

Bryan W. Shaw, Ph.D., *Chairman*  
Carlos Rubinstein, *Commissioner*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

November 13, 2012

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**COUNTY ENGINEER**

Mr. Jeremy Filedsend  
Newcombe Development LLC  
325 Mission Valley Road  
New Braunfels, Texas 78132

Re: Edwards Aquifer, Comal County

Name of Project: **Newcombe Tennis Ranch** Subdivision – Unit 2; located approximately 2 miles southwest of the intersection of State Highway 46 and Farm-to-Market Road 1863; New Braunfels, Texas

Type of Plan: Request for **Modification of an Approved Organized Sewage Collection System (SCS)** Plan; 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Edwards Aquifer Protection Program ID No. 1248.08; Investigation No. 1035586; Regulated Entity No. RN102747359

Dear Mr. Filedsend:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the organized sewage collection system plans and specifications for the referenced project submitted to the San Antonio Regional Office on behalf of Newcombe Development LLC by Moeller & Associates Engineering Solutions on September 19, 2012. Final review of the SCS was completed after additional material was received on October 30, 2012 and November 12, 2012. As presented to the TCEQ, the construction documents were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213 and Chapter 217. Therefore, based on the Texas Licensed Professional Engineer's concurrence of compliance, the planning materials for construction of the proposed sewage collection system 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 (2) two years from the date of this letter unless, prior to the expiration date, more than 10 percent of construction has commenced, or an extension of time has been requested.*

### Background

This project was previously approved by the letter dated June 15, 2012. The project site is located on the Edwards Aquifer Recharge Zone. The approved plan included construction of 4,140 linear feet of 8-inch diameter PVC SDR 26 115-psi pipe and joints (ASTM D3034, ASTM D3212), 126 linear feet of PVC



DR18 150- psi pressure pipe and joints (AWWA C-900, ASTM D3139) and 1,010 linear feet of 4-inch of PVC DR25 force main (AWWA C-900, ASTM D3139), manholes, laterals, and appropriate appurtenances.

### **Project Description**

This proposed modification was submitted due to change of the location of the lift station and subsequent adjustments to gravity lines A, D, E, F and G, and realignment of the force main. The proposed project only addressed the above mentioned lines. Construction plans and design information for gravity lines B and C can be found in the previously approved SCS.

This proposed project consists of 4,186 linear feet of 8-inch diameter PVC SDR 26 115-psi pipe and joints (ASTM D3034, ASTM D3212), 126 linear feet of PVC DR18 150- psi pressure pipe and joints (AWWA C-900, ASTM D3139) and 1,416 linear feet of 4-inch of PVC DR25 165-psi force main (AWWA C-900, ASTM D3139), manholes, laterals, and appropriate appurtenances. The proposed sewage collection system will provide disposal service for a residential development.

The proposed lift station will consist of a 7-foot diameter wet well with an approximate depth of 19 feet, two (2) non-clog self-priming pumps, and an emergency power generator. Each pump will have a pumping capacity of 80 gallons per minute (gpm) at a total dynamic head (TDH) of 32 feet. Additional equipment will include a control panel, an audio visual alarm, auto-dial telemetry, hoisting equipment, level pump controllers, pump supports and discharge piping with valves, and a security fence with controlled access.

The system will be connected to an existing City of New Braunfels wastewater line for conveyance to the Gruene Water Recycling Center for treatment and disposal. The project is located within the City of New Braunfels and will conform to all applicable codes, ordinances, and requirements of the City of New Braunfels.

### **Geology**

The geologic assessment indicates that the site is located over Del Rio Clay, the Buda Limestone, and possibly small areas of the Georgetown and Person Formation of the Edwards Group. Two features (one well and one fault) were identified on the site within 50 feet of the SCS. None of them were assessed as sensitive. A site investigation was not conducted by a representative of the San Antonio Regional Office.

### **Special Conditions**

- I. The geologic assessment indicates that an inferred fault exists on this project site. When excavating in the vicinity of the inferred fault, provide an assessment of it by a Texas Licensed Professional Geologist. If the fault is determined to allow rapid infiltration to the subsurface, construction may not resume in the area of the feature until a protection plan has been reviewed and accepted by the executive director. If the geologist determines that the fault does not allow rapid infiltration to the subsurface, the geologist's assessment must be submitted within 30 days of completion of the assessment. It is recommended that the evaluation of the fault be conducted as early as possible in the scheduled activities to prevent possible delays.
- II. It is emphasized that where wastewater lines must bridge faults, caverns, sinkholes, or solution features the lines shall be constructed in a manner that will maintain the structural integrity of the pipe. When such sensitive features are encountered, 30 TAC §213.5(f)(2) requires that all regulated activities near the feature must be immediately suspended and the owner/developer shall

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Mr. Jeremy Filedsend

Page 3

November 13, 2012

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immediately notify the San Antonio Regional Office. Additionally, when such geologic features are encountered which are bridged by construction, the location and extend of those features must be assessed by a geologist and must be reported to the San Antonio Regional Office in writing within two working days of discovery as required by 30 TAC §213.5(c)(3)(K). Construction may not resume in the area of the feature until the executive director has reviewed and approved the methods proposed to protect the aquifer from any potential adverse impacts. See Standard Condition 10 below.

- III. The lift station shall be designed and constructed to ensure that bypassing of any sewage does not occur. All lift stations must be designed to meet the requirements of 30 TAC §217.63.
- IV. Upon completion of any lift station excavation, a geologist shall certify that the excavation has been inspected for the presence of sensitive features. Certification that the excavation has been inspected must be submitted to the San Antonio Regional Office.
- V. In accordance with 30 TAC 213.5, please be aware that if the lift station emergency diesel generator is supplied fuel from an onsite permanent hydrocarbon storage facility that is 500 gallons or greater, an Edwards Aquifer Protection Plan is required prior to commencing regulated activities.
- VI. This modification is subject to all Special and Standard Conditions listed in the SCS approval letter dated June 15, 2012.

#### **Standard Conditions**

- 1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.
- 2. The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved plan. Additional and separate approvals, permits, registrations and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the specifics of the plan.
- 3. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.

#### ***Prior to Commencement of Construction:***

- 4. All contractors conducting regulated activities at the project location shall be provided a copy of this notice of approval. At least one complete copy of the approved SCS plan and this notice of approval shall be maintained at the project location until all regulated activities are completed.
- 5. Modification to the activities described in the referenced SCS and lift station applications following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
- 6. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the 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.



7. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved application, 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. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

*During Construction:*

8. During the course of regulated activities related to this project, the applicant or his agent shall comply with all applicable provisions of 30 TAC Chapter 213 and Chapter 217. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity, upon which that person or entity shall assume responsibility for all provisions and conditions of this approval.
9. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
10. 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.
11. The following records shall be maintained by the applicant and made available to the executive director upon request: the dates trenching 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 and completed.
12. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.
13. Intentional discharges of sediment laden water during construction are not allowed. If dewatering of excavated areas becomes necessary, the discharge will be filtered through appropriately selected temporary best management practices. These may include vegetative filter strips, sediment traps, rock berms, sit fence rings, etc.
14. No part of the system shall be used as a holding tank for a pump-and-haul operation.

*After Completion of Construction:*

15. Certification by a Texas Licensed Professional Engineer of the testing of sewage collection systems required by 30 TAC Chapter 213 and Chapter 217 shall be submitted to the San Antonio Regional Office within 30 days of test completion and prior to the new sewage collection system being put into service. The certification should include the project name as it appeared on the approved application, the program ID number, and two copies of a site plan sheet(s) indicating the

November 13, 2012

wastewater lines that were tested and are being certified as complying with the appropriate regulations.

16. Every five years after the initial certification, the sewage collection system shall be retested. Any lines that fail the test must be repaired and retested. Certification that the system continues to meet the requirements of 30 TAC Chapter 213 and Chapter 217 shall be submitted to the San Antonio Regional Office. The certification should include the project name as it appeared on the approved application, the program ID number and two copies of a site plan sheet(s) indicating the wastewater lines that were tested and are being certified as complying with the appropriate regulations.
17. If ownership of this organized sewage collection system is legally transferred (e.g., developer to city or Municipal Utility District), 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.
18. 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.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Yuliya Dunaway of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210-403-4077.

Sincerely,



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

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LMB/YD/eg

cc: Mr. James Ingalls, P.E., Moeller and Associates, Inc.  
Mr. Octavio Garza, P.E., City of New Braunfels  
Mr. Tom Hornseth, P.E., Comal County  
Mr. Roland Ruiz, Edwards Aquifer Authority  
TCEQ Central Records, Building F, MC 212





Comal county

TCEQ-R13  
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SAN ANTONIO

November 12, 2012

Ms. Yuliya Dunaway  
Edwards Aquifer Protection Division, Region 13 (San Antonio)  
Texas Commission on Environmental Quality  
14250 Judson Road  
San Antonio, TX 78233-4480

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RE: Newcombe Tennis Ranch Subdivision – Unit 2 – Sewage Collection System Plan.

Per your discussion with James Ingalls, attached is an updated Force Main plan sheet for Newcombe Tennis Ranch Subdivision – Unit 2 as well as all associated forms and attachments that changed as a result of the adjustment. The adjustment does not exceed the minimum fee of \$650 that was provided with the modification.

If you need additional information or have any questions, please do not hesitate to contact myself or James Ingalls.

Sincerely,

A handwritten signature in black ink, appearing to read 'Shane Klar'.

Shane Klar for  
James Ingalls, P.E.  
Attachments

**ATTACHMENT “C”**

**Project Description**

Newcombe Tennis Ranch Subdivision – Unit 2 is a 31.3 acre development on the north side of FM 1863 approximately 2 miles west of the nearest major intersection at SH 46 (See Location Map). The proposed site consists of 62 residential lots of varying size. The site is currently unimproved land primarily composed of open fields, dense brush and trees. The entire site drains south to an unnamed tributary of Dry Comal Creek. According to the Flood insurance Rate Map No. 48091C0430F there is no existing floodplain located within the property.

This SCS application is for Unit 2 of four planned units. The Unit 2 Sanitary Sewer System will tie into the Unit 1 system previously approved and sized for Unit 2 flows EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007.

The potable distribution and sanitary sewer collection systems on this project will be owned and maintained by New Braunfels Utilities (NBU) upon their acceptance of the constructed facilities. There will be no private utilities on site. The project includes approximately 4,190 linear feet of 8” sanitary sewer gravity main, 1,420 linear feet of 4” sanitary sewer force main and 1 lift station. The proposed SCS will connect to manhole MH-K\_3. The manhole was constructed as part of the Newcombe Tennis Ranch Subdivision – Unit 1 project (EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007).

Table 1 below has a break out of the sewer lengths by line.

<b>Table 1 – Pipe Lengths Broken Out by Line</b>	
<b>Sanitary Sewer Line</b>	<b>Length (ft)</b>
SSL A	873.88
SSL B	268.00
SSL C	924.95
SSL D	1,500.00
SSL E	215.47
SSL F	275.00
SSL G	128.86
Force Main	1,416.00

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**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: Newcombe Tennis Ranch Subdivision - Unit 2  
Original Regulated Entity Name: Newcombe Tennis Ranch Subdivision - Unit 2  
Assigned Regulated Entity Numbers (RN): 1) 102747359, 2) \_\_\_\_\_, 3) \_\_\_\_\_  
  
X The applicant has not changed and the Customer Number (CN) is: CN 603615485  
\_\_\_\_ 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.
3. A modification of a previously approved plan is requested for (check all that apply):  
  
\_\_\_\_ physical or operational modification of any water pollution abatement structure(s) including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;  
\_\_\_\_ change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;  
\_\_\_\_ development of land previously identified as undeveloped in the original water pollution abatement plan;  
X 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	_____	_____
Type of Development	_____	_____
Number of Residential Lots	_____	_____
Impervious Cover (acres)	_____	_____
Impervious Cover (%)	_____	_____
Permanent BMPs	_____	_____
Other	_____	_____
SCS Modification Summary	Approved Project	Proposed Modification
Linear Feet	<u>5,150</u>	<u>5,603</u>
Pipe Diameter	<u>8" &amp; 4"</u>	<u>8" &amp; 4"</u>
Other	_____	<u>lift station location</u>
AST Modification Summary	Approved Project	Proposed Modification
Number of ASTs	_____	_____
Volume of ASTs	_____	_____
Other	_____	_____

## UST Modification Summary

Number of USTs

Volume of USTs

Other

## Approved Project

## Proposed Modification

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.
- X   The approved construction has not commenced. The original approval letter, and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
- The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
- The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.
- The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.
- The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.
7.   N/A   The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
- X   Acreage has not been added to **or** removed from the approved plan.
8.   X   Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

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:

\_\_\_\_\_  
Print Name of Customer/Agent

\_\_\_\_\_  
Signature of Customer/Agent

\_\_\_\_\_  
Date

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\_\_\_\_\_ Total \_\_\_\_\_ gallons/day

5. Existing and anticipated infiltration/inflow is 23,475 gallons/day. This will be addressed by the installation of watertight resilient connectors at the pipe penetrations to the manholes. In addition, the newly installed pipe shall be tested via low pressure air test or exfiltration test for leakage per TCEQ 217.57.(a). Also, the newly installed pipe capacity exceeds the capacity required for the development (available capacity of 568,800 GPD versus required capacity of 81,578 GPD for peak wet weather flow).
6. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.
- ☒ The WPAP application for this development was approved by letter dated 12/28/07.  
A copy of the approval letter is attached at the end of this application.
- ☐ The WPAP application for this development was submitted to the TCEQ on \_\_\_\_\_, but has not been approved.
- ☐ A WPAP application is required for an associated project, but it has not been submitted.
- ☐ There is no associated project requiring a WPAP application.

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7. Pipe description:

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Pipe Diameter (Inches)	Linear Feet <sup>1</sup>	Pipe Material <sup>2</sup>	Specifications <sup>3</sup>
4"	1,416	PVC C-900 DR 25	AWWA C-900, ASTM D 3139
8"	126	PVC C-900 DR18	AWWA C-900, ASTM D 3139
8"	4,061	PVC SDR 26	ASTM D 3034, ASTM D 3212
Total Linear Feet	5,603		

1) Include stub-outs. Do not include private service laterals.  
2) If PVC, state SDR value.  
3) ASTM / ANSI / AWWA specification and class numbers should be included.

8. The following Wastewater Treatment Plant (WWTP) Gruene WWTP (name) will receive project wastewater for treatment and disposal. This WWTP is an **EXISTING/PROPOSED** (circle one) facility.
9. All components of this sewage collection system will comply with:
- ☒ New Braunfels Utilities standard specifications.
- ☐ Other. Specifications are provided directly behind this page.
10. ☒ No force main(s) and/or lift station(s) are associated with this sewage collection system.  
☒ A force main(s) and/or lift station(s) is associated with this sewage collection system and the Lift Station/Force Main System application is included with this application.

#### ALIGNMENT

11. ☒ There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.
12. N/A Joint Deflection - The maximum allowable joint deflection is the lesser of the following three alternatives:  
☐ equal to 5°; or  
☐ 80% of the manufacturer's recommended maximum deflection; or

**ATTACHMENT “B”**

**Justification and Calculations for Deviation in Straight Alignment Without Manholes**

The proposed system includes 1,416 linear feet of force main. Due to the pressurized nature of a force main manholes will not be used for deviation in straight alignment rather mechanical joint ductile iron fittings will be used.

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## PROJECT DESCRIPTION

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This SCS application is for Unit 2 of four planned units. The Unit 2 Sanitary Sewer System will tie into the Unit 1 system previously approved and sized for Unit 2 flows EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007.

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SSL E	215.47
SSL F	275.00
SSL G	128.86
Force Main	1,416.00

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## Specific Pipe Information

Newcombe Tennis Ranch - Unit 2 Gravity Sewer						
Sanitary Sewer Line	Diameter (in)	Length (ft)	Slope <sub>min</sub> (%)	Slope <sub>max</sub> (%)	Velocity <sub>min</sub> (ft/s)	Velocity <sub>max</sub> (ft/s)
SSL A	8"	873.88	0.33	1.85	2.00	4.71
SSL B	8"	268.00	1.05	4.56	3.55	7.39
SSL C	8"	924.95	0.33	0.33	2.00	2.00
SSL D	8"	1,500.00	0.33	1.12	2.00	3.66
SSL E	8"	215.47	0.54	0.54	2.54	2.54
SSL F	8"	275.00	0.33	0.33	2.00	2.00
SSL G	8"	128.86	0.33	0.33	2.00	2.00

\* All pipe to be SDR 26 PVC pipe conforming to ASTM D 3034 and ASTM D 3212

Newcombe Tennis Ranch - Unit 2 Sewer Pipe Stiffness & Buckling Summary						
Diameter (in)	Material	Length (ft)	Stiffness (psi)	Depth <sub>min</sub> (ft)	Depth <sub>max</sub> (ft)	Deflection <sub>max</sub> (%)
4	C-900 DR 25	1,416	129	4.0	4.0	0.76
8	C-900 DR 18	126	364	6.0	12.0	0.87
8	SDR 26	4,060	115	6.0	12.0	1.28

\*All proposed pipe maintains a depth of less than 17 feet and a stiffness greater than 46 psi.  
Per TAC 30 217.53(k)(4) the calculations for structural failure are not required.

### Pipe Stiffness

Pipe stiffness labeled in the table above came from the "Handbook of PVC Pipe" Table 7.1 below.

TABLE 7.1  
MINIMUM PVC PIPE STIFFNESS (psi)

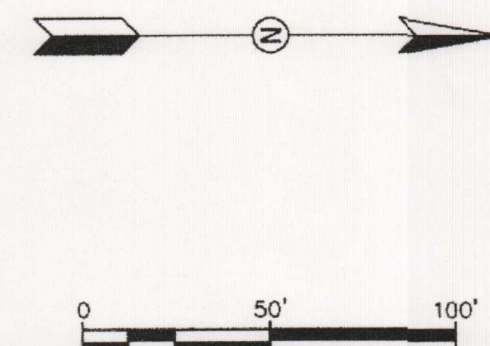
DR or SDR	Min. E = 400,000 psi	Min. E = 440,000 psi	Min. E = 500,000 psi
64	7	8	9
51	14	16	18
42	26	29	32
41	28	31	35
35	46	50	57
33.5	52	57	65
32.5	57	63	71
28	91	100	114
26	115	126	144
25	129	142	161
23.5	157	173	196
21	224	246	279
18	364	400	455
17	437	480	546
14	815	895	1,019
13.5	916	1,007	1,145

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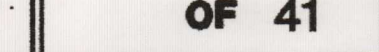
NOV 20 2012

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THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR WILL AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE INCURRED BY THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES, STRUCTURES OR FACILITIES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES 24-HOURS PRIOR TO COMMENCING CONSTRUCTION.





Comal County



## LETTER OF TRANSMITTAL

<b>ATTN: Yuliya Dunaway</b>	<b>DATE: 10/30/12</b>
<b>To: TCEQ</b>	<b>RE: Newcombe Tennis Ranch Subdivision – Unit 2 SCS Modification</b>

**WE ARE SENDING YOU** ☒ attached

☐ shop drawings

☐ prints

☐ plans

☐ copy of letter

☐ under separate cover the following:

☐ standards

☐ specifications

☐ ordinance

☐ other:

COPIES	ITEM	DESCRIPTION
5	Copies	Erosion Control Plan

**THESE ARE TRANSMITTED AS CHECKED BELOW:**

☐ for approval

☐ approved as submitted

☐ resubmit

☐ copies for approval

☐ for your use

☐ approved as noted

☐ submit

☐ copies for distribution

☒ as requested

☐ returned for corrections

☐ return

☐ corrected prints

☐ for review and comment

☐ other:

Signed

Shane Klar

**TCEQ-R13**  
**OCT 30 2012**  
**SAN ANTONIO**







Bryan W. Shaw, Ph.D., *Chairman*  
Buddy Garcia, *Commissioner*  
Carlos Rubinstein, *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

March 29, 2012

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: Newcombe Tennis Ranch Subdivision Unit 2, located along FM 1863 southwest 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.: 3042.00

Dear Mr. Hornseth:

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

Please forward your comments to this office by April 28, 2012.

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

A handwritten signature in blue ink that reads "Todd Jones".

Todd Jones  
Water Section Work Leader  
San Antonio Regional Office

TJ/eg

**ORGANIZED SEWAGE COLLECTION SYSTEM**  
**FOR**  
**Newcombe Tennis Ranch Subdivision – Unit 2**

PREPARED FOR  
**Texas Commission on Environmental Quality**

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

**TCEQ-R13**

MAR 23 2012

**SAN ANTONIO**

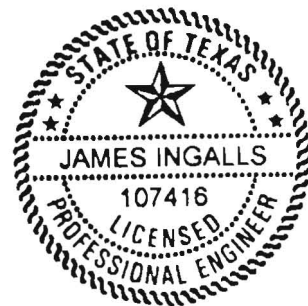
PREPARED BY



F-13351

James Ingalls, P.E.  
1040 N. Walnut Ave., Ste B  
New Braunfels, TX 78130

Prepared  
March 19, 2012



*James Ingalls*  
3/20/12



**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: Newcombe Tennis Ranch Subdivision - Unit 2  
COUNTY: Comal STREAM BASIN: Un-named Tributary of Dry Comal Creek

EDWARDS AQUIFER: ☒ RECHARGE ZONE  
☐ TRANSITION ZONE

PLAN TYPE: ☐ WPAP ☐ AST ☐ EXCEPTION  
☒ SCS ☐ UST ☐ MODIFICATION

**CUSTOMER INFORMATION**

1. Customer (Applicant):

Contact Person: Jeremy Filedsend  
Entity: Newcombe Development L.L.C.  
Mailing Address: 325 Mission Valley Road  
City, State: New Braunfels, TX. Zip: 78132-3629  
Telephone: (830)625-5911 FAX: (830)625-2004

Agent/Representative (If any):

Contact Person: James Ingalls, P.E.  
Entity: Moeller & Associates  
Mailing Address: 1040 N. Walnut Ave., Ste B  
City, State: New Braunfels, Texas Zip: 78130-5317  
Telephone: (830) 358-7127 FAX: (830) 515-5611

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

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

Newcombe Tennis Ranch Subdivision – Unit 2 is located on FM 1863 approximately 2 miles southwest of the intersection with State Highway 46.

4. ☒ **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. ☒ **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:

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

6. ☒ 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. ☒ **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)
  - ☐ Undeveloped (Undisturbed/Uncleared)
  - ☐ Other: construction of previously approved roadway

#### PROHIBITED ACTIVITIES

9. ☒ 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. ☐ N/A 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:
- ☐ 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 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)
- ☒ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

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

14. ☒ 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.

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:

James Ingalls, P.E.

Print Name of Customer/Agent

  
Signature of Customer/Agent

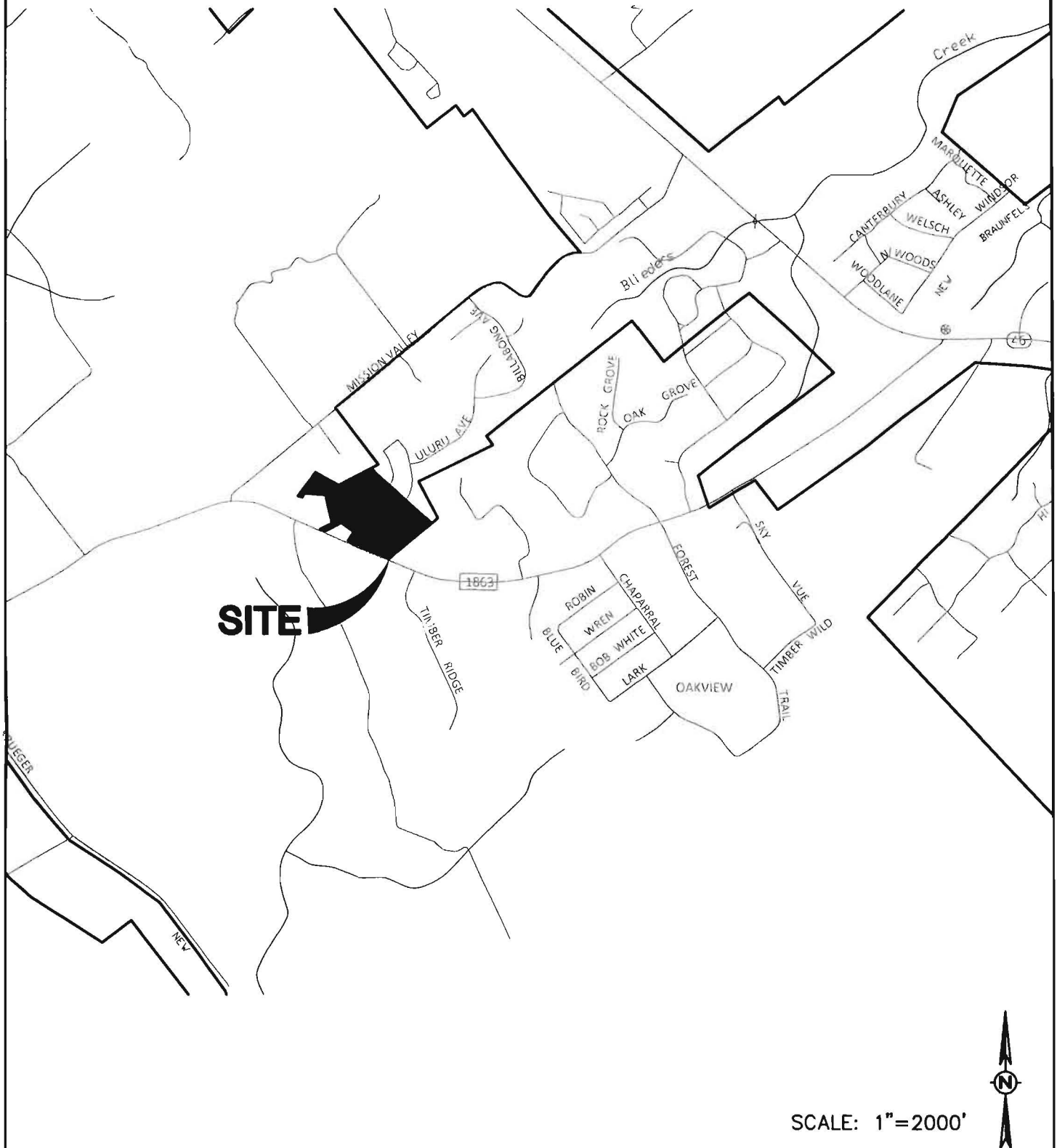
3/20/12  
Date

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.



ATTACHMENT A



1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX. 78130  
 PH: 830-358-7127 [www.ma-tx.com](http://www.ma-tx.com)  
 TBPE FIRM F-13351

LOCATION MAP  
 NEWCOMBE TENNIS RANCH - UNIT 2

DRAWN BY: SAK CHECKED BY: JII

DATE: 2/2012

SHEET  
1  
 OF  
1



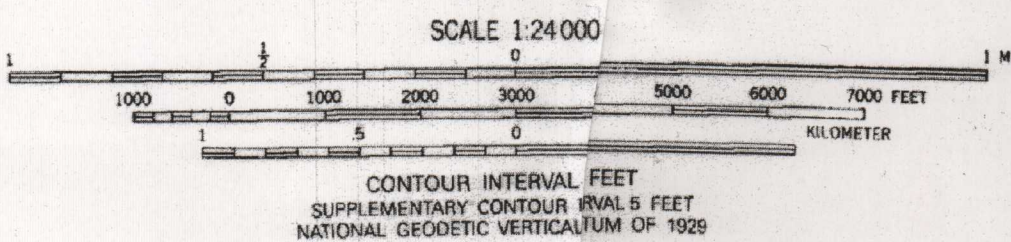
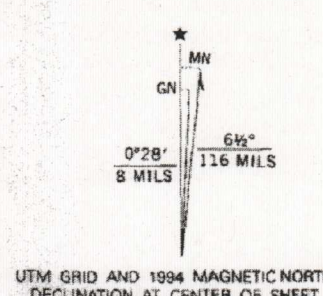
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

NEW BRAUNFELS EAST QUADRANGLE  
TEXAS  
7.5 MINUTE SERIES (TOPOGRAPHIC)

TCEQ-R13  
MAR 23 2012  
SAN ANTONIO



Produced by the United States Geological Survey in cooperation with the Defense Mapping Agency Control by USGS and NOS/NOAA and USCE  
Compiled from aerial photographs taken 1966. Revisions in purple and woodland compiled from aerial photographs taken 1986 and other sources and has been field checked. Map edited 1984. Conflicts may exist between some updated features and previously mapped contours.  
North American Datum of 1927 (NAD 27). Projection and 10000-foot ticks: Texas Coordinate System, south central zone (Lambert Conformal Conic). Blue 1000-meter Universal Transverse Mercator ticks, zone 14. North American Datum of 1983 (NAD 83) is shown by dashed corner ticks. The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software.



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



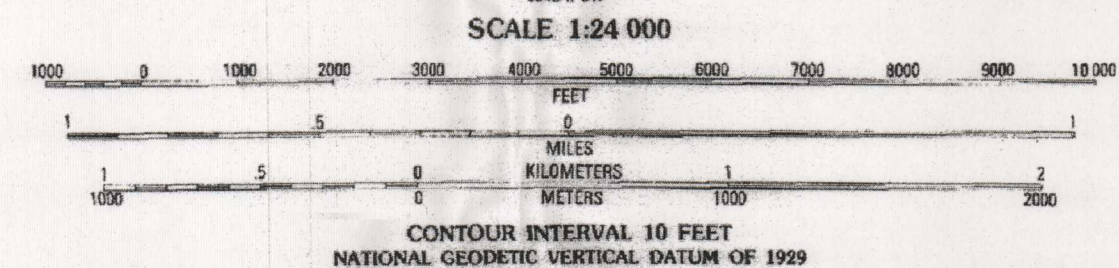
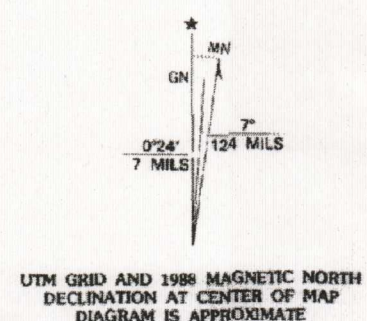
ROAD CLASSIFICATION  
Primary highway, hard surface. Light duty road, hard or improved surface.  
Secondary highway, hard surface. Unimproved road.  
Interstate Route. U.S. Route. State Route.

NEW BRAUNFELS EAST, TEX.  
29098-F1-TF-024  
REVISED 1984  
DMA 6343 I NE-SERIES V882





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 1966. 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



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.  
39098-F2-TF-024  
1988  
DMA 6343 II NW-SERIES V822

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

2998-413



Site Geologic Map  
Newcombe Tennis Ranch  
Subdivision  
160-Acres South of Mission  
Valley Road  
Comal County, Texas

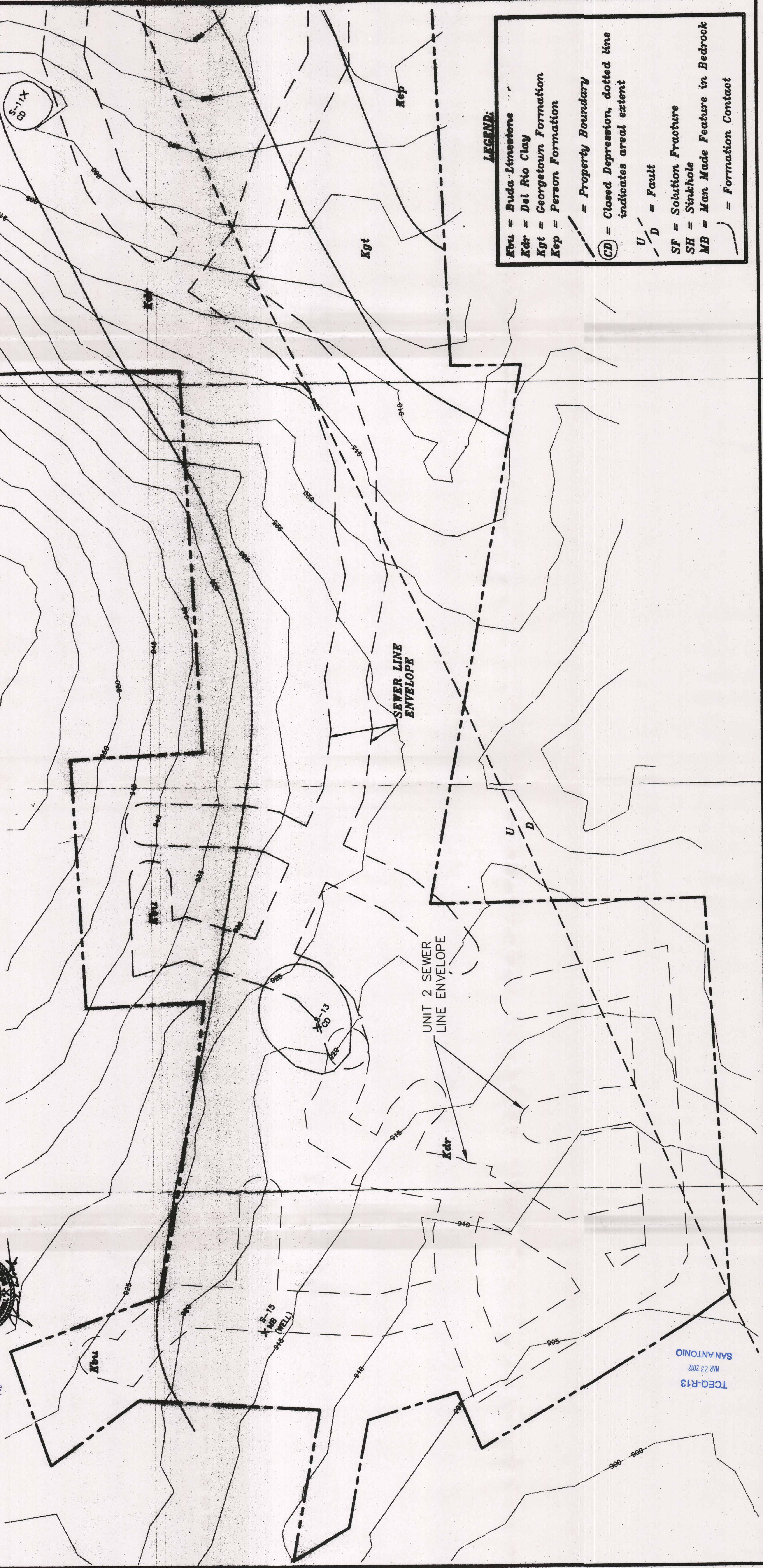
A & A File No. 07SA-4105

ARIAS & ASSOCIATES, INC.

Sheet 1 of 2



Scale: 1" = 100'



LEGEND:

- Kbu = Buda Limestone
- Kdr = Del Rio Clay
- Kgt = Georgetown Formation
- Kep = Person Formation
- - - = Property Boundary
- (CD) = Closed Depression, dotted line indicates areal extent
- U/D = Fault
- SF = Solution Fracture
- SH = Sinkhole
- MB = Man Made Feature in Bedrock
- = Formation Contact



**ATTACHMENT “C”**  
**Project Description**

Newcombe Tennis Ranch Subdivision – Unit 2 is a 31.3 acre development on the north side of FM 1863 approximately 2 miles west of the nearest major intersection at SH 46 (See Location Map). The proposed site consists of 61 residential lots of varying size. The site is currently unimproved land primarily composed of open fields, dense brush and trees. The entire site drains south to an unnamed tributary of Dry Comal Creek. According to the Flood insurance Rate Map No. 48091C0430F there is no existing floodplain located within the property.

This SCS application is for Unit 2 of four planned units. The Unit 2 Sanitary Sewer System will tie into the Unit 1 system previously approved and sized for Unit 2 flows EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007.

The potable distribution and sanitary sewer collection systems on this project will be owned and maintained by New Braunfels Utilities (NBU) upon their acceptance of the constructed facilities. There will be no private utilities on site. The project includes approximately 4,140 linear feet of 8” sanitary sewer gravity main, 1,010 linear feet of 4” sanitary sewer force main, and 1 lift station. The proposed SCS will connect to manhole MH-K\_3. The manhole was constructed as part of the Newcombe Tennis Ranch Subdivision – Unit 1 project (EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007).

Table 1 below has a break out of the sewer lengths by line.

<b>Table 1 – Pipe Lengths Broken Out by Line</b>	
<b>Sanitary Sewer Line</b>	<b>Length (ft)</b>
SSL A	871.28
SSL B	268.00
SSL C	924.95
SSL D	1,513.79
SSL E	222.48
SSL F	283.94
SSL G	56.00
Force Main	1,010.00

**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: NEWCOMBE TENNIS RANCH SUBDIVISION 160 ACRES SOUTH OF MISSION VALLEY ROAD

TYPE OF PROJECT: \_\_\_ WPAP \_\_\_ AST X SCS \_\_\_ UST

LOCATION OF PROJECT: X Recharge Zone \_\_\_ Transition Zone \_\_\_ Contributing Zone within the Transition Zone

PROJECT INFORMATION

1. X Geologic or manmade features are described and evaluated using the attached **GEOLOGIC ASSESSMENT TABLE**.
2. Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups\* (*Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986*). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

Soil Units, Infiltration Characteristics & Thickness			<p>* Soil Group Definitions (Abbreviated)</p> <p>A. Soils having a <u>high infiltration</u> rate when thoroughly wetted.</p> <p>B. Soils having a <u>moderate infiltration</u> rate when thoroughly wetted.</p> <p>C. Soils having a <u>slow infiltration</u> rate when thoroughly wetted.</p> <p>D. Soils having a <u>very slow infiltration</u> rate when thoroughly wetted.</p>
Soil Name	Group*	Thickness (feet)	
Comfort –Rock outcrop complex, 1-8% slopes (CrD)	D	0-1.5	
Krum Clay, 1-3% slopes (KrB)	D	0-2.8	
Medlin-Eckrant association, 1-8% slopes (MEC)	D	0-6.0	
Medlin-Eckrant association, 8 to 30% slopes (MED)	D	0-5.0	
Rumple-Comfort association, 1-8% slopes (RUD)	D	0-2.0	
Purves clay, 1-5% slopes (PuC)	D	0-3.75	

3. X A **STRATIGRAPHIC COLUMN** is attached at the end of this form that shows formations, members, and thicknesses. The outcropping unit should be at the top of the stratigraphic column.
4. X A **NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY** is attached at the end of this form. The description must include a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure, and karst characteristics of the site.
5. X Appropriate **SITE GEOLOGIC MAP(S)** are attached:

The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1" : 400'

Applicant's Site Plan Scale	1" = <u>100'</u>
Site Geologic Map Scale	1" = <u>100'</u>
Site Soils Map Scale (if more than 1 soil type)	1" = <u>1000'</u>

6. ☒ Method of collected positional data:  
☒ Global Positioning System (GPS) technology.  
☐ Other method(s).
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 4 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)  
☐ The wells are not in use and have been properly abandoned.  
☒ The wells are not in use and will be properly abandoned.  
☐ The wells are in use and comply with 16 TAC 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.

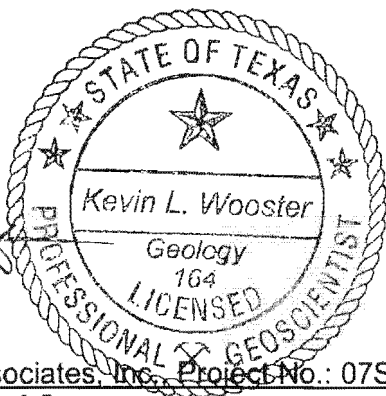
Date(s) Geologic Assessment was performed:

Date(s) July 23, 2007

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.

Kevin L. Wooster, P.G.  
 Print Name of Geologist

Kevin L. Wooster  
 Signature of Geologist



Telephone 210-308-5884

Fax 210-308-8731

December 10, 2007  
 Date

Representing: Arias & Associates, Inc. Project No.: 07SA-4105  
 (Name of Company)

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

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

GEOLOGIC ASSESSMENT TABLE										PROJECT NAME: Newcombe Tennis Ranch Subdivision - 160 Acres South of Mission Valley Road															
LOCATION							FEATURE CHARACTERISTICS								EVALUATION				PHYSICAL SETTING						
1A	1B *			1C*			2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12	
FEATURE ID	LATITUDE			LONGITUDE			FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DI	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)	TOPOGRAPHY		
	Degrees	Minutes	Dec. secs	Degrees	Minutes	Dec. Sec.				X	Y	Z		10						<40	≥40	<1.6	≥1.6		
S-1	29	43	25.6	98	11	39.2	CD	5	Kep	2.5	2.0	0.5					O, F	5	10	X		X		Hillside	
S-2	29	43	24.2	98	11	47.8	MB	30	Kep	water well							F	5	35	X		X		Hillside	
S-3	29	43	14.9	98	11	48.2	SF	20	Kep	150	3.5	2.0	N38E	10			O, F	9	39	X		X		Hillside	
S-4	29	43	19.4	98	11	50.3	MB	30	Kep	10	6	2.0			septic pit		F/C	9	39	X		X		Hillside	
S-5	29	43	13.8	98	11	49.8	C	30	Kep	19	16	12	N35E	10			N	30	70		X	X		Hilltop	
	same cave, different opening						C			4.0	2.0	4.0					N, F								
S-6	29	43	17.4	98	11	54	CD	5	Kgt	10	6.0	0.5					O, F, C	9	14	X		X		Drainage	
S-7	29	43	17.5	98	11	54.7	CD	5	Kgt	8.0	4.0	1.0					O, F, C	9	14	X		X		Draina	
S-8	29	43	17.2	98	11	55.2	CD	5	Kgt	15	15	2.0					O, F, C	9	14	X		X		Drainage	
S-9	29	43	19.6	98	11	54.8	CD	5	Kdr	40	15	1.0					F	5	10	X		X		Hillside	
S-10	29	43	24.08	98	11	55.3	CD	5	Kdr	160	90	5.0					F	5	10	X		X		Hillside	
S-11	29	43	15.1	98	11	59.8	CD	5	Kdr	180	170	8.0					F	5	10	X		X		Hillside	
S-12A	29	43	15.6	98	12	3.4	MB	30	Kbu	water well							F	5	35	X		X		Hilltop	
S-12B	29	43	15.6	98	12	3.4	MB	30	Kbu	abandoned water well							N	10	40		X	X		Hilltop	
S-13	29	42	56.5	98	12	15.8	CD	5	Kdr	230	180	9.0					F, C	5	10	X		X		Hillside	
S-14	29	43	23.4	98	11	51.9	F	20	Kdr/Kep	>5500			N38E	10			F, C	9	39	X		X		Variable	
S-15	29	42	54.1	98	12	23.1	MB	30	Kdr	abandoned water well							N	10	40		X	X		Hillside	
S-16	29	43	27.7	98	11	26.6	MB	30	Kep	existing sewer manhole							F	5	35	X		X		Streambed	

\* DATUM: NAD 83

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

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

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

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.

My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

*Kevin L. Wooster*

Date: December 10, 2007

Sheet 1 of 1



WITHIN SCS ENVELOPE



## FEATURE GPS TABLE

Water Pollution Abatement Plan  
Newcombe Tennis Ranch Subdivision  
160 Acres South of Mission Valley Road  
Comal County, Texas

Feature No.	Latitude			Longitude					
	Deg	Min	Sec	Deg	Min	Sec	Type	Date	Measured By
S-1	29	43	25.6	98	11	39.2	CD	7/23/07	J. Kniffen
S-2	29	43	24.2	98	11	47.8	MB (well)	7/23/07	J. Kniffen
S-3	29	43	14.9	98	11	48.2	SF	7/23/07	J. Martinez
S-4	29	43	19.4	98	11	50.3	MB (pit)	7/23/07	J. Kniffen
S-5	29	43	13.8	98	11	49.8	C	7/23/07	J. Martinez
				same cave, different opening			C	7/23/07	J. Martinez
S-6	29	43	17.4	98	11	54	CD	7/23/07	J. Martinez
S-7	29	43	17.5	98	11	54.7	CD	7/23/07	K. Wooster
S-8	29	43	17.2	98	11	55.2	CD	7/23/07	K. Wooster
S-9	29	43	19.6	98	11	54.8	CD	7/23/07	J. Martinez
S-10	29	43	24.08	98	11	55.3	CD	7/23/07	K. Wooster
S-11	29	43	15.1	98	11	59.8	CD	7/24/07	K. Wooster
S-12A	29	43	15.6	98	12	3.4	MB (Well)	7/24/07	J. Kniffen
S-12B	29	43	15.6	98	12	3.4	MB (Well)	7/24/07	J. Kniffen
S-13	29	42	56.5	98	12	15.8	CD	7/24/07	J. Kniffen
S-14	29	43	23.4	98	11	51.9	F	7/24/07	K. Wooster
S-15	29	42	54.1	98	12	23.1	MB (Well)	12/4/07	K. Wooster
S-16	29	43	27.7	98	11	26.6	MB	5/2/08	K. Wooster

# **SOIL NARRATIVE**

## **Water Pollution Abatement Plan** **Newcombe Tennis Ranch Subdivision** **160 Acres South of Mission Valley Road** **Comal County, Texas**

In accordance with the U.S.D.A. Soil Survey of Comal and Hays Counties, Texas, dated 1984, the natural surface soils have been mapped as within six primary soil groups.

The Comfort – Rock outcrop complex, 1-8% slopes (CrD) soils are mapped to cover the north central and east portions of the property and are classified as extremely stony clay. The CrD soils are very shallow over hard limestone. These soils consist of dark gray clay grading down into brown clay, having a very slow infiltration rate when thoroughly wetted.

The Krum clay, 1-3% slopes (KrB) soils are mapped to cover portions of the northwestern and southwestern portions of the property and are classified as silty clay. The KrB soils are moderately deep over marine clays. These soils consist of clay grading down into silty clay, having a very slow infiltration rate when thoroughly wetted.

The Medlin – Eckrant association, 1-8% slopes (MEC) soils are mapped to cover large portions of the central and southwestern portions of the property and are classified as silty clay. The MEC soils are very shallow over hard limestone. These soils consist of clay grading down into silty clay, having a very slow infiltration rate when thoroughly wetted.

The Medlin – Eckrant association, 8-30% slopes (MED) soils are mapped to cover very small portions of the southwestern project area and are classified as silty clay. The MED soils are very shallow over hard limestone. These soils consist of clay grading down into silty clay, having a very slow infiltration rate when thoroughly wetted.

The Rumble-Comfort association, 1-8% slopes (RUD) soils are mapped in the northwest portion of the Site north of Mission Valley Road and are classified as very gravelly clay and very stony clay. These soils consist of gravelly clay grading down into stony clay, having a very slow infiltration rate when thoroughly wetted.

The Purves clay, 1-5% slopes (PuC) soils are mapped to cover a small portion of the far southwestern edge of the property and are classified as silty clay. The PuC soils are moderately deep over marine clays. These soils consist of clay grading down into silty clay, having a very slow infiltration rate when thoroughly wetted.




Web Soil Survey 2.0  
National Cooperative Soil Survey

7/18/2007  
Page 1 of 3

## MAP LEGEND


### Area of Interest (AOI)


 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features

 Blowout

 Borrow Pit


 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh


 Mine or Quarry

 Miscellaneous Water

 Perennial Water


 Rock Outcrop

 Saline Spot


 Sandy Spot


 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot

 Spoil Area

 Stony Spot


 Very Stony Spot


 Wet Spot

 Other

### Special Line Features


 Gully

 Short Steep Slope

 Other

### Political Features

#### Municipalities

 Cities

 Urban Areas

#### Water Features

 Oceans

 Streams and Canals

#### Transportation

 Rails


#### Roads

 Interstate Highways

 US Routes

 State Highways

 Local Roads

 Other Roads

## MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 14N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas

Survey Area Data: Version 5, Jan 3, 2007

Date(s) aerial images were photographed: 1995

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Comal and Hays Counties, Texas (TX604)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CrD	Comfort-Rock outcrop complex, 1 to 8 percent slopes	231.5	28.1%
DeB	Denton silty clay, 1 to 3 percent slopes	3.4	0.4%
DeC3	Denton silty clay, 1 to 5 percent slopes, eroded	13.6	1.7%
KrB	Krum clay, 1 to 3 percent slopes	116.1	14.1%
KrC	Krum clay, 3 to 5 percent slopes	25.8	3.1%
MEC	Medlin-Eckrant association, 1 to 8 percent slopes	156.1	19.0%
MED	Medlin-Eckrant association, 8 to 30 percent slopes	92.7	11.3%
PuC	Purves clay, 1 to 5 percent slopes	37.0	4.5%
RaD	Real gravelly loam, 1 to 8 percent slopes	5.3	0.6%
RUD	Rumple-Comfort association, 1 to 8 percent slopes	142.1	17.2%
Totals for Area of Interest (AOI)		823.7	100.0%



Water Pollution Abatement Plan  
Newcombe Tennis Ranch Subdivision  
160 Acres South of Mission Valley Road  
Comal County, Texas

STRATIGRAPHIC COLUMN										
Hydrogeologic subdivision		Group formation or member		Hydro-logic fuction	Thick-ness (feet)	Lithology	Cavern develop-ment	Porosity / permeability type		
Quaternary		Terrace Deposits		CU	0-30	Gravel and sand	None	High porosity / high permeability		
Upper Cretaceous	Upper Confining Unit	Austin Group		CU	130-150	White to gray limestone	None	Low porosity / low permeability		
		Eagle Ford Group		CU	30-50	Buff, light gray, dense mudstone	None	Low porosity / low permeability		
		Buda Limestone		CU	40-50	Brown flaggy shale and argillaceous limestone	None	Low porosity / low permeability		
		Del Rio Clay		CU	40-50	Blue-green to yellow-brown clay	None	None / primary upper confining unit		
Lower Cretaceous	I	Edwards Group	Person F.M.	Georgetown Formation	CU	10	Reddish-brown, gray to light tan marly limestone	None	Low porosity / low permeability	
	II			Cyclic & marine members undivided	AQ	80-100	Mudstone to packstone; miliolid grainstone; chert	Many sub-surface	Laterally extensive; water yielding	
	III			Leached & col-lapsed members	AQ	80-100	Crystalline limestone; mudstone to grainstone; chert collapsed breccia	Extensive lateral devel-opment; large rooms	Majority not fabric / one of the most permeable	
	IV			Regional dense member	CU	20-24	Dense, argillaceous mudstone	Very few; only vertical fracture enlargement	Not fabric / low permeability; vertical barrier	
	V		Kainer F.M.	Grainstone member	AQ	50-60	Miliolid grainstone; mudstone to wackestone; chert	Few	Not fabric / recrystal-lization reduces permeability	
	VI			Kirschberg evaporite member	AQ	50-60	Highly altered crystalline limestone; chalky mudstone; chert	Probably extensive cave devel.	Majority fabric / one of the most permeable	
	VII			Dolomitic member	AQ	110-130	Mudstone to grainstone; crystalline limestone; chert	Caves rela-ted to struc-ture or bed-ding 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	Large lateral caves at surface	Fabric; stratigraph-ically controlled / large conduit flow at surface; no permea-bility 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	Some sur-face cave development	Some water produc-tion at evaporite beds / relatively impermeable	

Reference: U.S.G.S. Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop,

Comal County, Texas; Water-Resources Investigations Report 94-4117

Note: CU = Confining Unit; AQ = Aquifer

— — — Indicates Upper Most Surface Bedrock Formation



# **GEOLOGY NARRATIVE**

## **Water Pollution Abatement Plan** **Newcombe Tennis Ranch Subdivision** **160 Acres South of Mission Valley Road** **Comal County, Texas**

The outcropping geologic formations mapped at the Site consist of the Cretaceous Georgetown Formation and Person Formation of the Edwards Group. These formations form the southeastern half of the central portion and eastern portion of the property. Buda Limestone caps several hilltops on the northern and western portions of the Site. The Del Rio clay outcrops over the majority of the western portion and north central portion of the Site adjacent to Mission Valley Road. The Georgetown formation appears on the central portion of the Site, and consists of a gray to reddish brown marly limestone.

The Person is observed to be the predominant outcropping recharge unit at the Site, and is composed of grainstone, crystalline limestone, mudstone and chert. The approximate locations of all features are indicated on the accompanying Site Geologic Map.

No structural features such as faults or fractures were noted in the reviewed literature sources, with the exception of one main fault crossing the central portion of the Site (Feature 14). This normal fault juxtaposes Del Rio clay to the northwest against Del Rio, Georgetown, and Person limestone to the southeast. Indications of this feature were observed on the Site through changes in lithology and vegetation. The dominant structural trend of this feature follows the general NE-SW regional trend of structure and faulting with the Balcones Fault Zone. Since faults with Del Rio Clay on the upthrown side have clay infilling along the fault, the fault scour zone of low permeability clay materials forms a barrier to downward flow, resulting in low probability of rapid infiltration. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, this feature has a low infiltration rate.

One solution fracture (Feature 3) was observed in the central portion of the Site within Person limestone. The trend of this feature elongated and aligned with the regional structural trend. This feature's point value was adjusted upward with 10 points added for dominant trend. The entire length of the feature was uniformly infilled with fine grained sediment and had no openings to the subsurface. In our opinion, the overall sensitivity of the feature is low, with a low probability of rapid infiltration based on the fact that the feature is uniformly clay lined along its entire length and only has background infiltration occurring. Therefore, even with addition of 10 points for dominant trend, the infiltration point value of this feature should be adjusted downward from a 15 to a 9, to keep the feature's overall sensitivity low, due to the dominance of infilling. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the feature has a low infiltration rate.

Several karst type features were noted. One cave (Feature 5) was observed in the central portion of the Site within Person limestone. The trend of this feature elongated and aligned with the regional structural trend. The feature was open and extended to the subsurface through two openings separated by several feet. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the feature has a moderate infiltration rate with its hilltop location but is considered sensitive.

One man-made feature (Feature 4) was observed in the central portion of the Site within Person limestone. This feature was infilled at its floor with uniform fine-grained organic materials and contained some man-made debris, but was open to a depth of two feet. This feature bore some resemblance to a natural sinkhole, but, upon further investigation, appears to be a man-made excavation used historically as a septic pit. The floor of the feature, once exposed of debris and organic soil, was comprised of competent limestone with no solution features or openings at its floor. Its sidewalls appeared to be vertical and opposing sides were parallel, with squared corners, further suggesting an excavation. No trend was observed with this feature. This feature appears to have served only as a latrine, and no source of water was available, such that only small volumes of liquids were introduced. The feature had only organics and organic soils such that there is no evidence of sediments or soil from surrounding areas being transported into the feature. It does not appear capable of rapidly transmitting water into the subsurface relative to the surrounding formational materials. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the feature has a low infiltration rate.

Features 1, 6, 7, 8, and 9 are shallow closed depressions. Feature 1 is located on the base of a hillside adjacent to a drainage. Features 6, 7, 8, and 9 are located within drainages. These features are soil-floored and appear to be scour pools. No trends were observed with these features. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the features have a low infiltration rate.

Features 10, 11, and 13 are closed depressions that are dammed tanks within Del Rio Clay and have soil floors. No trends were observed with these features. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the features have a low infiltration rate.

Features S-2, S-12A, S-12B, and S-15 are man-made features, with S-2 and S-12A both existing water wells. Features S-12B and S-15 are both abandoned water wells with open casings that have above-ground stickups. No trends were observed with these features. Since S-12B and S-15 are open conduits without plugs or caps, they are considered sensitive until capped or plugged. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, the two existing water wells (S-2 and S-12A) have a low infiltration rate. All four wells are to be plugged.

Feature S-16 is an existing sanitary sewer manhole along Blieders Creek, to the northeast of the site. It does not appear capable of rapidly transmitting water into the subsurface relative to the surrounding formational materials. Based on the criteria shown in the Rapid Infiltration Probability flowchart of TCEQ-0585, this feature has a low infiltration rate. No other features were identified along the sewer alignment.



## REFERENCES

- Barnes V.L. 1983. Geologic Atlas of Texas, San Antonio, Sheet, Bureau of Economic Geology, The University of Texas at Austin, Texas.
- Collins, E.W., 1993. Geology of New Braunfels West Quadrangle, Comal County, Texas, Open File Map 2998-413. Bureau of Economic Geology, The University of Texas at Austin, Texas.
- Small, T.A. and Hanson, J.A. 1994. Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County, Texas. U.S. Geol. Survey, Water – Resources Investigations Report 94-4117. 8 pp., Plate, Fig., Table.
- Texas Commission on Environmental Quality, (TCEQ), Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge Zone, TCEQ-0585-Instructions (Rev. 10-01-04).
- United States Department of Agriculture. Soil Survey of Comal and Hays Counties, Texas. Web Soil Survey 1.1, Natural Resource Conservation Service. <<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>> July, 2007.
- United States Department of Agriculture. Urban Hydrology for Small Watersheds, Technical Release No. 55., Appendix A. Natural Resource Conservation Service, <<http://www.info.usda.gov/CED/ftp/CED/tr55.pdf> > July, 1986.
- United States Geologic Survey, 1988. New Braunfels West Quadrangle. USGS, Denver, Colorado.



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**Organized Sewage Collection System (SCS) Application**

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

REGULATED ENTITY NAME: Newcombe Tennis Ranch Subdivision - Unit 2

- X **ATTACHMENT A – SCS Engineering Design Report.** This Engineering Design Report is provided to fulfill the requirements of 30 TAC Chapter 217, including 217.10 of Subchapter A, §§217.51 – 217.70 of Subchapter C, and Subchapter D as applicable, and is required to be submitted with this SCS Application Form.

**CUSTOMER INFORMATION** (if different than customer information provided on core data form)

1. The entity and contact person responsible for providing the required engineering **certification** of testing for this sewage collection system upon completion (including private service connections) and every five years thereafter to the appropriate TCEQ region office pursuant to 30 TAC §213.5(c) is:

Contact Person: Ian Taylor, P.E. (5 years) / James Ingalls, P.E. (at Completion only)  
Entity: New Braunfels Utilities (5 years) / Moeller & Associates (at completion only)  
Mailing Address: 325 Mission Valley Road  
City, State: New Braunfels, TX. Zip: 78132-3629  
Telephone: (830)625-5911 FAX: (830)625-2004

The appropriate regional office must be informed of any changes in this information within 30 days of the change.

2. The engineer responsible for the **design** of this sewage collection system is:

Contact Person: James Ingalls, P.E.  
Texas Licensed Professional Engineer's Number: 107416  
Entity: Moeller & Associates  
Mailing Address: 1040 N. Walnut Ave., Ste B  
City, State: New Braunfels, Texas Zip: 78130-5317  
Telephone: (830) 358-7127 FAX: (830) 515-5611

**PROJECT DESCRIPTION**

3. Anticipated type of development to be served (estimated future population to be served, plus adequate allowance for institutional and commercial flows):

X Residential: # of single-family lots: 61  
    Multi-family residential units:             
    Commercial  
    Industrial  
    Off-site system (not associated with any development)  
    Other:                                   

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

<u>100</u> % Domestic	<u>14,945</u> gallons/day
<u>      </u> % Industrial	<u>      </u> gallons/day
<u>      </u> % Commingled	<u>      </u> gallons/day



\_\_\_\_\_ Total \_\_\_\_\_ gallons/day

5. Existing and anticipated infiltration/inflow is 22,830 gallons/day. This will be addressed by the installation of watertight resilient connectors at the pipe penetrations to the manholes. In addition, the newly installed pipe shall be tested via low pressure air test or exfiltration test for leakage per TCEQ 317.2.(4). Also, the newly installed pipe capacity exceeds the capacity required for the development (available capacity of 568,800 GPD versus required capacity of 81,578 GPD for peak wet weather flow).
6. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.
- ☒ The WPAP application for this development was approved by letter dated 12/28/07.  
A copy of the approval letter is attached at the end of this application.
- ☐ The WPAP application for this development was submitted to the TCEQ on \_\_\_\_\_, but has not been approved.
- ☐ A WPAP application is required for an associated project, but it has not been submitted.
- ☐ There is no associated project requiring a WPAP application.

7. Pipe description:

Pipe Diameter (Inches)	Linear Feet <sup>1</sup>	Pipe Material <sup>2</sup>	Specifications <sup>3</sup>
4"	1,010	PVC C-900 DR 25	AWWA C-900, ASTM D 3139
8"	126	PVC C-900 DR18	AWWA C-900, ASTM D 3139
8"	4,014	PVC SDR 26	ASTM D 3034, ASTM D 3212
Total Linear Feet	5,150		

1) Include stub-outs. Do not include private service laterals.  
2) If PVC, state SDR value.  
3) ASTM / ANSI / AWWA specification and class numbers should be included.

8. The following Wastewater Treatment Plant (WWTP) Gruene WWTP (name) will receive project wastewater for treatment and disposal. This WWTP is an **EXISTING/PROPOSED** (circle one) facility.
9. All components of this sewage collection system will comply with:
- ☒ New Braunfels Utilities standard specifications.
- ☐ Other. Specifications are provided directly behind this page.
10. ☐ No force main(s) and/or lift station(s) are associated with this sewage collection system.
- ☒ A force main(s) and/or lift station(s) is associated with this sewage collection system and the Lift Station/Force Main System application is included with this application.

**ALIGNMENT**

11. ☒ There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.
12. ☒ N/A Joint Deflection - The maximum allowable joint deflection is the lesser of the following three alternatives:  
☐ equal to 5°; or  
☐ 80% of the manufacturer's recommended maximum deflection; or



— 80% of the appropriate ASTM, AWWA, ANSI or nationally-established standard for joint deflection.

13. — There are no deviations from straight alignment in this sewage collection system without manholes.
- X **ATTACHMENT B - Justification and Calculations for Deviation in Straight Alignment Without Manholes.** Justification for deviations from straight alignment in this sewage collection system without manholes is provided in **ATTACHMENT B** at the end of this form.
- For curved sewer lines, all curved sewer line notes (TCEQ-0596) are included on the construction plans for the wastewater collection system.

## MANHOLES AND CLEANOUTS

14. Manholes or clean-outs exist at the end of each sewer line(s). These locations are listed below:

Line	Shown on Sheet	Station	Manhole or Clean-out?
SSL A	5 Of 20	18+71.28	MANHOLE
SSL B	6 Of 20	19+24.95	MANHOLE
SSL C	7 Of 20	12+68.00	MANHOLE
SSL D	9 Of 20	25+13.79	MANHOLE
SSL E	10 Of 20	12+22.48	MANHOLE
SSL F	11 Of 20	12+83.94	MANHOLE

15. X Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.
16. X The maximum spacing between manholes on this project for each pipe diameter is no greater than:

Pipe Diameter (inches)	Max. Manhole Spacing (feet)
6 - 15	500
16 - 30	800
36 - 48	1000
≥54	2000

- N/A **ATTACHMENT C – Justification for Variance from Maximum Manhole Spacing.** The maximum spacing between manholes on this project (for each pipe diameter used) is greater than listed in the table above. Justification for any variance from the maximum spacing provided as **ATTACHMENT C** at the end of the form must include a letter from the entity which will operate and maintain the system stating that it has the capability to maintain lines with manhole spacing greater than the allowed spacing.

17. — All manholes will be monolithic, cast-in-place concrete.
- X The owner/developer of this project is requesting the use of pre-cast manholes. The manufacturer's specifications and construction drawing, showing the method of sealing the joints, are attached.



**Items 18 through 23 must be included on the Site Plan.**

18. The Site Plan must have a minimum scale of 1" = 400'.  
Site Plan Scale: 1" = 100 '.
19. The Site Plan must include the sewage collection system general layout, including manholes with station numbers, and sewer pipe stubouts (if any). Site plan must be overlain by topographic contour lines, using a contour interval of not greater than ten feet and showing the area within both the five-year floodplain and the 100-year floodplain of any drainage way.
20. Lateral stub-outs:
- X The location of all lateral stub-outs are shown and labeled.  
 \_\_\_ No lateral stub-outs will be installed during the construction of this sewer collection system.
21. Location of existing and proposed water lines:
- X The entire water distribution system for this project is shown and labeled.  
 \_\_\_ If not shown on the Site Plan, a Utility Plan is provided showing the entire water and sewer systems.  
 \_\_\_ There will be no water lines associated with this project.
22. 100-year floodplain:
- X After construction is complete, no part of this project will be in or cross a 100-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above of sewer lines.)  
 \_\_\_ After construction is complete, all sections located within the 100-year floodplain will have water-tight manholes. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Line	Sheet	Station		Station
	of		to	
	of		to	
	of		to	
	of		to	

23. 5-year floodplain:
- X After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or man-made. (Do not include streets or concrete-lined channels constructed above sewer lines.)  
 \_\_\_ After construction is complete, all sections located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Line	Sheet	Station		Station
------	-------	---------	--	---------



	of		to	
	of		to	
	of		to	
	of		to	

Items 24 through 31 must be included on the Plan and Profile sheets.

24. ☒ All existing or proposed water line crossings and any parallel water lines within 9 feet of sewer lines are listed in the table below. These lines must have the type of pressure rated pipe to be installed shown on the plan and profile sheets. Any request for a variance from the required pressure rated piping at crossings must include a variance approval from 30 TAC Chapter 290.
- ☐ There will be no water line crossings.
- ☐ There will be no water lines within 9 feet of proposed sewer lines.

Line	Station or Closest Point	Crossing or Parallel	Horizontal Separation Distance	Vertical Separation Distance
SSL A	10+28.93	CROSSING		2.9'
SSL A	14+87.45	CROSSING		6.4'
SSL B	10+15.25	CROSSING		4.7'
SSL B	15+02.86	CROSSING		5.2'
SSL D	10+36.93	CROSSING		3.0'
SSL E	10+11.38	CROSSING		4.7'
SSL F	10+11.25	CROSSING		7.6'
SSL G	10+11.25	CROSSING		5.3'

25. Vented Manholes:

- ☒ **No part** of this sewer line is within the 100-year floodplain and vented manholes are not required by 30 TAC Chapter 217.
- ☐ **A portion** of this sewer line is within the 100-year floodplain and vented manholes will be provided at less than 1500 foot intervals. These water-tight manholes are listed in the table below and labeled on the appropriate profile sheets.
- ☐ **A portion** of this sewer line is within the 100-year floodplain and an alternative means of venting shall be provided at less than 1500 feet intervals. A description of the alternative means is described on the following page.
- ☐ **A portion** of this sewer line is within the 100-year floodplain; however, there is no interval longer than 1500 feet located in the 100-year floodplain. No vented manholes will be used.

Line	Manhole	Station	Sheet
------	---------	---------	-------



			of
			of
			of
			of
			of
			of

26. Drop manholes:

- ☒ There are no drop manholes associated with this project.  
☐ Sewer lines which enter new or existing manholes or "manhole structures" higher than 24 inches above the manhole invert are listed in the table below and labeled on the appropriate profile sheets. These lines meet the requirements of 30 TAC §217.55(I)(2)(H).

Line	Manhole	Station	Sheet
			of
			of
			of
			of
			of
			of

27. Sewer line stub-outs (For proposed extensions):

- ☐ The placement and markings of all sewer line stub-outs are shown and labeled.  
☒ No sewer line stub-outs are to be installed during the construction of this sewage collection system.

28. Lateral stub-outs (For proposed private service connections):

- ☒ The placement and markings of all lateral stub-outs are shown and labeled.  
☐ No lateral stub-outs are to be installed during the construction of this sewage collection system.

29. Minimum flow velocity (From APPENDIX A)

- ☒ Assuming pipes are flowing full, all slopes are designed to produce flows equal to or greater than 2.0 feet per second for this system/line.

30. Maximum flow velocity/slopes (From APPENDIX A)

- ☒ Assuming pipes are flowing full, all slopes are designed to produce maximum flows of less than or equal to 10 feet per second for this system/line.



**ATTACHMENT D – Calculations for Slopes for Flows Greater Than 10.0 Feet Per Second.** Assuming pipes are flowing full, some slopes produce flows which are greater than 10 feet per second. These locations are listed in the table below. Calculations are provided in **ATTACHMENT D** at the end of this form.

Line	Profile Sheet	Station		Station	FPS	% Slope	Erosion/Shock Protection
	of		to				
	of		to				
	of		to				
	of		to				

31. Assuming pipes are flowing full, where flows are  $\geq 10$  feet per second, the provisions noted below have been made to protect against pipe displacement by erosion and/or shock under 30 TAC §217.53(l)(2)(B).

N/A Concrete encasement shown on appropriate Plan and Profile sheets for the locations listed in the table above.

N/A Steel-reinforced, anchored concrete baffles/retards placed every 50 feet shown on appropriate Plan and Profile sheets for the locations listed in the table above.

## ADMINISTRATIVE INFORMATION

32. X The **final plans and technical specifications** are submitted for TCEQ review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.
33. Standard details are shown on the detail sheets, which are dated, signed, and sealed by the Texas Licensed Professional Engineer, as listed in the table below:

Standard Details	Shown on Sheet
Lateral stub-out marking <b>[REQUIRED]</b>	13 of 20
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) <b>[REQUIRED]</b>	13 of 20
Alternate method of joining lateral to existing SCS line for potential future connections <b>[REQUIRED]</b>	13 of 20
Typical trench cross-sections <b>[REQUIRED]</b>	14 of 20
Bolted manholes <b>[REQUIRED]</b>	13 of 20
Sewer Service lateral standard details <b>[REQUIRED]</b>	13 of 20
Clean-out at end of line <b>[REQUIRED, if used]</b>	N/A



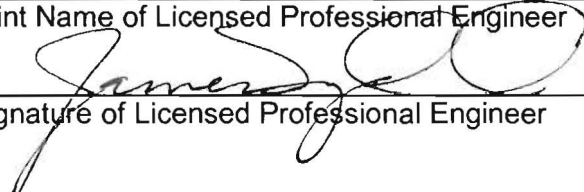
Baffles or concrete encasement for shock/erosion protection [ <b>REQUIRED, if flow velocity of any section of pipe &gt;10 fps</b> ]	N/A
Detail showing Wastewater Line/Water Line Crossing [ <b>REQUIRED, if crossings are proposed</b> ]	5,6,8-12 of 20
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) [ <b>REQUIRED, if Flexible Pipe is used</b> ]	13 of 20
Drop manholes [ <b>REQUIRED, if a pipe entering a manhole is more than 24 inches above manhole invert</b> ]	N/A

34.   X   All organized sewage collection system general construction notes (TCEQ-0596) are included on the construction plans for this sewage collection system.
35.   X   All proposed sewer lines will be sufficiently surveyed/staked to allow an assessment prior to TCEQ executive director approval. If the alignments of the proposed sewer lines are not walkable on that date, the application will be deemed incomplete and returned.
36.   X   Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
37.   X   Any modification of this SCS application will require TCEQ 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 **ORGANIZED SEWAGE COLLECTION SYSTEM APPLICATION** is hereby submitted for TCEQ review and executive director approval. The system was designed in accordance with the requirements of 30 TAC §213.5(c) and 30 TAC §217 and prepared by:

Place engineer's seal here:

James Ingalls, P.E.  
 \_\_\_\_\_  
 Print Name of Licensed Professional Engineer

 \_\_\_\_\_  
 Signature of Licensed Professional Engineer

3/20/12  
 \_\_\_\_\_  
 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.



**APPENDIX A**  
**Flow Velocity Table**

**Flow Velocity (Flowing Full)**

All gravity sewer lines on the Edwards Aquifer Recharge Zone shall be designed and constructed with hydraulic slopes sufficient to give a velocity when **flowing full** of not less than 2.0 feet per second, and not greater than 10 feet per second. The grades shown in the following table are based on Manning's formula and an n factor of 0.013 and shall be the minimum and maximum acceptable slopes unless provisions are made otherwise.

Pipe Diameter (Inches)	% Slope required for minimum flow velocity of 2.0 fps	% Slope which produces flow velocity of 10.0 fps
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

\*For lines larger than 39 inches in diameter, the slope may be determined by Manning's formula (as shown below) to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.

$$v = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

*Where:*

$v$  = velocity (ft/sec)

$n$  = Manning's roughness coefficient (0.013)

$R_h$  = hydraulic radius (ft)

$S$  = slope (ft/ft)



6  
CDeed Recordation Affidavit  
Edwards Aquifer Protection Plan

THE STATE OF TEXAS §

County of Comal §BEFORE ME, the undersigned authority, on this day personally appeared Newcombe Development, LLC.; Jeremy Fieldsend, Partner who, being duly sworn by me, deposes and says:

- (1) That my name is Jeremy Fieldsend and that I own the real property described below.
- (2) That said real property is subject to an EDWARDS AQUIFER PROTECTION PLAN which was required under the 30 Texas Administrative Code (TAC) Chapter 213.
- (3) That the EDWARDS AQUIFER PROTECTION PLAN for said real property was approved by the Texas Commission on Environmental Quality (TCEQ) on December 28, 2007.

A copy of the letter of approval from the TCEQ is attached to this affidavit as Exhibit A and is incorporated herein by reference.

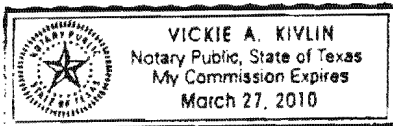
- (4) The said real property is located in Comal County, Texas, and the legal description of the property is as follows:

158.84 acres of land out of the Jacob Heidrich Survey, No. 284, J. H. Hartman Survey No. 358, and the J.G. Brehmer Survey No. 524, Comal County Texas.

Newcombe Development, LLC.; Jeremy Fieldsend, Partner  
LANDOWNER-AFFIANTSWORN AND SUBSCRIBED TO before me, on this 26-day of Feb., 2008.  
NOTARY PUBLICTHE STATE OF Texas §County of Comal §BEFORE ME, the undersigned authority, on this day personally appeared Jeremy Fieldsend 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 26 day of Feb., 2008.

NOTARY PUBLIC

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: March 27, 2010



Buddy Garcia, *Chairman*  
Larry R. Soward, *Commissioner*  
Bryan W. Shaw, Ph.D., *Commissioner*  
Glenn Shankle, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

December 28, 2007

Mr. Jeremy Fieldsend  
Newcombe Development L.L.C.  
325 Mission Valley Road  
New Braunfels, Texas 78132

Re: Edwards Aquifer, Comal County  
NAME OF PROJECT: Newcombe Tenn's Ranch Residential Subdivision; Located on the east side of Mission Valley Road approximately 0.5 miles southwest of 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. 1248.01; Investigation No. 598529; Regulated Entity No. RN102747359

Dear Mr. Fieldsend:

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 Carter & Burgess, Inc. on behalf of Newcombe Development L.L.C. on October 18, 2007. Final review of the WPAP was completed after additional material was received on December 14, 2007, and December 21, 2007. As presented to the TCEQ, the Temporary 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

This application was submitted as two sites (158.84 acres and 47.0 acres) separated by an existing public road (Mission Valley Road). Under the current rule interpretation, each site requires its own WPAP, and the 47.0 acre tract was withdrawn from review by a letter dated December 14, 2007, from the project engineer. A separate application will be submitted for the 47.0 acre site.

### PROJECT DESCRIPTION

The proposed single-family residential project will have an area of approximately 158.84 acres. It will include 177 single-family residences, 16 tennis courts, a swimming pool, two bath houses, a clubhouse, 15 casitas (visitors' quarters, single bedroom buildings with kitchen) and related roads, driveways, and

---

REPLY TO: REGION 13 • 14250 JULESSON RD. • SAN ANTONIO, TEXAS 78233-4480 • 210-490-3096 • FAX 210-545-1329

P.O. Box 13087 • Austin, Texas 78711-0987 • 512-239-1000 • Internet address: [www.tceq.state.tx.us](http://www.tceq.state.tx.us)



sidewalks. The impervious cover will be 31.30 acres (19.7%). Project wastewater will be disposed of by conveyance to the existing Gruene Road Wastewater Treatment Plant owned by the New Braunfels Utilities.

As understood, a casita is a one bedroom guest building with kitchen facilities. The casitas are to be used for special guests (touring tennis professionals, celebrities, etc.) for long term (not daily) accommodations while they train, coach, etc. at the nearby John Newcombe Tennis Ranch Club and Conference Center. There are no plans for commercial use of the casitas (rent, sale, or lease). The applicant will own and maintain the casitas.

#### 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, portions of the site are located on the Edwards Person Formation, the Del Rio Clay, and the Buda Limestone. As reported, there are 16 geologic and manmade features located on the project site. Features S-4 (sinkhole) and S-5 (cave) were assessed as sensitive. The San Antonio Regional Office site assessment conducted on December 3, 2007, revealed that the features were as described, with the exception of features S-4 and S-15 (well). Based on the feature's rectangular shape, and uniform depth, the project geologist reclassified Feature S-4 from a sinkhole to a manmade excavation, and re-assessed the feature as not sensitive. Feature S-15 was assessed as a sensitive feature because the well was not properly plugged or capped. A setback consistent with the criteria of RG-348, Section 5 is proposed for Feature S-4.

During the site assessment, minor vegetation clearing was observed. According to the project engineer, a "Bobcat" with a forestry cutter attachment was used for a preliminary survey of proposed roads to identify trees to be protected. The paths were approximately 5 feet wide. No soil disturbance was observed and the shredded material did not obscure the ground.

#### SPECIAL CONDITIONS

- I. The holder of the approved Edwards Aquifer WPAP must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the application.
- II. Intentional discharges of sediment laden 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.
- III. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.
- IV. Since this project will not have more than 20% impervious cover, an exemption from permanent BMPs is approved. If the percent impervious cover ever increases above 20% or the land use changes, the exemption for the whole site as described in the property boundaries required by §213.4(g), may no longer apply and the property owner must notify the appropriate regional office of these changes.



- V. If any of the casitas are rented, sold or leased, or in any way converted to commercial use for any period of time, the exemption listed in Special Condition IV for the whole site as described in the property boundaries required by §213.4(g), may no longer apply and the property owner must notify the appropriate regional office of these changes.
- VI. Feature S-15, and the other three wells shall be properly plugged.

#### STANDARD CONDITIONS

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

#### Prior to Commencement of Construction:

- 2. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.
- 3. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
- 4. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
- 5. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
- 6. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
- 7. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole



must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

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. There are four wells reported to be located on this project 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



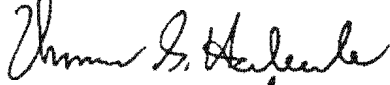
Mr. Jeremy Fieldsend  
December 28, 2007  
Page 5

another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

16. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
17. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
18. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact John Mauser of the Edwards Aquifer Protection Program of the San Antonio Regional Office at 210/403-4024.

Sincerely,

  
Glenn Shankle  
Executive Director  
Texas Commission on Environmental Quality

GS/JKM/eg

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

cc: Mr. Alex Zertuche, P.E., Carter & Burgess, Inc.  
Mr. Mike Etelamaki, P.E., City of New Braunfels  
Mr. Tom Hornseth, P.E., Comal County  
Ms. Velma Danielson, Edwards Aquifer Authority  
TCEQ Central Records, Building F, MC 212

Filed and Recorded  
Official Public Records  
Joy Streater, County Clerk  
Comal County, Texas  
02/26/2008 11:11:46 AM  
CASHONE  
200806007743







**ATTACHMENT “B”**

**Justification and Calculations for Deviation in Straight Alignment Without Manholes**

The proposed system includes 1,010 linear feet of force main. Due to the pressurized nature of a force main manholes will not be used for deviation in straight alignment rather mechanical joint ductile iron fittings will be used.



**Lift Station/Force Main System Application**  
for Regulated Activities  
On the Edwards Aquifer Recharge Zone  
and Relating to 30 TAC §213.5(c)(3)(B)and(c), Effective June 1, 1999

REGULATED ENTITY NAME: Newcombe Tennis Ranch Subdivision - Unit 2

**CUSTOMER INFORMATION** (if different than customer information provided on core data form)

1. The person(s) responsible for providing the engineering **certification** to the TCEQ pursuant to 30 TAC §213.5(f)(2)(C) during construction and 30 TAC §213.5 (c)(3)(D) upon completion of construction is:

Contact Person: Ian Taylor, P.E. (5 years) / James Ingalls, P.E. (at Completion only)  
Entity: New Braunfels Utilities (5 years) / Moeller & Associates (at completion only)  
Mailing Address: PO Box 310289 / 1040 N. Walnut Ave  
City, State: New Braunfels, Texas Zip: 78131-0289/78132-3629  
Telephone: (830) 629-8400 / (830) 358-7127 Fax(830) 629-8467 / (830) 515-5611

2. The engineer responsible for the **design** of this lift station and force main:

Contact Person: James Ingalls, P.E.  
Entity: Moeller & Associates  
Mailing Address: 1040 N. Walnut Ave., Ste B  
City, State: New Braunfels, Texas Zip: 78130-5317  
Telephone: (830) 358-7127 FAX: (830) 515-5611

Texas Licensed Professional Engineer's Serial Number: 107416

**PROJECT DESCRIPTION**

3. This project is for the construction or replacement of:  
☐ Lift Station only.  
☐ Lift Station and Force Main system.  
☒ Lift Station, Force Main, and Gravity system.
4. The following **existing**/proposed (circle one) wastewater treatment plant (WWTP) Gruene WWTP (name) will receive project wastewater for treatment and disposal.
5. All components of this lift station/force main system will comply with:  
☒ New Braunfels Utilities (NBU) standard specifications.  
☐ Other. Specifications are provided directly behind this page.

**SITE PLAN**

**Items 6 through 13 must be included on the Site Plan.**

6. The Site Plan must have a minimum scale of 1" = 400'.  
Site Plan Scale: 1" = 100 '.
7. ☒ Lift station/force main system layout meets all requirements of 30 TAC Chapter 217.



8. Geologic or Manmade Features:

- ☒ No geologic or manmade features were identified in the Geologic Assessment.
- ☐ All geologic or manmade features identified in the Geologic Assessment (caves, solution openings, sinkholes, fractures, joints, porous zones, etc.) which exist at the site of the proposed lift station and along the path(s) or within **50 feet of each side** of a proposed force main line are shown on the Site Plan and are listed in the table below. Designs used to protect the integrity of the sewer line crossing each feature are described and labeled on the attached page. A detailed design drawing for each feature is shown on Plan Sheet \_\_\_\_ of \_\_\_\_.
- ☐ No Geologic Assessment is required for this project.

Line	Station		Station	Type of Feature
		to		
		to		

9. ☒ Existing topographic contours are shown and labeled. The contour interval is \_\_\_\_ feet. (Contour interval must not be greater than 5 feet).
10. ☐ Finished topographic contours are shown and labeled. The contour interval is \_\_\_\_ feet. (Contour interval must not be greater than 5 feet).
- ☒ Finished topographic contours will not differ from the existing topographic configuration and are not shown.

11. 100-year floodplain boundaries

- ☐ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
- ☒ No part of the project site is located within the 100-year floodplain.

The 100-year floodplain boundaries are based on the following **specific** (including date of material) sources(s):

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---



---

12. 5-year floodplain:

- ☒ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above sewer lines.)
- ☐ After construction is complete, all sections of the force main located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Line	Sheet	Station		Station
	of		to	
	of		to	
	of		to	



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

- There are \_\_\_ (#) well(s) 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 plugged.
- The wells are not in use and will be properly plugged.
- The wells are in use and comply with 16 TAC Chapter 76.
- X There are no wells or test holes of any kind known to exist on the project site.

**PLAN AND PROFILE SHEETS.** The construction drawings and technical specifications will not be considered for review unless they are the **final plans and technical specifications** which will be used by the contractor for bidding and construction.

**Items 14 through 17 must be included on the Plan and Profile sheets.**

14. The equipment installation construction plans must have a minimum scale of 1" = 10'.  
Plan sheet scale: 1" = 5 '.
15. X Locations, descriptions and elevations of all required equipment and piping for the lift station and force main are shown and labeled.
16. N/A Air Release/Vacuum Valves will be provided at all peaks in elevation of the proposed force main. These locations are listed in the table below and labeled on the appropriate plan and profile sheets.

Line	Station	Sheet
		of
		of
		of
		of
		of
		of

17. X The **final plans and technical specifications** are submitted for the TCEQ's review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.
18. **ATTACHMENT A - Engineering Design Report.** An engineering design report with the following required items is included with this application:
- X The report is dated, signed, and sealed by a Texas Licensed Professional Engineer.
- X Calculations for sizing system.
- X Pump head calculations, including, but not limited to, system head and pump capacity curves, head loss calculations, and minimum and maximum static head C values for normal and peak operational conditions.
- X 100-year and 25-year flood considerations.
- X Total lift station pumping capacity with the largest pump out of service.
- X Type of pumps, including standby units.
- X Type of pump controllers, including standby air supply for bubbler controllers, as



- applicable.
- ☒ Pump cycle time.
  - ☒ Type of wet well ventilation, include number of air changes for mechanical ventilation.
  - ☒ Minimum and maximum flow velocities for the force main.
  - ☒ Lift station security.
  - ☒ Lift station emergency provisions and reliability.

#### ADMINISTRATIVE INFORMATION

19. ☒ Upon completion of the wet well excavation, a geologist must certify that the excavation was inspected for the presence of sensitive features and submit the signed, sealed, and dated certification to the appropriate regional office.
20. ☒ The TCEQ Lift Stations and Force Mains General Construction Notes (TCEQ-0591) are included on the General Notes Sheet of the Final Construction Plans for this lift station and/or force main system.
21. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
22. ☒ Any modification of this lift station/force main system application will require TCEQ 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 **LIFT STATION/FORCE MAIN SYSTEM APPLICATION FORM** is hereby submitted for TCEQ review and executive director approval. The system was designed in accordance with the requirements of 30 TAC §213.5(c)(3)(C) and 30 TAC Chapter 217, and prepared by:

Place engineer's seal here:

JAMES INGALLS, P.E.  
Print Name of Licensed Professional Engineer

  
Signature of Licensed Professional Engineer

3-23-12  
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.



**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: Newcombe Tennis Ranch Subdivision - Unit 2

**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 than 250 gallons will be stored on the site for less than one (1) year.  
☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.  
☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An **Aboveground Storage Tank Facility Plan** application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.  
☒ Fuels and hazardous substances will not be stored on-site.
2. ☒ **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. ☐ **N/A** Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
4. ☒ **ATTACHMENT B - Potential Sources of Contamination.** Describe in an attachment at the end of this form any other activities or processes which may be a potential source of contamination.  
☐ There are no other potential sources of contamination.

**SEQUENCE OF CONSTRUCTION**

5. ☒ **ATTACHMENT C - Sequence of Major Activities.** A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is 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. ☒ 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: Un-named Tributary of Dry Comal Creek

**TEMPORARY BEST MANAGEMENT PRACTICES (TBMPs)**

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the



Technical Guidance Manual for guidelines and specifications. **All structural BMPs must be shown on the site plan.**

7.   X   **ATTACHMENT D - Temporary Best Management Practices and Measures.** A description of the TBMPs and measures that will be used during and after construction are provided at the end of this form. For each activity listed in the sequence of construction, include appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
- X   TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information has been provided in the attachment at the end of this form
- a. A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
  - b. A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
  - c. A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
  - d. A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.
8. The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.
- ATTACHMENT E - Request to Temporarily Seal a Feature.** A request to temporarily seal a feature is provided at the end of this form. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
- X   There will be no temporary sealing of naturally-occurring sensitive features on the site.
9.   X   **ATTACHMENT F - Structural Practices.** Describe the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site. Placement of structural practices in floodplains has been avoided.
10.   X   **ATTACHMENT G - Drainage Area Map.** A drainage area map is provided at the end of this form to support the following requirements.
- For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
  - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
  - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to



protect down slope and side slope boundaries of the construction area.

- X 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, repairs, 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 manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
14. 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. N/A 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

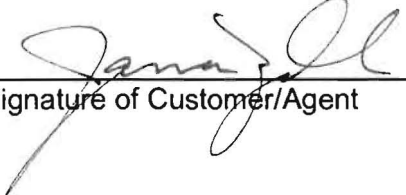


20. X All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
21. X If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately 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:

James Ingalls, P.E.

Print Name of Customer/Agent



Signature of Customer/Agent

3/20/12

Date



## **ATTACHMENT “A”** **Spill Response Actions**

There will be no above ground storage tanks allowed on this project. Equipment will be fueled using mobile fuel trucks as needed. There is a small chance of a fuel spill occurring due to leaking construction equipment or re-fueling operations. The spill prevention and control measures described below, and included in Section 1.4.16 of the Edwards Aquifer technical Guidance Manual (2005), will be followed.

### **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, and substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- (2) Store hazardous materials and wastes in covered containers and protect from vandalism.
- (3) Place a stockpile of spill cleanup materials where it will be readily accessible.



- (4) Train employees in spill prevention and cleanup.
- (5) Designate responsible individuals to oversee and enforce control measures.
- (6) Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn't compromise clean up activities.
- (7) Do not bury or wash spills with water.
- (8) Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMP's.
- (9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
- (10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- (11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- (12) Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

### ***Cleanup***

- (1) Clean up leaks and spills immediately.
- (2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- (3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMP's in this section for specific information.

### ***Minor Spills***

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



- (2) Use absorbent materials on small spills rather than hosing down or burying the spill.
- (3) Absorbent materials should be promptly removed and disposed of properly.
- (4) Follow the practice below for a minor spill:
- (5) Contain the spread of the spill.
- (6) Recover spilled materials.
- (7) Clean the contaminated area and properly dispose of contaminated materials.

### ***Semi-Significant Spills***

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

Spills should be cleaned up immediately:

- (1) Contain spread of the spill.
- (2) Notify the project foreman immediately.
- (3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- (4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- (5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

### ***Significant/Hazardous Spills***

For significant or hazardous spills that are in reportable quantities:

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



- (3) Notification should first be made by telephone and followed up with a written report.
- (4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
- (5) Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at: [http://www.tnrcc.state.tx.us/enforcement/emergency\\_response.html](http://www.tnrcc.state.tx.us/enforcement/emergency_response.html)

### ***Vehicle and Equipment Maintenance***

- (1) If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- (2) Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- (3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- (4) Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- (5) Place drip pans or absorbent materials under paving equipment when not in use.
- (6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- (7) Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- (8) Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- (9) Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

### ***Vehicle and Equipment Fueling***

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



(2) Discourage “topping off” of fuel tanks.

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

#### **ATTACHMENT “B”**

##### **Potential Sources of Contamination**

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

#### **ATTACHMENT “C”**

##### **Sequence of Major Activities**

Stages of Construction:

1. Prior to construction, silt fence will be installed to minimize erosion and loss of sediment from the site. Please refer to plan sheet 3 for details and locations of silt fence
2. Clearing and Grubbing: Removal of trees, stumps, brush, and other debris within the proposed sewage collection envelope.
3. SCS Installation: The proposed sanitary sewer pipes, manholes and laterals will be installed within the sewage collection system alignment envelope. This disturbed area will mirror the cleared area from stage two above.
4. The sewer mains and manholes will be tested in accordance with the specifications. No additional area will be disturbed.

#### **ATTACHMENT “D”**

##### **Temporary BMP's and Measures**

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

1. Sanitary Sewer centerline will be roughly cleared for surveying purposes. (No soil disturbance.)
2. Silt fence will be constructed on the downgradient side of proposed roadways prior to beginning clearing and grubbing operations.

A. As it has always done, natural vegetation will filter pollutants originating upgradient of the site, preventing pollution of on-site runoff. Silt fence will be placed on the downgradient side of each proposed improvement to contain pollutants generated from onsite runoff.

B. Silt fence will be placed on the downgradient side of each proposed improvement to contain pollutants generated from onsite runoff. Material from excavated utility trenches will be placed upstream of the trench to reduce the potential of sediment reports.

C. The majority of the property's natural vegetation will not be disturbed. This existing natural vegetation, in addition to the silt fences, upgradient of each stream and sensitive feature, will



prevent pollutants from entering them as well as the aquifer. All of the low areas, which collect stormwater runoff, will remain in a natural state acting as vegetative filter strips.

D. There were no naturally occurring sensitive features identified on the proposed project site.

#### **ATTACHMENT “E”**

##### **Request to Temporarily Seal a Feature**

There will be no request to temporarily seal a feature.

#### **ATTACHMENT “F”**

##### **Structural Practices**

Silt fence will be used to protect disturbed soils and to prevent contamination from leaving the project site. The majority of the site will remain in a natural condition with no impact to existing drainage paths; therefore, natural filtration will be allowed to occur.

#### **ATTACHMENT “G”**

##### **Drainage Area Map**

See Drainage Area Map at the end of this section.

#### **ATTACHMENT “H”**

##### **Temporary Sediment Pond Plans and Calculations**

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

#### **ATTACHMENT “I”**

##### **Inspection and Maintenance for BMP's**

##### **Inspection and Maintenance Plan**

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



Silt Fence: Remove sediment when buildup reaches 6 inches. Replace any torn fabric or install a second line of fencing parallel to the torn section. Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points. When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of the silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.

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

Any changes made to the location or type of controls shown on the accepted plans, due to onsite conditions, shall be documented on the site plan that is part of this Sanitary Sewer Collection system Plan. No other changes shall be made unless approved by TCEQ and the Design Engineer. The contractor is required to document any changes on the Site Plan, documentation must include person performing task, task performed, and date. The contractor must also document if proper inspection measures have been taken while making changes. Documentation shall clearly show changes made, date, and person responsible and reason change was made.



**Owner's Information:**

Owner: Newcombe Development LLC  
Contact: Jeremy Fieldsend  
Phone: (830) 625-5911  
Address: 325 Mission Valley Road  
New Braunfels, Texas 78132

**Design Engineer:**

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

**Person or Firm Responsible for Erosion/Sedimentation Control Maintenance:**

Company: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Address: \_\_\_\_\_

Signature of Responsible Party: \_\_\_\_\_

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



## **ATTACHMENT “J”**

### **Schedule of Interim and Permanent Soil Stabilization Practices**

There will be minimal disturbed soil due to construction operations. The area is generally very rocky with a minimal amount of overlying soil. Areas which are disturbed by construction, construction staging and storage areas will be hydro mulched with the appropriate seed mixture. All disturbed soils should be seeded or otherwise stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days. Installation and acceptable mixtures of hydro mulch are as follows:

#### **Materials:**

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

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

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

#### Seed Mixtures:

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

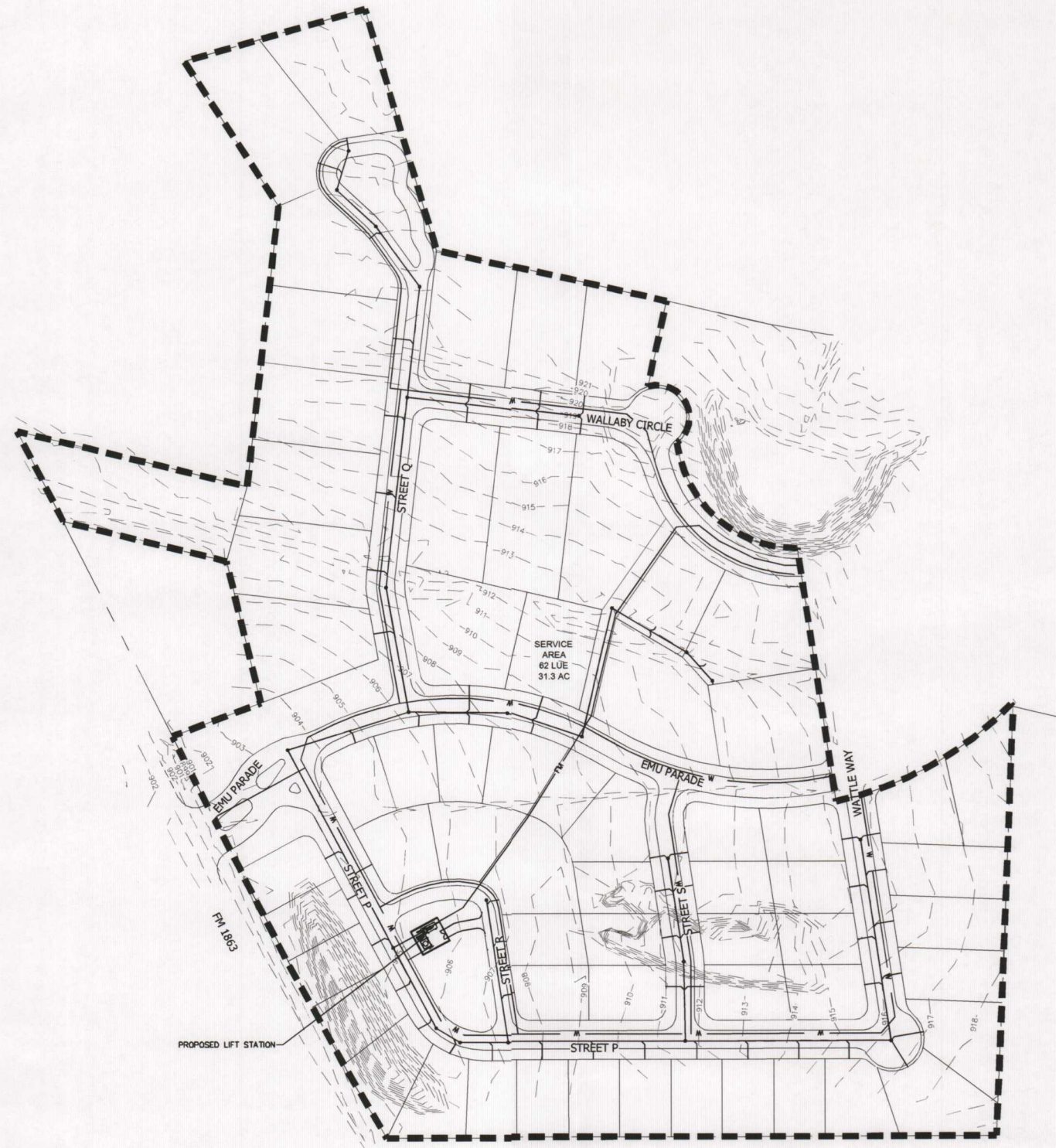


Fertilizer: Fertilizer should be applied at the rate of 40 pounds of nitrogen and 40 pounds of phosphorus per acre, which is equivalent to about 1.0 pounds of nitrogen and phosphorus per 1000 square feet.

**Installation:**

- (1) Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where other methods are impractical.
- (2) To be effective, hydraulic matrices require 24 hours to dry before rainfall occurs.
- (3) Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.





# LEGEND

- LEGAL BOUNDARY
- LIMITS OF SERVICE AREA
- EXISTING CONTOURS
- PROPOSED CONTOURS



ISSUES AND REVISIONS

DATE

NO

**MOELLER & ASSOCIATES**  
Engineering Solutions  
1040 N. WALNUT AVE., STE. B, NEW BRAUNFELS, TX. 78130  
PH: 830-255-1777 www.mfmo-tx.com  
TYPE FIRM F-13551

NEWCOMBE TENNIS RANCH  
UNIT2

DRAINAGE AREA MAP

SHEET

1  
OF 1



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

I **Jeremy Fieldsend**,  
Print Name

**Partner**,  
Title - Owner/President/Other

of **Newcombe Development L.L.C.**,  
Corporation/Partnership/Entity Name

have authorized **James Ingalls, P.E.**  
Print Name of Agent/Engineer

of **Moeller & Associates**  
Print Name of Firm

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

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to \$10,000 per day per violation.
2. For applicants who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.



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

[Signature]  
Applicant's Signature

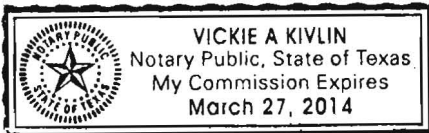
3/16/12  
Date

THE STATE OF Texas §

County of Comal §

BEFORE ME, the undersigned authority, on this day personally appeared Jeremy Fickson, 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 16<sup>th</sup> day of March 2012.



[Signature]  
NOTARY PUBLIC

Vickie A. Kivlin  
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: March 27 2014



Texas Commission on Environmental Quality  
Edwards Aquifer Protection Program  
**Application Fee Form**

NAME OF PROPOSED REGULATED ENTITY: Newcombe Tennis Ranch Subdivision – Unit 2  
REGULATED ENTITY LOCATION: Newcombe Tennis Ranch Subdivision – Unit 2 is located on FM 1863 approximately 2 miles southwest of the intersection with State Highway 46.

NAME OF CUSTOMER: Newcombe Development L.L.C.

CONTACT PERSON: Jeremy Fieldsend PHONE: (830) 625-5911  
(Please Print)

Customer Reference Number (if issued): CN 601400542 (nine digits)

Regulated Entity Reference Number (if issued): RN 102747359 (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**

☒ **San Antonio Regional Office**

☐ **Mailed to TCEQ:**

TCEQ – Cashier  
Revenues Section  
Mail Code 214  
P.O. Box 13088  
Austin, TX 78711-3088

☐ **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	Acres	\$
Sewage Collection System	5,150 L.F.	\$ 2,575.00
Lift Stations without sewer lines	Acres	\$
Underground or Aboveground Storage Tank Facility	Tanks	\$
Piping System(s)(only)	Each	\$
Exception	Each	\$
Extension of Time	Each	\$

Signature

Date

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.



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	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6,500
	100 < 500	\$8,000
	≥ 500	\$10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1	\$3,000
	1 < 5	\$4,000
	5 < 10	\$5,000
	10 < 40	\$6,500
	40 < 100	\$8,000
	≥ 100	\$10,000

**Organized Sewage Collection Systems and Modifications**

PROJECT	COST PER LINEAR FOOT	MINIMUM FEE MAXIMUM FEE
Sewage Collection Systems	\$0.50	\$650 - \$6,500

**Underground and Aboveground Storage Tank System Facility Plans and Modifications**

PROJECT	COST PER TANK OR PIPING SYSTEM	MINIMUM FEE MAXIMUM FEE
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

**Exception Requests**

PROJECT	FEE
Exception Request	\$500

**Extension of Time Requests**

PROJECT	FEE
Extension of Time Request	\$150









TCEQ Use Only

# TCEQ Core Data Form

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

## SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided)		
<input checked="" type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application)		
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)	<input type="checkbox"/> Other	
2. Attachments Describe Any Attachments: (ex. Title V Application, Waste Transporter Application, etc.)		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No SCS Application		
3. Customer Reference Number (if issued)		4. Regulated Entity Reference Number (if issued)
CN 601400542		RN 102747359

## 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:		
<input type="checkbox"/> Owner	<input type="checkbox"/> Operator	<input checked="" type="checkbox"/> Owner & Operator
<input type="checkbox"/> Occupational Licensee	<input type="checkbox"/> Responsible Party	<input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other: _____
7. General Customer Information		
<input type="checkbox"/> New Customer	<input type="checkbox"/> Update to Customer Information	<input type="checkbox"/> Change in Regulated Entity Ownership
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State)	<input checked="" type="checkbox"/> No Change**	
**If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.		
8. Type of Customer:	<input type="checkbox"/> Corporation	<input type="checkbox"/> Individual
<input type="checkbox"/> City Government	<input type="checkbox"/> County Government	<input type="checkbox"/> Sole Proprietorship- D.B.A
<input type="checkbox"/> Other Government	<input type="checkbox"/> General Partnership	<input type="checkbox"/> Federal Government
<input type="checkbox"/> Limited Partnership	<input type="checkbox"/> State Government	
<input type="checkbox"/> Other: _____		
9. Customer Legal Name (If an individual, print last name first: ex: Doe, John)		If new Customer, enter previous Customer below
		End Date: _____
10. Mailing Address:		
City	State	ZIP
		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)
( ) -		( ) -
16. Federal Tax ID (9 digits)	17. TX State Franchise Tax ID (11 digits)	18. DUNS Number (if applicable)
20. Number of Employees		21. Independently Owned and Operated?
<input type="checkbox"/> 0-20 <input type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher	<input type="checkbox"/> Yes <input type="checkbox"/> 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)	
<input type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> Update to Regulated Entity Information <input checked="" type="checkbox"/> 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)	
Newcombe Tennis Ranch Subdivision	



24. Street Address of the Regulated Entity: (No P.O. Boxes)	Entity has no street address. It is located on FM 1863 approximately 2 miles southwest of the intersection with State Highway 46. <i>Undetermined</i>						
	City	New Braunfels	State	TX	ZIP	78132	ZIP + 4
25. Mailing Address:	325 Mission Valley Road						
	City	New Braunfels	State	TX	ZIP	78132	ZIP + 4
26. E-Mail Address:							
27. Telephone Number	28. Extension or Code		29. Fax Number (if applicable)				
( 830 ) 625-5911			( 830 ) 625-2004				
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)			
1521	NA	236115		NA			
34. What is the Primary Business of this entity? (Please do not repeat the SIC or NAICS description.)							
Single-Family Houses							

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:	Located on FM 1863 approximately 2 miles southwest of the intersection with State Highway 46.					
36. Nearest City	County		State		Nearest ZIP Code	
New Braunfels	Comal		TX		78132	
37. Latitude (N) In Decimal:	29.7208 <sup>II</sup>		38. Longitude (W) In Decimal:	98.2000 <sup>II</sup>		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	
029	43	15	098	12	00	

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.

<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Industrial Hazardous Waste	<input type="checkbox"/> Municipal Solid Waste
<input type="checkbox"/> New Source Review – Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS	<input type="checkbox"/> Sludge
<input type="checkbox"/> Stormwater	<input type="checkbox"/> Title V – Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil	<input type="checkbox"/> Utilities
<input type="checkbox"/> Voluntary Cleanup	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:


#### SECTION IV: Preparer Information

40. Name:	James Ingalls, P.E.	41. Title:	Authorized Agent
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
( 830 ) 358-7127		( 830 ) 515-5611	JamesI@ma-tx.com

#### SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 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:	Newcombe Development, L.L.C.	Job Title:	Partner
Name (In Print):	Jeremy Fieldsend	Phone:	( 830 ) 625-5911
Signature:		Date:	3/16/12





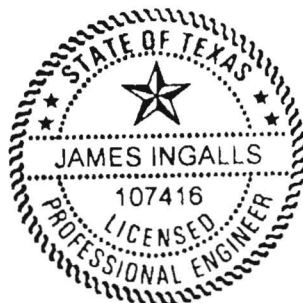
2012

# Newcombe Tennis Ranch – Unit 2 Sanitary Sewer Engineering Design Report

TCEQ-R13

MAR 23 2012

SAN ANTONIO



*James Ingalls*  
3-22-12

Prepared for :

Newcombe Development LLC

c/o Jeremy Fieldsend

3/22/2012



## Contents

PROJECT DESCRIPTION .....	2
SYSTEM SERVICE AREA .....	3
DESIGN SUMMARY .....	3
ATTACHMENT A    LOCATION MAP .....	5
ATTACHMENT B    OVERALL SERVICE AREA MAP .....	6
ATTACHMENT C    FEMA FIRM Map No. 48091C0430F .....	7
ATTACHMENT D    DESIGN FLOW CALCULATIONS .....	8
ATTACHMENT E    LIFT STATION DESIGN CALCULATIONS .....	9
ATTACHMENT F    SYSTEM AND PUMP CURVES .....	10
ATTACHMENT G    BIOXIDE INFORMATION.....	11
ATTACHMENT H    SPECIFIC PIPE INFORMATION .....	12
ATTACHMENT I    MATERIAL SPECIFICATIONS .....	13



## PROJECT DESCRIPTION

Newcombe Tennis Ranch Subdivision – Unit 2 is a 31.3 acre development on the north side of FM 1863 approximately 2 miles west of the nearest major intersection at SH 46 (See Location Map). The proposed site consists of 61 residential lots of varying size. The site is currently unimproved land primarily composed of open fields, dense brush and trees. The entire site drains south to an unnamed tributary of Dry Comal Creek. According to the Flood insurance Rate Map No. 48091C0430F there is no existing floodplain located within the property.

This SCS application is for Unit 2 of four planned units. The Unit 2 Sanitary Sewer System will tie into the Unit 1 system previously approved and sized for Unit 2 flows EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007.

The potable distribution and sanitary sewer collection systems on this project will be owned and maintained by New Braunfels Utilities (NBU) upon their acceptance of the constructed facilities. There will be no private utilities on site. The project includes approximately 4,140 linear feet of 8” sanitary sewer gravity main, 1,010 linear feet of 4” sanitary sewer force main and 1 lift station. The proposed sanitary sewer system will connect to manhole MH-K\_3. The manhole was constructed as part of the Newcombe Tennis Ranch Subdivision – Unit 1 project (EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007).

Table 1 below has a break out of the sewer lengths by line.

<b>Table 1 – Pipe Lengths Broken Out by Line</b>	
<b>Sanitary Sewer Line</b>	<b>Length (ft)</b>
SSL A	871.28
SSL B	268.00
SSL C	924.95
SSL D	1,513.79
SSL E	222.48
SSL F	283.94
SSL G	56.00
Force Main	1,010.00



## **SYSTEM SERVICE AREA**

The current proposed development is Unit 2 of four planned units. In Unit 1 of the Newcombe Tennis Ranch Sewage Collection System with approved SCS (EAPP# 1248.03 Investigation No. 706805, Regulated Entity No. RN 102747359 Approval dated December 30th, 2007) was sized to handle an additional 63 lots planned for in Unit 2. The proposed Unit 2 development will send flow of 61 lots, just under the 63 that the Unit 1 system was sized to accept. The Unit 1 system referenced above has adequate capacity for Unit 2 flows.

## **DESIGN SUMMARY**

### **Inflow/Infiltration**

Existing and anticipated infiltration/inflow is 22,830 gallons/day. This will be addressed by the installation of watertight resilient connectors at the pipe penetrations to the manholes. In addition, the newly installed pipe shall be tested via low pressure air test or exfiltration test for leakage per TCEQ 317.2.(4). Also, the newly installed pipe capacity exceeds the capacity required for the development (available capacity of 568,757 GPD versus required capacity of 83,590 GPD for peak wet weather flow).

### **Lift Station and Force Main**

The proposed lift station and force main were designed to perform with peak wet weather flow conditions of 84,235 gpd (58.5 gpm). The lift station was designed to have a firm pumping capacity (pumping capacity with the largest pump out of service) of 80 gpm. The pumping capacity exceeds the peak wet weather flow more than typical in order to satisfy the minimum velocity requirements for a 4" force main.

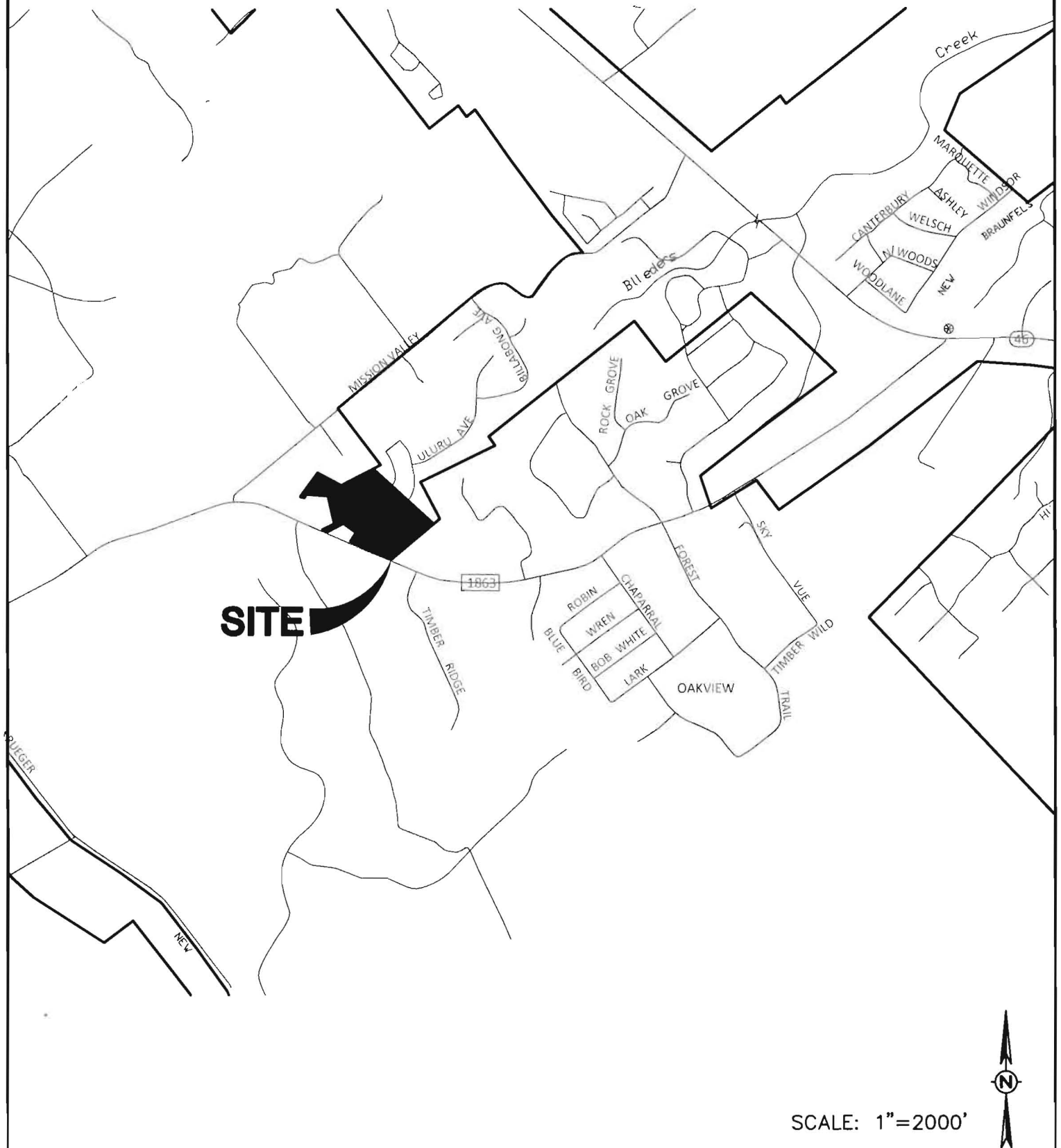
The lift station was designed with emergency storage available for 77.7 minutes during average dry weather conditions and 14.1 min during peak wet weather conditions. These values are conservative since they do not account for storage within the pipes and manholes below the maximum allowable storage elevation. Backup power is also proposed for the lift station, an 8 kW, diesel powered generator is proposed to provide backup power when needed.

See attachments D through G for backup calculations.



## ATTACHMENT A      LOCATION MAP





1040 N. WALNUT AVE. STE B, NEW BRAUNFELS, TX. 78130  
PH: 830-358-7127 [www.mo-tx.com](http://www.mo-tx.com)  
TBPE FIRM F-13351

LOCATION MAP  
NEWCOMBE TENNIS RANCH - UNIT 2

DRAWN BY: SAK CHECKED BY: JII

DATE: 2/2012

SHEET

1

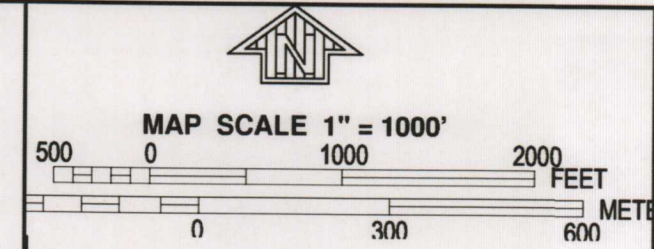
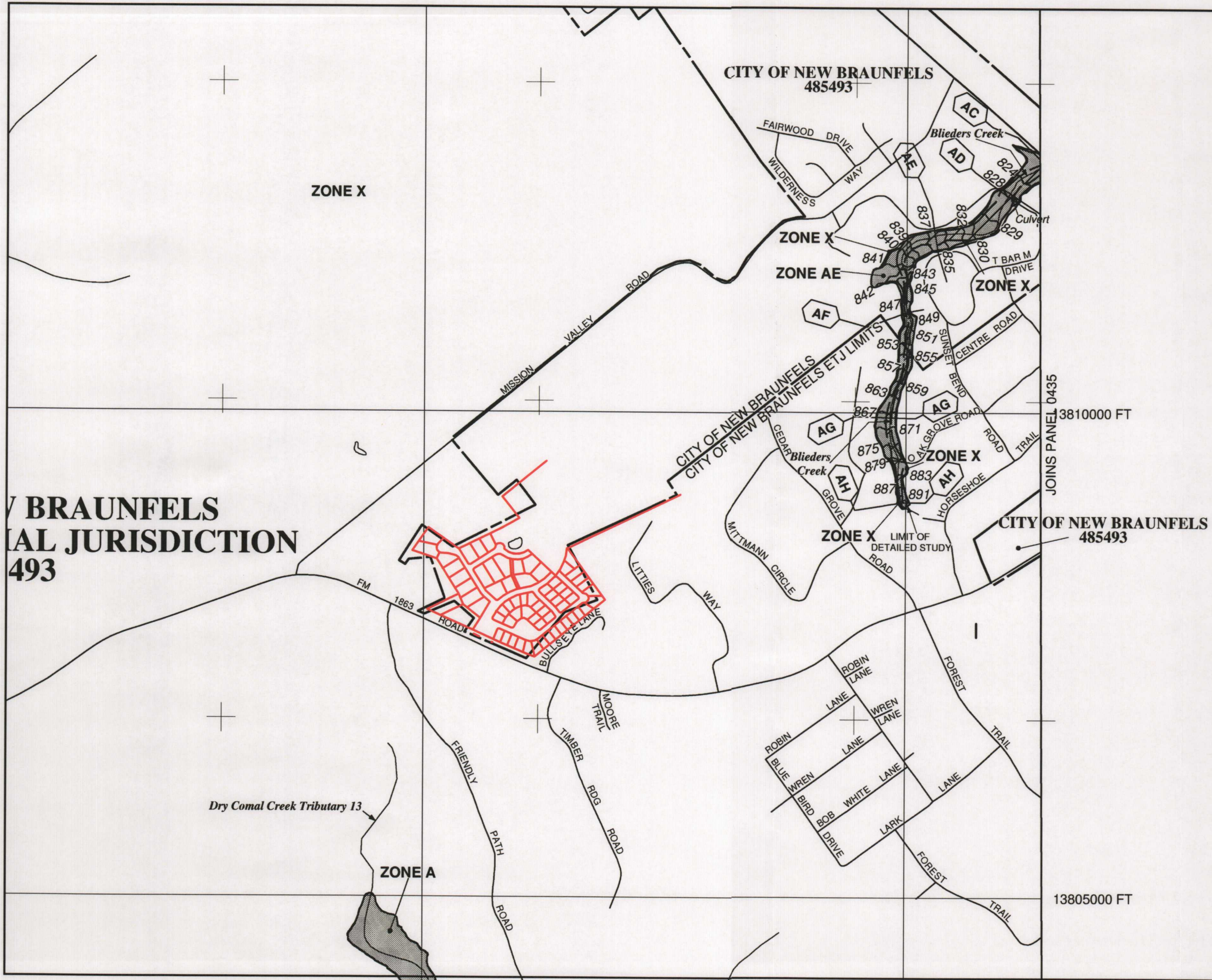
OF

1



## **ATTACHMENT B    OVERALL SERVICE AREA MAP**





NFIP

PANEL 0430F

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**COMAL COUNTY,**  
**TEXAS**  
**AND INCORPORATED AREAS**

**PANEL 430 OF 505**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)  
**CONTAINS:**  

COMMUNITY	NUMBER	PANEL	SUFFIX
COMAL COUNTY	485463	0430	F
NEW BRAUNFELS, CITY OF	485493	0430	F

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER**  
**48091C0430F**  
**EFFECTIVE DATE**  
**SEPTEMBER 2, 2009**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

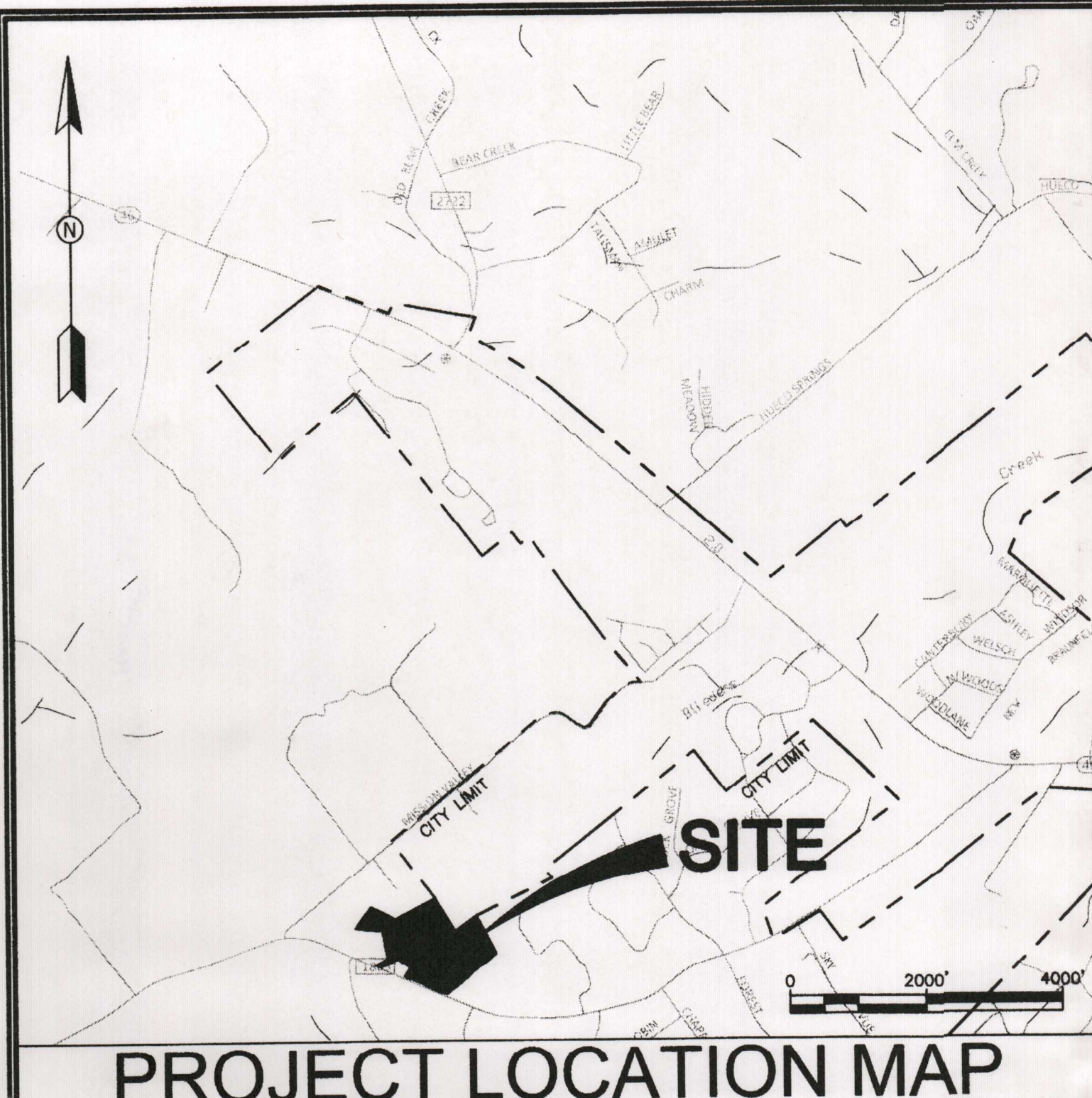


**ATTACHMENT C     FEMA FIRM Map No. 48091C0430F**



# NEWCOMBE TENNIS RANCH UNIT 2

## New Braunfels, Texas



## NEWCOMBE DEVELOPMENT, L.L.C.

325 MISSION VALLEY ROAD  
NEW BRAUNFELS, TEXAS 78132

SUBMITTAL DATE: 03-22-2012

PLEASE NOTE: NBU REQUIRES GPS POINTS FOR CERTAIN ELECTRIC, WATER AND WASTEWATER ATTRIBUTES, SOME OF WHICH MUST BE TAKEN PRIOR TO BACKFILL DURING CONSTRUCTION.

GPS POINTS SHALL BE REQUIRED FROM THE DEVELOPER'S CONTRACTOR OR ENGINEER. A MINIMUM OF THREE COORDINATE POINTS FOR GEOREFERENCING SHALL BE REQUIRED. THE WATER AND WASTEWATER GPS POINTS SHALL BE TO SURVEY GRADE. THE ELECTRIC GPS POINTS SHALL BE TO MAP GRADE.

**WATER**  
VERTICAL BENDS AND EDGE OF STEEL CASING (IF APPLICABLE) PRIOR TO BACKFILL  
HORIZONTAL BENDS PRIOR TO BACKFILL  
TEES PRIOR TO BACKFILL  
FITTINGS (REDUCERS AND COUPLINGS) PRIOR TO BACKFILL  
FIRE HYDRANTS (TOP OF FLANGE)  
VALVES  
METERS (TOP CENTER OF BOX)  
BLOW OFF ASSEMBLY  
CORNER SLAB OF WATER TANK & GATE VALVE ON WATER TANK

**WASTEWATER**  
MANHOLES  
CLEANOUTS  
CORNER SLAB OF LIFT STATION

**ELECTRIC**  
POLES  
TRANSFORMERS, BOTH ABOVE AND UNDERGROUND (FRONT LOOK)  
PULL BOXES  
STREET LIGHTS

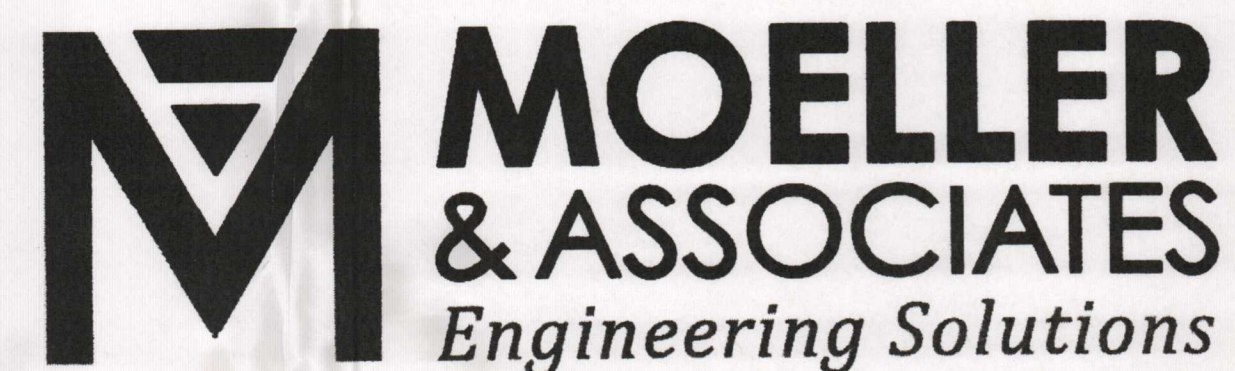
COORDINATE GPS REQUIREMENTS WITH NBU INSPECTOR

### GENERAL NOTES

- IF CONSTRUCTION HAS NOT COMMENCED WITHIN ONE-YEAR OF CITY OF NEW BRAUNFELS AND NEW BRAUNFELS UTILITIES (NBU) APPROVAL FOR CONSTRUCTION INSPECTION, THAT APPROVAL IS NO LONGER VALID.
- ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER OF RECORD. IN ACCEPTING THESE PLANS, THE CITY OF NEW BRAUNFELS MUST RELY UPON THE ADEQUACY OF THE WORK OF THE ENGINEER OF RECORD.
- PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR SHALL CONTACT THE CITY OF NEW BRAUNFELS (CONB) AND NEW BRAUNFELS UTILITIES (NBU) TO SET A PRE-CONSTRUCTION MEETING. A 48-HOUR ADVANCED NOTIFICATION IS REQUIRED.
  - ALL CONB INSPECTIONS ARE TO BE CALLED IN AT 830-221-4068 (PHONE)
  - FAXED IN AT 830-608-2117 (FAX)
  - EMAILED AT [inspections@nbtexas.org](mailto:inspections@nbtexas.org) (EMAIL).
  - NBU INSPECTIONS ARE TO BE CALLED AT 830-608-8971
- JAMES BROWNE (830) 609-0707, TxDOT MAINTENANCE SUPERVISOR WILL BE CONTACTED BY THE CONTRACTOR 48 HOURS PRIOR TO WORK OCCURRING IN STATE RIGHT OF WAY.
- PROJECT FALLS WITHIN THE LIMITS OF THE EDWARDS AQUIFER RECHARGE ZONE. CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS OF THE APPROVED WATER POLLUTION ABATEMENT PLAN, EDWARDS AQUIFER PROTECTION PROGRAM ID NO. 1248.01, INVESTIGATION NO. 598529, REGULATED ENTITY NO. RN102747359, APPROVAL LETTER DATED DECEMBER 28, 2007. CONTRACTOR SHALL GIVE WRITTEN NOTIFICATION TO TCEQ, SAN ANTONIO REGIONAL OFFICE, PRIOR TO THE COMMENCEMENT OF REGULATED ACTIVITY.
- PROJECT FALLS WITHIN THE LIMITS OF THE EDWARDS AQUIFER RECHARGE ZONE. ALL CONSTRUCTION ACTIVITIES MUST MEET THE REQUIREMENTS OF THE TCEQ APPROVED ORGANIZED SEWAGE COLLECTION SYSTEM (OSCS), EDWARDS AQUIFER PROTECTION PROGRAM ID NO. 1248.03, INVESTIGATION NO. 706805, REGULATED ENTITY NO. RN102747359, APPROVAL LETTER DATED DECEMBER 30, 2008. CONTRACTOR SHALL GIVE WRITTEN NOTIFICATION TO TCEQ, SAN ANTONIO REGIONAL OFFICE, PRIOR TO THE COMMENCEMENT OF REGULATED ACTIVITY.

Sheet List Table	
Sheet Number	Sheet Title
1	GENERAL NOTES
2	SITE TBM MAP
3	EROSION CONTROL PLAN
4	SANITARY SEWER OVERALL PLAN
5	SSL A STA 10+00 TO STA 18+71.28
6	SSL B STA 10+00 TO STA 19+24.95
7	SSL C STA 10+00 TO STA 12+68
8	SSL D STA 10+00 TO STA 20+00
9	SSL D STA 20+00 TO STA 25+13.79
10	SSL E STA 10+00 TO STA 12+22.48
11	SSL F STA 10+00 TO STA 12+83.94
12	SSL G STA 10+00 TO STA 10+56.00
13	SANITARY SEWER DETAILS 1
14	SANITARY SEWER DETAILS 2
15	LIFT STATION SITE PLAN
16	LIFT STATION DETAILS
17	MISC DETAILS 1
18	MISC DETAILS 2
19	MISC DETAILS 3
20	FORCE MAIN PLAN

Prepared By:



1040 N. Walnut Ave. Ste. B  
New Braunfels, TX 78130

PH: 830-358-7127 [www.ma-tx.com](http://www.ma-tx.com)  
TBPE Firm F-13351



KNOW ALL MEN BY THESE PRESENTS:

I, THE UNDERSIGNED, JAMES INGALLS, A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF TEXAS, HEREBY CERTIFY THAT PROPER ENGINEERING CONSIDERATION HAS BEEN GIVEN TO THESE PLANS AND ALL ENGINEERING ASPECTS, TO THE BEST OF MY KNOWLEDGE, ARE IN COMPLIANCE WITH CITY AND STATE ENGINEERING REGULATIONS AND LAWS.

*James Ingalls* 3-22-12  
JAMES INGALLS - REGISTERED PROFESSIONAL ENGINEER  
P.E. REGISTRATION NO. 107416  
TBPE FIRM # F-13351

RECEIVED  
APR 04 2012  
COUNTY ENGINEER

TCEQ-R13  
MAR 23 2012  
SAN ANTONIO

NEWCOMBE TENNIS RANCH UNIT 2  
SCS SUBMITTAL



## **ATTACHMENT D    DESIGN FLOW CALCULATIONS**



## Lift Station Design Calculations

Project: Newcombe Estates Unit 2  
 Project No: NEWC002.101  
 Date: 03/22/12

### Design Flow Calculations

Service Area	31.3	ac		
Total LUE's Served	62			
Population	186		(assume 3.0 people per LUE)	
Average Daily Flow (ADF)	245	gpd per LUE	NBU Design Requirement	
Average Daily Flow (ADF)	15,190	gpd		
	10.5	gpm		
Peaking Factor	4.00		TCEQ requires min of 4 for minor lines $[18 + (0.0206 * ADF)^{0.5}] / [4 + (0.0206 * ADF)^{0.5}]$	
Peak Dry Flow (PDF)	60,760	gpd	Peak Factor * ADF	
	42.2	gpm		
Inflow & Infiltration Rate (I&I)	750	gpd per acre		
Total I & I	23,475	gpd		
	16.3	gpm		
Peak Wet Flow (PWF)	84,235	gpd	PDF + I&I	Design Flow
	58.5	gpm		
Minimum Daily Flow (MDF)	8,829	gpd		
	6.1	gpm		
Pump Flow ( $Q_{\text{pump}}$ )	80	gpm		



## **ATTACHMENT E      LIFT STATION DESIGN CALCULATIONS**



## Lift Station Design Calculations

### Wet Well Calculations

Pumping Capacity ( $Q_p$ ) 80 gpm

Design Flow Rounded Up

Number of Pumps 2

Minimum Cycle Time ( $T_c$ ) 10 min

Motor HP	1. Cycle Time (min)
2 to 50	10
51 to 75	15
76 to 250	30
251 to 1500	45

Minimum Working Volume (V) 200 gal Assumes one pump operation

#### Wet Well Hydraulics

PWF 58.5 gpm

$Q_p$  - PWF 21.5 gpm

Net Outflow PWF

ADF 10.5 gpm

$Q_p$  - ADF 69.5 gpm

Net Outflow ADF

#### Wet Well Diameter

7 ft

287.86 gal per foot

Pump off - Pump On (depth ft)	Working Volume (gal)	Time to Pump Down		Time to Fill Wet Well		Cycle Time	
		ADF (minutes)	PWF (minutes)	ADF (minutes)	PWF (minutes)	ADF (minutes)	PWF (minutes)
1.5	431.8	6.2	20.1	40.9	7.4	47.2	27.5
2	575.7	8.3	26.8	54.6	9.8	62.9	36.6
2.5	719.7	10.4	33.5	68.2	12.3	78.6	45.8
3	863.6	12.4	40.2	81.9	14.8	94.3	54.9
3.5	1007.5	14.5	46.9	95.5	17.2	110.0	64.1
4	1151.5	16.6	53.5	109.2	19.7	125.7	73.2



## Lift Station Design Calculations

### Wet Well Detention Time and Pump Cycle Times

Wet Well Working Volume	431.8 gal
Working Volume Depth	1.5 ft
Wet Well Diameter	7 ft
MDF	6.13 gpm
ADF	10.55 gpm
PWF	58.50 gpm
$Q_p$	80.00 gpm

#### Average Detention Time

$T_{fill}$	40.9 min	$T_{fill} = V_{working} / ADF$
$T_{empty}$	6.2 min	$T_{fill} = V_{working} / (Q_p - ADF)$
$T_{detention}$	47.2 min	$T_{detention} = T_{fill} + T_{empty}$
Daily Cycles	31 cycles/day	

#### Minimum Detention Time

$T_{fill}$	7.4 min	$T_{fill} = V_{working} / PWF$
$T_{empty}$	20.1 min	$T_{fill} = V_{working} / (Q_p - PWF)$
$T_{detention}$	27.5 min	$T_{detention} = T_{fill} + T_{empty}$

#### Maximum Detention Time

$T_{fill}$	70.4 min	$T_{fill} = V_{working} / MDF$
$T_{empty}$	5.8 min	$T_{fill} = V_{working} / (Q_p - MDF)$
$T_{detention}$	76.3 min	$T_{detention} = T_{fill} + T_{empty}$

#### Minimum Time Between Pump Starts (results when inflow = 50% $Q_p$ )

$T_{fill}$	10.8 min	
$T_{empty}$	10.8 min	
$T_{detention}$	21.6 min	<b>Minimum Cycle Time OK</b>
Daily Cycles	67 cycles/day	

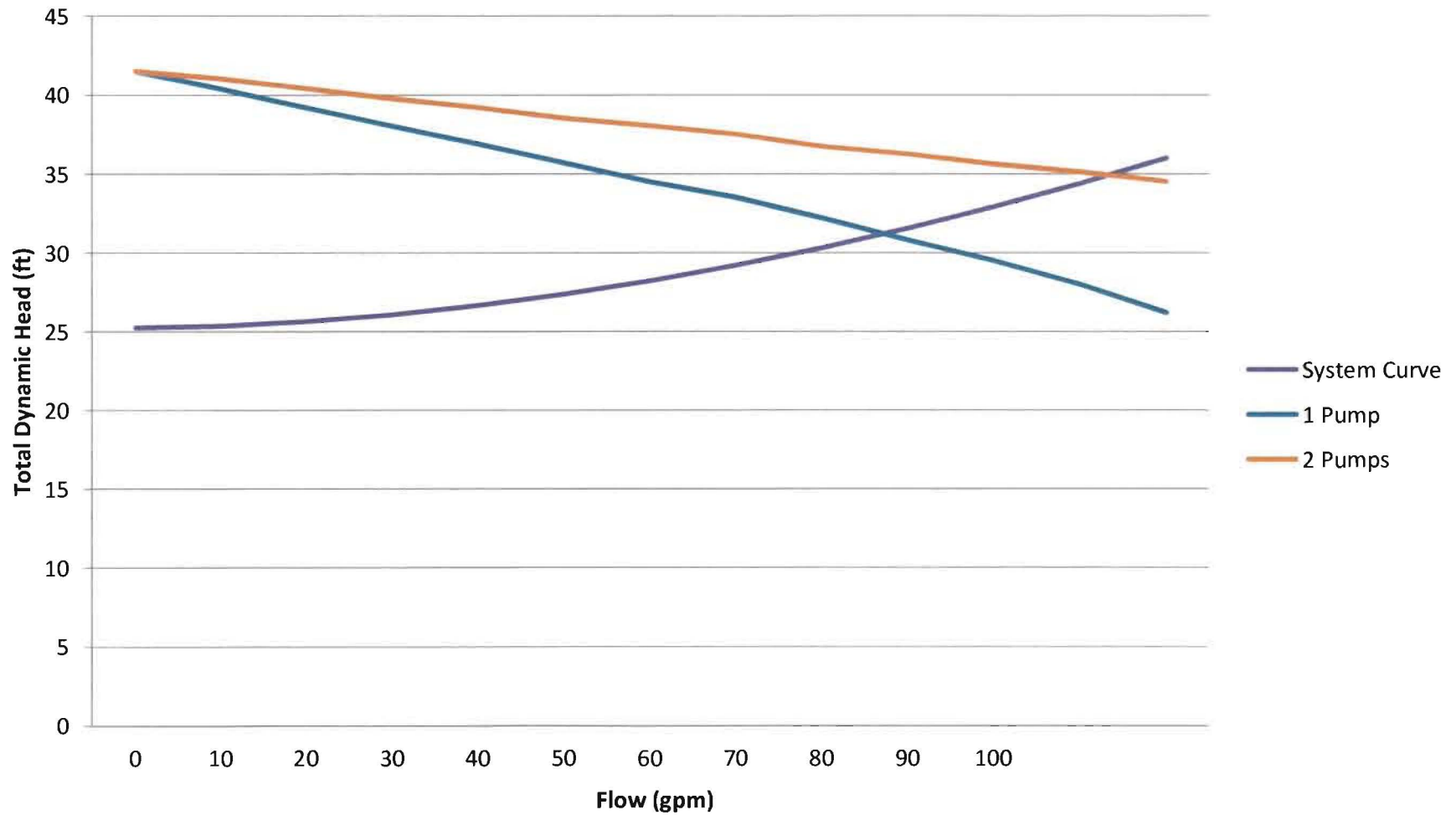
**Odor Control Req'd**



## **ATTACHMENT F      SYSTEM AND PUMP CURVES**



## Newcombe Tennis Ranch Unit 2 System and Pump Curves





System Curve						
Flow (MGD)	Flow (gpm)	EDU	Velocity (fps)	System Curve	1 Pump	2 Pumps
0.0	0	0	0.00	25.24	41.50	41.5
0.0	10	24	0.26	25.35	40.40	41
0.0	20	47	0.51	25.63	39.20	40.4
0.0	30	71	0.77	26.07	38.00	39.75
0.1	40	94	1.02	26.65	36.90	39.2
0.1	50	118	1.28	27.37	35.70	38.5
0.1	60	141	1.53	28.22	34.50	38
0.1	65	153	1.66	28.69	33.35	37.375
0.1	70	165	1.79	29.20	32.18	36.78
0.1	80	188	2.04	30.31	32.20	36.7
0.1	90	212	2.30	31.55	30.80	36.2
0.1	100	235	2.55	32.90	29.50	35.6
0.2	110	259	2.81	34.38	28.00	35.1
0.2	120	282	3.06	35.98	26.20	34.5



Company: Moeller & Associates  
 Name: James Ingalls, P.E.  
 Date: 3/22/2012



**Pump:**

Size: 83D-B-1  
 Type: 80-SERIES  
 Synch speed: Adjustable  
 Curve: 83D-B-1  
 Specific Speeds:  
 Dimensions:  
 Speed: 1900 rpm  
 Dia: 6 in  
 Impeller: 13557  
 Ns: ---  
 Nss: ---  
 Suction: 3 in  
 Discharge: 3 in

**Search Criteria:**

Flow: 80 US gpm Head: 32 ft

**Fluid:**

Water  
 SG: 1  
 Viscosity: 1.105 cP  
 NPSHa: ---  
 Temperature: 60 °F  
 Vapor pressure: 0.2563 psi a  
 Atm pressure: 14.7 psi a

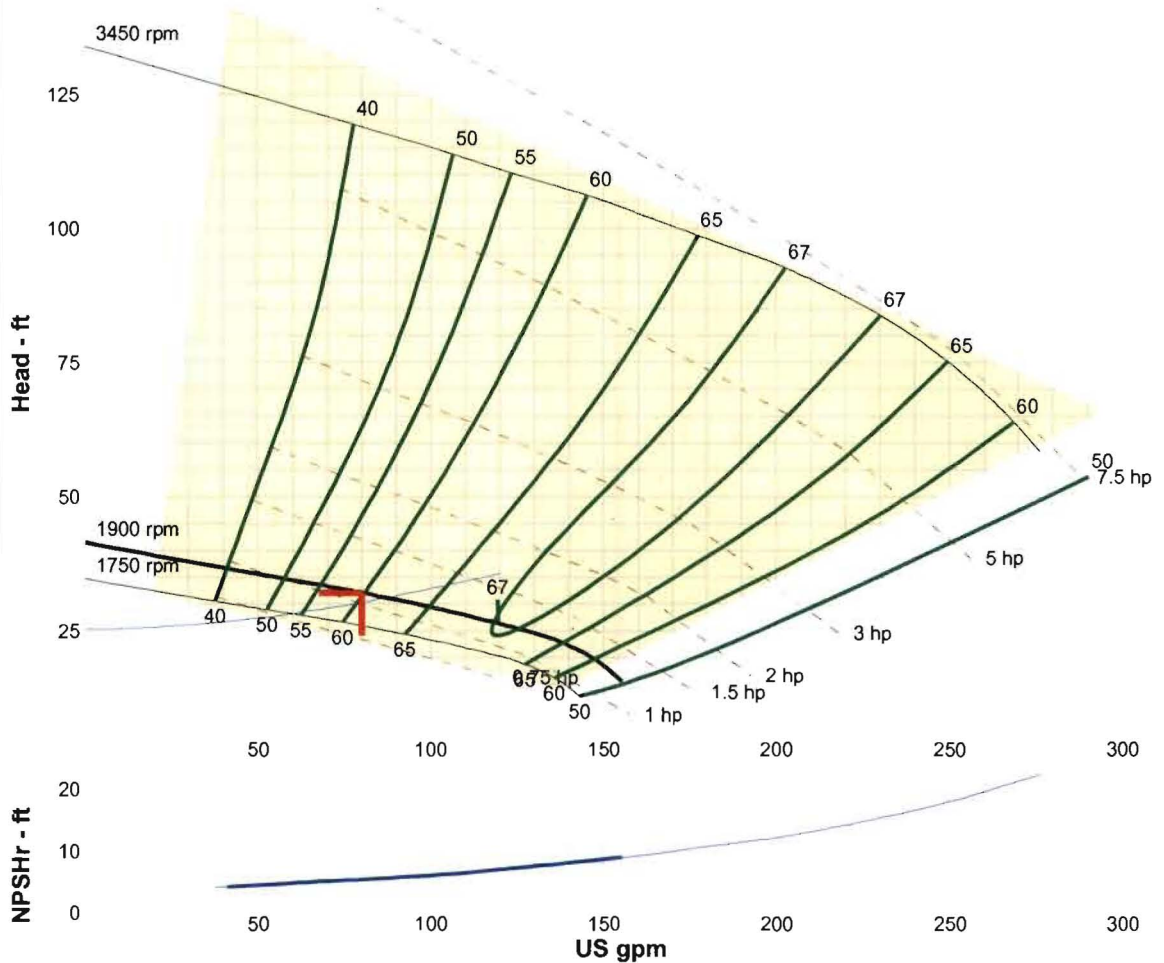
**Motor:**

Standard: NEMA  
 Enclosure: TEFC  
 Sizing criteria: Max Power on Design Curve  
 ---  
 Speed: ---  
 Frame: ---

**Pump Limits:**

Temperature: ---  
 Pressure: ---  
 Sphere size: 0.75 in  
 Power: ---  
 Eye area: ---

---- Data Point ----	
Flow:	80 US gpm
Head:	32.1 ft
Eff:	60%
Power:	1.08 hp
NPSHr:	5.43 ft
---- Design Curve ----	
Shutoff head:	41.6 ft
Shutoff dP:	18 psi
Min flow:	---
BEP:	67% @ 119 US gpm
NOL power:	1.22 hp @ 147 US gpm
-- Max Curve --	
Max power:	7.29 hp @ 249 US gpm

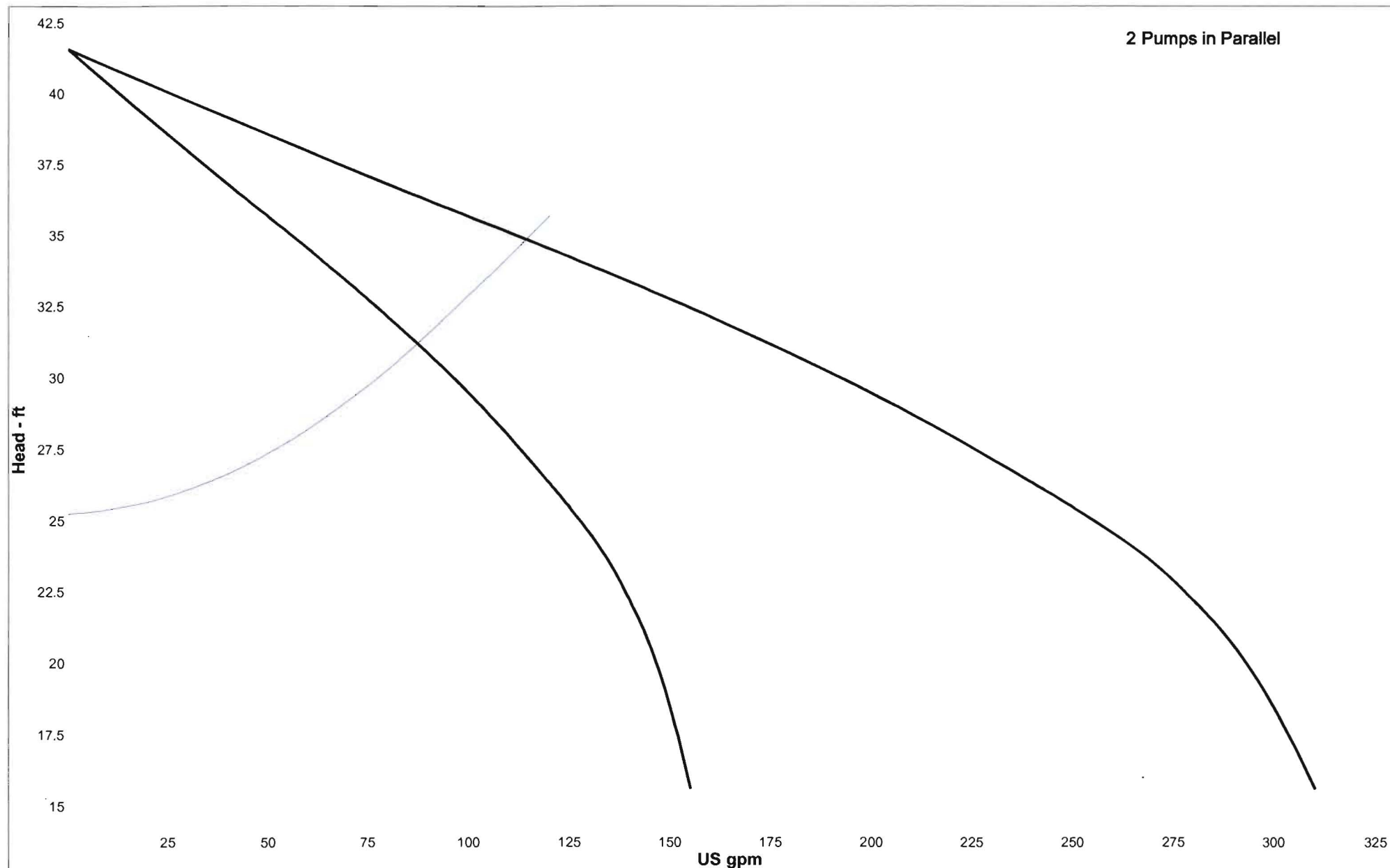


This curve is provided for preliminary selection only. Please consult factory before making final pump or motor selections.

**Performance Evaluation:**

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
96	1900	30	64	1.13	5.97
80	1900	32.1	60	1.08	5.43
64	1900	34.1	53	1.03	4.99
48	1900	35.9	44	0.974	4.49
32	1900	37.7	35	0.913	3.97





This curve is provided for preliminary selection only. Please consult factory before making final pump or motor selections.

Company: Moeller & Associates  
Name: James Ingalls, P.E.  
3/22/2012

Gorman-Rupp ES 60Hz  
Catalog: Gorman-Rupp Engineered Systems Pumps.60, Vers 4.58  
80-SERIES - Adjustable

Size: 83D-B-1  
Speed: 1900 rpm  
Dia: 6 in  
Curve: 83D-B-1  
Impeller: 13557





## **ATTACHMENT G    BIOXIDE INFORMATION**





# BIOXIDE® Solution for Odor Control

Water Technologies

**SIEMENS**





## BIOXIDE® solution is a safe, easy to handle method of odor control

To meet the needs of the industry, Siemens Water Technologies offers our BIOXIDE® solution for the elimination of odor, corrosion and safety problems associated with hydrogen sulfide in wastewater collection systems and treatment plants. BIOXIDE® solution is a unique, proven product because it achieves sewage odor control naturally, rather than chemically. This process eliminates the odor, prevents corrosion and overcomes safety concerns associated with atmospheric hydrogen sulfide.

### How BIOXIDE® solution works

BIOXIDE® solution is a process which controls hydrogen sulfide odors and corrosion biologically. Introduction of nitrate oxygen via addition of BIOXIDE® solution into a waste stream creates an environment in which certain naturally occurring bacteria thrive. These bacteria utilize the dissolved hydrogen sulfide which is present as a part of their metabolism, thereby cost effectively removing any dissolved hydrogen sulfide from the wastewater. As a result, BIOXIDE® solution both removes dissolved hydrogen sulfide and prevents its formation.

In addition to hydrogen sulfide, BIOXIDE® also combats most other odors commonly found in wastewater treatment systems.

BIOXIDE® solution has a proven track record for controlling hydrogen sulfide in a variety of collection system applications, with hundreds of installations throughout the U.S. Dissolved hydrogen sulfide concentrations of over 50 ppm are reduced to <0.1 ppm in the most severe applications.

### Why treat hydrogen sulfide?

The human nose is extremely sensitive to the presence of hydrogen sulfide (H<sub>2</sub>S) and detects it "as the smell of rotten eggs" in concentrations as low as 0.0001 parts per million (ppm). Hydrogen sulfide is often an indicator of the presence of other odors as well as a potential corrosion problem. Corrosion is caused due to the acidic nature of hydrogen sulfide.

In underground sewers or other wastewater collection systems where visual inspection is not easily accessible, the development and concentration of hydrogen sulfide causes offensive odors and corrosion can often go undetected until significant damage or failure occurs.

### Benefits of partnering with Siemens include:

- Wide range of odor control technologies; Siemens can provide a single product or combinations of products and treatment methods to provide the most cost effective solution available.
- Unmatched level of experience developed through decades of service, successfully solving thousands of odor problems.
- Regional service branch locations offer rapid response to your needs.
- Advanced technologies for controlling dose-to-demand at previously unattainable efficiencies.





## Advantages of choosing BIOXIDE® solution

### Contains no hazardous substances

One of the primary factors which should be taken into consideration when selecting any process for use in wastewater treatment systems, is the safety of those who will be handling the materials. Many options to control or eliminate odor compromise safety by reaction and flammability. Their storage and handling is often hazardous and costs are high, making them economically impracticable. BIOXIDE® solution is the only leading method of treatment for dissolved hydrogen sulfide which is not on the EPA CERCLA list of hazardous substances. This means that BIOXIDE® solution is safe for underground storage and is well suited to provide effective and affordable odor control throughout the entire collection system.

The use of BIOXIDE® solution releases no hazardous substances to the environment, nor does it expose workers or the public to potentially dangerous situations.

### Reduces Biological Oxygen Demand (BOD)

BIOXIDE® solution achieves odor control biologically and therefore, an additional benefit of its use is sewage BOD reduction. Benefits of reduced BOD include increased treatment capacity in plants otherwise limited by BOD loading.

### Treats other common sewage odors

Hydrogen sulfide is normally the predominant sewage odor problem. However, other odorous sulfur compounds such as mercaptans and organic sulfides can also contribute to odor problems. The biological environment created by BIOXIDE® solution will effectively remove these problem compounds as well.

### Arrests corrosion

Collection system and treatment plant equipment and structures of concrete or metal are severely corroded by atmospheric hydrogen sulfide. While no product can reverse the damage already caused by existing corrosion, BIOXIDE® solution reduces further corrosion by effectively eliminating dissolved hydrogen sulfide, the source of atmospheric hydrogen sulfide.

### Family of BIOXIDE® solutions

#### BIOXIDE® AE solution

BIOXIDE® AE solution is a patented product developed to take advantage of the benefits of our BIOXIDE® solution along with the addition of extra alkalinity into the process to increase the benefits of using one or the other chemical solution alone.

#### Ideal applications for BIOXIDE® AE solution include:

- Treatment systems where additional alkalinity is beneficial
- Low-velocity collection lines
- Biosolids storage

#### BIOXIDE - AQ® solution

BIOXIDE - AQ® solution is a patented product which combines our BIOXIDE® solution with the addition of AQUIT® solution to form a powerful hydrogen sulfide removal and prevention system. BIOXIDE - AQ® solution partially blocks the ability of anaerobes to utilize sulfate as an oxygen source and slows biological generation.

#### Ideal applications for BIOXIDE - AQ® solution include:

- Collection systems with long detention times
- Low-velocity collection lines
- Biosolids storage





## When compared to alternative methods, BIOXIDE® solution excels in efficiency, safety and cost effectiveness

There are many different technologies that can be applied to control odors from wastewater collection and treatment systems. These technologies can be split into two main groups; vapor phase technologies, used to control odorous compounds in the air or gas and liquid phase technologies, used to control odorous compounds in the liquid wastewater itself.

### **BIOXIDE® solution vs. chemical oxidizers**

Chemical oxidizers such as chlorine, hydrogen peroxide and potassium Permanganate are commonly used to control hydrogen sulfide odor. When compared to BIOXIDE® solution, these chemicals pose high reactivity and flammability risks, thus requiring expensive storage and handling techniques and equipment to overcome safety hazards.

In addition, chemical oxidizers trigger a chemical, rather than a biological, reaction within the system. The oxidizing mechanism of these products is not specific to hydrogen sulfide and therefore, excess dosage (compared to theoretical) is typical. This contributes to the relatively higher cost.

### **BIOXIDE® solution vs. pH adjustment**

If using sodium hydroxide to adjust the pH level and the level becomes greatly elevated, this method may kill many helpful organisms present in the sewage and detriment plant operations.

Furthermore, caustic treatment used for pH adjustment cannot be sustained on a continuous basis. In contrast, BIOXIDE® solution is suited for continuous treatment making it a much more effective, and consistent method of odor control.

### **BIOXIDE® solution vs. metal salts**

Metal salts are typically an economical treatment method for dissolved hydrogen sulfide control, however, in being specific to the removal of hydrogen sulfide only, they commonly leave other odor compounds untreated. BIOXIDE® solution provides equivalent treatment and cost effectiveness, but does so in a natural manner which also affects additional odor causing compounds. BIOXIDE® solution also provides BOD reduction.

### **BIOXIDE® solution vs. vapor phase treatment**

Vapor phase technologies, such as adsorption systems or air scrubbers, control odors by ventilating and treating the atmosphere in one geographic area. BIOXIDE® solution controls odor compounds within the sewage, thereby preventing their release to the atmosphere. BIOXIDE® solution prevents the odor problem at its source, while vapor phase technologies treat the problem after it already exists. BIOXIDE® solution also eliminates the severe corrosion caused by atmospheric hydrogen sulfide, making it a significantly more effective means of reducing corrosion than vapor phase treatment.

### **BIOXIDE® solution vs. bacteria addition**

The addition of volumes of "new" bacteria is not effective in controlling hydrogen sulfide because the sewage is not conducive to their growth. The difficulty in achieving consistent dosage and lack of stability contribute to the ineffectiveness and high cost of bacteria addition. The BIOXIDE® solution process provides the nutrients via a stable, easily metered aqueous solution, which promotes the growth of naturally occurring bacteria within the sewage collection system.





### Full Service Odor Control

Siemens Water Technologies is a recognized leader in the development of innovative products for the control of odors in wastewater collection and treatment systems. We offer a full range of treatment options, including our proprietary BIOXIDE®, AQUIT® and ODOPHOS® solutions, as well as other proven technologies for addressing odor. Due to site variation, there is no single best solution, nor is there a "one size fits all" approach to solving every odor and corrosion control application. Siemens' treatment recommendations are based on data collected at your site and may include one or more odor control products to achieve the best results and in a cost effective manner. With a complete selection of odor control products, Siemens can customize the right solution for your specific odor control problem. And, should your odor control system require follow-up service, Siemens extensive field experience and operational expertise are available from one of our local service branch locations.

### Services available for Odor and Corrosion control

- Installation Assistance
- Preventative maintenance and service contracts
- Process evaluation and optimization services
- Rehab and retrofit services
- Analytical and laboratory testing
- Plant control and instrumentation upgrades
- System survey and sampling
- Remote monitoring
- Parts and expendables
- Temporary/emergency odor control systems

Siemens Water Technologies delivers cost-effective, reliable systems guaranteed for quality, safety, and compliance. Our trained service staff is available to make sure your system is running at peak performance and to your specification. For your water treatment system, choose the partner that is committed to taking care of the world's water...and yours.



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MS-BIOXIDE-8R-0309  
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## ATTACHMENT H    SPECIFIC PIPE INFORMATION



## Specific Pipe Information

Newcombe Tennis Ranch - Unit 2 Gravity Sewer						
Sanitary Sewer Line	Diameter (in)	Length (ft)	Slope <sub>min</sub> (%)	Slope <sub>max</sub> (%)	Velocity <sub>min</sub> (ft/s)	Velocity <sub>max</sub> (ft/s)
SSL A	8"	871.28	0.33	1.85	2.00	4.71
SSL B	8"	268.00	1.05	4.56	3.55	7.39
SSL C	8"	924.95	0.33	0.33	2.00	2.00
SSL D	8"	1,513.79	0.33	1.12	2.00	3.66
SSL E	8"	22.48	0.54	0.54	2.54	2.54
SSL F	8"	283.94	0.33	0.33	2.00	2.00
SSL G	8"	56.00	0.33	0.33	2.00	2.00

\* All pipe to be SDR 26 PVC pipe conforming to ASTM D 3034 and ASTM D 3212

Newcombe Tennis Ranch - Unit 2 Sewer Pipe Stiffness & Buckling Summary						
Diameter (in)	Material	Length (ft)	Stiffness (psi)	Depth <sub>min</sub> (ft)	Depth <sub>max</sub> (ft)	Deflection <sub>max</sub> (%)
4	C-900 DR 25	1,010	129	4.0	4.0	0.76
8	C-900 DR 18	126	364	6.0	12.0	0.87
8	SDR 26	4,014	115	6.0	12.0	1.28

\*All proposed pipe maintains a depth of less than 17 feet and a stiffness greater than 46 psi.  
Per TAC 30 217.53(k)(4) the calculations for structural failure are not required.

## Pipe Stiffness

Pipe stiffness labeled in the table above came from the "Handbook of PVC Pipe" Table 7.1 below.

TABLE 7.1  
MINIMUM PVC PIPE STIFFNESS (psi)

DR or SDR	Min. E = 400,000 psi	Min. E = 440,000 psi	Min. E = 500,000 psi
64	7	8	9
51	14	16	18
42	26	29	32
41	28	31	35
35	46	50	57
33.5	52	57	65
32.5	57	63	71
28	91	100	114
26	115	126	144
25	129	142	161
23.5	157	173	196
21	224	246	279
18	364	400	455
17	437	480	546
14	815	895	1,019
13.5	916	1,007	1,145



## **Pipe Deflection**

Pipe deflection was determined using the attached Table 7.4 from the "Handbook of PVC Pipe". The load case for this project is H20 due to the presence of a live load with an embedment material modulus of  $E' = 1000 \text{ psi}$ .  $E'$  was selected from a Table 6-4 of values published by the Plastics Pipe Institute that matched NBU Specification Item 510 for Bedding Material. NBU Specification Item 510 mentions a gradation that closely matches the gradation of Type 1-A bedding identified in the ASTM 2321. As outlined in the specifications, Bedding Material is dumped into the trench and shaped to the proper thickness without any compaction. This corresponds to the "Dumped" Class 1-A ASTM 2321 soil in the table with an associated modulus of 1,000 psi. See attached Table 6-4 and NBU 510 specification. Due to the varying depths, a deflection for both the minimum and maximum cover were identified with a red box in the attached Table 7.4 to show both extremes for each pipe.



**Table 7.4**  
**CALCULATED DEFLECTIONS OF BURIED PVC PRESSURE PIPE**  
**DEFLECTION (PERCENT) FOR PRISM, HIGHWAY H20, OR RAILWAY E80 LOADS**

Height of Cover	2'			4'			6'			8'			10'		
Live Load	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80
E' Value	<b>DR 14</b>														
50	0.13	0.58	2.25	0.27	0.49	1.75	0.40	0.51	1.66	0.54	0.59	1.43	0.67	0.67	1.28
200	0.12	0.54	2.10	0.25	0.46	1.63	0.37	0.48	1.54	0.50	0.55	1.33	0.62	0.62	1.20
400	0.11	0.50	1.92	0.23	0.42	1.49	0.34	0.44	1.42	0.46	0.50	1.22	0.57	0.57	1.10
1000	0.09	0.40	1.54	0.18	0.34	1.19	0.27	0.35	1.13	0.37	0.40	0.97	0.46	0.46	0.88
2000	0.07	0.30	1.15	0.14	0.25	0.89	0.21	0.26	0.85	0.27	0.30	0.73	0.34	0.34	0.66
E' Value	<b>DR 18</b>														
50	0.29	1.26	4.89	0.58	1.07	3.79	0.87	1.11	3.60	1.16	1.28	3.10	1.45	1.45	2.79
200	0.25	1.09	4.22	0.50	0.92	3.27	0.75	0.96	3.10	1.00	1.11	2.67	1.25	1.25	2.40
400	0.21	0.92	3.57	0.42	0.78	2.76	0.64	0.81	2.62	0.85	0.94	2.26	1.06	1.06	2.03
1000	0.14	0.63	2.43	0.29	0.53	1.89	0.43	0.55	1.79	0.58	0.64	1.54	0.72	0.72	1.39
2000	0.09	0.41	1.59	0.19	0.35	1.23	0.28	0.36	1.17	0.38	0.42	1.01	0.47	0.47	0.91
E' Value	<b>DR 21</b>														
50	0.46	1.99	7.71	0.92	1.68	5.97	1.37	1.76	5.67	1.83	2.02	4.89	2.29	2.29	4.39
200	0.37	1.59	6.16	0.73	1.34	4.77	1.10	1.40	4.53	1.46	1.62	3.90	1.83	1.83	3.51
400	0.29	1.25	4.86	0.58	1.06	3.76	0.87	1.11	3.57	1.15	1.27	3.08	1.44	1.44	2.77
1000	0.18	0.77	2.97	0.35	0.65	2.30	0.53	0.68	2.19	0.71	0.78	1.88	0.88	0.88	1.69
2000	0.11	0.47	1.81	0.21	0.39	1.40	0.32	0.41	1.33	0.43	0.47	1.14	0.54	0.54	1.03
E' Value	<b>DR 25</b>														
50	0.75	3.23	12.56	1.49	2.74	9.73	2.24	2.86	9.23	2.98	3.29	7.96	3.73	3.73	7.15
200	0.53	2.29	8.91	1.06	1.94	6.90	1.59	2.03	6.55	2.12	2.34	5.65	2.65	2.65	5.07
400	0.38	1.65	6.42	0.76	1.40	4.97	1.14	1.46	4.72	1.53	1.68	4.07	1.91	1.91	3.66
1000	0.21	0.90	3.49	0.42	0.76	2.71	0.62	0.80	2.57	0.83	0.92	2.21	1.04	1.04	1.99
2000	0.12	0.51	1.99	0.24	0.43	1.54	0.35	0.45	1.46	0.47	0.52	1.26	0.59	0.59	1.13

$$\% \frac{\Delta Y}{D} = \frac{(D_L K P + K W') \chi 100}{[2 E (3 (D R - 1)^3)] + 0.061 E'}$$

Note: Calculation Based on soil weight (w) = 120 pcf

Where:

- P = Prism Load, psi
- K = Bedding Constant, 0.1
- W' = Live Load, psi
- DR = Dimension Ratio
- E = 400,000 psi
- E' = Modulus of Soil Reaction, psi
- D<sub>L</sub> = Deflection Lag Factor, 1.0



**Table 7.4 (cont.)**  
**CALCULATED DEFLECTIONS OF BURIED PVC PRESSURE PIPE**  
**DEFLECTION (PERCENT) FOR PRISM, HIGHWAY H20, OR RAILWAY E80 LOADS**

Height of Cover Live Load E' Value	2'			4'			6'			8'			10'		
	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80
<b>DR 26</b>															
50	0.83	3.59	13.95	1.66	3.04	10.80	2.49	3.18	10.26	3.31	3.66	8.84	4.14	4.14	7.94
200	0.57	2.47	9.59	1.14	2.09	7.43	1.71	2.18	7.05	2.28	2.51	6.07	2.85	2.85	5.46
400	0.40	1.74	6.77	0.80	1.47	5.24	1.21	1.54	4.98	1.61	1.77	4.29	2.01	2.01	3.85
1000	0.21	0.93	3.59	0.43	0.78	2.78	0.64	0.82	2.64	0.85	0.94	2.28	1.07	1.07	2.05
2000	0.12	0.52	2.02	0.24	0.44	1.56	0.36	0.46	1.48	0.48	0.53	1.28	0.60	0.60	1.15
E' Value	<b>DR 32.5</b>														
50	1.44	6.24	24.22	2.88	5.28	18.77	4.32	5.52	17.81	5.76	6.35	15.35	7.20	7.20	13.79
200	0.80	3.49	13.53	1.61	2.95	10.48	2.41	3.08	9.95	3.22	3.55	8.57	4.02	4.02	7.70
400	0.51	2.19	8.52	1.01	1.86	6.60	1.52	1.94	6.26	2.02	2.23	5.40	2.53	2.53	4.85
1000	0.24	1.04	4.04	0.48	0.88	3.13	0.72	0.92	2.97	0.96	1.06	2.56	1.20	1.20	2.30
2000	0.13	0.55	2.15	0.26	0.47	1.66	0.38	0.49	1.58	0.51	0.56	1.36	0.64	0.64	1.22
E' Value	<b>DR 41</b>														
50	2.31	10.01	38.88	4.62	8.47	30.12	6.93	8.85	28.59	9.24	10.19	24.63	11.55	11.55	22.13
200	1.02	4.42	17.14	2.04	3.74	13.28	3.05	3.90	12.60	4.07	4.49	10.86	5.09	5.09	9.76
400	0.58	2.53	9.82	1.17	2.14	7.61	1.75	2.24	7.22	2.33	2.58	6.22	2.92	2.92	5.59
1000	0.26	1.11	4.31	0.51	0.94	3.34	0.77	0.98	3.17	1.02	1.13	2.73	1.28	1.28	2.45
2000	0.13	0.57	2.22	0.26	0.48	1.72	0.40	0.51	1.64	0.53	0.58	1.41	0.66	0.66	1.27
E' Value	<b>DR 51</b>														
50	3.22	13.94	54.13	6.43	11.79	41.93	9.65	12.33	39.80	12.86	14.19	34.30	16.08	16.08	30.82
200	1.16	5.04	19.57	2.33	4.27	15.16	3.49	4.46	14.39	4.65	5.13	12.40	5.81	5.81	11.14
400	0.63	2.72	10.57	1.26	2.30	8.19	1.88	2.41	7.78	2.51	2.77	6.70	3.14	3.14	6.02
1000	0.26	1.14	4.44	0.53	0.97	3.44	0.79	1.01	3.27	1.06	1.17	2.82	1.32	1.32	2.53
2000	0.13	0.58	2.26	0.27	0.49	1.75	0.40	0.51	1.66	0.54	0.59	1.43	0.67	0.67	1.29



**Table 7.4 (cont.)**  
**CALCULATED DEFLECTIONS OF BURIED PVC PRESSURE PIPE**  
**DEFLECTION (PERCENT) FOR PRISM, HIGHWAY H20, OR RAILWAY E80 LOADS**

Height of Cover	12'			14'			16'			18'			20'		
Live Load	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80
E' Value	<b>DR 14</b>														
50	0.80	0.80	1.25	0.94	0.94	1.27	1.07	1.07	1.35	1.21	1.21	1.43	1.34	1.34	1.51
200	0.75	0.75	1.16	0.87	0.87	1.19	1.00	1.00	1.26	1.12	1.12	1.33	1.25	1.25	1.40
400	0.69	0.69	1.07	0.80	0.80	1.09	0.91	0.91	1.15	1.03	1.03	1.22	1.14	1.14	1.29
1000	0.55	0.55	0.85	0.64	0.64	0.87	0.73	0.73	0.92	0.82	0.82	0.97	0.91	0.91	1.03
2000	0.41	0.41	0.64	0.48	0.48	0.65	0.55	0.55	0.69	0.62	0.62	0.73	0.68	0.68	0.77
E' Value	<b>DR 18</b>														
50	1.74	1.74	2.71	2.04	2.04	2.76	2.33	2.33	2.93	2.62	2.62	3.10	2.91	2.91	3.27
200	1.50	1.50	2.34	1.75	1.75	2.38	2.01	2.01	2.53	2.26	2.26	2.67	2.51	2.51	2.82
400	1.27	1.27	1.98	1.48	1.48	2.01	1.69	1.69	2.14	1.91	1.91	2.26	2.12	2.12	2.38
1000	0.87	0.87	1.35	1.01	1.01	1.37	1.16	1.16	1.46	1.30	1.30	1.54	1.45	1.45	1.63
2000	0.57	0.57	0.88	0.66	0.66	0.90	0.76	0.76	0.95	0.85	0.85	1.01	0.95	0.95	1.06
E' Value	<b>DR 21</b>														
50	2.75	2.75	4.28	3.21	3.21	4.35	3.66	3.66	4.62	4.12	4.12	4.89	4.58	4.58	5.15
200	2.20	2.20	3.42	2.56	2.56	3.48	2.93	2.93	3.69	3.29	3.29	3.90	3.66	3.66	4.12
400	1.73	1.73	2.70	2.02	2.02	2.74	2.31	2.31	2.91	2.60	2.60	3.08	2.89	2.89	3.25
1000	1.06	1.06	1.65	1.24	1.24	1.68	1.41	1.41	1.78	1.59	1.59	1.88	1.77	1.77	1.99
2000	0.64	0.64	1.00	0.75	0.75	1.02	0.86	0.86	1.08	0.97	0.97	1.14	1.07	1.07	1.21
E' Value	<b>DR 25</b>														
50	4.48	4.48	6.97	5.22	5.22	7.09	5.97	5.97	7.52	6.71	6.71	7.96	7.46	7.46	8.39
200	3.18	3.18	4.94	3.70	3.70	5.03	4.23	4.23	5.34	4.76	4.76	5.65	5.29	5.29	5.95
400	2.29	2.29	3.56	2.67	2.67	3.62	3.05	3.05	3.85	3.43	3.43	4.07	3.81	3.81	4.29
1000	1.25	1.25	1.94	1.45	1.45	1.97	1.66	1.66	2.09	1.87	1.87	2.21	2.08	2.08	2.33
2000	0.71	0.71	1.10	0.83	0.83	1.12	0.94	0.94	1.19	1.06	1.06	1.26	1.18	1.18	1.33



**Table 7.4 (cont.)**  
**CALCULATED DEFLECTIONS OF BURIED PVC PRESSURE PIPE**  
**DEFLECTION (PERCENT) FOR PRISM, HIGHWAY H20, OR RAILWAY E80 LOADS**

Height of Cover Live Load	12'			14'			16'			18'			20'		
	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80	Prism	H20	E80
E' Value	<b>DR 26</b>														
50	4.97	4.97	7.73	5.80	5.80	7.87	6.63	6.63	8.35	7.46	7.46	8.84	8.29	8.29	9.32
200	3.42	3.42	5.32	3.99	3.99	5.41	4.56	4.56	5.74	5.13	5.13	6.08	5.69	5.69	6.41
400	2.41	2.41	3.75	2.81	2.81	3.82	3.22	3.22	4.05	3.62	3.62	4.29	4.02	4.02	4.52
1000	1.28	1.28	1.99	1.49	1.49	2.03	1.71	1.71	2.15	1.92	1.92	2.28	2.13	2.13	2.40
2000	0.72	0.72	1.12	0.84	0.84	1.14	0.96	0.96	1.21	1.08	1.08	1.28	1.20	1.20	1.35
E' Value	<b>DR 32.5</b>														
50	8.63	8.63	13.43	10.07	10.07	13.67	11.51	11.51	14.51	12.95	12.95	15.35	14.39	14.39	16.19
200	4.82	4.82	7.51	5.63	5.63	7.64	6.43	6.43	8.11	7.24	7.24	8.58	8.04	8.04	9.04
400	3.04	3.04	4.72	3.54	3.54	4.81	4.05	4.05	5.10	4.55	4.55	5.40	5.06	5.06	5.69
1000	1.44	1.44	2.24	1.68	1.68	2.28	1.92	1.92	2.42	2.16	2.16	2.56	2.40	2.40	2.70
2000	0.77	0.77	1.19	0.89	0.89	1.21	1.02	1.02	1.29	1.15	1.15	1.36	1.28	1.28	1.44
E' Value	<b>DR 41</b>														
50	13.86	13.86	21.56	16.17	16.17	21.94	18.48	18.48	23.28	20.79	20.79	24.64	23.09	23.09	25.98
200	6.11	6.11	9.51	7.13	7.13	9.68	8.15	8.15	10.27	9.16	9.16	10.86	10.18	10.18	11.45
400	3.50	3.50	5.45	4.08	4.08	5.54	4.67	4.67	5.88	5.25	5.25	6.22	5.83	5.83	6.56
1000	1.53	1.53	2.39	1.79	1.79	2.43	2.05	2.05	2.58	2.30	2.30	2.73	2.56	2.56	2.88
2000	0.79	0.79	1.23	0.92	0.92	1.26	1.06	1.06	1.33	1.19	1.19	1.41	1.32	1.32	1.49
E' Value	<b>DR 51</b>														
50	19.29	19.29	30.02	22.51	22.51	30.55	25.72	25.72	32.42	28.94	28.94	34.30	32.15	32.15	36.17
200	6.98	6.98	10.86	8.14	8.14	11.05	9.30	9.30	11.72	10.47	10.47	12.40	11.63	11.63	13.08
400	3.77	3.77	5.86	4.40	4.40	5.97	5.03	5.03	6.33	5.65	5.65	6.70	6.28	6.28	7.07
1000	1.58	1.58	2.46	1.85	1.85	2.51	2.11	2.11	2.66	2.38	2.38	2.82	2.64	2.64	2.97
2000	0.81	0.81	1.25	0.94	0.94	1.28	1.07	1.07	1.35	1.21	1.21	1.43	1.34	1.34	1.51



**Table 6-4**

**Backfill Class and Quality**

Pipe Embedment Material						E', psi (kPa) for Degree of Embedment Compaction				
ASTM D 2321*		ASTM D 2487		AASHTO M43	Min. Std. Proctor Density (%)	Lift Placement Depth	Dumped	Slightly < 85%	Moderate 85% - 95%	High > 95%
Class	Description	Notation	Description	Notation						
IA	Open-graded, clean manu-factured aggregates	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	5 56	Dumped	18" (0.45 m)	1000 (6,900)	3000 (20,700)	3000 (20,700)	3000 (20,700)
IB	Dense-graded, clean manu-factured, processed aggregates	N/A	Angular crushed stone or other Class IA material and stone/sand mixtures; little or no fines							
II	Clean, coarse-grained soils	GW	Well-graded gravel, gravel/sand mixtures; little or no fines	57 6 67	85%	12" (0.30 m)	N/R	1000 (6,900)	2000 (13,800)	3000 (20,700)
		GP	Poorly graded gravel, gravel/sand mixtures; little or no fines							
		SW	Well-graded sands, gravelly sands; little or no fines							
		SP	Poorly graded sands, gravelly sands; little or no fines							
III	Coarse-grained soils with fines	GM	Silty gravels, gravel/sand/silt mixtures	Gravel and sand with <10% fines	90%	9" (0.20 m)	N/R	N/R	1000 (6,900)	2000 (13,800)
		GC	Clayey gravels, gravel/sand/clay mixtures							
		SM	Silty sands, sand/silt mixtures							
		SC	Clayey sands, sand/clay mixtures							
IVA**	Inorganic fine-grained soils	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity				N/R	N/R	N/R	1000 (6,900)
		CL	Inorganic clays of low to medium plasticity; gravelly, sandy or silty clays; lean clays							
IVB	Inorganic fine-grained soils	MH	Inorganic silts, macaceous or diamaceous fine sandy or silty soils, elastic soils				N/R	N/R	N/R	N/R
		CH	Inorganic clays of high plasticity, fat clays							
V	Organic or highly organic soils	OL	Organic silts and organic silty clays of low plasticity				N/R	N/R	N/R	N/R
		OH	Organic clays of medium to high plasticity, organic silts							
		PT	Peat and other high organic soils							

N/R: Use not recommended by ASTM D 2321 for part of the backfill envelope.

\*Refer to ASTM D 2321 for more complete soil descriptions.

\*\*Use under the direction of a soils expert.



## **ATTACHMENT I     MATERIAL SPECIFICATIONS**



SUBMITTALS

CHARLOTTE'S CONCRETE, INC.  
4950 LANE DRIVE  
SAN ANTONIO, TX 78263

(210) 648-4774 PH.  
(210) 648-0556 FAX

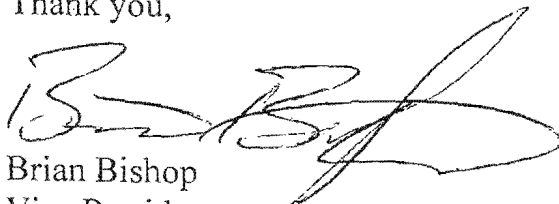


Charlotte's Concrete, Inc.  
4950 Lane Drive  
San Antonio, TX 78263

### CERTIFICATE OF COMPLIANCE

Portland Cement from Capitol Cement Company meets ASTM C-150 specifications. All precast manhole sections manufactured with Capitol Cement Company meet ASTM C-478 and/or C-913-07A specifications.

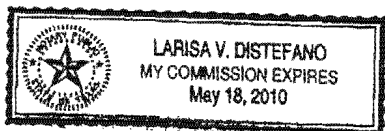
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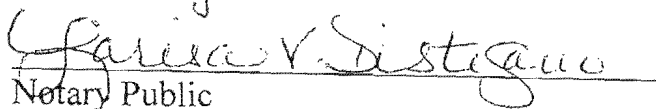
  
Brian Bishop  
Vice President

STATE OF TEXAS  
COUNTY OF BEXAR

SWORN AND SUBSCRIBED TO BEFORE ME THIS 4<sup>th</sup> DAY  
OF March, 2008.

My commission expires: May 18, 2010



  
Notary Public



Charlotte's Concrete, Inc.  
4950 Lane Drive  
San Antonio, TX 78263  
Ph-210-648-4774 Fx-210-648-0556

All precast manhole manufactured by Charlotte's Concrete Inc. will be manufactured in accordance with plans and specifications. Base sections with inverts shall have a standard yield of 2.17 or will vary due to pipe size and influent elevation. Riser sections are manufactured 12", 18", 24", 36", 48", and 60" standard heights. Flattops are used only when shown on plans or in a flood plain area and are to have a ring and cover cast in.

Cement shall be Portland cement conforming to ASTM C 150 Type I or Type III, and shall be properly vibrated and inspected to assure quality. All reinforcing steel meets or exceeds ASTM specifications.

Bases in 4' diameter range from 16" to 54" yield from flow line out to top of base with 7" of floor below pipe. Bases in 5' or 6' diameter range from 24" to 54" yield in 5' type or compression type connections will be used depending on design specifications to insure no leakage. Size of connections are determined by pipe sizes and types. All connections meet or exceed ASTM-923 specifications.

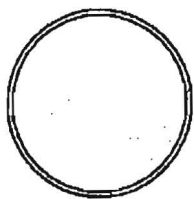
Precast riser sections and base sections have a single offset type joint or 7R type joint at spigot end if each section to accommodate a profile type gasket or o-ring type gasket. Both gaskets meet or exceed ASTM C-443-85A, ASTM C-443 and ASTM C-316A.

All invert channels are constructed secondary to the base section per plan and specifications to insure a smooth and uniform flow. All invert benches are constructed on a standard  $\frac{1}{2}$ " per foot slope or to plan specifications.

Cone sections vary from 18" to 32" in height and can be produced with concentric or eccentric openings with either 24" openings or 34  $\frac{1}{2}$ " openings. Flattops yield 9" to 12" and can be produced with the above mentioned openings. All cone sections and flattop sections meet or exceed ASTM C-478 specifications.

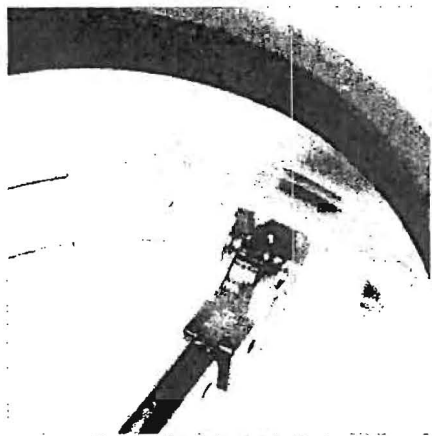
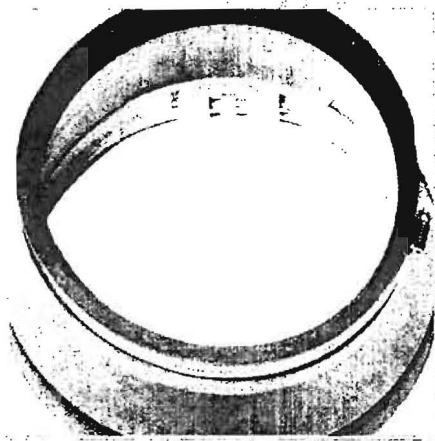
All riser sections, base sections, cone sections, and flattops are produced with the lift inserts for safe handling and installation.





# PSX:DIRECT DRIVE

PSX has always set the standard for watertight pipe-to-structure connections. **PSX: Direct Drive™** offers all of the sealing and durability advantages of PSX, combined with easy installation and adjustability. Using all stainless-steel components and polyisoprene rubber, PSX: Direct Drive is stronger than ever, and the unique adjusting mechanism makes installation simple.



## The PSX: Direct Drive Difference

PSX: Direct Drive uses a simple all stainless steel adjuster. From outside the manhole, a small, pre-set torque wrench ratchets around the adjuster nut, opening both sides of the sleeve quickly and evenly. The breakover design wrench signals when the proper torque is reached, fully compressing the rubber against the manhole opening. Both cored and cast holes can now have the benefit of PSX sealing with the ease of wrench adjustability; the best of both worlds.

## PSX: Direct Drive Advantages:

- \* Installs quickly and easily from outside the manhole
- \* Requires no retightening or adjustment before shipment/installation
- \* All stainless-steel components - No plastic wedges to crack or break
- \* Easily accommodates hole size variation



P.O. Box 10482, Fort Wayne, Indiana 46852

Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: [sales@press-seal.com](mailto:sales@press-seal.com) Web: [www.press-seal.com](http://www.press-seal.com)



## PRODUCT SPECIFICATIONS

PSX: Direct Drive meets and/or exceeds all requirements of ASTM C-923, including physical properties of materials and performance testing. Performance testing includes:

- \* 13 psi in straight alignment
- \* 10 psi at minimum 7° angle
- \* 10 psi under shear load of 150 lbs/in. pipe diameter

PSX: Direct Drive meets and/or exceeds the following specifications:

- \* ASTM C-923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
- \* ASTM C-1478 Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals.
- \* ASTM C-1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

## APPLICATIONS

- \* Sanitary sewers
- \* Storm sewers
- \* Septic tanks
- \* Valve vaults
- \* Lift and pump stations
- \* Commercial vaults
- \* Circular or straight-wall structures

## PIPE INSTALLATION

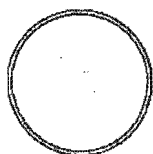
1. Clean pipe and boot to ensure no dirt or foreign materials are present.
2. Clamping surface on pipe must be clean and smooth.
3. Center pipe in opening and insert until pipe breaks the inside plane of manhole.
4. Attach take-up clamp(s) and stagger screw(s) of clamp(s) around the groove of the gasket so that take-up pressure will be equalized. Make sure each clamp is completely in the correct groove.
5. Using a torque ratchet or torque wrench, gradually tighten all screw(s) of clamp(s) in an alternating pattern to 60 lbs/in. torque.
6. After reaching 60 lbs/in. torque on final screw, check all screws again to ensure compression of all clamps.
7. Vacuum testing shall be conducted in accordance with ASTM C-1244-02.
8. Adjust pipe to line and grade. Use proper bedding, backfill materials, and techniques so that pipe deflection and deformation are minimized.
9. Any pipe stubs installed in the manhole must be positively restrained from movement per ASTM-C923. Press-Seal Gasket is not responsible for failure due to unrestrained pipe stubs for future connections.

## Why Specify PSX: Direct Drive

**PSX: Direct Drive** is the pipe-to-structure connector that finally satisfies all critical design and performance requirements: rugged construction of the adjuster and band; superior strength and toughness of polyisoprene rubber; and the proven sealing performance of PSX. It's the one adjustable connector that doesn't make you compromise sealing for convenience or price: **PSX: Direct Drive**.

U.S. Patent No. 6805359  
Copyright 2005 by Press-Seal Gasket Corporation

Press-Seal believes all information is accurate as of its publication date. Information, specifications, and prices are all subject to change without notice. Press-Seal is not responsible for any inadvertent errors.

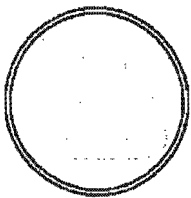


**PRESS-SEAL GASKET CORPORATION**

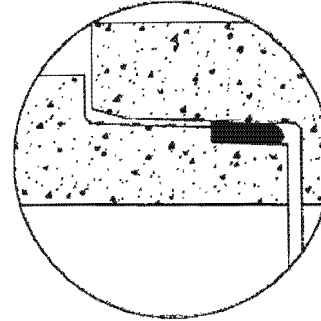
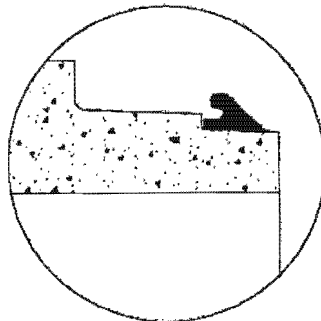
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## PROFILE GASKETS SINGLE STEP JOINTS



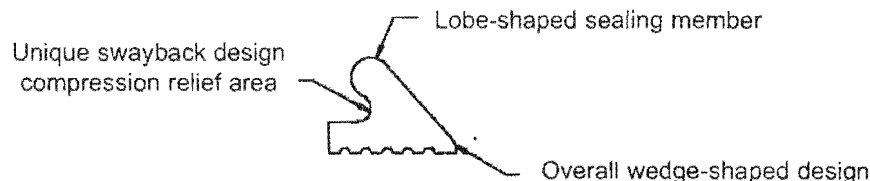
**The Type 4G & 4F Profiles Employ Special Cross Section Features For The Single Step Concrete Joint Design.**

Press-Seal Gasket has always been a pioneer in the development of pipe joining solutions, and our 4G and 4F Profile Gaskets are the latest in a series of design breakthroughs.

Single Step joints make concrete pipe and manhole production easier and more profitable, and the 4G and 4F make sealing of single step joints for concrete pipe and manholes reliable and economical. Press-Seal Gasket offers the Type 4G and 4F profiles in a wide variety of sizes and compounds for virtually any single step joint application. These gaskets represent years of successful use under the most demanding conditions. Our engineering department can easily determine which 4G and 4F is right for your sanitary, storm, manhole, and box culvert needs. We also offer complete joint design service for those producers interested in converting equipment to the single step design. Re-tooling to make the single step joint design makes sense for progressive producers, whether converting existing O-Ring joint equipment or purchasing new.

All Type 4G & 4F designs meet and/or exceed the Physical Property Requirements of **ASTM C-443 & ASTM C-361.**

Contact your Territory Manager or our Customer Service Department for more information.



**THESE SPECIAL DESIGN FEATURES COMBINED WITH THE HIGHEST QUALITY RUBBER COMPOUNDS PROVIDE THE PRECASTER, CONTRACTOR, AND ENGINEER WITH A WATERTIGHT JOINT EVERY TIME.**



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Type 4G and 4F gaskets are used to solve inherent problems with pre-lubricated gaskets as well as both rolling and confined O-Ring Joint Designs.

**Available for Concrete Pipe, Manholes and Box Culverts.**

## TYPE 4G AND 4F ADVANTAGES

### Easier Installation

- \* Less homing force required due to wedge shaped design.
- \* Self centering during joining allows for easier alignment.
- \* Swayback compression relief prevents joint "pushback" effect.
- \* Easier to lubricate, install, and equalize.
- \* Less likely to roll, pinch, or break bells.

### Superior Design and Performance

- \* More gasket surface contact area against joint surfaces.
- \* Single step joint much easier and less expensive to produce than the confined O-Ring joint.



155-4G



158-4G



190-4G



200-4G



260-4F



207-4G



210-4G



288-4G



290-4F/PS-23



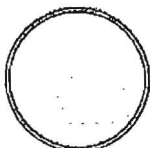
1016-4G

Type 4G & 4F gaskets meet and/or exceed the physical property requirement of  
ASTM C-443 & ASTM C-361

Type 4G & 4F gaskets are available in regular and oil resistant compounds.

Gasket Type	Gasket Base	Gasket Height	Annular Space
155-4G	.885	.618	.326
158-4G	.749	.622	.326
190-4G	.951	.624	.384
200-4G	.962	.700	.398
260-4G	.950	.775	.422
207-4G	1.125	.818	.450
210-4G	.880	.826	.452
288-4G	1.301	.908	.500
290-4F/PS-23	1.23	.927	.500
1016-4G	1.500	1.063	.600

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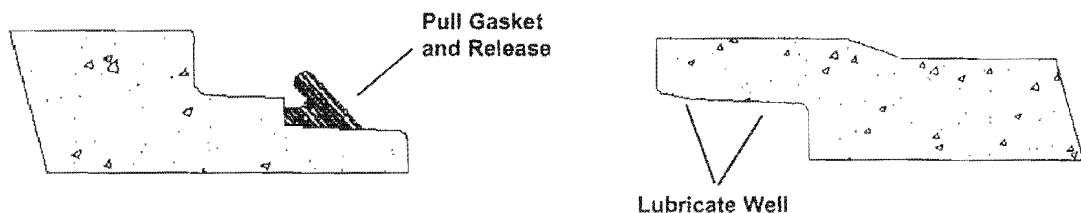
# TYPE 4G & 4F

## INSTALLATION INSTRUCTIONS

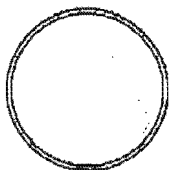
### Guidelines for Assembling 4G and 4F

Type 4G and 4F gaskets manufactured by Press-Seal Gasket Corporation have proved to be one of the most reliable gasket systems ever developed for concrete pipe. It is easy to ensure the best performance of the 4G and 4F gaskets by following these simple installation steps.

1. The pipe should be handled with extreme caution to avoid chipping of the spigots or bell grooves.
2. Clean spigot-end, including the seat of gasket.
3. Stretch the gasket over the spigot end of the pipe and move it back until it is seated against the step to the spigot. Always place squared area of gasket against pipe and step.
4. Equalize the stretch on the gasket by pulling the sealing lobe away from the spigot at least one inch and then releasing the gasket. Repeat this every three or four inches around the circumference of the pipe. Equalization of stretch makes sure that the gasket has the same stretch cross-section and tension throughout.
5. Remove all dirt and other foreign matter from the inside surface of the bell. Using a Press-Seal lubricant formulated especially for concrete pipe lubricate the entire bell area only of the joint. Be sure to coat the entrance slope of the bell thoroughly with lubricant. Do not place any lubricant on the gasket of the spigot. It is important that the gasket grips the spigot during installation, so that it is not displaced from the step.



6. Carefully align pipe sections and bring home slowly, making sure to seat pipe sections fully.
7. Complete installation by following pipe manufacturer's recommended bedding and backfilling practices.



**PRESS-SEAL GASKET CORPORATION**

P.O. Box 10482, Fort Wayne, Indiana 46852

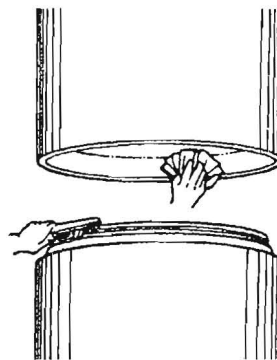
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: [sales@press-seal.com](mailto:sales@press-seal.com) Web: [www.press-seal.com](http://www.press-seal.com)



# O-RING GASKET INSTALLATION

## ON MANHOLE RISERS

①

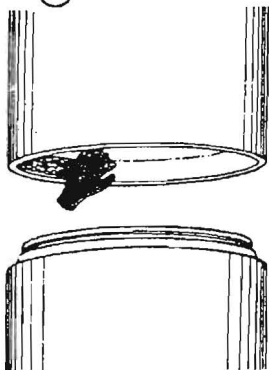


Carefully clean all dirt and foreign objects from the jointing surface of the bell or groove end of pipe

Carefully clean spigot or tongue end of pipe, including the gasket recess.

Improperly prepared bell and spigot surfaces may prevent homing of the pipe or keep the gasket from sealing.

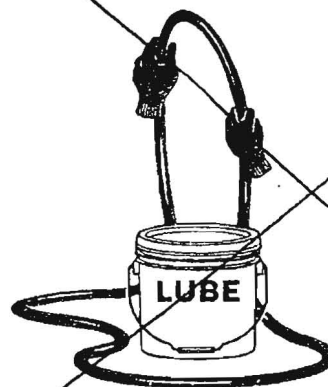
②



Lubricate bell joint surface liberally, cover entire inside surface. Using PRESS-SEAL Pipe Gasket Lubricant.

A bell and gasket not lubricated or improperly lubricated may cause the gasket to roll and leak or possibly damage the bell.

③

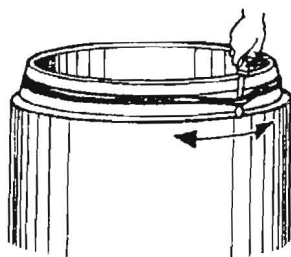


Lubricate the gasket thoroughly before it is placed on the spigot or tongue.

Excessive force will be needed to push the pipe home if the gasket is not well lubricated.

④

Fit the gasket carefully. Equalize the rubber gasket stretch by running a smooth, round object (inserted between gasket and spigot), around the entire circumference several times.

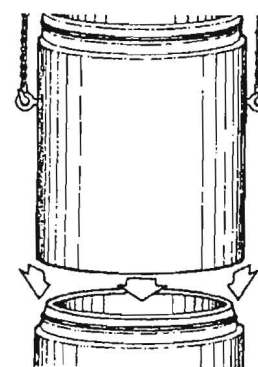


Unequal stretch could cause bunching of the gasket and may cause leaks in the joint or crack the bell.

⑤

Align the bell and spigot to be jointed. Before homing the joint check that the gasket is in contact with the bell end entrance taper around the entire circumference.

Improper alignment can dislodge gasket causing leaks or possibly breaking the bell.



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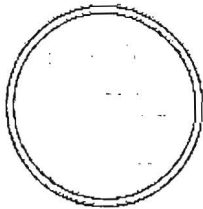
**PRESS-SEAL GASKET CORPORATION**

6935 LINCOLN PARKWAY - FORT WAYNE, INDIANA 46804

Phone (219) 436-0521 or (800) 348-7325

FAX (219) 436-1908





## PRESS-SEAL GASKET CORPORATION

Phone (260) 436-0521 Fax (260) 436-1908

September 8, 2004

This letter addresses Press-Seal Gasket's policy towards vacuum testing procedures for pipe-to-structure connectors. ASTM C 1244-02 Standard Test Method for Concrete Sewer Manholes by Negative Air Pressure (Vacuum) Test Prior to Backfill states in section 1.2, "This test method is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manholes prior to backfill". This is our policy also.

In an earlier version, ASTM C 1244-93 stated "It may also be used to test manholes after backfilling; however, testing should be correlated with the connector supplier". Our policy when testing backfilled is to install a standpipe next to the structure to determine the amount of hydrostatic head that exists. The test vacuum is then reduced one inch of mercury per foot of hydrostatic head as measured to the centerline of the lowest connector until zero. Our policy was developed to address this previous standard. The above statement was eliminated from the 2002 revision because Prior to Backfill was inserted into the title. Even with this additional clarification, there are those that test after backfill; therefore, we still use the above policy to address these instances.

The standard test time for most 4' manholes is 10 inches for one minute with an allowable drop of one inch for the test to be considered successful. Ten inches of mercury is equivalent to 5 PSI or approximately 12 feet of hydrostatic head. If there exists more than 11 feet of water in the stand pipe, then the vacuum test isn't required. The purpose of this reduction method is to balance the vacuum test with hydrostatic loads at the structure; therefore, giving specifiers the confidence that they are receiving an equivalent tested product. Not reducing vacuum pressures to compensate for existing hydrostatic head increases the intended effects of the vacuum test along with possibly damaging the structure and its component/accessory products.

We believe the reduction method described above for backfill tested structures is the only way to give specifiers and system owners a tested product while protecting structure manufacturers, contractors and component/accessory product manufacturers like ourselves.

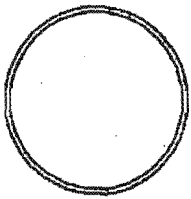
Please contact us if you have any questions or require a visit from a Territory Manager.

Mail to: P.O. Box 10482  
Fort Wayne, IN 46852

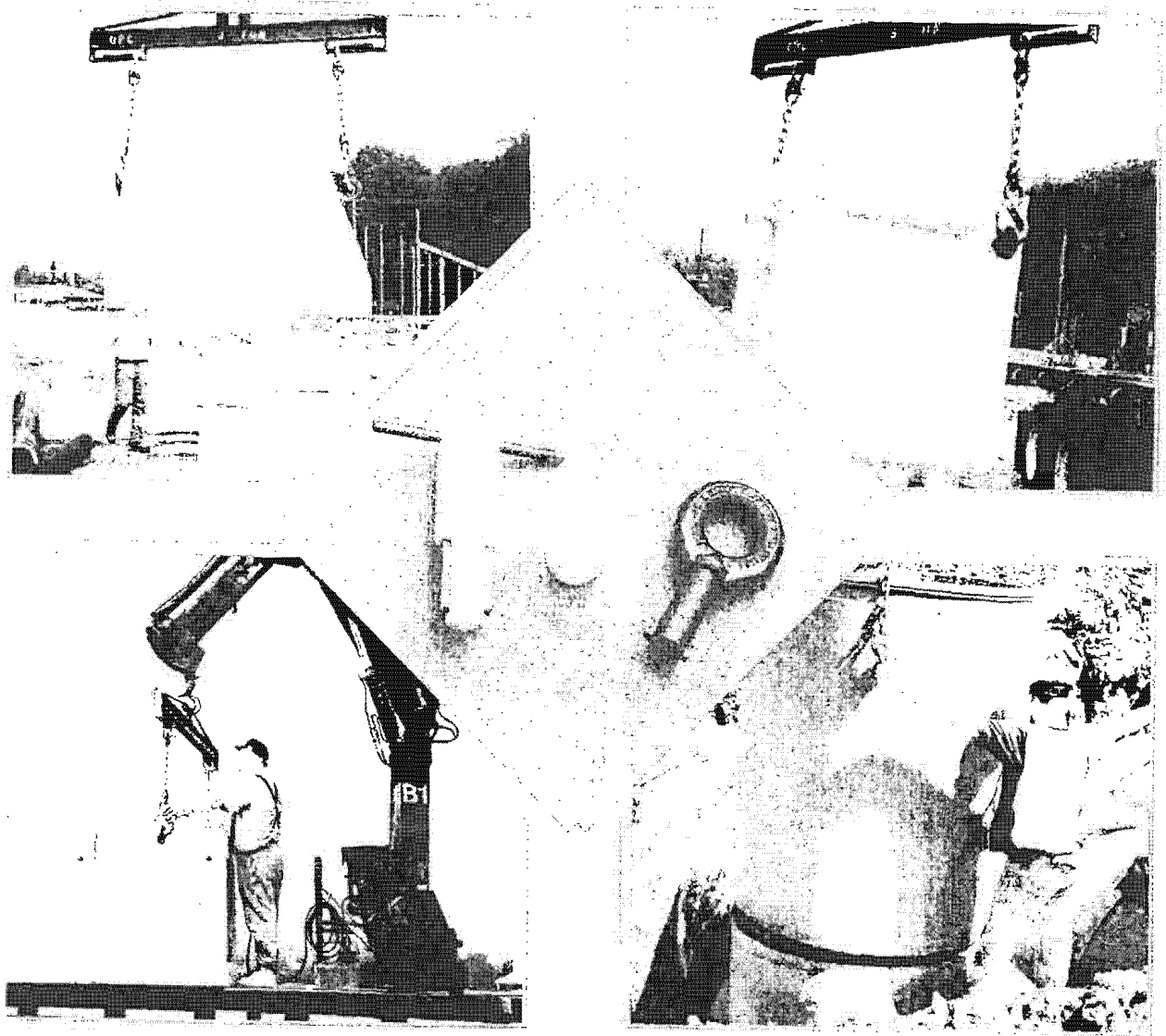
Ship to: 6932 Gettysburg Pike  
Fort Wayne, IN 46804

Web Site: [www.press-seal.com](http://www.press-seal.com)  
E-Mail: [sales@press-seal.com](mailto:sales@press-seal.com)



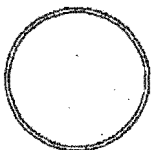


**SIMPLE \* SAFE \* QUICK \* INEXPENSIVE**



**An easy method of placing precast concrete manhole  
components in the field.**

**Over 18 years of Proven Performance.**

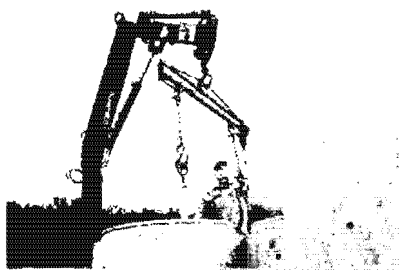


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Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: [sales@press-seal.com](mailto:sales@press-seal.com) Web: [www.press-seal.com](http://www.press-seal.com)



# INSTALLATION

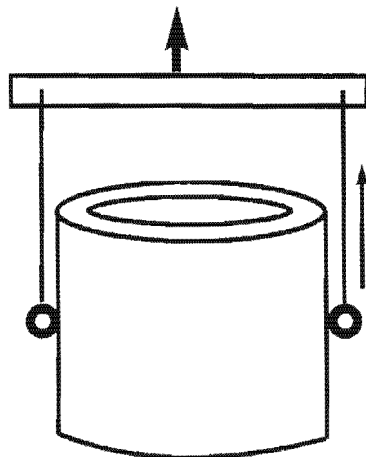
Manhole components are delivered to the field with all inserts installed and positioned for quick lifting and installation.



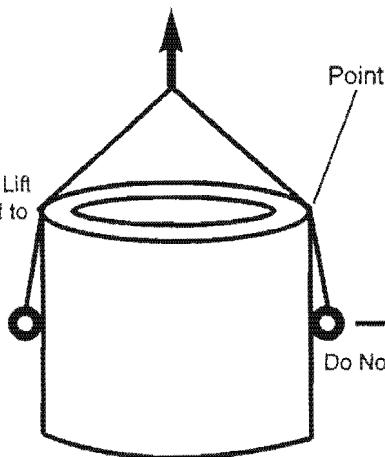
## FROM THE TRUCK TO THE DITCH

- \* Insert a lift eye into each insert.
- \* Turn the lift eye 90 degrees to the vertical position to lock it in place.
- \* Place hooks in lift eyes and lift.

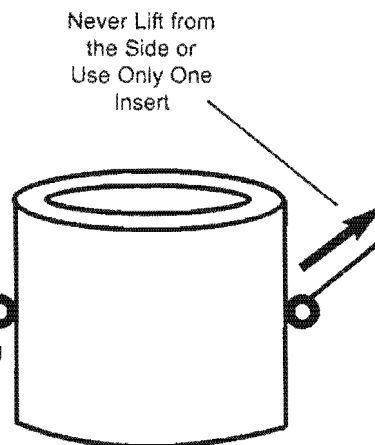
### Do's and Don'ts



**Spreader Bar Lift**



**Single Point Lift**



**Not Permitted**

Always Lift  
Parallel to  
Wall

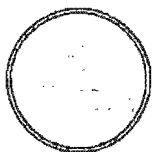
Point

Do Not Drag

Never Lift from  
the Side or  
Use Only One  
Insert

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Press-Seal believes all information is accurate as of its publication date. Information, specifications, and prices are all subject to change without notice. Press-Seal is not responsible for any inadvertent errors.



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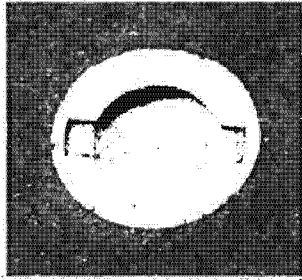
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: [sales@press-seal.com](mailto:sales@press-seal.com) Web: [www.press-seal.com](http://www.press-seal.com)



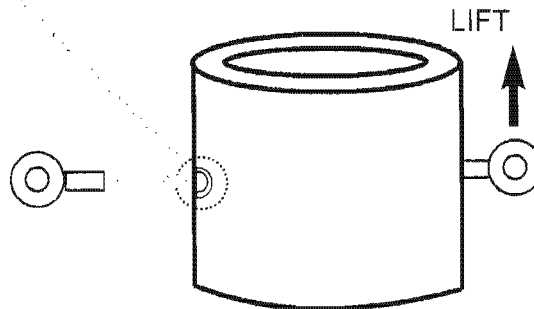
## DESIGN CRITERIA

Press-Seal Gasket provides customized design guidelines to each precaster for the use of the lift system with their particular product line and designed for its theoretical load capacity for both tensile and shear forces.

The lift inserts are designed in accordance with ASTM C-890 for four times the maximum load.



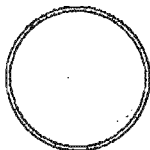
Each lift eye is designed, rated and tested to a lift capacity of 3,600 pounds with a factor of safety of five.



The maximum weight of a product for a two-lift eye system is 7,200 pounds.

The lift system works best when inserts are placed perpendicular to the wall with the lift parallel to the wall. This method insures a safe lift and does not damage the product. Special designs can be provided for product made with more than two lift inserts.

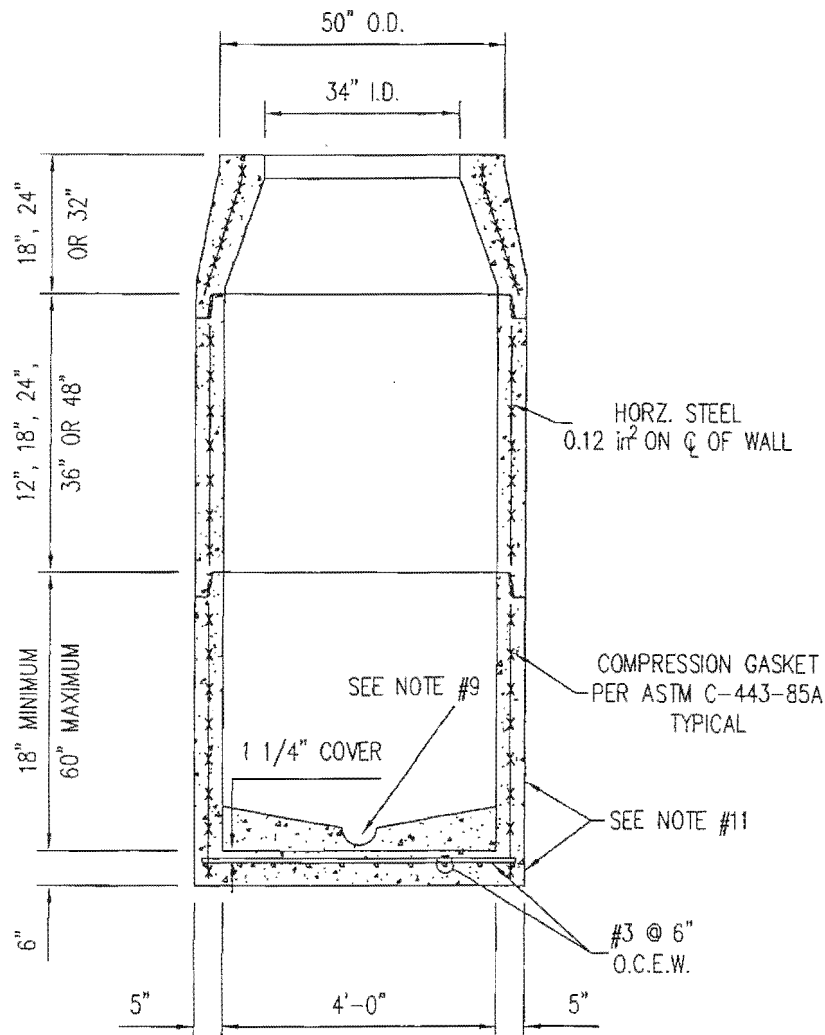
As a service to its customers, Press-Seal Gasket will determine recommended lift insert locations and maximum lift capacity for the system based on the product's geometric configuration and material properties. When requested and supplied, these designs will incorporate appropriate safety factors for lifting devices, but obtaining critical manufacturing strengths and tolerances is outside of Press-Seal Gasket's capability and responsibility. The precaster is advised that a four thousand psi minimum design concrete compressive strength is required and lift insert positioning are critical for the safe and successful performance of this system.



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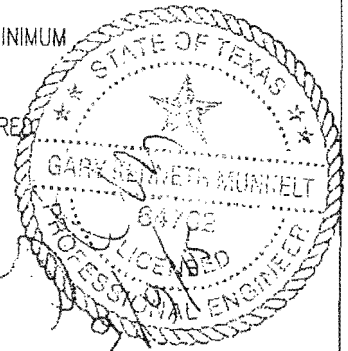
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: [sales@press-seal.com](mailto:sales@press-seal.com) Web: [www.press-seal.com](http://www.press-seal.com)





#### NOTES:

1. PIPE TO MANHOLE CONNECTIONS PER ASTM C-923 MECHANICAL TYPE OR COMPRESSION.
2. CONE AVAILABLE WITH 24" CLEAR OPENING.
3. CONCRETE STRENGTH  $f'_c = 4,000$  psi.
4. REBAR STRENGTH  $f_y = 60,000$  psi.
5. WELDED WIRE FABRIC STRENGTH  $f_y = 65,000$  psi.
6. LIVE LOAD - AASHTO HS-20.
7. (2) #4 BARS AT CORNERS OF OPENINGS TOP & BOTTOM OF SLABS.
8. 30'-0" MAXIMUM COVER TO TOP OF BOTTOM SLAB
9. INVERTS TO BE "U" SHAPED w/MINIMUM 3/4 DEPTH OF PIPE DIAMETER.
10. EXTENDED BASE AVAILABLE.
11. WALL AND BOTTOM SECTION POURED MONOLITHICALLY. INVERT POURED SECONDARY.



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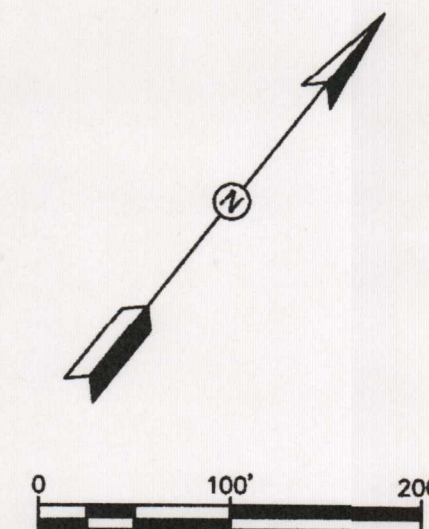
DESIGNER	JHP	MEETS STANDARDS	48" DIA. MANHOLE VARIABLE STACK	DRAWING #	GKM DWG #
ENGINEER	GKM	ASTM-C-478		AA	10
REVISION					



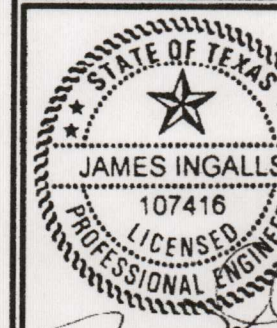
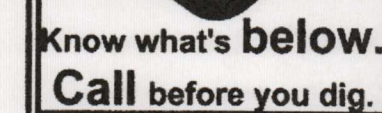




TBM B - CHISELED SQUARE IN TOP OF CURB, AT NORTHWEST CORNER OF THE  
INTERSECTION OF EMU PARADE AND WATTLE WAY.  
ELEV. = 915.28



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MAR 23 2012  
SAN ANTONIO



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[illegible]

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TBPB FIRM F-13351

SITE TBM MAP

SCS SUBMITTAL

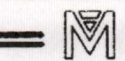
**NEWCOMBE TENNIS RANCH  
UNIT 2**

NEW BRAUNFELS, TEXAS

SHEET

**2**  
**OF 20**





## SILT FENCE

### MATERIALS:

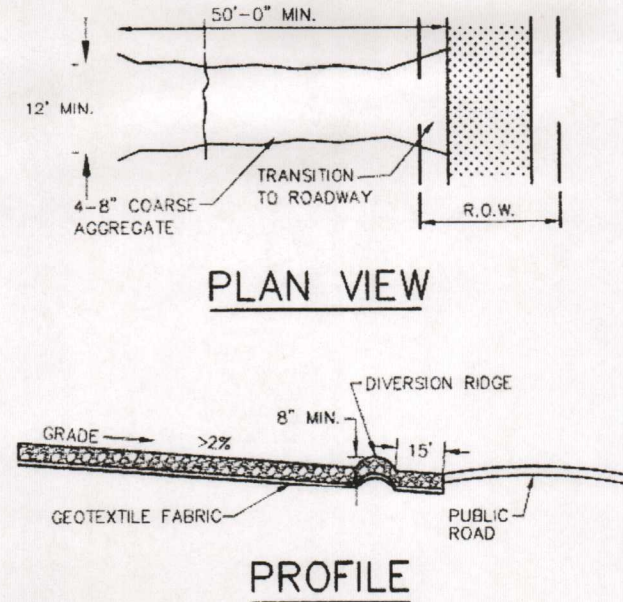
1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC WIDTH SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NO. 30.
2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR YBAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT2, AND BRINELL HARDNESS EXCEEDING 140.
3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

### INSTALLATION:

1. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 1- FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.
2. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS 1/4 ACRE/100 FEET OF FENCE.
3. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN-SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.
4. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE. TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
5. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3-FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.
6. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

### INSPECTION AND MAINTENANCE GUIDELINES:

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



## STABILIZED CONSTRUCTION ENTRANCE / EXIT

### MATERIALS:

1. THE AGGREGATE SHOULD CONSIST OF 4 TO 8 INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.
2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8 INCHES.
3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD2, A MULLEN BURST RATING OF 140 LB/IN2, AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.
4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4 INCH DIAMETER WASHED STONE OR COMMERCIAL RACK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

### INSTALLATION:

1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.
2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.
3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.
4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6 TO 8 INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.
5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.
6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.
7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN.
8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

### INSPECTION AND MAINTENANCE GUIDELINES:

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR LOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

## ROCK BERM

### MATERIALS:

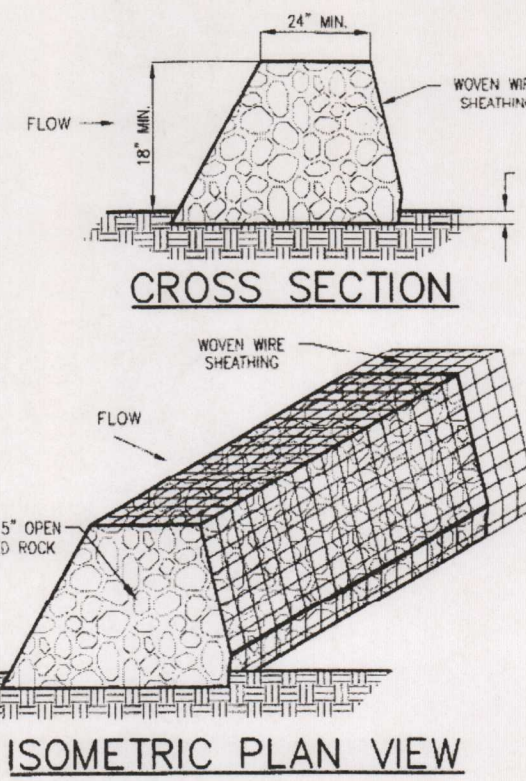
1. THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 11 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOT RINGS.
2. CLEAN, OPEN GRADED 3 - 5 INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5 - 8 INCH DIAMETERS ROCKS MAY BE USED.

### INSTALLATION:

1. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE. THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.
2. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER.
3. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM, TO A HEIGHT OF NOT LESS THAN 18 INCHES.
4. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH THE WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAPS AT LEAST 2 INCHES. AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.
5. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE.
6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

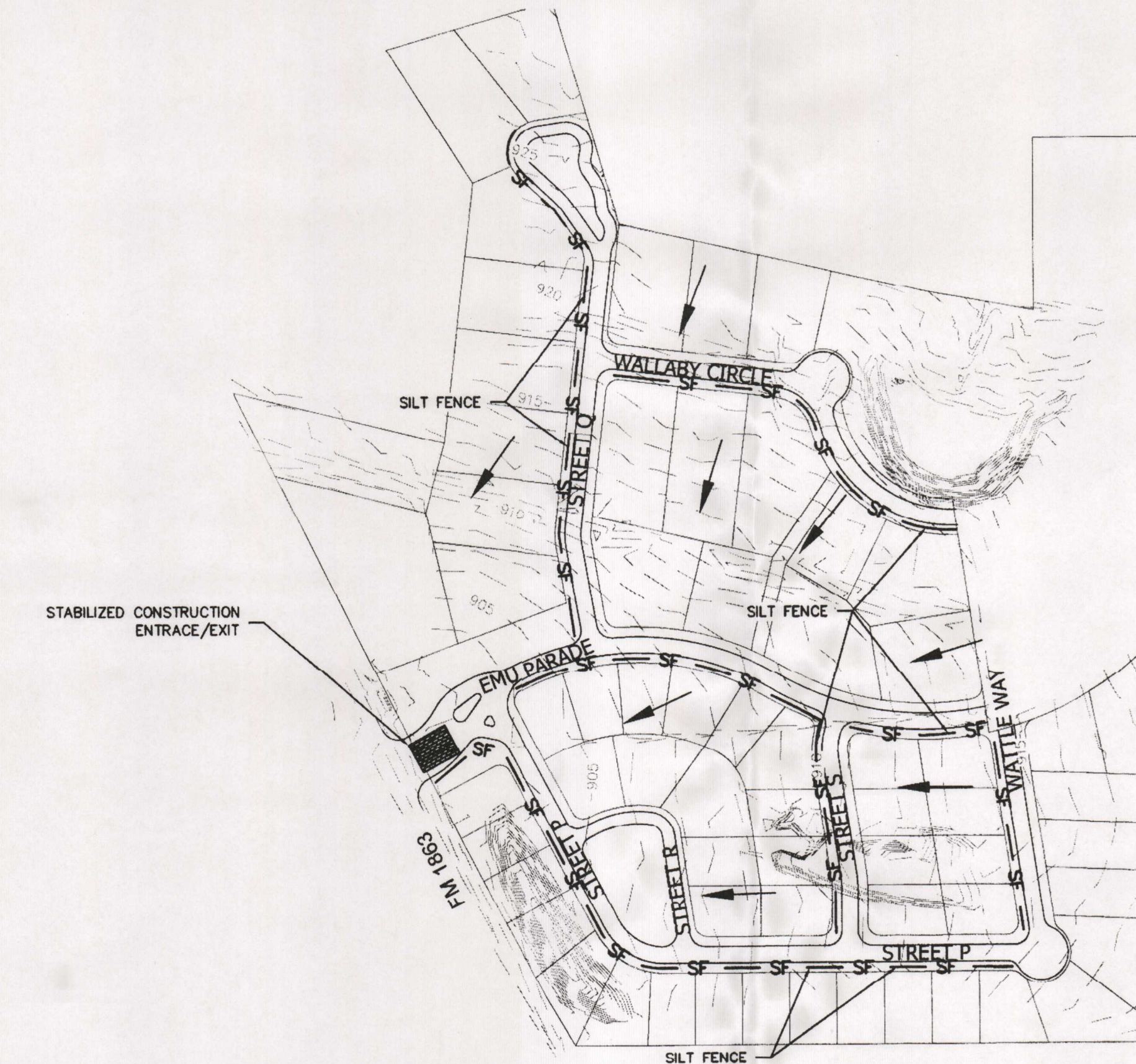
### INSPECTION AND MAINTENANCE GUIDELINES:

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY CONTRACTOR.
2. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6" AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION.
3. REPAIR ANY LOOSE WIRE SHEATHING.
4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.
5. THE BERM SHOULD BE REPLACED WHEN STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.



### SOIL STABILIZATION NOTE

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



## HYDRAULIC MULCH

### MATERIALS:

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

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

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

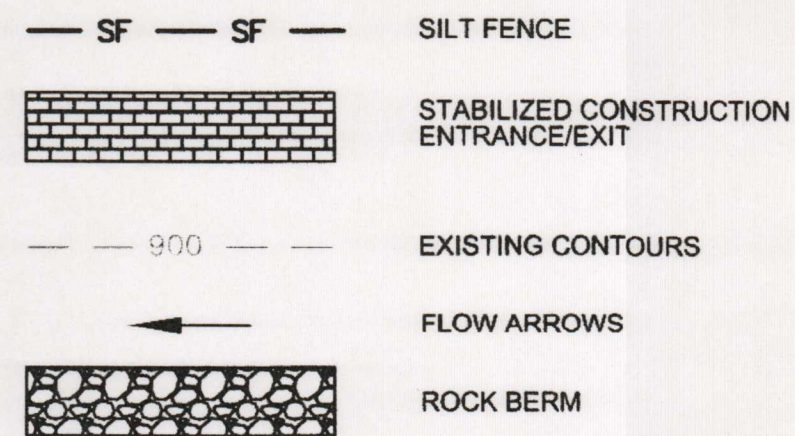
### INSTALLATION:

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

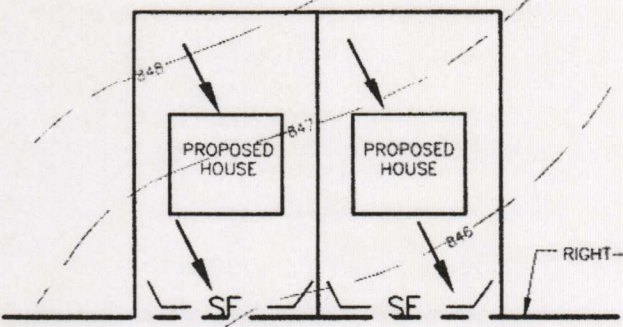
### INSPECTION AND MAINTENANCE GUIDELINES:

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

## LEGEND



PROJECT FALLS WITHIN THE LIMITS OF THE EDWARDS AQUIFER RECHARGE ZONE. CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS OF THE APPROVED WATER POLLUTION ABATEMENT PLAN, EAPP# 1248.01 INVESTIGATIVE NO. 598529, REGULATED ENTRY NO. BN 102747359. APPROVAL DATED DECEMBER 28TH, 2007. CONTRACTOR SHALL GIVE WRITTEN NOTIFICATION TO TCEQ, SAN ANTONIO REGIONAL OFFICE, PRIOR TO THE COMMENCEMENT OF REGULATED ACTIVITY.



TYPICAL SILT FENCE AT RESIDENTIAL LOT

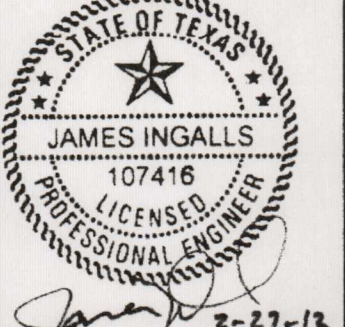
### NOTE:

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

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

1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL, OR OTHER SENSITIVE FEATURE.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S 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 OFF-SITE IMPACTS TO WATER QUALITY (E.G., FUGITIVE SEDIMENT IN STREET BEING WASHED INTO SURFACE STREAMS OR SENSITIVE FEATURES BY THE NEXT RAIN).
7. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.
8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BECOMING A POLLUTANT SOURCE FOR STORMWATER DISCHARGES (E.G., SCREENING OUTFALLS, PICKED UP DAILY).
9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
10. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARY OR PERMANENTLY CEASED IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL AND 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 EDWARDS AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
  - A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
  - B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
  - C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

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



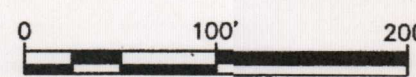
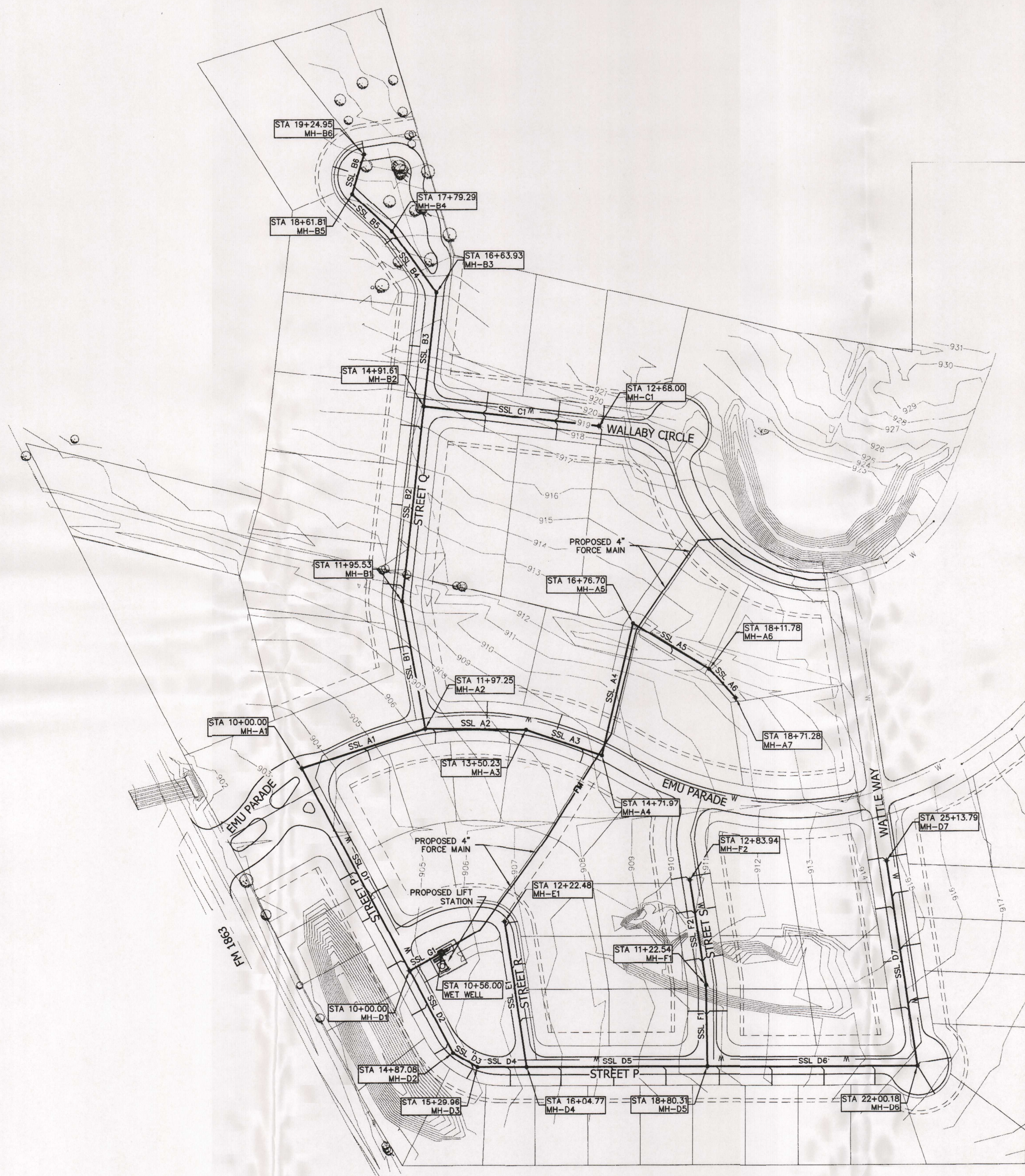
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**MOELLER & ASSOCIATES**  
Engineering Solutions  
1040 N. WALNUT AVE. STE. B, NEW BRAUNFELS, TX. 78130  
PH: 830-3681127 FAX: 830-3681127  
TBE FIRM E-13351

EROSION CONTROL PLAN  
UNIT 2

NEWCOMBE TENNIS RANCH  
UNIT 2  
TCEQ-R13  
MAR 23 2012  
SAN ANTONIO





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



3-22-12

CONSTRUCTION NOTES:

1. ALL CONSTRUCTION ACTIVITIES MUST MEET THE REQUIREMENTS OF THE TCEQ APPROVED WATER POLLUTION ABATEMENT PLAN, EDWARDS AQUIFER PROTECTION PROGRAM ID NO. 1248.01, INVESTIGATION NO. 598529, REGULATED ENTITY NO. RN022747359, APPROVAL LETTER DATED DECEMBER 28, 2007.
2. WHERE WATER LINES AND NEW SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES CROSSING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(D) (PIPE DESIGN) AND 30 TAC §290.44(E) (WATER DISTRIBUTION).
3. WHERE A 9' (NINE FOOT) SEPARATION FROM WATER AND SEWER LINES CROSSING CANNOT BE MAINTAINED, THE NEW WATER LINE SHALL BE ABOVE THE SEWER LINE AS SHOWN ON THE WATER/SEWER LINE CROSSING DETAIL . AT NO TIME SHALL A WATER LINE OR WATER SERVICE BE PLACED UNDER A SEWER LINE OR SEWER SERVICE.
4. WHERE A NEW POTABLE WATERLINE CROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, THE ONE SEPARATION FOOT (1') SHALL BE CENTERED ON THE EXISTING WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE EXISTING MAIN OR LATERAL. IF THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE THE WASTEWATER MAIN OR LATERAL, WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. IF THE EXISTING WASTEWATER MAIN OR LATERAL SHOWS SIGNS OF LEAKING, IT SHALL BE REPLACED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSI PRESSURE RATED PIPE.
5. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN COMPLIANCE WITH 30 TAC §213.5(C)(3)(c). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARY OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE REQUIREMENTS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS, AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
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**MOELLER  
& ASSOCIATES**  
*Engineering Solutions*

1040 N. WALNUT AVE., STE. B, NEW BRAUNFELS, TX. 78130  
PH: 830-358-7127 [www.mro-tx.com](http://www.mro-tx.com)  
TBD FIRM F-13351

**Contractor shall notify the following utility companies 48 hours prior to excavation:**

New Braunfels Utilities	830-629-8400
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Robert Sanders	830-643-6903
Damaged Line	888-876-5786
AT&T Telephone	830-303-1333
Erick White PM	210-283-1706
Scott McBrearty (Construction)	210-658-4886
Texas One Call	830-545-6005

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## TELEPHONE LOCATOR

THE EXISTENCE AND LOCATION OF UNDERGROUND CABLE INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR TO CONTACT THE TELEPHONE COMPANY CABLE LOCATOR 48HRS PRIOR TO EXCAVATION AT 1-800-545-6005,, CONTRACTOR HAS THE RESPONSIBILITY TO PROTECT AND SUPPORT TELEPHONE COMPANY DURING CONSTRUCTION.

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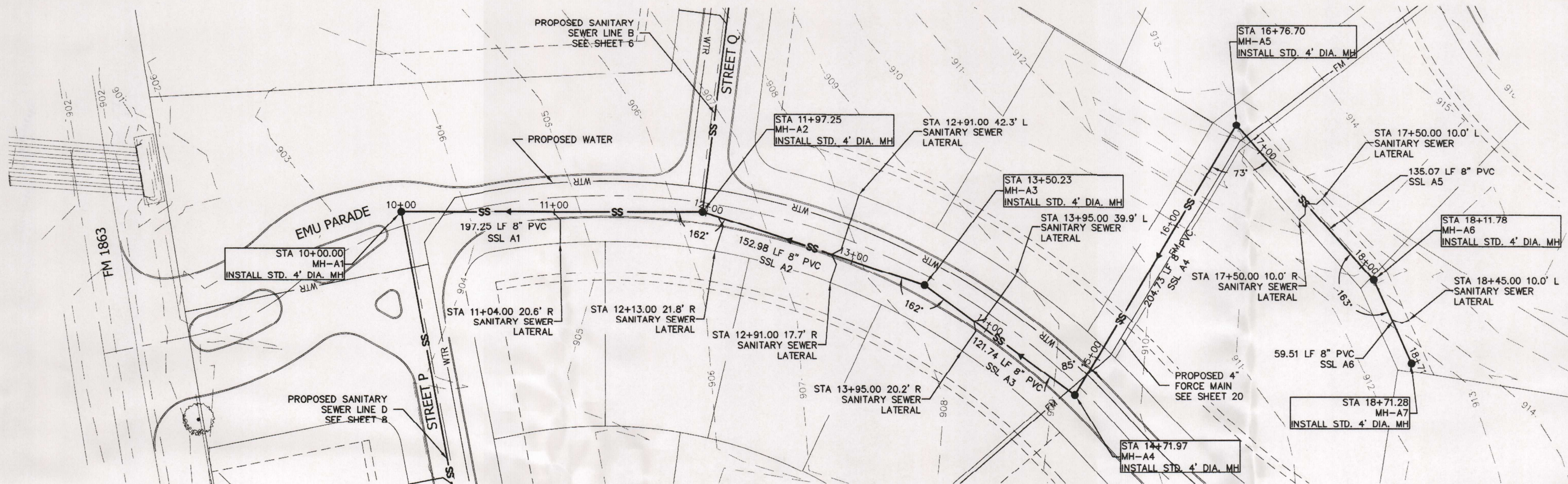
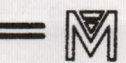
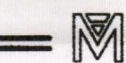
**SANITARY SEWER OVERALL  
PLAN**

NEWCOMBE TENNIS RANCH  
UNIT 2

SHEET

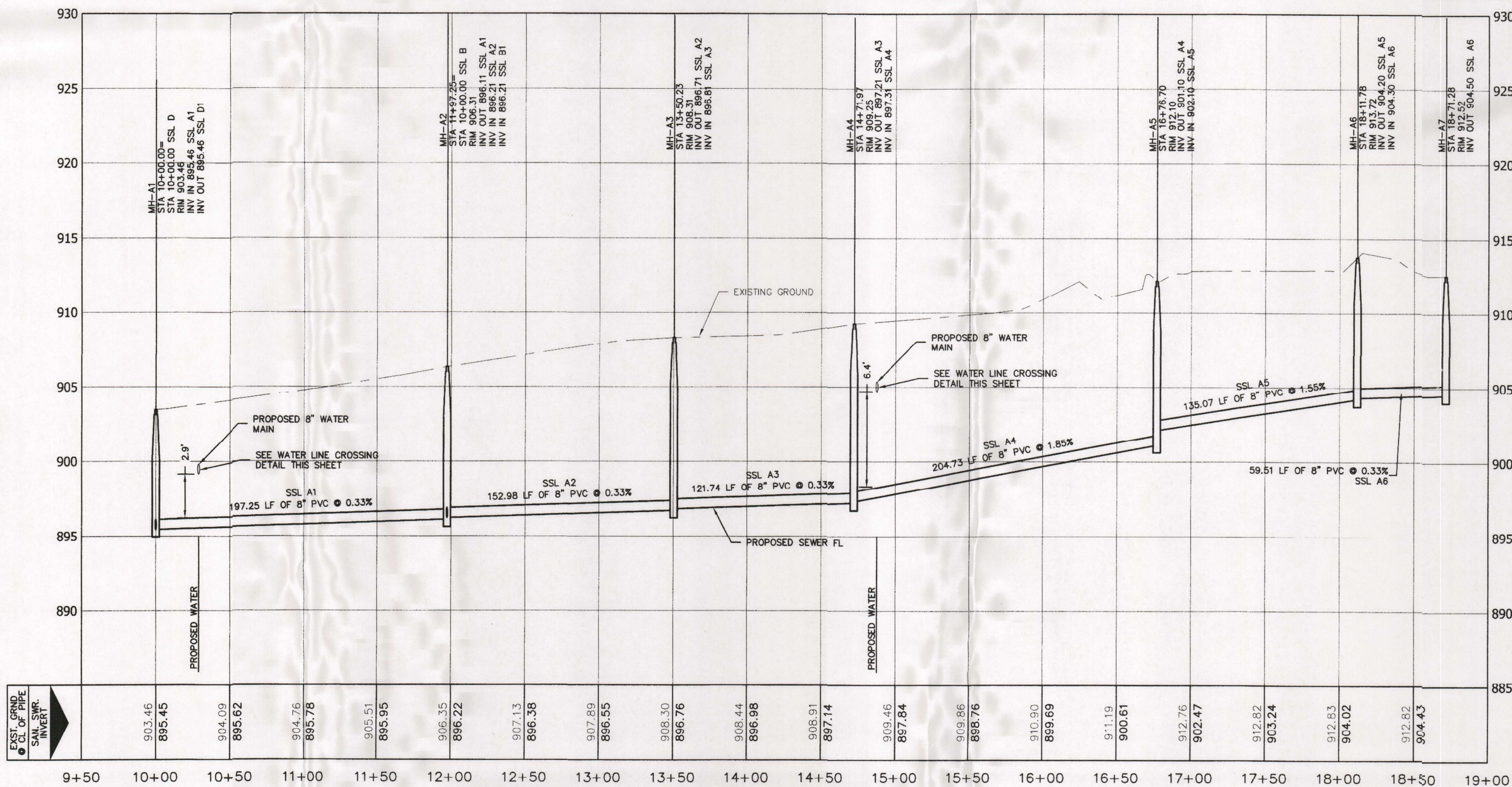
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### SANITARY SEWER LINE A STA 10+00 TO END

SCALE  
HORIZONTAL: 1" = 50'  
VERTICAL: 1" = 5'



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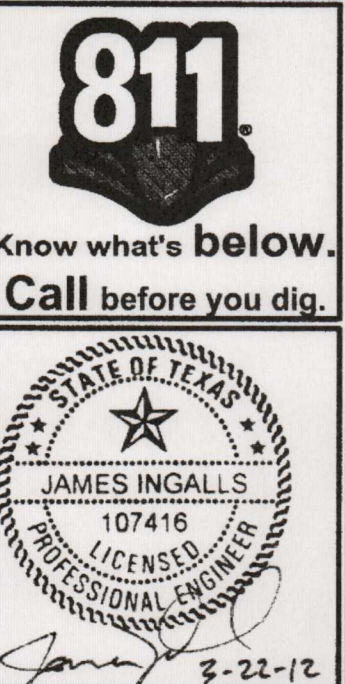
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**MOELLER & ASSOCIATES**  
Engineering Solutions  
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PH: 830-358-7127 www.mo-tx.com  
TCEQ FIRM E-13351

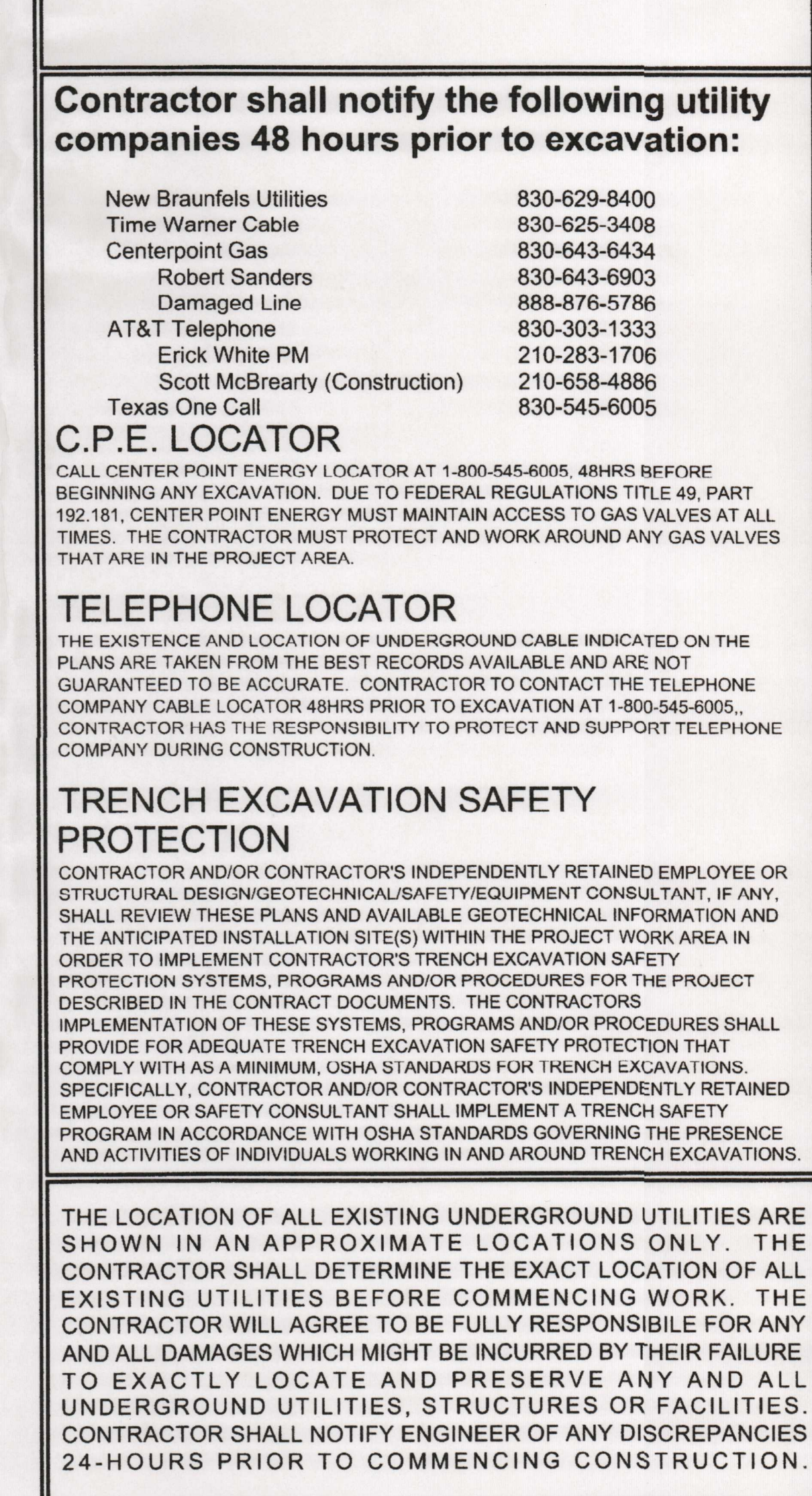
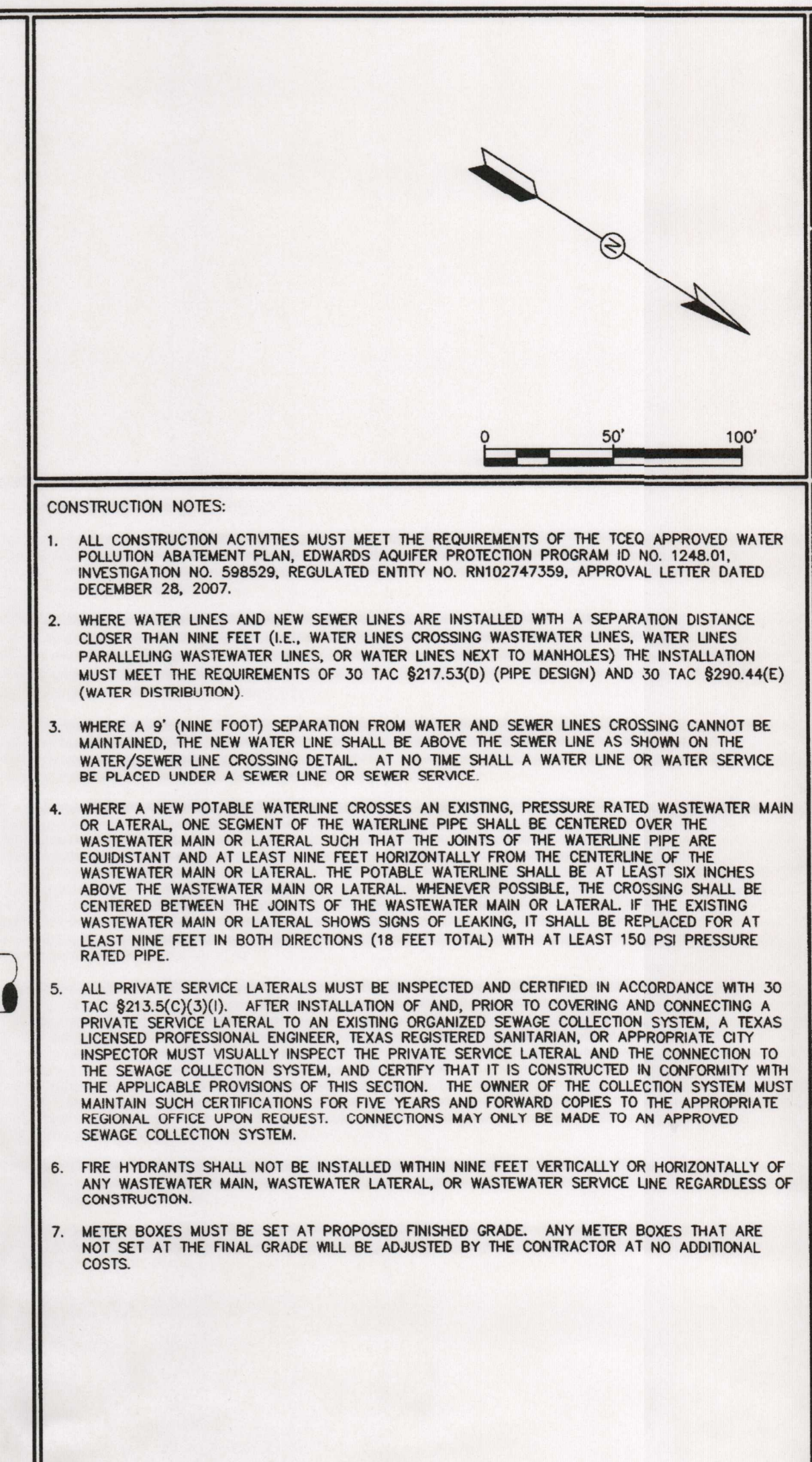
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NEWCOMBE TENNIS RANCH UNIT 2

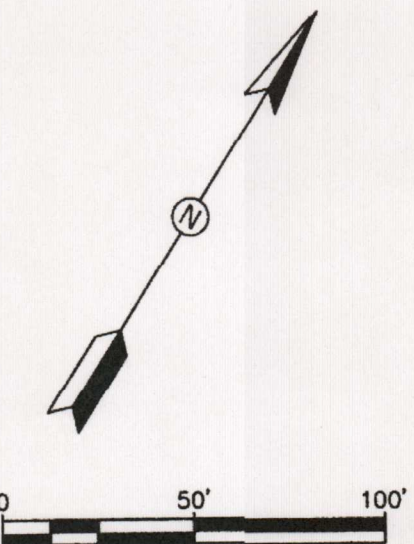
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4. WHERE A NEW POTABLE WATER LATERAL CROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SECTOR OF THE LATERAL SHALL BE CENTERED OVER THE WASTEWATER MAIN OR LATERAL, SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE PIPELINE SHALL BE AT LEAST 36 INCHES FROM THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. IF THE EXISTING WASTEWATER MAIN OR LATERAL SHOWS SIGNS OF LEAKING, IT SHALL BE REPLACED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSI PRESSURE RATED PIPE.
5. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §21.53(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARY, APPROPRIATE CITY ENGINEER, OR OTHER PERSON MUST INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNERS OF THE SEWAGE SYSTEMS SHALL BE RESPONSIBLE FOR SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY NOT BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
6. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION.
7. METER BOXES MUST BE SET AT PROPOSED FINISHED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINAL GRADE SHALL BE ADJUSTED BY THE CONTRACTOR AT NO ADDITIONAL COSTS.

SCS SUBMITTAL

New Braunfels Utilities	830-629-8400
Time Warner Cable	830-625-3408
Centerpoint Gas	830-643-6434
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Damaged Line	888-876-5786
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CALL CENTER POINT ENERGY LOCATOR AT 1-800-545-6005, 48HRS BEFORE BEGINNING ANY EXCAVATION. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181, CENTER POINT ENERGY MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.

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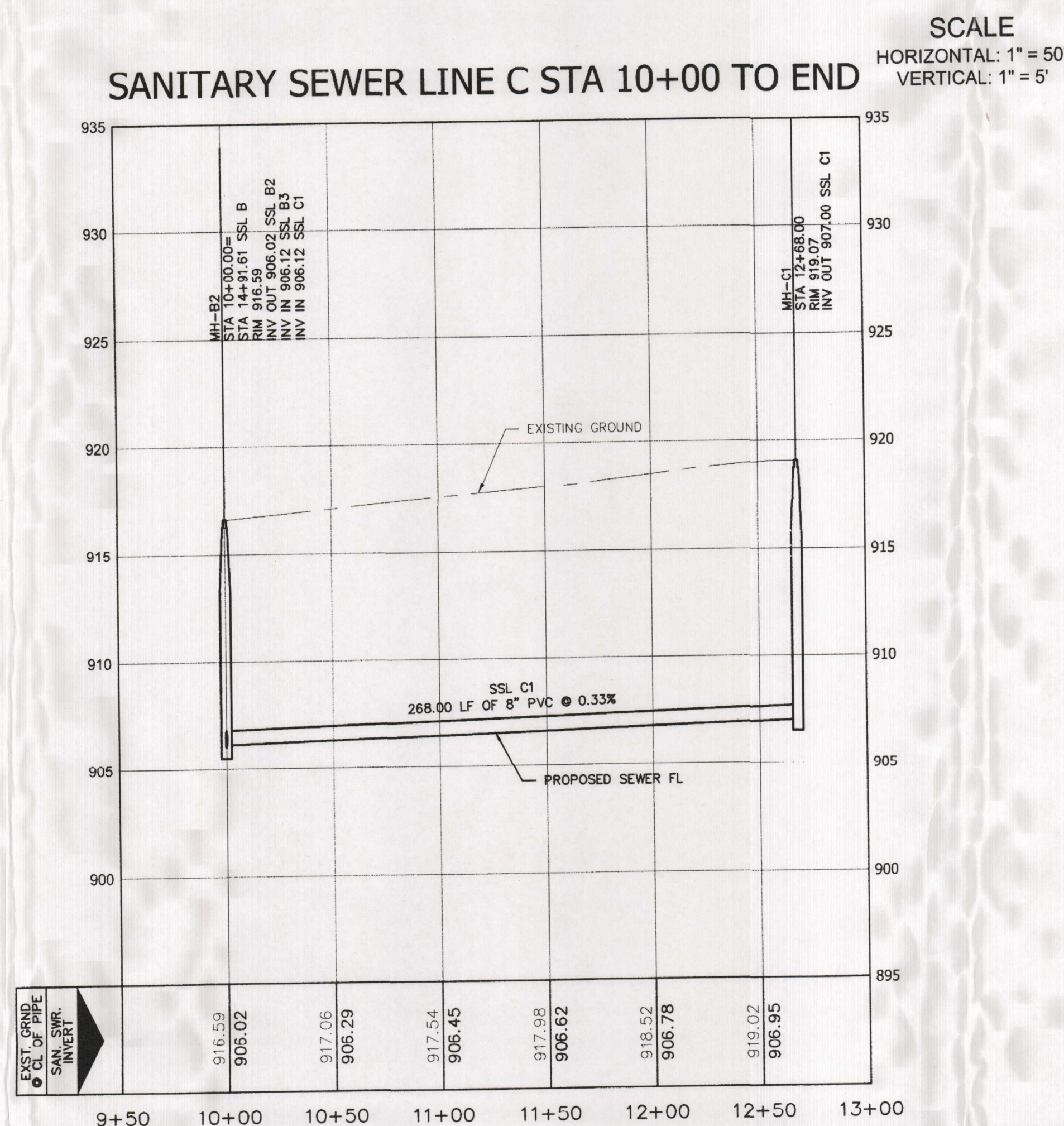
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NEWCOMBE TENNIS RANCH  
UNIT 2

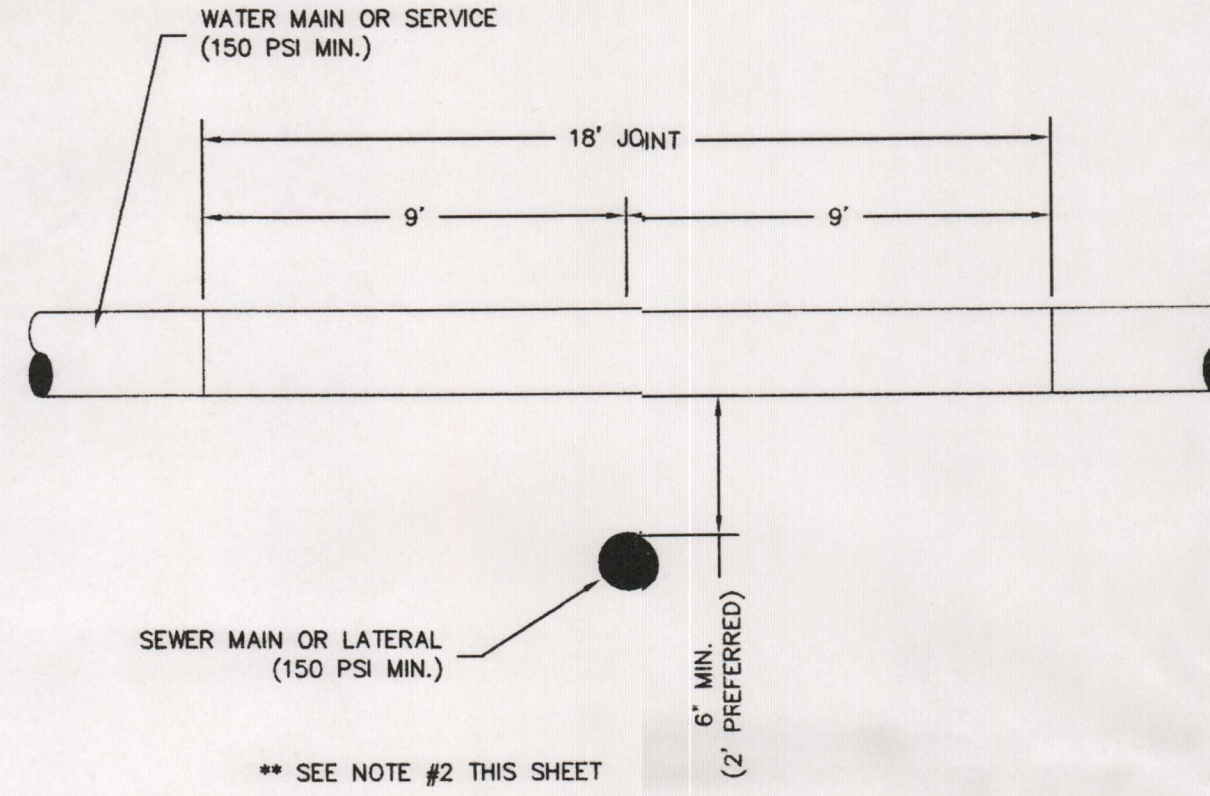
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**7**  
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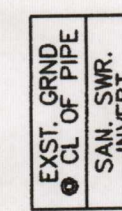
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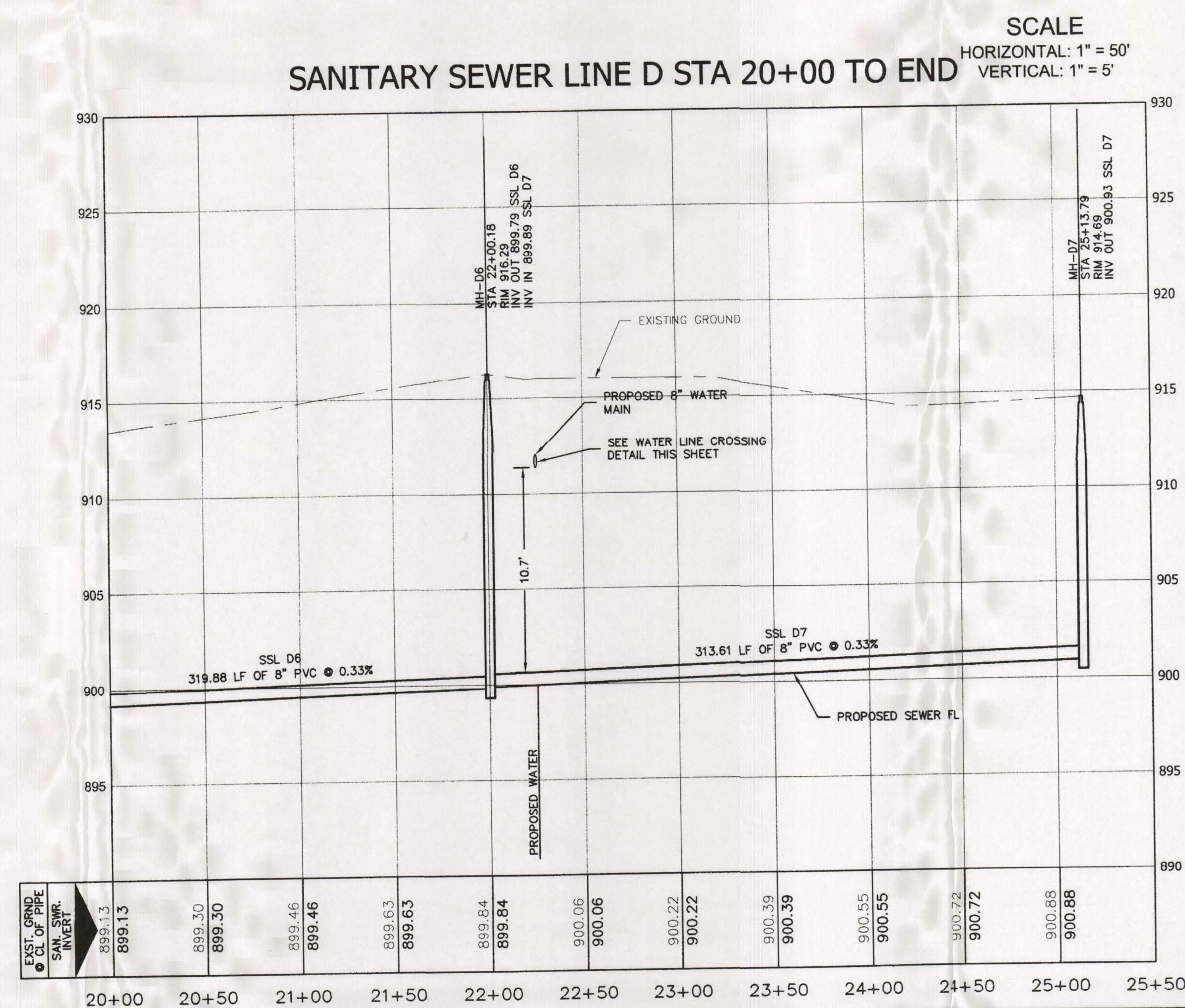
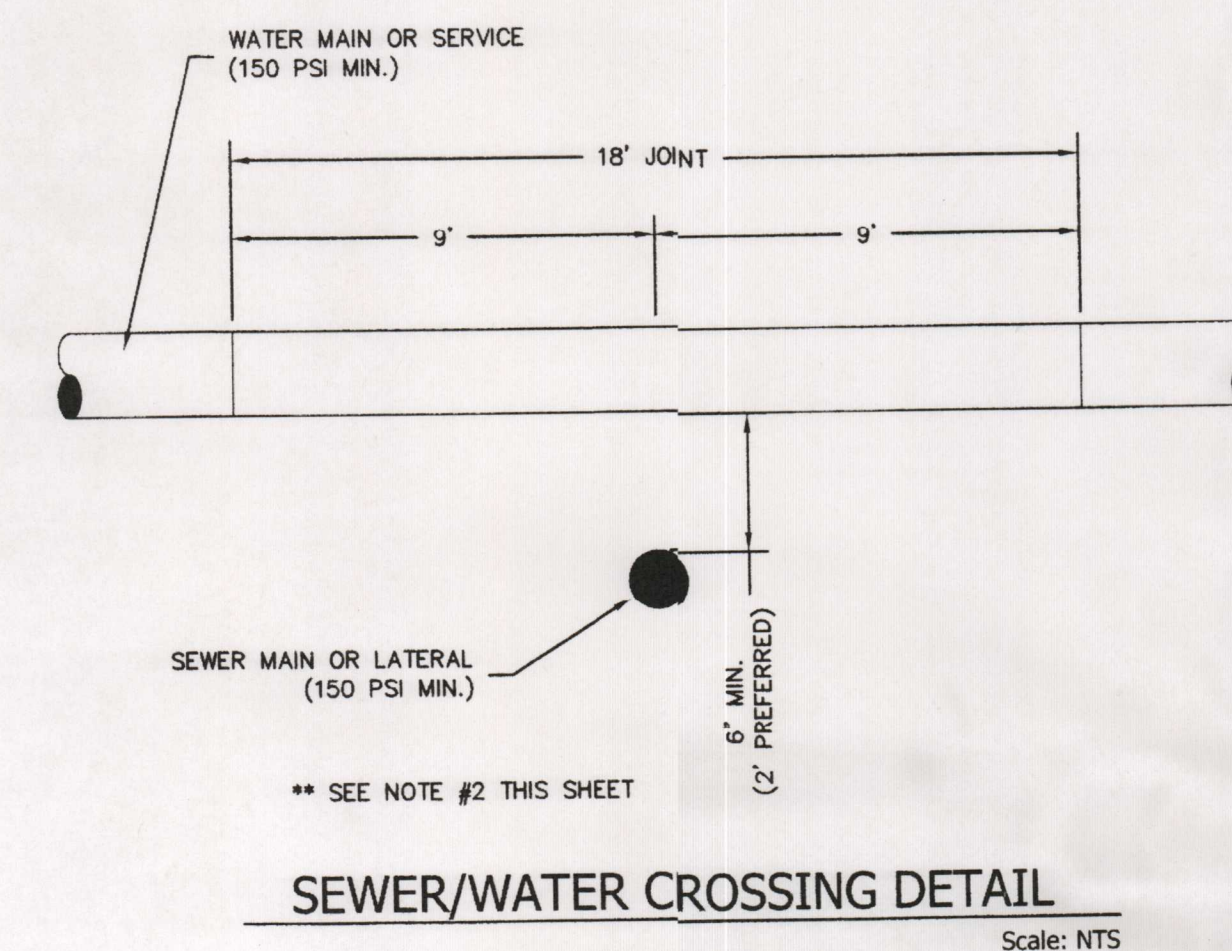
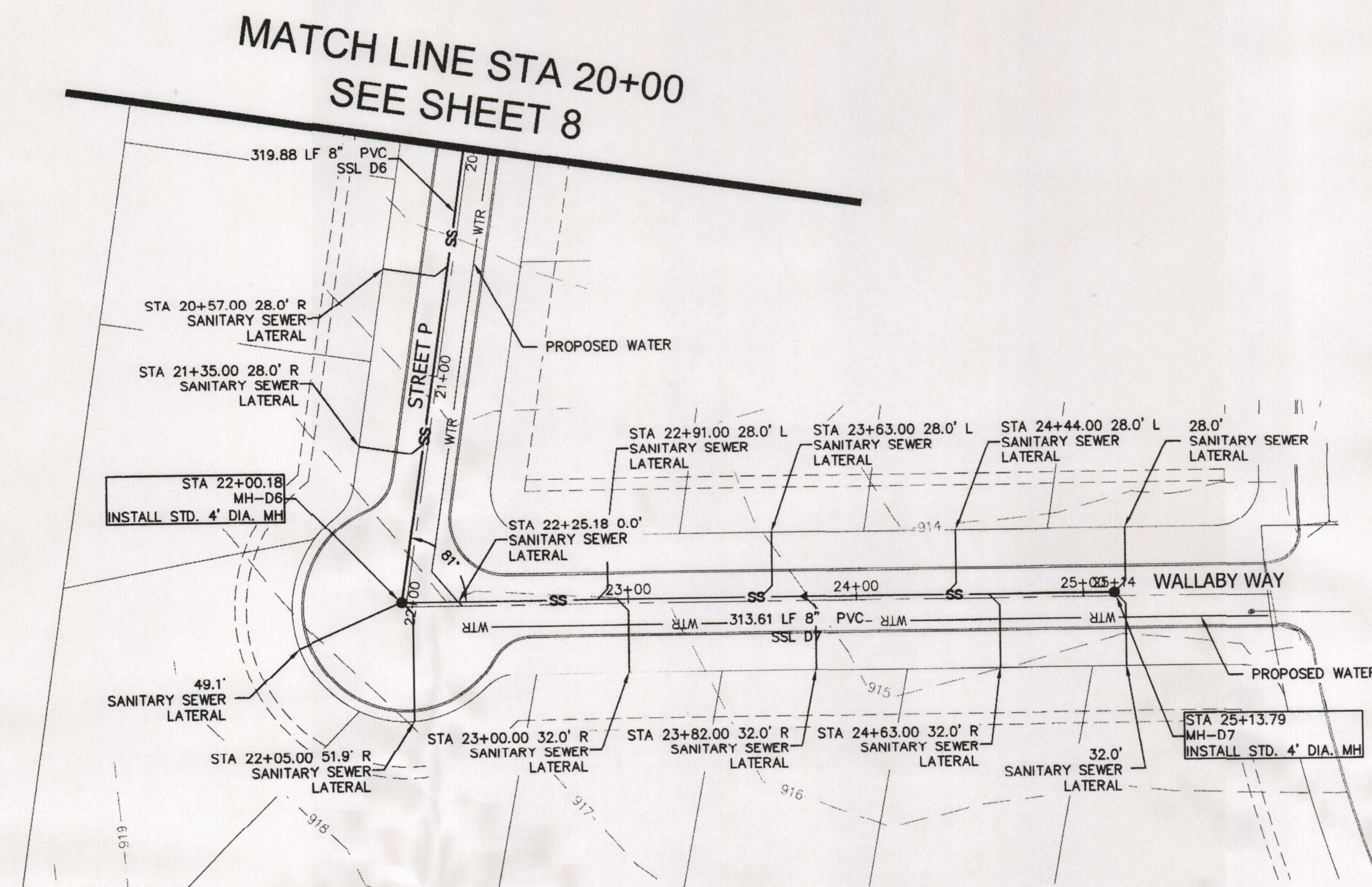


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CONSTRUCTION NOTES:

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4. WHERE A NEW POTABLE WATERLINE GROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER THE EXISTING WATER MAIN OR LATERAL. THE JOINTS OF THE WATERLINE PIPE SHALL BE AT LEAST ONE EQUIVDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE THE WASTEWATER MAIN OR LATERAL. WHERE POSSIBLE, THE WATERLINE PIPE SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. IF THE EXISTING WASTEWATER MAIN OR LATERAL SHOWS SIGNS OF LEAKING, IT SHALL BE REPAIRED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSIG PRESSURE RATED PIPE.
5. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.03(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING SEWER SERVICE, THE CITY ENGINEER OR TEXAS LAND SURVEY PROFESSIONAL WORKER, A STATE REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWER COLLECTION SYSTEM AND RECORD THE INSPECTION. THE CITY ENGINEER OR THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE. UNDERGROUND CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
6. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION.
7. METER BOXES MUST BE SET AT PROPOSED FINISHED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINAL GRADE WILL BE ADJUSTED BY THE CONTRACTOR AT NO ADDITIONAL COST.

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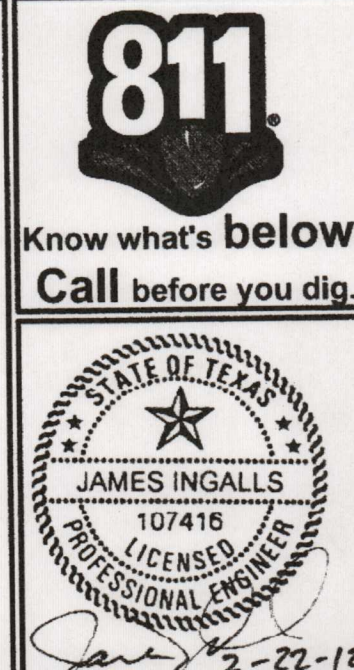
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## TRENCH EXCAVATION SAFETY PROTECTION

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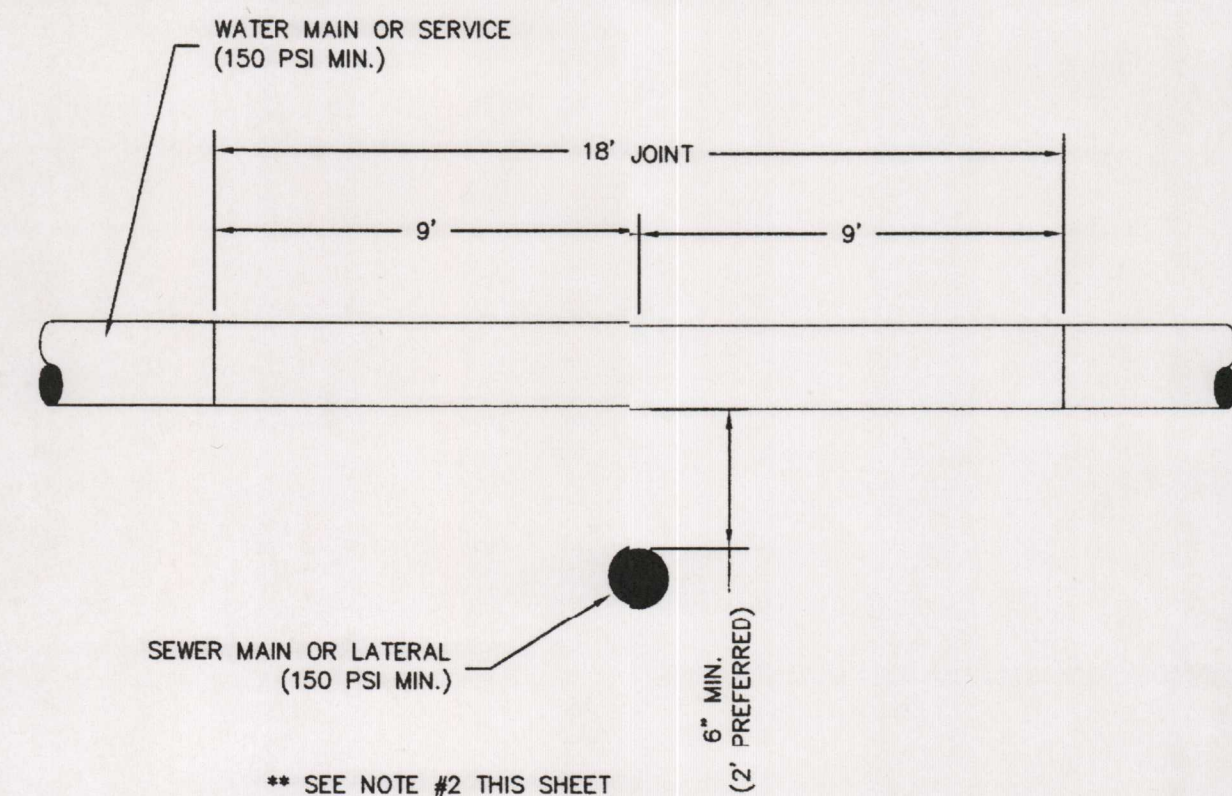
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**NEWCOMBE TENNIS RANCH**  
**UNIT 2**

SHEET  
**9**  
**OF 20**





Scale: NTS

\*\* SEE NOTE #2 THIS SHEET



HORIZONTAL: 1" = 50'  
VERTICAL: 1" = 5'

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2. WHERE WATER LINES AND NEW SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE OF 30 INCHES, THE WATER LINE SHALL BE INSTALLED NEXT TO THE EXISTING WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES. THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(D) (PIPE DESIGN) AND 30 TAC §290.44(E) (WATER DISTRIBUTION).
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5. ALL PRIVATE SEWERAGE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.5(c)(3)(i). AFTER INSTALLATION OF, AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SEWERAGE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS PROFESSIONAL ENGINEER, LICENSED IN THE STATE OF TEXAS, REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SEWERAGE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE SEWAGE COLLECTION SYSTEM DESIGN. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS. THE OWNER MUST FORWARD THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
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3-22-12

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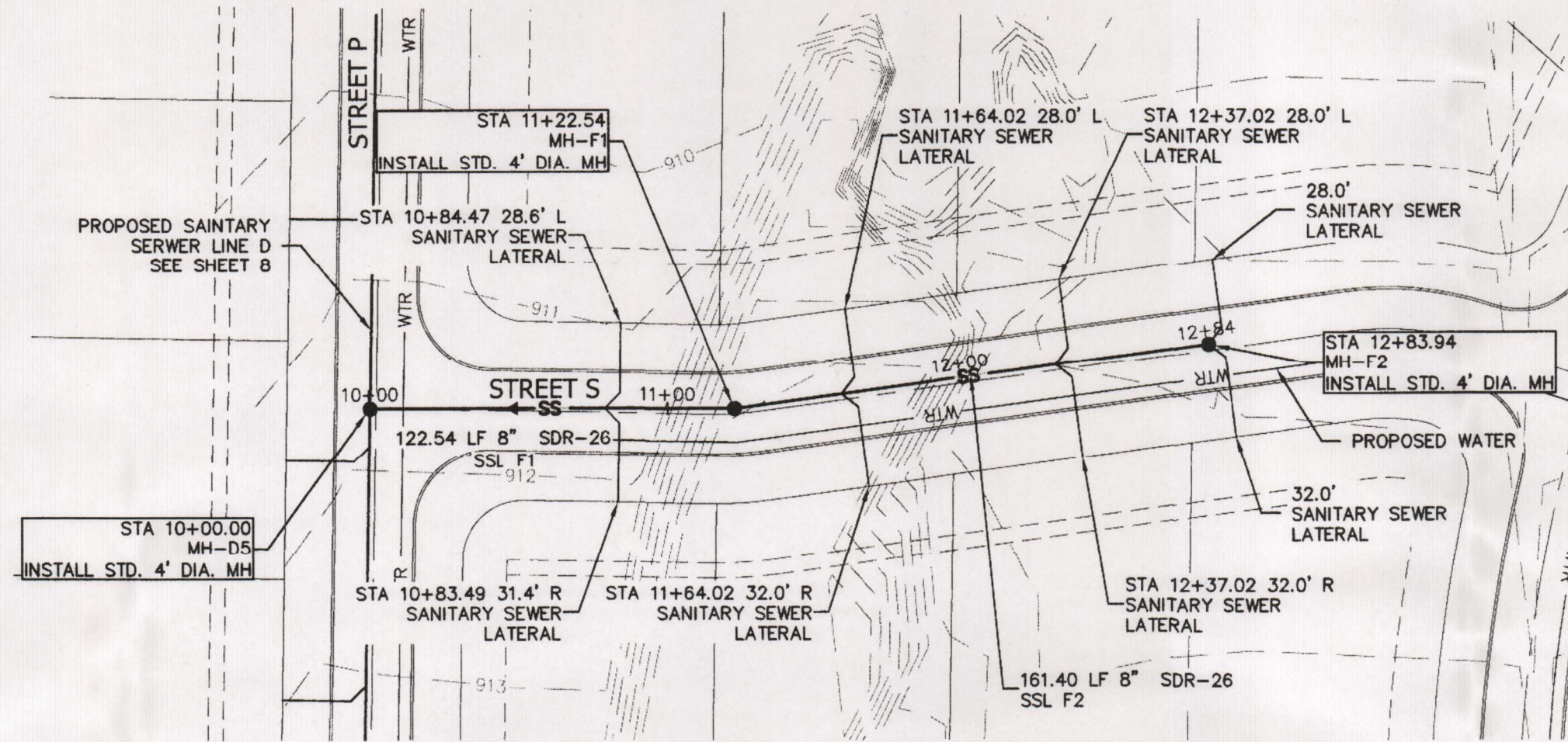
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UNIT 2

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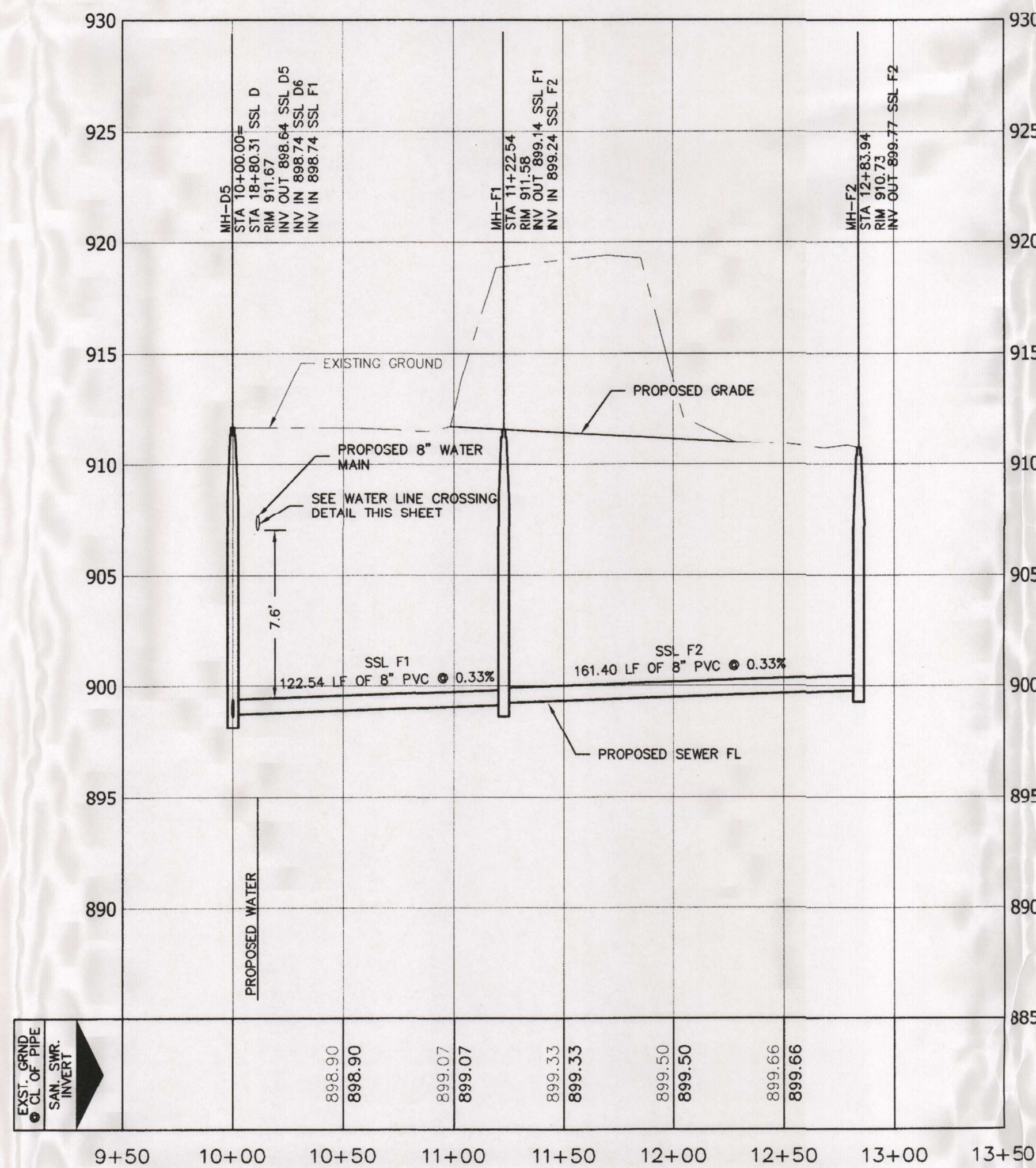
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**10**  
**OF 20**

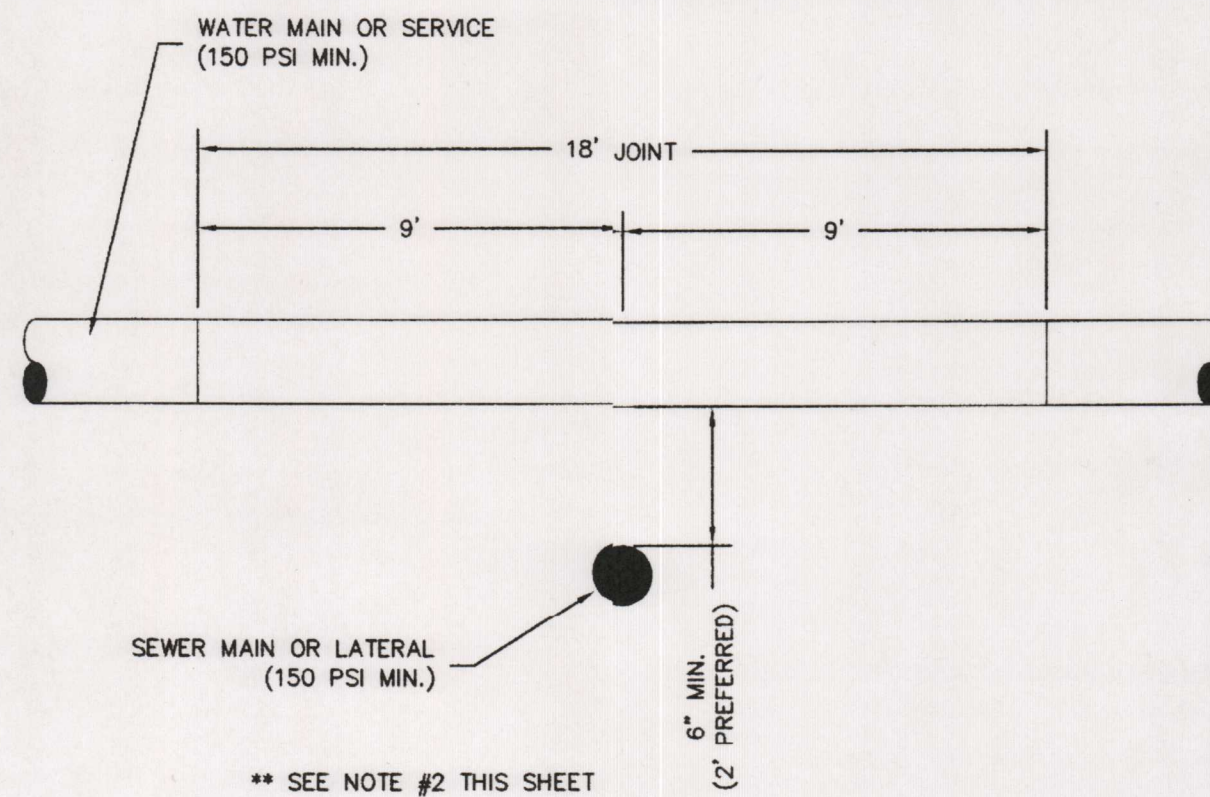




SANITARY SEWER LINE F STA 10+00 TO END



SCALE  
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SEWER/WATER CROSSING DETAIL

Scale: NTS

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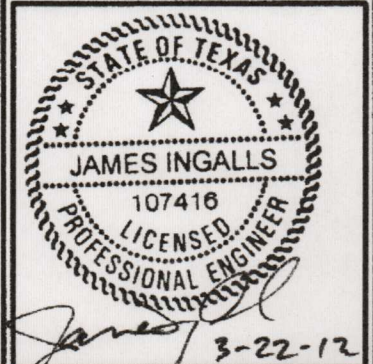
THE EXISTENCE AND LOCATION OF UNDERGROUND CABLE INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR TO CONTACT THE TELEPHONE COMPANY CABLE LOCATOR 48HRS PRIOR TO EXCAVATION AT 1-800-545-6005. CONTRACTOR HAS THE RESPONSIBILITY TO PROTECT AND SUPPORT TELEPHONE COMPANY DURING CONSTRUCTION.

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTORS IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATIONS.

THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR WILL AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE INCURRED BY THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES, STRUCTURES OR FACILITIES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES 24-HOURS PRIOR TO COMMENCING CONSTRUCTION.

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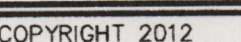
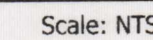
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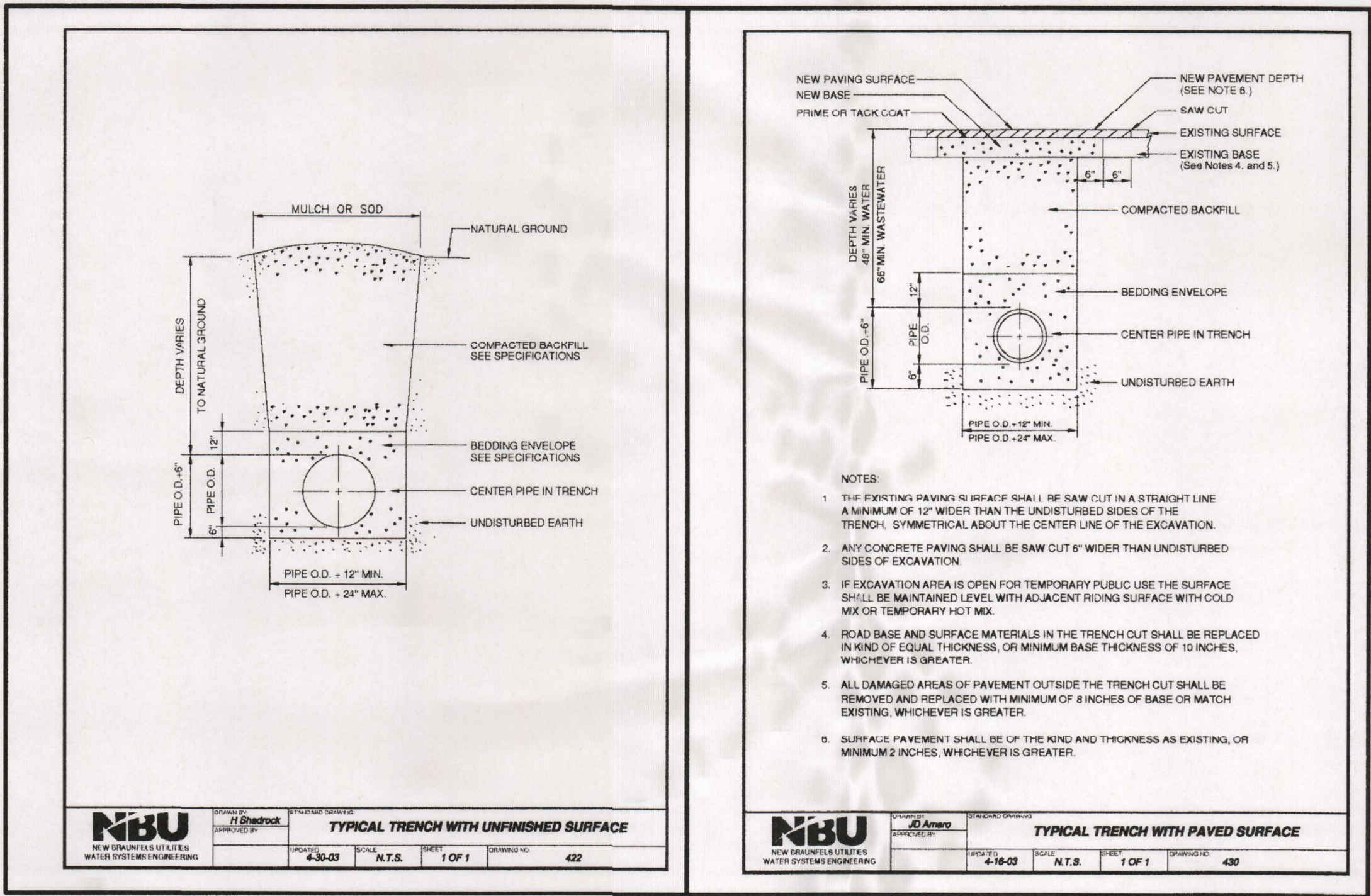




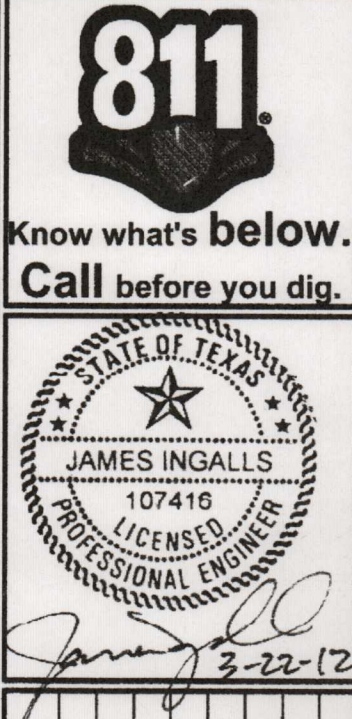








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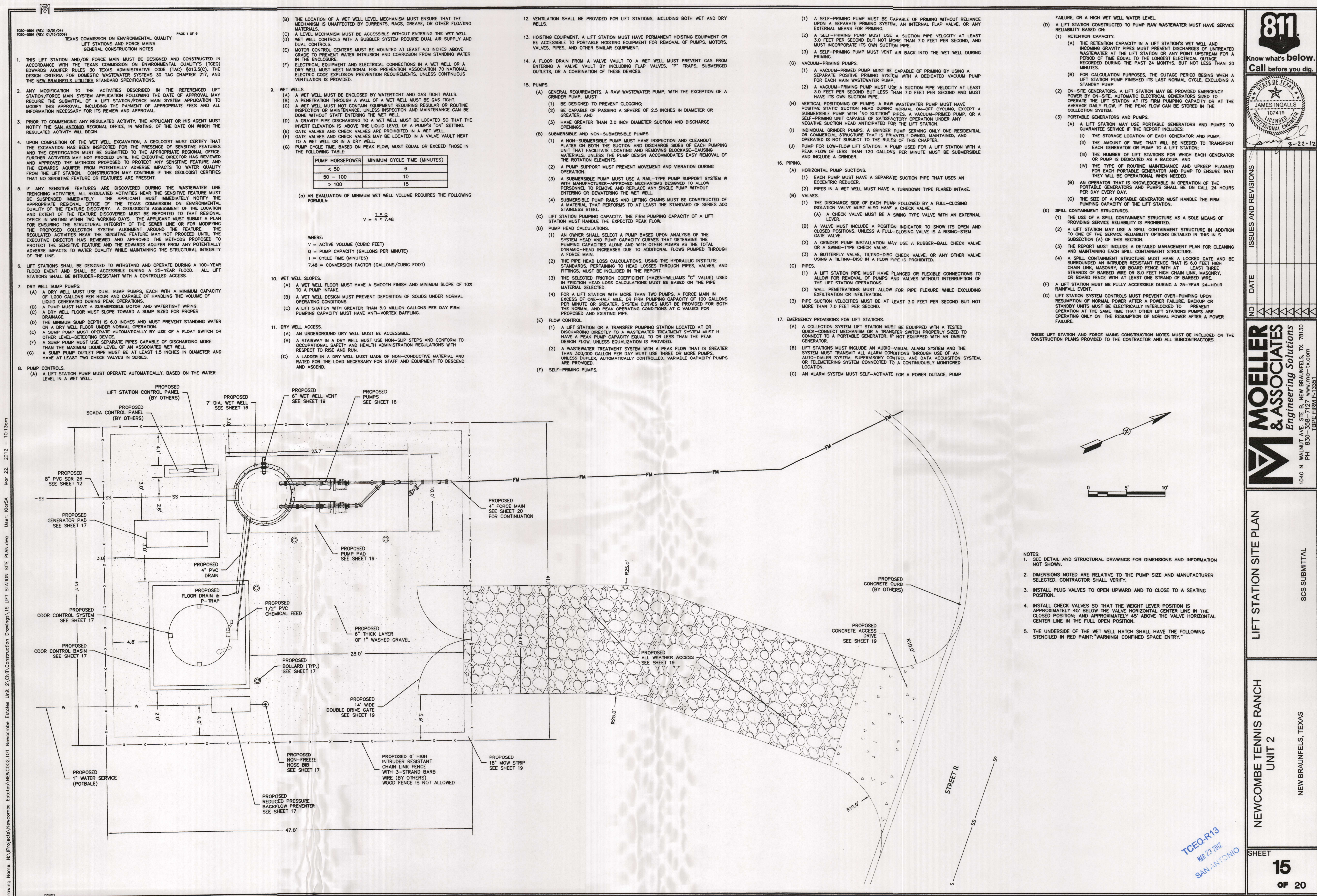
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LIFT STATION SITE PLAN

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NEWCOMBE TENNIS RANCH

UNIT 2

NEW BRAUNFELS, TEXAS

SHEET

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OF 20

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1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS 30 TAC CHAPTER 217, AND THE NEW BRAUNFELS UTILITIES STANDARD SPECIFICATIONS.

2. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED LIFT STATION/FORCE MAIN SYSTEM APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF A LIFT STATION/FORCE MAIN SYSTEM APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

3. PRIOR TO COMMENCING ANY REGULATED ACTIVITY, THE APPLICANT OR HIS AGENT MUST NOTIFY THE SAN ANTONIO REGIONAL OFFICE, IN WRITING, OF THE DATE ON WHICH THE REGULATED ACTIVITY WILL BEGIN.

4. UPON COMPLETION OF THE WET WELL EXCAVATION, A GEOLOGIST MUST CERTIFY THAT THE EXCAVATION HAS BEEN INSPECTED FOR THE PRESENCE OF SENSITIVE FEATURES AND THE CERTIFICATION MUST BE SUBMITTED TO THE APPROPRIATE REGIONAL OFFICE. FURTHER ACTIVITIES MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY FROM THE LIFT STATION. CONSTRUCTION MAY CONTINUE IF THE GEOLOGIST CERTIFIES THAT NO SENSITIVE FEATURE OR FEATURES ARE PRESENT.

5. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY OF THE FEATURE DISCOVERY. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THAT REGIONAL OFFICE IN WRITING WITHIN TWO WORKING DAYS. THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

6. LIFT STATIONS SHALL BE DESIGNED TO WITHSTAND AND OPERATE DURING A 100-YEAR FLOOD EVENT AND SHALL BE ACCESSIBLE DURING A 25-YEAR FLOOD. ALL LIFT STATIONS SHALL BE INTRUDER-RESISTANT WITH A CONTROLLED ACCESS.

7. DRY WELL SUMP PUMPS:

(A) A DRY WELL MUST USE DUAL SUMP PUMPS, EACH WITH A MINIMUM CAPACITY OF 1,000 GALLONS PER HOUR AND CAPABLE OF HANDLING THE VOLUME OF LIQUID GENERATED DURING PEAK OPERATIONS.

(B) A PUMP MUST HAVE A SUBMERSIBLE MOTOR AND WATERTIGHT WIRING.

(C) A DRY WELL FLOOR MUST SLOPE TOWARD A SUMP SIZED FOR PROPER DRAINAGE.

(D) THE MINIMUM SUMP DEPTH IS 6.0 INCHES AND MUST PREVENT STANDING WATER ON A DRY WELL FLOOR UNDER NORMAL OPERATION.

(E) A SUMP PUMP MUST OPERATE AUTOMATICALLY BY USE OF A FLOAT SWITCH OR OTHER LEVEL-DETECTING DEVICE.

(F) A SUMP PUMP MUST USE SEPARATE PIPES CAPABLE OF DISCHARGING MORE THAN THE MAXIMUM LIQUID LEVEL OF AN ASSOCIATED WET WELL.

(G) A SUMP PUMP OUTLET PIPE MUST BE AT LEAST 1.5 INCHES IN DIAMETER AND HAVE AT LEAST TWO CHECK VALVES IN SERIES.

8. PUMP CONTROLS.

(A) A LIFT STATION PUMP MUST OPERATE AUTOMATICALLY, BASED ON THE WATER LEVEL IN A WET WELL.

(B) THE LOCATION OF A WET WELL LEVEL MECHANISM MUST ENSURE THAT THE MECHANISM IS UNAFFECTED BY CURRENTS, RAGS, GREASE, OR OTHER FLOATING MATERIALS.

(C) A LEVEL MECHANISM MUST BE ACCESSIBLE WITHOUT ENTERING THE WET WELL.

(D) WET WELL CONTROLS WITH A BUBBLER SYSTEM REQUIRE DUAL AIR SUPPLY AND DUAL CONTROLS.

(E) MOTOR CONTROL CENTERS MUST BE MOUNTED AT LEAST 4.0 INCHES ABOVE GRADE TO PREVENT WATER INTRUSION AND CORROSION FROM STANDING WATER IN THE ENCLOSURE.

(F) ELECTRICAL EQUIPMENT AND ELECTRICAL CONNECTIONS IN A WET WELL OR A DRY WELL MUST MEET NATIONAL FIRE PREVENTION ASSOCIATION 70 NATIONAL ELECTRIC CODE EXPLOSION PREVENTION REQUIREMENTS, UNLESS CONTINUOUS VENTILATION IS PROVIDED.

9. WET WELLS.

(A) A WET WELL MUST BE ENCLOSED BY WATERTIGHT AND GAS TIGHT WALLS.

(B) A PENETRATION THROUGH A WALL OF A WET WELL MUST BE GAS TIGHT.

(C) A WET WELL MUST NOT CONTAIN EQUIPMENT REQUIRING REGULAR OR ROUTINE INSPECTION OR MAINTENANCE, UNLESS INSPECTION AND MAINTENANCE CAN BE DONE WITHOUT STAFF ENTERING THE WET WELL.

(D) A GRAVITY PIPE DISCHARGING TO A WET WELL MUST BE LOCATED SO THAT THE INVERT ELEVATION IS ABOVE THE LIQUID LEVEL OF A PUMP'S "ON" SETTING.

(E) GATE VALVES AND CHECK VALVES ARE PROHIBITED IN A WET WELL.

(F) GATE VALVES AND CHECK VALVES MAY BE LOCATED IN A VALVE VAULT NEXT TO A WET WELL OR IN A DRY WELL.

(G) PUMP CYCLE TIME, BASED ON PEAK FLOW, MUST EQUAL OR EXCEED THOSE IN THE FOLLOWING TABLE:

PUMP HORSEPOWER	MINIMUM CYCLE TIME (MINUTES)
< 50	6
50 - 100	10
> 100	15

(g) AN EVALUATION OF MINIMUM WET WELL VOLUME REQUIRES THE FOLLOWING FORMULA:

$$V = \frac{T \cdot Q}{4 \cdot 7.48}$$

WHERE:

V = ACTIVE VOLUME (CUBIC FEET)

Q = PUMP CAPACITY (GALLONS PER MINUTE)

T = CYCLE TIME (MINUTES)

7.48 = CONVERSION FACTOR (GALLONS/CUBIC FOOT)

10. WET WELL SLOPES.

(A) A WET WELL FLOOR MUST HAVE A SMOOTH FINISH AND MINIMUM SLOPE OF 10% TO A PUMP INTAKE.

(B) A WET WELL DESIGN MUST PREVENT DEPOSITION OF SOLIDS UNDER NORMAL OPERATING CONDITIONS.

(C) A LIFT STATION WITH GREATER THAN 5.0 MILLION GALLONS PER DAY FIRM PUMPING CAPACITY MUST HAVE ANTI-VORTEX BAFFLING.

11. DRY WELL ACCESS.

(A) AN UNDERGROUND DRY WELL MUST BE ACCESSIBLE.

(B) A STAIRWAY IN A DRY WELL MUST USE NON-SLIP STEPS AND CONFORM TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS WITH RESPECT TO RISE AND RUN.

(C) A LADDER IN A DRY WELL MUST BE MADE OF NON-CONDUCTIVE MATERIAL AND RATED FOR THE LOAD NECESSARY FOR STAFF AND EQUIPMENT TO DESCEND AND ASCEND.

12. VENTILATION SHALL BE PROVIDED FOR LIFT STATIONS, INCLUDING BOTH WET AND DRY WELLS.

13. HOISTING EQUIPMENT. A LIFT STATION MUST HAVE PERMANENT HOISTING EQUIPMENT OR BE ACCESSIBLE TO PORTABLE HOISTING EQUIPMENT FOR REMOVAL OF PUMPS, MOTORS, VALVES, PIPES, AND OTHER SIMILAR EQUIPMENT.

14. A FLOOR DRAIN FROM A VALVE VAULT TO A WET WELL MUST PREVENT GAS FROM ENTERING A VALVE VAULT BY INCLUDING FLAP VALVES, "P" TRAPS, SUBMERGED OUTLETS, OR A COMBINATION OF THESE DEVICES.

15. PUMPS.

(A) GENERAL REQUIREMENTS. A RAW WASTEWATER PUMP, WITH THE EXCEPTION OF A GRINDER PUMP, MUST:

(1) BE DESIGNED TO PREVENT CLOGGING;

(2) BE CAPABLE OF PASSING A SPHERE OF 2.5 INCHES IN DIAMETER OR GREATER; AND

(3) HAVE GREATER THAN 3.0 INCH DIAMETER SUCTION AND DISCHARGE OPENINGS.

(B) SUBMERSIBLE AND NON-SUBMERSIBLE PUMPS.

(1) A NON-SUBMERSIBLE PUMP MUST HAVE INSPECTION AND CLEANOUT PLATES ON BOTH THE SUCTION AND DISCHARGE SIDES OF EACH PUMPING UNIT THAT FACILITATE LOCATING AND REMOVING BLOCKAGE-CAUSING MATERIALS, UNLESS THE PUMP DESIGN ACCOMMODATES EASY REMOVAL OF THE ROTATION ELEMENTS.

(2) A PUMP SUPPORT MUST PREVENT MOVEMENT AND VIBRATION DURING OPERATION.

(3) A SUBMERSIBLE PUMP MUST USE A RAIL-TYPE PUMP SUPPORT SYSTEM WITH MANUFACTURER-APPROVED MECHANISMS DESIGNED TO ALLOW PERSONNEL TO REMOVE AND REPLACE ANY SINGLE PUMP WITHOUT ENTERING OR DEWATERING THE WET WELL.

(4) SUBMERSIBLE PUMP RAILS AND LIFTING CHAINS MUST BE CONSTRUCTED OF A MATERIAL THAT PERFORMS TO AT LEAST THE STANDARD OF SERIES 300 STAINLESS STEEL.

(C) LIFT STATION PUMPING CAPACITY. THE FIRM PUMPING CAPACITY OF A LIFT STATION MUST HANDLE THE EXPECTED PEAK FLOW.

(D) PUMP HEAD CALCULATIONS.

(1) AN OWNER SHALL SELECT A PUMP BASED UPON ANALYSIS OF THE SYSTEM HEAD AND PUMP CAPACITY CURVES THAT DETERMINE THE PUMPING CAPACITIES ALONE AND WITH OTHER PUMPS AS THE TOTAL DYNAMIC-HEAD INCREASES DUE TO ADDITIONAL FLOWS PUMPED THROUGH A FORCE MAIN.

(2) THE PIPE HEAD LOSS CALCULATIONS, USING THE HYDRAULIC INSTITUTE STANDARDS, PERTAINING TO HEAD LOSSES THROUGH PIPES, VALVES, AND FITTINGS, MUST BE INCLUDED IN THE REPORT.

(3) THE SELECTED FRICTION COEFFICIENT (HAZEN-WILLIAMS "C" VALUE) USED IN FRICTION HEAD LOSS CALCULATIONS MUST BE BASED ON THE PIPE MATERIAL SELECTED.

(4) FOR A LIFT STATION WITH MORE THAN TWO PUMPS, A FORCE MAIN IN EXCESS OF ONE-HALF MILE, OR FIRM PUMPING CAPACITY OF 100 GALLONS PER MINUTE OR GREATER, SYSTEM CURVES MUST BE PROVIDED FOR BOTH THE NORMAL AND PEAK OPERATING CONDITIONS AT C VALUES FOR PROPOSED AND EXISTING PIPE.

(E) FLOW CONTROL.

(1) A LIFT STATION OR A TRANSFER PUMPING STATION LOCATED AT OR DISCHARGING DIRECTLY TO A WASTEWATER TREATMENT SYSTEM MUST HAVE A PEAK PUMP CAPACITY EQUAL TO OR LESS THAN THE PEAK DESIGN FLOW, UNLESS EQUALIZATION IS PROVIDED.

(2) A WASTEWATER TREATMENT SYSTEM WITH A PEAK FLOW THAT IS GREATER THAN 300,000 GALLON PER DAY MUST USE THREE OR MORE PUMPS, UNLESS DUPLEX, AUTOMATICALLY CONTROLLED, VARIABLE CAPACITY PUMPS ARE PROVIDED.

(F) SELF-PRIMING PUMPS.

(1) A SELF-PRIMING PUMP MUST BE CAPABLE OF PRIMING WITHOUT RELIANCE UPON A SEPARATE PRIMING SYSTEM, AN INTERNAL FLAP VALVE, OR ANY EXTERNAL MEANS FOR PRIMING.

(2) A SELF-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND, AND MUST INCORPORATE ITS OWN SUCTION PIPE.

(3) A SELF-PRIMING PUMP MUST VENT AIR BACK INTO THE WET WELL DURING PRIMING.

(G) VACUUM-PRIMING PUMPS.

(1) A VACUUM-PRIMED PUMP MUST BE CAPABLE OF PRIMING BY USING A SEPARATE POSITIVE PRIMING SYSTEM WITH A DEDICATED VACUUM PUMP FOR EACH MAIN WASTEWATER PUMP.

(2) A VACUUM-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT LESS THAN 7.0 FEET PER SECOND AND MUST HAVE ITS OWN SUCTION PIPE.

(H) VERTICAL POSITIONING OF PUMPS. A RAW WASTEWATER PUMP MUST HAVE POSITIVE STATIC SUCTION HEAD DURING NORMAL ON-OFF CYCLING, EXCEPT A SUBMERSIBLE PUMP WITH "NO SUCTION" PIPES, A VACUUM-PRIMED PUMP, OR A SELF-PRIMING UNIT CAPABLE OF SATISFACTORY OPERATION UNDER ANY NEGATIVE SUCTION HEAD ANTICIPATED FOR THE LIFT STATION.

(I) INDIVIDUAL GRINDER PUMPS. A GRINDER PUMP SERVING ONLY ONE RESIDENTIAL OR COMMERCIAL STRUCTURE THAT IS PRIVATELY OWNED, MAINTAINED, AND OPERATED IS NOT SUBJECT TO THE RULES OF THIS CHAPTER.

(J) PUMP FOR LOW-FLOW LIFT STATION. A PUMP USED FOR A LIFT STATION WITH A PEAK FLOW OF LESS THAN 120 GALLONS PER MINUTE MUST BE SUBMERSIBLE AND INCLUDE A GRINDER.

16. PIPING.

(A) HORIZONTAL PUMP SUCTIONS.

(1) EACH PUMP MUST HAVE A SEPARATE SUCTION PIPE THAT USES AN ECCENTRIC REDUCER.

(2) PIPES IN A WET WELL MUST HAVE A TURNDOWN TYPE FLARED INTAKE.

(B) VALVES.

(1) THE DISCHARGE SIDE OF EACH PUMP FOLLOWED BY A FULL-CLOSING ISOLATION VALVE MUST ALSO HAVE A CHECK VALVE.

(A) A CHECK VALVE MUST BE A SWING TYPE VALVE WITH AN EXTERNAL LEVER.

(B) A VALVE MUST INCLUDE A POSITION INDICATOR TO SHOW ITS OPEN AND CLOSED POSITIONS, UNLESS A FULL-CLOSING VALVE IS A RISING-STEM GATE VALVE.

(2) A GRINDER PUMP INSTALLATION MAY USE A RUBBER-BALL CHECK VALVE OR A SWING-TYPE CHECK VALVE.

(3) A BUTTERFLY VALVE, TILTING-DISC CHECK VALVE, OR ANY OTHER VALVE USING A TILTING-DISC IN A FLOW PIPE IS PROHIBITED.

(C) PIPES.

(1) A LIFT STATION PIPE MUST HAVE FLANGED OR FLEXIBLE CONNECTIONS TO ALLOW FOR REMOVAL OF PUMPS AND VALVES WITHOUT INTERRUPTION OF THE LIFT STATION OPERATIONS.

(2) WALL PENETRATIONS MUST ALLOW FOR PIPE FLEXURE WHILE EXCLUDING EXFILTRATION OR INFILTRATION.

(3) PIPE SUCTION VELOCITIES MUST BE AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND.

17. EMERGENCY PROVISIONS FOR LIFT STATIONS.

(A) A COLLECTION SYSTEM LIFT STATION MUST BE EQUIPPED WITH A TESTED QUICK-CONNECT MECHANISM OR A TRANSFER SWITCH PROPERLY SIZED TO CONNECT TO A PORTABLE GENERATOR, IF NOT EQUIPPED WITH AN ONSITE GENERATOR.

(B) LIFT STATIONS MUST INCLUDE AN AUDIO-VISUAL ALARM SYSTEM AND THE SYSTEM MUST TRANSMIT ALL ALARM CONDITIONS THROUGH USE OF AN AUTO-DIALER SYSTEM, SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM, OR TELEMETRY SYSTEM CONNECTED TO A CONTINUOUSLY MONITORED LOCATION.

(C) AN ALARM SYSTEM MUST SELF-ACTIVATE FOR A POWER OUTAGE, PUMP FAILURE, OR A HIGH WET WELL WATER LEVEL.

(D) A LIFT STATION CONSTRUCTED TO PUMP RAW WASTEWATER MUST HAVE SERVICE RELIABILITY BASED ON:

(1) RETENTION CAPACITY.

(A) THE RETENTION CAPACITY IN A LIFT STATION'S WET WELL AND INCOMING GRAVITY PIPES MUST PREVENT DISCHARGES OF UNTREATED WASTEWATER AT THE LIFT STATION OR ANY POINT UPSTREAM FOR A PERIOD OF TIME EQUAL TO THE LONGEST ELECTRICAL OUTAGE RECORDED DURING THE PAST 24 MONTHS, BUT NOT LESS THAN 20 MINUTES.

(B) FOR CALCULATION PURPOSES, THE OUTAGE PERIOD BEGINS WHEN A LIFT STATION PUMP FINISHES ITS LAST NORMAL CYCLE, EXCLUDING A STANDBY PUMP.

(2) ON-SITE GENERATORS. A LIFT STATION MAY BE PROVIDED EMERGENCY POWER BY ON-SITE, AUTOMATIC ELECTRICAL GENERATORS SIZED TO OPERATE THE LIFT STATION AT ITS FIRM PUMPING CAPACITY OR AT THE AVERAGE DAILY FLOW, IF THE PEAK FLOW CAN BE STORED IN THE COLLECTION SYSTEM.

(3) PORTABLE GENERATORS AND PUMPS.

(A) A LIFT STATION MAY USE PORTABLE GENERATORS AND PUMPS TO GUARANTEE SERVICE IF THE REPORT INCLUDES:

(i) THE STORAGE LOCATION OF EACH GENERATOR AND PUMP.

(ii) THE AMOUNT OF TIME THAT WILL BE NEEDED TO TRANSPORT EACH GENERATOR OR PUMP TO A LIFT STATION.

(iii) THE NUMBER OF LIFT STATIONS FOR WHICH EACH GENERATOR OR PUMP IS DEDICATED AS A BACKUP; AND

(iv) THE TYPE OF ROUTINE MAINTENANCE AND UPKEEP PLANNED FOR EACH PORTABLE GENERATOR AND PUMP TO ENSURE THAT THEY WILL BE OPERATIONAL WHEN NEEDED.

(B) AN OPERATOR THAT IS KNOWLEDGEABLE IN OPERATION OF THE PORTABLE GENERATORS AND PUMPS SHALL BE ON CALL 24 HOURS PER DAY EVERY DAY.

(C) THE SIZE OF A PORTABLE GENERATOR MUST HANDLE THE FIRM PUMPING CAPACITY OF THE LIFT STATION.

(E) SPILL CONTAINMENT STRUCTURES.

(1) THE USE OF A SPILL CONTAINMENT STRUCTURE AS A SOLE MEANS OF PROVIDING SERVICE RELIABILITY IS PROHIBITED.

(2) A LIFT STATION MAY USE A SPILL CONTAINMENT STRUCTURE IN ADDITION TO ONE OF THE SERVICE RELIABILITY OPTIONS DETAILED IN THIS IN SUBSECTION (A) OF THIS SECTION.

(3) THE REPORT MUST INCLUDE A DETAILED MANAGEMENT PLAN FOR CLEANING AND MAINTAINING EACH SPILL CONTAINMENT STRUCTURE.

(4) A SPILL CONTAINMENT STRUCTURE MUST HAVE A LOCKED GATE AND BE SURROUNDED AN INTRUDER RESISTANT FENCE THAT IS 6.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST THREE STRANDS OF BARBED WIRE OR 8.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST ONE STRAND OF BARBED WIRE.

(F) A LIFT STATION MUST BE FULLY ACCESSIBLE DURING A 25-YEAR 24-HOUR RAINFALL EVENT.

(G) LIFT STATION SYSTEM CONTROLS MUST PREVENT OVER-PUMPING UPON RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE. BACKUP OR STANDBY UNITS MUST BE ELECTRICALLY INTERLOCKED TO PREVENT OPERATION AT THE SAME TIME THAT OTHER LIFT STATION PUMPS ARE OPERATING ONLY ON THE RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE.

THESE LIFT STATION AND FORCE MAINS CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

NOTES:

1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL VERIFY.

3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.

4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.

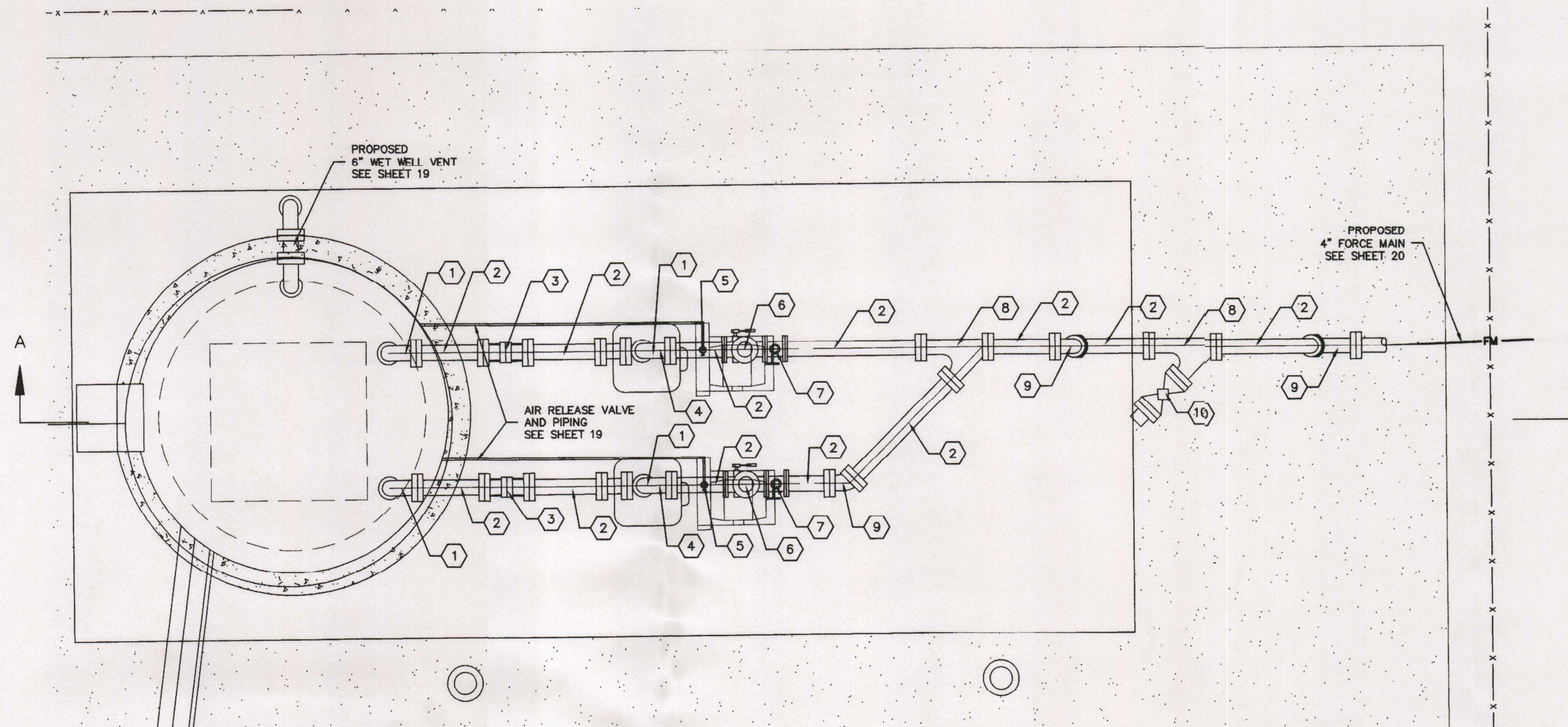
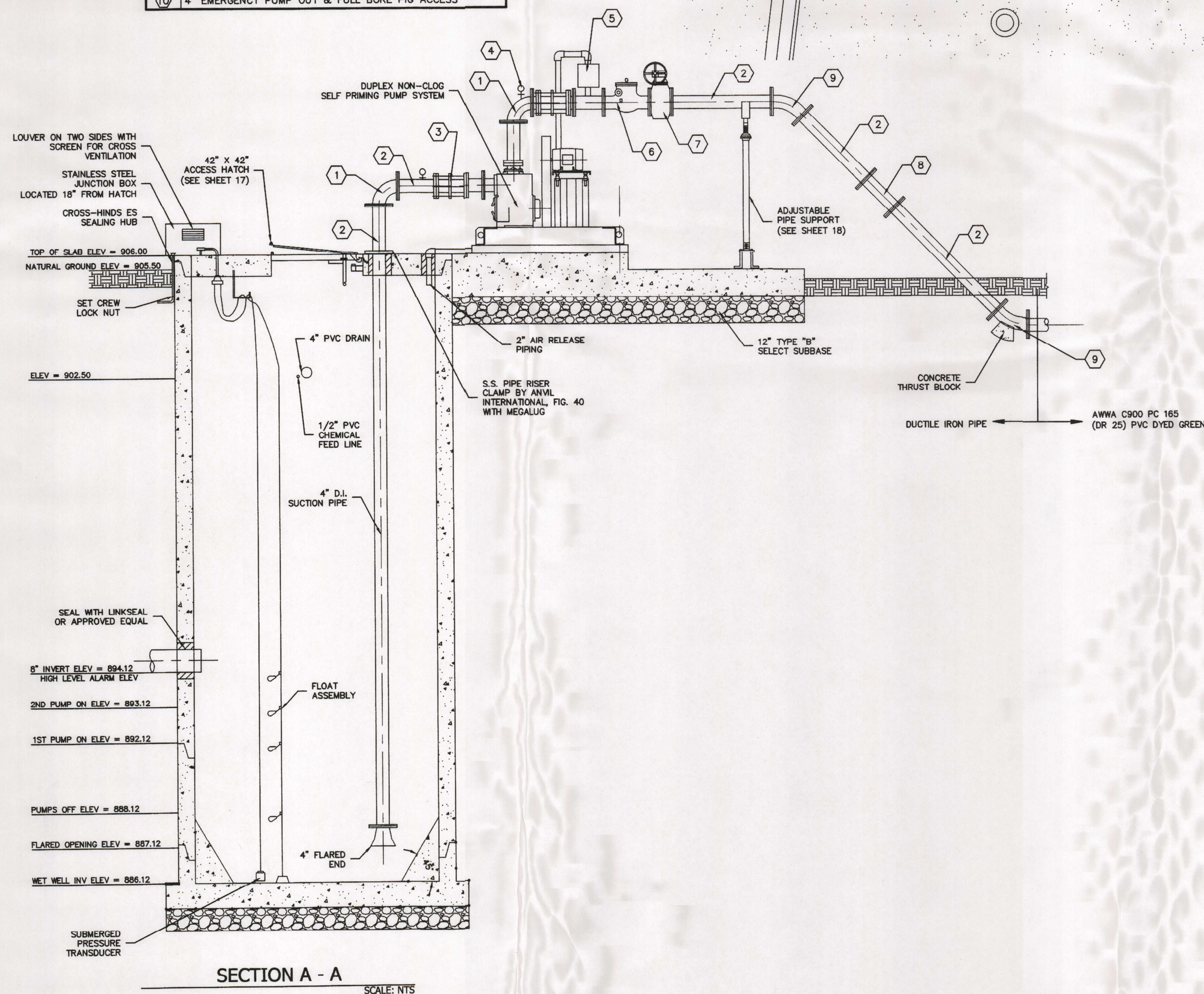
5. THE UNDERSIDE OF THE WET WELL HATCH SHALL HAVE THE FOLLOWING STENCILED IN RED PAINT: "WARNING! CONFINED SPACE ENTRY."



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- NOTES:
1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL VERIFY.
3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
5. THE UNDERSIDE OF THE WET WELL HATCH SHALL HAVE THE FOLLOWING STENCILED IN RED PAINT: "WARNING! CONFINED SPACE ENTRY."

PIPE AND FITTING SCHEDULE	
ITEM	NOTE
①	4" X 90° ELBOW, DI
②	4" SPOOL, DI
③	4" DRESSER DISMANTLING JOINT, DI
④	PRESSURE GAUGE, (TYP.)
⑤	2" COMBINATION AIR RELEASE VALVE AND PIPING
⑥	4" EXTERNAL ARM SWING CHECK VALVE
⑦	4" PLUG VALVE (TYP.)
⑧	4" FLOW THROUGH WYE, DI
⑨	4" X 45° BEND, DI
⑩	4" EMERGENCY PUMP OUT & FULL BORE PIG ACCESS



- NOTES:
1. DIMENSIONS AND DETAILS ARE SHOWN FOR THE MIN. SIZE AND DEPTH REQUIREMENTS FOR THE WET WELL, PUMP PLACEMENT PIPE, AND APPURTENANCES AS WELL AS FOR BIDDING PURPOSES. CONTRACTOR SHALL PROVIDE A DETAILED SHOP DRAWING SUBMITTAL FOR THE STRUCTURE (WALLS, BOTTOM SLAB, AND TOP) WITH DESIGN CALCULATIONS, SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS FOR THE SELECTED METHOD OF CONSTRUCTION TO BE REVIEWED AND APPROVED BY THE ENGINEER. THE SUBMITTED STRUCTURAL DESIGN SHALL ADDRESS ALL REQUIREMENTS TO ALLOW FOR ALL POSSIBLE LOADS AND STRESSES PLACED ON THE STRUCTURE DURING OPERATION AND AFTER PLACED IN OPERATION AND TO MEET THE GEOTECHNICAL CONDITIONS.
2. CONTRACTOR SHALL BACKFILL AREA AROUND WET WELL, WITH CEMENT STABILIZED SAND, SEE SPECIFICATIONS.
3. IF WET WELL IS CONSTRUCTED BY CAISSON METHOD, INJECT GROUT TO FILL ANNULAR VOID AROUND WET WELL.
4. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
5. PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN, INCLUDING CALCULATIONS.
6. CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS AND SUBMIT DESIGN OF ANCHOR BOLTS.
7. ALL PIPING IN THE WET WELL SHALL BE FLANGED, NO FLANGED COUPLING ADAPTERS, OR VITACUIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE OF WET WELL.
8. THE DIMENSIONING IN "SECTION A-A" WITH REFERENCE TO THIS NOTE ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL VERIFY THESE DIMENSIONS AND ADJUST ACCORDINGLY.
9. WET WELL TO BE LINED WITH T-LOCK PVC LINER OR APPROVED EQUAL LINER SHALL COVER ALL CONCRETE SURFACES AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.
10. TOP AND BOTTOM SLABS, INCLUDING VALVE PAD SHALL BE CONSTRUCTED OF 4000 PSI CONCRETE.
11. ALL HARDWARE SHALL BE 316 STAINLESS STEEL.
12. PUMPS SHALL BE NON-CLOG, SELF-PRIMING PUMPS CAPABLE OF HANDLING RAW WASTEWATER AND CAPABLE OF PASSING 3" DIAMETER SOLIDS AT A MINIMUM.
13. DUAL LEVEL INDICATING SYSTEM SHALL INCLUDE SUBMERGED PRESSURE TRANSDUCER AND BACK-UP FLOATING LEVEL ASSEMBLY.
14. THE ACCESS COVERS SHALL BE A MINIMUM OF 42" X 42" AND SHALL BE ABLE TO BE PADLOCKED, AN ALUMINUM SAFETY GRATE SHALL BE INSTALLED ON WET WELL OPENING.
15. A 316 STAINLESS STEEL FLOAT MOUNTING ASSEMBLY SHALL BE PROVIDED, THE FLOATS SHALL BE MOUNTED AROUND THE WET WELL INLET, ANY CONTROL WIRING, AND THE PUMP'S SUCTON, TO MINIMIZE DISTURBANCE BECAUSE OF TURBULENCE, LEVEL SETTINGS SHOWN ON THIS SHEET, FLOATS SHALL BE SUSPENDED FROM FLOAT MOUNTING ASSEMBLY WITH KELLUM GRIPS AND SHALL BE TIED TO A STAINLESS STEEL CHAIN AND ANCHOR ASSEMBLY.
16. PUMP/MOTOR DATA: 80 GPM @ 32FT T.D.H., 1.08 HP, 60HZ, 1900 RPM.
17. PUMP SHALL BE GORMAN RUPP MODEL 83D-B-1 (PUMP CURVE 83D-B-1)
18. ALL STATIONARY PIPING USED IN THE LIFT STATION SHALL BE LINED DUCTILE IRON OR 300 SERIES STAINLESS STEEL, ALL HARDWARE MUST BE 316 STAINLESS STEEL.
19. PUMP DISCHARGE LINES SHALL HAVE 1/4" TAPS WITH STAINLESS STEEL OR BRONZE BALL VALVES.
20. ALL DISCHARGE LINES SHALL HAVE ADEQUATE THRUST SUPPORT MEMBERS AT EACH FITTING, WHERE POSSIBLE, LONG RADIUS 90 DEG BENDS SHALL BE USED.
21. THE DISCHARGE LINE FROM EACH PUMP SHALL BE FITTED WITH A CHECK VALVE AND A ECCENTRIC PLUG VALVE.
22. NPT FITTINGS SHALL BE BRASS.
23. ARV COMBINATION SHALL BE MODEL D-020 BY ARI
24. AUDIO VISUAL ALARM SYSTEM SHALL TRANSMIT ALL ALARM CONDITIONS TO CELL PHONE BASED AUTO-DIALER FOR CONTINUOUS MONITORING

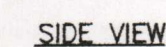


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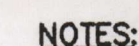
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DETAIL

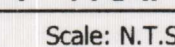
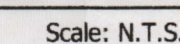
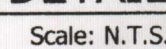
**DETAIL**  
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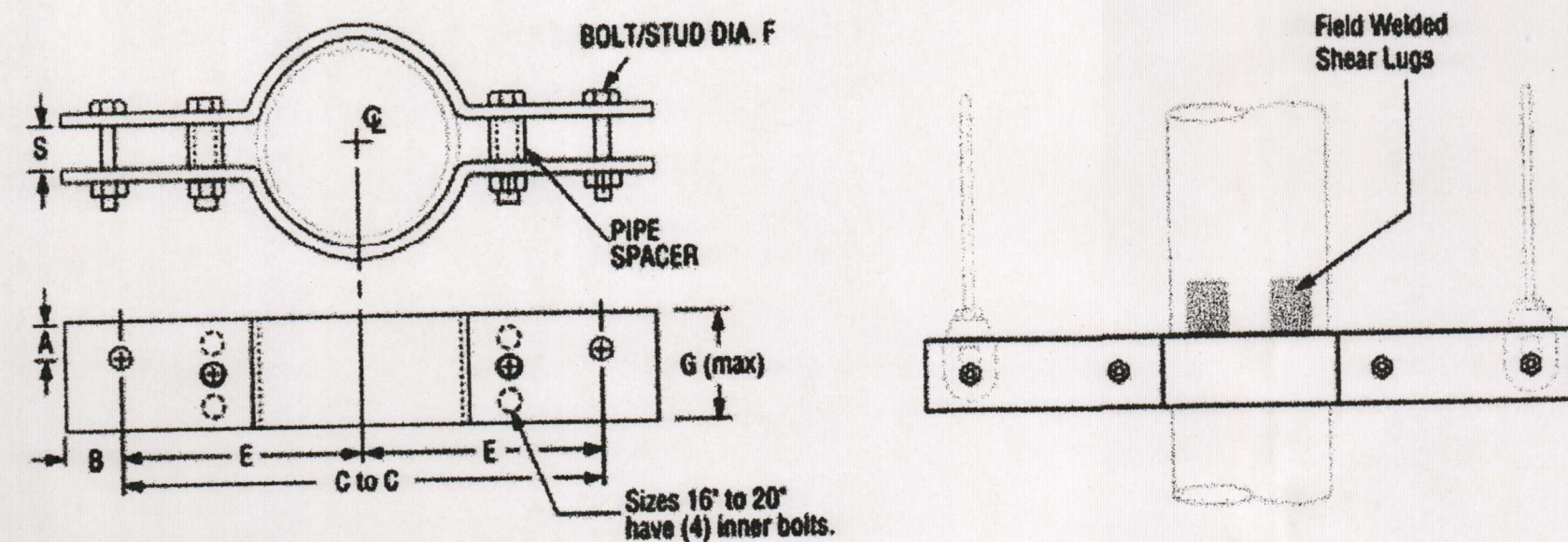


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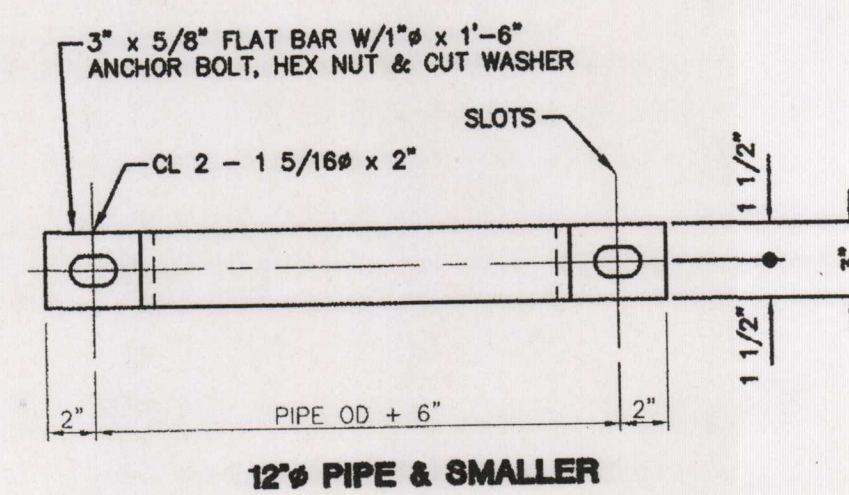
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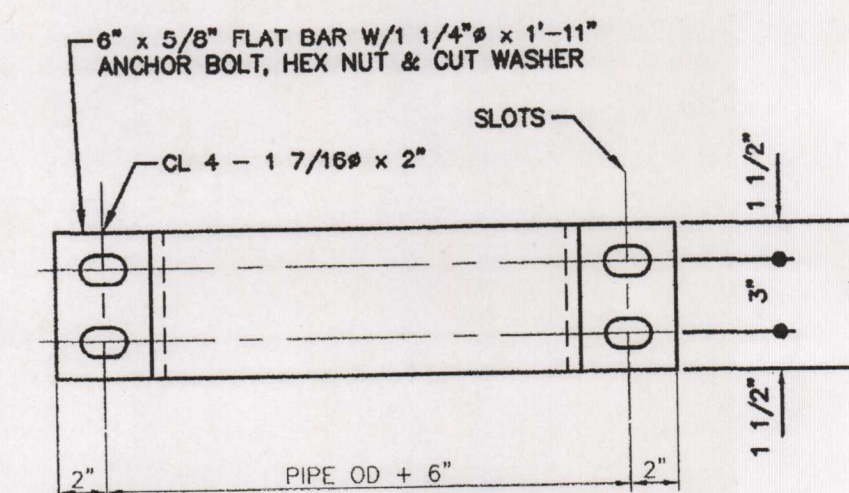


Pipe Size	Max Load		C-C	E	F (max)	G (max)	S	A (CS)	A (alloy) (SS)	B (max)	Maximum Weight Each		
	Rigid Assembly	Spring Assembly									CS	SS	Alloy
2	900	1,800	18	9	½	2½	¾	1¼	¾	2	18	15	18
2½			20	10	¾		1				20	20	20
3	1,500	3,000				3		1½			30	25	30
4	2,200	4,400	22	11	¾		1¼		1¼		40	40	44
5							4		2			45	40
6	3,000	6,000	24	12	¾		1½	¾	1¼	60	60	73	
8			27	13½		5					82	82	82
10	5,500	11,000	30	15	1¼	6	2¼	1¼	1¼	3	157	157	157
12	7,800	15,600	32	16		7		1¼	1¼		216	202	250
14			34	17			2½		1¼			228	228
16	9,000	18,000	36	18	1½	6		1½	2		314	277	315
18			39	19½		7						338	338
20	13,500	27,000	42	21	2	8	3½	2¼	2¼	4¼	525	525	580
24			45	22½									

**PIPE RISER CLAMP**  
Scale: N.T.S.



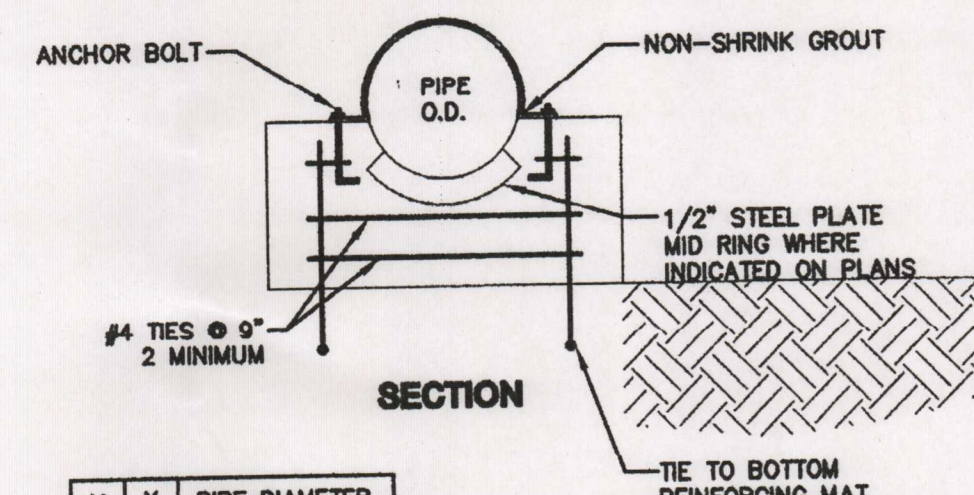
**12" PIPE & SMALLER**



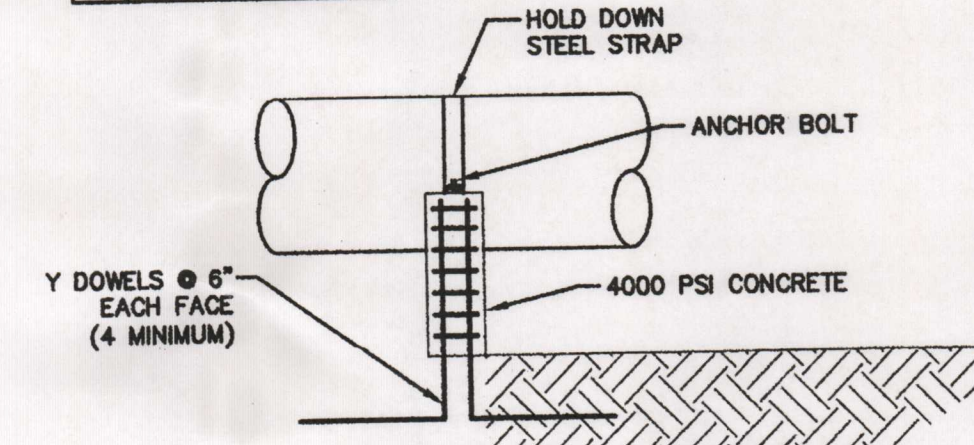
**LARGER THAN 12" PIPE**

NOTE: 1. HOT DIP GALV STRAP AFTER FABRICATION

**PIPE HOLD DOWN STRAP**  
Scale: N.T.S.

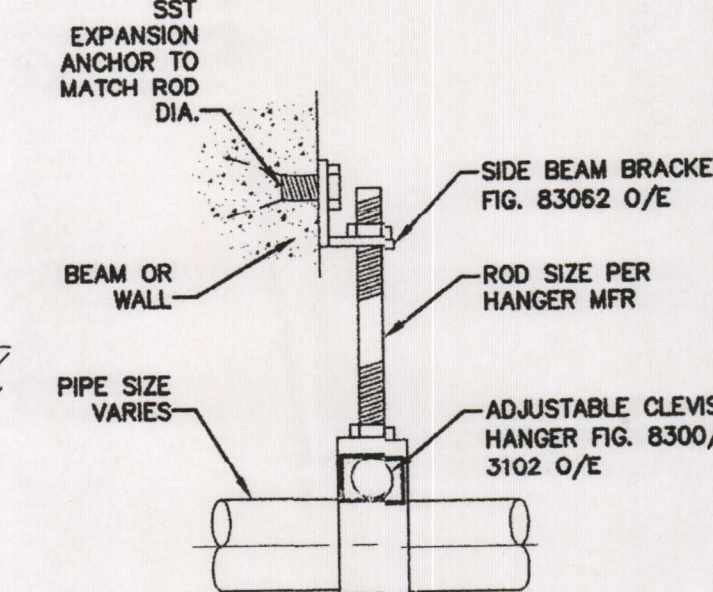


Y	X	PIPE DIAMETER
#6	12"	2"-12"
#8	16"	16" & LARGER

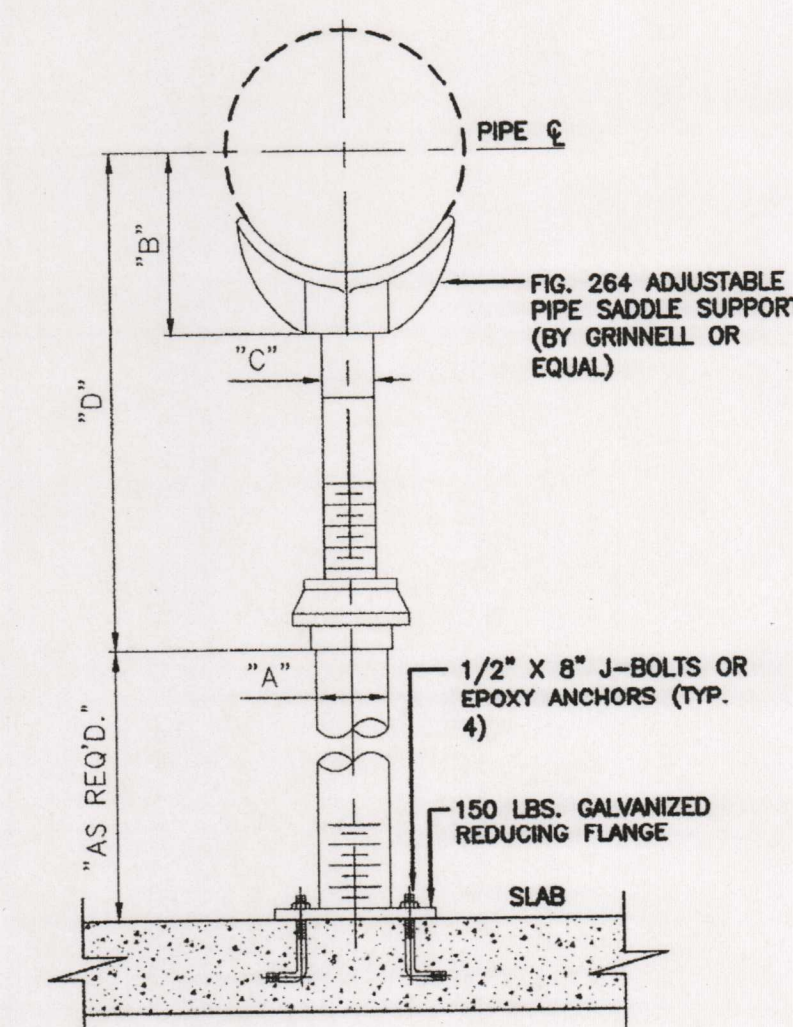


**SECTION**

**CONCRETE PIPE SUPPORT**  
Scale: N.T.S.



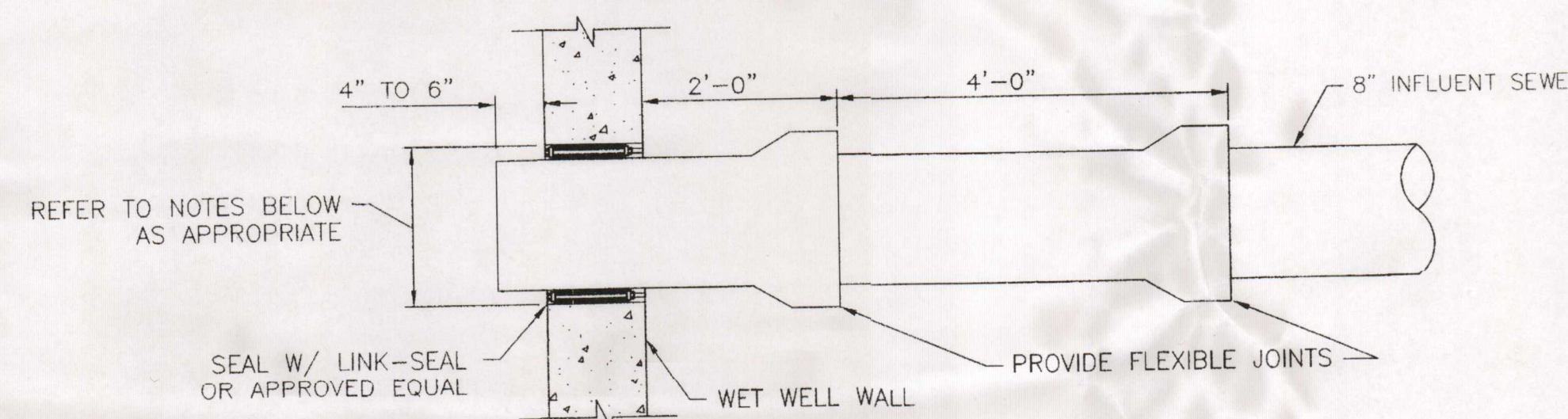
**PIPE SUPPORT**  
Scale: N.T.S.



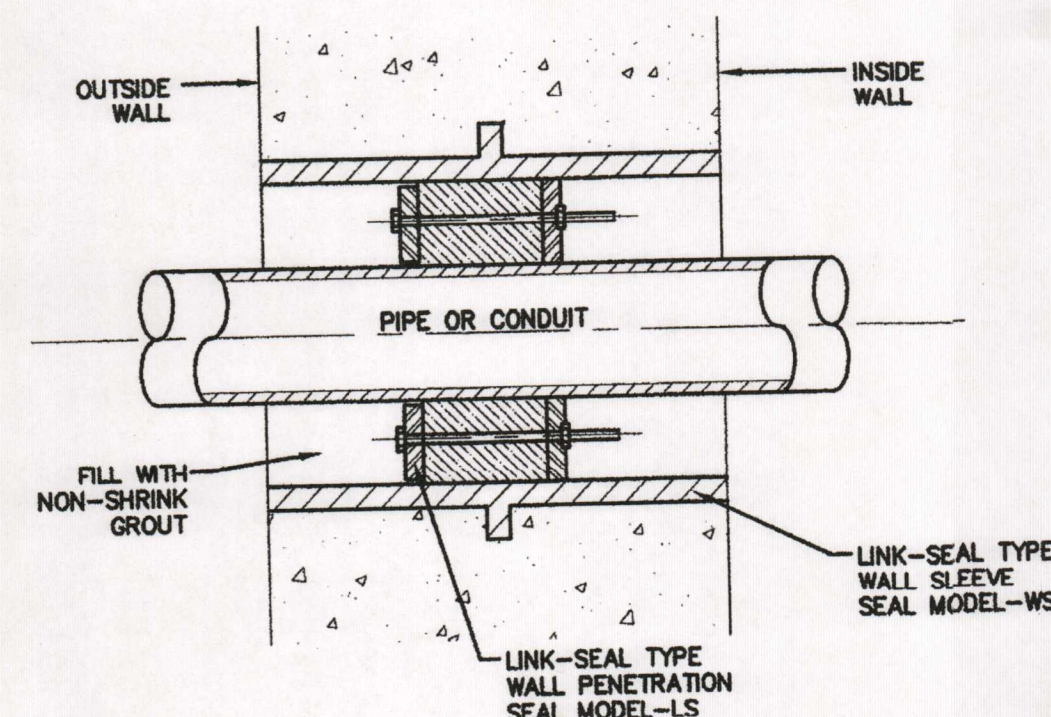
**FIG. 264 ADJUSTABLE PIPE SADDLE SUPPORT (BY GRINNELL OR EQUAL)**

PIPE SIZE	WGT APPROX. LBS EACH		SADDLE ONLY			D	
	COMPLETE	SADDLE ONLY	A	B	C	MINIMUM	MAXIMUM
2 1/2	9.0	4.8	2 1/2	3 1/2	1 1/2	8	13
3	9.2	5.0	2 1/2	3 3/4	1 1/2	8 1/4	13 1/4
3 1/2	9.4	5.2	2 1/2	4	1 1/2	8 1/2	13 1/2
4	15.0	7.8	3	4 1/4	2 1/2	9 1/4	14
5	16.7	8.3	3	4 7/8	2 1/2	10	14 3/4
6	17.7	10.3	3	5 1/2	2 1/2	10 1/2	15 1/4
8	20.2	12.8	3	6 7/8	2 1/2	11 3/4	16 1/2
10	25.2	17.8	3	8 1/2	2 1/2	13 1/2	18 1/4
12	29.0	21.6	3	9 15/16	2 1/2	15	19 3/4
14	40.2	36.0	4	10 15/16	3	16 1/4	20 3/4
16	53.2	42.0	4	12 3/8	3	17 3/4	22 1/4
18	70.8	51.0	6	13 7/8	3 1/2	19 1/2	24
20	104.8	85.0	6	15 3/8	3 1/2	21	25 1/2
24	137.0	110.0	6	17 15/16	4	23 3/4	28 1/2
30	170.0	150.0	6	21 5/16	4	27	31 1/2
32	181.0	161.1	6	22 1/2	4	28 1/8	32 3/4
36	249.0	229.0	6	24 1/4	4	30 1/4	34 3/4

**ADJUSTABLE PIPE SUPPORT**  
Scale: N.T.S.



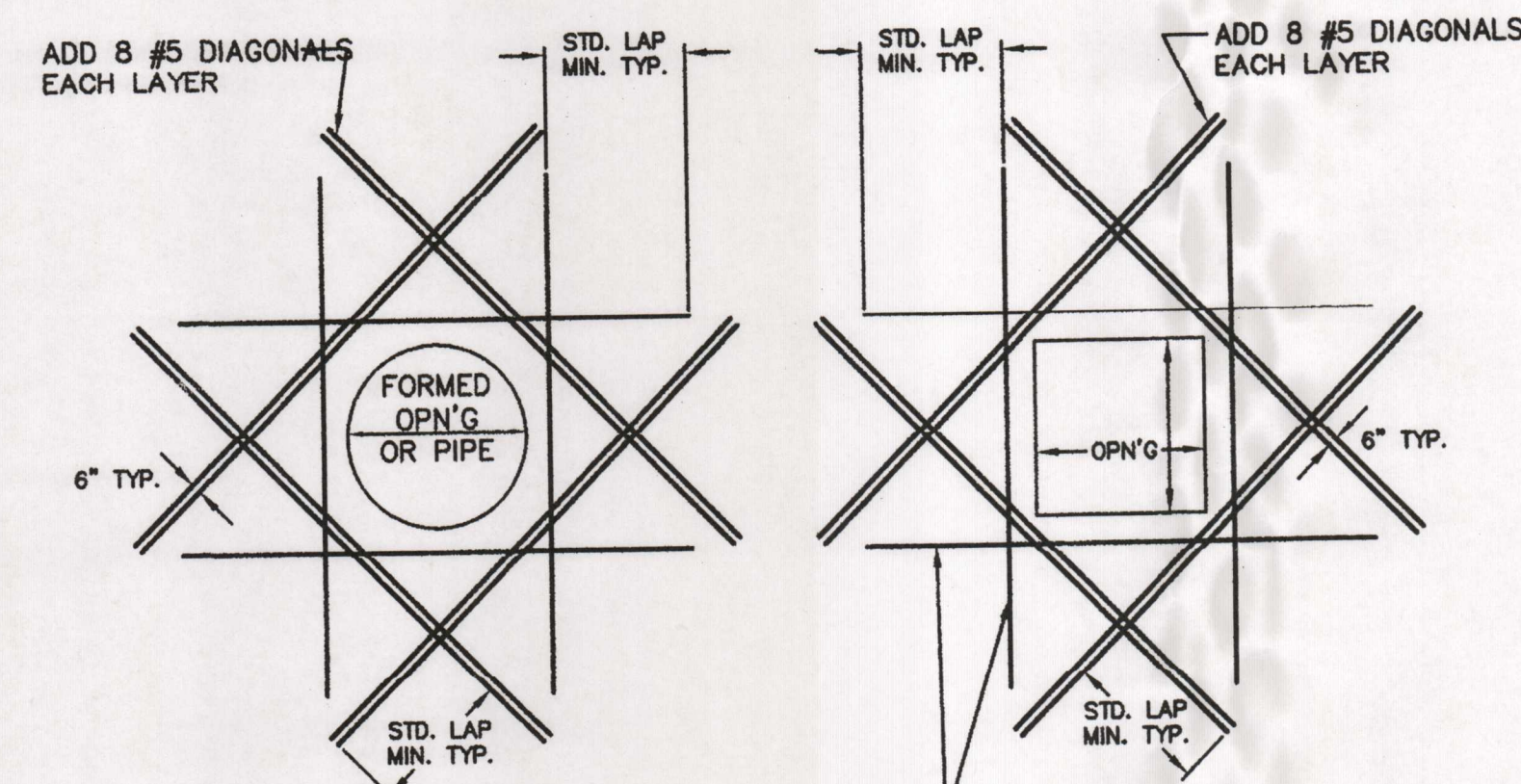
**INFLUENT SEWER PENETRATION DETAIL**  
Scale: N.T.S.



**NOTES:**

- INSIDE DIAMETER OF EACH WALL OPENING SHALL BE OF THE SIZE RECOMMENDED BY MANUFACTURER TO FIT THE PIPE OR CONDUIT AND THE WALL SEAL ASSEMBLY TO ASSURE WATER-TIGHT JOINT.
- PIPE TO WALL PENETRATION CLOSURES SHALL BE OF THE MODULAR MECHANICAL TYPE, CONSISTING OF INTERLOCKING SYNTHETIC RUBBER LINKS SHAPED TO FILL THE ANNULAR SPACE BETWEEN THE PIPE AND WALL OPENING. A PRESSURE PLATE SHALL BE PROVIDED UNDER EACH BOLT HEAD AND NUT, WITH THE SEAL CONSTRUCTED TO PROVIDE ELECTRICAL INSULATION BETWEEN PIPE AND WALL.
- WALL SEAL ASSEMBLY SHALL BE "LINK SEAL" AS MFG. BY THUNDERLINE CORP., WAYNE, MICHIGAN OR EQUAL.
- PROVIDE ESCUTCHEONS IN FINISHED SPACES.
- WALL SEAL ASSEMBLY MAY BE OMITTED AND THE ENTIRE ANNULAR SPACE BETWEEN THE PIPE AND WALL SHALL BE FILLED WITH GROUT WHERE PIPES PENETRATE EXISTING WALLS.

**WALL PENETRATIONS**  
Scale: N.T.S.

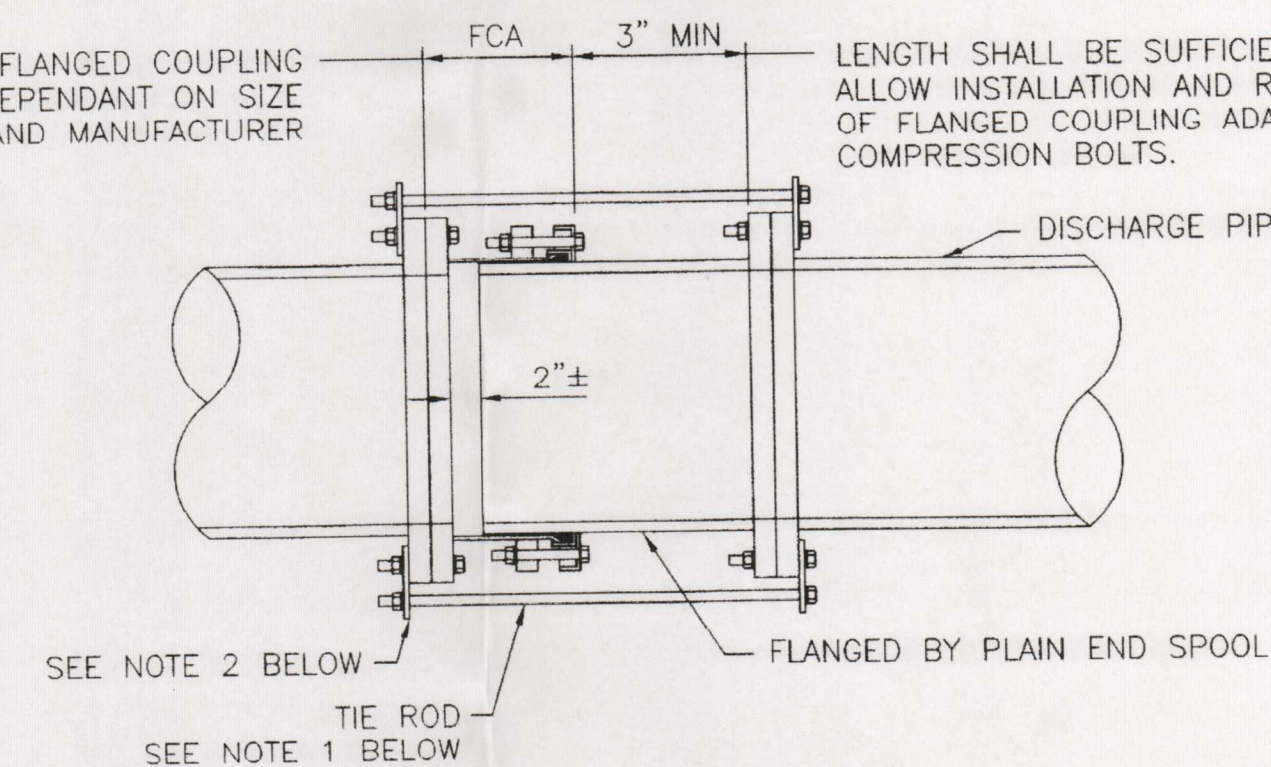


NOTE: SPREAD AND/OR CUT REINFORCING AT OPENINGS. SPREAD BARS NO MORE THAN ONE-HALF TYPICAL BAR SPACE.

ADD EXTRA REINFORCING EQUAL TO REINFORCING CUT (APPROX. SAME SIZE BARS AS CUT REINFORCING AND IN THE SAME PLANE) PLUS (1) #5 EA. FACE OF OPENING.

**PENETRATION REINFORCING**  
Scale: N.T.S.

LENGTH OF FLANGED COUPLING ADAPTOR IS DEPENDANT ON SIZE AND MANUFACTURER



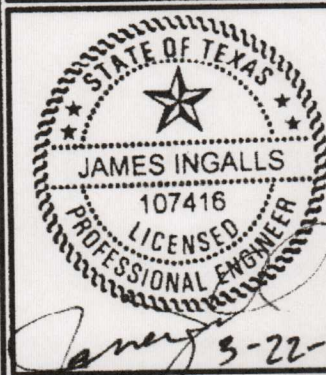
**NOTES:**

- PROVIDE A NUMBER OF TIE RODS EQUAL TO 1/2 THE NUMBER OF FLANGE BOLTS. EVENLY SPACE INSTALLATION OF TIE RODS. DIAMETER OF TIE RODS TO BE EQUAL TO THE DIAMETER OF FLANGE BOLTS. LENGTH OF TIE RODS TO BE DETERMINED BY CONTRACTOR BASED ON SIZE AND MANUFACTURER OF FLANGED COUPLING ADAPTOR AND FINAL LENGTH OF SPOOL PIECE.
- PROVIDE 316 SS TAB FOR ATTACHMENT OF TIE RODS. SIZE TO BE DETERMINED BY CONTRACTOR.
- CONTRACTOR TO SUBMIT DETAILS DURING SHOP DRAWING SUBMISSION.
- ALL HARDWARE SHALL BE 316 STAINLESS STEEL. TIE RODS SHOULD BE THREADED.
- THIS RESTRAINT DOES NOT REPLACE THRUST BLOCKS TO BE PROVIDED AT OTHER LOCATIONS.

**FLANGED COUPLING ADAPTOR RESTRAINT**  
Scale: N.T.S.

**811**

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MISC DETAILS 2

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SAN ANTONIO

SHEET

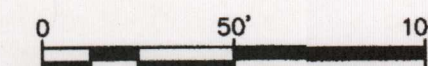
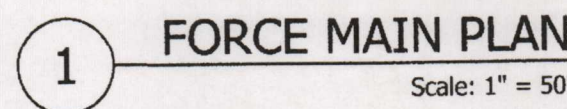
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