit to the Edwards aquifer	Cavernous	Aquifer	MO, BR, BP, FR, CV	Some surface cave development
					120–230 (thicker in northern Comal Co.)			Camp Bullis	Confining	BU, BP, FR, occasional CV	
					0–10			Upper evaporite	Aquifer	IP, MO, BU, BR	
					0–40			Fossil-iferous — Upper	Aquifer	MO, BU, FR, CV	
					80–150			Fossil-iferous — Lower	Confining	MO, BU, FR	
					8–10			Lower evaporite	Aquifer	IP, MO, BU, BR	
				Lower Glen Rose	30–40 (typ. 30)	Massive, fossiliferous limestone grading upward into thin beds of limestone, dolomite, marl, and shale; numerous caves and reefs occur in the lower portion of the member; *Orbitulina texana* , *Caprina* sp., *Toucasia* sp., *Trigonia* sp., *Turritella* sp., miliolids, and various corals common; contains trace fossil burrows, oysters, pectens, and shell fragments	Middle Trinity	Bulverde	Semi-confining	MO, BR BP, FR	--

Source: Clark, Golab, and Morris (2016); Cavern development modified from Stein and Ozuna (1995). Porosity types - Fabric selective: IP, interparticle porosity; IG, intergranular porosity; IC, intercrystalline porosity; SH, shelter porosity; MO,

ATTACHMENT C

LA CANTERA WEST GOLF COURSE
Site Geology

SITE DESCRIPTION:

The La Cantera West Golf Course project site, which includes the associated La Cantera Resort Hotel and other related amenity buildings, is located north of the intersection of Loop 1604 W and La Cantera Parkway. The 330.29-acre commercial development is located within the city limits of San Antonio in Bexar County, Texas and is over both the Edwards Aquifer Recharge Zone and Contributing Zone. The existing development consists of an eighteen (18) hole championship golf course, golf cart paths, golf course restrooms and snack buildings, a resort hotel, casita village, clubhouse, golf course maintenance facility, restaurant, sidewalks, connecting drives and associated parking lots. These improvements are all located within the original golf course WPAP boundary but were permitted under separate WPAP applications throughout each phase of development. The current WPAP Modification aims to replace these separate and overlapping plans with an overall boundary, impervious cover count and treatment summary.

The geologic assessments for most plans on the project site were conducted prior to the June 1, 1999 revisions of the Edwards Aquifer rules [Title 30 Texas Administrative Code (TAC) Chapter 213]. Subsequently a substantial portion of the project site needed to be reassessed.

Additionally, an exception request was submitted for areas developed where improvements would not provide evidence of geologic features as any geologic features within those areas would have been developed over. These areas are shown on the geologic map.

NARRATIVE SUMMARY:

Based on the results of the field survey conducted in accordance with *Instructions for Geologists for Geologic Assessments in the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 Instructions),* one sensitive, naturally occurring, geologic feature was identified on-site. The overall potential for fluid migration to the Edwards Aquifer for the site is low.

The subject site is located within several members of both the Kainer formation and the Glen Rose formation. Below is a summary of those members.

- The Kirschberg (Kekk) member of the Kainer formation. The Kekk is a highly altered, crystalline limestone with chert. Karst development within the Kekk is characterized by extensive cave formation.

- The dolomitic (Kekd) member of the Kainer formation. The Kekd is a massively bedded, mudstone to grainstone, crystalline limestone. Karst development within the Kekd is characterized by small sinkholes and often caves develop as vertical shafts.

- The basal nodular (Kekbn) member of the Kainer formation. The Kekbn is a massive, shaly, mudstone to grainstone, nodular limestone. Karst development within the Kekbn is characterized by vertical shafts as well as large lateral caves.

- The upper member of the Glen Rose (Kgru) formation. The Kgru is characterized as yellowish-tan thinly bedded limestone and marl. Karst development within the Kgru is characterized by cave formation, with predominantly lateral large rooms.

The predominant trend of faults in the vicinity of the site is approximately N65°E, based on faults identified during previous mapping of the area.

FEATURE DESCRIPTIONS:

Feature S-1
Feature S-1 is several existing sewer lines that are primarily not located beneath pavement. The sewer lines have been trenched through bedrock and backfilled with a mix of fine and course fill material that may be more permeable than surrounding undisturbed areas. Therefore, the probability of rapid infiltration is intermediate.

Features S-2 and S-6
Features S-2 and S-6 are existing water wells that are not in use. Because of the unknown age, integrity of casing and extent of casing below ground surface, the probability for rapid infiltration is high.

Feature S-3
Feature S-3 is a man-made closed-depression used as a tank for temporary hold of pumped water from the nearby well S-2. It is located within the soil horizon and has an interpreted non-karst origin. Therefore, the probability for rapid infiltration is low.

Feature S-5
Feature S-5 is a solution cavity located in side of a stream channel in a floodplain. The cavity extends laterally approximately 3 feet into the cliff-face but does not appear to continue. Probability of rapid infiltration is moderate, due to its location within the floodplain and geometry.

Features S-7 to S-9
Features S-7 to S-9 are interformational faults that were identified during field reconnaissance and trends along the dominate trend of other faults near the site. No areas of enhanced permeability along the faults were observed and an overall lack of field evidence suggests a low probability for rapid infiltration.

Feature S-10
Feature S-10 is an intraformational fault that was identified during field reconnaissance and trends along the dominant trend of other faults near the site. No areas of enhanced permeability along the fault were observed and an overall lack of field evidence suggests a low probability for rapid infiltration.

REFERENCES

Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers Within Northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, scale 1:24,000, 20 p. pamphlet.

Nationwide Environmental Title Research, LLC. Historical Aerials. historicalaerials.com. Web. March 1, 2017.

Texas Water Development Board, Wells in TWDB Groundwater Database Viewer, http://www2.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer, 10/24/2018.

ATTACHMENT D

Date: Jan 04, 2019 2:42:44 PM User: HStultz
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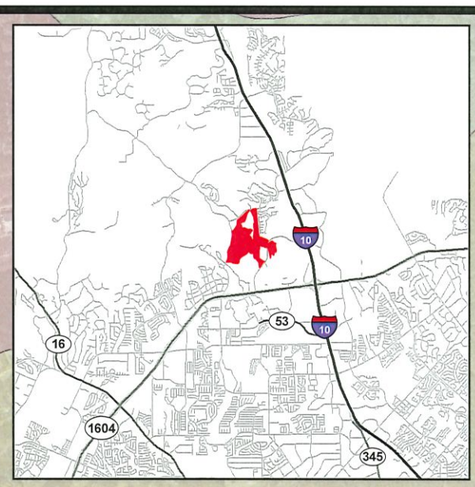


TaC
TaB
Kr
BtE
TaB
TaD
TaD
Cb
TaD
TaC
TaB
Cb

N

0 300 600
Feet

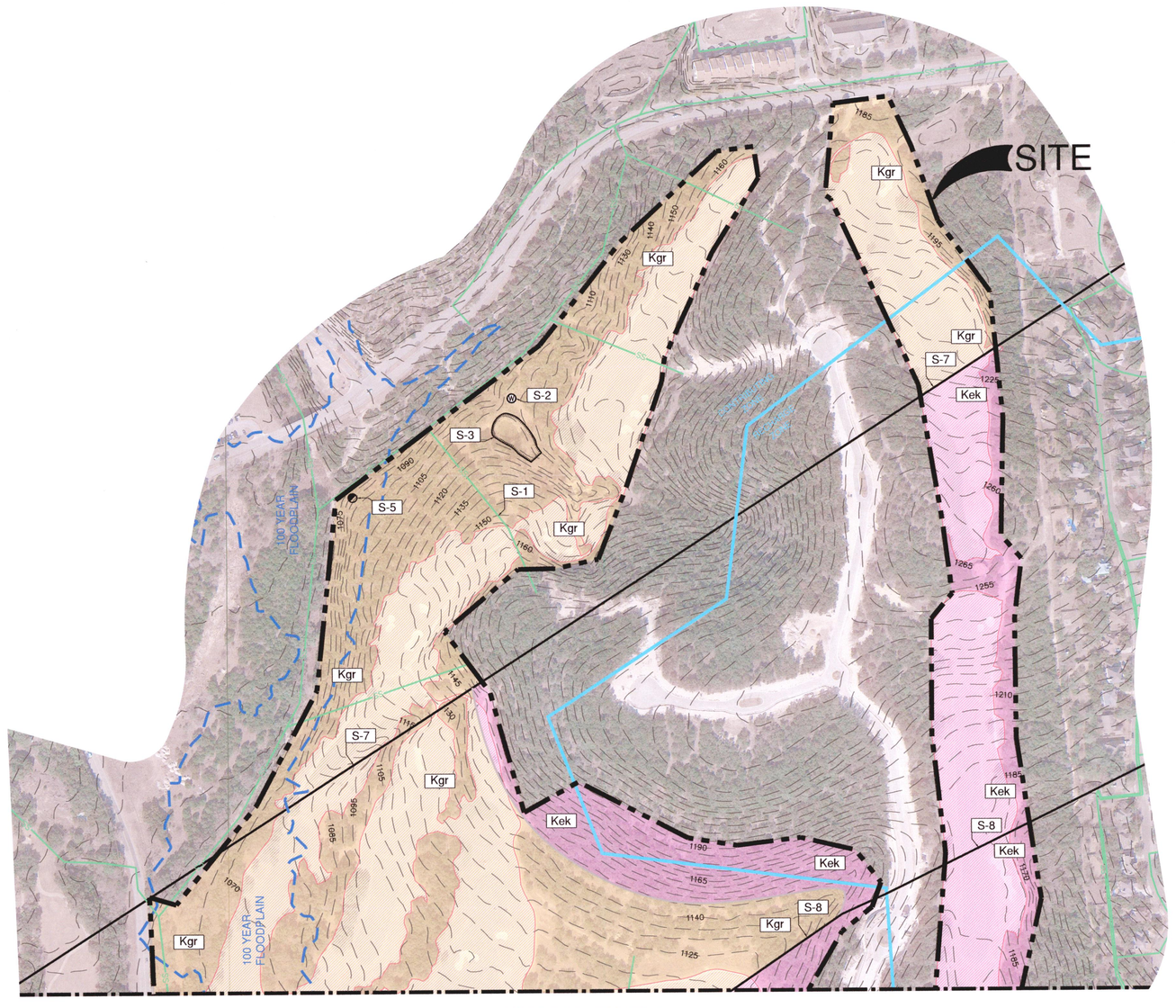
Site Boundary

JOB NO.	8441-70
DATE	Jan 2019
DESIGNER	HS
CHECKED	HDJ
DRAWN	HS
SHEET	ATT. D

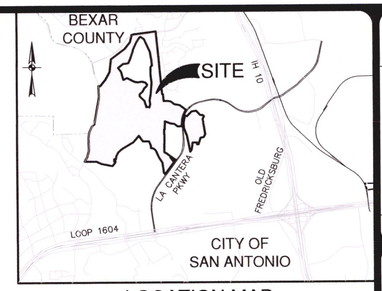
LA CANTERA WEST GOLF COURSE

SAN ANTONIO, TEXAS
SITE SOILS MAP

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



MATCHLINE "A" - SEE SHEET 2



LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 200'

0' 200' 400' 600'

LEGEND

GEOLOGIC FORMATION

Qal	ALLUVIUM	Kep	PERSON
Kbu	BUDA	Kek	KAINER
Kdr	DEL RIO	Kwa	WALNUT
Kgt	GEORGETOWN	Kgr	GLEN ROSE

- S-1 POTENTIAL RECHARGE FEATURE
- CONTACT, LOCATED APPROXIMATELY
- CONTACT, INFERRED
- FAULT, LOCATED APPROXIMATELY (D, DOWNTHROWN SIDE; U, UPTHROWN SIDE)
- FAULT, EXTRAPOLATED
- FAULT, INFERRED
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIP OF JOINTS
- STRIKE OF VERTICAL JOINTS
- CAVE
- SOLUTION CAVITY
- SWALLOW HOLE
- SINKHOLE
- NON-KARST CLOSED DEPRESSION
- ZONE
- OTHER NATURAL BEDROCK FEATURES
- MB MAN-MADE FEATURE IN BEDROCK
- W WATER WELL
- SANITARY SEWER LINE

NOTE: THE GEOSCIENTIST SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR PURPOSES OF GEOLOGIC INFORMATION. ALL OTHER INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SIGNED AND SEALED CIVIL ENGINEERING DRAWINGS.

NOTE: ONLY THOSE GEOLOGIC FEATURES WITHIN THE AREA OF THIS ASSESSMENT ARE INCLUDED. THEREFORE, THE FEATURES MAY NOT BE NUMBERED SEQUENTIALLY.

NOTE: AREA MARKED AS PART OF EXCEPTION REQUEST SUBMITTED ON AUGUST 29, 2018

NO.	REVISION	DATE

STATE OF TEXAS
HENRY STULTZ III
GEOLOGY
12121
LICENSED
PROFESSIONAL GEOSCIENTIST

January 10, 2019

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 | TBPG FIRM REGISTRATION #50351

LA CANTERA WEST GOLF COURSE

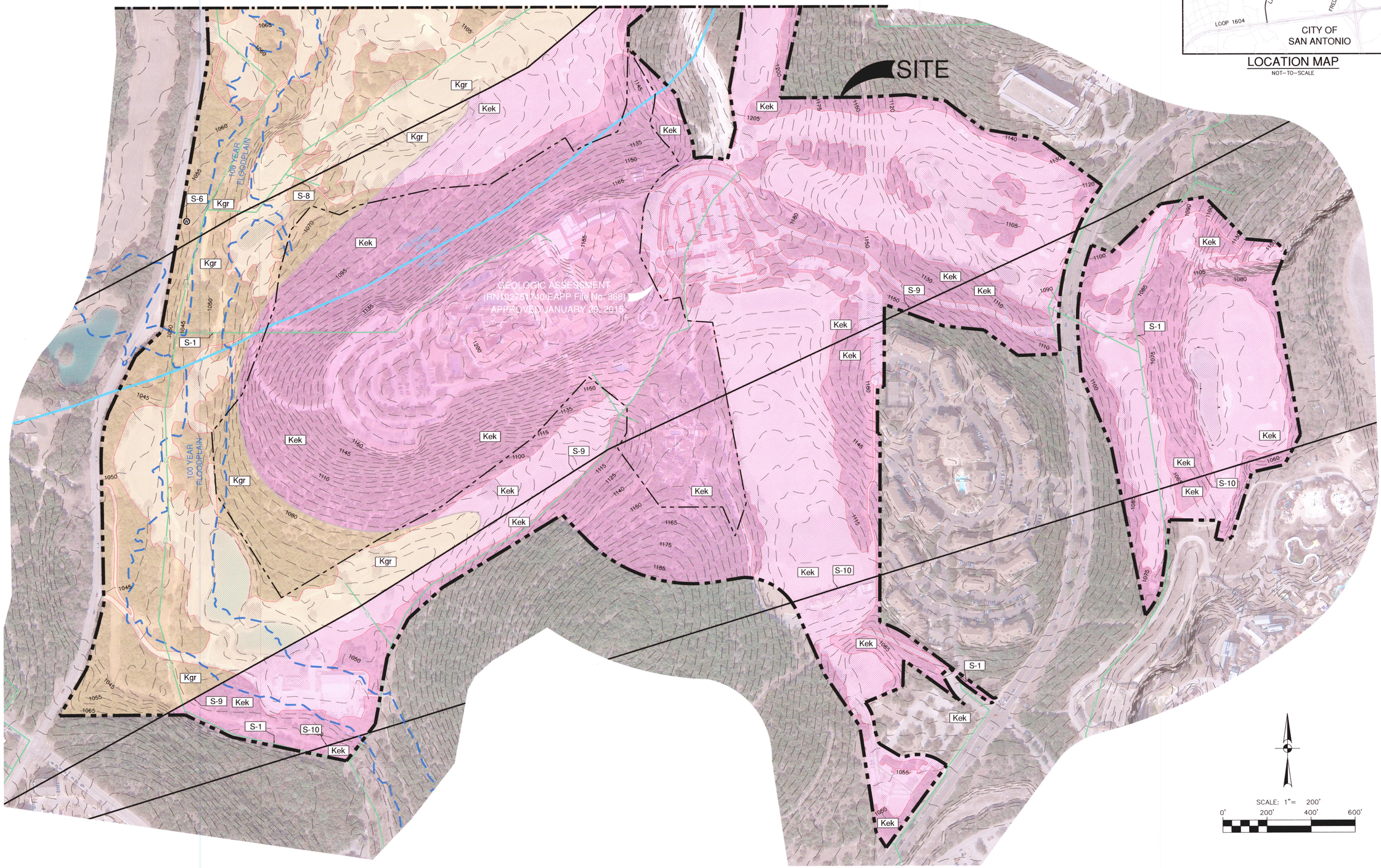
SAN ANTONIO, TEXAS

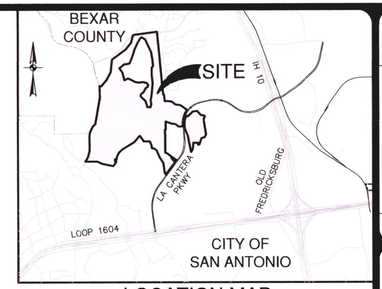
SITE GEOLOGIC MAP
WATER POLLUTION ABATEMENT PLAN

JOB NO. 8441-70
DATE JANUARY 2019
DESIGNER HS
CHECKED HDJ DRAWN HS

ATTACHMENT D
SHEET 1

MATCHLINE "A" - SEE SHEET 1





LOCATION MAP
NOT-TO-SCALE

NO.	REVISION	DATE

STATE OF TEXAS
HENRY STILTZ III
GEOLOGY
12127
LICENSED
PROFESSIONAL GEOSCIENTIST

January 10, 2019

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 | TBPG FIRM REGISTRATION #50351

LA CANTERA WEST GOLF COURSE

SAN ANTONIO, TEXAS

SITE GEOLOGIC MAP
WATER POLLUTION ABATEMENT PLAN

SCALE: 1"= 200'
0' 200' 400' 600'

JOB NO. 8441-70
DATE JANUARY 2019
DESIGNER HS
CHECKED HDJ DRAWN HS

ATTACHMENT D
SHEET 2

Date: Jan 10, 2019, 9:00am User ID: HStultz
File: P:\8441\70\Design\Environmental\GA\GA844170_24x36.dwg

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

Modification of a Previously Approved Plan

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Transition Zone and Relating to 30 TAC 213.4(j), Effective June 1, 1999

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

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

Signature

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

Print Name of Customer/Agent: Thomas M. Carter, P.E.

Date: 10/2/23

Signature of Customer/Agent:

Project Information

1. Current Regulated Entity Name: La Cantera Resort & Spa
   Original Regulated Entity Name: The Resort Course at La Cantera
   Regulated Entity Number(s) (RN): 102747714
   Edwards Aquifer Protection Program ID Number(s): 13000870
   ☐ The applicant has not changed and the Customer Number (CN) is: _____
   ☒ The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. ☒ **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	330.29	330.29
Type of Development	Commercial	Commercial
Number of Residential Lots	N/A	N/A
Impervious Cover (acres)	40.51	38.80
Impervious Cover (%	12.26	11.7
Permanent BMPs	Ret./Irr., Sand Filter Basins	Proposed Jellyfish filter
Other	VFS, Batch Detention Basin	Ret./Irr., Sand Filter Basins VFS, Batch Detention Basin

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 23, 2019

Mr. Bruce C. Petersen
LCWW Partners
9830 Colonnade Blvd, Ste 600
San Antonio, Texas 78230

Re: Edwards Aquifer, Bexar County

NAME OF PROJECT: The Resort Course at La Cantera; Located at 16641 La Cantera Parkway; San Antonio, Texas

TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Regulated Entity No. RN102748472; Additional ID No. 13000870

Dear Mr. Petersen:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP application for the above-referenced project submitted to the San Antonio Regional Office by Pape-Dawson Engineers, Inc. on behalf of LCWW Partners on February 18, 2019. Final review of the WPAP was completed after additional material was received on May 2, 2019 and May 21, 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

The original WPAP for the La Cantera Master Plan was approved by letter dated September 8, 1986 and had a site area of 1,695 acres for a multi-use, multi-phase development. A supplement to the original master plan was approved by letter dated March 23, 1988. An update to the master plan WPAP was approved by letter dated July 8, 1992 that established 1,004 acres to be a golf course/open space and commercial, residential, and resort areas. The first three approvals did not authorize construction activities and required site specific WPAPs be submitted for review and approval prior to conducting regulated activities.

Multiple WPAPs and subsequent modifications have been approved for the overall development since the July 8, 1992 master plan WPAP approval. The La Cantera West Golf Course WPAP was approved by letter dated February 22, 1993 and subsequently modified by letter dated August 2, 1993. The La Cantera Maintenance Facility and Hotel Site WPAP was approved by letter dated December 10, 1993 and subsequently modified by letter dated January 31, 1994. The La Cantera West Golf Academy WPAP was approved by letter dated January 31, 1994 and subsequently modified by letter dated October 18, 1994. The La Cantera Resort Entry Drive WPAP was approved by letter dated September 14, 1994. The La Cantera Golf Course Operation and Maintenance WPAP was approved by letter dated November 30, 1994. The La Cantera Golf Clubhouse WPAP was approved by letter dated March 27, 1996. The La Cantera Resort Hotel WPAP was approved by letter dated January 28, 1997 and subsequently modified by letter dated January 29, 2015.

PROJECT DESCRIPTION

While located within the boundaries of the July 8, 1992 WPAP master plan approval, the various WPAP's and subsequent modifications discussed above were approved with their own individual site boundaries. This submittal proposes to combine all the previously identified approved WPAP's and subsequent modifications into one single overall site.

The proposed commercial project will have an area of approximately 330.29 acres. It will include clearing and grading near the Resort Spa Building; clearing and the installation of drainage improvements related to the Casita Village and within the golf course Hole 1 fairway; the construction of additional hardscape and drives/interconnecting paths throughout the site; building additions and expansions to the Resort Hotel, the Resort Spa, Clubhouse, Casita Village, and golf course amenity structures; the reconstruction of sedimentation/filtration basin "F" to a batch detention basin; and clearing and mass grading in two undeveloped areas on site. There shall be a net increase of 3.52 acres of impervious cover. The overall impervious cover for the 330.29-acre site shall be 40.51 acres (12.26 percent). Project wastewater will be disposed of by conveyance to the existing Leon Creek Water Recycling Center owned by the San Antonio Water System.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, three previously approved basins, basins "D", "E", and "F-2", one proposed batch detention basin, and engineered vegetative filter strips, will be utilized to treat stormwater runoff generated from the net increase of impervious cover. The proposed batch detention basin and engineered vegetative filter strips were designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005). The required total suspended solids (TSS) treatment for this project is 2,872 pounds of TSS generated from the 3.52 acres of new impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

GEOLOGY

According to the geologic assessment included with the application, the site lies on the Kainer formation and the Glen Rose Formation. Three sensitive man-made features (one sewer line, two water wells), and seven geologic features, one sensitive (S-5, solution cavity) and six non-sensitive, were identified by the project geologist. The site assessment conducted on April 18, 2019 revealed the site was generally as described in the geologic assessment.

A natural buffer was proposed for feature S-5. No regulated activities (such as construction or soil disturbing activities) will take place within the natural buffer. The size is generally based on the drainage area of the sensitive feature. The setback for feature S-5 is illustrated on the construction plans.

SPECIAL CONDITIONS

I. This modification is subject to all Special and Standard Conditions listed in the various WPAP and subsequent modification approval letters discussed in the background section above.

II. 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.

III. An inspection of all existing water quality basins on site was conducted on May 20, 2019. The inspection reports, submitted on May 21, 2019, summarized various maintenance actions that must be initiated for each of the basins to bring them into compliance with their respective approved inspection and maintenance plans. The maintenance actions outlined in the submitted reports must be completed prior to first use of the new improvements proposed in this current project.

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. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.
5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be

installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

During Construction:

10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.
12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the San Antonio Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.
13. Two wells exist on site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.
14. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.
16. The following records shall be maintained and made available to the executive director upon request: the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

18. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the San Antonio Regional Office within 30 days of site completion.
19. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
22. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

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 Mr. Joshua Vacek of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4028.

Sincerely,

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

RCS/jv

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

cc: Mr. Thomas M. Carter, P.E., Pape-Dawson Engineers, Inc.
Ms. Renee Green, P.E., Bexar County Public Works
Mr. Roland Ruiz, Edwards Aquifer Authority
Mr. George Wissmann, Trinity Glen Rose Groundwater Conservation District
Mr. Scott Halty, San Antonio Water System

ATTACHMENT B

Attachment B – Narrative of Proposed Modification

The La Cantera Resort & Spa Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the previously approved Resort Course at La Cantera WPAP MOD approved on May 23, 2019 (EAPP ID No. 13000870), which included the associated La Cantera Resort Hotel and other related amenities. This site is located northwest of the intersection of Loop 1604 W and La Cantera Parkway on 330.29 acres within the city limits of San Antonio, Bexar County, Texas. The site lies over the Edwards Aquifer Recharge Zone and Contributing Zone. The existing development consists of an eighteen (18) hole championship golf course, golf cart paths, golf course restrooms and snack buildings, a resort hotel, casita village, clubhouse, golf course maintenance facility, restaurant, sidewalks, connecting drives and associated parking lots. These improvements are all located within the original golf course WPAP boundary but were permitted under separate WPAP applications throughout each phase of development; the approved Resort Course at La Cantera WPAP MOD (EAPP ID No. 13000870) simplified the entire development with one project boundary and treatment summary – totaling 40.51 acres of impervious cover, or 12.3% of the 330.29- acre project limits, and twenty-three (23) PBMPs, as follows:

- Three (3) sedimentation/detention basins connected to one (1) central retention/irrigation lake for the overall retention/irrigation system
- One (1) separate sedimentation/detention basin connected to the Fiesta Texas drainage infrastructure
- One (1) batch detention basin
- Two (2) sand filter basins, one of which is also connected to the central retention/irrigation lake
- Existing grate/curb inlets with oil skimming booms
- Fourteen (14) engineered vegetative filter strips

All existing PMBPs within the project limits, including those for the resort hotel, the Villas, the clubhouse, the maintenance facility and entry drive, will continue to function as approved, unless affected by the proposed modifications referenced herein. All exiting drainage patterns are also being maintained but have minor alterations based of some grading improvements . All grandfathered PBMPs and modified PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site, in accordance with the LCR Technical Manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015), and in accordance with the TCEQ/s TGM RG-348 (2005), respectively. All upgradient areas depicted in the exhibits herein will contribute to stormwater runoff to the site that is accepted by onsite drainage infrastructure and either bypassed or routed to existing basins that are sized to account for the upgradient flow. All upgradient areas are either undeveloped or contribute treated stormwater runoff that is part of an approved WPAP. All proposed and existing storm water systems that convey upgradient runoff will be appropriately sized to capture and convey said runoff for the 25-year storm event at non-erosive velocities that are less than six (6) feet per second (fps).

This La Cantera Resort & Spa WPAP MOD proposes the construction of an event facility, mass grading, and the remediation of several PBMPs and watershed designations, as follows:

- The six-inch (6') force main at Basin "B" has been abandoned, and treatment will no longer be provided by Basin "B". The previously approved 0.36-acres of impervious cover in Watershed "B" will now be treated via overtreatment.

- Expansion of a kids' pool area in Watershed "D" proposes 0.57 acres of additional impervious cover to the previously approved 11.31 acres of impervious cover; however, updated survey shows 0.75 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 11.13 total acres. Basin "D" will still provide treatment for this area and remain unchanged.
- Expansion of an existing spa in Watershed "E" proposes 0.15 acres of additional impervious cover to the previously approved 3.55 acres of impervious cover; however, updated survey shows 0.43 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 3.27 total acres. Re-grading is proposed near the existing Villas to re-route the runoff towards existing fairway inlets. Basin "E" will still provide treatment for this area and remain unchanged.
- Proposed tennis courts and expansion of existing clubhouse in Watershed "F" propose 0.53 acres of additional impervious cover to the previously approved 10.98 acres of impervious cover; however, updated survey shows 1.13 acres of previously approved impervious cover have been removed from the plan, and therefore, the net post-development impervious cover will be under the previously approved amount, at 10.38 total acres. The retrofitting of Basin "F" to a batch detention basin, as previously approved, has been complete, and will continue to provide treatment for this watershed.
- Clearing, grading, excavation for installation of utilities and drainage improvements, parking and hardscapes are proposed for the construction of the event facility within Watershed "F-1". Approximately 1.28 acres of impervious cover is proposed for this construction. The proposed Permanent Best Management Practice for this watershed is one (1) Jellyfish filter, which is 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 this area.
- Updated survey for Watershed "G" shows 0.05 acres of impervious cover of the previously approved 0.53 acres have not been constructed. The net post-development impervious cover is 0.48 acres. No changes are proposed for this watershed, and the area will still be treated via overtreatment.
- The proposed re-grading of Watershed "E" changes the drainage area of Watershed "I", and updated survey shows 1.88 acres of impervious cover have not been constructed. The net post-development impervious cover is 0.31 acres, which will still be treated via overtreatment.
- Updated survey for Watershed "K" shows an increase of 0.03 acres of impervious cover, which will be treated via overtreatment. The engineered VFS for this watershed will remain unchanged.
- The guardhouse in Watershed "L" has changed locations with a new connection to the roundabout, and the adjusted adjacent watersheds, which resulted in approximately 0.05 acres of increase in existing impervious cover. The existing BMPs will remain unchanged and provide treatment for the increase.

In summary, approximately 4.24 acres of impervious cover have been removed from the plan following updated survey. This WPAP MOD proposes the construction of an additional 2.53 acres of impervious cover, for a net decrease of 1.71 acres overall; therefore, the total post-development impervious cover is 38.80 acres, or 11.7% of the overall 330.29-acre project limits. There are twenty-two (22) existing, previously approved PBMPs (ID 13000870) within the project limits to remain, including two (2) lined detention/sedimentation basins, one (1) retention irrigation basin, one (1) batch detention basin, two (2)

sand filter basins, one (1) lined detention/sedimentation basin treated offsite by Fiesta Texas Basin 5, vacuum sweeping and oil booms, and fourteen (14) engineered fifteen-foot (15') vegetative filter strips (VFS). All grandfathered PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site in accordance with the LCR Technical Manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015) and in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005), respectively. The proposed additional Permanent Best Management Practices (PBMPs) for stormwater treatment under this WPAP MOD is one (1) Jellyfish filter, which is designed in accordance with the TCEQ's TGM RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site. Please see the Treatment Summary Table attached with this application.

At ultimate development, this project will generate the same amount of average wastewater flow, approximately 81,000 gallons per day (gpd). Wastewater service for the area is provided by the San Antonio Water System (SAWS) with conveyance to the existing Leon Creek Water Recycling Center. Potable water service is provided by SAWS. Makeup irrigation for the golf course is provided by onsite privately owned water wells.

ATTACHMENT C

Date: Feb 14, 2019, 10:02am User ID: mcushman
File: P:\84\41\70\Design\Environmental\WPAP MOD\Report Exhibits\EX190104_Att.C Current Site Plan.dwg

LEGEND

PROJECT LIMITS

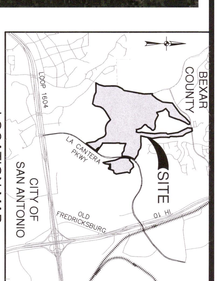
GOLF COURSE HOLE NUMBERS

SCALE: 1" = 200'

0' 200' 400' 600'

LOCATION MAP

NOT-TO-SCALE



THE RESORT COURSE AT LA CANTERA

SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN - MODIFICATION
CURRENT SITE PLAN OF THE APPROVED PROJECT

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 #100288800

STATE OF TEXAS — CHRISTOPHER MATTHEW CARTER — 79272 — LICENSED PROFESSIONAL ENGINEER — 2/14/2019

NO.	REVISION	DATE	NO.	REVISION	DATE

PLAT NO. -
JOB NO. 8441-70
DATE JANUARY, 2019
DESIGNER MC
CHECKED MC DRAWN MC
SHEET ATT-C

WATER POLLUTION ABATEMENT PLAN APPLICATION FORM (TCEQ-0584)

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

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

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

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

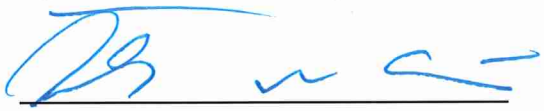
Signature

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

Print Name of Customer/Agent: Thomas M. Carter, P.E.

Date: 10/2/23

Signature of Customer/Agent:



Regulated Entity Name: La Cantera Resort & Spa

Regulated Entity Information

1. The type of project is:

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

2. Total site acreage (size of property):330.29

3. Estimated projected population:N/A

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

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	347,173	÷ 43,560 =	7.97
Parking	437,342	÷ 43,560 =	10.04
Other paved surfaces	905,612	÷ 43,560 =	20.79
Total Impervious Cover	1,690,127	÷ 43,560 =	38.80

Total Impervious Cover 38.80 **÷ Total Acreage** 330.29 **X 100 =** 11.74**% Impervious Cover**

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

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

For Road Projects Only

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

7. Type of project:

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

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

   ☐ Concrete
   ☐ Asphaltic concrete pavement
   ☐ Other: _____

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

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

10. Length of pavement area: _____ feet.

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

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

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

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

Stormwater to be generated by the Proposed Project

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

Wastewater to be generated by the Proposed Project

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

100% Domestic	81,000 Gallons/day
_____% Industrial	_____ Gallons/day
_____% Commingled	_____ Gallons/day

TOTAL gallons/day 81,000* Average daily flow from the original WPAP was based on TAC Chapter 285, which used a flow projection of 80 gal/person/day for hotel developments. Flow today would be projected at 100 gal/room/day and the proposed event facility will generate an additional 938 gpd (185 people * 5 gpd/seat = 938 gpd) for a total of 51,738 gpd, which is less conservative than orignally approved.

15. Wastewater will be disposed of by:

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

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

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

☒ Sewage Collection System (Sewer Lines):

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

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

☒ The SCS was previously submitted on December 18, 1997.
☐ The SCS was submitted with this application.
☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

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

☒ Existing.
☐ Proposed.

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

Site Plan Requirements

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

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

Site Plan Scale: 1" = 200'.

18. 100-year floodplain boundaries:

☒ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
☐ No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): DFIRM (Digital Flood Insurance Rate Map for Bexar County, Texas and Incorporated Areas) Panel No. 48029C0230G, Dated September 29, 2010

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

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

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

☒ There are 2 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

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

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

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

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

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

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

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

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

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

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

26. ☒ Surface waters (including wetlands).

☐ N/A

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

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

28. ☒ Legal boundaries of the site are shown.

Administrative Information

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

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

ATTACHMENT A

Attachment A – Factors Affecting Water Quality

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

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

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

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

ATTACHMENT B

Attachment B – Volume and Character of Stormwater

Stormwater runoff will increase as a result of this development. For a 25-year storm event, the proposed event facility will generate an increase of stormwater runoff of approximately 16 cfs. The runoff coefficient for the site changes from approximately 0.50 before development to 0.97 after development. Values are based on the Rational Method using runoff coefficients per the City of San Antonio Unified Development Code.

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: Thomas M. Carter, P.E.

Date: 10/2/23

Signature of Customer/Agent:

Regulated Entity Name: La Cantera Resort & Spa

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: construction staging area

   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: Upper Leon Creek

Temporary Best Management Practices (TBMPs)

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

7. ☒ **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

Attachment A – Spill Response Actions

In the event of an accidental leak or spill:

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

In the event of an accidental significant or hazardous spill:

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

- Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site. https://www.tceq.texas.gov/response/spills/spill_rq.html
- For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

- Notification should first be made by telephone and followed up with a written report.

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

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

- Contaminated soils will be sampled for waste characterization. When the analysis results are known the contaminated soils will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.

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

ATTACHMENT B

Attachment B – Potential Sources of Contamination

Other potential sources of contamination during construction include:

Potential Source
- 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

Attachment C – Sequence of Major Activities

The sequence of major activities which disturb soil during construction on this site will be divided into two stages. The first is site preparation that will include installation of TBMPs, clearing and grubbing of vegetation where applicable. This will disturb approximately 23.34 acres. The second is construction that will include construction of the event facility, tennis courts, pool expansion, clubhouse expansion, mass grading, construction of new pavement area, landscaping and site cleanup. This will disturb approximately 23.34 acres.

ATTACHMENT D

Attachment D – Temporary Best Management Practices and Measures

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

All upgradient areas depicted in the exhibits herein will contribute stormwater runoff to the site that is accepted by onsite drainage infrastructure and either bypassed or routed to existing basins that are sized to account for the upgradient flow. All upgradient areas are either undeveloped or contribute treated stormwater runoff that is part of an approved WPAP. All proposed and existing stormwater systems that convey upgradient runoff will be appropriately sized to capture and convey said runoff for the 25-year storm event at non-erosive velocities. All TBMPs are adequate for the drainage areas they serve.

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

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

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

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

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

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

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

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

ATTACHMENT F

Attachment F – Structural Practices

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

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

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

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

ATTACHMENT G

Attachment G – Drainage Area Map

No more than ten (10) acres will be disturbed within a common drainage area at one time as the site is comprised of multiple sub-drainage areas, which are currently developed. All TBMPs utilized are adequate for the drainage areas served.

ATTACHMENT I

INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures weekly and within 24 hours after a storm event. An inspection report that summarizes the scope of the inspection, names and qualifications of personnel conducting the inspection, date of the inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water TPDES data for a period of three years after the Notice of Termination (NOT) has been filed. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over 6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, (6) concrete truck rinse-out pit for signs of potential failure, (7) embankment, spillways, and outlet of sediment basin (where applicable) for erosion damage, and (8) sediment basins (where applicable) for evidence that basin has accumulated 50% of its volume in silt. Deficiencies noted during the inspection will be corrected and documented within seven calendar days following the inspection or before the next anticipated storm event if practicable.

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

LA CANTERA RESORT & SPA
Water Pollution Abatement Plan Modification

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

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

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

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

Inspector's Name _____ Inspector's Signature _____ Date _____

PROJECT MILESTONE DATES

Date when major site grading activities begin:

Construction Activity	Date
Installation of BMPs	

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
Removal of BMPs	

ATTACHMENT J

Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

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

Stabilization measures will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and except as provided below, will be initiated no more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures do not have to be initiated on that portion of site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonably arid conditions, stabilization measures must be initiated as soon as practicable.

PERMANENT STORMWATER SECTION (TCEQ-0600)

Permanent Stormwater Section

Texas Commission on Environmental Quality

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

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

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

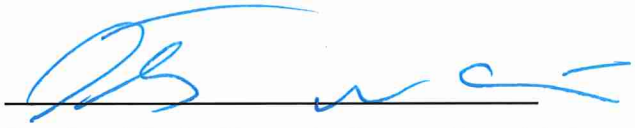
Signature

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

Print Name of Customer/Agent: Thomas M. Carter, P.E.

Date: 10/2/23

Signature of Customer/Agent



Regulated Entity Name: La Cantera Resort & Spa

Permanent Best Management Practices (BMPs)

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

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

   ☐ N/A

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

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

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

☐ N/A

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

   ☐ N/A

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

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

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

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

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

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

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

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

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

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

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

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

☐ N/A

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

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

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

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

☒ Design calculations (TSS removal calculations)
☒ TCEQ construction notes
☒ All geologic features
☒ All proposed structural BMP(s) plans and specifications

☐ N/A

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

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

    ☐ N/A

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

    ☒ N/A

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

    ☐ N/A

Responsibility for Maintenance of Permanent BMP(s)

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

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

    ☐ N/A

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

    ☐ N/A

ATTACHMENT B

Attachment B – BMPs for Upgradient Stormwater

All upgradient areas depicted in the exhibits herein will contribute stormwater runoff to the site that is accepted by onsite drainage infrastructure and either bypassed or routed to existing basins that are sized to account for the upgradient flow. All upgradient areas are either undeveloped or contribute treated stormwater runoff that is part of an approved WPAP. All proposed and existing stormwater systems that convey upgradient runoff will be appropriately sized to capture and convey said runoff for the 25-year storm event at non-erosive velocities.

The proposed additional Permanent Best Management Practices (PBMPs) for stormwater treatment under this WPAP MOD is one (1) Jellyfish filter, which is 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.

There are twenty-two (22) existing, previously approved PBMPs (ID 13000870) within the project limits to remain, including two (2) lined detention/sedimentation basins, one (1) retention irrigation basin, one (1) batch detention basin, two (2) sand filter basins, one (1) lined detention/sedimentation basin treated offsite by Fiesta Texas Basin 5, vacuum sweeping and oil booms, and fourteen (14) engineered fifteen-foot (15') vegetative filter strips (VFS). All grandfathered PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site in accordance with the LCR Technical manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015), and in accordance with the TCEQ TGM RG-348 (2005), respectively.

ATTACHMENT C

Attachment C – BMPs for On-Site Stormwater

The proposed additional Permanent Best Management Practices (PBMPs) for stormwater treatment under this WPAP MOD is one (1) Jellyfish filter, which is 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.

There are twenty-two (22) existing, previously approved PBMPs (ID 13000870) within the project limits to remain, including two (2) lined detention/sedimentation basins, one (1) retention irrigation basin, one (1) batch detention basin, two (2) sand filter basins, one (1) lined detention/sedimentation basin treated offsite by Fiesta Texas Basin 5, vacuum sweeping and oil booms, and fourteen (14) engineered fifteen-foot (15') vegetative filter strips (VFS). All grandfathered PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site in accordance with the LCR Technical manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015), and in accordance with the TCEQ TGM RG-348 (2005), respectively.

ATTACHMENT D

Attachment D – BMPs for Surface Streams

The proposed additional Permanent Best Management Practices (PBMPs) for stormwater treatment under this WPAP MOD is one (1) Jellyfish filter, which is 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.

There are twenty-two (22) existing, previously approved PBMPs (ID 13000870) within the project limits to remain, including two (2) lined detention/sedimentation basins, one (1) retention irrigation basin, one (1) batch detention basin, two (2) sand filter basins, one (1) lined detention/sedimentation basin treated offsite by Fiesta Texas Basin 5, vacuum sweeping and oil booms, and fourteen (14) engineered fifteen-foot (15') vegetative filter strips (VFS). All grandfathered PBMPs have been designed to remove an equivalent of 80% of the increase in Total Suspended Solids (TSS) for the 330.29-acre overall site in accordance with the LCR Technical manual (Jan-1991) as approved with the La Cantera Resort Hotel WPAP (January 29, 2015), and in accordance with the TCEQ TGM RG-348 (2005), respectively.

ATTACHMENT F

Attachment F – Construction Plans

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

ATTACHMENT G

LA CANTERA RESORT & SPA
Water Pollution Abatement Plan

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 the 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.

DocuSigned by:
Joe Ward Authorized Signatory
3A650A842BC6431...

Joe Ward, Managing Director,
Asset Management
LCR Hotel, LLC

9/18/2023
Date

INSPECTION AND MAINTENANCE SCHEDULE
FOR
PERMANENT POLLUTION ABATEMENT MEASURES

Recommended Frequency	*Task to be Performed*													
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
After Rainfall	√				√		√		√		√	√		√
Monthly	√				√		√	√	√					
Quarterly	√	√			√		√	√	√					
*Biannually**	√	√		√	√	√	√	√	√	√	√	√	√	√
*Annually***	√	√	√	√	√	√	√	√	√	√	√	√	√	√

At least one biannual inspection must occur during or immediately after a rainfall event.
****Inspections to occur quarterly during the first year of operation.***
√Indicates maintenance procedure that applies to this specific site.

See description of maintenance task to be performed on the following pages. These tasks are from the original WPAP approved by the TNRCC on January 28, 1997, since all existing BMPs will remain in place. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather-related conditions but may not be altered without TCEQ approval. Inspection frequency in subsequent years is based on the maintenance plan developed in the first year but must occur annually at a minimum.
A w*ritten record will be kept of inspection results and maintenance performed.*

Task No. & Description		***Included in this project***	
1.	Check Oil Skimming Boom Integrity	**Yes**	~~No~~
2.	Check Oil Skimming Boom Trough	**Yes**	~~No~~
3.	Replace Oil Skimming Boom	**Yes**	~~No~~
4.	Check Depth of Silt Deposit in Basin	**Yes**	~~No~~
5.	Perform Operational Maintenance (If Necessary)	**Yes**	~~No~~
6.	Accumulated Silt Testing and Removal/Disposal	**Yes**	~~No~~
7.	Visually Inspect Irrigation Area Vegetation	**Yes**	~~No~~
8.	Mowing	**Yes**	~~No~~
9.	Litter and Debris Removal	**Yes**	~~No~~
10.	Erosion Control (If Necessary)	**Yes**	~~No~~
11.	Vegetated Filter Strips	**Yes**	~~No~~
12.	For Pump Stations	**Yes**	~~No~~
13.	For Pump Stations	**Yes**	~~No~~
14.	For Pump Stations	**Yes**	~~No~~

LA CANTERA RESORT & SPA
Water Pollution Abatement Plan

Recommended Frequency	*Task to be Performed*													
	15	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*
After Rainfall	√							√						
Monthly														
Quarterly														
*Biannually**	√	√	√	√	√	√	√	√	√	√	√			
*Annually***												√	√	√

At least one biannual inspection must occur during or immediately after a rainfall event.
****Inspections to occur quarterly during the first year of operation.***
√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. Inspection frequency in subsequent years is based on the maintenance plan developed in the first year but must occur annually at a minimum.
A w*ritten record will be kept of inspection results and maintenance performed.*

Task No. & Description		***Included in this project***	
	Batch Detention Basin "F"		
15.	Mowing	**Yes**	~~No~~
16.	Litter and Debris Removal	**Yes**	~~No~~
17.	Erosion Control	**Yes**	~~No~~
18.	Level Sensor	**Yes**	~~No~~
19.	Nuisance Control	**Yes**	~~No~~
20.	Structural Repairs and Replacement	**Yes**	~~No~~
21.	Discharge Pipe	**Yes**	~~No~~
22.	Detention Drawdown Time	**Yes**	~~No~~
23.	Sediment Removal	**Yes**	~~No~~
24.	Logic Controller	**Yes**	~~No~~
25.	Visually Inspect Security Fencing for Damage or Breach	**Yes**	~~No~~
	Contech Jellyfish Filter		
26.	Cleaning	**Yes**	~~No~~
27.	Manual Backflush / Flow Rate Test	**Yes**	~~No~~
28.	External Rinsing	**Yes**	~~No~~
29.	Hazardous Material Spill	**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, and Addendum, Section 3.2.13, Section 3.2.22, as well as the Jellyfish Filter Owner's Manual provided by Contech Engineered Solutions.

1. Check Oil Skimming Boom Integrity: The oil skimming boom will be checked to ensure that it has not been vandalized or that it has not deteriorated to a condition where it will not serve its intended purpose. The boom will be checked for integrity and the amount of petroleum products absorbed. The boom will be replaced if necessary. *A written record will be kept of inspection results and maintenance performed.*

2. Check Oil Skimming Boom Trough: The trough holding the oil skimming boom will be checked for accumulation of silt and/or trash. Silt and trash will be removed and disposed of properly. The boom will also be checked for integrity and the amount of petroleum products absorbed. The boom will be replaced if necessary. *A written record will be kept of inspection results and maintenance performed.*

3. Replace Oil Skimming Boom: As a minimum, the oil skimming boom will be replaced annually. *A written record will be kept of inspection results and maintenance performed.*

4. Check Depth of Silt Deposit in Basin: The retention basin will be routinely inspected, and the accumulation of silt shall be checked. Any sand discolored because of apparent impact by petroleum hydrocarbon or hazardous materials should also be removed and replaced. All silt removed will be disposed of properly. *A written record will be kept of inspection results and maintenance performed.*

5. Perform Operational Maintenance (If Necessary): Maintenance will be performed as needed to maintain the operational performance of the basin. The irrigation system, including pumps, should be routinely inspected, and tested (or observed while in operation) to ensure proper operation.

Any leaks, broken spray heads, or other malfunctions with the irrigation system should be repaired immediately. Sprinkler heads must be checked to determine if any are broken, clogged, or not spraying properly. A w*ritten record will be kept of inspection results and maintenance performed.*

6. Accumulated Silt Testing and Removal/Disposal: Remove sediment from splitter box, basin, and wet wells at least two times per year or when the depth reaches three inches. Any silt removed from the basin will be routinely tested for TPH and BTEX before removal from the site. All silt removed will be disposed of properly. *A written record will be kept of inspection results and the maintenance performed.*

7. Visually Inspect Irrigation Area Vegetation: To the greatest extent practicable, irrigation areas are to remain in their natural state. However, vegetation must be maintained in the irrigation area such that it does not impede the spray of water from the irrigation heads. Tree and shrub trimmings and other large debris should be removed from the irrigation area. *A written record will be kept of inspection results and corrective measures taken.*

8. Mowing: The upper stage, side slopes, and embankment of a retention basin must be mowed regularly to discourage woody growth and control weeds. Grass areas in and around basins must be mowed at least twice annually to limit vegetation height to eighteen inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing is performed a mulching mower should be used, or grass clippings should be caught and removed. *A written record will be kept of inspection results and corrective measures taken.*

9. Litter and Debris Removal: Debris and litter will accumulate near the basin pump and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the irrigation system. The basin shall be checked for the accumulation of debris and trash such as brush, limbs, leaves, paper cups, aluminum cans, plastic bottles, etc. Accumulated trash and debris shall be raked or collected from the basin and disposed of properly. *A written record of the inspection findings and corrective actions performed will be made.*

10. Erosion Control (If Necessary): The pond side slopes and embankment may periodically suffer from slumping and erosion, although this should not occur if the soils are properly compacted during construction. Re-grading and re-vegetation may be required to correct the problems. The height of the confining berm and visual signs of erosion or potential breach should be checked routinely. Signs of erosion should be identified and repaired immediately. *A written record of the inspection findings and corrective actions performed will be made.*

11. Vegetative 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 four 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 will be made.*

12. For Pump Stations: Check wet well discharge pipe to confirm flow through the pump system. If the flow is not present, allow sufficient time for the pump to cycle on and off. If flow does not occur, the wet well should be checked for the level of water. The wet well should be opened, and the on/off float switches should be moved up and down to activate the pump. If the pump does not start, a repair technician shall be called in to repair the malfunction within five working days. *A written record of the inspection findings and corrective actions performed will be made.*

13. For Pump Stations: Check the wet well for accumulation for trash, debris, and silt. Trash and debris should be removed and disposed of properly. Silt depth can be checked by probing the bottom of the wet well with a stick or PVC pipe. Silt accumulations should be removed when silt collects to a depth of three (3) inches over the entire wet well bottom. Silt can be removed by vacuum pump method. If silt buildup continues, the underdrain system shall be inspected. *A written record will be kept of inspection results and maintenance performed.*

14. For Pump Stations: Visually check aboveground pump wiring and connections for damage. Damaged or loose connections should be repaired within five working days. *A written record will be kept of inspection results and maintenance performed.*

Batch Detention Basin "F"

15. 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 eighteen inches in height. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. *A written record will be kept of inspection results and maintenance performed.*

16. 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 clogging or obstructions and any debris removed. *A written record will be kept of inspection results and maintenance performed.*

17. 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. *A written record will be kept of inspection results and maintenance performed.*

18. 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. *A written record will be kept of inspection results and maintenance performed.*

19. 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.). *A written record will be kept of inspection results and maintenance performed.*

20. 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 will be kept of inspection results and maintenance performed.*

21. 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 will be kept of inspection results and maintenance performed.*

22. 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 the 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 indicate blockage of the discharge pipe. Corrective actions should be performed and completed within fifteen working days. *A written record will be kept of inspection results and maintenance performed.*

23. 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 six 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. *A written record will be kept of inspection results and maintenance performed.*

24. 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. *A written record will be kept of inspection results and maintenance performed.*

25. Visually Inspect Security Fencing for Damage or Breach: Check maintenance access gates for proper operation. Damage to fencing or gates shall be repaired within five (5) working days. *A written record will be kept of inspection results and maintenance performed.*

Contech Jellyfish Filter

26. Cleaning. Removal and appropriate disposal of all water, sediment, oil and grease, and debris that has accumulated within the unit will be performed. The Jellyfish® Filter will be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. Since some of the maintenance procedures require manned entry into the Jellyfish structure, only professional maintenance service providers trained

in confined space entry procedures should enter the vessel. *A written record will be kept of inspection results and maintenance performed.*

27. Manual Backflush / Flow Rate Test. A manual backflush must be performed on a single draindown cartridge using a Jellyfish Cartridge Backflush Pipe (described in the Jellyfish® Filter Owner's Manual). If the time required to drain 14 gallons of backflush water from the Backflush Pipe (from top of pipe to the top of the open flapper valve) exceeds 15 seconds, it is recommended to perform a manual backflush on each of the cartridges. After the manual backflush, the draindown test should be repeated on a single cartridge to determine if the cartridge can drain 14 gallons of water in 15 seconds. If the cartridge still does not achieve the design flow rate, it must be replaced. Filter cartridges should be tested for adequate flow rate, every 12 months and cleaned and re-commissioned, or replaced if necessary. *Written record will be kept of inspection results and maintenance performed.*

28. External Rinsing. If external rinsing is performed within the structure, the cartridge or individual filtration tentacles should be rinsed while safely suspended over the maintenance access wall opening in the cartridge deck, such that rinsate flows into the lower chamber of the Jellyfish® Filter. If the rinsing procedure is performed outside the structure, the cartridge or individual filtration tentacles should be rinsed in a suitable basin such as a plastic barrel or tub, and rinsate subsequently poured into the maintenance access wall opening in the cartridge deck. Sediment is subsequently removed from the lower chamber by standard vacuum service. *Written record will be kept of inspection results and maintenance performed.*

29. Hazardous Material Spill. Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site and may be required in the event of a chemical spill or due to excessive sediment loading. In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and appropriate regulatory agencies immediately. Maintenance should be performed by a licensed liquid waste hauler. Cartridge replacement may also be required in the event of an accidental significant or hazardous spill. Industrial and hazardous waste materials will be disposed of in accordance with TCEQ rules in

30 Texas Administration Code (TAC) Sections (§§)335.501-.521 (subchapter R). If class I or II non-hazardous or hazardous wastes are generated, a third-party disposal contractor will manage the wastes. *Written record will be kept of inspection results and maintenance performed.*

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 kept at the appropriate La Cantera Resort Superintendent's Office, or under the direct control of the golf course or agronomy director's office (whomever retains full responsibility and implementation authority for all inspection and maintenance actions).
- Written records shall be retained for a minimum of five (5) years.
- The Operations and Maintenance Manual for the Hotel and Casita Village (The Villas) will provide additional details of all inspection schedules and maintenance requirements for pollution abatement measures and/or relative features at the facility.
- Basin 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 batch detention 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.

ATTACHMENT I

Attachment I – Measures for Minimizing Surface Stream Contamination

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

AGENT AUTHORIZATION FORM (TCEQ-0599)

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

I ***Joe Ward***,
Print Name

Managing Director, Asset Management,
Title - Owner/President/Other

of ***LCR Hotel, LLC***,

have authorized ***Pape-Dawson Consulting Engineers, LLC***
Print Name of Agent/Engineer

of ***Pape-Dawson Consulting Engineers, LLC***
Print Name of Firm

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

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Joe Ward
Applicant's Signature

9/22/23
Date

THE STATE OF Texas §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared Joe Ward 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 22 day of September.

NOTARY PUBLIC

PATRICIA A. ROY
Notary Public, State of Texas
Comm. Expires 03-11-2026
Notary ID 1849361

PATRICIA A. ROY
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 3/11/2026

APPLICATION FEE FORM (TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: La Cantera Resort & Spa
Regulated Entity Location: 16641 La Cantera Parkway, San Antonio, Texas 78256
Name of Customer: LCR Hotel, LLC
Contact Person: Joe Ward Phone: (210) 558-6500
Customer Reference Number (if issued):CN _____
Regulated Entity Reference Number (if issued):RN 102747714

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☒ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

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

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

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

Site Location (Check All That Apply):

☒ Recharge Zone ☒ Contributing Zone ☐ Transition Zone

Type of Plan	*Size*	*Fee Due*
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	330.29 Acres	$ 10,000
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: 10/2/23

TCEQ-0574 (Rev. 02-24-15)

Application Fee Schedule

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

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

CORE DATA FORM
(TCEQ-10400)

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions 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)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN		RN 102747714

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:*

LCR Hotel, LLC

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (*if applicable*)
0804079325	32079316108	86-3141917	

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:

16641 La Cantera Pkwy

City	State	ZIP	ZIP + 4
San Antonio	TX	78256	

16. Country Mailing Information (*if outside USA*)	17. E-Mail Address (*if applicable*)
	jward@ohanare.com

18. Telephone Number	19. Extension or Code	20. Fax Number (*if applicable*)
(210) 558-6500		( ) -

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.*)

La Cantera Resort & Spa

23. Street Address of the Regulated Entity: *(No PO Boxes)*	16641 La Cantera Pkwy							
	City	SanAntonio	**State**	TX	**ZIP**	78256	**ZIP + 4**	
24. County	Bexar							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**

27. Latitude (N) In Decimal:	29.602897		**28. Longitude (W) In Decimal:**	-98.622352	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	36	10	-98	37	20

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)
1542	1623	236220	237110

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

Commercial Development

34. Mailing Address:	**16641 La Cantera Pkwy**							
	City	**San Antonio**	**State**	**TX**	**ZIP**	**78256**	**ZIP + 4**	

35. E-Mail Address:	**jward@ohanare.com**	
36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(210) 558-6500		**( ) -**

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:

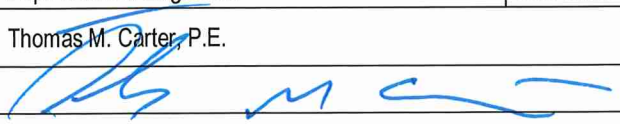
SECTION IV: Preparer Information

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

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	**Job Title:**	Senior Vice President
Name *(In Print):*	Thomas M. Carter, P.E.	**Phone:**	(210) 375- 9000
Signature:		**Date:**	10/2/23

POLLUTANT LOAD AND REMOVAL CALCULATIONS

La Cantera Resort & Spa WPAP Modification: Treatment Summary

Treatment Summary by Watershed

WATERSHED/SUB-BASIN	TOTAL WATERSHED AREA (ACRES)	2019 PREVIOUSLY APPROVED IMPERVIOUS COVER AREA (ACRES)	PROPOSED IMPERVIOUS COVER AREA (ACRES)	REMOVED/NOT CONSTRUCTED (ACRES)	POST-DEVELOPMENT IMPERVIOUS COVER AREA (ACRES)	PERMANENT BMP TYPE	TOTAL TSS GENERATED ANNUALLY (LBS)	TOTAL TSS REMOVED ANNUALLY (LBS)
A	6.08	0.24	0.00		0.24	OVERTREATMENT	196	-
* UPGRADIENT-A	2.90	-	-		-	-	-	-
B	7.45	0.36	0.00		0.36	OVERTREATMENT	294	-
* UPGRADIENT-B	9.42	-	-		-	-	-	-
C	19.37	0.63	0.00		0.63	BASIN "C" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	514	958
* UPGRADIENT-C	2.31	-	-		-	-	-	-
D (D-1 & D-2)	33.40	11.31	**0.57**	0.75	11.13	BASIN "D" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	9,082	10,067
E (E-1 : E-4)	26.87	3.55	**0.15**	0.43	3.27	BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	2,668	3,777
F	41.48	10.98	**0.53**	1.13	10.38	RETROFIT BATCH BASIN	8,470	9,493
** UPGRADIENT F	6.32	-	**-**		-	-	-	-
F-1	2.13	0.00	**1.28**		1.28	**PROPOSED** CONTECH JELLYFISH FILTER (JFPD0806-10-2)	1,044	1,102
UPGRADIENT F-1	0.44	-	-		-	-	-	-
F-2	1.65	1.93	0.00		1.93	SAND FILTER BASIN WITH OIL BOOM	1,575	1,575
*** F-2-A	2.47	-	-		-	-	-	-
G	20.55	0.53	0.00	0.05	0.48	OVERTREATMENT	392	-
H	6.00	0.13	0.00		0.13	FIESTA TEXAS BASIN 5	106	106
I (I-1 & I-2)	18.63	2.19	0.00	1.88	0.31	OVERTREATMENT	253	-
UPGRADIENT I	12.92	-	-		-	-	-	-
J (J-1 : J-4)	41.01	1.58	0.00	0.08	1.50	OVERTREATMENT	1,224	-
* UPGRADIENT J	19.46	-	-		-	-	-	-
**** K (K-1 : K-7)	98.58	4.16	0.00	**-0.03**	4.19	ENGINEERED VFS FOR 1.87 ACRES OF CART PATH (REMAINING 2.32 ACRES OVERTREATMENT)	3,419	2,982
* UPGRADIENT K	3.25	-	-		-	-	-	-
**L	3.75	1.28	0.00	**-0.05**	1.33	VACUUM SWEEPING/CURB INLETS WITH OIL BOOM	1,085	1,085
UPGRADIENT L	2.53	-	-		-	-	-	-
M	3.34	1.64	0.00		1.64	SAND FILTER BASIN WITH OIL BOOM	1,338	1,617
TOTAL	**392.31**	**40.51**	**2.53**	**4.24**	**38.80**	**-**	**31,661**	**32,762**

*** THE "F-2-A" WATERSHED AREA IS SUBJECT TO AN EXISITNG DRAINAGE EASEMENT/ACCEPTANCE AGREEMENT, THEREFORE TREATED AS ONSITE IMPERVIOUS COVER.

**approved IC in "L" was 1.28 but adjusted watershed from "F" increased IC to 1.33

*UPGRADIENT	62.02
NET AREA	330.29

La Cantera Resort & Spa WPAP Modification: Basin Summary Sheet

Basin Summary by Watershed

BASIN/WATER QUALITY POND	EXISTING BASIN WATER QUALITY VOLUME (CF)	DESIGNED/REQUIRED BASIN WATER QUALITY VOLUME (CF)	CONTRIBUTING WATERSHED (ACRES)	PREVIOUSLY APPROVED IMPERVIOUS COVER (ACRES)	POST-DEVELOPMENT IMPERVIOUS COVER AREA (ACRES)	PERMANENT BMP TYPE	REQUIRED TOTAL TSS REMOVAL ANNUALLY (LBS)	TOTALTSS TREATED ANNUALLY (LBS)	TOTAL ANNUAL TSS OVERTREATMENT CAPACITY (LBS)
A	26780	-	8.98	0.24	0.24	EXISTING SEDIMENTATION/DETENTION BASIN WITH LINER (**NO TREATMENT PROVIDED**)	196	-	-196
B	26304	-	16.87	0.36	0.36	EXISTING RETENTION/IRRIGATION BASIN WITH LINER & ABANDONED FORCE MAIN (**NO TREATMENT PROVIED**)	294	-	-294
C	22106	20374	21.68	0.63	0.63	BASIN "C" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	514	958	444
D	52040	50370	33.40	11.31	11.13	BASIN "D" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	9,082	10,067	985
E	169993	67236	26.87	3.55	3.27	BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	2,668	3,777	1,109
F	91288	85166	47.80	10.98	10.38	EXISTING RETROFIT BATCH BASIN	8,470	9,493	1,023
F-1	-	-	2.57	0.00	1.28	PROPOSED CONTECH JELLYFISH FILTER (JFPD0806-10-2)	1,044	1,102	58
F-2	12878	8805	4.12	1.93	1.93	EXISTING SAND FILTER BASIN WITH OIL SKIMMING BOOM	1,575	1,575	0
G	73144	-	20.55	0.53	0.48	EXISTING SERIES OF SEDIMENTATION/DETENTION BASINS WITH LINERS (**NO TREATMENT PROVIDED**)	392	-	-392
H	188922	-	6.00	0.13	0.13	EXISTING SEDIMENTATION/DETENTION BASIN WITH LINER (TREATMENT FROM FIESTA TEXAS BASIN NO.5)	106	106	0
M	12170	11286	3.34	1.64	1.64	EXISITNG SAND FILTER BASIN WITH OIL BOOM THAT PUMPS TREATED RUNOFF TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	1,338	1,617	279
TOTAL				**31.30**	**31.47**		**25,680**	**28,695**	**3,015**

***THE 3,015 LBS OF TSS OVERTREATMENT FROM THE BASINS AND JELLYFISH SHOWN ABOVE IS TO BE COMBINED WITH 1,456 LBS TSS OVERTREATMENT FROM VEGETATIVE FILTER STRIPS, AND APPLIED TOWARD 253 LBS TSS FROM WATERSHED "I", 1,224 LBS TSS FROM WATERSHED "J", AND 1,893 LBS FROM 2.32 ACRES OF UNCAPTURED IMPERVIOUS AREA (MOSTLY CART PATH) FROM WATERSHED "K".**

La Cantera Resort & Spa WPAP Modification: Treatment Calculations

Treatment Calculations by Watershed

Basin	Watershed "A"	Watershed "B"	Watershed "C"	Watershed "D"	Watershed "E"	Watershed "F"	Watershed "F-1"	Watershed "F-2"	Watershed "G"	Watershed "H"	Leon Creek Bypass Watershed "I"	Maverick Creek Bypass Watershed "J"	***Cart Paths Areas Watershed "K"	Entry Drive Watershed "L"	Maint. Area Watershed "M"	Total
Type	None	None	Sed/Det w/Liner	Sed/Det w/Liner	Ret/Irrigation	Batch Basin	Prop. Jellyfish	Sand Filter w/Oil Boom	None	Fiesta Texas Basin 5	None	None	VFS	Curb Inlet w/Booms	Sand Filter w/Oil Boom	
***Offsite/Upgradient Area (Acres)**	2.90	9.42	2.31			6.32	0.44	2.47			12.92	19.46	3.25	2.53		**62.02**
Onsite Watershed Area (Acres)	6.08	7.45	19.37	33.40	26.87	41.48	2.13	1.65	20.55	6.00	18.63	41.01	98.58	3.75	3.34	**330.29**
Total Watershed Area (Acres)	**8.98**	**16.87**	**21.68**	**33.40**	**26.87**	**47.80**	**2.57**	**4.12**	**20.55**	**6.00**	**31.55**	**60.47**	**101.83**	**6.28**	**3.34**	**392.31**
Existing Basin Water Quality Volume (cf)			22106	52040	169993	91288		12878							12170	
Required Basin Water Quality Volume (cf)			20374	50370	67236	85166		8805							11286	
Previously Approved Impervious Cover (Acres)	**0.24**	**0.36**	**0.63**	**11.31**	**3.55**	**10.98**	**0.00**	**1.93**	**0.53**	**0.13**	**2.19**	**1.58**	**1.87**	**1.28**	**1.64**	**38.22**
Structures/Rooftops				3.14	1.78	1.34			0.01				0.02		0.43	
Parking				3.62	0.09	5.06		1.64							0.21	
Other Paved Surfaces (Cart Path, etc.)	0.24	0.36	0.63	3.80	1.25	3.45		0.29	0.47	0.13	0.31	1.50	1.85	1.33	1.00	
Proposed Impervious Cover (Acres)	**0**	**0**	**0**	**0.57**	**0.15**	**0.53**	**1.28**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2.53**
IC demolished or not constructed - updated survey				**0.75**	**0.43**	**1.13**			**0.05**		**1.88**	**0.08**	**0.03 additional OT**	**-0.05**		**4.24**
Total Prop. Impervious Cover to Treat (Acres)	**0.24**	**0.36**	**0.63**	**11.13**	**3.27**	**10.38**	**1.28**	**1.93**	**0.48**	**0.13**	**0.31**	**1.50**	**1.87**	**1.33**	**1.64**	**36.48**
Total TSS Generated (Lm) (lbs)	196	294	514	9082	2668	8470	1044	1575	392	106	253	1224	1526	1085	1338	**29768**
Total TSS Treated by BMP (Lr) (lbs)	**0**	**0**	**958**	**10067**	**3777**	**9493**	**1102**	**1575**	**0**	**106**	**0**	**0**	**2982**	**1085**	**1617**	**32762**
Difference in TSS Treatement (lbs)	196	294	-444	-985	-1109	-1023	-58	0	392	0	253	1224	-1456	0	-279	**-2994**

*Watershed "F-2" has no true upgradient (see site plan notes for "F-2-A")

***Clarification for Watershed K - cart paths

Uncaptured Previously Approved Impervious Cover - Cart Path Within Cumulative Watershed "K" (Acres):	**2.29**
Uncaptured Proposed Impervious Cover Within Cumulative Watershed "K" (Acres):	**0.03**
Total Post-Development Uncaptured Impervious Cover Area Within Cumulative Watershed "K" to Overtreat (Acres)	**2.32**
Total TSS Generated By Uncaptured Impervious Cover (Lm):	1893
Overtreatment Provided (Lr):	2994

Total Previously Approved Impervious Cover Area (Acres):	40.51
Total Post-Development Impervious Cover Area (Acres):	**38.80**

Contech Engineered Solutions Calculations for Texas Commission on Environmental Quality
TSS Removal Calculations

Project Name: La Cantera Resort & Spa - Event Barn
Date Prepared: 9/18/2023

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: $L_M = 27.2(A_N \times P)$

$L_{M\ TOTAL\ PROJECT}$ = 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 =	Bexar	
Total project area included in plan * =	2.57	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	1.28	acres
Total post-development impervious cover fraction * =	0.50	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	1044	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	1	

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

Drainage Basin/Outfall Area No. = F-1

Total drainage basin/outfall area =	2.13	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	1.28	acres
Post-development impervious fraction within drainage basin/outfall area =	0.60	
$L_{M\ THIS\ BASIN}$ =	1044	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	JF	abbreviation
Removal efficiency =	86	percent

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

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

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 =	2.13	acres
A_I =	1.28	acres
A_P =	0.85	acres
L_R =	1154	lbs.

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

Desired $L_{M\ THIS\ BASIN}$ =	1102	lbs.
F =	0.95	

6. Calculate Treated Flow required by the BMP Type for this drainage basin / outfall area.

Offsite area draining to BMP =	0.44	acres
Offsite impervious cover draining to BMP =	0.00	acres

Calculations from RG-348 Pages Section 3.2.22

Rainfall Intensity =	1.60	inches per hour
Effective Area =	1.19	acres
Cartridge Length =	54	inches
Peak Treatment Flow Required =	1.92	cubic feet per second

7. Jellyfish
Designed as Required in RG-348 Section 3.2.22

Flow Through Jellyfish Size

Jellyfish Size for Flow-Based Configuration =	JFPD0806-10-2	
Jellyfish Treatment Flow Rate =	1.96	cfs

10/2/23

La Cantera Resort & Spa			12430-10		***Water Quality Basin "C"***
Existing:	DRY				
Width=	VARIES	ft			
Length=	VARIES	ft			
Bottom elev=	1063.5				
Increment=	1	height			
Side slopes=	5	:1			
					Required Basin Volume = **20374**
	Elev	**Area**	**Vol Inc**	**Vol Tot**	
Bottom =	1063.5	1282	0	0	**Water Quality Storage Volume =** **22106**
1	1064.5	4068	2675	2675	
2	1065.5	5827	4948	7623	
3	1066.5	7366	6597	14219	
4	1067.5	8407	7887	22106	Spillway ~ 1067.5

Notes: This dry bunker referenced as Basin C, is a sedimentation/detention basin with a synthetic liner and discharges upgradient of Lake D on Hole 3 via an 8-inch force main that is joint trenched with irrigation. There is a single pump on the control panel next to the wet well that serves the 8-inch force main. There is a 24-inch diameter grate inlet at an elevation of 1063.50; this along with the wet well float settings allows for 4 feet of water quality storage in Basin C.

La Cantera Resort & Spa	12430-10	***Water Quality Basin "D"***

Existing:	WET	
Width=	VARIES	ft
Length=	VARIES	ft
Bottom elev=	1048	
Increment=	1	height
Side slopes=	3	:1

	Elev	Area	Vol Inc	Vol Tot	
Bottom =	1048	2333	0	0	
1	1049	3405	2869	2869	
2	1050	5697	4551	7420	
3	1051	7620	6659	14079	
4	1052	9381	8501	22579	
5	1053	11242	10312	32891	
6	1054	13230	12236	45127	
7	1055	15347	14289	59415	
8	1056	17552	16450	75865	Constant WSEL - WQV above this elevation
9	1057	19902	18727	94592	
10	1058	22867	21385	115976	
10.5	1058.5	24845	11928	127904	Max. WSEL

Modeled assuming Basin D is not connected to E	
Required Basin Volume =	**50370**
Water Quality Storage Volume =	**52040**

Notes: This pond is referenced as Lake D, and is a wet sedimentation/detention basin with a synthetic liner that gravity drains any excess water quality volume above the constant WSEL to the Irrigation Lake (Lake E). This excess volume over a 3'x3' grate inlet with top elevation at 1056 (per construction plans) that drains out with an 18-inch storm drain. This amenity lake maintains a constant storage depth of 8' with 2.5' of freeboard for an overflow spillway. There is also a wet well and lift station present for a 12inch intake line from a submerged 3'x3' grate inlet that feeds a 10-inch force main for additional irrigation use.

La Cantera Resort & Spa	12430-10	***Water Quality Basin "E"***

Existing:	WET	
Width=	VARIES	ft
Length=	VARIES	ft
Bottom elev=	1035.5	
Increment=	1	height
Side slopes=	3	:1

	Elev	Area 1	Area 2	Vol Inc	Vol Tot	
Bottom =	1035.5	41107	22056	0	0	
0.5	1036	42577	23070	32203	32203	
1.5	1037	45566	25170	68192	100394	
2.5	1038	48617	27358	73356	173750	
3.5	1039	51732	29635	78671	252421	
4.5	1040	54915	31992	84137	336558	
5.5	1041	58169	34423	89750	426307	
6.5	1042	61492	36945	95515	521822	
7.5	1043	64888	39553	101439	623261	
8	1043.5	66613	40884	52985	676245	Constant WSEL - WQV above this elevation
8.5	1044	68352	42231	54520	730765	
9.5	1045	120362		115473	846238	Overflow Structure
10.5	1046	127208		123785	970023	
11.5	1047	134053		130631	1100653	Emergency Spillway Elevation
12.5	1048	143981		139017	1239670	Max. 100-Year WSEL

Required Basin Volume =	**67236**
Water Quality Storage Volume =	**169993**

Notes: This is the main retention/irrigation pond referenced as Lake E and is located by Hole 2 and the Maintenance Facility. The lake also serves as a sedimentation/detention basin with a synthetic liner that accepts water from Lakes B and D as well as Basin C. There is an overflow structure at an elevation of 1045 feet that discharges to Leon Creek. There is also an emergency spillway at an elevation of 1047 feet that allows for the 100-year WSEL to reach a maximum elevation of 1048 feet.

La Cantera Resort & Spa	12430-10		***Water Quality Basin "F"***
Retrofit:	DRY		
Width=	VARIES	ft	
Length=	VARIES	ft	
Bottom elev=	1064.5		
Increment=	1	height	
Side slopes=	3	:1	

Required Basin Volume =	**84718**
Batch Detention Basin Volume =	**91288**

	Elev	**Area**	**Vol Inc**	**Vol Tot**
Bottom =	1064.5	0	0	0
0.5	1065	10266	2566.5	
1.5	1066	16395	13330.5	13331
2.5	1067	20021	18208	31539
3.5	1068	22938	21479.5	53018
4.5	1069	26210	24574	77592
5	1069.5	28573	13695.75	91288

Notes: This represents the as-built volume of the batch detention basin "Basin F" that was completed in September 2021.

La Cantera Resort & Spa			12430-10			***Water Quality Basin "F-2"***
Existing:	DRY					
Width=	VARIES	ft				
Length=	VARIES	ft				Sand filter basin in report with oil skimming boom inlet structure.
Bottom elev=	1048					
Increment=	1	height				
Side slopes=	3	:1				
						Required Basin Volume = **8805**
	Elev	**Area**	**Vol Inc**	**Vol Tot**		
Bottom =	1048	3200	0	0		**Sand Filter Basin Volume =** **12878**
1	1049	3891	3546	3546		
2	1050	4649	4270	7816		
3	1051	5475	5062	12878	Weir	

Notes: This sand filter basin is equipped with an oil & grease skimming boom within a grate inlet that filters storm water runoff as it enters the basin. After the stormwater infiltrates through the sand layer and into the underlying perforated pipe, it is discharged via a small diameter outlet pipe into Leon Creek.

La Cantera Resort & Spa	12430-10	***Water Quality Basin "M"***

Existing:	DRY	
Width=	VARIES	ft
Length=	VARIES	ft
Bottom elev=	1039	
Increment=	1	height
Side slopes=	3	:1

Sand filter basin in report with oil skimming boom inlet structure. Spillover elevation at 1051. Water is pumped back to Lake E for use as irrigation.

Required Basin Volume =	**11286**
Sand Filter Basin WQV =	**12170**

	Elev	**Area**	**Vol Inc**	**Vol Tot**	
Bottom =	1039	1840	0	0	
1	1040	2399	2120	2120	
2	1041	3007	2703	4823	
3	1042	3681	3344	8167	
4	1043	4325	4003	12170	Weir

Notes: This sand filter basin is equipped with an oil & grease skimming boom within a grate inlet that filters storm water runoff as it enters the basin. After the stormwater infiltrates through the sand layer and into the underlying perforated pipe, it enters a wet well where the filtered water is then pumped back to the irrigation pond (Lake E) where it is then applied to the golf course.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan* =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = F

Total drainage basin/outfall area=	47.80	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	10.38	acres
Post-development impervious fraction within drainage basin/outfall area =	0.22	
$L_{M\ THIS\ BASIN}$ =	8470	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.

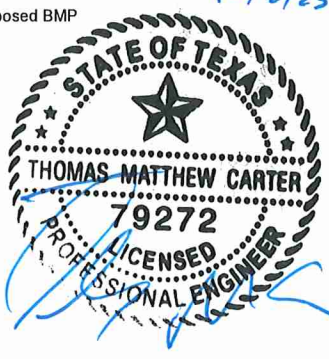
RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	41.48	acres
A_I =	10.38	acres
A_P =	31.10	acres
L_R =	10263	lbs

10/2/23



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

Desired $L_{M\ THIS\ BASIN}$ = **9493** lbs.

F = **0.92**

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 =	**2.00**	inches
Post Development Runoff Coefficient =	**0.23**	
On-site Water Quality Volume =	**69681**	cubic feet

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

Off-site area draining to BMP =	**8.89**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0.00**	
Off-site Runoff Coefficient =	**0.02**	
Off-site Water Quality Volume =	**1291**	cubic feet
Storage for Sediment =	**14194**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**85166**	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 = **85166** cubic feet

9. Filter area for Sand Filters Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**NA**	cubic feet	
Minimum filter basin area =	**NA**	square feet	
Maximum sedimentation basin area =	**NA**	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	**NA**	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool =	**NA**	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	**NA**	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands Designed as Required in RG-348 Pages 3-71 to 3-73

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = C

Total drainage basin/outfall area =	21.68	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.63	acres
Post-development impervious fraction within drainage basin/outfall area =	0.03	
$L_{M\ THIS\ BASIN}$ =	514	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 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: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	19.37	acres
A_I =	0.63	acres
A_P =	18.74	acres
L_R =	958	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 958 lbs.

F = 1.00

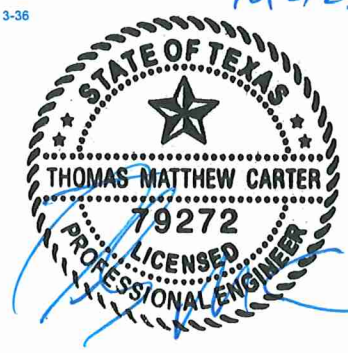
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	4.00	inches
Post Development Runoff Coefficient =	0.06	
On-site Water Quality Volume =	16307	cubic feet

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

Off-site area draining to BMP = 2.31 acres

10/2/23



Off-site Impervious cover draining to BMP =	0.00	acres	
Impervious fraction of off-site area =	0.00		
Off-site Runoff Coefficient =	0.02		
Off-site Water Quality Volume =	671	cubic feet	
Storage for Sediment =	3396		
Total Capture Volume (required water quality volume(s) x 1.20) =	20374	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 =	20374	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 =	81494	square feet	
	1.87	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 =	NA	cubic feet	

9. Filter area for Sand Filters — Designed as Required in RG-348 — Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	NA	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System — Designed as Required in RG-348 — Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin =	NA	cubic feet	

11. Wet Basins — Designed as Required in RG-348 — Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands — Designed as Required in RG-348 — Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands =	NA	cubic feet	

13. AquaLogic™ Cartridge System — Designed as Required in RG-348 — Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System =	NA	cubic feet	

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan* =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = K

Total drainage basin/outfall area =	98.58	acres
Predevelopment impervious area within drainage basin/outfall area=	0.00	acres
Post-development impervious area within drainage basin/outfall area=	1.87	acres
Post-development impervious fraction within drainage basin/outfall area=	0.02	
$L_{M\ THIS\ BASIN}$ =	1526	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: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	98.58	acres
A_I =	1.87	acres
A_P =	96.71	acres
L_R =	2982	lbs

10/2/23

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

Desired $L_{M\ THIS\ BASIN}$ = 2982 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = D

Total drainage basin/outfall area =	33.40	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	11.13	acres
Post-development impervious fraction within drainage basin/outfall area =	0.33	
$L_{M\ THIS\ BASIN}$ =	9082	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 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 =	33.40	acres
A_I =	11.13	acres
A_P =	22.27	acres
L_R =	11914	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 10067 lbs.

F = 0.84

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 =	1.26	inches
Post Development Runoff Coefficient =	0.27	
On-site Water Quality Volume =	41975	cubic feet

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

Off-site area draining to BMP = 0.00 acres

10/2/23

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 =	8395		
Total Capture Volume (required water quality volume(s) x 1.20) =	**50370**	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 = **50370** 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 =	201478	square feet	
	4.63	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 = **NA** cubic feet

9. Filter area for Sand Filters Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	NA	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands Designed as Required in RG-348 Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System Designed as Required in RG-348 Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the 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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = E

Total drainage basin/outfall area =	26.87	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	3.27	acres
Post-development impervious fraction within drainage basin/outfall area =	0.12	
$L_{M\ THIS\ BASIN}$ =	2668	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 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 =	26.87	acres
A_I =	3.27	acres
A_P =	23.60	acres
L_R =	3777	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 3777 lbs.

F = 1.00

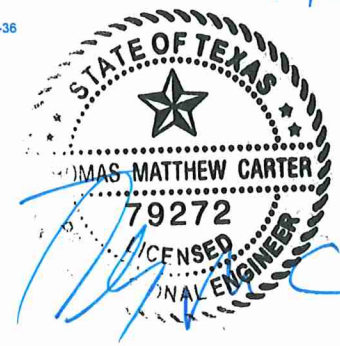
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	4.00	inches
Post Development Runoff Coefficient =	0.14	
On-site Water Quality Volume =	56030	cubic feet

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

Off-site area draining to BMP = 0.00 acres

10/2/23



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 =	11206		
Total Capture Volume (required water quality volume(s) x 1.20) =	67236	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 = **67236** 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 =	268946	square feet	
	6.17	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 = **NA** cubic feet

9. Filter area for Sand Filters — Designed as Required in RG-348 — Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	NA	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System — Designed as Required in RG-348 — Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins — Designed as Required in RG-348 — Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands — Designed as Required in RG-348 — Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System — Designed as Required in RG-348 — Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

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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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = F2

Total drainage basin/outfall area =	4.12	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	1.93	acres
Post-development impervious fraction within drainage basin/outfall area =	0.47	
$L_{M\ THIS\ BASIN}$ =	1575	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = 89 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: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	4.12	acres
A_I =	1.93	acres
A_P =	2.19	acres
L_R =	1815	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 1575 lbs.

F = 0.87

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 =	1.44	inches
Post Development Runoff Coefficient =	0.34	
On-site Water Quality Volume =	7337	cubic feet

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

Off-site area draining to BMP = 0.00 acres

10/2/23

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 =	1467		
Total Capture Volume (required water quality volume(s) x 1.20) =	8805	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 = **NA** cubic feet

9. Filter area for Sand Filters — Designed as Required in RG-348 — Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	8805	cubic feet	
Minimum filter basin area =	408	square feet	
Maximum sedimentation basin area =	3669	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	917	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	8805	cubic feet	
Minimum filter basin area =	734	square feet	
Maximum sedimentation basin area =	2935	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	183	square feet	**For maximum water depth of 8 feet**

10. Bioretention System — Designed as Required in RG-348 — Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins — Designed as Required in RG-348 — Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands — Designed as Required in RG-348 — Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System — Designed as Required in RG-348 — Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = H

Total drainage basin/outfall area =	6.00	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.13	acres
Post-development impervious fraction within drainage basin/outfall area =	0.02	
$L_{M\ THIS\ BASIN}$ =	106	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 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: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	6.00	acres
A_I =	0.13	acres
A_P =	5.87	acres
L_R =	230	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 106 lbs.

F = 0.46

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 =	0.37	inches
Post Development Runoff Coefficient =	0.05	
On-site Water Quality Volume =	369	cubic feet

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

Off-site area draining to BMP = 0.00 acres

10/2/23

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 =	74		
Total Capture Volume (required water quality volume(s) x 1.20) =	**442**	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 = **442** 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 =	1769	square feet	
	0.04	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 = **NA** cubic feet

9. Filter area for Sand Filters Designed as Required in RG-348 Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	NA	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System Designed as Required in RG-348 Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands Designed as Required in RG-348 Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System Designed as Required in RG-348 Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: La Cantera Resort & Spa
Date Prepared: 9/18/2023

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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 =	Bexar	
Total project area included in plan * =	330.29	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	38.80	acres
Total post-development impervious cover fraction * =	0.12	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	31661	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 14

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

Drainage Basin/Outfall Area No. = M

Total drainage basin/outfall area =	3.34	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	1.64	acres
Post-development impervious fraction within drainage basin/outfall area =	0.49	
$L_{M\ THIS\ BASIN}$ =	1338	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 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: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

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

A_C =	3.34	acres
A_I =	1.64	acres
A_P =	1.70	acres
L_R =	1730	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 1617 lbs.

F = 0.93

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 =	2.20	inches
Post Development Runoff Coefficient =	0.35	
On-site Water Quality Volume =	9405	cubic feet

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

Off-site area draining to BMP = 0.00 acres

14/2/23

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 =	1881		
Total Capture Volume (required water quality volume(s) x 1.20) =	**11286**	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 = **11286** 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 =	45145	square feet	
	1.04	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 = **NA** cubic feet

9. Filter area for Sand Filters — Designed as Required in RG-348 — Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	**For minimum water depth of 2 feet**
Minimum sedimentation basin area =	NA	square feet	**For maximum water depth of 8 feet**

9B. Partial Sedimentation and Filtration System

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

10. Bioretention System — Designed as Required in RG-348 — Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins — Designed as Required in RG-348 — Pages 3-66 to 3-71

Required capacity of Permanent Pool =	NA	cubic feet	**Permanent Pool Capacity is 1.20 times the WQV**
Required capacity at WQV Elevation =	NA	cubic feet	**Total Capacity should be the Permanent Pool Capacity plus a second WQV.**

12. Constructed Wetlands — Designed as Required in RG-348 — Pages 3-71 to 3-73

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System — Designed as Required in RG-348 — Pages 3-74 to 3-78

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with maintenance contract with AquaLogic™.**

Required Sedimentation chamber capacity =	NA	cubic feet	
Filter canisters (FCs) to treat WQV =	NA	cartridges	
Filter basin area (RIA_F) =	NA	square feet	

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

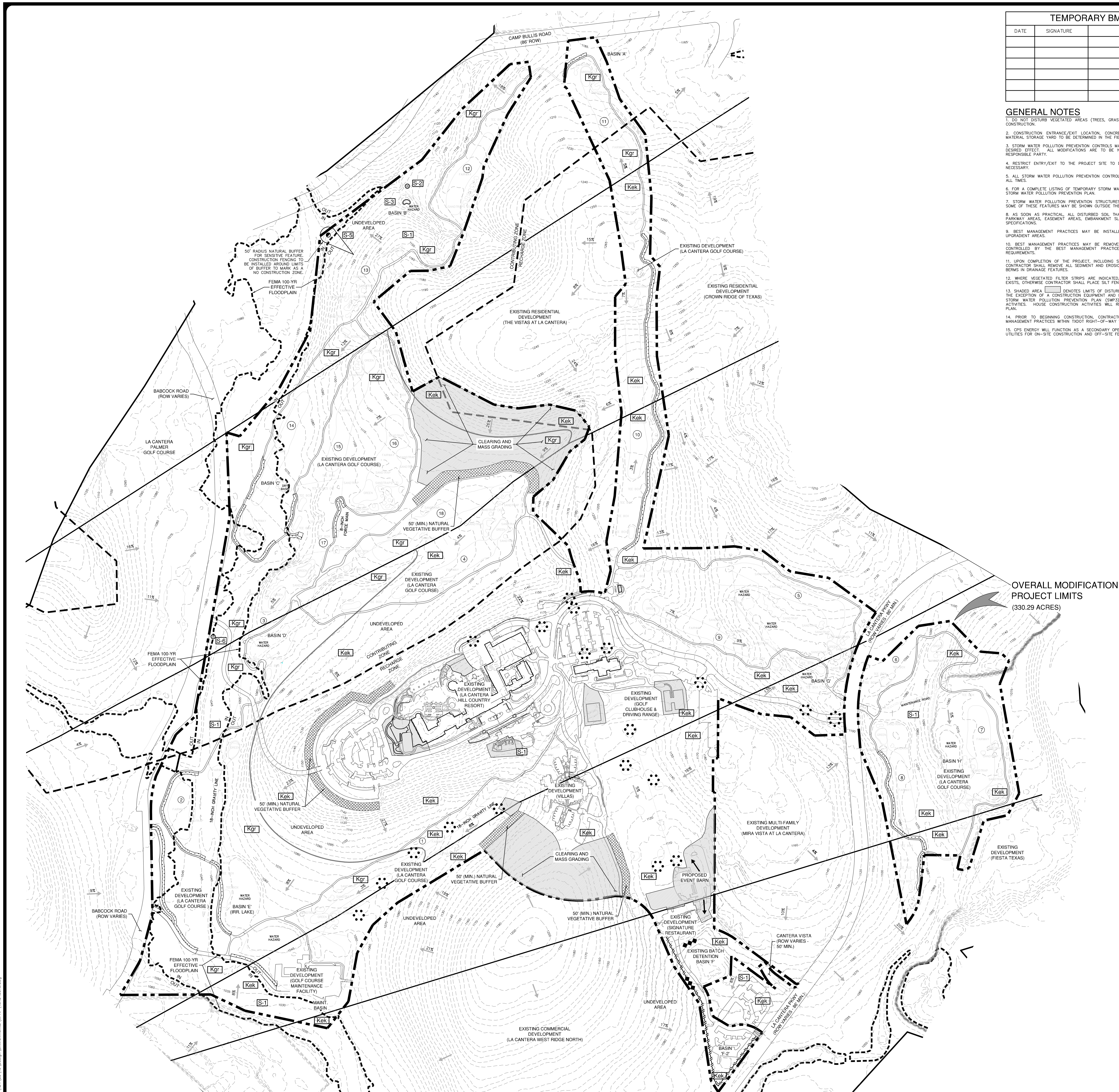
THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FLOW RATES - NOT CALCULATED WATER QUALITY VOLUMES

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

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A =	3.30	acres
Impervious Cover in Drainage Area =	2.97	acres
Rainfall intensity = i =	1.1	in/hr
Swale Slope =	0.035	ft/ft
Side Slope (z) =	5	
Design Water Depth = y =	0.33	ft
Weighted Runoff Coefficient = C =	0.70	
A_{CS} = cross-sectional area of flow in Swale =	3.82	sf
P_W = Wetted Perimeter =	13.29	feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W =	0.29	feet

EXHIBITS



TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

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

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

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

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

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

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

10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED IN ACCORDANCE WITH TPDES REQUIREMENTS.

11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.

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

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

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

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

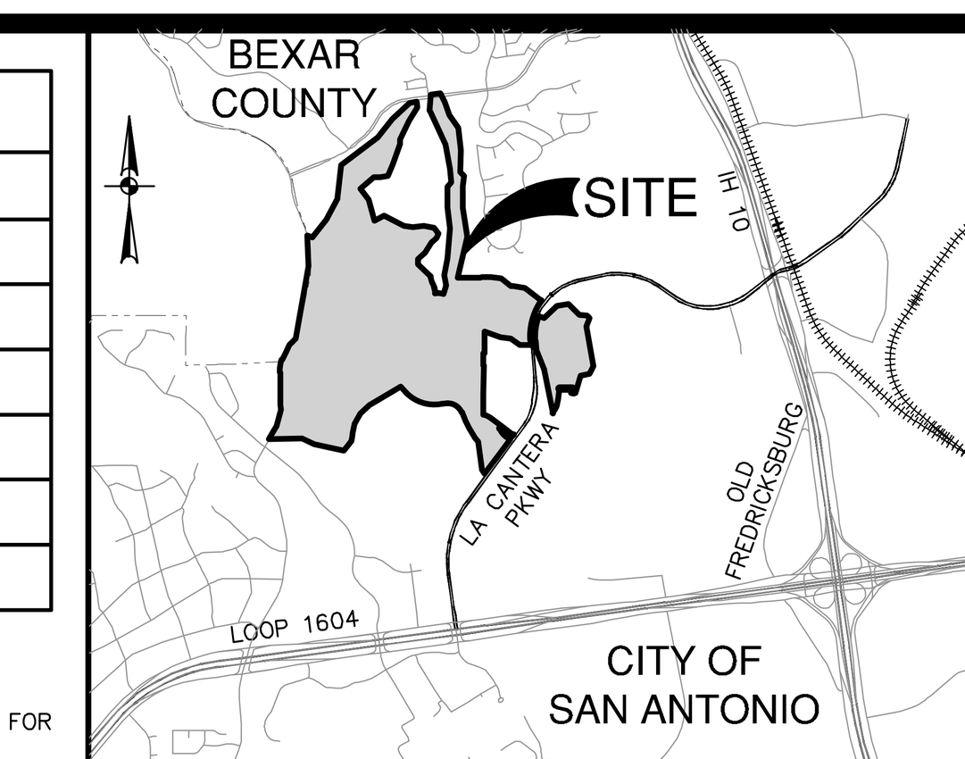
LEGEND

GEOLOGIC FORMATION

Qal	ALLUVIUM	Kep	PERSON
Kbu	BUDA	Kek	KAINER
Kdr	DEL RIO	Kwa	WALNUT
Kgt	GEORGETOWN	Kgr	GLEN ROSE

- S-1 — POTENTIAL RECHARGE FEATURE
- DEVELOPED AREAS (EXCLUSION APPROVED APRIL 2018)
- CONTACT, LOCATED APPROXIMATELY
- CONTACT, INFERRED
- FAULT, LOCATED APPROXIMATELY (D, DOWNTHROWN SIDE; U, UPTHROWN SIDE)
- FAULT, EXTRAPOLATED
- FAULT, INFERRED
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIP OF JOINTS
- STRIKE OF VERTICAL JOINTS
- CAVE
- SOLUTION CAVITY
- SWALLOW HOLE
- SINKHOLE
- NON-KARST CLOSED DEPRESSION
- ZONE
- OTHER NATURAL BEDROCK FEATURES
- MAN-MADE FEATURE IN BEDROCK
- WATER WELL
- SANITARY SEWER LINE (MANHOLE)

OVERALL MODIFICATION PROJECT LIMITS (330.29 ACRES)



LOCATION MAP

NOT-TO-SCALE

SCALE: 1" = 200'

0' 200' 400' 600'

LEGEND

- PROJECT LIMITS
- 976 EXISTING GRADE
- 970 PROPOSED GRADE
- SILT FENCE/SEDIMENT CONTROL ROLLS
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- ROCK BERM
- GRATE INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- 50' NATURAL VEGETATIVE BUFFER
- (9) GOLF COURSE HOLE NUMBERS
- AREA OF DISTURBANCE (23.34 ACRES)

TCEQ WATER POLLUTION ABATEMENT PLAN GENERAL CONSTRUCTION NOTES

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
6. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.
7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.
11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST:
   - THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
   - THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
   - THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
12. THE HOLDER OF ANY APPROVED EDWARDS AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

   A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;

   B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FORM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;

   C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329

TEMPORARY POLLUTION ABATEMENT NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTURBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. ROCK BERMS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS AT DRAINAGE STRUCTURES. THESE BERMS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. THIS PROJECT DOES NOT INCLUDE THE INSTALLATION OF ABOVE GROUND STORAGE TANKS (AST) WITH VOLUME(S) GREATER THAN OR EQUAL TO 500 GALLONS.

4. DRAINAGE PATTERNS ARE ILLUSTRATED BY FLOW ARROWS. SLOPES VARY THROUGHOUT THE SITE; TYPICAL SLOPES IN THIS PROJECT WILL RANGE FROM **0.5% TO 2H:1V.**

5. THE NATURE OF CONSTRUCTION IS SUCH THAT IT IS DIFFICULT TO PREDICT AREAS THAT WILL BE DISTURBED AND RE-VEGETATED. THE CONSTRUCTION PLANS INCLUDE A NOTE ON **EXHIBIT 3** WHICH WILL REQUIRE THE CONTRACTOR TO RE-VEGETATE DISTURBED AREAS WITH SEEDING, HYDROMULCH, OR SOD AND SPRINKLING. ALL IMPERVIOUS COVER AREAS WILL BE DISTURBED. APPROXIMATELY **330.29 ACRES** WILL BE DISTURBED.

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 1

DATE	NO.	REVISION

10/2/2023

STATE OF TEXAS — THOMAS MATTHEW CARTER — 79272 — LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS

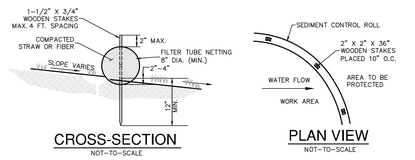
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

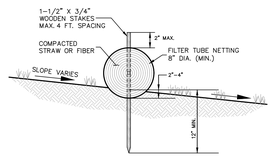
LA CANTERA RESORT & SPA - EVENT BARN

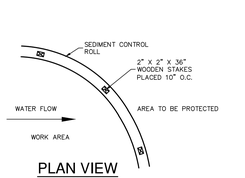
SAN ANTONIO, TEXAS

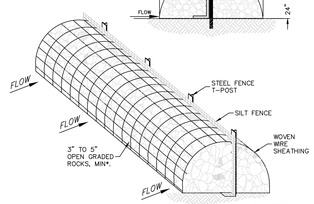
WATER POLLUTION ABATEMENT PLAN - MODIFICATION
TEMPORARY POLLUTION ABATEMENT PLAN

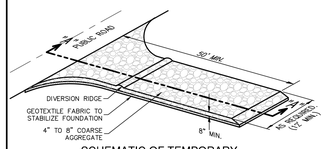
PLAT NO. -
JOB NO. 12430-10
DATE SEPTEMBER 2023
DESIGNER MC
CHECKED WK DRAWN MC
SHEET C2.00

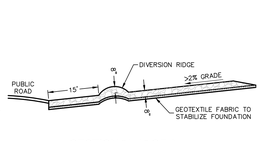


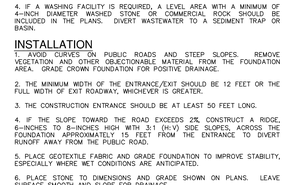


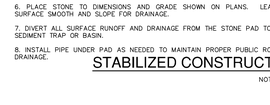


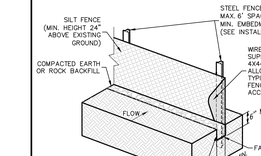


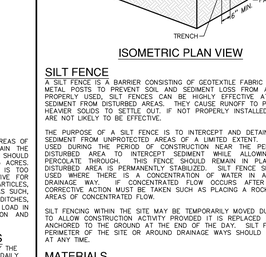












CROSS-SECTION
NOT-TO-SCALE

PLAN VIEW
NOT-TO-SCALE

SEDIMENT CONTROL ROLLS

NOT-TO-SCALE

SEDIMENT CONTROL ROLLS

SEDIMENT CONTROL ROLLS ARE ELONGATED TUBES OF COMPACTED STRAW AND/OR OTHER FIBERS THAT ARE INSTALLED ALONG CONTOURS OR AT THE BASE OF SLOPES TO HELP REDUCE SOIL EROSION AND RETAIN SEDIMENT. THEY FUNCTION BY SHORTENING SLOPE LENGTH, REDUCING RUNOFF WATER VELOCITY, TRAPPING DISLODGED SOIL PARTICLES AND REDUCING THE EFFECTS OF SLOPE STEEPNESS.

MATERIALS

CORE MATERIAL: CORE MATERIALS SHALL BE BIODEGRADABLE NAD NOXIOUS WEED FREE. MATERIAL MAY BE COMPOST, MULCH, ASPEN EXCELSIOR WOOD FIBERS, CHIPPED SITE VEGETATION, AGRICULTURAL RICE OR WHEAT STRAW, COCONUT FIBER, OR OTHER 100% BIODEGRADABLE FIBERS.
CONTAINMENT MESH: CONTAINMENT MESH SHALL BE 100% BIODEGRADABLE, PHOTODEGRADABLE OR RECYCLABLE SUCH AS BURLAP TWINE, UV PHOTODEGRADABLE PLASTIC OR POLYESTER.
USE BIODEGRADABLE OR PHOTODEGRADABLE MESH WHEN WATTLE WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. USE RECYCLABLE MESH FOR TEMPORARY INSTALLATIONS.
WATTLES SHALL HAVE A MINIMUM DIAMETER OF 8 INCHES AND A MAXIMUM DIAMETER OF 20 INCHES.
NO MORE THAN 5% OF THE FILL MATERIAL SHALL BE PERMITTED TO ESCAPE FROM THE CONTAINING MESH. MESH SHALL BE 0.5" X 0.5" HIGH DENSITY POLYETHYLENE AND ETHYLY VINYL ACETATE AND CONTAIN ULTRA-VIOLET INHIBITORS. WATTLE ENDS SHALL BE TIED CLOSED.

SEDIMENT CONTROL ROLLS IN A TEMPORARY EROSION CONTROL APPLICATION

WHEN NO LONGER REQUIRED FOR THE INTENDED PURPOSE, TEMPORARY ROLLS SHALL BE REMOVED FROM THE SITE. AS AN OPTION, THE STRAW ROLLS MAY BE SLIT DOWN THE LENGTH OF THE NETTING AND THE STRAW MAY BE USED ON SLOPES OR OTHER AREAS.

TRENCHES, DEPRESSIONS OR ANY OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY STRAW ROLLS SHALL BE BACKFILLED AND REPAIRED WITH THE EXCESS SEDIMENT CAPTURED BY THE ROLLS, PRIOR TO SPREADING THE STRAW OR OTHER FINAL EROSION CONTROL PROTECTION.

SEDIMENT CONTROL ROLLS IN A PERMANENT EROSION CONTROL APPLICATION

LEAVE ROLLS AS INSTALLED TO PHOTODEGRADE OR BIODEGRADE OVER TIME AS NATIVE AND APPLIED VEGETATION ULTIMATELY STABILIZE THE REPAIRED SITE.

INSTALLATION

1. REMOVE ALL ROCKS, CLODS, VEGETATION OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED ROLLS WILL HAVE DIRECT CONTACT WITH THE SOIL.

2. A SMALL TRENCH, 2–4 INCHES IN DEPTH SHOULD BE EXCAVATED ON THE SLOPE CONTOUR AND PERPENDICULAR TO WATER FLOW. SOIL FROM THE EXCAVATION SHOULD BE PLACED UPSLOPE NEXT TO THE TRENCH.

3. INSTALL THE ROLLS IN THE TRENCH, INSURING THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE ROLL. ROLL SHOULD BE LAPPED 6" MINIMUM TO PREVENT SEDIMENT PASSING THROUGH THE FIELD JOINT.

4. WOODEN STAKES SHOULD BE USED TO FASTEN THE ROLLS TO THE SOIL. WHEN CONDITIONS WARRANT, A STRAIGHT METAL BAR CAN BE USED TO DRIVE A "PILOT HOLE" THROUGH THE ROLL AND INTO THE SOIL.

5. WOODEN STAKES SHOULD BE PLACED 6" FROM THE ROLL END ANGLED TOWARDS THE ADJACENT ROLL AND SPACED AT 4 FEET CENTERS LEAVING LESS THAN 1–2 INCHES OF STAKE EXPOSED ABOVE THE ROLL. ALTERNATELY, STAKES MAY BE PLACED ON EACH SIDE OF THE ROLL TYING ACROSS WITH WITH A NATURAL FIBER TWINE OR STAKING IN A CROSSING MANNER ENSURING DIRECT SOIL CONTACT AT ALL TIMES.

6. TERMINAL ENDS OF ROLLS MAY BE "DOG LEGGED" UP SLOPE TO ENSURE CONTAINMENT AND PREVENT CHANNELING OF SEDIMENT.

7. BACKFILL THE UPSLOPE LENGTH OF THE ROLL WITH THE EXCAVATED SOIL AND COMPACT.

8. CARE SHALL BE TAKEN DURING INSTALLATION SO AS TO AVOID DAMAGE OCCURRING TO THE ROLL AS A RESULT OF THE INSTALLATION PROCESS. SHOULD THE ROLL BE DAMAGED DURING INSTALLATION, A WOODEN STAKE SHALL BE PLACED EITHER SIDE OF THE DAMAGED AREA TERMINATING THE LOG SEGMENT.

INSPECTION AND MAINTENANCE

1. THE SEDIMENT CONTROL ROLLS SHALL BE INSPECTED AFTER INSTALLATION TO INSURE THAT THEY ARE TRENCHED-IN AND THAT NO GAPS EXIST UNDER THE ROLLS OR BETWEEN ADJACENT ENDS OF THE ROLLS.

2. ROLLS SHALL BE INSPECTED AFTER SIGNIFICANT RAINFALL EVENTS. RILLS OR GULLIES UPSLOPE OF THE ROLL AND ANY UNDERCUTTING IS TO BE REPAIRED.

CROSS-SECTION
NOT-TO-SCALE

PLAN VIEW
NOT-TO-SCALE

SEDIMENT CONTROL ROLLS
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NO MORE THAN 5% OF THE FILL MATERIAL SHALL BE PERMITTED TO ESCAPE FROM THE CONTAINING MESH. MESH SHALL BE 0.5" X 0.5" HIGH DENSITY POLYETHYLENE AND ETHYLY VINYL ACETATE AND CONTAIN ULTRA-VIOLET INHIBITORS. WATTLE ENDS SHALL BE TIED CLOSED.

SEDIMENT CONTROL ROLLS IN A TEMPORARY EROSION CONTROL APPLICATION
WHEN NO LONGER REQUIRED FOR THE INTENDED PURPOSE, TEMPORARY ROLLS SHALL BE REMOVED FROM THE SITE. AS AN OPTION, THE STRAW ROLLS MAY BE SLIT DOWN THE LENGTH OF THE NETTING AND THE STRAW MAY BE USED ON SLOPES OR OTHER AREAS.

TRENCHES, DEPRESSIONS OR ANY OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY STRAW ROLLS SHALL BE BACKFILLED AND REPAIRED WITH THE EXCESS SEDIMENT CAPTURED BY THE ROLLS, PRIOR TO SPREADING THE STRAW OR OTHER FINAL EROSION CONTROL PROTECTION.

SEDIMENT CONTROL ROLLS IN A PERMANENT EROSION CONTROL APPLICATION
LEAVE ROLLS AS INSTALLED TO PHOTODEGRADE OR BIODEGRADE OVER TIME AS NATIVE AND APPLIED VEGETATION ULTIMATELY STABILIZE THE REPAIRED SITE.

INSTALLATION
1. REMOVE ALL ROCKS, CLODS, VEGETATION OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED ROLLS WILL HAVE DIRECT CONTACT WITH THE SOIL.
2. A SMALL TRENCH, 2–4 INCHES IN DEPTH SHOULD BE EXCAVATED ON THE SLOPE CONTOUR AND PERPENDICULAR TO WATER FLOW. SOIL FROM THE EXCAVATION SHOULD BE PLACED UPSLOPE NEXT TO THE TRENCH.
3. INSTALL THE ROLLS IN THE TRENCH, INSURING THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE ROLL. ROLL SHOULD BE LAPPED 6" MINIMUM TO PREVENT SEDIMENT PASSING THROUGH THE FIELD JOINT.
4. WOODEN STAKES SHOULD BE USED TO FASTEN THE ROLLS TO THE SOIL. WHEN CONDITIONS WARRANT, A STRAIGHT METAL BAR CAN BE USED TO DRIVE A "PILOT HOLE" THROUGH THE ROLL AND INTO THE SOIL.
5. WOODEN STAKES SHOULD BE PLACED 6" FROM THE ROLL END ANGLED TOWARDS THE ADJACENT ROLL AND SPACED AT 4 FEET CENTERS LEAVING LESS THAN 1–2 INCHES OF STAKE EXPOSED ABOVE THE ROLL. ALTERNATELY, STAKES MAY BE PLACED ON EACH SIDE OF THE ROLL TYING ACROSS WITH WITH A NATURAL FIBER TWINE OR STAKING IN A CROSSING MANNER ENSURING DIRECT SOIL CONTACT AT ALL TIMES.
6. TERMINAL ENDS OF ROLLS MAY BE "DOG LEGGED" UP SLOPE TO ENSURE CONTAINMENT AND PREVENT CHANNELING OF SEDIMENT.
7. BACKFILL THE UPSLOPE LENGTH OF THE ROLL WITH THE EXCAVATED SOIL AND COMPACT.
8. CARE SHALL BE TAKEN DURING INSTALLATION SO AS TO AVOID DAMAGE OCCURRING TO THE ROLL AS A RESULT OF THE INSTALLATION PROCESS. SHOULD THE ROLL BE DAMAGED DURING INSTALLATION, A WOODEN STAKE SHALL BE PLACED EITHER SIDE OF THE DAMAGED AREA TERMINATING THE LOG SEGMENT.

INSPECTION AND MAINTENANCE
1. THE SEDIMENT CONTROL ROLLS SHALL BE INSPECTED AFTER INSTALLATION TO INSURE THAT THEY ARE TRENCHED-IN AND THAT NO GAPS EXIST UNDER THE ROLLS OR BETWEEN ADJACENT ENDS OF THE ROLLS.
2. ROLLS SHALL BE INSPECTED AFTER SIGNIFICANT RAINFALL EVENTS. RILLS OR GULLIES UPSLOPE OF THE ROLL AND ANY UNDERCUTTING IS TO BE REPAIRED.

SEDIMENT CONTROL ROLLS
NOT-TO-SCALE

*SEE NOTE 3 OF INSTALLATION SECTION

SCHEMATIC DIAGRAM OF HIGH SERVICE ROCK BERM (LCRA, 1998)

GENERAL NOTES

A HIGH SERVICE ROCK BERM SHOULD BE DESIGNATED IN AREAS OF IMPORTANT ENVIRONMENTAL SIGNIFICANCE SUCH AS IN STEEP CANYONS OR ABOVE PERMANENT SPRINGS, POOLS, RECHARGE FEATURES, OR OTHER ENVIRONMENTALLY SENSITIVE AREAS THAT MAY REQUIRE A HIGHER LEVEL OF PROTECTION. THE DRAINAGE AREA TO THIS DEVICE SHOULD NOT EXCEED 5 ACRES AND THE SLOPE SHOULD BE LESS THAN 30%.

MATERIALS

1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC WIDTH 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 NO. 30.

2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT², AND BRINDELL HARDNESS EXCEEDING 140. REBAR (EITHER #5 OR #6) MAY ALSO BE USED TO ANCHOR THE BERM.

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

4. 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.

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

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.

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. INSTALL THE SILT FENCE ALONG THE CENTER OF THE PROPOSED BERM PLACEMENT, AS WITH A NORMAL SILT FENCE DESCRIBED IN SECTION 2.4.3.

3. PLACE THE ROCK ALONG THE SHEATHING ON BOTH SIDES OF THE SILT FENCE AS SHOWN IN THE DIAGRAM (FIGURE 1-29), TO A HEIGHT NOT LESS THAN 24 INCHES. CLEAN, OPEN GRADED 3" TO 5" DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5" TO 8" DIAMETER ROCK MAY BE USED.

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. THE HIGH SERVICE ROCK BERM SHOULD BE REMOVED WHEN THE SITE IS REVEGETATED OR OTHERWISE STABILIZED OR IT MAY REMAIN IN PLACE AS A PERMANENT BMP IF DRAINAGE IS ADEQUATE.

COMMON TROUBLE POINTS

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

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

3. INTERNAL SILT FENCE NOT ANCHORED SECURELY TO GROUND (HIGH FLOWS DISPLACING BERM).

4. WHEN INSTALLED IN STREAMBEDS, THEY OFTEN RESULT IN DIVERSION SCOUR, SO THEIR USE IN THIS SETTING IS NOT RECOMMENDED.

COMMON TROUBLE POINTS

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

2. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER.

3. REPAIR ANY LOOSE WIRE SHEATHING.

4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTIONS.

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.

HIGH SERVICE ROCK BERM

NOT-TO-SCALE

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

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

IN CRITICAL AREAS, SECURE SOD WITH NETTING. USE STAPLES.

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.

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

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

ISOMETRIC PLAN VIEW

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

OUTLET STRUCTURE DETAIL

TYPICAL DETAIL

TEMPORARY SEDIMENTATION BASIN NOTES

1. CONTRACTOR TO CONSTRUCT BASINS IN ACCORDANCE WITH CONSTRUCTION PLANS FOR PERMANENT SEDIMENTATION/FILTRATION WITH THE EXCEPTION OF THE GRAVEL DRAIN LAYER AND SAND FILTER LAYERS.

2. INSTALL PERMANENT STAKE TO INDICATE SEDIMENT LEVEL IN THE BASIN. STAKE SHOULD BE MARKED TO INDICATE WHEN SEDIMENT OCCUPIES 50% OF THE VOLUME OF THE BASIN.

3. SEDIMENT WILL BE REMOVED WHEN MORE THAN 50% OF THE BASIN CAPACITY IS EXCEEDED.

4. CONTRACTOR TO SECURE PIPE TO BOTTOM OF BASIN TO PREVENT BUOYANCY DURING A RAIN EVENT. A CONCRETE ANCHOR MAY BE USED.

5. DISCHARGE PIPE TO BE INSTALLED SO AS TO BE IN PLACE FOR PERMANENT STRUCTURE.

TEMPORARY SEDIMENT POND 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 STACKED 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

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"

GENERAL NOTES

1. THE SANDBAGS SHOULD BE FILLED WITH WASHED PEA GRAVEL AND STACKED TO FORM A CONTINUOUS BARRIER ABOUT 1 FOOT HIGH 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 MATTER 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 GRATE INLET PROTECTION 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

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 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 2

NO.	REVISION	DATE	NO.	REVISION	DATE

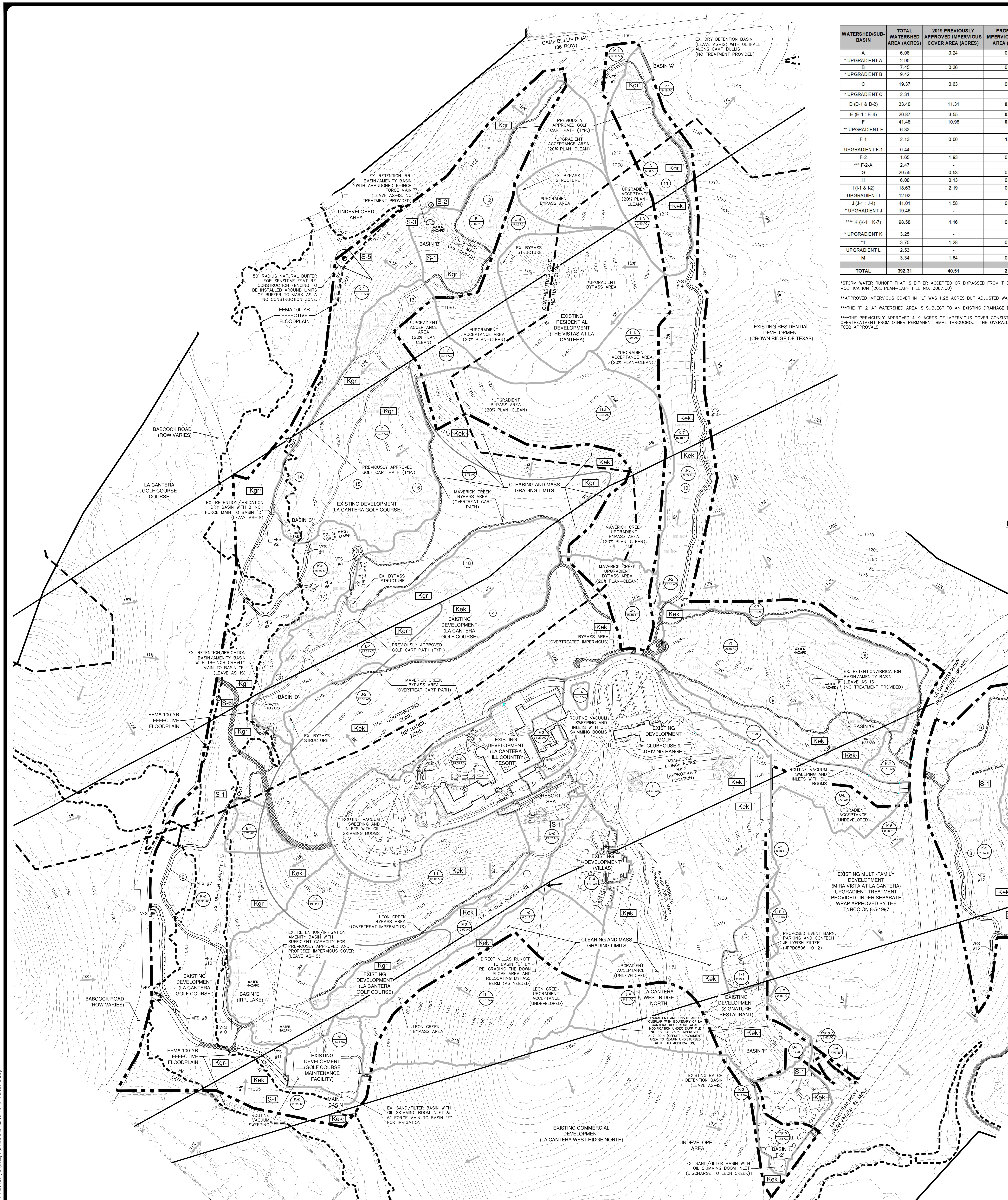
10/2/2023
THOMAS MATTHEW CARTER
79272

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

LA CANTERA RESORT & SPA - EVENT BARN
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN - MODIFICATION
TEMPORARY POLLUTION ABATEMENT DETAILS

PLAT NO. -
JOB NO. 12430-10
DATE SEPTEMBER 2023
DESIGNER MC
CHECKED WK DRAWN MC
SHEET C2.10



TREATMENT SUMMARY

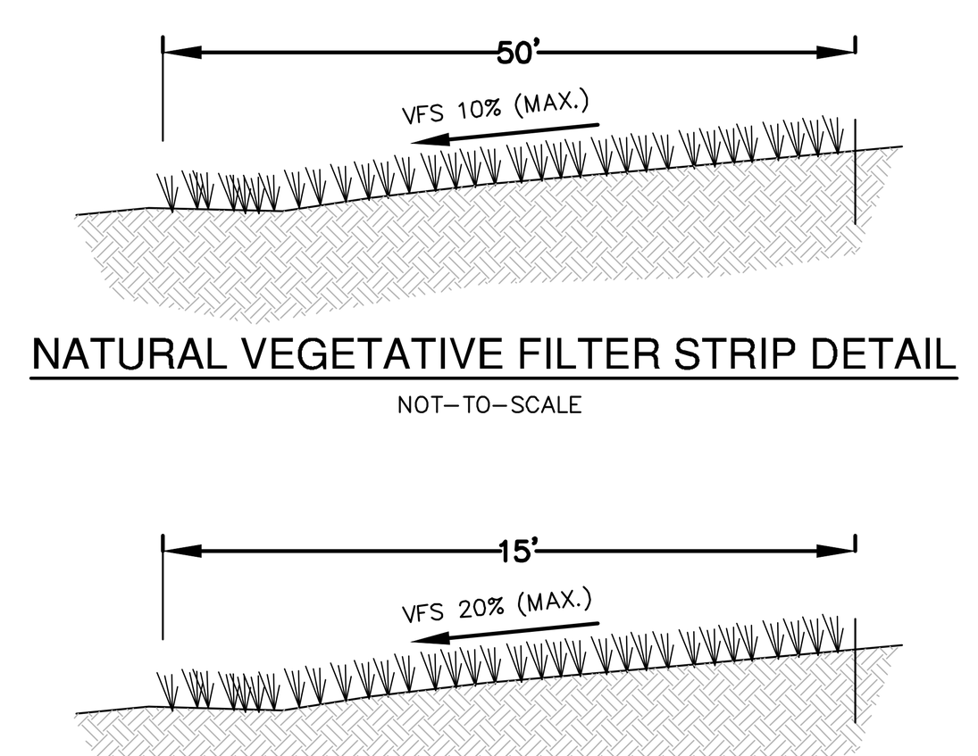
WATERSHED/SUB-BASIN	TOTAL WATERSHED AREA (ACRES)	2019 PREVIOUSLY APPROVED IMPERVIOUS COVER AREA (ACRES)	PROPOSED IMPERVIOUS COVER AREA (ACRES)	REMOVED/NOT CONSTRUCTED (ACRES)	POST-DEVELOPMENT IMPERVIOUS COVER AREA (ACRES)	PERMANENT BMP TYPE	TOTAL TSS GENERATED ANNUALLY (LBS)	TOTAL TSS REMOVED ANNUALLY (LBS)
A	6.08	0.24	0.00		0.24	OVERTREATMENT	196	-
* UPGRADIENT-A	2.90	-	-		-	-	-	-
B	7.45	0.36	0.00		0.36	OVERTREATMENT	294	-
* UPGRADIENT-B	9.42	-	-		-	-	-	-
C	19.37	0.63	0.00		0.63	BASIN "C" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	514	958
* UPGRADIENT-C	2.31	-	-		-	-	-	-
D (D-1 & D-2)	33.40	11.31	**0.57**	0.75	11.13	BASIN "D" TO BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	9,082	10,067
E (E-1 : E-4)	26.87	3.55	**0.15**	0.43	3.27	BASIN "E" (IRR. LAKE) (RETENTION/IRRIGATION)	2,668	3,777
F	41.48	10.98	**0.53**	1.13	10.38	RETROFIT BATCH BASIN	8,470	9,493
** UPGRADIENT F	6.32	-	**-**		-	-	-	-
F-1	2.13	0.00	**1.28**		1.28	**PROPOSED** CONTECH JELLYFISH FILTER (JFPD0806-10-2)	1,044	1,102
UPGRADIENT F-1	0.44	-	-		-	-	-	-
F-2	1.65	1.93	0.00		1.93	SAND FILTER BASIN WITH OIL BOOM	1,575	1,575
*** F-2-A	2.47	-	-		-	-	-	-
G	20.55	0.53	0.00	0.05	0.48	OVERTREATMENT	392	-
H	6.00	0.13	0.00		0.13	FIESTA TEXAS BASIN 5	106	106
I (I-1 & I-2)	18.63	2.19	0.00	1.88	0.31	OVERTREATMENT	253	-
UPGRADIENT I	12.92	-	-		-	-	-	-
J (J-1 : J-4)	41.01	1.58	0.00	0.08	1.50	OVERTREATMENT	1,224	-
* UPGRADIENT J	19.46	-	-		-	-	-	-
**** K (K-1 : K-7)	98.58	4.16	0.00	**-0.03**	4.19	ENGINEERED VFS FOR 1.87 ACRES OF CART PATH (REMAINING 2.32 ACRES OVERTREATMENT)	3,419	2,982
* UPGRADIENT K	3.25	-	-		-	-	-	-
**L	3.75	1.28	0.00	**-0.05**	1.33	VACUUM SWEEPING/CURB INLETS WITH OIL BOOM	1,085	1,085
UPGRADIENT L	2.53	-	-		-	-	-	-
M	3.34	1.64	0.00		1.64	SAND FILTER BASIN WITH OIL BOOM	1,338	1,617
TOTAL	**392.31**	**40.51**	**2.53**	**4.24**	**38.80**	-	**31,661**	**32,762**

*STORM WATER RUNOFF THAT IS EITHER ACCEPTED OR BYPASSED FROM THE EXISTING VISTAS AT LA CANTERA RESIDENTIAL DEVELOPMENT WAS PREVIOUSLY APPROVED ON 2–27–2013 UNDER THE LA CANTERA RESIDENTIAL WPAP MODIFICATION (20% PLAN–EAPP FILE NO. 3087.00)

**APPROVED IMPERVIOUS COVER IN "L" WAS 1.28 ACRES BUT ADJUSTED WATERSHED FROM "F" AND "G" INCREASED IMPERVIOUS COVER TO 1.33 ACRES

***THE "F–2–A" WATERSHED AREA IS SUBJECT TO AN EXISTING DRAINAGE EASEMENT/ACCEPTANCE AGREEMENT, THEREFORE TREATED AS ONSITE IMPERVIOUS COVER

****THE PREVIOUSLY APPROVED 4.19 ACRES OF IMPERVIOUS COVER CONSISTS OF 1.87 ACRES OF CAPTURED GOLF CART PATH TREATED BY 15' ENGINEERED VFS, AND 2.32 ACRES OF UNCAPTURED GOLF CART PATH THAT REQUIRES OVERTREATMENT FROM OTHER PERMANENT BMPs THROUGHOUT THE OVERALL SITE. ANY CHANGE TO PROPOSED IMPERVIOUS COVER WILL BE SUBMITTED AS A SPECIFIC SITE PLAN UPDATE IN A TECHNICAL LETTER FOR ALL SUCCESSIVE TCEQ APPROVALS.

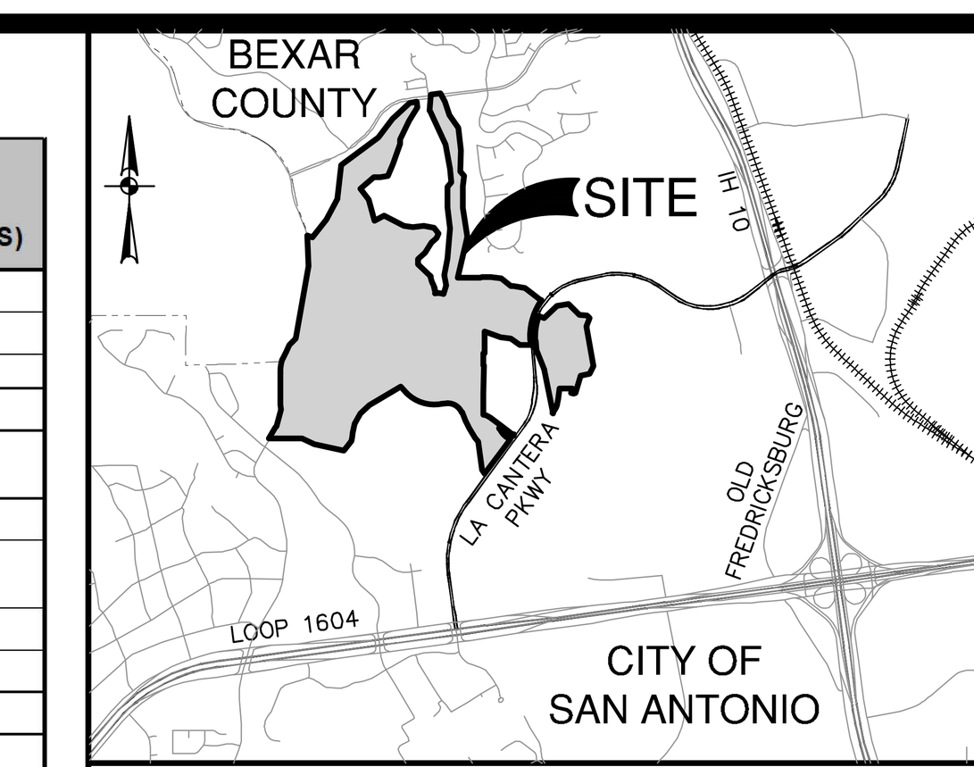


NATURAL VEGETATIVE FILTER STRIP DETAIL

NOT–TO–SCALE

ENGINEERED VEGETATIVE FILTER STRIP DETAIL

NOT–TO–SCALE



LOCATION MAP

NOT–TO–SCALE

TCEQ WATER POLLUTION ABATEMENT PLAN GENERAL CONSTRUCTION NOTES

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON–SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
6. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.
7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON–SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.
11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST:
   - THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
   - THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
   - THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
12. THE HOLDER OF ANY APPROVED EDWARDS AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

    A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO BASINS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;

    B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FORM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;

    C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233–4480
PHONE (210) 490–3096
FAX (210) 545–4329

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES

1. SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL ALL UTILITY AND DRAINAGE IMPROVEMENTS ARE COMPLETED.
2. ENERGY DISSIPATERS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.
3. THIS PROJECT DOES NOT INCLUDE THE INSTALLATION OF ABOVE GROUND STORAGE TANKS (AST) WITH VOLUME(S) GREATER THAN OR EQUAL TO 500 GALLONS.
4. DRAINAGE PATTERNS ARE ILLUSTRATED BY FLOW ARROWS. SLOPES VARY THROUGHOUT THE SITE; TYPICAL SLOPES IN THIS PROJECT WILL RANGE FROM **0.5% TO 2H:1V.**
5. PERMANENT BMP'S FOR THIS SITE INCLUDE TWENTY–TWO (22) EXISTING, PREVIOUSLY APPROVED PBMPs (ID 13000870) WITHIN THE PROJECT LIMITS TO REMAIN, INCLUDING TWO (2) LINED DETENTION/SEDIMENTATION BASINS, ONE (1) RETENTION IRRIGATION BASIN, ONE (1) BATCH DETENTION BASIN, TWO (2) SAND FILTER BASINS, ONE (1) LINED DETENTION/SEDIMENTATION BASIN TREATED OFFSITE BY FIESTA TEXAS BASIN 5, VACUUM SWEEPING AND OIL BOOMS, AND FOURTEEN (14) ENGINEERED FIFTEEN–FOOT (15') VEGETATIVE FILTER STRIPS (VFS). ONE (1) CONTECH JELLYFISH FILTER IS PROPOSED AS A NEW PBMP WITH THIS MODIFICATION. ALL GRANDFATHERED PBMPs AND THE PROPOSED CONTECH JELLYFISH FILTER HAVE BEEN DESIGNED TO REMOVE AN EQUIVALENT OF 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE **330.29 ACRES** IN ACCORDANCE WITH THE LCR TECHNICAL MANUAL (JAN–1991) AS APPROVED WITH LA CANTERA RESORT HOTEL WPAP (JAN. 29, 2015), AND IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG–348 (2005), RESPECTIVELY.
6. FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" TOPSOIL PRIOR TO RE–VEGETATION.
7. TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED IN ACCORDANCE WITH APPLICABLE PROJECT SPECIFICATIONS.
8. DURING CONSTRUCTION, TO THE EXTENT PRACTICABLE, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE RE–VEGETATED 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 (TGM) 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 TOPSOIL 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.
9. ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

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. TEMPORARY BMPs SHOWN ON THIS SHEET ARE FOR GRAPHICAL PURPOSES AND MAY NOT BE TO SCALE. BMPs SHALL BE LOCATED WITHIN THE PROJECT LIMITS.
12. UPON COMPLETION OF THE PROJECT AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES.
13. 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.
14. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND BE INSTALLING ELECTRIC UTILITIES FOR ON–SITE CONSTRUCTION AND OFF–SITE FEED TO THE PROJECT.

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 3

LA CANTERA RESORT & SPA - EVENT BARN

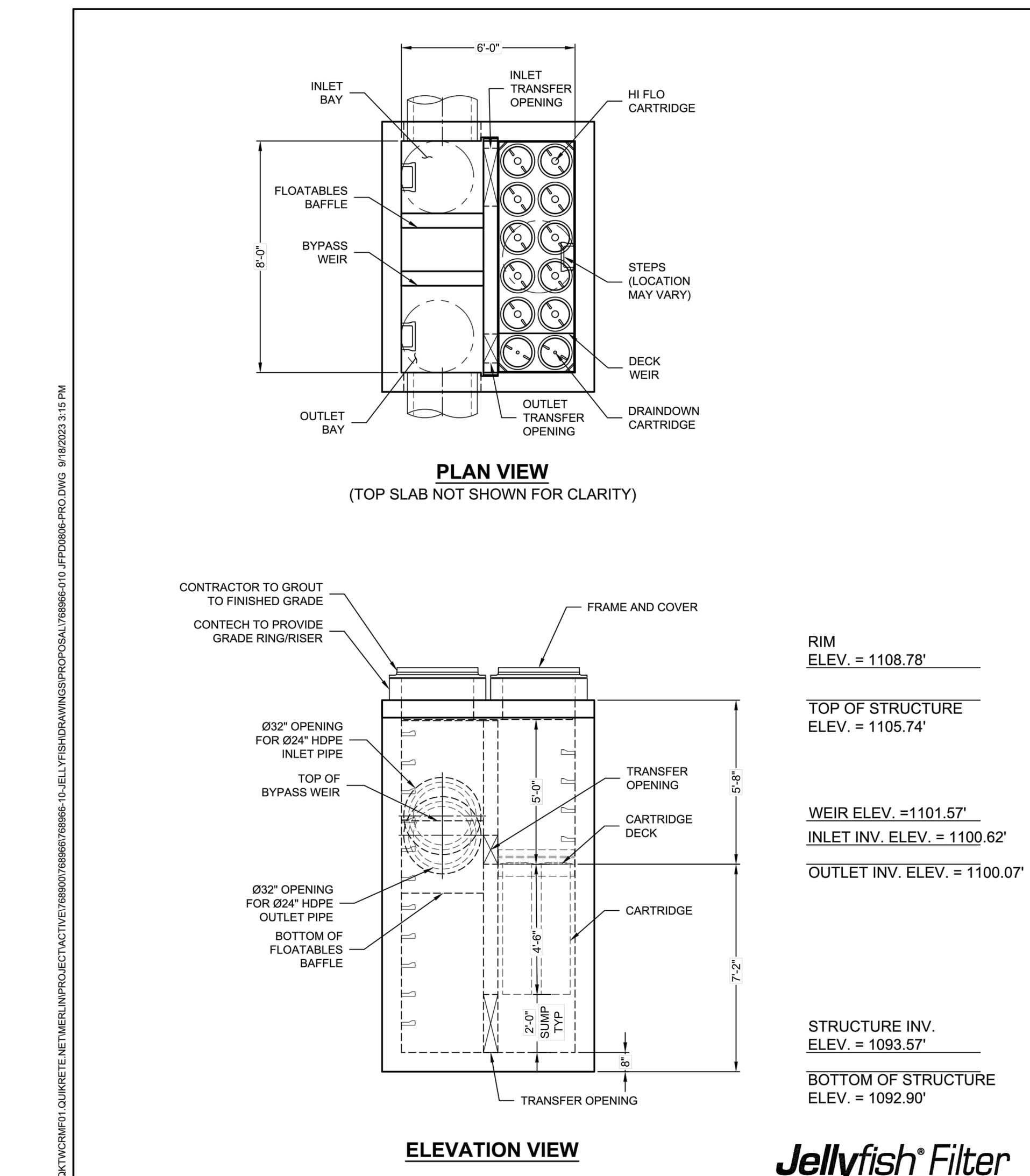
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN - MODIFICATION

PERMANENT POLLUTION ABATEMENT PLAN

PAPE-DAWSON ENGINEERS

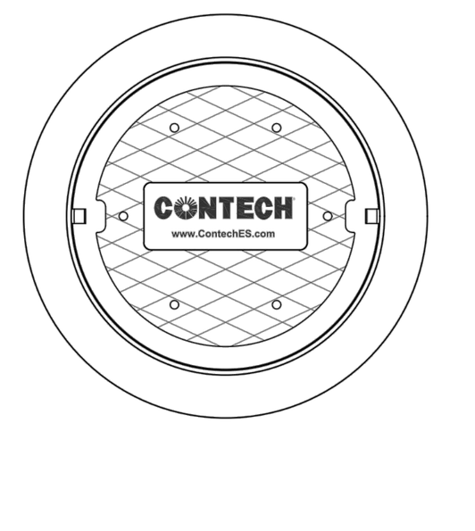
PLAT NO. -
JOB NO. 12430-10
DATE SEPTEMBER 2023
SHEET C2.20



JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD

CARTRIDGE LENGTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089
MAX. TREATMENT (CFS)	1.96
DECK TO INSIDE TOP (MIN) (B)	5.00



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

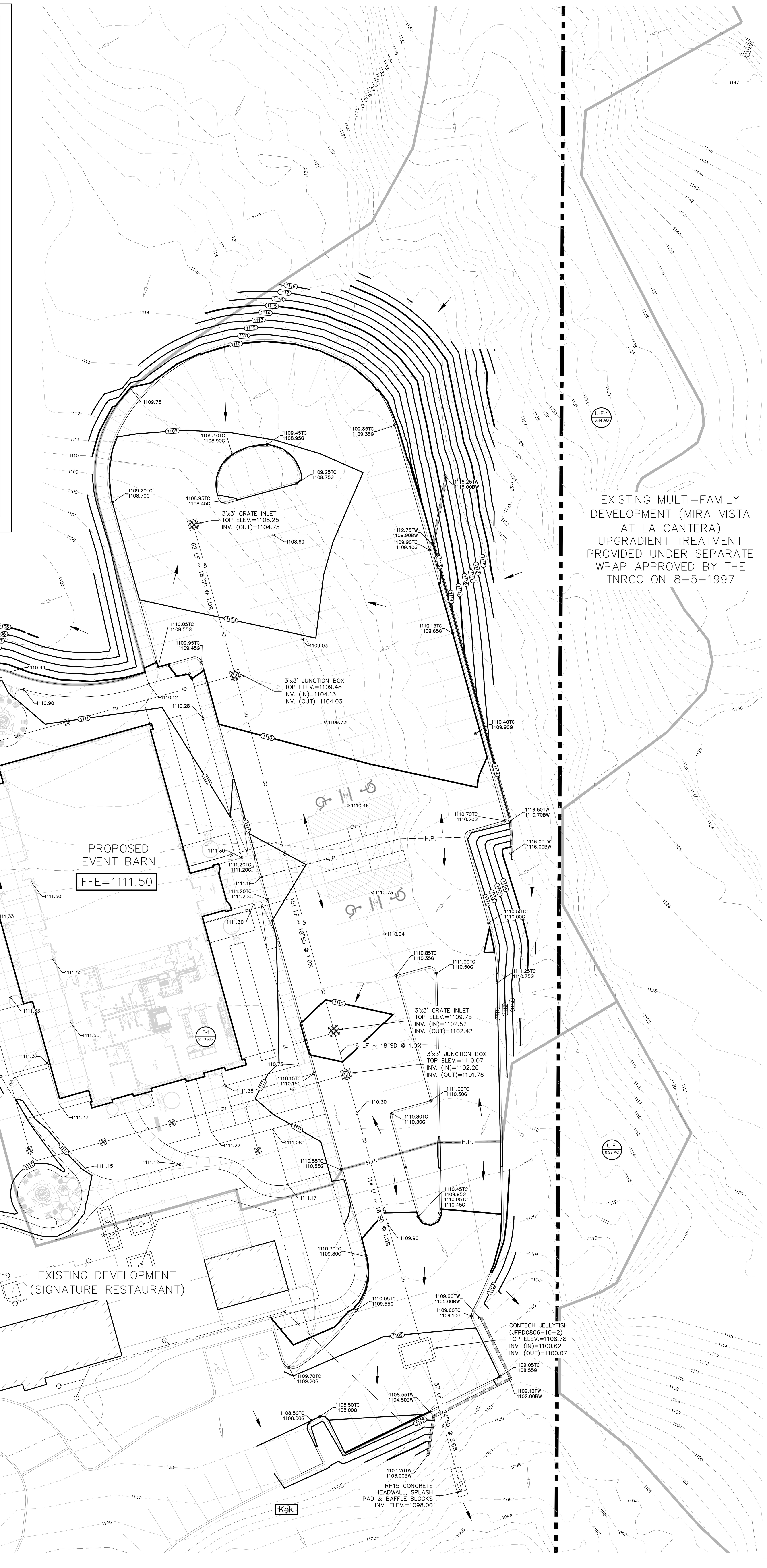
STRUCTURE ID					WQU
WATER QUALITY FLOW RATE (cfs)					1.92
PEAK FLOW RATE (cfs)					22
RETURN PERIOD OF PEAK FLOW (yrs)					25
# OF CARTRIDGES REQUIRED (HF / DD)					10 / 2
CARTRIDGE LENGTH					54"
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	1100.62'	HDPE	24"	*	*
INLET #2	*	*	*	*	*
OUTLET	1100.07'	HDPE	24"	*	*
SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.					
RIM ELEVATION					1108.78'
ANTI-FLOTATION BALLAST			WIDTH		HEIGHT
			*		*
NOTES/SPECIAL REQUIREMENTS:					
* PER ENGINEER OF RECORD					

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

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

8' x 6' JELLYFISH - 768966- 010
LA CANTERA RESORT & SPA - EVENT BARN
SAN ANTONIO, TX
SITE DESIGNATION: WQU



PLAN VIEW
SCALE: 1"=20'

LEGEND

GEOLOGIC FORMATION
Qal ALLUVIUM
Kbu BUDA
Kdr DEL RIO
Kgt GEORGETOWN
Kep PERSON
Kek KAINER
Kwa WALNUT
Kgr GLEN ROSE
S-1 POTENTIAL RECHARGE FEATURE
DEVELOPED AREAS (EXCLUSION APPROVED APRIL 2018)
CONTACT, LOCATED APPROXIMATELY
CONTACT, INFERRED
FAULT, LOCATED APPROXIMATELY
FAULT, EXTRAPOLATED
FAULT, INFERRED
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF JOINTS
STRIKE OF VERTICAL JOINTS
CAVE
SOLUTION CAVITY
SWALLOW HOLE
SINKHOLE
NON-KARST CLOSED DEPRESSION
ZONE
OTHER NATURAL BEDROCK FEATURES
MAN-MADE FEATURE IN BEDROCK
WATER WELL
SANITARY SEWER LINE (MANHOLE)

JELLYFISH FILTER "F-1" DESIGN DATA

OVERALL WATERSHED AREA	=	111,949 SF (2.57 ACRES)
ONSITE WATERSHED AREA	=	92,783 SF (2.13 ACRES)
PRE-DEVELOPMENT IMPERVIOUS	=	0 SF (0.00 ACRES)
POST-DEVELOPMENT IMPERVIOUS	=	55,757 SF (1.28 ACRES)
POST-DEVELOPMENT PERVIOUS	=	37,026 SF (0.85 ACRES)
PRECIPITATION (AVERAGE ANNUAL)	=	30 INCHES
REQUIRED TSS REMOVAL	=	1,044 LBS
DESIGN TSS REMOVAL	=	1,102 LBS
EFFECTIVE AREA	=	1.19 ACRES
DRAINDOWN CARTRIDGES	=	2
TREATMENT FLOW RATE	=	1.96 CFS
BMP EFFICIENCY	=	86%

NOTES TO CONTRACTOR

NOTE:
1. TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY THE BMP DISTRIBUTOR CONTECH ENGINEERED SOLUTIONS (CONTECH) PRIOR TO JELLYFISH FILTER INSTALLATION SO A REPRESENTATIVE CAN BE ON HAND TO SUPERVISE. CONTACT CONTECH AT 972-590-2000. CONTRACTOR SHALL NOTIFY ENGINEER FOR A FINAL WALK-THROUGH.

3. CONTRACTOR SHALL PROVIDE THE CONTECH REPRESENTATIVE AND THE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO THE TIME THE BMP WILL BE AT THE REQUIRED STAGE.

TCEQ WATER POLLUTION ABATEMENT PLAN GENERAL CONSTRUCTION NOTES

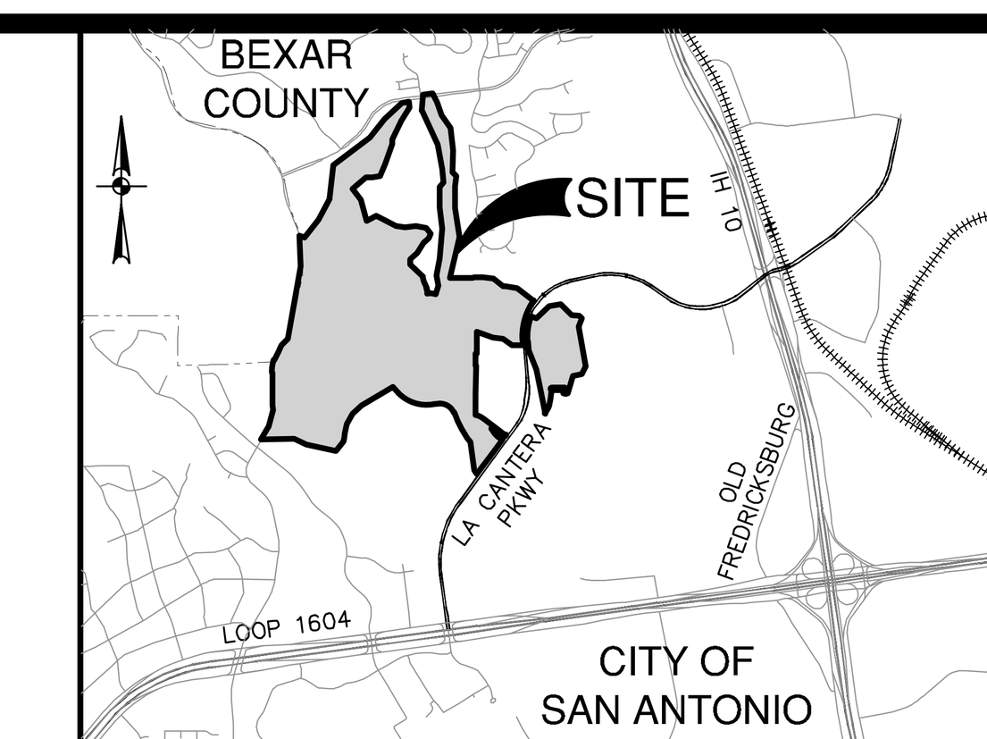
1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
6. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.
7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.
11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST:
   - THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
   - THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
   - THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
12. THE HOLDER OF ANY APPROVED EDWARDS AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

   A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO BASINS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;

   B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FORM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;

   C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329



LOCATION MAP

NOT-TO-SCALE

SCALE: 1" = 20'

LEGEND

PROJECT LIMITS
EXISTING CURB
PROPOSED STANDARD CURB
PROPOSED HEADER CURB
EXISTING CONTOURS
5 FT CONTOUR
1 FT CONTOUR
PROPOSED CONTOURS
5 FT CONTOUR
1 FT CONTOUR
EXISTING SPOT ELEVATIONS
PROPOSED SPOT ELEVATIONS
EXISTING DIRECTIONAL FLOW ARROW
PROPOSED DIRECTIONAL FLOW ARROW
PROPOSED STORM DRAIN
WATERSHED BOUNDARY
WATERSHED DESIGNATION

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES

1. SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL ALL UTILITY AND DRAINAGE IMPROVEMENTS ARE COMPLETED.
2. ENERGY DISSIPATERS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.
3. THIS PROJECT DOES NOT INCLUDE THE INSTALLATION OF ABOVE GROUND STORAGE TANKS (AST) WITH VOLUME(S) GREATER THAN OR EQUAL TO 500 GALLONS.
4. DRAINAGE PATTERNS ARE ILLUSTRATED BY FLOW ARROWS. SLOPES VARY THROUGHOUT THE SITE; TYPICAL SLOPES IN THIS PROJECT WILL RANGE FROM **0.5% TO 2H:1V.**
5. PERMANENT BMP'S FOR THIS SITE INCLUDE TWO (2) RETENTION BASINS CONNECTED TO ONE (1) CENTRAL RETENTION/IRRIGATION LAKE FOR THE OVERALL RETENTION/IRRIGATION SYSTEM, ONE (1) SEPARATE RETENTION BASIN CONNECTED TO THE FIESTA TEXAS DRAINAGE INFRASTRUCTURE, ONE (1) BATCH DETENTION BASIN, TWO (2) SAND FILTER BASINS WITH ONE OF THEM ALSO CONNECTED TO THE CENTRAL RETENTION/IRRIGATION LAKE, EXISTING GRATE/CURB INLETS WITH OIL SKIMMING BOOMS, ROUTINE STREET SWEEPING, FOURTEEN (14) ENGINEERED VEGETATIVE FILTER STRIPS AND ONE (1) CONTECH JELLYFISH FILTER. BOTH THE EXISTING GRANDFATHERED PERMANENT BMP'S, AND THE PROPOSED PERMANENT BMP'S, HAVE BEEN DESIGNED TO REMOVE AN EQUIVALENT OF 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE **330.29 ACRES** IN ACCORDANCE WITH THE LCR TECHNICAL MANUAL (JAN-1991) AS APPROVED WITH LA CANTERA RESORT HOTEL WPAP (JAN. 29, 2015), AND IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005), RESPECTIVELY.
6. FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" TOPSOIL PRIOR TO RE-VEGETATION.
7. TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED IN ACCORDANCE WITH APPLICABLE PROJECT SPECIFICATIONS.
8. DURING CONSTRUCTION, TO THE EXTENT PRACTICABLE, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE RE-VEGETATED 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 (TGM) 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 TOPSOIL 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.
9. ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

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. TEMPORARY BMPs SHOWN ON THIS SHEET ARE FOR GRAPHICAL PURPOSES AND MAY NOT BE TO SCALE. BMPs SHALL BE LOCATED WITHIN THE PROJECT LIMITS.
12. UPON COMPLETION OF THE PROJECT AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES.
13. 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.
14. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.

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

LA CANTERA RESORT & SPA - EVENT BARN

SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN - MODIFICATION
JELLYFISH FILTER DETAIL SHEET

PAPE-DAWSON ENGINEERS

THOMAS MATTHEW CARTER 79272 10/2/2023

NO.	REVISION	DATE

PLAT NO. -
JOB NO. 12430-10
DATE SEPTEMBER 2023
DESIGNER MC
CHECKED WK DRAWN MC
SHEET C2.30