TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

March 21, 2016

Mr. Darren Gerloff
Gruene Rock, LLC
14955 Bulverde Road
San Antonio, Texas 78247-2631

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: Settlement at Gruene; Located on the west side of Rock Street approximately 900 feet north of its intersection with Loop 337; New Braunfels, Texas

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

Regulated Entity No. RN108900523; Additional ID No. 13000038

Dear Mr. Gerloff:

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 Moeller & Associates on behalf of Gruene Rock, LLC on December 10, 2015. Final review of the WPAP was completed after additional material was received on February 11, 2016, and March 9, 2016. 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.*

PROJECT DESCRIPTION

The proposed residential project will have an area of approximately 73.37 acres. It will include construction of 240 single-family residential lots, streets, driveways, and associated utilities. The impervious cover will be 31.23 acres (42.6 percent). Project wastewater will be disposed of by conveyance to the existing Gruene Wastewater Treatment Facility owned by New Braunfels Utilities.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, four partial sedimentation/filtration basins, designed using the TCEQ technical guidance document; Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 28,032 pounds of TSS generated from the 31.23 acres of impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

The individual treatment measures are detailed in the table below:

Drainage Area	Impervious Cover (acres)	Required WQV (ft^3)	Designed WQV (ft^3)	Required Filter Area (ft^2)	Designed Filter Area (ft^2)	TSS Removed
1A (uncaptured)	1.85	8,515	0	710	0	0
1B	1.07	7,189	11,402	599	780	1,030
2	10.42	60,205	60,376	5,017	5,020	9,870
3	14.55	93,535	94,399	7,795	7,869	13,940
4	3.34	23,439	25,218	1,953	2,053	3,229
Total	31.23					28,069

GEOLOGY

According to the geologic assessment included with the application, the site is underlain by the Person Formation. One non-karst closed depression and six man-made features in bedrock were identified in the report. Four of the man-made features (water wells) were classified as sensitive. The San Antonio Regional Office site assessment conducted on January 21, 2016 revealed the site was generally as described in the geologic assessment.

SPECIAL CONDITIONS

I. The permanent pollution abatement measures shall be operational prior to first occupancy of any structure within its associated drainage area.

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.

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. Four 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.

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

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. Alex Grant of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4035

Sincerely,

Lynn Bumguardner, Water Section Manager
San Antonio Region
Texas Commission on Environmental Quality

LB/AG/eg

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

cc: Mr. Shane Klar, P.E., Moeller & Associates
Mr. Garry Ford, Jr., P.E., City of New Braunfels
Mr. Tom Hornseth, P.E., Comal County
Mr. George Wissmann, Comal Trinity GCD
Mr. Roland Ruiz, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC 21

MOELLER & ASSOCIATES
Engineering Solutions

RECEIVED
FEB 18 2016
COUNTY ENGINEER
TCEQ R-13 2016 FEB 11 16:50

February 1, 2016

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Attn: Mr. Alex Grant
14250 Judson Rd
San Antonio TX 78233-4480

RE: Settlement at Gruene; located on the west side of Rock Street approximately 900 feet north of its intersection with Loop 337; San Antonio, Texas.

Plan Type: Request for approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213;
San Antonio File No. RN108900523; Additional ID No. 13000038

This letter is in response to the fax received 01/16/2016 from The Texas Commission on Environmental Quality/ Edwards Aquifer Protection Program Division as it pertains to The Settlement at Gruene Project. The comments received are in italics and our responses are in bold.

Water Pollution Abatement Plan Application (TCEQ-0584)

1. *The WPAP site plan exhibit that was submitted with the application does not specifically show how stormwater will drain to and enter the proposed sand filter basins. Will storm drains be installed to capture and direct the stormwater to the basins? If no storm drains are being proposed, where will the stormwater enter the proposed basins? Please update the site plan exhibit to include any additional proposed stormwater conveyances or update the site plan with additional contour and basin inlet details to show how the stormwater will be directed to and enter the sand filter basins.*
   Additional detail has been added to the WPAP Site Plan. Please see attached.

Temporary Stormwater Section (TCEQ-0602)

2. *According to Attachment "D" of this section, rock berms will be constructed downstream of proposed road culverts and channels. These proposed culverts, channels, and rock berms were not included on the submitted site plan exhibits. Please update the site plan to include these proposed items and update the temporary BMP inspection and maintenance schedule (attachment I) to include the rock berms.*
   Rock berms will not be used on this project. This section has been updated accordingly.

3. *The 8.5 x 11 drainage area map that was included at the end of the temporary stormwater section only shows two drainage areas but the WPAP Basin Drainage Basin Map shows four separate drainage areas. Please update and resubmit the 8.5 x 11 drainage area map to display the correct drainage areas and acreages.*
   The intent of the drainage area map attached to this section is to show the two main drainage divides within the proposed property. The WPAP Basin Map is intended to provide additional detail for onsite drainage area and establish treatment areas for each basin.

Permanent Stormwater Section (TCEQ-0600)

4. *The WPAP Pond Detail schematic sheet does not show the locations where the sediment depth markers will be placed within the basins. The WPAP drainage basin map shows an image of a sediment depth marker but does not detail where it will be placed within each basin. Please update the WPAP Pond Detail schematic sheet to include the placement locations of the sediment depth markers.*
   Sediment depth marker locations have been identified in the revised detail sheets.

5. *The WPAP Pond Detail and the WPAP Drainage Basin schematic sheets infer that at least 18 inches of sand will be used but does not describe the specifications of the type of sand. ASTM C-33 fine aggregate sand is the required specification for the sand media. Please update the design sheets to include the sand media specifications.*
   Note has been added to the plan sheets.

6. *The WPAP Pond Detail sheet and the sand bed profile, displayed on the WPAP Drainage Basin Map, show that an impermeable liner will be used but it does not specify which type of impermeable liner is proposed. However, specifications for a clay liner were provided on the Drainage Basin Map sheet. Please verify the type of impermeable liner that will be proposed for each of the four basins. If possible, please add the proposed liners to the cross sections (section AA) for each basin.*
   Additional detail has been added to the sections for each pond.

7. *According to the WPAP Pond Detail schematic sheet, sand filter basins 1,2,and 4 have fewer than 3 underdrain pipes. According to RG-348, complying with the Edwards Aquifer Rules; Technical Guidance on Best Management Practices, "The underdrain piping should consist of a main collector pipe and two or more lateral branch pipes, each with a minimum diameter of 4 inches. The pipes should have a minimum slope f 1% (1/8 inch per foot) and the laterals should be spaced at intervals of no more than 10 feet. There should be no fewer than two lateral branch pipes." Please update the sand filter basin designs to meet the design parameters listed in RG-348.*
   Underdrain piping has been revised.

8. *According to the WPAP Pond Detail schematic sheet, the proposed flow splitter for the sand filter basins will be an overflow weir located within an earthen sidewall of the basins. The specific elevations of the overflow weir structure and the tops of the earthen walls were not included on the sheets. Please update the schematic sheets to include the spillway elevations and upper wall elevations of the weir structure as well as the surrounding earthen wall elevations for each basin.*
   Additional detail has been added.

9. *Will the overflow weir be constructed of concrete or any other solid material to deter erosion of the surrounding wall during overflow events?*
   Overflow weirs will be concrete and have been added to each pond accordingly.

10. *The cross section AA listed on the WPAP Pond detail schematic sheet appears to be a general representation of each basin and does not show specific details for each basin such as; the water quality volume elevation, stormwater inlet characteristics (velocity dissipation, etc.), weir overflow structure, maintenance access structure, security fence (if proposed), etc. Please update the WPAP Pond Detail sheet to display the cross sections of each basin to include the specific water quality volume elevation, inlet structure(s), velocity dissipation, erosion prevention riprap, weir overflow structure & elevations (if applicable), maintenance access locations, etc.*
    Additional detail has been added to the sections.

11. *According to the WPAP Pond Detail sheet the proposed maintenance access will be located within the side walls but the details for this access were not included in the drawings. Cross section AA of this*

sheet shows the slope of the basin side walls as 3 to 1 (33.33%). This slope exceeds the maximum recommended slope for maintenance access drives as listed in RG-348. Please revise the detail sheet to provide additional detail for each proposed maintenance access drive. Please ensure these maintenance access drives conform to the recommended design criteria as listed in RG-348.
Maintenance ramp locations have been included in the revised plan sheets.

12. *The individual basin outfall isolation valve locations were not included on the WPAP Pond Detail sheet. Please update this sheet to include the locations of the required isolation valves for each basin.*
Isolation valve locations are shown in the revised plan sheets.

13. *According to the WPAP Pond Detail sheet it appears that the basin outfall for basins 2,3, and 4 will discharge offsite and the outfall for basin 1 will discharge into its associated detention basin. Please explain how erosion will be prevented at the outfall discharge points for each basin. If velocity dissipation will be proposed, please update the schematic drawings to include these structures.*
Additional detail is included in the revised sheets.

14. *The WPAP Pond Detail and the WPAP drainage basin sheets do not show the outfall structures proposed for the detention ponds associated with basins 1,3, and 4. Please update the schematic sheets to show the outfall structures and any proposed erosion control measures for these detention ponds.*
Additional detail is included in the revised sheets.

15. *The basin sizing and design values listed on the bottom of the WPAP Pond Detail sheet appear to be incorrectly displayed. The four proposed sand filter basins have rock gabion walls separating the sedimentation and filtration chambers. These types of basins are classified as partial sedimentation designs but the classification and minimum sizing values displayed in the listed chart are for full sedimentation designs. Based on proposed design criteria the value chart should be displayed as follows:*

Basin	*Proposed BMP*	*Water Quality Volume (WQV) ft^3*		*Filter Area ft^2*	
		Minimum	*Provided*	*Minimum*	*Provided*
1	*Sand Filter (Partial)*	*15,419*	*16,000*	*1,285*	*750*
2	*Sand Filter (Partial)*	*46,620*	*49,200*	*3,885*	*2,200*
3	*Sand Filter (Partial)*	*67,496*	*67,770*	*5,625*	*3,200*
4	*Sand Filter (Partial)*	*16,166*	*16,820*	*1,347*	*750*

As presented, the proposed sand filter areas for each of the four basins are sized below minimum standards. Please submit corrected basin designs that meet or exceed the minimum sizing criteria.
Basin designs have been corrected.

Please accept these comments and revisions for the referenced project. If you need additional information or have any questions, please do not hesitate to contact me.

Sincerely,

Shane Klar, P.E.
Attachments

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	732,000	÷ 43,560 =	16.80
Parking	288,000	÷ 43,560 =	6.61
Other paved surfaces	340,639	÷ 43,560 =	7.82
Total Impervious Cover	1,361,670	÷ 43,560 =	31.23

Total Impervious Cover 31.23 **÷ Total Acreage** 73.37 **X 100 =** 42.6**% 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.

ATTACHMENT "B"
Potential Sources of Contamination

The only potential sources of contamination are construction equipment leaks, re-fueling spills, port-o-lets, and the total suspended solids (TSS) due to the construction activities on-site. There are no other anticipated potential sources of contamination.

ATTACHMENT "C"
Sequence of Major Activities

Stages of Construction:

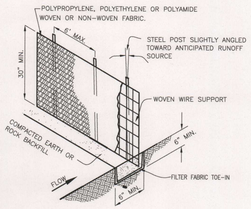
1. Clearing and Grubbing: Removal of trees, stumps, brush, and other debris within the proposed street right-of-way to allow for construction of streets. Approximate total disturbed area= 12.04 acres.
2. Rough Grading: Cutting of proposed roadway areas to prepare the roadbend for pavement layers. Approximate total disturbed are = 12.04 acres.
3. Culvert and Pond Installation: Culverts will be installed where needed to allow runoff under the proposed roads. Approximate total disturbed area = 2.5 acres.
4. Utility Installation: there will be underground water, telephone, cable television and electric lines installed primarily within the proposed streets. There will be minimal disturbance outside of the clearing and grubbing area.
5. Finished Grading: Final landscaping and asphalt pavement layers are installed. Approximate total disturbed area= 12.04 acres.
6. Residential Construction: Lots will be sold, and homes built at random times. The construction is very minimal and will average 50% of disturbed area per lot with an average lot size of 0.165 acre. Approximate total disturbance area= 19.8 acres.

ATTACHMENT "D"
Temporary BMP's and Measures

The following sequence will be followed for installing temporary BMP's:

1. Roadway centerline will be roughly cleared for surveying purposes. (No soil disturbance.)
2. Silt fence will be constructed on the downgradient side of proposed roadways prior to beginning clearing and grubbing operations.
3. A stabilized construction entrances will be established before clearing and grubbing equipment is delivered to the site.
4. Silt Fence will be constructed downstream of proposed soil disturbance before rough grading and throughout the duration of the project.
5. Prior to beginning each individual home construction, silt fence will be constructed on the down gradient side of the lot.

A. The upgradient perimeter of the subdivision will remain in its natural vegetative state. As it has always done, this natural vegetation will filter pollutants originating upgradient of the site,



SILT FENCE

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 YBAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT2, 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. POST MUST BE EMBEDDED A MINIMUM OF 1— FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.
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.

INSPECTION AND MAINTENANCE GUIDELINES:

1. INSPECT ALL FENCING WEEKLY, AND AFTER ANY RAINFALL.
2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.
3. REPLACE ANY TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.
4. REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.
5. WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

HYDRAULIC MULCH

MATERIALS:

HYDRAULIC MULCHES: WOOD FIBER MULCH CAN BE APPLIED ALONE OR AS A COMPONENT OF HYDRAULIC MATRICES. WOOD FIBER APPLIED ALONE IS TYPICALLY APPLIED AT THE RATE OF 2,000 TO 4,000 LB/ACRE. WOOD FIBER MULCH IS MANUFACTURED FROM WOOD OR WOOD WASTE FROM LUMBER MILLS OR FROM URBAN SOURCES.

HYDRAULIC MATRICES: HYDRAULIC MATRICES INCLUDE A MIXTURE OF WOOD FIBER AND ACRYLIC POLYMER OR OTHER TACKIFIER AS BINDER. APPLY AS A LIQUID SLURRY USING A HYDRAULIC APPLICATION MACHINE (I.E., HYDRO SEEDER) AT THE FOLLOWING MINIMUM RATES, OR AS SPECIFIED BY THE MANUFACTURER TO ACHIEVE COMPLETE COVERAGE OF THE TARGET AREA: 2,000 TO 4,000 LB/ACRE WOOD FIBER MULCH, AND 5 TO 10% (BY WEIGHT) OF TACKIFIER (ACRYLIC COPOLYMER, GUAR, PSYLLIUM, ETC.)

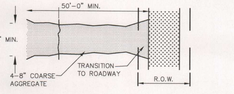
BONDED FIBER MATRIX: BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SYSTEM OF FIBERS AND ADHESIVES THAT UPON DRYING FORMS AN EROSION RESISTANT BLANKET THAT PROMOTES VEGETATION, AND PREVENTS SOIL EROSION. BFMS ARE TYPICALLY APPLIED AT RATES FROM 3,000 LB/ACRE TO 4,000 LB/ACRE BASED ON THE MANUFACTURER'S RECOMMENDATION. A BIODEGRADABLE BFM IS COMPOSED OF MATERIALS THAT ARE 100% BIODEGRADABLE. THE BINDER IN THE BFM SHOULD ALSO BE BIODEGRADABLE AND SHOULD NOT DISSOLVE OR DISPERSE UPON RE—WETTING. TYPICALLY, BIODEGRADABLE BFMS SHOULD NOT BE APPLIED IMMEDIATELY BEFORE, DURING OR IMMEDIATELY AFTER RAINFALL IF THE SOIL IS SATURATED. DEPENDING ON THE PRODUCT, BFMS TYPICALLY REQUIRE 12 TO 24 HOURS TO DRY AND BECOME EFFECTIVE.

INSTALLATION:

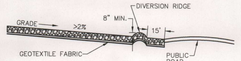
1. PRIOR TO APPLICATION, ROUGHEN EMBANKMENT AND FILL AREAS BY ROLLING WITH A CRIMPING OR PUNCHING TYPE ROLLER OR BY TRACK WALKING. TRACK WALKING SHALL ONLY BE USED WHERE OTHER METHODS ARE IMPRACTICAL.
2. TO BE EFFECTIVE, HYDRAULIC MATRICES REQUIRE 24 HOURS TO DRY BEFORE RAINFALL OCCURS.
3. AVOID MULCH OVER SPRAY ONTO ROADS, SIDEWALKS, DRAINAGE CHANNELS, EXISTING VEGETATION, ETC.

INSPECTION AND MAINTENANCE GUIDELINES:

1. MULCHED AREAS SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.
2. AREAS DAMAGED BY STORMS OR NORMAL CONSTRUCTION ACTIVITIES SHOULD BE REGRADED AND HYDRAULIC MULCH REAPPLIED AS SOON AS PRACTICAL.



PLAN VIEW



PROFILE

STABILIZED CONSTRUCTION ENTRANCE / EXIT

MATERIALS:

1. THE AGGREGATE SHOULD CONSIST OF 4 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 RACK 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 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.

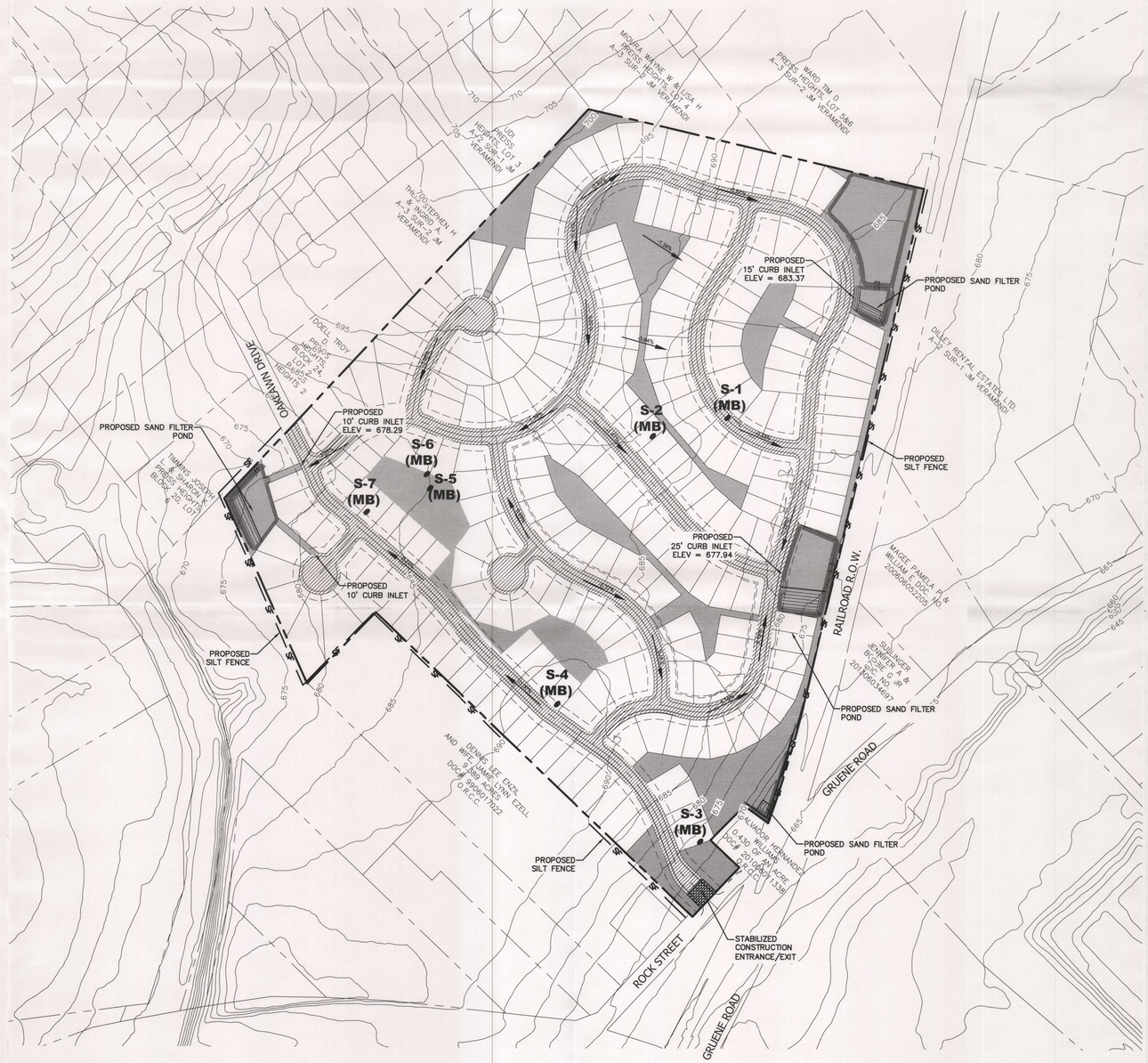
INSPECTION AND MAINTENANCE GUIDELINES:

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR LOWING 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.

TOTAL LAND AREA	=	73.37 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	12.04 AC
TOTAL IMPERVIOUS AREA	=	31.23 AC
% IMPERVIOUS	=	42.6%

SOIL STABILIZATION NOTE

ALL DISTURBED SOILS SHOULD BE SEEDED OR OTHERWISE STABILIZED WITH 14 CALENDAR DAYS AFTER FINAL GRADING OR WHERE CONSTRUCTION ACTIVITY HAS TEMPORARILY CEASED FOR MORE THAN 21 DAYS.



TYPICAL SILT FENCE AT RESIDENTIAL LOT

NOTE:
RESIDENTIAL LOT CONSTRUCTION MUST MEET THE REQUIREMENTS OF THIS WPAP AS WELL AS WITH LOCAL, STATE, AND FEDERAL REGULATIONS. TEMPORARY BMPS MUST BE IN PLACE PRIOR TO ANY RESIDENTIAL LOTS CONSTRUCTION.

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

1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN 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 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. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL, OR OTHER SENSITIVE FEATURE.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE TEMPORARY STORM WATER SECTION OF THE APPROVED EDWARDS AQUIFER PROTECTION PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.
6. 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).
7. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.
8. 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).
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. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARY OR PERMANENTLY CEASE IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE. IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL ARID CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.
11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

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

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

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

AUSTIN REGIONAL OFFICE 2800 S. IH 35, SUITE 100 AUSTIN, TEXAS 78704—5712 PHONE (512) 339—2929 FAX (512) 339—3795	SAN ANTONIO REGIONAL OFFICE 14250 JUDSON ROAD SAN ANTONIO, TEXAS 78233—4480 PHONE (210) 490—3096 FAX (210) 545—4329

LEGEND

- SF — SF — SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE/EXIT
- 900 EXISTING CONTOURS
- FLOW ARROWS
- DISTURBED AREA (INFRASTRUCTURE)
- OPEN SPACE/DRAINAGE

0 200' 400'

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WPAP SITE PLAN

PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

SHEET 1 OF 1

Drawing Name: N:\Projects\QR\EEOI\101.74 cc - Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan.dwg User: danielsantoni Feb 11, 2016 - 9:53am

BASIN 1A

TOTAL LAND AREA	=	4.24 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	0.65 AC
TOTAL IMPERVIOUS AREA	=	1.85 AC
% IMPERVIOUS	=	43.6%

BASIN 1B

TOTAL LAND AREA	=	3.88 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	0.00 AC
TOTAL IMPERVIOUS AREA	=	1.07 AC
% IMPERVIOUS	=	0.28%

BASIN 2

TOTAL LAND AREA	=	23.2 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	4.38 AC
TOTAL IMPERVIOUS AREA	=	10.4 AC
% IMPERVIOUS	=	44.9%

BASIN 3

TOTAL LAND AREA	=	32.5 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	5.61 AC
TOTAL IMPERVIOUS AREA	=	14.6 AC
% IMPERVIOUS	=	44.7%

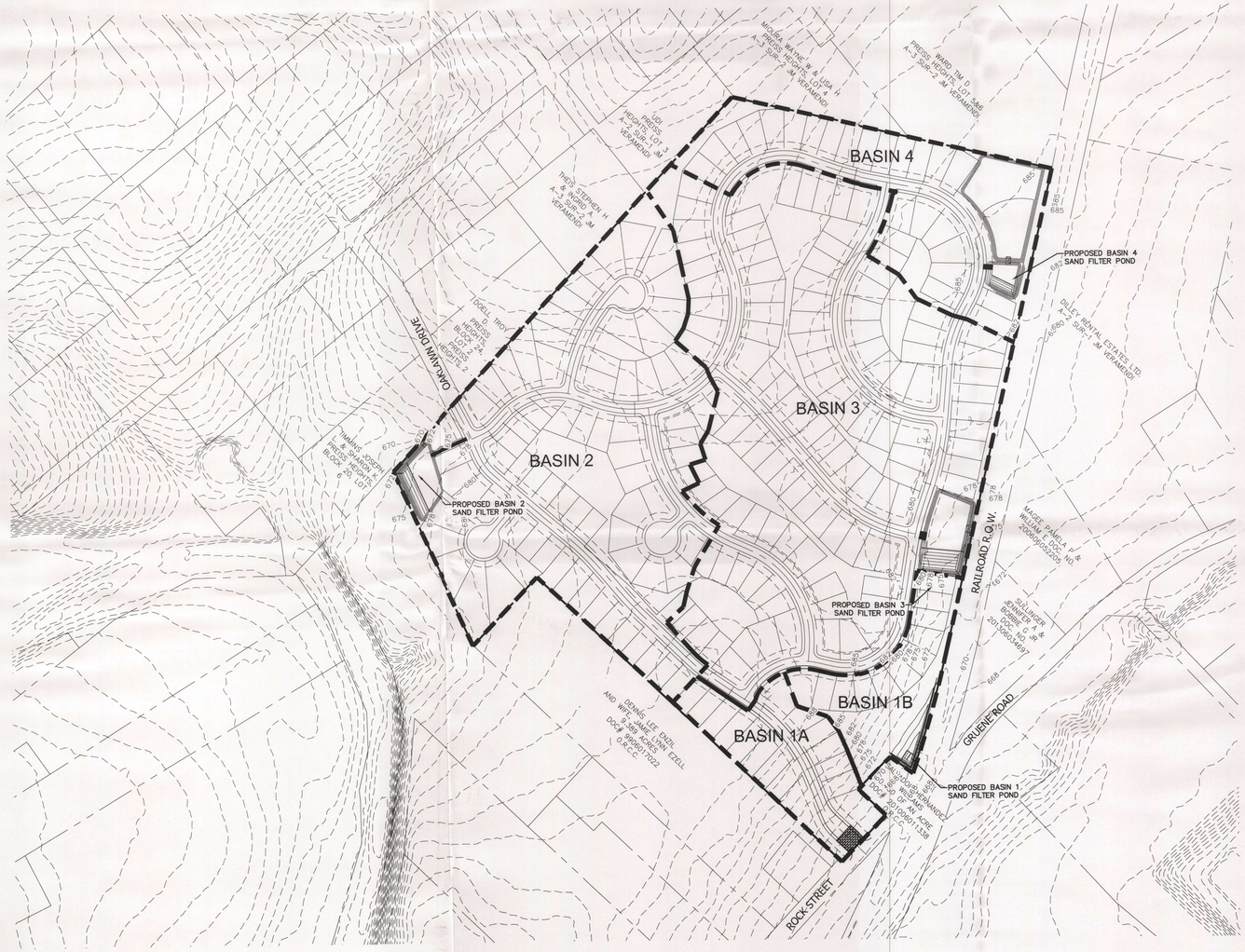
BASIN 4

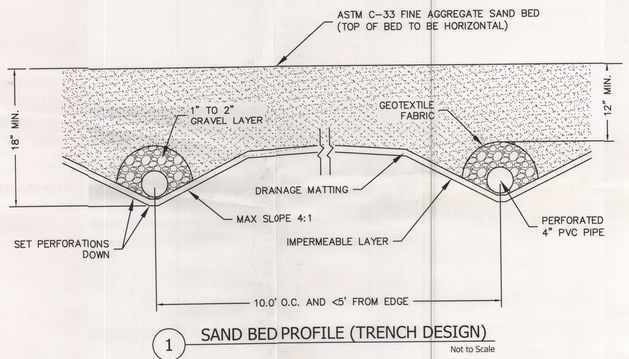
TOTAL LAND AREA	=	9.46 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	1.41 AC
TOTAL IMPERVIOUS AREA	=	3.34 AC
% IMPERVIOUS	=	35.3%

Basin	Proposed BMP	Water Quality Volume (WQV) ft³		Filter Area ft²	
		Minimum	Provided	Minimum	Provided
1	Sand Filter (full)	15,419	16,000	714	750
2	Sand Filter (full)	46,620	49,200	2,158	2,200
3	Sand Filter (full)	67,496	67,770	3,125	3,200
4	Sand Filter (full)	16,166	16,820	748	750

TSS Removal Summary

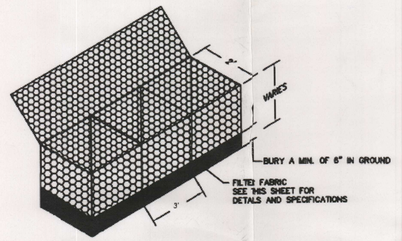
Basin	Contributing Area	Existing Imp. Cover	Proposed Imp. Cover	Req. TSS Removal (lbs)	Design TSS Removal (lbs)	BMP
1	8.62	0.00	3.28	2,944	2,944	Sand Filter
2	22.69	0.00	10.04	9,012	9,012	Sand Filter
3	33.15	0.00	14.47	12,988	12,988	Sand Filter
4	8.91	0.00	3.47	3,115	3,115	Sand Filter





1 SAND BED PROFILE (TRENCH DESIGN)
Not to Scale

*NOTE: ALL CLEANOUTS TO HAVE SCREW-ON CAPS



GABION BASKET DETAIL
SCALE: NTS

1. STONE
   STONE FILL MATERIAL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE OF THE SIZE INDICATED, 6 TO 9 INCHES IN SIZE OR AS APPROVED BY THE ENGINEER AND RESISTANT TO THE ACTION OF AIR AND WATER AND SUITABLE IN ALL RESPECTS FOR THE PURPOSE INTENDED.
2. WIRE CONTAINERS
   WIRE MESH SHALL CONSIST OF PLASTIC COATED (P.V.C) GALVANIZED WIRE 0.120 INCH IN DIAMETER MINIMUM AND SHALL EQUAL OR EXCEED FEDERAL SPECIFICATION QQ-W-461G, CLASS 3 UNLESS OTHERWISE INDICATED. OPENING OF THE MESH SHALL NOT EXCEED APPROXIMATELY 4 INCHES IN THE LONGEST DIMENSION. THE WIRE MESH IS TO BE FABRICATED IN SUCH MANNER AS TO BE NONRAVELING. TIE AND CONNECTING WIRE SHALL BE OF THE SAME TYPE AND SIZE AS THE BASKETS AND SHALL BE SUPPLIED IN SUFFICIENT QUANTITY FOR SECURELY FASTENING ALL EDGES OF THE GABION AND DIAPHRAGMS.
3. FILTER FABRIC
   FILTER FABRIC SHALL BE NON-BIODEGRADABLE ULTRAVIOLET STABILIZED, INERT TO MOST SOIL CHEMICALS, UNAFFECTED BY MOISTURE WHICH ALLOWS WATER TO PASS THROUGH WHILE RETAINING SOIL PARTICLES AND SHALL CONFORM TO ITEM NO. 620, "FILTER FABRIC".

Table 3-6 Clay Liner Specifications (COA, 2004)

Property	Test Method	Unit	Specification
Permeability	ASTM D-2434	cm/sec	1×10^{-6}
Plasticity Index of Clay	ASTM D-423 & D-424	%	Not less than 15
Liquid Limit of Clay	ASTM D-2216	%	Not less than 30
Clay Particles Passing	ASTM D-422	%	Not less than 30
Clay Compaction	ASTM D-2216	%	95% of Standard Proctor Density

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WPAP -DRAINAGE BASIN MAP

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SETTLEMENT AT GRUENE

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SHEET 1 OF 2

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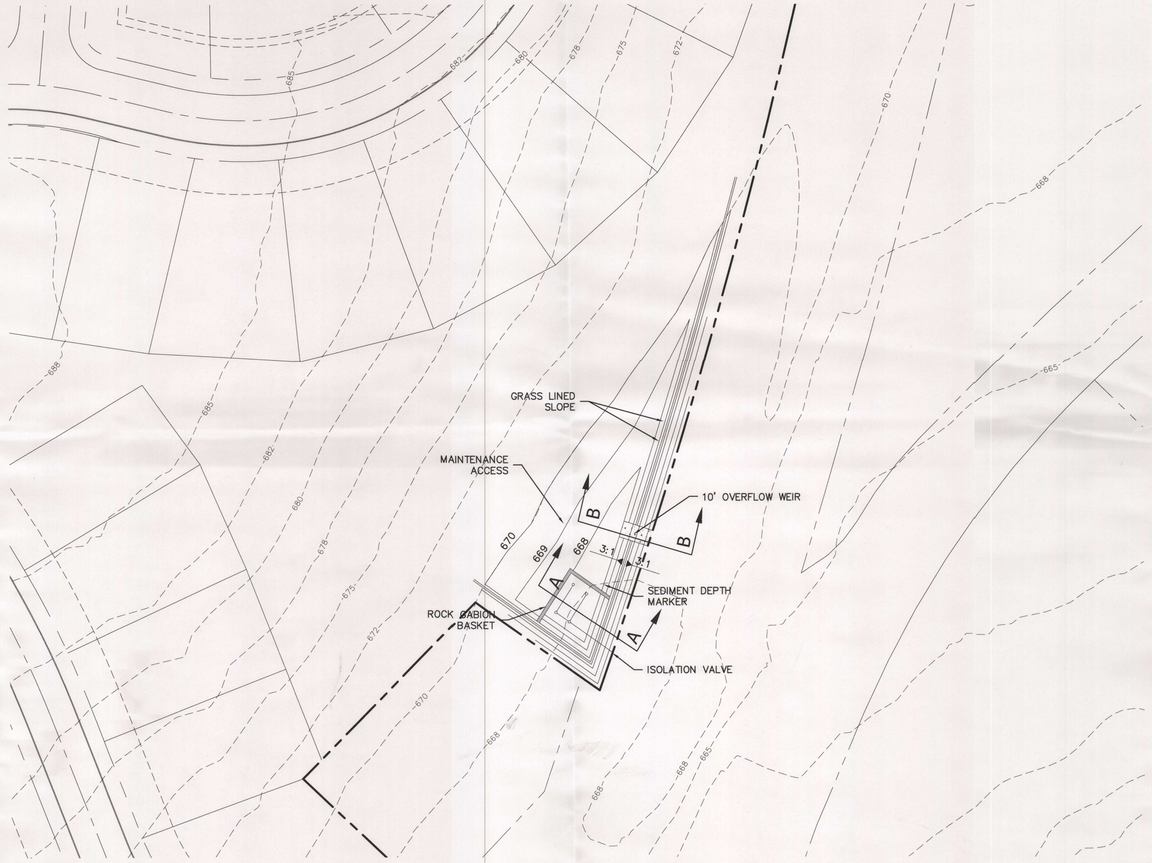
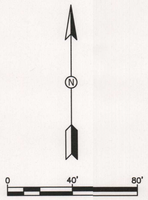
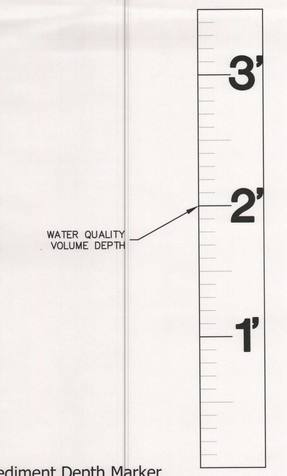


1 Sand Filter Basin #1

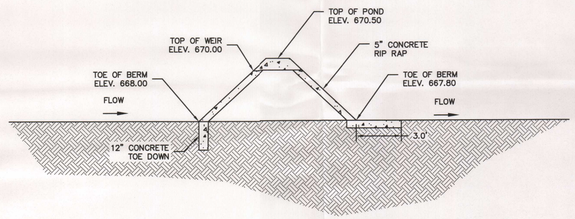
Scale: 1"=40'





4 Sediment Depth Marker

Not to Scale



3 Section B-B

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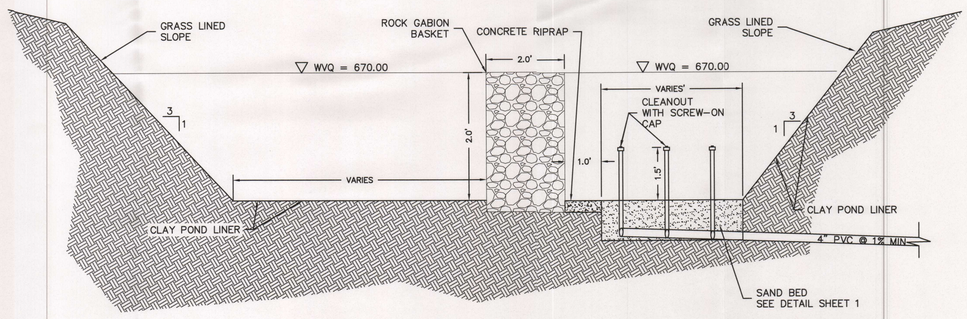

2 Section A-A

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SHEET 1 OF 4

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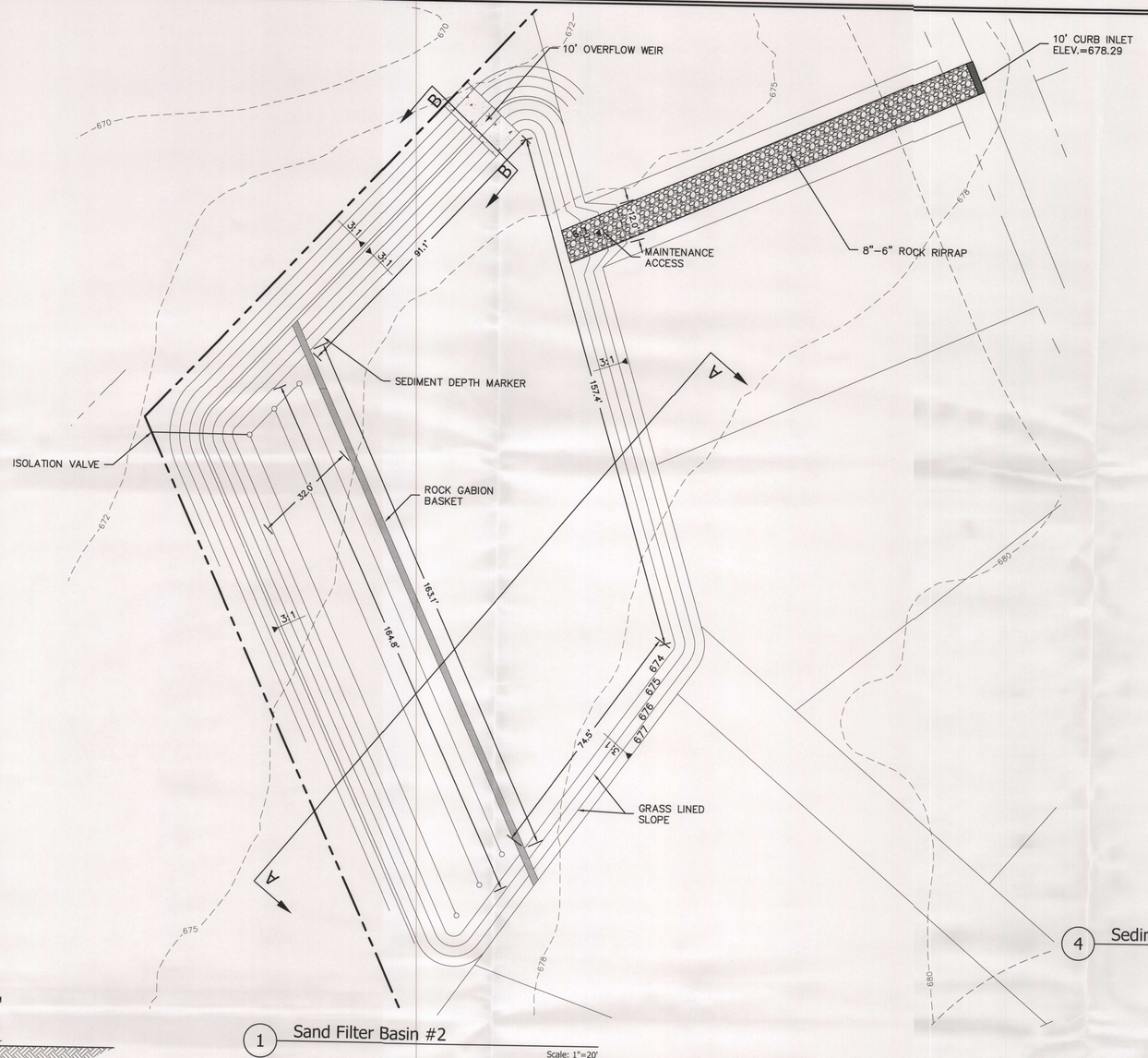
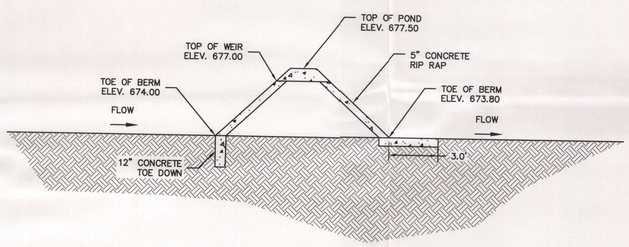


1 Sand Filter Basin #2

Scale: 1"=20'



3 Section B-B

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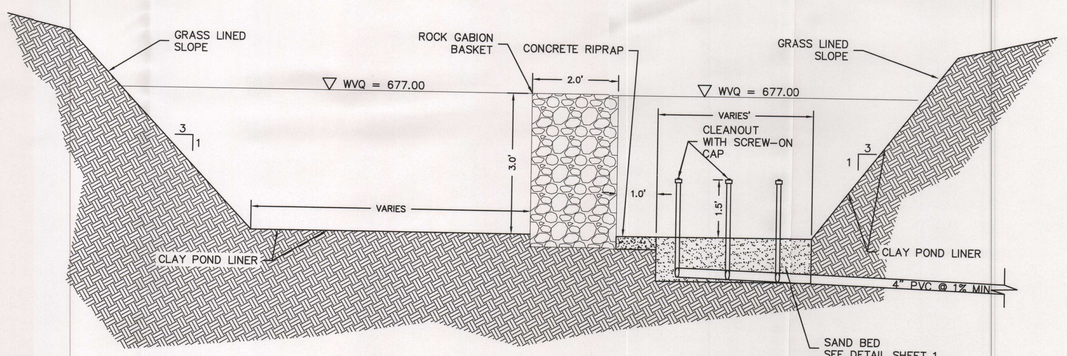
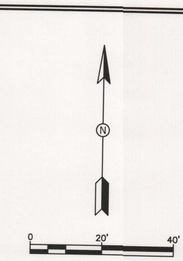


2 Section A-A

Not to Scale

4 Sediment Depth Marker

Not to Scale



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SETTLEMENT AT GRUENE

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SHEET 2 OF 4

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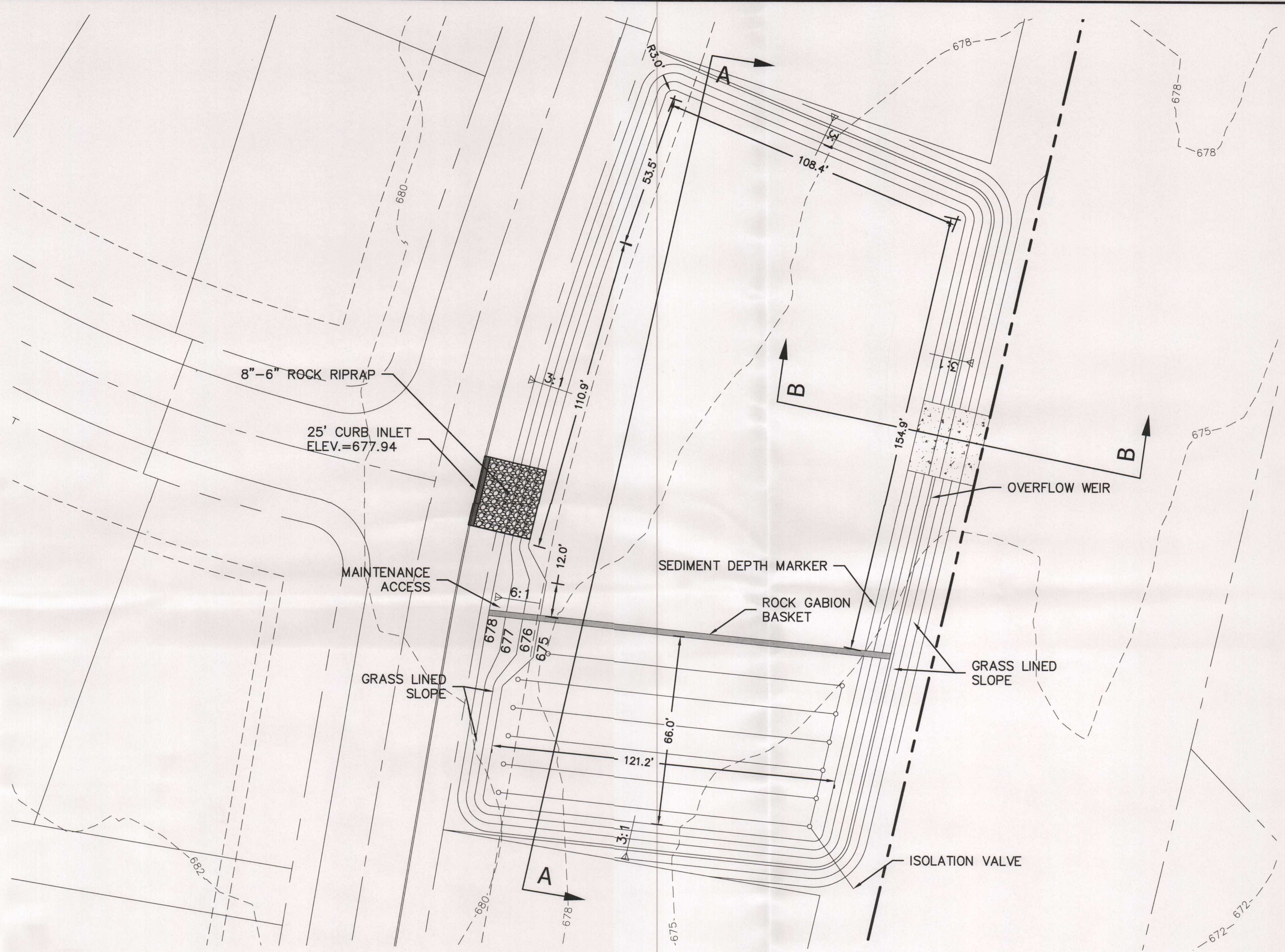

3 Sand Filter Basin #3

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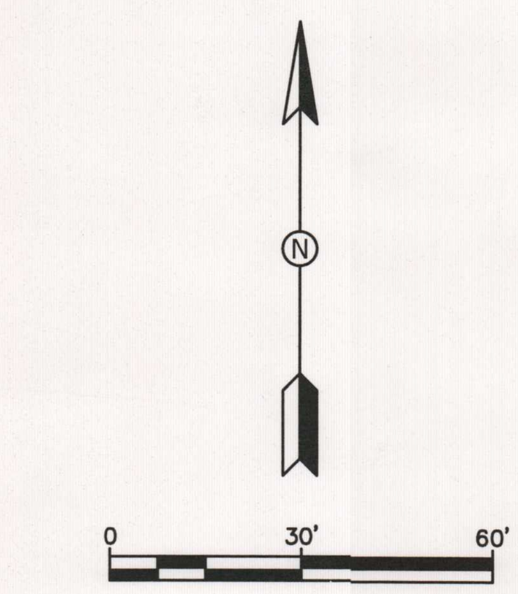
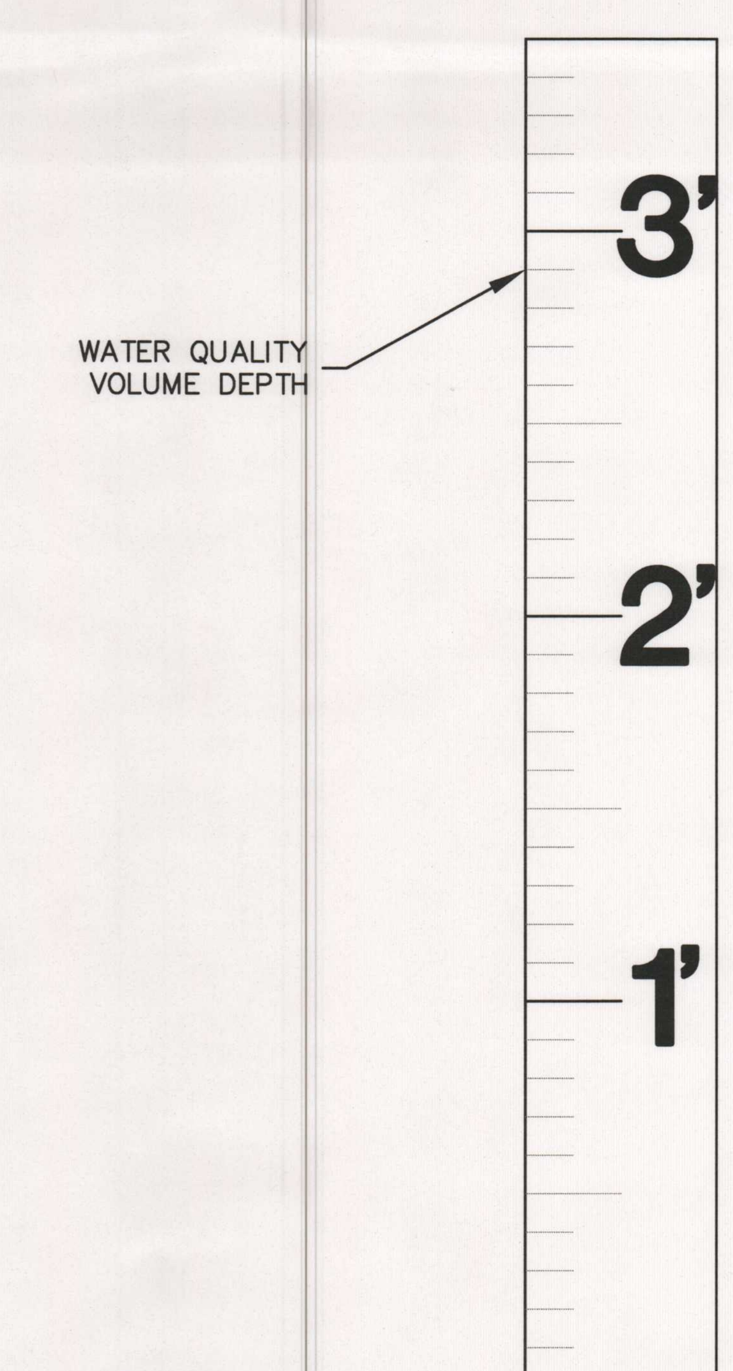
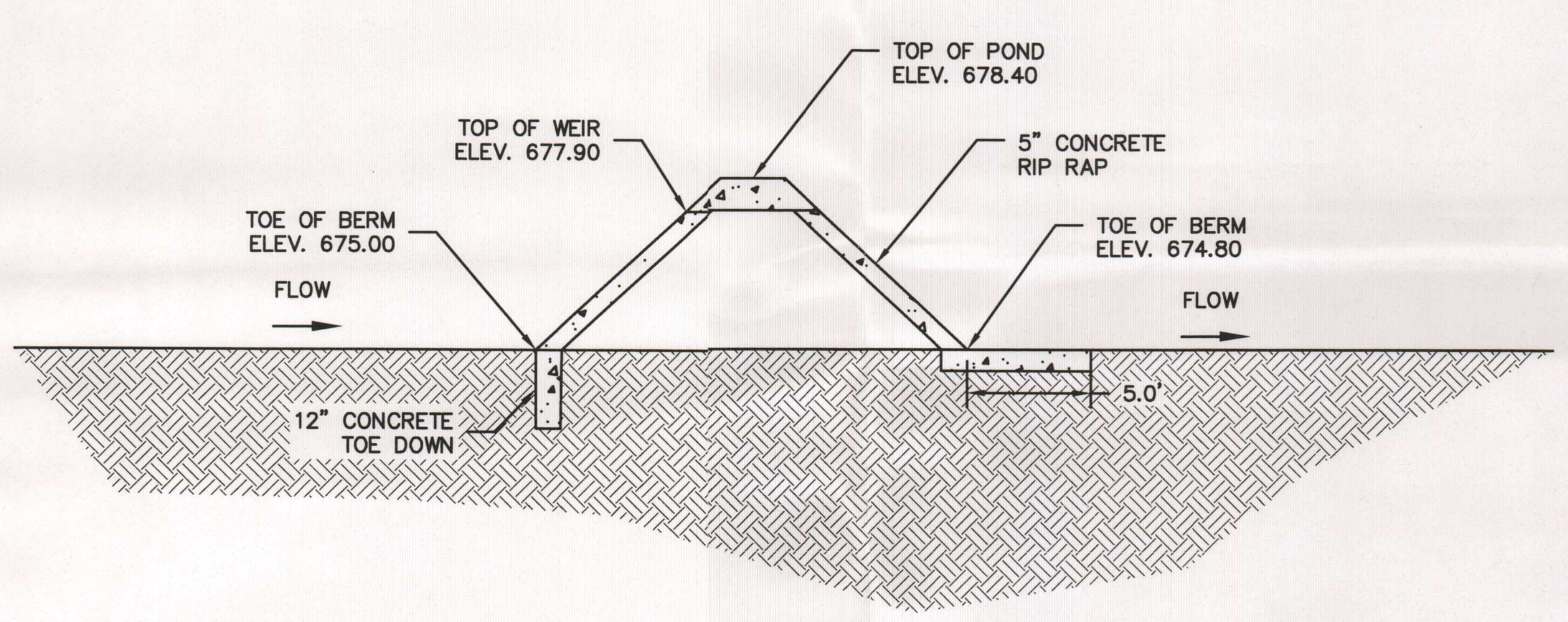




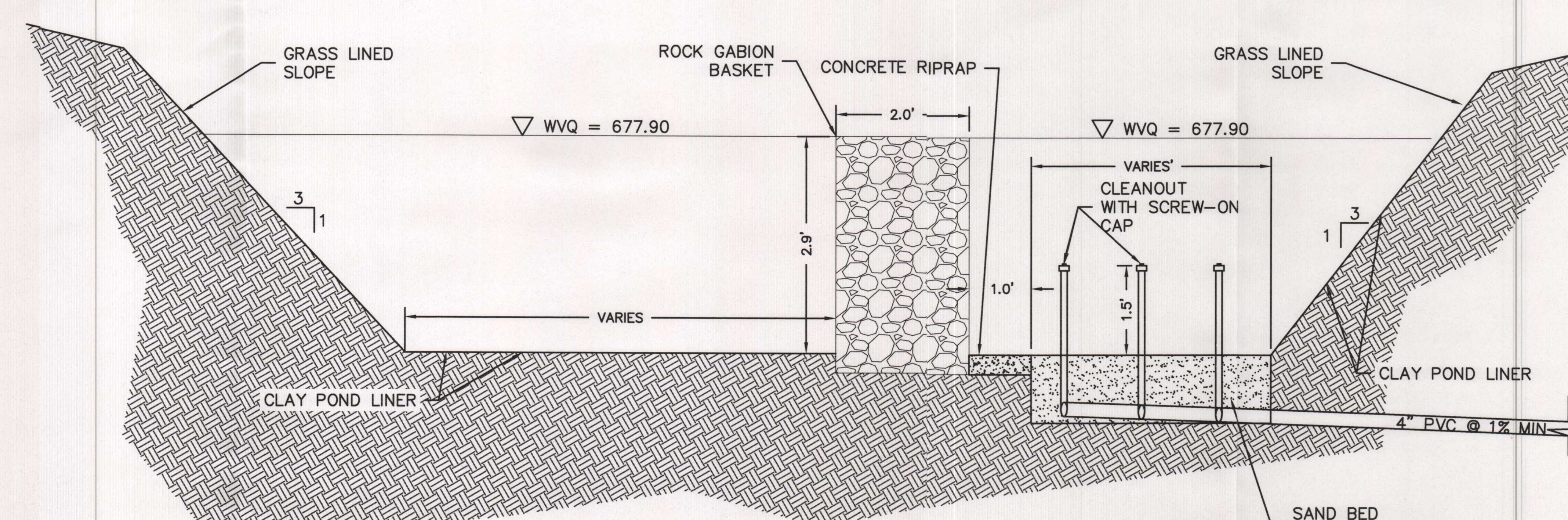
4 Sediment Depth Marker

Not to Scale



3 Section B-B

Not to Scale



2 Section A-A

Not to Scale

811 Know what's below. Call before you dig.

STATE OF TEXAS
SHANE KLAR
115610
LICENSED PROFESSIONAL ENGINEER
2/11/16

NO	DATE	ISSUES AND REVISIONS

MOELLER & ASSOCIATES
Engineering Solutions
1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX 78130
PH: 830-358-7127 www.ma-tx.com
TBPE FIRM F-13351

WPAP - POND DETAILS

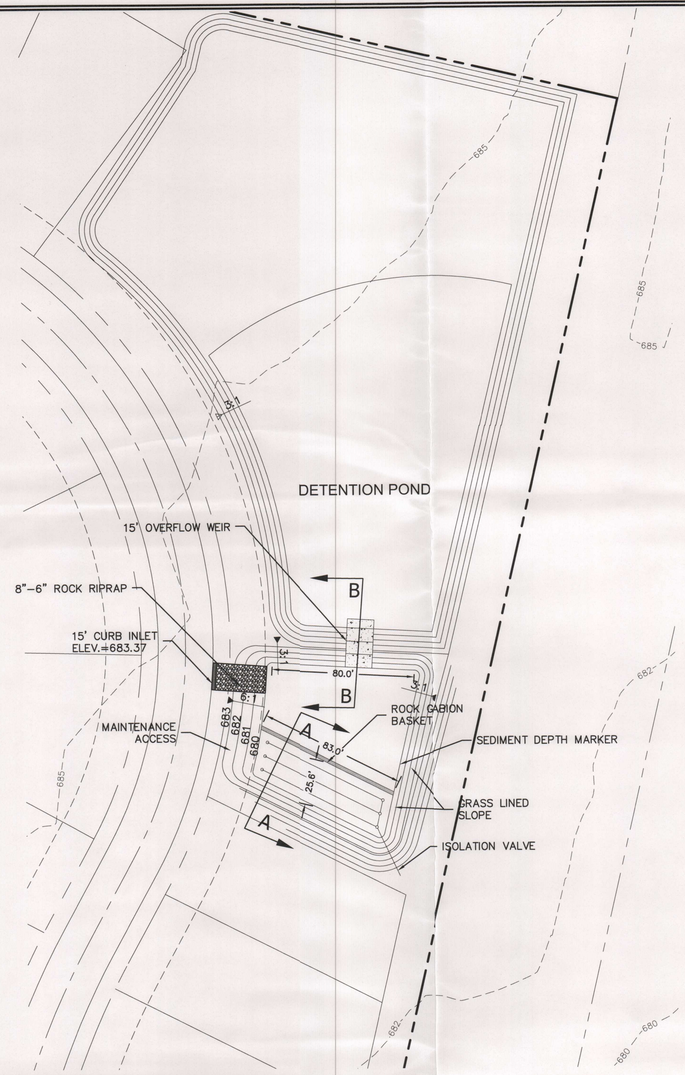
PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

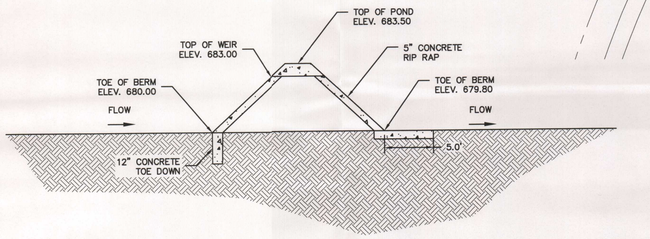
SHEET
3
OF 4

Drawing Name: N:\Projects\GRUE001.101 74 cc - Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan & Details.dwg User: danielsontoni Feb 11, 2016 - 11:08am



1 Sand Filter Basin #4

Scale: 1"=40'



3 Section B-B

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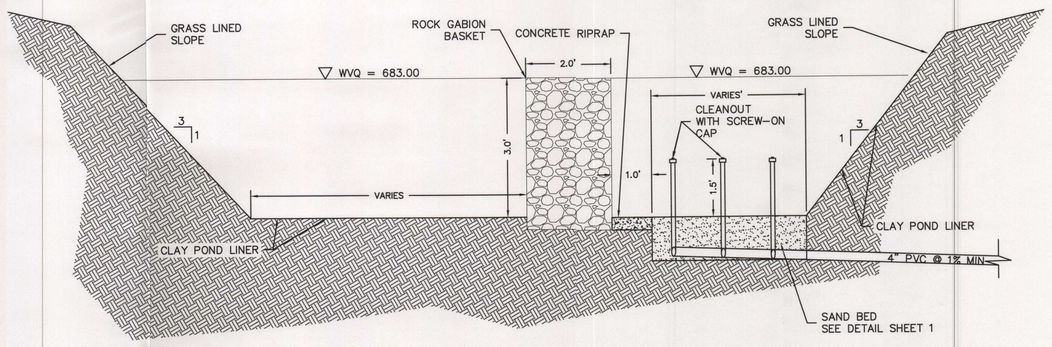
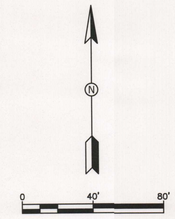


2 Section A-A

Not to Scale

4 Sediment Depth Marker

Not to Scale



811 Know what's below. Call before you dig.

STATE OF TEXAS
SHANE KLAR
115810
LICENSED PROFESSIONAL ENGINEER
2/11/16

NO	DATE	ISSUES AND REVISIONS
1		

MOELLER & ASSOCIATES Engineering Solutions
1040 N. WALNUT AVE., STE. B, NEW BRAUNFELS, TX. 78130
PH: 830-358-7127 www.mta-tx.com
TBPE FIRM F-3561

WPAP - POND DETAILS

PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

SHEET 4 OF 4

Drawing Name: N:\Projects\GRUEN001.101_74 oc – Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan & Details.dwg User: donaldsontoni Feb 11, 2016 – 11:08am

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 11, 2015

RECEIVED

DEC 23 2015

COUNTY ENGINEER

Mr. Thomas H. Hornseth, P.E.
Comal County Engineer
195 David Jonas Drive
New Braunfels TX 78132-3710

Re: PROJECT NAME: Settlement at Gruene, located at on the west side of Rock Street approximately 900 feet north of its intersection with Loop 337, ETJ of New Braunfels, Texas

PLAN TYPE: Application for Approval of Water Pollution Abatement Plan (WPAP) 30 Texas Administration Code (TAC) Chapter 213; Edwards Aquifer Protection Program
EAPP Additional ID: 13000038

Dear Mr. Hornseth:

The referenced application is being forwarded to you pursuant to the Edwards Aquifer Rules. The Texas Commission on Environmental Quality (TCEQ) is required by 30 TAC Chapter 213 to provide copies of all applications to affected incorporated cities and underground water conservation districts for their comments prior to TCEQ approval. More information regarding this project may be obtained from the TCEQ Central Registry website at http://www.tceq.state.tx.us/permitting/central_registry/.

Please forward your comments to this office by January 11, 2016.

The Texas Commission on Environmental Quality appreciates your assistance in this matter and your compliance efforts to ensure protection of the State's environment. If you or members of your staff have any questions regarding these matters, please feel free to contact the San Antonio Region Office at (210) 490-3096.

Sincerely

Todd Jones
Water Section Work Leader
San Antonio Regional Office

TJ/eg

WATER POLLUTION ABATEMENT PLAN

FOR

SETTLEMENT AT GRUENE

PREPARED FOR

Texas Commission on Environmental Quality

Region 13 – San Antonio
14250 Judson Road
San Antonio, Texas 78233
210-490-3096 (office)
210-545-4329 (fax)

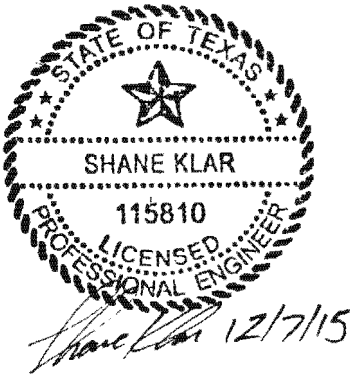
PREPARED BY

MOELLER & ASSOCIATES
Engineering Solutions

F-13351

Shane Klar, P.E.
1040 N. Walnut Ave., Ste B
New Braunfels, TX 78130

Prepared
December 7, 2015



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 if not withdrawn the application will be denied and 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 to you:

- You can withdraw your application, and your fees will be refunded or credited for a resubmittal.
- 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 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 effected 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: Settlement at Gruene						**2. Regulated Entity No.:**			
3. Customer Name: Gruene Rock, 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):**		73.37	
9. Application Fee:	$6,500.00		**10. Permanent BMP(s):**			Yes			
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Comal		**14. Watershed:**			Blieders Creek			

Application Distribution

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

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

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

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

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	__	_X_	__	__	__
Region (1 req.)	__	_X_	__	__	__
County(ies)	__	_X_	__	__	__
Groundwater Conservation District(s)	__ Edwards Aquifer Authority __Trinity-Glen Rose	_X_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 _X_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.
Shane Klar Print Name of Customer/Authorized Agent
Signature of Customer/Authorized Agent — 12/7/15 Date

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

General Information Form

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: Shane Klar, P.E.

Date: 12/4/15

Signature of Customer/Agent:

Project Information

1. Regulated Entity Name: Settlement at Gruene
2. County: Comal
3. Stream Basin: Blieders Creek
4. Groundwater Conservation District (If applicable): N/A
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

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

7. Customer (Applicant):

Contact Person: Darren Gerlof
Entity: Gruene Rock LLC
Mailing Address: 14955 Bulverde Road
City, State: San Antonio, Texas Zip: 78247-2631
Telephone: (210) 490-2777 FAX: (210) 494-0610
Email Address: firedup2@aol.com

8. Agent/Representative (If any):

Contact Person: Shane Kalr, P.E.
Entity: Moeller & Associates
Mailing Address: 1040 N. Walnut Ave
City, State: New Braunfels, TX Zip: 78130
Telephone: 830-358-7127 FAX: 830-515-5611
Email Address: shaneklar@ma-tx.com

9. Project Location:

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

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

The project is located on the west side of Rock Street approximately 900 feet north of the intersection with Loop 337.

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: 1/1/2016

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.


PROJECT SITE
Coleco Park
Edwards Blvd
Mary Priess Dr
Oaklawn Dr
Gruene Rd
Rock St
GRUENE ROCK SUBDIVISION
PROJECT LOCATION MAP
Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China
Legend
Project_Site
Parcels
MOELLER & ASSOCIATES
bing

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NEW BRAUNFELS WEST QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

RECHARGE ZONE

TRANSITION ZONE

NEW BRAUNFELS

Produced by the United States Geological Survey
Revised in cooperation with the Texas Water Development Board

Control by USGS, NOS/NOAA, and USCE

Compiled by the Army Map Service by photogrammetric methods
from aerial photographs taken 1956. Field checked 1958
Revised from aerial photographs taken 1986. Field checked 1987
Map edited 1988

Projection and 10,000-foot grid ticks: Texas coordinate
system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 14
1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 20 meters south and
28 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines
generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1988 MAGNETIC NORTH
DECLINATION AT CENTER OF MAP
DIAGRAM IS APPROXIMATE

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

QUADRANGLE LOCATION

2998-413

ROAD CLASSIFICATION

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

NEW BRAUNFELS WEST, TEX.
29098-F2-TF-024

1988

DMA 6343 II NW–SERIES V822

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NEW BRAUNFELS EAST QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

RECHARGE ZONE

SITE

TRANSITION ZONE

Produced by the United States Geological Survey in cooperation with the Defense Mapping Agency

Control by USGS and NOS/NOAA and USCE

Compiled from aerial photographs taken 1956. Revisions in purple and woodland compiled from aerial photographs taken 1986 and other sources and has been field checked. Map edited 1994
Conflicts may exist between some updated features and previously mapped contours

North American Datum of 1927 (NAD 27). Projection and 10000-foot ticks: Texas Coordinate System, south central zone (Lambert Conformal Conic)
Blue 1000-meter Universal Transverse Mercator ticks, zone 14

North American Datum of 1983 (NAD 83) is shown by dashed corner ticks. The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

UTM GRID AND 1994 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

QUADRANGLE LOCATION

2998-414

ROAD CLASSIFICATION

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

NEW BRAUNFELS EAST, TEX.
29098-F1-TF-024

1958
REVISED 1994
DMA 6343 II NE-SERIES V882

ATTACHMENT "C"
Project Description

Settlement at Gruene is a 73.37 acre development located on the west side of Rock Street approximately 900 feet north of the intersection at Loop 337 (See Location Map). The site is currently unimproved land primarily composed of pasture land with scattered dense brush and trees. The entire 73.37 acre site drains south to Blieders Creek. According to the Flood Insurance Rate Map No. 48091C0455F there is no existing floodplain located within the property.

The site is located outside the New Braunfels city limits. The site is served by New Braunfels Utilities for electric, water, and wastewater.

The proposed land use will consist of the following:

240 single family lots with an average lot size of 7,200 square feet (0.165 acres). Eacj lot will be assumed to have an average of 4,250 square feet of impervious cover which exceeds the assumption provided in Table 3-2 of the Technical Guidance Manual for lots this size.

Treatment for the entire development will be Sand Filter Ponds for each drainage basin. The proposed permanent BMP treatment areas are divided into 4 separate basins. Perimeter lots that do not drain by gravity to the proposed BMP's will be treated via Natural Vegetative Filter strips as prescribed in section 3.4.6 of the Technical guidance Manual.

The proposed construction will include grading for the streets, drainage, and utility service lines. The subdivision infrastructure will include a water system, sewer, electricity, telephone, cable television and approximately 10,200 linear feet of roadway. The total area of impervious cover for the site will be 31.26 acres (42.6%). Total impervious cover was calculated using an estimated area of 4,250 square feet impervious cover per lot as referenced above along with the total proposed roadway. The total area of disturbance for the infrastructure of the site will be 26.48 acres for the construction of streets, drainage improvements, water improvements, and dry utility improvements. No more than 10 acres of disturbance will occur in a single drainage area. Development infrastructure will occur before disturbance of the lots for home construction. A more detailed break out of disturbed areas can be found in the Temporary Stormwater Section in Attachment C "Sequence of Major Activities".

Sand Filter Ponds will ensure the quality of water exiting without adversely affecting the downstream drainage patterns. The increase in stormwater runoff due to the development of this property will be detained within multiple detention basins located in the development. The detention basins will be designed to reduce the peak stormwater runoff for ultimate development within the proposed drainage area of the each basin.

Geologic Assessment

Texas Commission on Environmental Quality

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

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

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

Signature

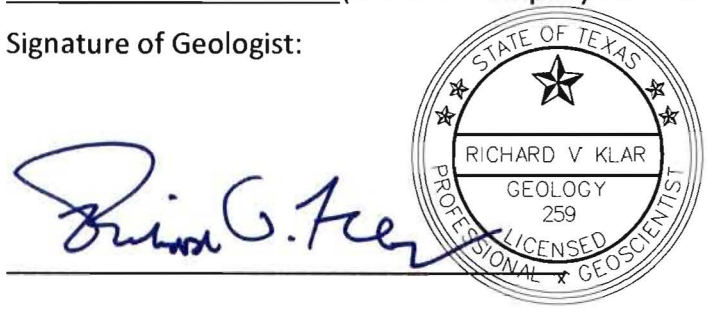
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

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

Date: December 2, 2015 Fax: 210-699-6426

Representing: Raba Kistner Environmental, Inc., TBPE Firm #3257/TBPG Firm #50220 for Moeller & Associates (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



Regulated Entity Name: Settlement at Gruene

Project Information

1. Date(s) of Geologic Assessment was performed: December 1 and 2, 2014 and November 18, 2015

2. Type of Project:

☒ WPAP ☐ AST

☐ SCS ☐ UST

3. Location of Project:

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

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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness (feet)
Comfort-Rock outcrop complex, undulating (CrD)	D	Veneer to 1.5 ft
Rumple-Comfort association, undulating (RUD)	C	~1 to 2.5 ft

**Soil Group Definitions (Abbreviated)*

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

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

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

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

   Applicant's Site Plan Scale: 1" = 200'
   Site Geologic Map Scale: 1" = 200'
   Site Soils Map Scale (if more than 1 soil type): 1" = 300'

9. Method of collecting positional data:

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

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

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

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

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

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

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

☒ There are __4__(#) 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 not 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

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

ATTACHMENTS

ATTACHMENT A

GEOLOGIC ASSESSMENT TABLE (TCEQ-0585-TABLE)

COMMENTS TO GEOLOGIC ASSESSMENT TABLE

SOIL PROFILE

SITE SOILS MAP

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: ***Settlement at Gruene, New Braunfels, Comal County, Texas*** *(RKEI Project No. ASF14-181-01)*

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	N29 44 7.21	W98 6 59.33	CD	5	Kep	98.4	39.4	3.9	N-S				F/N	8	13	✓			✓	Hilltop
S-2	N29 44 6.65	W98 7 2.03	MB (Well)	30	Kep	0.5	0.5	~150					N	35	65		✓	✓		Hilltop
S-3	N29 43 54.00	W98 7 0.39	MB (Well)	30	Kep	0.5	0.5	~150					N	35	65		✓	✓		Hilltop
S-4	N29 43 58.31	W98 7 5.51	MB (Well)	30	Kep	0.5	0.5	~150					N	35	65		✓	✓		Hilltop
S-5	N29 44 5.05	W98 7 10.058	MB (Well)	30	Kep	0.5	0.5	~150					N	35	65		✓	✓		Hilltop
S-6	N29 44 5.49	W98 7 10.15	MB (Septic)	30	Kep	5	8	4-6					F/X	8	38	✓		✓		Hilltop
S-7	N29 44 4.31	W98 7 12.32	MB (Septic)	30	Kep	5	8	4-6					F/X	8	38	✓		✓		Hilltop

*** DATUM:** *NAD 83*

Kep = Person Formation

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

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

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 213

STATE OF TEXAS
RICHARD V KLAR
GEOLOGY
259
LICENSED
PROFESSIONAL GEOSCIENTIST

Date: ***12-2-15***

Sheet 1 of 1

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

COMMENTS TO GEOLOGIC ASSESSMENT TABLE
Settlement at Gruene
New Braunfels, Comal County, Texas

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

Non-Karst Closed Depression

Feature S-1 (CD):

Feature S-1 consists of a former manmade stock pond. This feature measures approximately 98.4 x 39.4 x 3.9 feet. At the time field activities were conducted, no significant drainage entering or directed towards the pond was observed. The feature was observed to be dry with some vegetation. As the feature functioned historically as a pond containing an earthen clay floor with the banks consisting of stockpiled soil and rock, it does not facilitate rapid infiltration to the subsurface.

Manmade Features (Wells and Septic Tank Systems)

Feature S-2 (MB):

Feature S-2 consists of an irrigation well. The well is completed with casing approximately 6-inch in diameter and is inferred to be completed in the Edwards Aquifer at a depth greater than approximately 150 feet. The well was apparently operated by a Randols Right-Angle Drive Diesel Engine, but not currently utilized.

The Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) system did not have any information regarding this well. Therefore, it does not appear the well is registered with TWDB.

Feature S-3 (MB):

Feature S-3 consists of a water-supply well located adjacent to the stone house at the southeast corner of the property. The well is completed with casing approximately 6-inch in diameter and is inferred to be completed in the Edwards Aquifer at a depth greater than approximately 150 feet. The water well has an associated submersible pump with an approximate 30-gallon tank.

The Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) system did not have any information regarding this well. Therefore, it does not appear the well is registered with TWDB.

Feature S-4 (MB):

Feature S-4 consists of a water-supply well with an associated windmill for a cattle trough. The well is completed with casing approximately 6-inch in diameter and is inferred to be completed in the Edwards Aquifer at a depth greater than approximately 150 feet.

The Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) system did not have any information regarding this well. Therefore, it does not appear the well is registered with TWDB.

Feature S-5 (MB):

Feature S-5 consists of a water-supply well located approximately 11 feet southeast of the garden house with an unattached windmill directly above it. A submersible pump associated with the well is connected to a pressure tank inside the garden house. The well is completed with casing approximately 6-inch in diameter and is inferred to be completed in the Edwards Aquifer at a depth greater than approximately 150 feet.

The Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) system did not have any information regarding this well. Therefore, it does not appear the well is registered with TWDB.

Feature S-6 (MB):

Feature S-6 consists of a septic tank associated with the guest house. The dimensions of the tank could not be determined on the basis of field observations. However, based on industry standards, the typical length and width of a 1,000-gallon tank is 4 feet. The tank is believed to penetrate the top of the limestone to depths on the order of 2 - 3 feet.

Feature S-7 (MB):

Feature S-7 consists of a septic system associated with the main residence. The dimensions of the septic system could not be determined on the basis of field observations.

The constructions details are unknown however, based on industry standards, the typical length and width of a 1,000-gallon tank is 4 feet. The tank is believed to penetrate the top of the limestone to depths on the order of 2 – 3 ft.

SOIL PROFILE
Settlement at Gruene
New Braunfels, Comal County, Texas

SOIL SERIES	THICKNESS ON SITE	DESCRIPTION
Comfort-Rock	**Veneer to 1.5 ft**	***Comfort-Rock outcrop complex, undulating (CrD):*** This complex comprises shallow clayey soils and limestone outcrop on side slopes, hilltops, and ridge tops in the Edwards Plateau. On average, Comfort soils make of 70% of the complex. Areas of limestone outcrop form narrow horizontal bands, and Comfort soils occur between the bands. The surface layer of the Comfort soil is dark brown, extremely stony clay, typically about 6 inches thick. Cobbles to 4 feet in diameter are abundant. Subsoil is dark reddish-brown clay, extremely stony and occurs to depths of about 13 inches.
Rumple Comfort	**~1 to 2.5 ft**	***Rumple-Comfort-association, undulating (RUD):*** Rumple soils make up about 60% of this association and are on broad ridge tops and side slopes. The surface layer is dark reddish brown very cherty clay loam about 10 inches thick with rounded chert, limestone cobbles and gravel cover about 20% of the surface. The subsoil is dark reddish brown very cherty clay to approximate depth of 14 inches and dark reddish brown extremely stony clay to a depth of about 28 inches. The surface layer of the Comfort soil is dark brown, neutral, extremely stony clay about 7 inches thick. The subsoil is dark reddish brown, mildly alkaline, extremely stony clay to a depth of 12 inches. The underlying material for both Rumple and Comfort soils is indurated fractured limestone fragments

The preceding table was prepared on the basis of information provided in the *Soil Survey of Comal and Hays Counties, Texas (1984)* in addition to field observations. Native soils mapped throughout the central to northern portion of the project correspond to Rumple-Comfort association, undulating (RUD), as presented on the ***Site Soils Map (Attachment A)***. Soils classified as the Comfort-Rock outcrop complex, undulating soils (CrD) are mapped throughout the remainder of the SITE. Each of the referenced soils are weakly-developed and relatively thin, occurring over weathered limestone units of the Person Formation. While both soil units exhibit low permeability, Rumple soils have a higher reported permeability than Comfort soils (0.2-0.6 inches/hour versus 0.06-0.2 inches/hour, respectively), which accounts for its Soil Group classification of "C" versus "D" (USDA, 1986). Both the RUD and CrD soils are reported as having low to moderate shrink-swell potential.

STATE OF TEXAS
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12-2-15

Robinhood
Oaklawn
Mary Preiss
Dewberry
RUD
CrD
EDWARDS AQUIFER RECHARGE ZONE
Barn
S-6 (MB)
Guest House
S-7 (MB)
Main House
S-5 (MB)
S-2 (MB)
S-1 (CD)
Blieders Creek
LeB
Area of Clearing
S-4 (MB)
Windmill
Ewelling
Gruene
Or
LeB
BoB
Pt
S-3 (MB)
EDWARDS AQUIFER TRANSITION ZONE
CrD
Oa
Pt
Rock
LeA

LEGEND
- GA FEATURE
- APPROXIMATE SITE BOUNDARY
- FENCE
- SOIL TYPE
- 100-YEAR FLOODPLAIN
- EDWARDS AQUIFER BOUNDARY (TCEQ-2005)

SOURCES:
1. Aerial Photograph, New Braunfels East from the City of San Antonio (COSA) - 2013.
2. Soils Data Downloaded from Natural Resources Conservation Service (NRCS), 2004. Soils Based on Soil Survey of Comal and Hays County, USDA, June 1984.
3. The SITE is located on the Edwards Aquifer Recharge Zone (EARZ), TCEQ Edwards Aquifer Protection Program, 1998 Edwards Aquifer Recharge Zone Map, New Braunfels East Quadrangle - September 1998.
4. Property Boundary Provided by Moeller & Associates on November 24, 2015 (Settlement at Gruene Boundary.dwg)

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

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TBPE Firm F-3257 / TBPG Firm F-50220

SITE SOILS MAP

SETTLEMENT AT GRUENE
NEW BRAUNFELS, COMAL COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF14-181-01
ISSUE DATE:	12-02-15
DRAWN BY:	LAW
CHECKED BY:	RAS
REVIEWED BY:	RVK

N
W E
S
0 75 150 300
FEET
1 INCH = 300 FEET

ATTACHMENT B

STRATIGRAPHIC COLUMN

STRATIGRAPHIC COLUMN
Settlement at Gruene
New Braunfels, Comal County, Texas

STRATIGRAPHIC FORMATION	THICKNESS	DESCRIPTION
Edwards Limestone (Ked) Person Formation (Kep)	180-224	Formation generally consists of gray to light tan marly limestone. Identified in the field by the presence of *Waconella wacoensis.*
Cyclic and Marine Members, undivided	80–100 ft	Unit consists of massive mudstone to packstone; *miliolid* grainstone; and chert. Identified in the field by cycles of massive beds to relatively thin beds. **No in-situ exposures identified at the SITE, but limestone boulders and fragments exposed at the stock pond area.**
Leached and Collapsed Members, undivided	80–100 ft	Unit consists of crystalline limestone, mudstone to grainstone and chert. Identified in the field by bioturbated iron-stained beds separated by massive limestone beds. **No exposures at the SITE.**
Regional Dense Member	20–24 ft	Unit consists of dense, argillaceous mudstone. Identified in the field by wispy iron-oxide stains. **No exposures at the SITE.**

Note: Stratigraphic Column adapted from Small and Hanson (1994).

ATTACHMENT C

NARRATIVE OF SITE SPECIFIC GEOLOGY

SITE GEOLOGY NARRATIVE
Settlement at Gruene
New Braunfels, Comal County, Texas

Introduction

The following discussion is a site-specific assessment of existing geological conditions and potential recharge features within the referenced project site. This assessment was performed by **Raba Kistner Environmental, Inc. (RKEI)** for Moeller & Associates, pursuant to applicable Edwards Aquifer Protection Program Rules as specified in *Title 30 of the Texas Administrative Code, Section 213 (30 TAC §213, effective April 24, 2008).* This assessment report is in the format required by the Texas Commission on Environmental Quality (TCEQ) for the Geologic Assessment portion of a Water Pollution Abatement Plan (WPAP) and was prepared in accordance with the revised *to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585)*, which are applicable to submittals received by the TCEQ after October 1, 2004.

This geologic assessment report documents conditions observed by **RKEI** within the project boundaries initially on December 1 and 2, 2014, and fully re-evaluated on November 18, 2015.

Site Description

Site Location. The project includes land development activities for a proposed residential subdivision comprising of approximately 73.37 acres located along Rock Street near its intersection with Gruene Road in New Braunfels, Comal County, Texas (referred to herein as SITE). The project boundary was provided by Moeller & Associates and is indicated on the attached ***Site Geologic Map (Attachment D)***.

As defined herein, the project area is fully located over the Edwards Aquifer Recharge Zone (EARZ) as defined based on official maps made available by the TCEQ. Given the location within the EARZ, performance of a geologic assessment is required to facilitate planned construction activities pursuant to applicable Edwards Aquifer Protection Program (EAPP) rules. As presented on the attached ***Site Geologic Map,*** adjacent properties include single-family residential development, railroad and undeveloped land.

Topography and Drainage. The SITE generally consists of a gently sloping hillside characterized by hilltop topography as defined by *Instructions to Geologists (TCEQ-0585)* criteria. As presented on the ***Site Geologic Map***, designated 100-year floodplain associated with Blieders Creek is located approximately 300 feet southwest of SITE boundaries. A review of Flood Insurance Rate Map (FEMA, 2009) indicates that no portion of the SITE is located within the 100-yr floodplain area associated with Blieders Creek.

As indicated by topographic contours presented on the ***Site Geologic Map***, the maximum surface elevation for the SITE is approximately 700 feet above mean sea level (MSL) along the northwest property boundary. Drainage for this portion of the SITE occurs to the southeast toward the Guadalupe River. A secondary topographic high of approximately 685 feet MSL occurs along the southern property boundary. Drainage pattern occurs to the southwest toward Blieders Creek.

Historical Property Use. Although research pertaining to past SITE operations and historical land use activities was beyond the scope of this assessment, historical aerial imagery was reviewed to evaluate historical land use and the presence of lineations that could indicate the presence of a normal fault. The following aerial photographs were reviewed: 1995, 2005, 2008, 2010, and 2014. The aerial photograph from 1995 to 2014 indicates that the SITE has remained essentially unchanged over this time period, consisting predominantly of farm and ranch land with 2 residences and other minor improvements. Since the initial field reconnaissance in December 2014, extensive tree and brush clearing has been conducted within the southern portion of the SITE, south of the agricultural field as indicated on the ***Site Geologic Map.*** At the time of the recent reconnaissance, November 2015, several large brush piles are present throughout the cleared area. Although ground disturbance is evident throughout this area associated with the removal of Ashe juniper, no large depressions were identified that met criteria for mapping per TCEQ-0585 requirements.

Similarly the surrounding properties have remained unchanged since 1995 with undeveloped land to the north and southwest, single-family residential to the northwest, Rock Street to the south and railroad tracks to the east.

Classification of Recharge Features: As further described herein, features identified at the SITE and discussed below include 6 manmade features (irrigation well, septic systems, and water-supply wells). No naturally-occurring recharge features were identified within SITE boundaries. The significance of these features was assessed using definitions and guidance provided in *Instructions to Geologists (TCEQ-0585-Instructions, revised October 1, 2004)*. All features within the SITE that met the criteria presented in this reference were mapped. The characteristics of all mapped features and the assessments of these features, as defined by the TCEQ, are presented in the attached ***Geologic Assessment Table (TCEQ-0585).***

Stratigraphy

Information pertaining to the lithologies and thickness of geologic units underlying the SITE was primarily taken from Collins (2000) and Small and Hanson (1994). Collective published data referenced indicate that the SITE is underlain by Person Formation (Kep). As described on the ***Stratigraphic Column (Attachment B)***, the Kep is commonly divided into three distinct members: (i) Cyclic and Marine Member, undivided – mudstone to packstone, grainstone, and chert; (ii) Leached and Collapsed Member, undivided - unit includes crystalline limestone, mudstone to grainstone, and chert; and (iii) Regional Dense Member - unit consists of dense, carbonate mudstone. The total thickness of the Kep is on the order of 180 to 224 feet. Although no in-situ exposures were identified owing to soil cover, the uppermost or Cyclic and Marine member of the Kep represents the portion of the Edwards Limestone directly underlying the west portion of the SITE to depths on the order of 80 to 100 ft. Based upon the work of Maclay (1995), this unit contains many open fractures and possesses low matrix permeability with total porosity on the order of 5 to 10%.

Structure

This SITE is located within the Balcones Fault Zone and as such possesses a distinct structural trend. This zone generally consists of a northeast-southwest trending, *en echelon* normal fault system, which

juxtaposes Upper Cretaceous lithologies in the southeast with Lower Cretaceous lithologies in the northwest. As a result of this larger-scale, regional faulting, minor internal fault sequences and fractures exist within this zone which follow the same structural trend and accommodate localized displacement.

No evidence of faulting or displacement was noted during the assessment at the SITE. The nearest published fault is mapped approximately 450 feet southeast of the project boundary beyond Rock Street/Gruene Road as presented on the published geologic map prepared by Collins (2000). This normal fault zone facilitates relatively significant vertical displacement on the order of 200 feet, juxtaposing the Quaternary Terrace Deposits to the south with older Edwards Limestone to the north.

Karst Feature

No features attributed to karstification of Person Formation were identified on the property.

Non-Karst Closed Depression

A non-karst closed depression, ***Feature S-1*** consisting of a manmade stock pond was mapped at the SITE. As presented in the ***Geologic Assessment Table (TCEQ-0585)*** this feature is located in the central part of the SITE, south of the former cultivated field. The feature measures approximately 98.4 x 39.4 x 3.9 feet and is fully excavated within clay soils. Given its function and the fact that the pond is not associated with a discernable drainage feature, it is classified as not sensitive and as having a low potential of transmitting fluids into the Edwards Aquifer.

Manmade Features

As presented on the ***Site Geologic Map***, a total of 6 manmade features was identified which may potentially serve to enhance the transmission of surface runoff to the subsurface. The features are existing wells and septic systems that meet criteria for assessment as manmade features in bedrock. The features are listed below:

- ***Feature S-2*** consists of an irrigation well apparently used to support farming activities at the cultivated field.
- ***Features S-3, S-4, and S-5*** consist of water-supply wells.
- ***Feature S-6*** consists of a septic tank.
- ***Feature S-7*** consists of a septic system.

The Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) system did not have any information regarding ***Features S-2*** through ***S-5***. Therefore, it does not appear the wells are registered with TWDB. However, there are 2 water-supply wells within the vicinity of the SITE. A brief description of the wells is listed below:

- The well (State Well No. 6824103) is approximately 546 feet southwest of the property boundary. The well was drilled in 1958 to a total depth of 130 feet below ground surface and is completed with a cemented 8 inch surface casing.

- The well (State Well No. 6824106) is approximately 503 feet southeast of the property boundary. The well was drilled in 1936 to a total depth of 65 feet below ground surface and is completed with a cemented 8 inch surface casing.

None of these manmade features was observed in conjunction with any naturally-occurring recharge features. The irrigation and water-supply wells are classified has sensitive owing to rapid infiltration potential if the surface seals were to become compromised. The septic tank systems which are essentially contained within the soil horizon are classified as not sensitive, having a low potential of transmitting fluids into the Edwards Aquifer. This classification is based upon the point assignment criteria presented in the ***Geologic Assessment Table (TCEQ-0585)*** and professional judgment.

Potential for Fluid Migration to the Edwards Aquifer

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

- The SITE is directly underlain to depths estimated on the order of 80-100 feet by the Person Formation, the uppermost unit of the Edwards Aquifer. As the SITE is characterized by intact limestone with overlying clay soils, published infiltration rates are listed as slow to moderate.
- No naturally-occurring features were identified within SITE boundaries attributed to karstification of limestone terrain or normal faulting. No in-situ exposures were identified at the SITE.
- With the exception of the existing irrigation and water-supply wells, no sensitive karst or man-made features were observed at the SITE. As the onsite water-supply wells are completed within the Edwards Aquifer, these features are classified as sensitive from a general water quality/groundwater protection perspective. The wells have high potential of transmitting fluids to the Edwards Aquifer only in the event that the existing surface completions become breached or compromised.

References

Barnes, V. L., 1983, Geologic Atlas of Texas San Antonio Sheet; Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.

Collins, Edward W., 2000, Geologic Map of the New Braunfels, Texas, 30 x 60 Minute Quadrangle: Geologic Framework of an Urban-Growth Corridor along the Edwards Aquifer, South-Central Texas: Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.

Moeller & Associates (2015), Project Boundary: *Settlement at Gruene.dwg* provided to **RKEI** via email correspondence on 11/24/15.

National Flood Insurance Program, 2009, Flood Insurance Rate Map, Comal County, Texas and Incorporated Areas; Federal Emergency Management Agency, Map 48091C0455F.

Small, T. A., and J. A. Hanson, 1994, Geologic framework and hydrogeologic characteristics of the Edwards Aquifer Outcrop, Comal County, Texas: USGS Water-Resources Investigations Report 94-4117.

TCEQ Edwards Aquifer Protection Program, 1998, Edwards Aquifer Recharge Zone Map, New Braunfels East Quadrangle; TNRCC, September 1998.

Texas Water Development Board (TWDB), 2015, Water Information Integration and Dissemination (WIID) system, TWDB, December 2015.

United States Geological Survey (USGS), 1992, New Braunfels East Quadrangle; USGS, Denver, Colorado.

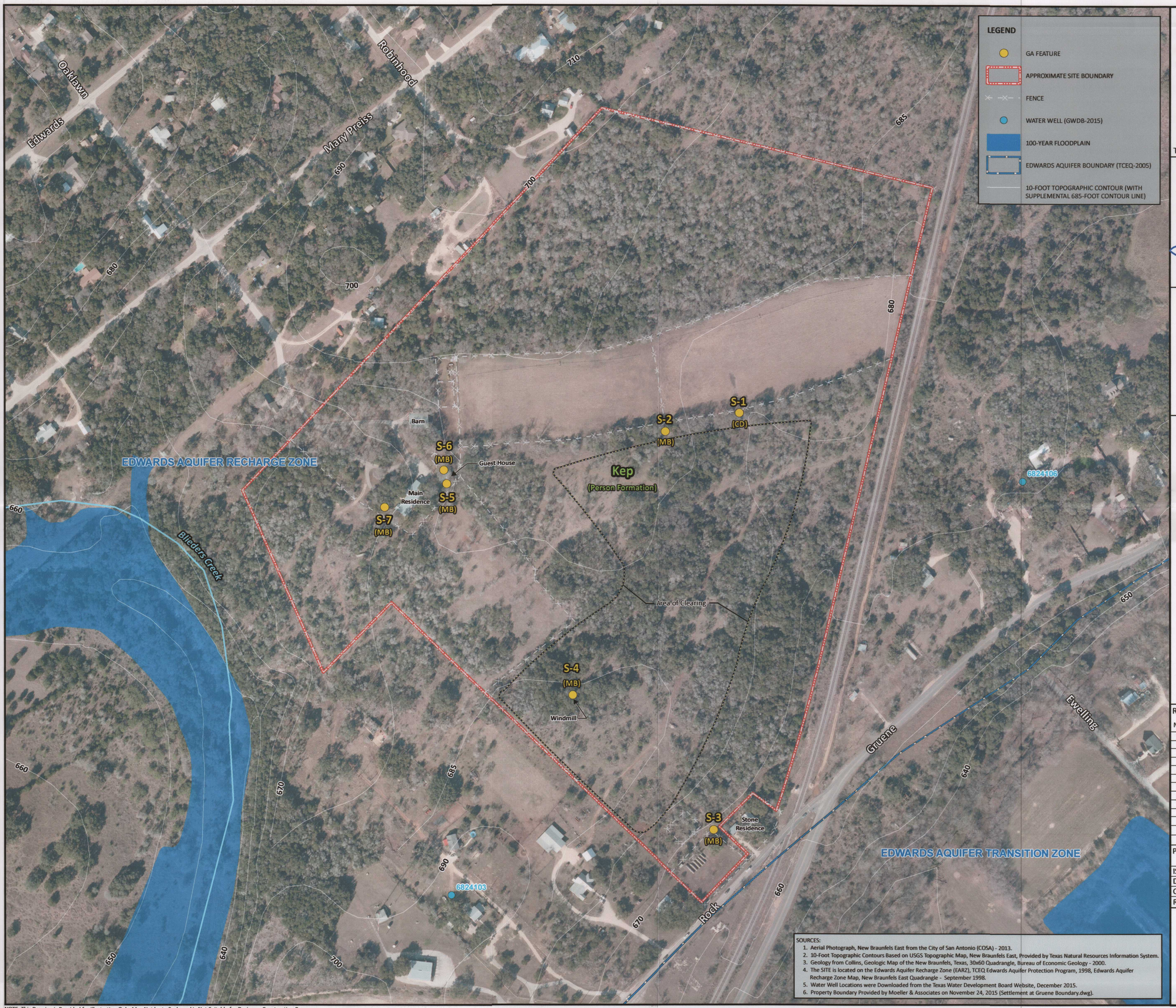
United States Department of Agriculture (USDA), 1962, Soil Survey of Comal and Hays Counties, Texas; USDA / Soil Conservation Service / Texas Agricultural Experiment Station, Issued June 1984.

United States Department of Agriculture (USDA), 1986, Urban Hydrology for Small Watersheds; USDA / Natural Resource Conservation Service, Technical Release (TR-) 55, June 1986.

ATTACHMENT D

SITE GEOLOGIC MAP

FEATURE POSITION TABLE
(GPS COORDINATES)



SOURCES:

1. Aerial Photograph, New Braunfels East from the City of San Antonio (COSA) - 2013.
2. 10-Foot Topographic Contours Based on USGS Topographic Map, New Braunfels East, Provided by Texas Natural Resources Information System.
3. Geology from Collins, Geologic Map of the New Braunfels, Texas, 30x60 Quadrangle, Bureau of Economic Geology - 2000.
4. The SITE is located on the Edwards Aquifer Recharge Zone (EARZ), TCEQ Edwards Aquifer Protection Program, 1998, Edwards Aquifer Recharge Zone Map, New Braunfels East Quadrangle - September 1998.
5. Water Well Locations were Downloaded from the Texas Water Development Board Website, December 2015.
6. Property Boundary Provided by Moeller & Associates on November 24, 2015 (Settlement at Gruene Boundary.dwg).

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

RABA KISTNER ENVIRONMENTAL
Raba Kistner Environmental, Inc.
12821 West Golden Lane
San Antonio, Texas 78249
P 210 :: 699 :: 9090
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TBPE Firm F-3257 / TBPG Firm F-50220

12-2-15

STATE OF TEXAS
RICHARD V. KLAR
GEOLOGY
259
LICENSED
PROFESSIONAL GEOSCIENTIST

SITE GEOLOGIC MAP

SETTLEMENT AT GRUENE
NEW BRAUNFELS, COMAL COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF14-181-01
ISSUE DATE:	12-02-15
DRAWN BY:	LAW
CHECKED BY:	RAS
REVIEWED BY:	RVK

N
W E
S

0 50 100 200
FEET
1 INCH = 200 FEET

FEATURE POSITION TABLE

Settlement at Gruene

New Braunfels, Comal County, Texas

RKEI Project No. ASF14-181-01

Feature Designation	Feature Type	Date Collected	North Latitude	West Longitude	UTM Northing (meters)	UTM Easting (meters)
S-1	Non-karst closed depression	12/1/2014	N29 44 7.21	W98 6 59.33	3289786	585440
S-2	Manmade feature in bedrock (Irrigation Well)	12/1/2014	N29 44 6.65	W98 7 2.03	3289767	585369
S-3	Manmade feature in bedrock (Water Well)	12/2/2014	N29 43 54.00	W98 7 0.39	3289376	585414
S-4	Manmade feature in bedrock (Water Well)	12/2/2014	N29 43 58.31	W98 7 5.51	3289511	585276
S-5	Manmade feature in bedrock (Water Well)	12/1/2014	N29 44 5.05	W98 7 10.058	3289723	585146
S-6	Manmade feature in bedrock (Septic Tank)	12/1/2014	N29 44 5.49	W98 7 10.15	3289731	585150
S-7	Manmade feature in bedrock (Septic System)	12/1/2014	N29 44 4.31	W98 7 12.32	3289704	585061

NOTES:

1) Geographic coordinates are presented Degrees, Minutes, Decimal Seconds
2) Reference Datum is NAD 83
3) Data were collected utilizing a ***Garmin 60Cx Global Positioning System***
4) Horizontal Accuracy: RMS Value < 3 meter ground resolution
5) GPS data were collected by Rick Sample (**RKEI** Environmental Professional)

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: Shane Klar, P.E

Date: 12/7/15

Signature of Customer/Agent:

Regulated Entity Name: Settlement at Gruene

Regulated Entity Information

1. The type of project is:

   ☒ Residential: Number of Lots:240
   ☐ Residential: Number of Living Unit Equivalents:_____
   ☐ Commercial
   ☐ Industrial
   ☐ Other:_____

2. Total site acreage (size of property):73.37

3. Estimated projected population:840

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	732,000	÷ 43,560 =	16.80
Parking	288,000	÷ 43,560 =	6.61
Other paved surfaces	341,670	÷ 43,560 =	7.85
Total Impervious Cover	1,361,670	÷ 43,560 =	31.26

Total Impervious Cover 31.26 ÷ **Total Acreage** 73.37 **X 100 =** 42.6% **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	84,000Gallons/day
_____% Industrial	_____Gallons/day
_____% Commingled	_____Gallons/day
TOTAL gallons/day 84,000	

15. Wastewater will be disposed of by:

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

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

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

☒ Sewage Collection System (Sewer Lines):

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

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

☐ The SCS was previously submitted on_____.

☐ The SCS was submitted with this application.

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

☒ The sewage collection system will convey the wastewater to the Gruene Wastewater (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): FEMA Panel Number 48091C0455F 9/2/2009

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

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

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

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

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

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

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

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

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

26. ☐ Surface waters (including wetlands).

    ☒ N/A

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

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

28. ☒ Legal boundaries of the site are shown.

Administrative Information

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

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

ATTACHMENT "A"
Factors Affecting Water Quality

The development will be a low density, single family residential development with approximately 10,200 linear feet of street and associated infrastructure and 4 proposed sand filter ponds. This will result in minimal to no pollution from the site. Some pollution may originate from automobile wastes and cleaning chemicals which may have an effect on surface water by sediments leaving the site after a rainfall event.

ATTACHMENT "B"
Volume and Character of Stormwater

The development of this site will result in a minimal increase in stormwater run-off. Throughout the design of the subdivision, the watersheds will be sub-divided in order to size drainage culverts and check street capacities. Due to the city of New Braunfels' storm water detention requirement, the post development run-off leaving the site will not exceed the pre-development run-off. All existing drainage patterns will remain.

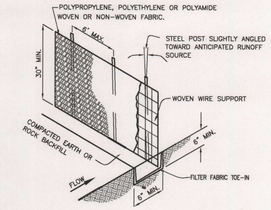
Drainage patterns for the site will remain relatively unchanged. Low areas and swales will remain in their original condition, therefore offering natural vegetative filtering capabilities. In addition to the natural vegetation 4 sand filter ponds will be constructed which will result in the quality of stormwater run-off leaving the site remaining relatively unchanged.

ATTACHMENT "C"
Suitability Letter from Authorized Agent

There is no proposed OSSF.

ATTACHMENT "D"
Exception to the Required Geologic Assessment

No exception will be requested.



SILT FENCE

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 YBAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT2, 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. POST MUST BE EMBEDDED A MINIMUM OF 1— FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.
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.

INSPECTION AND MAINTENANCE GUIDELINES:

1. INSPECT ALL FENCING WEEKLY, AND AFTER ANY RAINFALL.
2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.
3. REPLACE ANY TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.
4. REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.
5. WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

HYDRAULIC MULCH

MATERIALS:

HYDRAULIC MULCHES: WOOD FIBER MULCH CAN BE APPLIED ALONE OR AS A COMPONENT OF HYDRAULIC MATRICES. WOOD FIBER APPLIED ALONE IS TYPICALLY APPLIED AT THE RATE OF 2,000 TO 4,000 LB/ACRE. WOOD FIBER MULCH IS MANUFACTURED FROM WOOD OR WOOD WASTE FROM LUMBER MILLS OR FROM URBAN SOURCES.

HYDRAULIC MATRICES: HYDRAULIC MATRICES INCLUDE A MIXTURE OF WOOD FIBER AND ACRYLIC POLYMER OR OTHER TACKIFIER AS BINDER. APPLY AS A LIQUID SLURRY USING A HYDRAULIC APPLICATION MACHINE (I.E., HYDRO SEEDER) AT THE FOLLOWING MINIMUM RATES, OR AS SPECIFIED BY THE MANUFACTURER TO ACHIEVE COMPLETE COVERAGE OF THE TARGET AREA: 2,000 TO 4,000 LB/ACRE WOOD FIBER MULCH, AND 5 TO 10% (BY WEIGHT) OF TACKIFIER (ACRYLIC COPOLYMER, GUAR, PSYLLIUM, ETC.)

BONDED FIBER MATRIX: BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SYSTEM OF FIBERS AND ADHESIVES THAT UPON DRYING FORMS AN EROSION RESISTANT BLANKET THAT PROMOTES VEGETATION, AND PREVENTS SOIL EROSION. BFMS ARE TYPICALLY APPLIED AT RATES FROM 3,000 LB/ACRE TO 4,000 LB/ACRE BASED ON THE MANUFACTURER'S RECOMMENDATION. A BIODEGRADABLE BFM IS COMPOSED OF MATERIALS THAT ARE 100% BIODEGRADABLE. THE BINDER IN THE BFM SHOULD ALSO BE BIODEGRADABLE AND SHOULD NOT DISSOLVE OR DISPERSE UPON RE—WETTING. TYPICALLY, BIODEGRADABLE BFMS SHOULD NOT BE APPLIED IMMEDIATELY BEFORE, DURING OR IMMEDIATELY AFTER RAINFALL IF THE SOIL IS SATURATED. DEPENDING ON THE PRODUCT, BFMS TYPICALLY REQUIRE 12 TO 24 HOURS TO DRY AND BECOME EFFECTIVE.

INSTALLATION:

1. PRIOR TO APPLICATION, ROUGHEN EMBANKMENT AND FILL AREAS BY ROLLING WITH A CRIMPING OR PUNCHING TYPE ROLLER OR BY TRACK WALKING. TRACK WALKING SHALL ONLY BE USED WHERE OTHER METHODS ARE IMPRACTICAL.
2. TO BE EFFECTIVE, HYDRAULIC MATRICES REQUIRE 24 HOURS TO DRY BEFORE RAINFALL OCCURS.
3. AVOID MULCH OVER SPRAY ONTO ROADS, SIDEWALKS, DRAINAGE CHANNELS, EXISTING VEGETATION, ETC.

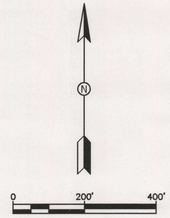
INSPECTION AND MAINTENANCE GUIDELINES:

1. MULCHED AREAS SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.
2. AREAS DAMAGED BY STORMS OR NORMAL CONSTRUCTION ACTIVITIES SHOULD BE REGRADED AND HYDRAULIC MULCH REAPPLIED AS SOON AS PRACTICAL.

TOTAL LAND AREA	=	73.37 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	12.04 AC
TOTAL IMPERVIOUS AREA	=	31.26 AC
% IMPERVIOUS	=	42.6%

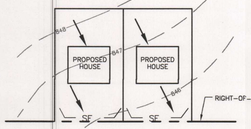
SOIL STABILIZATION NOTE

ALL DISTURBED SOILS SHOULD BE SEEDED OR OTHERWISE STABILIZED WITH 14 CALENDAR DAYS AFTER FINAL GRADING OR WHERE CONSTRUCTION ACTIVITY HAS TEMPORARILY CEASED FOR MORE THAN 21 DAYS.



LEGEND

- SF — SF — SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE/EXIT
- 900 EXISTING CONTOURS
- FLOW ARROWS
- DISTURBED AREA (INFRASTRUCTURE)
- OPEN SPACE/DRAINAGE



TYPICAL SILT FENCE AT RESIDENTIAL LOT

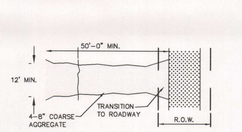
NOTE:
RESIDENTIAL LOT CONSTRUCTION MUST MEET THE REQUIREMENTS OF THIS WPAP AS WELL AS WITH LOCAL, STATE, AND FEDERAL REGULATIONS. TEMPORARY BMPS MUST BE IN PLACE PRIOR TO ANY RESIDENTIAL LOTS CONSTRUCTION.

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

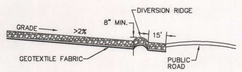
1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN 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 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. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL, OR OTHER SENSITIVE FEATURE.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE TEMPORARY STORM WATER SECTION OF THE APPROVED EDWARDS AQUIFER PROTECTION PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.
6. 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).
7. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50% A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.
8. 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).
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. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARY OR PERMANENTLY CEASE IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE. IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL ARID CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.
11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
    A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
    B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
    C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

AUSTIN REGIONAL OFFICE
2800 S. IH 35, SUITE 100
AUSTIN, TEXAS 78704—5712
PHONE (512) 339—2929
FAX (512) 339—3795

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



PLAN VIEW



PROFILE

STABILIZED CONSTRUCTION ENTRANCE / EXIT

MATERIALS:

1. THE AGGREGATE SHOULD CONSIST OF 4 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 RACK 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 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.

INSPECTION AND MAINTENANCE GUIDELINES:

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR LOWING 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.

811 Know what's below. Call before you dig.

STATE OF TEXAS
SHANE KLAR
115810
LICENSED PROFESSIONAL ENGINEER
12/8/15

NO	DATE	ISSUES AND REVISIONS

MOELLER & ASSOCIATES Engineering Solutions
1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX. 78130
PH: 830—358—7127 www.ma—tx.com
TBPE FIRM F—13351

WPAP SITE PLAN

PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

SHEET 1 OF 1

Drawing Name: N:\Projects\GRUE001\101 74 ac - Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan & Details.dwg User: shonekor Dec 08, 2015 - 8:34am

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.

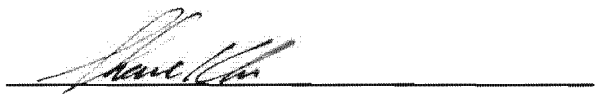
Signature

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: Shane Klar, P.E.

Date: 12/7/2015

Signature of Customer/Agent:



Regulated Entity Name: Settlement at Gruene

Project Information

Potential Sources of Contamination

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

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

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

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

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

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

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

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

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

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

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

Sequence of Construction

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

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

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

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

Temporary Best Management Practices (TBMPs)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

☒ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

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

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

Administrative Information

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

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

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

ATTACHMENT "A"
Spill Response Actions

Spill Prevention and Control

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

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

Education

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

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

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

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

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

General Measures

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

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

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

(4) Train employees in spill prevention and cleanup.

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

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

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

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

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

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

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

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

Cleanup

(1) Clean up leaks and spills immediately.

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

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

Minor Spills

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

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

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

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

(5) Contain the spread of the spill.

(6) Recover spilled materials.

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

Semi-Significant Spills

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

Spills should be cleaned up immediately:

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

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

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

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

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

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

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

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

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

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

More information on spill rules and appropriate responses is available on the TCEQ website at: http://www.tnrcc.state.tx.us/enforcement/emergency_response.html

Vehicle and Equipment Maintenance

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

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

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

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

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

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

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

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

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

Vehicle and Equipment Fueling

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

(2) Discourage "topping off" of fuel tanks.

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

ATTACHMENT "B"
Potential Sources of Contamination

The only potential sources of contamination are construction equipment leaks, re-fueling spills, port-o-lets, and the total suspended solids (TSS) due to the construction activities on-site. There are no other anticipated potential sources of contamination.

ATTACHMENT "C"
Sequence of Major Activities

Stages of Construction:

1. Clearing and Grubbing: Removal of trees, stumps, brush, and other debris within the proposed street right-of-way to allow for construction of streets. Approximate total disturbed area= 12.04 acres.
2. Rough Grading: Cutting of proposed roadway areas to prepare the roadbend for pavement layers. Approximate total disturbed are = 12.04 acres.
3. Culvert and Pond Installation: Culverts will be installed where needed to allow runoff under the proposed roads. Approximate total disturbed area = 2.5 acres.
4. Utility Installation: there will be underground water, telephone, cable television and electric lines installed primarily within the proposed streets. There will be minimal disturbance outside of the clearing and grubbing area.
5. Finished Grading: Final landscaping and asphalt pavement layers are installed. Approximate total disturbed area= 12.04 acres.
6. Residential Construction: Lots will be sold, and homes built at random times. The construction is very minimal and will average 50% of disturbed area per lot with an average lot size of 0.165 acre. Approximate total disturbance area= 19.8 acres.

ATTACHMENT "D"
Temporary BMP's and Measures

The following sequence will be followed for installing temporary BMP's:

1. Roadway centerline will be roughly cleared for surveying purposes. (No soil disturbance.)
2. Silt fence will be constructed on the downgradient side of proposed roadways prior to beginning clearing and grubbing operations.
3. A stabilized construction entrances will be established before clearing and grubbing equipment is delivered to the site.
4. Rock berms will be constructed downstream of proposed culvert and channel locations once rough grading has been completed and prior to culvert installations or channel construction.
5. Prior to beginning each individual home construction, silt fence will be constructed on the down gradient side of the lot.

A. The upgradient perimeter of the subdivision will remain in its natural vegetative state. As it has always done, this natural vegetation will filter pollutants originating upgradient of the site, preventing pollution of on-site runoff. A stabilized construction entrance will be constructed at the entrance of subdivision to filter upgradient pollutants.

B. Silt fence will be placed on the downgradient side of each proposed improvement to contain pollutants generated from onsite runoff. Soil disturbance will be limited to a minimal distance outside the proposed pavement and the parking pads. Disturbed areas will be seeded to replace destroyed vegetation. The existing vegetation located downgradient of each proposed improvement will work in conjunction with the silt fence, rock berms, and stabilized construction entrance to prevent pollution of water originating onsite and/or flowing offsite.

C. The majority of the property's natural vegetation will not be disturbed. This existing natural vegetation, in addition to the silt fences and stabilized construction entrances constructed upgradient of each stream and sensitive feature, will prevent pollutants from entering them as well as the aquifer. All of the low areas, which collect stormwater runoff, will remain in a natural state acting as vegetative filter strips.

D. There are no naturally-occurring sensitive features identified in the Geologic Assessment.

ATTACHMENT "E"
Request to Temporarily Seal a Feature

There will be no request to temporarily seal a feature.

ATTACHMENT "F"
Structural Practices

Stabilized Construction Exit and Silt fence will be used to protect disturbed soils and to prevent contamination from leaving the project site.

ATTACHMENT "G"
Drainage Area Map

See Drainage Area Map at the end of this section.

ATTACHMENT "H"
Temporary Sediment Pond Plans and Calculations

There will not be more than 10 acres of disturbed soil in one common drainage area that will occur at one time. Silt fence will be used for small drainage areas. No sediment ponds will be constructed due to the minimal amount of soil disturbance.

ATTACHMENT "I"
Inspection and Maintenance for BMP's

Inspection and Maintenance Plan

The contractor is required to inspect the control and fences at weekly intervals and after any rainfall events to insure that they are functioning properly. The contractor is required to document any changes on the Site Plan, documentation must include person performing task, task performed, and date. The contractor must also document if proper inspection measures have been taken while making changes. The person(s) responsible for maintenance controls and fences shall immediately make any necessary repairs to damaged areas.

Temporary Construction Entrance/Exit: 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. All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor. When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way. 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. All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

Silt Fence: Remove sediment when buildup reaches 6 inches. Replace any torn fabric or install a second line of fencing parallel to the torn section. Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points. 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.

TCEQ staff will be allowed full access to the property during construction of the project for inspecting controls and fences and to verify that the accepted plan is being utilized in the field. TCEQ staff has the right to speak with the contractor to verify plan changes and modifications.

Documentation: All scheduled inspection and maintenance measures made to the temporary BMPs must be documented clearly on the WPAP Site Plan showing inspection/maintenance measures performed, date, and person responsible for inspection and maintenance. Any changes made to the location or type of controls shown on the accepted plans, due to onsite conditions, shall be documented on the site plan that is part of this Water Pollution Abatement Plan. No other changes shall be made unless approved by TCEQ and the Design Engineer. Documentation shall clearly show changes made, date, person responsible for the change, and the reason for the change.

Owner's Information:

Owner: Gruene Rock, LLC.
Contact: Darren Gerlof
Phone: (210) 490-2777
Address: 14955 Bulverde Road
San Antonio, Texas 78247

Design Engineer:

Company: Moeller & Associates
Contact: Shane Klar, P.E.
Phone: (830) 358-7127
Address: 1040 N. Walnut Ave., Ste. B
New Braunfels, Texas 78130

Person or Firm Responsible for Erosion/Sedimentation Control Maintenance:

Company: _____
Contact: _____
Phone: _____
Address: _____

Signature of Responsible Party: _____

This portion of the form shall be filled out and signed by the responsible party prior to construction.

ATTACHMENT "J"
Schedule of Interim and Permanent Soil Stabilization Practices

Bair soils should be seeded or otherwise stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days.

Areas which are disturbed by construction staging and storage areas will be hydro mulched with the appropriate seed mixture. Areas between the edge of pavement and property line will also by hydro mulched. There will be no fill slopes exceeding a 3:1 slope, and all fill slopes will be hydro mulched. Installation and acceptable mixtures of hydro mulch are as follows:

Materials:

Hydraulic Mulches: Wood fiber mulch can be applied alone or as a component of hydraulic matrices. Wood fiber applied alone is typically applied at the rate of 2,000 to 4,000 lb/acre. Wood fiber mulch is manufactured from wood or wood waste from lumber mills or from urban sources.

Hydraulic Matrices: Hydraulic matrices include a mixture of wood fiber and acrylic polymer or other tackifier as binder. Apply as a liquid slurry using a hydraulic application machine (i.e., hydro seeder) at the following minimum rates, or as specified by the manufacturer to achieve complete coverage of the target area: 2,000 to 4,000 lb/acre wood fiber mulch, and 5 to 10% (by weight) of tackifier (acrylic copolymer, guar, psyllium, etc.)

Bonded Fiber Matrix: Bonded fiber matrix (BFM) is a hydraulically applied system of fibers and adhesives that upon drying forms an erosion resistant blanket that promotes vegetation, and prevents soil erosion. BFMs are typically applied at rates from 3,000 lb/acre to 4,000 lb/acre based on the manufacturer's recommendation. A biodegradable BFM is composed of materials that are 100% biodegradable. The binder in the BFM should also be biodegradable and should not dissolve or disperse upon re-wetting. Typically, biodegradable BFMs should not be applied immediately before, during or immediately after rainfall if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Seed Mixtures:

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

Fertilizer: Fertilizer should be applied at the rate of 40 pounds of nitrogen and 40 pounds of phosphorus per acre, which is equivalent to about 1.0 pounds of nitrogen and phosphorus per 1000 square feet.

Installation:

(1) Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where other methods are impractical.

(2) To be effective, hydraulic matrices require 24 hours to dry before rainfall occurs.

(3) Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

LEGEND

- LIMITS OF DRAINAGE BASIN
- LIMITS OF SUB-DRAINAGE AREA
- TC — TC — TIME OF CONCENTRATION
- 960 — EXISTING CONTOURS
- 900 — PROPOSED CONTOURS
- FLOW ARROWS
- A / 9.0 — DRAINAGE BASIN LABEL / BASIN AREA (AC)
- A1 / 2.0 — SUB-DRAINAGE AREA LABEL / SUB-DRAINAGE AREA (AC)
- A1 — INLET LABEL
- (A1) — ANALYSIS POINT LABEL

811 Know what's below. Call before you dig.

NO	DATE	ISSUES AND REVISIONS

MOELLER & ASSOCIATES
Engineering Solutions
1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX. 78130
PH: 830-358-7127 www.ma-tx.com
TBPE FIRM F-13351

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

DRAINAGE AREA MAP

PERMIT SET

SHEET 1 OF 1

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)(li), (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.

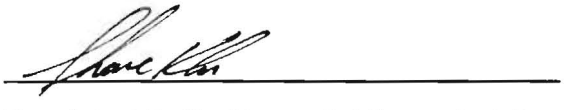
Signature

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: Shane Klar, P.E.

Date: 12/7/2015

Signature of Customer/Agent



Regulated Entity Name: Settlement at Gruene

Permanent Best Management Practices (BMPs)

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

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

   ☐ N/A

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

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

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

☐ N/A

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

   ☐ N/A

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

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

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

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

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

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

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

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

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

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

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

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

☒ N/A

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

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

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

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

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

☐ N/A

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

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

☐ N/A

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

☒ N/A

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

☐ N/A

Responsibility for Maintenance of Permanent BMP(s)

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

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

☐ N/A

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

☐ N/A

ATTACHMENT "A"
20% or Less Impervious Cover Waiver

The proposed development at Settlement at Gruene will exceed 20% impervious cover and will not be used for multi-family residential developments, schools, or small business sites.

ATTACHMENT "B"
BMP's for Upgradient Stormwater

The stormwater generated upgradient of the site is minimal. Minor grading around proposed improvements will allow upstream runoff to be diverted away from areas being treated. Due to the rural nature of the development, stormwater originating upgradient will have minimal to no pollutant load. Most upgradient stormwater flows across grassy areas prior to reaching the proposed improvements.

ATTACHMENT "C"
BMP's for On-Site Stormwater

The permanent BMP's used to treat on-site stormwater runoff will be Sand Filter Ponds. Please refer to the WPAP Site Plan for areas of treatment and BMP structures used.

ATTACHMENT "D"
BMP's for Surface Streams

The Sand Filter Ponds will be installed to prevent pollutants from entering surface streams and, ultimately, the aquifer. There were no sensitive features identified by the Geological Assessment.

The natural vegetation located downgradient of proposed improvements will provide additional filtration to help prevent pollution from entering streams, sensitive features, and the aquifer.

ATTACHMENT "D"
Construction Plans

See attached TTS Removal Calculations/Permanent BMP Design document.

ATTACHMENT "G"
Inspection, Maintenance, Repair, and Retrofit Plan

Sand Filter Systems Maintenance and Monitoring Procedures

- *Inspections.* BMP facilities must be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. During each

inspection, erosion areas inside and downstream of the BMP must be identified and repaired or revegetated immediately. With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) must be identified and repaired immediately. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage.

- *Sediment Removal.* Remove sediment from the inlet structure and sedimentation chamber when sediment buildup reaches a depth of 6 inches or when the proper functioning of inlet and outlet structures is impaired. Sediment should be cleared from the inlet structure at least every year and from the sedimentation basin at least every 5 years.

- *Media Replacement.* Maintenance of the filter media is necessary when the drawdown time exceeds 48 hours. When this occurs, the upper layer of sand should be removed and replaced with new material meeting the original specifications. Any discolored sand should also be removed and replaced. In filters that have been regularly maintained, this should be limited to the top 2 to 3 inches.

- *Debris and Litter Removal.* Debris and litter will accumulate near the sedimentation basin outlet device and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the control device or riser.

- *Filter Underdrain.* Clean underdrain piping network to remove any sediment buildup as needed to maintain design drawdown time.

- *Mowing.* Grass areas in and around sand filters must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. Vegetation on the pond embankments should be mowed as appropriate to prevent the establishment of woody vegetation.

ATTACHMENT "I"

Measures for Minimizing Surface Stream Contamination

All surface streams will be protected from erosion by not allowing runoff to exceed existing velocities. The stormwater runoff for the property will be directed into one of the 4 proposed sand filter ponds where the pollutants will be removed.

Attachment "G"

Maintenance Plan for Sand Filtration Basin

Location: The sand filtration basin will be located as shown in the plans attached to this permit.

Owner: Gruene Rock LLC.
14955 Bulverde Rd
San Antonio, TX 78247-2631
Phone: (210) 490-2777

Sand Filtration Basin Maintenance and Monitoring Procedures will be implemented to ensure that the proposed BMP functions as designed.

Darren Gerloff
Gruene Rock LLC

11/11/15
Date

I have reviewed the attached maintenance and monitoring procedures and to the best of my knowledge certify that, if they are followed as outlined, the Sand Filtration Basin will function as designed.

12/7/15

Shane Klar, P.E.

TSS REMOVAL CALCULATIONS/PERMANENT BMP DESIGN

FOR

SETTLEMENT AT GRUENE

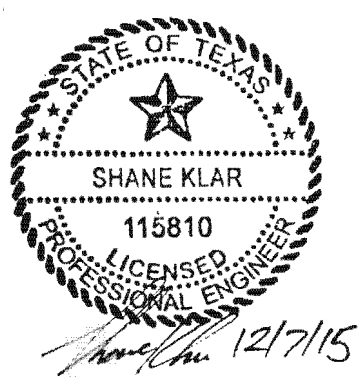
PREPARED BY

MOELLER & ASSOCIATES
Engineering Solutions

F-13351

Shane Klar, P.E.
1040 N. Walnut Ave., Ste B
New Braunfels, TX 78130

Prepared
December 7, 2015



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corn
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will

1. The Required Load Reduction for the total project: Calculations from RG-348

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

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resul
A_N = Net increase in impervious a
P = Average annual precipitation

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

County =	Comal	
Total project area included in plan * =	73.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	31.26	acres
Total post-development impervious cover fraction * =	**0.43**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**28059**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 4

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

Drainage Basin/Outfall Area No. = 1

Total drainage basin/outfall area =	8.62	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	3.28	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.38**	
$L_{M\ THIS\ BASIN}$ =	**2944**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = **89** percent

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

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

where:

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

A_C =	8.62	acres
A_I =	3.28	acres
A_P =	**5.34**	acres
L_R =	**3418**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	2944	lbs.
F =	**0.86**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth =	**1.38**	inches
Post Development Runoff Coefficient =	**0.30**	
On-site Water Quality Volume =	**12849**	cubic feet

Calculations from RG-348

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet

Storage for Sediment =	**2570**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**15419**	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

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

Irrigation Area Calculations:

Soil infiltration/permeability rate =	0.1	in/hr
Irrigation area =	**NA**	square feet
	NA	acres

8. Extended Detention Basin System — Designed as Required in RG

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

9. Filter area for Sand Filters — Designed as Required in RG

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**15419**	cubic feet
Minimum filter basin area =	**714**	square feet
Maximum sedimentation basin area =	**6424**	square feet
Minimum sedimentation basin area =	**1606**	square feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	**15419**	cubic feet
Minimum filter basin area =	**1285**	square feet
Maximum sedimentation basin area =	**5140**	square feet
Minimum sedimentation basin area =	**321**	square feet

10. Bioretention System — Designed as Required in RG

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

11. Wet Basins — Designed as Required in RG

Required capacity of Permanent Pool =	**NA**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

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1. The Required Load Reduction for the total project: Calculations from RG-348

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

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resul
A_N = Net increase in impervious a
P = Average annual precipitation

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

County =	Comal	
Total project area included in plan * =	73.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	31.26	acres
Total post-development impervious cover fraction * =	**0.43**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**28059**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 4

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

Drainage Basin/Outfall Area No. = 2

Total drainage basin/outfall area =	22.69	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	10.04	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.44**	
$L_{M\ THIS\ BASIN}$ =	**9012**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = **89** percent

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

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

where:

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

A_C =	22.69	acres
A_I =	10.04	acres
A_P =	**12.65**	acres
L_R =	**10403**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	9012	lbs.
F =	**0.87**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth =	**1.44**	inches
Post Development Runoff Coefficient =	**0.33**	
On-site Water Quality Volume =	**38850**	cubic feet

Calculations from RG-348

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet

Storage for Sediment =	**7770**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**46620**	cubic feet

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

7. Retention/Irrigation System — Designed as Required in RG

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

Irrigation Area Calculations:

Soil infiltration/permeability rate =	0.1	in/hr
Irrigation area =	**NA**	square feet
	NA	acres

8. Extended Detention Basin System — Designed as Required in RG

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

9. Filter area for Sand Filters — Designed as Required in RG

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**46620**	cubic feet
Minimum filter basin area =	**2158**	square feet
Maximum sedimentation basin area =	**19425**	square feet
Minimum sedimentation basin area =	**4856**	square feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	**46620**	cubic feet
Minimum filter basin area =	**3885**	square feet
Maximum sedimentation basin area =	**15540**	square feet
Minimum sedimentation basin area =	**971**	square feet

10. Bioretention System — Designed as Required in RG

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

11. Wet Basins — Designed as Required in RG

Required capacity of Permanent Pool =	**NA**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corn
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Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	73.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	31.26	acres
Total post-development impervious cover fraction * =	**0.43**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**28059**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 4

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

Drainage Basin/Outfall Area No. = 3

Total drainage basin/outfall area =	33.15	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	14.47	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.44**	
$L_{M\ THIS\ BASIN}$ =	**12988**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = **89** percent

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

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

where:

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

A_C =	33.15	acres
A_I =	14.47	acres
A_P =	**18.68**	acres
L_R =	**15001**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	12988	lbs.
F =	**0.87**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth =	**1.44**	inches
Post Development Runoff Coefficient =	**0.32**	
On-site Water Quality Volume =	**56246**	cubic feet

Calculations from RG-348

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet

Storage for Sediment =	**11249**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**67496**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG

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

Irrigation Area Calculations:

Soil infiltration/permeability rate =	0.1	in/hr
Irrigation area =	**NA**	square feet
	NA	acres

8. Extended Detention Basin System Designed as Required in RG

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

9. Filter area for Sand Filters Designed as Required in RG

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**67496**	cubic feet
Minimum filter basin area =	**3125**	square feet
Maximum sedimentation basin area =	**28123**	square feet
Minimum sedimentation basin area =	**7031**	square feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	**67496**	cubic feet
Minimum filter basin area =	**5625**	square feet
Maximum sedimentation basin area =	**22499**	square feet
Minimum sedimentation basin area =	**1406**	square feet

10. Bioretention System Designed as Required in RG

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

11. Wet Basins Designed as Required in RG

Required capacity of Permanent Pool =	**NA**	cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corn
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will

1. The Required Load Reduction for the total project: Calculations from RG-348

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

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resul
A_N = Net increase in impervious a
P = Average annual precipitation

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

County =	Comal	
Total project area included in plan * =	73.37	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	31.26	acres
Total post-development impervious cover fraction * =	**0.43**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**28059**	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 4

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

Drainage Basin/Outfall Area No. = 4

Total drainage basin/outfall area =	8.91	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	3.47	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.39**	
$L_{M\ THIS\ BASIN}$ =	**3115**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = **89** percent

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

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

where:

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

A_C =	8.91	acres
A_I =	3.47	acres
A_P =	**5.44**	acres
L_R =	**3612**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	3115	lbs.
F =	**0.86**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth =	**1.38**	inches
Post Development Runoff Coefficient =	**0.30**	
On-site Water Quality Volume =	**13472**	cubic feet

Calculations from RG-348

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet

Storage for Sediment =	**2694**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**16166**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG

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

Irrigation Area Calculations:

Soil infiltration/permeability rate =	0.1	in/hr
Irrigation area =	**NA**	square feet
	NA	acres

8. Extended Detention Basin System Designed as Required in RG

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

9. Filter area for Sand Filters Designed as Required in RG

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =	**16166**	cubic feet
Minimum filter basin area =	**748**	square feet
Maximum sedimentation basin area =	**6736**	square feet
Minimum sedimentation basin area =	**1684**	square feet

9B. Partial Sedimentation and Filtration System

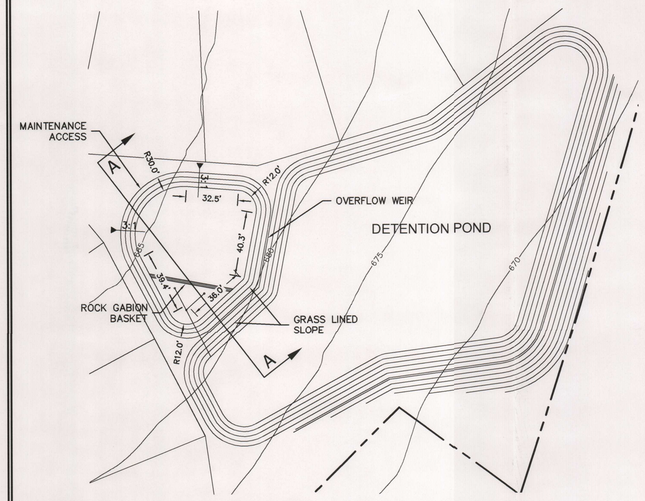
Water Quality Volume for combined basins =	**16166**	cubic feet
Minimum filter basin area =	**1347**	square feet
Maximum sedimentation basin area =	**5389**	square feet
Minimum sedimentation basin area =	**337**	square feet

10. Bioretention System Designed as Required in RG

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

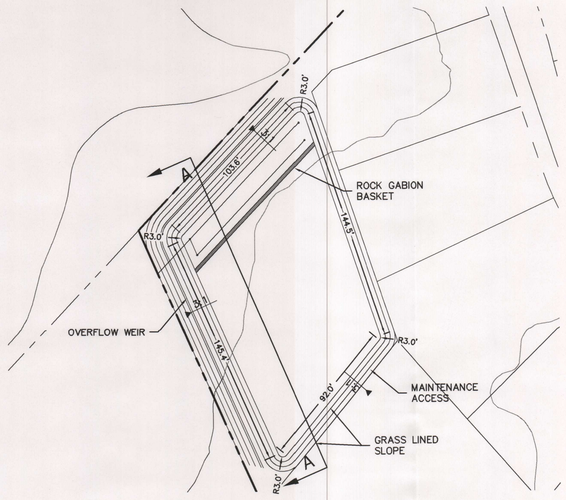
11. Wet Basins Designed as Required in RG

Required capacity of Permanent Pool =	**NA**	cubic feet



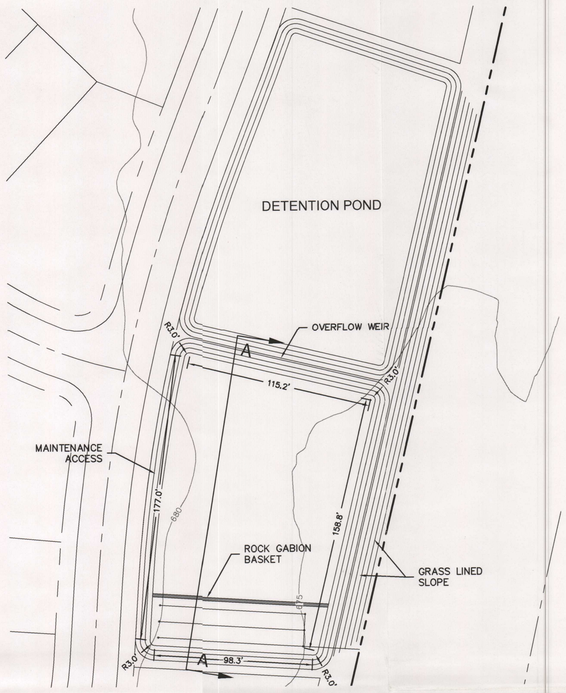
1 Sand Filter Basin #1

Scale: 1"=40'



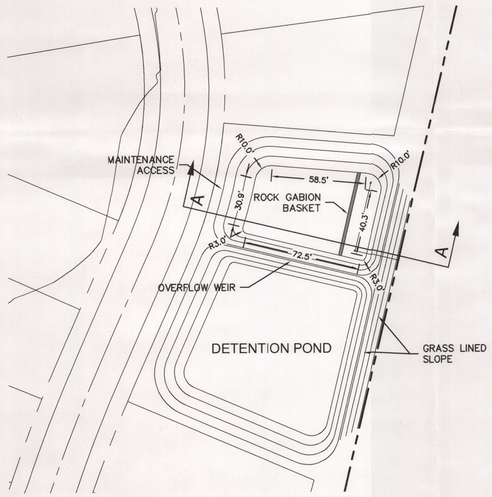
2 Sand Filter Basin #2

Scale: 1"=40'



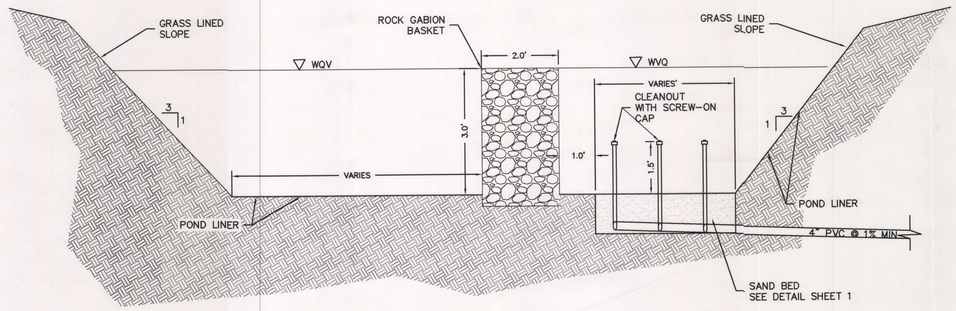
3 Sand Filter Basin #3

Scale: 1"=40'



4 Sand Filter Basin #4

Scale: 1"=40'



1 Section A-A

Not to Scale

Basin	Proposed BMP	Water Quality Volume (WQV) ft³		Filter Area ft²	
		Minimum	Provided	Minimum	Provided
1	Sand Filter (full)	15,419	16,000	714	750
2	Sand Filter (full)	46,620	49,200	2,158	2,200
3	Sand Filter (full)	67,496	67,770	3,125	3,200
4	Sand Filter (full)	16,166	16,820	748	750

TSS Removal Summary

Basin	Contributing Area	Existing Imp. Cover	Proposed Imp. Cover	Req. TSS Removal (lbs)	Design TSS Removal (lbs)	BMP
1	8.62	0.00	3.28	2,944	2,944	Sand Filter
2	22.69	0.00	10.04	9,012	9,012	Sand Filter
3	33.15	0.00	14.47	12,988	12,988	Sand Filter
4	8.91	0.00	3.47	3,115	3,115	Sand Filter

STATE OF TEXAS
SHANE KLAR
115810
LICENSED PROFESSIONAL ENGINEER
12/10/15

NO	DATE	ISSUES AND REVISIONS

MOELLER & ASSOCIATES Engineering Solutions
1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX. 78130
PH: 830-358-7127 www.ma-tx.com
TBPE FIRM F-13351

WPAP - POND DETAILS

PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

SHEET 2 OF 2

Drawing Name: K:\Projects\GRU2001.101 74 oc - Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan & Details.dwg Dec 10, 2015 - 11:46am User: shonekor

BASIN 1

TOTAL LAND AREA	=	8.62 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	1.13 AC
TOTAL IMPERVIOUS AREA	=	3.28 AC
% IMPERVIOUS	=	38.0%

BASIN 2

TOTAL LAND AREA	=	22.69 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	7.12 AC
TOTAL IMPERVIOUS AREA	=	10.04 AC
% IMPERVIOUS	=	44.3%

BASIN 3

TOTAL LAND AREA	=	33.15 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	2.96 AC
TOTAL IMPERVIOUS AREA	=	14.47 AC
% IMPERVIOUS	=	43.7%

BASIN 4

TOTAL LAND AREA	=	8.91 AC
TOTAL DISTURBED AREA (INFRASTRUCTURE)	=	0.83 AC
TOTAL IMPERVIOUS AREA	=	3.47 AC
% IMPERVIOUS	=	38.8%

LEGEND

BASIN BOUNDARY

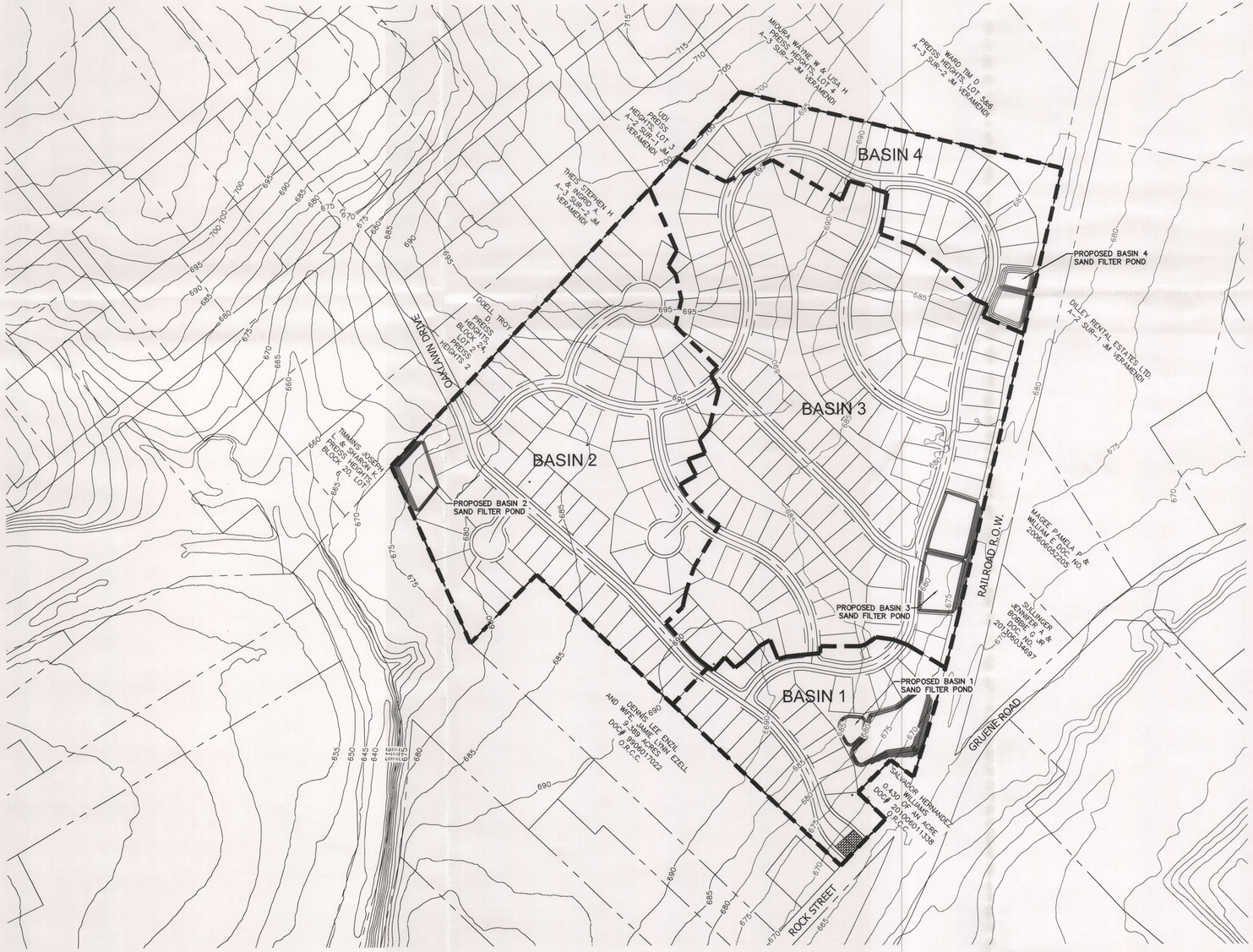
N

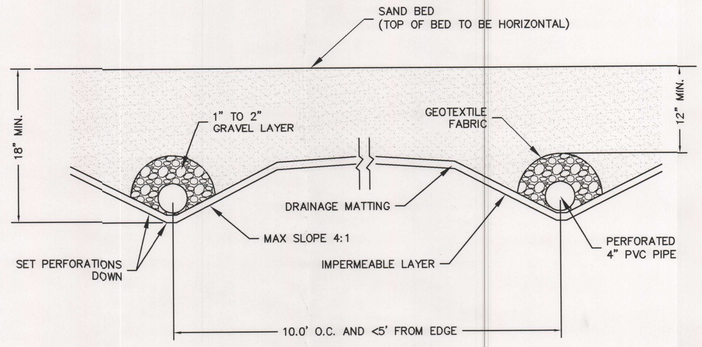
0 200' 400'

Basin	Proposed BMP	Water Quality Volume (WQV) ft³		Filter Area ft²	
		Minimum	Provided	Minimum	Provided
1	Sand Filter (full)	15,419	16,000	714	750
2	Sand Filter (full)	46,620	49,200	2,158	2,200
3	Sand Filter (full)	67,496	67,770	3,125	3,200
4	Sand Filter (full)	16,166	16,820	748	750

TSS Removal Summary

Basin	Contributing Area	Existing Imp. Cover	Proposed Imp. Cover	Req. TSS Removal (lbs)	Design TSS Removal (lbs)	BMP
1	8.62	0.00	3.28	2,944	2,944	Sand Filter
2	22.69	0.00	10.04	9,012	9,012	Sand Filter
3	33.15	0.00	14.47	12,988	12,988	Sand Filter
4	8.91	0.00	3.47	3,115	3,115	Sand Filter

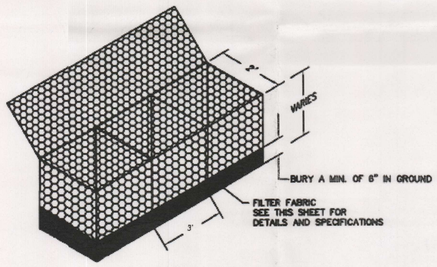




1 SAND BED PROFILE (TRENCH DESIGN)

Not to Scale

*NOTE: ALL CLEANOUTS TO HAVE SCREW-ON CAPS



GABION BASKET DETAIL

SCALE: NTS

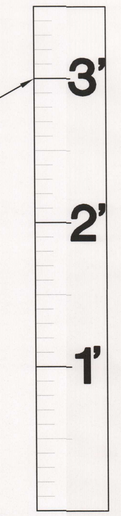
1. STONE
   STONE FILL MATERIAL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE OF THE SIZE INDICATED, 6 TO 9 INCHES IN SIZE OR AS APPROVED BY THE ENGINEER AND RESISTANT TO THE ACTION OF AIR AND WATER AND SUITABLE IN ALL RESPECTS FOR THE PURPOSE INTENDED.
2. WIRE CONTAINERS
   WIRE MESH SHALL CONSIST OF PLASTIC COATED (P.V.C.) GALVANIZED WIRE 0.120 INCH IN DIAMETER MINIMUM AND SHALL EQUAL OR EXCEED FEDERAL SPECIFICATION QQ-W-461G, CLASS 3 UNLESS OTHERWISE INDICATED. OPENING OF THE MESH SHALL NOT EXCEED APPROXIMATELY 4 INCHES IN THE LONGEST DIMENSION. THE WIRE MESH IS TO BE FABRICATED IN SUCH MANNER AS TO BE NONRAVELING. TIE AND CONNECTING WIRE SHALL BE OF THE SAME TYPE AND SIZE AS THE BASKETS AND SHALL BE SUPPLIED IN SUFFICIENT QUANTITY FOR SECURELY FASTENING ALL EDGES OF THE GABION AND DIAPHRAGMS.
3. FILTER FABRIC
   FILTER FABRIC SHALL BE NON-BIODEGRADABLE ULTRAVIOLET STABILIZED, INERT TO MOST SOIL CHEMICALS, UNAFFECTED BY MOISTURE WHICH ALLOWS WATER TO PASS THROUGH WHILE RETAINING SOIL PARTICLES AND SHALL CONFORM TO ITEM NO. 620, "FILTER FABRIC".

Table 3-6 Clay Liner Specifications (COA, 2004)

Property	Test Method	Unit	Specification
Permeability	ASTM D-2434	cm/sec	1×10^{-6}
Plasticity Index of Clay	ASTM D-423 & D-424	%	Not less than 15
Liquid Limit of Clay	ASTM D-2216	%	Not less than 30
Clay Particles Passing	ASTM D-422	%	Not less than 30
Clay Compaction	ASTM D-2216	%	95% of Standard Proctor Density

Table 3-7 Geotextile Fabric Specifications (COA, 2004)

Property	Test Method	Unit	Specification (min)
Unit Weight		oz/yd²	8
Filtration Rate		in/sec	0.08
Puncture Strength	ASTM D-751*	lb	125
Mullen Burst Strength	ASTM D-751	psi	400
Tensile Strength	ASTM D-1682	lb	200
Equiv. Opening Size *modified	US Standard Sieve	No.	80



1 Sediment Depth Marker

Not to Scale

811 Know what's below. Call before you dig.

STATE OF TEXAS
SHANE KLAR
115810
LICENSED PROFESSIONAL ENGINEER
12/8/15

NO	DATE	ISSUES AND REVISIONS

MOELLER & ASSOCIATES Engineering Solutions
1040 N. WALNUT AVE. STE. B, NEW BRAUNFELS, TX. 78130
PH: 830-358-7127 www.ma-tx.com
TBPE FIRM F-13351

WPAP -DRAINAGE BASIN MAP

PERMIT SET

SETTLEMENT AT GRUENE

NEW BRAUNFELS, TX 78130

SHEET 1 OF 1

Drawing Name: N:\Projects\GRUE001.101 74 ac - Settlement at Gruene\Engineering Reports\WPAP\WPAP Site Plan & Details.dwg User: shonekor Dec 08, 2015 - 8:32am

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

I **Darren Gerloff**,
Print Name

President,
Title - Owner/President/Other

of **Gruene Rock, LLC**,
Corporation/Partnership/Entity Name

have authorized **Shane Klar, P.E.**
Print Name of Agent/Engineer

of **Moeller & Associates**
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 applicants 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.

Applicant's Signature _____ Date 11/11/15

KELLY K. PAPE
Notary Public, State of Texas
My Commission Expires
September 16, 2019

THE STATE OF TX §

County of Comal §

BEFORE ME, the undersigned authority, on this day personally appeared Darren Gerdes 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 11th day of November, 2015.

Kelly K Pape
NOTARY PUBLIC

Kelly K Pape
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 9/16/19

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Settlement at Gruene
Regulated Entity Location: 1442 Oaklawn Drive
Name of Customer: Gruene Rock, LLC
Contact Person: Shane Klar, P.E. (Agent) Phone: 830-358-7127
Customer Reference Number (if issued):CN _____
Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☒ Comal ☐ Kinney

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

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

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

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	73.37 Acres	$ 6,500
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	$
Sewage Collection System	L.F.	$
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 12/7/15

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

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

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

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

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

2. Customer Reference Number (if issued)

CN

Follow this link to search for CN or RN numbers in Central Registry**

3. Regulated Entity Reference Number (if issued)

RN

SECTION II: Customer Information

4. General Customer Information | 5. Effective Date for Customer Information Updates (mm/dd/yyyy) 12/8/2015

☒ 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: e.g.: Doe, John) | If new Customer, enter previous Customer below:

Gruene Rock, 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)
0802107804	32055763094	N/A	N/A

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☒ Other: Limited Liability Company

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: 14955 Bulverde Road

City	State	ZIP	ZIP + 4
San Antonio	TX	78247	2631

16. Country Mailing Information (if outside USA)

17. E-Mail Address (if applicable) firedup2@aol.com

18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)
(210) 490 - 2777		(210) 494 - 0610

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.)

Settlement at Gruene

23. Street Address of the Regulated Entity: (No PO Boxes)							
	City		State		ZIP		ZIP + 4	
24. County	Comal						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	The project is located on the west side of Rock Street approximately 900 feet north of the intersection with Loop 337.						
26. Nearest City				State		Nearest ZIP Code	
New Braunfels				TX		78132	
27. Latitude (N) In Decimal:	29.733601			28. Longitude (W) In Decimal:	-98.117212		
Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	
29	44	0.96		-98	7	1.96	

29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)
1521	N/A	236115	N/A

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

Single Family Home Construction

34. Mailing Address:	14955 Bulverde Road						
	City	San Antonio	State	TX	ZIP	78247	ZIP + 4	2631
35. E-Mail Address:	firedup2@aol.com						

36. Telephone Number	37. Extension or Code	38. Fax Number (if applicable)
(210) 490 - 2777		(210) 494 - 0610

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:	Shane Klar, P.E.		41. Title: AuthorizedAgent
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(830) 358 - 7127		(830) 515 - 5611	shaneklar@ma-tx.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:	Moeller & Associates	Job Title:	Engineer
Name(*In Print*):	Shane Klar, P.E.	Phone:	(830)358-7127
Signature:		Date:	12/8/15