TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 10, 2008

Mr. Chris McMonagle
Southerland Communities NB Land Properties, Ltd.
9670 Ranch Road 12
Wimberley, Texas 78676

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Copper Ridge; Located on the south side of Highway 46, two miles west of FM 2722; New Braunfels ETJ, Texas
TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer
Edwards Aquifer Protection Program ID No. 2726.00; Investigation No. 598538; Regulated Entity No. RN105363956

Dear Mr. McMonagle:

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 Matkin-Hoover Engineering and Surveying on behalf of Southerland Communities NB Land Properties, Ltd. on October 19, 2007. Final review of the WPAP was completed after additional material was received on December 4, 2007 and January 4, 2007. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were 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 single family residential project will have an area of approximately 813.61 acres. It will include 595 residential lots, one four acre park area and associated roadways and utilities. The impervious cover will be 152.78 acres (18.8%). According to a letter dated, October 5, 2007, signed by Robert Boyd, P.E., with Comal County, the site in the development is acceptable for the use of on-site sewage facilities.

PERMANENT POLLUTION ABATEMENT MEASURES

Since this single-family residential project will not have more than 20 percent impervious cover, an exemption from permanent BMPs is approved. The permanent natural buffer areas for sensitive futures were designed using the TCEQ technical guidance document Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005). The individual buffer areas for sensitive features can be seen in the enclosed Attachment A, taken from the WPAP, "Site Plan for Copper Ridge". Temporary BMPs, silt fence and high service rock berms will be installed during construction activities. The natural buffer area will be shown on the subdivision plat and on respective lot plats as a construction free area.

GEOLOGY

According to the geologic assessment included with the application, eight sensitive geologic and manmade features were evaluated at the project site. Five of the eight features were manmade water wells. The San Antonio Regional Office site assessment conducted on December 3, 2007 revealed the site as described by the geologic assessment and site plan. The following table summarizes the sensitive features and the BMP measures for each feature.

Sensitive Feature and Water Well BMP Summary

Feature ID	Feature Type	BMP Provided	BMP Sizing
S-25*	C	Natural buffer area	50 foot radius from the edge of the cave footprint and 200 feet upgradient
S-39*	SF	Natural buffer area	50 foot radius in all directions and 200 feet upgradient
S-217*	F	Seal[A]	NA[A]
S-30*	MB (water well)	OSSF separation distance	150 foot radius in all directions
S-31*	MB (water well)	OSSF separation distance	150 foot radius in all directions
S-324*	MB (water well)	OSSF separation distance	150 foot radius in all directions
S-33**	MB (water well)	OSSF separation distance	150 foot radius in all directions
S-52**	MB (water well)	OSSF separation distance	150 foot radius in all directions

The assessment was completed as two separate tracts. Feature IDs with:
* are part of the 550 Acre Tract
** are part of the Tri City Tract

A: See justification provided below.

SC: Solution cavity C: Cave SF: Solution fractures MB: Manmade feature in bedrock

Feature S-217 is an inferred fault that runs along a streambed parallel to Highway 46, crosses the northern edge of the property and extends beyond the property boundaries. As noted by the project geologist during the field inspection, fractures were present in this area of the streambed. The proposed roadway into the subdivision crosses this fault. The natural buffer area will not be provided and part of the fault will be sealed by the roadway. Justification for sealing the feature is based on the width of the roadway compared to the total length of the fault and maintaining natural flow. In this area, the property boundary and fault width is approximately 200 feet wide and the roadway will be approximately 85 feet wide. The roadway only crosses a small portion of the fault based on the total length. Secondly, natural flow will be maintained and the right of way areas will be kept in a natural state to the maximum extent possible. Culverts will be constructed to control stormwater, including flood events, and pass the stormwater under the roadway. Riprap will be located on downstream end of the culverts to control stormwater velocities. The remaining fault line and streambed will be kept in the natural state.

SPECIAL CONDITIONS

I. The holder of the approved Edwards Aquifer WPAP must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the application.

II. Intentional discharges of sediment laden stormwater are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetative filter strips, sediment traps, rock berms, silt fence rings, etc.

III. 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.

IV. Since this project will not have more than 20% impervious cover, an exemption from permanent BMPs is approved. If the percent impervious cover ever increases above 20% or the land use changes, the exemption for the whole site as described in the property boundaries required by §213.4(g), may no longer apply and the property owner must notify the appropriate regional office of these changes.

V. Upon completion of the cave gate to feature S-25, provide a file update to the TCEQ with photographs demonstrating the installed cave gate.

VI. The U.S. Fish and Wildlife Service (FWS) has expressed concerns about potential impacts to federally listed threatened or endangered species. The site and applicant may be required to comply with the rules and regulations of the FWS and/or the Texas Parks and Wildlife Department (Endangered Resources Branch). The FWS letter (enclosed) addressed to Mr. Richard Garcia, TCEQ San Antonio Regional Director, and dated December 19, 2007, provides comments from the FWS that should be taken into consideration prior to the commencement of activities. This letter shall be deed recorded with this approval letter.

VII. Refer to 30 TAC Chapter 285 and specifically, §285.91, Table 10 Minimum Required Separation Distance for On-Site Sewage Facilities, for information and requirements on separation distance from water wells and from sensitive recharge features.

VIII. The justification to seal feature S-217 has been approved. However, the OSSF separation distance still applies.

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.

Prior to Commencement of Construction:

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

<u>During Construction:</u>

8. 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.

9. 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.

10. Five 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.

11. 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.

12. 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.

13. 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>

14. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the San Antonio Regional Office within 30 days of site completion.

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

16. 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.

17. 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.

18. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact Charly Fritz of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4065.

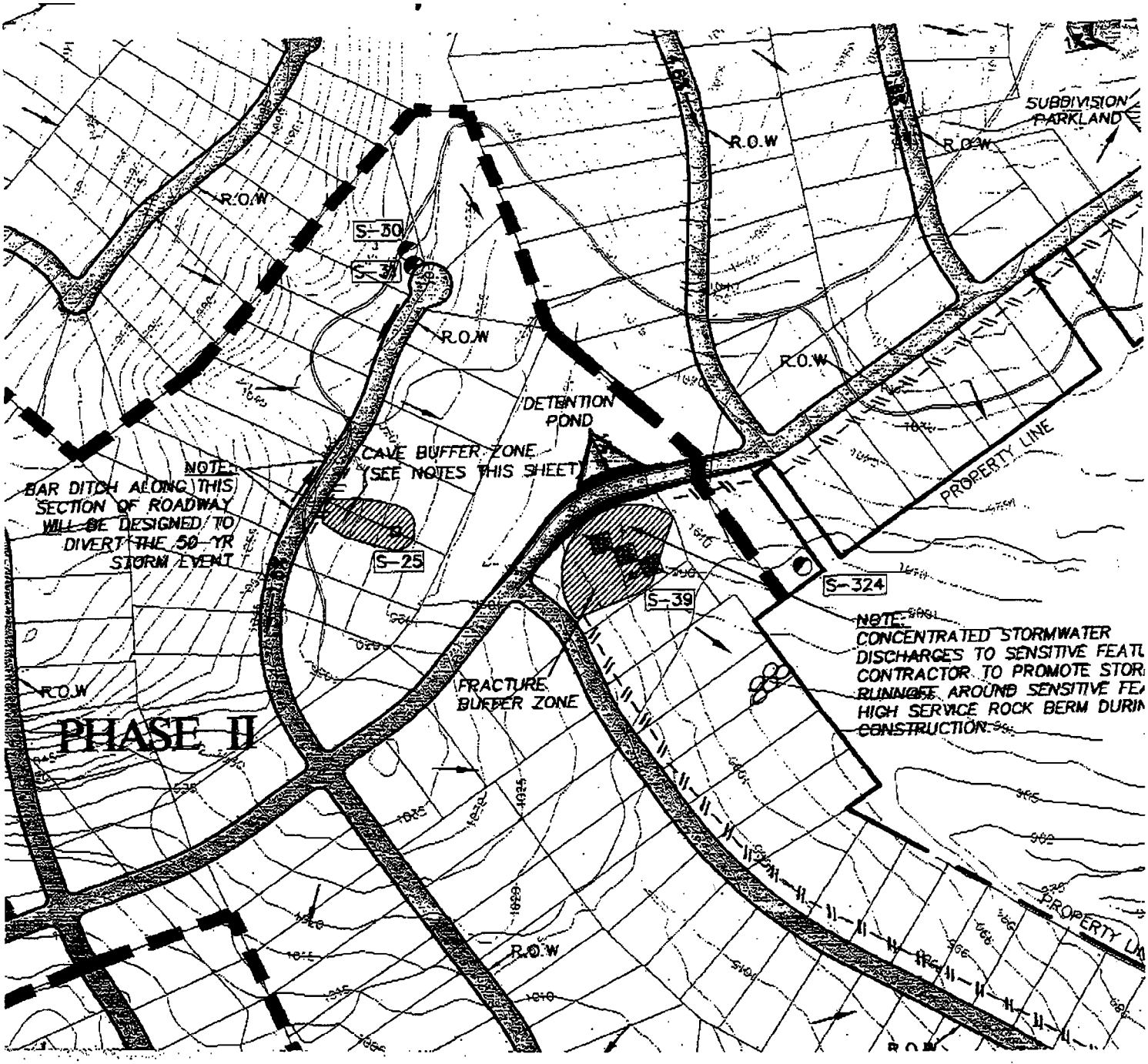
Sincerely,

Glenn Shankle
Executive Director
Texas Commission on Environmental Quality

GS/CEF/eg

Enclosures: Deed Recordation Affidavit, Form TCEQ-0625
Sensitive Feature Setbacks from the Site Plan for Copper Ridge
U.S. Fish and Wildlife Service letter dated December 19, 2007

cc: Mr. Allen Hoover, P.E., Matckin-Hoover Engineering and Surveying
Mr. Tom Hornseth P.E., Comal County
Mr. Bruce Boyer, City of New Braunfels
Mr. Adam Zerrenner, U.S. Fish and Wildlife Service
Ms. Velma Danielson, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC 212



Sensitive Feature Setbacks
Copper Ridge Site Plan
1" = 400'

United States Department of the Interior

FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
FAX 490-0974

DEC 19 2007

2007 DEC 21 A 10:38

Mr. Richard Garcia
Texas Commission on Environmental Quality
14250 Judson Road
San Antonio, Texas 78233

Consultation Number: 21450-2008-TA-0047

Dear Mr. Garcia:

The purpose of this letter is to provide comments on a request for the Approval of a Water Pollution Abatement Plan (WPAP) for the Copper Ridge Residential Subdivision (Edwards Aquifer Protection Program ID No. 2726.00; Investigation No. 598538, Regulated Entity No. RN105363956), Comal County, Texas. Specifically, the U.S. Fish and Wildlife Service (Service) is concerned over the sensitive features identified on this property. Inadequate protection of these features could result in contamination of the aquifer that may affect listed species at Comal Springs. The property may also provide habitat for the federally listed black-capped vireo (*Vireo atricapilla*) and Golden-cheeked warbler (*Dendroica chrysoparia*). Therefore, we are providing this information to assist you and the applicant in assessing and avoiding impacts to federally listed threatened and endangered species, their habitat, and wetlands.

Federally listed species

The proposed project site is not located within designated critical habitat of any federally listed threatened or endangered species. A list of species for Comal County is enclosed. You may access a list of federally listed or proposed species by county of occurrence in Texas at http://www.fws.gov/southwest/es/EndangeredSpecies/lists/. A searchable database with information related to the life history and ecology of each of these species can be found at http://endangered.fws.gov/.

Generally, the Service believes that the first step in determining impacts to endangered species is presence/absence surveys conducted within the project area by persons with appropriate biological expertise. If assessments indicate that suitable habitat is likely to be affected either directly or indirectly, we recommend that you consult with us further. If any endangered species or their habitats are present, the project can often be modified to avoid all impacts. Please send any completed surveys or habitat assessments to our office for assistance in evaluating potential impacts.

If an assessment indicates activities on the above site may affect listed species, please contact this office. If a Federal agency is to fund or permit all or part of the project, the project may affect any listed species, and impacts cannot be avoided, then the Federal agency must consult

with our office pursuant to section 7 of the Act. If no Federal agency is involved, you or the applicant may choose to get a section 10 permit if you expect take of listed species to occur as a result of the proposed project.

Take, as defined by the Act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Take is further defined to include "significant habitat modification where it actually kills or injures wildlife by significantly interfering with essential behavioral patterns such as breeding, feeding and sheltering" (50 Code of Federal Regulations 17.3).

State-listed species

The State of Texas also protects certain species of plants and animals. Contact the Texas Parks and Wildlife Department (Endangered Resources Branch), Fountain Park Plaza Building, Suite 100, 3000 South IH-35, Austin, Texas 78704 (512-912-7011) for information concerning fish, wildlife, and plants of State concern.

Wetlands and native habitats

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Section 404 permit from the U.S. Army Corps of Engineers. For permitting requirements under Section 404 of the Clean Water Act, please contact the Fort Worth District, Permits Section, CESWF-EV-0, P.O. Box 17300, Fort Worth, Texas, 76102-0300, 817-978-2681.

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to flood control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provide food and cover for wildlife, stabilize banks, and decrease soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Construction activities near such areas should be carefully designed to minimize impacts. If vegetation clearing is needed in riparian areas, these areas should be revegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental reestablishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be revegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas, 78711.

We also urge you to take all precautions to ensure sediment loading does not occur to receiving streams in the project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils. No permanent structures should be placed in the 100-year floodplain.

Thank you for your concern for endangered and threatened species and other natural resources, and we appreciate the opportunity to comment on the proposed project. If we can be of further assistance or if you have any questions about these comments, please contact William Amy at 512-490-0057, extension 234. Please refer to the Service Consultation number listed above in any future correspondence regarding this project.

Sincerely,

for Adam Zerrenner
Field Supervisor

Enclosure

cc: Chris MeMonagle, Edwards Aquifer Authority

Federally Listed as Threatened and Endangered Species of Texas
December 17, 2007

This list represents species that may be found in Comal County in the Austin Ecological Services office's area of responsibility. Please contact the Austin ES office (U.S. Fish and Wildlife Service, 10711 Burnet Rd., Suite 200, Austin, Texas 78758, 512/490-0057) if additional information is needed.

DISCLAIMER

This County by County list is based on information available to the U.S. Fish and Wildlife Service at the time of preparation, date on page 1. This list is subject to change, without notice, as new biological information is gathered and should not be used as the sole source for identifying species that may be impacted by a project.

Migratory Species Common to many or all Counties: Species listed specifically in a county have confirmed sightings. If a species is not listed they may occur as migrants in those counties.

Least tern	(E ~)	*Sterna antillarum*
Whooping crane	(E w/CH)	*Grus americana*
Bald eagle	(T)	*Haliaeetus leucocephalus*
Piping plover	(T w/CH)	*Charadrius melodus*

Comal County (Edwards Aquifer County)

Black-capped vireo	(E)	*Vireo atricapilla*
Golden-cheeked warbler	(E)	*Dendroica chrysoparia*
Fountain darter	(E w/CH)	*Etheostoma fonticola*
Comal Springs riffle beetle	(E w/CH)	*Heterelmis comalensis*
Comal Springs dryopid beetle	(E w/CH)	*Stygoparnus comalensis*
Peck's cave amphipod	(E w/CH)	*Stygobromus (=Stygonectes) pecki*
Texas blind salamander*	(E)	*Typhlomolge rathbuni*
San Marcos gambusia*	(E w/CH)	*Gambusia georgei*
San Marcos salamander*	(T □w/CH)	*Eurycea nana*
Texas wild-rice*	(E w/CH)	*Zizania texana*

* These species and their critical habitat are found in Hays County but may be affected by activities within the southern segment of the Edwards Aquifer, which includes portions of Comal County.

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Statewide or areawide migrants are not included by county, except where they breed or occur in concentrations. The whooping crane is an exception; an attempt is made to include all confirmed sightings on this list.

E = Species in danger of extinction throughout all or a significant portion of its range.

T = Species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

C = Species for which the Service has on file enough substantial information to warrant listing as threatened or endangered. These species currently have no legal protection. However, addressing these species at this stage could better provide for overall ecosystem health in the local area and may avert potential future listing.

CH	=	Critical Habitat (in Texas unless annotated ‡)
P/	=	Proposed ...
P/E	=	Species proposed to be listed as endangered.
P/T	=	Species proposed to be listed as threatened.
TSA	=	Threatened due to similarity of appearance. Protections of the Act, such as consultation requirements for Federal agencies under section 7, and recovery planning provisions under section 4(f), do not apply to species listed under similarity of appearance provisions.
□	=	with special rule
‡	=	CH designated (or proposed) outside Texas
~	=	protection restricted to populations found in the "interior" of the United States. In Texas, the least tern receives full protection, except within 50 miles (80 km) of the Gulf Coast.

MATKINHOOVER
ENGINEERING
& SURVEYING

December 3, 2007

Charlyne Fritz
Environmental Investigator
TCEQ San Antonio Regional Office, Region 13
14250 Judson Rd.
San Antonio, Texas 78233-480

RECEIVED
DEC 2 0 2007
COUNTY ENGINEER

Re: Edwards Aquifer, Comal County
Copper Ridge
WPAP comments
Regulated Entity No. RN105363956

Dear Ms. Fritz,

This letter and its attachments address each of those comments as listed in your WPAP Review Comments, dated November 20, 2007.

The following items are attached to this letter:

1. Revised Estates at Stone Crossing Master Plan (14-copies)
2. Copy of TIA Worksheet from Alliance.
3. Master Plan Application form

2007 DEC -4 PM 1:59

RECEIVED TCEQ
SAN ANTONIO
REGION

The following are detailed responses to each of your review comments:

1. *Provide a signed and dated Application Fee Form, TCEQ-0574.*

See Attached form for completion.

2. *Confirm the number of lots for the proposed development Item 1 of TCEQ-0584 states 595 lots and Attachment B of TCEQ-0584 states 597 lots. Amend the plan as necessary.*

See revised WPAP Application Attachment B.

3. *Identify the four acre park land area on the site plan and provide the proposed layout of impervious cover on the plan. Also identify any areas that will have soil disturbance.*

Park land area has been identified in the WPAP Site Plan

4. *The temporary BMP details provide in the exhibits of the application are not identical to the temporary BMP details on the site plan. Amend the temporary BMPs details, on the site plan, to conform to the temporary BMP details provided in the exhibits portion of the application.*

See revised WPAP Site Plan

5. *Identify the areas of soil disturbance due to construction of the individual house lots. On the site plan, detail the location of the temporary BMPs that will be implemented for individual lot construction or provide a typical drawing of temporary BMP layout for individual lot construction.*

Ms. Fritz, per our conversation, our office will be unable to determine the exact soil disturbance due to lot construction. It will be the responsibility of the individual lot owner to provide SWPPP for lot specific construction. Our office can confirm that these lots will be custom homes and mass site grading will not occur.

6. *Explain the purpose of the other five disturbed areas, located throughout the site, similar in structure to the sediment basin but do not have any identification label. Provide a legend detail as necessary.*

The five areas of soil disturbance are proposed detention ponds. These detention ponds have been labeled on the WPAP Site Plan. See Attached.

7. *Temporary Sediment Basin, Edwards Aquifer Technical Guidance Manual (2005)*

   a. *Section 1.4.11(9), Sediment Depth Marker. Provide the location and details for a permanent stake to indicate the sediment level in the basin*
   b. *Section 1.4.11(12), Riser Pipe. A perforated riser pipe is required to drawdown the remaining stormwater in the basin. Update Exhibit H to include a perforated riser pipe and necessary details and calculations.*
   c. *Verify the top of berm elevation for both basins. The top of berm elevation in the plan view on Exhibit H is inconsistent with the elevation seen in the profile view.*

See Revised Sediment Basin Sheet. Furthermore, after completing the road design for Phase I, we determined that the disturbed area for this phase of construction will not exceed 10 acres; therefore a temporary sediment basin will not be constructed within this drainage area. Sediment Basin "B" on our first WPAP submittal has been renamed Sediment Basin "A" on the attached sheet.

8. *Verify the contour elevations on the geologic map, specially the southwest corner of the property. Revise as necessary. Provide this revised map prior to the site assessment (if the site assessment is scheduled prior to the response due date).*

See Revised Geologic Map attached

9. *For sensitive feature S-217 (fault), provide a response from the licensed geologist, who conducted the assessment, explaining the condition(s) of the fault in greater detail. The geologist response should address the statement made in Attachment D of TCEQ-0600 that "no visible signs of recharging appear to be present through this section of the property".*

See attached letter provided by Frost Geosciences. See revised WPAP site plan where a note was added for the revegetation of all soil near S-217.

Sincerely,
Matkin-Hoover Engineering & Surveying

Garrett Keller

RECEIVED
DEC 2 0 2007
COUNTY ENGINEER

Texas Commission on Environmental Quality
Edwards Aquifer Protection Plan
Application Fee Form

NAME OF PROPOSED REGULATED ENTITY: Copper Ridge
REGULATED ENTITY LOCATION: on Hwy 46, 2 miles east from the FM 2722 and Hwy 46 intersection
NAME OF CUSTOMER: SOUTHERLAND COMMUNITIES NB LAND PROPERTIES, LTD
CONTACT PERSON: Chris McMonagle PHONE: (512) 847 – 5263

Customer Reference Number (if issued): CN _____ (nine digits)
Regulated Entity Reference Number (if issued): RN _____ (nine digits)

AUSTIN REGIONAL OFFICE (3373)
☐ Hays
☐ Travis
☐ Williamson

SAN ANTONIO REGIONAL OFFICE (3362)
☐ Bexar
☒ Comal
☐ Kinney
☐ Medina
☐ Uvalde

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 (CHECK ONE):

☒ **SAN ANTONIO REGIONAL OFFICE**
☐ **Mailed to TCEQ**:
TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☐ **AUSTIN REGIONAL OFFICE**
☐ **Overnight Delivery to TCEQ**:
TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
512/239-0347

Type of Plan	Size	Fee Due
Water Pollution Abatement, One Single Family Residential Dwelling	Acres	$0
Water Pollution Abatement, Multiple Single Family Residential and Parks	813 Acres	$5,000.00
Water Pollution Abatement, Non-residential	Acres	$ 0
Sewage Collection System	L.F.	$0
Lift Stations without sewer lines	Acres	$0
Underground or Aboveground Storage Tank Facility	Tanks	$0
Piping System(s)(only)	Each	$0
Exception	Each	$0
Extension of Time	Each	$0

"RECEIVED TCEQ SAN ANTONIO REGION 2007 DEC -4 PM 3:00

Signature _____ Date 10-16-07

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

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

COPPER RIDGE
VOLUME AND CHARACTER OF STORMWATER

The total project acreage of this site is 813.61 acres. Currently the entrance of the property has a small portion within the 100 year flood plain. The property is broken into 6 watersheds, two of which drain to south portion of the property, two which drain to the north portion of the property, and two which drain near the entrance of the property. The tributaries to the south drain 1,078 acres, the tributaries to the north drain 177 acres, and the tributaries near the entrance drain 1,116 acres.

The general land slope of the site ranges from 0.5% to 30%, the steepest areas being the lows throughout the property. The tract generally consists of moderate to dense vegetative cover with native trees and grasses.

The proposed development will consist of approximately 595 single family residential tracts with a minimum lot size of 1 acre. Upon completion, the site will consist of an estimated 18.5% impervious cover. On-site Detention ponds will be utilized to mitigate increased stormwater runoff as a result of development.

The SCS methods with a type II rainfall distribution was utilize within this study. Time of Concentration values were established using Technical Release-55 and curve numbers used are from the City of New Braunfels Drainage Criteria Manual. Below is a summary of the pre-developed and post-developed runoff:

Pre-Development Runoff:

Evaluation Point	Curve Number	Acreage	Runoff (cfs) *(for the 25 year storm frequency)*
A	82	20.06	**129.87**
B	82	157.57	**735.05**
C	82	840.41	**3022.19**
D	82	276.39	**1093.64**
E	80	440.51	**1722.19**
F	76	638.22	**2653.37**

Post-Development Runoff:

Evaluation Point	Curve Number	Acreage	Runoff (cfs) *(for the 25 year storm frequency)*
A	84	23.61	**117.36**
B	83.2	154.42	**663.03**
C	82	840.41	**3022.19**
D	82.6	276.66	**981.29**
E	78.0	440.27	**1690.13**
F	83.2	661.42	**2754.22**

(Evaluation Points shown on Attachment "D" of this section)

COPPER RIDGE
PROJECT DESCRIPTION

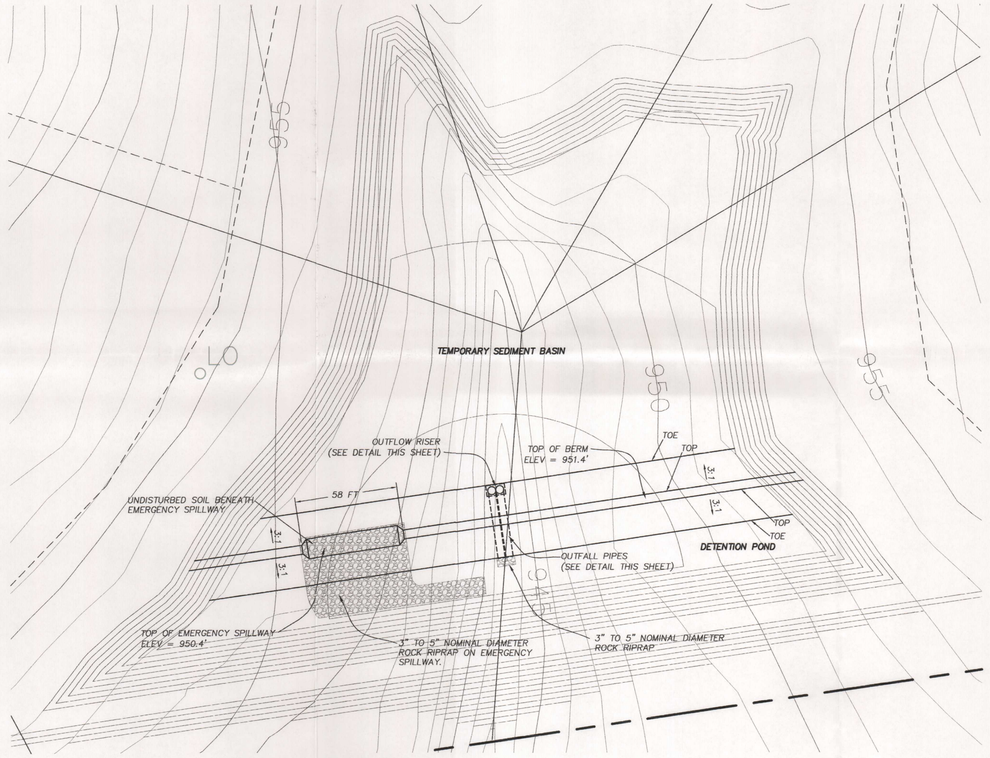
The proposed Copper Ridge subdivision is located approximately seven miles west of the City of New Braunfels, Texas on Highway 46. The project area is 813.61 acres of undeveloped/uncleared ranchland currently being used predominantly for agricultural purposes.

The project has several well defined lows throughout the site with a natural ridgeline that traverses the site from the southwest to northeast. This ridge parallels the southwest property line with the majority of the site draining to the south of the property. All of the drainage from this site ultimately ends up in the Dry Comal Creek. A portion of this site is located within the FEMA 100 year flood plain as shown on the Flood Insurance Rate Map Panel Number 485463 0800C dated September 29, 1986.

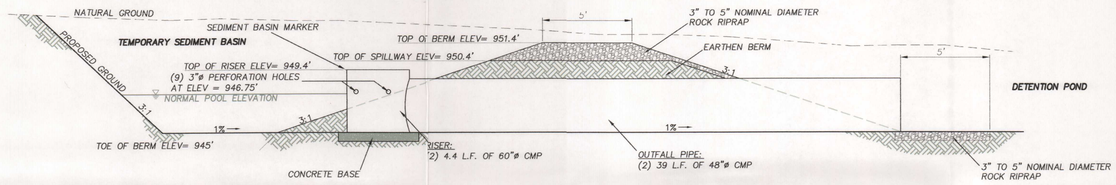
The general land slope of the site ranges from 0.5% to 30%, the steepest areas being the lows throughout the property. The tract generally consists of moderate to dense vegetative cover with native trees and grasses.

The proposed development will consist of 595 single family residential tracts with a minimum lot size of 1 acre and one Park. Upon completion, the site will consist of 152.78 acres (18.8%) of impervious cover. For this impervious cover calculation, it was assumed that each single family lot will ultimately consist of 8,500 square feet of impervious cover and the 4 acres of park land would consist of 125,000 square feet of impervious cover. A final layout for the park land has not yet been decided, therefore 125,000 square feet (2.9 acres) of impervious cover was assumed as an over estimation. These estimates are considered conservative and fully developed conditions are expected to contain less impervious cover than theses estimates. During construction, temporary sediment basins will be utilized to prevent sediment laden runoff from exiting the project site.

The BMPs for this project have been designed in accordance with the TCEQ Technical Guidance Manual RG-348(2005).



TEMPORARY SEDIMENT BASIN "A"
PLAN VIEW



SEDIMENT BASIN "A"
OUTFALL STRUCTURE
ELEVATION SECTION

NOT TO SCALE

Scale: 1" = 40'

LEGEND

EXISTING 1' CONTOUR
EXISTING 5' CONTOUR 1015
PROPOSED 1' CONTOUR

GENERAL NOTES:

1. CONTRACTOR TO LINE THE EMERGENCY SPILLWAY WITH 3" TO 5" NOMINAL DIAMETER ROCK RIPRAP.

2. CONTRACTOR TO INSTALL A SEDIMENT DEPTH MARKER IN SEDIMENT BASIN "A". MARKER SHALL EXTEND TO THE HEIGHT OF THE EMERGENCY SPILLWAY.

3. ALL STRUCTURAL FILL SHALL BE PLACED AND COMPACTED TO 95% STANDARD PROCTOR.

4. WHERE EARTHEN BERMS ARE TO BE CONSTRUCTED, CONTRACTOR SHALL USE CONSTRUCTION PROCEDURES TO MINIMIZE DISTURBANCE OF EXISTING ON-SITE SOIL. THE MATERIAL BENEATH THE EMERGENCY SPILLWAY MUST BE UNDISTURBED SOIL.

5. AN ANTI-VORTEX DEVICE AND RUBBISH SCREEN SHOULD BE ATTACHED ON THE TOP OF THE RISERS FOR BOTH SEDIMENT BASINS AND SHOULD BE MADE OF POLYVINYL CHLORIDE OR CORRUGATED METAL.

6. ACCUMULATED SILT SHOULD BE REMOVED AND THE BASIN SHOULD BE RE-GRADED TO ITS ORIGINAL DIMENSIONS AT SUCH POINT THAT THE CAPACITY OF THE IMPOUNDMENT HAS BEEN REDUCED BY 75% OF ITS ORIGINAL STORAGE CAPACITY.

Rev.

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DEC 2 0 2007
COUNTY ENGINEER

STATE OF TEXAS
ALLEN D. HOOVER
86943
LICENSED
PROFESSIONAL ENGINEER

12/3/07

MATKIN HOOVER
ENGINEERING & SURVEYING
CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS
P.O. BOX 33
8 SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE 830.249.0600 FAX 830.249.0099

SEDIMENTATION BASIN "A" PLAN
FOR
COPPER RIDGE
NEW BRAUNFELS, TEXAS

JOB NO. 2289.01
DATE OCT 2007
DESIGNED GDK
CHECKED ADH
SHEET 1 OF 1

EXHIBIT "H"

MATKINHOOVER
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COUNTY ENGINEER

Basin "A"

- Max disturbed Area = 15.44 acres
- Comal County two-year, 24-hour rainfall depth = 3.7in

Required Storage Volume

$$= (15.44 \text{ acres}) \times (3.7 \text{ in}) \times \left(\frac{43560 \text{ Ft}^2}{1 \text{ ac}}\right) \times \left(\frac{1 \text{ Ft}}{12 \text{ in}}\right)$$

$$= 207,374 \text{ Ft}^3$$

Riser

- two-year, 3-hour Flow = 136 cfs

$Q = 4.8 A H^{.5}$ (orifice equation)

$(136.09 \text{ cfs}) = 4.8 A\sqrt{T}$

$A = 28.35 \text{ Ft}^2$ ($\div 2 = 14.18$)

$A = \pi R^2$ (area of a circle)

$14.18 \text{ Ft}^2 = \pi R^2$

$R = 2.12 \text{ Ft} = 25.49 \text{ in}$ radius

50.98 in diameter

Use 2,54" CMP

Perforation

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

STATE OF TEXAS
ALLEN D. HOOVER
86943
LICENSED PROFESSIONAL ENGINEER

12/3/07

8 Spencer Road, Suite 100 • P.O. Box 54 • Boerne, Texas 78006 • Office: 830.249.0600 • Fax: 830.249.0099 • www.matkinhoover.com

Attachment "H"

MATKINHOOVER
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$$A_o = \frac{(90,871\ FE^2)\sqrt{2\,(4)}}{0.6 \times 780,000} = .437\ FE^2 = 63 in^2$$

(1) 3" ϕ hole area = 7.07 in^2

Use 9, 3-in diameter holes at 946.75

Emergency Spillway

- ten-year, 3-hour Flow = 310.25 cfs
- Flow carried by Riser = $4.8(28.3\ FE^2)\sqrt{1}$
  = 136 cfs
- Required Spillway Flow = 310.25 − 136 = 174.25 cf

Weir length $L = \frac{Q}{3.0\ H^{3/2}} = \frac{174.25\ cfs}{(3.0)(1^{3/2})}$

L = 58 ft

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Channel Report

Hydraflow Express by Intelisolve

Tuesday, Oct 9 2007, 5:15 PM

Sediment Basin A - Outfall

Circular

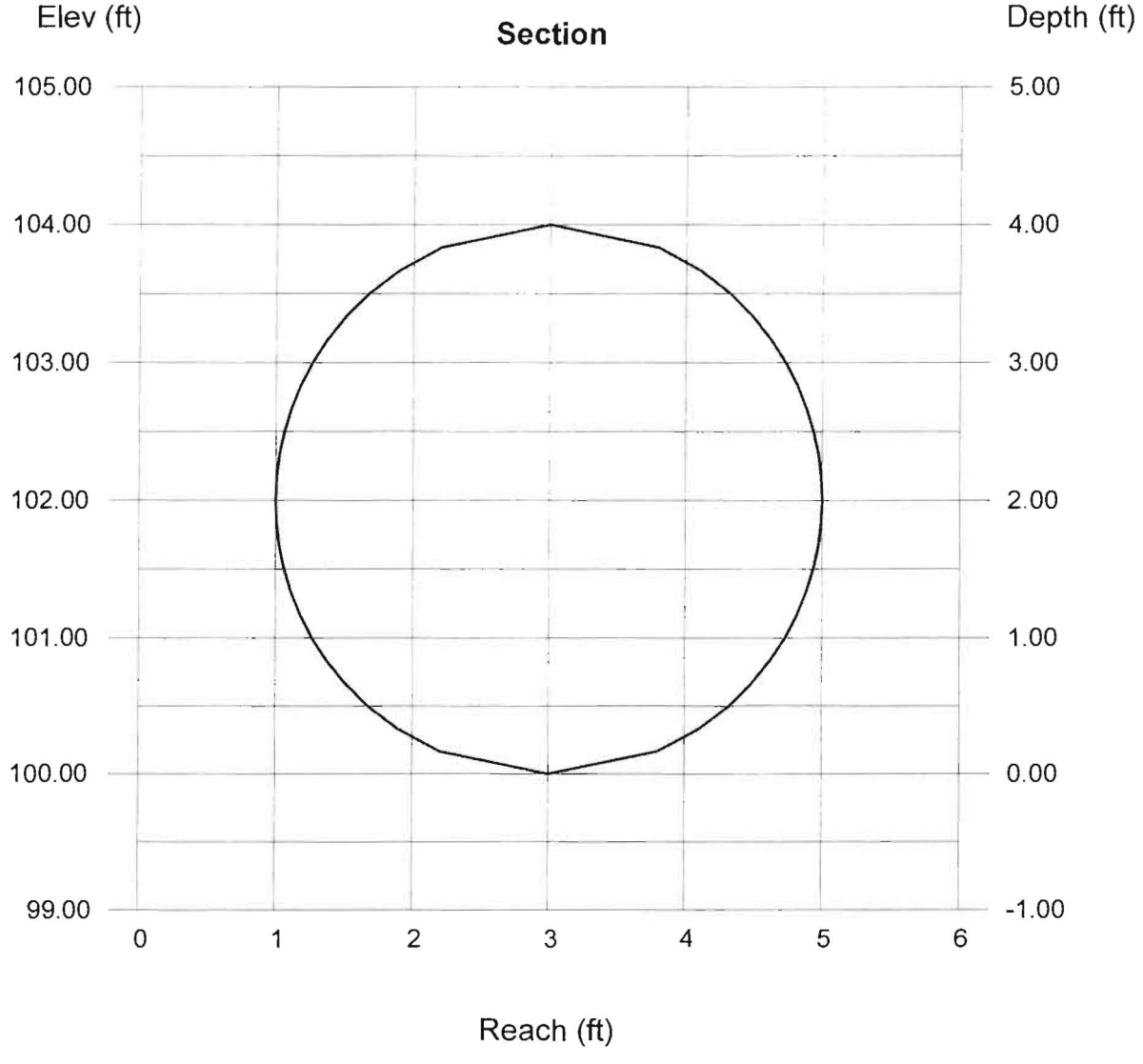
Diameter (ft)	= 4.00
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.024

Calculations

Compute by:	Q vs Depth
No. Increments	= 1

Highlighted

Depth (ft)	= 4.00
Q (cfs)	= 77.81
Area (sqft)	= 12.57
Velocity (ft/s)	= 6.19
Wetted Perim (ft)	= 12.57
Crit Depth, Yc (ft)	= 0.01
Top Width (ft)	= 0.00
EGL (ft)	= 4.60



Frost GeoSciences
Geotechnical • Construction Materials
Forensics • Environmental

13402 Western Oak
Helotes, Texas 78023
Phone (210) 372-1315
Fax (210) 372-1318
www.frostgeosciences.com

December 3, 2007

Matkin-Hoover Engineering
#8 Spencer Road
Boerne, Texas 78006

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DEC 2 0 2007
COUNTY ENGINEER

Attn: Mr. Garrett Keller

Re: Response to the TCEQ Comment Letter
Copper Ridge, PRF # 217
New Braunfels, Texas

Dear Sir:

Frost GeoSciences, Inc. has reviewed the TCEQ Comment Letter requesting additional justification for allowing of a sensitive potential recharge feature (PRF # 217) to be sealed. PRF # 217 is an inferred fault. When the field inspection was performed we noted fractures within the streambed through this interval as well. The combination of these factors led us to believe that the potential for rapid infiltration could exist. However, given that this portion of the property is the only access in and out of the proposed subdivision, and the fact that the width of the proposed right-of-way improvements would be minimal compared to the length of the inferred fault along the streambed, Frost GeoSciences, Inc. is of the opinion that sealing the portion of the feature under the proposed right-of-way easement would be acceptable.

Additionally, Frost GeoSciences, Inc. would recommend that the area along the entry into the subdivision be kept in as much of natural state as possible.

If you have any questions regarding this response to the TCEQ Comment Letter, or if Frost GeoSciences, Inc. may be of additional assistance to you on this project, please feel free to call our office. It has been a pleasure to work with you and we wish to thank you for the opportunity to be of service to you on this project. We look forward to being of continued service.

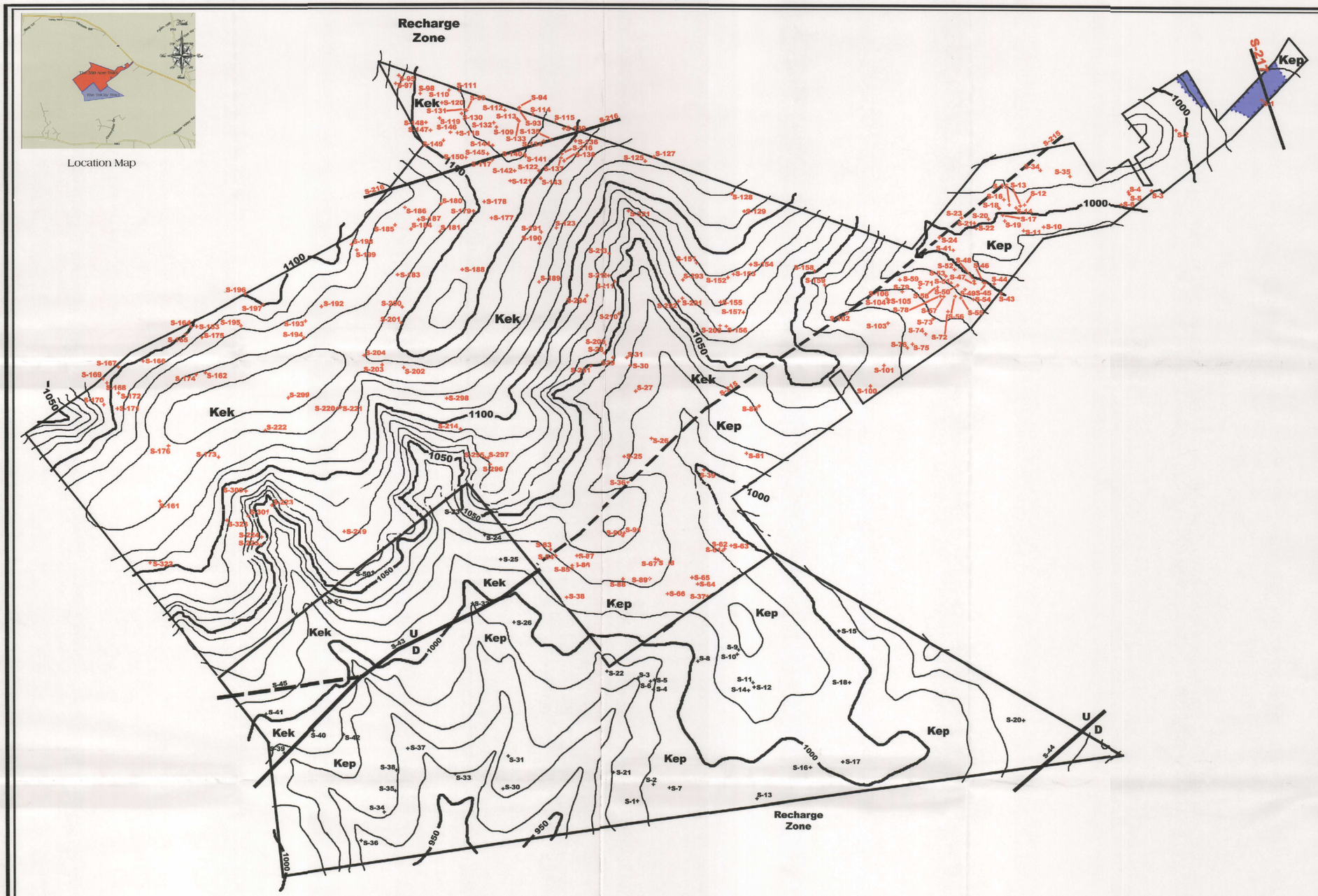
STATE OF TEXAS
Steve M. Frost
Geology
License No. 315
LICENSED
PROFESSIONAL GEOSCIENTIST

Sincerely,
Frost GeoSciences, Inc.

Steve Frost

Steve Frost, C.P.G.
Executive Vice President

Location Map



Frost GeoSciences

Construction Materials • Forensics
Environmental • Geotechnical

Site Geologic Map

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
for
The 835-Acre Tract
Comal County, Texas

Frost GeoSciences, Inc. Control # FGS-E07212; The TriCity Tract, 285 Acres

Frost GeoSciences, Inc. Control # FGS-E07260; The 550-Acre Tract, 550 Acres

Legend

- Fill - Fill Material
- Qal - Alluvium
- Kau - Austin Chalk
- Kef - Eagle Ford Shale
- Kbu - Buda Limestone
- Kdr - Del Rio Clay
- Kgt - Georgetown Limestone
- Kep - Edwards Person Limestone
- Kek - Edwards Kainer Limestone
- Kgr - Glen Rose Formation
- S# - Potential Recharge Feature (PRF) for The 550 Acre Tract
- S# - Potential Recharge Feature (PRF) for The TriCity Acre Tract
- Inferred Fault
- U / D - Normal Fault; U = Upthrown Block, D = Downthrown Block
- 100 Year Flood Plain

Floodplain Information Obtained From
FIRM: Flood Insurance Rate Map
Comal County, Texas: Panel # 4854630080 C (dated 9/29/1986)

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)

North
NW NE West East SW SE South

400 0 200 400 800

1 inch = 400 feet
Representative Fraction 1:4800

Contour Interval - 10 feet

STATE OF TEXAS
TOMAS HERNANDEZ, JR.
GEOLOGY
3297
LICENSED
PROFESSIONAL GEOSCIENTIST

Signature of Texas Licensed Geoscientist
Tomas Hernandez, Jr., TPG# 3297

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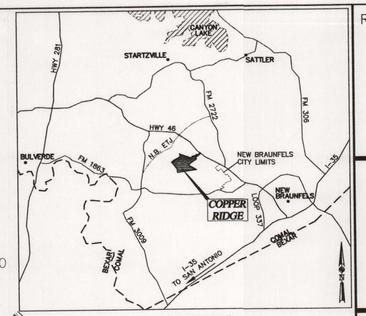
CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS
P.O. BOX 34
8 SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE 830.249.0600 FAX 830.249.0099

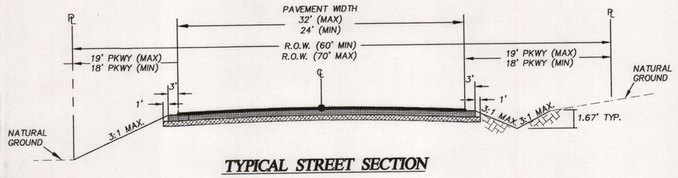
WATER POLLUTION ABATEMENT PLAN

SITE PLAN FOR COPPER RIDGE

NEW BRAUNFELS, TEXAS



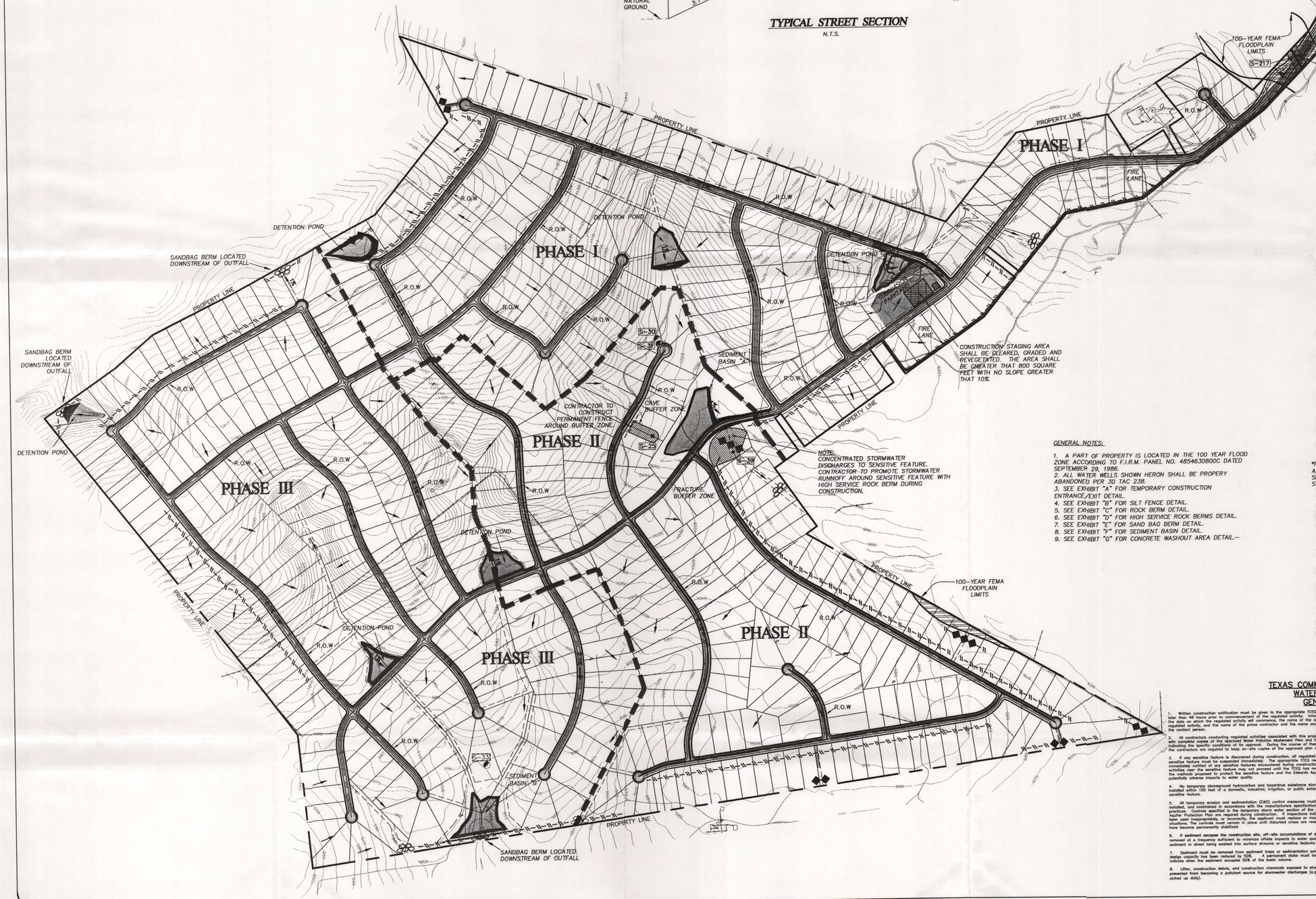
LOCATION MAP
N.T.S.



TYPICAL STREET SECTION
N.T.S.

Scale: 1" = 400'

0 100 800 1200



NOTE:
1. CONCENTRATED UPGRADIENT STORMWATER DISCHARGES TO SENSITIVE FEATURE.
2. CONTRACTOR TO REVEGETATE ALL SOIL SURROUNDING THE CULVERT CROSSING.

LEGEND

- EXISTING 5' CONTOURS
- *PROPOSED 1' CONTOURS
- S-217 — SENSITIVE FEATURE ID AS DENOTED ON THE 550 ACRE TRACT GEOLOGIC ASSESSMENT (FGS-E07212)
- S-33 — SENSITIVE FEATURE ID AS DENOTED ON THE 285 ACRE TRACT GEOLOGIC ASSESSMENT (FGS-E07260)
- CAVE
- WATER WELL
- FRACTURE
- SOIL DISTURBANCE AREA
- STABILIZED CONSTRUCTION ENTRANCE
- CONSTRUCTION STAGING AREA
- CONCRETE WASHOUT AREA
- ON-SITE 100-YEAR FEMA FLOODPLAIN
- SILT FENCE
- SAND BAG BERM
- FLOW ARROWS
- ROCK BERM
- HIGH SERVICE ROCK BERM

*PROPOSED ROAD CONTOURS NOT SHOWN FOR CLARITY. VERTICAL ROAD ALIGNMENT WILL GENERALLY FOLLOW EXISTING GROUND AND ALL CUT/FILL SLOPES WILL BE CONTAINED WHITHIN THE RIGHT-OF WAY. SEE TYPICAL STREET SECTION ON THIS SHEET FOR PROPOSED STREET DIMENSIONS.

GENERAL NOTES:

1. A PART OF PROPERTY IS LOCATED IN THE 100 YEAR FLOOD ZONE ACCORDING TO F.I.R.M. PANEL NO. 48546308OOC DATED SEPTEMBER 29, 1986.
2. ALL WATER WELLS SHOWN HERON SHALL BE PROPERY ABANDONED) PER 30 TAC 238.
3. SEE EXHIBIT "A" FOR TEMPORARY CONSTRUCTION ENTRANCE/EXIT DETAIL.
4. SEE EXHIBIT "B" FOR SILT FENCE DETAIL.
5. SEE EXHIBIT "C" FOR ROCK BERM DETAIL.
6. SEE EXHIBIT "D" FOR HIGH SERVICE ROCK BERMS DETAIL.
7. SEE EXHIBIT "E" FOR SAND BAG BERM DETAIL.
8. SEE EXHIBIT "F" FOR SEDIMENT BASIN DETAIL.
9. SEE EXHIBIT "G" FOR CONCRETE WASHOUT AREA DETAIL.-

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 the 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. 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 activities on a portion of the site will be 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
1921 Cedar Bend, Suite 150
Austin, Texas 78758-5336
Phone (512) 339-2929
Fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, TX 78233-4480
Phone: (210) 403-4024
Fax:

JOB NO.	2289.01
DATE	OCT 2007
DESIGNED	GDK
CHECKED	ADH
SHEET	1 OF 1

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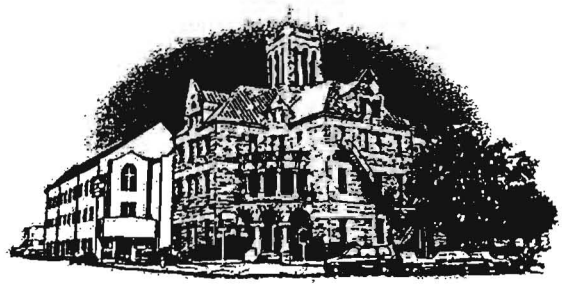


Comal County

OFFICE OF COMAL COUNTY ENGINEER

October 5, 2007

Mr. Garrett Keller
Matkin-Hoover Engineering & Surveying
8 Spencer Road, Suite 100
P.O. Box 54
Boerne, Texas 78006

Re: Copper Ridge On-Site Sewage Facility Suitability Letter, within Comal County, Texas

Dear Mr. Keller:

In accordance with TAC §213.5(b)(4)(F)(ii), Comal County has found that the entire referenced site (except for areas listed below) is suitable for the use of private sewage facilities and will meet the special requirements for on-site sewage facilities located on the Edwards Aquifer recharge zone as specified in TAC §285.40-42 based on the following information submitted to our office on October 5, 2007:

- The Tri-City Tract Geologic Assessment, prepared by Frost Geosciences, Inc.
- The 550 Acre Tract Geologic Assessment, prepared by Frost Geosciences, Inc.
- The Water Pollution Abatement Plan, prepared by Matkin-Hoover Engineering & Surveying

Areas that are not Suitable

The Tri-City Tract Geologic Assessment identified 1 feature as sensitive, with the associated measures to prevent pollutants from entering said features.

Feature ID	Latitude	Longitude	Permanent Pollution Abatement Measure
S-33	29°44'1.98"	-98°15'25.7"	Plug Water Well

The 550 Acre Tract Geologic Assessment identified 5 features as sensitive, with the associated measures to prevent pollutants from entering said features.

Feature ID	Latitude	Longitude	Permanent Pollution Abatement Measure
S-25	29°44'28.4"	-98°15'9.46"	200' Buffer
S-30	29°44'35.8"	-98°15'6.65"	Plug Water Well
S-31	29°44'36.5"	-98°15'9.07"	Plug Water Well
S-39	29°44'27.2"	-98°15'1.88"	200' Buffer
S-217	29°44'57.4"	-98°14'8.60"	50' Buffer

According to Table 10 of TAC §285.91, the following minimum separation distances from the listed sensitive features, which will not be plugged according to TAC §238, must be maintained:

- No sewage treatment tank or holding tank may be located within 50 feet of a sensitive recharge feature listed above.
- No soil absorption system may be located within 150 feet of a sensitive recharge feature listed above.
- No surface application (edge of spray area) may be located within 150 feet of a sensitive recharge feature listed above.

Moreover, according to TAC §285.41(b), Southerland Communities, the owner of the referenced site, must inform, in writing, each prospective purchaser, lessee, or renter of the following:

- All lots within Copper Ridge are subject to the terms and conditions of TAC §285.40-42;
- A Permit to Construct is required from Comal County before an OSSF can be constructed in Copper Ridge;
- A License to Operate is required from Comal County before an OSSF can be operated in Copper Ridge;
- That an application for a water pollution abatement plan, as defined in TAC §213, has been made, whether it has been approved, and if any restrictions or conditions have been placed on that approval; and
- Minimum separation distances, as outlined in Table 10 of TAC §285.91, from the sensitive recharge features listed above.

Furthermore, according to TAC §285.42(a), if any recharge feature, not listed above, is discovered during construction of an OSSF, all regulated activities near the feature shall be suspended immediately. The owner shall immediately notify the TCEQ San Antonio office of the discovery of the feature. All activities regulated under TAC §213 shall not proceed near the feature until Comal County, in conjunction with the TCEQ San Antonio office, has reviewed and approved a plan proposed to protect the feature, the structural integrity of the OSSF, and the water quality of the aquifer. The plan shall be sealed, signed, and dated by a professional engineer.

Finally, on a separate matter, according to TAC §285.4(c), persons proposing residential subdivisions within Comal County and using on-site sewage facilities (OSSFs) for sewage disposal are required to submit planning materials for the residential subdivision to Comal County. The planning materials shall be prepared by a professional engineer or professional sanitarian and shall include an overall site plan, topographic map, 100-year floodplain map, soil survey, location of water wells, locations of easements as identified in TAC §285.91(10) (relating to Tables), a complete report detailing the types of OSSFs to be considered and their compatibility with area-wide drainage and groundwater, and a comprehensive drainage plan. Comal County also asks for an existing improvements sketch and gate combination(s) in order to adequately inspect the site for use of OSSFs for sewage disposal. We have included Comal County's *Application for Licensing Authority Recommendation for Private Sewerage Facilities for a Proposed Subdivision* for your use.

If you have any questions or need additional information, please do not hesitate to contact our office.

Sincerely,

Robert Boyd, P.E.
Comal County Assistant Engineer

cc: Jay Millikin, Comal County Commissioner, Precinct No. 2
Betty Lien, Comal County Subdivision Coordinator

attachment a/s

Application for Licensing Authority Recommendation
for Private Sewerage Facilities for a Proposed Subdivision

Date: _____

Subdivision Name: _____

Owner's Name: _____

Address: _____

Phone #: _____

Fee Schedule:
5 or less tracts: $20/tract
6 or more tracts: $100 base fee + $5/tract

Total Fee: $_____

Received by: _____

Make check payable to Comal County

According to TAC §285.4(c), before the permit process for individual OSSFs can begin, persons proposing residential subdivisions, manufactured housing communities, multi-unit residential developments, business parks, or other similar uses within Comal County and using on-site sewage facilities (OSSFs) for sewage disposal are required to submit planning materials for these developments to Comal County, as the Authorized Agent of the Texas Commission on Environmental Quality (TCEQ). The planning materials shall be prepared by a professional engineer or professional sanitarian and shall include:

- an overall site plan
- topographic map
- 100-year floodplain map
- soil survey
- location of water wells
- locations of easements as identified in TAC §285.91(10) (relating to Tables)
- a complete report detailing the types of OSSFs to be considered and their compatibility with area-wide drainage and groundwater
- a comprehensive drainage plan

Comal County also asks for an existing improvements sketch and gate combination(s) in order to adequately inspect the site for use of OSSFs for sewage disposal.

_____
Applicant/Agent Signature

Date of Review (must be within 45 days of receipt): _____

☐ Approved

☐ Denied

Reasons for Denial: _____

_____

_____

_____

Reviewer: _____, D.R.

*** Note: This sheet shall be first with all planning materials listed above following behind.**

MATKINHOOVER
ENGINEERING
& SURVEYING

October 5, 2007

RECEIVED
OCT 05 2007
COUNTY ENGINEER

Robert Boyd
Assistant Engineer
Comal County

Re: Copper Ridge
Suitability Letter from Authorized Agent

Dear Mr. Boyd,

I am submitting a preliminary copy of the Water Pollution Abatement Plan for Copper Ridge for your review. If approved, provide our office with a suitability letter authorizing the use of on-site sewage facilities to be used to treat and dispose of wastewater on this site.

Please contact me or Allen Hoover at our office with any questions.

Sincerely,
Matkin-Hoover Engineering & Surveying

Garrett Keller

Attachments

8 Spencer Road, Suite 100 • P.O. Box 54 • Boerne, Texas 78006 • Office: 830.249.0600 • Fax: 830.249.0099 • www.matkinhoover.com

__ 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 description of the volume and character (quality) of the stormwater runoff which is expected to occur from the proposed project is provided at the end of this form. The estimates of stormwater runoff quality and quantity should be based on area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

WASTEWATER TO BE GENERATED BY THE PROPOSED PROJECT

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

_x_ % Domestic	179,100 gallons/day
__ % Industrial	_____ gallons/day
__ % Commingled	_____ gallons/day
TOTAL	179,100 gallons/day (597 EDU x 300 gpd/EDU)

15. Wastewater will be disposed of by:
_x_ **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. The appropriate licensing authority's (authorized agent) written approval is provided at the end of this form. It states that the land is suitable for the use of an on-site sewage facility or identifies areas that are not suitable.
_x_ 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

MATKIN-HOOVER ENGINEERING & SURVEYING

Copper Ridge
New Braunfels, Texas

Water Pollution Abatement Plan

8 Spencer Road Suite 100 Post Office Box 54 Boerne, Texas 78006 Phone 830.249.0600 Fax 830.249.0099

September 17, 2007

Edwards Aquifer Protection Program
Texas Commission on Environmental Quality
San Antonio Regional Office
14250 Judson Road
San Antonio, TX 78233-4480

Re: Copper Ridge
New Braunfels, Texas
Water Pollution Abatement Plan

Please find attached four (4) copies of Copper Ridge Water Pollution Abatement Plan. This Water Pollution Abatement Plan has been prepared in accordance with the Texas Commission on Environmental Quality (30 TAC 313) and current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan applies to an 813.61 acre tract located on Highway 46, approximately 2 miles west from FM 2722.

Please review the attached WPAP information for the items it is intended to address, and if acceptable, provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Appropriate review fees ($5,000) and fee application are included. If you have any questions regarding this information, please call our office.

Sincerely,
Matkin-Hoover Engineering & Surveying

Allen Hoover, P.E.
Vice President

Attachments

General Information Form
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

REGULATED ENTITY NAME: Copper Ridge
COUNTY: Comal STREAM BASIN: Dry Comal Creek

EDWARDS AQUIFER: _X_ RECHARGE ZONE
___ TRANSITION ZONE

PLAN TYPE: _X_ WPAP __ AST __ EXCEPTION
__ SCS __ UST __ MODIFICATION

CUSTOMER INFORMATION

1. Customer (Applicant):

Contact Person:	Chris McMonagle	
Entity:	Southerland Communities	
Mailing Address:	9670 Ranch Road 12	
City, State:	Wimberley, Texas	Zip: 78676
Telephone:	(512) 847-5263	FAX: (512) 847-3690

Agent/Representative (If any):

Contact Person:	Allen Hoover	
Entity:	Matkin-Hoover Engineering and Surveying	
Mailing Address:	8 Spencer Road, PO Box 54	
City, State:	Boerne, Texas	Zip: 78006
Telephone:	(830) 249-0600	FAX: (830) 249–0099

2. __ This project is inside the city limits of _____.
_X_ This project is outside the city limits but inside the ETJ (extra-territorial jurisdiction) of New Braunfels.
__ This project is not located within any city's limits or ETJ.

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

From San Antonio, take I-35 north to New Braunfels, exit Highway 46. Take Highway 46 west toward Boerne. The project site is located on Highway 46, two miles past the Highway 46 and FM 2722 intersection. (see attachment "A")

4. _X_ **ATTACHMENT A - ROAD MAP**. A road map showing directions to and the location of the project site is attached at the end of this form.

5. X **ATTACHMENT B - USGS / EDWARDS RECHARGE ZONE MAP**. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached behind this sheet. The map(s) should clearly show:

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

6. X 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. **The TCEQ must be able to inspect the project site or the application will be returned.**

7. X **ATTACHMENT C - PROJECT DESCRIPTION**. Attached at the end of this form is a detailed narrative description of the proposed project.

8. Existing project site conditions are noted below:
   ___ Existing commercial site
   ___ Existing industrial site
   ___ Existing residential site
   ___ Existing paved and/or unpaved roads
   ___ Undeveloped (Cleared)
   X Undeveloped (Undisturbed/Uncleared)
   ___ Other:

PROHIBITED ACTIVITIES

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

   (1) waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);
   (2) new feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;
   (3) land disposal of Class I wastes, as defined in 30 TAC §335.1;
   (4) the use of sewage holding tanks as parts of organized collection systems; and
   (5) new municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).

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

   (1) waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);
   (2) land disposal of Class I wastes, as defined in 30 TAC §335.1; and
   (3) new municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

ADMINISTRATIVE INFORMATION

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

- X For a Water Pollution Abatement Plan and Modifications, the total acreage of the site where regulated activities will occur.
- __ For an Organized Sewage Collection System Plans and Modifications, the total linear footage of all collection system lines.
- __ For a UST Facility Plan or an AST Facility Plan, the total number of tanks or piping systems.
- __ A Contributing Zone Plan.
- __ 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.

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

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

13. X Submit one (1) original and three (3) copies of the completed application to the appropriate regional office for distribution by the TCEQ to the local municipality or county, groundwater conservation districts, and the TCEQ's Central Office.

14. X No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the executive director.
    X No person shall commence any regulated activity until the Contributing Zone Plan for the activity has been filed with the executive director.

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:

Allen Hover
Print Name of Customer/Agent

Signature of Customer/Agent Date

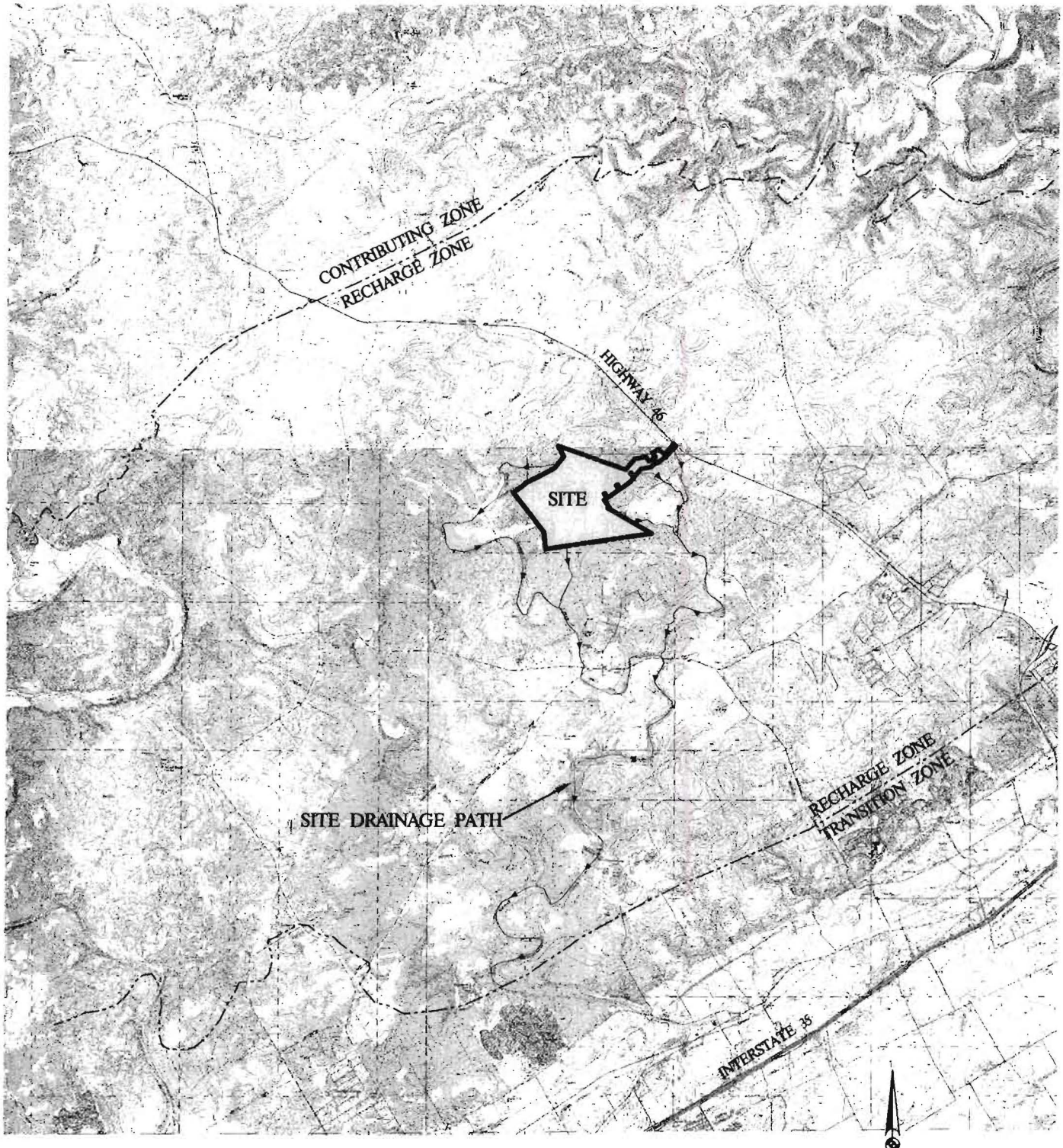
If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

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

MATKINHOOVER
ENGINEERING & SURVEYING
P.O. BOX 54
S SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE: 830.249.0600 FAX:830.249.0099
CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

ROAD MAP
COPPER RIDGE
NEW BRAUNFLES, TEXAS

ATTACHMENT "A"



NOTE:
USGS QUAD NAMES:

1. SMITHSON VALLEY (NW)
2. SATTLER (NE)
3. BAT CAVE (SW)
4. NEW BRAUNFELS WEST (SE)

USGS/EDWARDS RECHARGE ZONE MAP

COPPER RIDGE

NEW BRAUNFLES, TEXAS

MATKINHOOVER
ENGINEERING & SURVEYING
P.O. BOX 54
8 SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE: 830.249.0600 FAX 830.249.0099
CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

ATTACHMENT "B"

COPPER RIDGE
PROJECT DESCRIPTION

The proposed Copper Ridge subdivision is located approximately seven miles west of the City of New Braunfels, Texas on Highway 46. The project area is 813.61 acres of undeveloped/uncleared ranchland currently being used predominantly for agricultural purposes.

The project has several well defined lows throughout the site with a natural ridgeline that traverses the site from the southwest to northeast. This ridge parallels the southwest property line with the majority of the site draining to the south of the property. All of the drainage from this site ultimately ends up in the Dry Comal Creek. A small portion at the entrance of this site is located within the FEMA 100 year flood plain as shown on the Flood Insurance Rate Map Panel Number 485463 0800C dated September 29, 1986.

The general land slope of the site ranges from 0.5% to 30%, the steepest areas being the lows throughout the property. The tract generally consists of moderate to dense vegetative cover with native trees and grasses.

The proposed development will consist of 597 single family residential tracts with a minimum lot size of 1 acre and one amenity center. Upon completion, the site will consist of an estimated 150 acres (18.5%) of impervious cover. During construction, a sediment basin will be utilized to prevent sediment laden runoff from exiting the project site.

The BMPs for this project have been designed in accordance with the TCEQ Technical Guidance Manual RG-348(2005).

Frost GeoSciences
Construction Materials • Forensics
Environmental • Geotechnical

Frost Geosciences, Inc.
13402 Western Oak
Helotes, Texas 78023
Office (210)-372-1315
Fax (210)-372-1318

August 16, 2007

Edwards Aquifer Protection Program
Texas Commission on Environmental Quality
San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480

Re: Geologic Assessment (WPAP)
The 835 Acre Tract
Comal County, Texas
MHES Job # 2289.00

To Whom It May Concern:

In general accordance with the verbal authorization given by Matkin-Hoover Engineering and Surveying (MHES) on April 21, 2007; Frost GeoSciences, Inc. (FGS) was authorized to perform a Geologic Assessment for regulated activities/development on the Edwards Aquifer Recharge/Transition/Contributing Zone for the TriCity Tract in Comal County, Texas. Following authorization for The TriCity Tract, FGS was given verbal authorization by MHES on May 16, 2007 to perform a Geologic Assessment for regulated activities/development on the Edwards Aquifer Recharge/Transition/Contributing Zone for the 550-Acre Tract in Comal County, Texas.

The following reports were submitted to MHES:

Geologic Assessment (WPAP)
The TriCity Tract
285 Acres
New Braunfels, Texas
FGS-E07260
Submitted June 29, 2007

Geologic Assessment (WPAP)
The 550-Acre Tract
+/- 550 Acres
New Braunfels, Texas
FGS-E07212
Submitted July 18, 2007

Upon submittal of these two reports, FGS was informed that MHES was preparing a Water Pollution Abatement Plan for the combined 835-Acre Tract (MHES Job # 2289.00). FGS is pleased to submit a revised Geologic Site Plan for the combined 835-Acre Tract to supplement the WPAP prepared by MHES. Because FGS performed the Geologic Assessment separately, features flagged in the field will have duplicate numbering. However, FGS has made a clear distinction on the Geologic Site Plan between all the features and their locations. When referencing the features noted on the Geologic Site Plan, please consult the appropriate report. The combining of these two separate reports does not alter the findings and conclusions of the previously submitted reports. If we may be of additional assistance in this matter, please feel free to contact our office.

Respectfully submitted,
Frost GeoSciences, Inc.

Taylor Bickford
Environmental Scientist

Tomas Hernandez, Jr., P.G.
Project Manager

GEOLOGIC ASSESSMENT
(WPAP)

THE TRI CITY TRACT
285 ACRES
NEW BRAUNFELS, TEXAS

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-E07260
JUNE 29, 2007

Prepared exclusively for

Matkin-Hoover Engineering
#8 Spencer Road, Suite 100
Boerne, Texas 78006

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost Geosciences, Inc.
13402 Western Oak
Helotes, Texas 78023
Office (210)-372-1315
Fax (210)-372-1318

June 29, 2007

Matkin-Hoover Engineering
#8 Spencer Road, Suite 100
Boerne, Texas 78006

Attn: Mr. Allen Hoover, P.E.

SUBJECT:
Geologic Assessment
The Tri City Tract
285 Acres
New Braunfels, Texas 78006
FGS Project Nº FGS-E07260

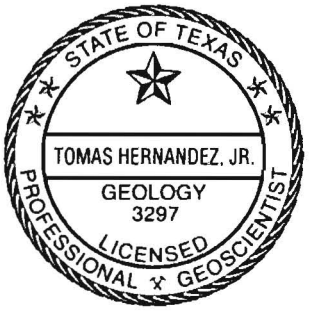
Dear Mr. Hoover:

Frost GeoSciences, Inc., (FGS) is pleased to submit the enclosed Geologic Assessment completed for the above referenced project site as it relates to 30 TAC §213.5(b)(3), effective September 11, 2003. Our investigation was conducted, and this report was prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04).

If you have any questions regarding this report, or if Frost GeoSciences, Inc. may be of additional assistance to you on this project, please feel free to call our office. It has been a pleasure to work with you and we wish to thank you for the opportunity to be of service to you on this project. We look forward to being of continued service.

We appreciate the opportunity to perform these services for Matkin-Hoover Engineering. Please contact the undersigned if you have questions regarding this report.

Respectfully submitted,
Frost GeoSciences, Inc.



Kevin K. Bryant
Projec tGeologist

Tomas Hernandez, Jr., P.G.
Project Geologist

Copies Submitted: (6) Allen Hoover, P.E.; Matkin-Hoover Engineering

TABLE OF CONTENTS

GEOLOGIC ASSESSMENT

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

REGULATED ENTITY NAME: The Tri City Tract

TYPE OF PROJECT: _X_ WPAP __ AST __ SCS __ UST

LOCATION OF PROJECT: _X_ Recharge Zone __ Transition Zone __ Contributing Zone within the Transition Zone

PROJECT INFORMATION

1. _X_ Geologic or manmade features are described and evaluated using the attached **GEOLOGIC ASSESSMENT TABLE**.

2. 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.

Soil Units, Infiltration Characteristics & Thickness		
Soil Name	Group*	Thickness (feet)
Rumple-Comfort Association (RUD)	C-D	0-1.0
Comfort-Rock outcrop complex, undulating (CrD)	D	0-1.0
Eckrant-Rock outcrop complex, steep (ErG)	D	0-1.0

* 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.

3. _X_ A **STRATIGRAPHIC COLUMN** is attached at the end of this form that shows formations, members, and thicknesses. The outcropping unit should be at the top of the stratigraphic column.

4. _X_ A **NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY** is attached at the end of this form. The description must include a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure, and karst characteristics of the site.

5. _X_ Appropriate **SITE GEOLOGIC MAP(S)** are attached:

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" = 400 '
Site Geologic Map Scale	1" = 400 '
Site Soils Map Scale (if more than 1 soil type)	1" = N/A '

6. Method of collecting positional data:

   X Global Positioning System (GPS) technology.
   ___ Other method(s).

7. X The project site is shown and labeled on the Site Geologic Map.

8. X Surface geologic units are shown and labeled on the Site Geologic Map.

9. X 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.

10. X The Recharge Zone boundary is shown and labeled, if appropriate.

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

   X There are 1 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
   - The wells are not in use and have been properly abandoned.
   - The wells are not in use and will be properly abandoned.
   - The wells are in use and comply with 16 TAC Chapter 76.

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

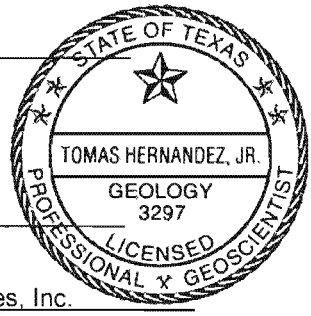
ADMINISTRATIVE INFORMATION

12. X One (1) original and three (3) copies of the completed assessment has been provided.

Date(s) Geologic Assessment was performed: June 23, 2007
Date(s)

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.

Tomas Hernandez, Jr., P.G.
Print Name of Geologist



Signature of Geologist

210-372-1315
Telephone

210-372-1318
Fax

June 29, 2007
Date

Representing: Frost Geosciences, Inc.
(Name of Company)

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

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

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: The Tri City Tract																	
LOCATION			FEATURE CHARACTERISTICS											EVALUATION			PHYSICAL SETTING			
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29° 43' 59.6"	-98° 15' 8.23"	CD	5	Kep	5	6	1						6	11	11		Yes		Hillside
S-2	29° 44' 1.09"	-98° 15' 6.8"	CD	5	Kep	3	6	0.5						6	11	11		Yes		Hillside
S-3	29° 44' 9.67"	-98° 15' 7.96"	O	5	Kep	70	30	0.5			2-3	0.25	O, F	9	14	14			Yes	Hillside
S-4	29° 44' 8.69"	-98° 15' 5.85"	SC	20	Kep	0.25	0.5	1					O, V	8	28	28			Yes	Hillside
S-5	29° 44' 9.44"	-98° 15' 6.63"	SC	20	Kep	1	1	3					O	9	29	29			Yes	Hillside
S-6	29° 44' 9.38"	-98° 15' 6.96"	SC	20	Kep	4	3	2					O,C,V	9	29	29			Yes	Hillside
S-7	29° 44' 0.69"	-98° 15' 5.16"	CD	5	Kep	3	3	2.5					C	7	12	12		Yes		Hilltop
S-8	29° 44' 11"	-98° 15' 2.59"	SC	20	Kep	1	1	1					O, F, C	7	27	27		Yes		Hillside
S-9	29° 44' 11.9"	-98° 14' 58.8"	CD	5	Kep	7	4	0.5					O, V	7	12	12		Yes		Hilltop
S-10	29° 44' 11.6"	-98° 14' 58.9"	SC	20	Kep	1.5	2	2					O, V, C	8	28	28		Yes		Hilltop
S-11	29° 44' 9.29"	-98° 14' 57.4"	SC	20	Kep	2	1	2					O, C, F	7	27	27		Yes		Hilltop
S-12	29° 44' 9.22"	-98° 14' 57.3"	SC	20	Kep	1.5	1	1.5					O, C, F	7	27	27		Yes		Hilltop
S-13	29° 43' 59.9"	-98° 14' 57.1"	CD	5	Kep	15	12	0.75					O, V	6	11	11		Yes		Hilltop
S-14	29° 44' 8.64"	-98° 14' 57.8"	SC	20	Kep	2	0.5	1.5					O, F	6	26	26		Yes		Hilltop
S-15	29° 44' 13.5"	-98° 14' 49.5"	SC	20	Kep	0.5	1	2					O	6	26	26		Yes		Hilltop
S-16	29° 44' 2.34"	-98° 14' 52.1"	CD	5	Kep	9	9	1.5					O	7	12	12		Yes		Hilltop
S-17	29° 44' 2.81"	-98° 14' 49.1"	SC	20	Kep	1	1	1.5					O, F	6	26	26		Yes		Hilltop
S-18	29° 44' 9.34"	-98° 14' 48.8"	SC	20	Kep	1	2	2					O, F	7	27	27		Yes		Hilltop
S-20	29° 44' 6.12"	-98° 14' 32.2"	CD	5	Kep	2	2	2					O	6	11	11		Yes		Hillside
S-21	29° 44' 1.89"	-98° 15' 10.6"	SC	20	Kep	2	1	1					O	7	27	27		Yes		Hillside
S-22	29° 44' 10.2"	-98° 15' 11.1"	SC	20	Kep	1.5	0.75	1					O, C	8	28	28		Yes		Hillside
S-23	29° 44' 26.7"	-98° 15' 25"	SC	20	Kek	1	.75	3					N	6	26	26			Yes	Hillside
S-24	29° 44' 21.4"	-98° 15' 22.7"	SC	20	Kek	0.5	0.5	0.75					O, V	7	27	27		Yes		Hillside
S-25	29° 44' 19.3"	-98° 15' 21.3"	SC	20	Kek	1	1.25	1.5					O, V	7	27	27		Yes		Hillside
S-26	29° 44' 14.3"	-98° 15' 20.2"	O	5	Kep	10	30	0.75			4	0.25-0.5	O, F	9	14	14		Yes		Hillside
S-30	29° 44' 0.78"	-98° 15' 21.3"	CD	5	Kep	6	5	0.75					O	7	12	12		Yes		Hilltop
S-31	29° 44' 3.49"	-98° 15' 35"	SC	20	Kep	0.5	0.5	1					O	6	26	26		Yes		Hilltop
S-32	29° 44' 15.7"	-98° 15' 24"	SC	20	Kek	3	1	1					O, F, C	14	34	34			Yes	Streambed
S-33	29° 44' 1.98"	-98° 15' 25.7"	MB	30	Kep	0.5	0.5	?					X	40	70		70	Yes		Hillside
S-34	29° 43' 58.9"	-98° 15' 32.4"	SC	20	Kep	4	3	3					O, F	8	28	28		Yes		Hillside
S-35	29° 44' 0.7"	-98° 15' 35"	CD	5	Kep	15	20	0.75					O	9	14	14		Yes		Hillside
S-36	29° 43' 56.7"	-98° 15' 38.2"	O	5	Kep	10	10	0.5			2-3	0.25-0.75	O, F	8	13	13			Yes	Hillside
S-37	29° 44' 4.3"	-98° 15' 33.7"	SC	20	Kep	4	2	1.75					O	8	28	28		Yes		Hillside
S-38	29° 44' 2.35"	-98° 15' 34.7"	SC	20	Kep	1	0.75	1					O, V	7	27	27		Yes		Hillside

GEOLOGIC ASSESSMENT TABLE | **PROJECT NAME: The Tri City Tract**

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-39	29° 44' 3.69"	-98° 15' 41.3"	O	5	Kek	40	20	1			2-3	0.25-0.75	O, F	9	14	14			Yes	Hillside
S-40	29° 44' 5.97"	-98° 15' 42.8"	O	5	Kep	20	30	1			1-8	0.25-0.5	O, V	9	14	14		Yes		Hillside
S-41	29° 44' 6.95"	-98° 15' 43.9"	O	5	Kek	50	40	1			4-6	0.25-0.33	O, F	8	13	13			Yes	Hillside
S-42	29° 44' 5.3"	-98° 15' 39.6"	SC	20	Kep	1.5	0.75	1					O, V	7	27	27		Yes		Hillside
S-43	29° 44' 15.7"	-98° 15' 34.5"	F	20	Kek/Kep	30	3500	?	~60	10				5	35	35			Yes	Hillside
S-44	29° 44' 3.28"	-98° 14' 29.5"	F	20	Kep	?	600	?	~50	10				5	35	35			Yes	Hilltop
S-45	29° 44' 9.4"	-98° 15' 45.8"	F	20	Kek	?	1400	?	~85	10				5	35	35			Yes	Hillside
S-50	29° 44'18.5"	-98° 15' 33.2"	SC	20	Kek	2	3	1					O, F	7	27	27		Yes		Hilltop
S-51	29° 44' 16"	-98° 15' 37.6"	SC	20	Kek	3	1	2					O, F, C	9	29	29			Yes	Hillside

Datum: NAD 27

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

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

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Floodplain, Streambed

STATE OF TEXAS
TOMAS HERNANDEZ, JR.
GEOLOGY
3297
LICENSED
PROFESSIONAL GEOSCIENTIST

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

Tomas Hernandez, Jr. P.G.

Date June 23, 2007

Sheet 2 of 2

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

STRATIGRAPHIC COLUMN

Hydrogeologic subdivision			Group, formation, or member			Hydrologic function	Thickness (feet)	Lithology	Field identification	Cavern development	Porosity/ permeability type
Upper Cretaceous	Upper confining unit		Taylor Group			CU	600	Clay; chalky limestone	Gray-brown clay; marly limestone	None	Low porosity/ low permeability
			Austin Group			CU; rarely AQ	130 – 150	White to light-tan to gray limestone	White, chalky limestone; *Pycnodonte aucella Inoceramus subquadratus*	None	Low porosity; rare water production from fractures/ low permeability
			Eagle Ford Group			CU	30 – 50	Brown, flaggy sandy shale and argillaceous limestone	Thin flagstones; petroliferous	None	Primary porosity lost/ low permeability
			Buda Limestone			CU	40 – 50	Buff, light-gray, dense mudstone	Porcelaneous limestone	Minor surface karst	Low porosity/ low permeability
			Del Rio Clay			CU	50 – 60	Blue-green to yellow-brown clay	Fossiliferous; *Ilymatogyra arietina*	None	None/primary upper confining unit
Lower Cretaceous	I	Edwards aquifer	Georgetown Formation			CU	40 – 60	Gray to light-tan, marly limestone	Marker fossil: *Waconella waconsis*	None	Low porosity/ low permeability
	II		Edwards Group	Person Formation	Cyclic and marine members, undivided (4)	AQ	0 – 70	Mudstone to packstone; *miliolid* grainstone; chert	Boxwork vugs; light tan, massive; some *Toucasia*, *Caprinid*, and *Chondrodonta*	Many caves; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric/water-yielding; one of the most porous and permeable; essentially absent in Travis County
	III				Leached and collapsed members, undivided (4)	AQ	30 – 80	Crystalline limestone; mudstone to wackestone to *miliolid* grainstone; chert; collapsed breccia	Light-gray, bioturbated iron-stained beds separated by massive limestone beds; *Toucasia*, *Chondrodonta*	Extensive lateral development; large rooms	Majority not fabric/ one of the most porous and permeable
	IV				Regional dense member (3)	CU	20 – 30	Light-tan, dense, argillaceous mudstone	Wispy iron-oxide stains; *Pleuromya knowltoni*, *Ceratostreon texanum*	None; only vertical fracture enlargement	Not fabric/ low permeability; vertical barrier
	V			Kainer Formation	Grainstone member (2)	AQ	45 – 60	Light-gray, *miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone; *Toucasia*, *Turritella*, and *Chondrodonta*	Few caves	Not fabric/ recrystallization reduces permeability
	VI				Kirschberg evaporite member (1)	AQ	65 – 75	Light-gray, crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame; *Cladophyllia* and *Turritella*	Probably extensive cave development	Majority fabric/ one of the most porous and permeable
	VII				Dolomitic member (1)	AQ	110 – 150	Mudstone to grainstone; crystalline limestone; chert	Massively bedded, light gray, *Toucasia* abundant; *Dictyoconus walnutensis*, *Caprinid*	Caves related to structure or bedding planes	Mostly not fabric; some bedding-plane fabric/ water-yielding; locally permeable
	VIII				Basal nodular member	Karst AQ; not karst CU	45 – 60	Shaly, fossiliferous, nodular limestone; mudstone; *miliolid* grainstone	Massive, nodular and mottled; *Ceratostreon texanum*, *Dictyoconus walnutensis*, and *Texigryphaea*	Few caves	Fabric/low permeability
	Lower confining unit		Upper member of the Glen Rose Limestone			CU; evaporite beds AQ	350 – 500	Yellowish-tan, thinly bedded limestone and marl	Stair-step topography; alternating limestone and marl	Some surface cave development	Some water production at evaporite beds/ relatively impermeable

LOCATION

The property is located north of Oak Creek Drive, just north of the intersection of Oak Creek Drive and High Chaparral, west of New Braunfels, Texas, here forth known as the "Site." The approximate center of the Site is located at N 29° 44' 8.64" Latitude and W 98° 14' 57.8" Longitude (NAD27).

METHODOLOGY

The Geologic Assessment was performed by Mr. Kevin K. Bryant, Project Geologist, and Mr. Tomas Hernandez, Jr., P.G., with Frost GeoSciences, Inc., on June 19-22, 2007. Frost GeoSciences, Inc. researched the geology of the area surrounding Oak Creek Drive and High Chaparral, west of New Braunfels, Texas. The research included, but was not limited to, the Geologic Atlas of Texas, San Antonio Sheet, United States Geologic Society (USGS) Water Resource Investigation (WRI) (94-4117) for Comal County, FEMA maps, Edwards Aquifer Recharge Zone Maps, USGS 7.5 Minute Quadrangle Maps, and the USDA Soil Survey of Bexar County, Texas.

After reviewing the available information, a field investigation was performed to identify any geologic or man made potential recharge features. A transect spacing of approximately 50 feet, or less depending on vegetation thickness, was used to inspect the Site. A 2005 aerial photograph, in conjunction with a hand held Garmin GPS 72 Global Positioning System with an Estimated Potential Error ranging from 9 to 20 feet, was used to navigate on the Site and identify the locations of potential recharge features, as recommended in the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The Geologic Assessment Form, Stratigraphic Column, and the Geologic Assessment Table have been filled with the appropriate information for this project site and are included on pages 1-5 of this report.

NARRATIVE DESCRIPTIVE OF SITE GEOLOGY

The Site is located on gently rolling hills and corresponding broader areas. The Site has a thick stand of vegetative cover consisting primarily of Ashe juniper, live oak, native grasses, and various cactus.

Underlying the soil cover is the Persons Formation and Kainer Formation of the Edwards Group. The Edwards Group subdivided in to two formations – the Persons and Kainer which are then further subdivided into several members. Based on literature research the project site has two faults trending across the northern and far eastern portions of the Site. The northern fault separates the Kainer from the Persons Formation across the Site. A third, inferred fault is located in the far northwestern corner of the Site. All three faults are described in the USGS WRI (94-4117) for Comal County, presented on Plate 6.

No visible faulting was observed on the Site. A single water well was noted in the southwestern portion of the Site. No other significant observations were noted across the project area during the site reconnaissance.

SITE SPECIFIC GEOLOGIC FEATURE DESCRIPTIONS

S-1: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-2: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-3: This feature is an area of vuggy rock. The vugs measure approximately three inches in diameter and have depths up to six inches.

S-4: This feature is a solution cavity within bedrock. The cavity measures approximately three to six inches in diameter with a depth of nearly one foot.

S-5: This feature is a solution cavity within bedrock. The cavity measures approximately one foot wide, three feet in length, and three feet deep.

S-6: This feature is a solution cavity within bedrock. The cavity measures approximately four feet wide, three feet in length, and two feet deep.

S-7: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-8: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, one foot in length, and one foot in depth.

S-9: This feature is a non-karst closed depression. The feature appears to be have been created as the result of a cedar tree fallen over.

S-10: This feature is a solution cavity within bedrock. The feature measures approximately one-and-a-half feet wide, two feet in length, and two feet in depth. The feature is located at the base of a large cedar tree.

S-11: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, two feet in length, and two feet in depth.

S-12: This feature is a solution cavity within bedrock. The feature measures approximately one-and-a-

half feet wide, one foot in length, and one-and-a-half feet in depth.

S-13: This feature is a non-karst closed depression. The feature appears to a large animal wallow hole.

S-14: This feature is a solution cavity within bedrock. The feature measures approximately six inches wide, two feet in length, and one-and-a-half feet in depth.

S-15: This feature is a solution cavity within bedrock. The feature measures approximately six inches wide, one foot in length, and nearly two feet in depth.

S-16: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-17: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, one foot in length, and approximately 18 inches in depth.

S-18: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, two feet in length, and two feet in depth.

S-20: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-21: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, two feet in length, and one foot in depth. The cavity is completely infilled with organic matter.

S-22: This feature is a solution cavity within bedrock. The feature measures approximately one-and-a-half feet wide, nine inches in length, and one foot in depth. The cavity is located at the base of a large boulder.

S-23: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, nine inches in length, and three feet in depth. The cavity is most likely a discharge point rather than a recharge feature.

S-24: This feature is a solution cavity within bedrock. The feature measures approximately six inches wide, six inches in length, and nine inches in depth. The cavity appears to be the result of a tree removal.

S-25: This feature is a solution cavity within bedrock. The feature measures approximately 15 inches wide, one foot in length, and 18 inches in depth. The cavity appears to be the result of a cedar tree removal.

S-26: This feature is an area of vuggy rock. The vugs measure approximately three inches in diameter and have depths up to nine inches.

S-30: This feature is a non-karst closed depression. The feature appears to be a natural low point with the soil.

S-31: This feature is a solution cavity within bedrock. The feature measures approximately six inches wide, six inches in length, and one foot in depth. The cavity appears to be enlarged by local wildlife into an animal burrow.

S-32: This feature is a solution cavity within bedrock. The feature measures approximately three feet wide, one foot in length, and one foot in depth.

S-33: This feature is a manmade bore hole in bedrock. The feature is a water well used for watering livestock.

S-34: This feature is a solution cavity within bedrock. The feature measures approximately four feet wide, three feet in length, and three feet in depth. The cavity appears to have been enlarged into an animal burrow.

S-35: This feature is a non-karst closed depression. The feature appears to be an animal wallow hole.

S-36: This feature is an area of vuggy rock. The vugs measure approximately three inches in diameter and have depths up to six inches.

S-37: This feature is a solution cavity within bedrock. The feature measures approximately four feet wide, two feet in length, and nearly two feet in depth. The cavity appears to have been enlarged into an animal burrow.

S-38: This feature is a solution cavity within bedrock. The feature measures approximately one foot wide, nine inches in length, and one foot in depth. The cavity appears to have been exposed from a tree fallen over.

S-39: This feature is an area of vuggy rock. The vugs measure approximately three inches in diameter and have depths up to 12 inches.

S-40: This feature is an area of vuggy rock. The vugs measure from one to five inches in diameter and have depths up to one foot.

S-41: This feature is an area of vuggy rock. The vugs measure from one to four inches in diameter and have depths up to one foot.

S-42: This feature is a solution cavity within bedrock. The feature measures approximately 18 inches wide, nine inches in length, and one foot in depth. The cavity appears to be the result of a cedar tree removal.

S-43: This feature is a normal fault. The feature measures approximately 3,500 feet in length and 30 feet wide. The fault is depicted on the geologic map (Plate 6 of this report).

S-44: This feature is a normal fault. The feature measures approximately 600 feet in length. The fault is depicted on the geologic map (Plate 6 of this report).

S-45: This feature is an inferred normal fault. The feature measures approximately 1,400 feet in length. The fault is depicted on the geologic map (Plate 6 of this report).

S-50: This feature is a solution cavity within bedrock. The feature measures approximately two feet wide, three feet in length, and one foot in depth.

S-51: This feature is a solution cavity within bedrock. The feature measures approximately two feet wide, one foot in length, and two feet in depth.

Based on a visual inspection of the ground surface, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to be low based on the appearance of the surface of the Site.

SOIL DESCRIPTION

The Site has soil cover ranging from 0-2 feet, consisting of the following soil associations:

The **Comfort-Rock outcrop complex, undulating (CrD)** consists of shallow, clayey soils and Rock outcrops on the side slopes, hilltops, and ridgetops in the uplands area of the Edwards Plateau. This soil complex is composed of the Comfort extremely stony clay (~49% to ≥95% of the complex), the Rock outcrop (5-36% of the complex), and small amounts of the Rumple, Purves, Eckert, and Real soils.

Typically, the surface layer of the Comfort soil is dark brown extremely stony clay about 6 inches thick. Stones and cobbles (some as much as 4 feet across) cover approximately 45% of the surface. The subsoil extends to a depth of 13 inches. It's a dark reddish brown extremely stony clay. The underlying material is indurated fractured limestone. The soil is mildly alkaline and non-calcareous throughout. The soil is well drained, surface runoff is slow to medium, permeability is slow, and the available water capacity is very low. Water erosion is a slight hazard.

Typically, the Rock outcrop is dolomitic limestone that is barren of soil except in narrow fractures in the rock. Some areas may have as much as 3 inches of soil on top of the outcrop.
The soil is well drained and surface runoff is slow to medium. Permeability is slow. The available water capacity is very low. The rooting zone is shallow and water erosion is a slight hazard.

The **Eckrant-Rock outcrop complex, steep (ErG)** is a complex consisting of shallow, clayey soils and Rock outcrop found on upland areas. Slopes are convex and range from 8 to 30 percent. The soils occur in long, narrow slopes on high hills and ridges and along escarpments. The soils of the complex range in size from 50 to a few thousand acres.

The Eckrant soil makes up approximately 50-80 percent of the complex, but averages around 70 percent. Typically, the surface layer is very dark gray extremely stony clay about 10 inches thick. It is about 35 percent, by volume, cobbles and stones in the upper portions and 75 percent, by volume, in the lower portions. The underlying material is indurated fractured limestone. The soil is moderately alkaline throughout.

The Rock outcrops make up 9-30 percent of the complex, averaging around 20 percent. Typically, the Rock outcrops are barren exposures of indurated limestone. In some areas, as much as 4 inches of clayey soil may overlay the outcrops. Dark colored clay may be present in cracks and fractures.

The soils of this complex are well drained and surface runoff is rapid. Permeability is moderately slow and the available water capacity is very low. Water erosion is a severe hazard.

The **Rumple-Comfort Association (RUD)** consists of shallow and moderately deep soils on uplands in the Edwards Plateau Land Resource Area. The surface layer of the Rumple Soil is dark reddish brown very cherty clay loam about 10 inches thick. Rounded chert and limestone cobbles and gravel cover about 20 percent of the surface.

The subsoil to a depth of 14 inches is dark reddish-brown very cherty clay, and to a depth of 28 inches it is dark reddish-brown extremely stony clay. The underlying material is indurated fractured limestone. The Comfort Soil is dark brown, neutral, extremely stony clay about 7 inches thick. The subsoil to a depth of 12 inches is dark reddish-brown, mildly alkaline, extremely stony clay. The underlying material is indurated fractured limestone. The soil is noncalcareous throughout. The soils in this association are well drained. Surface runoff is medium, but varies due to the occurrence of caves, fracture zones, and sinks. Permeability is moderately slow. Water erosion is a moderate hazard.

RESEARCH

7.5 Minute Quadrangle Map Review

According to the USGS 7.5 Minute Quadrangle Map, Bat Cave, Texas (1988) and New Braunfels West, Texas (1988), the elevation of the project site ranges from 958 feet to 1071 feet. These elevations are calculated above mean sea level (AMSL). Surface runoff from the project site flows to the southeast into unnamed tributaries of Dry Comal Creek.

Recharge / Transition Zone

According to the Official Edwards Aquifer Recharge Zone Map, Bat Cave, Texas and New Braunfels West, Texas, the project site is located within the Recharge Zone of the Edwards Aquifer.

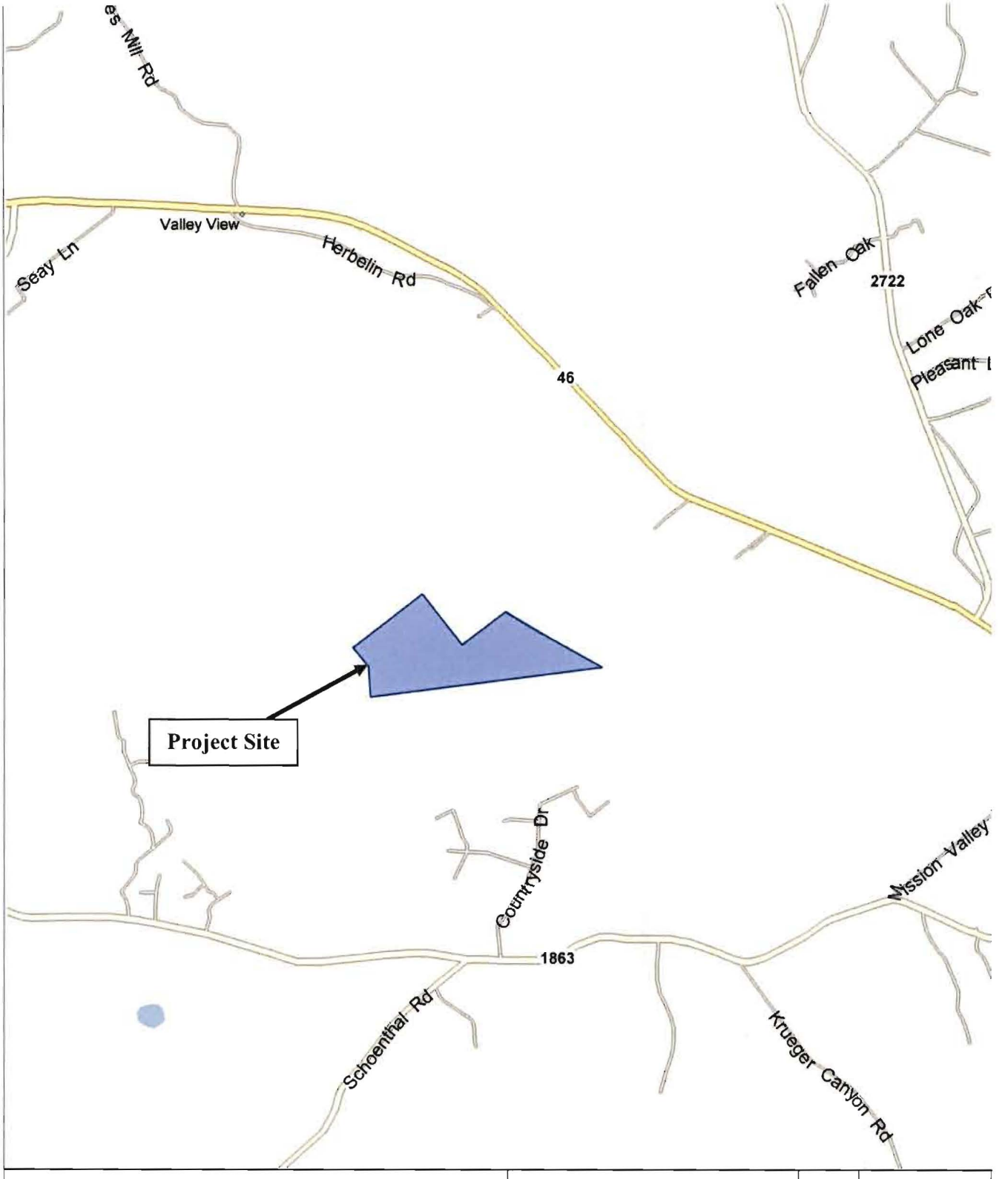
100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Bexar County, Texas, Community Panel Number 4854630080-C (revised September 29, 1986) was reviewed. The project site does not appear to be in a special flood zone.

REFERENCES

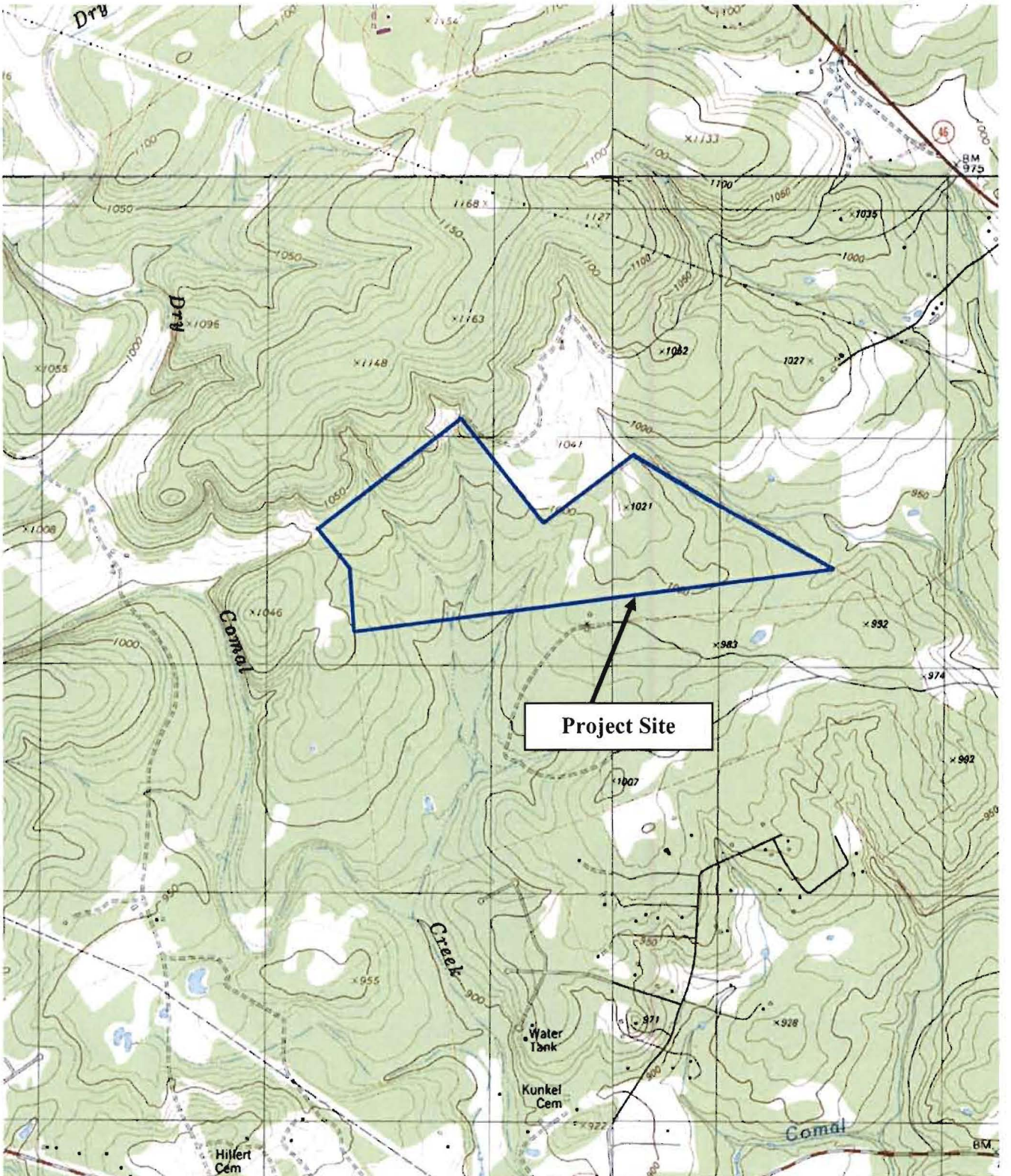
1. USGS 7.5 Minute Quadrangle Map, Bat Cave, Texas (1988) and New Braunfels West, Texas (1988).
2. Edwards Underground Water District Reference Map.
3. Official Edwards Aquifer Recharge Zone Map, Bat Cave, Texas and New Braunfels West, Texas.
4. USGS Water Resources Investigations 94-4117.
5. Geologic Atlas of Texas, San Antonio Sheet (1982), Bureau of Economic Geology.
6. Federal Emergency Management Agency (FEMA), February 16, 1996, Comal County, Texas and Incorporated Areas, Flood Insurance Rate Map (FIRM), Panel Number 4854630080-C (revised September 29, 1986).
7. USDA Soil Conservation Service, Soil Survey website, http://websoilsurvey.nrcs.usda.gov/app/
8. TCEQ-0585-Instructions (Rev. 10-1-04). "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone"

FIGURES



Vicinity Map	DRAWING NOT TO SCALE	N↑	FIGURE 2

FGS Project Nº FGS-E07260

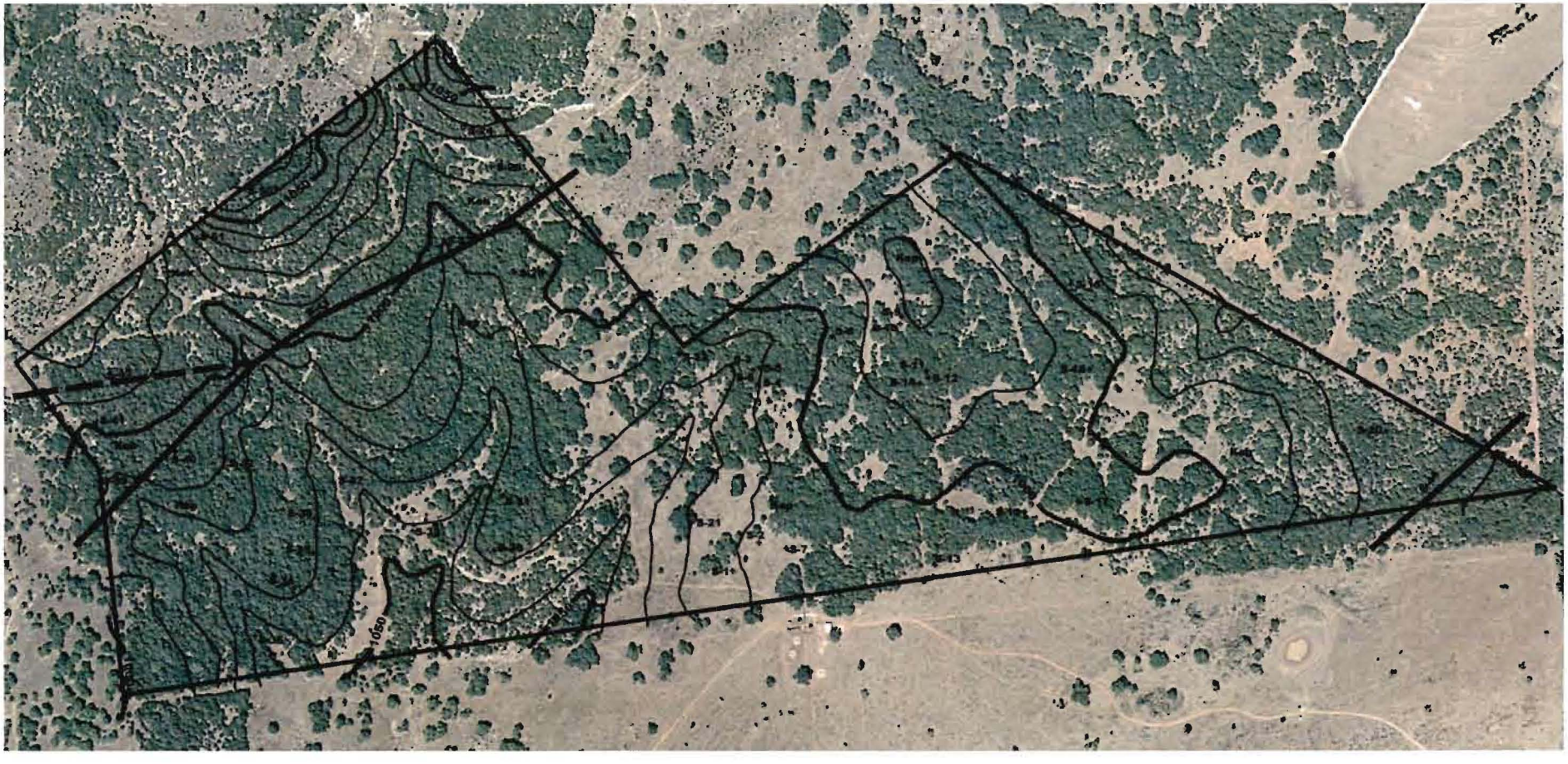


Topographic Map	1 inch = 2,000 feet	N↑	FIGURE 3

FGS Project Nº FGS-E07260

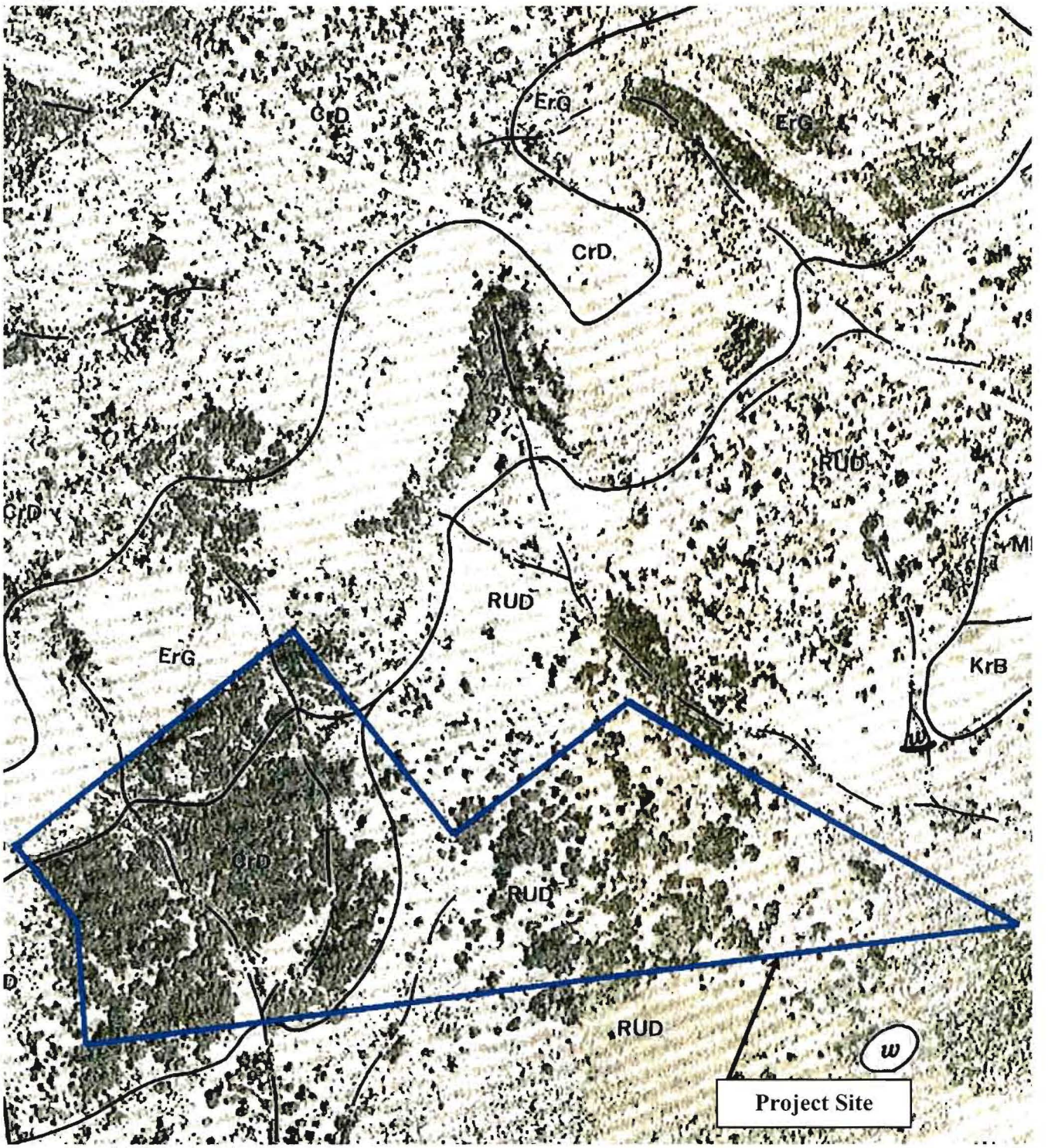
Frost GeoSciences

Frost GeoSciences



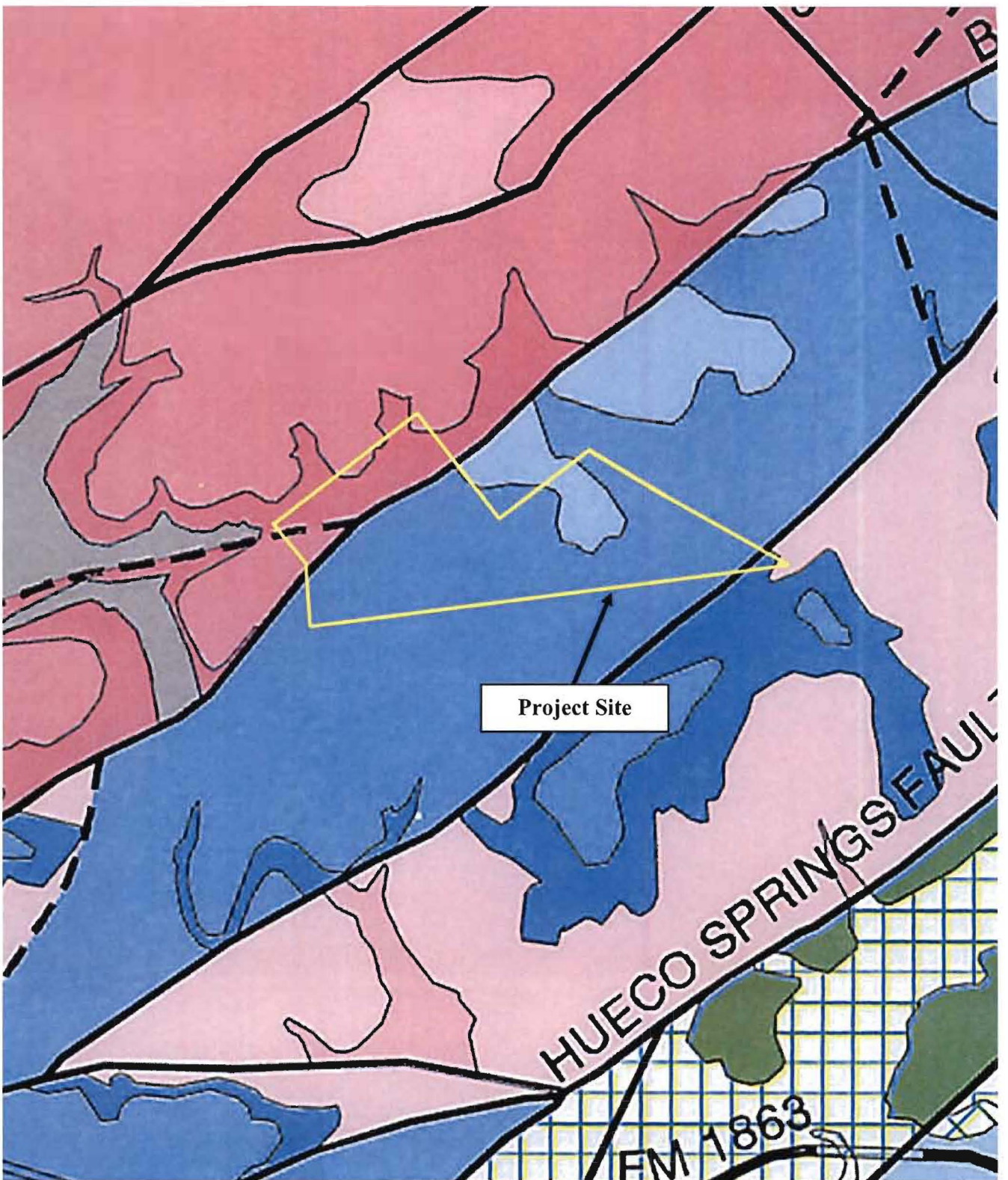
Aerial Photograph	DRAWING NOT TO SCALE	N↑	FIGURE 4

FGS Project Nº FGS-E07260



Soils Map	DRAWING NOT TO SCALE	N↑	FIGURE 5

FGS Project Nº FGS-E07260



Geologic Map	1 inch = 2,000 feet	N↑	FIGURE 6

FGS Project Nº FGS-E07260

APPENDIX A

SITE PHOTOGRAPHS

Photo #1 – View of feature S-2.

Photo #2 – View of feature S-4.

Photo #3 – View of feature S-5.

Photo #4 – View of feature S-6.

Photo #5 – View of feature S-8.

Photo #6 – View of feature S-9.

Photo #7 – View of feature S-10.

Photo #8 – View of feature S-11.

Photo #9 – View of feature S-12.

Photo #10 – View of feature S-13.

Photo #11 – View of feature S-14.

Photo #12 – View of feature S-17.

Photo #13 – View of feature S-21.

Photo #14 – View of feature S-22.

Photo #15 – View of feature S-24.

Photo #16 – View of feature S-25.

Photo #17 – View of feature S-31.

Photo #18 – View of feature S-32.

Photo #19 – View of feature S-33.

Photo #20 – View of feature S-34.

Photo #21 – View of feature S-35.

Photo #22 – View of feature S-37.

Photo #23 – View of feature S-38.

Photo #24 – View of feature S-39.

Photo #25 – View of feature S-40.

Photo #26 – View of feature S-41.

Photo #27 – View of feature S-50.

Photo #28 – View of feature S-50.

GEOLOGIC ASSESSMENT
(WPAP)

THE 550-ACRE TRACT
+/- 550 ACRES
NEW BRAUNFELS, TEXAS

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-E07212
JULY 18, 2007

Prepared exclusively for

Matkin-Hoover Engineering
#8 Spencer Road, Suite 100
Boerne, Texas 78006

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

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July 18, 2007

Matkin-Hoover Engineering
#8 Spencer Road, Suite 100
Boerne, Texas 78006

Attn: Allen Hoover, P.E.

SUBJECT:
Geologic Assessment
The 550-Acre Tract
+/- 550 Acres
New Braunfels, Texas
FGS Project Nº FGS-E07212

Dear Mr. Hoover:

Frost GeoSciences, Inc., (FGS) is pleased to submit the enclosed Geologic Assessment completed for the above referenced Site as it relates to 30 TAC §213.5(b)(3), effective September 11, 2003. Our investigation was conducted, and this report was prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04).

If you have any questions regarding this report, or if Frost GeoSciences, Inc. may be of additional assistance to you on this project, please feel free to call our office. It has been a pleasure to work with you and we wish to thank you for the opportunity to be of service to you on this project. We look forward to being of continued service.

We appreciate the opportunity to perform these services for Matkin-Hoover Engineering. Please contact the undersigned if you have questions regarding this report.

STATE OF TEXAS
TOMAS HERNANDEZ, JR.
GEOLOGY
3297
LICENSED
PROFESSIONAL GEOSCIENTIST

Respectfully submitted,
Frost GeoSciences, Inc.

Tomas Hernandez, Jr., P.G.
Project Geologist

Copies Submitted: (6) Matkin-Hoover Engineering

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GEOLOGIC ASSESSMENT

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

REGULATED ENTITY NAME: The 550-Acre Tract

TYPE OF PROJECT: _X_ WPAP __ AST __ SCS __ UST

LOCATION OF PROJECT: _X_ Recharge Zone __ Transition Zone __ Contributing Zone Within the Transition Zone

PROJECT INFORMATION

1. _X_ Geologic or manmade features are described and evaluated using the attached **GEOLOGIC ASSESSMENT TABLE**.

2. Soil cover on the 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 Site, show each soil type on the site Geologic Map or a separate soils map.

Soil Units, Infiltration Characteristics & Thickness		
Soil Name	Group*	Thickness (feet)
Rumple-Comfort Association (RUD)	C-D	0-1.0
Comfort-Rock outcrop complex, undulating (CrD)	D	0-1.0
Eckrant-Rock outcrop complex, steep (ErG)	D	0-1.0

* 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.

3. _X_ A **STRATIGRAPHIC COLUMN** is attached at the end of this form that shows formations, members, and thicknesses. The outcropping unit should be at the top of the stratigraphic column.

4. _X_ A **NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY** is attached at the end of this form. The description must include a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure, and karst characteristics of the site.

5. _X_ Appropriate **SITE GEOLOGIC MAP(S)** are attached:

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" = 400 '
Site Geologic Map Scale	1" = 400 '
Site Soils Map Scale (if more than 1 soil type)	1" = N/A '

6. Method of collecting positional data:

_X_ Global Positioning System (GPS) technology.
___ Other method(s).

7. _X_ The Site is shown and labeled on the Site Geologic Map.

8. _X_ Surface geologic units are shown and labeled on the Site Geologic Map.

9. _X_ Geologic or manmade features were discovered on the 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 Site during the field investigation.

10. _X_ The Recharge Zone boundary is shown and labeled, if appropriate.

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

_X_ There are 2 (#) wells present on the 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.
_X_ The wells are not in use and will be properly abandoned.
__ The wells are in use and comply with 16 TAC Chapter 76.

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

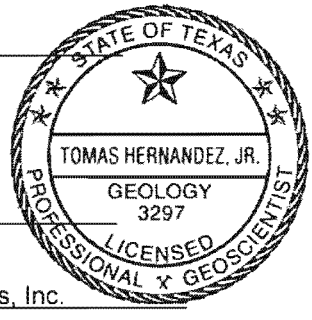
ADMINISTRATIVE INFORMATION

12. _X_ One (1) original and three (3) copies of the completed assessment has been provided.

Date(s) Geologic Assessment was performed: May 22 through July 9, 2007
Date(s)

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.

Tomas Hernandez, Jr., P.G.
Print Name of Geologist



Signature of Geologist

210-372-1315
Telephone

210-372-1318
Fax

July 18, 2007
Date

Representing: Frost Geosciences, Inc.
(Name of Company)

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

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

GEOLOGIC ASSESSMENT TABLE	PROJECT NAME: The 550 Acre Tract

LOCATION			FEATURE CHARACTERISTICS											EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)	TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29° 44' 56.9"	-98° 14' 8.86"	SC	20	Kep	1.5	1.5	0.75					O	10	30	30		Yes		Floodplain
S-2	29° 44' 54.6"	-98° 14' 17"	CD	5	Kep	6	5	1					O, V	7	12	12		Yes		Hilltop
S-3	29° 44' 49.6"	-98° 14' 19.2"	SC	20	Kep	3	1.5	0.75					O	7	27	27		Yes		Hilltop
S-4	29° 44' 49.6"	-98° 14' 21.5"	CD	5	Kep	6	4	1.33					O	7	12	12		Yes		Hilltop
S-5	29° 44' 49.4"	-98° 14' 21.5"	CD	5	Kep	6	5	1.33					O	7	12	12		Yes		Hilltop
S-6	29° 44' 48.5"	-98° 14' 22.2"	SC	20	Kep	4	1.5	1.5					O, V	8	28	28		Yes		Hilltop
S-10	29° 44' 46.7"	-98° 14' 29.6"	SC	20	Kep	1.5	1	0.75					O	9	29	29		Yes		Hilltop
S-11	29° 44' 46.4"	-98° 14' 31.4"	SC	20	Kep	2	1.5	2					O	9	29	29		Yes		Hilltop
S-12	29° 44' 48.5"	-98° 14' 31.3"	SC	20	Kep	2	1	1.5					O, F	8	28	28		Yes		Hilltop
S-13	29° 44' 48.4"	-98° 14' 31.8"	CD	5	Kep	6	3	1					O, F	10	15	15		Yes		Hilltop
S-14	29° 44' 48.4"	-98° 14' 32.2"	CD	5	Kep	6	3	2					O, F	10	15	15		Yes		Hilltop
S-15	29° 44' 48.6"	-98° 14' 32.8"	SC	20	Kep	1	1	1.33					O, V	8	28	28		Yes		Hilltop
S-16	29° 44' 49"	-98° 14' 33.2"	CD	5	Kep	7	5	2					O	9	14	14		Yes		Hilltop
S-17	29° 44' 47.7"	-98° 14' 33.5"	SC	20	Kep	0.75	1.5	1.25					O, F	9	29	29		Yes		Hilltop
S-18	29° 44' 48.2"	-98° 14' 33.7"	CD	5	Kep	6	2	1					O, V	9	14	14		Yes		Hilltop
S-19	29° 44' 47.2"	-98° 14' 33.2"	SC	20	Kep	2	2	0.5					O	9	29	29		Yes		Hilltop
S-20	29° 44' 47.4"	-98° 14' 34.7"	SC	20	Kep	3	3	2					O	8	28	28		Yes		Hilltop
S-21	29° 44' 47.1"	-98° 14' 36.1"	CD	5	Kep	6	6	1					O,F,C,V	8	13	13		Yes		Hilltop
S-22	29° 44' 46.8"	-98° 14' 35.9"	CD	5	Kep	6	4	1					O,F,C,V	10	15	15		Yes		Hilltop
S-23	29° 44' 47.5"	-98° 14' 37.3"	SC	20	Kek	1.5	1	3					O, F	10	30	30		Yes		Hilltop
S-24	29° 44' 46.0"	-98° 14' 39.4"	SC	20	Kek	2	1	2					O	8	28	28		Yes		Hilltop
S-25	29° 44' 28.4"	-98° 15' 9.46"	C	30	Kek	3	5	25+					C	40	70		70	Yes		Hilltop
S-26	29° 44' 29.7"	-98° 15' 6.85"	CD	5	Kek	7	4	0.5					O, V, F	7	12	12		Yes		Hilltop
S-27	29° 44' 33.7"	-98° 15' 8.23"	SC	20	Kek	1.33	1	1.66					O	6	11	11		Yes		Hilltop
S-28	29° 44' 36.8"	-98° 15' 3.89"	SC	20	Kek	1.25	0.75	1.25					O	8	28	28		Yes		Hilltop
S-29	29° 44' 36.4"	-98° 15' 6.65"	SC	20	Kek	1.5	1.5	1.66					O	7	27	27		Yes		Hilltop
S-30	29° 44' 35.8"	-98° 15' 8.78"	MB	30	Kek	1	1	?					X	45	75		75	Yes		Hilltop
S-31	29° 44' 36.5"	-98° 15' 9.07"	MB	30	Kek	1	1	~1000					X	45	75		75	Yes		Hilltop
S-34	29° 44' 51.3"	-98° 14' 29.8"	CD	5	Kep	12	7	0.33					O, F	7	12	12		Yes		Hilltop
S-35	29° 44' 50.9"	-98° 14' 27"	CD	5	Kep	7	4	0.5					O, F	7	12	12		Yes		Hilltop
S-36	29° 44' 26.2"	-98° 15' 9.14"	CD	5	Kek	8	6	0.5					C	7	12	12		Yes		Hilltop
S-37	29° 44' 16.7"	-98° 15' 1.66"	SC	20	Kep	1	1	0.75					O, F	6	26	26		Yes		Hilltop

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: The 550 Acre Tract																	
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-38	29° 44' 16.8"	-98° 15' 15.3"	SC	20	Kep	2.5	1	1.33					O,F,V	7	27	27		Yes		Hilltop
S-39	29° 44' 27.2"	-98° 15' 1.88"	SF	20	Kep	30	12	0.33	~65	10	1-3	≤0.33	O,F,C	36	66		66		Yes	Streambed
S-41	29° 44' 44.9"	-98° 14' 38.2"	SC	20	Kep	4	2.5	1.5					O	10	30	30		Yes		Hillside
S-43	29° 44' 41.3"	-98° 14' 33.7"	CD	5	Kep	6	3	0.75					O	7	12	12		Yes		Hilltop
S-44	29° 44' 42.1"	-98° 14' 34.3"	SC	20	Kep	0.75	0.75	0.5					O	8	28	28		Yes		Hilltop
S-45	29° 44' 42.2"	-98° 14' 35.1"	SC	20	Kep	0.75	0.75	2					O	8	28	28		Yes		Hilltop
S-46	29° 44' 42.2"	-98° 14' 35.1"	SC	20	Kep	1.33	2	2					O	8	28	28		Yes		Hilltop
S-47	29° 44' 48.5"	-98° 14' 31.3"	SC	20	Kep	3	2.5	2					O	8	28	28		Yes		Hilltop
S-48	29° 44' 42.4"	-98° 14' 36.2"	SC	20	Kep	3	3	2					O	7	27	27		Yes		Hilltop
S-49	29° 44' 41.7"	-98° 14' 36.9"	SC	20	Kep	2	1	1.5					O	8	28	28		Yes		Hilltop
S-50	29° 44' 42"	-98° 14' 37.7"	SC	20	Kep	3	3	1.5					O	7	27	27		Yes		Hilltop
S-51	29° 44' 42.3"	-98° 14' 38.3"	SC	20	Kep	3	3	1.5					O	7	27	27		Yes		Hilltop
S-52	29° 44' 43.2"	-98° 14' 38"	CD	5	Kep	6	6	1					O, C	9	14	14		Yes		Hilltop
S-53	29° 44' 42.7"	-98° 14' 38.9"	SC	20	Kep	1.5	1.25	1.5					O	7	27	27		Yes		Hilltop
S-54	29° 44' 40.8"	-98° 14' 36.3"	Z[SC]	30	Kep	30	15	1.5			<1	0.75-3	O	8	38	38		Yes		Hilltop
S-55	29° 44' 40.9"	-98° 14' 37.5"	CD	5	Kep	7	5	1.33					O	7	12	12		Yes		Hilltop
S-56	29° 44' 41.1"	-98° 14' 38"	SC	20	Kep	3	3	1.66					O	8	28	28		Yes		Hilltop
S-57	29° 44' 41.1"	-98° 14' 39.1"	CD	5	Kep	10	5	1					O	7	12	12		Yes		Hilltop
S-58	29° 44' 41.9"	-98° 14' 39.6"	SC	20	Kep	1	0.5	1.75					O, V	8	28	28		Yes		Hilltop
S-59	29° 44' 42.6"	-98° 14' 43.2"	SC	20	Kep	3	3	1.33					O	7	27	27		Yes		Hilltop
S-61	29° 44' 20.4"	-98° 15' 0.22"	SC	20	Kep	2	3	0.75					O,F,C	7	27	27		Yes		Hilltop
S-62	29° 44' 20.6"	-98° 15' 0.14"	SC	20	Kep	0.5	0.66	2					O,F,C	8	28	28		Yes		Hilltop
S-63	29° 44' 208"	-98° 14' 59.4"	SC	20	Kep	1	1	1.5					O, F	8	28	28		Yes		Hilltop
S-64	29° 44' 17.6"	-98° 15' 2.62"	CD	5	Kep	7	4	0.5					O,F,C	6	11	11		Yes		Hilltop
S-65	29° 44' 18.2"	-98° 15' 3.1"	SC	20	Kep	0.25	0.5	1.5					O, F, V	7	27	27		Yes		Hilltop
S-66	29° 44' 17"	-98° 15' 5.45"	CD	5	Kep	8	5	1					O,F,C,V	9	14	14		Yes		Hilltop
S-67	29° 44' 19.9"	-98° 15' 6.73"	SC	20	Kep	0.5	0.75	0.75					O, F, V	7	27	27		Yes		Hilltop
S-68	29° 44' 19.8"	-98° 15' 6.36"	SC	20	Kep	5	4	3					O, C	11	31	31		Yes		Hilltop
S-71	29° 44' 41.9"	-98° 14' 41.4"	SC	20	Kep	1	1	1.5					O	8	28	28		Yes		Hilltop
S-72	29° 44' 39.8"	-98° 14' 38.6"	SC	20	Kep	1	1	1.25					O	8	28	28		Yes		Hilltop
S-73	29° 44' 39.3"	-98° 14' 41.2"	SC	20	Kep	1	1	0.66					O	6	26	26		Yes		Hilltop
S-74	29° 44' 38"	-98° 14' 40.8"	CD	5	Kep	6	5	1					O	6	11	11		Yes		Hilltop

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: The 550 Acre Tract																	
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-75	29° 44' 37.2"	-98° 14' 42.1"	SC	20	Kep	1	1	1.5					O	7	27	27		Yes		Hilltop
S-76	29° 44' 36.9"	-98° 14' 42.5"	SC	20	Kep	3	3	1					O	7	27	27		Yes		Hilltop
S-78	29° 44' 41.3"	-98° 14' 39.3"	CD	5	Kep	6	4	0.66					O, V	6	11	11		Yes		Hilltop
S-79	29° 44' 41.6"	-98° 14' 42.9"	CD	5	Kep	6	4	0.75					O, V	6	11	11		Yes		Hilltop
S-80	29° 44' 32.4"	-98° 14' 56.6"	CD	5	Kep	7	5	1.66					O, V	7	12	12		Yes		Hilltop
S-81	29° 44' 28.6"	-98° 14' 57.9"	SC	20	Kep	4	3	2					O, V	11	31	31		Yes		Hilltop
S-83	29° 44' 20.8"	-98° 15' 16.7"	SC	20	Kek	1.33	1.33	1.33					O, V	8	28	28		Yes		Hilltop
S-84	29° 44' 20.3"	-98° 15' 16.3"	SC	20	Kep	4	3	2					O, V	8	28	28		Yes		Hilltop
S-85	29° 44' 19.2"	-98° 15' 14.9"	SC	20	Kep	2.5	1.5	1					O	8	28	28		Yes		Hilltop
S-86	29° 44' 19.3"	-98° 15' 14.8"	SC	20	Kep	1.5	1.5	0.75					O	7	27	27		Yes		Hilltop
S-87	29° 44' 20.3"	-98° 15' 14.4"	SC	20	Kep	2.5	2	1.5					O	8	28	28		Yes		Hilltop
S-88	29° 44' 18.2"	-98° 15' 9.65"	SC	20	Kep	3	3	1.5					O	8	28	28		Yes		Hilltop
S-89	29° 44' 18.2"	-98° 15' 7.16"	CD	5	Kep	6	4	0.75					O, V	7	12	12		Yes		Hilltop
S-90	29° 44' 12.4"	-98° 15' 9.66"	CD	5	Kep	6	4.5	1					O	8	13	13		Yes		Hilltop
S-91	29° 44' 12.2"	-98° 15' 9.55"	SC	20	Kep	2	2	1.5					O	6	26	26		Yes		Hilltop
S-92	29° 44' 1.5"	-98° 15' 1.32"	SC	20	Kep	1.33	1	1.33					O	6	26	26		Yes		Hilltop
S-93	29° 44' 56.9"	-98° 14' 19"	CD	5	Kek	7	5	1					O	8	13	13		Yes		Hilltop
S-94	29° 44' 57.3"	-98° 15' 19"	CD	5	Kek	7	4	1					O, V	8	13	13		Yes		Hilltop
S-95	29° 44' 59.9"	-98° 15' 30.4"	CD	5	Kek	7	6	1.33					O, V	8	13	13		Yes		Hillside
S-97	29° 44' 59.3"	-98° 15' 30.6"	CD	5	Kek	8	6	1.5					O, V	7	12	12		Yes		Hillside
S-98	29° 44' 58.4"	-98° 15' 28.3"	CD	5	Kek	6	5	1.5					O, V	7	12	12		Yes		Hilltop
S-99	29° 44' 57"	-98° 15' 24"	CD	5	Kek	6	5	2					O	8	13	13		Yes		Hilltop
S-100	29° 44' 33.8"	-98° 14' 46.2"	CD	5	Kep	6	4	0.75					O, F, V	7	12	12		Yes		Hilltop
S-101	29° 44' 35.3"	-98° 14' 44.8"	CD	5	Kep	7	4	0.5					O, F, V	7	12	12		Yes		Hilltop
S-102	29° 44' 39.9"	-98° 14' 48.2"	SC	20	Kep	0.75	0.5	0.33					O, V, F	6	26	26		Yes		Hilltop
S-103	29° 44' 38.9"	-98° 14' 44.4"	SC	20	Kep	0.33	0.33	0.5					O, C	5	25	25		Yes		Hilltop
S-104	29° 44' 40.7"	-98° 14' 44.3"	SC	20	Kep	0.5	0.25	1					O	6	26	26		Yes		Hilltop
S-105	29° 44' 40.8"	-98° 14' 44.3"	SC	20	Kep	0.75	1	1.33					O, F	6	26	26		Yes		Hilltop
S-106	29° 44' 40.9"	-98° 14' 44.5"	SC	20	Kep	1	3	3					O, F, V	7	27	27		Yes		Hilltop
S-109	29° 44' 55.6"	-98° 15' 21.2"	CD	5	Kek	6	5	1					O, F, V	7	12	12		Yes		Hilltop
S-110	29° 44' 58.7"	-98° 15' 25.7"	CD	5	Kek	8	5	0.5					O, F, C	7	12	12		Yes		Hilltop

GEOLOGIC ASSESSMENT TABLE	PROJECT NAME: The 550 Acre Tract

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-111	29° 44' 58.8"	-98° 15' 24.4"	CD	5	Kek	7	6	1.5					O,F,C,V	6	11	11		Yes		Hilltop
S-112	29° 44' 56.9"	-98° 15' 20.3"	CD	5	Kek	8	5	1					O,F,C,V	6	11	11		Yes		Hilltop
S-113	29° 44' 56.1"	-98° 15' 19.2"	CD	5	Kek	10	8	1.5					O,F,C,V	9	14	14		Yes		Hilltop
S-114	29° 44' 56.5"	-98° 15' 17.7"	CD	5	Kek	10	5	1					O,F,C,V	8	13	13		Yes		Hilltop
S-115	29° 44' 55.9"	-98° 15' 15.6"	SC	20	Kek	0.75	0.5	1					O, F	8	28	28		Yes		Hilltop
S-116	29° 44' 53.2"	-98° 15' 15.1"	SC	20	Kek	1	1	1.25					O, F	7	27	27		Yes		Hilltop
S-117	29° 44' 52.9"	-98° 15' 21.6"	CD	5	Kek	9	5	1.5					O,F,C,V	8	13	13		Yes		Hilltop
S-118	29° 44' 55.1"	-98° 15' 24.9"	SC	20	Kek	0.75	0.75	2					O, F	7	27	27		Yes		Hilltop
S-119	29° 44' 56.4"	-98° 15' 26.6"	SC	20	Kek	1	1	1.75					O,F,C	8	28	28		Yes		Hilltop
S-120	29° 44' 57.6"	-98° 15' 26.3"	CD	5	Kek	9	5	1.75					O,F,C,V	9	14	14		Yes		Hilltop
S-121	29° 44' 51.1"	-98° 15' 20"	SC	20	Kek	1.5	2	2					O, C	8	28	28		Yes		Hilltop
S-122	29° 44' 51.9"	-98° 15' 17.4"	SC	20	Kek	1.5	1	1.5					O,F,C,V	7	27	27		Yes		Hilltop
S-123	29° 44' 47.6"	-98° 15' 15.7"	SC	20	Kek	0.33	0.33	1					O	8	28	28		Yes		Hilltop
S-125	29° 44' 52.6"	-98° 15' 7.2"	SC	20	Kek	1	0.5	0.5					O, F	8	28	28		Yes		Hilltop
S-127	29° 44' 52.9"	-98° 15' 6.34"	CD	5	Kek	8	6	2					O, C	9	14	14		Yes		Hilltop
S-128	29° 44' 49.8"	-98° 15' 59.1"	SC	20	Kek	0.75	0.5	0.5					O, C	7	27	27		Yes		Hilltop
S-129	29° 44' 48.3"	-98° 14' 57.8"	O^{VR}	5	Kek	25	30	0.75			1-5	≤0.33	O, V	9	14	14		Yes		Hilltop
S-130	29° 44' 56.8"	-98° 15' 24.6"	SC	20	Kek	1.5	1.5	0.75					O	7	27	27		Yes		Hilltop
S-131	29° 44' 57"	-98° 15' 24.2"	CD	5	Kek	6	4	0.75					O, V	7	12	12		Yes		Hilltop
S-132	29° 44' 56.5"	-98° 15' 21.5"	SC	20	Kek	0.75	0.75	0.75					O	7	27	27		Yes		Hilltop
S-133	29° 44' 56"	-98° 15' 19"	SC	20	Kek	1.25	0.75	0.75					O	6	26	26		Yes		Hilltop
S-134	29° 44' 54.3"	-98° 15' 16.8"	SC	20	Kek	2	1.5	1.5					O	8	28	28		Yes		Hilltop
S-135	29° 44' 54.5"	-98° 15' 16.2"	SC	20	Kek	3	3	2					O, C	11	31	31		Yes		Hilltop
S-136	29° 44' 54.3"	-98° 15' 13.9"	SC	20	Kek	1	1.5	2					O	9	29	29		Yes		Hilltop
S-137	29° 44' 52.9"	-98° 15' 15.2"	SC	20	Kek	0.75	2	1.5					O, C	8	28	28		Yes		Hilltop
S-138	29° 44' 52.7"	-98° 15' 14.9"	SC	20	Kek	1	1	1					O	6	26	26		Yes		Hilltop
S-139	29° 44' 55.3"	-98° 15' 14.9"	SC	20	Kek	3	3	1.5					O	6	26	26		Yes		Hilltop
S-140	29° 44' 53.2"	-98° 15' 18.6"	CD	5	Kek	9	4.5	1					O, V	6	11	11		Yes		Hilltop
S-141	29° 44' 53.2"	-98° 15' 18.6"	CD	5	Kek	6	4	1.5					O, V	6	11	11		Yes		Hilltop
S-142	29° 44' 52"	-98° 15' 19.5"	SC	20	Kek	3	0.75	1.5					O	8	28	28		Yes		Hilltop
S-143	29° 44' 51.2"	-98° 15' 17.4"	SC	20	Kek	1	1	2					O	9	29	29		Yes		Hilltop
S-144	29° 44' 54"	-98° 15' 21.6"	SC	20	Kek	0.75	0.75	2					O	8	28	28		Yes		Hilltop
S-145	29° 44' 53.3"	-98° 15' 22"	CD	5	Kek	8	6	1					O, V	7	12	12		Yes		Hilltop
S-146	29° 44' 55.2"	-98° 15' 25.6"	SC	20	Kek	3	2	1					O	9	29	29		Yes		Hilltop

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: The 550 Acre Tract																	
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-147	29° 44' 52.9"	-98° 15' 15.2"	SC	20	Kek	3	3	1					O, V	7	27	27		Yes		Hilltop
S-148	29° 44' 56.1"	-98° 15' 27.8"	SC	20	Kek	4	3	2					O, C, V	9	29	29		Yes		Hilltop
S-149	29° 44' 55.1"	-98° 15' 26.2"	SC	20	Kek	3	1.5	1					O	7	27	27		Yes		Hilltop
S-150	29° 44' 53.1"	-98° 15' 24.2"	CD	5	Kek	6	4	1					O, C	6	11	11		Yes		Hilltop
S-151	29° 44' 52.7"	-98° 15' 23.9"	SC	20	Kek	2	0.5	1					O, V	7	27	27		Yes		Hilltop
S-152	29° 44' 43"	-98° 14' 59.5"	SF	20	Kek	20	50	2	~80		1-2	≤0.66	O, V	8	28	28		Yes		Hilltop
S-153	29° 44' 43.2"	-98° 14' 59"	SF	20	Kek	20	15	1	35-45	10	1-2	≤0.25	O, V	9	39	39		Yes		Hilltop
S-154	29° 44' 44"	-98° 14' 55.3"	SF	20	Kek	30	20	1.5	70-80		1-2	≤0.33	O, V	8	28	28		Yes		Hilltop
S-155	29° 44' 40.9"	-98° 15' 0.18"	SC	20	Kek	1	1	1.25					O, F	8	28	28		Yes		Hilltop
S-156	29° 44' 38.9"	-98° 14' 59.7"	SF	20	Kek	35	20	1	25-30		1-3	≤0.33	O, V	9	29	29		Yes		Hilltop
S-157	29° 44' 40.1"	-98° 14' 58.1"	SC	20	Kek	0.75	0.5	0.5					O	9	14	14		Yes		Hilltop
S-158	29° 44' 43.4"	-98° 14' 51.2"	CD	5	Kek	12	6	1					O, V, C	6	11	11		Yes		Hillside
S-159	29° 44' 42.2"	-98° 14' 50.3"	CD	5	Kek	6	4	1					O, C, V	8	13	13		Yes		Hillside
S-161	29° 44' 25.3"	-98° 15' 53.6"	CD	5	Kek	6	4	0.75					O, V	6	11	11		Yes		Hilltop
S-162	29° 44' 35.7"	-98° 15' 49.2"	SC	20	Kek	1	4	4					C	15	35	35		Yes		Hilltop
S-163	29° 44' 39.7"	-98° 15' 49.9"	O^{VR}	5	Kek	50	30	1			1-7	≤0.5	O, V	8	13	13		Yes		Hillside
S-164	29° 44' 39.7"	-98° 15' 50.5"	SC	20	Kek	3	2	1.5					O	7	27	27		Yes		Hillside
S-165	29° 44' 39"	-98° 15' 50.9"	SC	20	Kek	3	1	1					O	7	27	27		Yes		Hillside
S-166	29° 44' 36.9"	-98° 15' 54.9"	SC	20	Kek	1.5	2	0.75					O	7	27	27		Yes		Hillside
S-167	29° 44' 36.4"	-98° 15' 57.3"	SC	20	Kek	3	5	2					O, V, C	16	36	36		Yes		Hillside
S-168	29° 44' 35.1"	-98° 15' 58.5"	O^{VR}	5	Kek	15	25	1			1-5	≤0.5	O, V	7	12	12		Yes		Hillside
S-169	29° 44' 35.6"	-98° 15' 58.9"	O^{VR}	5	Kek	40	20	1			1-8	≤0.33	O, V	8	13	13		Yes		Hillside
S-170	29° 44' 33.4"	-98° 15' 58.8"	SC	20	Kek	1	0.5	1.25					O	8	28	28		Yes		Hillside
S-171	29° 44' 33"	-98° 15' 57.5"	CD	5	Kek	6	4	0.75					O, C	6	11	11		Yes		Hillside
S-172	29° 44' 34.3"	-98° 15' 57.3"	SC	20	Kek	2	0.75	1					O, C	7	27	27		Yes		Hillside
S-173	29° 44' 28.9"	-98° 15' 48"	SC	20	Kek	0.5	0.5	1					O	7	27	27		Yes		Hilltop
S-174	29° 44' 35.7"	-98° 15' 50.1"	SC	20	Kek	4	5	1.5					O, V, C	9	29	29		Yes		Hilltop
S-175	29° 44' 38.8"	-98° 15' 49.4"	SC	20	Kek	2	0.75	0.5					O, V, C	8	28	28		Yes		Hillside
S-176	29° 44' 29.8"	-98° 15' 52.7"	SC	20	Kek	0.75	0.75	1.5					O	7	27	27		Yes		Hilltop
S-177	29° 44' 48.1"	-98° 15' 21.8"	CD	5	Kek	6	2.5	0.5					O, V	6	11	11		Yes		Hilltop
S-178	29° 44' 49.5"	-98° 15' 22.5"	CD	5	Kek	8	3.5	0.5					O, V	6	11	11		Yes		Hilltop
S-179	29° 44' 48.7"	-98° 15' 23.5"	SC	20	Kek	1	1	0.75					O	6	26	26		Yes		Hilltop
S-180	29° 44' 49.4"	-98° 15' 26.5"	O^{VR}	5	Kek	40	30	0.5			1-15	≤0.5	O	6	11	11		Yes		Hilltop

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: The 550 Acre Tract																
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-181	29° 44' 47.1"	-98° 15' 26.3"	O^{VR}	5	Kek	20	20	0.5			1-9	≤0.33	O	6	11	11		Yes		Hilltop
S-182	29° 44' 49.1"	-98° 15' 32.4"	CD	5	Kek	40	100	2					O, C, V	9	14	14			Yes	Hilltop
S-183	29° 44' 43.6"	-98° 15' 30.8"	O^{VR}	5	Kek	15	20	0.5			1-6	≤0.5	O	6	11	11		Yes		Hilltop
S-184	29° 44' 47.3"	-98° 15' 29.5"	SF	20	Kek	10	25	0.75	~45		1-2	≤0.33	O	7	27	27		Yes		Hilltop
S-185	29° 44' 47.7"	-98° 15' 31"	CD	5	Kek	12	15	0.5					O	6	11	11		Yes		Hilltop
S-186	29° 44' 49.1"	-98° 15' 30"	SC	20	Kek	1	0.5	0.75					O, C	8	28	28		Yes		Streambed
S-187	29° 44' 48.1"	-98° 15' 28.7"	O^{VR}	5	Kek	25	20	1			1-6	≤0.5	O	8	13	13		Yes		Hilltop
S-188	29° 44' 43.9"	-98° 15' 24.6"	CD	5	Kek	7	4	0.5					O, V	7	12	12		Yes		Hilltop
S-189	29° 44' 42.8"	-98° 15' 17.4"	O^{VR}	5	Kek	20	20	0.75			1-3	≤0.5	O, V	7	12	12		Yes		Hillside
S-190	29° 44' 45.9"	-98° 15' 17.3"	SC	20	Kek	0.5	0.5	1					O, C	7	27	27		Yes		Hilltop
S-191	29° 44' 46.8"	-98° 15' 17.2"	O^{VR}	5	Kek	15	15	0.75			2-8	≤0.25	O	7	12	12		Yes		Hilltop
S-192	29° 44' 41"	-98° 15' 38"	SC	20	Kek	1	1.5	1.5					O, V	9	29	29		Yes		Hilltop
S-193	29° 44' 40"	-98° 15' 39.6"	O^{VR}	5	Kek	15	12	0.5			1-3	≤0.33	O	7	12	12		Yes		Hilltop
S-194	29° 44' 38.6"	-98° 15' 39.8"	SC	20	Kek	0.33	0.33	0.5					O	6	26	26		Yes		Hilltop
S-195	29° 44' 39.6"	-98° 15' 45.6"	CD	5	Kek	6	6	0.75					O, V	6	11	11		Yes		Hilltop
S-196	29° 44' 42.2"	-98° 15' 45.3"	SC	20	Kek	1	0.5	0.5					O	8	28	28		Yes		Hilltop
S-197	29° 44' 41.4"	-98° 15' 43.7"	O^{VR}	5	Kek	17	30	0.5			1-16	≤0.33	O, V	9	14	14		Yes		Hillside
S-198	29° 44' 46.2"	-98° 15' 35.1"	SC	20	Kek	1.5	1.75	2					O, C	9	29	29		Yes		Hilltop
S-199	29° 44' 45.7"	-98° 15' 34.6"	O^{VR}	5	Kek	18	15	0.5			1-6	≤0.5	O	7	12	12		Yes		Hilltop
S-200	29° 44' 40.9"	-98° 15' 30.4"	O^{VR}	5	Kek	25	20	0.33			1-6	≤0.33	O	7	12	12		Yes		Hilltop
S-201	29° 44' 39.6"	-98° 15' 30.6"	CD	5	Kek	6	5	0.5					O, V	6	11	11		Yes		Hilltop
S-202	29° 44' 36"	-98° 15' 30.4"	O^{VR}	5	Kek	25	30	0.5			1-4	≤0.33	O, V	7	12	12		Yes		Hilltop
S-203	29° 44' 36.2"	-98° 15' 32.4"	O^{VR}	5	Kek	25	30	0.5			1-4	≤0.33	O, V	7	12	12		Yes		Hilltop
S-204	29° 44' 37"	-98° 15' 34.1"	CD	5	Kek	6	3	0.75					O, V	7	12	12		Yes		Hilltop
S-208	29° 44' 39"	-98° 15' 0.23"	SF	20	Kek	25	10	0.5	~25		1-2	≤0.33	O, V	7	27	27		Yes		Hilltop
S-209	29° 44' 39.1"	-98° 15' 11.1"	O^{VR}	5	Kek	25	10	1			1-16	≤0.5	O, V	8	13	13		Yes		Hillside
S-210	29° 44' 48.7"	-98° 15' 23.5"	SC	20	Kek	1.5	1	2.5					O	14	34	34		Yes		Hillside
S-211	29° 44' 42.8"	-98° 15' 10.1"	SC	20	Kek	3	3	4					O	14	34	34		Yes		Hillside
S-212	29° 44' 43.2"	-98° 15' 10.7"	O^{VR}	5	Kek	30	10	2			1-6	≤0.5	O	7	12	12		Yes		Hillside
S-213	29° 44' 45.1"	-98° 15' 10.5"	SC	20	Kek	1.5	1	1.75					O	9	29	29		Yes		Hillside
S-214	29° 44' 30.9"	-98° 15' 25.2"	O^{VR}	5	Kek	20	15	1			1-6	≤0.33	O	8	13	13		Yes		Hillside
S-215	29° 44' 32.7"	-98° 15' 0.91"	F	20	Kek/Kep	5600	?	?	~50	10			?	9	39	39			Yes	Hilltop
S-216	29° 44' 53.7"	-98° 15' 11.9"	F	20	Kek	1700	?	?	~75	10			?	5	35	35			Yes	Hilltop
S-217	29° 44' 57.4"	-98° 14' 8.60"	F	20	Kep	200	?	?	~160	10			?	25	55		55		Yes	Floodplain

GEOLOGIC ASSESSMENT TABLE	PROJECT NAME: The 550 Acre Tract

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-219	29° 44' 22.5"	-98° 15' 36.3"	O[VR]	5	Kek	20	12	0.75			1-7	≤0.33	O	7	12	12		Yes		Hilltop
S-220	29° 44' 32.6"	-98° 15' 36.7"	SC	20	Kek	0.5	0.5	1.75					O	9	29	29		Yes		Hilltop
S-221	29° 44' 32.7"	-98° 15' 36.5"	SC	20	Kek	1	1.25	1.5					O	8	28	28		Yes		Hilltop
S-222	29° 44' 31"	-98° 15' 43.5"	SC	20	Kek	1	1.5	1					O	8	28	28		Yes		Hilltop
S-224	29° 44' 22.2"	-98° 15' 44.1"	SC	20	Kek	2	2	1.5					O	9	29	29		Yes		Hillside
S-225	29° 44' 21.6"	-98° 15' 44.2"	Z[SC]	30	Kek	60	25	8					O, F	9	39	39		Yes		Hillside
S-261	29° 44' 35.9"	-98° 15' 12.8"	SC	20	Kek	4	3	2					O	11	31	31		Yes		Hillside
S-291	29° 44' 41.2"	-98° 15' 3.64"	O[VR]	5	Kek	50	10	0.5			1-4	≤0.25	O	7	12	12		Yes		Hillside
S-292	29° 44' 41.1"	-98° 15' 4.34"	O[VR]	5	Kek	45	10	0.5			1-3	≤0.25	O	7	12	12		Yes		Hillside
S-293	29° 44' 42.8"	-98° 15' 3.59"	SC	20	Kek	1	1	3					O	7	12	12		Yes		Hillside
S-294	29° 44' 41.7"	-98° 15' 12.8"	O[VR]	5	Kek	30	30	0.5			1-6	≤0.33	O	7	12	12		Yes		Hillside

GEOLOGIC ASSESSMENT TABLE | **PROJECT NAME: The 550 Acre Tract**

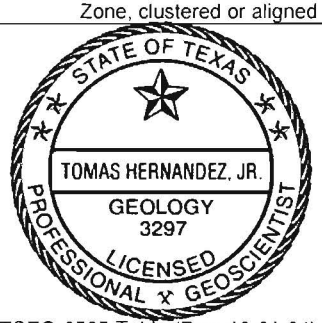
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-295	29° 44' 28.3"	-98° 15' 22.9"	SC	20	Kek	2	1	3					O	8	28	28		Yes		Hilltop
S-296	29° 44' 28"	-98° 15' 22.5"	SC	20	Kek	1.25	2	1					O	7	27	27		Yes		Hilltop
S-297	29° 44' 28.3"	-98° 15' 22.6"	O^VR	5	Kek	20	30	0.5			1-6	≤0.5	O	6	11	11		Yes		Hilltop
S-298	29° 44' 33.5"	-98° 15' 26.2"	O^VR	5	Kek	30	10	0.5			1-12	≤0.5	O	7	12	12		Yes		Hilltop
S-299	29° 44' 33.9"	-98° 15' 41.4"	SC	20	Kek	2	3	1					O	8	28	28		Yes		Hilltop
S-300	29° 44' 26"	-98° 15' 45.6"	SC	20	Kek	1	1	1					O	10	30	30		Yes		Hillside
S-301	29° 44' 24.2"	-98° 15' 45.1"	SC	20	Kek	2	1	2.5					O	11	31	31		Yes		Hillside
S-321	29° 44' 48.5"	-98° 15' 10.9"	SC	20	Kek	1	0.5	1.5					C	12	32	32		Yes		Streambed
S-322	29° 44' 20.3"	-98° 15' 54.5"	SC	20	Kek	1	0.75	1.5					O,F	9	29	29		Yes		Hillside
S-323	29° 44' 23.8"	-98° 15' 47.7"	SC	20	Kek	1	1	1.5					O,F	9	29	29		Yes		Hillside

Datum: NAD 27

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

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

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Floodplain, Streambed



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

Tomas Hernandez, Jr. P.G.

Date July 18, 2007

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

STRATIGRAPHIC COLUMN

Hydrogeologic subdivision			Group, formation, or member			Hydro-logic function	Thickness (feet)	Lithology	Field identification	Cavern development	Porosity/ permeability type
Upper Cretaceous	Upper confining unit		Taylor Group			CU	600	Clay; chalky limestone	Gray-brown clay; marly limestone	None	Low porosity/ low permeability
			Austin Group			CU; rarely AQ	130 – 150	White to light-tan to gray limestone	White, chalky limestone; *Pycnodonte aucella Inoceramus subquadratus*	None	Low porosity; rare water production from fractures/ low permeability
			Eagle Ford Group			CU	30 – 50	Brown, flaggy sandy shale and argillaceous limestone	Thin flagstones; petroliferous	None	Primary porosity lost/ low permeability
			Buda Limestone			CU	40 – 50	Buff, light-gray, dense mudstone	Porcelaneous limestone	Minor surface karst	Low porosity/ low permeability
			Del Rio Clay			CU	50 – 60	Blue-green to yellow-brown clay	Fossiliferous; *Ilymatogyra arietina*	None	None/primary upper confining unit
Lower Cretaceous	I	Edwards aquifer	Georgetown Formation			CU	40 – 60	Gray to light-tan, marly limestone	Marker fossil: *Waconella wacoensis*	None	Low porosity/ low permeability
	II		Edwards Group	Person Formation	Cyclic and marine members, undivided (4)	AQ	0 – 70	Mudstone to packstone; *miliolid* grainstone; chert	Boxwork vugs; light tan, massive; some *Toucasia*, *Caprinid*, and *Chondrodonta*	Many caves; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric/water-yielding; one of the most porous and permeable; essentially absent in Travis County
	III				Leached and collapsed members, undivided (4)	AQ	30 – 80	Crystalline limestone; mudstone to wacke-stone to *miliolid* grainstone; chert; collapsed breccia	Light-gray, bioturbated iron-stained beds separated by massive limestone beds; *Toucasia*, *Chondrodonta*	Extensive lateral development; large rooms	Majority not fabric/ one of the most porous and permeable
	IV				Regional dense member (3)	CU	20 – 30	Light-tan, dense, argillaceous mudstone	Wispy iron-oxide stains; *Pleuromya knowltoni*, *Ceratostreon texanum*	None; only vertical fracture enlargement	Not fabric/ low permeability; vertical barrier
	V			Kainer Formation	Grainstone member (2)	AQ	45 – 60	Light-gray, *miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone; *Toucasia*, *Turritella*, and *Chondrodonta*	Few caves	Not fabric/ recrystallization reduces permeability
	VI				Kirschberg evaporite member (1)	AQ	65 – 75	Light-gray, crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame; *Cladophyllia* and *Turritella*	Probably extensive cave development	Majority fabric/ one of the most porous and permeable
	VII				Dolomitic member (1)	AQ	110 – 150	Mudstone to grainstone; crystalline limestone; chert	Massively bedded, light gray, *Toucasia* abundant; *Dictyoconus walnutensis*, *Caprinid*	Caves related to structure or bedding planes	Mostly not fabric; some bedding-plane fabric/ water-yielding; locally permeable
	VIII				Basal nodular member	Karst AQ; not karst CU	45 – 60	Shaly, fossiliferous, nodular limestone; mudstone; *miliolid* grainstone	Massive, nodular and mottled; *Ceratostreon texanum*, *Dictyoconus walnutensis*, and *Texigryphaea*	Few caves	Fabric/low permeability
	Lower confining unit		Upper member of the Glen Rose Limestone			CU; evaporite beds AQ	350 – 500	Yellowish-tan, thinly bedded limestone and marl	Stair-step topography; alternating limestone and marl	Some surface cave development	Some water production at evaporite beds/ relatively impermeable

LOCATION

The Site consists of +/-550 acres of partially-developed land and agricultural land located along and west of State Highway 46, approximately 1,200 feet northwest of the intersection of State Highway 46 and Range Road in New Braunfels, Texas, herein referred to as the "Site." The center of the Site is located at N 29° 44' 35.81" Latitude and W 98° 15' 8.17" Longitude (NAD27).

METHODOLOGY

The Geologic Assessment was performed by Mr. Kevin K. Bryant, Project Geologist, and Mr. Tomas Hernandez, Jr., P.G., with Frost GeoSciences, Inc., on May 22 through July 9, 2007. Frost GeoSciences, Inc. researched the geology of the area surrounding State Highway 46 and Range Road, in New Braunfels, Texas. The research included, but was not limited to, the Geologic Atlas of Texas, San Antonio Sheet, FEMA maps, Edwards Aquifer Recharge Zone Maps, USGS 7.5 Minute Quadrangle Maps, and the USDA Soil Survey of Comal and Hays Counties, Texas.

After reviewing the available information, a field investigation was performed to identify any geologic or manmade potential recharge features (PRF's). A transect spacing of approximately 50 feet, or less depending on vegetation thickness, was used to inspect the Site. A 2005 aerial photograph, in conjunction with a hand held Garmin GPS 72 Summit Global Positioning System with an Estimated Potential Error ranging from 9 to 22 feet, was used to navigate on the property and identify the locations of potential recharge features, as recommended in the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The Geologic Assessment Form, Stratigraphic Column, and the Geologic Assessment Table have been filled with the appropriate information for this Site and are included on pages 1-10 of this report.

NARRATIVE DESCRIPTIVE OF SITE GEOLOGY

The Site is located in an area characterized by large, flat hills with gentle slopes and a few steep drainage pathways. The Site has a sparse stand of vegetative cover consisting primarily of grass, live oak, Texas persimmon and ash trees.

Underlying the soil cover is the Persons and Kainer Formations of the Edwards Group. The Edwards Group undivided in to two formations – the Persons and Kainer which are then subdivide into several members. The following members are present within the boundaries of the Site:

The Cyclic and Marine Member of the Cretaceous Edwards Person Limestone consists of mudstone to packstone and miliolid grainstone with chert. The member is characterized by massive beds of limestone to relatively thin beds of limestone with some crossbedding. The Cyclic and Marine Member forms a few caves some that are laterally extensive. Overall thickness ranges from 80 to 90 feet thick.

The Leached and Collapsed Member of the Cretaceous Edwards Person Limestone consists of crystalline limestone, mudstone to grainstone with chert, and collapsed breccia. This member is stromatolitic limestone. The Leached and Collapsed Member is characterized by bioturbated iron stained beds separated by massive limestone beds. This member is typically one of the most permeable and has extensive lateral development with large rooms. Overall thickness ranges from 70 to 90 feet thick.

The Kirschberg Evaporite Member of the Cretaceous Edwards Kainer Limestone consists of a highly altered crystalline limestone, and chalky mudstone with chert. Boxwork voids with neospar and travertine frame is a common feature. Extensive cavernous development within this unit is probable. Overall thickness ranges from 50 to 60 feet.

The Dolomitic Member of the Cretaceous Edwards Kainer Limestone consists of mudstone to grainstone with crystalline limestone and chert. This member is massively bedded and light gray with abundant fossils of Toucasia. Karst features within this member are typically related to structure or bedding planes. Overall thickness ranges from 110 to 130 feet.

The Basal Nodular Member of the Cretaceous Edwards Kainer Limestone consists of shaly, nodular limestone, mudstone, and milliolid grainstone. This member is massive, nodular, and mottled with fossils of Exogyra texana. This member typically forms large lateral caves at the surface. Overall thickness ranges from 50 to 60 feet.

Based on literature research, three faults were noted trending across the northern, central, and eastern portions of the Site. The easternmost fault is located in near Highway 46 and is within the Person Formation. The northernmost fault is located in the northern corner of the Site within the Kainer Formation. The third, and largest, fault is located in the central portion of the Site and is known as the Bat Cave Fault. This fault separates the Kainer and Person Formations with the Kainer being north of the fault. Little surface expression of these faults was noted on the Site during field reconnaissance. Fault information was obtained from the *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas* (USGS Water Resources Investigation Report 94-4117).

Two water wells were noted in the central portion of the Site, north of the Bat Cave Fault, within the Kainer Formation. A large cave was also noted in the central portion of the Site, north of Bat Cave Fault, within the Kainer Formation. No other significant observations were noted across the project area during the site reconnaissance.

SITE SPECIFIC GEOLOGIC FEATURE DESCRIPTIONS

S-1: Solution Cavity in Bedrock: The cavity measures approximately 18 inches in diameter with a depth of nearly nine inches. The feature was partially filled with organic matter.

S-2: Non-karst Closed Depression: This feature measures approximately six feet wide, five feet in length, and one foot in depth. The feature was partially filled with organic matter. Native grasses and oak saplings were noted growing within the feature.

S-3: Solution Cavity in Bedrock: The cavity measures approximately three feet in length, 18 inches wide, and nine inches deep. The feature was partially filled with organic matter.

S-4: Non-karst Closed Depression: This feature measures approximately six feet wide, four feet in length, and 16 inches in depth. The feature was partially filled with organic matter.

S-5: Non-karst Closed Depression: This feature measures approximately six feet wide, five feet in length, and 16 inches in depth. The feature was almost completely filled with organic matter.

S-6: Solution Cavity in Bedrock: The cavity measures approximately four feet in length, 18 inches wide and 18 inches deep. The feature was partially filled with organic matter. The roots of a large adjacent oak tree penetrated the walls cavity.

S-10: Solution Cavity in Bedrock: The cavity measures approximately 18 inches wide, one foot long, and nine inches deep. The feature was partially filled with organic matter.

S-11: Solution Cavity in Bedrock: The cavity measures approximately 18 inches wide, two feet long, and two feet deep. The feature was partially filled with organic matter.

S-12: Solution Cavity in Bedrock: The cavity measures approximately one foot long, two feet wide and 18 inches deep. The feature was partially filled with organic matter and fined-grained material.

S-13: Non-karst Closed Depression: This feature measures approximately six feet wide, three feet in length, and one foot in depth. The feature was partially filled with organic matter and fined-grained material.

S-14: Non-karst Closed Depression: This feature measures approximately six feet wide, three feet in length, and two feet in depth. The feature was partially filled with organic matter and fined-grained material.

S-15: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 16 inches. The feature was partially filled with organic matter. A rotted tree stump was noted adjacent to the feature, forming a portion of the cavity wall.

S-16: Non-karst Closed Depression: This feature measures approximately seven feet wide, five feet in length, and two feet in depth. The feature was partially filled with organic matter.

S-17: Solution Cavity in Bedrock: The cavity measures approximately 9 inches wide, 18 inches long, and 15 inches deep. The feature was partially filled with organic matter and fined-grained material.

S-18: Non-karst Closed Depression: This feature measures approximately six feet wide, two feet in length, and one foot in depth. The feature was located at the base of an oak tree and was partially filled with organic matter.

S-19: Solution Cavity in Bedrock: The cavity measures approximately two feet in diameter with a depth of nearly six inches. The feature appeared to be an animal burrow. The feature was partially filled with organic matter.

S-20: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly two feet. The feature was nearly completely filled with organic matter.

S-21: Non-karst Closed Depression: This feature measures approximately six feet wide, six feet in length, and one foot in depth. The feature was partially filled with organic matter, small amounts of gravel, and fine-grained materials. Native grasses were noted growing within the feature.

S-22: Non-karst Closed Depression: This feature measures approximately six feet wide, four feet in length, and one foot in depth. The feature was partially filled with organic matter, small amounts of gravel, and fine-grained materials. Native grasses and prickly-pear cactus were noted growing within the feature.

S-23: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, one foot wide, and nearly three feet in depth. The feature was partially filled with organic matter and fine-grained material.

S-24: Solution Cavity in Bedrock: The cavity measures approximately two feet long, one foot wide, and nearly two feet in depth. The feature was partially filled with organic matter.

S-25: Cave: The opening of this large cave measures approximately three feet wide and five feet in length. The depth of the cave was measured to be greater than 25 feet. The floor of the cave was covered in limestone boulders. Due to safety concerns, the interior of the cave (and its exact depth) could not be determined. Given the nature of the feature, its location, and its large size, this cave scores a total of 70 points on the Geologic Assessment Table and is considered a sensitive feature.

S-26: Non-karst Closed Depression: This feature measures approximately seven feet wide, four feet in length, and six inches in depth. The feature was partially filled with organic matter and fine-grained materials. Native grasses and prickly-pear cactus were noted growing within the feature.

S-27: Solution Cavity in Bedrock: The cavity measures approximately 16 inches wide, one foot long and 20 inches deep. The feature was partially filled with organic matter.

S-28: Solution Cavity in Bedrock: The cavity measures approximately 15 inches wide, nine inches long, and 15 inches deep. The feature was nearly filled with organic matter.

S-29: Solution Cavity in Bedrock: The cavity measures approximately 18 inches in diameter with a depth of 20 inches. The feature was partially filled with organic matter.

S-30: Manmade feature in bedrock: This feature is a water well. The well is connected to an old windmill and water collected from the well is stored in an adjacent cistern. The depth of the well could not be determined. The well appeared to be in proper working order at the time of the on-site inspection. Since water wells are direct conduits to groundwater, this feature is considered sensitive has been assigned a score of 75 on the Geologic Assessment table. If not utilized, this well must be plugged and abandoned in accordance with State law.

S-31: Manmade feature in bedrock: This feature is a water well. The well appears to be a water availability test well that was being drilled at the time of the on-site inspection. According to the drillers present on Site, the well was approximately 1,000 feet. Since water wells are direct conduits to groundwater, this feature is considered sensitive has been assigned a score of 75 on the Geologic Assessment table. If not utilized, this well must be plugged and abandoned in accordance with State law.

S-34: Non-karst Closed Depression: This feature measures approximately seven feet wide, 12 feet in length, and four inches in depth. The feature appears to be an animal wallow hole. The feature was partially filled with organic matter and fine-grained materials.

S-35: Non-karst Closed Depression: This feature measures approximately seven feet wide, four feet in length, and six inches in depth. The feature was partially filled with organic matter and fine-grained materials.

S-36: Non-karst Closed Depression: This feature measures approximately eight feet wide, six feet in length, and six inches in depth. The feature was partially filled with a small amount of gravel and small stones.

S-37: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly nine inches. The feature appeared to be an animal burrow. The feature was partially filled with organic matter and fine-grained materials.

S-38: Solution Cavity in Bedrock: The cavity measures approximately 30 inches wide, one foot long and 16 inches deep. The feature was partially filled with organic matter, fine-grained material, and a few small woody shrubs.

S-39: Solution-Enlarged Fractures: The fractures are located along a streambed in the central portion of the Site. The fractures have a trend of approximately 65 degrees and are surrounded by vuggy rock. The fractures measure approximately 1 to 8 inches wide and extend down as much as one foot. Approximately 1 to 3 fractures were noted per square foot. The fractures were partially filled with organic matter, fine-grained materials, and small amounts of gravel. The root systems of several small trees, such as cedar and oak, were noted penetrating into a few of the fractures. Given the nature of the fractures, their orientation relative to major faults on the Site, and the large catchment area, this feature is considered sensitive has been assigned a score of 66 on the Geologic Assessment table.

S-41: Solution Cavity in Bedrock: The cavity measures approximately four feet wide, 30 inches long and 18 inches deep. The feature was partially filled with organic matter.

S-43: Non-karst Closed Depression: This feature measures approximately six feet wide, three feet in length, and nine inches in depth. The feature appeared to be an animal burrow. The feature was nearly completely filled with organic matter.

S-44: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly six inches. The feature was partially filled with organic matter.

S-45: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly two feet. The feature was partially filled with organic matter.

S-46: Solution Cavity in Bedrock: The cavity measures approximately 16 inches wide, two feet in length, and two feet deep. The feature was partially filled with organic matter.

S-47: Solution Cavity in Bedrock: The cavity measures approximately three feet long, 30 inches wide, and two feet deep. The feature appeared to be an animal burrow. The feature was partially filled with organic matter.

S-48: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly two feet. The feature was partially filled with organic matter.

S-49: Solution Cavity in Bedrock: The cavity measures approximately two feet long, one foot wide and 18 inches deep. The feature was partially filled with organic matter.

S-50: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly 18 inches. The feature appeared to be an animal burrow. The feature was partially filled with organic matter.

S-51: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly 18 inches. The feature was partially filled with organic matter.

S-52: Non-karst Closed Depression: This feature measures approximately six feet wide, six feet in length, and one foot in depth. The feature was partially filled with a small amount of gravel and organic matter.

S-53: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, 16 inches wide, and 18 inches deep. The feature was partially filled with organic matter.

S-54: Zone of Solution Cavities: This zone measures approximately 30 feet long, 15 feet wide and 18 inches deep. Approximately 3 to 4 individual solution cavities were noted within the zone. The cavities ranged in size from 2 to 4 feet long, 9 to 36 inches wide, and depth ups to 16 inches. All of the noted cavities in the zone were partially filled with organic matter.

S-55: Non-karst Closed Depression: This feature measures approximately seven feet wide, five feet long, and 16 inches in depth. The feature was partially filled with a small amount of gravel and organic matter.

S-56: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly 18 inches. The feature appears to have been used as an animal burrow. The feature was partially filled with organic matter.

S-57: Non-karst Closed Depression: This feature measures approximately 10 feet wide, five feet in length, and one foot in depth. The feature was partially filled with organic matter.

S-58: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches in wide and nearly 20 inches deep. The feature was partially filled with organic matter. Native grasses were noted around the rim of the feature.

S-59: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly 16 inches. The feature appeared to have been used as an animal burrow. The feature was partially filled with organic matter.

S-61: Solution Cavity in Bedrock: The cavity measures approximately three feet long, two feet wide, and nearly nine inches deep. The feature was almost completely filled with organic matter.

S-62: Solution Cavity in Bedrock: The cavity measures approximately six inches wide, eight inches long, and two feet deep. The feature was almost completely filled with organic matter.

S-63: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of 18 nine inches. The feature appears to have been used in the past as an animal shelter. The feature was partially filled with organic matter.

S-64: Non-karst Closed Depression: This feature measures approximately seven feet long, four feet wide, and six inches in depth. The feature was partially filled with organic matter.

S-65: Solution Cavity in Bedrock: The cavity measures approximately three inches wide, six inches long, and 18 inches in depth. The feature was partially filled with organic matter. Native grasses were noted around the perimeter of the feature.

S-66: Non-karst Closed Depression: This feature measures approximately eight feet long, five feet wide, and one foot in depth. The feature was partially filled with organic matter and small limestone boulders. Prickly-pear cactus was noted growing within the depression.

S-67: Solution Cavity in Bedrock: The cavity measures approximately six inches wide, nine inches long, and nine inches deep. The feature was partially filled with organic matter, fine-grained material, and covered in native grasses.

S-68: Solution Cavity in Bedrock: The cavity measures approximately five feet long, four feet wide, and three feet in depth. The feature was partially filled with organic matter and small limestone boulders.

S-71: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 18 inches. The feature appears to have been used as an animal shelter. The feature was partially filled with organic matter.

S-72: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 18 inches. The feature was partially filled with organic matter.

S-73: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly eight inches. The feature was partially filled with organic matter.

S-74: Non-karst Closed Depression: This feature measures approximately six feet long, five feet in wide, and one foot in depth. The feature was partially filled with organic matter.

S-75: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 18 inches. The feature was almost completely filled with organic matter.

S-76: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly one foot. The feature was almost completely filled with organic matter.

S-78: Non-karst Closed Depression: This feature measures approximately six feet long, four feet wide, and eight inches in depth. The feature was partially filled with organic matter. Native grasses covered most of the feature.

S-79: Non-karst Closed Depression: This feature measures approximately six feet long, four feet wide, and nine inches in depth. The feature was partially filled with organic matter. A few sapling oaks were noted within the boundaries of the feature.

S-80: Non-karst Closed Depression: This feature measures approximately seven feet long, five feet wide, and 18 inches in depth. The feature was partially filled with organic matter. A few sapling oaks were noted within the boundaries of the feature.

S-81: Solution Cavity in Bedrock: The cavity measures approximately four feet long, three feet wide, and two feet deep. The feature was partially filled with organic matter and located at the base of an oak tree.

S-83: Solution Cavity in Bedrock: The cavity measures approximately 16 inches in diameter with a depth of nearly 16 inches. The feature was partially filled with organic matter and located at the base of a large tree.

S-84: Solution Cavity in Bedrock: The cavity measures approximately four feet long, three feet wide, and two feet deep. The feature was partially filled with organic matter and is located underneath the root of a large tree.

S-85: Solution Cavity in Bedrock: The cavity measures approximately 30 inches long, 18 inches wide, and one foot deep. The feature was almost completely filled with organic matter.

S-86: Solution Cavity in Bedrock: The cavity measures approximately 18 inches in diameter with a depth of nearly nine inches. The feature was almost completely filled with organic matter.

S-87: Solution Cavity in Bedrock: The cavity measures approximately 30 inches long, two feet wide and 18 inches deep. The feature was partially filled with organic matter.

S-88: Solution Cavity in Bedrock: The cavity measures approximately three feet long, three feet wide and 18 inches deep. The feature was partially filled with organic matter.

S-89: Non-karst Closed Depression: This feature measures approximately six feet long, four feet wide, and nine inches deep. The feature was partially filled with organic matter. A feature was covered in native grasses and a prickly-pear cactus.

S-90: Non-karst Closed Depression: This feature measures approximately six feet long, four-and-a-half feet wide, and one foot in depth. The feature was partially filled with organic matter. The feature appears to have been created by a tree falling over.

S-91: Solution Cavity in Bedrock: The cavity measures approximately two feet in diameter with a depth of nearly 18 inches. The feature was mostly filled with organic matter. A nearby fallen tree appears to have had its roots within the cavity and the falling of the tree has exposed the cavity.

S-92: Solution Cavity in Bedrock: The cavity measures approximately 16 inches long, one foot wide and 16 inches deep. The feature was partially filled with organic matter.

S-93: Non-karst Closed Depression: This feature measures approximately seven feet long, five feet wide, and one foot in depth. The feature was partially filled with organic matter.

S-94: Non-karst Closed Depression: This feature measures approximately seven feet long, six feet wide, and 16 inches in depth. The feature was partially filled with organic matter.

S-95: Non-karst Closed Depression: This feature measures approximately seven feet long, six feet wide, and 16 inches in depth. The feature was partially filled with organic matter. The feature was covered in native grasses.

S-97: Non-karst Closed Depression: This feature measures approximately eight feet long, six feet wide, and 18 inches in depth. The feature was partially filled with organic matter. The feature was covered in native grasses.

S-98: Non-karst Closed Depression: This feature measures approximately six feet long, five feet wide, and 18 inches in depth. The feature was partially filled with organic matter. The feature was covered in native grasses. A single cedar tree was also noted along the perimeter of the feature.

S-99: Non-karst Closed Depression: This feature measures approximately six feet long, five feet wide, and two feet in depth. The feature was partially filled with organic matter.

S-100: Non-karst Closed Depression: This feature measures approximately six feet long, four feet wide, and 18 inches in depth. The feature was partially filled with organic matter and fine-grained material. Native grasses were noted within the feature.

S-101: Non-karst Closed Depression: This feature measures approximately seven feet long, four feet wide, and six inches in depth. The feature was partially filled with organic matter and fine-grained material. Native grasses were noted within the feature.

S-102: Solution Cavity in Bedrock: The cavity measures approximately nine inches long, six inches wide, and four inches deep. The feature was partially filled with organic matter and fine-grained materials. Woody shrubs and thorny vines were noted growing along the perimeter of the cavity.

S-103: Solution Cavity in Bedrock: The cavity measures approximately four inches long, four inches wide, and six inches deep. The feature was partially filled with organic matter and small amounts of gravel.

S-104: Solution Cavity in Bedrock: The cavity measures approximately six inches long, three inches wide, and one foot in depth. The feature was partially filled with organic matter.

S-105: Solution Cavity in Bedrock: The cavity measures approximately nine inches long, one foot wide, and 16 inches in depth. The feature was partially filled with organic matter and fine-grained materials.

S-106: Solution Cavity in Bedrock: The cavity measures approximately one foot wide, three feet long, and three feet in depth. The feature was partially filled with organic matter and fine-grained materials. Two large trees were noted along the edges of the feature.

S-109: Non-karst Closed Depression: This feature measures approximately six feet long, five feet wide, and one foot in depth. The feature was partially filled with organic matter and fine-grained material. Native grasses were noted within the feature.

S-110: Non-karst Closed Depression: This feature measures approximately eight feet long, five feet wide, and six inches in depth. The feature was partially filled with organic matter and fine-grained material. Small limestone stones were noted with the depression.

S-111: Non-karst Closed Depression: This feature measures approximately seven feet long, six feet wide, and 18 inches in depth. The feature was partially filled with organic matter, small limestone cobbles, and fine-grained material. The feature was covered by native grasses.

S-112: Non-karst Closed Depression: This feature measures approximately eight feet long, five feet wide, and one foot in depth. The feature was partially filled with organic matter, small limestone cobbles, and fine-grained material. The feature was covered by native grasses.

S-113: Non-karst Closed Depression: This feature measures approximately 10 feet long, eight feet wide and 18 inches deep. The feature was partially filled with organic matter, small limestone boulders, and fine-grained materials. Native grasses and a cedar tree were noted within the feature.

S-114: Non-karst Closed Depression: This feature measures approximately ten feet long, five feet wide, and one foot in depth. The feature was partially filled with organic matter, small limestone cobbles, and fine-grained material. The feature was covered by native grasses and scrub cedar.

S-115: Solution Cavity in Bedrock: The cavity measures approximately nine inches long, six inches wide, and one foot depth. The feature was partially filled with organic matter and fine-grained materials. The feature appears to have been an animal shelter in the past.

S-116: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 15 inches. The feature was partially filled with organic matter and fine-grained materials. The feature appears to have been used as an animal shelter.

S-117: Non-karst Closed Depression: This feature measures approximately nine feet long, five feet wide, and 18 inches in depth. The feature was partially filled with organic matter, a few small limestone cobbles, and fine-grained material. The feature was covered by native grasses.

S-118: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly two feet. The feature was partially filled with organic matter and fine-grained materials.

S-119: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 21 inches. The feature was partially filled with organic matter.

S-120: Non-karst Closed Depression: This feature measures approximately nine feet long, five feet wide, and 21 inches in depth. The feature was partially filled with organic matter, a few small limestone cobbles, and fine-grained material. The feature was covered by native grasses.

S-121: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, two feet wide, and two feet deep. The feature was partially filled with organic matter and small amounts of gravel.

S-122: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, one foot wide and 18 inches deep. The feature was partially filled with organic matter, fine-grained materials, and gravel. The feature was located at the base of a rotted cedar stump.

S-123: Solution Cavity in Bedrock: The cavity measures approximately four inches in diameter with a depth of nearly one foot. The feature was partially filled with organic matter.

S-125: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches wide, and nearly six inches in depth. The feature was partially filled with organic matter and fine-grained materials.

S-127: Non-karst Closed Depression: This feature measures approximately eight feet long, six feet wide, and two feet in depth. The feature was partially filled with organic matter and a few small limestone cobbles.

S-128: Solution Cavity in Bedrock: The cavity measures approximately nine inches long, six inches wide, and six inches deep. The feature was partially filled with organic matter and a small amount of gravel.

S-129: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to nine inches. The feature was partially filled with organic matter. Native grasses and sapling oak trees were noted within some of the vugs.

S-130: Solution Cavity in Bedrock: The cavity measures approximately 18 inches in diameter with a depth of nearly nine inches. The feature was partially filled with organic matter.

S-131: Non-karst Closed Depression: The feature measures approximately six feet long, four feet across, and nine inches deep. The feature was partially filled with organic matter and covered in native grasses.

S-132: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly nine inches. The feature was partially filled with organic matter.

S-133: Solution Cavity in Bedrock: The cavity measures approximately 15 inches long, nine inches wide, and nearly nine inches deep. The feature was partially filled with organic matter.

S-134: Solution Cavity in Bedrock: The cavity measures approximately two feet long, 18 inches wide and 18 inches deep. The feature was partially filled with organic matter.

S-135: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly two feet. The feature was partially filled with organic matter and small limestone cobbles.

S-136: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, one foot wide, and two feet in depth. The feature was partially filled with organic matter.

S-137: Solution Cavity in Bedrock: The cavity measures approximately two feet wide, nine inches wide, and 18 inches deep. The feature was partially filled with organic matter.

S-138: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly one foot. The feature was partially filled with organic matter.

S-139: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly 18 inches. The feature was partially filled with organic matter.

S-140: Non-karst Closed Depression: The feature measures approximately nine feet long, four-and-a-half feet wide, and one foot deep. The feature was partially filled with organic matter and covered in native grasses.

S-141: Non-karst Closed Depression: The feature measures approximately six feet long, four feet wide and 18 inches deep. The feature was partially filled with organic matter and covered in native grasses.

S-142: Solution Cavity in Bedrock: The cavity measures approximately three feet long, nine inches wide, and nearly 18 inches deep. The feature was partially filled with organic matter.

S-143: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of two feet. The feature was partially filled with organic matter.

S-144: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly two feet. The feature was partially filled with organic matter.

S-145: Non-karst Closed Depression: The feature measures approximately eight feet long, six feet wide, and one foot deep. The feature was partially filled with organic matter and covered in native grasses and scrub cedar.

S-146: Solution Cavity in Bedrock: The cavity measures approximately three feet long, two feet wide, and one foot deep. The feature was partially filled with organic matter.

S-147: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly one foot. The feature was partially filled with organic matter and covered in natural grasses.

S-148: Solution Cavity in Bedrock: The cavity measures approximately four feet long, three feet wide, and two feet deep. The feature was partially filled with organic matter and large limestone boulders. The feature was covered in native grasses.

S-149: Solution Cavity in Bedrock: The cavity measures approximately three feet long, 18 inches wide, and one foot. The feature was partially filled with organic matter.

S-150: Non-karst Closed Depression: The feature measures approximately six feet long, four feet wide, and one foot deep. The feature was partially filled with organic matter and limestone cobbles.

S-151: Solution Cavity in Bedrock: The cavity measures approximately two feet long, six inches wide, and one foot deep. The feature was partially filled with organic matter and covered with native grasses.

S-152: Solution-Enlarged Fractures: This feature covers an area approximately 20 feet long and 50 feet wide. The fractures have a trend of approximately 80 degrees and are surrounded by vuggy rock. The fractures measure approximately 1 to 8 inches wide and extend down as much as two feet. Approximately 1 to 2 fractures were noted per square foot. The majority of the fractures were almost completely filled with organic matter. Some of the fractures were noted to contain small tufts of native grasses as well.

S-153: Solution-Enlarged Fractures: This feature covers an area approximately 20 feet long and 15 feet wide. The fractures have a trend of ranging from 35 to 45 degrees and are surrounded by vuggy rock. The fractures measure approximately 1 to 3 inches wide and extend down as much as one foot. Small amounts of native grasses and young woody shrubs were noted growing within some of the fractures. Approximately 1 to 2 fractures were noted per square foot. The majority of the fractures were partially filled with organic matter.

S-154: Solution-Enlarged Fractures: This feature covers an area approximately 30 feet long and 20 feet wide. The fractures have a trend of ranging from 70 to 80 degrees and are surrounded by vuggy rock. The fractures measure approximately 1 to 4 inches wide and extend down as much as 18 inches. Small amounts of native grasses and young woody shrubs were noted growing within some of the fractures. Approximately 1 to 2 fractures were noted per square foot. The majority of the fractures were partially filled with organic matter.

S-155: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly 15 inches. The feature was partially filled with organic matter and fine-grained material.

S-156: Solution-Enlarged Fractures: This feature covers an area approximately 35 feet long and 20 feet wide. The fractures have a trend of ranging from 25 to 30 degrees. The fractures measure approximately 1 to 4 inches wide and extend down as much as one foot. Approximately 1 to 3 fractures were noted per square foot. The majority of the fractures were partially filled with organic matter. Small amounts of native grasses and young woody shrubs were noted growing within some of the fractures.

S-157: Solution Cavity in Bedrock: The cavity measures approximately nine inches long, sic inches wide, and six inches deep. The feature was partially filled with organic matter. The feature appears to be an animal burrow located at the base of a cracked boulder.

S-158: Non-karst Closed Depression: The feature measures approximately 12 feet long, six feet wide, and one foot deep. The feature was partially filled with organic matter and limestone cobbles. The majority of the feature was covered with native grasses.

S-159: Non-karst Closed Depression: The feature measures approximately six feet long, four feet wide, and nine inches deep. The feature was partially filled with organic matter and limestone cobbles. The majority of the feature was covered with native grasses.

S-161: Non-karst Closed Depression: The feature measures approximately six feet long, four feet wide, and one foot deep. The feature was partially filled with organic matter. The majority of the feature was covered with native grasses.

S-162: Solution Cavity in Bedrock: The cavity measures approximately four feet long, one foot wide, and four feet deep. The floor of the cavity was partially filled with limestone rubble.

S-163: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 50 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 7. The feature was partially filled with organic matter. Native grasses and sapling oak trees were noted within some of the vugs.

S-164: Solution Cavity in Bedrock: The cavity measures approximately three feet wide, two feet long and 18 inches deep. The feature was partially filled with organic matter. The feature appears to have been an animal shelter.

S-165: Solution Cavity in Bedrock: The cavity measures approximately three feet long, a foot wide, and one foot deep. The feature was partially filled with organic matter.

S-166: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, two feed wide, and nine inches deep. The feature was partially filled with organic matter.

S-167: Solution Cavity in Bedrock: The cavity measures approximately three feet wide, five feet long, and two feet in depth. The opening of the cavity is located at the bottom of a shallow depression in exposed bedrock. The depression measures approximately 30 feet across. The feature was partially filled with organic matter and coarse limestone cobbles. A prickly-pear cactus and small cedar tree were noted growing along the eastern side of the cavity's opening.

S-168: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 15 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 5. The feature was partially filled with organic matter. Native grasses were noted within some of the vugs.

S-169: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 40 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 8. The feature was partially filled with organic matter. Native grasses trees were noted within some of the vugs.

S-170: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches wide, and 15 inches deep. The feature was partially filled with organic matter.

S-171: Non-karst Closed Depression: The feature measures approximately six feet long, four feet wide, and nine inches deep. The feature was partially filled with organic matter and coarse gravel and small cobbles.

S-172: Solution Cavity in Bedrock: The cavity measures approximately two feet long, nine inches wide, and one foot deep. The feature was partially filled with organic matter and small limestone cobbles.

S-173: Solution Cavity in Bedrock: The cavity measures approximately six inches in diameter with a depth of nearly one foot. The feature was partially filled with organic matter.

S-174: Solution Cavity in Bedrock: The cavity measures approximately four feet wide, five feet long and 18 inches deep. The feature was partially filled with organic matter and gravel. Small oak saplings were noted growing within the feature. This feature appears to have been exposed as a result of a tree falling over.

S-175: Solution Cavity in Bedrock: The cavity measures approximately two feet long, nine inches wide, and six inches deep. The feature was partially filled with organic matter and coarse gravel. The feature is located at the base of a cedar tree.

S-176: Solution Cavity in Bedrock: The cavity measures approximately nine inches in diameter with a depth of nearly 18 inches. The feature was partially filled with organic matter.

S-177: Non-karst Closed Depression: The feature measures approximately six feet long, 30 inches wide, and six inches deep. The feature was partially filled with organic matter and covered with native grasses.

S-178: Non-karst Closed Depression: The feature measures approximately eight feet long, three and a half feet wide, and six inches deep. The feature was partially filled with organic matter and covered in native grasses.

S-179: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly nine inches. The feature was partially filled with organic matter.

S-180: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 40 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 15. The feature was partially filled with organic matter.

S-181: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 20 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 9. The feature was partially filled with organic matter.

S-183: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 15 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-184: Solution-Enlarged Fractures: This feature covers an area approximately 10 feet long and 25 feet wide. The fractures have a trend of approximately 45 degrees. The fractures measure approximately 1 to 4 inches wide and extend down as much as nine inches. Approximately 1 to 2 fractures were noted per square foot. The majority of the fractures were partially filled with organic matter.

S-185: Non-karst Closed Depression: The feature measures approximately 12 feet long, 15 feet wide, and six inches deep. The feature was partially filled with organic matter. The feature appears to be an animal wallow hole.

S-186: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches wide, and nine inches deep. The feature was partially filled with organic matter and small limestone cobbles.

S-187: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-188: Non-karst Closed Depression: The feature measures approximately seven feet long, four feet wide, and six inches deep. The feature was partially filled with organic matter and was covered with native grasses.

S-189: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 20 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to nine inches. The number of vugs per square foot ranged from 1 to 3. The feature was partially filled with organic matter. Native grasses and various small cactus plants were noted growing within some of the vugs.

S-190: Solution Cavity in Bedrock: The cavity measures approximately six inches in diameter with a depth of nearly one foot. The feature was partially filled with organic matter and small, coarse gravel.

S-191: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 15 feet wide and 15 feet long. The vugs present have apertures ranging in size up to approximately three inches and depths up to nine inches. The number of vugs per square foot ranged from 2 to 8. The feature was partially filled with organic matter.

S-192: Solution Cavity in Bedrock: The cavity measures approximately one foot long, 18 inches wide, and 18 inches deep. The feature was partially filled with organic matter. The feature was noted at the base of a rotted tree stump.

S-193: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 15 feet wide and 12 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 3. The feature was partially filled with organic matter.

S-194: Solution Cavity in Bedrock: The cavity measures approximately four inches in diameter with a depth of nearly six inches. The feature was partially filled with organic matter.

S-195: Non-karst Closed Depression: The feature measures approximately six feet long, six feet wide, and nine inches deep. The feature was partially filled with organic matter and was covered with native grasses and a small prickly-pear cactus.

S-196: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches wide, and six inches deep. The feature was partially filled with organic matter.

S-197: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 17 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 16. The feature was partially filled with organic matter and covered with a thin layer of native grasses.

S-198: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, and 21 inches wide, and two feet deep. The feature was partially filled with organic matter and small limestone cobbles.

S-199: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 18 feet wide and 15 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-200: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to four inches. The number of vugs per square foot ranged from 1 to 16. The feature was partially filled with organic matter.

S-201: Non-karst Closed Depression: The feature measures approximately six feet long, five feet wide, and six inches deep. The feature was partially filled with organic matter and was covered with native grasses.

S-202: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 4. The feature was partially filled with organic matter and a few of the vugs contained native grasses.

S-203: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 4. The feature was partially filled with organic matter and a few of the vugs contained native grasses.

S-204: Non-karst Closed Depression: The feature measures approximately six feet long, three feet wide, and nine inches deep. The feature was partially filled with organic matter and was covered with native grasses. The feature appears to have been created via a fallen tree.

S-208: Solution-Enlarged Fractures: This feature covers an area approximately 10 feet long and 25 feet wide. The fractures have a trend of approximately 25 degrees. The fractures measure approximately 1 to 4 inches wide and extend down as much as six inches. Approximately 1 to 2 fractures were noted per square foot. The majority of the fractures were partially filled with organic matter. Some of the fractures were filled with small tufts of native grasses.

S-209: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 25 feet wide and 10 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 16. The feature was partially filled with organic matter. Small sapling cedar trees were noted in some of the vugs.

S-210: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, one foot wide and 30 inches deep. The feature was partially filled with organic matter. The cavity appears to be a discharge point located at the headcut of a drainage pathway. An obvious channel was noted flowing away and downgradient from the cavity.

S-211: Solution Cavity in Bedrock: The cavity measures approximately three feet in diameter with a depth of nearly four feet. The feature was partially filled with organic matter. The cavity appears to be a discharge point located at the headcut of a drainage pathway.

S-212: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 30 feet wide and 10 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to two feet. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-213: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, one foot wide and one-and-a-half feet deep. The feature was partially filled with organic matter.

S-214: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 20 feet wide and 15 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to one foot. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-215: Fault: This feature is a normal fault known as the Bat Cave Fault. The fault separates the Kainer Formation from the Person Formation across the Site. This fault trends approximately 50 degrees and measures 5,600 linear feet across the Site. Most visible indications of the fault have been obscured by local vegetation and soil cover. The fault was mapped on the Geologic Site Plan (Figure 1) as depicted in the *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas* (USGS Water Resources Investigation Report 94-4117).

S-216: Fault: This fault trends approximately 75 degrees and measures 1,700 linear feet across the Site. Most visible indications of the fault have been obscured by local vegetation and soil cover. The fault was mapped on the Geologic Site Plan (Figure 1) as depicted in the *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas* (USGS Water Resources Investigation Report 94-4117).

S-217: Fault: This fault trends approximately 160 degrees and measures 200 linear feet across the Site. Most visible indications of the fault have been obscured by local vegetation and soil cover. The fault was mapped on the Geologic Site Plan (Figure 1) as depicted in the *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas* (USGS Water Resources Investigation Report 94-4117).

S-219: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 20 feet wide and 12 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to nine inches. The number of vugs per square foot ranged from 1 to 7. The feature was partially filled with organic matter.

S-220: Solution Cavity in Bedrock: The cavity measures approximately six inches in diameter with a depth of nearly 21 inches. The feature was partially filled with organic matter.

S-221: Solution Cavity in Bedrock: The cavity measures approximately one foot wide, 15 inches long and 18 inches deep. The feature was partially filled with organic matter.

S-222: Solution Cavity in Bedrock: The cavity measures approximately one foot wide, 18 inches long, and one foot deep. The feature was partially filled with organic matter.

S-224: Solution Cavity in Bedrock: The cavity measures approximately two feet in diameter with a depth of nearly 18 inches. The feature was partially filled with organic matter.

S-225: Zone of Solution Cavities: This feature is a zone of small solution cavities measuring approximately 60 feet long and 25 feet wide. Between 8 to 10 cavities were noted in the zone ranging in size up to nine inches long, six inches wide, and nine inches deep. All of the cavities were almost completely filled with organic matter and fine-grained material.

S-261: Solution Cavity in Bedrock: The cavity measures approximately four feet long, three feet wide, and two feet deep. The feature was partially filled with organic matter.

S-291: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 50 feet wide and 10 feet long. The vugs present have apertures ranging in size up to approximately three inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 4. The feature was partially filled with organic matter.

S-292: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 45 feet wide and 10 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to nine inches. The number of vugs per square foot ranged from 1 to 3. The feature was partially filled with organic matter.

S-293: Solution Cavity in Bedrock: The cavity measures approximately one foot in diameter with a depth of nearly three feet. The feature was partially filled with organic matter.

S-294: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 30 feet wide and 30 feet long. The vugs present have apertures ranging in size up to approximately four inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-295: Solution Cavity in Bedrock: The cavity measures approximately two feet long, one foot wide, and three feet deep. The feature was partially filled with organic matter.

S-296: Solution Cavity in Bedrock: The cavity measures approximately 18 inches long, two feet wide, and one foot deep. The feature was partially filled with organic matter.

S-297: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 30 feet wide and 20 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 6. The feature was partially filled with organic matter.

S-298: Other Natural Bedrock Feature (Vuggy Rock): This feature covers an area approximately 30 feet wide and 10 feet long. The vugs present have apertures ranging in size up to approximately six inches and depths up to six inches. The number of vugs per square foot ranged from 1 to 12. The feature was partially filled with organic matter.

S-299: Solution Cavity in Bedrock: The cavity measures approximately two feet long, three feet wide, and one foot deep. The feature was partially filled with organic matter.

S-300: Solution Cavity in Bedrock: The cavity measures approximately one foot long, one foot wide, and one foot deep. The feature was partially filled with organic matter.

S-301: Solution Cavity in Bedrock: The cavity measures approximately two feet long, one foot wide and two-and-a-half feet deep. The feature was partially filled with organic matter.

S-321: Solution Cavity in Bedrock: The cavity measures approximately one foot long, six inches wide, and 18 inches deep. The feature was partially filled with coarse gravel.

S-322: Solution Cavity in Bedrock: The cavity measures approximately one foot long, nine inches wide, and 18 inches deep. The feature was partially filled with organic matter and fine-grained materials.

S-323: Solution Cavity in Bedrock: The cavity measures approximately one foot long, one foot wide and 18 inches deep. The feature was partially filled with organic matter and fine-grained materials.

Based on the visual inspection of the ground surface, the overall potential for fluid flow from the Site into the Edwards Aquifer appears to be moderate based on the features observed on the Site surface.

SOIL DESCRIPTION

The Site has soil cover ranging from 0-2 feet, consisting of the following soil associations:

The **Comfort-Rock outcrop complex, undulating (CrD)** consists of shallow, clayey soils and Rock outcrops on the side slopes, hilltops, and ridgetops in the uplands area of the Edwards Plateau. This soil complex is composed of the Comfort extremely stony clay (~49% to ≥95% of the complex), the Rock outcrop (5-36% of the complex), and small amounts of the Rumple, Purves, Eckert, and Real soils.

Typically, the surface layer of the Comfort soil is dark brown extremely stony clay about 6 inches thick. Stones and cobbles (some as much as 4 feet across) cover approximately 45% of the surface. The subsoil extends to a depth of 13 inches. It's a dark reddish brown extremely stony clay. The underlying material is indurated fractured limestone. The soil is mildly alkaline and non-calcareous throughout. The soil is well drained, surface runoff is slow to medium, permeability is slow, and the available water capacity is very low. Water erosion is a slight hazard.

Typically, the Rock outcrop is dolomitic limestone that is barren of soil except in narrow fractures in the rock. Some areas may have as much as 3 inches of soil on top of the outcrop.
The soil is well drained and surface runoff is slow to medium. Permeability is slow. The available water capacity is very low. The rooting zone is shallow and water erosion is a slight hazard.

The **Eckrant-Rock outcrop complex, steep (ErG)** is a complex consisting of shallow, clayey soils and Rock outcrop found on upland areas. Slopes are convex and range from 8 to 30 percent. The soils occur in long, narrow slopes on high hills and ridges and along escarpments. The soils of the complex range in size from 50 to a few thousand acres.

The Eckrant soil makes up approximately 50-80 percent of the complex, but averages around 70 percent. Typically, the surface layer is very dark gray extremely stony clay about 10 inches thick. It is about 35 percent, by volume, cobbles and stones in the upper portions and 75 percent, by volume, in the lower portions. The underlying material is indurated fractured limestone. The soil is moderately alkaline throughout.

The Rock outcrops make up 9-30 percent of the complex, averaging around 20 percent. Typically, the Rock outcrops are barren exposures of indurated limestone. In some areas, as much as 4 inches of clayey soil may overlay the outcrops. Dark colored clay may be present in cracks and fractures.

The soils of this complex are well drained and surface runoff is rapid. Permeability is moderately slow and the available water capacity is very low. Water erosion is a severe hazard.

The **Rumple-Comfort Association (RUD)** consists of shallow and moderately deep soils on uplands in the Edwards Plateau Land Resource Area. The surface layer of the Rumple Soil is dark reddish brown very cherty clay loam about 10 inches thick. Rounded chert and limestone cobbles and gravel cover about 20 percent of the surface. The subsoil to a depth of 14 inches is dark reddish-brown very cherty clay, and to a depth of 28 inches it is dark reddish-brown extremely stony clay. The underlying material is indurated fractured limestone. The Comfort Soil is dark brown, neutral, extremely stony clay about 7 inches thick. The subsoil to a depth of 12 inches is dark reddish-brown, mildly alkaline, extremely stony clay. The underlying material is indurated fractured limestone. The soil is noncalcareous throughout. The soils in this association are well drained. Surface runoff is medium, but varies due to the occurrence of caves, fracture zones, and sinks. Permeability is moderately slow. Water erosion is a moderate hazard.

RESEARCH

7.5 Minute Quadrangle Map Review

The elevation of the Site ranges from approximately 990-1168 feet above mean sea level according to the Bat Cave, Texas (1988), New Braunfels West, Texas (1988), Sattler, Texas (1994), and Smithson Valley, Texas (1994) 7.5 Minute USGS Topographic Quadrangle Maps. Surface runoff from the Site flows west, south, and southeast into unnamed tributaries of Dry Comal Creek.

Recharge / Transition Zone

According to the Edwards Underground Water District Reference Map (1988), the Texas Water Development Board - Report 345 "Aquifers of Texas" (1995), and the Hydrologic Investigations Atlas 730 – Ground Water Atlas of the United States – Segment 4 – Texas/Oklahoma (1996), the project site is located on the Recharge Zone of the Edwards Aquifer.

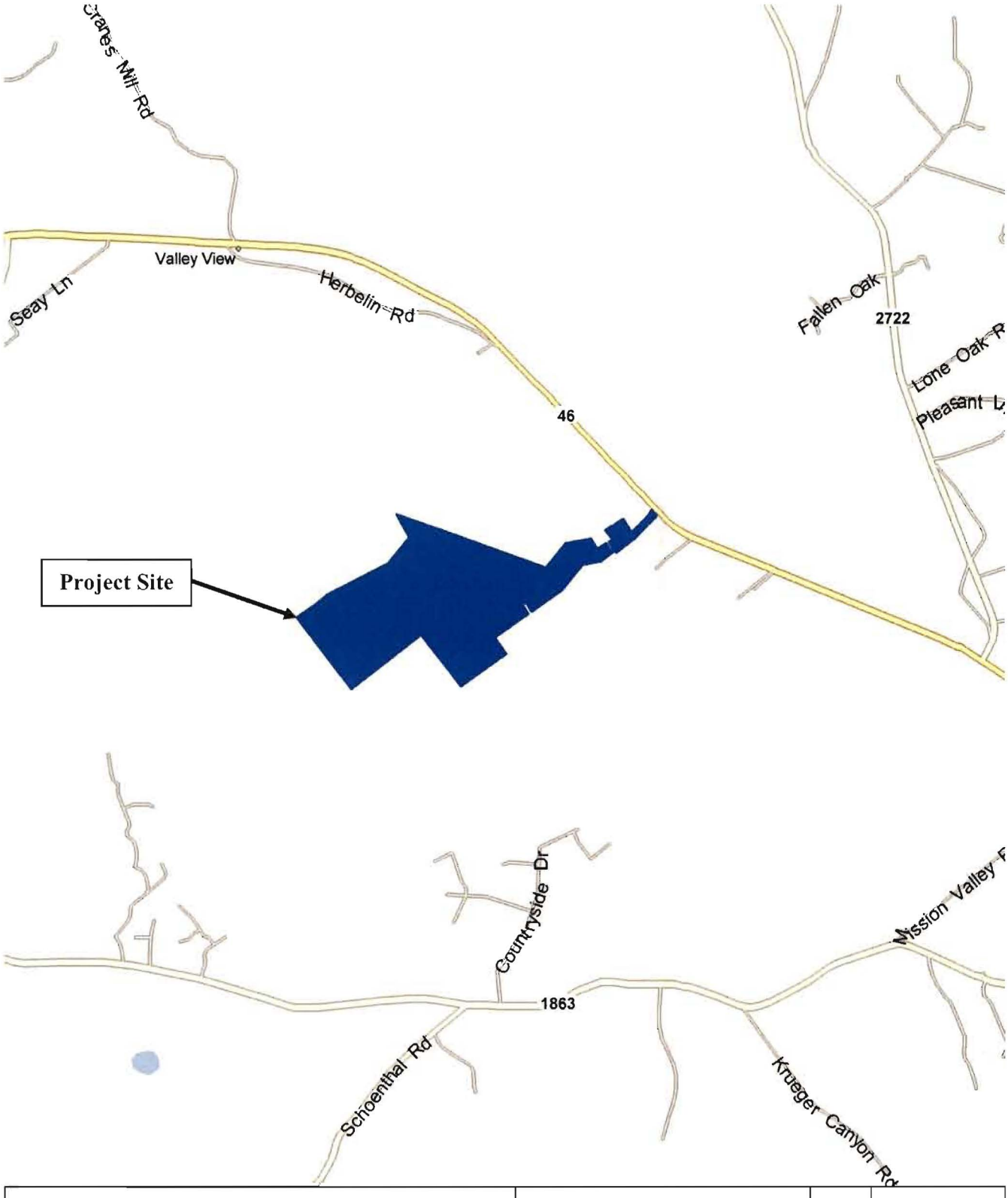
100-Year Floodplain

A small portion of the Site is designated as being within a special flood hazard area according to the FEMA National Flood Insurance Program *Flood Insurance Rate Map*, Panel No. 4854630080-C (dated 9/29/1986) for incorporated areas of Comal County, Texas. This portion of the Site, located east areas of the Site, is labeled as Zone A. According to the panel legend, Zone A is designated as areas within the 100-year flood plain but do not have base flood elevations or flood hazard factors determined. The remaining majority of the Site is located within Zone X which, according to the panel legend, is designated as areas outside the 100-year flood plain.

REFERENCES

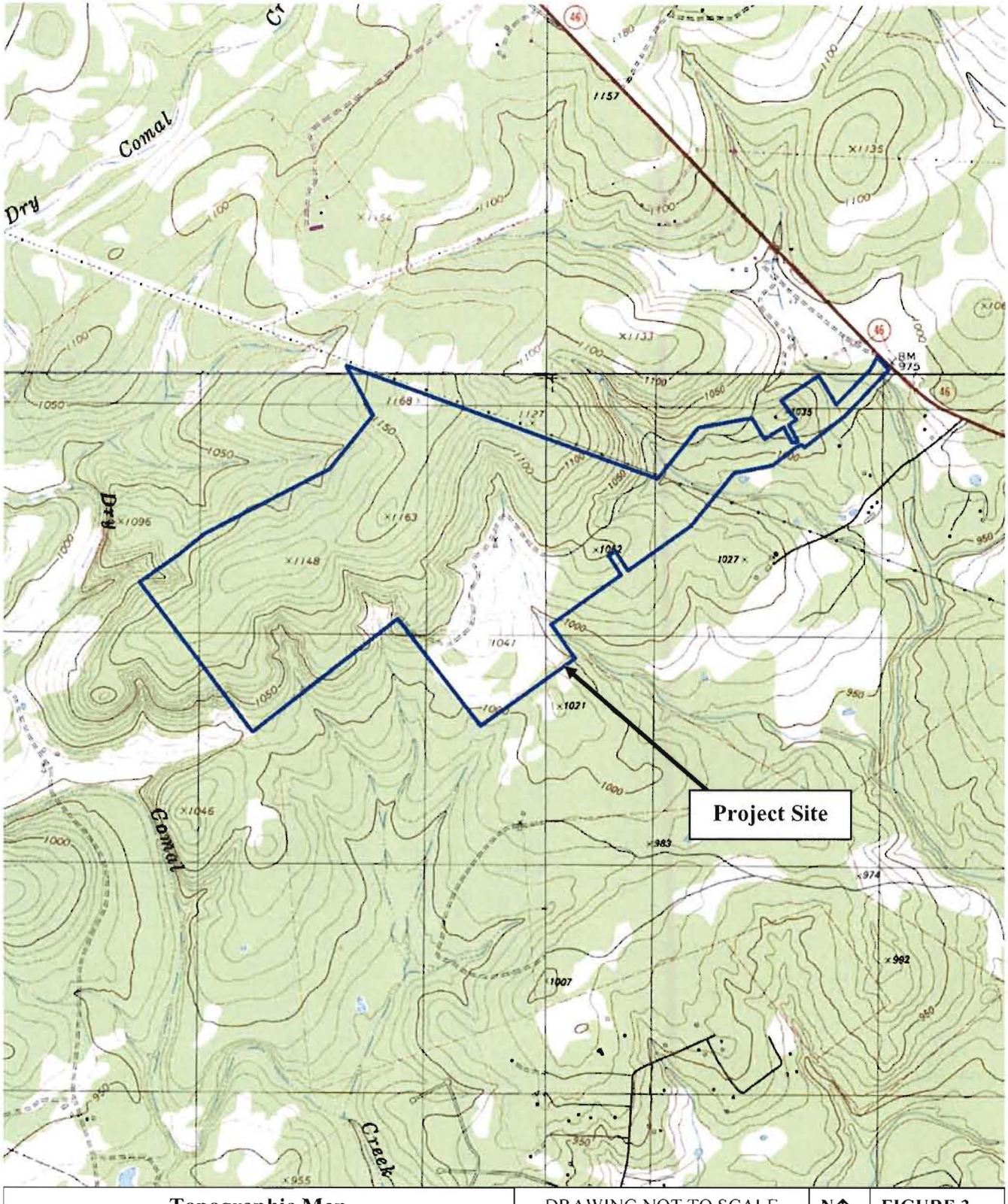
1. USGS - 7.5 Minute Topographic Quadrangle of Bat Cave, Texas (1988), New Braunfels West, Texas (1988), Sattler, Texas (1994), and Smithson Valley, Texas (1994).
2. Edwards Underground Water District Reference Map.
3. Texas Water Development Board (TWDB), Report 345, Aquifers of Texas, by John B. Ashworth and Janie Hopkins, November 1995.
4. USGS Water Resources Investigations 94-4117.
5. Geologic Atlas of Texas, San Antonio Sheet (1982), Bureau of Economic Geology.
6. Federal Emergency Management Agency (FEMA), February 16, 1996, Comal County, Texas and Incorporated Areas, Flood Insurance Rate Map (FIRM), Panel Number 4854630080-C (revised September 29, 1986).
7. USDA Soil Conservation Service, Soil Survey website, http://websoilsurvey.nrcs.usda.gov/app/
8. TCEQ-0585-Instructions (Rev. 10-1-04). "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone"

FIGURES



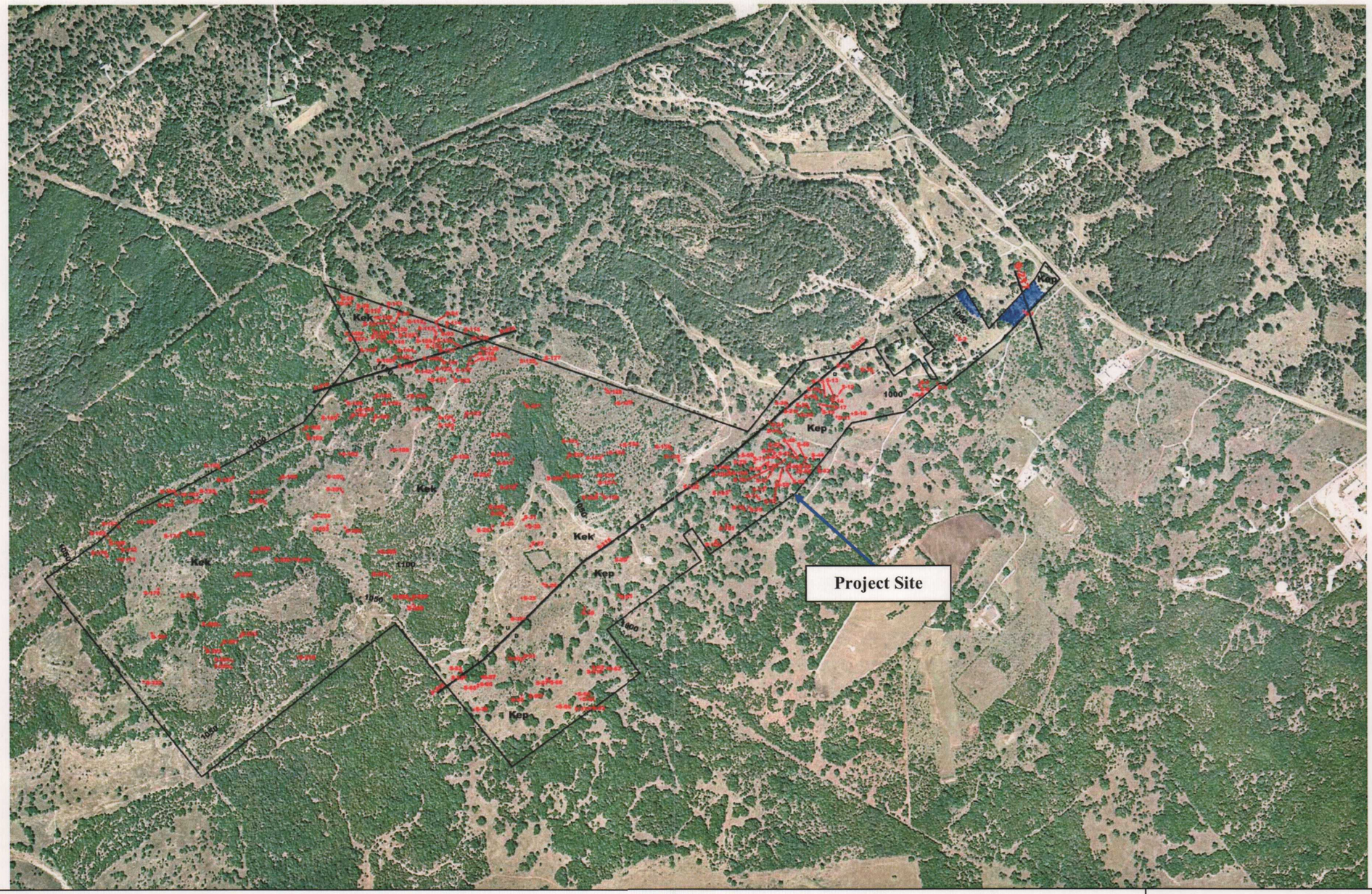
Vicinity Map	DRAWING NOT TO SCALE	N↑	FIGURE 2

FGS Project Nº FGS-E07212



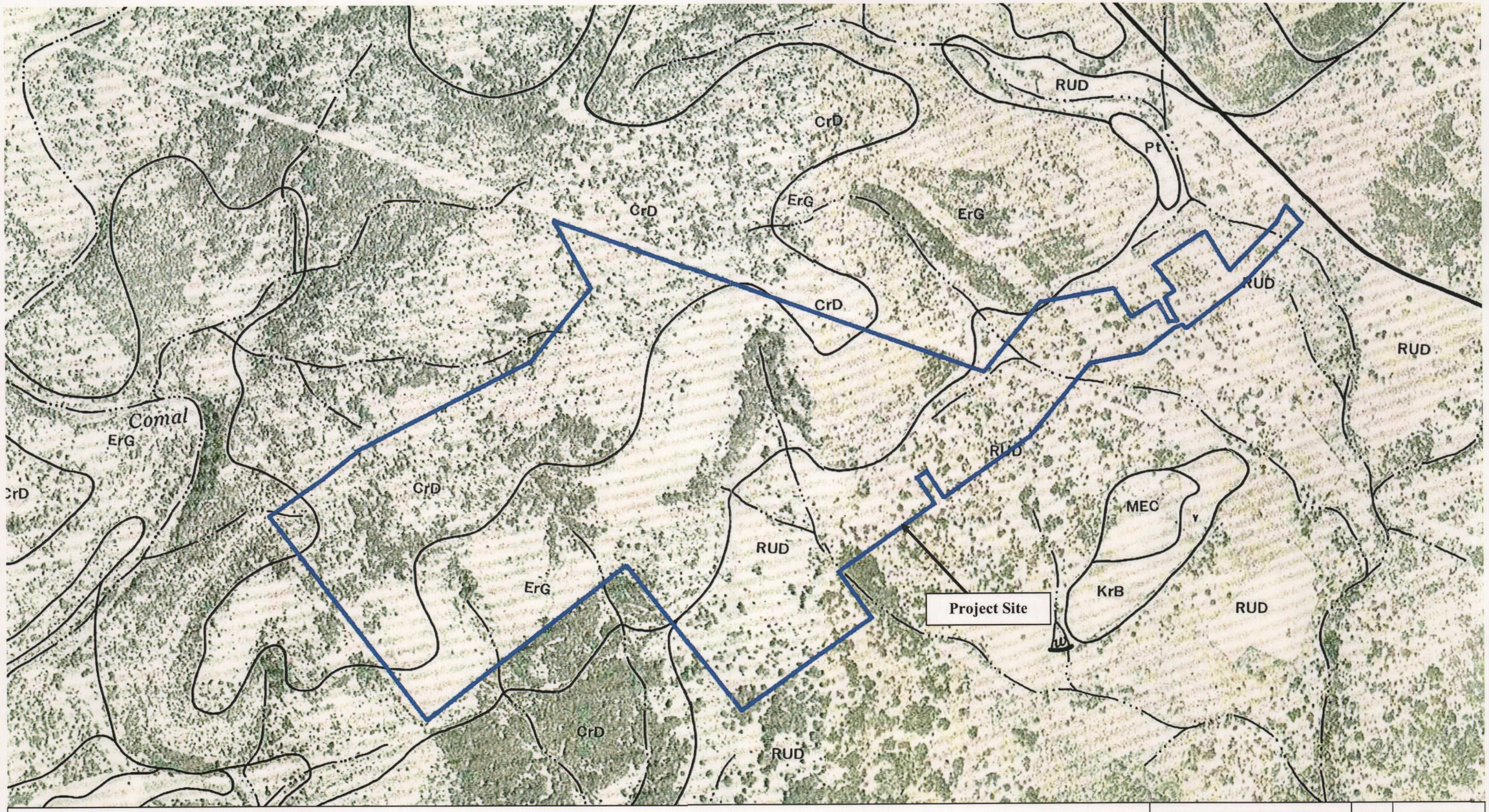
Topographic Map	DRAWING NOT TO SCALE	N↑	FIGURE 3

FGS Project Nº FGS-E07212



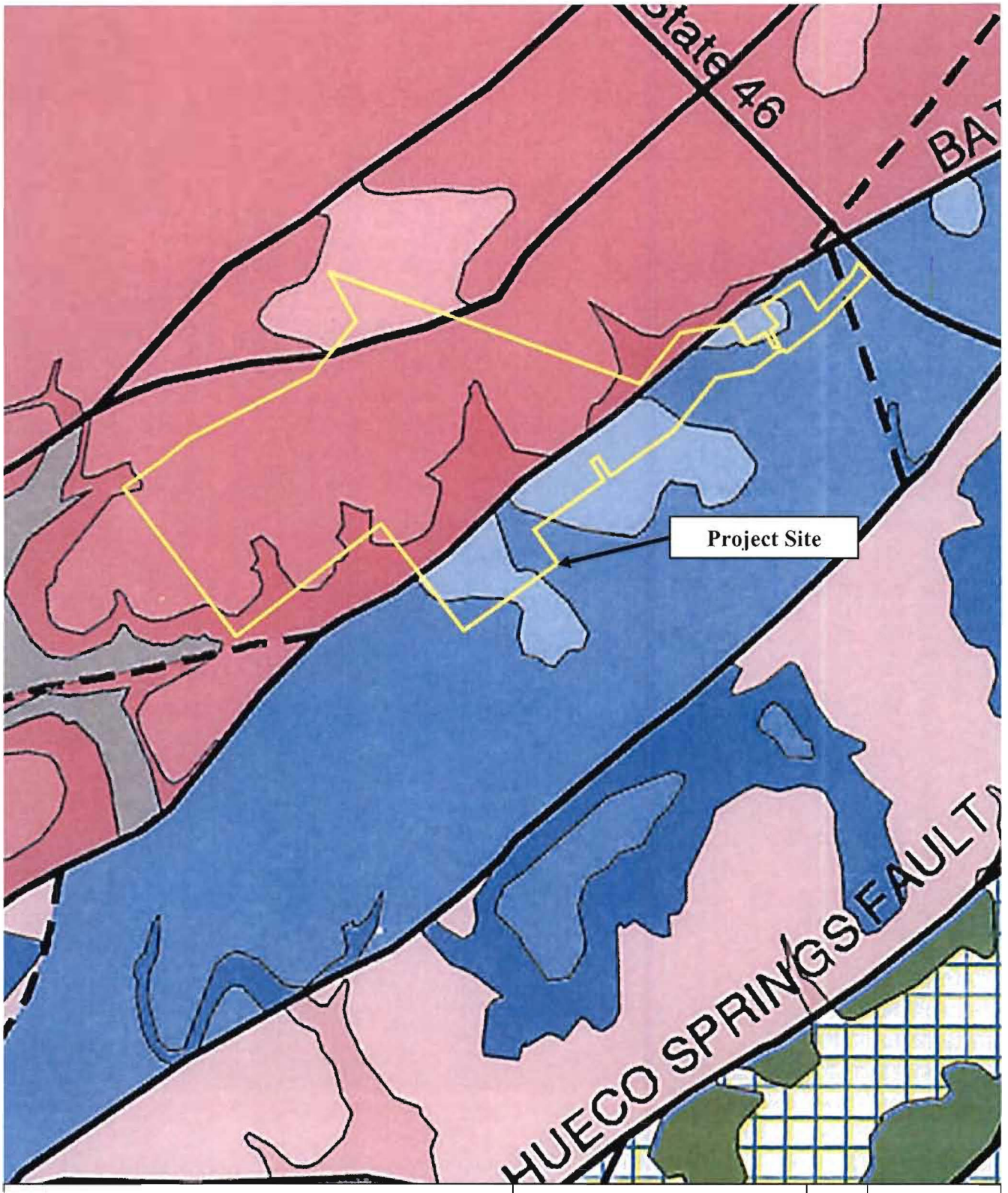
Aerial Photograph with Potential Recharge Features	1 inch = 2,000 feet	N↑	FIGURE 4

FGS Project Nº FGS-E07212



Soils Map | DRAWING NOT TO SCALE | N↑ | **FIGURE 5**

FGS Project Nº FGS-E07212



Geologic Map	DRAWING NOT TO SCALE	N↑	FIGURE 6

APPENDIX A

SITE PHOTOGRAPHS

Photo #1 – View of the entrance to PRF S-25 (a cave). Cedar logs were used to cover the entrance, preventing livestock from falling in.

Photo #2 –View of PRF S-30 (water well).

Photo #3 – View of PRF S-31 (water well).

Photo #4 – Typical view of one of the several non-karst closed depressions noted throughout the Site. This photo is a view of PRF S-34 (an animal wallow hole).

Photo #5 – Typical view of one of the several solution cavities noted throughout the Site. This photo is a view of PRF S-38.

Photo #6 – View of PRF S-39 (solution-enlarged fractures) located within a streambed.

Photo #7 – View of PRF S-46 (solution cavity).

Photo #8 – View of PRF S-68 (solution cavity).

Photo #9 – Typical view of one of the numerous non-karst closed depressions noted throughout the Site. This photo is a view of PRF S-101.

Photo #10 – View of PRF S-113 (non-karst closed depression).

Photo #11 – View of PRF S-116 (solution cavity) that has been enlarged by the burrowing of animals.

Photo #12 – Typical view of one of the few areas of solution-enlarged fractures noted throughout the Site. This photo is a view of PRF S-153.

Photo #13 – View of PRF S-162 (solution cavity).

Photo #14 – Typical view of one of the several areas of vuggy rock noted throughout the Site. This photo is a view of PRF S-168.

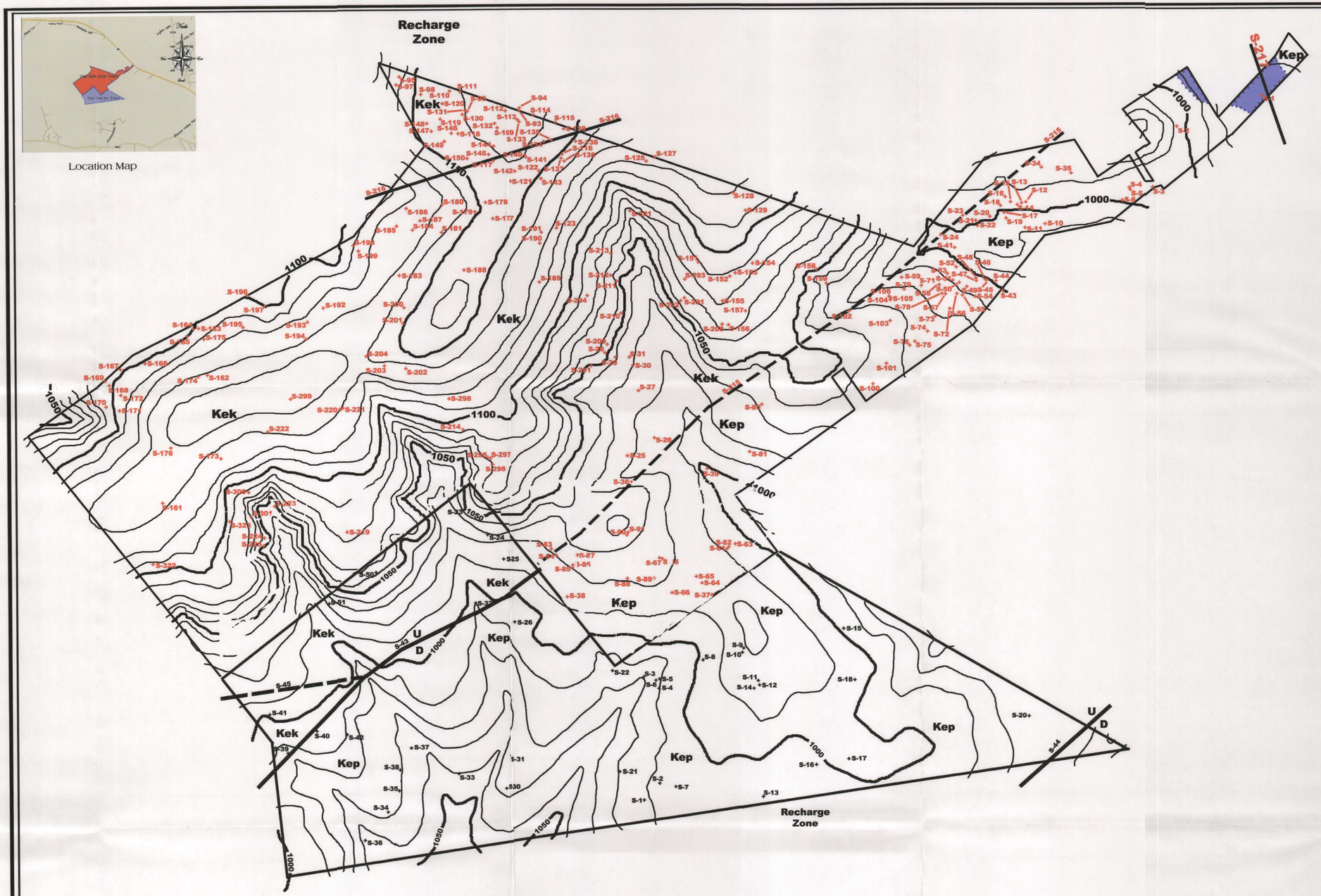
Photo #15 – View of PRF S-174 (solution cavity).

Photo #16 – View of PRF S-184 (solution-enlarged fracture).

Photo #17 – View of PRF S-210 (solution cavity) located in an area of severe erosion at the head of an intermittent stream. The feature appears to be a discharge point. An obvious channel was noted leading away and down gradient from the cavity.

Photo #18 – View of one of the several small solution cavities associated with PRF S-225 (Zone of solution cavities).

Location Map



Site Geologic Map

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
for
The 835-Acre Tract
Comal County, Texas

Frost GeoSciences, Inc. Control # FGS-E07212; The TriCity Tract, 285 Acres

Frost GeoSciences, Inc. Control # FGS-E07260; The 550-Acre Tract, 550 Acres

Legend

- Fill - Fill Material
- Qal - Alluvium
- Kau - Austin Chalk
- Kef - Eagle Ford Shale
- Kbu - Buda Limestone
- Kdr - Del Rio Clay
- Kgt - Georgetown Limestone
- Kep - Edwards Person Limestone
- Kek - Edwards Kainer Limestone
- Kgr - Glen Rose Formation
- S# - Potential Recharge Feature (PRF) for The 550 Acre Tract
- S# - Potential Recharge Feature (PRF) for The TriCity Acre Tract
- Inferred Fault
- U / D - Normal Fault (U = Upthrown Block, D = Downthrown Block)
- = 100 Year Flood Plain

Floodplain Information Obtained From
FIRM: Flood Insurance Rate Map
Comal County, Texas: Panel # 4854630080-C (dated 9/29/1986)

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)

North
NW NE
West East
SW SE
South

400 0 200 400 800

1 inch = 400 feet
Representative Fraction 1:4800

Contour Interval - 10 feet

STATE OF TEXAS
TOMAS HERNANDEZ, JR.
GEOLOGY
3297
LICENSED
PROFESSIONAL GEOSCIENTIST

Signature of Texas Licensed Geoscientist
Tomas Hernandez, Jr., TPG# 3297

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

REGULATED ENTITY NAME: Copper Ridge

REGULATED ENTITY INFORMATION

1. The type of project is:
   - x Residential: # of Lots: 597
   - x Residential: # of Living Unit Equivalents: 597
   - ___ Commercial
   - ___ Industrial
   - ___ Other:

2. Total site acreage (size of property): 813.61 acres

3. Projected population: 1791 (= 597 x 3)

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

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	3,044,700	÷ 43,560 =	69.90
Parking	2,029,800	÷ 43,560 =	46.60
Other paved surfaces	1,492,384	÷ 43,560 =	34.26
Total Impervious Cover	6,566,884	÷ 43,560 =	150.75
Total Impervious Cover ÷ Total Acreage x 100 =			18.5 %

5. x **ATTACHMENT A - Factors Affecting Water Quality.** A description of any factors that could affect surface water and groundwater quality is provided at the end of this form.

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

FOR ROAD PROJECTS ONLY
Complete questions 7-12 if this application is exclusively for a road project.

7. Type of project:
   - ___ TXDOT road project.
   - ___ County road or roads built to county specifications.
   - ___ City thoroughfare or roads to be dedicated to a municipality.
   - ___ Street or road providing access to private driveways.

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

__ Asphaltic concrete pavement
__ Other:

9. Length of Right of Way (R.O.W.): _____ feet.
Width of R.O.W.: _____ feet.
L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.

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

11. __ A rest stop will be included in this project.
__ A rest stop will **not** be included in this project.

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

STORMWATER TO BE GENERATED BY THE PROPOSED PROJECT

13. **ATTACHMENT B - Volume and Character of Stormwater.** A description of the volume and character (quality) of the stormwater runoff which is expected to occur from the proposed project is provided at the end of this form. The estimates of stormwater runoff quality and quantity should be based on area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

WASTEWATER TO BE GENERATED BY THE PROPOSED PROJECT

14. The character and volume of wastewater is shown below:
x % Domestic 179,100 gallons/day
__ % Industrial _____ gallons/day
__ % Commingled _____ gallons/day

TOTAL 179,100 gallons/day (597 EDU x 300 gpd/EDU)

15. Wastewater will be disposed of by:
x **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. The appropriate licensing authority's (authorized agent) written approval is provided at the end of this form. It states that the land is suitable for the use of an on-site sewage facility or identifies areas that are not suitable.
x 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 (name) Treatment Plant. The treatment facility is :

__ existing.

__ proposed.

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

SITE PLAN REQUIREMENTS

Items 17 through 27 must be included on the Site Plan.

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

18. 100-year floodplain boundaries

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

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

The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA Panel 485463 0800C dated September 29, 1986

19. x The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Show lots, recreation centers, buildings, roads, etc.

__ The layout of the development is shown with existing contours. Finished topographic contours will not differ from the existing topographic configuration and are not shown.

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

x There are 3 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.

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

x The wells are in use and comply with 30 TAC §238.

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

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

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

__ No **sensitive and possibly sensitive** geologic or manmade features were identified in the Geologic Assessment.

__ **ATTACHMENT D - Exception to the Required Geologic Assessment.** An exception to the Geologic Assessment requirement is requested and explained in ATTACHMENT D

provided at the end of this form. Geologic or manmade features were found and are shown and labeled.

__ **ATTACHMENT D - Exception to the Required Geologic Assessment.** An exception to the Geologic Assessment requirement is requested and explained in ATTACHMENT D provided at the end of this form. No geologic or manmade features were found.

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

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

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

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

26. _N/A_ Surface waters (including wetlands).

27. _x_ Locations where stormwater discharges to surface water or sensitive features.
__ There will be no discharges to surface water or sensitive features.

ADMINISTRATIVE INFORMATION

28. _x_ One (1) original and three (3) copies of the completed application have been provided.

29. _x_ Any modification of this WPAP will require TCEQ executive director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

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:

Allen Hoover
Print Name of Customer/Agent

Signature of Customer/Agent Date

COPPER RIDGE
FACTORS AFFECTING WATER QUALITY

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

- Soil erosion due to the clearing of the site
- Oil, grease, fuel, and hydraulic fluid contamination from construction equipment and vehicle drippings
- Hydrocarbons from asphalt paving operations
- Miscellaneous trash and litter from construction operations and material wrappings

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

- Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings
- Dirt and dust that may fall off vehicles
- Miscellaneous trash and litter
- Fertilizers, herbicides, and pesticides from landscaping operations

COPPER RIDGE
VOLUME AND CHARACTER OF STORMWATER

The total project acreage of this site is 813.61 acres. Currently the entrance of the property has a small portion within the 100 year flood plain. The property is broken into 6 watersheds, two of which drain to south portion of the property, two which drain to the north portion of the property, and two which drain near the entrance of the property. The tributaries to the south drain 1,078 acres, the tributaries to the north drain 177 acres, and the tributaries near the entrance drain 1,116 acres.

The general land slope of the site ranges from 0.5% to 30%, the steepest areas being the lows throughout the property. The tract generally consists of moderate to dense vegetative cover with native trees and grasses.

The proposed development will consist of approximately 597 single family residential tracts with a minimum lot size of 1 acre. Upon completion, the site will consist of an estimated 18.5% impervious cover. On-site Detention ponds will be utilized to mitigate increased stormwater runoff as a result of development.

The SCS methods with a type II rainfall distribution was utilize within this study. Time of Concentration values were established using Technical Release-55 and curve numbers used are from the City of New Braunfels Drainage Criteria Manual. Below is a summary of the pre-developed and post-developed runoff:

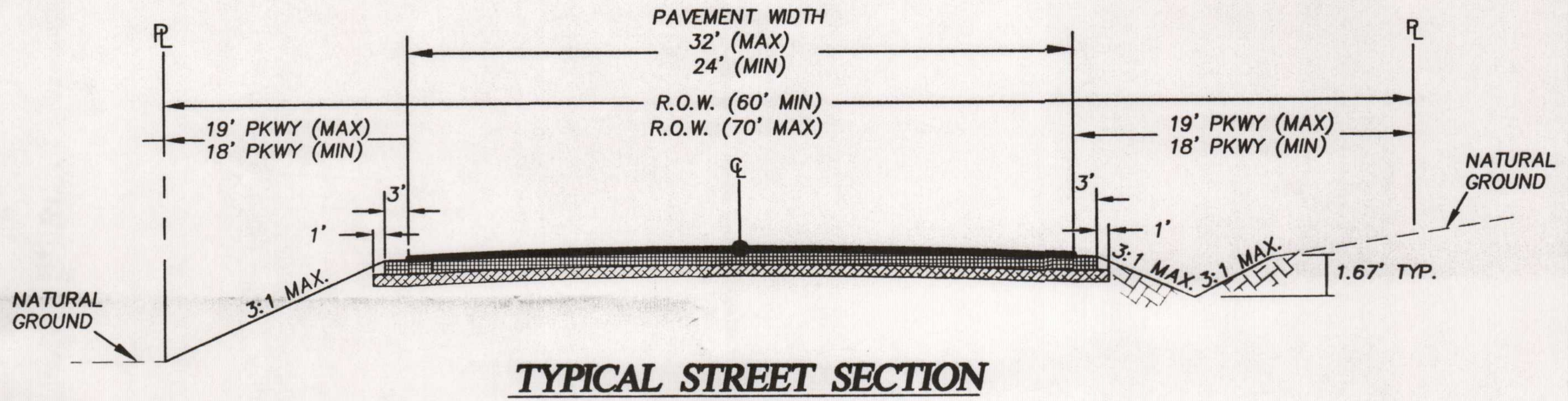
Pre-Development Runoff:

Evaluation Point	**Curve Number**	**Acreage**	**Runoff (cfs)** *(for the 25 year storm frequency)*
A	82	20.06	**129.87**
B	82	157.57	**735.05**
C	82	840.41	**3022.19**
D	82	276.39	**1093.64**
E	80	440.51	**1722.19**
F	76	638.22	**2653.37**

Post-Development Runoff:

Evaluation Point	**Curve Number**	**Acreage**	**Runoff (cfs)** *(for the 25 year storm frequency)*
A	84	23.61	**117.36**
B	83.2	154.42	**663.03**
C	82	840.41	**3022.19**
D	82.6	276.66	**981.29**
E	78.0	440.27	**1690.13**
F	83.2	661.42	**2754.22**

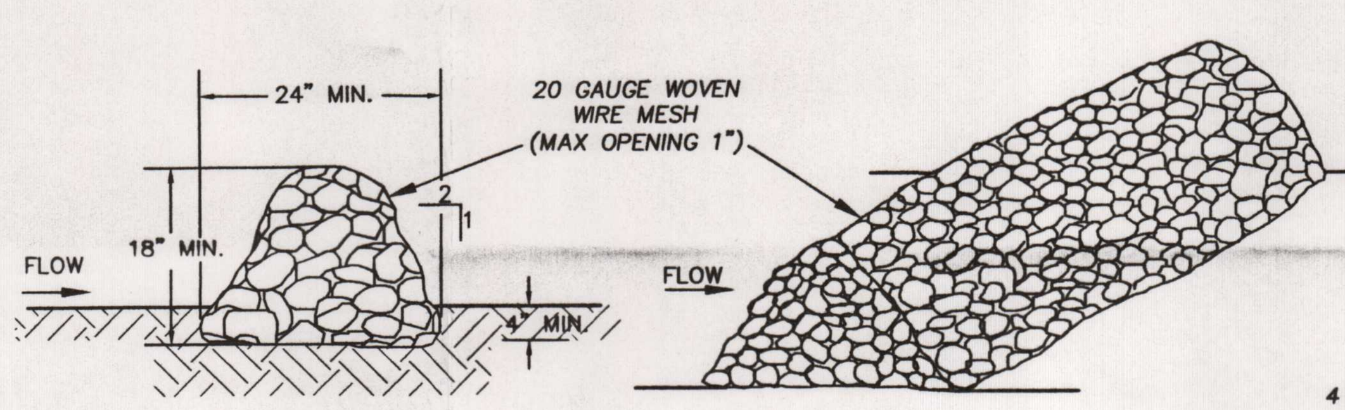
(Evaluation Points shown on Site Plan)



TYPICAL STREET SECTION

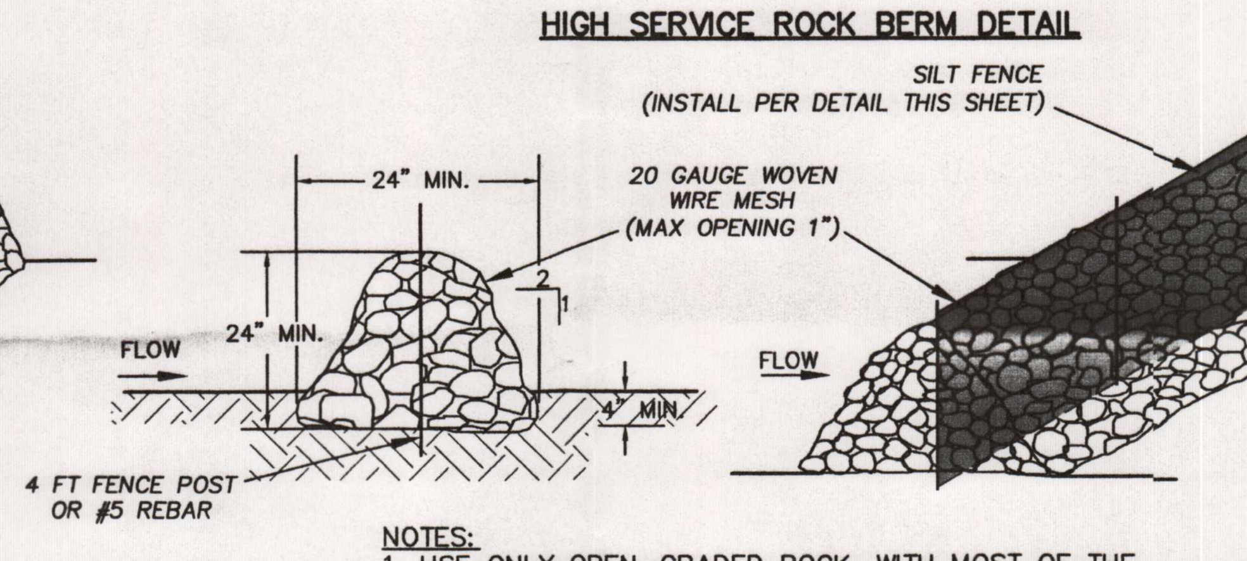
N.T.S.

ROCK BERM DETAIL



NOTES:
1. USE ONLY OPEN-GRADED ROCK, WITH MOST OF THE FINES REMOVED.
2. STONE SHALL BE CRUSHED AND, UNLESS OTHERWISE SPECIFIED, SHALL BE 3 TO 5 INCHES IN DIAMETER AND LESS THAN 1 CUBIC FOOT IN VOLUME.
3. THE ROCK BERM SHALL BE EMBEDDED INTO SOIL A MINIMUM OF 4 INCHES.
4. THE ROCK BERM SHALL BE INSPECTED AFTER EACH RAIN, AND THE STONE SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

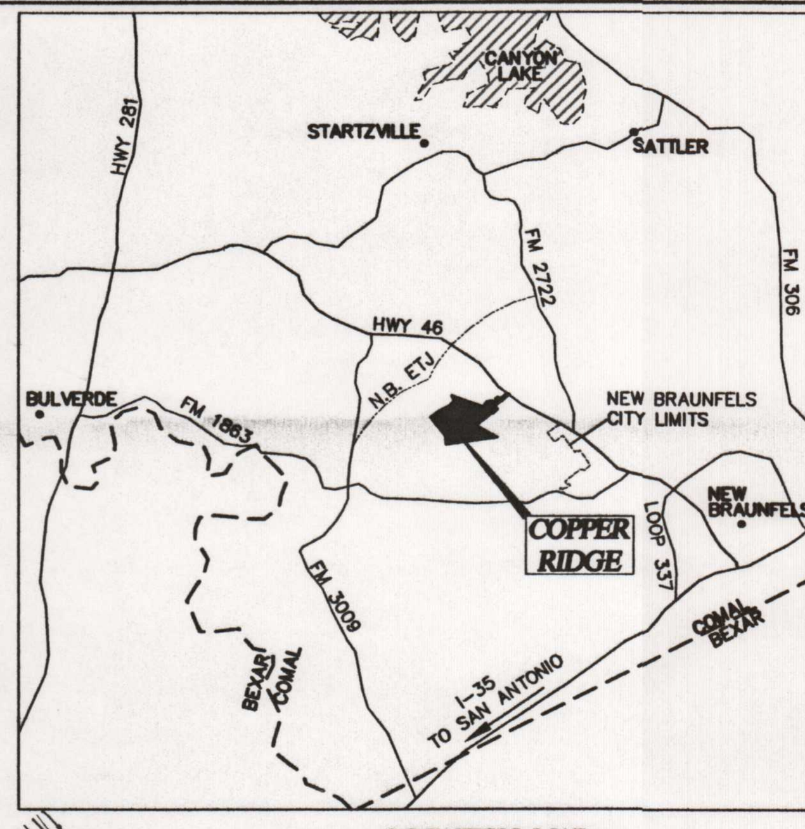
HIGH SERVICE ROCK BERM DETAIL



NOTES:
1. USE ONLY OPEN-GRADED ROCK, WITH MOST OF THE FINES REMOVED.
2. STONE SHALL BE CRUSHED AND, UNLESS OTHERWISE SPECIFIED, SHALL BE 3 TO 5 INCHES IN DIAMETER AND LESS THAN 1 CUBIC FOOT IN VOLUME.
3. THE ROCK BERM SHALL BE EMBEDDED INTO SOIL A MINIMUM OF 4 INCHES.
4. THE ROCK BERM SHALL BE INSPECTED AFTER EACH RAIN, AND THE STONE SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

Scale: 1" = 400'

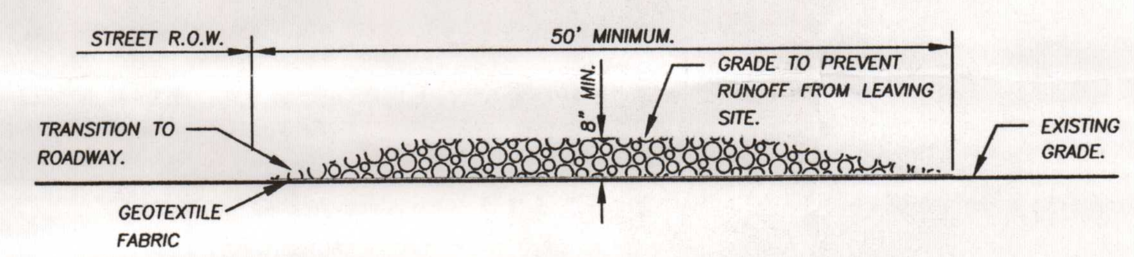
0 400 800 1200



LOCATION MAP

N.T.S.

STABILIZED CONSTRUCTION ENTRANCE



NOTES:
1. STONE SIZE SHALL BE 4" – 8" OPEN GRADED ROCK.
2. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8".
3. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS.
4. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR. AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

SAND BAG BERM DETAIL

CROSS SECTION

N.T.S.

PROFILE VIEW

N.T.S.

FIGURE FROM RG–348 SECTION 1.4.9 (TCEQ 2005)

NOTES:
1. WHEN A SAND BAG IS FILLED WITH MATERIAL, THE OPEN END OF THE SAND BAG SHOULD BE STAPLED OR TIED WITH NYLON OR POLY CORD.
2. SAND BAGS SHOULD BE STACKED IN AT LEAST THREE ROWS ABUTTING EACH OTHER, AND IN STAGGERED ARRANGEMENT.
3. THE BASE OF THE BERM SHOULD HAVE AT LEAST 3 SAN BAGS. THESE CAN BE REDUCED TO 2 TO 1 BAD IN THE SECOND AND THIRD ROWS RESPECTIVELY.
4. FOR EACH ADDITIONAL 6 INCHES OF HEIGHT, AN ADDITIONAL SAN BAG MUST BE ADDED TO EACH ROW WIDTH.

REFERENCE RG–348 SECTION 1.4.9 (TCEQ 2005) FOR INSTRUCTIONS REGARDING MATERIALS AND INSTALLATION.

LEGEND

1085	EXISTING 5' CONTOURS
	PROPOSED 1' CONTOURS
S-217	SENSITIVE FEATURE ID AS DENOTED ON THE 550 ACRE TRACT GEOLOGIC ASSESSMENT (FGS-E07212)
S-33	SENSITIVE FEATURE ID AS DENOTED ON THE 285 ACRE TRACT GEOLOGIC ASSESSMENT (FGS-E07260)
	CAVE
	WATER WELL
	FRACTURE
	SOIL DISTURBANCE AREA
	STABILIZED CONSTRUCTION ENTRANCE
	CONSTRUCTION STAGING AREA
	CONCRETE WASHOUT AREA
	ON-SITE 100-YEAR FEMA FLOODPLAIN
	SILT FENCE
	SAND BAG BERM
	FLOW ARROWS
	ROCK BERM
	HIGH SERVICE ROCK BERM
	BRUSH BERM

GENERAL NOTES:

1. A PART OF PROPERTY IS LOCATED IN THE 100 YEAR FLOOD ZONE ACCORDING TO F.I.R.M. PANEL NO. 4854630800C DATED SEPTEMBER 29, 1986.

2. ALL DISTURBED AREAS SHALL BE PERMANENTLY SEEDED OR OTHERWISE STABILIZED WITHIN 14 CALENDAR DAYS AFTER FINAL GRADING OR WHERE TEMPORARY CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 21 DAYS

3. CONSTRUCTION STAGING AREA SHALL BE CLEARED, GRADED AND REVEGETATED. THE AREA SHALL BE GREATER THAT 800 SQUARE FEET WITH NO SLOPE GREATER THAT 10%.

4. CONTRACTOR TO PROMOTE DRAINAGE AWAY FROM SENSITIVE FEATURES DURING CONSTRUCTION.

SILT FENCE DETAIL

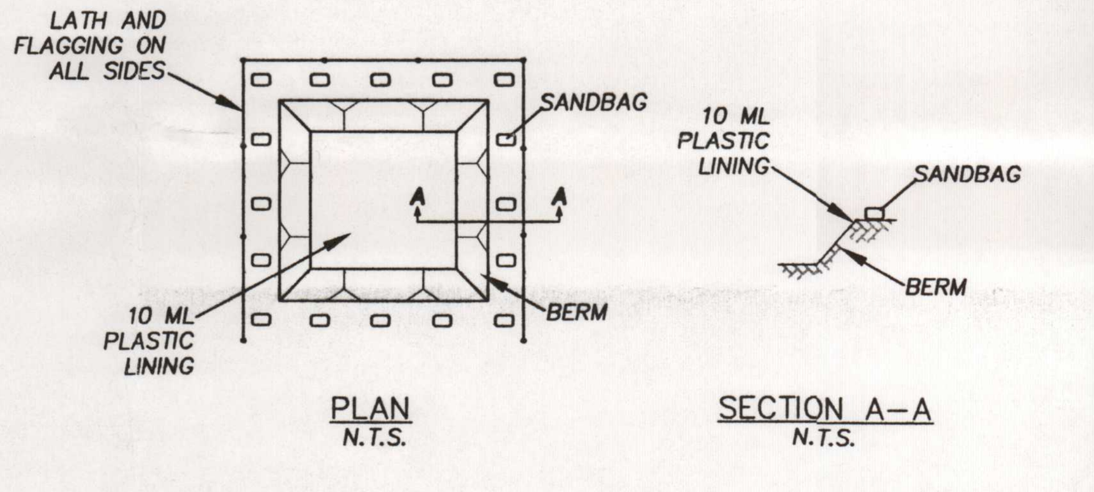
2"X2" WOOD POSTS OR STEEL POSTS, MAX. 8' SPACING WITH WIRE SUPPORT, 3' WITHOUT WIRE SUPPORT
SILT FENCE FABRIC
12 GA. MIN. WOVEN WIRE SUPPORT. EXTEND 2" INTO SOIL
24" MAX.
FLOW
MIN. 6"X6" TRENCH (BACKFILLED)

NOTES:
1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPEN– DICULAR TO THE LINE OF FLOW.
3. THE TRENCH SHOULD BE A MIN. OF 6" DEEP AND 6" WIDE TO ALLOW FOR THE SILT FENCE TO BE LAID IN THE GROUND AND BACKFILLED.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POSTS.

TEMPORARY OR PERMANENT VEGETATIVE SOIL STABILIZATION

NOTES:
1. INTERIM OR FINAL GRADING MUST BE COMPLETED PRIOR TO SEEDING, MINIMIZING ALL STEEP SLOPES.
2. SEEDBED SHOULD BE WELL PULVERIZED, LOOSE, AND UNIFORM.
3. FERTILIZER SHOULD BE APPLIED AT THE RATE OF 40 POUNDS OF NITROGEN AND 40 POUNDS OF PHOSPHORUS PER ACRE. COMPOST CAN BE USED INSTEAD OF FERTILIZER AND APPLIED AT THE SAME TIME AS THE SEED.

CONCRETE WASHOUT AREA DETAIL



PLAN N.T.S.

SECTION A–A N.T.S.

NOTES:
1. THE LINED WASHOUT PIT SHALL BE SUFFICIENTLY LARGE ENOUGH TO HOLD EXPECTED VOLUME OF WASHOUT MATERIAL.
2. WHEN FACILITY IS NO LONGER REQUIRED, HARDENED CONCRETE SHOULD PROPERLY REMOVED AND DISPOSED OF.
3. CONTRACTOR TO BACKFIELD PIT UPON REMOVAL OF LINING.

Rev.

MATKIN HOOVER
ENGINEERING & SURVEYING
P.O. BOX 54
8 SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE: 830.249.0600 FAX:830.249.0099
CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

WATER POLLUTION ABATEMENT PLAN

SITE PLAN FOR

COPPER RIDGE

NEW BRAUNFELS, TEXAS

JOB NO.	2289.01
DATE	OCT 2007
DESIGNED	GDK
CHECKED	ADH
SHEET	1 OF 1

Temporary Stormwater Section
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

REGULATED ENTITY NAME: Copper Ridge

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:

__ Aboveground storage tanks with a cumulative storage capacity of less that 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.

x Fuels and hazardous substances will not be stored on-site.

2. x **ATTACHMENT A - Spill Response Actions**. A description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is provided at the end of this form.

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

4. x **ATTACHMENT B - Potential Sources of Contamination.** Describe in an attachment at the end of this form any other activities or processes which may be a potential source of contamination.

__ The are no other potential sources of contamination.

SEQUENCE OF CONSTRUCTION

5. x **ATTACHMENT C - Sequence of Major Activities.** A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is provided at the end of this form. For each activity described, an estimate of the total area of the site to be disturbed by each activity is given.

6. x Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: tributary to Dry Comal Creek

TEMPORARY BEST MANAGEMENT PRACTICES (TBMPs)

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

7. _x_ **ATTACHMENT D - Temporary Best Management Practices and Measures.** A description of the TBMPs and measures that will be used during and after construction are provided at the end of this form. For each activity listed in the sequence of construction, include appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented.

_x_ 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 has been provided in the attachment at the end of this form

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

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

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

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

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 provided at the end of this form. The request includes justification as to why no reasonable and practicable alternative exists for each feature.

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

9. _x_ **ATTACHMENT F - Structural Practices.** Describe 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. Placement of structural practices in floodplains has been avoided.

10. _x_ **ATTACHMENT G - Drainage Area Map**. A drainage area map is provided at the end of this form to support the following requirements.

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

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

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

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

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 has 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 provided as at the end of this form.

12. x **ATTACHMENT I - Inspection and Maintenance for BMPs.** A plan for the inspection of temporary BMPs and measures and for their timely maintenance, repair, and, if necessary, retrofit is provided at the end of this form. A description of documentation procedures and recordkeeping practices is included in the plan.

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

14. x 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. x 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. x 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. x **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 at the end of this form.

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

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

ADMINISTRATIVE INFORMATION

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

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

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

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:

Allen Hoover
Print Name of Customer/Agent

Signature of Customer/Agent Date

COPPER RIDGE
SPILL RESPONSE ACTIONS

General Response Actions

1. All leaks and spills should be cleaned immediately.
2. Rags, mops, and absorbent material may all be used to cleanup a spill.
3. If these materials are used to clean a hazardous material, then they must be disposed of as hazardous waste.
4. Never hose down or bury dry material spills.

Minor Spills

If a minor spill occurs (typically small quantities of oil, gasoline, paint, etc.) the following actions should be taken.

1. Contain the spread of the spill
2. Recover spilled materials
3. Clean the contaminated area and properly dispose of contaminated materials

Semi-Significant Spills

If a semi-significant spill occurs the following actions should be taken.

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

If a significant or hazardous spill occurs in reportable quantities the following actions should be taken.

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 contactor should notify the National Response Center at 1-800-424-8802.
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.

COPPER RIDGE
POTENTIAL SOURCES OF CONTAMINATION

Potential sources of contamination that may occur are:

- Oil, grease, fuel, and hydraulic fluid from construction equipment and vehicle drippings
- Miscellaneous trash and litter from construction workers and material wrappings
- Construction debris
- Excess application of fertilizers, herbicides, and pesticides

Preventative measures that will be taken to reduce contamination are:

- Vehicle maintenance will be performed within the construction staging area
- Trash containers will be placed throughout the site to encourage proper trash disposal
- Construction debris will be monitored daily be the contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring immediate attention will be addressed on a case by case basis
- Fertilizers, herbicides, and pesticides will be applied only when necessary and in accordance with manufacturer's directions

COPPER RIDGE
SEQUENCE OF MAJOR ACTIVITIES

Phase I

1. Mobilization of the contractor's equipment. (2 acres disturbed)
2. Installation of phase one temporary best management practices as described in attachment "D" of this section (silt fence, rock berm, etc).
3. Construction of temporary sediment basin. (1.5 acres disturbed)
4. Construction of detention ponds (7.5 acres disturbed)
5. Trenching and installation of utilities. (5 acres disturbed)
6. Construction of roads. (29.8 acres disturbed)
7. Construction of park (3.5 acres disturbed)
8. Landscaping (3 acres disturbed)
9. Conversion on sediment basin to detention pond (1 acre disturbed)

Phase II

10. Installation of phase two temporary best management practices as described in attachment "D" of this section (silt fence, rock berm, etc).
11. Construction of temporary sediment basin. (1.7 acres disturbed)
12. Construction of detention pond (1.3 acres disturbed)
13. Trenching and installation of utilities. (4 acres disturbed)
14. Construction of roads. (23.8 acres disturbed)
15. Conversion on sediment basin to detention pond (1 acre disturbed)

Phase III

16. Installation of phase three temporary best management practices as described in attachment "D" of this section (silt fence, rock berm, etc).
17. Construction of detention pond (1.2 acres disturbed)
18. Trenching and installation of utilities. (4.2 acres disturbed)
19. Construction of roads. (25.1 acres disturbed)

a. All upgraidnet stormwater entering the site will be treated by the BMPs that will prevent pollution of surface water or groundwater that originates on-site or flows off site. See a list of these BMPs in section "b."

b. The BMPs that will prevent pollution of surface water or groundwater that originates on-site or flows off site are:

i. **Temporary Construction Entrance/Exit** – The installation of a stabilized construction entrance/exit will reduce the dispersion of sediment from the site. See Exhibit 1 of this application which is a copy of Section 1.4.2 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

ii. **Silt Fence** – The erection of silt fence along the boundary of construction activities will provide temporary erosion and sedimentation control. See Exhibit 2 of this application which is a copy of Section 1.4.3 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

iii. **Rock Berm** – The use of rock berms throughout the site will provide temporary erosion and sedimentation control. See Exhibit 3 of this application which is a copy of Section 1.4.5 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

iv. **High Service Rock Berm** – The use of a high service rock berm in environmentally sensitive areas of this site will provide temporary erosion and sedimentation control. See Exhibit 4 of this application which is a copy of Section 1.4.6 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

v. **Sand Bag Berm** – The use of sand bag berms, within major lows on site, will intercept sediment-laden water from construction in stream beds, create a retention pond, detain sediment and release water in sheet flow. See Exhibit 5 of this application which is a copy of Section 1.4.9 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

vi. **Sediment basin** – Sediment basins will intercept sediment-laden water from construction and trap the sediment to provide temporary sediment control. See Exhibit 6 of this application which is a copy of Section 1.4.13 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

vii. **Concrete Truck Washout Pit** – A concrete truck washout pit aids in the final cleanup and prevents unnecessary discharge of concrete residue from contaminating the storm water runoff. See Exhibit 7 of this application which is a copy of Section 1.4.18 from the Edwards Aquifer Rules: Technical Guidance on Best Management Practices for materials, installation, common trouble points, inspection and maintenance.

c. Silt fence and high service rock berm (see section "b") will be used to prevent sediment-laden runoff from entering sensitive features on this site.

d. The flow to the natural sensitive features on this site, to a maximum practical extent, will not be disturbed. No clearing, excavation or grading will occur within the buffer zone of the sensitive feature. If another naturally-occurring sensitive feature is identified during construction all activity will be stopped and the contractor should notify TCEQ.

COPPER RIDGE
STRUCTURAL PRACTICES

Structural practices installed to prevent the runoff of pollutants from exposed areas of the site are:

- Silt fence
- Stabilized Construction Entrance/Exit
- Concrete Truck Washout Pit
- Rock Berm
- High service Rock Berm
- Sandbag Berm
- Sediment Basin

These structural practices will not be installed in the flood plain.

LEGEND

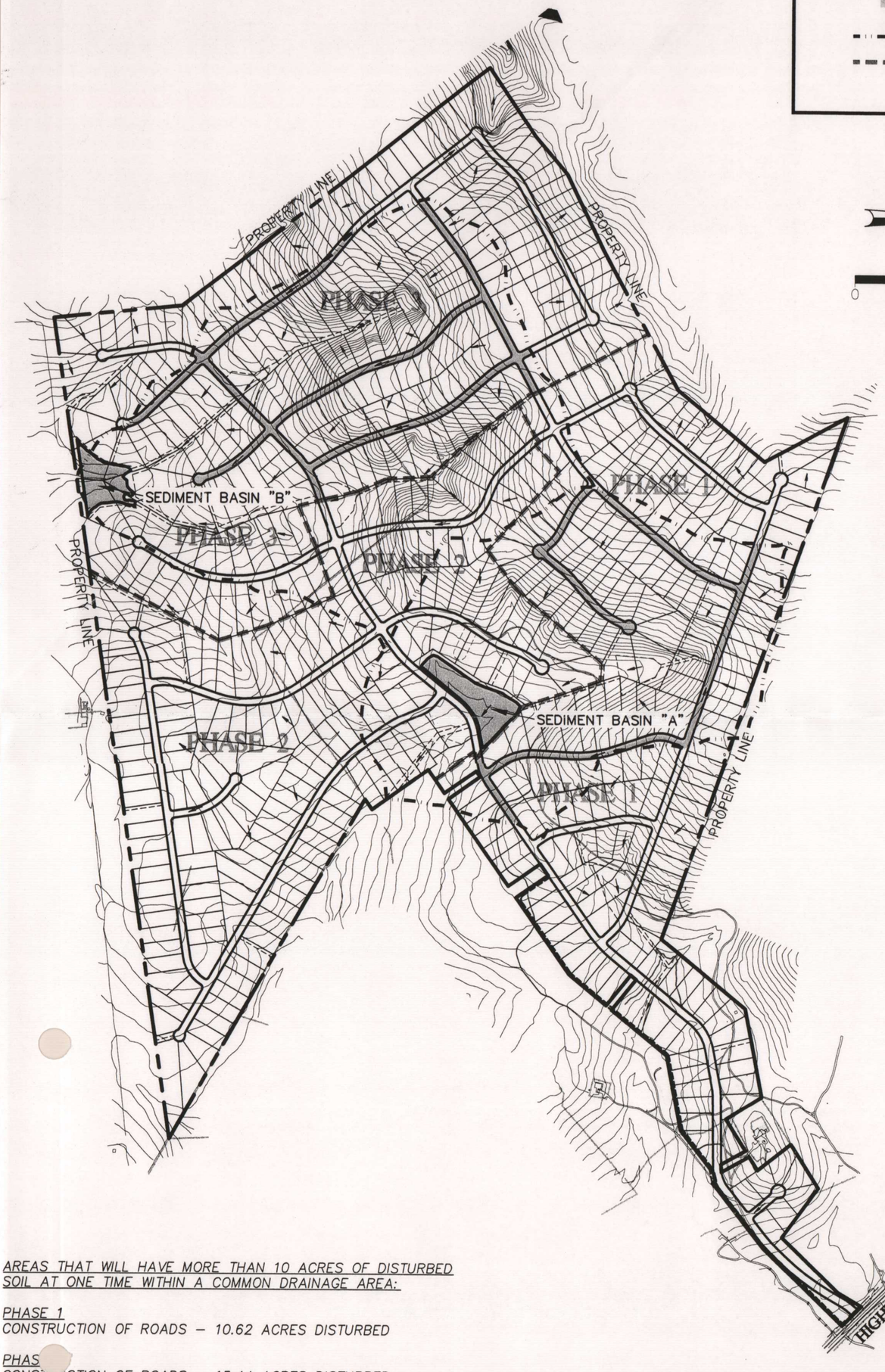
EXISTING 5' CONTOURS

SOIL DISTURBANCE AREA

DRAINAGE AREA

PHASE LINES

FLOW ARROWS



SCALE: 1"=1000'

0 500 1000 1500 2000

AREAS THAT WILL HAVE MORE THAN 10 ACRES OF DISTURBED SOIL AT ONE TIME WITHIN A COMMON DRAINAGE AREA:

PHASE 1
CONSTRUCTION OF ROADS – 10.62 ACRES DISTURBED

PHASE 2
CONSTRUCTION OF ROADS – 15.44 ACRES DISTURBED

(FOR ALL DISTURBED AREA QUANTITIES, SEE ATTACHMENT "C" OF THE TEMPORARY STORMWATER SECTION.)

ATTACHMENT "G"

WATER POLLUTION ABATEMENT PLAN

DRAINAGE AREA MAP

FOR

COPPER RIDGE

NEW BRAUNFELS, TEXAS

MATKINHOOVER ENGINEERING & SURVEYING

P.O. BOX 54
8 SPENCER ROAD SUITE 100
BOERNE, TEXAS 78006
OFFICE: 830.249.0600 FAX:830.249.0099

CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

MATKINHOOVER
ENGINEERING
& SURVEYING

Basin "B"

- Max disturbed Area = 15.44 acres
- Comal County two-year, 24-hour rainfall depth = 3.7in

Required storage Volume

$$= (15.44 \text{ acres}) \times (3.7 \text{ in}) \times \left(\frac{43560 \text{ ft}^2}{1 \text{ ac}}\right) \times \left(\frac{1 \text{ ft}}{12 \text{ in}}\right)$$

$$= 207,574 \text{ ft}^3$$

Riser

- two-year, 3-hour Flow = 136 cfs

$Q = 4.8 A H^{.5}$ (orifice equation)

$(136.09 \text{ cfs}) = 4.8 A\sqrt{T}$

$A = 28.3 \text{ ft}^2$

$A = \pi R^2$ (area of a circle)

$28.4 \text{ ft}^2 = \pi R^2$

$R = 3.0 \text{ ft} = 36 \text{ in}$ radius

72 in diameter

Use 72in CMP

Perforation

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

Attachment "L"

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ENGINEERING
& SURVEYING

$$A_o = \frac{(90,871\ ft^2)\sqrt{2\,(4)}}{0.6 \times 780,000} = .437\ ft^2 = 63 in^2$$

(1) 3" ϕ hole area = 7.07 in^2

Use 9, 3-in diameter holes at 948'

Emergency Spillway

- ten-year, 3-hour Flow = 310.25 cfs
- Flow carried by Riser = $4.8(28.3\ ft^2)\sqrt{1}$
  = 136 cfs
- Required Spillway Flow = 310.25 − 136 = 174.25 cf

Weir length $L = \frac{Q}{3.0\ H^{3/2}} = \frac{174.25\ cfs}{(3.0)(1^{3/2})}$

$L = 58\ ft$

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& SURVEYING

$$A_o = \frac{(41{,}206\ ft^2)\sqrt{2\,(2.5)}}{0.6 \times 980{,}000} = .157\ ft^2 = 22.5\ in^2$$

(1) 2" ϕ hole area = 3.14 in^2

Use 8, 2-in diameter holes at 1017.25 ft

Emergency Spillway

- ten-year, 3-hour Flow = 172.42 cfs
- Flow carried by riser = 4.8 (15.90)($\sqrt{1}$)
  = 76.34 cfs

Required spillway flow = 172.42 − 76.34
= 96.07 cfs

Weir length, $L = \frac{Q}{3.0\ H^{3/2}} = \frac{96.07}{(3.0)(1^{3/2})}$

L = 32 ft

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Attachment "H

MATKINHOOVER
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Temporary Sediment Basin Calculations

Basin "A"

- Max disturbed area = 10.62 acres
- Comal County two-year, 24-hour rainfall depth = 3.7 in

Required Storage Volume

$$= (10.62 \text{ acres}) \times (3.7 \text{ in}) \times \left(\frac{43560 \text{ Ft}^2}{1 \text{ acres}}\right) \times \left(\frac{1 \text{ Ft}}{12 \text{ in}}\right)$$

$$= 142,637 \text{ Ft}^3$$

Riser

- two-year, 3-hour flow = 72.52 cfs

$Q = 4.8 A H^{.5}$ (orifice equation)

$(72.52 \text{ cfs}) = (4.8) A (\sqrt{1 \text{ Ft}})$

$A = 15.12 \text{ Ft}^2$

$A = \pi R^2$ (area of a circle)

$15.12 \text{ Ft}^2 = \pi R^2$

$R = 2.19 \text{ Ft} = 26 \text{ in}$ radius

$= 52 \text{ in}$ diameter

Use 54 in CMP

Perforation

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

COPPER RIDGE
INSPECTION AND MAINTENANCE FOR BMPs

Designated and qualified person(s) shall inspect Pollution Control Measures every seven days and within 24 hours after a storm event greater than 0.5 inches of rainfall. An inspection report that summarized the scope of the inspection, names and qualifications of personnel conducting the inspection, date of inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of the Storm Water T.P.D.E.S. Plan. A copy of the inspection report form is provided as page 2 of this attachment.

Inspection and Maintenance Guidelines:

Construction Entrance:

(1) The entrance should be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment.
(2) All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor.
(3) When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way.
(4) When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
(5) All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

Silt Fence:

(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.

COPPER RIDGE
INSPECTION AND MAINTENANCE FOR BMPs

Sediment Basin:

(1) Inspection should be made weekly and after each rainfall. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Repair should be made promptly as needed by the contractor.
(2) Trash and other debris should be removed after each rainfall to prevent clogging of the outlet structure.
(3) Accumulated silt should be removed and the basin should be re-graded to its original dimensions at such point that the capacity of the impoundment has been reduced to 75% of its original storage capacity.
(4) The removed sediment should be stockpiled or redistributed in areas that are protected from erosion.

Sandbag Berm:

(1) The sand bag berm should be inspected weekly and after each rain.
(2) The sandbags should be reshaped or replaced as needed during inspection.
(3) When the silt reaches 6 inches, the accumulated silt should be removed and disposed of at an approved site in a manner that will not contribute to additional siltation.
(4) The sandbag berm should be left in place until all upstream areas are stabilized and accumulated silt removed; removal should be done by hand.

Rock Berm:

(1) Inspection should be made weekly and after each rainfall by the responsible party. For installations in streambeds, additional daily inspections should be made.
(2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved manner that will not cause any additional siltation.
(3) Repair any loose wire sheathing.
(4) The berm should be reshaped as needed during inspection.
(5) The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.
(6) The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

Temporary/Permanent Vegetation:

(1) Permanent vegetation should be inspected weekly and after each rain event to locate and repair any erosion.

(2) Erosion from storms or other damage should be repaired as soon as practical by regrading the area and applying new seed.

(3) If the vegetated cover is less than 80%, the area should be reseeded.

COPPER RIDGE
INSPECTION AND MAINTENANCE FOR BMPs

INSPECTION REPORT

Approved Inspection intervals:

i. Conducted once every 7 days AND within 24 hours after rainfall event greater than 0.5 inch

PROJECT NAME _____
REPORT # _____ DATE _____
INSPECTOR _____ TITLE _____
REASON FOR INSPECTION (CHECK ONE) Weekly ____ Or ½" Rain ____
DATE OF LAST RAINFALL _____ AMOUNT _____

SITE CONDITIONS:

EROSION AND SEDIMENTATION CONTROLS	IN CONFORMANCE	EFFECTIVE
Concrete Washout Area		
Construction Entrance	Yes/No/Na	Yes/No
Permanent Vegetation	Yes/No/Na	Yes/No
Silt Fence	Yes/No/Na	Yes/No
Sediment Basin	Yes/No/Na	Yes/No
Sandbag Berm	Yes/No/Na	Yes/No
Rock Filter Berm	Yes/No/Na	Yes/No

RECOMMENDED REMEDIAL ACTIONS:

COMMENTS:

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

INSPECTOR: _____ DATE: _____

COPPER RIDGE
SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

Soil stabilization practices will be used to reduce the amount of erosion from the site. Only the areas essential for immediate construction should be cleared. This will keep a buffer zone around the area of construction as these areas will remain undisturbed until construction begins there.

Interim soil stabilization areas are determined in the field. Temporary vegetation will be used as an aid to control erosion on critical sites during establishment period of protective vegetation when construction is temporarily ceased.

Permanent soil stabilization areas are indicated on the included Site Plan. Permanent seeding will take place in these areas when construction is permanently ceased.

Stabilization practices should be installed according to the following rules:

- Stabilization measures shall be initiated as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

- Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by weather conditions, stabilization measures shall be initiated as soon as practical.

- In areas experiencing droughts where the initiation of stabilization measure 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 practical.

Permanent Stormwater Section
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

REGULATED ENTITY NAME: Copper Ridge

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

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

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

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

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

3. X 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.

4. x 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.

   x This site will be used for low density single-family residential development and has 20% or less impervious cover.

   __ This site will be used for low density single-family residential development but has more than 20% impervious cover.

   __ This site will not be used for low density single-family residential development.

5. x 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.** This 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 found at the end of this form.

___ This site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.

_x_ This site will not be used for multi-family residential developments, schools, or small business sites.

6. **ATTACHMENT B - BMPs for Upgradient Stormwater.**

_x_ 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 identified as **ATTACHMENT B** at the end of this form.

___ If no surface water, groundwater or stormwater originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT B** at the end of this form.

___ If 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, an explanation is provided as **ATTACHMENT B** at the end of this form.

7. **ATTACHMENT C - BMPs for On-site Stormwater.**

_x_ 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 identified as **ATTACHMENT C** at the end of this form.

___ If 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, an explanation is provided as **ATTACHMENT C** at the end of this form.

8. _x_ **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 provided at the end of this form. Each feature identified in the Geologic Assessment as "sensitive" or "possibly sensitive" has been addressed.

9. _x_ 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.

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

occurring "sensitive" or "possibly sensitive" features on this site.

___ **ATTACHMENT E - Request to Seal Features.** A request to seal a naturally-occurring "sensitive" or "possibly sensitive" feature, that includes a justification as to why no reasonable and practicable alternative exists, is found at the end of this form. A request and justification has been provided for each feature.

10. N/A **ATTACHMENT F - Construction Plans.** Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information have been signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed permanent BMPs and measures are provided at the end of this form. Design Calculations, TCEQ Construction Notes, all man-made or naturally occurring geologic features, all proposed structural measures, and appropriate details must be shown on the construction plans.

11. x **ATTACHMENT G - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is provided at the end of this form. The plan has been prepared and certified by the engineer designing the permanent BMPs and measures. The plan has been signed by the owner or responsible party. The plan includes procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofits as well as a discussion of record keeping procedures.

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

___ Pilot-scale field testing (including water quality monitoring) may be required for BMPs that are not contained in technical guidance recognized by or prepared by the executive director.

___ **ATTACHMENT H - Pilot-Scale Field Testing Plan.** A plan for pilot-scale field testing is provided at the end of this form.

13. x **ATTACHMENT I -Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is provided at the end of this form. 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.

Responsibility for maintenance of permanent BMPs and measures after construction is complete.

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

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

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:

Allen Hoover
Print Name of Customer/Agent

Signature of Customer/Agent Date

COPPER RIDGE
BMPs FOR UPGRAIDENT STORMWATER

All water wells identified in the geologic assessment will be properly plugged and abandoned per TCEQ requirements (30 TAC §238) to prevent pollution in groundwater. Sensitive features "S-25", "S-39", and "S-217" will have permanent buffer zones within their drainage area where pre-existing soil structure and vegetation will be used to prevent pollution from stormwater that originates upgraidient of from this site and flows across the site from entering the feature. Because the buffer zone of "S-25" (Cave) lies within two residential lots, a permanent fence will be constructed around the buffer zone to prevent conventional landscaping and maintain its natural state.

ATTACHMENT "B"

COPPER RIDGE
BMPs FOR ON-SITE STORMWATER

All water wells identified in the geologic assessment will be properly plugged and abandoned per TCEQ requirements (30 TAC §238) to prevent pollution in groundwater. Sensitive features "S-25", "S-39", and "S-217" will have permanent buffer zones within their drainage area where pre-existing soil structure and vegetation will be used to prevent pollution from stormwater that originates on-site from entering the feature. Because the buffer zone of "S-25" (Cave) lies within two residential lots, a permanent fence will be constructed around the buffer zone to prevent conventional landscaping and maintain its natural state.

ATTACHMENT "C"

COPPER RIDGE
BMPs FOR SURFACE STREAMS

Permanent measures will be taken that prevent pollutants in storm water runoff from entering sensitive features. Below is a list of the measure taken for each sensitive feature.

Sensitive Feature ID as denoted on the 550 acre tract geologic assessment (FGS-E07212)

S-25: This existing cave will have a permanent 200 foot buffer zone within its drainage area where pre-existing soil structure and vegetation will be used to prevent pollution of stormwater from this site from entering the feature. Because the buffer zone lies within two residential lots, a permanent fence will be constructed around the buffer zone to prevent conventional landscaping and maintain its natural state.

S-30: This existing water wells will be properly plugged and abandoned per TCEQ requirements (30 TAC §238).

S-31: This existing water wells will be properly plugged and abandoned per TCEQ requirements (30 TAC §238).

S-39: This existing fracture will have a permanent 200 foot buffer zone within its drainage area where pre-existing soil structure and vegetation will be used to prevent pollution of stormwater from this site from entering the feature.

S-217: This existing fault generally parallels a low, which has 685 acres of drainage area. Even though the geologist has rated this feature with a high sensitivity, no visible signs of recharging appear to be present through this section of the property. It can also be seen from the geologic map and the overall site plan that a road crossing at this location is imperative as this is the only access point to the proposed subdivision. As for permanent protection outside of the road section the owner is placing a 50' buffer on each side of the fault as it bisect the subject tract where pre-existing soil structure and vegetation will be used to prevent pollution in stormwater from entering the feature

Sensitive Feature ID as denoted on the 285 acre tract geologic assessment (FGS-E07260)

S-33: This existing water wells will be properly plugged and abandoned per TCEQ requirements (30 TAC §238).

COPPER RIDGE
INSPECTION AND MAINTENANCE PLAN

The owner is aware of their maintenance obligation and agrees to keep accurate records of the maintenance of the sensitive feature buffer zones. These records are to include the name and address of parties performing the maintenance, dates and duration of maintenance, and any problems encountered with the functioning of the buffer zone.

See the attached Inspection and Maintenance Plan for specific details of this program.

ATTACHMENT "G"

ATTACHMENT G – INSPECTION AND MAINTENANCE PLAN

NAME OF PROPOSED PROJECT: **Copper Ridge**
PROJECT LOCATION: **New Braunfels, Texas**
NAME OF APPLICANT: **Southerland Communities**
APPLICANT'S ADDRESS: **9670 Ranch Road Wimberley, Texas 78676**
CONTACT PERSON: **Chris McMonagle** PHONE: **(512) 847-5263**

SENSITIVE FEATURE BUFFER ZONES

Sensitive feature buffer zones must be inspected at least once per year. With each inspection, any damage to the barrier of the buffer zone (fence, etc.) must be identified and repaired immediately. Any degradation of the natural vegetation within the buffer zone must be identified and measure should be taken to prevent further degradation.

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

I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule

_____ _____
Owner Date

COPPER RIDGE
MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

Contamination of surface streams will be kept at a minimum during construction by implementing temporary BMPs such as silt fencing and rock berms. Further BMPs are discussed in the temporary section. Before construction, a temporary sediment basin will be used to reduce pollution and minimize surface stream contamination. This development will utilize detention ponds to reduce increased stormwater runnoff flows to pre-developed conditions, therefore stream flashing, flows, and velocities will not increase as a result of this development.

ATTACHMENT "I"

TCEQ Core Data Form

TCEQ Use Only

If you have questions on how to fill out this form or about our Central Registry, please contact us at 512-239-5175.

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

SECTION I: General Information

1. Reason for Submission *Example: new wastewater permit; IHW registration; change in customer information; etc.*
Water Pollution Abatement Plan Submittal

2. Attachments ☑ Yes ☐ No
Describe Any Attachments: *(ex: Title V Application, Waste Transporter Application, etc.)*

3. Customer Reference Number-*if issued*
CN *(9 digits)*

4. Regulated Entity Reference Number-*if issued*
RN *(9 digits)*

SECTION II: Customer Information

5. 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 and Operator
☐ Occupational Licensee ☐ Volunteer Cleanup Applicant ☐ Other: _____

TCEQ Use Only ☐ Superfund ☐ PST ☐ Respondent

6. General Customer Information
☑ New Customer ☐ Change to Customer Information ☐ Change in Regulated Entity Ownership ☐ No Change*
*If "No Change" and Section I is complete, skip to Section III - Regulated Entity Information.

7. Type of Customer: ☐ Individual ☐ Sole Proprietorship - D.B.A. ☐ Partnership ☑ Corporation
☐ Federal Government ☐ State Government ☐ County Government ☐ City Government
☐ Other Government _____ ☐ Other _____

8. Customer Name *(If an individual, please print last name first)* *If new name, enter previous name:*
Southerland Communities

9. Mailing Address: **9670 Ranch Road 12**

City	State	ZIP	ZIP + 4
Wimberley	**TX**	**78676**	**5238**

10. Country Mailing Information *if outside USA*

11. E-Mail Address *if applicable*
christophmcmonagle@sbcglobal.net

12. Telephone Number
(512) 847 - 5263

13. Extension or Code

14. Fax Number *if applicable*
(512) 847 - 3690

15. Federal Tax ID *(9 digits)*

16. State Franchise Tax ID Number *if applicable*

17. DUNS Number *if applicable (9 digits)*

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

19. Independently Owned and Operated?
☑ YES ☐ NO

SECTION III: Regulated Entity Information

20. General Regulated Entity Information
☑ New Regulated Entity ☐ Change to Regulated Entity Information ☐ No Change*
*If "No Change" and Section I is complete, skip to Section IV - Preparer Information.

21. Regulated Entity Name *(If an individual, please print last name first)*
Copper Ridge

22. Street Address:			
(No P.O. Boxes)			
City: New Braunfels	State: TX	ZIP:	ZIP + 4:
23. Mailing Address: 9670 Ranch Road 12			
City: Wimberley	State: TX	ZIP: 78676	ZIP + 4: 5238

24. E-Mail Address: christophmcmonagle@sbcglobal.net

25. Telephone Number	26. Extension or Code	27. Fax Number *if applicable*
(512) 847 - 5263		(512) 847 - 3690

28. Primary SIC Code *(4 digits)*	29. Secondary SIC Code *(4 digits)*	30. Primary NAICS Code *(5 or 6 digits)*	31. Secondary NAICS Code *(5 or 6 digits)*

32. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*
Single family residential

Questions 33 - 37 address geographic location. Please refer to the instructions for applicability.

33. County: Comal

34. Description of Physical Location
The site is located on the west side of Highway 46, 2 miles West of FM 2722.

35. Nearest City	State	Nearest ZIP
New Braunfels	TX	78132

36. Latitude (N)			37. Longitude (W)		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	44	35	98	15	9

38. TCEQ Programs In Which This Regulated Entity Participates *Not all programs have been listed. Please add to this list as needed. If you don't know or are unsure, please mark "unknown."*

☐ Animal Feeding Operation	☐ Petroleum Storage Tank	☐ Water Rights
☐ Title V – Air	☐ Wastewater Permit	☑ EAPP
☐ Industrial & Hazardous Waste	☐ Water Districts	☐
☐ Municipal Solid Waste	☐ Water Utilities	☐ Unknown
☐ New Source Review - Air	☐ Licensing - TYPE(s)	

SECTION IV: Preparer Information

39. Name	40. Title
Allen Hoover	Project Manager

41. Telephone Number	42. Extension or Code	43. Fax Number *if applicable*
(830) 249 - 0600		(830) 249 - 0099

44. E-Mail Address: allenh@matkinhoover.com