TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 4, 2010

Mr. Richard N. Maier
Continental Homes of Texas, L.P.
12554 Riata Vista Circle, 2nd Floor
Austin, Texas 78727-7165

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Community Center Manor Creek; located approximately 2 miles west of Loop 337 on the northeast side of SH State Highway 46; New Braunfels, Texas
TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer;
EAPP File No: 2439.04; Investigation No. 792433; Regulated Entity No. RN105881080

Dear Mr. Maier:

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 The Shultz Group, Inc. on behalf of Continental Homes of Texas, L.P. on February 12, 2010. Final review of the WPAP was completed after additional material was received on April 19, 2010 and May 3, 2010. 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.*

BACKGROUND

The above referenced site is to be a community center within the Manor Creek Subdivision. Manor Creek Subdivision was previously approved by letter dated April 4, 2006 and subsequently modified by letter dated April 5, 2010. The 266.92 acre subdivision was approved for 340 single-family residential lots, roads, and utilities. The impervious cover was approved to be 53.141 acres (19.91 percent).

PROJECT DESCRIPTION

The proposed commercial project will have an area of approximately 1.08 acres. It will include the construction of a community pool, restroom facility, storage building, parking lot, and associated utilities. The impervious cover will be 0.318 acres (29.4 percent). Project wastewater will be disposed of by conveyance to the existing Gruene Road Wastewater Treatment Plant owned by New Braunfels Utilities.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, engineered vegetated filter strips and one sedimentation/filtration basin, designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 285 pounds of TSS generated from the 0.318 acres of impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project. The individual treatment measures are described in the table below.

Table 1: BMP Summary

Partial Sedimentation/Filtration Basin[1]

Drainage Area	Total Area (ac)	Impervious Cover (ac)	Calc. run-off depth (in)	Req. WQV (ft^3)	Design WQV (ft^3)	Req. sand filter area (ft^2)	Design sand filter area (ft^2)	Req. TSS Removal (lb/yr)	Design TSS Removal (lb/yr)
C	0.218	0.155	3	1,472	1,526	123	144	139	154

Engineered Vegetated Filter Strips[2]

Drainage Area	Total Area (ac)	Impervious Cover (ac)	---	Calc. TSS Removal	Design TSS Removal
A	0.524	0.06	---	54	54
B	0.309	0.086	---	77	77

Uncaptured Area[3]

Drainage Area	Total Area (ac)	Impervious Cover (ac)	---	Calc. TSS Removal	Design TSS Removal
D	0.03	0.017	---	15	---
Site Total	1.08	0.318	---	285	285

1. The filtration system for the basin will consist of:
   - Washed concrete sand (ASTM C-33), which is 18 inches thick,
   - an underdrain piping system covered with a minimum two inch gravel layer, and
   - a concrete liner. (Please note the entire basin will utilize a concrete liner)
2. The engineered vegetated filter ftrips will be constructed in accordance with RG-348's (2005, ed.) engineered vegetated filter strip design criteria.
3. The single chamber sedimentation/filtration basin has been oversized to account for the TSS loading generated from the access drive.

GEOLOGY

According to the geologic assessment included with the application, the site is located within the Edwards Aquifer recharge zone. Reddish-brown and dark brown stony clay soils reportedly overlie limestone of the Person Formation of the Edwards Group. No geologic or man-made features were reported within the community center site. The San Antonio Regional Office site assessment conducted on April 7, 2010 revealed no additional features and that the site is generally as described by geologic assessment.

SPECIAL CONDITIONS

I. All permanent pollution abatement measures shall be operational prior to occupancy of the facility.

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

STANDARD CONDITIONS

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

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

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

Prior to Commencement of Construction:

4. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.

5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.

6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of

appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.

7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.

8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

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

<u>During Construction</u>:

10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.

11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.

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

13. Zero wells exist on-site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.

14. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.

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

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

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

After Completion of Construction:

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

19. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.

21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.

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

If you have any questions or require additional information, please contact Javier Anguiano of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4019.

Sincerely,

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

MRV/JA/eg

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

cc: Mr. Michael G. Short, P.E., The Shultz Group
Mr. James C. Klien, P.E., City of New Braunfels
Mr. Thomas H. Hornseth, P.E., Comal County
Mr. Karl J. Dreher, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC 212

COMMUNITY CENTER MANOR CREEK

WATER POLLUTION ABATEMENT PLAN MODIFICATION

February 2010

Prepared for:

Continental Homes of Texas, LP
12554 Riata Circle, 2nd Floor
Austin, Texas 78727

Project No. 110309

Prepared By:

The Schultz Group Inc.
2461 Loop 337
New Braunfels, TX 78130
(830) 606-3913

THE Schultz Group INC.

P.O. BOX 310483 • NEW BRAUNFELS, TX 78131-0483 • Phone: (830) 606-3913 • Fax: (830) 625-2204

April 19, 2010

Mr. Javier Anguiano
EAPP/San Antonio Region
Texas Commission of Environmental Quality
14250 Judson Rd.
San Antonio, TX 78233-4480

Re: Edwards Aquifer Protection Program, Comal County
TYPE OF PLAN: Modification of an Approved Water Pollution Abatement Plan
NAME OF PROJECT: Community Center Manor Creek

Javier Anguiano:

On April 6, 2010 The Schultz Group, Inc. received an Administrative Deficiency Notice from your office. To the best of our knowledge we have corrected all deficiencies in the following manner:

Responses to Deficiencies

1. Item 11, Attachment G –Pest control language from Section RG-348 from the Edwards Aquifer Technical Guidance Manual has been included in this attachment.

2. Runoff from the rooftops of the structures shown will flow onto decorative rock splash pad before draining to the vegetative filter strips or to the adjacent parking lot.

3. Stormwater runoff from the driveway and parking area will no longer enter a vegetative filter strip. Runoff from these areas will be directed by stand up curb, grading, and a trench drain to a partial sediment/sand filter system.

4. Runoff from the driveway, parking areas, and a portion of the sidewalks has been revised to flow into a sand filter system. Approximately 741 SF of new impervious cover common to drive draining to Hamburg Avenue in Drainage area D (See Drainage Area Plan) will not be captured for treatment and will be accounted for by overtreatment by the sand filter system.

   The stormwater within Drainage Area C will overland flow down the parking lot and into a grate inlet. It will then flow into the sand filter system via 1~8" PVC pipe. Stormwater flows greater than the 25-year storm event will (weir) flow over the grate inlet and continue down the driveway. The sand filter system has been designed in accordance with the TCEQ's Complying with Edwards Aquifer Rules Technical Guidance on Best Management Practices (July 2005).

   The sand filter system (See Sheet P1 as Provided) basin has been sized to capture the first 3.00 inches of stormwater run-off from 0.155 acres of impervious cover within a 0.218 acre catchment area (Drainage Area D), providing a total capture volume of 1,526 cubic feet where only 1,472 cubic feet is needed to treat 139 pounds of total suspended solids. A sand filtration system will consist of 144 square feet of sand, 18 inches thick, with under drain piping surrounded by gravel. Sand and gravel layers will be separated with filter fabric and contained above an impermeable concrete liner.

Additional Items Changed

1. The flush curb surrounding the drive and parking areas has been changed to standup curb, to keep flows within these areas and to direct flows into the sand filter system.

2. A bicycle rack pad area has been added.

3. As a result of the changes made, various TCEQ forms and attachments have been revised and are included.

If the TCEQ has any questions or requires additional information please don't hesitate to contact us.

Thank you,

Mike Short, P.E.
Senior Design Engineer
The Schultz Group, Inc.
Phone: (830) 606-3913
Fax: (830) 625-2204

4/16/10

TCEQ
Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: April 6, 2010 NUMBER OF PAGES *(including this cover sheet):* 3

TO: Name **Michael G. Short, P.E.**
Organization **The Shultz Group, Inc.**
FAX Number **830/625-2204**

TO: Name **Richard N. Maler**
Organization **Continental Homes of Texas, L.P.**
FAX Number **512/533-1429**

FROM: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Name **Javier Angulano**
Division/Region **EAPP/San Antonio**
Telephone Number **210/403-4019**
FAX Number **210/545-4329**

NOTES:

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Community Center Manor Creek; located approximately 2 miles west of Loop 337 on the northeast side of SH State Highway 46; New Braunfels, Texas
TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAPMOD); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer;
Edwards Aquifer Protection Program ID No. 2439.04; Investigation No. 792433; Regulated Entity No. RN105881080

Dear Mr. Short:

We are in the process of technically reviewing the WPAPMOD application you submitted for the above-referenced project. Before we can proceed with our review, the following comments relating to the application must be addressed:

TCEQ-0600 Concerns:

1. Item 11, Attachment G; Include the language found in Edwards Aquifer Technical Guidance manual (RG-348), Section 3.5.8, on pest management.

Site Plan Concerns:

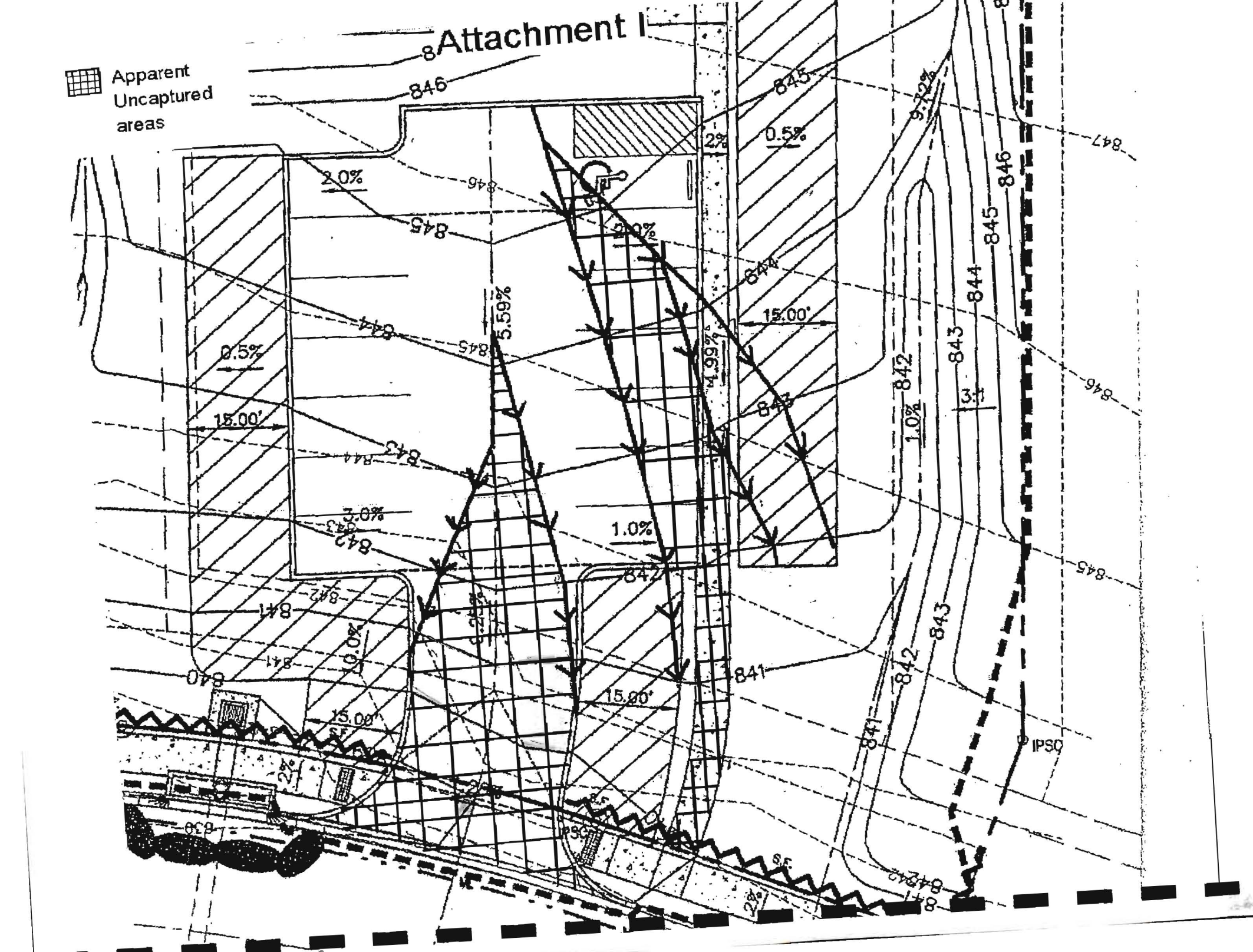
2. How will roof runoff from the proposed building be directed into the proposed VFS without concentrating flow into or causing erosion to the VFS?

3. Demonstrate how stormwater runoff from the parking lot and driveway will enter the VFS (i.e. ribbon curbs, saw-tooth curb, etc.)

4. According to the proposed contours stormwater runoff from parts of the driveway, parking lot, and sidewalk will not flow to a VFS or will pass through less than 15 feet of VFS (see Attachment I). Please explain and revise as necessary.

We ask that you submit one original and **four copies** of the amended materials to supplement the WPAPMOD application to this office by no later than **14 days from the date of this letter** to avoid denial of the plan. If the response to this notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, a second notice will be sent to you requiring a response within 14 days from the notice date. If the response to the second is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application will be denied unless you provide written notification that the application is being withdrawn. Please note that the application fee will be forfeited if the plan is not withdrawn. If you have any questions or require additional information, please contact Javier Anguiano of the Edwards Aquifer Protection Program of the San Antonio Regional Office at the number listed above.

Attachment I



Attachment C – Project Description

The project was previously titled Tschirhart Ranch Subdivision, it has since become know as Manor Creek. The original proposed project consisted of 252.038 acres of land that was to be developed into a 343 lot residential subdivision. Each individual residential lot was to contain approximately 3,860 square feet of impervious cover which included a building structure and a concrete driveway. There was to be approximately 6,800 L.F. of street in a 60' R.O.W. The overall developed project was to consist of less than 20% impervious cover, so that structural BMP's would not be required. The permanent BMP's around the sensitive features consist of native vegetation for a minimum of 50 feet around each feature.

Unit one has been constructed and the impervious cover has exceeded the 3,860 square feet of impervious cover allowed for each lot. As a result the owner has purchased an additional 15.001 acres to keep the impervious cover for the site under 20%.The impervious cover for lots within Units 2-6 have been reconfigured to contain approximately 3,662 square feet of impervious cover for interior lots and 3,865 square feet for optional corner lots which includes all proposed typical building structures and a concrete driveway. With the addition of the 15.001 acres and a reduction of area given an existing TxDOT dedication of 0.123 acres this development will have less than 20% impervious cover; therefore, no structural BMP's are required. The 50 foot vegetative buffer around sensitive features will be maintained.

Additional Items Changed

a. FEMA Flood Plain has been updated with the new FEMA Flood Plain maps approved September 2009
b. The south entrance from State Hwy 46 has been adjusted in anticipation of a future TxDOT drainage structure.
c. In Unit III Varrelman Road has been shifted slightly north.
d. In Unit V Liermann Avenue was shifted slightly south.
e. 15.001 Acres have been added to the original tract an a dedication of 0.123 acres to TxDOT has occurred at the Hamburg entrance. The total area for the site is now 266.916 acres.
f. Three lots have been combined in Unit II for a future Community Center. Making the total acreage outside the Community Center 265.836 acres.

The above mentioned changes have been included in the "Modification Tschirhart Ranch Subdivision" submitted concurrently with this application.

This WPAP Modification will include the addition of a Community Center on 3 lots which will contain approximately 13,763 square feet of impervious cover onsite and 1,025 SF of streets and other common to the overall project and right-of-way. The community center will include restrooms, pool and a parking facility. Permanent BMPs for the proposed site will be filter strips and a sand filter system located immediately downstream of impervious cover. The remaining portion of the overall subdivision will remain under 20% impervious cover.

Modification of a Previously Approved Plan

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

1. Current Regulated Entity Name: Water Pollution Abatement Plan for Tschirhart Ranch Subdivision
Original Regulated Entity Name: Community Center Manor Creek
Assigned Regulated Entity Numbers (RN): 1) _____, 2) _____, 3) _____

X The applicant has not changed and the Customer Number (CN) is: CN 601213523
___ The applicant has changed. A new Core Data Form has been provided.

2. X **Attachment A: Original Approval Letter and Approved Modification Letters:** A copy of the original approval letter and copies any letters approving modification are found at the end of this form. The overall subdivision modification submitted concurrently with this plan is not approved to date.

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

X 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;
X change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
___ development of land previously identified as undeveloped in the original water pollution abatement plan;
___ physical modification of the approved organized sewage collection system;
___ physical modification of the approved underground storage tank system;
___ physical modification of the approved aboveground storage tank system.

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

WPAP Modification Summary	Approved Project	Proposed Modification
Acres	252.038	265.836/1.081
Type of Development	Residential	Residential/Commercial
Number of Residential Lots	343	0340/1
Impervious Cover (acres)	50.29	53.141//0.316
Impervious Cover (%)	19.95%	19.99%/29.23%
Permanent BMPs	Vegetative Buffers	Vegetative Buffers/Filter Strips & Sand Filter System
Other	_____	_____

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

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

Attachment B – Narrative of Proposed Modification

The project was previously titled Tschirhart Ranch Subdivision, it has since become know as Manor Creek. The original proposed project consisted of 252.038 acres of land that was to be developed into a 343 lot residential subdivision. Each individual residential lot was to contain approximately 3,860 square feet of impervious cover which included a building structure and a concrete driveway. There was to be approximately 6,800 L.F. of street in a 60' R.O.W. The overall developed project was to consist of less than 20% impervious cover, so that structural BMP's would not be required. The permanent BMP's around the sensitive features consist of native vegetation for a minimum of 50 feet around each feature.

Unit one has been constructed and the impervious cover has exceeded the 3,860 square feet of impervious cover allowed for each lot. As a result the owner has purchased an additional 15.001 acres to keep the impervious cover for the site under 20%.The impervious cover for lots within Units 2-6 have been reconfigured to contain approximately 3,662 square feet of impervious cover for interior lots and 3,865 square feet for optional corner lots which includes all proposed typical building structures and a concrete driveway. With the addition of the 15.001 acres and a reduction of area given an existing TxDOT dedication of 0.123 acres this development will have less than 20% impervious cover; therefore, no structural BMP's are required. The 50 foot vegetative buffer around sensitive features will be maintained.

Additional Items Changed

a. FEMA Flood Plain has been updated with the new FEMA Flood Plain maps approved September 2009
b. The south entrance from State Hwy 46 has been adjusted in anticipation of a future TxDOT drainage structure.
c. In Unit III Varrelman Road has been shifted slightly north.
d. In Unit V Liermann Avenue was shifted slightly south.
e. 15.001 Acres have been added to the original tract an a dedication of 0.123 acres to TxDOT has occurred at the Hamburg entrance. The total area for the site is now 266.916 acres.
f. Three lots have been combined in Unit II for a future Community Center. Making the total acreage outside the Community Center 265.836 acres.

The above mentioned changes have been included in the "Modification Tschirhart Ranch Subdivision" submitted concurrently with this application.

This WPAP Modification will include the addition of a Community Center on 3 lots which will contain approximately 13,763 square feet of impervious cover onsite and 1,025 SF of streets and other common to the overall project and right-of-way. The community center will include restrooms, pool and a parking facility. Permanent BMPs for the proposed site will be filter strips and a sand filter system located immediately downstream of impervious cover. The remaining portion of the overall subdivision will remain under 20% impervious cover.

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: Community Center Manor Creek

REGULATED ENTITY INFORMATION

1. The type of project is:
   __ Residential: # of Lots: _____
   __ Residential: # of Living Unit Equivalents: _____
   X Commercial
   __ Industrial
   __ Other: _____

2. Total site acreage (size of property): 1.081

3. Projected population: _____

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	953	÷ 43,560 =	0.022
Parking	5,224	÷ 43,560 =	0.120
Other paved surfaces	7,586	÷ 43,560 =	0.174
Total Impervious Cover	13,763	÷ 43,560 =	0.316
Total Impervious Cover ÷ Total Acreage x 100 =			29.23%

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

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

8. Type of pavement or road surface to be used:
   N/A Concrete
   N/A Asphaltic concrete pavement
   N/A Other: _____

WATER POLLUTION ABATEMENT PLAN APPLICATION

5. ATTACHMENT A - Factors Affecting Water Quality.

The various facets of construction involved with this project will consist of site clearing, site grading, utility service lines, building structure, driveways, etc. for this 1.081 acre project site. The disturbances of the existing site during construction are factors that could affect surface water and groundwater quality. To assist in the preservation of the quality of surface water exiting the site during construction, which in turns assists in the preservation the groundwater quality, temporary pollution controls will be installed. Some possible sources of contamination during construction would be from machinery or equipment in the form of oil or fuel. Containment and cleanup is addressed in the Temporary Pollution Control section of this submittal.

13. ATTACHMENT B - Volume and Character of Stormwater.

The stormwater runoff generated from this site will consist of rooftops, concrete driveways, paved streets and landscape areas. The runoff will be of a domestic nature and may contain small amounts of oil, suspended solids, fertilizers, and household pesticides. This is a low density single family development with less than 20% impervious cover. Therefore, no structural permanent Best Management Practices are being proposed to capture a specific volume of storm water runoff. However, the sensitive features located on the site will be protected by native environment buffer zones which are shown on the Site Plan. The average Pre-Construction runoff coefficient for the site is Cpre = 0.36 and the average Post-Construction runoff coefficient is Cpost = 0.53.

The stormwater runoff generated from the proposed Community Center Site will consist of rooftops, paved parking areas and landscape areas. The runoff will be of a domestic nature and may contain small amounts of oil, suspended solids, fertilizers, and household pesticides. Permanent BMPs for the proposed Community Center will be Filter Strips and a Sand Filter System. The runoff from the Community Center will be accounted for in the overall drainage design for Tschirhart Ranch "(Manor Creek).

TEMPORARY STORMWATER SECTION

2. ATTACHMENT A -Spill Response Actions.

The following includes a copy of Section 1.4.16 of the TCEQ "Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices"' Pages 1-118 through 1-121, Spill Prevention and Control. The following is made part of the spill response action plan. In addition in the event of a significant hazardous spill the contractor or construction personnel shall notify 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 or after hours contact the Environmental Release Hotline at 1-800-832-8224. The contractor shall have available at the construction site all emergency numbers to include the Edwards Aquifer Authority (210) 222-2204 or 1-800-292-1047 and the National Response Center (202) 267-2675 or 1-800-424-8802.

4. ATTACHMENT B -Potential Sources of Contamination.

Vehicle Maintenance (i.e. fuel spill, oil spill)

5. ATTACHMENT C - Sequence of Major Activities.

The following is a sequence of major activities which will involve soil disturbance along with an estimate of the area of the site to be disturbed by each activity:

Total Site

Sequence No.	Description of Soil Disturbing Activity	Estimated Area to be Disturbed by each Activity (Acres) (Total)
1	Clearing and Grubbing (Street/Drainage)	47
2	Excavation and Grading (Streets/Drainage)	47
3	Underground Utility Service Installation	30
4	Final Structures Installation (Including Houses & Driveways)	31

Recreation Center

Sequence No.	Description of Soil Disturbing Activity	Estimated Area to be Disturbed by each Activity (Acres) (Total)
1	Clearing and Grubbing (Parking/Drainage)	0.93
2	Excavation and Grading (Parking/Drainage)	0.93
4	Final Structures Installation (Including Rec Center, swimming pool, & Awning)	0.20

Attachment B – BMPs for Upgradient Stormwater

Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required. The proposed community center site will have filter strips and a sand filter system which will mitigate the increase in impervious cover specifically for the community center.

Attachment C – BMPs for Onsite Stormwater

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Community Center will be filter strips and a sand filter system. The proposed filter strips and sand filter system will adequately mitigate the increase of impervious cover on the Community Center site. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Runoff from the driveway, parking areas, and a portion of the sidewalks has been revised to flow into a sand filter system. Approximately 741 SF of new impervious cover common to drive draining to Hamburg Avenue in Drainage area D (See Drainage Area Plan) will not be captured for treatment and will be accounted for by overtreatment by the sand filter system.

The stormwater within Drainage Area C will overland flow down the parking lot and into a grate inlet. It will then flow into the sand filter system via 1~8" PVC pipe. Stormwater flows greater than the 25-year storm event will (weir) flow over the grate inlet and continue down the driveway. The sand filter system has been designed in accordance with the TCEQ's Complying with Edwards Aquifer Rules Technical Guidance on Best Management Practices (July 2005).

The sand filter system (See Sheet P1 as Provided) basin has been sized to capture the first 3.00 inches of stormwater run-off from 0.155 acres of impervious cover within a 0.218 acre catchment area (Drainage Area D), providing a total capture volume of 1,526 cubic feet where only 1,472 cubic feet is needed to treat 139 pounds of total suspended solids. A sand filtration system will consist of 144 square feet of sand, 18 inches thick, with under drain piping surrounded by gravel. Sand and gravel layers will be separated with filter fabric and contained above an impermeable concrete liner.

Attachment D – BMPs for Surface Streams

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Subdivision Community Center will be filter strips and a sand filter system. The filter strips and sand filter system have been designed to mitigate all proposed impervious cover onsite. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Attachment I – Measures for Minimizing Surface Stream Contamination

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Subdivision Community Center will be filter strips and a sand filter system. The filter strips and sand filter system have been designed to mitigate all proposed impervious cover onsite. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Attachment - Inspection, Maintenance, Repair, and Retrofit Plan

Sedimentation Basin:

Monthly:	The vegetative growth in the basin shall be checked. The growth shall not exceed 18 inches in height.
Quarterly:	The level of accumulated silt shall be checked. If depth of silt exceeds 6 inches, it shall be removed and disposed of "properly".
Annually:	The basin shall be inspected for structural integrity and repaired if necessary.
After Rainfall:	The basin shall be checked after each rainfall occurrence to insure that it drains within 24 hours after the storm is over. If it does not drain within this time, corrective maintenance will be accomplished.

Filtration Basins:

Monthly:	The vegetative growth shall be checked. Vegetation in the basin shall not exceed 18 inches in height.
Quarterly:	The level of accumulated silt shall be checked. If depth of silt/pollutants exceeds ½ inch, it shall be removed and disposed of "properly". The accumulation of pollutants/oils shall be checked. If the pollutants have significantly reduced the designed capacity of the sand filter, the pollutants shall be removed. The basin shall be checked for accumulation of debris and trash. The debris and trash shall be removed if excessive. All debris and trash shall be removed at least every six months.
Annually:	The basin shall be inspected for structural integrity and repaired if necessary.
After Rainfall:	The basin shall be checked after each rainfall occurrence to insure that it drains within 24 hours after the sedimentation basin has been emptied. If it does not drain within this time, corrective maintenance will be accomplished.

Following any required maintenance, the surface of the filtration basin shall be raked and leveled to restore the system to its designed condition.

"Proper" disposal of accumulated silt shall be accomplished following the Texas Commission of Environmental Quality guidelines and specifications.

Engineered Filter Strip

Weekly	The project site shall be checked for accumulation of debris and trash. The debris and trash shall be removed.
Monthly	The vegetation growth in the vegetated filter strip shall be checked. The growth shall not exceed 18 inches in height.
Quarterly	The level of accumulated silt shall be checked. If depth of silt exceeds 6 inches, it shall be removed and disposed of "properly".
Annually	The vegetation shall be inspected and additional native grasses planted as necessary.
After Rainfall	To maintain vegetative cover over this area, the area shall be checked after each rainfall occurrence to insure that the area drains within 6 hours after the storm is over. If it does not drain within this time, corrective measures will be instituted.
Pest Management	An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

"Proper" disposal of accumulated silt shall be accomplished following the Texas Commission of Environmental Quality guidelines and specifications.

An amended copy of this document will be provided to the Texas Commission of Environmental Quality (San Antonio Region) within thirty (30) days of any changes in the following information.

Contact Person:	Richard N. Maier, Assistant Secretary
Entity:	Continental Homes of Texas, L.P., a Texas Limited Partnership
	By: CHTEX of Texas, Inc. a Delaware Corporation, Its General Partner
Mailing Address:	12554 Riata Vista Circle, 2nd Floor
City, State:	Austin, TX. Zip: 78727
Telephone:	(512) 345-4663 FAX: (512) 533-1429

by [signature] V.P. 4/16/10

Signature of Responsible Party Date

Reference Material

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Manor Creek Rec Center
Date Prepared: 4/13/2010

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

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

where,

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

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

County =	Comal	
Total project area included in plan * =	1.08	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	0.32	acres
Total post-development impervious cover fraction * =	**0.29**	
P =	**33**	inches
$L_{M\ TOTAL\ PROJECT}$ =	**284**	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	1	

Drainage Basin Parameters (Drainage Area A):

Drainage Basin/Outfall Area No. =	A	
Total drainage basin/outfall area =	0.52	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.06	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.11**	
$L_{M\ THIS\ BASIN}$ =	**52**	lbs

Proposed BMP Code for this Basin A.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = **85** percent

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

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

where,

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

A_C =	0.06	acres
A_I =	0.06	acres
A_P =	**0.00**	acres
L_R =	**56**	lbs

Drainage Basin Parameters (Drainage Area B):

Drainage Basin/Outfall Area No. =	B	
Total drainage basin/outfall area =	0.31	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.09	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.28**	
$L_{M\ THIS\ BASIN}$ =	**77**	lbs

Proposed BMP Code for this Basin B.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = **85** percent

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

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

where,

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

A_C =	0.09	acres
A_I =	0.09	acres
A_P =	**0.00**	acres
L_R =	**82**	lbs

Drainage Basin Parameters (Drainage Area D):

Drainage Basin/Outfall Area No. =	D	
Total drainage basin/outfall area =	0.03	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.02	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.57**	
$L_{M\ THIS\ BASIN}$ =	**15**	lbs.

Drainage Basin Parameters (Drainage Area C):

Drainage Basin/Outfall Area No. =	C	
Total drainage basin/outfall area =	0.22	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.16	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.71**	
$L_{M\ THIS\ BASIN}$ =	**139**	lbs

Proposed BMP Code for this Basin C.

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

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

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

where

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

A_C =	0.22	acres
A_I =	0.16	acres
A_P =	**0.06**	acres
L_R =	**159**	lbs

Calculate Fraction of Annual Runoff to Treat the Drainage Basin / Outfall Area C

Desired $L_{M\ THIS\ BASIN}$ =	154	lbs.
F =	**0.97**	

Calculate Capture Volume required by the BMP Type for this Drainage Basin C.

Rainfall Depth =	**3.00**	inches
Post Development Runoff Coefficient =	**0.52**	
On-site Water Quality Volume =	**1227**	cubic feet
Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**245**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**1472**	cubic feet

Filter area for Sand Filters Designed as Required in RG-348

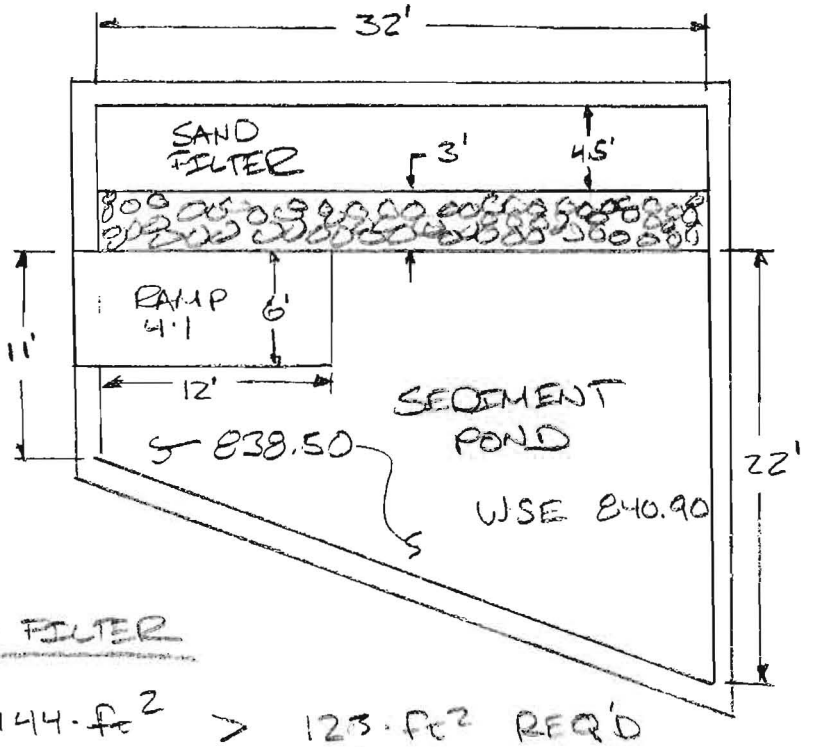
Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	**1472**	cubic feet
Minimum filter basin area =	**123**	square feet
Maximum sedimentation basin area =	**491**	square feet
Minimum sedimentation basin area =	**31**	square feet

Catchment Area and Proposed BMP	Drainage Area (acres)	Imp Cover (acres)	Required TSS Removal (lbs/yr)	TSS Removed (lbs/yr)
Area A - VFS	0.524	0.058	52	52
Area B - VFS	0.309	0.086	77	77
Area C - Partial Sediment/Sand Filter: WQ Volume Provided = 1526 cu-ft > WQV Required = 1,472 cu-ft, Sand Filter Area Provided = 144 sq-ft > Sand Filter Area Required = 123 sq-ft, Depth = 2.40 ft	0.218	0.155	139	155
Area D - Uncaptured	0.030	0.017	15	0
Total	1.081	0.316	284	284

4/13/10 MEK

WQP VOLUME CALCULATIONS



AREA OF SAND FILTER

$4.5' * 32' = 144 \cdot ft^2 > 123 \cdot ft^2$ REQ'D

AREA OF SEDIMENT POND

$(11' * 32') - (12' * 6') + \frac{1}{2}(11' * 32') = 456 \cdot ft^2$

AREA ABOVE GABION BASKET (3 x 1.5)

$3' * 32' = 96 \cdot ft^2$

SEDIMENT STORAGE

$456 * 1.5 = 684\ ft^2 > 245\ ft^3$ REQ'D

DEPTH OF WQP

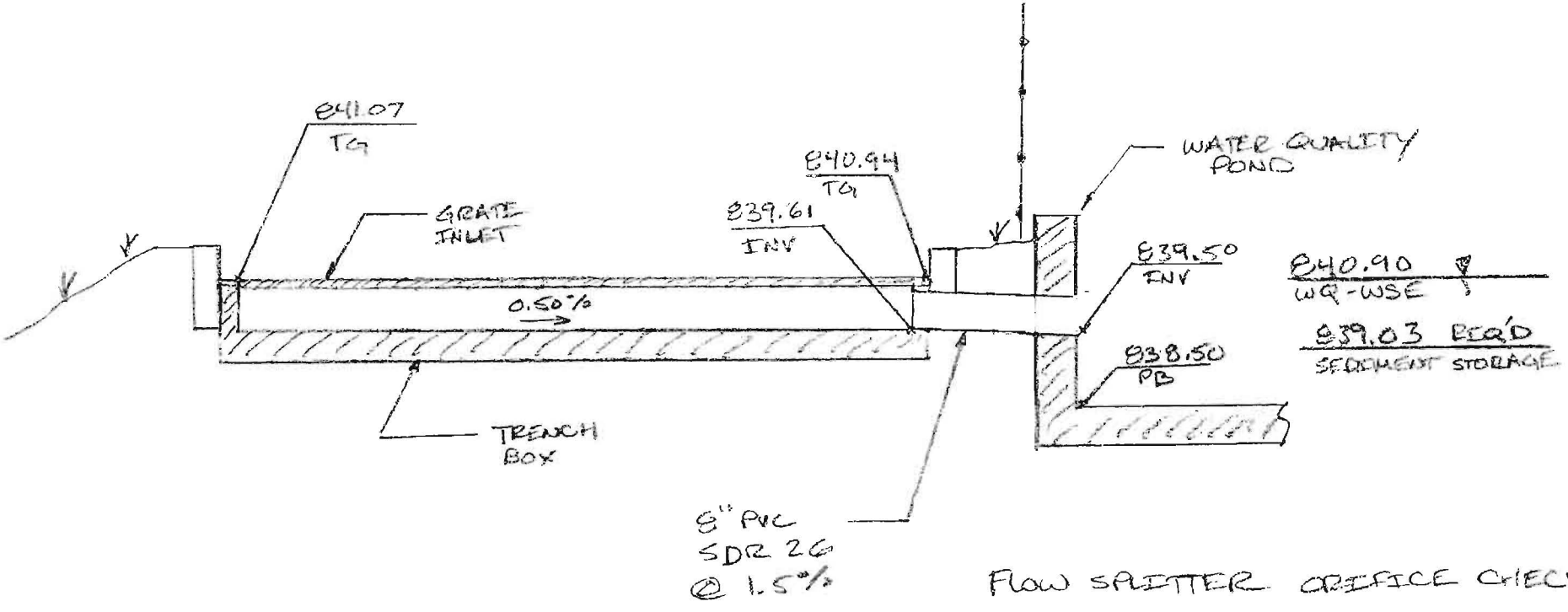
$840.90 - 838.50 = 2.40\ ft$

WQ VOLUME

$2.40 * (144 + 456) + (2.40 - 1.5) * 96$
$= 1,526\ ft^3 > 1,472\ ft^3$ REQ'D

FLOW SPLITTER CALCULATIONS

4/15/10



FLOW SPLITTER/INLET

NOTE:

FLOWS GREATER THAN Q_{25} WILL (WEIR) FLOW OVER GRATE INLET AND CONTINUE DOWN THE DRIVE

FLOW SPLITTER ORIFICE CHECK

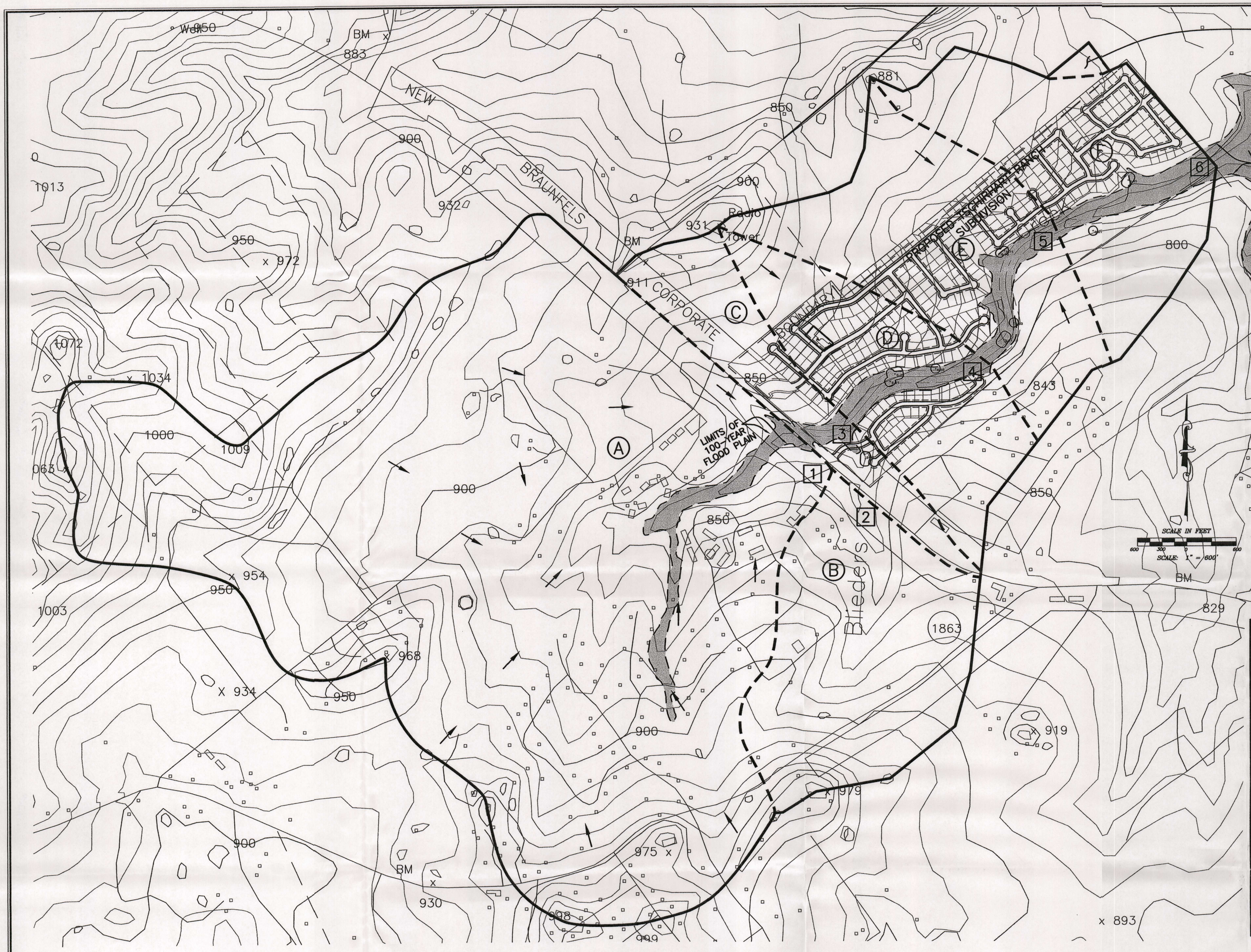
ORIFICE DIAMETER	= 8 IN
INLET INVERT	= 839.94 ELEV
Q_{25}	= 1.9 cfs
Q_{25} WSE @ INLET	= 840.94 ELEV
SPRING LINE	= 840.27 ELEV
HEAD	= 1.00 ft
AREA ORIFICE	= 0.35 ft^2
Q OF ORIFICE	= 1.9 cfs
n	= 0.010
S_n	= 1.46%

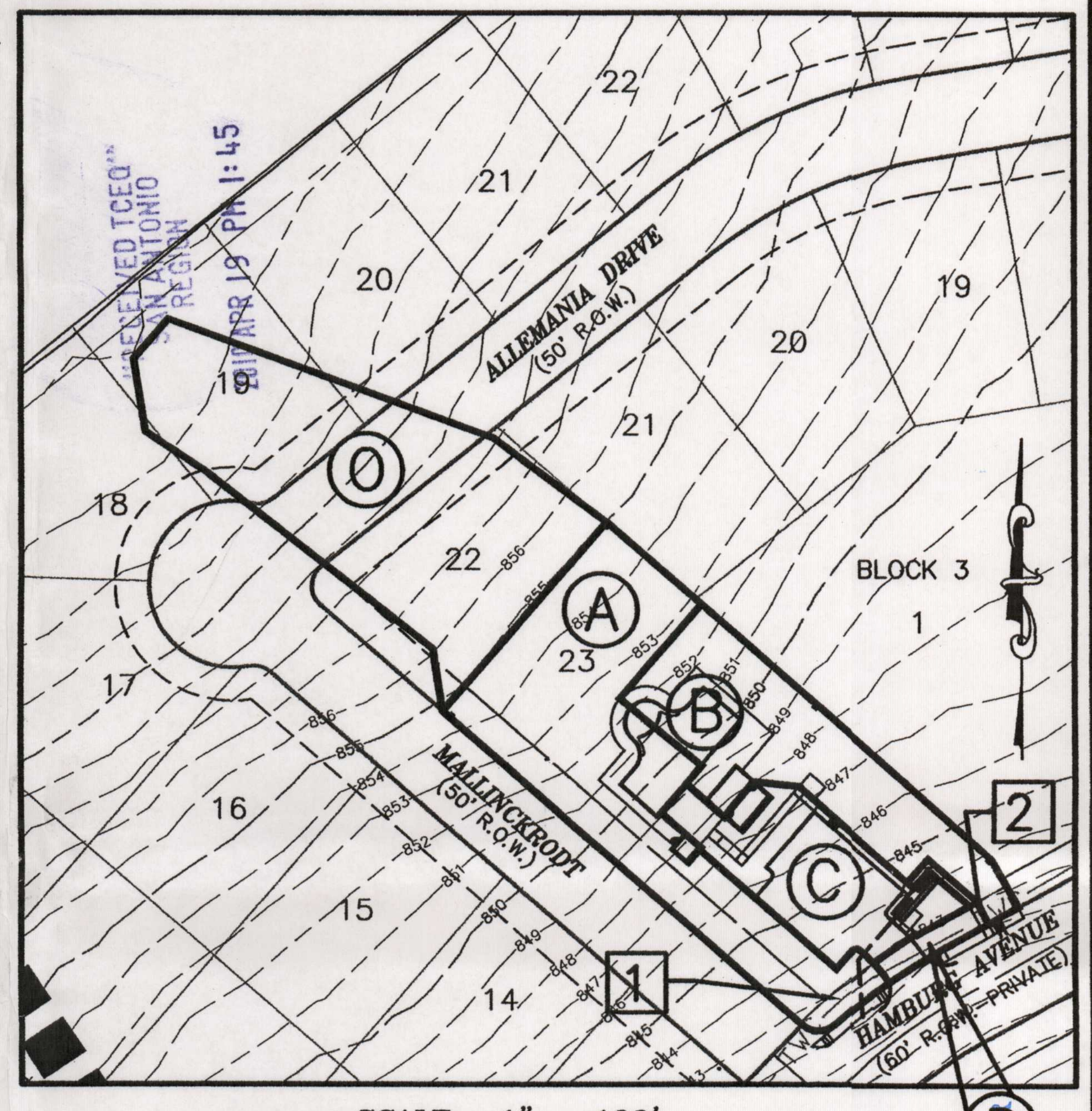
Drainage Calculations

Project: Rec Center
Calculated by: Mike Short

Drainage Area			Data						
ID	C Value Table 5.2	Area (ac)	Tc (min)	I100 (in/hr)	Q100 (cfs)	I25 (in/hr)	Q25 (cfs)	I10 (in/hr)	Q10 (cfs)
O (Offsite)	0.51	0.64	10	11.90	4.8	9.07	3.2	7.57	2.5
A	0.40	0.52	10	11.90	3.1	9.07	2.1	7.57	1.6
B	0.48	0.31	10	11.90	2.2	9.07	1.5	7.57	1.1
C	0.67	0.22	5	15.30	2.8	11.58	1.9	9.61	1.4
D	0.61	0.03	5	15.30	0.4	11.58	0.2	9.61	0.2
1 (O&A)	0.46	1.16	10	11.90	8.0	9.07	5.3	7.57	4.0
2 (O,A,B,C,D)	0.49	1.72	10	11.90	12.5	9.07	8.4	7.57	6.4

K10 = 1.0, K25 = 1.1, K100 = 1.25 C10 Asphalt = .81, C10 Grass Good Conditin 2-7% = .35
Calculations were done in accordance with the "City of New Braunfels Drainage and Erosion Control Manual"





SCALE: 1" = 100'

DRAINAGE AREA DESIGNATION	AREA (ACRES)	AREA (MILES^2)
A	992.3	1.550
B	175.7	0.275
C	82.9	0.130
D	134.3	0.210
E	177.7	0.278
F	158.2	0.247

SCS UNIT HYDROGRAPH TYPE III DISTRIB, AMC II (DEVELOPED CONDITIONS)

DRAINAGE NODE POINT	CONTRIBUTING D.A.'s	TOTAL AREA (ACRES)	CN	TIME OF CONCENTRATION (min.)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
1	A	992.3	86	49	2399.2	3167.0	4582.4
2	B	175.7	86	17	672.9	886.3	1278.6
3	A+B+C	1250.9	86	52	2930.8	3865.2	5585.1
4	A+B+C+D	1385.2	86	57	3081.0	4062.8	5870.2
5	A+B+C+D+E	1562.9	86	63	3271.9	4316.0	6238.3
6	A+B+C+D+E+F	1721.1	86	69	3421.4	4520.9	6546.3

NOTES:

1) NODE POINTS [1] & [2] ARE LOCATED ON THE UPSTREAM END OF THE CULVERTS BELOW S.H. 46.

2) NODE POINTS [3], [4], [5] & [6] ARE CONFLUENCE POINTS OF CONTRIBUTING DRAINAGE AREAS ALONG BLIEDERS CREEK.

OVERALL DRAINAGE INFORMATION AND CALCULATIONS OBTAINED FROM PREVIOUSLY APPROVED TSCHIRHART RANCH SUBDIVISION (SGI 2005)

DRAINAGE CALCULATIONS

Project:		Rec Center
Calculated by:		Mike Short

Drainage Area			Data						
ID	C Value Table 5.2	Area (ac)	Tc (min)	I100 (in/hr)	Q100 (cfs)	I25 (in/hr)	Q25 (cfs)	I10 (in/hr)	Q10 (cfs)
O (Offsite)	0.51	0.64	10	11.90	4.8	9.07	3.2	7.57	2.5
A	0.40	0.52	10	11.90	3.1	9.07	2.1	7.57	1.6
B	0.48	0.31	10	11.90	2.2	9.07	1.5	7.57	1.1
C	0.67	0.22	5	15.30	2.8	11.58	1.9	9.61	1.4
D	0.61	0.03	5	15.30	0.4	11.58	0.2	9.61	0.2
1 (O&A)	0.46	1.16	10	11.90	8.0	9.07	5.3	7.57	4.0
2 (O,A,B,C,D)	0.49	1.72	10	11.90	12.5	9.07	8.4	7.57	6.4

K10 = 1.0, K25 = 1.1, K100 = 1.25 | C10 Asphalt = .81, C10 Grass Good Conditin 2-7% = .35

Calculations were done in accordance with the "City of New Braunfels Drainage and Erosion Control Manual"

RECEIVED MAY 11 2010 COUNTY ENGINEER

REVISIONS

DATE	DESCRIPTION

STATE OF TEXAS — MICHAEL G. SHORT — 88015 — LICENSED PROFESSIONAL ENGINEER

MASTER DRAINAGE AREA MAP OF

RECREATION CENTER

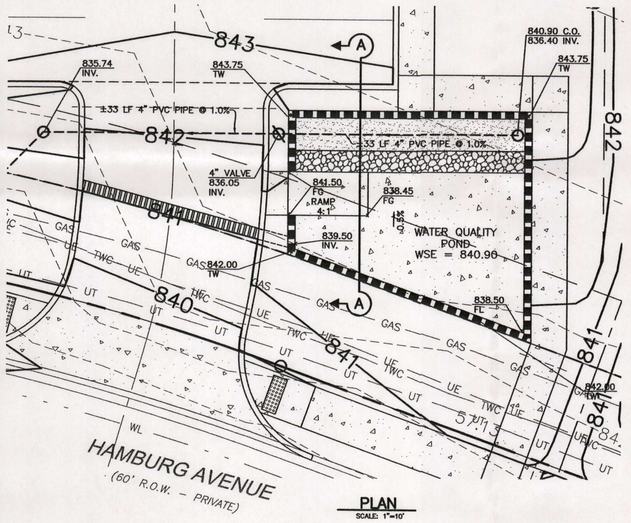
MANOR CREEK SUBDIVISION UNIT 2A

NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: APRIL 2010
JOB NO.: 110309

D-1



PLAN
SCALE: 1"=10'

SCALE IN FEET
10 5 0 10
SCALE: 1" = 10'

LEGEND

x683.00	PROPOSED SPOT ELEVATION
—680—	EXISTING CONTOUR
680	PROPOSED CONTOUR
→	FLOW DIRECTION
PB	POND BOTTOM
TW	TOP OF WALL
FL	FLOWLINE
FG	FINISH GRADE
INV	INVERT
C.O.	CLEANOUT
WSE	WATER SURFACE ELEVATION
	CONCRETE RETAINING WALL
	WROUGHT IRON FENCE

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Manor Creek Rec Center**
Date Prepared: **4/13/2010**

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

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

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

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

County =	Comal	
Total project area included in plan * =	1.08	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	0.32	acres
Total post-development impervious cover fraction * =	0.29	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	284	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	4	

Drainage Basin Parameters (Drainage Area A):

Drainage Basin/Outfall Area No. =	A	
Total drainage basin/outfall area =	0.52	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.06	acres
Post-development impervious fraction within drainage basin/outfall area =	0.11	
$L_{M\ THIS\ BASIN}$ =	52	lbs.

Proposed BMP Code for this Basin A.

Proposed BMP =	Vegetated Filter Strips	
Removal efficiency =	85	percent

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

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

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

A_C =	0.06	acres
A_I =	0.06	acres
A_P =	0.00	acres
L_R =	56	lbs

Drainage Basin Parameters (Drainage Area B):

Drainage Basin/Outfall Area No. =	B	
Total drainage basin/outfall area =	0.31	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.09	acres
Post-development impervious fraction within drainage basin/outfall area =	0.28	
$L_{M\ THIS\ BASIN}$ =	77	lbs.

Proposed BMP Code for this Basin B.

Proposed BMP =	Vegetated Filter Strips	
Removal efficiency =	85	percent

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

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

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

A_C =	0.09	acres
A_I =	0.09	acres
A_P =	0.00	acres
L_R =	82	lbs

Drainage Basin Parameters (Drainage Area D):

Drainage Basin/Outfall Area No. =	D	
Total drainage basin/outfall area =	0.03	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.02	acres
Post-development impervious fraction within drainage basin/outfall area =	0.57	
$L_{M\ THIS\ BASIN}$ =	15	lbs.

Drainage Basin Parameters (Drainage Area C):

Drainage Basin/Outfall Area No. =	C	
Total drainage basin/outfall area =	0.22	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.16	acres
Post-development impervious fraction within drainage basin/outfall area =	0.71	
$L_{M\ THIS\ BASIN}$ =	139	lbs.

Proposed BMP Code for this Basin C.

Proposed BMP =	Sand Filter	
Removal efficiency =	89	percent

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

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

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

A_C =	0.22	acres
A_I =	0.16	acres
A_P =	0.06	acres
L_R =	159	lbs

Calculate Fraction of Annual Runoff to Treat the Drainage Basin / Outfall Area C

Desired $L_{M\ THIS\ BASIN}$ =	154	lbs.
F =	0.97	

Calculate Capture Volume required by the BMP Type for this Drainage Basin C.

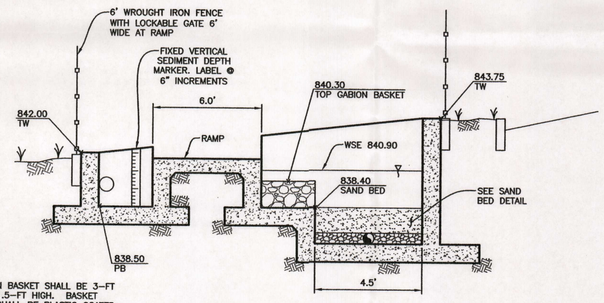
Rainfall Depth =	3.00	inches
Post Development Runoff Coefficient =	0.52	
On-site Water Quality Volume =	1227	cubic feet
Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	245	
Total Capture Volume (required water quality volume(s) x 1.20) =	1472	cubic feet

Filter area for Sand Filters Designed as Required in RG-348

Partial Sedimentation and Filtration System

Water Quality Volume for combined basins =	1472	cubic feet
Minimum filter basin area =	123	square feet
Maximum sedimentation basin area =	491	square feet
Minimum sedimentation basin area =	31	square feet

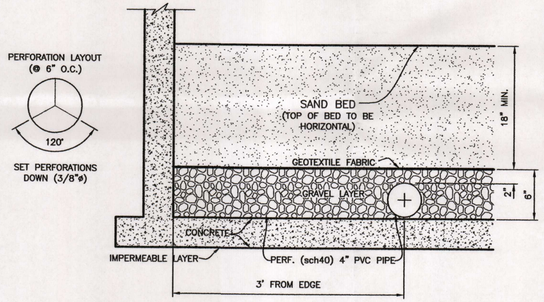
Catchment Area and Proposed BMP	Drainage Area (acres)	Imp. Cover (acres)	Required TSS Removal (lbs/yr)	TSS Removed (lbs/yr)
Area A - VFS	0.524	0.058	52	52
Area B - VFS	0.309	0.086	77	77
Area C - Partial Sediment/Sand Filter: WQ Volume Provided = 1526 cu-ft > WQV Required = 1,472 cu-ft, Sand Filter Area Provided = 144 sq-ft > Sand Filter Area Required = 123 sq-ft, Depth = 2.40 ft	0.218	0.155	139	155
Area D - Uncaptured	0.030	0.017	15	0
Total	1.081	0.316	284	284



NOTES:

1. GABION BASKET SHALL BE 3-FT WIDE 1.5-FT HIGH. BASKET WIRE SHALL BE PLASTIC COATED MIN. 12-GA. BASKET SHALL BE FILLED WITH 5" TO 8"ø ROCKS.
2. SEE STRUCTURAL DETAILS FOR ALL WALLS AND FLOOR OF SEDIMENTATION/FILTRATION BASIN.

WATER QUALITY POND SECTION A-A
N.T.S.



SAND BED PROFILE
(WITH GRAVEL FILTER)

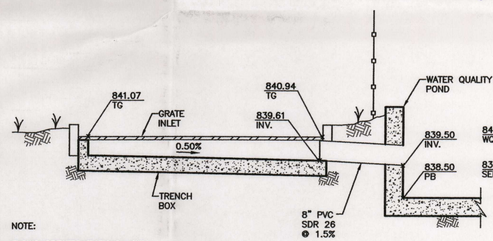
Table 3.6 Geotextile Fabric Specifications (COA, 1997)

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

*modified

SAND BED WITH GRAVEL LAYER NOTES:

THE TOP LAYER IS TO BE A MINIMUM OF EIGHTEEN (18) INCHES OF 0.02-0.04 INCH DIAMETER SAND WHICH CORRESPOND WITH ASTM C-33 CONCRETE SAND (SMALLER SAND SIZE IS NOT ACCEPTABLE). UNDER THE SAND SHALL BE A LAYER OF ONE-HALF (0.5) TO ONE AND ONE-HALF (1.5) INCH DIAMETER WASHED, ROUNDED, RIVER GRAVEL WHICH PROVIDES A MINIMUM OF TWO (2) INCHES OF COVER OVER THE TOP OF THE UNDERDRAIN LATERAL PIPES. THE SAND AND GRAVEL MUST BE SEPARATED BY A LAYER OF GEOTEXTILE FABRIC MEETING THE SPECIFICATIONS LISTED IN TABLE 3.6 "GEOTEXTILE FABRIC SPECIFICATIONS (COA, 1997). THE GEOTEXTILE FABRIC SHALL MEET THE SPECIFICATIONS LISTED IN TABLE 3.6 TAKEN FROM THE TNRCC TECHNICAL GUIDANCE ON BEST MANAGEMENT PRACTICES, JUNE 1999.



NOTE:

FLOWS GREATER THEN Q25 WILL (WEIR) FLOW OVER GRATE INLET AND CONTINUE DOWN THE DRIVE.

FLOW SPLITTER/INLET
N.T.S.

FLOW SPLITTER ORIFICE CHECK

ORIFICE DIAMETER	=	8 in
INLET INVERT	=	839.94 ELEV.
Q25	=	1.9 cfs
Q25 WSE @ INLET	=	840.94 ELEV.
SPRING LINE	=	840.27 ELEV.
HEAD	=	1.00 ft
AREA ORIFICE	=	0.35 ft²
Q OF ORIFICE	=	1.9 cfs
n	=	0.010
Sn	=	1.46%

REVISIONS

DESCRIPTION	DATE

MICHAEL G. SHORT 88015 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

WATER QUALITY POND PLAN & DETAILS FOR RECREATION CENTER

MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: APRIL 2010
JOB NO.: 110309

P-1

Monday, April 19, 2010, 10:48 AM
File Name: P:\110309\Sheets\pp001.dwg

SCALE IN FEET
20 10 0 20
SCALE: 1" = 20'

AREA NOT TO BE DISTURBED

AREA NOT TO BE DISTURBED

Kep

Kep

IPSC

IPSC

1.5'x13' ROCK RIPRAP SPLASH PAD

1.5'x28' ROCK RIPRAP SPLASH PAD

Kep

S.A. & M.G. R.R. CO.
SURVEY NO. 280
ABSTRACT NO. 591

MANOR CREEK SUBDIVISION
UNIT ONE
DOCUMENT NO. 200606053209

HAMBURG AVENUE
(60' R.O.W. – PRIVATE)

Kep

1/2"IPF
4233"

LEGEND:

- PROPOSED BUILDINGS, SIDEWALKS, DETENTION POND AND PARKING AREAS
- FILTER STRIP
- SILT FENCE
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
- CURB INLET GRAVEL FILTER
- AREAS TO BE DISTURBED w/SOIL STABILIZATION (WITH SITE CONSTRUCTION PLANS)
- Kep — SEE GEOLOGICAL ASSESSMENT

RECEIVED
MAY 11 2010
COUNTY ENGINEER

RECEIVED TCEQ SAN ANTONIO REGION
2010 APR 19 PM 1:44

REVISIONS

DATE	DESCRIPTION

STATE OF TEXAS — MICHAEL G. SHORT — 86015 — LICENSED PROFESSIONAL ENGINEER

SITE PLAN
(Proposed)

RECREATION CENTER
MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: APRIL 2010
JOB NO.: 110309

REC–2

Friday, April 16, 2010, 9:16 AM
File Name: P:\110309\CIVIL\SITES\REC-02.dwg

COMMUNITY CENTER MANOR CREEK

WATER POLLUTION ABATEMENT PLAN MODIFICATION ADDENDUM #2

April 2010

Prepared for:

Continental Homes of Texas, LP
12554 Riata Circle, 2nd Floor
Austin, Texas 78727

Project No. 110309

Prepared By:

The Schultz Group Inc.
2461 Loop 337
New Braunfels, TX 78130
(830) 606-3913

THE Schultz Group INC.

P.O. BOX 310483 • NEW BRAUNFELS, TX 78131-0483 • Phone: (830) 606-3913 • Fax: (830) 625-2204

April 28, 2010

Mr. Javier Anguiano
EAPP/San Antonio Region
Texas Commission of Environmental Quality
14250 Judson Rd.
San Antonio, TX 78233-4480

Re: Edwards Aquifer Protection Program, Comal County
TYPE OF PLAN: Modification of an Approved Water Pollution Abatement Plan
NAME OF PROJECT: Community Center Manor Creek

Javier Anguiano:

On April 23, 2010 The Schultz Group, Inc. received comments from your office on the above referenced project. To the best of our knowledge we have corrected all deficiencies in the following manner:

Responses to Deficiencies

1. Plans have been revised to show the sand filter under-drain as two laterals which combine to one main line. The installation appears to be consistent with the Technical Guidance Manual (RG-348).

2. Specific inspections have been noted for the under-drain pipe on the "Inspection, Maintenance, Repair, and Retrofit Plan." In addition a standard form to note inspection data has been provided.

3. Screw-on-caps have been specifically noted on Sheet P1 Pond Plan View.

Additional Items Changed

1. No other changes have been made to the submittal.

If the TCEQ has any questions or requires additional information please don't hesitate to contact us.

Thank you,

Mike Short, P.E.
Senior Design Engineer
The Schultz Group, Inc.
Phone: (830) 606-3913
Fax: (830) 625-2204

4/28/10

TCEQ
Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: April 23, 2010 NUMBER OF PAGES *(including this cover sheet)*: 2

TO: Name: Michael G. Short, P.E.
Organization: The Shultz Group, Inc.
FAX Number: 830/625-2204

TO: Name: Richard N. Maier
Organization: Continental Homes of Texas, L.P.
FAX Number: 512/533-1429

FROM: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Name: Javier Anguiano
Division/Region: EAPP/San Antonio
Telephone Number: 210/403-4019
FAX Number: 210/545-4329

NOTES:

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Community Center Manor Creek; located approximately 2 miles west of Loop 337 on the northeast side of SH State Highway 46; New Braunfels, Texas
TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAPMOD); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer;
Edwards Aquifer Protection Program ID No. 2439.04; Investigation No. 792433; Regulated Entity No. RN105881080

Dear Mr. Short:

We are in receipt of the additional information you have submitted for the above-referenced project for the WPAPMOD application and are in the process of technically reviewing the additional information. Before we can proceed with our review, the following comments relating to the application must be addressed:

1. The Technical Guidance Manual (RG-348) requires that the underdrain piping consist of a main collector pipe and two or more lateral branch pipes. The proposed basin contains one (1) underdrain pipe. Please explain why one pipe is proposed instead of

the aforementioned requirement and discuss how this will affect the operation of basin and water quality, e.g., will having one pipe potentially lead to more frequent clogging, and maintenance of the pipe compared to having the required main collector pipe and two or more laterals. Revise as necessary.

2. In a related issue, please add the following to the Inspection, Maintenance, and Repair Plan:
   - A section discussing the filter underdrain piping.
   - An example of the inspection form to be used for record keeping, and/or a discussion of the record keeping practices to be used, which shall include the information that should be recorded, such as, name and signature of who conducted the inspection, date of inspection, what was inspected, observations, name and signature of responsible party or representative. Receipts, bills, work orders, etc. should be included as documentation of any maintenance actions as necessary.

3. Confirm that the underdrain pipe(s) cleanout(s) will have "screw-on" caps.

We ask that you submit **one original and four copies** of the amended materials to supplement the WPAPMOD application to this office by no later than **14 days from the date of this letter** to avoid denial of the plan. If the response to this notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application will be denied unless you provide written notification that the application is being withdrawn. Please note that the application fee will be forfeited if the plan is not withdrawn. If you have any questions or require additional information, please contact Javier Anguiano of the Edwards Aquifer Protection Program of the San Antonio Regional Office at the number listed above.

Attachment G - Inspection, Maintenance, Repair, and Retrofit Plan

Sedimentation Basin:

Monthly: The vegetative growth in the basin shall be checked. The growth shall not exceed 18 inches in height.

Quarterly: The level of accumulated silt shall be checked. If depth of silt exceeds 6 inches, it shall be removed and disposed of "properly".

Annually: The basin shall be inspected for structural integrity and repaired if necessary.

After Rainfall: The basin shall be checked after each rainfall occurrence to insure that it drains within 48 hours after the storm is over. If it does not drain within this time, corrective maintenance will be accomplished.

Filtration Basins:

Monthly: The vegetative growth shall be checked. Vegetation in the basin shall not exceed 18 inches in height.

Quarterly: The level of accumulated silt shall be checked. If depth of silt/pollutants exceeds ½ inch, it shall be removed and disposed of "properly". The accumulation of pollutants/oils shall be checked. If the pollutants have significantly reduced the designed capacity of the sand filter, the pollutants shall be removed. The basin shall be checked for accumulation of debris and trash. The debris and trash shall be removed if excessive. All debris and trash shall be removed at least every six months. The above grade drain pipe shall be checked. Clean out caps shall be confirmed secure. Record and correct all defects noted.

Annually: The basin shall be inspected for structural integrity and repaired if necessary. The filtration drain pipe outfall shall be checked for silt accumulation. The drain pipe valve shall be operated to the fully closed position and then back to the fully opened position. Confirm the drain pipe valve is fully opened.

After Rainfall: The basin shall be checked after each rainfall occurrence to insure that it drains within 48 hours. If it does not drain within this time, corrective maintenance shall be accomplished. The corrective maintenance shall include cleaning the under drain piping network as needed to remove any sediment buildup and replacing the sand filter media as necessary. The media replacement will consist of removing layers of discolored sand and replacing with new media meeting the original specifications. In sand filters that have been regularly maintained media replacement should be limited to the top 2 to 3 inches.

Following any required maintenance, the surface of the filtration basin shall be raked and leveled to restore the system to its designed condition.

Engineered Filter Strip:

Weekly	The project site shall be checked for accumulation of debris and trash. The debris and trash shall be removed.
Monthly	The vegetation growth in the vegetated filter strip shall be checked. The growth shall not exceed 18 inches in height.
Quarterly	The level of accumulated silt shall be checked. If depth of silt exceeds 6 inches, it shall be removed and disposed of "properly."
Annually	The vegetation shall be inspected and additional native grasses planted as necessary.
After Rainfall	To maintain vegetative cover over this area, the area shall be checked after each rainfall occurrence to insure that the area drains within 6 hours after the storm is over. If it does not drain within this time, corrective measures will be instituted.
Pest Management	An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

"Proper" disposal of accumulated silt shall be accomplished following the Texas Commission of Environmental Quality guidelines and specifications.

All above required inspections (other than weekly and monthly) and any corrective action or maintenance activity performed on the site's BMPs must be recorded and kept on file using the attached form. All documentation required to support the maintenance activity (receipts, work orders, etc.) shall also be kept on file.

An amended copy of this document will be provided to the Texas Commission of Environmental Quality (San Antonio Region) within thirty (30) days of any changes in the following information.

Contact Person:	Richard N. Maier, Assistant Secretary
Entity:	Continental Homes of Texas, L.P., a Texas Limited Partnership By: CHTEX of Texas, Inc. a Delaware Corporation, Its General Partner
Mailing Address:	12554 Riata Vista Circle, 2nd Floor
City, State:	Austin, TX. Zip: 78727
Telephone:	(512) 345-4663 FAX: (512) 533-1429

Signature of Responsible Party V.P. Date

MANOR CREEK REC-CENTER
BMP INSPECTION REPORT

DATE	AFTER RAINFALL	QUARTERLY	ANNUALLY	MAINTENANCE	OBSERVATIONS				SIGNATURE
					CONDITION OF SEDIMENTATION BASIN	CONDITION OF FILTRATION BASIN	CONDITION OF VEGETATIVE FILTER STRIPS	CORRECTIVE/MAINT-ENANCE ACTION	
	○	○	○	○					
	○	○	○	○					
	○	○	○	○					
	○	○	○	○					
	○	○	○	○					
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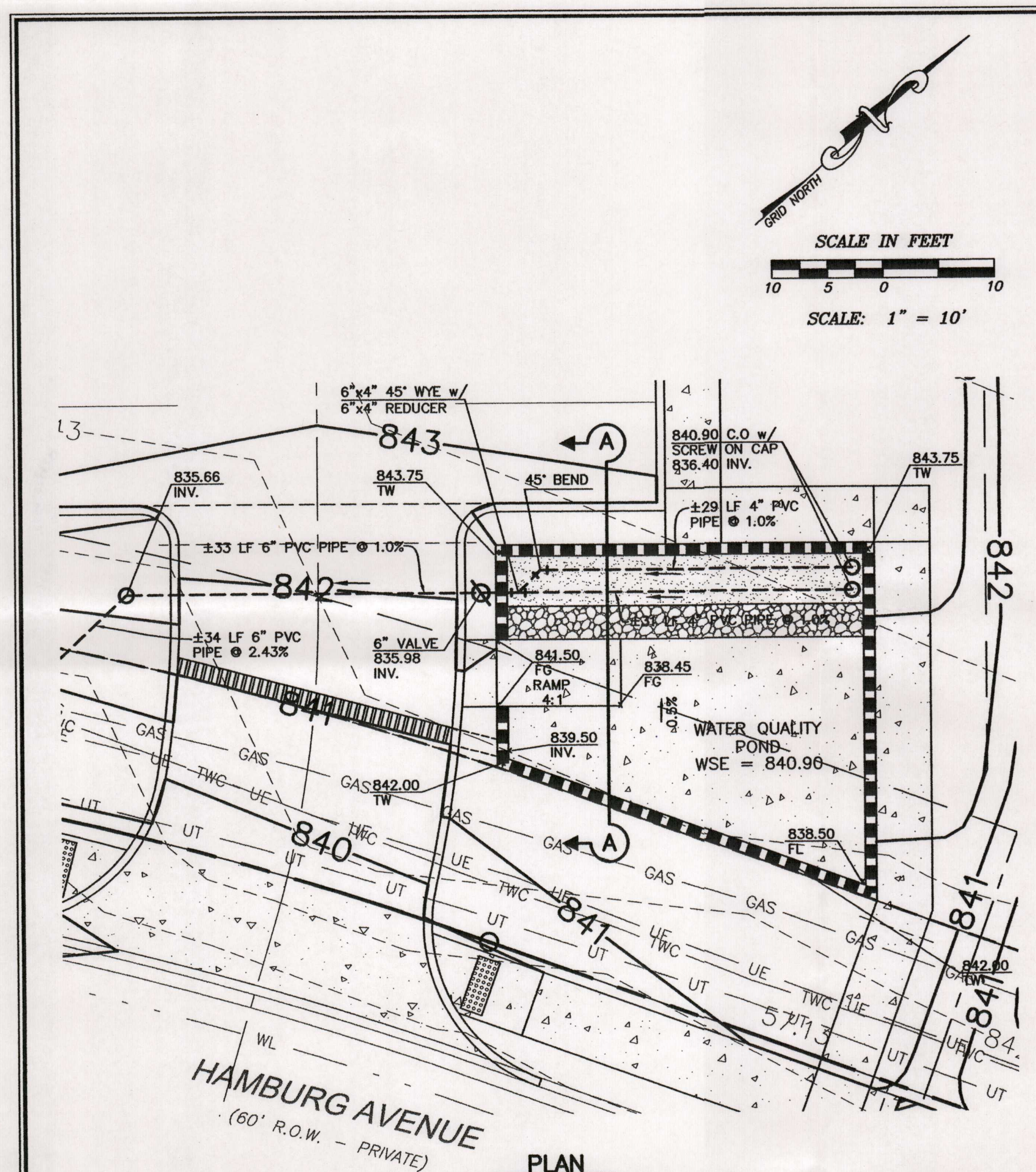


PLAN
SCALE: 1"=10'

LEGEND

x683.00	PROPOSED SPOT ELEVATION
— — 680 — —	EXISTING CONTOUR
—— 680 ——	PROPOSED CONTOUR
——→	FLOW DIRECTION
PB	POND BOTTOM
TW	TOP OF WALL
FL	FLOWLINE
FG	FINISH GRADE
INV	INVERT
C.O.	CLEANOUT
WSE	WATER SURFACE ELEVATION
▪▪▪▪▪	CONCRETE RETAINING WALL
—o—o—	WROUGHT IRON FENCE

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Manor Creek Rec Center
Date Prepared: 4/13/2010

The Required Load Reduction for the total project:	Calculations from RG-348	Pages 3-27 to 3-30	
Page 3-29 Equation 3.3: L_M =	27.2(A_N x P)		
where: $L_{M\ TOTAL\ PROJECT}$ =	Required TSS removal resulting from the proposed development = 80% of increased load		
A_N =	Net increase in impervious area for the project		
P =	Average annual precipitation, inches		
Site Data: Determine Required Load Removal Based on the Entire Project			
County =	Comal		
Total project area included in plan * =	1.08	acres	
Predevelopment impervious area within the limits of the plan * =	0.00	acres	
Total post-development impervious area within the limits of the plan* =	0.32	acres	
Total post-development impervious cover fraction * =	0.29		
P =	33	inches	
$L_{M\ TOTAL\ PROJECT}$ =	284	lbs.	
Number of drainage basins / outfalls areas leaving the plan area =	4		

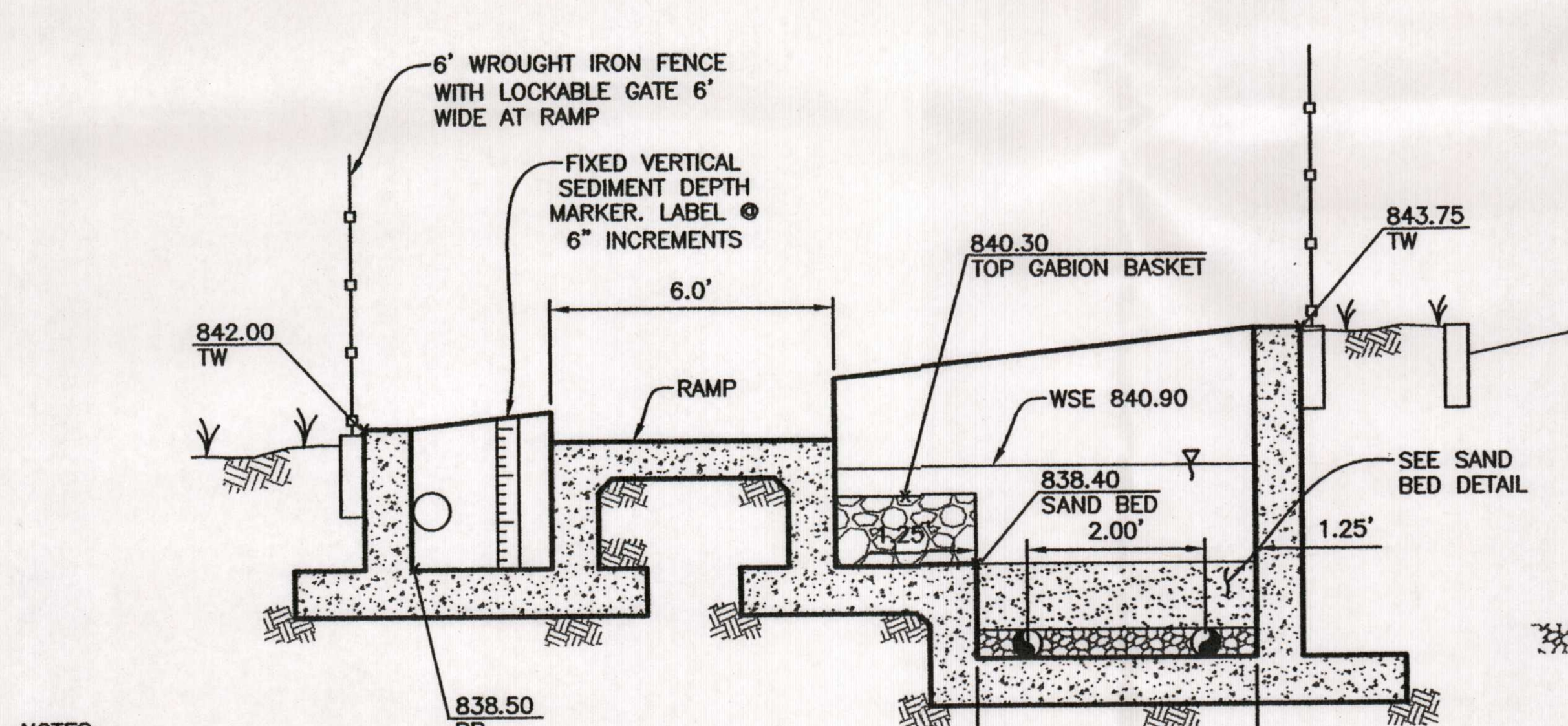
Drainage Basin Parameters (Drainage Area A):		
Drainage Basin/Outfall Area No. =	A	
Total drainage basin/outfall area =	0.52	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.06	acres
Post-development impervious fraction within drainage basin/outfall area =	0.11	
$L_{M\ THIS\ BASIN}$ =	54	lbs.
Proposed BMP Code for this Basin A.		
Proposed BMP =	Vegetated Filter Strips	
Removal efficiency =	85	percent
Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin A by the selected BMP Type.		
RG-348 Page 3-33 Equation 3.7: L_R =	(BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)	
where: A_C =	Total On-Site drainage area in the BMP catchment area	
A_I =	Impervious area proposed in the BMP catchment area	
A_P =	Pervious area remaining in the BMP catchment area	
L_R =	TSS Load removed from this catchment area by the proposed BMP	
A_C =	0.06	acres
A_I =	0.06	acres
A_P =	0.00	acres
L_R =	58	lbs

Drainage Basin Parameters (Drainage Area B):		
Drainage Basin/Outfall Area No. =	B	
Total drainage basin/outfall area =	0.31	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.09	acres
Post-development impervious fraction within drainage basin/outfall area =	0.28	
$L_{M\ THIS\ BASIN}$ =	77	lbs.
Proposed BMP Code for this Basin B.		
Proposed BMP =	Vegetated Filter Strips	
Removal efficiency =	85	percent
Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin B by the selected BMP Type.		
RG-348 Page 3-33 Equation 3.7: L_R =	(BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)	
where: A_C =	Total On-Site drainage area in the BMP catchment area	
A_I =	Impervious area proposed in the BMP catchment area	
A_P =	Pervious area remaining in the BMP catchment area	
L_R =	TSS Load removed from this catchment area by the proposed BMP	
A_C =	0.09	acres
A_I =	0.09	acres
A_P =	0.00	acres
L_R =	82	lbs

Drainage Basin Parameters (Drainage Area D):		
Drainage Basin/Outfall Area No. =	D	
Total drainage basin/outfall area =	0.03	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.02	acres
Post-development impervious fraction within drainage basin/outfall area =	0.57	
$L_{M\ THIS\ BASIN}$ =	15	lbs.

Drainage Basin Parameters (Drainage Area C):		
Drainage Basin/Outfall Area No. =	C	
Total drainage basin/outfall area =	0.22	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.16	acres
Post-development impervious fraction within drainage basin/outfall area =	0.71	
$L_{M\ THIS\ BASIN}$ =	139	lbs.
Proposed BMP Code for this Basin C.		
Proposed BMP =	Sand Filter	
Removal efficiency =	89	percent
Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin C by the selected BMP Type.		
RG-348 Page 3-33 Equation 3.7: L_R =	(BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)	
where: A_C =	Total On-Site drainage area in the BMP catchment area	
A_I =	Impervious area proposed in the BMP catchment area	
A_P =	Pervious area remaining in the BMP catchment area	
L_R =	TSS Load removed from this catchment area by the proposed BMP	
A_C =	0.22	acres
A_I =	0.16	acres
A_P =	0.06	acres
L_R =	159	lbs
Calculate Fraction of Annual Runoff to Treat the Drainage Basin / Outfall Area C		
Desired $L_{M\ THIS\ BASIN}$ =	154	lbs.
F =	0.97	
Calculate Capture Volume required by the BMP Type for this Drainage Basin C.		
Rainfall Depth =	3.00	inches
Post Development Runoff Coefficient =	0.52	
On-site Water Quality Volume =	1227	cubic feet
Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	245	
Total Capture Volume (required water quality volume(s) x 1.20) =	1472	cubic feet
Filter area for Sand Filters	Designed as Required in RG-348	
Partial Sedimentation and Filtration System		
Water Quality Volume for combined basins =	1472	cubic feet
Minimum filter basin area =	123	square feet
Maximum sedimentation basin area =	491	square feet
Minimum sedimentation basin area =	31	square feet

Catchment Area and Proposed BMP	Drainage Area (acres)	Imp. Cover (acres)	Required TSS Removal (lbs/yr)	TSS Removed (lbs/yr)
Area A - VFS	0.524	0.06	54	54
Area B - VFS	0.309	0.086	77	77
Area C - Partial Sediment/Sand Filter: WQ Volume Provided = 1526 cu-ft > WQV Required = 1,472 cu-ft, Sand Filter Area Provided = 144 sq-ft > Sand Filter Area Required = 123 sq-ft, Depth = 2.40 ft	0.218	0.155	139	154
Area D - Uncaptured	0.030	0.017	15	0
Total	1.081	0.318	285	285

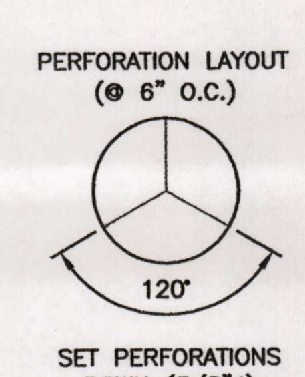


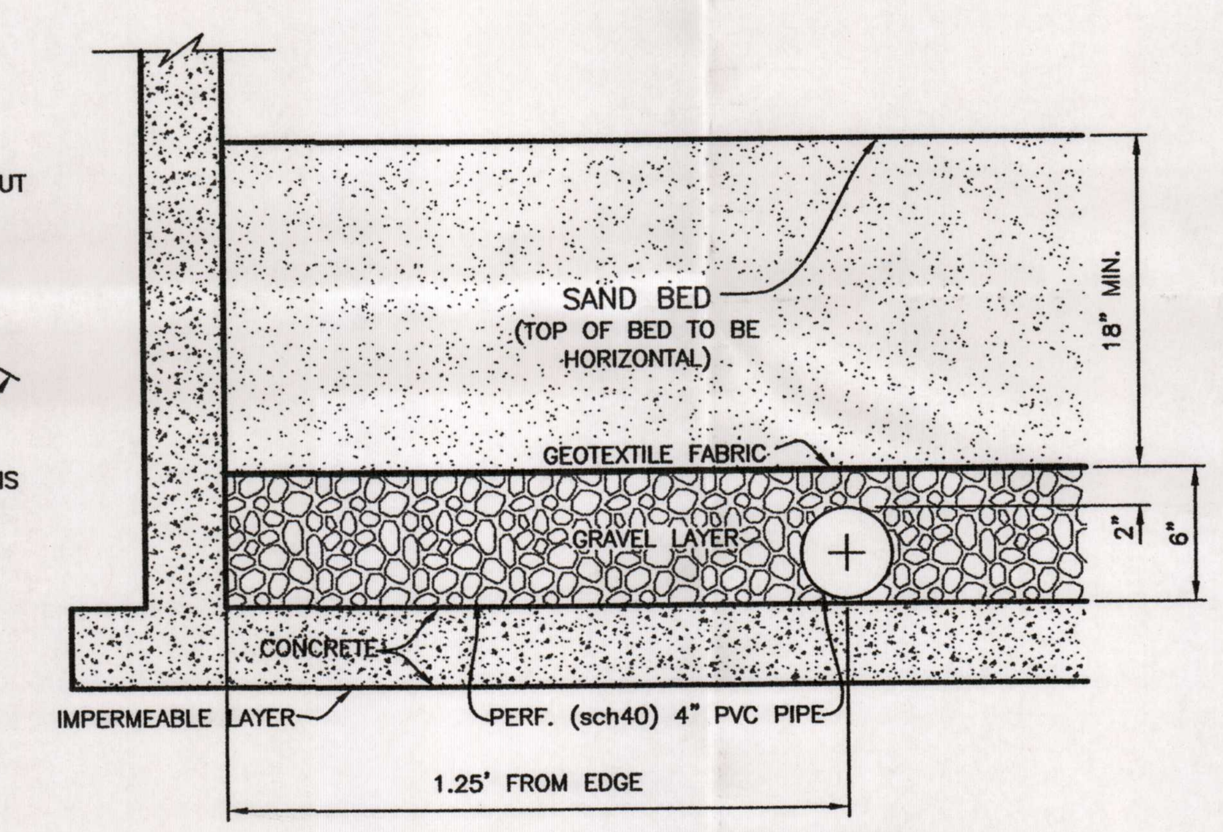
NOTES:

1. GABION BASKET SHALL BE 3-FT WIDE 1.5-FT HIGH. BASKET WIRE SHALL BE PLASTIC COATED MIN. 12-GA. BASKET SHALL BE FILLED WITH 5" TO 8"ø ROCKS.
2. SEE STRUCTURAL DETAILS FOR ALL WALLS AND FLOOR OF SEDIMENTATION/FILTRATION BASIN.

WATER QUALITY POND SECTION A-A
N.T.S.

Monday, May 03, 2010, 8, 57, AM
File Name: F:\110309\Sheets\ppd01.dwg





SAND BED PROFILE
(WITH GRAVEL FILTER)

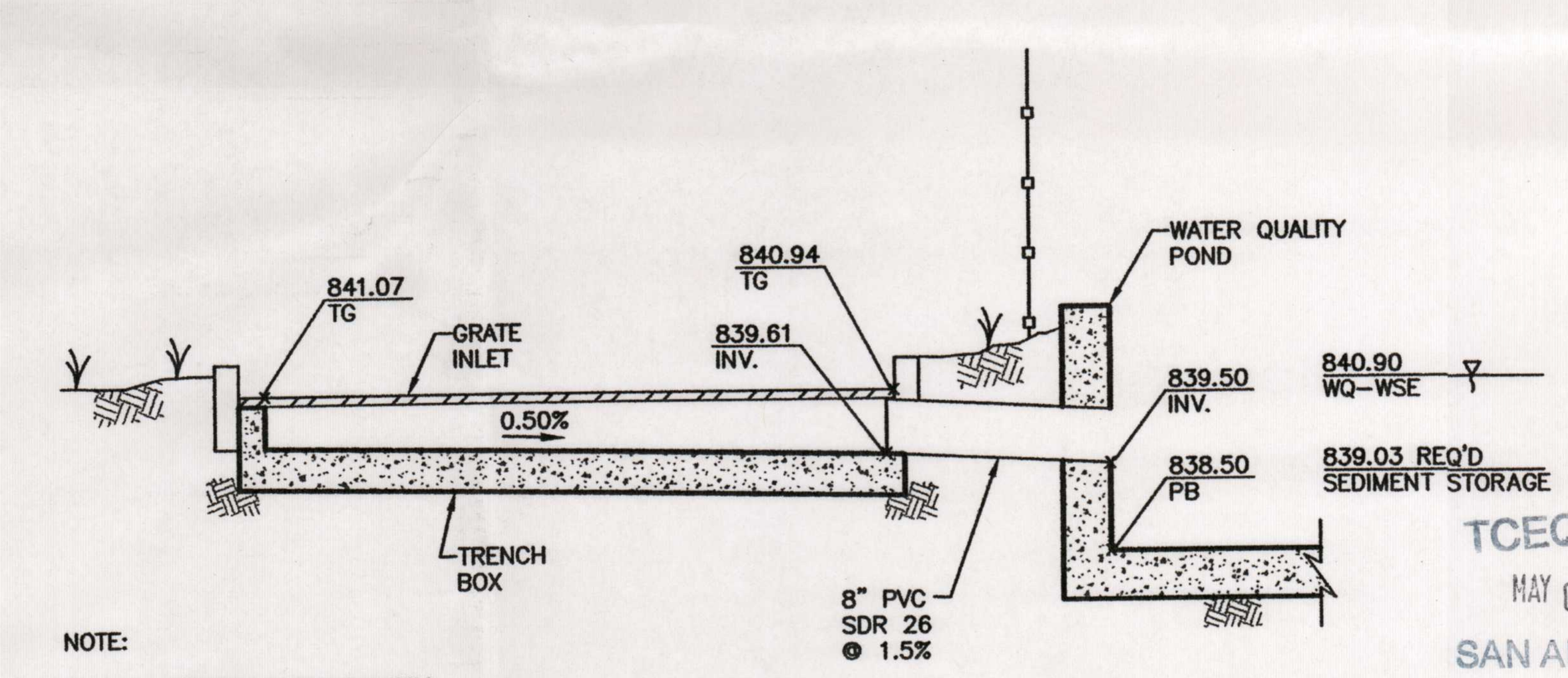
Table 3.6 Geotextile Fabric Specifications (COA, 1997)

Property	Test Method	Unit	Specification (min.)
Unit Weight		oz/yd^{-6}	8
Filtration Rate		in/sec	0.08
Puncture Strength	ASTM D-751*	lb	125
Mullen Burst Strength	ASTM D-751	psi	400
Tensile Strength	ASTM D-1682	lb	200
Equiv. Opening Size	US Standard Sieve	No.	80

*modified

SAND BED WITH GRAVEL LAYER NOTES:

THE TOP LAYER IS TO BE A MINIMUM OF EIGHTEEN (18) INCHES OF 0.02-0.04 INCH DIAMETER SAND WHICH CORRESPOND WITH ASTM C-33 CONCRETE SAND (SMALLER SAND SIZE IS NOT ACCEPTABLE). UNDER THE SAND SHALL BE A LAYER OF ONE-HALF (0.5) TO ONE AND ONE-HALF (1.5) INCH DIAMETER WASHED, ROUNDED, RIVER GRAVEL WHICH PROVIDES A MINIMUM OF TWO (2) INCHES OF COVER OVER THE TOP OF THE UNDERDRAIN LATERAL PIPES. THE SAND AND GRAVEL MUST BE SEPARATED BY A LAYER OF GEOTEXTILE FABRIC MEETING THE SPECIFICATIONS LISTED IN TABLE 3.6 "GEOTEXTILE FABRIC SPECIFICATIONS (COA, 1997). THE GEOTEXTILE FABRIC SHALL MEET THE SPECIFICATIONS LISTED IN TABLE 3.6 TAKEN FROM THE TNRCC TECHNICAL GUIDANCE ON BEST MANAGEMENT PRACTICES, JUNE 1999.



NOTE:

FLOWS GREATER THEN Q_{25} WILL (WEIR) FLOW OVER GRATE INLET AND CONTINUE DOWN THE DRIVE.

FLOW SPLITTER/INLET
N.T.S.

RECEIVED
MAY 1 1 2010
COUNTY ENGINEER

FLOW SPLITTER ORIFICE CHECK

ORIFICE DIAMETER	=	8 in
INLET INVERT	=	839.94 ELEV.
Q_{25}	=	1.9 cfs
Q_{25} WSE @ INLET	=	840.94 ELEV.
SPRING LINE	=	840.27 ELEV.
HEAD	=	1.00 ft
AREA ORIFICE	=	0.35 ft^2
Q OF ORIFICE	=	1.9 cfs
n	=	0.010
Sn	=	1.46%

TCEQ-R13
MAY 03 2010
SAN ANTONIO

REVISIONS

DATE	DESCRIPTION

STATE OF TEXAS
MICHAEL G. SHORT
88015
LICENSED PROFESSIONAL ENGINEER

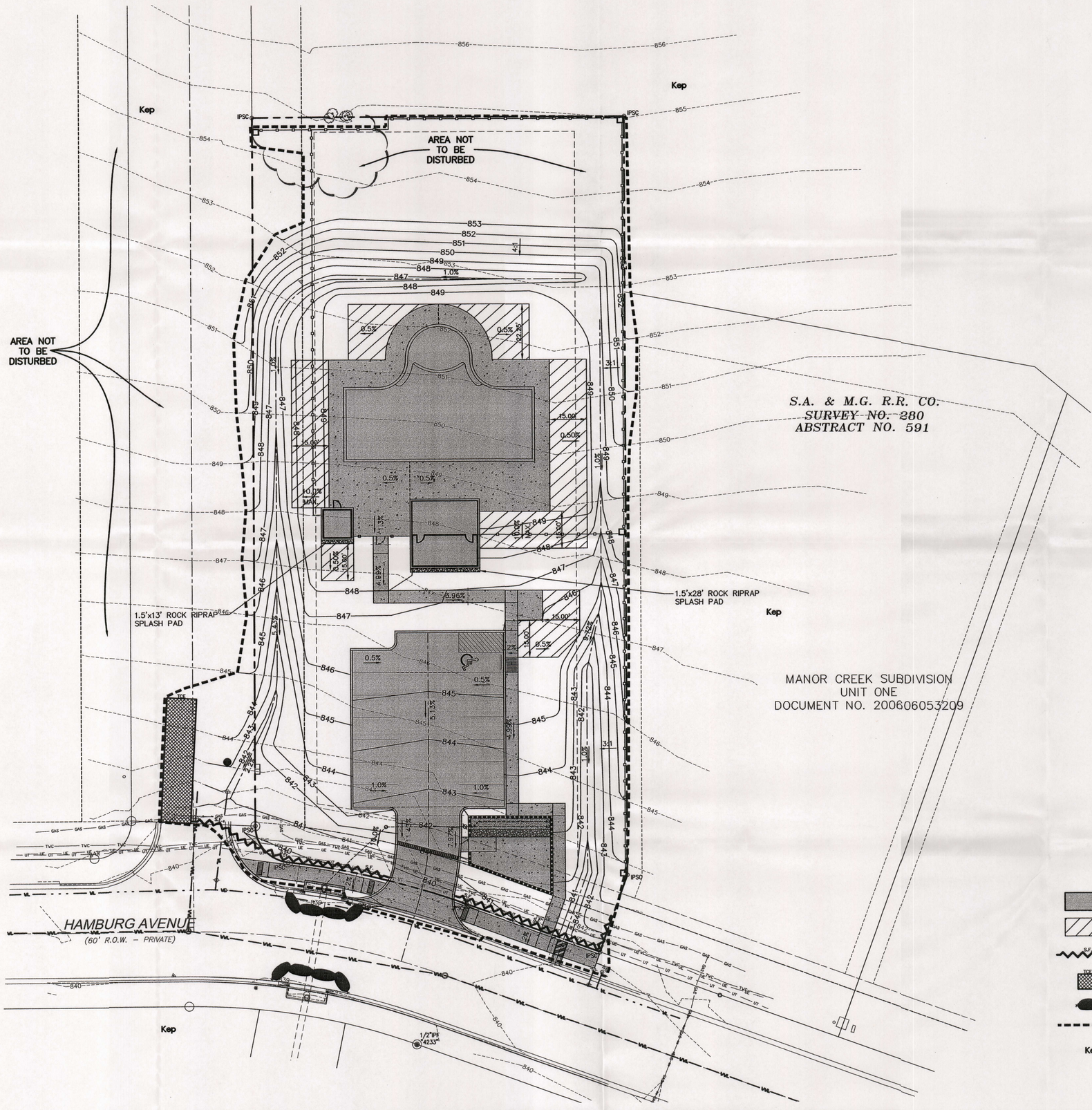
WATER QUALITY POND PLAN & DETAILS FOR

RECREATION CENTER
MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: APRIL 2010
JOB NO.: 110309

P-1



LEGEND:

- PROPOSED BUILDINGS, SIDEWALKS, DETENTION POND AND PARKING AREAS
- FILTER STRIP
- SILT FENCE
- TEMPORARY CONSTRUCTION ENTRANCE/EXIT
- CURB INLET GRAVEL FILTER
- AREAS TO BE DISTURBED w/SOIL STABILIZATION (WITH SITE CONSTRUCTION PLANS)
- Kep — SEE GEOLOGICAL ASSESSMENT

RECEIVED
MAY 11 2010
COUNTY ENGINEER

RECEIVED TCEQ SAN ANTONIO REGION
2010 APR 29 PM 3:01

TCEQ-R13
MAY 03 2010
SAN ANTONIO

REVISIONS

DATE	DESCRIPTION

STATE OF TEXAS — MICHAEL G. SHORT — LICENSED PROFESSIONAL ENGINEER — 88015

SITE PLAN (Proposed)

RECREATION CENTER

MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: APRIL 2010
JOB NO.: 110309

REC-2

Wednesday, April 28, 2010, 9:53 AM
File Name: P:\110309\TCEQ\SCS\REC-02.dwg

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 16, 2010

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

Re: Edwards Aquifer, Comal County
PROJECT NAME: Community Center Manor Creek Subdivision, located approximately 2 miles west of Loop 337 on the northeast side of State Highway 46, New Braunfels, Texas
PLAN TYPE: Application for Approval of a Water Pollution Abatement Plan (WPAP) 30 Texas Administration Code (TAC) Chapter 213; Edwards Aquifer Protection Program
EAPP File No.: 2439.04

Dear Mr. Hornseth:

The referenced application administratively complete on February 12, 2010, is being forwarded to you pursuant to the Edwards Aquifer Rules. The Texas Commission on Environmental Quality (TCEQ) is required by 30 TAC Chapter 213 to provide copies of all applications to affected incorporated cities and underground water conservation districts for their comments prior to TCEQ approval.

Please forward your comments to this office by March 11, 2010.

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

Sincerely

Lynn M. Bumguardner
Water Section Manager
San Antonio Regional Office

LMB/eg

2439.04

COMMUNITY CENTER MANOR CREEK

WATER POLLUTION ABATEMENT PLAN MODIFICATION

February 2010

Prepared for:

Continental Homes of Texas, LP
12554 Riata Circle, 2nd Floor
Austin, Texas 78727

Project No. 110309

Prepared By:

The Schultz Group Inc.
2461 Loop 337
New Braunfels, TX 78130
(830) 606-3913

Modification of a Previously Approved Plan Checklist

✓ General Information Form (*TCEQ-0587*)
- ATTACHMENT A - Road Map
- ATTACHMENT B - USGS / Edwards Recharge Zone Map
- ATTACHMENT C - Project Description

✓ Geologic Assessment Form (*TCEQ-0585*)
- ATTACHMENT A - Geologic Assessment Table, *TCEQ-0585-Table*
- Comments to the Geologic Assessment Table
- ATTACHMENT B - Soil Profile and Narrative of Soil Units
- ATTACHMENT C - Stratigraphic Column
- ATTACHMENT D - Narrative of Site Specific Geology
- Site Geologic Map(s)
- Table or list for the position of features' latitude/longitude (if mapped using GPS)

✓ Modification of a Previously Approved Plan (*TCEQ-0590*)
- ATTACHMENT A - Original Approval Letter and Approved Modification Letters
- ATTACHMENT B - Narrative of Proposed Modification
- ATTACHMENT C - Current Site Plan of the Approved Project

✓ Application Form (appropriate for the modification)
- Aboveground Storage Tank Facility Plan (*TCEQ-0575*)
- Organized Sewage Collection System Plan (*TCEQ-0582*)
- Underground Storage Tank Facility Plan (*TCEQ-0583*)
- Water Pollution Abatement Plan Application Form (*TCEQ-0584*)
- Lift Station / Force Main System Application (*TCEQ-0624*)

✓ Temporary Stormwater Section (*TCEQ-0602*), if necessary
- ATTACHMENT A - Spill Response Actions
- ATTACHMENT B - Potential Sources of Contamination
- ATTACHMENT C - Sequence of Major Activities
- ATTACHMENT D - Temporary Best Management Practices and Measures
- ATTACHMENT E - Request to Temporarily Seal a Feature, if sealing a feature
- ATTACHMENT F - Structural Practices
- ATTACHMENT G - Drainage Area Map
- ATTACHMENT H - Temporary Sediment Pond(s) Plans and Calculations
- ATTACHMENT I - Inspection and Maintenance for BMPs
- ATTACHMENT J - Schedule of Interim and Permanent Soil Stabilization Practices

✓ Permanent Stormwater Section (*TCEQ-0600*), if necessary
- ATTACHMENT A - 20% or Less Impervious Cover Waiver, if project is multi-family residential, a school, or a small business and 20% or less impervious cover is proposed for the site
- ATTACHMENT B - BMPs for Upgradient Stormwater
- ATTACHMENT C - BMPs for On-site Stormwater
- ATTACHMENT D - BMPs for Surface Streams
- ATTACHMENT E - Request to Seal Features, if sealing a feature
- ATTACHMENT F - Construction Plans
- ATTACHMENT G - Inspection, Maintenance, Repair and Retrofit Plan
- ATTACHMENT H - Pilot-Scale Field Testing Plan, if BMPs not based on *Complying with the Edwards Aquifer Rules: Technical Guidance for BMPs*
- ATTACHMENT I -Measures for Minimizing Surface Stream Contamination

Modification of a Previously Approved Plan Checklist (continued)

✓ Agent Authorization Form (*TCEQ-0599)*, if application submitted by agent

✓ Application Fee Form (*TCEQ-0574*)

✓ Check Payable to the "Texas Commission on Environmental Quality"

✓ Core Data Form (*TCEQ-10400)*

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: Community Center Manor Creek
COUNTY: Comal STREAM BASIN: Bleiders Creek

EDWARDS AQUIFER: X RECHARGE ZONE
__ TRANSITION ZONE

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

CUSTOMER INFORMATION

1. Customer (Applicant):

Contact Person: Richard N. Maier, Assistant Secretary
Entity: Continental Homes of Texas, L.P., a Texas Limited Partnership By: CHTEX of Texas, Inc. a Delaware Corporation, Its General Partner
Mailing Address: 12554 Riata Vista Circle, 2nd Floor
City, State: Austin, TX. Zip: 78727
Telephone: (512) 345-4663 FAX: (512) 533-1429

Agent/Representative (If any):

Contact Person: Michael G. Short, P.E.
Entity: The Schultz Group, Inc.
Mailing Address: 2461 Loop 337
City, State: New Braunfels, TX. Zip: 78130
Telephone: (830) 606-3913 FAX: (830) 625-2204

2. X This project is inside the city limits of New Braunfels, TX.
__ This project is outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
__ 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.

The proposed Manor Creek development is located approximately 2 miles West of Loop 337 on the Northeast side of State Highway 46.

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)~~ (4) 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.
__ 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:

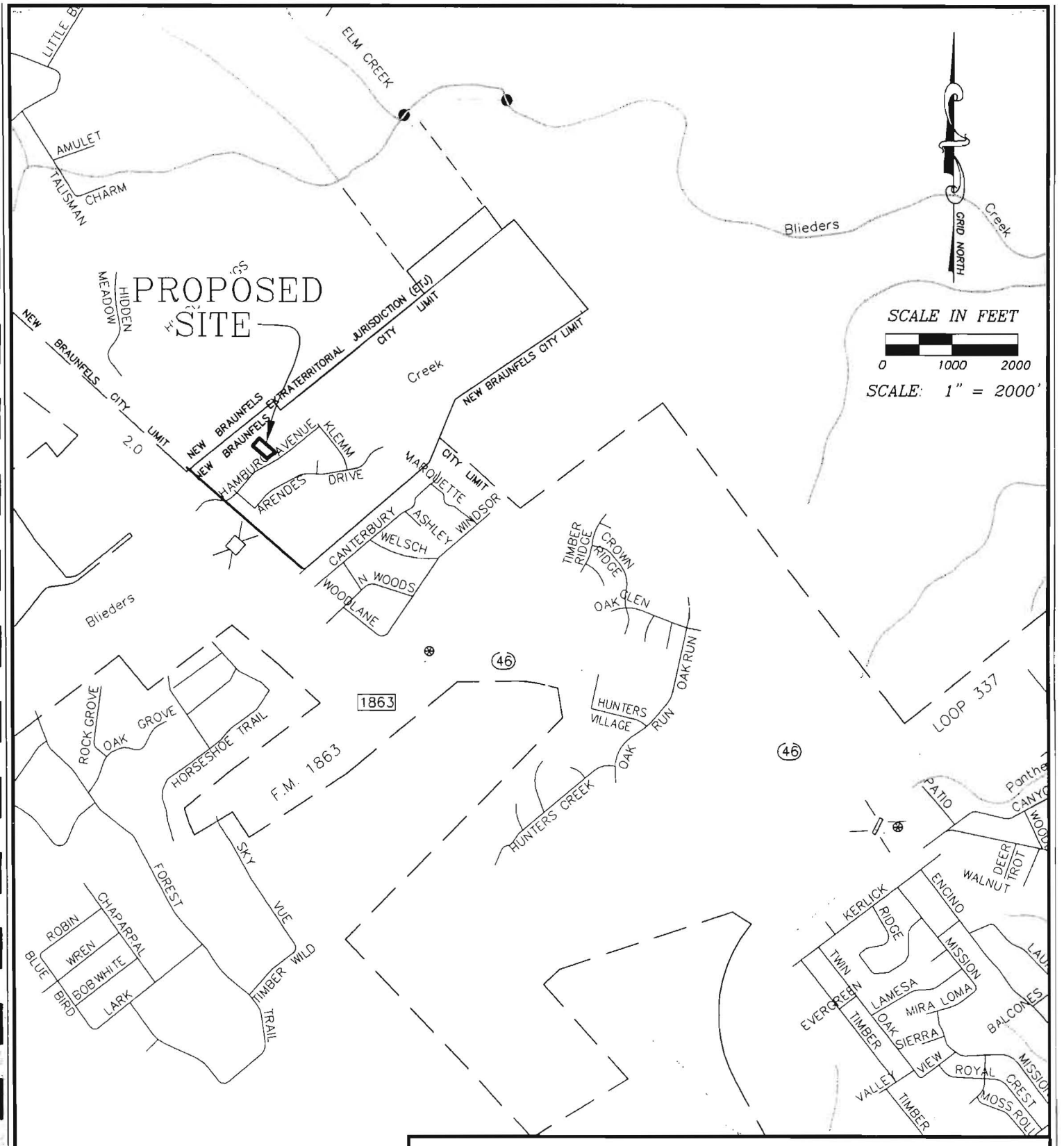
Michael G. Short, P.E.
Print Name of Customer/Agent

Signature of Customer/Agent

2/11/10
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.



LOCATION MAP

THE Schultz Group, INC.

TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130 P: 830.606.3913
F: 830.625.2204

DRAWN BY: M.H.	DATE: NOVEMEBER 2009
CHECKED BY: S.S.	JOB NO.: 110109

Attachment C – Project Description

The project was previously titled Tschirhart Ranch Subdivision, it has since become know as Manor Creek. The original proposed project consisted of 252.038 acres of land that was to be developed into a 343 lot residential subdivision. Each individual residential lot was to contain approximately 3,860 square feet of impervious cover which included a building structure and a concrete driveway. There was to be approximately 6,800 L.F. of street in a 60' R.O.W. The overall developed project was to consist of less than 20% impervious cover, so that structural BMP's would not be required. The permanent BMP's around the sensitive features consist of native vegetation for a minimum of 50 feet around each feature.

Unit one has been constructed and the impervious cover has exceeded the 3,860 square feet of impervious cover allowed for each lot. As a result the owner has purchased an additional 15.001 acres to keep the impervious cover for the site under 20%.The impervious cover for lots within Units 2-6 have been reconfigured to contain approximately 3,662 square feet of impervious cover for interior lots and 3,865 square feet for optional corner lots which includes all proposed typical building structures and a concrete driveway. With the addition of the 15.001 acres and a reduction of area given an existing TxDOT dedication of 0.123 acres this development will have less than 20% impervious cover; therefore, no structural BMP's are required. The 50 foot vegetative buffer around sensitive features will be maintained.

Additional Items Changed

a. FEMA Flood Plain has been updated with the new FEMA Flood Plain maps approved September 2009
b. The south entrance from State Hwy 46 has been adjusted in anticipation of a future TxDOT drainage structure.
c. In Unit III Varrelman Road has been shifted slightly north.
d. In Unit V Liermann Avenue was shifted slightly south.
e. 15.001 Acres have been added to the original tract an a dedication of 0.123 acres to TxDOT has occurred at the Hamburg entrance. The total area for the site is now 266.916 acres.
f. Three lots have been combined in Unit II for a future Community Center. Making the total acreage outside the Community Center 265.836 acres.

The above mentioned changes have been included in the "Modification Tschirhart Ranch Subdivision" submitted concurrently with this application.

This WPAP Modification will include the addition of a Community Center on 3 lots which will contain approximately 14,553 square feet of impervious cover. The community center will include restrooms, pool and parking facility. Permanent BMPs for the proposed site will be filter strips located immediately downstream of impervious cover. The remaining portion of the subdivision will remain under 20% impervious cover, therefore; no new permanent BMPs are required.

Edwards Aquifer Recharge Zone Map
30 Texas Administrative Code Chapter 213
Edwards Aquifer Authority Rule Chapter 713

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NEW BRAUNFELS WEST QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

NEW BRAUNFELS EAST QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

PROPOSED OVERALL
MANOR CREEK SUBDIVISION

SITE: MANOR CREEK
RECREATION CENTER

Recharge Zone

Transition Zone

NEW BRAUNFELS

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

Control by USGS, NOS/NOAA, and USCE

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

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

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

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

SCALE 1:24 000

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000 FEET
1 .5 0 1 MILES
1 .5 0 KILOMETERS 1 2
1000 0 METERS 1000 2000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

TEXAS
QUADRANGLE LOCATION

2998-413

ROAD CLASSIFICATION

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

NEW BRAUNFELS WEST, TEX.
29098-F2-TF-024
1988
DMA 6343 II NW-SERIES V822

ATTACHMENT B
USGS/EDWARDS RECHARGE ZONE MAP

NEW BRAUNFELS EAST, TEX.
29098-F1-TF-024
1968
REVISED 1994
DMA 6343 II NE-SERIES V822

Last revision date of the Recharge Zone Boundary for this Quadrangle Map: March 1974

Geologic Site Assessment (WPAP)

for Regulated Activities / Development
on the Edwards Aquifer Recharge / Transition Zone

The Tschirhart Ranch Subdivision
(Manor Creek)
267.038 Acres
New Braunfels, Texas

FROST GEOSCIENCES CONTROL # FGS-E09176

DECEMBER 31, 2009

Prepared exclusively for

The Schultz Group
2461 Loop 337
New Braunfels, Texas 78130

Frost GeoSciences

Geotechnical • Construction Materials
Forensics • Environmental

13402 Western Oak • Helotes, Texas 78023 • Phone: (210) 372-1315 • Fax: (210) 372-1318

Frost GeoSciences
Geotechnical • Construction Materials
Forensics • Environmental

13402 Western Oak
Helotes, TX 78023
Phone (210) 372-1315
Fax (210) 372-1318
www.frostgeosciences.com
TBPE Firm Registration # F-9227
TBPG Firm Registration # 50040

December 31, 2009

The Schultz Group
2461 Loop 337
New Braunfels, Texas 78130

Attn: Mr. Shawn Schorn

Re: Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivis9on
267.038 Acres
New Braunfels, Texas

Frost GeoSciences, Inc. Control # FGS-E09176

Gentlemen:

Attached is a copy of the Geologic Assessment Report completed for the above referenced project site as it relates to 30 TAC §213.5(b)(3), effective June 1, 1999. Our investigation was conducted, and this report was prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The results of our investigation along with any required recommendations for Best Management Practices (BMP's) are provided in the following report.

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.

Sincerely,
Frost GeoSciences, Inc.

Steve Frost, C.P.G.
President, Senior Geologist

Distribution: (6) The Schultz Group

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 Tschirhart Ranch Subdivision - 267.038 Acres

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

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

PROJECT INFORMATION

1. ✓ 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 Assoc.	C/D	0.5 to 1
Comfort-Rock Outcrop Complex	D	0.5 to 1

* 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. ✓ **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. ✓ **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. ✓ 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" = 200 '
Site Geologic Map Scale	1" = 200 '
Site Soils Map Scale (if more than 1 soil type)	1" = 1000 '

6. Method of collecting positional data:

✓ Global Positioning System (GPS) technology.
✓ Other method(s). 2003 & 2009 Aerial Photo

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

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

9. ✓ 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. ✓ The Recharge Zone boundary is shown and labeled, if appropriate.

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

— There are ___(#) 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. ✓ One (1) original and three (3) copies of the completed assessment has been provided.

Date(s) Geologic Assessment was performed: April 5-14, 21-28, 2005 & December 19, 2009
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.

Steve Frost, C.P.G.
Print Name of Geologist

(210) 372-1315
Telephone

(210) 372-1318
Fax

Signature of Geologist

December 31, 2009
Date

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

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

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.

Stratigraphic Column

[Hydrogeologic subdivisions modified from Maclay and Small (1976); groups, formations, and members modified from Rose (1972); lithology modified from Dunham (1962); and porosity type modified from Choquette and Pray (1970). CU, confining unit; AQ, aquifer]

Hydrogeologic subdivision			Group, formation, or member			Hydrologic function	Thickness (feet)	Lithology	Field identification	Cavern development	Porosity/permeability type
Upper Cretaceous	Upper confining units		Eagle Ford Group			CU	30 – 50	Brown, flaggy 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 with calcite-filled veins	Minor surface karst	Low porosity/low permeability
			Del Rio Clay			CU	40 – 50	Blue-green to yellow-brown clay	Fossiliferous; *Hymenoyra arietina*	None	None/primary upper confining unit
Lower Cretaceous	I	Edwards aquifer	Georgetown Formation			Karst AQ; not karst CU	2 – 20	Reddish-brown, gray to light tan marly limestone	Marker fossil; *Macroscella washitaensis*	None	Low porosity/low permeability
	II		Edwards Group	Person Formation	Cyclic and marine members, undivided	AQ	80 – 90	Mudstone to packstone; *miliolid* grainstone; chert	Thin graded cycles; massive beds to relatively thin beds; crossbeds	Many subsurface; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric/water-yielding
	III				Leached and collapsed members, undivided	AQ	70 – 90	Crystalline limestone; mudstone to grainstone; chert, collapsed breccia	Bioturbated iron-stained beds separated by massive limestone beds; stromatolitic limestone	Extensive lateral development, large rooms	Majority not fabric/one of the most permeable
	IV				Regional dense member	CU	20 – 24	Dense, argillaceous mudstone	Wispy iron-oxide stains	Very few; only vertical fracture enlargement	Not fabric/low permeability; vertical barrier
	V			Kainer Formation	Grainstone member	AQ	50 – 60	*Miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone	Few	Not fabric/ recrystallization reduces permeability
	VI				Kirschberg evaporite member	AQ	50 – 60	Highly altered crystalline limestone; chalky mudstone; chert	Boxwork voids, with nexaur and travertinic frame	Probably extensive cave development	Majority fabric/one of the most permeable
	VII				Dolomitic member	AQ	110 – 130	Mudstone to grainstone; crystalline limestone; chert	Massively bedded light gray, *Toucasia* abundant	Caves related to structure or bedding planes	Mostly not fabric; some bedding plane-fabric/water-yielding
	VIII				Basal nodular member	Karst AQ; not karst CU	50 – 60	Shaly, nodular limestone; mudstone and *miliolid* grainstone	Massive, nodular and mogled, *Exogyra texana*	Large lateral caves at surface; a few caves near Cibolo Creek	Fabric; stratigraphically controlled/large conduit flow at surface; no permeability in subsurface
	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

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	≥ 40	<1.6	≥1.6	
S-1	N29° 43' 42.6"	W98° 11' 17"	SC	20	Kep	1	1	1.5	-	-	-	-	O,F	7	27	27		Yes		Hillside
S-2	N29° 43' 42.2"	W98° 11' 15.8"	O^{VG}	5	Kep	15	50		-	-	1	0.5	O,F,C	15	20	20		Yes		Hillside
S-3	N29° 43' 41.1"	W98° 11' 17"	SC	20	Kep	1	1	1.5	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-4	N29° 43' 37.9"	W98° 11' 12.4"	SC	20	Kep	1	1	2	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-5	N29° 43' 39.4"	W98° 11' 11.6"	SC	20	Kep	1	1	1.5					O,F	10	30	30		Yes		Hillside
S-6	N29° 43' 34.5"	W98° 11' 11"	O^{VegR}	5	Kep	25	75		45	-	4/1-	.03/.03	O,F,C	19	24	24			Yes	Drainage
S-7	N29° 43' 33.5"	W98° 11' 7.97"	MB	30	Kep	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-8	N29° 43' 33.4"	W98° 11' 7.37"	O^{VR}	5	Kep	20	200				3-10	0.08-0.3	O,F,C	19	24	24			Yes	Cliff
S-9	N29° 43' 44.3"	W98° 11' 5.2"	O^{FR}	5	Kep	20	40		33	10	1	0.25	O,F,C	19	34	34			Yes	Hillside
S-10	N29° 43' 41.9"	W98° 11' 4.85"	SC	20	Kep	1.5	1.5	2	-	-	-	-	O,F,N	12	32	32		Yes		Hillside
S-11	N29° 43' 36.6"	W98° 11' 4.18"	MB	30	Kep	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-12	N29° 43' 38.3"	W98° 11' 3.72"	SC	20	Kep	1	1	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside

* DATUM 1927 North American Datum (NAD27)

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

8A INFILLING

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

12 TOPOGRAPHY

Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

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STATE OF TEXAS
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Geology
License No. 315
LICENSED PROFESSIONAL GEOSCIENTIST

Signature _____ Date December 31, 2009

Sheet 1 of 9

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	≥ 40	<1.6	≥1.6	
S-13	N29° 43' 33.4"	W98° 11' 4.95"	SC	20	Kcp	1	1	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-14	N29° 43' 32.6"	W98° 11' 4.96"	OVHG	5	Kcp	15	40		25	10	3-5	0.12	O,F,C	15	30	30		Yes		Drainage
S-15	N29° 43' 30.5"	W98° 11' 3.15"	ZMSC	30	Kcp	20	75		-	-	1-5	0.25	O,F,C	20	50		50		Yes	Drainage
S-16	N29° 43' 33.5"	W98° 11' 0.93"	SC	20	Kcp	1	2	2	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-17	N29° 43' 37.4"	W98° 10' 54.7"	SC	20	Kcp	2	2	2					O,F	12	32	32		Yes		Hillside
S-18	N29° 43' 37.8"	W98° 10' 54.4"	SC	20	Kcp	2	2	1.5	-	-	-	-	O,F,C	12	32	32			Yes	Hillside
S-19	N29° 43' 34.2"	W98° 11' 0.26"	SC	20	Kcp	0.5	0.5	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-20	N29°43' 39.1"	W98° 10' 53.6"	SC	20	Kcp	2	2	2	-	-	-	-	O,F,C	12	32	32		Yes		Hillside
S-21	N29° 43' 39.8"	W98° 10' 59.5"	SF	20	Kcp	15	30		45	10	1-2	0.25	O,F,C	20	50		50		Yes	Drainage
S-22	N29° 43' 40.8"	W98° 10' 52.9"	MB	30	Kcp	3	3		-	-	-	-	X	7	37	37		Yes		Hillside
S-23	N29° 43' 42"	W98° 10' 44.4"	SC	20	Kcp	0.5	4	1.5	-	-	-	-	O,F	15	35	35		Yes		Hillside
S-24	N29° 43' 38.3"	W98° 11' 3.72"	SC	20	Kcp	0.5	4	1.5	-	-	-	-	O,F	15	35	35		Yes		Hillside

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2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution Cavity	20
SF	Solution-enlarged fracture(s)	20
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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

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N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
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STATE OF TEXAS
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Signature Steve Frost Date December 31, 2009 Sheet 2 of 9

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	> 40	<1.6	>1.6	
S-25	N29° 43' 40.7"	W98° 10' 58.6"	Z[VIOT]	30	Kep	50	100		-	-	1-4	0.25	O,F,C	20	50		50	Yes		Drainage
S-26	N29° 43' 40.6"	W98° 11' 1.51"	SC	20	Kep	1	1	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-27	N29° 43' 41.1"	W98° 11' 0.076"	O[V]	5	Kep	20	60		-	-	2-6	0.2-0.5	O,F,C	12	17	17		Yes		Hillside
S-28	N29° 43' 41.1"	W98° 11' 0.83"	SC	20	Kep	1.5	1	2	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-29	N29° 43' 41.3"	W98° 11' 1.09"	SC	20	Kep	1.5	4	1.5					O,F	15	35	35		Yes		Hillside
S-30	N29° 43' 44.3"	W98° 11' 1.81"	SC	20	Kep	1	1	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-31	N29° 43' 41.4"	W98° 10' 59.2"	MB	30	Kep	3	3	7	-	-	-	-	X	7	37	37		Yes		Hillside
S-32	N29° 43' 42.1"	W98° 10' 58.6"	SC	20	Kep	1.5	3	1.5	-	-	-	-	O,F	19	39	39		Yes		Hillside
S-33	N29° 43' 56.7"	W98° 10' 56.8"	SC	20	Kep	2	2	1.5	-	-	-	-	O,F,C	12	32	32		Yes		Hillside
S-34	N29° 43' 57.6"	W98° 10' 55.6"	SC	20	Kep	1	1	1	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-35	N29° 43' 41.2"	W98° 10' 53.2"	SF	20	Kep	10	15		78	10	1	0.20	O,F	20	50		50	Yes		Hillside
S-36	N29° 43' 50.6"	W98° 10' 53.9"	SC	20	Kep	1	0.5	1	-	-	-	-	O,F	10	30	30		Yes		Hillside

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2A TYPE	TYPE	2B POINTS
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8A INFILLING

N	None, exposed bedrock
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Signature _____ Date December 31, 2009 Sheet 3 of 9

GEOLOGIC ASSESSMENT TABLE — PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS											EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	≥ 40	<1.6	≥1.6	
S-37	N29° 43' 59.1"	W98° 10' 53.4"	O^V^	5	Kep	15	20		-	-	2-4	0.15	O,F	15	20	20		Yes		Drainage
S-38	N29° 43' 59.1"	W98° 10' 51.1"	Z^V^^FR^	30	Kep	20	75		-	-	-	-	O,F	20	50		50		Yes	Drainage
S-39	N29° 43' 52"	W98° 10' 52.3"	SC	20	Kep	1	1	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-40	N29° 43' 41.1"	W98° 11' 0.83"	CD	5	Kep	4	5	1	-	-	-	-	O,F	9	14	14		Yes		Hillside
S-41	N29° 43' 54.8"	W98° 10' 50.8"	SC	20	Kep	1.5	3	1.5					O,F	15	35	35		Yes		Hillside
S-42	N29° 43' 50.4"	W98° 10' 50.1"	SC	20	Kep	1	1	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-43	N29° 43' 42.7"	W98° 10' 47.8"	MB	30	Kep	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-44	N29° 43' 51.3"	W98° 10' 47.4"	SC	20	Kep	2	2	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-45	N29° 43' 53.4"	W98° 10' 47.7"	SC	20	Kep	2	2	1.5	-	-	-	-	O,F,C	12	32	32		Yes		Hillside
S-46	N29° 43' 50.7"	W98° 10' 48.8"	SF	20	Kep	2	10	2	-	-	-	-	O,F	19	39	39		Yes		Hillside
S-47	N29° 43' 50.7"	W98° 10' 49.1"	SC	20	Kep	1	0.5	1	-	-	-	-	O,F	10	30	30		Yes		Hillside
S-48	N29° 43' 50.6"	W98° 10' 49.2"	SC	20	Kep	2	1.5	2	-	-	-	-	O,F	10	30	30		Yes		Hillside

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2A TYPE	TYPE	2B POINTS
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8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
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GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

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1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
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						X	Y	Z		10						< 40	> 40	< 1.6	> 1.6	
S-49	N29° 43' 49.2"	W98° 10' 44.1"	MB	30	Kcp	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-50	N29° 43' 45.7"	W98° 10' 43.5"	MB	30	Kcp	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-51	N29° 43' 58"	W98° 10' 46.6"	O^VHR	5	Kcp	25	75		60	10	1-3	0.1-0.5	O,F	12	27	27		Yes		Hillside
S-52	N29° 43' 54"	W98° 10' 44.3"	O^VHR	5	Kcp	50	75		40-55	10	1-4	0.1-0.5	O,F	19	34	34		Yes		Drainage
S-53	N29° 43' 52.9"	W98° 10' 44.9"	O^VR	5	Kcp	20	40		-	-	3-6	0.1-0.25	O,F,C	12	17	17		Yes		Hillside
S-54	N29° 43' 45.1"	W98° 10' 46.8"	SC	20	Kcp	2	1	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-55	N29° 43' 41.8"	W98° 10' 44.5"	O^VR	5	Kcp	10	10		-	-	1-4	0.1-0.25	O,F,C	10	15	15		Yes		Hillside
S-56	N29° 43' 43.1"	W98° 10' 43.9"	SC	20	Kcp	0.5	0.5	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-57	N29° 43' 43.1"	W98° 10' 44.2"	O^VHR	5	Kcp	10	50		50-60	-	1-3	0.1-0.25	O,F,C	12	17	17		Yes		Hillside
S-58	N29° 43' 42.8"	W98° 10' 43.2"	O^VR	5	Kcp	10	50	1	-	-	-	-	O,F	12	17	17		Yes		Hillside
S-59	N29° 43' 41.2"	W98° 10' 53.2"	SC	20	Kcp	1	0.5		-	-	-	-	O,F	12	32	32		Yes		Hillside
S-60	N29° 43' 50.6"	W98° 10' 53.9"	SC	20	Kcp	1	0.5	1	-	-	-	-	O,F	10	30	30		Yes		Hillside

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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

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Geology
License No. 315
LICENSED PROFESSIONAL GEOSCIENTIST

Signature Steve Frost Date December 31, 2009 Sheet 5 of 9

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	> 40	<1.6	>1.6	
S-61	N29° 43' 44.6"	W98° 10' 43.9"	Z[VMBC]	30	Kep	30	100		-	-	1-4	0.1-0.25	O,F,C	20	50		50		Yes	Drainage
S-62	N29° 43' 47"	W98° 10' 47.4"	SC	20	Kep	1	1	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-63	N29° 43' 46.5"	W98° 10' 42.3"	C	30	Kep	4	10	10	-	-	-	-	N	20	50		50		Yes	Cliff
S-64	N29° 43' 46.5"	W98° 10' 42.3"	O[VR]	5	Kep	15	75	10	-	-	-	-	O,F,C	15	20	20			Yes	Cliff
S-65	N29° 43' 47.5"	W98° 10' 42.8"	O[FC]	5	Kep	15	100						O,F	15	20	20			Yes	Drainage
S-66	N29° 43' 49.1"	W98° 10' 40.9"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-67	N29° 43' 49.1"	W98° 10' 41.7"	SC	20	Kep	1	0.75	1.5	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-68	N29° 43' 51.6"	W98° 10' 42.4"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-69	N29° 43' 55"	W98° 10' 44"	O[VR]	5	Kep	15	20		18	-	1-4	0.1-0.25	O,F,C	12	17	17		Yes		Hillside
S-70	N29° 43' 55"	W98° 10' 44.2"	SC	20	Kep	3	1	1	-	-	-	-	O,F	20	40		40		Yes	Drainage
S-71	N29° 43' 55.1"	W98° 10' 43.6"	SC	20	Kep	4	4	1.5	-	-	-	-	O,F,C	20			40		Yes	Drainage
S-72	N29° 43' 56.3"	W98° 10' 38.6"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside

* DATUM 1927 North American Datum (NAD27)

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

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Signature Steve Frost Date December 31, 2009 Sheet 6 of 9

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	> 40	<1.6	>1.6	
S-73	N29° 43' 55.8"	W98° 10' 42.4"	O[V8]	5	Kep	20	50		-	-	1-4	0.1-0.25	O,F,C	20	25	25			Yes	Drainage
S-74	N29° 43' 57.3"	W98° 10' 39.6"	O[F8]	5	Kep	20	50		-	-	1-4	0.1-0.25	O,F,C	20	25	25			Yes	Drainage
S-75	N29° 43' 58.8"	W98° 10' 41.1"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32			Yes	Hillside
S-76	N29° 43' 8.48"	W98° 10' 40.5"	SC	20	Kep	2	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-77	N29° 43' 59.8"	W98° 10' 37.9"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-78	N29° 43' 57.5"	W98° 10' 34.5"	SC	20	Kep	5	5	1	-	-	-	-	O,F	19	39	39		Yes		Hillside
S-79	N29° 43' 58.5"	W98° 10' 31.3"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-80	N29° 43' 58.4"	W98° 10' 30.5"	SC	20	Kep	1	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-81	N29° 43' 59.3"	W98° 10' 31.3"	SH	20	Kep	10	10	1	-	-	-	-	O,F,V	20	40		40	Yes		Hillside
S-82	N29° 43' 57.7"	W98° 10' 30.1"	MB	30	Kep	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside
S-83	N29° 43' 59.2"	W98° 10' 27.3"	SC	20	Kep	1	1	3	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-84	N29° 43' 58.9"	W98° 10' 26.4"	MB	30	Kep	3	3	2	-	-	-	-	X	7	37	37		Yes		Hillside

* DATUM 1927 North American Datum (NAD27)

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
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GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: The Tschirhart Ranch Subdivision - 267.038 Acres FGS-E09176

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT²)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						< 40	≥ 40	<1.6	≥1.6	
S-85	N29° 43' 3.42"	W98° 10' 26.3"	Z[VISC]	30	Kep	20	90		-	-	1-4	0.1-0.5	O,F,C	25	55		55		Yes	Floodplain
S-86	N29° 44' 0.19"	W98° 10' 25"	SC	20	Kep	3	2	2	-	-	-	-	O,F	15	35	35		Yes		Hillside
S-87	N29° 43' 56.2"	W98° 10' 35"	MB	30	Kep	3	3	?	-	-	-	-	X	7	37	37		Yes		Hillside
S-88	N29° 44' 3.42"	W98° 10' 42.7"	SC	20	Kep	2	1	1	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-89	N29° 44' 3.3"	W98° 10' 18.1"	Z[VISC]	30	Kep	15	40		-	-	1-5	0.1-1	O,F	20	50		50		Yes	Floodplain
S-90	N29° 44' 14.1"	W98° 10' 25.4"	SC	20	Kep	6	5	1	-	-	-	-	O,F	19	39	39		Yes		Hillside
S-91	N29° 44' 10.7"	W98° 10' 19.5"	SC	20	Kep	2	2	2	-	-	-	-	O,F	15	35	35		Yes		Hillside
S-92	N29° 44' 7.32"	W98° 10' 32.5"	SC	20	Kep	4	1	2	-	-	-	-	O,F	17	37	37		Yes		Hillside
S-93	N29° 44' 8.33"	W98° 10' 32.1"	SH	20	Kep	4	5	2	-	-	-	-	O,F,C	20	40		40	Yes		Hillside
S-94	N29° 44' 9.15"	W98° 10' 20"	O[VIS]	5	Kep	10	20		41	-	1-2	0.25-0.33	O,F	19	24	24			Yes	Hillside
S-95	N29° 44' 7.42"	W98° 10' 17.4"	O[VIS]	5	Kep	20	50		76	-	1-4	0.1-0.33	O,F,C	19	24	24			Yes	Hillside
S-96	N29° 44' 7.87"	W98° 10' 16.1"	SC	20	Kep	1	1	1	-	-	-	-	O,F	19	39	39		Yes		Floodplain

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2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution Cavity	20
SF	Solution-enlarged fracture(s)	20
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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
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						X	Y	Z		10						< 40	≥ 40	<1.6	≥1.6	
S-97	N29° 44' 7.71"	W98° 10' 16.6"	O^VR	5	Kep	15	75		-	-	1-4	0.1-0.25	O,F,C	19	24	24			Yes	Hillside
S-98	N29° 44' 14.6"	W98° 10' 30.2"	SC	20	Kep	1	3	2	-	-	-	-	O,F	12	32	32		Yes		Hillside
S-99	N29° 44' 7.02"	W98° 10' 30.1"	SC	20	Kep	3	3	1.5	-	-	-	-	O,F	19	39	39		Yes		Hillside
S-100	N29° 44' 5.02"	W98° 10' 17.5"	F	20	Kep				-	-	-	-	-	-	-	-	-		Yes	Streambed
S-101	N29° 43' 52.9"	W98° 10' 41.5"	MB	30	Kep	3	3	?	-	-	-	-	X	7	37	37		Yes		Hillside
S-102	N29° 43' 49.9"	W98° 10' 42.7"	MB	30	Kep	3	3	?	-	-	-	-	X	7	37	37		Yes		Hillside
S-103	N29° 44' 9.16"	W98° 10' 19.1"	SC	20	Kep	2	3	2	-	-	-	-	O,F,C	15	35	35		Yes		Hillside
S-104	N29° 44' 00.9"	W98° 10' 25.3"	SC	20	Kep	2	2	2	-	-	-	-	O,F	19	39	39		Yes		Floodplain
S-501	N29° 44' 13.74"	W98° 10' 34.74"	O^VR	5	Kep	10	30	-	-	-	1	0.5	F	7	12	12		Yes		Hillside
S-502	N29° 44' 16.5"	W98° 10' 30.9"	MB	30	Kep	50	100	-	-	-	-	-	F	5	35	35		Yes		Hillside

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2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution Cavity	20
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Sheet 9 of 9

LOCATION

The project site is located along and north of State Highway 46, approximately 3/4 miles northwest of the intersection of State Highway 46 and F.M. 1863, in New Braunfels, Texas. An overall view of the area is shown on copies of the site plan, a street map, the U.S.G.S. Topographic Map, the Official Edwards Aquifer Recharge Zone Map, the FIRM Map, a geologic map, a 2003 Aerial Photograph at a scale of 1"=1000', a 2003 Aerial Photograph at a scale of 1"=600', and a 1973 Aerial Photograph at a scale of 1"=1000', Plates 1a, 2, 3, 4, 5, 6, 8, and 9 in Appendix A.

METHODOLOGY

The Geologic Assessment was conducted by Mr. Steve Frost, C.P.G., President and Senior Geologist with Frost GeoSciences, Inc.. Mr. Frost is a Licensed Professional Geoscientist in the State of Texas (License # 315), and is a Certified Professional Geologist with the American Institute of Professional Geologist (Certification # 10176).

Frost GeoSciences, Inc. researched the geology of the area near the intersection of State Highway 46 and F.M. 1863. The research included, but was not limited to, the Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet, FEMA maps, Edwards Aquifer Recharge Zone Maps, U.S.G.S. 7.5 Minute Quadrangle Maps, the Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle, the U.S.G.S. Water-Resources Investigations Report 94-4117, and the U.S.D.A. Soil Survey of Comal & Hays Counties, 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 project area. A 2003 aerial photograph, in conjunction with a hand held Garmin eTrex Summit Global Positioning System with an Estimated Potential Error ranging from 15 to 18 feet, was used to navigate around 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 locations of any potential recharge features noted in the field were marked with blue and white flagging. The flagging is numbered with the same potential recharge feature I.D. # that is used on the Site Geologic Map in Appendix C of this report. The Site Geologic Map indicating the limits of the project site and the locations of potential recharge features is included in Appendix C. A copy of a 2003 Aerial Photograph at an approximate scale of 1"=600' indicating the limits of the project site and the locations of potential recharge features is included on Plate 8 in Appendix A. 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 1-12 of this report.

RESEARCH & OBSERVATIONS

7.5 Minute Quadrangle Map Review

According to the U.S.G.S. 7.5 Minute Quadrangle Map, New Braunfels West, Texas Sheet (1988), the elevation across the project site ranges from 760 to 860 feet above mean sea level. The project site has a total relief of approximately 100 feet. Runoff from the project site flows to the southeast and north into Blieders Creek. Blieders Creek then flows to the northeast. Blieders Creek is located along the southeastern property line. State Highway 46 is located immediately southwest of the project site. The intersection of State Highway 46 and F.M. 1863 is located southeast of the project site. Huego Springs Loop Road is located northwest of the project site. A few areas of residential development are visible south and southwest of the project site. A landing strip is located east of the project site. A flood control - recharge dam is located northeast of the project site along Blieders Creek. A copy of the U.S.G.S. 7.5 Minute Quadrangle Map indicating the location of the project site is included on Plate 3 in Appendix A.

Recharge / Transition Zone

According to the Official Edwards Aquifer Recharge Zone Map, New Braunfels West, Texas Sheet (1988), the project site is located within the Recharge Zone of the Edwards Aquifer.

A copy of the Official Edwards Aquifer Recharge Zone Map indicating the location of the project site is included on Plate 4 in Appendix A.

100-Year Floodplain

According to the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) Panel #'s 4854630100C and 4854630105C, revised 09-29-86, the areas along Blieders Creek in the northeast portion of project site are located within Zone A of the 100-year flood. The remainder of the project site is located in Zone C. According to the panel legend, Zone A represents areas of the 100 year flood plain where base flood elevations and flood hazards factors are not determined. Zone C represents areas of minimal flooding. A copy of the above referenced FIRM panels indicating the location of the project site is included on Plate 5 in Appendix A.

Soils

According to the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Comal & Hays Counties, Texas, (1977), the project site is located on the Rumple-Comfort Association (RUD), and the Comfort-Rock Complex (CrD). A copy of the 1973 aerial photograph (approximate scale: 1"=1000') from the U.S.D.A. Soil Survey of Comal & Hays Counties, Texas indicating the location of the project site and the soil types is included on Plate 9 in Appendix A.

The Rumple-Comfort Association 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.

This soil has a USDA Texture Classification of very cherty clay loam, stony clay, very stony clay, extremely stony clay, and weathered bedrock. The Unified Classification is GC, CL or SC. The AASHO Classification is A-2-6, A-6, and A-2-7. This soil has an average permeability from 0.2 to 0.6 inches/hour.

The Comfort-Rock Outcrop Complex consists of shallow, clayey soils and Rock Outcrop on side slopes and on hilltops and ridge tops on uplands in the Edwards Plateau Land Resource Area. The Comfort Extremely Stony Clay makes up 49 to more than 95 percent of the complex, but on the average it makes up 70 percent. Rock Outcrop and areas of soil less than 4 inches deep make up 5 to 36 percent, but the average is 15 percent. Typically, the surface layer of the Comfort soil is dark brown extremely stony clay about 6 inches thick. Cobbles and stones as much as 4 feet across cover about 45 percent of the surface. The subsoil extends to a depth of 13 inches. It is dark reddish brown extremely stony clay. The underlying material is indurated fractured limestone. The soil is mildly alkaline and noncalcareous throughout. The Comfort 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.

This soil has a USDA Texture Classification of extremely stony clay, stony clay, very stony clay, and weathered bedrock. The Unified Classification is CH, GC, CL, or SC. The AASHO Classification is A-2-7, and A-7-6. This soil has an average permeability from 0.6 to 0.2 inches/hour.

Narrative Description of the Site Geology

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 to intermediate.

One hundred two features were noted on the project site at the time of the field investigation on April 5-14 and 21-28, 2005. Ninety natural karst features and 12 man-made features were noted on the project site at the time of the field investigation. According to the U.S. Geological Survey Water Resources Investigations 94-4117, a fault (S-100) is located along the southeastern property line. No obvious visual indications of the fault were noted on the project site at the time of the on-site inspection. The natural karst features noted on the site consisted of numerous solution cavities, rock outcrops, and zones of fractured rock, vuggy rock, and solution cavities. A number of the solution cavities appeared to have been dug out by burrowing animals. The man made features consisted of man hole covers associated with a sanitary sewer line crossing the project site. The locations of the Potential Recharge Features are identified on the Site Plan on Plate 1a in Appendix A, on the 2003 aerial photograph on Plate 8 in Appendix A, and on the Site Geologic Map provided in Appendix C. Color photographs of the project site and some of the potential recharge features are included in Appendix B.

Potential Recharge Feature (PRF) #S-1 is a small solution cavity infilled with fine soil and leaves. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 27 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 4 of this report.

Potential Recharge Feature #S-2 consists of an outcrop of vuggy limestone. The outcrop was about 15 feet wide and 50 feet long. The vugs were approximately 6 inches in size and occurred at a density of 1 vug per foot. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 20 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 4 of this report.

Potential Recharge Features #S-3 through #S-5 consist of the solution cavities noted on the project site at the time of the field investigation. PRF #S-4 and PRF #S-5 appeared to be dug out by a burrowing animal. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 30 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 4 of this report.

Potential Recharge Feature #S-6 is an outcrop of vuggy and fractured limestone noted within a natural drainage path. The outcrop is about 25 feet wide and 75 feet long. The vugs ranged in size from 1/2 inches to 1 inch with a density of 4 to 5 vugs per foot. The fractures were approximately an inch in width and occurred in a density of 1 fracture per foot. The general trend of the fractures was 45 degrees. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 24 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 4 of this report.

Potential Recharge Features #S-7, #S-11, #S-22, #S-31, #S-43, #S-49, #S-50, #S-82, #S-84, #S-87, S-101, and S-102 are man hole covers associated with a sanitary sewer line crossing the project site along the southeastern portion of the property. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 37 on the sensitivity scale in column 10 of the Geologic Assessment Table on Pages 4-12 of this report.

Potential Recharge Features #S-8 and #S-9 are outcrops of vuggy and fractured limestone. PRF #S-8 is a cliff of limestone along Blieders Creek. The cliff is ranges from 3 feet to 15 feet along the length of the outcrop. PRF #S-9 is a outcrop of fractured limestone about 20 feet wide and 40 feet long. The fractures are approximately 1 inch in width and occur at a density of 1 fracture per foot. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 24 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 4 of this report.

Potential Recharge Features # S-10, #S-12, and #S-13 are solution cavities. PRF #S-10 is a vertical feature that is about 18 inches around and extends vertically about 2 feet. PRF #S-12

is a solution cavity noted under a limestone boulder. The feature is about 1 foot wide and 1 foot long and extends about 18 inches downward. PRF #S-13 appears to have been dug out by a burrowing animal. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 32 on the sensitivity scale in column 10 of the Geologic Assessment Table on Pages 4 and 5 of this report.

Potential Recharge Feature #S-14 consists of an outcrop of vuggy and fractured limestone noted in a natural drainage path. The outcrop was about 15 feet wide and 40 feet long. The vugs were approximately 1 to 2 inches in size and occurred at a density of 3 to 5 vugs per foot. The fractures are about 1 in width and occur 1 to 2 fractures per foot. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 30 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 of this report.

Potential Recharge Feature #'s S-15, #S-85, and #S-89 are zones of vuggy rock and solution cavities. The Zones consist of large vugs ranging from 4 inches to 12 inches with several solution cavities ranging from 4 inches to 18 inches. The vugs and solution cavities are infilled with fine soils leaves and other organic materials. PRF#S-15 was noted in a natural drainage path. According to the FEMA, Flood Insurance Rate Map, PRF #S-85 and PRF #S-89 are located in the 100 year flood plain. Frost GeoSciences, Inc. rates these features as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 50 to 55 on the sensitivity scale in column 10 of the Geologic Assessment Table on Pages 5 and 11 of this report.

Potential Recharge Features #S-16 through #S-20 are solution cavities noted on the site at the time of the field inspection. PRF #S-16 appears to have been dug out by a burrowing animal. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 32 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 of this report.

Potential Recharge Features #S-21 and #S-35 appear to be outcrops of solution enlarged fractures. PRF #S-21 is about 15 feet wide and 30 feet long. The fractures are about 1 to 2 inches in width and occur at a density of 1 to 2 fractures per foot. The dominate trend of the

fractures was about 45 degrees. The outcrop was noted in a natural drainage path. PRF #S-35 is about 10 feet wide and 15 feet long. The fractures are about 2 to 4 inches wide and occur at about 1 to 2 fractures per foot. The dominate trend of the fractures was about 78 degrees. Frost GeoSciences, Inc. rates this feature as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 50 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 and 6 of this report.

Potential Recharge Features #S-23 and #S-24 are elongated solution cavities approximately 6 inches in width and 4 feet in length. The features are infilled with fine soils and leaves. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 35 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 of this report.

Potential Recharge Features #S-25, #S-38, and #S-61 are zones of vuggy and fractured rock. The widths of the zones range from 30 to 50 feet and the lengths range from 75 to 100 feet. Each of the outcrop zones were noted in natural drainage paths. The vugs ranged in size from 1 inch to 3 inches and occurred at a density of 1 to 4 per foot. The fractures ranged in size from 1 to 2 inches in width and occurred at a density of 1 to 3 per foot. The orientation of the fractures varied. Frost GeoSciences, Inc. rates these features as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score a 50 on the sensitivity scale in column 10 of the Geologic Assessment Table on Pages 6, 7, and 9 of this report.

Potential Recharge Features #S-26, #S-28 through #S-30, and #S-32 through #S-34 are solution cavities noted on the project site at the time of the field inspection. The features are infilled with fine soils and leaves. The features range in size from 12 inches to 18 inches wide and 1 to 4 feet in length. The features were about 18 inches to 2 feet deep. PRF #S-26, PRF #S-28, and PRF #S-30 appeared to be dug out by a burrowing animal. PRF #S-29 is an elongated solution cavity. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 30 to 39 on the sensitivity

scale in column 10 of the Geologic Assessment Table on Page 6 of this report.

Potential Recharge Feature #S-27 is an outcrop of vuggy rock typical of the outcrops noted on the project site at the time of the field investigation. The outcrop is about 20 feet wide and 60 feet long. The vugs were 2 to 6 inches in size and occur at a density of 2 to 3 per foot. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 17 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 of this report.

Potential Recharge Features #S-36, #S-39, #S-41, #S-42, #S-44, #S-45, #S-47, and #S-48 are solution cavities noted on the project site at the time of the field investigation. The features were infilled with fine soils and leaves and twigs. PRF #S-42 and PRF #S-48 appear to have been dug out by burrowing animals at one time. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 30 to 32 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 6 and 7 of this report.

Potential Recharge Feature #S-37 is a outcrop of vuggy rock noted on the project site at the time of the field investigation. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 20 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 7 of this report.

Potential Recharge Feature #S-40 is a closed depression about 4 feet wide and 5 feet long. The feature is about 1 foot deep and may be the result of a tree removal. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 14 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 5 of this report.

Potential Recharge Feature #S-46 is a solution enlarged fracture about 2 feet wide and 10 feet long. The feature appears to be a few solution cavities in a row. The feature appears to be about 2 feet deep and infilled with soil, leaves, twigs, and gravel. Frost GeoSciences, Inc. rates this

feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 39 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 7 of this report.

Potential Recharge Features #S-51, #S-52, and #S-57 are outcrops of vuggy and fractured rock. PRF #S-52 is located in a natural drainage path. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 17 to 34 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 8 of this report.

Potential Recharge Features #S-53, #S-55, and #S-58 are outcrops of vuggy rock noted on the project site at the time of the field inspection. The outcrops all have vugs ranging in size from 1 to 3 inches with a density ranging from 3 to 6 vugs per foot. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 15 to 17 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 8 of this report.

Potential Recharge Features #S-54, #S-56, #S-59, #S-60, #S-62, and #S-66 through #S-68 are solution cavities noted on the project site at the time of the field investigation. The features were infilled with fine soils and leaves and twigs. The size of the features range in size from 6 inches to 2 feet wide, 6 inches to 2 feet long, and 1 to 2 feet deep. PRF #S-54 appears to have been dug out by burrowing animals at one time. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 30 to 32 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 8 and 9 of this report.

Potential Recharge Feature #S-63 is a cave noted in the wall of a cliff. The cliff was noted along a natural drainage path. The opening of the cave was about 4 feet tall and 10 feet wide. The cave extended horizontally approximately 10 feet into the cliff. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). This feature scores a 20 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 9 of this report.

Potential Recharge Features #S-65 and #S-69 are outcrops of vuggy and fractured rock noted on the project site at the time of the field inspection. #S-65 have fractures ranging in size from 1 to 2 inches wide and the fractures occur about 1 to 2 fractures per foot. #S-69 have vugs ranging in size from 1 to 3 inches with a density ranging from 3 to 6 vugs per foot. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 17 to 20 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 8 of this report.

Potential Recharge Features #S-70 and #S-71 are solution cavities noted in a natural drainage path. The features were infilled with fine soils and leaves and twigs. Frost GeoSciences, Inc. rates these features as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score 40 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 8 and 9 of this report.

Potential Recharge Features #S-72, #S-75 through #S-80, and #S-83 are solution cavities noted on the project site at the time of the field investigation. The features were infilled with fine soils and leaves and twigs. The size of the features range in size from 6 inches to 2 feet wide, 6 inches to 2 feet long, and 1 to 2 feet deep. PRF #S-75 appears to have been dug out by a burrowing animal at one time. PRF #S-78 is about 5 feet wide, 5 feet long and 1 foot deep. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 32 to 39 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 9 and 10 of this report.

Potential Recharge Features #S-73 and #S-74 are outcrops of vuggy and fractured rock noted on the project site at the time of the field inspection. PRF #S-73 have vugs ranging in size from 1 to 3 inches with a density ranging from 3 to 6 vugs per foot. PRF #S-74 have fractures ranging in size from 1 to 2 inches wide and the fractures occur about 1 to 2 fractures per foot. Frost GeoSciences, Inc. rates these features as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score 25 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 10 of this report.

Potential Recharge Features #S-81 and #S-93 are sinkholes. PRF S#-81 is about 10 feet around and 1 foot deep. A tree was noted growing in the middle of the feature. The feature was infilled with fine soils, coarse sand, cobbles, and with grass and shrubs. PRF #S-93 is 4 feet wide, 5 feet long, and 2 feet deep. The feature is infilled with coarse soils and gravel as well as leaves and twigs. Frost GeoSciences, Inc. rates these features as intermediate on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score 40 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 10 and 11 of this report.

Potential Recharge Features #S-86, #S-88, and #S90 through #S-92 are solution cavities noted on the project site at the time of the field investigation. The features were infilled with fine soils and leaves and twigs. The size of features PRF #S-86, PRF #S-88, PRF #S-91 and PRF #S-92 range in size from 1 foot to 4 feet wide, 1 foot to 2 feet long, and 1 to 2 feet deep. PRF #S-90 is about 6 feet wide, 5 feet long and 1 foot deep. PRF #S-92 appears to have been dug out by a burrowing animal at one time. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 32 to 39 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 11 of this report.

Potential Recharge Features #S-94, #S-95 and #S-97 are outcrops of vuggy rock noted on the project site at the time of the field inspection. The outcrops have vugs ranging in size from 1 to 3 inches with a density ranging from 3 to 6 vugs per foot. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features score 24 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 10 of this report.

Potential Recharge Features #S-96, #S-98, and #S-99 are solution cavities noted on the project site at the time of the field investigation. The features were infilled with fine soils and leaves and twigs. According to the FEMA, Flood Insurance Rate Map, PRF #S-96 are located in the 100 year flood plain. PRF #S-98 and PRF #S-99 appears to have been dug out by a burrowing animal at one time. Frost GeoSciences, Inc. rates these features as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 5-01-02). These features range in score from 32 to 39 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 11 and 12 of this report.

Potential Recharge Feature #S-103 consist of three small solution cavities in a limestone boulder. The features are infilled with leaves and fine soils. The small cavities range in size from 8 inches to 18 inches wide and 12 to 18 inches in length. The general overall width and length of the feature is approximately 2 feet by 3 feet. The overall depth of the feature was about 18 inches to 2 feet deep. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores a 35 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 12 of this letter.

Potential Recharge Feature #S-104 is solution cavity within a closed depression. The solution cavity was approximately 2 feet wide and 2 feet long. The closed depression was approximately 3 feet wide and 4 feet long. The overall depth appears to be 18 inches to 2 feet. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores a 39 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 12 of this report.

Potential Recharge Feature #S-501 is an outcrop of vuggy limestone. The vugs are up to 6 inches and spaced approximately 1 per foot. These vugs are infilled with dark clay and would allow little or no fluid flow into the subsurface. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores a 12 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 12 of this report.

Potential Recharge Feature #S-502 is an area of cleared vegetation that appears to have been used to have a line of sight from a deer blind to a feeder. No indications of infiltration were noted within the cleared area. Frost GeoSciences, Inc. rates this feature as low on Figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores a 35 on the sensitivity scale in column 10 of the Geologic Assessment Table on Page 12 of this report.

According to the U.S. Geological Survey Water Resources Investigations 94-4117, Potential Recharge Feature #S-100 is a fault located along the southeastern property line. No obvious visual indications of the fault were noted on the project site at the time of the on-site inspection.

The project site supports a dense stand of vegetative cover with a several open grassy areas. Overall vegetation on the project site consists of ashe juniper (*Juniperus ashei*), live oak (*Quercus virginiana*), cedar elm (*Ulmus crassifolia*), and mesquite (*Prosopis glandulosa*), with Texas persimmon (*Diospyros texana*), agarita (*Berberis trifoliolata*), huisache (*Acacia farnesiana*), sage (*Leucophyllum*), whitebrush (*Aloysia gratissima*), Yucca, mountain laurel, and prickly pear cactus (*Opuntia lindheimeri*).

According to the site plan provided by Schultz Group, Inc., the surveyed elevations on the project site range from 760 to 860 feet. A copy of the site plan indicating the boundary of the project site and the elevations is included on the Site Plan on Plate 1a in Appendix A and the Site Geologic Map in Appendix C of this report.

According to the U.S. Geological Survey Water Resources Investigations 94-4117, the project site is located on the Cyclic and Marine Member and the Leached and Collapsed Member of the Cretaceous Edwards Person Limestone.

The Cyclic and Marine Member of the Edwards Person Limestone consists of mudstone to packstone with milliolid grainstone and chert. This member occurs as thin graded cycles of massive to relatively thin beds with some crossbeds. Typically, cavern development in this member is common, but occurs mainly in the subsurface. The caverns within this member might be associated with earlier episodes of karst development.

The Leached and Collapsed Member of the Cretaceous Edwards Person Limestone consists of crystalline limestone, mudstone, and grainstone with chert and collapsed breccia. Bioturbated iron-stained beds are common and are separated by massive limestone beds with stromatolitic limestone. This member forms extensive lateral karst development with large rooms. The overall thickness of this member ranges from 70 to 90 feet thick.

A copy of the U.S.G.S. Water Resources Investigation 94-4117 indicating the location of the project site is included on Plate 6 in Appendix A.

BEST MANAGEMENT PRACTICE (BMP)

Based on a visual inspection of the ground surface and the research performed for this project, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to be low to intermediate. According to the U.S. Geological Survey Water Resources Investigations 94-4117, a fault located along the southeastern property line. No obvious visual indications of the fault were noted on the project site at the time of the on-site inspection. However, the potential always exists to encounter subsurface features that lack a surface expression. Construction personnel should be informed of the potential to encounter subsurface karst features associated with the fault, vuggy outcrops, or outcrops zones during excavating activities. Construction personnel should also be informed of the proper protocol to follow in the event that a solution cavity and/or cave is encountered during the excavation and development of the property.

DISCLAIMER

This report has been prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04) by a Licensed Texas Professional Geoscientist. All areas of the project site were carefully inspected for features that could contribute to the recharge of the Edwards Aquifer, however, this survey cannot preclude the presence of subsurface karst features that lack surface expression. This report is not intended to be a definitive investigation of all possible geologic or karst features at this site. All conclusions, opinions, and recommendations for Best Management Practices (BMP's) in this report are based on information obtained while researching the project, and on the site conditions at the time of our field investigation.

This report has been prepared for the exclusive use of The Schultz Group. This report is based on available known records, a visual inspection of the project site, and the work generally accepted for a Geologic Assessment for Regulated Activities / Developments on the Edwards Aquifer Recharge / Transition Zone, relating to 30 TAC §213.5(b)(3), effective June 1, 1999.

REFERENCES

1) U.S.G.S. 7.5 Minute Quadrangle Map, New Braunfels West, Texas Sheet (1988).

2) Official Edwards Aquifer Recharge Zone Map, New Braunfels West, Texas Sheet (1996).

3) Small, Ted A., and Hanson, John A., 1994, Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas. U.S. Geological Survey Water Resources Investigations 94-4117.

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

5) Federal Emergency Management Agency (FEMA), May 15, 1991, Comal County, Texas and Incorporated Areas, Flood Insurance Rate Map (FIRM), Panel #'s 4854630100C and 4854630105C, FEMA, Washington D.C.

6) U.S.D.A. Soil Conservation Service, Soil Survey of Comal and Hayes County, Texas (1984).

7) TCEQ-0585-Instructions (Rev. 10-1-04). "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone".

8) Collins, Edward, W., 2000, Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle, Bureau of Economic Geology, The University of Texas at Austin, Texas.

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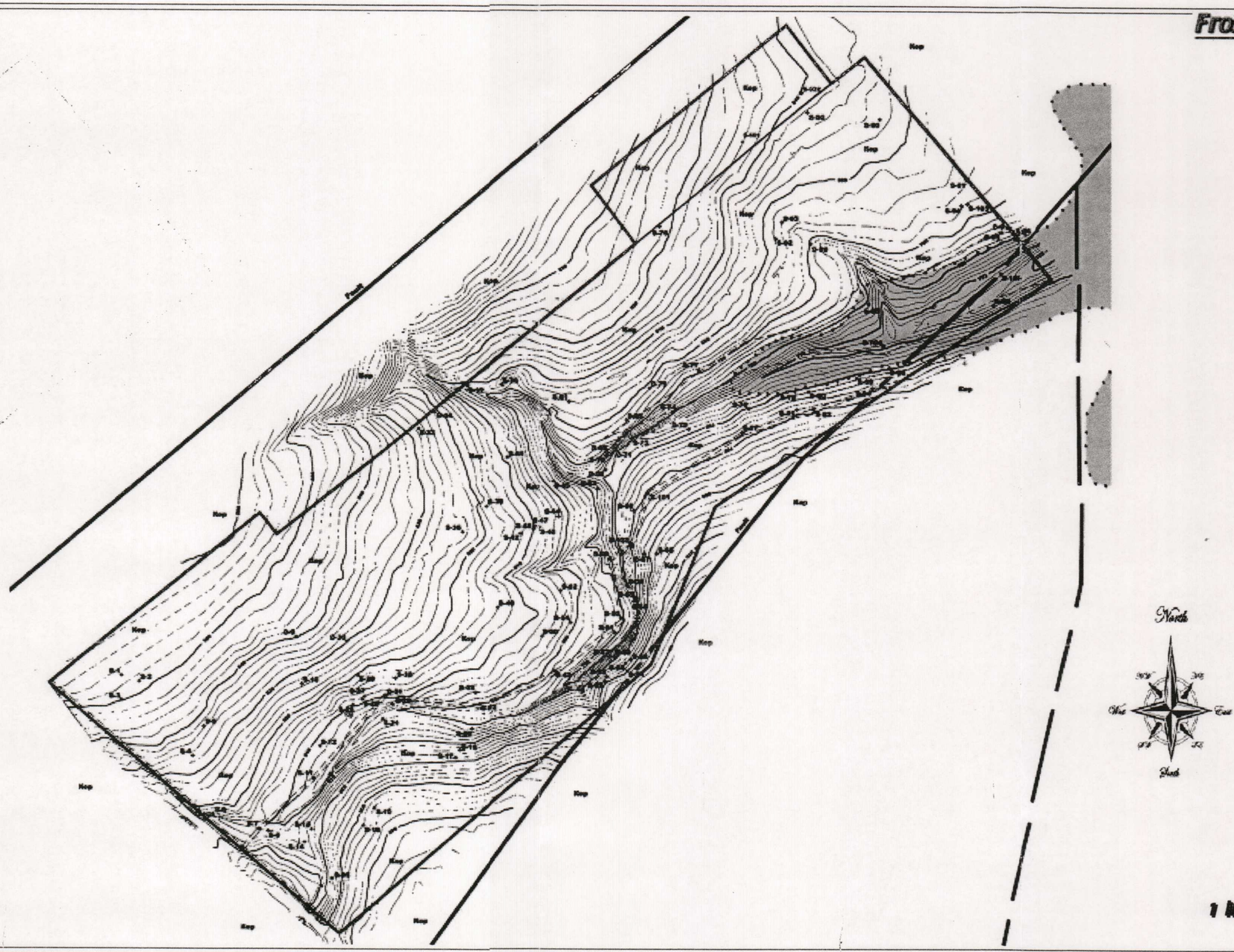
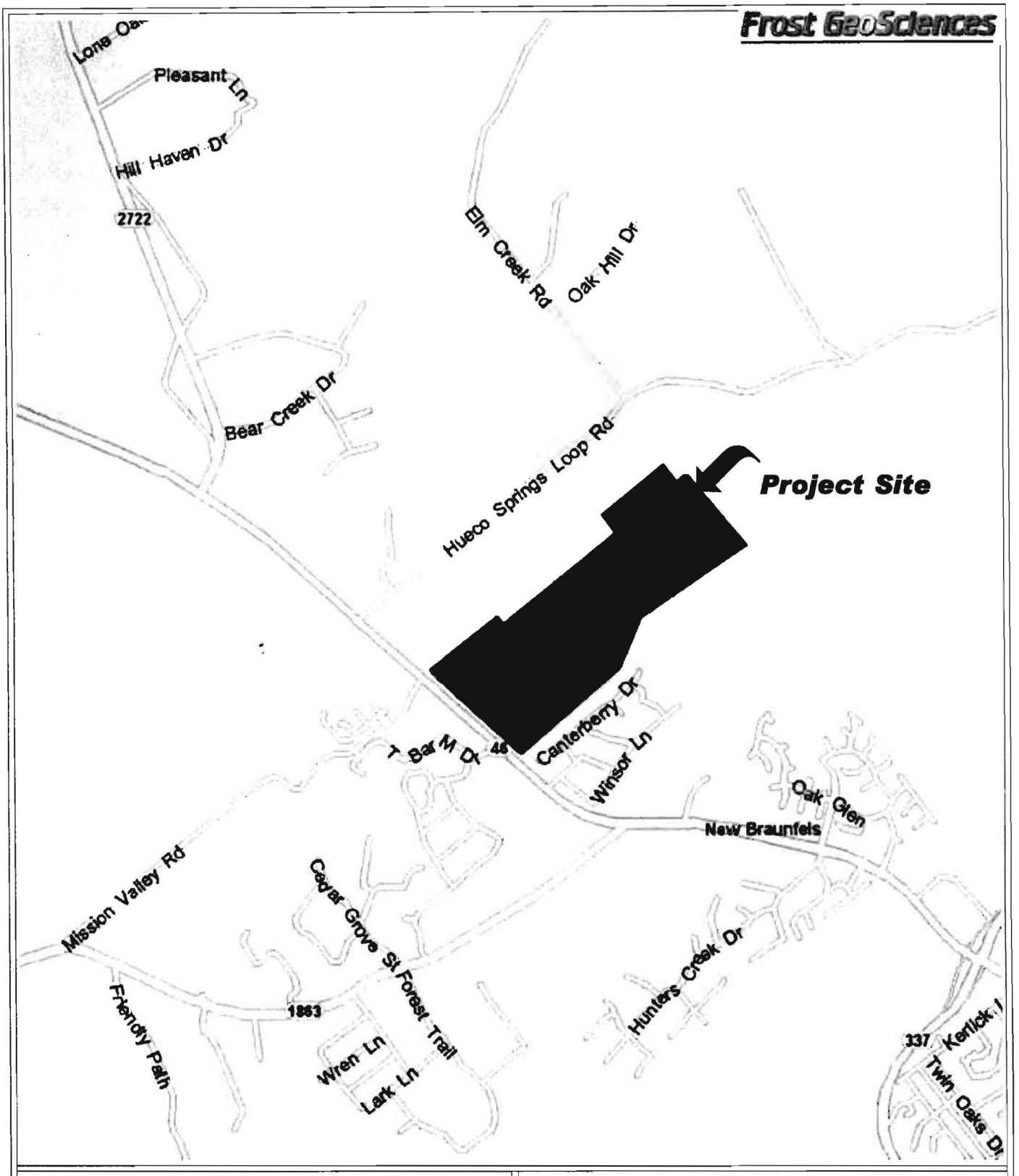
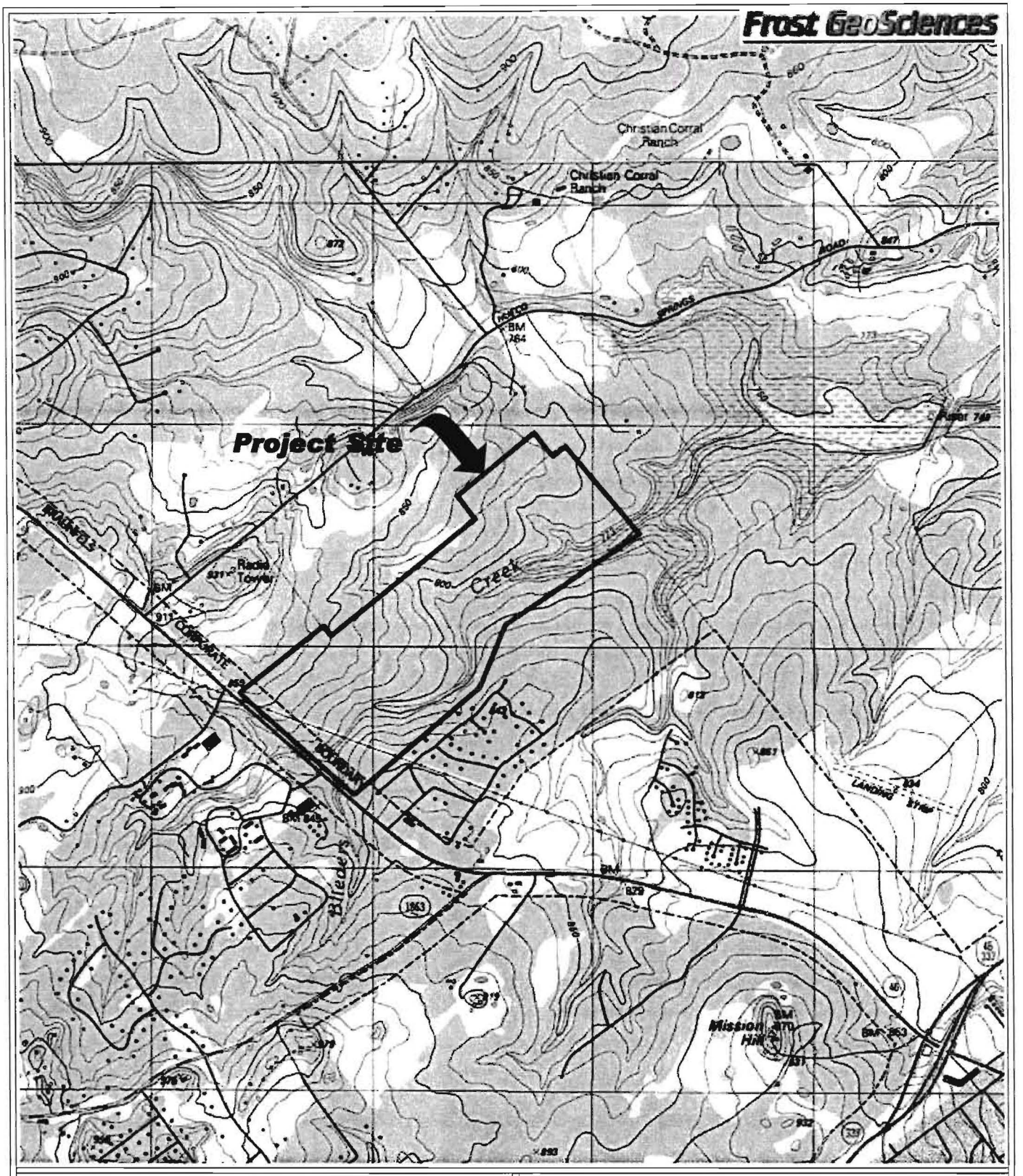


PROJECT NAME:	Geologic Site Assessment (WPAP) for Regulated Activities / Development on the Edwards Aquifer Recharge / Transition Zone The Tschirhart Ranch Subdivision New Braunfels, Texas
	Site Plan with PRF's
PROJECT NO.:	FGS-E09176
DATE:	December 31, 2009



PROJECT NAME: Geologic Site Assessment (WPAP) for Regulated Activities / Development on the Edwards Aquifer Recharge / Transition Zone The Tschirhart Ranch Subdivision New Braunfels, Texas	Street Map
PROJECT NO.: FGS-E09176	**DATE:** December 31, 2009

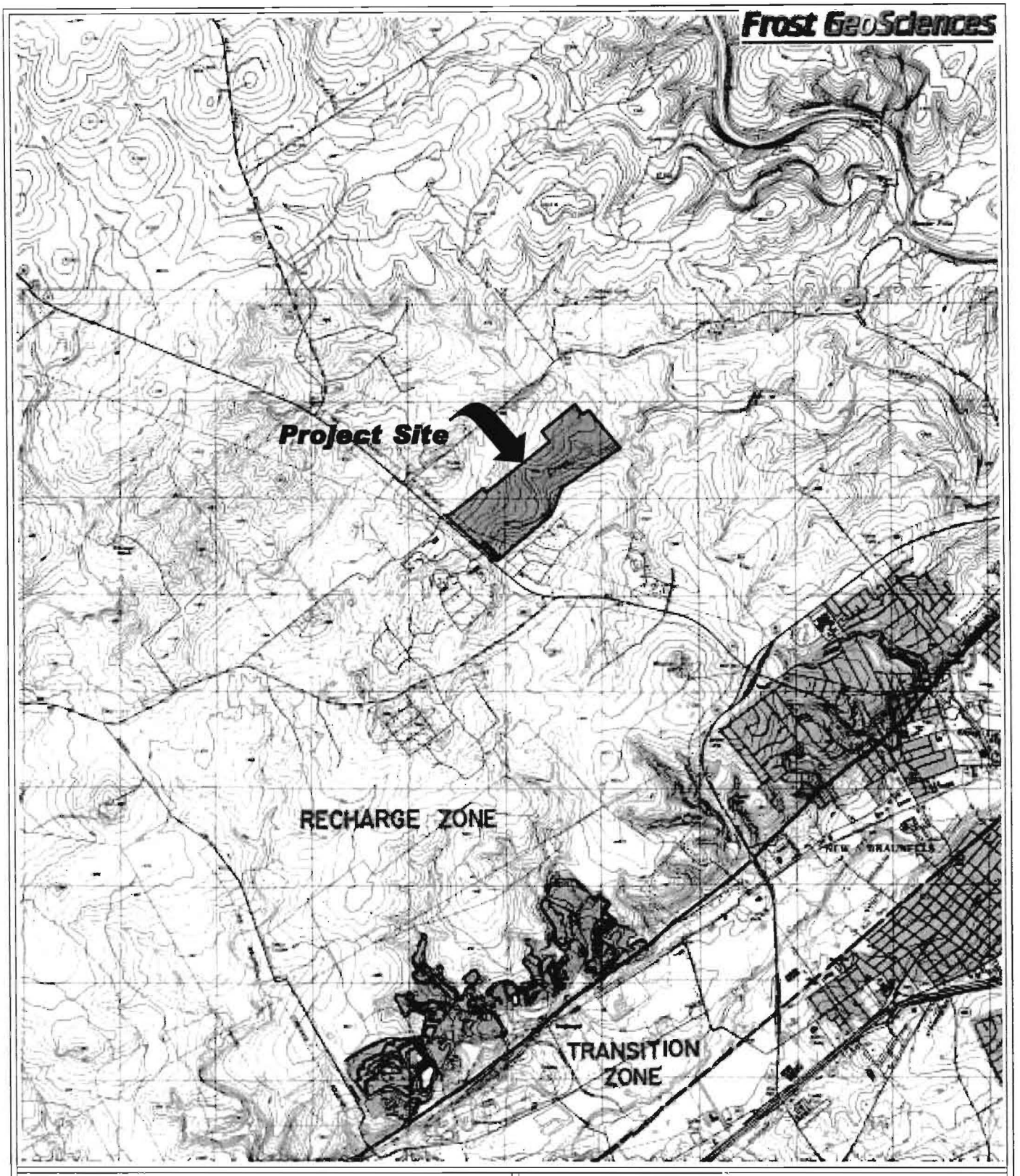


PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

U.S.G.S. 7.5 Minute Quadrangle Map
New Braunfels West, Texas Sheet (1988)

PROJECT NO.:	**DATE:**
FGS-E09176	December 31, 2009

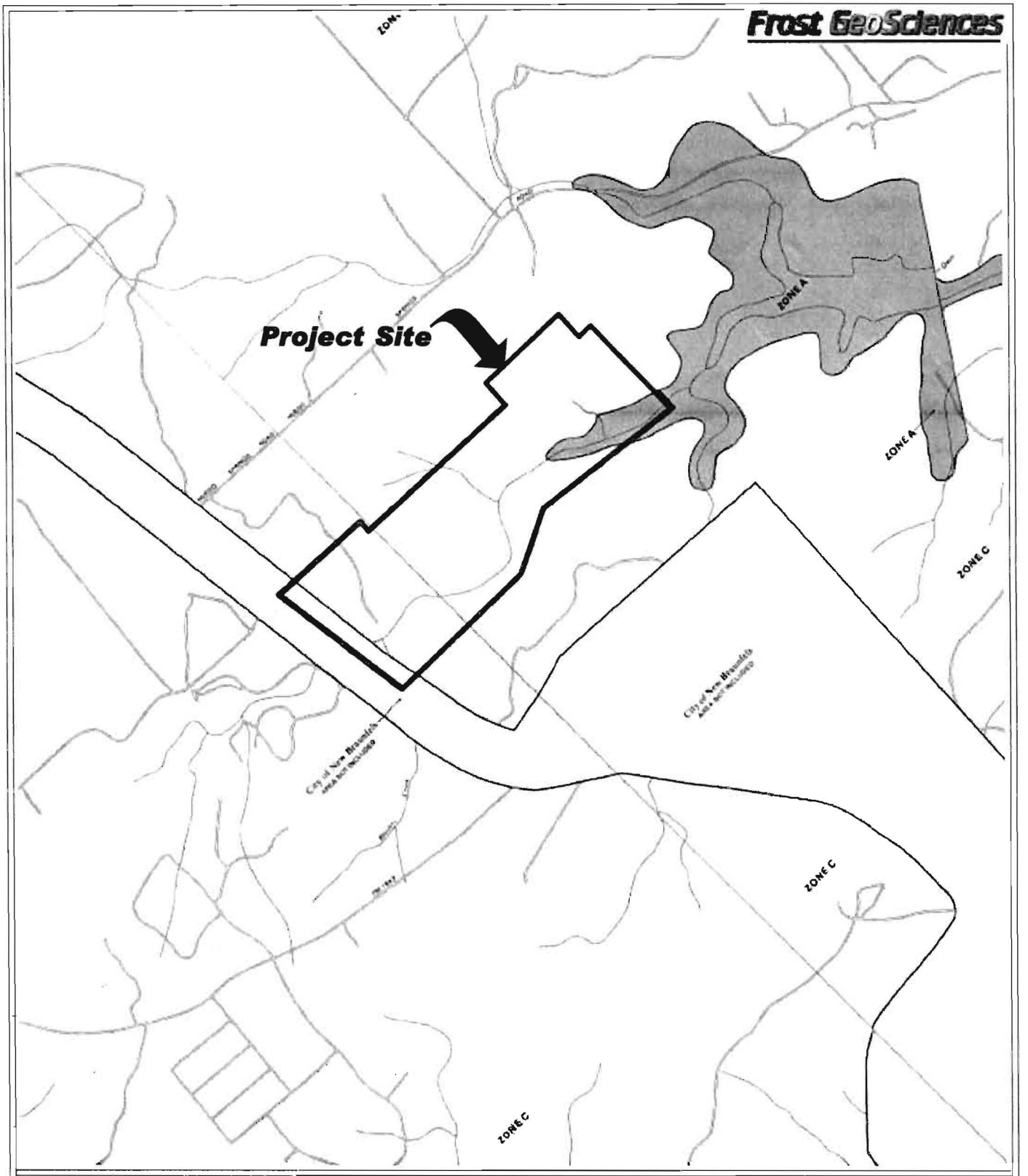


PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

Official Edwards Aquifer Recharge Zone Map
New Braunfels West, Texas Sheet 1988

PROJECT NO.:	DATE:
FGS-E09176	December 31, 2009

Frost GeoSciences



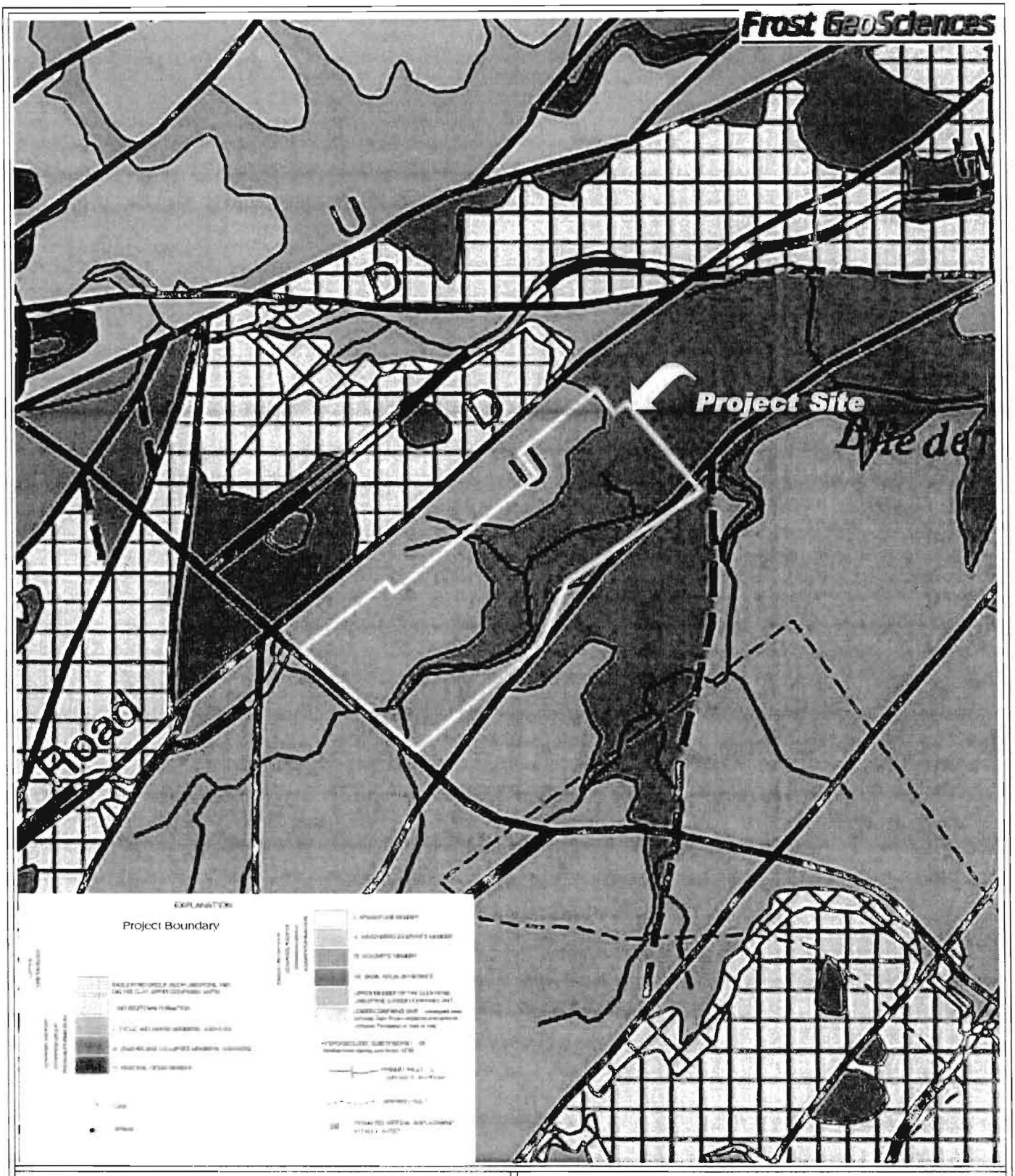
PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

Flood Insurance Rate Map (FIRM)
Community Panel #'s
4854630100C & 4854630105C (9-29-1986)

PROJECT NO.: FGS-E09176

DATE: December 31, 2009

Frost GeoSciences



PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

United States Geologic Survey
Water Resources Investigations #94-4117
Geologic Map of Comal County, Texas

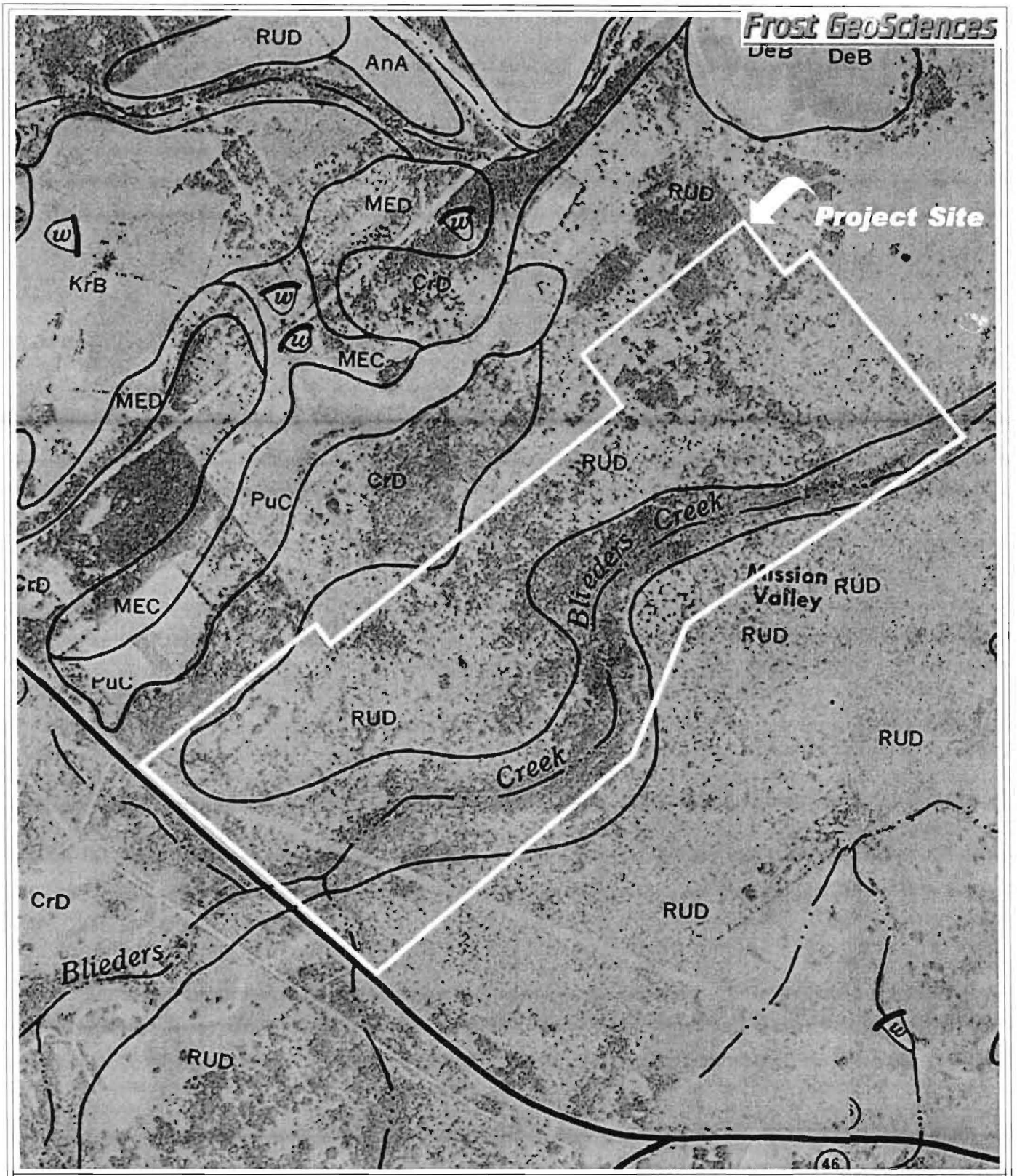
PROJECT NO.: FGS-E09176

DATE: December 31, 2009

PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

2009 Aerial Photograph
Landiscor Aerial Information

PROJECT NO.:	DATE:
FGS-E09176	December 31, 2009



PROJECT NAME: Geologic Site Assessment (WPAP) for Regulated Activities / Development on the Edwards Aquifer Recharge / Transition Zone The Tschirhart Ranch Subdivision New Braunfels, Texas	1973 Aerial Photograph United States Department of Agriculture
PROJECT NO.: FGS-E09176	**DATE:** December 31, 2009

PROJECT NAME:
Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
The Tschirhart Ranch Subdivision
New Braunfels, Texas

2009 Aerial Photograph with Potential Recharge Feature Locations
Landiscor Aerial Information

PROJECT NO.: FGS-E09176

DATE: December 31, 2009

View of potential recharge feature # S-1.

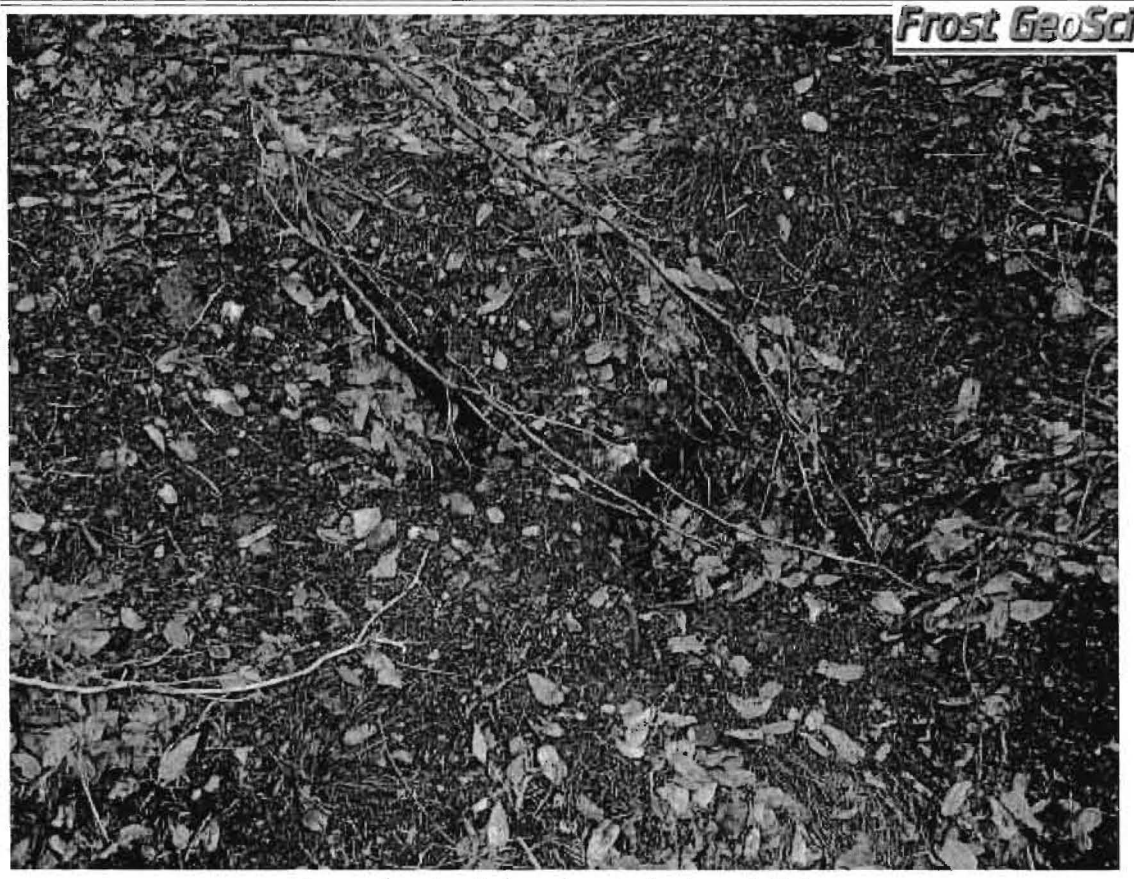
Typical view of the vegetative cover noted near S-1.

View of potential recharge feature # S-2.

Typical view of the vegetative cover noted near S-2.

View of potential recharge feature # S-3.

Typical view of the vegetative cover noted near S-3.



View of potential recharge feature # S-4.

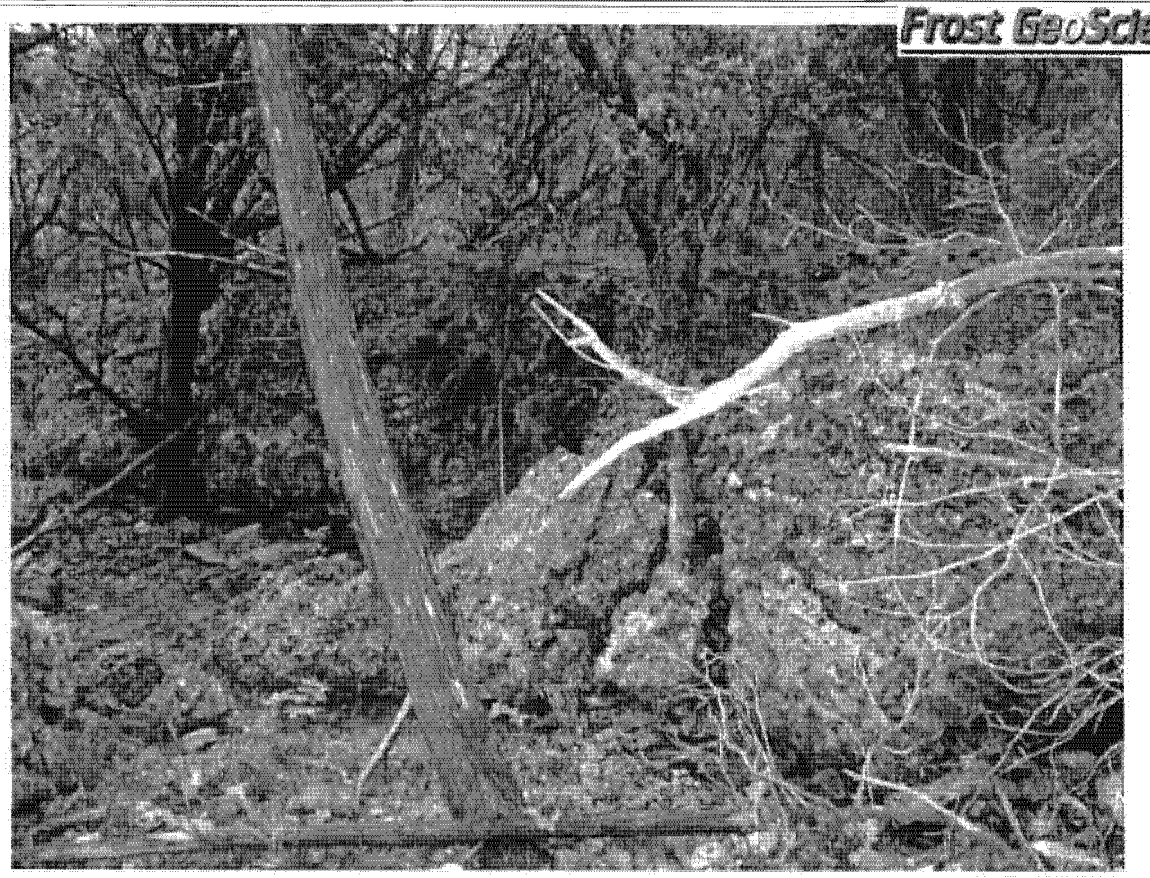
Typical view of vegetative cover noted near S-4.

View of potential recharge feature # S-5.

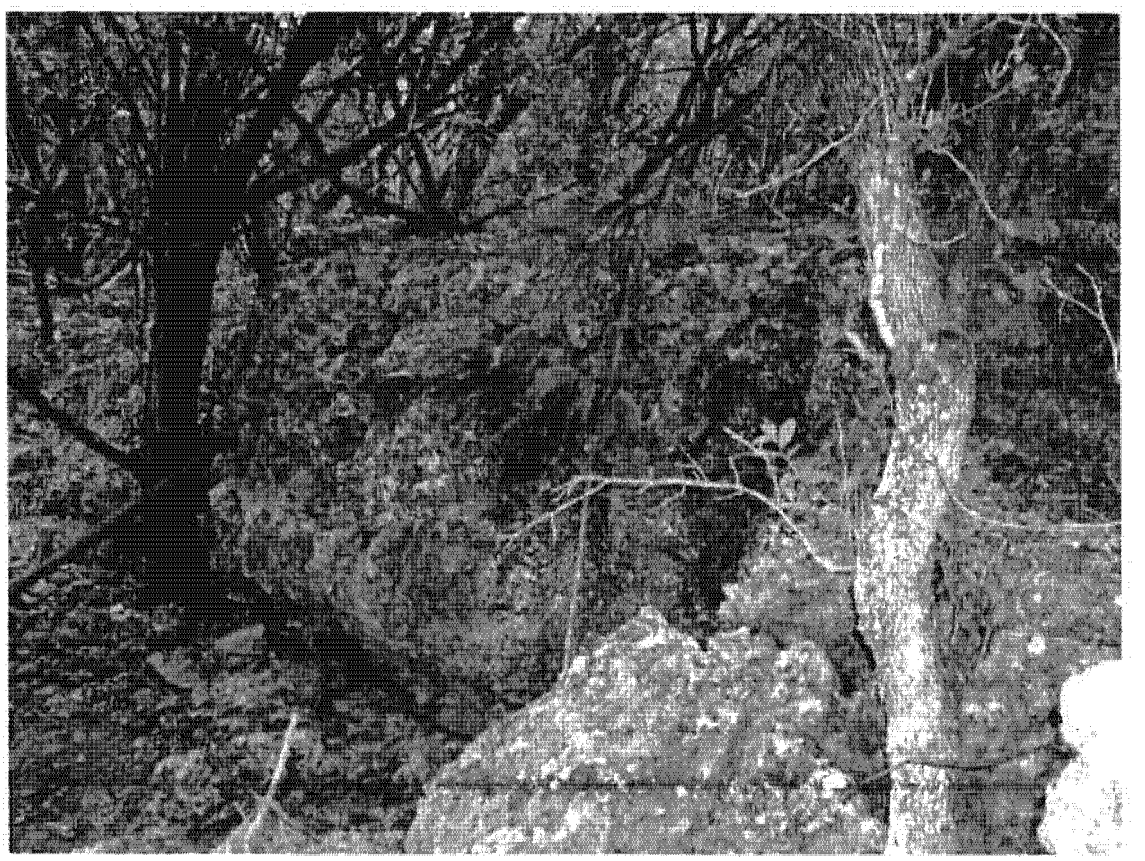
Typical view of the vegetative cover noted near S-5..

View of Potential Recharge Feature # S-6.

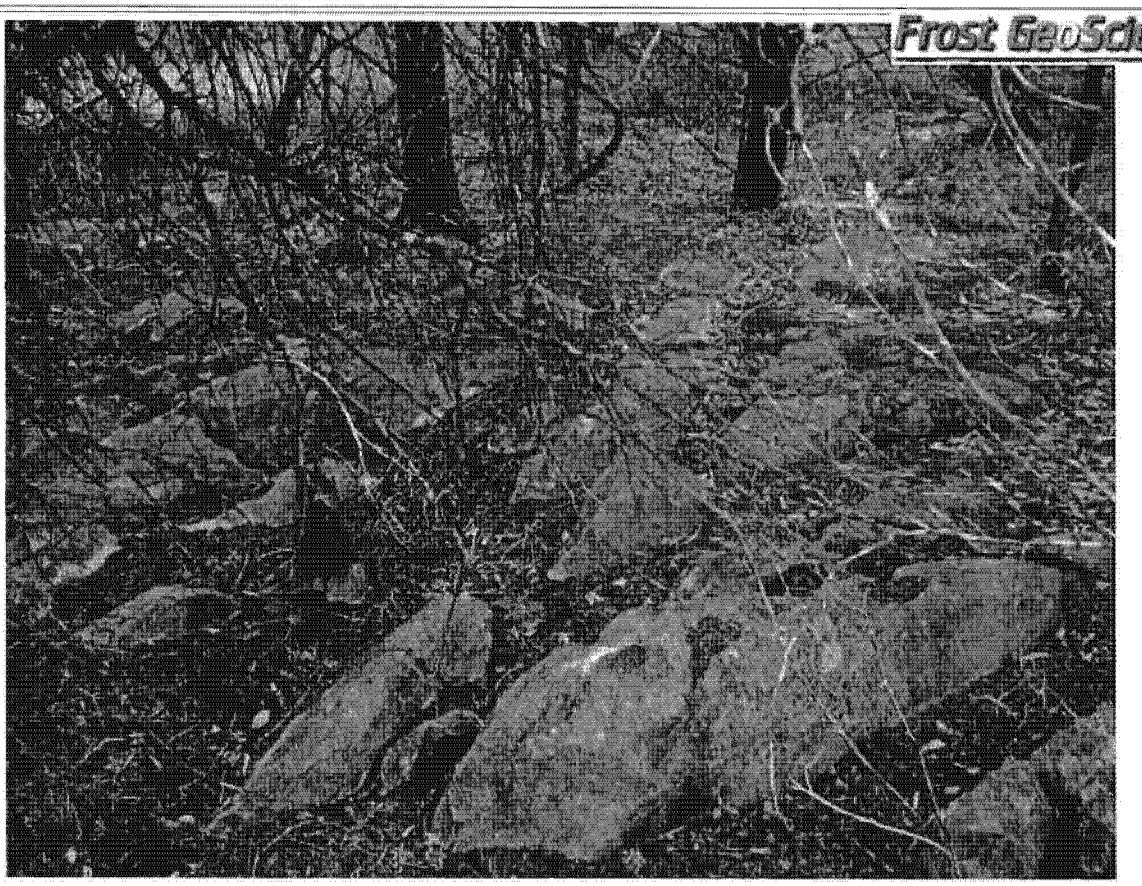
View of Potential Recharge Feature # S-7.



View of Potential Recharge Feature # S-8.



View of Potential Recharge Feature # S-8.

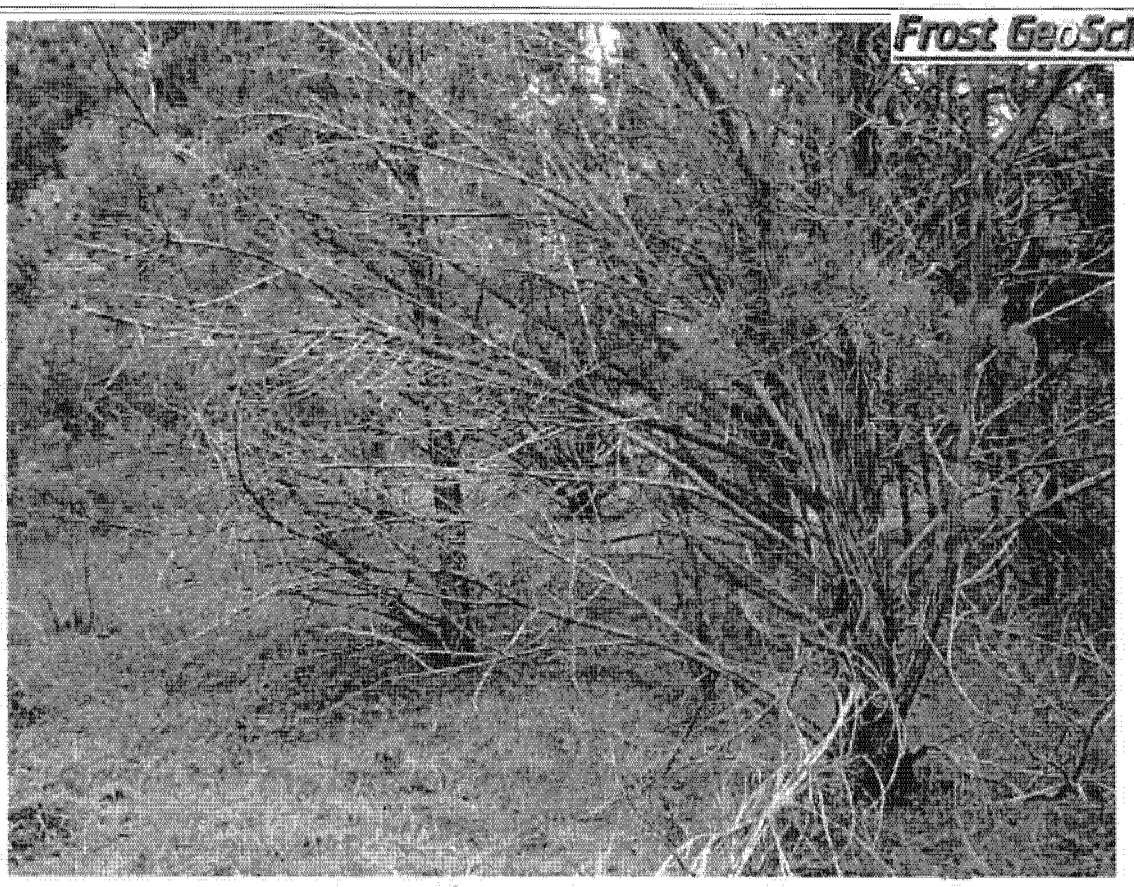


View of Potential Recharge Feature # S-9.

Typical view of the vegetative cover noted near S-9.

View of Potential Recharge Feature # S-10.

View of the interior of S-10.

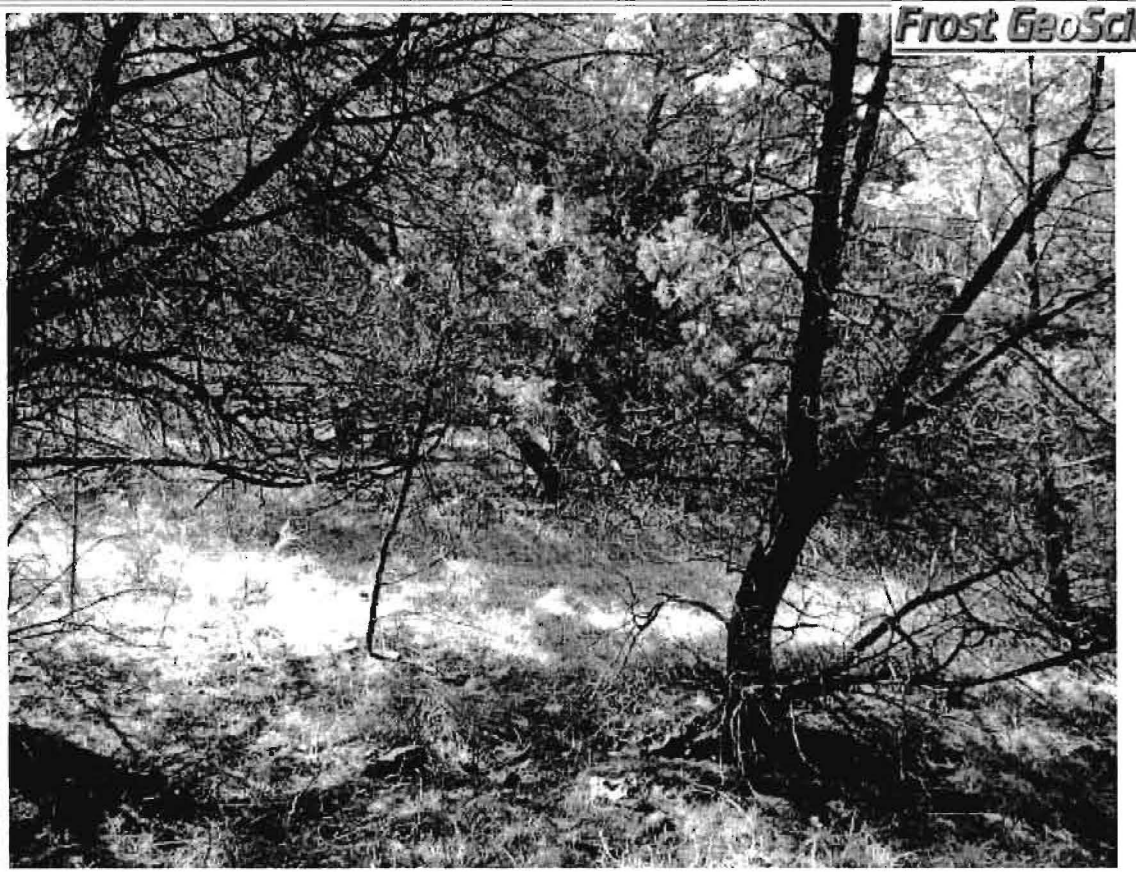


Typical view of the vegetative cover noted near S-10.

View of Potential Recharge Feature # S-11.

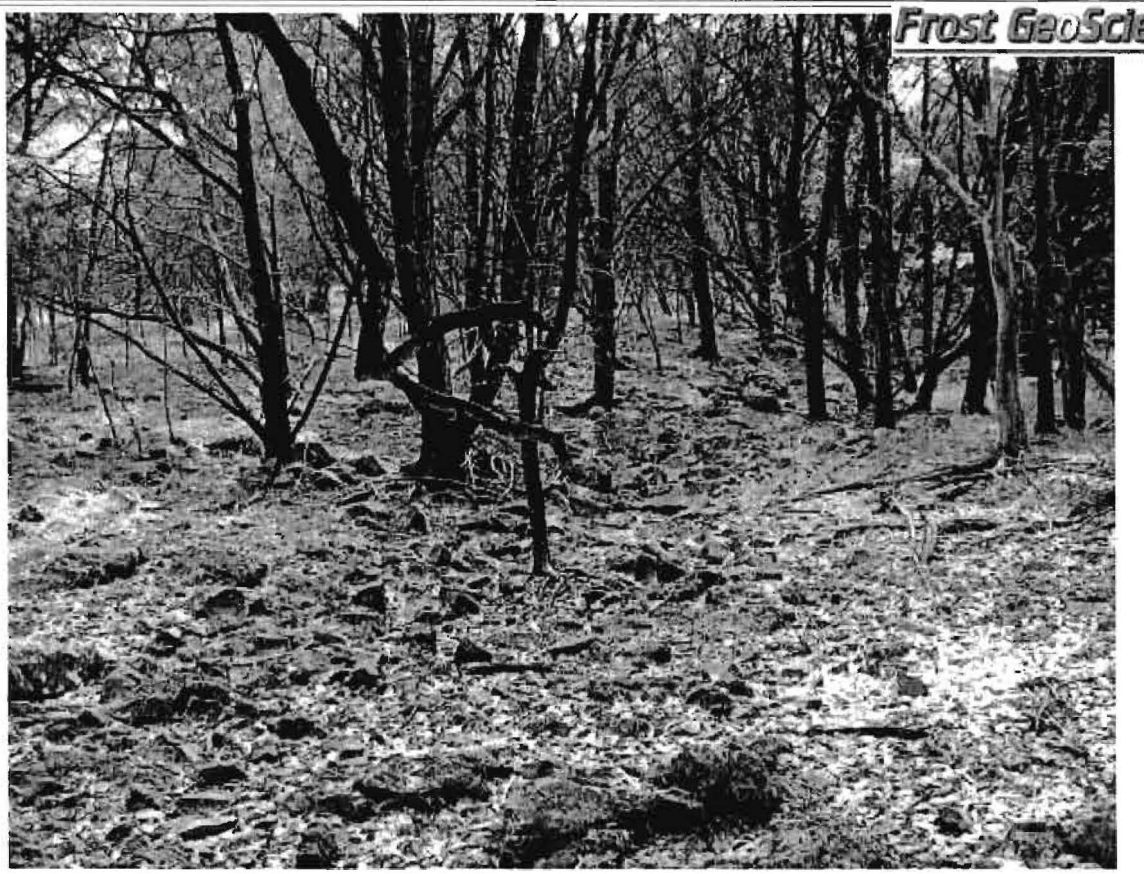
View of Potential Recharge Feature # S-12.

View of Potential Recharge Feature # S-13.



Typical view of the vegetative cover noted near S-13.

View of Potential Recharge Feature # S-14.



Typical view of the vegetative cover noted near S-14.

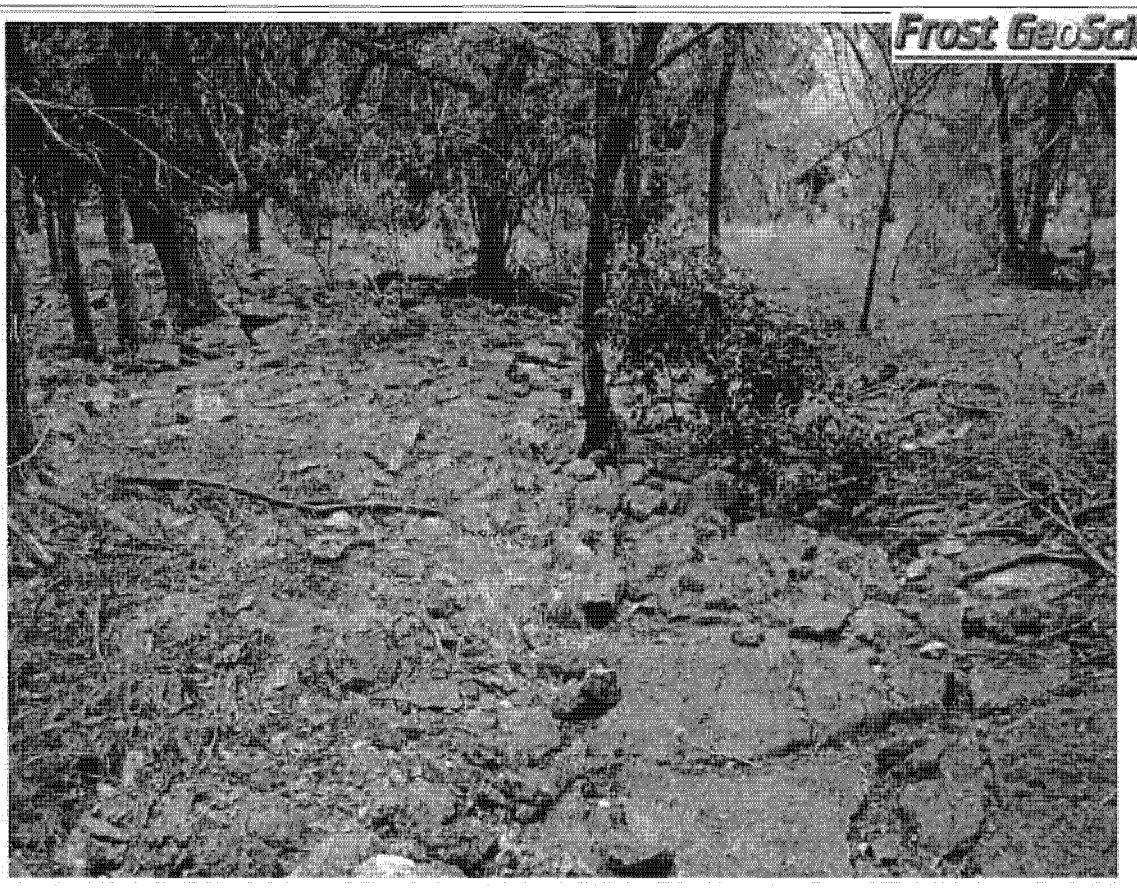
Typical view of the vegetative cover noted near S-15.

View to the east along the Potential Recharge Feature # S-15.

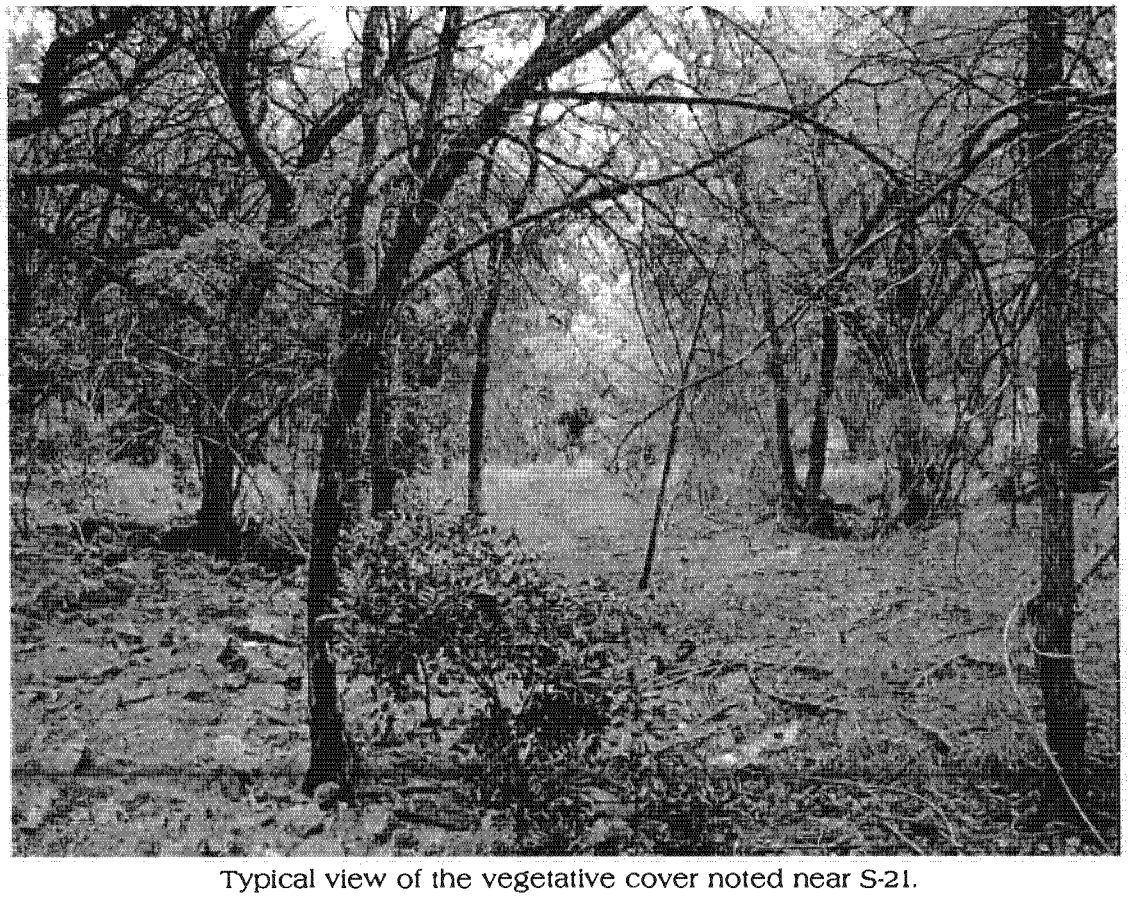
View to the west along the Potential Recharge Feature # S-15.

View of Potential Recharge Feature # S-19.

Typical view of the vegetative cover noted near S-19.

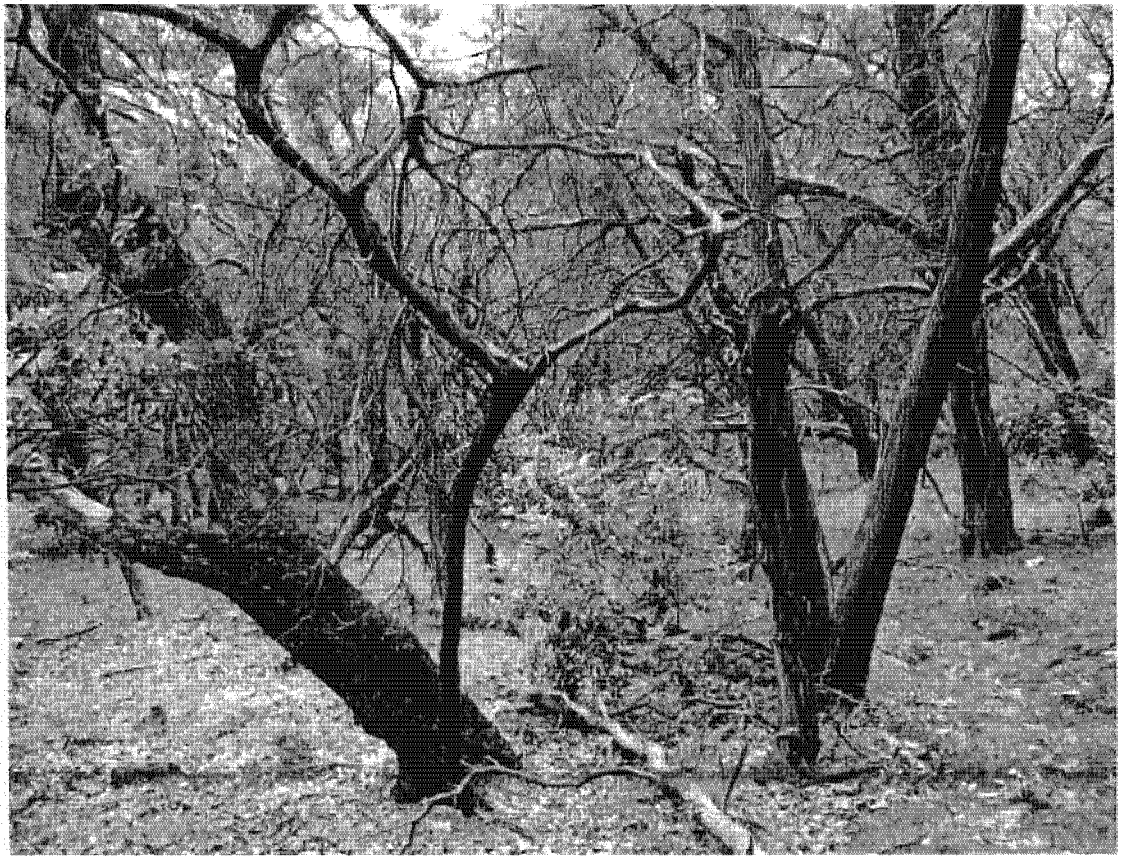


View of Potential Recharge Feature # S-21.

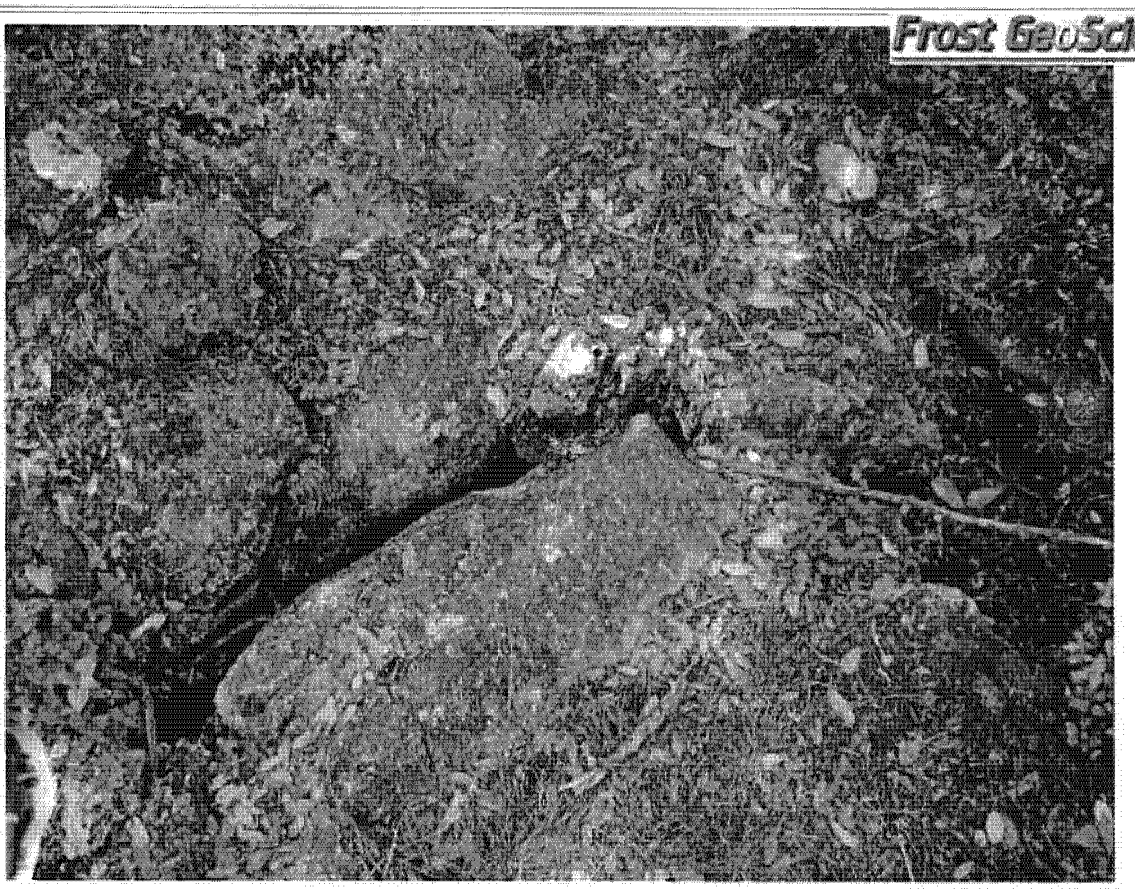


Typical view of the vegetative cover noted near S-21.

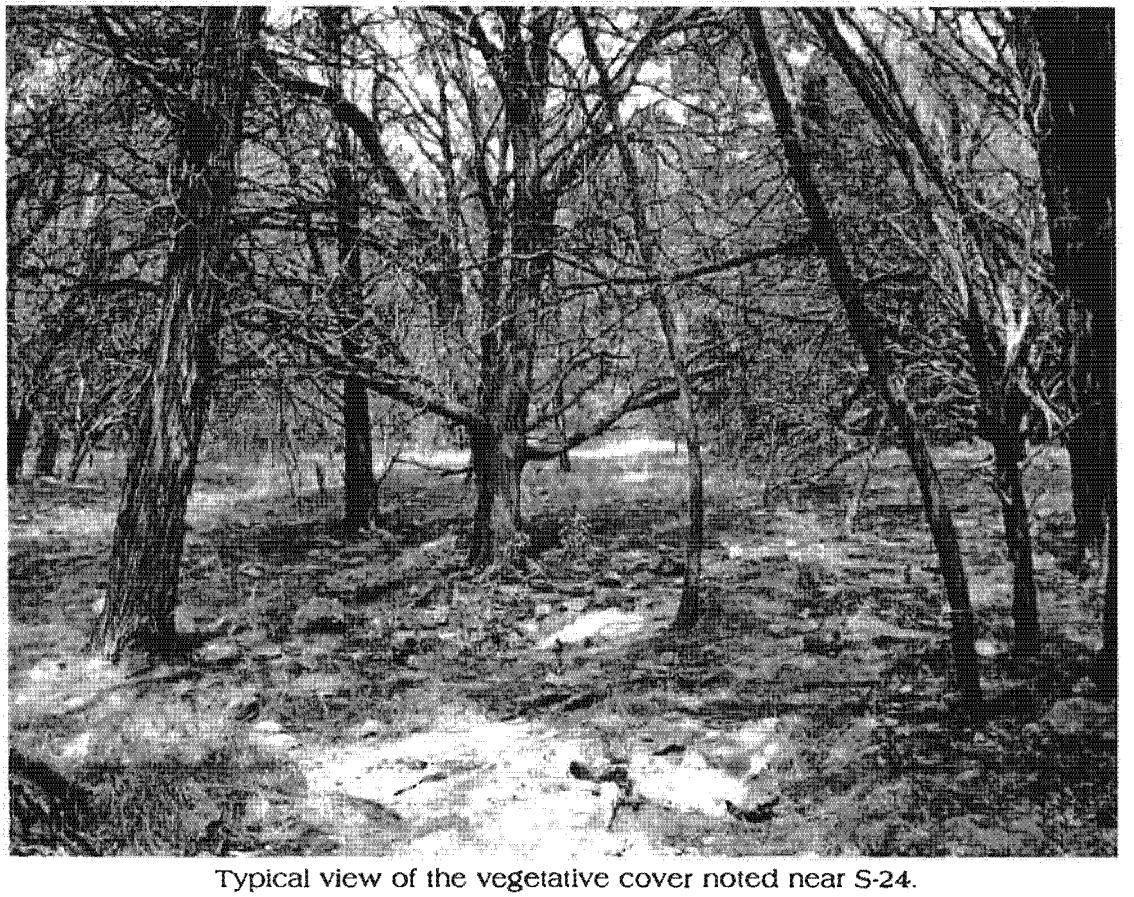
View of Potential Recharge Feature # S-23.



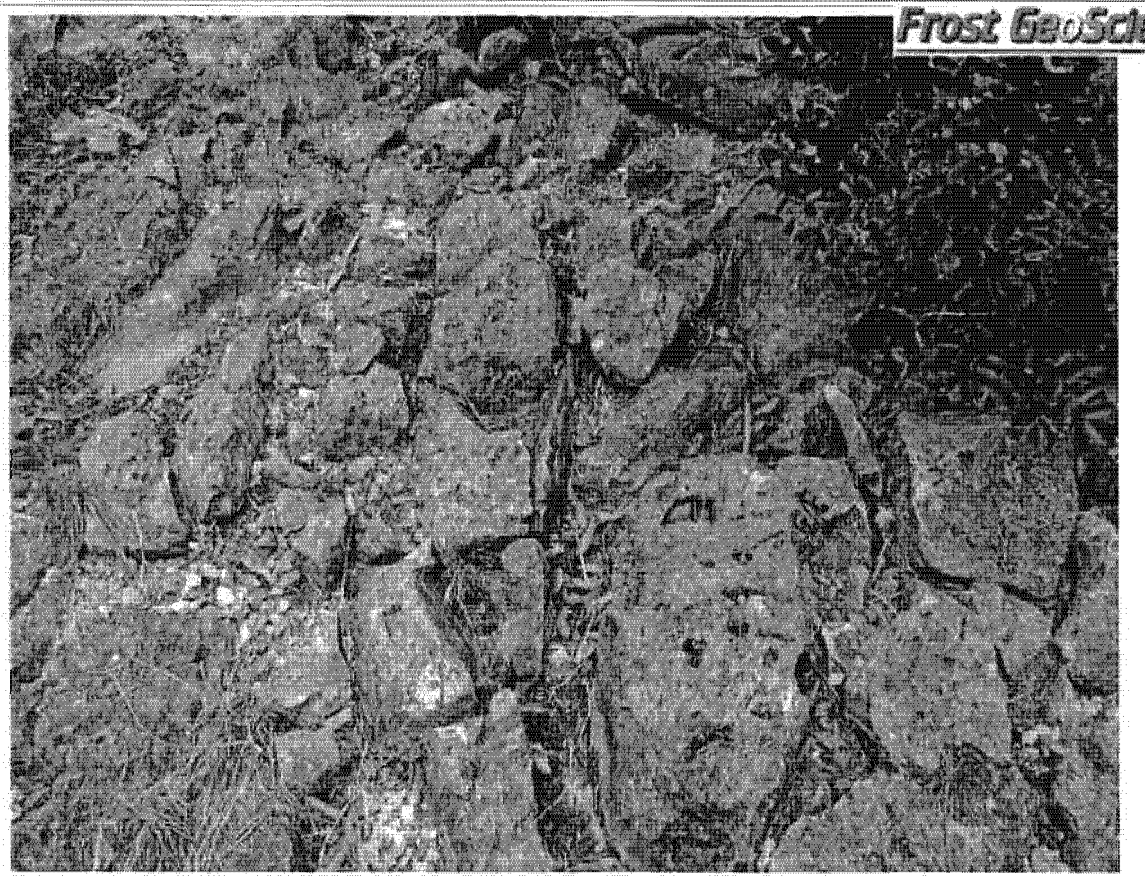
Typical view of the vegetative cover noted near S-23.



View of Potential Recharge Feature # S-24.



Typical view of the vegetative cover noted near S-24.



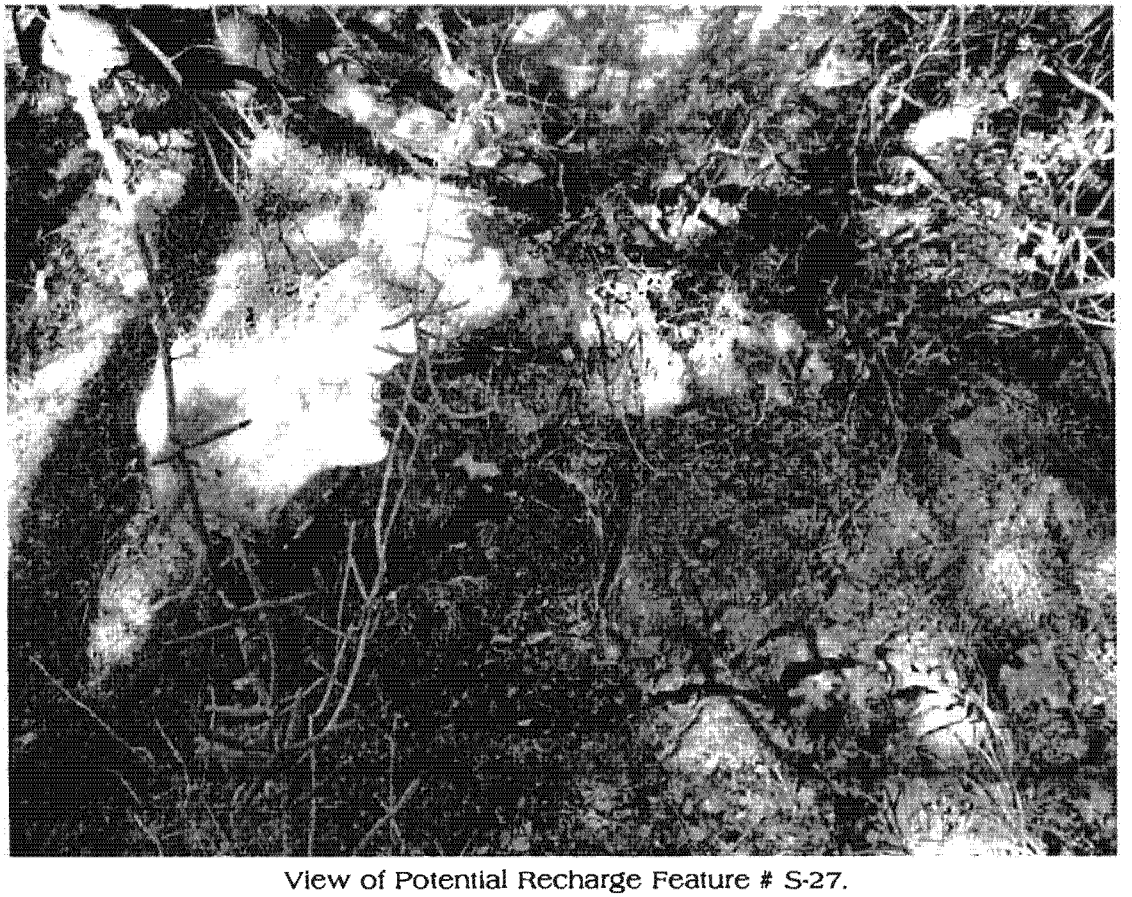
View of Potential Recharge Feature # S-25.

Typical view of the vegetative cover noted near S-25.

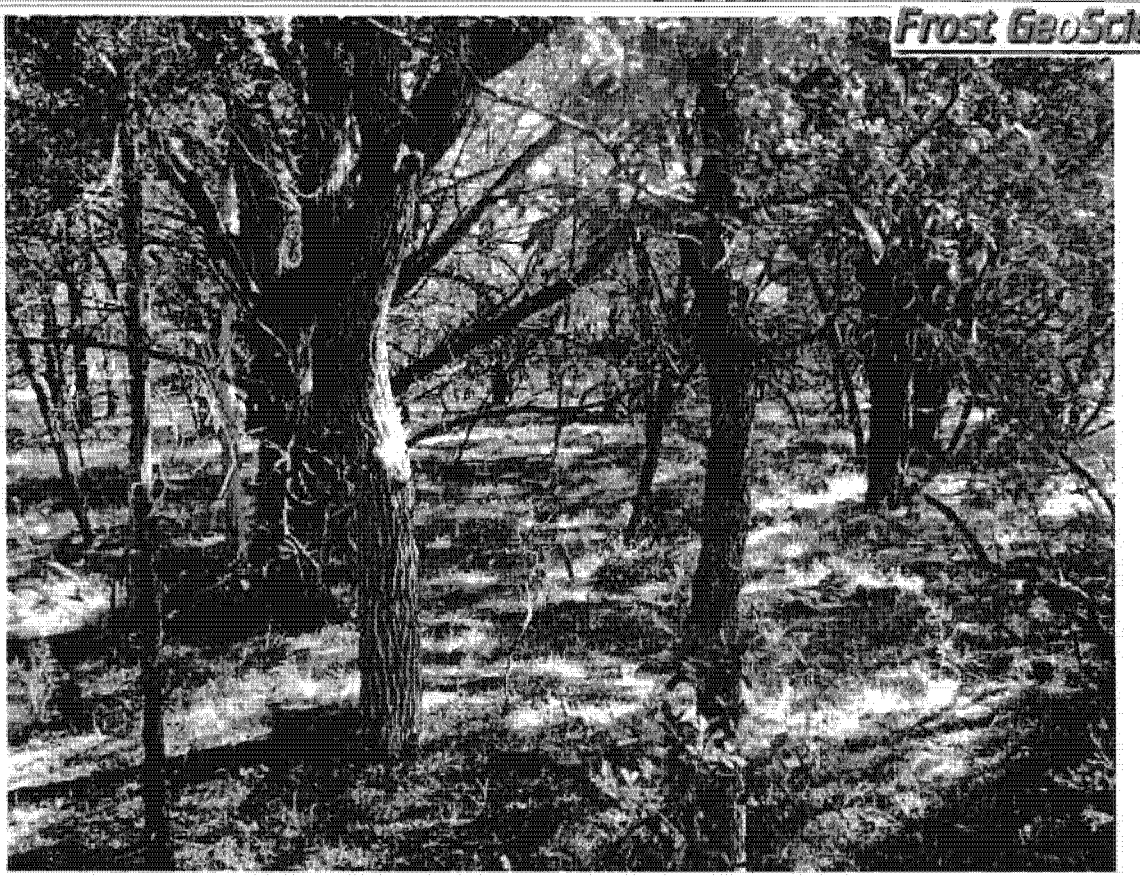
View of Potential Recharge Feature # S-26.

Typical view of the vegetative cover noted near S-26.

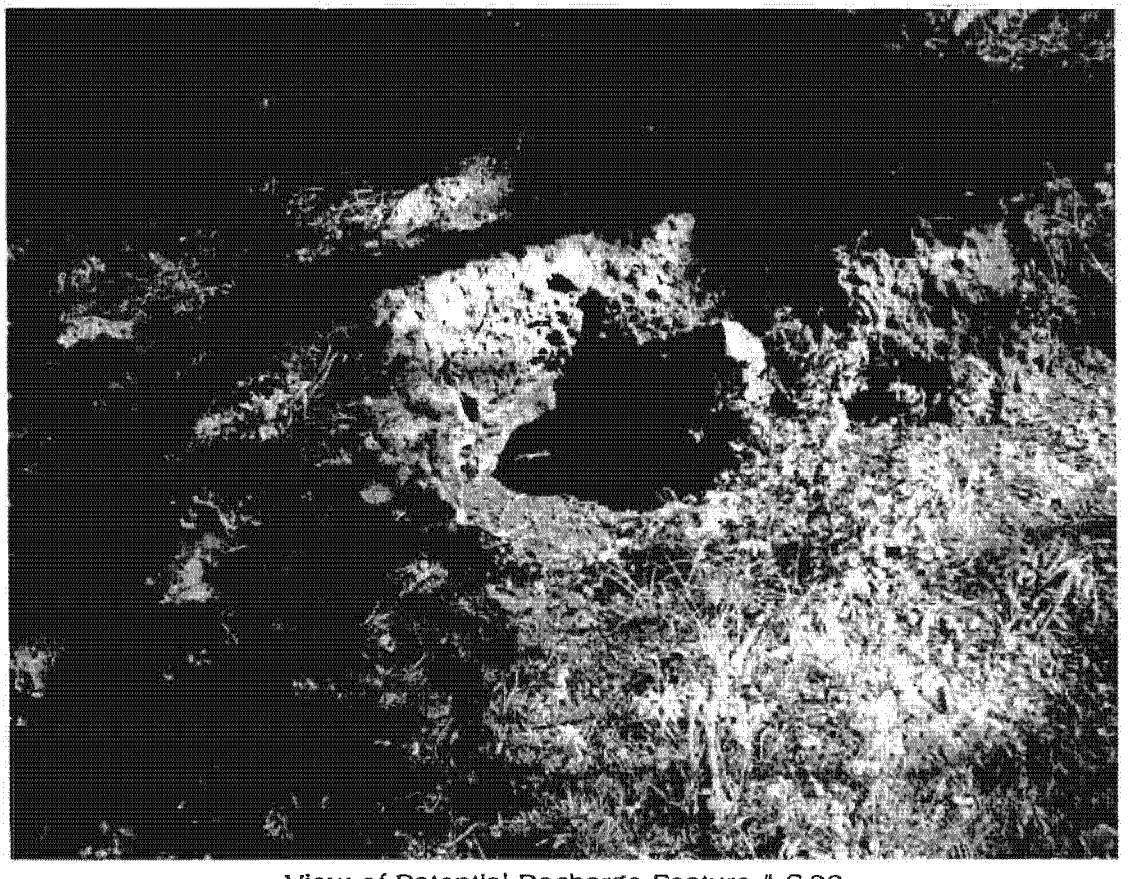
View of Potential Recharge Feature # S-27.



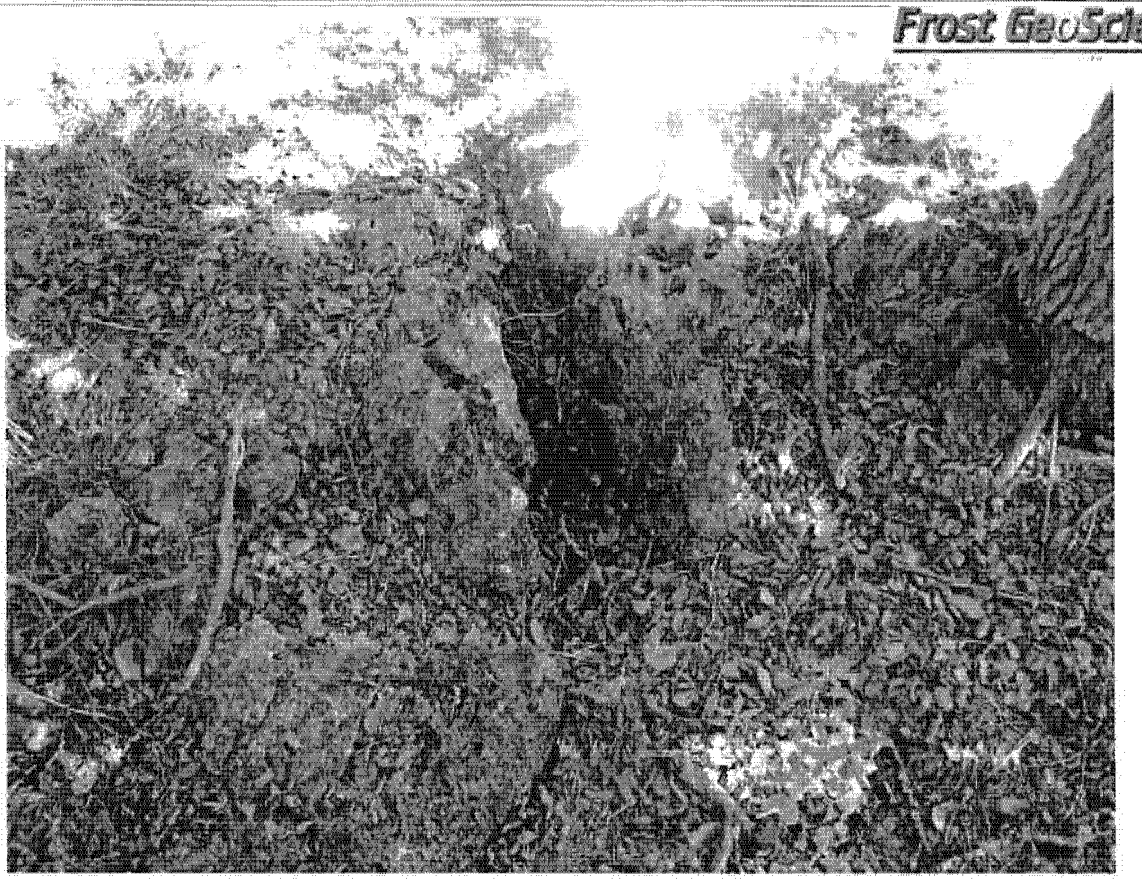
View of Potential Recharge Feature # S-27.



Typical view of the vegetative cover noted near S-27.



View of Potential Recharge Feature # S-28.

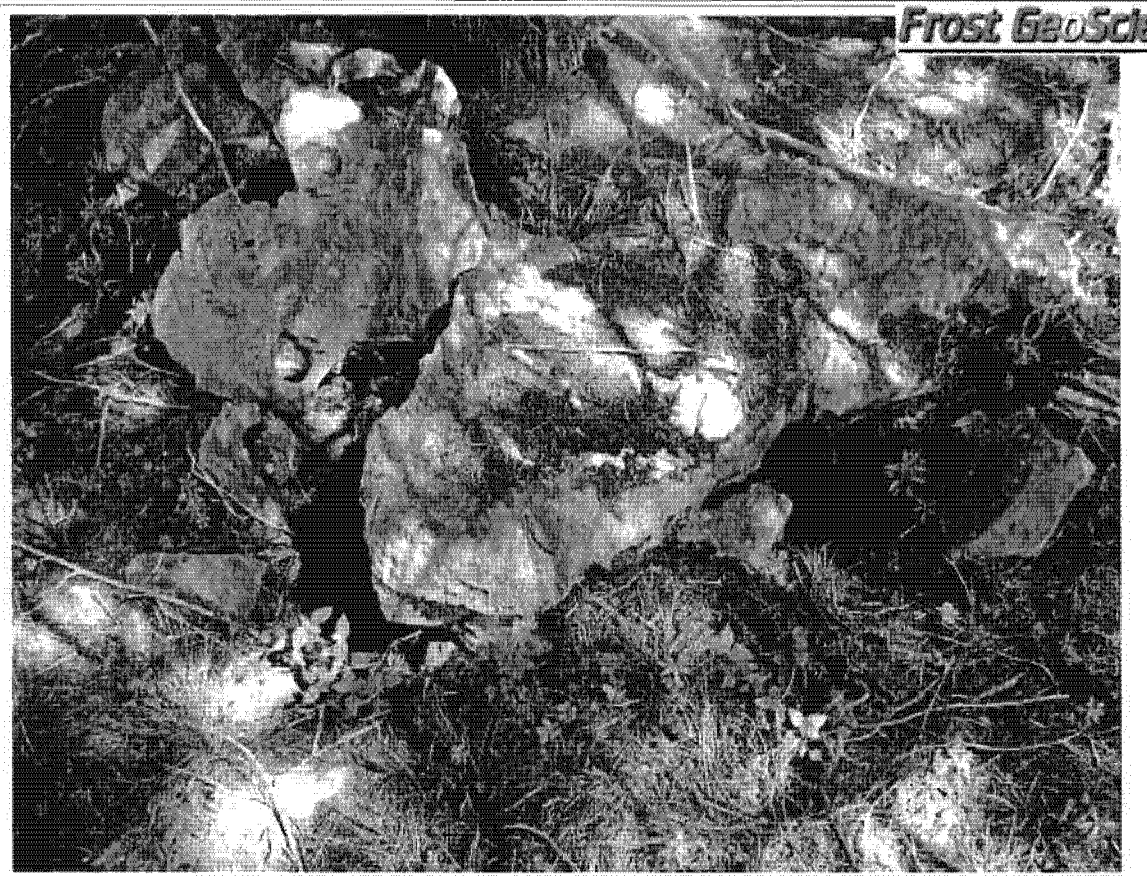


View of Potential Recharge Feature # S-29.

Typical view of the vegetative cover noted near S-29.

View of Potential Recharge Feature # S-30.

Typical view of the vegetative cover noted near S-30.

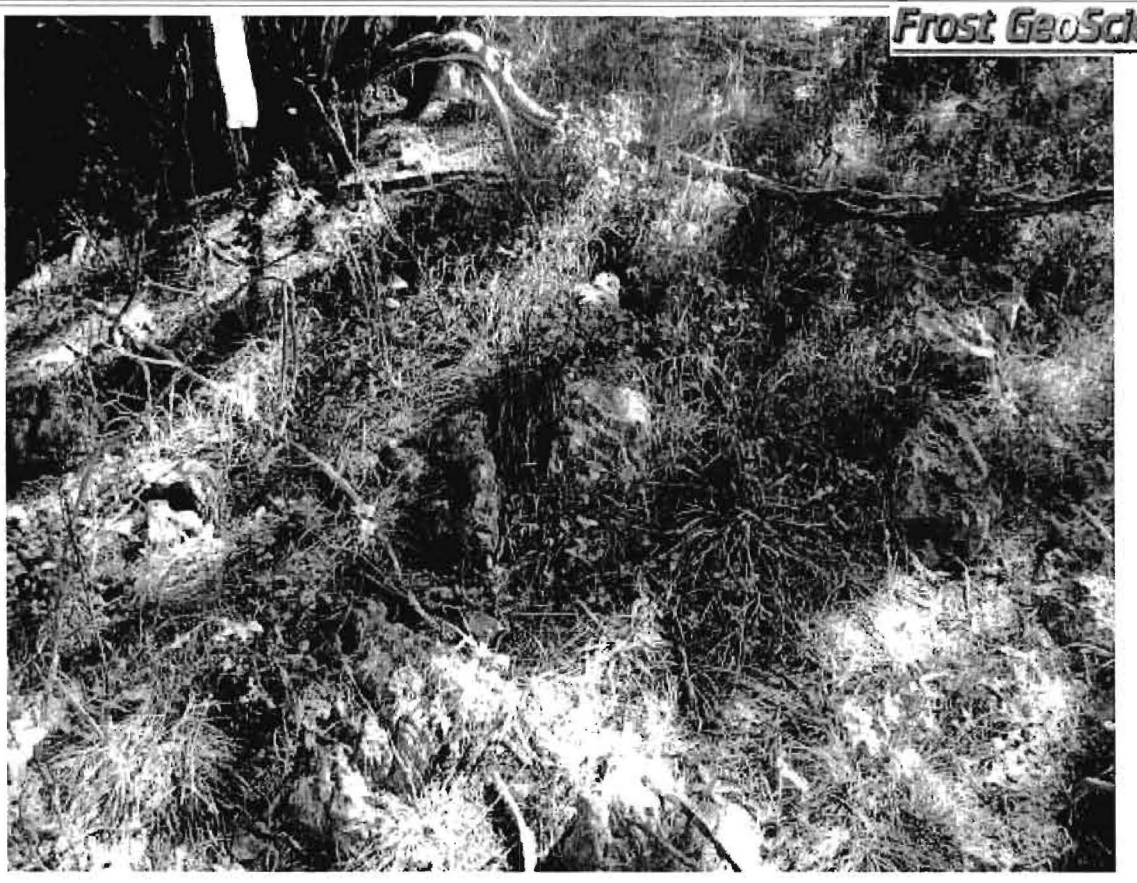


View of Potential Recharge Feature # S-32.

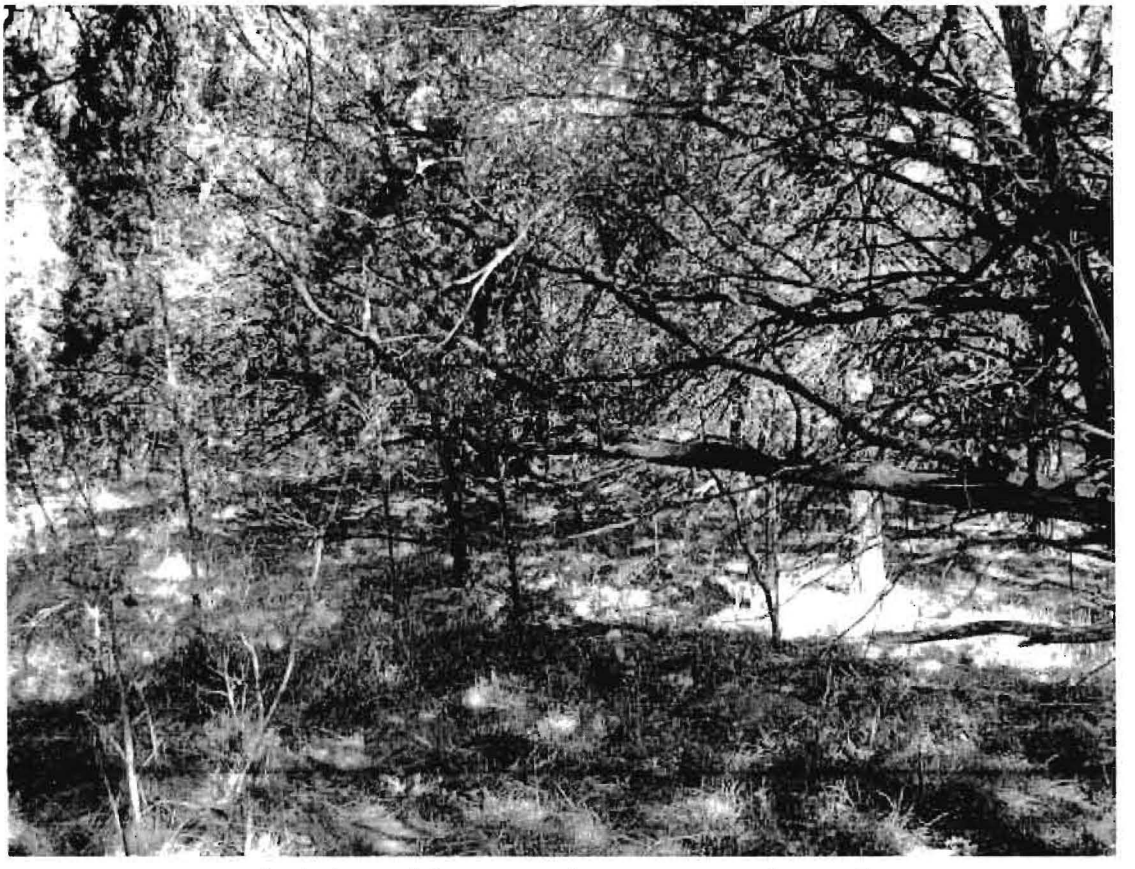
Typical view of the vegetative cover noted near S-32.

View of Potential Recharge Feature # S-34.

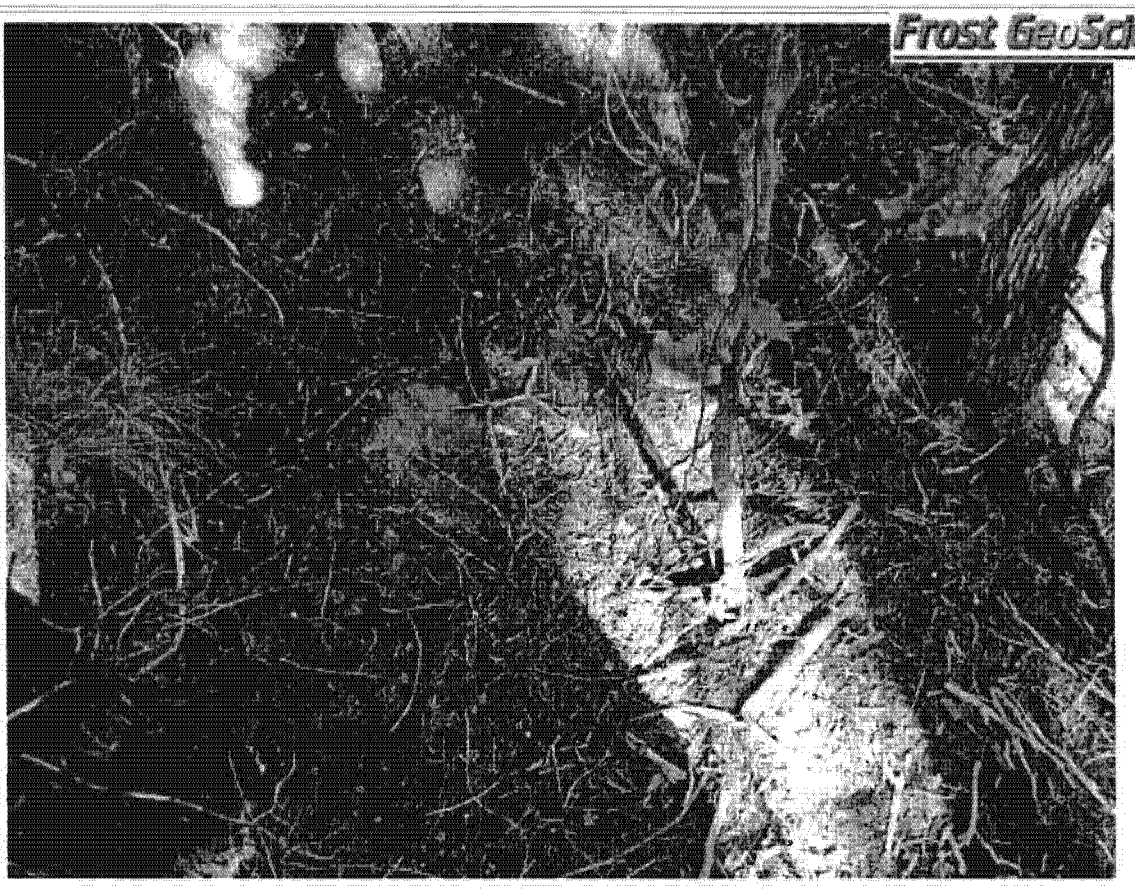
Typical view of the vegetative cover noted near S-34.



View of Potential Recharge Feature # S-35.

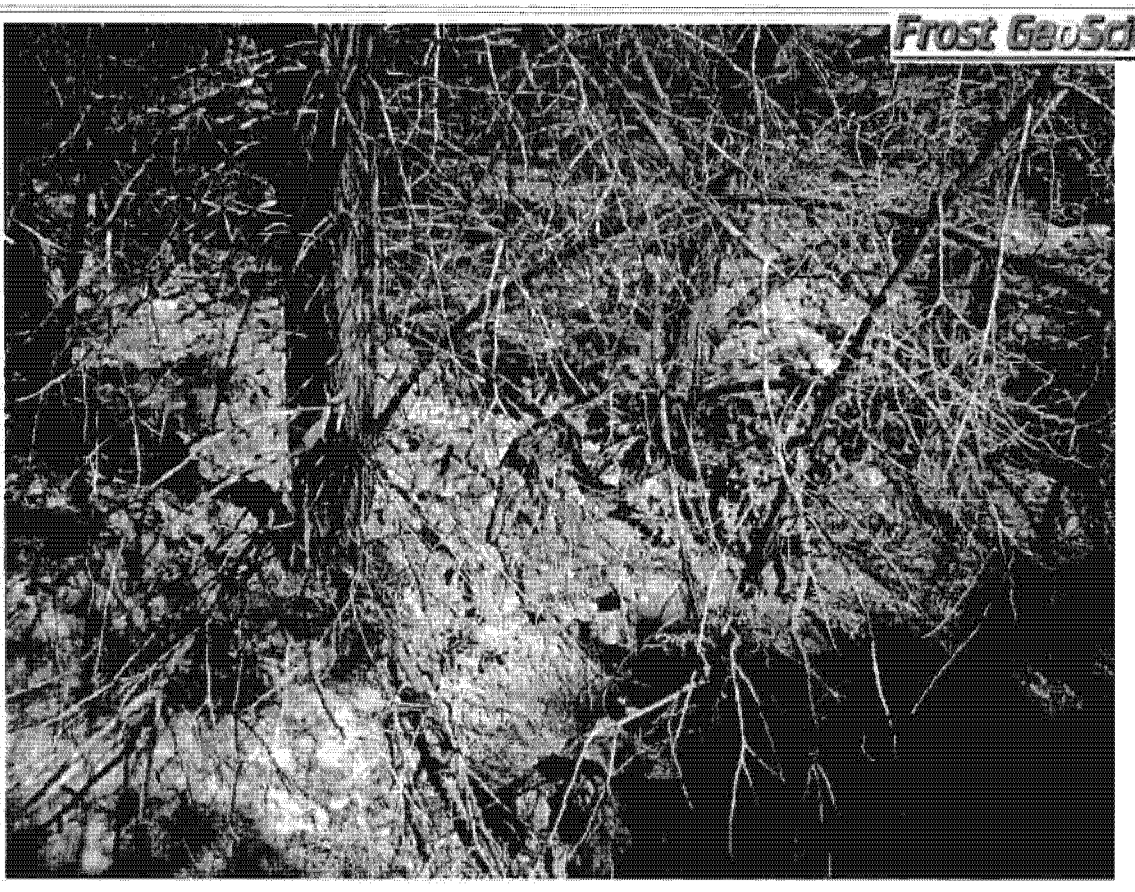


Typical view of the vegetative cover noted near S-35.

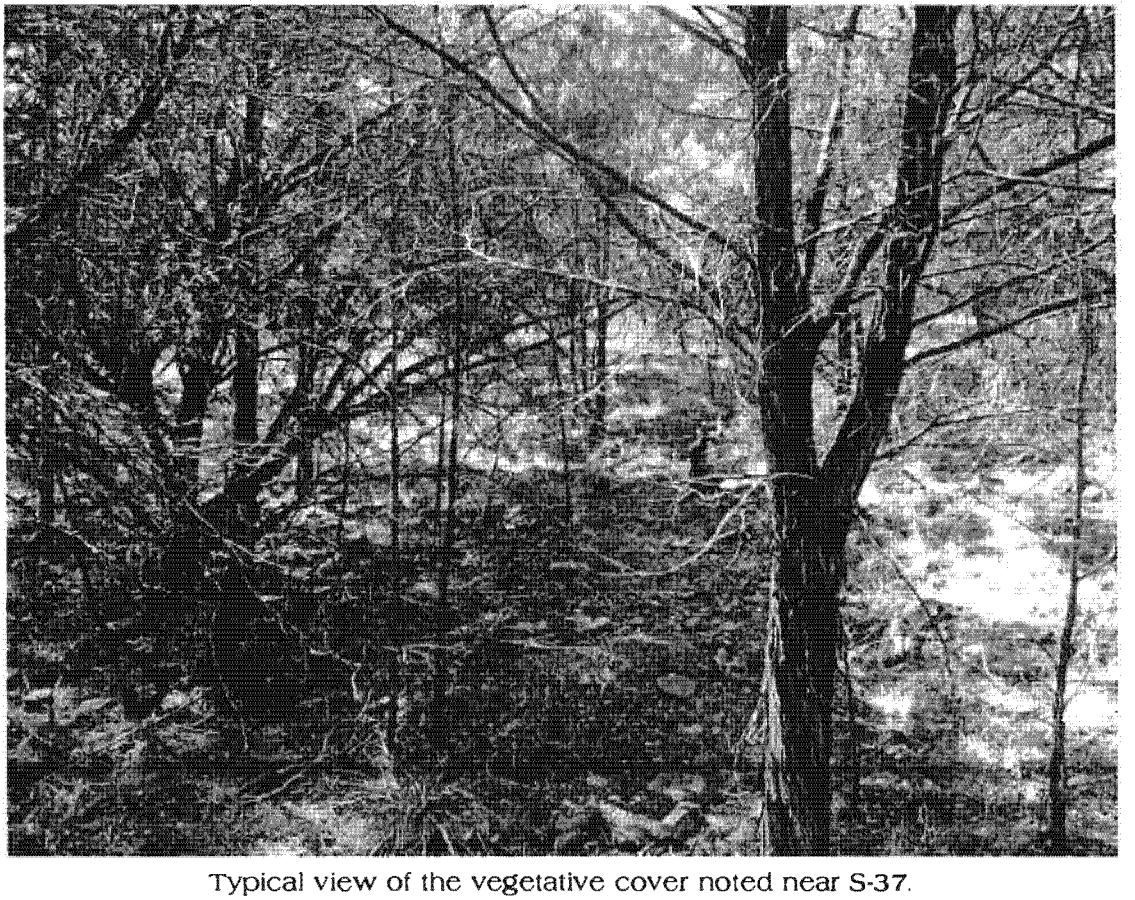


View of Potential Recharge Feature # S-36.

Typical view of the vegetative cover noted near S-36.



View of Potential Recharge Feature # S-37.



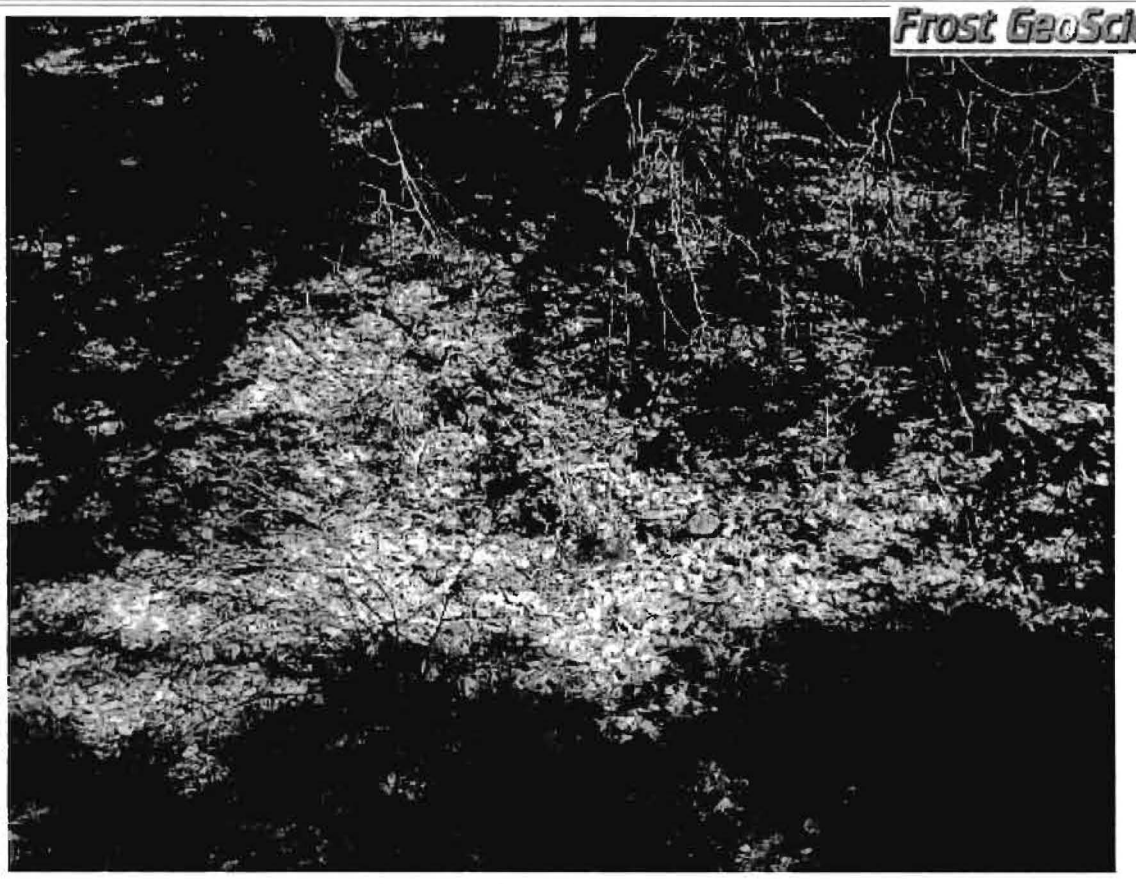
Typical view of the vegetative cover noted near S-37.

View to the east along the rock outcrop of Potential Recharge Feature # S-38.

View to the west along the rock outcrop of Potential Recharge Feature # S-38.

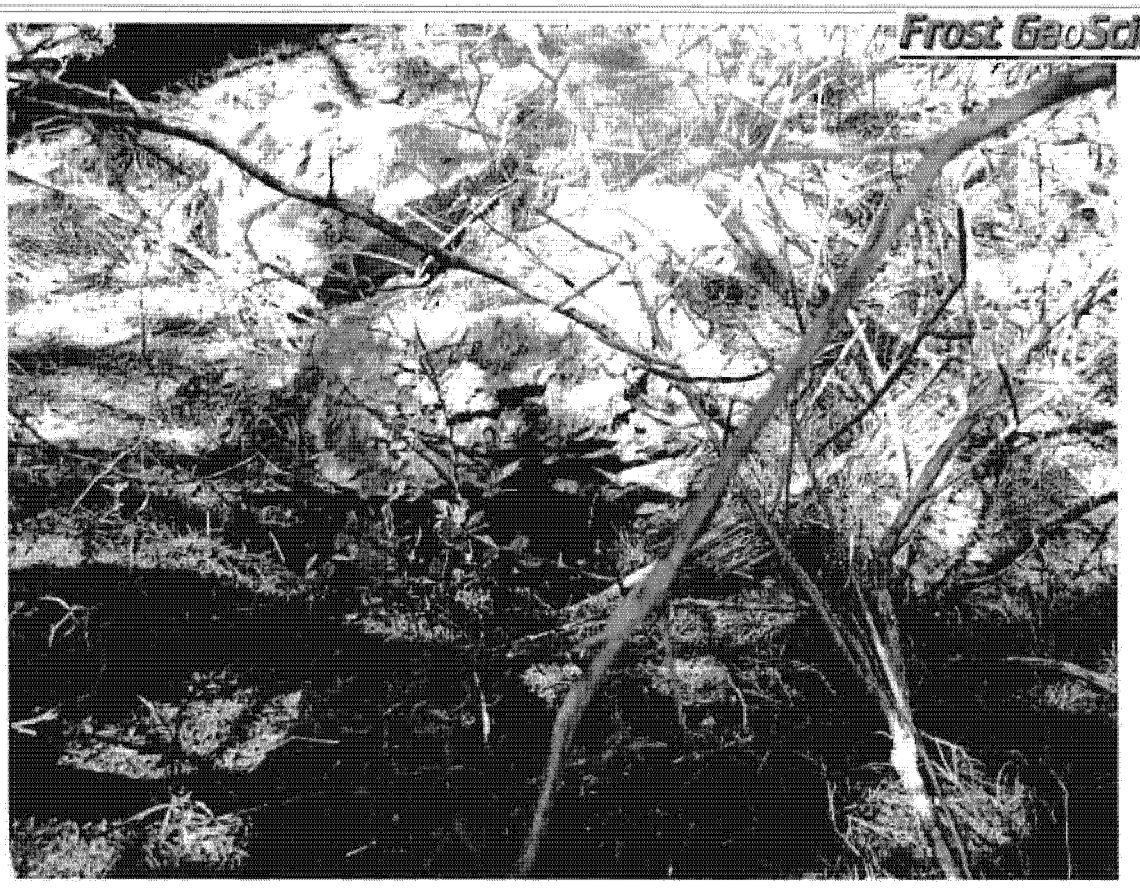
View of Potential Recharge Feature # S-39.

Typical view of the vegetative cover noted near S-39.

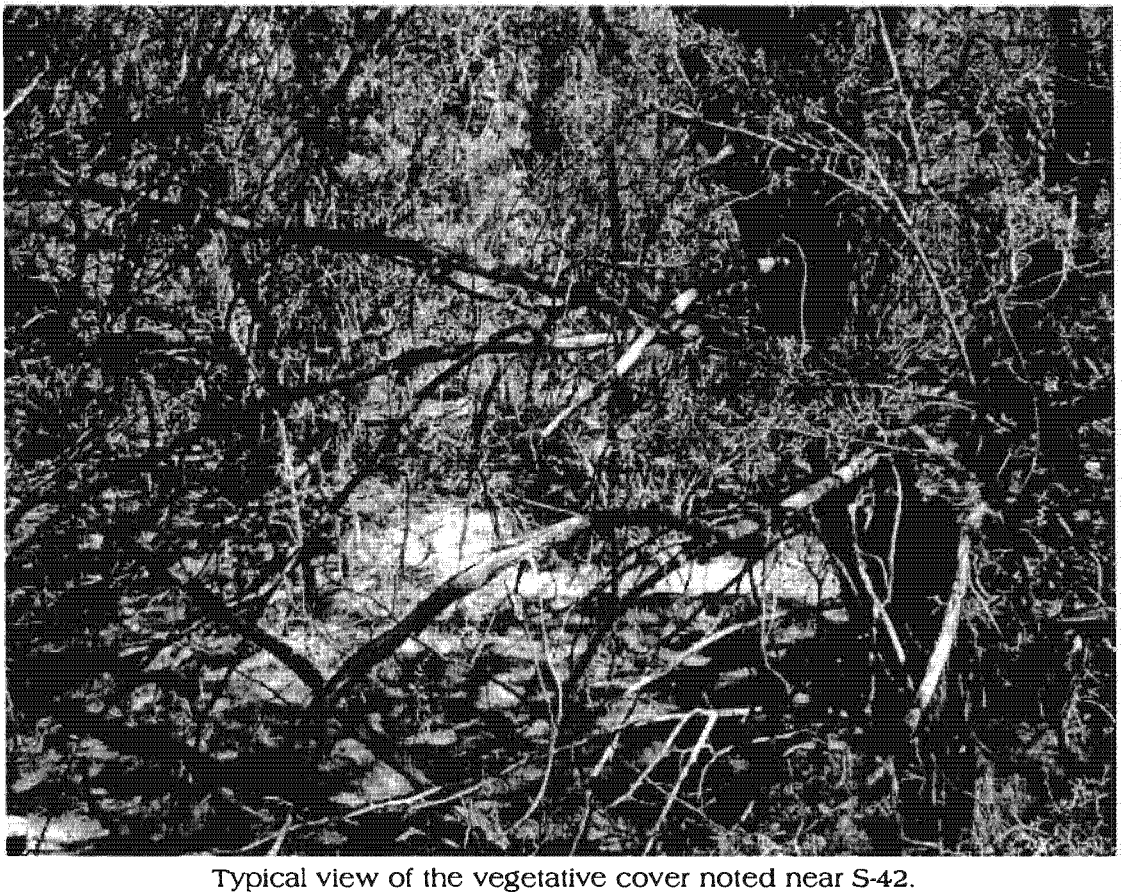


View of Potential Recharge Feature # S-40.

Typical view of the vegetative cover noted near S-40.



View of Potential Recharge Feature # S-42.



Typical view of the vegetative cover noted near S-42.

View of Potential Recharge Feature # S-46.

Typical view of the vegetative cover noted near S-46.

View of Potential Recharge Feature # S-47.

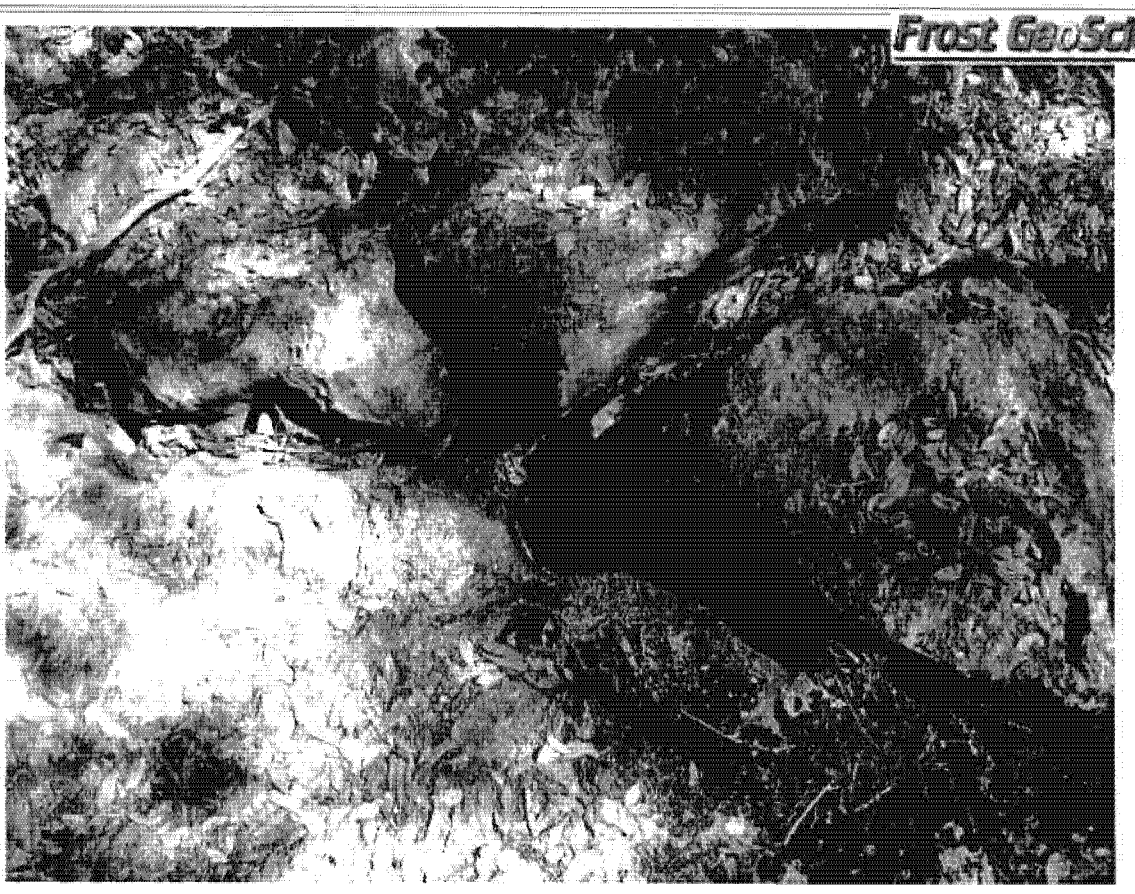
View of Potential Recharge Feature # S-48.

View of Potential Recharge Feature # S-52.

Typical view of the vegetative cover noted near S-52.

View of Potential Recharge Feature # S-53.

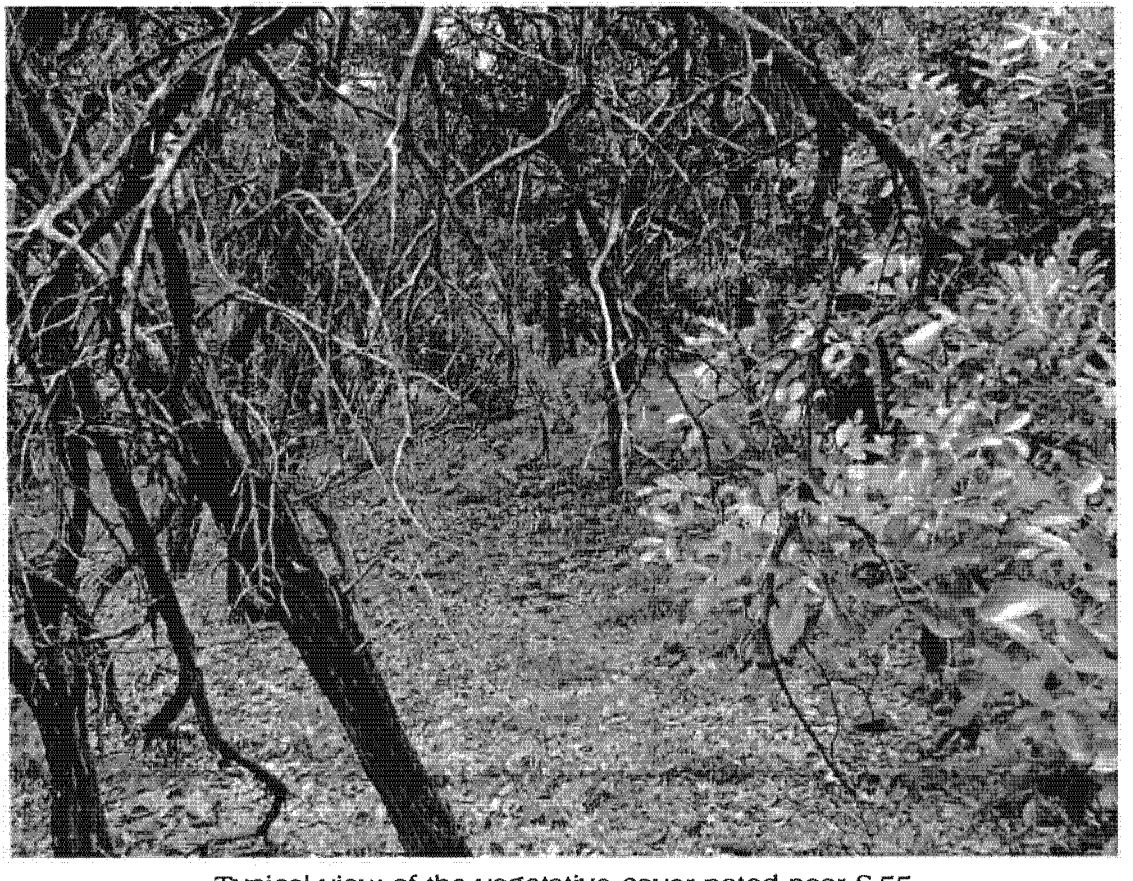
Typical view of the vegetative cover noted near S-53.



View of Potential Recharge Feature # S-54.

Typical view of the vegetative cover noted near S-54.

View of Potential Recharge Feature # S-55.



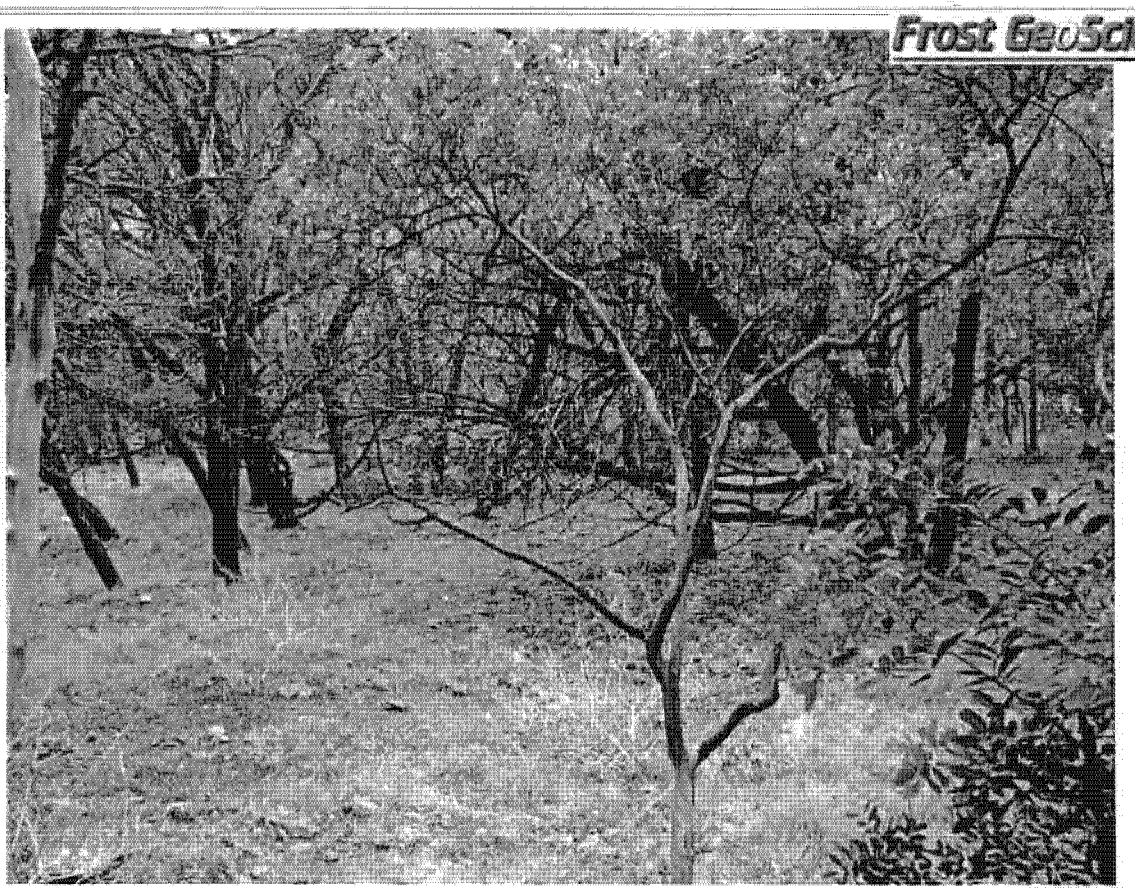
Typical view of the vegetative cover noted near S-55.

View of Potential Recharge Feature # S-56.

Typical view of the vegetative cover noted near S-56.

View of Potential Recharge Feature # S-57.

View of Potential Recharge Feature # S-58.

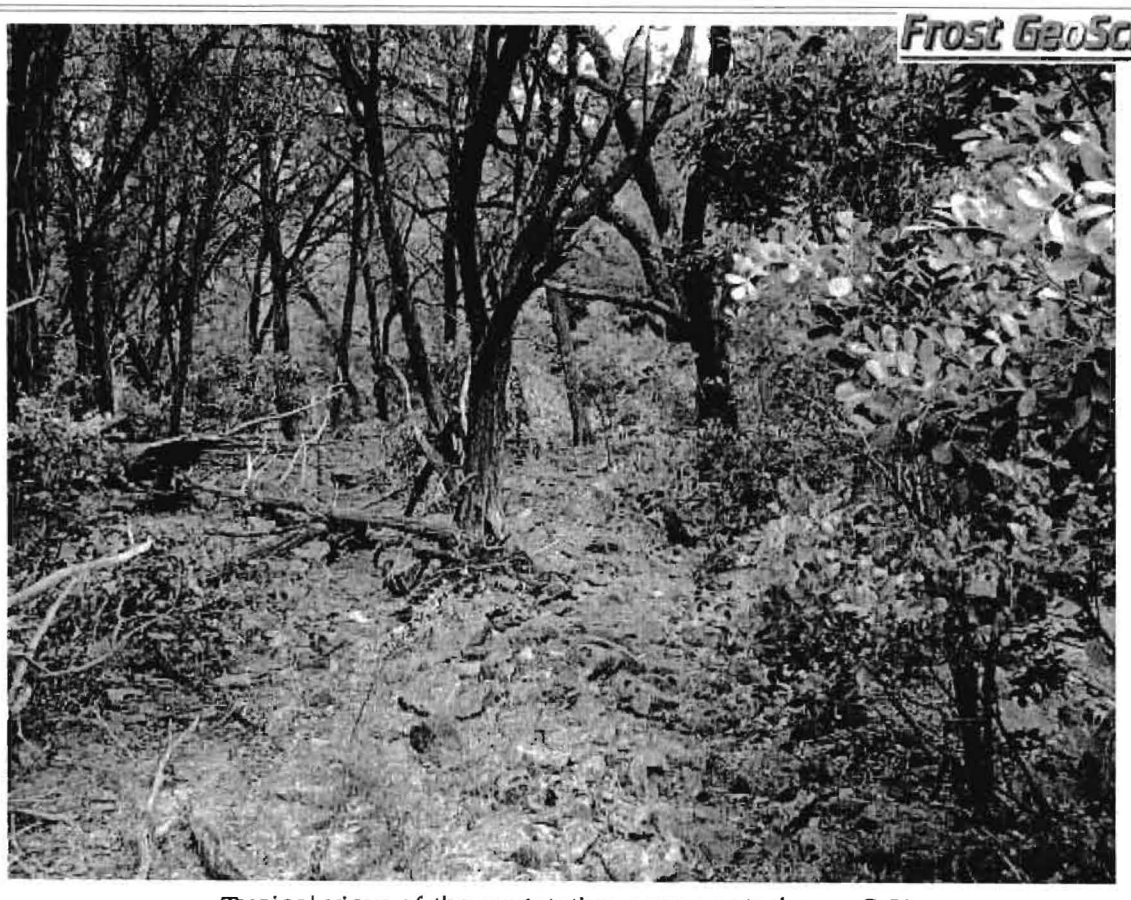


Typical view of the vegetative cover noted near S-58.

View of Potential Recharge Feature # S-59.

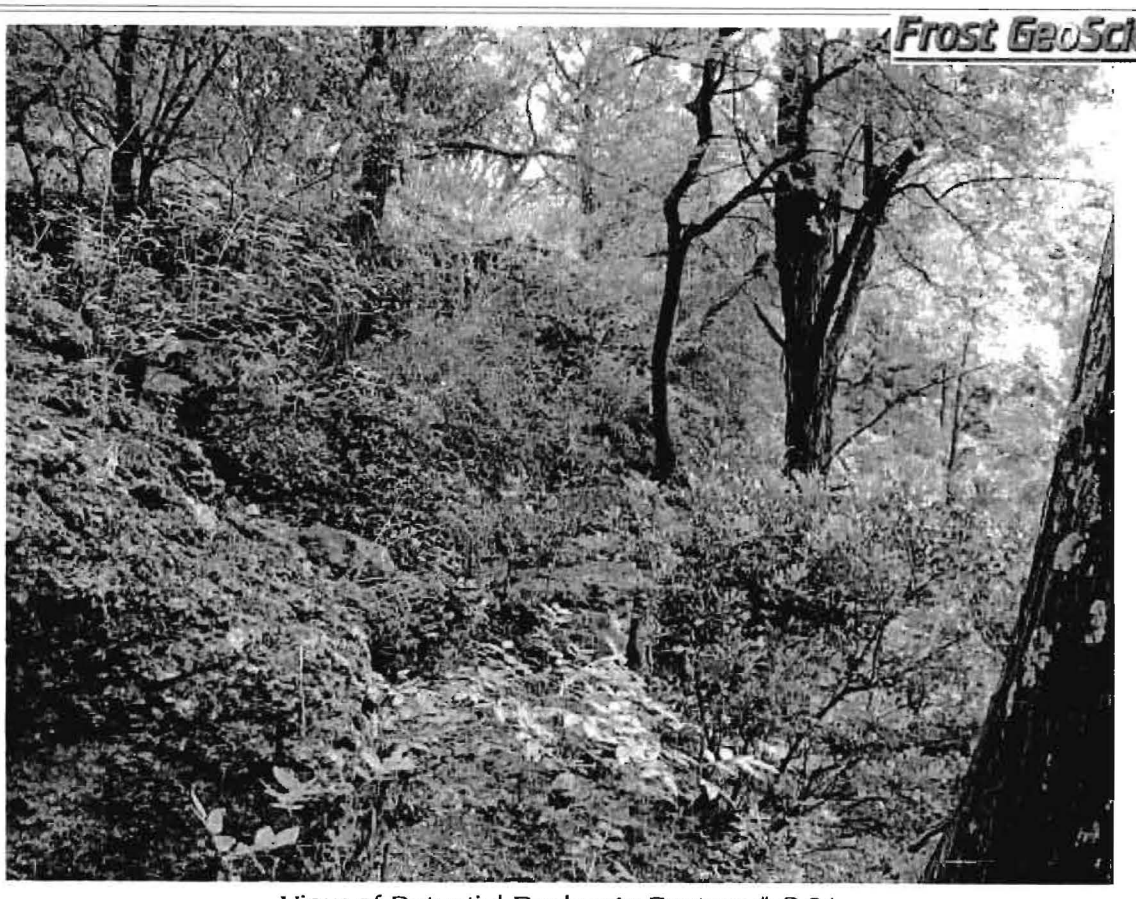
View of Potential Recharge Feature # S-61.

Typical view of the vegetative cover noted near S-61.



Typical view of the vegetative cover noted near S-61.

View of Potential Recharge Feature # S-63.



View of Potential Recharge Feature # S-64.

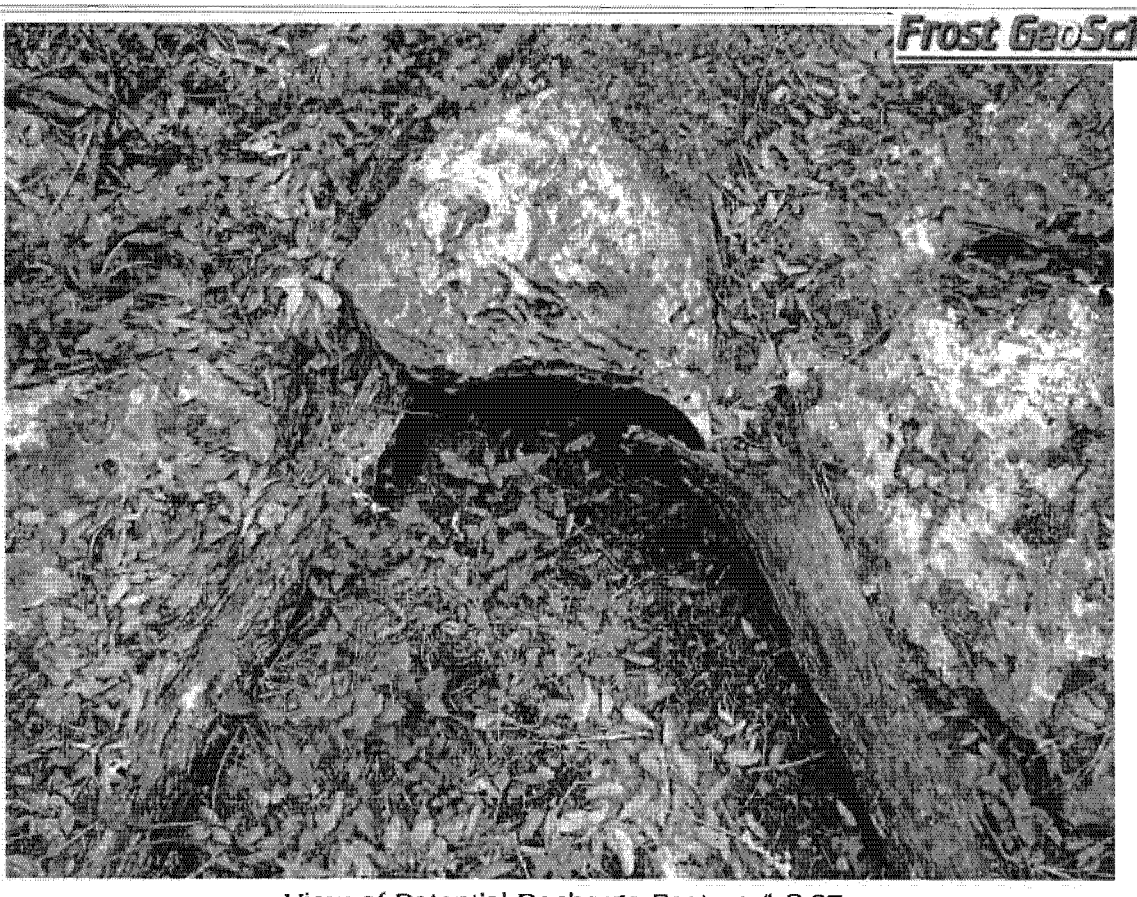
Typical view of the vegetative cover noted near S-64.

View of Potential Recharge Feature # S-65.

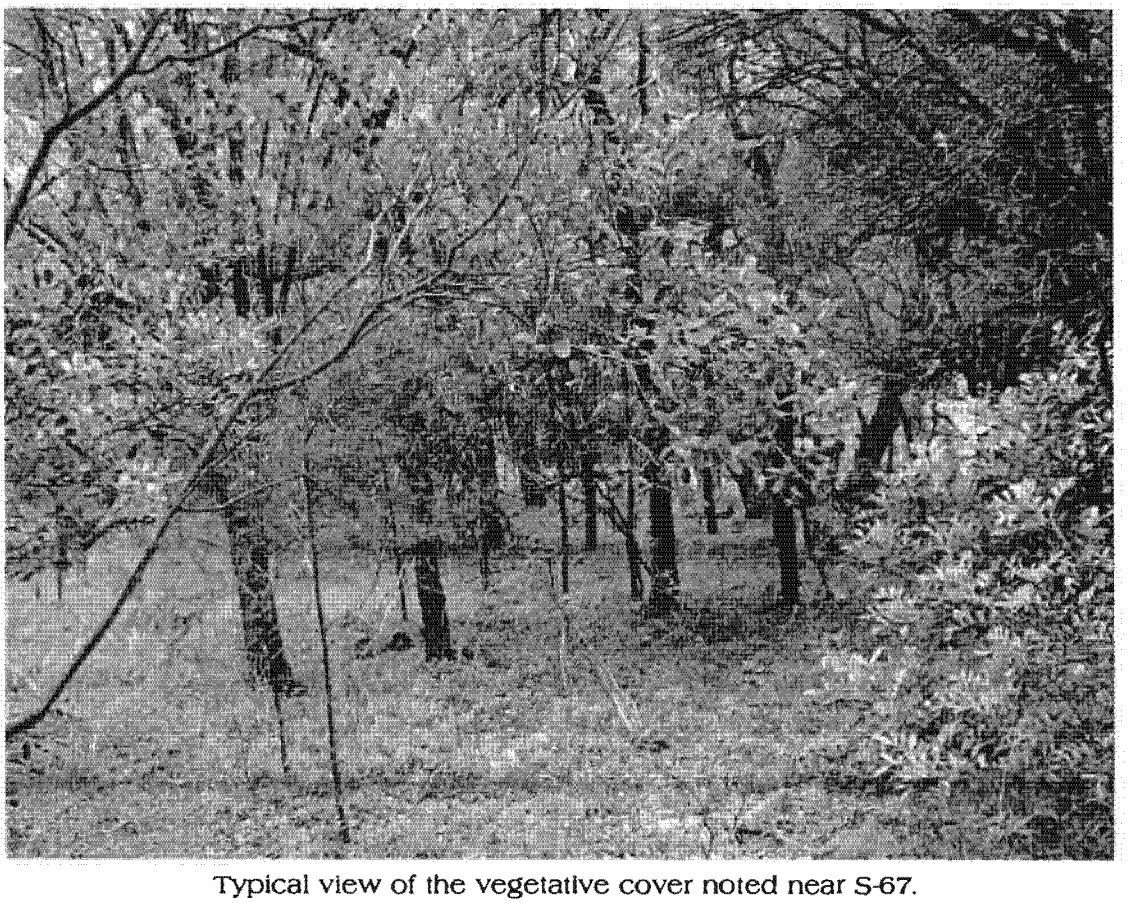
View of Potential Recharge Feature # S-65.

View of Potential Recharge Feature # S-66.

Typical view of the vegetative cover noted near S-66.

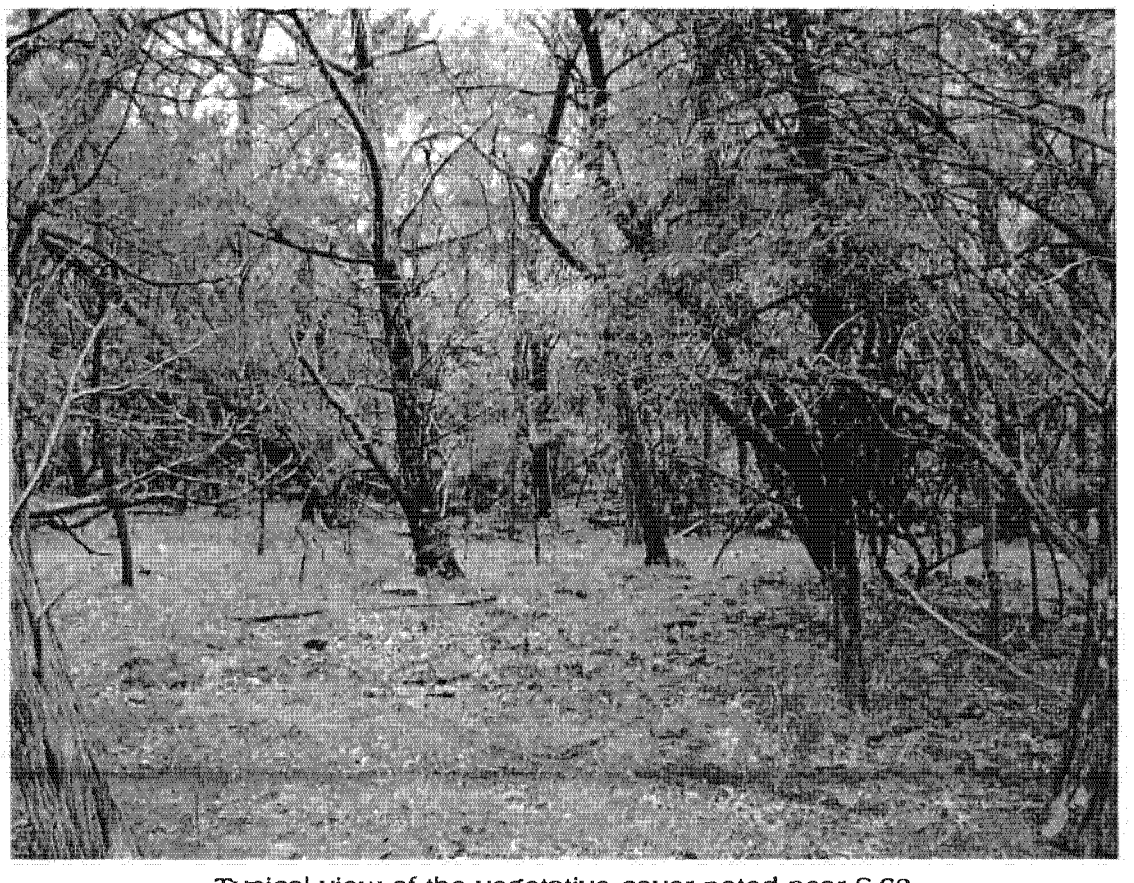


View of Potential Recharge Feature # S-67.

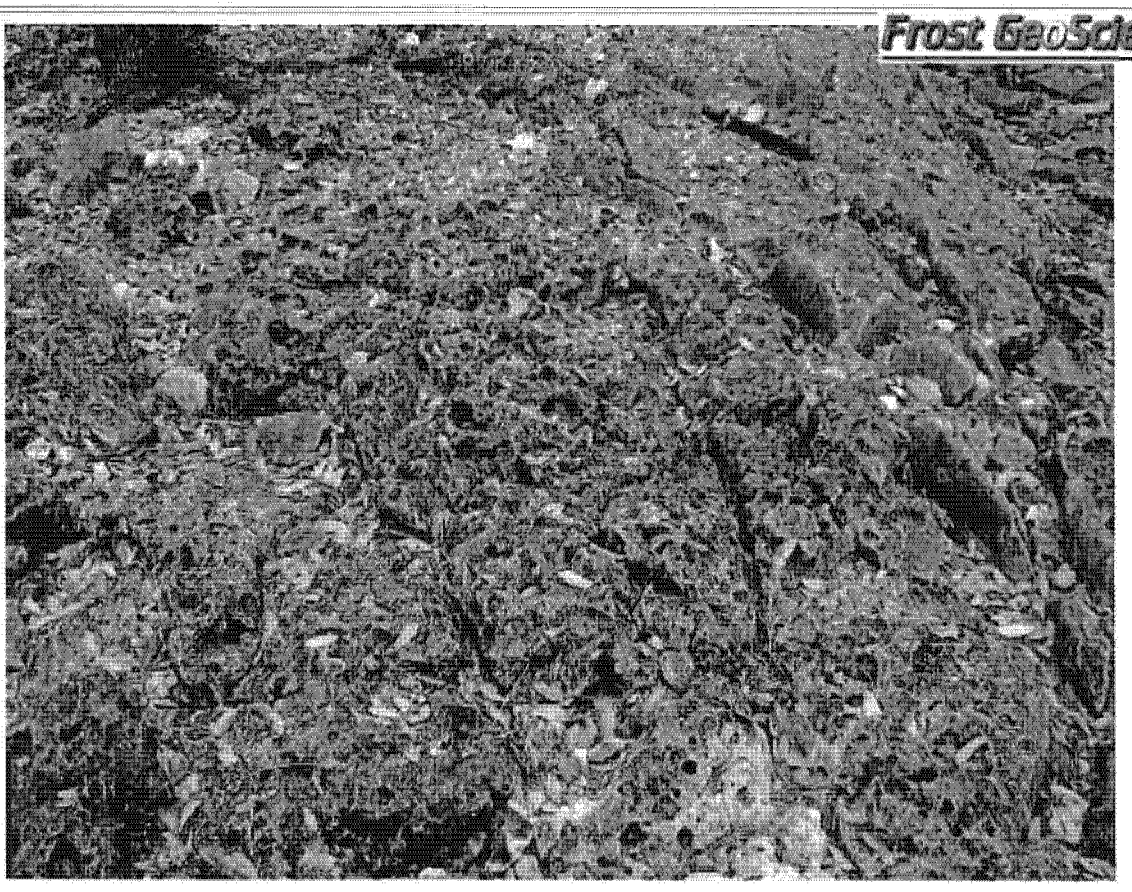


Typical view of the vegetative cover noted near S-67.

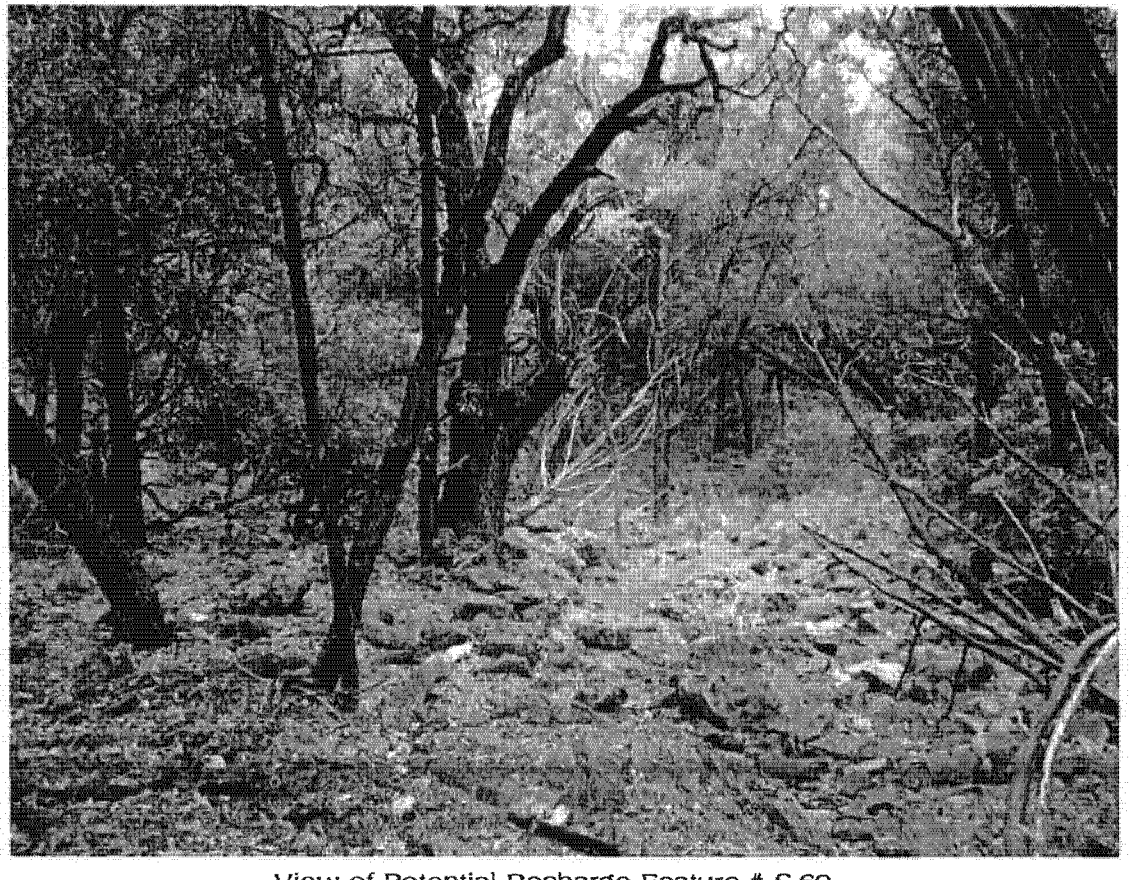
View of Potential Recharge Feature # S-68.



Typical view of the vegetative cover noted near S-68.



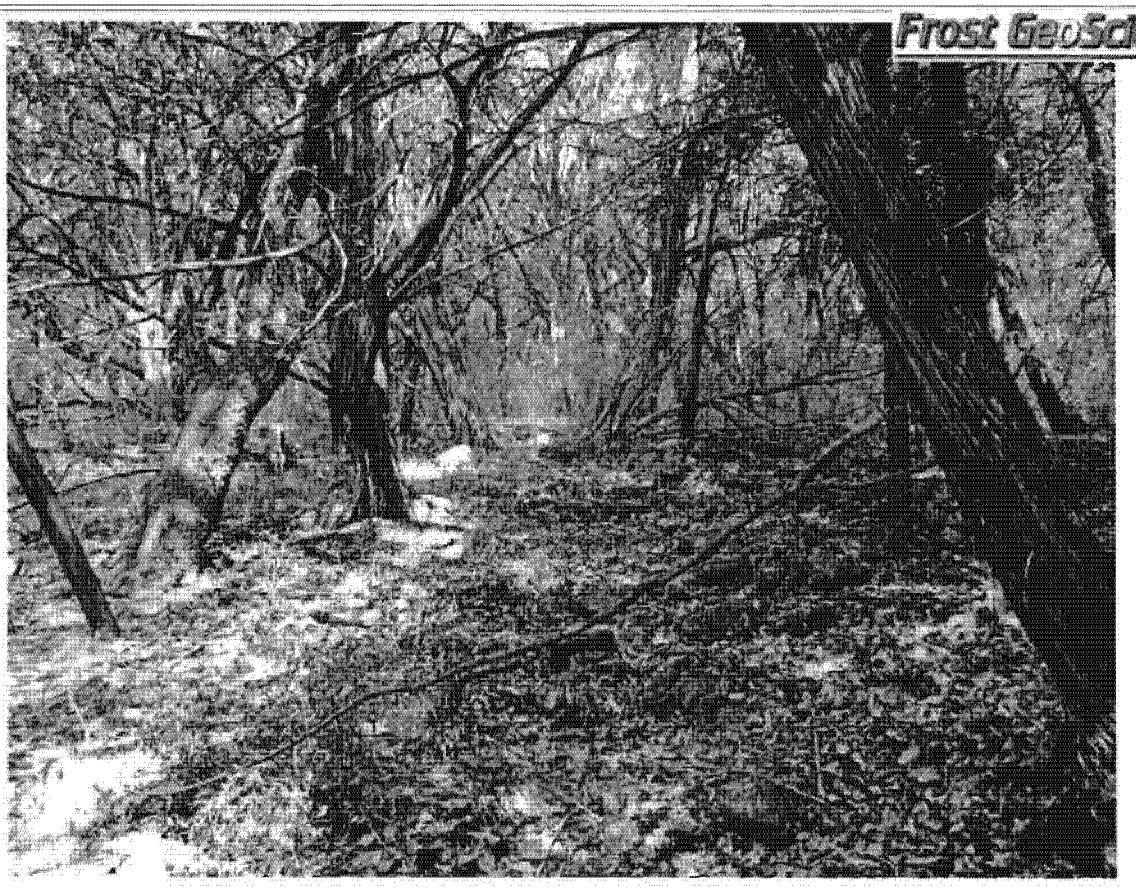
View of Potential Recharge Feature # S-69.



View of Potential Recharge Feature # S-69.

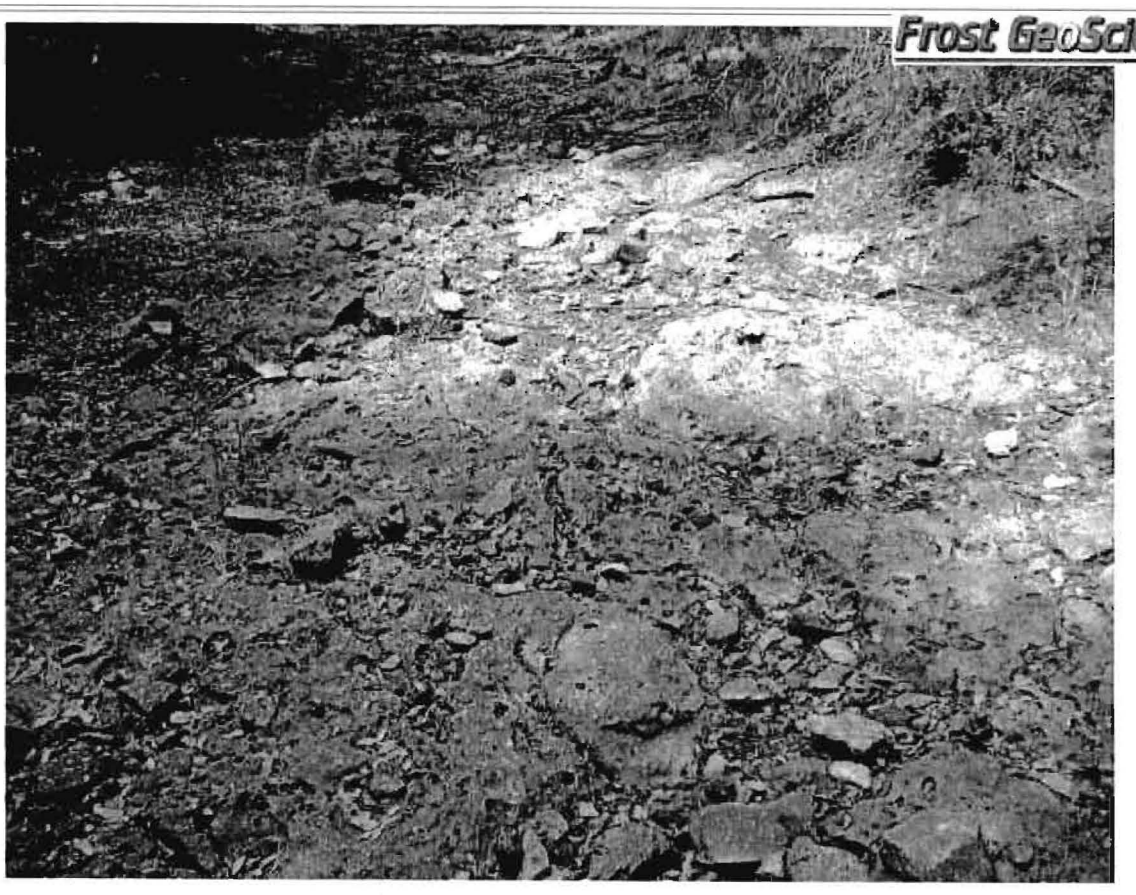
View of Potential Recharge Feature # S-70.

View of Potential Recharge Feature # S-72.

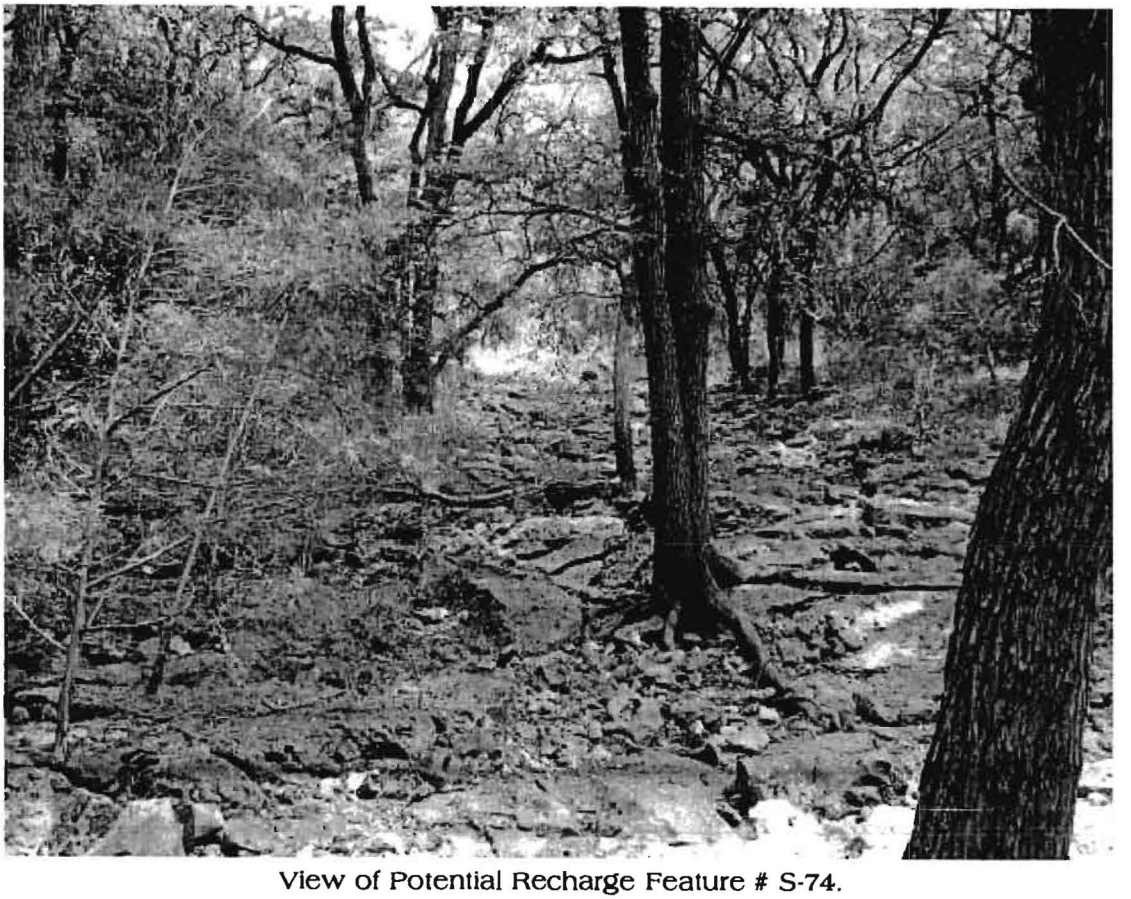


Typical view of the vegetative cover noted near S-72.

View of Potential Recharge Feature # S-73.

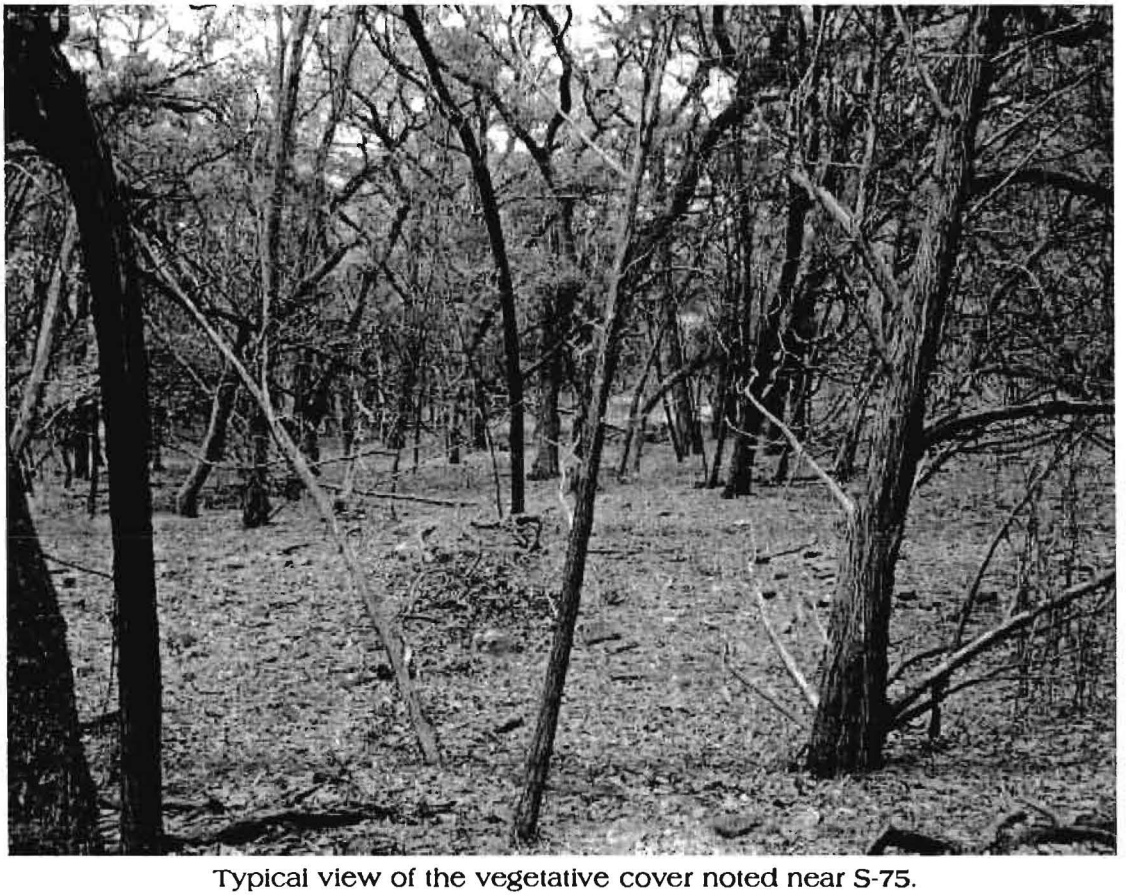


View of Potential Recharge Feature # S-74.



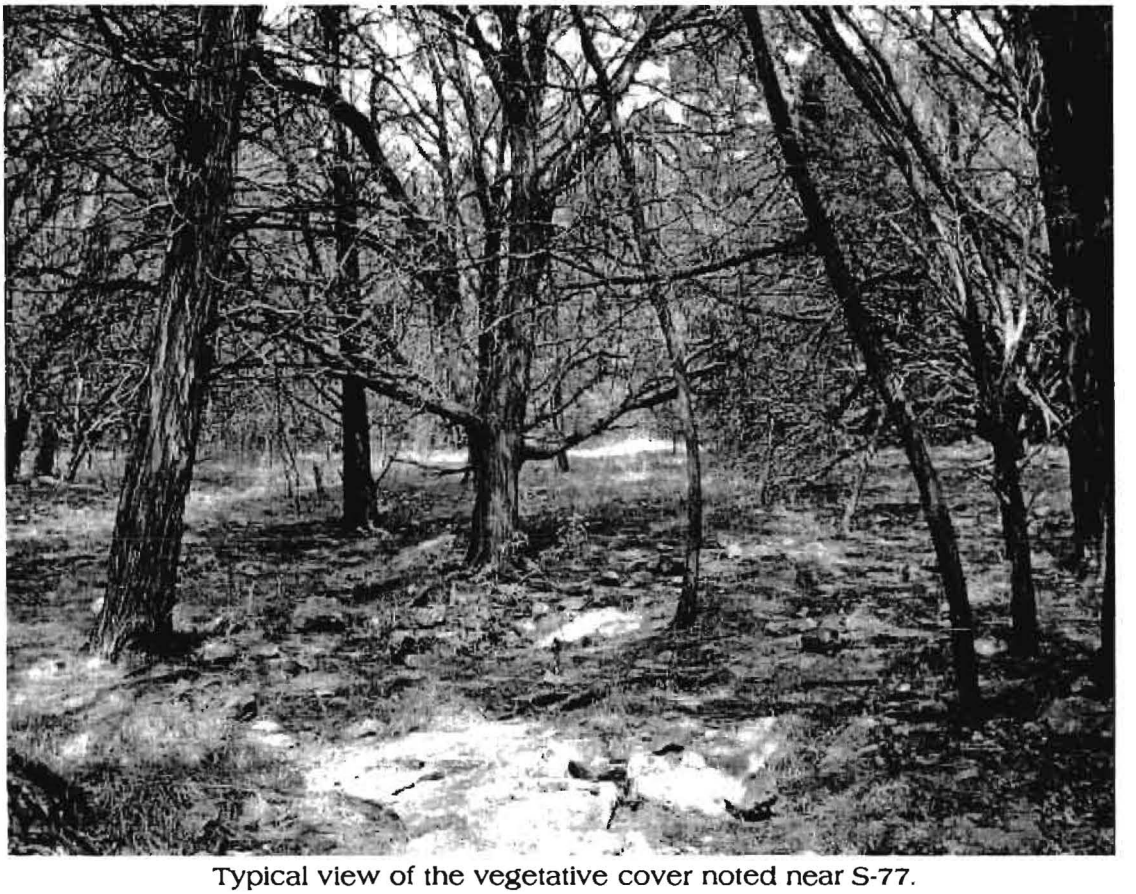
View of Potential Recharge Feature # S-74.

View of Potential Recharge Feature # S-75.



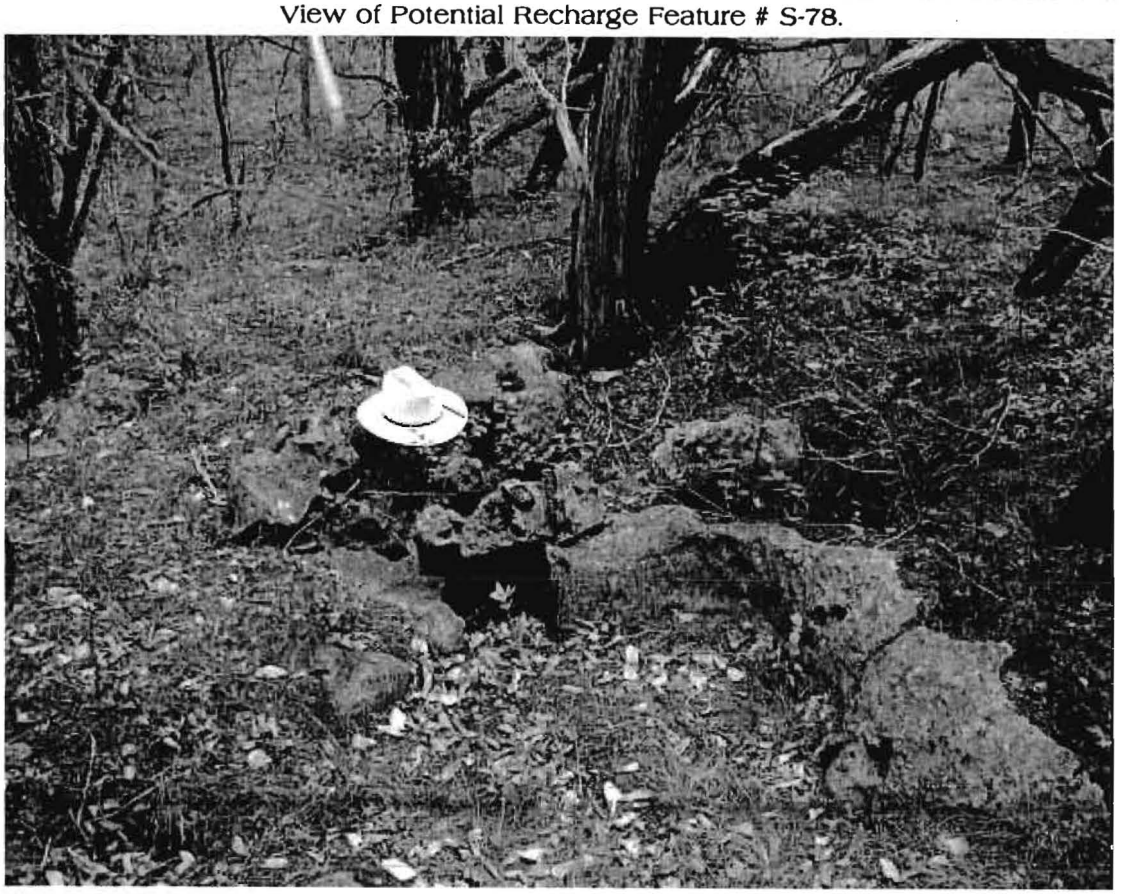
Typical view of the vegetative cover noted near S-75.

View of Potential Recharge Feature # S-77.



Typical view of the vegetative cover noted near S-77.

View of Potential Recharge Feature # S-78.



View of Potential Recharge Feature # S-78.

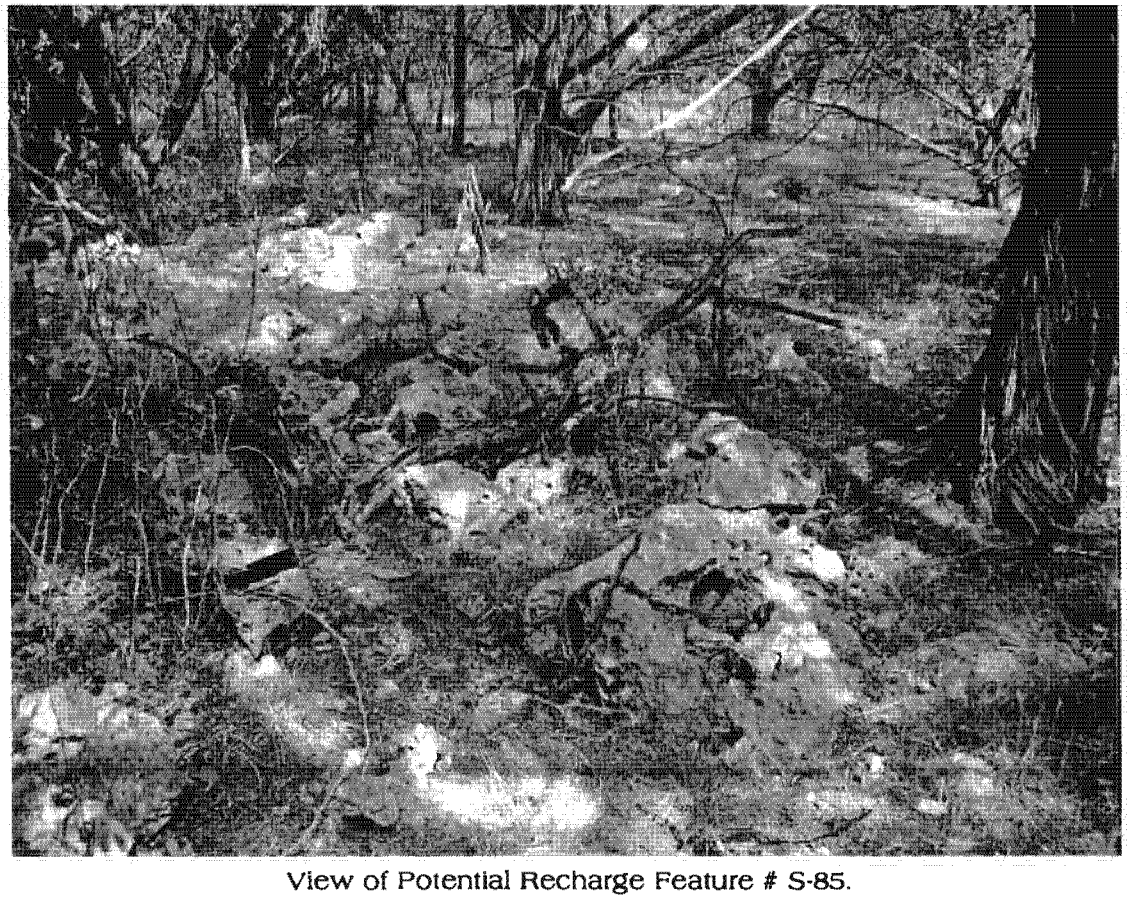
View of Potential Recharge Feature # S-79.

View of Potential Recharge Feature # S-80.

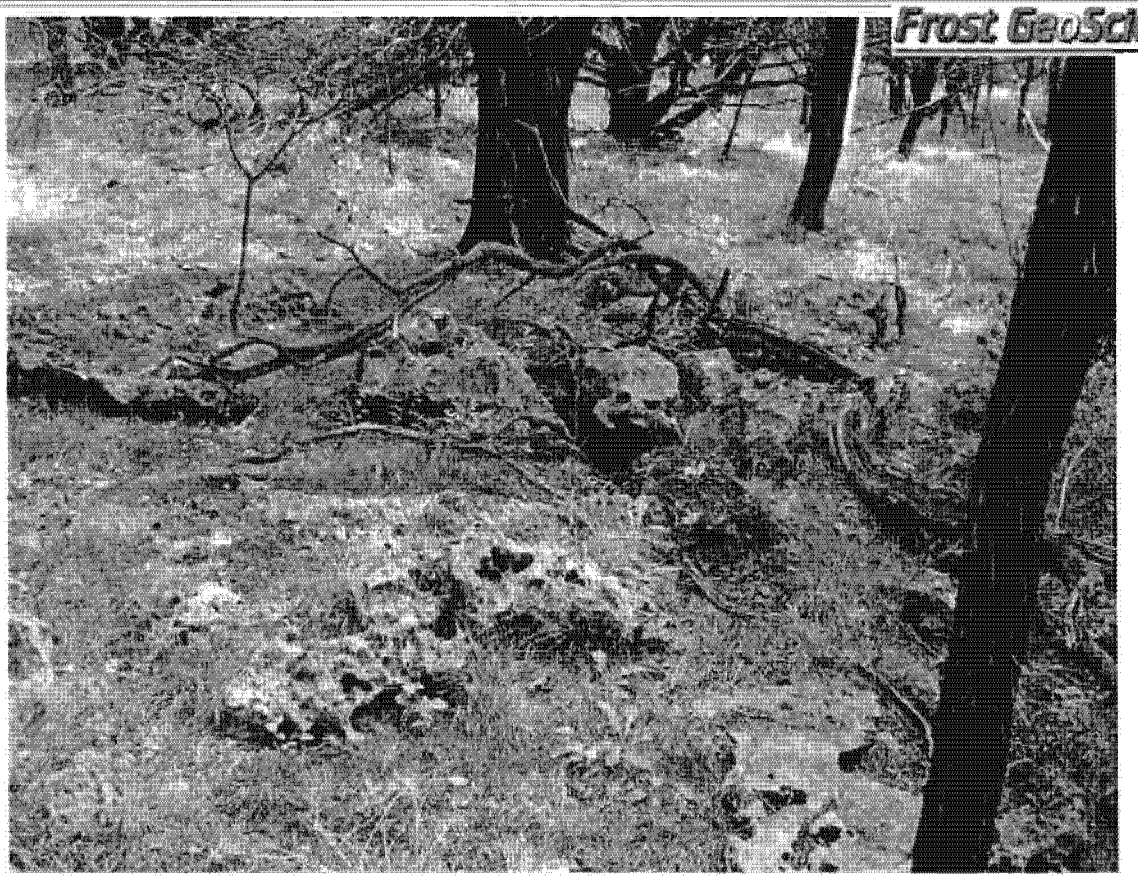
View of Potential Recharge Feature # S-81.

View of Potential Recharge Feature # S-81.

View of Potential Recharge Feature # S-83.

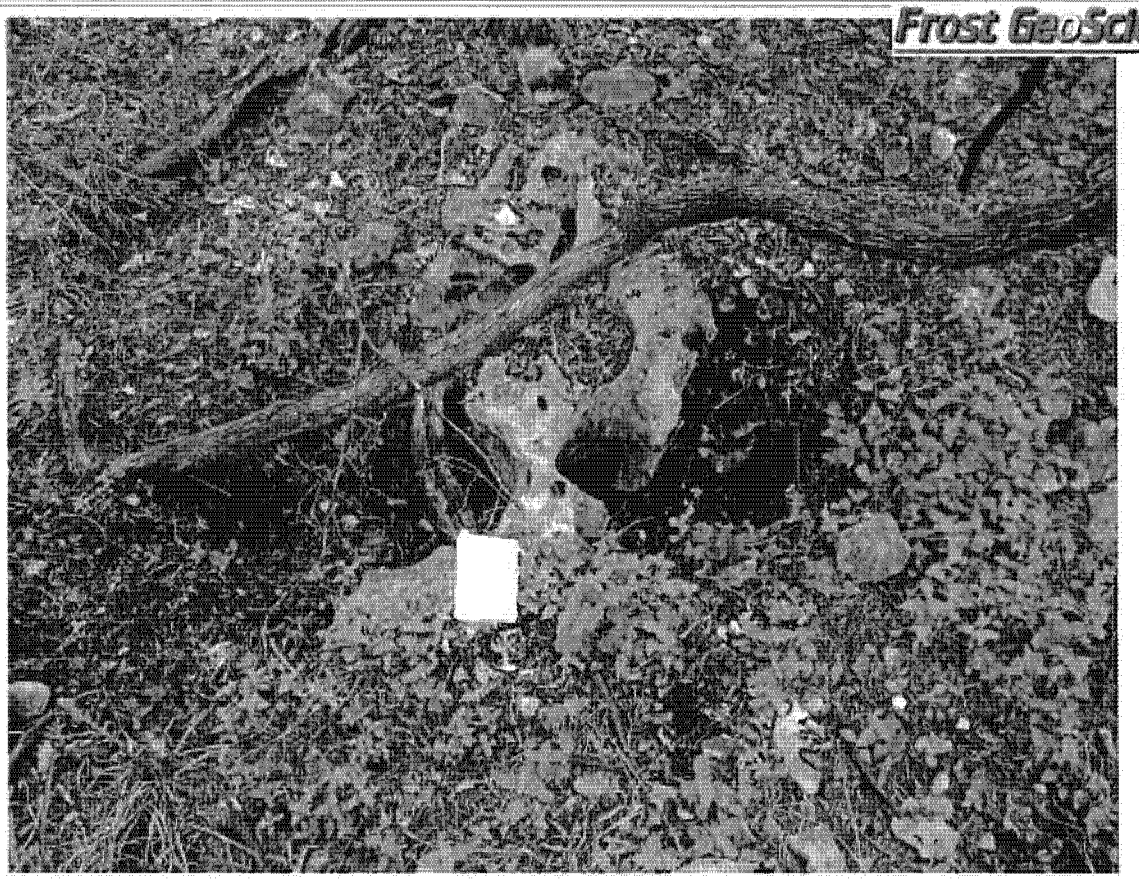


View of Potential Recharge Feature # S-85.



View of Potential Recharge Feature # S-85.

View of Potential Recharge Feature # S-86.



View of Potential Recharge Feature # S-88.

View of Potential Recharge Feature # S-89.

View of Potential Recharge Feature # S-89.

View of Potential Recharge Feature # S-89.

View of Potential Recharge Feature # S-90.

View of Potential Recharge Feature # S-91.

View of Potential Recharge Feature # S-92.

Typical view of the vegetative cover noted near S-92.

View of Potential Recharge Feature # S-93.

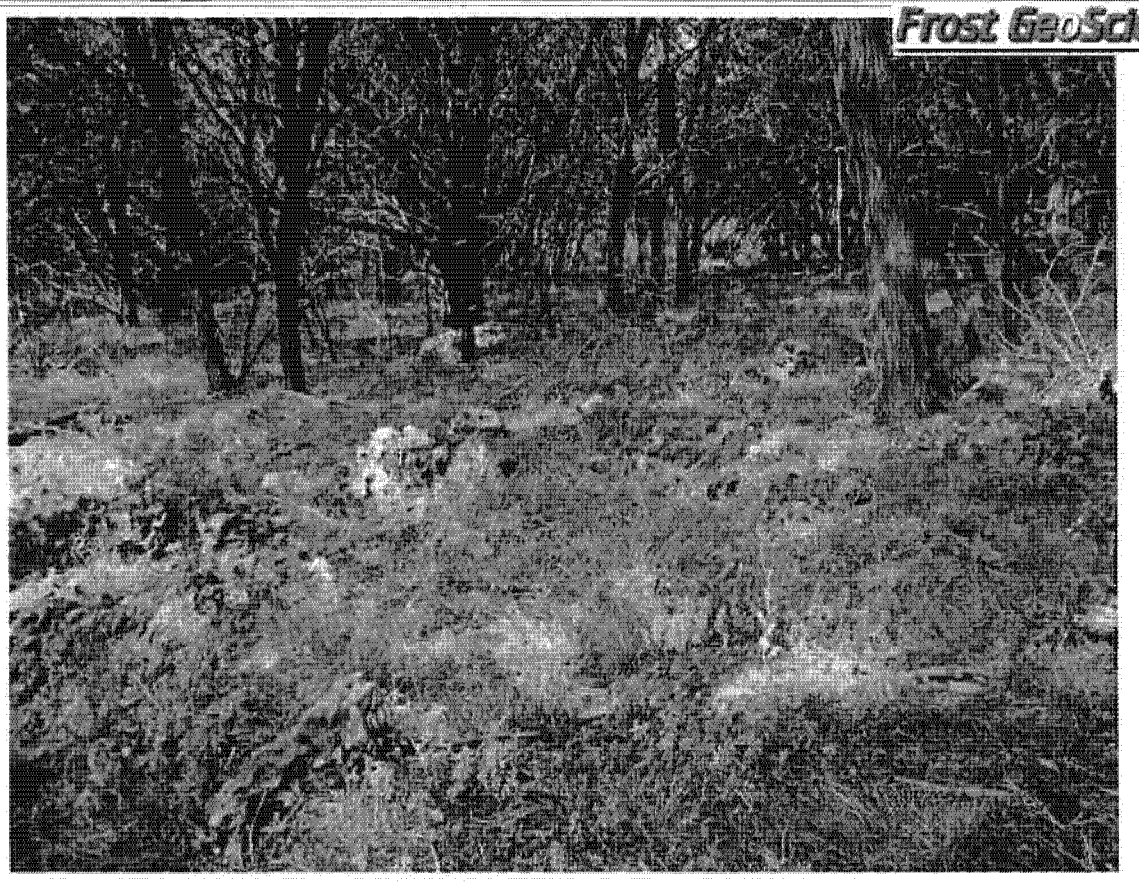
Typical view of the vegetative cover noted near S-93.

View of Potential Recharge Feature # S-94.

View of Potential recharge Feature # S-95.

Typical view of the vegetative cover noted near S-95.

View of Potential Recharge Feature # S-96.

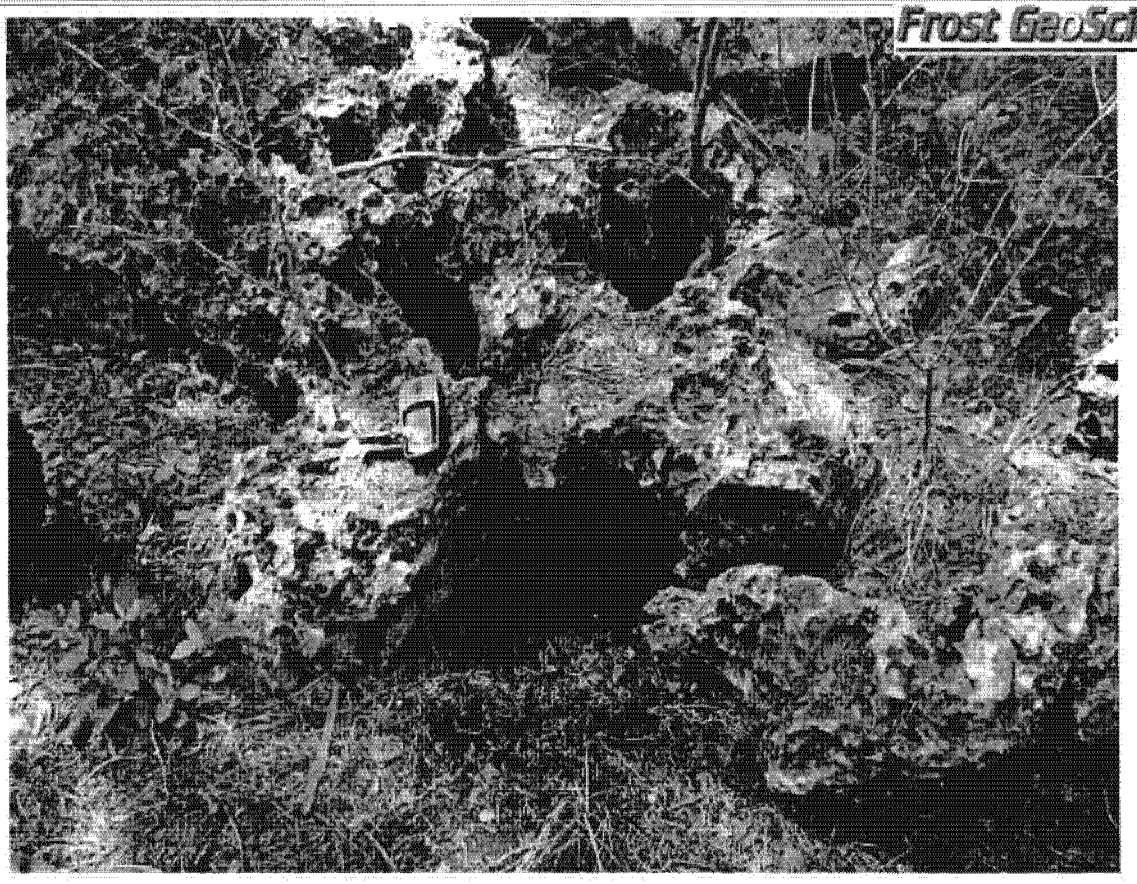


View of Potential Recharge Feature # S-97.

Typical view of the vegetative cover noted near S-97.

View of Potential Recharge Feature # S-98.

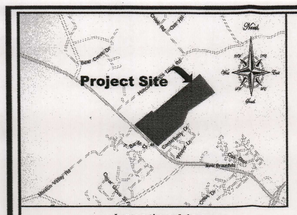
Typical view of the vegetative cover noted near S-98.



View of Potential Recharge Feature # S-99.

Typical view of the vegetative cover noted near S-99.

View of Potential Recharge Feature # S-103.



Location Map

Frost GeoSciences
Geotechnical • Construction Materials
Forensics • Environmental
13402 Western Oak Dr. • Helotes, Texas 78023
Phone: (210) 372-1315 Fax: (210) 372-1318

Site Geologic Map

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
for the
Tschirhart Ranch Subdivision
267.038 Acres
New Braunfels, Texas

Frost GeoSciences, Inc. Control # FGS-E09176

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)
- Formation Contact
- 100-Year Floodplain - Zone A
- 100-Year Floodplain - Zone AE
- Other Flood Hazard Area - Zone X (shaded)

Floodplain Information Obtained From
FIRM: Flood Insurance Rate Map
Comal County, Texas: Panel # 48546301000, Revised 2/29/86
Comal County, Texas: Panel # 48546301050, Revised 2/29/86

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report 94-4117 (1994)
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)

North
NW NE West East SW SE South

Graphic Scale
200 0 100 200 400
(In Feet)

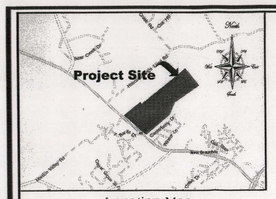
1 inch = 200 feet
Representative Fraction 1:2400

Contour Interval - 2 feet

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

Signature of Texas Licensed Geoscientist
Steve Frost, TPG# 315, AIPG # 10176

Attachment Showing Location
of Community Center



Location Map

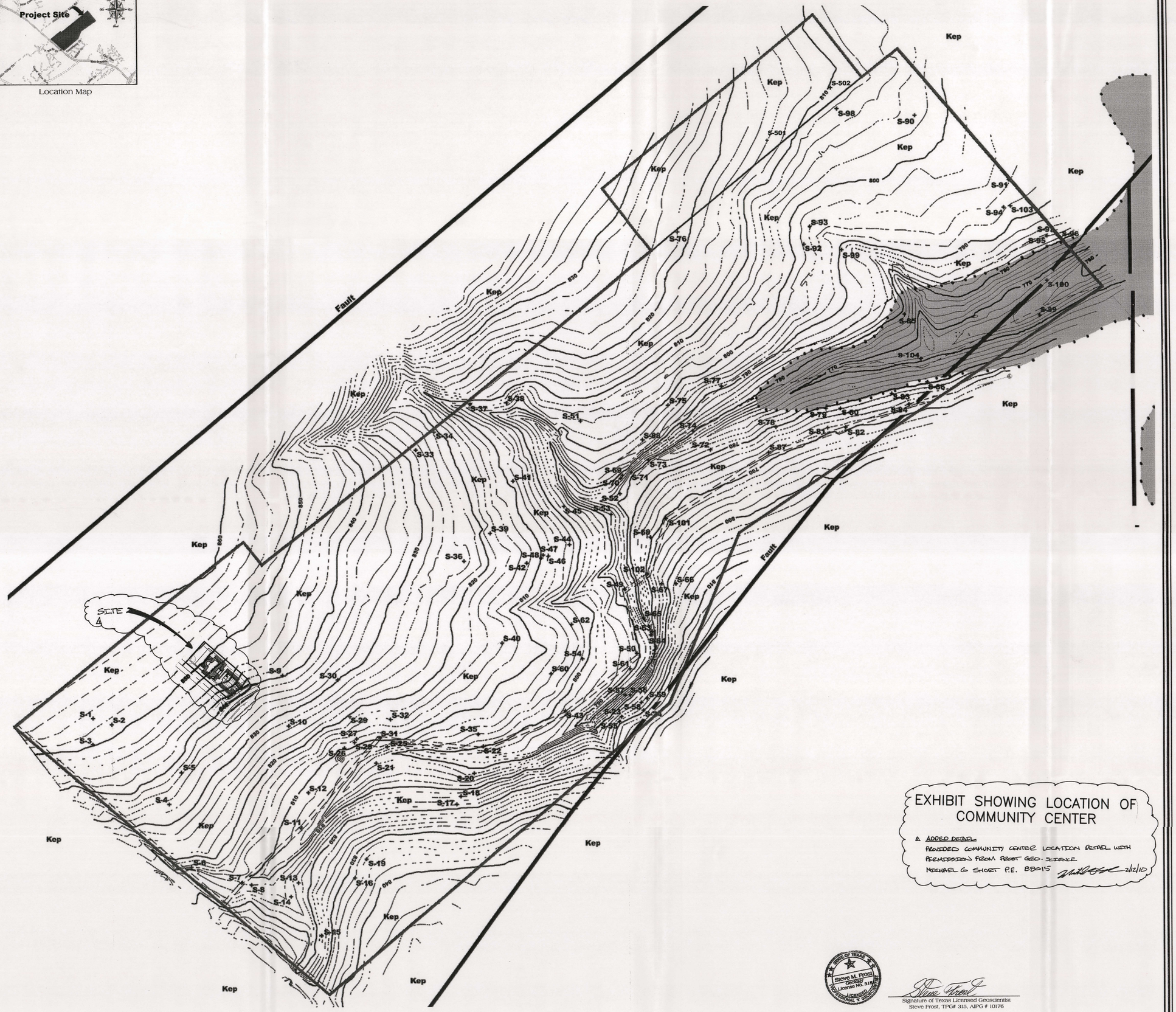


EXHIBIT SHOWING LOCATION OF COMMUNITY CENTER

Δ ADDED DETAIL
PROVIDED COMMUNITY CENTER LOCATION DETAIL WITH PERMISSION FROM FROST GEO-SCIENCE
MICHAEL G SHORT P.E. 88015 2/2/10

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

Signature of Texas Licensed Geoscientist
Steve Frost, TPG# 315, AIPG # 10176

Frost GeoSciences
Geotechnical • Construction Materials
Forensics • Environmental
13402 Western Oak Dr. • Helotes, Texas 78023
Phone: (210) 372-1315 Fax: (210) 372-1318

Site Geologic Map

Geologic Site Assessment (WPAP)
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Edwards Aquifer Recharge / Transition Zone
for the
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267.038 Acres
New Braunfels, Texas

Frost GeoSciences, Inc. Control # FGS-E09176

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)
-------	-	Formation Contact
.....	-	100-Year Floodplain - Zone A
-.-.-.-	-	100-Year Floodplain - Zone AE
-..-..-	-	Other Flood Hazard Area - Zone X (shaded)

Floodplain Information Obtained From
FIRM: Flood Insurance Rate Map
Comal County, Texas: Panel # 48546301 00C, Revised 2/29/86
Comal County, Texas: Panel # 48546301 05C, Revised 2/29/86

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report 94-4117 (1994)
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)

North

Graphic Scale
200 0 100 200 400
(In Feet)

1 inch = 200 feet
Representative Fraction 1:2400

Contour Interval - 2 feet

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

1. Current Regulated Entity Name: Water Pollution Abatement Plan for Tschirhart Ranch Subdivision
Original Regulated Entity Name: Community Center Manor Creek
Assigned Regulated Entity Numbers (RN): 1) _____, 2) _____, 3) _____

X The applicant has not changed and the Customer Number (CN) is: CN 601213523
___ The applicant has changed. A new Core Data Form has been provided.

2. X **Attachment A: Original Approval Letter and Approved Modification Letters:** A copy of the original approval letter and copies any letters approving modification are found at the end of this form. The overall subdivision modification submitted concurrently with this plan is not approved to date.

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

X 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;
X change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
___ development of land previously identified as undeveloped in the original water pollution abatement plan;
___ physical modification of the approved organized sewage collection system;
___ physical modification of the approved underground storage tank system;
___ physical modification of the approved aboveground storage tank system.

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

WPAP Modification Summary	Approved Project	Proposed Modification
Acres	252.038	265.8.36/1.081
Type of Development	Residential	Residential/Commercial
Number of Residential Lots	343	0340/1
Impervious Cover (acres)	50.29	53.141//0.334
Impervious Cover (%)	19.95%	19.99%/30.90%
Permanent BMPs	Vegetative Buffers	Vegetative Buffers/Filter Strips
Other	_____	_____

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

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

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

5. X **Attachment B: Narrative of Proposed Modification**. A narrative description of the nature of the proposed modification is provided at the end of this form. It discusses what was approved, including previous modifications, and how this proposed modification will change the approved plan.

6. X **Attachment C: Current site plan of the approved project.** A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is provided at the end of this form. A site plan detailing the changes proposed in the submitted modification is required elsewhere.

___ The approved construction has not commenced. The original approval letter, and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.

___ The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.

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

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

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

7. ___ The acreage of the approved plan has increased A Geologic Assessment has been provided for the new acreage.

___ Acreage has ~~not~~ been ~~added to or~~ removed from the approved plan.

8. X One (1) original and ~~3~~ 4 copies of the complete application has been provided.

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

Michael G. Short, P.E.
Print Name of Customer/Agent

Signature of Customer/Agent

2/11/10
Date

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 4, 2006

Mr. Timothy D. Pruski
Continental Homes of Texas
211 N. Loop 1604 East, Suite 130
San Antonio, TX 78232

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Manor Creek (Tschirhart Ranch) ; Located on the north side of State Highway 46, approximately 2 miles west of the intersection of Loop 337 and State Highway 46; New Braunfels, Texas
TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer
Edwards Aquifer Protection Program ID No. 2439.00
Investigation Number: 449964
Regulated Entity Number: RN104801568

Dear Mr. Pruski:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP application for the referenced project submitted to the San Antonio Regional Office by The Schultz Group, Inc. on behalf of Continental Homes of Texas on December 7, 2007. Final review of the WPAP application was completed after additional material was received on March 31, 2006. 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 252.038 acres. It will include 343 lots, roads, and utilities. The impervious cover will be 50.29 acres (19.95 percent). Project wastewater will be disposed of by conveyance to the existing Gruene Road Wastewater Treatment Plant owned by the New Braunfels Utilities.

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.

GEOLOGY

According to the geologic assessment included with the application and additional information submitted during the review, 104 geologic and man-made features were identified on the site. Thirteen of the features, S15, S21, S25, S35, S38, S61, S63, S70, S71, S81, S85, S89, and S93, were initially assessed as sensitive. Two of the sensitive features, S -38 and S-93, received additional evaluation by the geologist, who determined the features not to be sensitive. The San Antonio Regional Office site inspection of March 22, 2006, revealed that the site is generally as described by the geologic assessment.

SPECIAL CONDITIONS

I. If the impervious cover ever increases above 20 percent or the land use changes, the exemption for the whole site may no longer apply and the property owner must notify the San Antonio Regional Office of these changes.

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. As proposed, a 50 foot natural buffer will be provided around geologic features assessed as sensitive.

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, TNRCC-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.

During Construction:

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. No wells exist on the site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.

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.

After Completion of Construction:

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 the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TNRCC-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 Lynn M. Bumguardner of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210.403.4023.

Sincerely,

Glenn Shankle
for Executive Director
Texas Commission on Environmental Quality

GS/LMB/eg

Enclosures: Deed Recordation Affidavit, TNRCC-0625
Change in Responsibility for Maintenance on Permanent BMPs, TNRCC-10263

cc: Mr. Stephen E. Schultz, The Schultz Group, Inc
Mr. Michael Short, City of New Braunfels
Mr. Tom Hornseth, Comal County
Mr. Robert J. Potts, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC 212

Attachment B – Narrative of Proposed Modification

The project was previously titled Tschirhart Ranch Subdivision, it has since become know as Manor Creek. The original proposed project consisted of 252.038 acres of land that was to be developed into a 343 lot residential subdivision. Each individual residential lot was to contain approximately 3,860 square feet of impervious cover which included a building structure and a concrete driveway. There was to be approximately 6,800 L.F. of street in a 60' R.O.W. The overall developed project was to consist of less than 20% impervious cover, so that structural BMP's would not be required. The permanent BMP's around the sensitive features consist of native vegetation for a minimum of 50 feet around each feature.

Unit one has been constructed and the impervious cover has exceeded the 3,860 square feet of impervious cover allowed for each lot. As a result the owner has purchased an additional 15.001 acres to keep the impervious cover for the site under 20%.The impervious cover for lots within Units 2-6 have been reconfigured to contain approximately 3,662 square feet of impervious cover for interior lots and 3,865 square feet for optional corner lots which includes all proposed typical building structures and a concrete driveway. With the addition of the 15.001 acres and a reduction of area given an existing TxDOT dedication of 0.123 acres this development will have less than 20% impervious cover; therefore, no structural BMP's are required. The 50 foot vegetative buffer around sensitive features will be maintained.

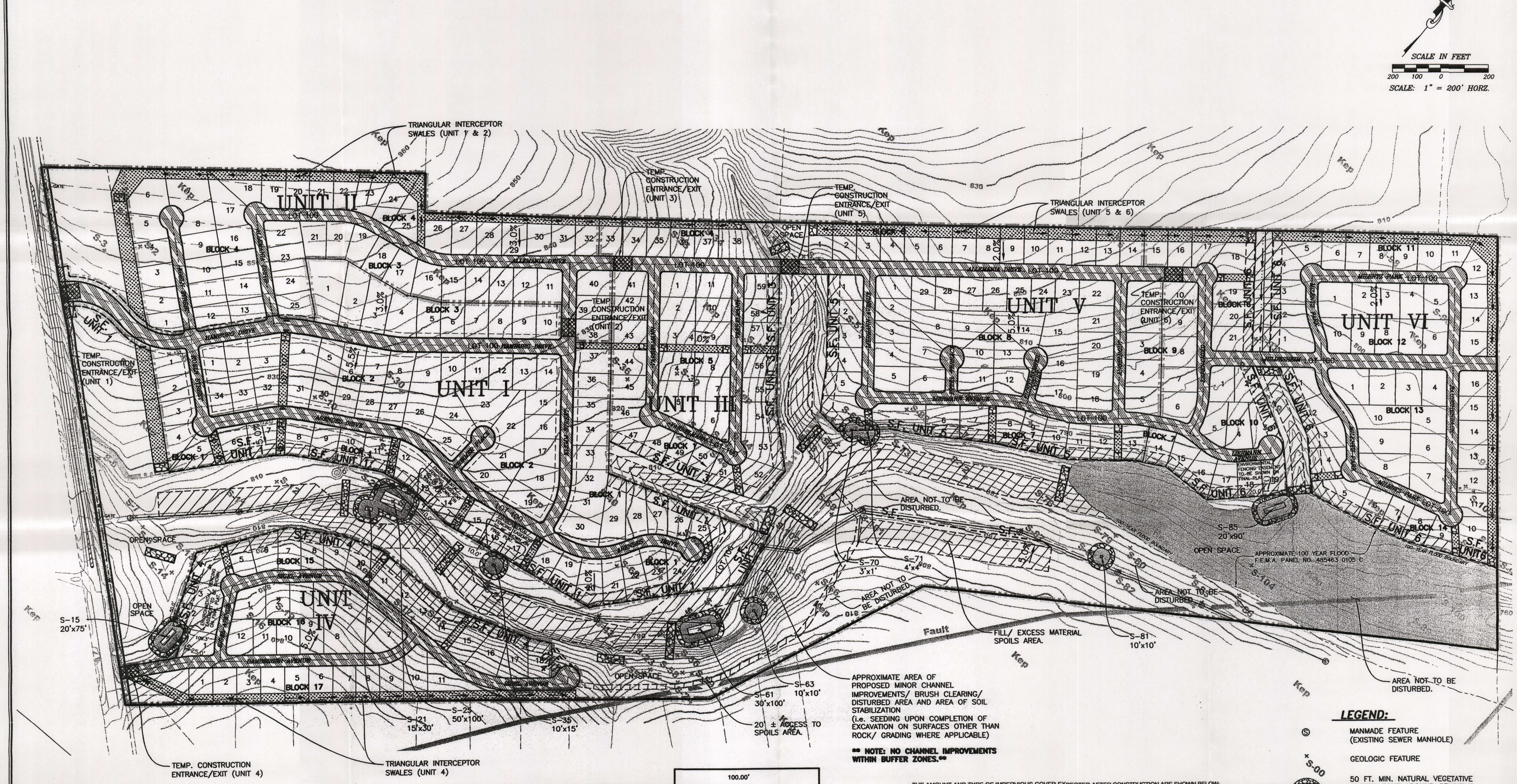
Additional Items Changed

a. FEMA Flood Plain has been updated with the new FEMA Flood Plain maps approved September 2009
b. The south entrance from State Hwy 46 has been adjusted in anticipation of a future TxDOT drainage structure.
c. In Unit III Varrelman Road has been shifted slightly north.
d. In Unit V Liermann Avenue was shifted slightly south.
e. 15.001 Acres have been added to the original tract an a dedication of 0.123 acres to TxDOT has occurred at the Hamburg entrance. The total area for the site is now 266.916 acres.
f. Three lots have been combined in Unit II for a future Community Center. Making the total acreage outside the Community Center 265.836 acres.

The above mentioned changes have been included in the "Modification Tschirhart Ranch Subdivision" submitted concurrently with this application.

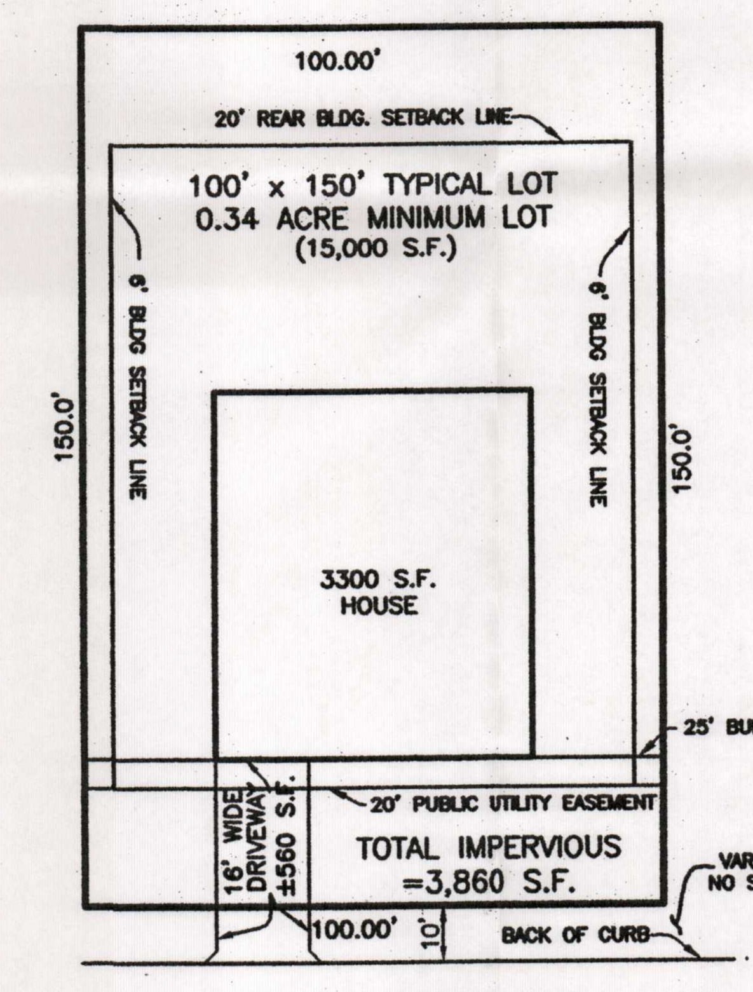
This WPAP Modification will include the addition of a Community Center on 3 lots which will contain approximately 14,553 square feet of impervious cover. The community center will include restrooms, pool and parking facility. Permanent BMPs for the proposed site will be filter strips located immediately downstream of impervious cover. The remaining portion of the subdivision will remain under 20% impervious cover, therefore; no new permanent BMPs are required.

Attachment C
Current Site Plan



NATIVE BUFFER ZONE NOTE:

BUFFER ZONES AROUND A POINT RECHARGE FEATURE OR CLUSTER OF CONTIGUOUS POINT RECHARGE FEATURES SHALL BE MAINTAINED IN A NATURAL STATE TO THE MAXIMUM PRACTICAL EXTENT. THIS IMPLIES A CONSTRUCTION-FREE ZONE. WHEN ALL OR A PORTION OF THE BUFFER FOR A SENSITIVE FEATURE IS LOCATED WITHIN THE YARD OF A RESIDENTIAL TRACT, IT SHOULD BE SEPARATED BY A BARRIER, SUCH AS A FENCE, FROM CONVENTIONAL LANDSCAPING AND MAINTAINED IN THE NATURAL STATE. THE "NATURAL STATE" OF A BUFFER WILL TYPICALLY BE A COMBINATION OF DENSE NATIVE GRASSES, SHRUBS AND TREES.



TYPICAL LOT IMPERVIOUS COVER

NOTE TO SCALE

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	1,131,900	÷ 43,560 =	25.98
Street & Driveways	1,037,065	÷ 43,560 =	23.81
Other paved surfaces/Drainage	21924	÷ 43,560 =	0.50
Total Impervious Cover	2,190,889	÷ 43,560 =	50.29
Total Impervious Cover ÷ Total Acreage x 100 =			19.95 %

TOTAL SITE ACREAGE = 252.038 AC.

TOTAL NUMBER OF RESIDENTIAL LOTS = 343

**** NOTE ****

THIS SITE WILL BE USED FOR A LOW DENSITY SINGLE- FAMILY RESIDENTIAL DEVELOPMENT AND HAS 20% OR LESS IMPERVIOUS COVER. THEREFORE, NO OTHER PERMANENT BMP's WITH SUPPORTING CALCULATIONS ARE REQUIRED / PRESENT.

LEGEND:

- MANMADE FEATURE (EXISTING SEWER MANHOLE)
- GEOLOGIC FEATURE
- 50 FT. MIN. NATURAL VEGETATIVE BUFFER ZONE AROUND SENSITIVE GEOLOGIC FEATURE w/ TEMPORARY HIGH SERVICE ROCK BERM AROUND PERIMETER
- S.F. — SILT FENCE
- ROCK BERM
- TEMPORARY CONSTRUCTION ENTRANCE / EXIT
- CHANNEL IMPROVEMENTS/BRUSH CLEARING AREA TO BE DISTURBED w/ SOIL STABILIZATION WHERE ROCK IS NOT ENCOUNTERED.
- AREAS TO BE DISTURBED (PROPOSED R.O.W.'s w/ SOIL STABILIZED PARKWAYS)
- AREAS TO BE DISTURBED (PROPOSED CHANNEL IMPROVEMENTS w/ SOIL STABILIZATION)

REVISIONS

DATE	DESCRIPTION
03/31/06	REVISED SITE FEATURES/AREAS TO BE DISTURBED.

SITE PLAN OF TSCHIRHART RANCH SUBDIVISION
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: J.J.M.
DATE: DECEMBER 2005
JOB NO.: 110205

S-1

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: Community Center Manor Creek

REGULATED ENTITY INFORMATION

1. The type of project is:
   ___ Residential: # of Lots: _____
   ___ Residential: # of Living Unit Equivalents: _____
   X Commercial
   ___ Industrial
   ___ Other: _____

2. Total site acreage (size of property): 1.081

3. Projected population: _____

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	953	÷ 43,560 =	0.022
Parking	5,618	÷ 43,560 =	0.129
Other paved surfaces	7,981	÷ 43,560 =	0.183
Total Impervious Cover	14,553	÷ 43,560 =	0.334
Total Impervious Cover ÷ Total Acreage x 100 =			30.90%

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

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

8. Type of pavement or road surface to be used:
   N/A Concrete
   N/A Asphaltic concrete pavement
   N/A 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. N/A A rest stop will be included in this project.
N/A A rest stop will **not** be included in this project.

12. N/A 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:

100% Domestic	102,900 gallons/day
__% Industrial	_____ gallons/day
__% Commingled	_____ gallons/day
TOTAL	102,900 gallons/day

15. Wastewater will be disposed of by:
___**On-Site** Sewage Facility (OSSF/Septic Tank):
ATTACHMENT C - Suitability Letter from Authorized Agent. An on-site sewage facility will be used to treat and dispose of the wastewater. 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.
__ 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.

X Sewage Collection System (Sewer Lines):
X Private service laterals from the wastewater generating facilities will be connected to an existing SCS.
__ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.
__ The SCS was previously submitted on _____.
__ The SCS was submitted with this application.

__ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to executive director approval.

The sewage collection system will convey the wastewater to the Gruene Road (name) Treatment Plant. The treatment facility is:

X 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" = 200 '.

18. 100-year floodplain boundaries
__ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
X No part of the Community Center 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):

_____

_____

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.):
__ There are ____(#) 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 30 TAC §238.
X 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)~~ (4) 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:

Michael G. Short, P.E.
Print Name of Customer/Agent

Signature of Customer/Agent

2/11/10
Date

WATER POLLUTION ABATEMENT PLAN APPLICATION

5. ATTACHMENT A - Factors Affecting Water Quality.

The various facets of construction involved with this project will consist of site clearing, site grading, utility service lines, building structure, driveways, etc. for this 1.081 acre project site. The disturbances of the existing site during construction are factors that could affect surface water and groundwater quality. To assist in the preservation of the quality of surface water exiting the site during construction, which in turns assists in the preservation the groundwater quality, temporary pollution controls will be installed. Some possible sources of contamination during construction would be from machinery or equipment in the form of oil or fuel. Containment and cleanup is addressed in the Temporary Pollution Control section of this submittal.

13. ATTACHMENT B - Volume and Character of Stormwater.

The stormwater runoff generated from this site will consist of rooftops, concrete driveways, paved streets and landscape areas. The runoff will be of a domestic nature and may contain small amounts of oil, suspended solids, fertilizers, and household pesticides. This is a low density single family development with less than 20% impervious cover. Therefore, no structural permanent Best Management Practices are being proposed to capture a specific volume of storm water runoff. However, the sensitive features located on the site will be protected by native environment buffer zones which are shown on the Site Plan. The average Pre-Construction runoff coefficient for the site is Cpre = 0.36 and the average Post-Construction runoff coefficient is Cpost = 0.53.

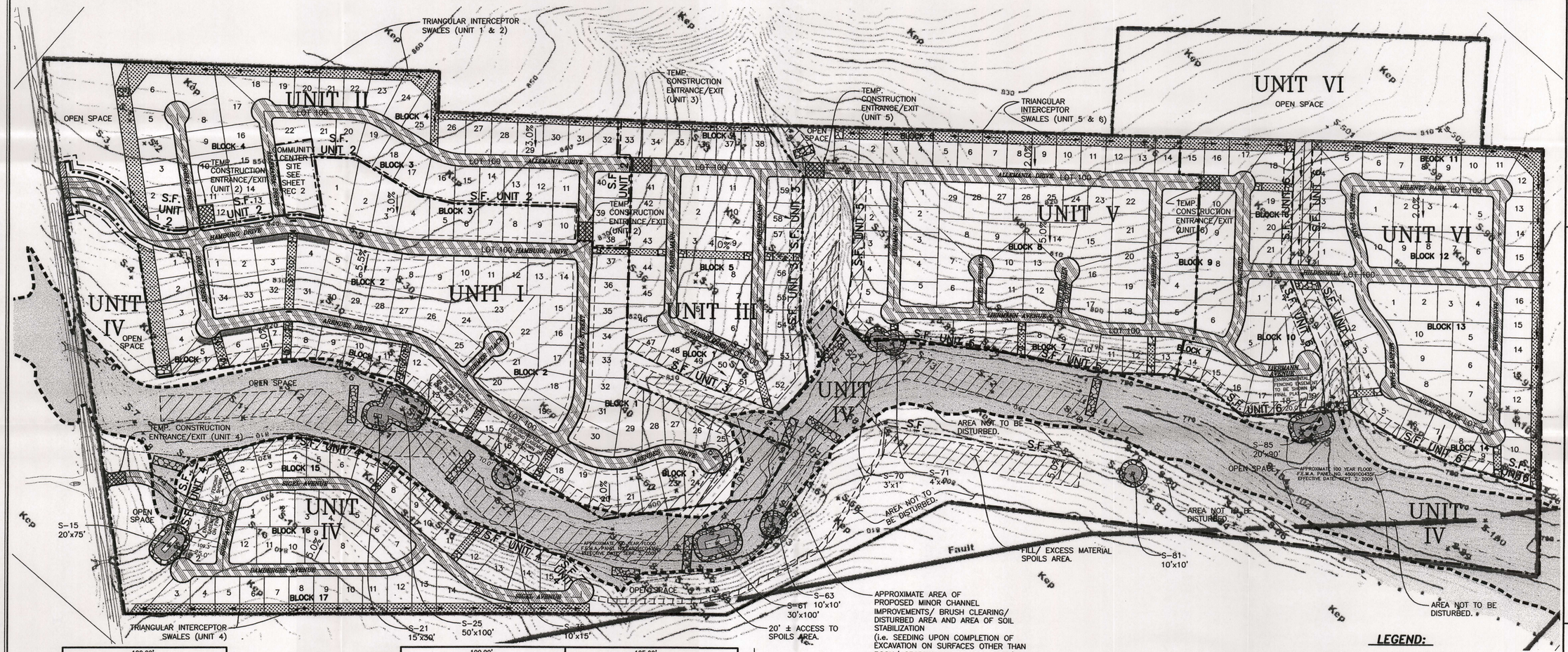
The stormwater runoff generated from the proposed Community Center Site will consist of rooftops, paved parking areas and landscape areas. The runoff will be of a domestic nature and may contain small amounts of oil, suspended solids, fertilizers, and household pesticides. Permanent BMPs for the proposed Community Center will be Filter Strips. The runoff from the Community Center will be accounted for in the overall drainage design for Tschirhart Ranch "(Manor Creek).

SITE PLAN

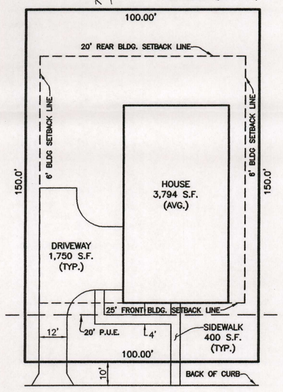
NATIVE BUFFER ZONE NOTE:

BUFFER ZONES AROUND A POINT RECHARGE FEATURE OR CLUSTER OF CONTIGUOUS POINT RECHARGE FEATURES SHALL BE MAINTAINED IN A NATURAL STATE TO THE MAXIMUM PRACTICAL EXTENT. THIS IMPLIES A CONSTRUCTION–FREE ZONE. WHEN ALL OR A PORTION OF THE BUFFER FOR A SENSITIVE FEATURE IS LOCATED WITHIN THE YARD OF A RESIDENTIAL TRACT, IT SHOULD BE SEPARATED BY A BARRIER, SUCH AS A FENCE, FROM CONVENTIONAL LANDSCAPING AND MAINTAINED IN THE NATURAL STATE. THE "NATURAL STATE" OF A BUFFER WILL TYPICALLY BE A COMBINATION OF DENSE NATIVE GRASSES, SHRUBS AND TREES.

SCALE IN FEET
200 100 0 200
SCALE: 1" = 200' HORZ.



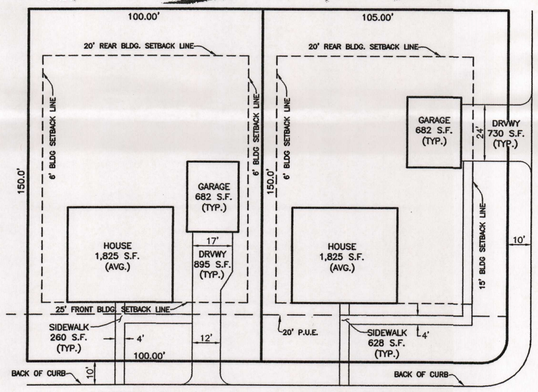
**** NOTE: NO CHANNEL IMPROVEMENTS WITHIN BUFFER ZONES.****



UNIT 1
TYPICAL LOT
IMPERVIOUS COVER
(AVERAGE PER LOT 5,944 SF)
SEE NOTE 1
NOT TO SCALE

NOTE:

1. TOTAL IMPERVIOUS COVER FOR UNIT 1 SHALL NOT EXCEED 481,464 SF FOR ALL 81 LOTS.
2. IMPERVIOUS COVER CALCULATED TO THE BACK OF CURB AND INCLUDES THE TYPICAL DRIVEWAY AND SIDEWALKS.
3. TOTAL IMPERVIOUS COVER FOR UNIT 2–6 SHALL NOT EXCEED 954,548 SF FOR ALL 259 LOTS (30 CORNER LOTS, 229 INTERIOR LOTS)



UNIT 2–6
TYPICAL INTERIOR LOT
IMPERVIOUS COVER
(AVERAGE PER LOT 3,662 SF)
SEE NOTE 3
NOT TO SCALE

UNIT 2–6
TYPICAL CORNER LOT (OPTION)
IMPERVIOUS COVER
(AVERAGE PER LOT 3,865 SF)
SEE NOTE 3
NOT TO SCALE

IMPERVIOUS COVER SUMMARY

IMPERVIOUS COVER OF PROPOSED PROJECT	SQUARE–FEET	ACRES
STRUCTURES / ROOF TOPS UNIT 1	307,314	7.055
DRIVEWAYS / SIDEWALKS UNIT 1	174,150	3.998
STRUCTURES / ROOF TOPS UNITS 2–6	649,313	14.924
DRIVEWAYS / SIDEWALKS UNITS 2–6	305,235	7.007
STREETS	856,867	19.671
OTHER PAVED SURFACES / DRAINAGE	21,924	0.503
TOTAL / IMPERVIOUS COVER	2,314,803	53.141

TOTAL SITE ACREAGE = 265.836 AC.

TOTAL IMPERVIOUS COVER ÷ TOTAL ACREAGE = 19.99%

TOTAL NUMBER OF RESIDENTIAL LOTS = 340

**** NOTE ****

THIS SITE WILL BE USED FOR A LOW DENSITY SINGLE– FAMILY RESIDENTIAL DEVELOPMENT AND HAS 20% OR LESS IMPERVIOUS COVER. THEREFORE, NO OTHER PERMANENT BMP's WITH SUPPORTING CALCULATIONS ARE REQUIRED / PRESENT.

LEGEND:

- Ⓢ MANMADE FEATURE (EXISTING SEWER MANHOLE)
- GEOLOGIC FEATURE
- 50 FT. MIN. NATURAL VEGETATIVE BUFFER ZONE AROUND SENSITIVE GEOLOGIC FEATURE w/ TEMPORARY HIGH SERVICE ROCK BERM AROUND PERIMETER
- S.F. SILT FENCE
- ROCK BERM
- TEMPORARY CONSTRUCTION ENTRANCE / EXIT
- CHANNEL IMPROVEMENTS/BRUSH CLEARING AREA TO BE DISTURBED w/ SOIL STABILIZATION WHERE ROCK IS NOT ENCOUNTERED.
- AREAS TO BE DISTURBED (PROPOSED R.O.W.'s w/ SOIL STABILIZED PARKWAYS)
- AREAS TO BE DISTURBED (PROPOSED CHANNEL IMPROVEMENTS w/ SOIL STABILIZATION)

REVISIONS

DESCRIPTION	DATE

STATE OF TEXAS — MICHAEL G. SHORT — 89015 — LICENSED PROFESSIONAL ENGINEER

SITE PLAN
RECREATION CENTER

MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

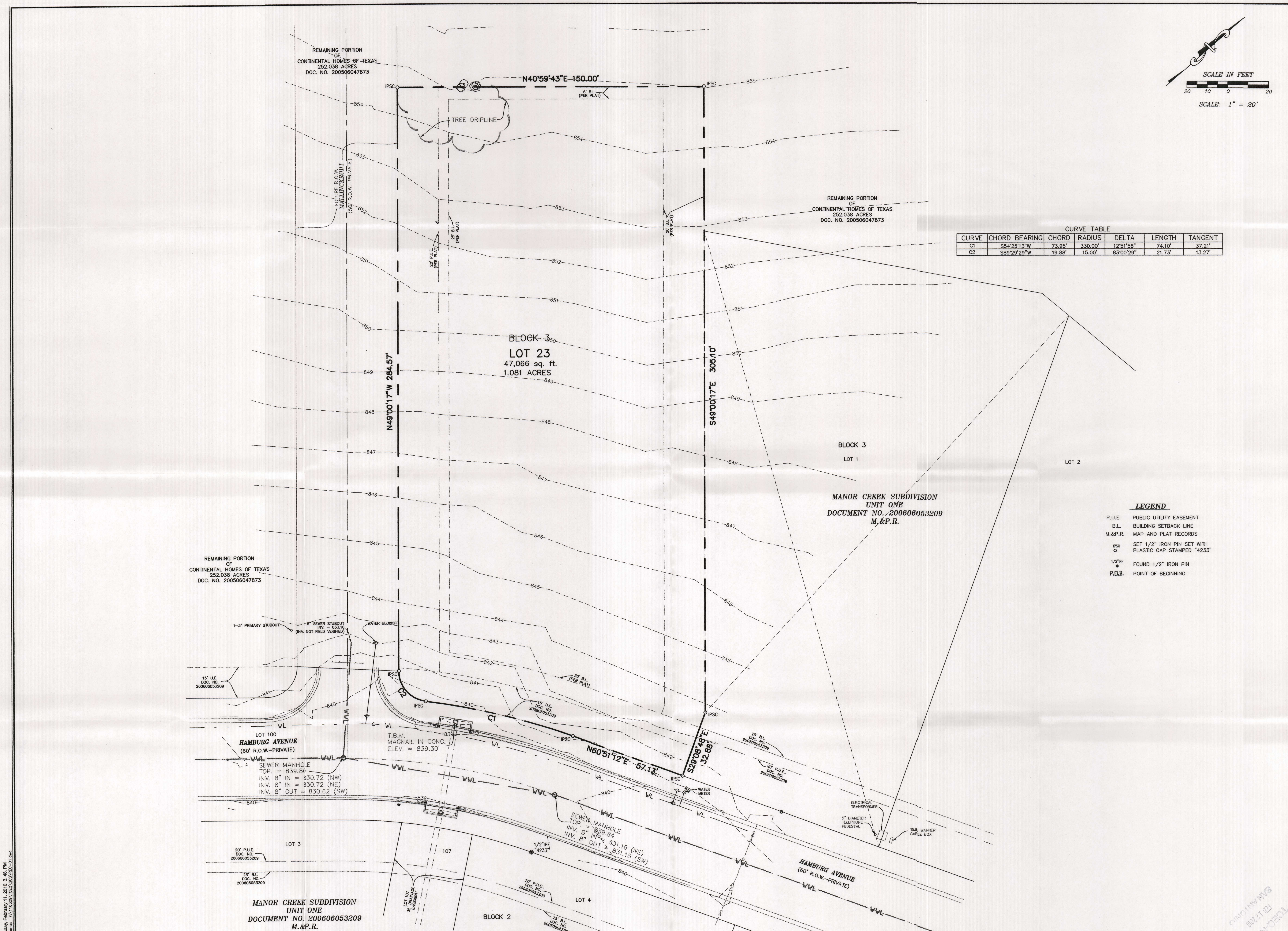
THE Schultz Group, INC.
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: NOVEMEBR 2009
JOB NO.: 110109

S–1

File Name: F:\110109\TCEQ\sm01.dwg

SITE PLAN
(Existing Condition)
RECREATION CENTER
MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS



SCALE IN FEET
20 10 0 20
SCALE: 1" = 20'
REMAINING PORTION OF CONTINENTAL HOMES OF TEXAS 252.038 ACRES DOC. NO. 200506047873
N40°59'43"E 150.00'
IPSC
6' B.L. (PER PLAT)
TREE DRIPLINE
FUTURE R.O.W. MALLINCKRODT (50' R.O.W.-PRIVATE)
20' P.U.E. (PER PLAT)
25' B.L. (PER PLAT)
20' B.L. (PER PLAT)
BLOCK 3
LOT 23
47,066 sq. ft.
1.081 ACRES
N49°00'17"W 284.57'
S49°00'17"E 305.10'
BLOCK 3
LOT 1
LOT 2
MANOR CREEK SUBDIVISION UNIT ONE DOCUMENT NO. 200606053209 M.&P.R.
1-3" PRIMARY STUBOUT
8" SEWER STUBOUT INV. = 833.16 (INV. NOT FIELD VERIFIED)
WATER BLOWOFF
15' U.E. DOC. NO. 200606053209
25' B.L. (PER PLAT)
C1
C2
N60°51'12"E 57.13'
S29°08'48"E 32.88'
LOT 100
HAMBURG AVENUE (60' R.O.W.-PRIVATE)
T.B.M. MAGNAIL IN CONC. ELEV. = 839.30'
SEWER MANHOLE TOP. = 839.80 INV. 8" IN = 830.72 (NW) INV. 8" IN = 830.72 (NE) INV. 8" OUT = 830.62 (SW)
SEWER MANHOLE TOP. = 839.84 INV. 8" IN = 831.16 (NE) INV. 8" OUT = 831.15 (SW)
WATER METER
ELECTRICAL TRANSFORMER
5" DIAMETER TELEPHONE PEDESTAL
TIME WARNER CABLE BOX
25' B.L. DOC. NO. 200606053209
20' P.U.E. DOC. NO. 200606053209
LOT 3
LOT 4
107
1/2"IPF "4233"
BLOCK 2
LOT 107 DRAINAGE EASEMENT

CURVE TABLE

CURVE	CHORD BEARING	CHORD	RADIUS	DELTA	LENGTH	TANGENT
C1	S54°25'13"W	73.95'	330.00'	12°51'58"	74.10'	37.21'
C2	S89°29'29"W	19.88'	15.00'	83°00'29"	21.73'	13.27'

LEGEND

P.U.E.	PUBLIC UTILITY EASEMENT
B.L.	BUILDING SETBACK LINE
M.&P.R.	MAP AND PLAT RECORDS
IPSC	SET 1/2" IRON PIN SET WITH PLASTIC CAP STAMPED "4233"
1/2"IPF	FOUND 1/2" IRON PIN
P.O.B.	POINT OF BEGINNING

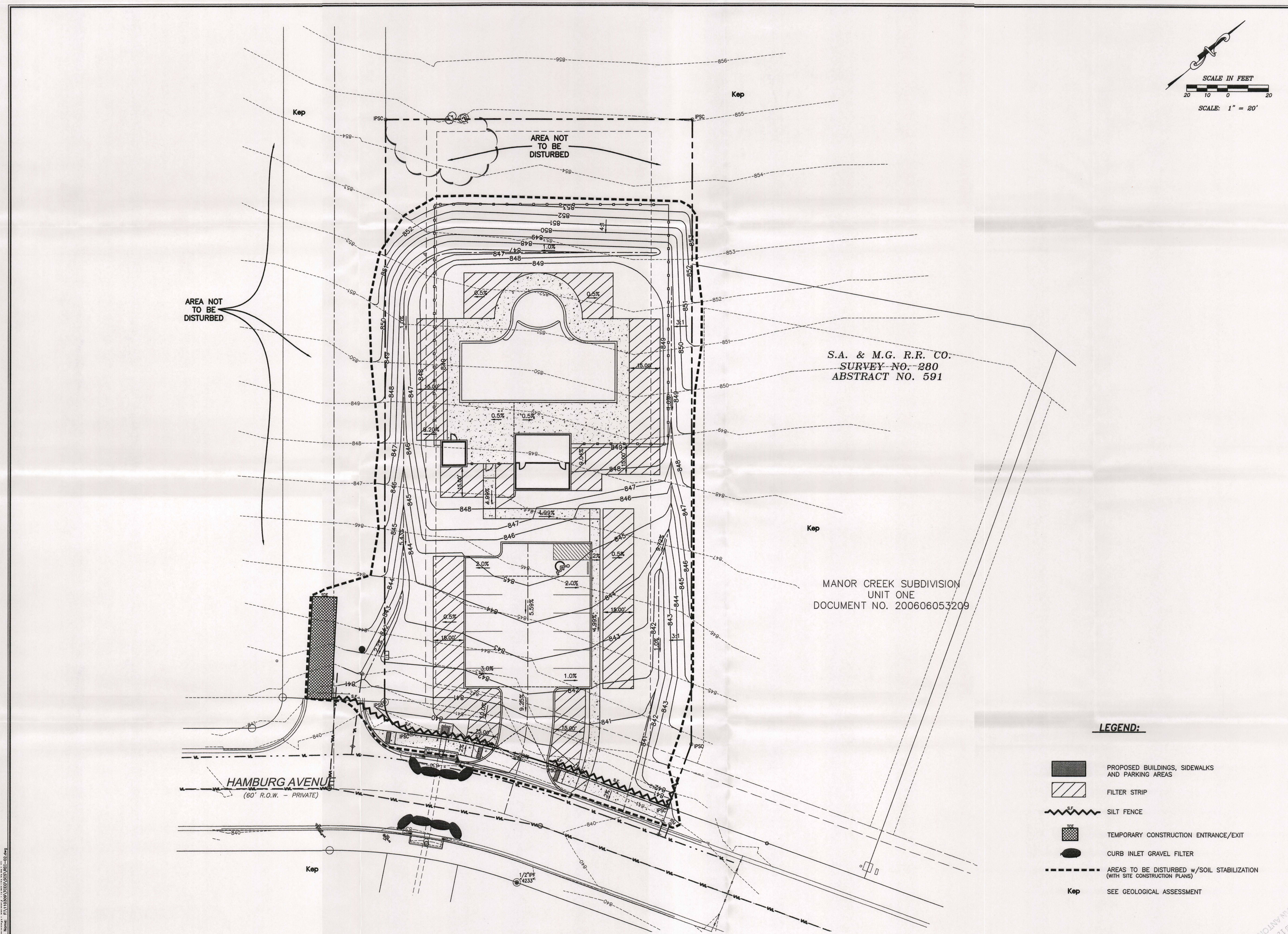
REVISIONS

DATE	DESCRIPTION

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: JANUARY 2010
JOB NO.: 110309

REC-1



REVISIONS

DATE	DESCRIPTION

SITE PLAN (Proposed)

RECREATION CENTER

MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

The Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: JANUARY 2010
JOB NO.: 110309

REC-2

Texas Commission on Environmental Quality
Water Pollution Abatement Plan
General Construction Notes

1. Written construction notification must be given to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information must include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor and the name and telephone number of the contact person.

2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on–site copies of the approved plan and approval letter.

3. If any sensitive feature is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. The regulated activities near the sensitive feature may not proceed until the TCEQ has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality.

4. No temporary aboveground hydrocarbon and hazardous substance storage tank system is installed within 150 feet of a domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

5. Prior to commencement of construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. Controls specified in the temporary storm water section of the approved Edwards Aquifer Protection Plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

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

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

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

9. All spoils (excavated material) generated from the project site must be stored on–site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

10. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by 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:

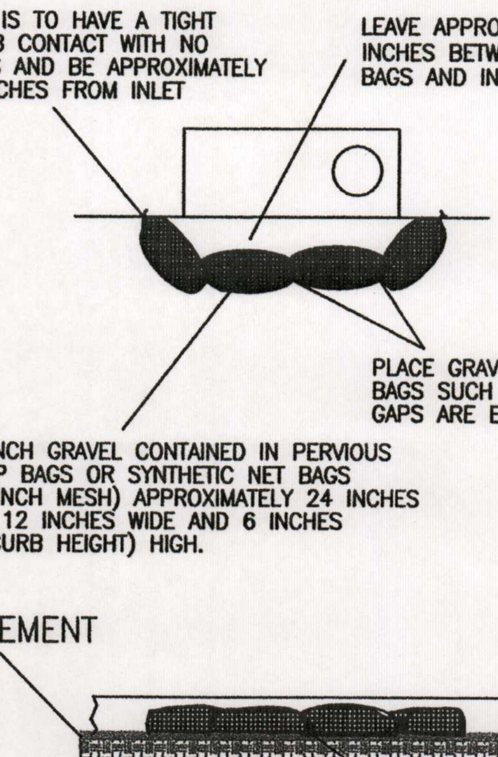
A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

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, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

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

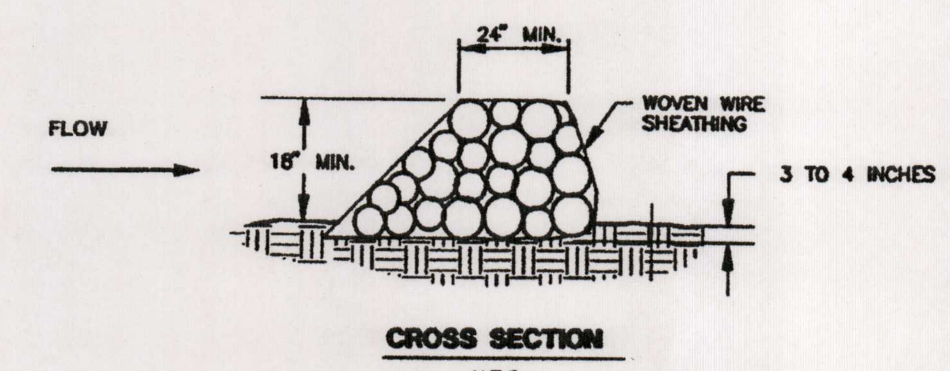


FRONT VIEW

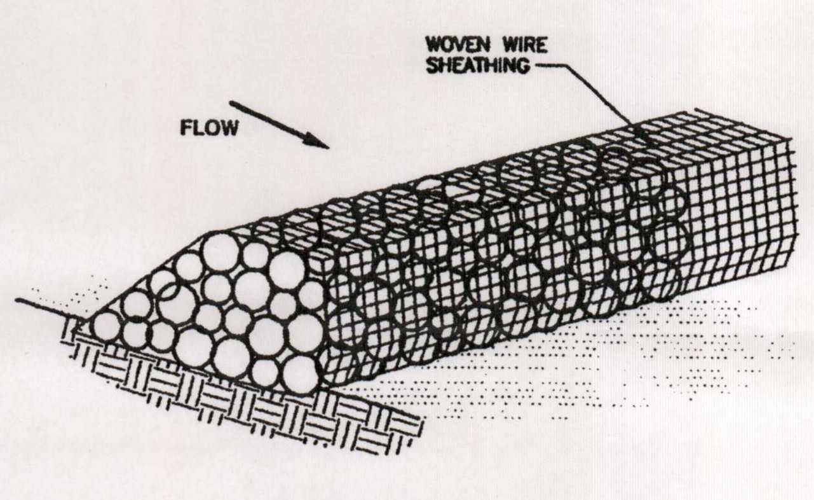
NOTES:

BAGS SHOULD BE FILLED ONLY 3/4 FULL
GRAVEL FILTERS CAN BE USED ON PAVEMENT OR BARE GROUND

CURB–INLET GRAVEL FILTER DETAIL
N.T.S.



CROSS SECTION
N.T.S.



ISOMETRIC PLAN VIEW
N.T.S.

Materials:

(1) The berm structure shall be secured with a woven wire sheathing having maximum opening of 1 inch a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

(2) Clean, open graded 3– to 5–inch diameter rock shall be used.

Installation:

(1) Lay out the woven wire sheathing perpendicular to the flow line. The sheathing shall be 20 gauge woven wire mesh with 1 inch opening.

(2) Berm shall have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter.

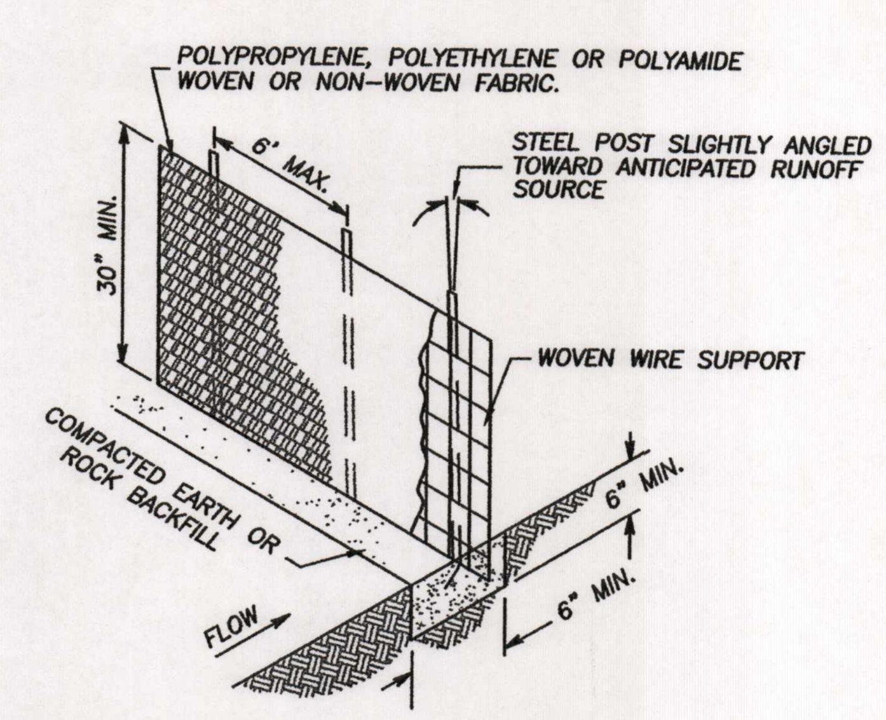
(3) Place the rock along the sheathing as shown in the Rock Berm Detail to a height not less than 18".

(4) Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.

(5) Berm shall be built along the contour at zero percent grade or as near as possible.

(6) The ends of the berm shall be tied into existing upslope grade and the berm shall be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.

ROCK BERM DETAIL
N.T.S.



Materials:

(1) Silt fence material shall be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in^2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

(2) Fence posts shall be made of hot rolled steel, at least 4 feet long with Tee or Y–bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft , and Brindell hardness exceeding 140.

(3) Woven wire backing to support the fabric shall be galvanized 2" x 4" welded wire, 12 gauge minimum.

Installation:

(1) Steel posts, which support the silt fence, shall be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1 foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing shall be 6 feet.

(2) Lay out fencing down–slope of disturbed area, following the contour as closely as possible. The fence shall be sited so that the maximum drainage area is 1/4 acre/100 feet of fence.

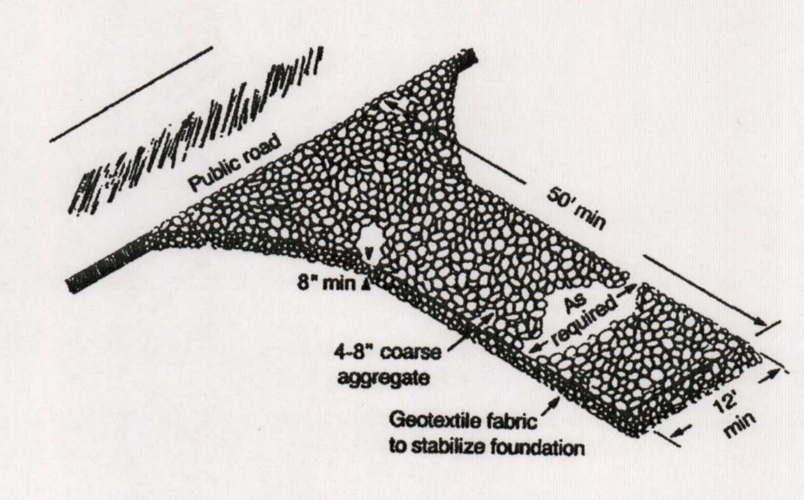
(3) The toe of the silt fence shall be trenched in with a spade or mechanical trencher, so that the down–slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.

(4) The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.

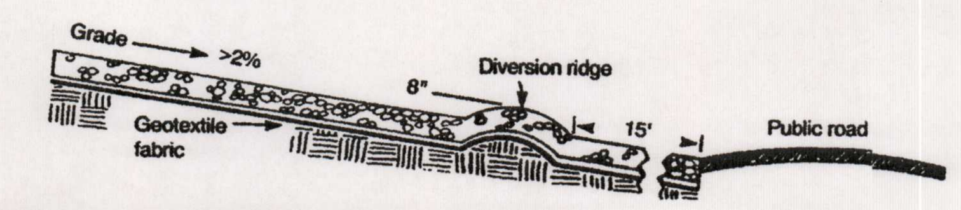
(5) Silt fence shall be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There shall be a 3–foot overlap, securely fastened where ends of fabric meet.

(6) Silt fence shall be removed when the site is completely stabilized so as not to block or impede storm flow drainage.

SILT FENCE
N.T.S.



Schematic of Temporary Construction Entrance/Exit



Cross-section of a Construction Entrance/Exit

Materials:

(1) The aggregate shall consist of 4 to 8 inch washed stone over a stable foundation as specified in the plan.

(2) The aggregate shall be placed with a minimum thickness of 8 inches.

(3) The geotextile fabric shall be designed specifically for use as a soil filtration media with an approximate weight of 6 oz/yd^2, a mullen burst rating of 140 lb/in^2, and an equivalent opening size greater than a number 50 sieve.

(4) If vehicle(s) require washing, a washing facility with a level area and a minimum of 4 inch washed stone or commercial rack shall be constructed in an approved area. Divert wastewater to sedimentation controlled areas.

Installation:

(1) Remove vegetation and other objectionable material from the foundation area. Grade crown foundation for positive drainage.

(2) The minimum width of the entrance/exit shall be 12 feet or the the full width of exit roadway, whichever is greater.

(3) The construction entrance shall be at least 50 feet long.

(4) If the slope toward the road exceeds 2%, construct a ridge, 6 to 8 inches high with 3 : 1 (H:V) side slopes, across the foundation approximately 15 feet from the entrance to divert runoff away from the public road.

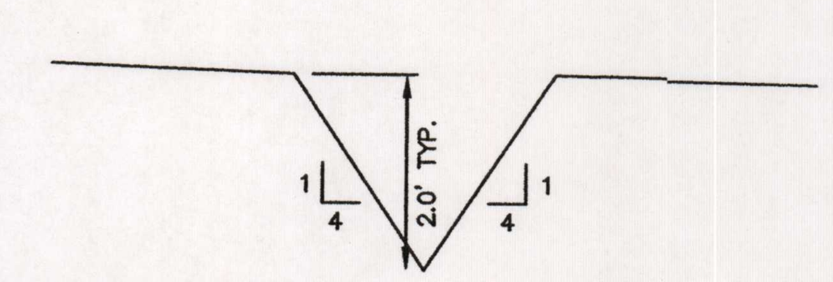
(5) Place geotextile fabric and grade foundation to improve stability, especially where wet conditions are anticipated.

(6) Place stone to dimensions and grade shown on plans. Leave surface smooth and slope for drainage.

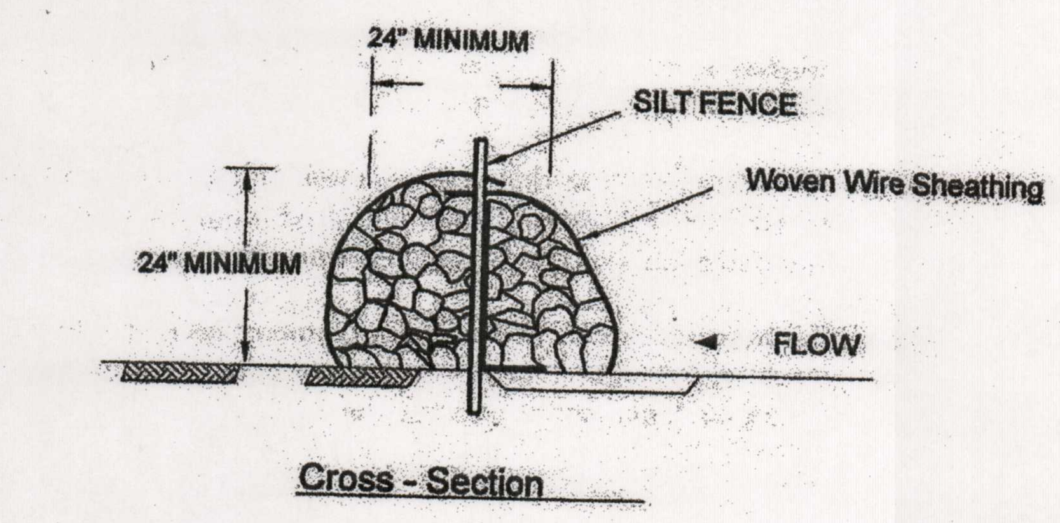
(7) Divert all surface runoff and drainage from the stone pad to sedimentation controlled areas.

(8) Top of Temporary Construction Entrance/Exit Shall Project no more than 4" above Natural Ground.

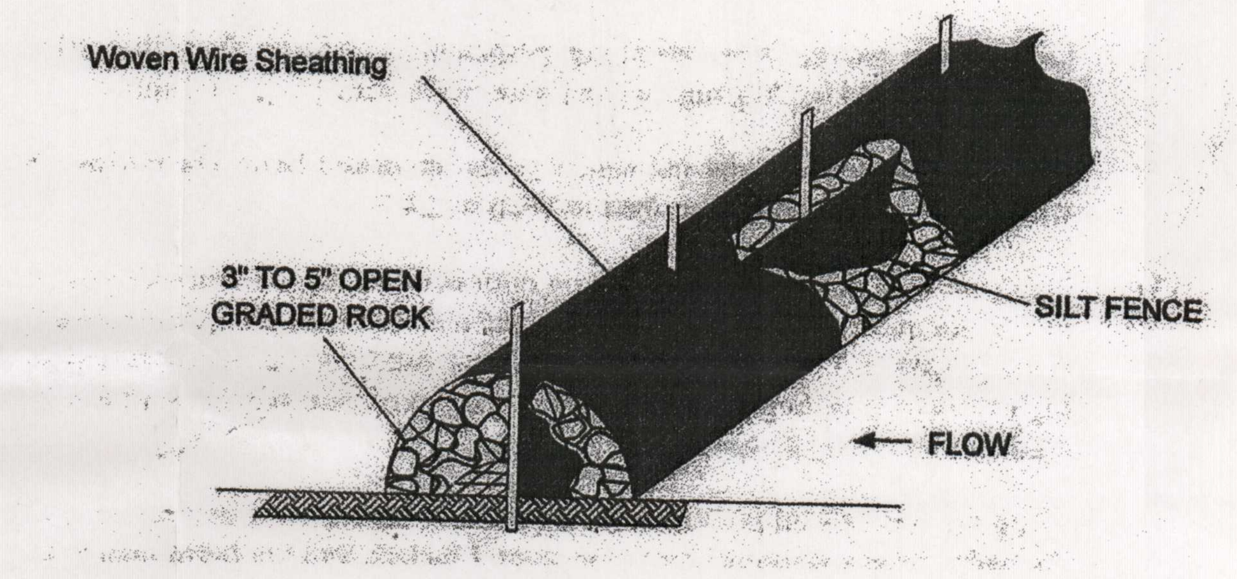
TEMPORARY CONSTRUCTION ENTRANCE/EXIT
N.T.S.



TRIANGULAR INTERCEPTOR SWALE DETAIL
N.T.S.



Cross - Section



Materials:

(1) Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in^2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

(2) Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft^2, and Brindell hardness exceeding 140. Rebar (either #5 or #6) may also be used to anchor the berm.

(3) Woven wire backing to support the fabric should be galvanized 2" x 4" welded wire, 12 gauge minimum.

(4) The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

(5) Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

Installation:

(1) Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1-inch openings.

(2) Install the silt fence along the center of the proposed berm placement, as with a normal silt fence described in Section 2.4.3.

(3) Place the rock along the sheathing on both sides of the silt fence as shown in the diagram (Figure 1.30), to a height not less than 24 inches. Clean, open graded 3-5" diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rock may be used.

(4) Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.

(5) The high service rock berm should be removed when the site is revegetated or otherwise stabilized or it may remain in place as a permanent BMP if drainage is adequate.

HIGH SERVICE ROCK BERM
N.T.S.

REVISIONS	
DATE	DESCRIPTION

STATE OF TEXAS
MICHAEL G. SHORT
88015
LICENSED PROFESSIONAL ENGINEER

WATER POLLUTION ABATEMENT PLAN
GENERAL NOTES & DETAILS
RECREATION CENTER
MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100059-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337 NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: JANUARY 2010
JOB NO.: 110309

REC–3

Thursday, February 11, 2010, 2:49, PM
File Name: F:\110309\TCEQ\SCS\spn02.dwg

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: Community Center Manor Creek .

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: **Bleider's 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.

__ 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.

X 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. N/A **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:

Michael G. Short, P.E.
Print Name of Customer/Agent

Signature of Customer/Agent

2/1/10
Date

TEMPORARY STORMWATER SECTION

2. ATTACHMENT A -Spill Response Actions.

The following includes a copy of Section 1.4.16 of the TCEQ "Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices"' Pages 1-118 through 1-121, Spill Prevention and Control. The following is made part of the spill response action plan. In addition in the event of a significant hazardous spill the contractor or construction personnel shall notify 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 or after hours contact the Environmental Release Hotline at 1-800-832-8224. The contractor shall have available at the construction site all emergency numbers to include the Edwards Aquifer Authority (210) 222-2204 or 1-800-292-1047 and the National Response Center (202) 267-2675 or 1-800-424-8802.

4. ATTACHMENT B -Potential Sources of Contamination.

Vehicle Maintenance (i.e. fuel spill, oil spill)

5. ATTACHMENT C - Sequence of Major Activities.

The following is a sequence of major activities which will involve soil disturbance along with an estimate of the area of the site to be disturbed by each activity:

Total Site

Sequence No.	Description of Soil Disturbing Activity	Estimated Area to be Disturbed by each Activity (Acres) (Total)
1	Clearing and Grubbing (Street/Drainage)	47
2	Excavation and Grading (Streets/Drainage)	47
3	Underground Utility Service Installation	30
4	Final Structures Installation (Including Houses & Driveways)	31

Recreation Center

Sequence No.	Description of Soil Disturbing Activity	Estimated Area to be Disturbed by each Activity (Acres) (Total)
1	Clearing and Grubbing (Parking/Drainage)	0.60
2	Excavation and Grading (Parking/Drainage)	0.60

RG-348
Revised July 2005

Complying with the Edwards Aquifer Rules

Technical Guidance on Best Management Practices

Field Operations Division

printed on recycled paper

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

1.4.16 Spill Prevention and Control

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

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

Education

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

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

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

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

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

General Measures

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

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

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

(4) Train employees in spill prevention and cleanup.

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

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

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

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

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

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

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

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

Cleanup

(1) Clean up leaks and spills immediately.

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

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

Minor Spills

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

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

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

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

(5) Contain the spread of the spill.

(6) Recover spilled materials.

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

Semi-Significant Spills

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

Spills should be cleaned up immediately:

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

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

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

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

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

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

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

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

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

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

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

Vehicle and Equipment Maintenance

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

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

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

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

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

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

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

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

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

Vehicle and Equipment Fueling

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

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

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

7. ATTACHMENT D - Temporary Best Management Practices and Measures.

The Temporary Best Management Practices (TBMP) that will be used for this project are silt fences, rock berms, high service rock berms, inlet gravel filters, and a temporary construction entrance/exit. The temporary controls will be installed prior to construction and shall be maintained during construction by the contractor. The controls shall be removed by the contractor when vegetation is established and the construction area is stabilized.

The silt fences, rock berms, high service rock berms, inlet gravel filters and temporary construction entrance/exit shown on the Site Plan shall be in place prior to any construction activities. These temporary measures will remain in place throughout clearing and grubbing, excavation and grading and underground utility service installation. Upon completion of street and utility construction, silt fences shall be installed down gradient of all proposed home building and driveway construction operations to contain any sediment from leaving the individual lots. The temporary construction entrance/exit shall be adjusted/relocated prior to the construction of each new unit of development and will be removed just prior to final pavement placement.

a. Stormwater that is flowing upstream of the project limits in the Bleider's Creek will continue to pass through the project limits in its current manner. All other stormwater that originates upgradient of the project site will be allowed to enter the property limits but will then be directed around the disturbed areas via interceptor swales in association with each unit of construction. The stormwater runoff will be conveyed via these swales that will be cut around the perimeter of the site and rock berms will be installed in these swales to control the sediment from the disturbed areas. The rock berms will slow the velocity of the water down and the sediment will settle out. It will be the contractors responsibility to remove the sediment that builds up after significant rainfall events. The swales will be vegetated/landscaped in the final conditions of the site.

b. Stormwater that originates on-site will be filtered by silt fences, rock berms, or inlet gravel filters on the downgradient side of the property. The silt fences, rock berms, and inlet gravel filters will slow the velocity of the water down and the sediment will settle out. It will be the contractors responsibility to remove the sediment that builds up after significant rainfall events. There will be no contaminated/polluted runoff coming off this site other than sediment which will be handled with silt fence, rock berms and the temporary construction entrance/exit.

c. Stormwater runoff that originates on-site and upgradient of the site will be filtered by silt fences, rock berms, and inlet gravel filters on the downgradient side of the property. The silt fences, rock berms, and inlet gravel filters will slow the velocity of the water down and the sediment will settle out. It will be the contractor's responsibility to remove the sediment that builds up after significant rainfall events. The silt fences and rock berms will capture the sediment that would otherwise be conveyed to streams, sensitive features, etc.

d. There were eleven sensitive features located on the site. These features are S-15, 21, 25, 35, 61, 63, 70, 71, 81, 85 and 89. The majority of these sensitive features are located along the banks of very defined natural channels with drainage areas greater than 1.6 acres. The predominant recharge of these features appears to be the natural water way that drains to these locations with limited drainage contributing via sheet flow. There will be a 50 ft. native environment buffer zone around each sensitive feature and each will be protected during construction by the installation of high service rock berms around the 50' perimeter. There are no sensitive features being proposed to be sealed and the non-sensitive features are either located in the proposed yards of platted lots which will be covered by topsoil and grass or they will be covered by concrete (house pad/driveway).

9. ATTACHMENT F - Structural Practices.

The structural practices that will be used for temporary control of erosion/sediment on this site are silt fences, rock berms, high service rock berms, inlet gravel filters and a temporary construction entrance/exit. Interceptor swales will be excavated around the sides of the property that will prevent upgradient runoff from flowing across the disturbed areas. These swales will outfall to areas that are controlled with by rock berms and the runoff will be filtered before leaving the property. These minor swales will be excavated to the extent that the stormwater will not enter disturbed areas during construction.

10. ATTACHMENT G - Drainage Area Map.

The drainage area map has been enclosed and is located at the end of this section.

12. ATTACHMENT I - Inspection and Maintenance for BMP's.

Silt Fence Inspection and Maintenance Guidelines:

1) Inspect all fencing weekly, and after any rainfall.
2) Remove sediment when buildup reaches 6 inches, or install a second line of fencing parallel to the old fence.
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, relocate it to a spot where it will provide equal protection, but will not obstruct vehicles.

Rock Berm Inspection and Maintenance Guidelines:

1) Inspection shall be made weekly and after each rainfall by the contractor.
2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved site and in such a manner as to not contribute to additional siltation.
3) Repair any loose wire sheathing.

4) The berm shall be reshaped as needed during inspection.
5) The berm shall 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 shall be left in place until all upstream areas are stabilized and accumulated silt removed.

High Service Rock Berm Inspection and Maintenance Guidelines:

1) Inspection shall be made weekly and after each rainfall by the contractor.
2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved site and in such a manner as to not contribute to additional siltation.
3) Repair any loose wire sheathing.
4) The berm shall be reshaped as needed during inspection.
5) The berm shall 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 shall be left in place until all upstream areas are stabilized and accumulated silt removed.

Temporary Construction Entrance/Exit:

1) The entrance shall be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way.
2) All sediment spilled, dropped, washed or tracked on to public rights-of-way shall be removed immediately by the contractor.
3) When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way.
4) When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
5) All sediment shall be prevented from entering any storm drain, ditch or water course by using approved methods.

High Service Rock Berm Inspection and Maintenance Guidelines:

1) Inspection shall be made weekly and after each rainfall by the contractor.
2) Remove sediment and other debris when buildup reaches 4 inches and dispose of the accumulated silt in an approved site and in such a manner as to not contribute to additional siltation.
3) Repair any damaged filter bags.
4) The bags shall be reshaped/replaced as needed during inspection.
5) The bags shall be replaced when the structure ceases to function as intended due to silt accumulation, washout, construction traffic damage, etc.
6) The filter bags shall be left in place until all upstream areas are stabilized and accumulated silt removed.

TEMPORARY CONSTRUCTION ENTRANCE/EXIT

INSPECTION FORM

GENERAL NOTES

1. STONE SIZE - 4 TO 8 INCHES CRUSHED ROCK.

2. LENGTH - AS EFFECTIVE, BUT NOT LESS THAN 50 FEET.

3. THICKNESS - NOT LESS THAN 8 INCHES.

4. WIDTH - NOT LESS THAN 12 FEET.

5. WASHING - WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO THAT NO SEDIMENT LEAVES THE SITE. ALL UNFILTERED SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE.

6. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.

7. DRAINAGE - ENTRANCE MUST BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

INSPECTION REPORT

DATE: _____

SIGNATURE: _____

DOES MUCH SEDIMENT GET TRACKED ONTO ROAD?	IS THE GRAVEL CLEAN OR IS IT FILLED WITH SEDIMENT?	DOES ALL TRAFFIC USE THE STABILIZED ENTRANCE TO LEAVE THE SITE?

MAINTENANCE REQUIRED FOR STABILIZED CONSTRUCTION ENTRANCE:

_____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

SILT FENCE

INSPECTION FORM

GENERAL NOTES

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

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 PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT), WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.

3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED AND COMPACTED.

4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST AND TO WOVEN WIRE, WHICH IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHALL BE A 3 FOOT DOUBLE OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

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

6. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.

INSPEATION REPORT

DATE:_____

SIGNATURE: _____

IS THE BOTTOM OF THE FABRIC STILL BURIED ?	IS THE FABRIC TORN OR SAGGING ?	ARE THE POSTS TIPPED OVER ?	HOW DEEP IS THE SEDIMENT?

MAINTENANCE REQUIRED FOR SILT FENCE:

_____

_____

TO BE PERFORMED BY:_____ ON OR BEFORE:_____

ROCK BERMS

INSPECTION FORM

GENERAL NOTES:

1. WOVEN WIRE SHEATHING SHALL BE PERPENDICULAR TO THE FLOW LINE AND THE SHEATHING SHALL BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

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

3. PLACEMENT OF THE ROCK ALONG THE SHEATHING SHALL NOT BE LESS THAN 18 INCHES.

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

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

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

INSPECTION REPORT

DATE: _____

SIGNATURE: _____

IS THE BERM A MINIMUM OF 18 INCHES HIGH?	IS LEVEL OF SILT GREATER THAN 6 INCHES DEEP?

MAINTENANCE REQUIRED FOR ROCK BERMS:

_____

_____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

HIGH SERVICE ROCK BERMS

INSPECTION FORM

GENERAL NOTES:

1. WOVEN WIRE SHEATHING SHALL BE PERPENDICULAR TO THE FLOW LINE AND THE SHEATHING SHALL BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

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

3. PLACEMENT OF THE ROCK ALONG THE SHEATHING SHALL NOT BE LESS THAN 18 INCHES.

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

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

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

INSPECTION REPORT

DATE: _____

SIGNATURE: _____

IS THE BERM A MINIMUM OF 24 INCHES HIGH ?	IS LEVEL OF SILT GREATER THAN 6 INCHES DEEP?

MAINTENANCE REQUIRED FOR HIGH SERVICE ROCK BERMS:

_____

_____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

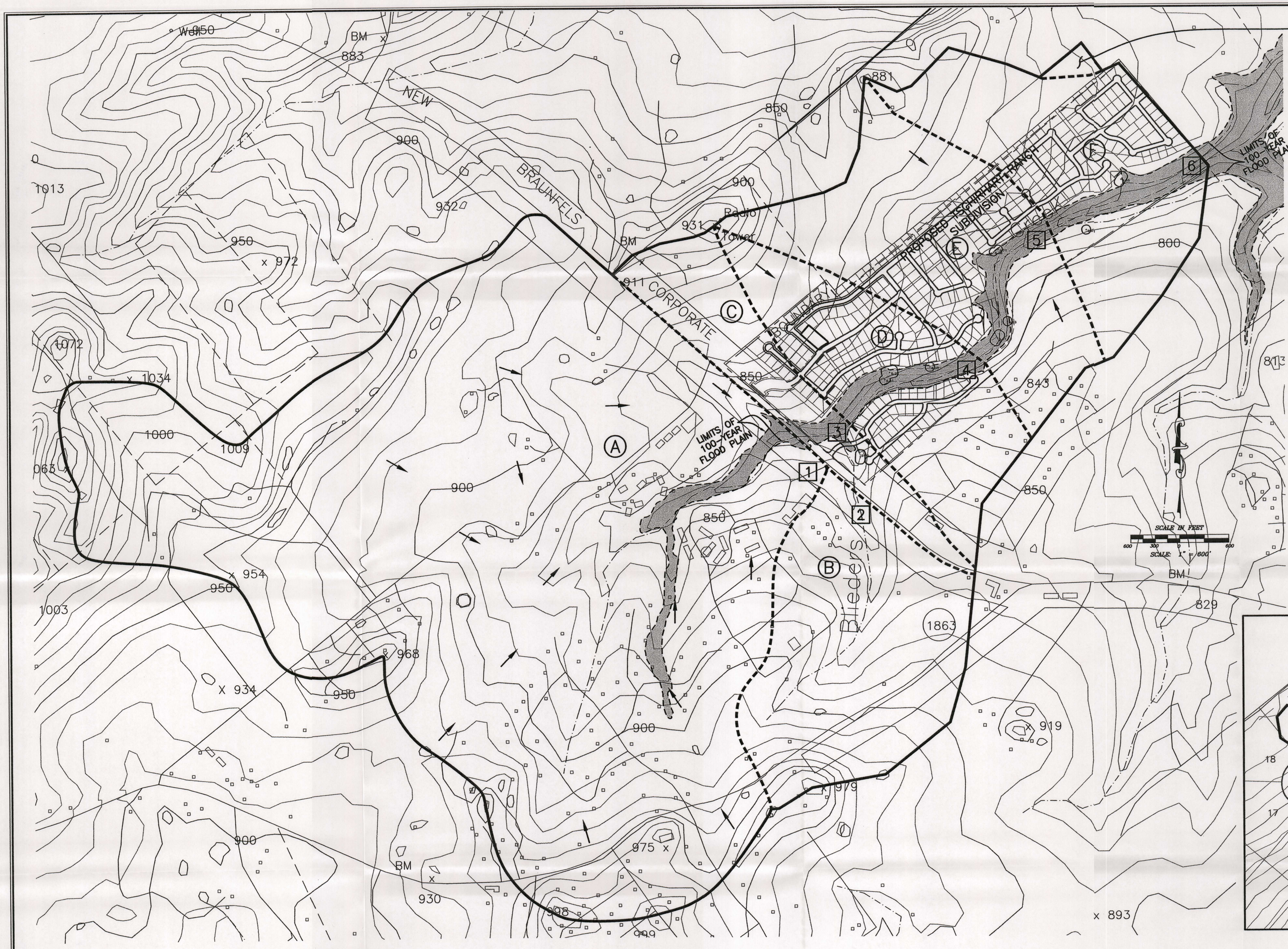
17. ATTACHMENT J - Schedule of Interim and Permanent Soil Stabilization Practices.

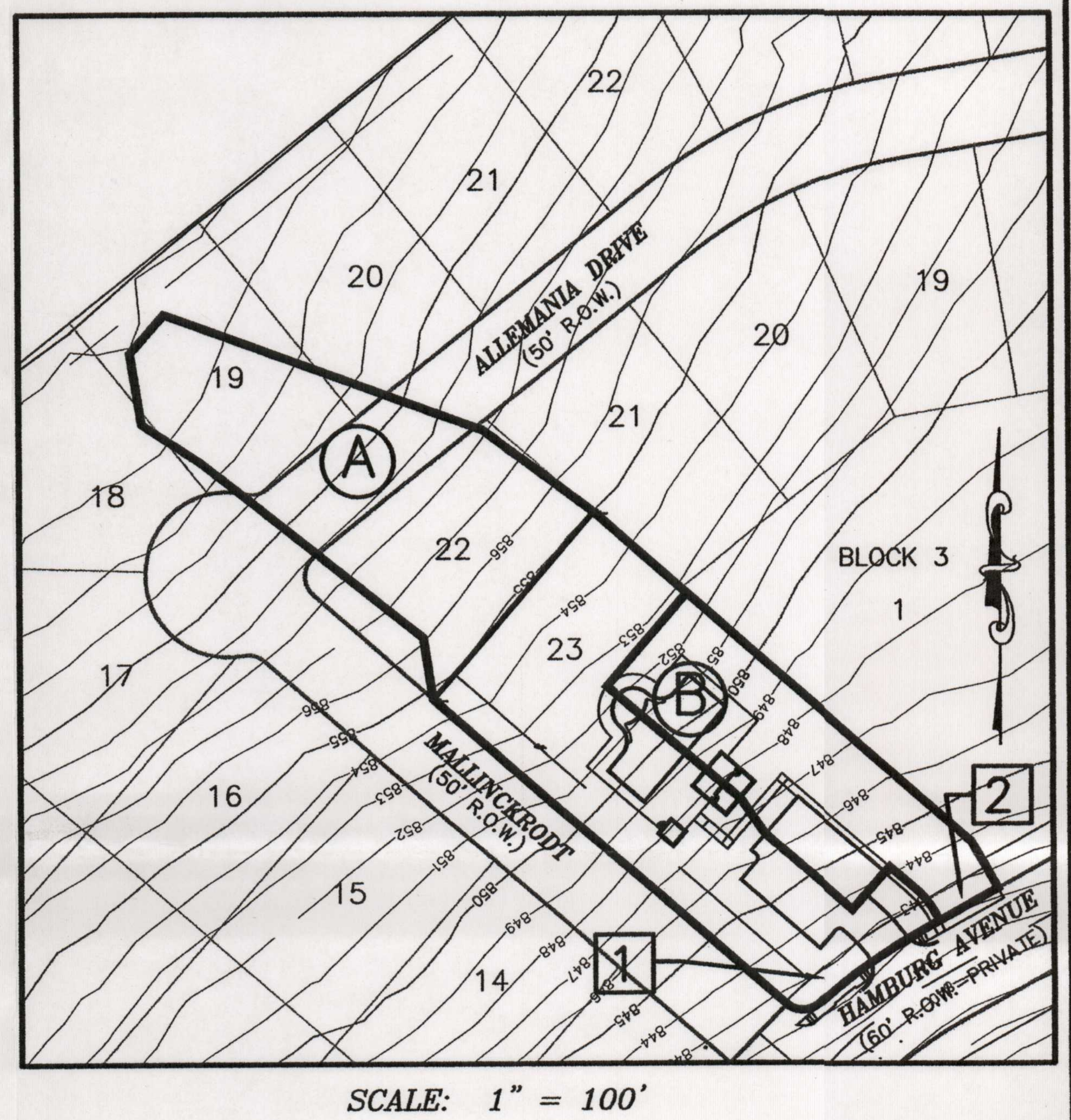
Temporary Stabilization - No bare ground exposed during construction will be left to stabilize naturally. In any disturbed area where construction activities have ceased, permanently or temporarily, the contractor shall initiate temporary stabilization of the area by the use of seeding and mulching within 14 days, except in areas where construction activities are scheduled to resume within 21 days. The temporary seeding will consist of Green Sprangletop, Buffalograss, and Bermuda Grass with straw or cedar mulch applied on final layer in accordance with TxDOT Item 164- Seeding for Erosion Control. Depending on the growing season at the time of construction, mixture and application rates may be modified by the engineer.

Permanent Stabilization - Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 14 days after the last construction activity. The permanent seed mix shall consist of Green Sprangletop, Buffalorgrass, and Bermuda Grass with straw or cedar mulch applied on final layer in accordance with TxDOT Item 164 - Seeding for Erosion Control. Depending on the growing season at the time of construction, mixture and application rates may be modified by the engineer. It shall be the contractors responsibility to provide watering bi-weekly for the seeded areas for a period of 30 calendar days.

ATTACHMENT G

MASTER DRAINAGE AREA MAP





SCALE: 1" = 100'

DRAINAGE AREA DESIGNATION	AREA (ACRES)	AREA (MILES^2)
A	992.3	1.550
B	175.7	0.275
C	82.9	0.130
D	134.3	0.210
E	177.7	0.278
F	158.2	0.247

SCS UNIT HYDROGRAPH TYPE III DISTRIB, AMC II (DEVELOPED CONDITIONS)

DRAINAGE NODE POINT	CONTRIBUTING D.A.'s	TOTAL AREA (ACRES)	CN	TIME OF CONCENTRATION (min.)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
1	A	992.3	86	49	2399.2	3167.0	4582.4
2	B	175.7	86	17	672.9	886.3	1278.6
3	A+B+C	1250.9	86	52	2930.8	3865.2	5585.1
4	A+B+C+D	1385.2	86	57	3081.0	4062.8	5870.2
5	A+B+C+D+E	1562.9	86	63	3271.9	4316.0	6238.3
6	A+B+C+D+E+F	1721.1	86	69	3421.4	4520.9	6546.3

NOTES:

1) NODE POINTS 1 & 2 ARE LOCATED ON THE UPSTREAM END OF THE CULVERTS BELOW S.H. 46.

2) NODE POINTS 3, 4, 5 & 6 ARE CONFLUENCE POINTS OF CONTRIBUTING DRAINAGE AREAS ALONG BLIEDERS CREEK.

OVERALL DRAINAGE INFORMATION AND CALCULATIONS OBTAINED FROM PREVIOUSLY APPROVED TSCHIRHART RANCH SUBDIVISION (SGI 2005)

Rational Method Flow Calculations

Drainage Area	Node	K_{10}	K_{25}	K_{100}	C	I_{10}	I_{25}	I_{100}	A	Q_{10}	Q_{25}	Q_{100}
Drainage Area A	1	1.0	1.1	1.3	0.51	5.71	6.83	8.94	1.32	3.85	5.06	7.52
Drainage Area B	2	1.0	1.1	1.3	0.59	6.48	7.76	10.16	0.41	1.57	2.06	3.07

Calculations were done in accordance with the City of New Braunfels "Drainage and Erosion Control Manual"

REVISIONS

DATE	DESCRIPTION

MASTER DRAINAGE AREA MAP OF

RECREATION CENTER

MANOR CREEK SUBDIVISION UNIT 2A
NEW BRAUNFELS, TEXAS

THE Schultz Group, INC.
TEXAS REGISTERED ENGINEERING FIRM F-532
TEXAS LICENSED SURVEYING FIRM 100095-00
CONSULTING ENGINEERS & LAND SURVEYORS
2461 LOOP 337, NEW BRAUNFELS, TEXAS 78130
PHONE (830) 606-3913 FAX (830) 625-2204

DRAWN BY: D.C.
CHECKED BY: M.G.S.
DATE: JANUARY 2010
JOB NO.: 110309

D-1

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

REGULATED ENTITY NAME: Community Center Manor Creek

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. N/A 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.

   N/A This site will be used for low density single-family residential development and has 20% or less impervious cover.

   N/A This site will be used for low density single-family residential development but has more than 20% impervious cover.

   N/A This site will not be used for low density single-family residential development.

5. N/A 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.

N/A **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.

N/A This site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.

N/A 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.

N/A 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.

N/A 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.

N/A 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.

N/A **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. X **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.

N/A 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:

Michael G. Short, P.E.
Print Name of Customer/Agent

Signature of Customer/Agent

2/4/10
Date

Attachment B – BMPs for Upgradient Stormwater

Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required. The proposed community center site will have Filter Strips which will mitigate the increase in impervious cover specifically for the community center.

Attachment C – BMPs for Onsite Stormwater

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Community Center will be filter strips. The proposed filter strips will adequately mitigate the increase of impervious cover on the Community Center site. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Attachment D – BMPs for Surface Streams

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Subdivision Community Center will be filter strips. The filter strips have been designed to mitigate all proposed impervious cover onsite. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Attachment I – Measures for Minimizing Surface Stream Contamination

The Best Management Practice used as the permanent control device for the Tschirhart Ranch Subdivision Community Center will be filter strips. The filter strips have been designed to mitigate all proposed impervious cover onsite. The remaining portion of Tschirhart Ranch has less than 20% impervious cover, therefore; no permanent BMPs are required outside the community center lot boundary.

Attachment G - Inspection, Maintenance, Repair and Retrofit Plan

Project Name: Community Center Tschirhart Ranch Subdivision (Manor Creek)

Engineered Filter Strip

Weekly — The project site shall be checked for accumulation of debris and trash. The debris and trash shall be removed.

Monthly — The vegetation growth in the vegetated filter strip shall be checked. The growth shall not exceed 18 inches in height.

Quarterly — The level of accumulated silt shall be checked. If depth of silt exceeds 6 inches, it shall be removed and disposed of "properly".

Annually — The vegetation shall be inspected and additional native grasses planted as necessary.

After Rainfall — To maintain vegetative cover over this area, the area shall be checked after each rainfall occurrence to insure that the area drains within 6 hours after the storm is over. If it does not drain within this time, corrective measures will be instituted.

"Proper" disposal of accumulated silt shall be accomplished following the Texas Commission of Environmental Quality guidelines and specifications.

An amended copy of this document will be provided to the Texas Commission of Environmental Quality (San Antonio Region) within thirty (30) days of any changes in the following information.

Contact Person:	Richard N. Maier, Assistant Secretary
Entity:	Continental Homes of Texas, L.P., a Texas Limited Partnership
	By: CHTEX of Texas, Inc. a Delaware Corporation, Its General Partner
Mailing Address:	12554 Riata Vista Circle, 2nd Floor
City, State:	Austin, TX. Zip: 78727
Telephone:	(512) 345-4663 FAX: (512) 533-1429

Continental Homes of Texas, L.P., a
Texas limited partnership
By: CHTEX of Texas, Inc., a
Delaware corporation its sole General Partner

by _____ _____ 2/12/10

Signature of Responsible Party — Date

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

I Richard N. Maier,
Print Name

Title - Owner/President/**Other** Assistant Secretary of

Continental Homes of Texas, L.P., a Texas limited partnership

Corporation/Partnership/Entity Name

have authorized Michael G. Short, P.E.

Print Name of Agent/Engineer

of The Schultz Group, Inc.

Print Name of Firm

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

I also understand that:

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

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

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

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

by _____ V.P. 10/1/08
Applicant's Signature Date

THE STATE OF Texas §

County of Paris §

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

GIVEN under my hand and seal of office on this 1 day of December, 2009.

_____
NOTARY PUBLIC

KATRINA MCDONALD
Notary Public, State of Texas
My Commission Expires
August 10, 2013

Katrina McDonald
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 8/10/13

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

NAME OF PROPOSED REGULATED ENTITY: Community Center Manor Creek
REGULATED ENTITY LOCATION: Approx. 2 miles West from Loop 337 on the NE side of SH 46
NAME OF CUSTOMER: Continental Homes of Texas, L.P.
CONTACT PERSON: Michael G. Short, P.E. PHONE: (830) 606-3913
(Please Print)

Customer Reference Number (if issued): CN 601213523 (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 ☐ Medina ☐ Kinney ☐ 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):

☐ **Austin Regional Office**

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

☒ **San Antonio Regional Office**

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

Site Location (Check All That Apply): ☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	Size	Fee Due
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	1.081 Acres	$4,000.00
Sewage Collection System	L.F.	$
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature

2/12/10
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.

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

Water Pollution Abatement Plans and Modifications
Contributing Zone Plans and Modifications

PROJECT	PROJECT AREA IN ACRES	FEE
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

PROJECT	COST PER LINEAR FOOT	MINIMUM FEE MAXIMUM FEE
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

PROJECT	COST PER TANK OR PIPING SYSTEM	MINIMUM FEE MAXIMUM FEE
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

PROJECT	FEE
Exception Request	$500

Extension of Time Requests

PROJECT	FEE
Extension of Time Request	$150

D·R HORTON America's Builder

File Copy - Do Not Mail

Check Number 0230597
Date 02/09/10

Texas Commission on Environmental Qua
14250 Judson Road

DRH Inc. Texas Disb Account Stub 1 of 1 **1382697**

PO Numb	Invoice Number	Subdv	Lot#	Lot Address	Cost Cde	Legal Desc	Gross	Deductions	Amount Paid
	2/4/2010	42552		Manor Creek 6			4,000.00		4,000.00
							4,000.00		4,000.00

Check Number 0230597
Date 02/09/10

Texas Commission on Environmental Qua
14250 Judson Road

DRH Inc. Texas Disb Account Stub 1 of 1 1382697

PO Numb	Invoice Number	Subdv	Lot#	Lot Address	Cost Cde	Legal Desc	Gross	Deductions	Amount Paid
	2/4/2010	42552		Manor Creek 6			4,000.00		4,000.00
							4,000.00		4,000.00

THIS CHECK IS PRINTED IN RED AND BLUE INK ON THE FACE ON CHEMICAL AND BLEACH REACTIVE PAPER WITH INVISIBLE FLUORESCENT FIBERS AND BASKETWEAVE ON BACK MP

D·R HORTON America's Builder

DRH Inc. Texas Disb Account
801 Commerce Street, Suite 500
Fort Worth, TX 76102

Controlled Disbursement
Bank of America, N.A.
Atlanta, Dekalb County, Georgia

64-1278
611 GA
1382697

Check Number 230597

Date	Amount
02/09/10	$*****4,000.00

Void after 6 months from date of issue

Pay *FOUR THOUSAND AND 00/100* **********

To The Order Of:

Texas Commission on Environmental Qua
14250 Judson Road
San Antonio TX 78233-4480

D. R. Horton

⑈0023059 7⑈ ⑆061112788⑆ 329 903 6873⑈

TCEQ

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

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

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

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

2. Attachments — Describe Any Attachments: *(ex. Title V Application, Waste Transporter Application, etc.)*

☒ Yes ☐ No — Community Center Manor Creek

3. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	4. Regulated Entity Reference Number *(if issued)*
CN 601213523		RN

SECTION II: Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

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

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

7. General Customer Information

☒ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State) ☐ No Change**

If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.

8. Type of Customer:			
☐ Corporation	☐ Individual	☐ Sole Proprietorship- D.B.A	
☐ City Government	☐ County Government	☐ Federal Government	☐ State Government
☐ Other Government	☐ General Partnership	☐ Limited Partnership	☒ Other: Partnership

9. Customer Legal Name *(If an individual, print last name first: ex: Doe, John)*	*If new Customer, enter previous Customer below*	*End Date:*
Continental Homes of Texas, LP		

10. Mailing Address: 12554 Riata Vista Circle, 2nd Floor

City	Austin	State	TX	ZIP	78727	ZIP + 4	

11. Country Mailing Information *(if outside USA)*	12. E-Mail Address *(if applicable)*

13. Telephone Number	14. Extension or Code	15. Fax Number *(if applicable)*
(512) 345-4663		(512) 533-1429

16. Federal Tax ID *(9 digits)*	17. TX State Franchise Tax ID *(11 digits)*	18. DUNS Number *(if applicable)*	19. TX SOS Filing Number *(if applicable)*
741229207	N/A	N/A	N/A

20. Number of Employees

☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

21. Independently Owned and Operated?

☐ Yes ☒ No

SECTION III: Regulated Entity Information

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

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information ☐ No Change** *(See below)*

**If "NO CHANGE" is checked and Section I is complete, skip to Section IV, Preparer Information.

23. Regulated Entity Name *(name of the site where the regulated action is taking place)*

Continental Homes of Texas, LP

24. Street Address of the Regulated Entity: *(No P.O. Boxes)*	12554 Riata Vista Circle, 2nd Floor							
	City	Austin	State	TX	ZIP	78727	ZIP + 4	
25. Mailing Address:								
	City		State		ZIP		ZIP + 4	

26. E-Mail Address:			
27. Telephone Number	28. Extension or Code	29. Fax Number *(if applicable)*	
(512) 345-4663		(512) 533-1429	
30. Primary SIC Code (4 digits)	31. Secondary SIC Code (4 digits)	32. Primary NAICS Code (5 or 6 digits)	33. Secondary NAICS Code (5 or 6 digits)
		236115	

34. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*

Community Center for Residential Subdivision

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:	The proposed Manor Creek development is located approximately 2 miles West of Loop 337 on the Northeast side of State Highway 46.

36. Nearest City	County	State	Nearest ZIP Code
New Braunfels	Comal	TX	78130

37. Latitude (N) In Decimal:	29.730278	38. Longitude (W) In Decimal:	98.187222

Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	43	49	98	11	14

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form or the updates may not be made. If your Program is not listed, check other and write it in. See the Core Data Form instructions for additional guidance.

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

SECTION IV: Preparer Information

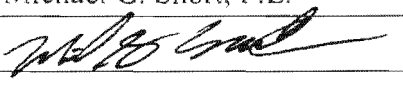
40. Name:	Michael G. Short, P.E.	41. Title:	Senior Engineer

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(830) 606-3913		(830) 625-2204	mshort@schultzgroupinc.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 9 and/or as required for the updates to the ID numbers identified in field 39.

(See the Core Data Form instructions for more information on who should sign this form.)

Company:	The Schultz Group, Inc.	Job Title:	Senior Engineer
Name *(In Print)* :	Michael G. Short, P.E.	Phone:	(830) 606-3913
Signature:		Date:	2/12/10