ORGANIZED SEWAGE COLLECTION SYSTEM PLAN

FOR

LYNDON RANCH

PREPARED FOR

Texas Commission on Environmental Quality

Region 13 – San Antonio

14250 Judson Road

San Antonio, Texas 78233

210-490-3096 (office)

210-545-4329 (fax)

PREPARED BY

INK CIVIL

F-13351

James Ingalls, P.E.

2021 SH 46W, Ste. 105

New Braunfels, TX 78132

Prepared

October 5, 2023

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.

6. If the geologic assessment was completed before October 1, 2004 and the site contains “possibly sensitive” features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.

4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Lyndon Ranch					**2. Regulated Entity No.:** 111578712				
3. Customer Name: Paravel New Braunfels I, LP					**4. Customer No.:** 606063501				
5. Project Type: (Please circle/check one)	New		Modification		Extension		Exception		
6. Plan Type: (Please circle/check one)	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: (Please circle/check one)	Residential		Non-residential			**8. Site (acres):**		28.129	
9. Application Fee:	$1,079		**10. Permanent BMP(s):**			N/A			
11. SCS (Linear Ft.):	2,158		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Comal		**14. Watershed:**			Comal/Guadalupe River			

Application Distribution

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

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

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

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

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	__	✓	__	__	__
Region (1 req.)	__	✓	__	__	__
County(ies)	__	✓	__	__	__
Groundwater Conservation District(s)	__ Edwards Aquifer Authority __Trinity-Glen Rose	✓ __Edwards Aquifer Authority	__Kinney	__EAA __Medina	__EAA __Uvalde
City(ies) Jurisdiction	__Castle Hills __Fair Oaks Ranch __Helotes __Hill Country Village __Hollywood Park __San Antonio (SAWS) __Shavano Park	__Bulverde __Fair Oaks Ranch __Garden Ridge ✓ __New Braunfels __Schertz	NA	__San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.
James Ingalls, PE Print Name of Customer/Authorized Agent
Signature of Customer/Authorized Agent 10-5-23 Date

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

General Information Form

Texas Commission on Environmental Quality

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

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

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

Signature

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

Print Name of Customer/~~Agent~~: James Ingalls, PE

Date: 10-5-23

Signature of Customer/~~Agent~~:

Project Information

1. Regulated Entity Name: Lyndon Ranch
2. County: Comal
3. Stream Basin: Comal/Guadalupe River
4. Groundwater Conservation District (If applicable): _____
5. Edwards Aquifer Zone:

   ☑ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

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

7. Customer (Applicant):

Contact Person: Curtis Thigpen
Entity: Paravel New Braunfels I, LP
Mailing Address: 1509 Old W. 38th Street, Suite 3
City, State: Austin, TX Zip: 78731
Telephone: 512-467-4441 FAX: _____
Email Address: cthigpen@paravelcap.com

8. Agent/Representative (If any):

Contact Person: James Ingalls, PE
Entity: INK Civil
Mailing Address: 2021 SH 46W, Suite 105
City, State: New Braunfels, TX Zip: 78132
Telephone: 830-358-7127 FAX: _____
Email Address: jamesingalls@ink-civil.com

9. Project Location:

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

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

_____

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

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

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

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

☑ Survey staking will be completed by this date: 6/1

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

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

15. Existing project site conditions are noted below:

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

Prohibited Activities

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

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

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

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

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

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

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

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

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

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

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

Administrative Information

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

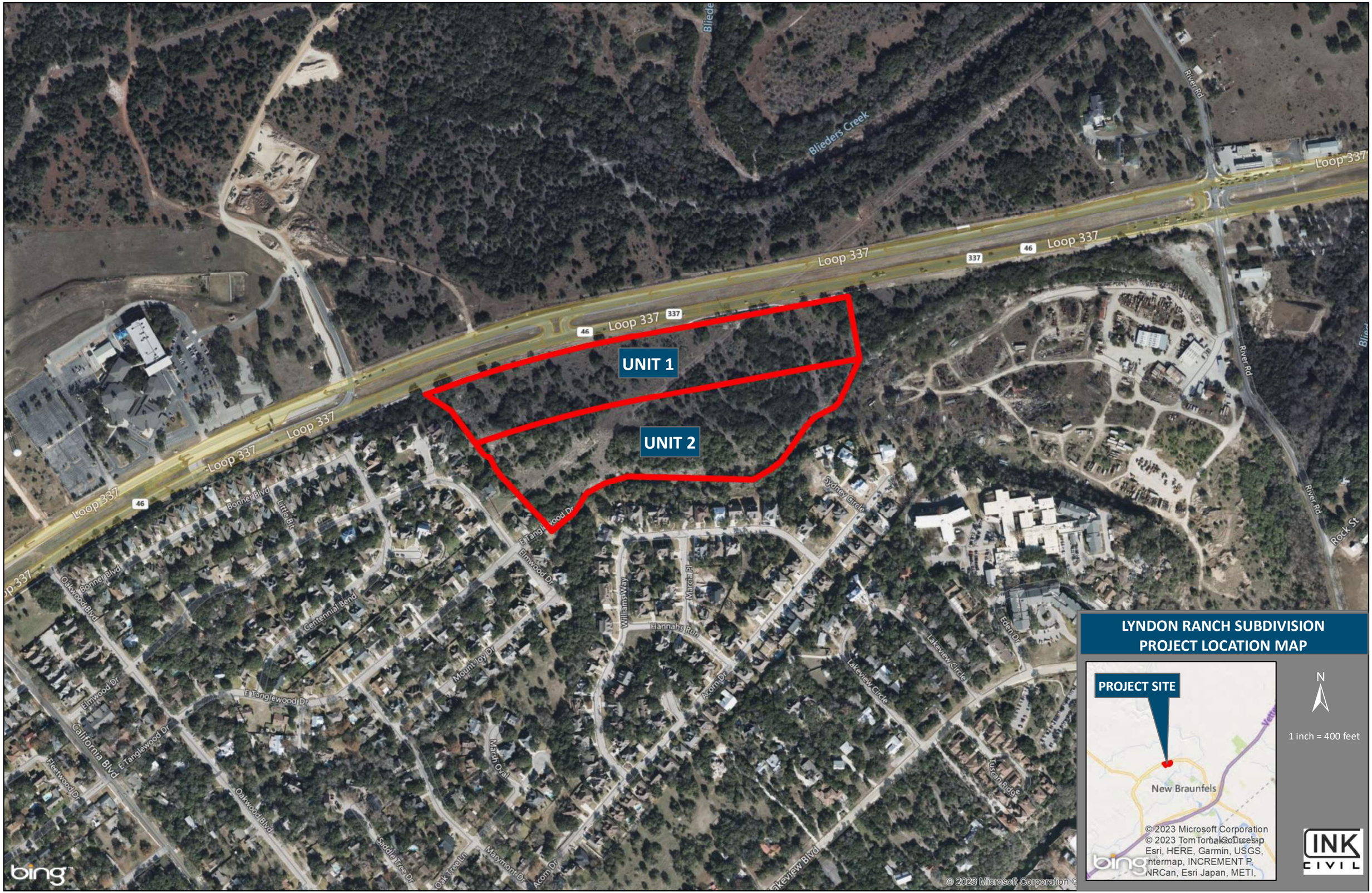
- ☐ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- ☑ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
- ☐ For a UST Facility Plan or Modification or an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

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

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

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

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



LYNDON RANCH SUBDIVISION
PROJECT LOCATION MAP

N

1 inch = 400 feet

INK CIVIL

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NEW BRAUNFELS WEST
TEXAS
7.5 MINUTE SERIES (TO

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NEW BRAUNFELS EAST QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

SITE

RECHARGE ZONE

TRANSITION ZONE

RECHARGE ZONE

TRANSITION ZONE

NEW BRAUNFELS

NEW BRAUNFELS
MUNICIPAL AIRPORT

Produced by the United States Geological Survey
Revised in cooperation with the Texas Water Development Board
Control by USGS, NOS/NOAA, and USCE
Compiled by the Army Map Service by photogrammetric methods from aerial photographs taken 1956. Field checked 1958
Revised from aerial photographs taken 1986. Field checked 1987
Map edited 1988
Projection and 10,000-foot grid ticks: Texas coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 14
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 20 meters south and 28 meters east as shown by dashed corner ticks
Fine red dashed lines indicate selected fence and field lines

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

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

QUADRANGLE LOCATION

2998-413

ROAD CLASSIFI
Primary highway, hard surface
Secondary highway, hard surface
Interstate Route
U. S. R
Ligh
impr
Unim

NEW BRAUNI
2909
DMA 6343 I

Produced by the United States Geological Survey in cooperation with the Defense Mapping Agency
Control by USGS and NOS/NOAA and USCE
Compiled from aerial photographs taken 1956. Revisions in purple and woodland compiled from aerial photographs taken 1986 and other sources and has been field checked. Map edited 1994
Conflicts may exist between some updated features and previously mapped contours
North American Datum of 1927 (NAD 27). Projection and 10,000-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

SCALE 1:24 000

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

UTM GRID AND 1994 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

QUADRANGLE LOCATION

2998-414

ROAD CLASSIFICATION
Primary highway, hard surface — 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
1958
REVISED 1994
DMA 6343 II NE-SERIES V882

ATTACHMENT "C"
Project Description

The proposed site is 28.17 acres comprised of two tracts. The site is located south of Loop 337, approximately 0.44 miles west of the intersection of River Road and Loop 337, in the City of New Braunfels, Comal County, Texas. Site investigation and review of historical aerial photographs done as part of the Geologic Assessment suggest that previous land use was agriculture. An existing LCRA power transmission line runs through the site. No other above ground improvements are observed.

The entire site will be platted into two lots zoned as multi-family and residential.. A public improvements project to bring sanitary sewer utilities to the site is planned. A Water Pollution Abatement Plan will be submitted to TCEQ for each lot. No other uses are proposed for this site.

According to the Flood Insurance Rate Map No. 48091C0435F, effective date 9/02/2009, no portion of the site is in a flood plain. The entire site drains to the Comal/Guadalupe Rivers.

For the scope of the sewage collection system (SCS), proposed construction will include minor grading for the utility mains. The SCS on this project will be owned and maintained by New Braunfels Utilities (NBU) upon the acceptance of the constructed facilities. The project includes approximately 2,158 linear feet of 8" sanitary sewer gravity main. The proposed SCS will connect to an existing NBU main with a doghouse manhole.

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

Table 1 – Pipe Lengths Broken Out by Line	
Sanitary Sewer Line	Length (ft)
Line A	2,158

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GEOLOGIC ASSESSMENT
FOR THE APPROXIMATELY 26.5-ACRE
LAUREL TREE RANCH TRACT

Comal County, Texas

September 2022

Submitted to:
Paravel Capital
1509 Old W 38th Street,
Suite 3
Austin, Texas 78731

Prepared by:
aci consulting
1001 Mopac Circle
Austin, Texas 78746
TBPG Firm License No. 50260

aci project #: 22-22-105

Geologic Assessment

Texas Commission on Environmental Quality

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

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

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

Signature

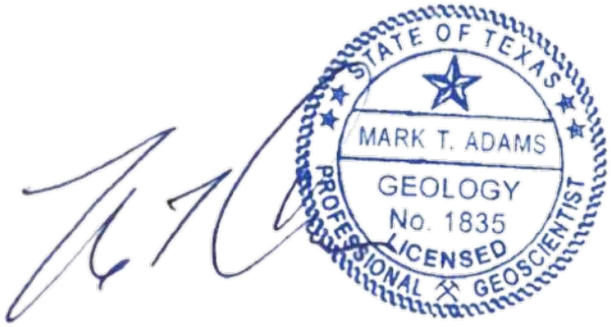
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Mark T. Adams Telephone: (512) 347-9000

Date: 9/26/2022 Fax: (512) 306-0974

Representing: aci Group LLC TBPG License No. 50260 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



9/26/2022

Regulated Entity Name: Laurel Tree Ranch

Project Information

1. Date(s) Geologic Assessment was performed: 5/10/2022, 5/16/2022, 5/27/2022
2. Type of Project:
   - ☒ WPAP
   - ☒ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☐ Transition Zone
   - ☐ Contributing Zone within the Transition Zone

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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)

Soil Name	Group*	Thickness(feet)
CrD - Comfort-Rock outcrop complex, 1 to 8 percent slopes	D	0-3.33

** Soil Group Definitions (Abbreviated)*

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

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

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

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

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

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

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

   Applicant's Site Plan Scale: 1" = 100'
   Site Geologic Map Scale: 1" = 100'
   Site Soils Map Scale (if more than 1 soil type): 1" = 400'

9. Method of collecting positional data:

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

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

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

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

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

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

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

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

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

Administrative Information

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

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

September 2022

Geologic Assessment for the 26.5-acre Laurel Tree Ranch Tract located in Comal County, Texas

1.0 INTRODUCTION

The Texas Commission on the Environmental Quality (TCEQ) regulates activities that have the potential to pollute the Edwards Aquifer through the Edwards Aquifer Protection Program. Projects meeting a certain criterion over the Edwards Aquifer Recharge Zone must submit an Edwards Aquifer Protection Plan (EAPP).

The purpose of this report is to identify all potential pathways for contaminant movement to the Edwards Aquifer and provide sufficient geologic information so that the appropriate Best Management Practices (BMPs) can be proposed in the Edwards Aquifer Protection Plan (EAPP). This report complies with the requirements of Title 30, Texas Administrative Code (TAC) Chapter 213 relating to the protection of the Edwards Aquifer Recharge Zone. Per the Rules, the Geologic Assessment must be completed by a Geologist licensed according to the Texas Geoscience Practice Act.

2.0 PROJECT INFORMATION

The approximately 26.5-acre Laurel Tree Ranch Tract, hereafter referred to as the subject area or site, is located south of Laurel Tree Ranch, approximately 0.44 mile west of the intersection of River Road (Rd) and Laurel Tree Ranch, in the City of New Braunfels, Comal County, Texas (**Attachment A, Figure 1**). Pedestrian investigations of the 26.5-acre tract were performed on May 10, 2022 and May 16, 2022 by Marcos Cardenas and Andrew Marlow, under the supervision of Mark Adams, P.G. with **aci consulting**. Additionally, several features encountered during the initial field investigation were re-evaluated on May 25, 2022, to determine their recharge potential.

This report is intended to satisfy the requirements for a Geologic Assessment, which shall be included as a component of a Water Pollution Abatement Plan (WPAP) and Sewage Collection System (SCS). The site is approximately 26.5 acres in total. The proposed site use is currently pending design. The scope of the report consists of a site reconnaissance, field survey, and review of existing data and reports. Features identified during the field

survey were ranked utilizing the Texas Commission on Environmental Quality (TCEQ) matrix for Edwards Aquifer Recharge Zone features. The ranking of the features will determine their viability as "sensitive" features.

3.0 INVESTIGATION METHODS

The following investigation methods and activities were used to develop this report:

- Review of existing files and literature to determine the regional geology and any known caves associated with the project area;
- Review of past geological field reports, cave studies, and correspondence regarding the existing geologic features on the project area, if available;
- Site reconnaissance by a registered professional geologist to identify and examine caves, recharge features, and other significant geological structures;
- Evaluation of collected field data and a ranking of features using the TCEQ Ranking Table 0585 for the Edwards Aquifer Recharge Zone; and
- Review of historic aerial photographs to determine if there are any structural features present, and to determine any past disturbances on the subject property.

4.0 SOILS AND GEOLOGY

The following includes a site-specific description of the soils, geologic stratigraphy, geologic structure, and karstic characteristics as they relate to the Edwards aquifer. Also included in this section is a review of historic aerials for presence of geologic changes or changes to manmade features in bedrock.

Soils

According to the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (2022), one soil unit occurs within the project area (**Attachment A, Figure 2**):

- CrD - Comfort-Rock outcrop complex, 1 to 8 percent slopes

The Comfort component makes up 70 percent of the map unit. Slopes are 1 to 8 percent. This component is on ridges on dissected plateaus. The parent material consists of residuum weathered from limestone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted

depth) is very low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. This soil does not meet the criteria for hydric soils. Hydrologic Soil Group: D.

Geologic Stratigraphy

According to the *Geologic Map of the New Braunfels West Quadrangle, Texas*, one geologic unit occurs within the project area (**Attachment A, Figure 3**). This unit and a description by Collins (2000) are as follows:

- Person Formation (Kp)

"Person limestone, dolomitic limestone, and dolomite also reflect the shallow subtidal to tidal-flat cyclic deposition on the San Marcos Platform (Rose, 1972; Abbott, 1973). This upper unit of the Edwards Group, 130 to 150 ft thick along its outcrop belt, thickens downdip. Person outcrops typically contain limestone interbedded with recrystallized dolomitic limestone and argillaceous limestone (Rose, 1972; Abbott, 1973). Some leached and collapsed intervals exist, and honeycombed porosity is common. Pockets of red clay (terra rosa) occur locally in collapse features, cave and vuggy intervals, and solution-widened bedding planes and fractures. Chert is also locally abundant. Common fossils include pelecypods, gastropods, and rudistids. The lower 20 to 30 ft comprises the Regional Dense Member, commonly dense argillaceous limestone and limestone. The Regional Dense Member of the San Marcos Platform, stratigraphically equivalent to the Kiamichi Formation of North Central Texas (Rose, 1972; Abbott, 1973), represents a regional sea-level highstand. A distinct topographic bench commonly occurs at the Regional Dense Member's contact with the Kainer Formation, which aids in the mapping of these units."

Site-Specific Stratigraphic Column

Formation	Members	Thickness (Collins, 2000)
Person Formation	N/A	130-150 feet

9/26/2022

STATE OF TEXAS
MARK T. ADAMS
GEOLOGY
No. 1835
LICENSED
PROFESSIONAL GEOSCIENTIST

Geologic Structure

The geologic strata associated with the Edwards Aquifer include the Georgetown Limestone Formation of the Washita Group, the Edwards Limestone Group which is interfingered with the Comanche Peak Formation, followed by the Walnut formation, and finally the Glen Rose Formation of the Trinity Group. These Groups dip gently to the southeast and are a characterized by the Balcones Fault Escarpment, a zone of en echelon normal faults downthrown to the southeast. Locally, the dominant structural trend of faults within the area is 45°, as evidenced by the mapped fault patterns (**Attachment A, Figure 4**). Thus, all features that have a trend ranging from 30° to 60° are considered "on trend" and were awarded the additional 10 points in the Geologic Assessment Table.

The entire subject area is underlain by the Person Formation (Kp). The geology appeared uniform throughout the site; however, it was noted throughout that massive limestone boulders appeared unnaturally displaced causing the appearance of small to large depressions in certain areas. After review of historic aerials, it was determined that the displacement of these boulders is likely attributed to the use of heavy machinery and vegetation clearing over the years.

Karstic Characteristics

In limestone landscapes, karst is expressed by erratically developed cavernous porosity from dissolution of bedrock as water combined with weak acids moves through the subsurface. Karst terrains are typical of the Edwards Limestone, occurring across a vast region of Central Texas, including the Balcones Fault Escarpment. The features produced by karst processes include, but are not limited to, sinkholes, solution cavities, solution enlarged fractures, and caves. These features can eventually provide conduits for fluid movement such as surface water runoff, as "point recharge" to the Edwards Aquifer. Faults and manmade features within bedrock can also provide conduits for point recharge in many cases.

According to Edwards aquifer zone map produced by the TCEQ (2005), the entire subject area is within the southern segment of the Edwards aquifer Recharge Zone. Thus, all karst features identified as sensitive within the project limits have the potential to be point recharge features into the Edwards aquifer.

Review of Historic Aerials

Aerial photographs were reviewed for the subject property and adjoining properties from 1938, 1952, 1958, 1969, 1973, 1983, 1995, 2004, 2010, 2016, and 2020 (**Attachment C**). Review of historic aerials suggests that the subject property was used as undeveloped or agricultural land since before the first aerial dated 1938. An easement where the current electric transmission line resides is present in the 1938 aerial image. Vegetation clearing occurs between the 1938 and 1952 aerials. Laurel Tree Ranch, a major roadway abutting the north property boundary, first appears in the 1969 aerial. Residential developments to the south, east, and west first appear in the 1969 aerial and appear to expand through the 2020 aerial. The Eden Heights retirement home complex first appears in the 1983 aerial. A construction yard to the east first appears in the 1995 aerial. The subject property itself remains relatively unchanged throughout the aerials, with the exception of vegetation clearing and regrowth in several of the images.

5.0 SUMMARY OF FINDINGS

This report documents the findings of a geologic assessment conducted by **aci consulting** personnel on May 10, May 16, and May 25 of 2022. Thirty-four features (manmade features in bedrock, karst, and non-karst features) were noted on the site. Comprehensive descriptions and recommendations for each feature can be found in **Attachment B**. Based on assessment of each feature, it was determined that all thirty-one naturally occurring features are non-sensitive. Three features are man-made features in bedrock, which have been deemed sensitive for the purpose of bringing to the attention of the project engineer.

6.0 REFERENCES

Collins, E.W., 2000. *Geologic Map of the New Braunfels West Quadrangle, Texas.* Bureau of Economic Geology. Austin, Texas.

(SCS) Soil Conservation Survey. 1983. Soil Survey of Comal County, Texas. United States Department of Agriculture. Texas Agriculture Experiment Station.

(TCEQ) Texas Commission on Environmental Quality. 2004. Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones. October 1, 2004. Austin, Texas.

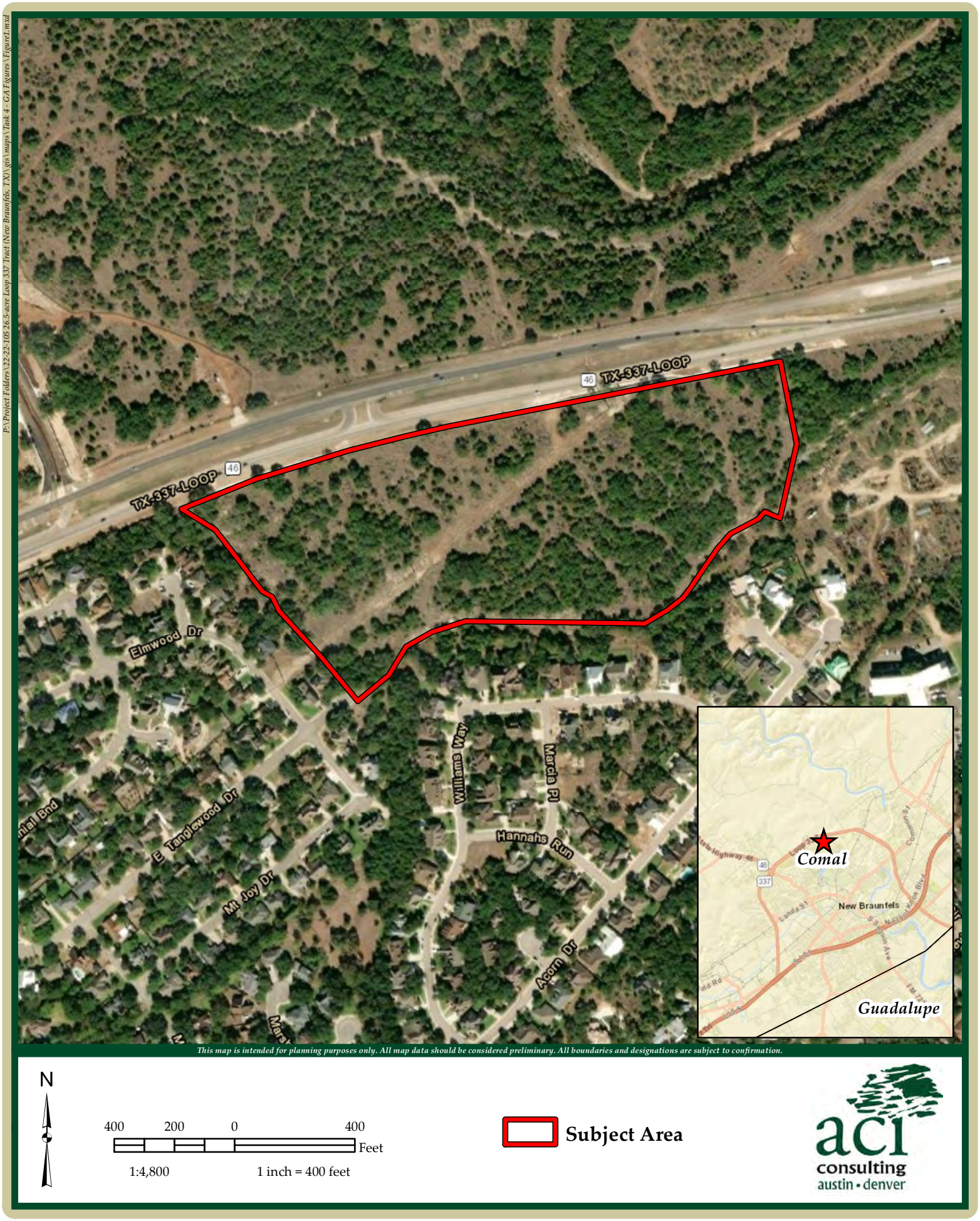
(TCEQ) Texas Commission on Environmental Quality. 2005. "Edwards Aquifer Protection Program, Chapter 213 Rules - Recharge Zone, Transition Zone, Contributing Zone, and Contributing Zone within the Transition Zone." Map. Digital data. September 1, 2005. Austin, Texas.

(TWDB) Texas Water Development Board. 2022. Water Data Interactive Groundwater Data Viewer. Accessed on June 10, 2022. Available at: http://www2.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer

(USDA NRCS) U.S. Department of Agriculture Natural Resources Conservation Service. 2022. WebSoilSurvey.com. Soil Survey Area: Comal County, Texas. Date accessed: June 10, 2022.

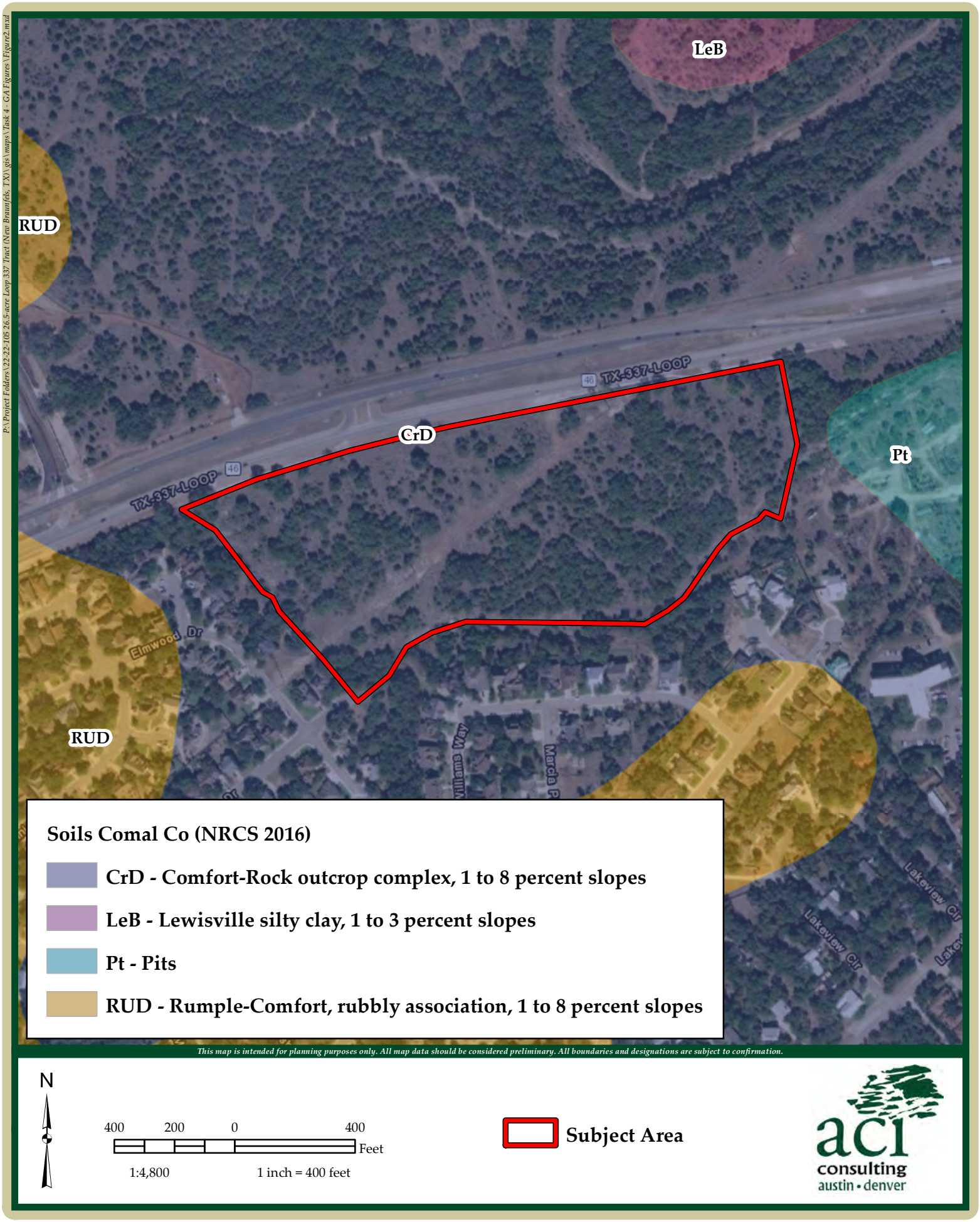
ATTACHMENT A

Site Maps



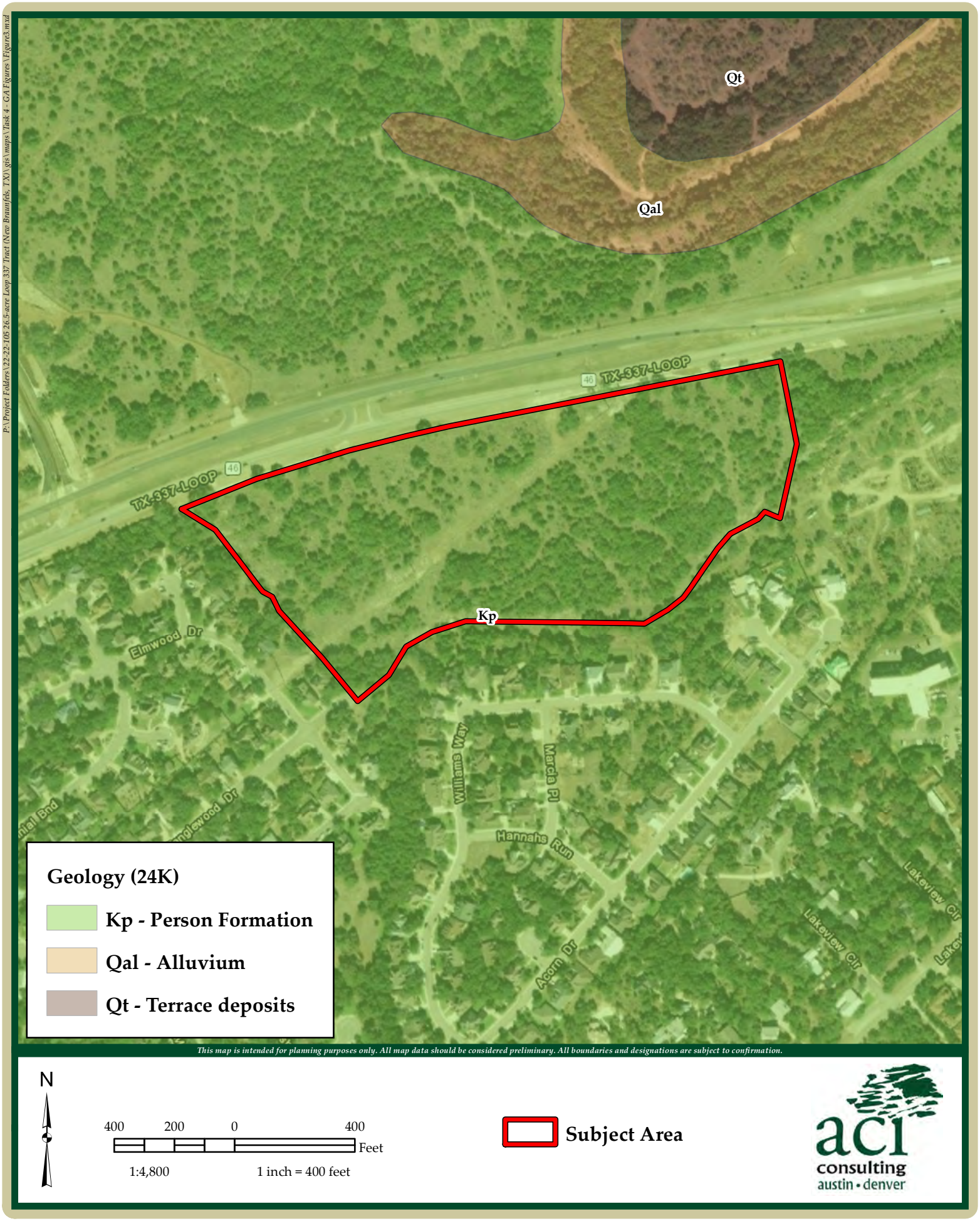
26.5-acre Laurel Tree Ranch | **aci Project No.: 22-22-105**

Figure 1: Site Location Map | **September 2022**



26.5-acre Laurel Tree Ranch | **aci Project No.: 22-22-105**

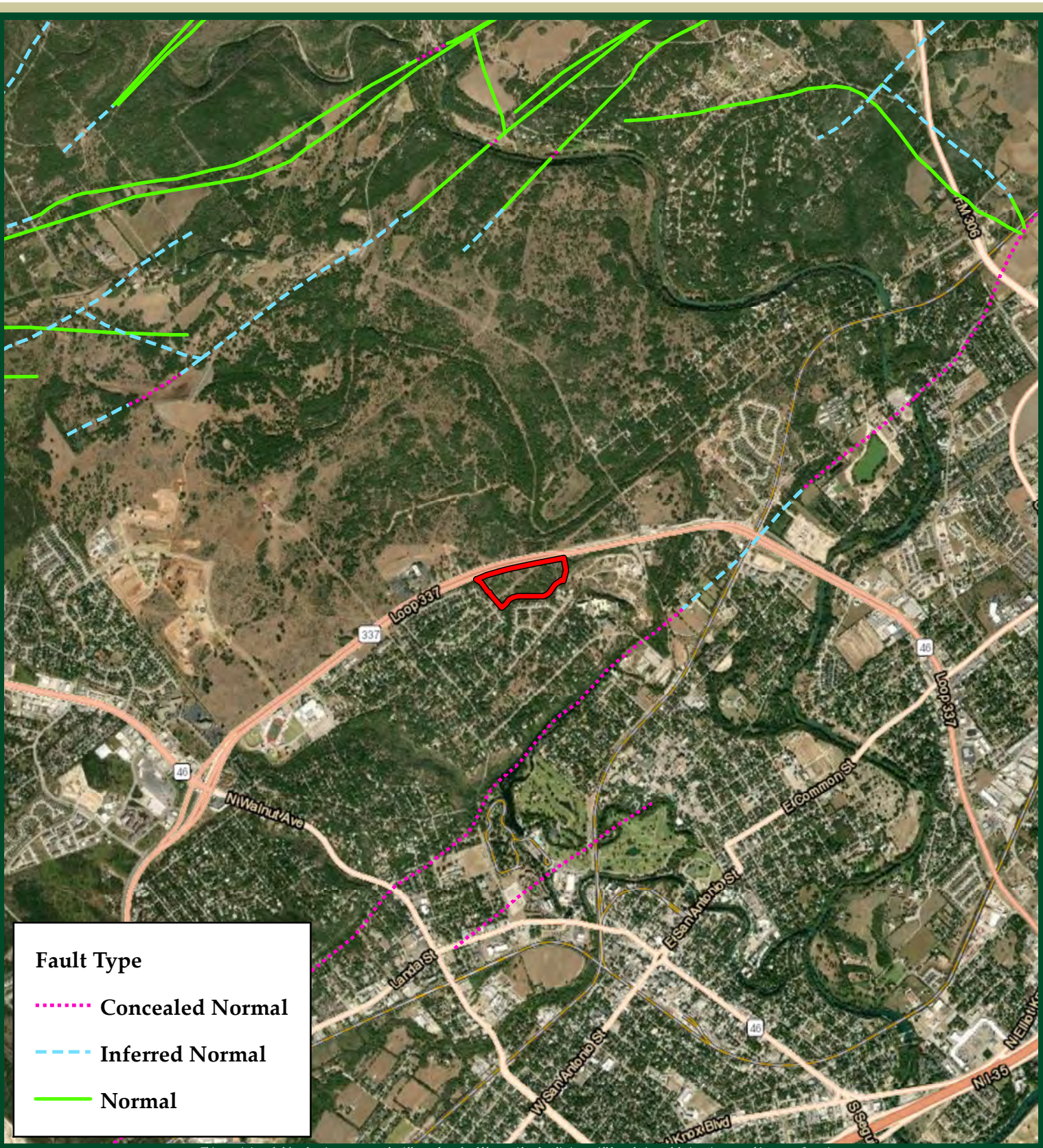
Figure 2: Site Soils | **September 2022**



26.5-acre Laurel Tree Ranch **aci Project No.: 22-22-105**

Figure 3: Site Geology **September 2022**

P:\Project Folders\22-22-105 26.5-acre Loop 337 Tract (New Braunfels, TX)\gis\maps\Task 4 - GA Figures\Figure4.mxd



Fault Type

- Concealed Normal
- Inferred Normal
- Normal

This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

N

3,000 1,500 0 3,000 Feet

1:36,000 1 inch = 3,000 feet

Subject Area

Regional Fault Trend ~45°

aci consulting austin • denver

26.5-acre Laurel Tree Ranch **aci Project No.: 22-22-105**

Figure 4: Regional Trend **September 2022**

ATTACHMENT B

Geologic Table
Geologic and Manmade Feature Map (Figure 5)
Feature Descriptions and Recommendations

GEOLOGIC ASSESSMENT TABLE — PROJECT NAME: Laurel Tree Ranch

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
F01	29.726404	-98.136505	CD	5	Kp	5	3	1	-	-	-	-	C, O	5	10	X		X		Hillside
F02	29.726595	-98.136576	CD	5	Kp	6	6	1	-	-	-	-	C, O, V	5	10	X		X		Hillside
F03	29.726951	-98.136516	CD	5	Kp	5	5	1	-	-	-	-	C, O, V	5	10	X		X		Hillside
F04A	29.726649	-98.136108	CD	5	Kp	10	6	1.5	-	-	-	-	C, O, V	7	12	X		X		Hillside
F04B	29.72662	-98.136153	SF	20	Kp	7	0.25	0.5	28	-	-	-	C, O, V	7	27	X		X		Hillside
F04C	29.726575	-98.1361	CD	5	Kp	7	4	1	-	-	-	-	C, O, V	7	12	X		X		Hillside
F04D	29.726692	-98.136147	SF	20	Kp	4	0.25	0.5	46	10	-	-	C, O, V	7	37	X		X		Hillside
F05	29.725946	-98.135532	CD	5	Kp	10	10	1	-	-	-	-	C, O, V	5	10	X		X		Hillside
F06	29.726769	-98.136194	SC	20	Kp	1	2	2	-	-	-	-	N, V, F	10	30	X		X		Hillside
F07	29.726897	-98.136013	CD	5	Kp	3.5	3.5	0.5	-	-	-	-	C, O, V	6	11	X		X		Hillside
F08	29.726556	-98.135601	SC	20	Kp	3	1	1.5	100	-	-	-	N, V, F	15	35	X		X		Hillside
MB01	29.726237	-98.134844	MB	30	Kp	6	6	?	-	-	-	-	?	10	40		X	X		Hillside
F09	29.726591	-98.13468	CD	5	Kp	3	3	0.5	-	-	-	-	O, V	7	12	X		X		Hillside
F10	29.725929	-98.134059	CD	5	Kp	4	4	1	-	-	-	-	O, V	7	12	X		X		Hillside
F11	29.726974	-98.13485	O	5	Kp	3	3	0.5	-	-	-	-	O, F, V	7	12	X		X		Hillside

* DATUM: NAD 1983 State Plane 4203

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

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

12 TOPOGRAPHY

Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

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

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

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Sheet 1 of 3

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

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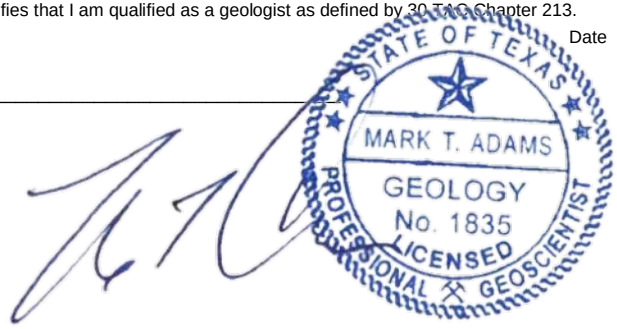

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME:			Laurel Tree Ranch														
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	≥40	<1.6	≥1.6	
F12	29.726793	-98.134523	O	5	KP	1	0.5	0.5	-	-	-	-	O, V	5	10	X		X		Hillside
F13	29.726289	-98.133924	CD	5	KP	4	4	1	-	-	-	-	C, O	6	11	X		X		Hillside
F14	29.725864	-98.133621	SC	20	KP	1	1	2	-	-	-	-	O	10	30	X		X		Hillside
F15	29.725902	-98.133047	CD	5	KP	4	4	1	-	-	-	-	O, F, V	5	10	X		X		Hillside
F16	29.726208	-98.133215	SC	20	KP	3	1.5	3	-	-	-	-	O	7	27	X		X		Hillside
F17	29.726285	-98.133536	CD	5	KP	3	3	0.5	-	-	-	-	O, F, V	5	10	X		X		Hillside
F18	29.726264	-98.133192	CD	5	KP	6	3	1.5	-	-	-	-	O, F, V	5	10	X		X		Hillside
F19A	29.726454	-98.133184	CD	5	KP	3	3	1	-	-	-	-	O, F, V	5	10	X		X		Hillside
F19B	29.726441	-98.133248	CD	5	KP	3	3	1	-	-	-	-	O, F, V	5	10	X		X		Hillside
F20	29.727157	-98.133722	O	5	KP	1	1	1.5	-	-	-	-	O,V	7	12	X		X		Hillside
F21	29.727083	-98.133701	SC	20	KP	1	2	2	-	-	-	-	N, O, C	18	38	X		X		Hillside
F22	29.726583	-98.13349	SC	20	KP	1.5	1	3	-	-	-	-	C, O, F	10	30	X		X		Hillside
F23	29.72617	-98.132499	SC	20	KP	0.5	0.5	0.5	-	-	-	-	C, O, V	5	25	X		X		Hillside
F24	29.726577	-98.132833	SC	20	KP	2	1	3	-	-	-	-	O, V	10	30	X		X		Hillside
F25	29.727039	-98.132966	CD	5	KP	6	2	0.5	-	-	-	-	C, V,F	5	10	X		X		Hillside

* DATUM: NAD 1983 State Plane 4203

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

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

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Sheet 2 of 3

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

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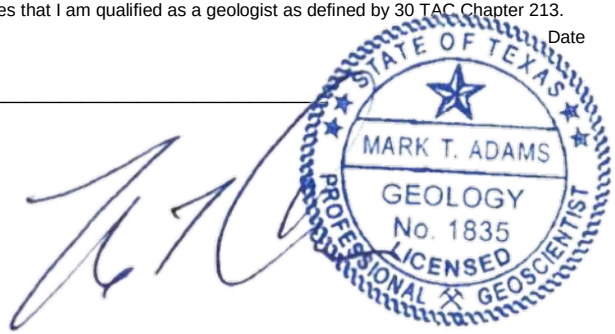

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						X	Y	Z		10						<40	>40	<1.6	>1.6	
F-26	29.726747	-98.132482	SF	20	Kp	4	0.25	0.5	84	-	-	-	C, O, V	5	25	X		X		Hillside
F-27	29.726607	-98.132054	CD	5	Kp	3	1	2	-	-	-	-	C, O, V	6	11	X		X		Hillside
MB-02	29.727678	-98.132748	MB	30	Kp	6	6	?	-	-	-	-	?	10	40		X	X		Hillside
MB-03	29.727817	-98.132554	MB	30	Kp	2	2	?	-	-	-	-	C	10	40		X	X		Hillside

* DATUM: NAD 1983 State Plane 4203

2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
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Sheet 3 of 3

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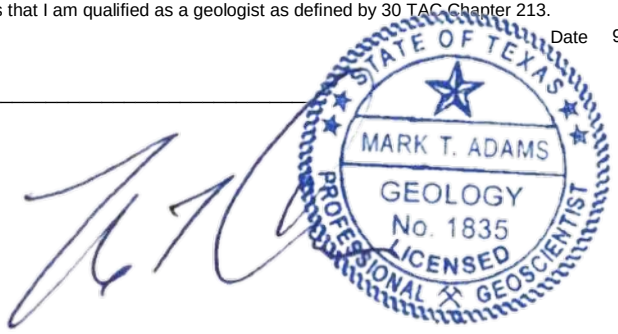
9/26/2022



This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

N

100 50 0 100
Feet
1:1,200 1 inch = 100 Feet

Subject Area

Geologic Features
- Manmade Feature in Bedrock
- Non-Sensitive

Geology (24K)
- Kp - Person Formation
- Qal - Alluvium

9/26/2022

STATE OF TEXAS
MARK T. ADAMS
GEOLOGY
No. 1835
LICENSED
PROFESSIONAL GEOSCIENTIST

aci consulting
austin • denver

26.5-acre Laurel Tree Ranch
Figure 5: Geologic Feature Map

aci Project No.: 22-22-105
September 2022

F01
GPS: 29.726404, -98.136505

F01 is a closed depression located on a gently sloping hillside in the Person Formation. This feature is approximately 5 feet long by 3 feet wide by 1 foot deep. The infill material consists of large boulders, organic material, and dark, loose soils. The catchment area is less than 1.6 acres. It was noted that an unnatural displacement of large boulders and several brush piles were located near this feature suggesting possible land clearing or the use of heavy machinery on the property. The infiltration rate for this feature was determined to be low and assigned a point value of 5, due to no evidence of subsurface development and the absence of any portals. In following the Instructions to Geologists, this feature has been determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F01

F02
GPS: 29.726595, -98.136576

F02 is a closed depression located on a gently sloping hillside in the Person Formation. This feature is approximately 6 feet in diameter by 1 foot deep. The infill material consists of several fractured boulders, organic material, and vegetation including juvenile hackberries and desert Christmas cactus. The catchment area is less than 1.6 acres. It was noted that an unnatural displacement of large boulders and several brush piles were located near this feature suggesting possible land clearing or the use of heavy machinery on the property. The infiltration rate for this feature was determined to be low and assigned a point value of 5, due to no evidence of subsurface development and the absence of any portals. In following the Instructions to Geologists, this feature has been determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F02

F03
GPS: 29.726951, -98.136516

F03 is a closed depression located on a gently sloping hillside in the Person Formation. This feature is approximately 5 feet in diameter by 1 foot deep. The infill material consists of cobles, organic material, compact soils, and vegetation including grasses, Lindhimer's senna, Mexican hat, Texas persimmon, Texas kidneywood, and acacias. The catchment area is less than 1.6 acres. This feature is located near the northern property boundary and a major highway. The infiltration rate for this feature was determined to be low and assigned a point value of 5, due to no evidence of subsurface development and the absence of any portals. In following the Instructions to Geologists, this feature has been determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F03

F04A
GPS: 29.726649, -98.136108

F04A is a closed depression on a gently sloping hillside with several unnaturally positioned boulders (likely epikarst slabs) in the middle of the depression. The dimensions of F04A are approximately 10 feet long by 6 feet wide by 1.5 feet deep. F04A is within a 75-ft radius of F04B, F04C, and F04D. Two large oak trees are positioned in the middle of all four features, likely contributing to the displacement of the large float rocks via root upheaval. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, large boulders, and vegetation including Texas live oak and Texas persimmon The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

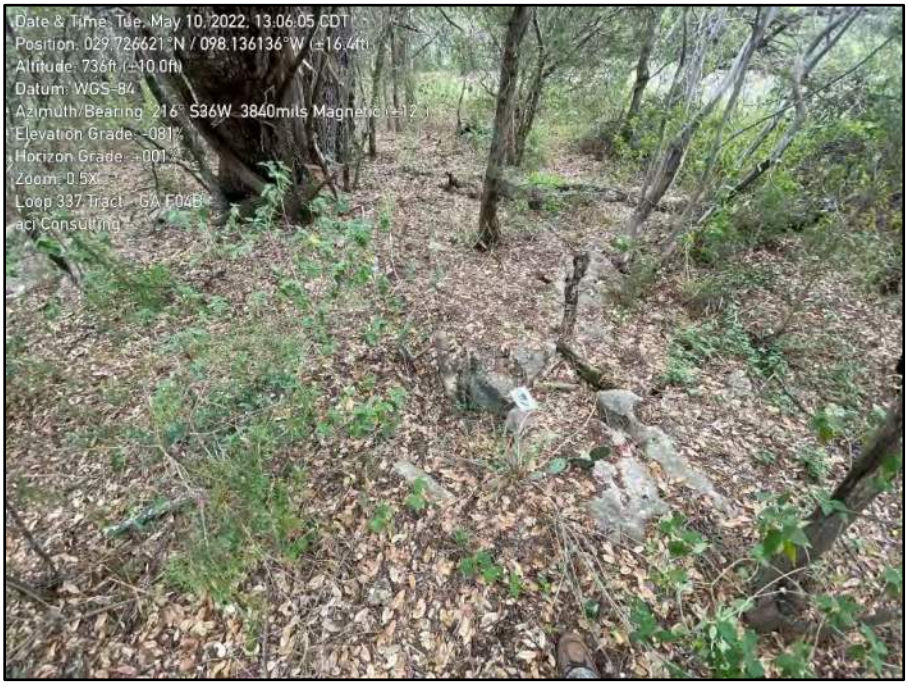
Recommendations: There are no recommendations for this feature.

F-04A

F04B
GPS: 29.72662, -98.136153

F04B is a solution fracture on a gently sloping hillside. The dimensions of F04B are approximately 7 feet long by 0.25 feet wide by 0.5 feet deep. The trend of the main fracture within the feature was measured at 28°. F04B is within a 75-ft radius of F04A, F04C, and F04D. Two large oak trees are positioned in the middle of all four features, likely contributing to the displacement of the large float rocks. Additionally, there are persimmon and cedar trees within the feature. The catchment area is less than 1.6 acres. Extensive excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, large boulders, and vegetation. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.



F04B

F04B after excavation.

F04C
GPS: 29.726575, -98.1361

F04C is a closed depression on a gently sloping hillside. The dimensions of F04C are approximately 7 feet long by 4 feet wide by 1 foot deep. There are several unnaturally positioned boulders along one side of the depression. F04C is within a 75-ft radius of F04A, F04B, and F04D. Two large oak trees are positioned in the middle of all four features, likely contributing to the displacement of the large float rocks. Additionally, there are trees within the feature. The catchment area is less than 1.6 acres. Extensive excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, large boulders, and vegetation. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F04C before excavations.

F04C after excavations.

F04D
GPS: 29.726692, -98.136147

F04D is a solution fracture on a gently sloping hillside. The dimensions of F04D are approximately 4 feet long by 0.25 feet wide by 0.5 feet deep. The trend of the main fracture within the feature was measured at 46°. F04D is within a 75-ft radius of F04A, F04B, and F04C. Two large oak trees are positioned in the middle of all four features, likely contributing to the displacement of the large float rocks. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, large boulders, and vegetation. The infiltration rate for this feature was determined to be low and assigned a point value of 7. As the surrounding features were determined to be non-sensitive and likely epikarst in origin, this feature has also been determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F04D

F05
GPS: 29.725946, -98.135532

F05 is a closed depression on a gently sloping hillside with several unnaturally positioned boulders (likely epikarst slabs) in the middle of the depression. The dimensions of F05 are approximately 10 feet in diameter by 1 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, large boulders (epikarst), and vegetation including Ashe juniper, green briar, and grasses. The infiltration rate for this feature was determined to be low and assigned a point value of 5. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F05

F06
GPS: 29.726769, -98.136194

F-06 is a solution cavity located on a gently sloping hillside. The dimensions of this feature are approximately 2 feet by 1 foot by 2 feet deep. There is exposed bedrock, vegetation including prickly pear cactus, and hard, compact soils within the feature. Extensive excavation was performed on this feature to determine the extent of any subsurface development. After excavations, the vertical depth of the feature was measured at 2.5 feet below the surface. There was no additional lateral development beyond the initial surface expression, and no portals or drains were noted after removing the infill material. It was determined that this feature is a shallow solution cavity with no significant sub surface development. The catchment area is less than 1.6 acres, and the infiltration rate was determined to be low and assigned a point value of 10. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

1 F06 before excavations.

F06 after excavations.

F07
GPS: 29.726897, -98.136013

F07 is a closed depression on a gently sloping hillside. The dimensions of F07 are approximately 3.5 feet in diameter by 0.5 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted. Infill material consisted of loose soils, organic material, cobbles, and vegetation including Ashe juniper, Lindhimer's senna, and other grasses. The infiltration rate for this feature was determined to be low and assigned a point value of 6. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F07

F08
GPS: 29.726556, -98.135601

F08 is a solution cavity located on a gently sloping hillside. The dimensions of this feature are approximately 3 feet by 1 foot by 1.5 feet deep, with approximately 1.5 feet of lateral development trending at 100°. There is exposed bedrock, dark organic material, and hard, compact soils within the feature. Extensive excavation was performed on this feature to determine the extent of any subsurface development. After excavations, the vertical depth of the feature was measured at 2 feet below the surface. No portals or apertures were noted within the feature beyond the initial surface expression. It was determined that this feature is a shallow solution cavity with no significant subsurface development. The catchment area is less than 1.6 acres, and the infiltration rate was determined to be low and assigned a point value of 15. After feature excavations, this feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F-08 before feature excavations.

Interior of F08 before excavations.

F08 after feature excavations.

MB01
GPS: 29.726237, -98.134844

MB01 is a manmade feature in bedrock, an electric transmission pole, on a gently sloping hillside. The dimensions of MB01 are approximately 6 feet in diameter with an unknown depth. The catchment area is less than 1.6 acres and the infill material is unknown. The infiltration rate for this feature was determined to be low and assigned a point value of 10, in order to deem this feature as sensitive.

Recommendations: Bring to the attention of the engineer.

MB01

F09
GPS: 29.726591, -98.13468

F09 is a closed depression on a gently sloping hillside. The dimensions of F09 are approximately 3 feet in diameter by 0.5 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted; however, several unnaturally positioned limestone rocks were noted near the feature. The upheaval of these rocks was likely caused by the roots of a Texas live oak tree nearby. Infill material consisted of loose soils, organic material, and vegetation including juvenile Texas live oak and Texas persimmon. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F09

F10
GPS: 29.725929, -98.134059

F10 is a closed depression on a gently sloping hillside. The dimensions of F10 are approximately 4 feet in diameter by 1 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted of large boulders, grasses, and organic material. This feature is located near an area of cleared vegetation, and the unnatural location of the large limestone boulders is likely attributed to the use of heavy machinery for vegetation clearing or agricultural purposes. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F10

F11
GPS: 29.726974, -98.13485

F11 is a "other natural bedrock feature", a vuggy rock located within a small depression, on a gently sloping hillside. The dimensions the closed depression are approximately 3 feet in diameter by 0.5 foot deep. Several solution cavities were noted on the limestone boulder; thus, light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. The closed depression noted around the feature is likely attributed to the Ashe Juniper and persimmon trees growing within the feature. Other infill material consisted of organic material and compact clay soils. The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F11

F12
GPS: 29.726793, -98.134523

F12 is an "other natural bedrock feature", a creature feature, on a gently sloping hillside. The dimensions of F12 are approximately 1 foot long by 0.5 foot wide by 0.5 foot deep. No visible drainage portals were noted beneath the feature. This feature is likely a non-karst feature, influenced by surrounding vegetation and wildlife. Infill material consisted of organic material and tree roots. The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 5. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F12

F13
GPS: 29.726289, -98.133924

F13 is a closed depression on a gently sloping hillside. The dimensions of F13 are approximately 4 feet in diameter by 1 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted of large boulders, organic material, and loose, dark soils. The infiltration rate for this feature was determined to be low and assigned a point value of 6. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F13

F14
GPS: 29.725864, -98.133621

F14 is a solution cavity located on a gently sloping hillside. The dimensions of this feature are approximately 1 foot long by 1 foot wide with 2 feet of lateral development. There is loose, organic material and dark soils within the feature. Light hand excavation was performed on this feature to determine the extent of any subsurface development. No portals or apertures were noted within the feature. It was determined that this feature is a shallow solution cavity with no significant sub surface development. The catchment area is less than 1.6 acres, and the infiltration rate was determined to be low, and assigned a point value of 10. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F14.

F15
GPS: 29.725902, -98.133047

F15 is a closed depression on a gently sloping hillside. The dimensions of F15 are approximately 4 feet in diameter by 1 foot deep. The catchment area is less than 1.6 acres. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted, organic material, compact soils and vegetation including Texas live oak, agarita, cedar elm, and crepe myrtle. The infiltration rate for this feature was determined to be low and assigned a point value of 5. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F15

F16
GPS: 29.726208, -98.133215

F16 is a solution cavity located on a gently sloping hillside. The dimensions of this feature are approximately 3 feet long by 1.5 feet wide with 3 feet of lateral development. There is loose, organic material and dark soils within the feature. Light hand excavation was performed on this feature to determine the extent of any subsurface development. No portals or apertures were noted within the feature. It was determined that this feature is a shallow solution cavity with no significant sub surface development. The catchment area is less than 1.6 acres, and the infiltration rate was determined to be low, and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F16

Interior of F16.

F17
GPS: 29.726285, -98.133536

F17 is a closed depression on a gently sloping hillside. The dimensions of F17 are approximately 3 feet in diameter by 0.5 foot deep. Large limestone boulders were noted within the depression, as well as several persimmon trees growing up through the boulders, likely contributing to the development of the feature. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted, organic material, compact soils, and vegetation. The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 5. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F17

F18
GPS: 29.726264, -98.133192

F18 is a closed depression on a gently sloping hillside. The dimensions of F18 are approximately 6 feet long by 3 feet wide by 1.5 feet deep. This feature was similar to F17 in that large limestone boulders were noted around the depression, as well as vegetation, likely contributing to the development of the feature. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted, organic material, compact soils, and vegetation. The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 5. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F18

F19A
GPS: 29.726454, -98.133184

F19A is a closed depression on a gently sloping hillside. The dimensions of F19A are approximately 3 feet in diameter by 1 foot deep. It was noted that unnaturally shifted boulders and juvenile vegetation were located within the feature. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted, organic material, compact soils, and vegetation (Texas persimmon and Ashe juniper). The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 5. Due to the lack of subsurface development and the location of this feature being near an area of previous disturbance (vegetation clearing present in historic aerials) this feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F19A

F19B
GPS: 29.726441, -98.133248

F19B is a closed depression adjacent to F19A, on a gently sloping hillside. The dimensions of F19B are approximately 3 feet in diameter by 1 foot deep. It was noted that unnaturally placed boulders and juvenile vegetation were located within the feature. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. Infill material consisted, organic material, compact soils, and vegetation (Ashe juniper). The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 5. Due to the lack of subsurface development and the location of this feature near an area of previous disturbance (vegetation clearing present in historic aerials), this feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F19B

F20
GPS: 29.727157, -98.133722

F20 is an "other" type feature, a creature feature, on a gently sloping hillside. The dimensions of F20 are approximately 1 foot in diameter by 1.5 feet deep (laterally). Evidence of burrowing including a fill pile of loose soil and organic material was noted outside of the feature. Extensive excavations were performed on this feature to verify the lack of subsurface development. No visible drainage portals were noted within the feature. Infill material consisted, organic material, tree roots, and vegetation (Bluewood condalia). The catchment area is less than 1.6 acres. The infiltration rate for this feature was determined to be low and assigned a point value of 7. This feature is determined to be non-sensitive.

Recommendations: There are no recommendations for this feature.

F20

F20 after feature excavations.

F21
GPS: 29.727083, -98.133701

F21 is a solution cavity located on a gently sloping hillside. The dimensions of F21 are approximately 1 foot by 2 feet by 2 feet deep, with approximately 1 foot of lateral development within the feature. The feature is rock lined, with loose organic material, and cobbles within the feature. Extensive excavation was performed on this feature to determine the extent of any subsurface development. After excavations, the dimensions of the feature were 3.5 feet long by 2.5 feet wide by 3 feet deep. Six feet of lateral development along a tapering bedding plane was exposed before hitting an area of hard, compact soils. There was no air flow or water present within the feature. The catchment area is less than 1.6 acres, and the infiltration rate was determined to be low and assigned a point value of 18. After feature excavations, it was determined that this feature is a non-sensitive shallow, solution cavity with minor potential for background infiltration.

Recommendations: There are no recommendations for this feature.

F-21 before excavations

F21 after excavations.

F22
GPS: 29.726583, -98.13349

F22 is a solution cavity located on a gently sloping hillside. The dimensions of F22 are approximately 1.5 feet by 1 foot by 3 feet deep (laterally). The infill material of this feature appeared to be loose organics, light colored soils, and limestone cobbles. Extensive excavation was performed on this feature to determine the extent of any subsurface development. After excavations, the dimensions of the feature were approximately 1.5 feet long by 2.5 feet wide by 3 feet deep (laterally). It was determined that this feature is a shallow solution cavity likely influenced by animal burrowing. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 10. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F-22

F23
GPS: 29.72617, -98.132499

F23 is a solution cavity located on a gently sloping hillside. The dimensions of F23 are approximately 0.5 feet in diameter by 0.5 feet deep. The infill material of this feature appeared to be loose organics, cobbles, and tree roots. Evidence of animal burrowing was noted near the cavity, and it is likely that this feature has been influenced by the nearby juniper tree. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 5. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F23

F24
GPS: 29.726577, -98.132833

F24 is a solution cavity located on a gently sloping hillside. The dimensions of F24 are approximately 2 feet long by 1 foot wide by 3 feet deep (laterally). The infill material consists of loose organics, dark, compact soils, and vegetation (Texas persimmon). Harvestmen were also noted within the feature; however, after several minutes of light hand excavation, it was determined that this feature lacked any subsurface development beyond the 3 feet of observed lateral development. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 10. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F24

F25
GPS: 29.727039, -98.132966

F25 is a closed depression located on a gently sloping hillside. The dimensions of F25 are approximately 6 feet long by 2 foot wide by 0.5 foot deep. The infill material consists of cobbles, grasses, and compact soil. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 5. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F25

F26
GPS: 29.726747, -98.132482

F26 is a solution enlarged fracture located on a gently sloping hillside. The dimensions of F26 are approximately 4 feet long by 0.25 foot wide by 0.5 foot deep and is trending mainly at 84°. The infill material consists of loose organic material, cobbles, and vegetation including persimmon. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature, and it was determined this feature is likely an epikarst feature. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 5. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F26

F27
GPS: 29.726607, -98.132054

F27 is a closed depression located on a gently sloping hillside. The dimensions of F27 are approximately 3 feet long by 1 foot wide by 2 foot deep. Several large, fractured limestone boulders are located within the depression. Additional infill material consists of loose organic material, cobbles, and vegetation including agarita, Christmas cholla, and Ashe juniper. Light hand excavation was performed to identify any portals or subsurface development within the depression. No visible drainage portals were noted beneath the feature, and it was determined displaced boulders are likely epikarst. The drainage area is less than 1.6 acres, and the infiltration rate has been determined to be low and assigned a point value of 6. This feature is non-sensitive.

Recommendations: There are no recommendations for this feature.

F27

MB02
GPS: 29.727678, -98.132748

MB02 is a manmade feature in bedrock, an electric transmission pole, on a gently sloping hillside. The dimensions of MB02 are approximately 6 feet in diameter with an unknown depth. The catchment area is less than 1.6 acres, and the infill material is unknown. The infiltration rate for this feature was determined to be low and assigned a point value of 10 in order to deem this feature as sensitive.

Recommendations: Bring to the attention of the engineer.

MB02

MB03
GPS: 29.727817, -98.132554

MB03 is a manmade feature in bedrock, a test pit, on a gently sloping hillside. The dimensions of MB03 are approximately 2 feet in diameter with an unknown depth. The catchment area is less than 1.6 acres, and the infill material appears to be sandy gravel. The infiltration rate for this feature was determined to be low and assigned a point value of 10, in order to deem this feature as sensitive.

Recommendations: Bring to the attention of the engineer.

MB03

ATTACHMENT C

Historic Aerial Photographs

Npcn_pcbĀdmp8

ACI CONSULTING
1001 Mopac Circle
Austin, TX 78746

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Historical Aerial Photographs

26.5-acre Loop 337 Tract

New , TX

Comal County

PO #: 22-22-105

ES-139725

Thursday, May 12, 2022

Date: 2020
Source: USDA

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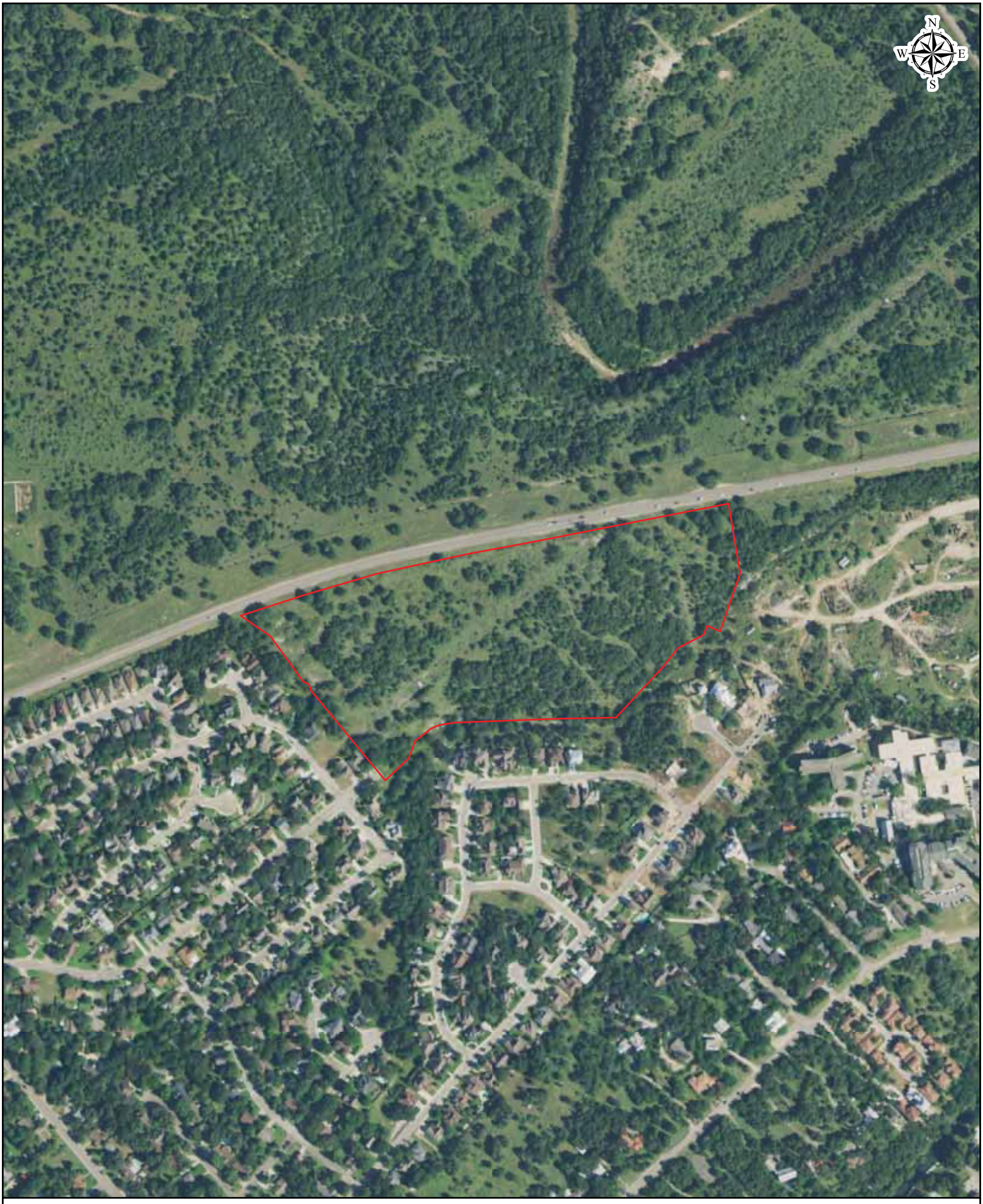
BANKS
ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



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Source: USDA

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BANKS
ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Date: 2010
Source: USDA

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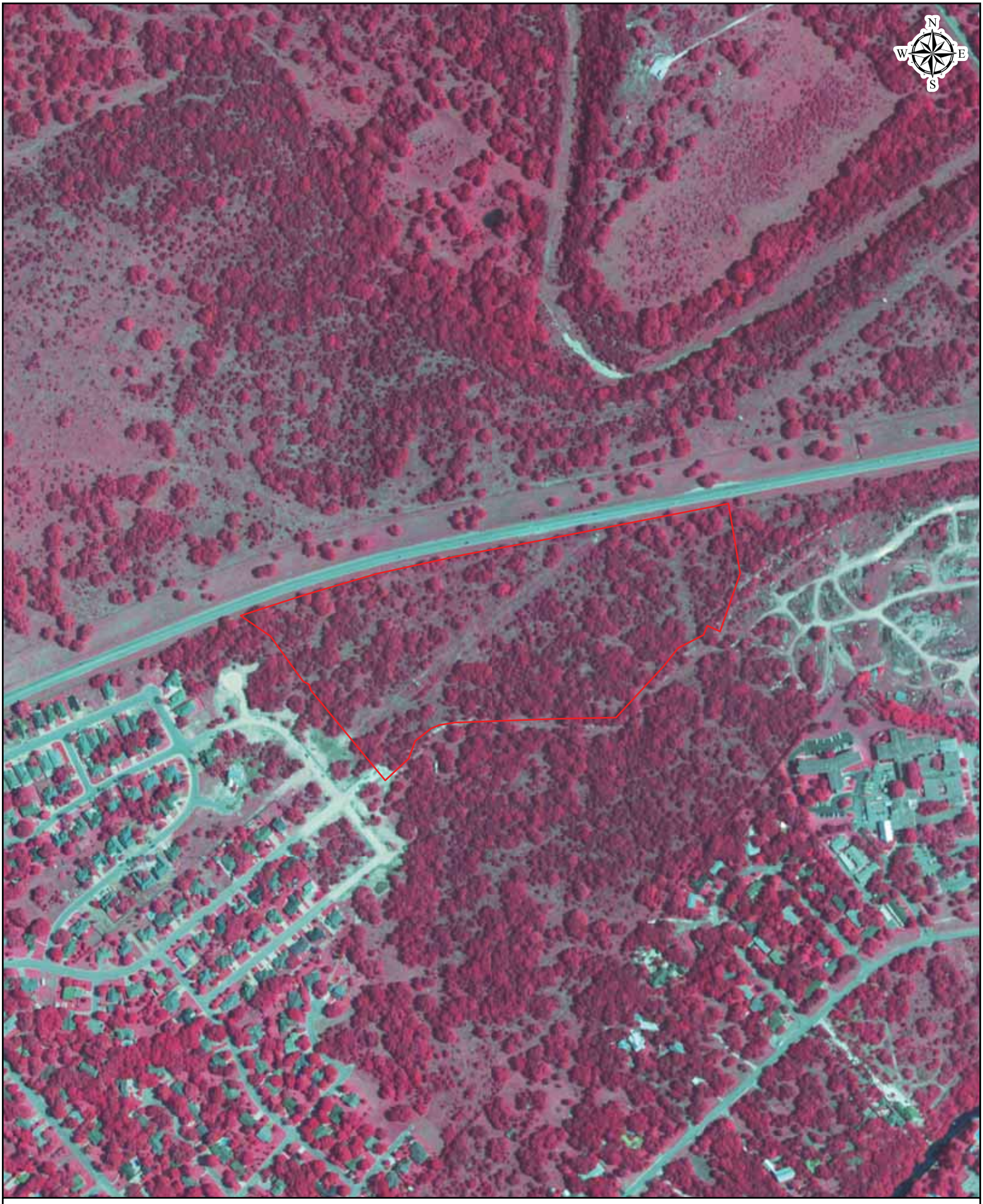
BANKS
ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



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Source: USDA

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BANKS
ENVIRONMENTAL DATA
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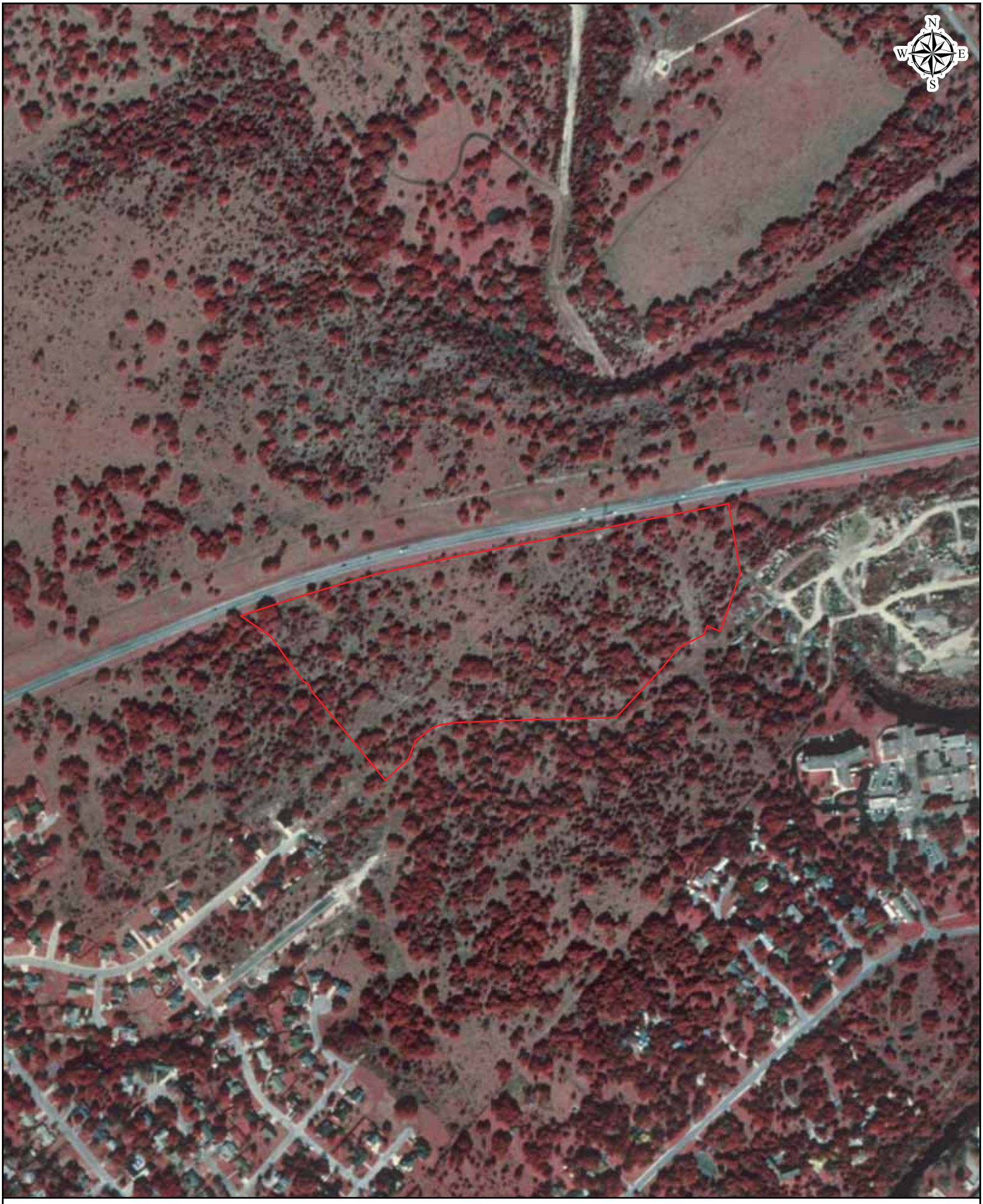

Date: 1995
Source: USGS

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Date: 1983
Source: USGS

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BANKS ENVIRONMENTAL DATA
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Date: 1973
Source: USGS

Feet
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BANKS
ENVIRONMENTAL DATA
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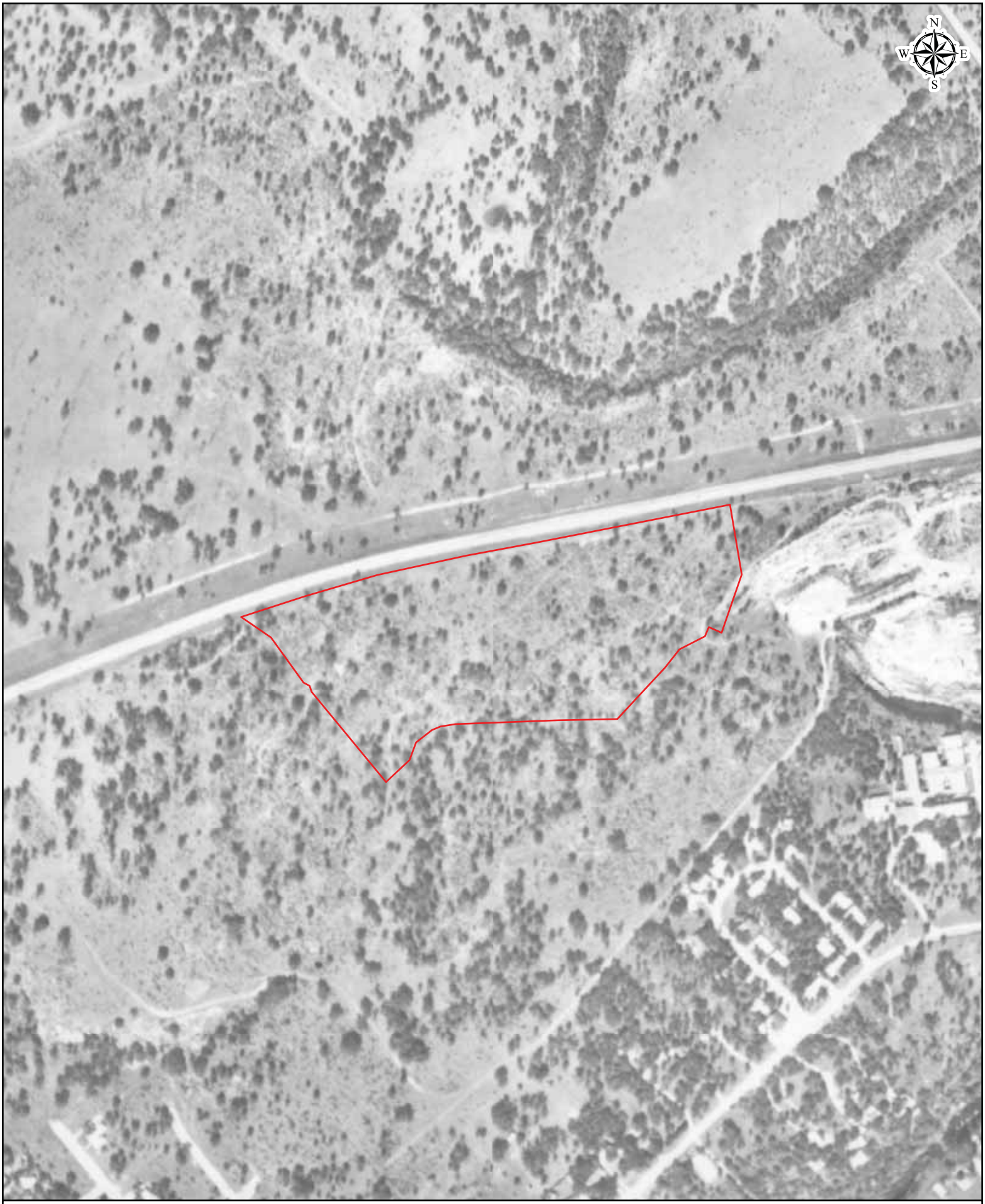

Date: 1969
Source: ASCS

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Date: 1958
Source: USAF

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BANKS ENVIRONMENTAL DATA
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Date: 1952
Source: AMS

0 250 500 1,000 Feet

BANKS ENVIRONMENTAL DATA
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Date: 1938
Source: ASCS

0 250 500 1,000 Feet

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AERIAL SOURCE DEFINITIONS

Acronym	Agency
NASA	National Aeronautics & Space Administration
AMS	Army Mapping Service
ASCS	Agricultural Stabilization & Conservation Service
SCS	Soil Conservation Service
USBR	United States Bureau of Reclamation
Fairchild	Fairchild Aerial Surveys
TXDOT	Texas Department of Transportation
BLM	Bureau of Land Management
USAF	United States Air Force
USCOE	United States Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WALLACE	Wallace-Zingery Aerial Surveys
TNRIS	Texas Natural Resources Information System

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Modification of a Previously Approved Plan

Texas Commission on Environmental Quality

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

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

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

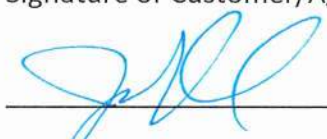
Signature

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

Print Name of Customer/Agent: James Ingalls, P.E.

Date: 10-5-23

Signature of Customer/Agent:



Project Information

1. Current Regulated Entity Name: Lyndon Ranch
   Original Regulated Entity Name: Laurel Tree Ranch
   Regulated Entity Number(s) (RN): 111578712
   Edwards Aquifer Protection Program ID Number(s): 13001628, 13001715
   ☑ The applicant has not changed and the Customer Number (CN) is: 606063501
   ☐ The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. ☑ **Attachment A: Original Approval Letter and Approved Modification Letters**. A copy of the original approval letter and copies of any modification approval letters are attached.

3. A modification of a previously approved plan is requested for (check all that apply):
   - ☐ Physical or operational modification of any water pollution abatement structure(s) including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
   - ☐ Change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
   - ☐ Development of land previously identified as undeveloped in the original water pollution abatement plan;
   - ☑ Physical modification of the approved organized sewage collection system;
   - ☐ Physical modification of the approved underground storage tank system;
   - ☐ Physical modification of the approved aboveground storage tank system.

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

WPAP Modification Summary	***Approved Project***	***Proposed Modification***
Acres		
Type of Development		
Number of Residential Lots		
Impervious Cover (acres)		
Impervious Cover (%		
Permanent BMPs		
Other		

SCS Modification Summary	***Approved Project***	***Proposed Modification***
Linear Feet	380.84 ft. / 2,200 ft.	2158 ft.
Pipe Diameter	8"	8"
Other		

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

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

5. ☑ **Attachment B: Narrative of Proposed Modification**. A detailed narrative description of the nature of the proposed modification is attached. It discusses what was approved, including any previous modifications, and how this proposed modification will change the approved plan.

6. ☑ **Attachment C: Current Site Plan of the Approved Project**. A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is attached. A site plan detailing the changes proposed in the submitted modification is required elsewhere.
   - ☑ The approved construction has not commenced. The original approval letter and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
   - ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
   - ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.
   - ☐ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.
   - ☐ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.

7. ☐ The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
   ☑ Acreage has not been added to or removed from the approved plan.

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 22, 2022

Mr. Curtis Thigpen
Paravel New Braunfels I, LP
1509 Old 38th Street, Suite 3
Austin, Texas 78731

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: Laurel Tree Ranch; Located south of Loop 337, approximately 0.44 miles west of River Road and Loop 337 intersection; New Braunfels, Texas

TYPE OF PLAN: Request for an Approved Organized Sewage Collection System (SCS) Plan; 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Regulated Entity No. RN111578712; Additional ID No. 13001628

Dear Mr. Thigpen:

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 Paravel New Braunfels I, LP by INK Civil on October 3, 2022. 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.*

PROJECT DESCRIPTION

This project includes 380.84 linear feet of 8-inch PVC, SDR-26, ASTM-D-3034 gravity pipe connecting the onsite collection system to an existing New Braunfels Utilities (NBU) main. The proposed sewage collection system will provide disposal service for residential development.

The system will be connected to an existing City of New Braunfels/NBU wastewater line for conveyance to the New 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 and NBU.

GEOLOGY

According to the geologic assessment included with the application, the project site is underlain by the Person Formation. The geologic assessment indicates that no sensitive geologic features were identified. Three LCRA high tension power poles were identified by the geologist as sensitive manmade features in bedrock to call attention to their location. The site assessment conducted on November 22, 2022, revealed the site was generally as described in the application.

SPECIAL CONDITION

I. By the responsible engineer's dated signature and seal on the Engineering Design Report attached to the submitted application, all information therein accurately reflects the information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer in accordance with the requirements of 30 TAC 213.5 (c) and Chapter 217.

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 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.
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 stormwater 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, silt 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 wastewater lines and manholes that were tested and are being certified as complying with the appropriate regulations. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Should any test result fail to meet passing test criteria and then subsequently pass testing, the result(s) and an explanation of what repair, adjustment, or other means were taken to facilitate a subsequent passing result shall be provided.
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 and manholes that were tested and are being certified as complying with the appropriate regulations. Should any test result fail to meet passing test criteria, and then subsequently pass testing, the result(s) and an explanation of what repair, adjustment, or other means were taken to facilitate a subsequent passing result shall be provided.

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 Don Vandertulip, PE, BCEE of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4057.

Sincerely,

Lillian Butler

Lillian Butler, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality
LIB/dv

cc: Mr. James Ingalls, PE, INK Civil

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 12, 2023

Mr. Curtis Thigpen
Paravel New Braunfels I, LP
1509 Old W 38th St, Ste 3
Austin, Texas 78731

Re: Modification of an approved Organized Sewage Collection System (SCS) Plan
Lyndon Ranch; Located approximately 0.44 miles southwest of River Rd and Loop 337 intersection; New Braunfels, Comal County, Texas
Edwards Aquifer Protection Program ID: 13001715, Regulated Entity No. RN111578712

Dear Mr. Thigpen:

The Texas Commission on Environmental Quality (TCEQ) has completed its review on the application for the above-referenced project submitted to the Edwards Aquifer Protection Program (EAPP) by INK Civil on behalf of the applicant, Paravel New Braunfels I, LP on May 12, 2023. Final review of the application was completed after additional material was received on July 10, 2023.

As presented to the TCEQ, the application was prepared in general compliance with the requirements of 30 Texas Administrative Codes (TAC) Chapter §213 and Chapter §217. The engineering design report, technical specifications and final design plans were prepared by a Texas licensed professional engineer (PE). All construction plans and design information were sealed, signed, and dated by a Texas licensed PE. Therefore, the application for the construction of the proposed project and methods to protect the Edwards Aquifer are hereby **approved,** subject to applicable state rules and the conditions in this letter.

This approval expires two 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 officially requested. This approval or extension will expire, and no extension will be granted if more than 50 percent of the project has not been completed within ten years from the date of 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 in accordance with 30 TAC §50.139.

BACKGROUND

The original SCS was approved by letter dated November 22, 2022, and included 380.84 linear feet of gravity piping, manholes, and appropriate appurtenances.

PROJECT DESCRIPTION

The original SCS as approved shall not be constructed. Instead, this modification to the system includes 2,182 linear feet of 8-inch diameter PVC SDR 26 (ASTM D3034, ASTM D3212) gravity piping and 18 linear feet of 8-inch diameter SDR 26 (ASTM D2241, Class 160, ASTM D3139) pressure rated pipe, manholes, and appropriate appurtenances.

TREATMENT FACILITY

The system will be connected to an existing City of New Braunfels wastewater line for conveyance to the New Gruene Wastewater Treatment Plant for treatment and disposal. **The proposed system shall be connected for conveyance prior to use of the development.** The project will conform to all applicable codes, ordinances, and requirements of the City of New Braunfels.

GEOLOGY

According to the Geologic Assessment (GA) included with the application, the surficial units of the site are the Person Formation. No sensitive geologic features were identified in the GA. The site assessment conducted on June 23, 2023 by TCEQ staff determined the site to be generally as described by the GA.

SPECIAL CONDITIONS

I. This modification is subject to all the special and standard conditions listed in the approval letter(s) dated November 22, 2022.

STANDARD CONDITIONS

1. The plan holder (applicant) must comply with all provisions of 30 TAC Chapter §213 and all technical specifications in the approved plan. The plan holder should also acquire and comply with additional and separate approvals, permits, registrations or authorizations from other TCEQ Programs (i.e., Water Quality) as required based on the specifics of the plan.

2. In addition to the rules of the Commission, the plan holder must also comply with state and local ordinances and regulations providing for the protection of water quality as applicable.

Prior to Commencement of Construction:

3. The plan holder of any approved Edwards Aquifer protection plan must notify the EAPP and obtain approval from the executive director prior to initiating any modification to the activities described in the referenced application following the date of the approval.

4. The plan holder must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the EAPP no later than 48 hours prior to commencement of the regulated activity. 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.

5. Temporary erosion and sedimentation (E&S) controls as described in the referenced 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:

6. This approval does not authorize the installation of temporary or permanent aboveground storage tanks on this project that will have a total storage capacity of 500 gallons or more of static hydrocarbons or hazardous substances without prior approval of an Aboveground Storage Tank facility application.

7. If any sensitive feature is encountered during construction, replacement, or rehabilitation on this project, all regulated activities must be **immediately** suspended near it and notification must be made to TCEQ EAPP staff. Temporary BMPs must be installed and maintained to protect the feature from pollution and contamination. 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.

8. 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.

9. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge must be filtered through appropriately selected BMPs.

10. 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.

11. 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:

12. No part of the organized sewage collection system may be used as a sewage holding tank, as defined in 30 TAC §213.3 (excluding lift stations), over the Edwards Aquifer recharge zone.

13. A Texas licensed PE **must certify** in writing that the new sewage collection system (including force mains) has passed all required testing. The certification shall be submitted to the EAPP within 30 days of test completion and prior to the new sewage collection system being put into service.

14. A Texas licensed PE **must certify** subsequent testing required every five years of the existing sewage collection system after being put into use to determine types and locations of structural damage and defects such as offsets, open joints, or cracked or crushed lines that would allow exfiltration to occur. The test results must be retained by the plan holder for five years and made available to the executive director upon request.

The holder of the approved Edwards Aquifer protection plan is responsible for compliance with Chapter §213 and any condition of the approved plan through all phases of plan implementation. Failure to comply with any condition within this approval letter is a violation of Chapter §213 and is subject to administrative rule or orders and penalties as provided under §213.10 of this title (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. Upon legal transfer of this property, the new owner is required to comply with all terms of the approved Edwards Aquifer protection plan.

This action is taken as delegated by the executive director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Mr. Joshua Vacek of the Edwards Aquifer Protection Program at 210-403-4028 or the regional office at 512-339-2929.

Sincerely,

Lillian Butler

Lillian Butler, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality

LIB/jv

cc: Ms. Melanie Norris, P.E., INK Civil

ATTACHMENT "B"
Narrative of Proposed Modification

The originally approved SCS for Lyndon Ranch (previously Laurel Tree Ranch) dated November 22, 2022 (See Attachment A), was for approximately 380.84 linear feet of 8" sanitary sewer gravity main. It was decided to change the location of the connection to the existing main further to the east, and to extend the main through Lot 1 to serve the proposed development as design progressed which resulted in 2,200 linear feet of 8" sanitary sewer main. Modification approval was granted for the above revised plans on July 12, 2023.

Upon recent coordination with NBU's operations department, it was determined that a segment of sanitary sewer line A from the previous alignment Station 10+00 to Station 11+25.93 would not be serviceable for maintenance due to steep grades. The relocation of a proposed manhole and connection point into an existing sewer line was found to be in the best interest of NBU. The total revised sanitary sewer main length is 2'158 linear feet.

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LYNDON RANCH	
ITEM	QTY.
SANITARY SEWER MAIN (8" PVC SDR-26)	LF
SANITARY SEWER SERVICE	EA.
SANITARY SEWER PLUG	EA.
STANDARD MANHOLE	EA.

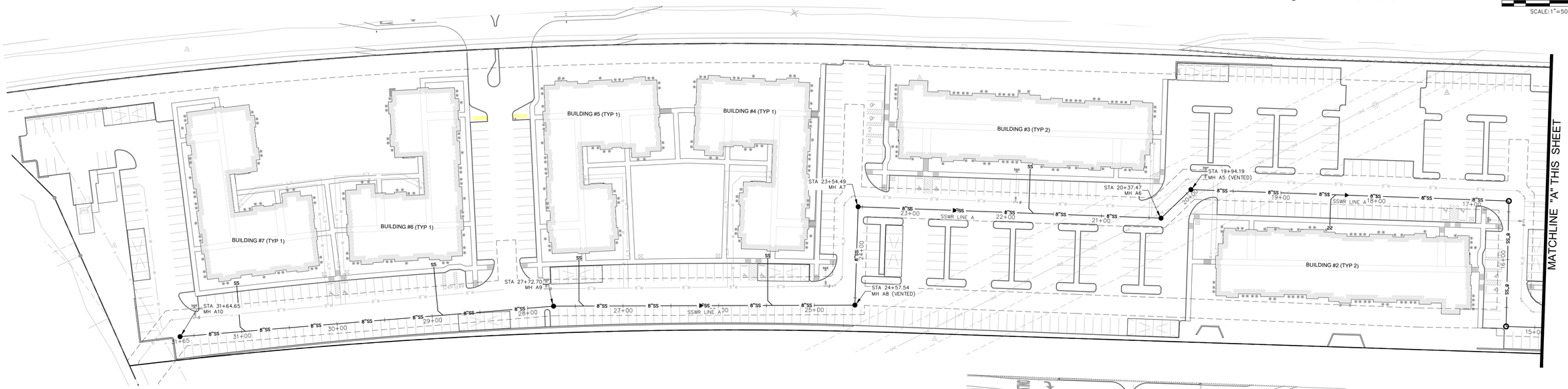
LEGEND

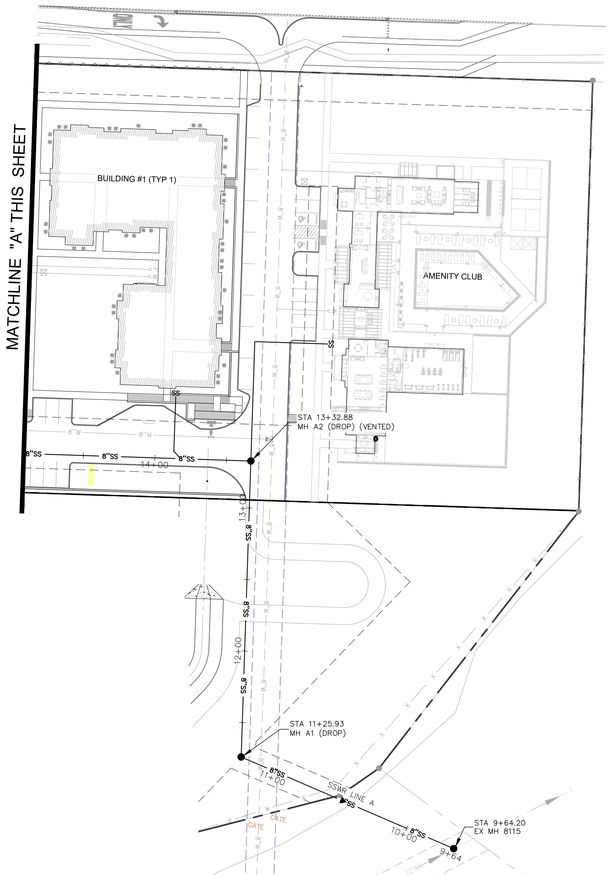
- SS — NEW SANITARY SEWER
- ● — NEW MANHOLE
- SS — NEW SEWER LATERAL
- W — NEW WATER MAIN
- NEW SINGLE METERED SINGLE WATER SERVICE
- NEW FIRE HYDRANT

N

0 50' 100'

SCALE: 1"=50'





CONSTRUCTION NOTES:

1. 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 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).
2. 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 SREVICE BE PLACED UNDER A SEWER LINE OR SEWER SERVICE.
3. WHERE A NEW POTABLE WATERLINE CROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE 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 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.
4. ALL PRIVATE SERVICE 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 SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, 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 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 UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
5. UTILITY SERVICES TO HAVE A MINIMUM A 3' COVER UNLESS OTHERWISE NOTED OR REQUIRED BY THE UTILITY COMPANY.
6. METER BOXES MUST BE SET AT PROPOSED FINISHED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINALE GRADE WILL BE ADJUSTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. CONTRACTOR TO COORDINATE WITH NBU IF EXISTING WATER MAINS WILL BE REMOVED FROM SERVICE AT ANY TIME.
8. 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.
9. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A SPECIFICATIONS.
10. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
11. CONTRACTOR TO PROTECT INSTALLED PIPE FROM BEING CONTAMINATED OR DAMAGED PRIOR TO PLACING INTO SERVICE. ANY PIPE NBU INSPECTIONS DETERMINES IS CONTAMINATED, DIRTY, OR DAMAGED, SHALL BE REPLACED. (NSP)
12. REFERENCE TO "CAP" ON THE DESIGN PLANS MEANS CAP OR PLUG. CAPS SHALL BE USED ON ALL SPIGOT ENDS AND PLUGS ON ALL BELL ENDS PER NBU SPECIFICATIONS.
13. INITIAL BACKFILL OF WATER LINES SHALL BE 3/4" TO DUST OR PEA GRAVEL AS PER NBU SPECIFICATIONS.
14. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES, INCLUDING SERVICE LATERALS, AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT, AND TO PROTECT THE SAME DURING CONSTRUCTION.
15. CONTRACTOR TO PRE-DIG TO VERIFY SIZE, TYPE AND LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. ALL EXISTING UTILITIES MUST BE MAINTAINED UNTIL FINAL ACCEPTANCE OF NEW SYSTEM AND SWITCH OVER OCCURS (NSP)
16. CONTRACTOR TO UTILIZE WATER LINE STOPPERS TO MINIMIZE OUTAGES. USE OF LINE STOPPERS, INSTEAD OF EXISTING VALVES, MUST BE APPROVED BY NBU INSPECTIONS PRIOR TO INSTALLATION.
17. SIZES ON SIZE WATER TAPS ARE ACCEPTABLE ONLY IF SOLID TAPS ARE USED.
18. CONTRACTOR WILL KEEP THE AREA ON TOP OF AND AROUND THE WATER METER BOX FREE OF ALL OBJECTS AND DEBRIS.
19. NO METER BOXES TO BE SET IN DRIVEWAYS. ANY METER BOXES SET IN DRIVEWAYS WILL BE RELOCATED AT CONTRACTOR'S AND/OR DEVELOPER'S EXPENSE.
20. METER BOXES MUST BE SET AT PROPOSED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINAL GRADE WILL BE ADJUSTED AT CONTRACTOR'S AND/OR DEVELOPER'S EXPENSE.
21. EXISTING PIPE MATERIALS ARE UNKNOWN. CONTRACTOR WILL BE REQUIRED TO TIE PROPOSED WATER MAINS TO EXISTING WATER MAINS PER NBU SPECIFICATIONS. ADDITIONAL PIPE NEEDED TO MAKE THE TIE IN WILL BE PAID FOR UNDER THE UNIT BID PRICE OF WATER PIPE OF THE SIZE INSTALLED. FITTINGS NEEDED TO MAKE THE CONNECTION TO THE EXISTING PIPE WILL BE PAID AS PART OF ITEM 510, PIPE. NO SEPARATE PAYMENT WILL BE MADE FOR THESE FITTINGS.
22. DOMESTIC SERVICE BACKFLOW PREVENTER TO BE SPECIFIED AS: WATTS SERIES 909M1QT (REDUCED PRESSURE ZONE ASSEMBLY) OR ENGINEER APPROVED EQUAL
23. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO STREETS.
24. ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE CITY OF NEW BRAUNFELS STREET INSPECTOR. AT A MINIMUM TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE CITY OF NEW BRAUNFELS STREET INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE CITY OF NEW BRAUNFELS INSPECTOR.
25. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF BUILDING, APPERTUNANCES, DIMENSIONS, AND UTILITY ENTRANCE LOCATIONS.
26. CONTRACTOR TO COORDINATE SANITARY SEWER AND WATER CONNECTIONS TO BUILDING WITH M.E.P. PLANS.
27. CONTRACTOR TO COORDINATE ELECTRIC, TELEPHONE, AND GAS SERVICES WITH UTILITY PROVIDERS AND M.E.P. PLANS.
28. THE GAS AND TELECOMMUNICATIONS SERVICES SHOWN ARE PRELIMINARY. REFERENCE THE M.E.P. PLANS FOR EXACT LOCATIONS OF ELECTRICAL, GAS, AND TELECOMMUNICATIONS SERVICES ARE NOT PART OF THE CIVIL DESIGN PLANS.
29. MINIMUM DEPTH OF COVER OVER THE UPPERMOST PROJECTION OF THE WATER PIPE AND ALL APPURTENANCES SHALL BE 42 INCHES, IF COVER IS LESS 42 INCHES ADD A CONCRETE CAP OR ENCASEMENT.
30. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5 FEET IN DEPTH LOCATED IN PUBLIC RIGHT OF WAY OR EASEMENTS, DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND CITY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO CITY PRIOR TO UTILITY INSTALLATION.
31. NEW MANHOLES MUST BE CONSTRUCTED OF OR LINED WITH A CORRSION RESISTAN MATERIAL. WHERE NEW CONSTRUCTION CONNECTS TO AN EXISTING MANHOLE THAT IS NOT CONTRUCTED OF A CORROSION RESISTANT MATERIAL, THE EXISTING MANHOLES MUST BE LINED WITH OR REPLACED WITH A CORROSION RESISTANT MATERIAL.
32. MINIMUM SLOPE ALLOWED FOR SEWER SERVICE LATERALS SHALL BE 2%
33. IN ALL NEW SYSTEMS, GRADE BREAKS EXCEEDING ALLOWABLE JOINT DEFLECTION MUST BE MADE WITH APPROVED FITTINGS AND SHALL NOT EXCEED CUMULATIVE TOTAL OF 45 DEGREES.
34. POINT OF DELIVERY IS DETERMINED BY NBU AND MAY NOT BE CLEANOUT, IT MAY BE A PROPERTY LINE OR EASEMENT BOUNDARY. NBU IS RESPONSIBLE FROM MAIN TO CLEANOUT OR PROPERTY LINE. CUSTOMER IS RESPONSIBLE FOR PIPE FROM THE CLEANOUT/ PROPERTY LINE TO PRIVATE PLUMBING, INCLUDING DESIGN, CONSTRUCTION, OPERATION, AND COMPLIANCE WITH CITY CODES.

STATE OF TEXAS
MELANIE NORRIS
140721
LICENSED PROFESSIONAL ENGINEER
Melanie Norris 5/3/23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

OVERALL SANITARY SEWER PLAN

SHEET 29 OF 53

NO	DATE	ISSUES AND REVISIONS
1		

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

Drawing Name: N:\Projects\PARAVEL (P 337 Townhomes)\Civil\Construction Drawings\COMMERCIAL SET\OVERALL SANITARY SEWER PLAN.dwg User: melanienorris May 03, 2023 9:42am

Organized Sewage Collection System Application

Texas Commission on Environmental Quality

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

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

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

Regulated Entity Name: Lyndon Ranch

1. ☑ **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

2. 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: Curtis Thigpen
   Entity: Paravel New Braunfels I, LP
   Mailing Address: 1509 Old W. 38th Street, Suite 3
   City, State: Austin, TX Zip: 78731
   Telephone: 512-467-4441 Fax: _____
   Email Address: cthigpen@paravelcap.com

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

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

   Contact Person: James Ingalls, PE
   Texas Licensed Professional Engineer's Number: 107416
   Entity: INK Civil
   Mailing Address: 2021 SH 46W, Suite 105
   City, State: New Braunfels, TX Zip: 78132
   Telephone: 830-358-7127 Fax: _____
   Email Address: jamesingalls@ink-civil.com

Project Information

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

- [ ] Residential: Number of single-family lots: _____
- [x] Multi-family: Number of residential units: 303
- [ ] Commercial
- [ ] Industrial
- [ ] Off-site system (not associated with any development)
- [ ] Other: _____

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

100 % Domestic	63,630 gallons/day
_____ % Industrial	_____ gallons/day
_____ % Commingled	_____ gallons/day

Total gallons/day: 63,630

6. Existing and anticipated infiltration/inflow is 21,096 gallons/day. This will be addressed by:

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.

7. 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 _____. A copy of the approval letter is attached.
- [ ] The WPAP application for this development was submitted to the TCEQ on _____, but has not been approved.
- [x] A WPAP application is required for an associated project, but it has not been submitted.
- [ ] There is no associated project requiring a WPAP application.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*
8"	2140	PVC SDR-26	ASTM D-3034, D-3212, F-477
8"	18	PVC SDR-26	ASTM D2241

Total Linear Feet: 2,158

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

New Gruene WWTP

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

   ☑ Existing
   ☐ Proposed

10. All components of this sewage collection system will comply with:

   ☑ The City of New Braunfels; New Braunfels Utilities standard specifications.
   ☐ Other. Specifications are attached.

11. ☐ 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** form (TCEQ-0624) is included with this application.

Alignment

12. ☑ There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.

13. ☑ There are no deviations from straight alignment in this sewage collection system without manholes.

   ☐ **Attachment B - Justification and Calculations for Deviation in Straight Alignment without Manholes**. A justification for deviations from straight alignment in this sewage collection system without manholes with documentation from pipe manufacturer allowing pipe curvature is attached.

   ☐ 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: (Please attach additional sheet if necessary)

Table 2 - Manholes and Cleanouts table provided on next page

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	Of		
	Of		
	Of		
	Of		
	Of		
	Of		

Line	Shown on Sheet			Station	Manhole or Cleanout
Line A	42	of	65	9+98.07	Doghouse Manhole
Line A	42	of	65	10+54.88	Manhole
Line A	42	of	65	13+46.30	Drop Manhole
Line A	42	of	65	15+43.41	Drop Manhole
Line A	42	of	65	16+74.87	Manhole
Line A	42	of	65	20+07.61	Manhole
Line A	43	of	65	20+50.89	Manhole
Line A	43	of	65	23+67.91	Manhole
Line A	43	of	65	24+70.96	Manhole
Line A	43	of	65	27+86.12	Manhole
Line A	43	of	65	31+78.07	Manhole

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	Of		
	Of		

15. ☑ Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.

16. ☑ 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

☐ **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. A justification for any variance from the maximum spacing is attached, and 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.

☑ The use of pre-cast manholes is requested for this project. The manufacturer's specifications and construction drawings, showing the method of sealing the joints, are attached.

Site Plan Requirements

Items 18 - 25 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 stub outs (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:

☑ 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.)

Table 3 - 100-Year Floodplain

Line	*Sheet*	*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.)

Table 4 - 5-Year Floodplain

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

24. [x] Legal boundaries of the site are shown.

25. [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.

Items 26 - 33 must be included on the Plan and Profile sheets.

26. ☑ 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.

Table 5 - Water Line Crossings

Line	*Station or Closest Point*	*Crossing or Parallel*	*Horizontal Separation Distance*	*Vertical Separation Distance*
Line A	10+41.65	Crossing	2'	0

27. 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 within. No vented manholes will be used.

Table 6 - Vented Manholes

Line	*Manhole*	*Station*	*Sheet*
Line A	MH A2	13+46.30	42 of 65
Line A	MH A5	20+07.61	42 of 65
Line A	MH A8	24+70.96	42 of 65

Line	*Manhole*	*Station*	*Sheet*

28. 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(l)(2)(H).

Table 7 - Drop Manholes

Line	*Manhole*	*Station*	*Sheet*
Line A	MH A2	13+46.30	42 of 65
Line A	MH A3	15+43.41	42 of 65

29. 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.

30. 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.

31. 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.

32. 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 attached.

Table 8 - Flows Greater Than 10 Feet per Second

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

33. Assuming pipes are flowing full, where flows are ≥ 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).

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

☐ 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.

☑ N/A

Administrative Information

34. ☑ 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.

35. ☑ 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:

Table 9 - Standard Details

Standard Details	*Shown on Sheet*
Lateral stub-out marking **[Required]**	44 of 65
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	44, 45 of 65
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	44 of 65
Typical trench cross-sections **[Required]**	46 of 65
Bolted manholes **[Required]**	45 of 65
Sewer Service lateral standard details **[Required]**	44 of 65
Clean-out at end of line **[Required, if used]**	N/A of
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	N/A of
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	42 of 65
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	46 of 65

Standard Details	*Shown on Sheet*
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	45 of 65

36. ☑ All organized sewage collection system general construction notes (TCEQ-0596) are included on the construction plans for this sewage collection system.

37. ☑ 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.

    ☑ Survey staking was completed on this date: 11/10/2023

38. ☑ 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.

39. ☑ Any modification of this SCS application will require TCEQ approval, prior to construction, and may require submission of a revised application, with appropriate fees.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **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:

Print Name of Licensed Professional Engineer: James Ingalls, PE

Date: 10-5-23

Place engineer's seal here:

Signature of Licensed Professional Engineer:

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.

Table 10 - Slope Velocity

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.*

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

Figure 1 - Manning's Formula

Where:

v = velocity (ft/sec)
n = Manning's roughness coefficient (0.013)
Rh = hydraulic radius (ft)
S = slope (ft/ft)

2023

Lyndon Ranch - Sanitary Sewer Engineering Design Report

INK Civil
2021 SH 46W, Ste 105
New Braunfels, TX 78132
TBPE Firm # F-13351

Prepared for :

Paravel Capital

c/o Curtis Thigpen

10/13/2023

Contents

PROJECT DESCRIPTION

Lyndon Ranch is 28.17 acre development comprised of two tracts. The site is located south of Loop 337, approximately 0.44 miles west of the intersection of River Road and Loop 337, in the City of New Braunfels, Comal County, Texas. (See Location Map). The development requires a public improvement project to bring public utilities to the site. This SCS application is for the sanitary sewer extension project that will serve the site. The proposed Sanitary Sewer System will tie into and existing offsite manhole currently part of New Braunfels Utilities system that s sized to accept ultimate developed flows.

The site is currently unimproved land primarily composed of scattered dense brush and trees. The entire 28.17-acre site drains southeast into a creek that ties into Blieders Creek and ultimately the Comal River. According to the Flood Insurance Rate Map No. 48091C0435F there is no existing floodplain located within the property.

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. The project includes approximately 2,200 linear feet of 8" sanitary sewer gravity main. The proposed SCS will connect to an existing NBU sewer line with a doghouse manhole.

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

Table 1 – Pipe Lengths Broken Out by Line

Sanitary Sewer Line	Length (ft)
Line A	2,158

SYSTEM SERVICE AREA

The current proposed development is for a multi-family residential development. Coordination done with NBU showed that the proposed SCS with connection to the existing sanitary sewer main has an adequate capacity for the proposed Lyndon Ranch development.

DESIGN SUMMARY

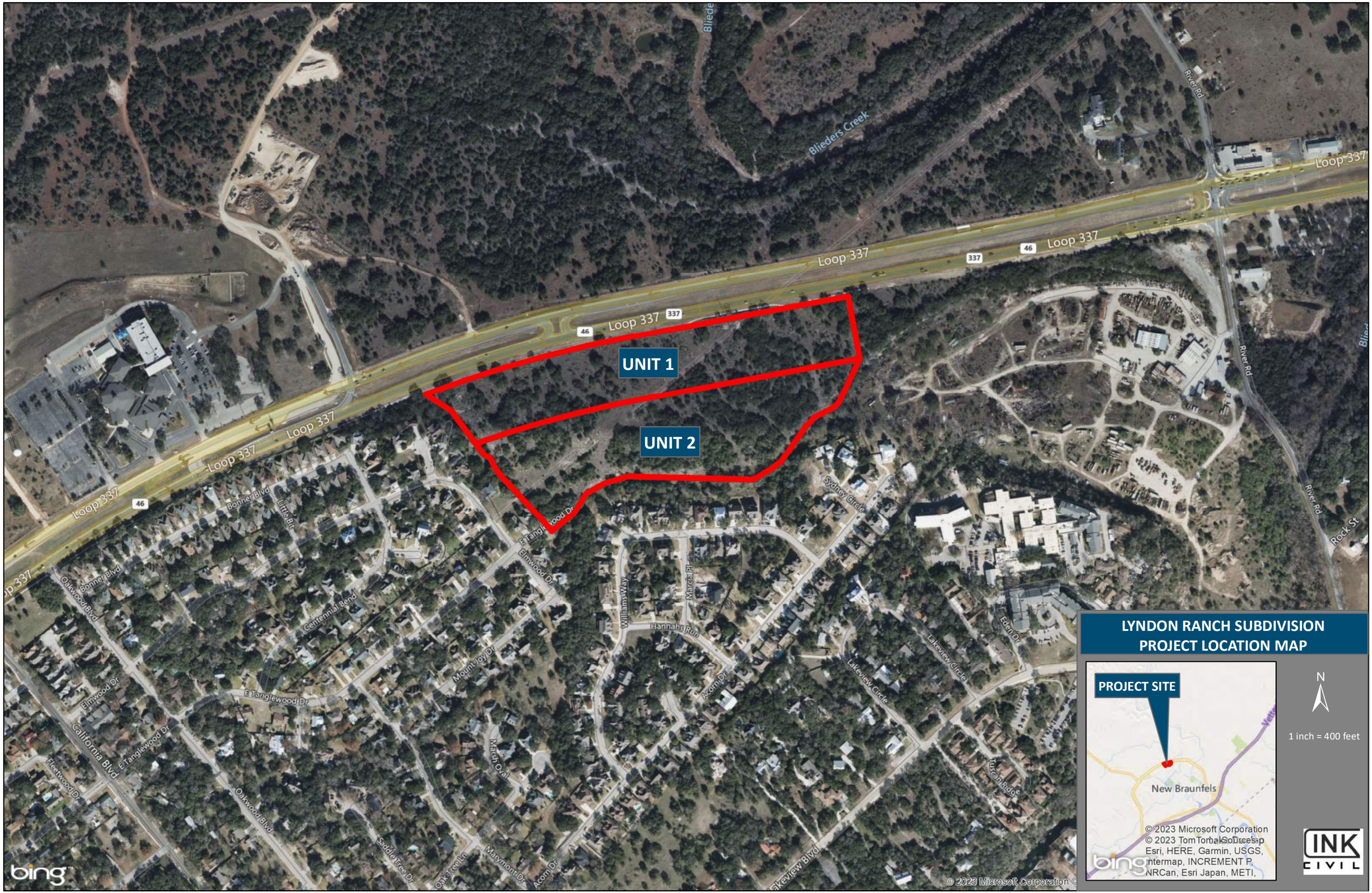
Inflow/Infiltration

Existing and anticipated infiltration/inflow is 21,128 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.

Wastewater/Water System Crossings

The proposed wastewater collection system pipe crosses a water distribution system pipe at one location. The crossing occurs at Station 10+41.65 in the Sanitary Sewer Line A at a vertical distance of 2.0' above the water distribution line. This must meet the design criteria set in TAC 217.53. Per TAC 217.53(5), when a collection system pipe crosses below a water supply pipe, each portion of the collection system pipe within nine feet of the water supply pipe must either be constructed using 150 psi pressure class pipe, encased in cement stabilized sand, or encased in a casing pipe.

ATTACHMENT A LOCATION MAP



LYNDON RANCH SUBDIVISION
PROJECT LOCATION MAP

N

1 inch = 400 feet

INK CIVIL

ATTACHMENT B OVERALL SERVICE AREA MAP

LYNDON RANCH	
ITEM	QTY.
SANITARY SEWER MAIN (8" PVC SDR-26)	2,158 LF
SANITARY SEWER SERVICE	8 EA.
SANITARY SEWER PLUG	0 EA.
STANDARD MANHOLE	9 EA.

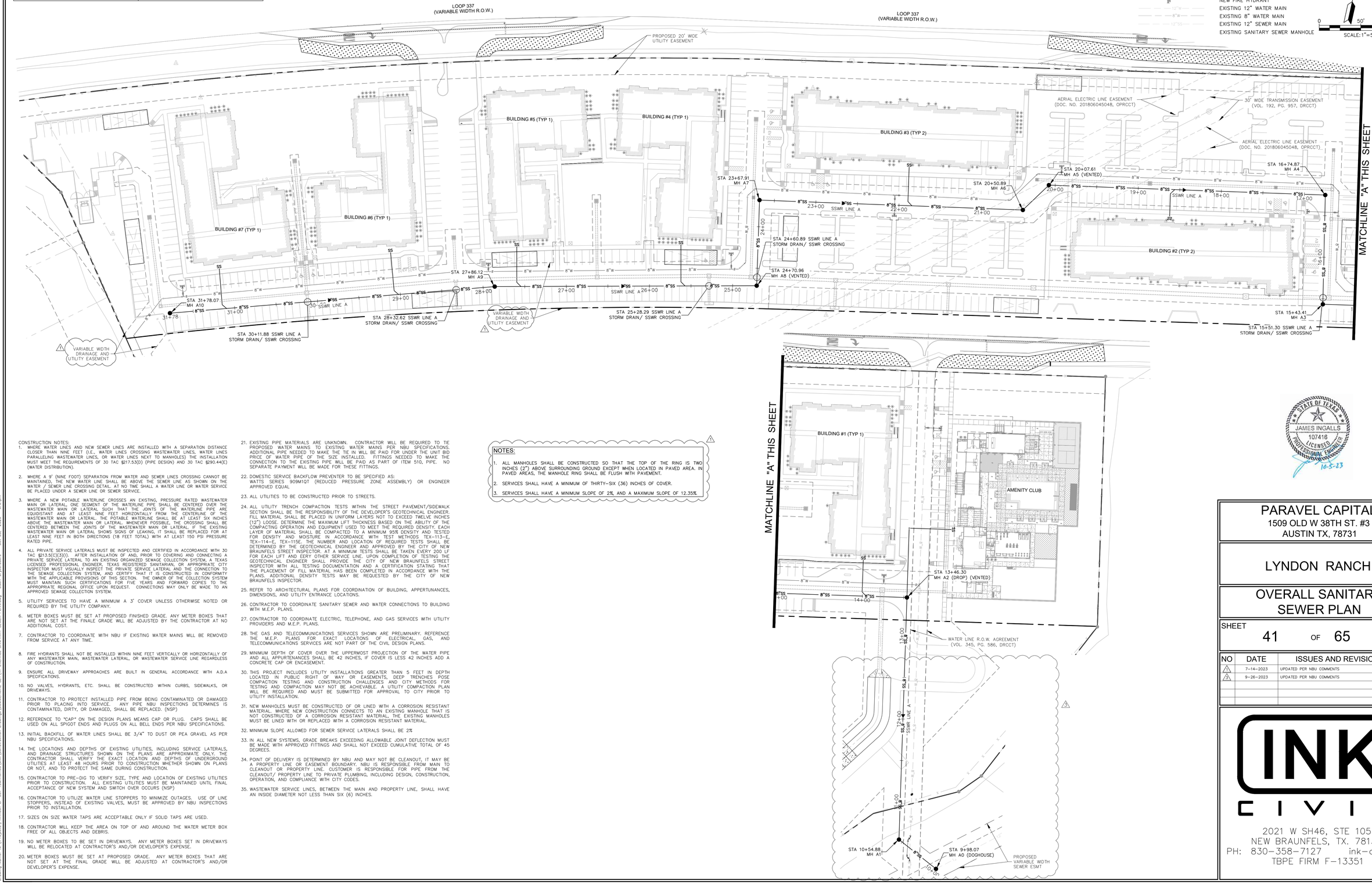
LEGEND

- 8"SS — PROPOSED 8" SANITARY SEWER MAIN
- NEW MANHOLE
- SS — NEW SEWER LATERAL
- 8"W — PROPOSED 8" WATER MAIN
- W — NEW WATER SERVICE
- 6"W — NEW FIRE SERVICE
- NEW FIRE HYDRANT
- 12"W — EXISTING 12" WATER MAIN
- 8"W — EXISTING 8" WATER MAIN
- 12"SS — EXISTING 12" SEWER MAIN
- EXISTING SANITARY SEWER MANHOLE

N

0 50' 100'

SCALE: 1"=50'



CONSTRUCTION NOTES:

1. 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 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).
2. 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.
3. WHERE A NEW POTABLE WATERLINE CROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE 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 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.
4. ALL PRIVATE SERVICE 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 SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, 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 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 UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.
5. UTILITY SERVICES TO HAVE A MINIMUM A 3' COVER UNLESS OTHERWISE NOTED OR REQUIRED BY THE UTILITY COMPANY.
6. METER BOXES MUST BE SET AT PROPOSED FINISHED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINALE GRADE WILL BE ADJUSTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. CONTRACTOR TO COORDINATE WITH NBU IF EXISTING WATER MAINS WILL BE REMOVED FROM SERVICE AT ANY TIME.
8. 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.
9. ENSURE ALL DRIVEWAY APPROACHES ARE BUILT IN GENERAL ACCORDANCE WITH A.D.A SPECIFICATIONS.
10. NO VALVES, HYDRANTS, ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
11. CONTRACTOR TO PROTECT INSTALLED PIPE FROM BEING CONTAMINATED OR DAMAGED PRIOR TO PLACING INTO SERVICE. ANY PIPE NBU INSPECTIONS DETERMINES IS CONTAMINATED, DIRTY, OR DAMAGED, SHALL BE REPLACED. (NSP)
12. REFERENCE TO "CAP" ON THE DESIGN PLANS MEANS CAP OR PLUG. CAPS SHALL BE USED ON ALL SPIGOT ENDS AND PLUGS ON ALL BELL ENDS PER NBU SPECIFICATIONS.
13. INITIAL BACKFILL OF WATER LINES SHALL BE 3/4" TO DUST OR PEA GRAVEL AS PER NBU SPECIFICATIONS.
14. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES, INCLUDING SERVICE LATERALS, AND DRAINAGE STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTHS OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT, AND TO PROTECT THE SAME DURING CONSTRUCTION.
15. CONTRACTOR TO PRE-DIG TO VERIFY SIZE, TYPE AND LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. ALL EXISTING UTILITIES MUST BE MAINTAINED UNTIL FINAL ACCEPTANCE OF NEW SYSTEM AND SWITCH OVER OCCURS (NSP)
16. CONTRACTOR TO UTILIZE WATER LINE STOPPERS TO MINIMIZE OUTAGES. USE OF LINE STOPPERS, INSTEAD OF EXISTING VALVES, MUST BE APPROVED BY NBU INSPECTIONS PRIOR TO INSTALLATION.
17. SIZES ON SIZE WATER TAPS ARE ACCEPTABLE ONLY IF SOLID TAPS ARE USED.
18. CONTRACTOR WILL KEEP THE AREA ON TOP OF AND AROUND THE WATER METER BOX FREE OF ALL OBJECTS AND DEBRIS.
19. NO METER BOXES TO BE SET IN DRIVEWAYS. ANY METER BOXES SET IN DRIVEWAYS WILL BE RELOCATED AT CONTRACTOR'S AND/OR DEVELOPER'S EXPENSE.
20. METER BOXES MUST BE SET AT PROPOSED GRADE. ANY METER BOXES THAT ARE NOT SET AT THE FINAL GRADE WILL BE ADJUSTED AT CONTRACTOR'S AND/OR DEVELOPER'S EXPENSE.
21. EXISTING PIPE MATERIALS ARE UNKNOWN. CONTRACTOR WILL BE REQUIRED TO TIE PROPOSED WATER MAINS TO EXISTING WATER MAINS PER NBU SPECIFICATIONS. ADDITIONAL PIPE NEEDED TO MAKE THE TIE IN WILL BE PAID FOR UNDER THE UNIT BID PRICE OF WATER PIPE OF THE SIZE INSTALLED. FITTINGS NEEDED TO MAKE THE CONNECTION TO THE EXISTING PIPE WILL BE PAID AS PART OF ITEM 510, PIPE. NO SEPARATE PAYMENT WILL BE MADE FOR THESE FITTINGS.
22. DOMESTIC SERVICE BACKFLOW PREVENTER TO BE SPECIFIED AS: WATTS SERIES 909M1QT (REDUCED PRESSURE ZONE ASSEMBLY) OR ENGINEER APPROVED EQUAL
23. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO STREETS.
24. ALL UTILITY TRENCH COMPACTION TESTS WITHIN THE STREET PAVEMENT/SIDEWALK SECTION SHALL BE THE RESPONSIBILITY OF THE DEVELOPER'S GEOTECHNICAL ENGINEER. FILL MATERIAL SHALL BE PLACED IN UNIFORM LAYERS NOT TO EXCEED TWELVE INCHES (12") LOOSE. DETERMINE THE MAXIMUM LIFT THICKNESS BASED ON THE ABILITY OF THE COMPACTING OPERATION AND EQUIPMENT USED TO MEET THE REQUIRED DENSITY. EACH LAYER OF MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AND TESTED FOR DENSITY AND MOISTURE IN ACCORDANCE WITH TEST METHODS TEX-113-E, TEX-114-E, TEX-115E. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE CITY OF NEW BRAUNFELS STREET INSPECTOR. AT A MINIMUM TESTS SHALL BE TAKEN EVERY 200 LF FOR EACH LIFT AND EERY OTHER SERVICE LINE. UPON COMPLETION OF TESTING THE GEOTECHNICAL ENGINEER SHALL PROVIDE THE CITY OF NEW BRAUNFELS STREET INSPECTOR WITH ALL TESTING DOCUMENTATION AND A CERTIFICATION STATING THAT THE PLACEMENT OF FILL MATERIAL HAS BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. ADDITIONAL DENSITY TESTS MAY BE REQUESTED BY THE CITY OF NEW BRAUNFELS INSPECTOR.
25. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF BUILDING, APPERTUNANCES, DIMENSIONS, AND UTILITY ENTRANCE LOCATIONS.
26. CONTRACTOR TO COORDINATE SANITARY SEWER AND WATER CONNECTIONS TO BUILDING WITH M.E.P. PLANS.
27. CONTRACTOR TO COORDINATE ELECTRIC, TELEPHONE, AND GAS SERVICES WITH UTILITY PROVIDERS AND M.E.P. PLANS.
28. THE GAS AND TELECOMMUNICATIONS SERVICES SHOWN ARE PRELIMINARY. REFERENCE THE M.E.P. PLANS FOR EXACT LOCATIONS OF ELECTRICAL, GAS, AND TELECOMMUNICATIONS SERVICES ARE NOT PART OF THE CIVIL DESIGN PLANS.
29. MINIMUM DEPTH OF COVER OVER THE UPPERMOST PROJECTION OF THE WATER PIPE AND ALL APPURTENANCES SHALL BE 42 INCHES, IF COVER IS LESS 42 INCHES ADD A CONCRETE CAP OR ENCASEMENT.
30. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5 FEET IN DEPTH LOCATED IN PUBLIC RIGHT OF WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND CITY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO CITY PRIOR TO UTILITY INSTALLATION.
31. NEW MANHOLES MUST BE CONSTRUCTED OF OR LINED WITH A CORROSION RESISTANT MATERIAL. WHERE NEW CONSTRUCTION CONNECTS TO AN EXISTING MANHOLE THAT IS NOT CONSTRUCTED OF A CORROSION RESISTANT MATERIAL, THE EXISTING MANHOLES MUST BE LINED WITH OR REPLACED WITH A CORROSION RESISTANT MATERIAL.
32. MINIMUM SLOPE ALLOWED FOR SEWER SERVICE LATERALS SHALL BE 2%
33. IN ALL NEW SYSTEMS, GRADE BREAKS EXCEEDING ALLOWABLE JOINT DEFLECTION MUST BE MADE WITH APPROVED FITTINGS AND SHALL NOT EXCEED CUMULATIVE TOTAL OF 45 DEGREES.
34. POINT OF DELIVERY IS DETERMINED BY NBU AND MAY NOT BE CLEANOUT, IT MAY BE A PROPERTY LINE OR EASEMENT BOUNDARY. NBU IS RESPONSIBLE FROM MAIN TO CLEANOUT OR PROPERTY LINE. CUSTOMER IS RESPONSIBLE FOR PIPE FROM THE CLEANOUT/ PROPERTY LINE TO PRIVATE PLUMBING, INCLUDING DESIGN, CONSTRUCTION, OPERATION, AND COMPLIANCE WITH CITY CODES.
35. WASTEWATER SERVICE LINES, BETWEEN THE MAIN AND PROPERTY LINE, SHALL HAVE AN INSIDE DIAMETER NOT LESS THAN SIX (6) INCHES.

1 NOTES:

1. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS TWO INCHES (2") ABOVE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREA. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.
2. SERVICES SHALL HAVE A MINIMUM OF THIRTY-SIX (36) INCHES OF COVER.
3. SERVICES SHALL HAVE A MINIMUM SLOPE OF 2%, AND A MAXIMUM SLOPE OF 12.35%.

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

OVERALL SANITARY SEWER PLAN

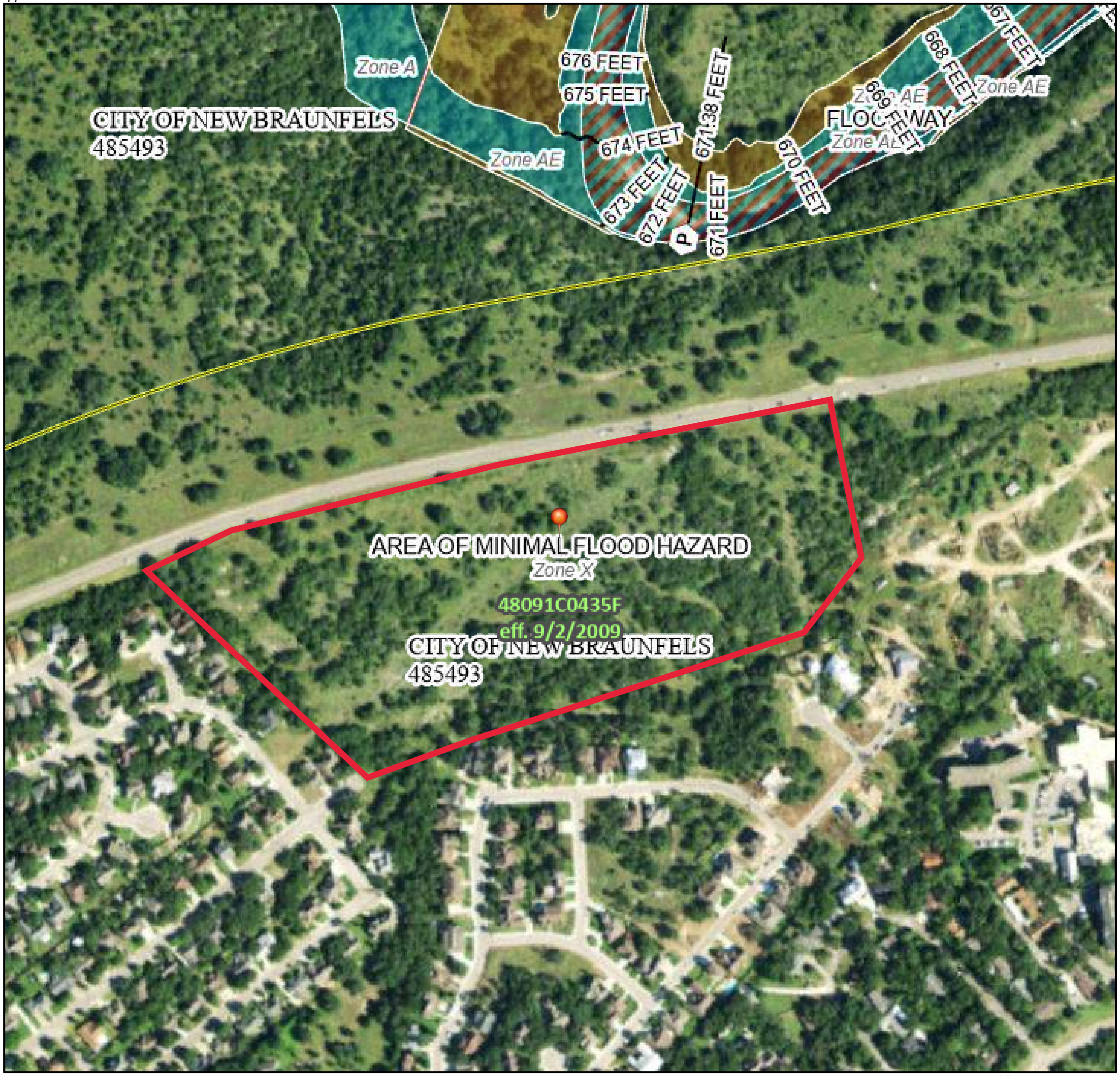
SHEET 41 OF 65

NO	DATE	ISSUES AND REVISIONS
1	7-14-2023	UPDATED PER NBU COMMENTS
2	9-26-2023	UPDATED PER NBU COMMENTS

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

Drawing Name: N:\Projects\PARA001 LP 337 Townhomes\Civil\Construction Drawings\COMMERCIAL SET\41 OVERALL SANITARY SEWER PLAN.dwg User: bryanders Oct 05, 2023 - 6:01pm

ATTACHMENT C FEMA FIRM Map No. 48091C0435F



Zone A
676 FEET
675 FEET
671.38 FEET
674 FEET
673 FEET
672 FEET
671 FEET
670 FEET
669 FEET
668 FEET
667 FEET
Zone AE
FLOODWAY
CITY OF NEW BRAUNFELS
485493
AREA OF MINIMAL FLOOD HAZARD
Zone X
48091C0435F
eff. 9/2/2009
CITY OF NEW BRAUNFELS
485493

FEMA

ATTACHMENT D PIPE CALCULATIONS AND DESIGN INFORMATION

Critical Buckling Pressure
SDR 26

The equations below are from Chapter 7 of the "Handbook of PVC Pipe"

$$P_{cr} = \frac{2E}{(1 - v^2)(DR - 1)^3}$$

E = Modulus of Elasticity, lbs/in^2	E =	400,000
v = Poisson's Ratio, 0.38 for PVC p	v =	0.38
DR = Dimension Ratio	DR =	26

P_{cr} = Critical Buckling Pressure, lbs/in^2 **P_{cr} = 59.84 lbs/in^2**

$$P_b = 1.15\sqrt{P_{cr}E'}$$

E' = Modulus of Soil Reaction, lbs/in^2	E' =	1,000

P_b = Buckling Pressure in a Given Soil, lbs/in^2 **P_b = 281.32 lbs/in^2**

= 40,509.78 lbs/ft^2

$D_{max} = P_b/w_{sat}$

w_{sat} = Saturated Soil Weight, lbs/ft^3	w_{sat} =	120

D_{max} = Maximum Trench Depth, ft **D_{max} = 337.58 ft**

The limiting factor for buckling pressure is not depth but rather deflection. In this case deflection is not to exceed 5% which works out to a maximum depth of 42.62 ft shown below.

$$P_e = \frac{\Delta(.149\ PS + .061E')}{K}$$

PS = Pipe Stiffness, lbs/in^2	PS =	115
K = Bedding Constant	K =	0.11
Δ = Specific Deflection, %	Δ =	5%

P_e = Buckling Pressure at specific deflection, lbs/in^2 **P_b = 35.52 lbs/in^2**

= 5,114.29 lbs/ft^2

$D_{\%} = P_e/w_{sat}$

$D_{\%}$ = Depth of Pipe Limited by Deflection, ft **$D_{\%}$ = 42.62 ft**

**** Maximum depth of pipe is controlled by a maximum deflection of 5% ($D_{\%}$).***

Specific Pipe Information

Lyndon Ranch Gravity Sewer						
Sanitary Sewer Line	Diameter (in)	Length (ft)	$Slope_{min}$ (%)	$Slope_{max}$ (%)	$Velocity_{min}$ (ft/s)	$Velocity_{max}$ (ft/s)
Line A	8	2,158	0.40	8.00	2.19	9.79

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

Lyndon Ranch Sewer Pipe Stiffness & Buckling Summary						
Diameter (in)	Material	Length (ft)	Stiffness (psi)	$Depth_{min}$ (ft)	$Depth_{max}$ (ft)	$Deflection_{max}$ (%)
8	SDR 26	2,200	115	3.0	25.9	< 5%

Pipe Stiffness

Pipe stiffness labeled in the table below 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 for shallow buried pipe and Table 7.5 for deep buried pipe 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 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 the pipe.

Pipe Strain

Strain failure is not a controlling factor in the design of this system. Performance of PVC pipe is rarely controlled by strain forces according to the Uni-Bell “Handbook of PVC Pipe”. Because deflection is not to exceed 5%, strain related failure is not expected.

Table 7.4 Calculated deflections of buried PVC pressure pipe; deflection (%) for prism, highway H20, and railway E80 loads (*continued*)

Height of cover, ft	2			4			6			8			10		
Load type	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**
E′, psi	**DR 26**														
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′, psi	**DR 32.5**														
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′, psi	**DR 41**														
50	2.31	10.01	38.88	4.62	8.47	20.12	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′, psi	**DR 51**														
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	16.06	16.06	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 Calculated deflections of buried PVC pressure pipe; deflection (%) for prism, highway H20, and railway E80 loads (*continued*)

Height of cover, ft	12			14			16			18			20		
Load type	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**	**Prism**	**H20**	**E80**
E′, psi	**DR 26**														
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′, psi	**DR 32.5**														
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′, psi	**DR 41**														
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	9.5	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′, psi	**DR 51**														
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 7.5

MEASURED LONG-TERM DEFLECTIONS OF SDR 35 PVC
(MINIMUM PIPE STIFFNESS 46 PSI) PIPE (PERCENT)

ASTM Embedment Material Classification		Density (Proctor) AASHTO T-99	Height of Cover (feet)													
			3	5	8	10	12	14	16	18	20	22	24	26	28	30
Manufactured Granular Angular	CLASS I		0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6
Clean Sand & Gravel	CLASS II	90%	0.2	0.3	0.5	0.7	0.8	0.9	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0
		80%	0.9	1.4	2.3	3.2	3.6	4.1	5.0	5.5	6.0	6.4	7.3	7.7	8.2	9.1
Sand & Gravel with Fines	CLASS III	90%	0.2	0.4	0.6	0.8	0.9	1.1	1.2	1.4	1.6	1.7	1.9	2.1	2.2	2.3
		85%	0.7	0.9	1.7	2.2	2.6	3.0	3.5	3.9	4.3	4.8	5.2	5.6	6.0	6.5
		75%	1.1	1.8	2.9	3.8	4.5	5.5	6.8	8.5	9.9	11.3	12.7	14.1	15.5	16.8
		65%	1.3	2.4	3.6	4.7	5.5	6.8	8.5	9.6	11.4	13.0	14.5	16.0	17.3	18.0
Silt & Clay	CLASS IV	85%	0.7	0.9	1.7	2.2	2.6	3.0	3.5	3.9	4.3	4.8	5.2	5.6	6.0	6.5
		75%	1.3	2.3	3.3	4.3	5.0	6.5	7.8	9.5	10.6	12.2	13.5	15.0	16.3	17.0
		65%	1.3	2.4	3.6	4.7	5.5	8.0	10.5	12.5	15.0	17.6	20.0	22.0	24.0	26.0

1. Test data indicates no length of pipe installed under conditions specified will deflect more than is indicated; the pipe will deflect less than the amount indicated if specified density is obtained.
2. Embedment material classifications are as per ASTM D 2321, "Underground Installation of Flexible Thermoplastic Sewer Pipe."
3. Listed deflections are those caused by soil loading only and do not include initial out-of-roundness, etc.
4. Data obtained from Utah State University report.

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 Notation	Min. Std. Proctor Density (%)	Lift Placement Depth	Dumped	Slightly < 85%	Moderate 85% - 95%	High > 95%
Class	Description	Notation	Description							
IA	Open-graded, clean manufactured 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 manufactured, 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 E 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.

Thank you,

Brian Bishop
Vice President

STATE OF TEXAS
COUNTY OF BEXAR

SWORN AND SUBSCRIBED TO BEFORE ME THIS 4th DAY OF March, 2008.

My commission expires: May 18, 2010

LARISA V. DISTEFANO
MY COMMISSION EXPIRES
May 18, 2010

Larisa V. Distefano
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.

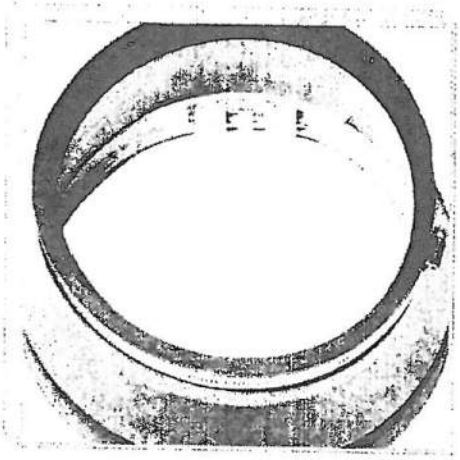
All invert channels are constructed secondary to the base section per plan and specifications to insure a smooth and uniform flow. All invert benches are constructed on a standard ½ " per foot slope or to plan specifications.

Cone sections vary form 18" to 32" in height and can be produced with concentric or eccentric openings with either 24" openings or 34 ½" 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 Web: 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**.

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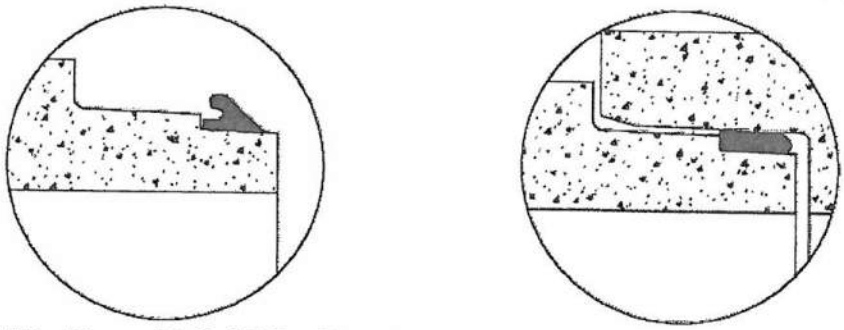
P.O. Box 10482, Fort Wayne, Indiana 46852
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: sales@press-seal.com Web: www.press-seal.com

PROFILE GASKETS SINGLE STEP JOINTS



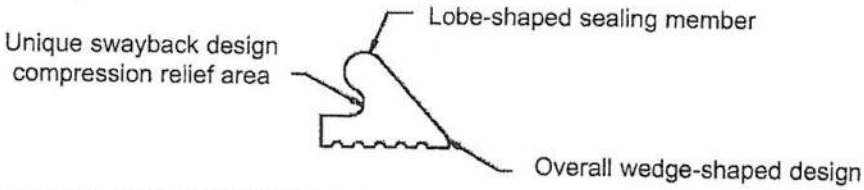
The Type 4G & 4F Profiles Employ Special Cross Section Features For The Single Step Concrete Joint Design.

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

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.

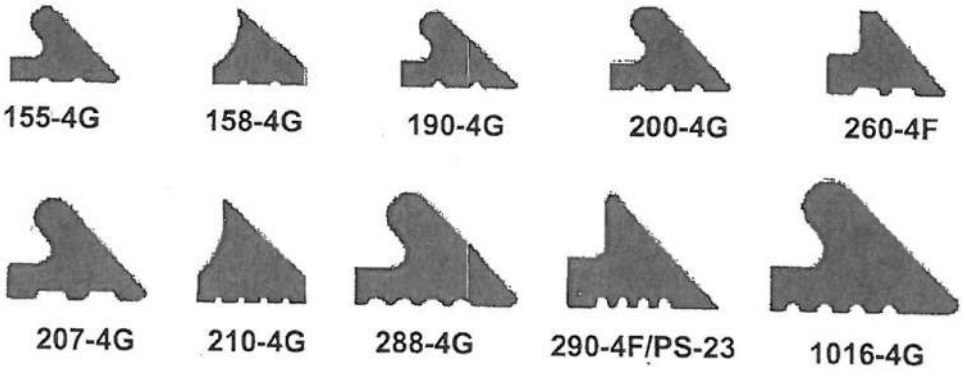
TYPE 4G AND 4F ADVANTAGES

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.



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

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 Web: www.press-seal.com

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.

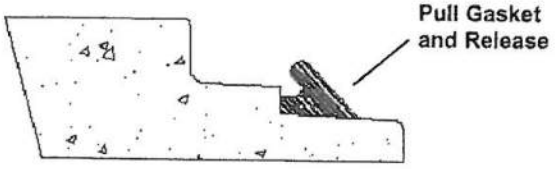
1. The pipe should be handled with extreme caution to avoid chipping of the spigots or bell grooves.

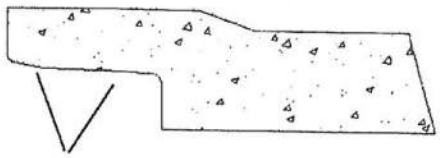
2. Clean spigot-end, including the seat of gasket.

3. Stretch the gasket over the spigot end of the pipe and move it back until it is seated against the step fo 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 circumfernece 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 enterance slop 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.

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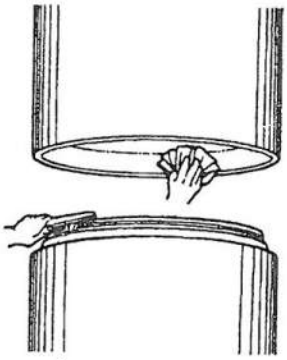
O-RING GASKET INSTALLATION

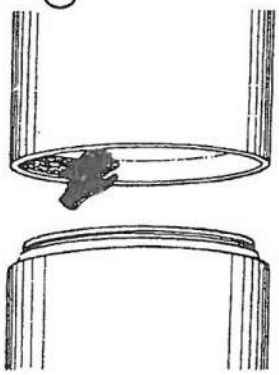
ON MANHOLE RISERS

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 rnay cause the gasket to roll and leak or possibly damage the bell.

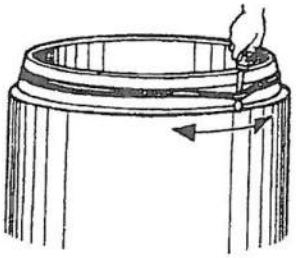
③ 

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.

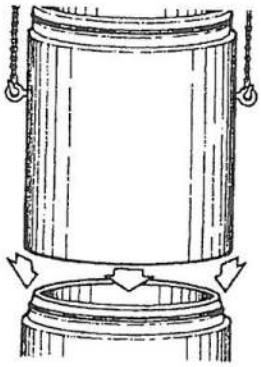


Unequal stretch could cause bunching of the gasket and may cause leaks in the joint or crack the bell.

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.



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) 436-1808

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.

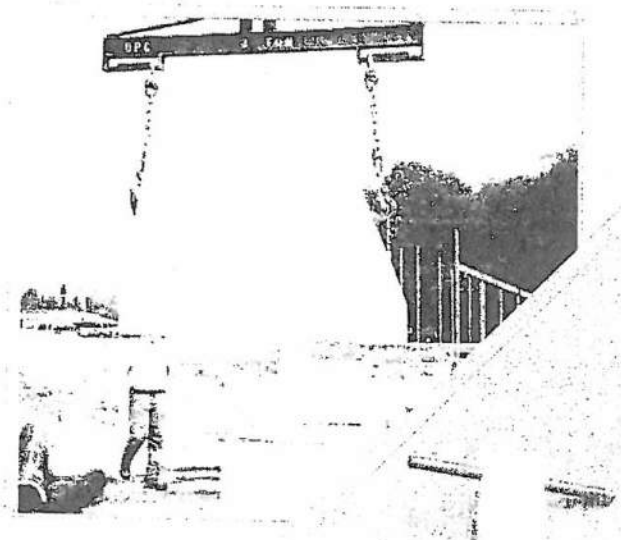
Please contact us if you have any questions or require a visit from a Territory Manager.

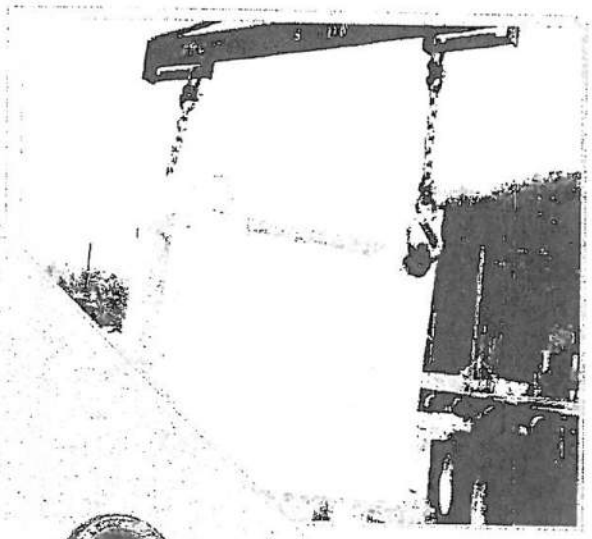
Mail to: P.O. Box 10482
Fort Wayne, IN 46852

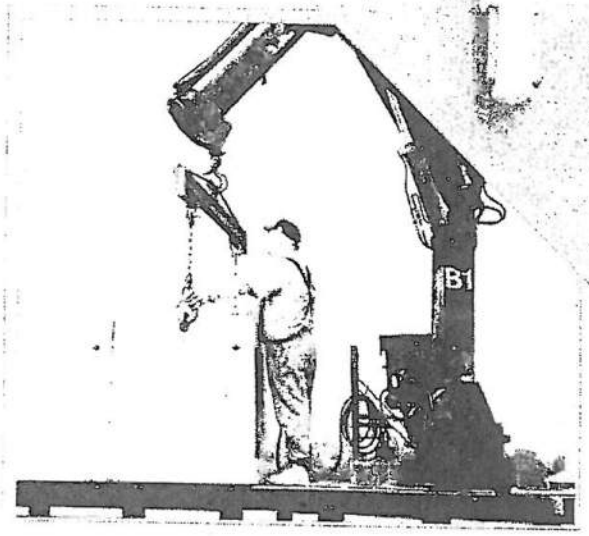
Ship to: 6932 Gettysburg Pike
Fort Wayne, IN 46804

Web Site: www.press-seal.com
E-Mail: sales@press-seal.com

SIMPLE * SAFE * QUICK * INEXPENSIVE







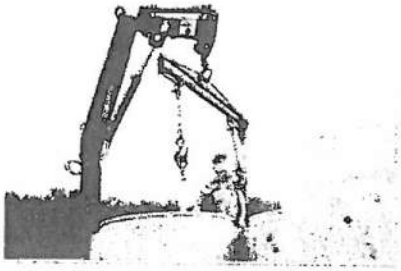
An easy method of placing precast concrete manhole components in the field.

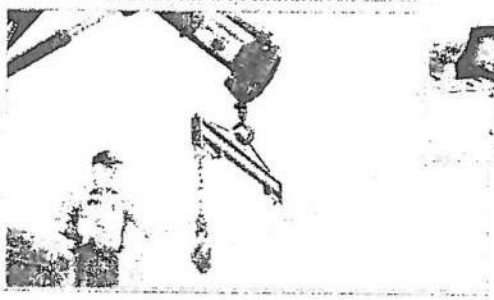
Over 18 years of Proven Performance.

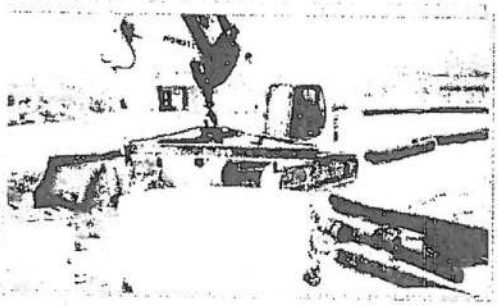
P.O. Box 10482, Fort Wayne, Indiana 46852
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: sales@press-seal.com Web: www.press-seal.com

INSTALLATION

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



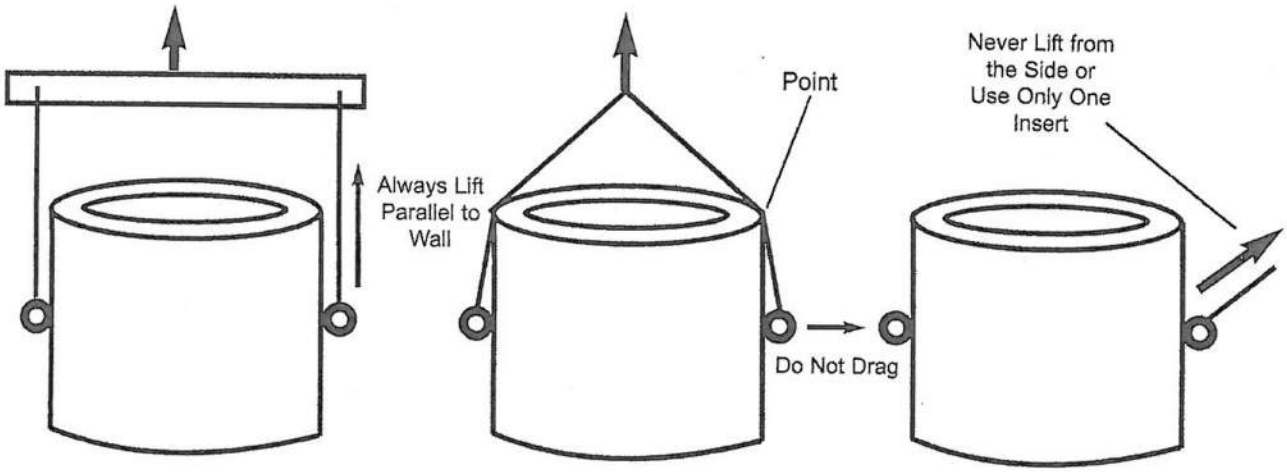




FROM THE TRUCK TO THE DITCH

* 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**

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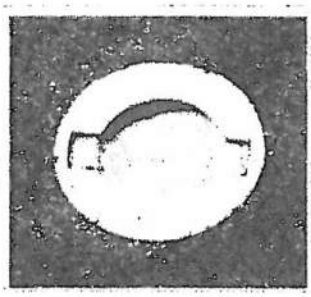
Phone: (260) 436-0521 (800) 348-7325 Fax: (260) 436-1908 E-mail: sales@press-seal.com Web: www.press-seal.com

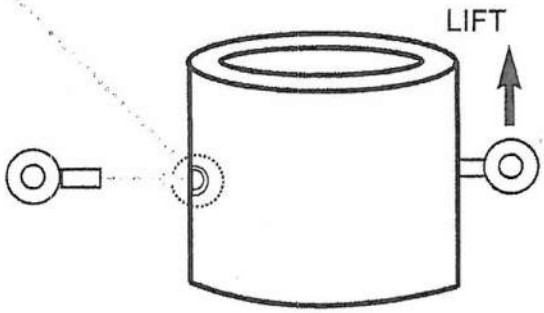
DESIGN CRITERIA

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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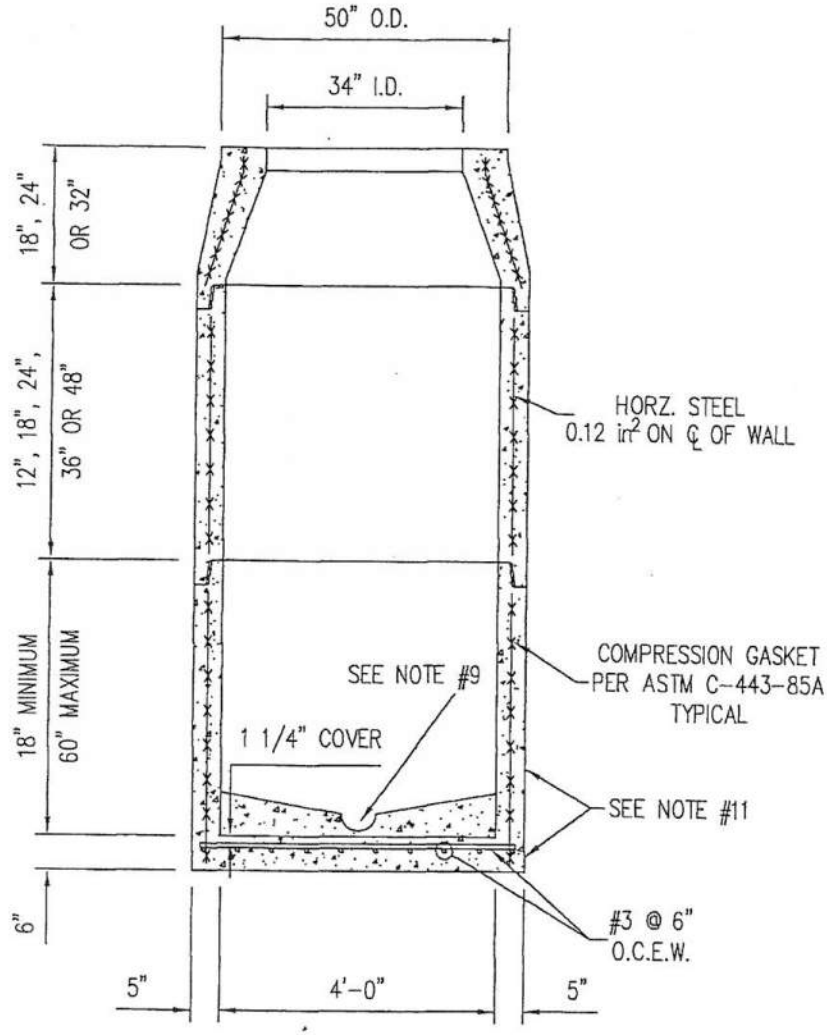
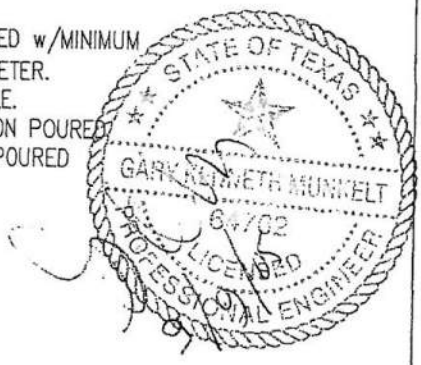


NOTES:

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 fy = 60,000 psi.
5. WELDED WIRE FABRIC STRENGTH fy = 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.



CHARLOTTES CONCRETE INC.

DESIGNER	JHP	MEETS STANDARDS
ENGINEER	GKM	ASTM-C-478
REVISION	·	

48" DIA. MANHOLE VARIABLE STACK

DRAWING #	GKM DWG #
AA	10

ATTACHMENT F DESIGN FLOW & PIPE CAPACITY

Sanitary Sewer
Design Calculations

Project: Lyndon Ranch
Project No:
Date: 05/02/23

NBU Design Standards

Design Flow Calculations

Input Variables			
Service Area	28.129	acre	
Total LUE's Served	151.5	LUE's	303 Units, 1/2 LUE per Unit
Average Dry Flow ($ADF_{1\ LUE}$)	210	gpd per LUE	
Inflow & Infiltration Rate (I&I)	750	gpd per acre	

Population = 454.5 people (assume 3.0 people per LUE)

Average Dry Flow(ADF) = $ADF_{1\ LUE}$ * Total LUE Served

ADF_{DESIGN} = 31,815 gpd

22.1 gpm (1 gpm = 1440 gpd)

Peaking Factor = 4.00 $\frac{18+(0.0206*ADF_{(gpm)})^{0.5}}{4+(0.0206*ADF_{(gpm)})^{0.5}}$

TCEQ requires min of 4 for minor lines

Peak Dry Flow(PDF) = ADF_{DESIGN} * Peak Factor

PDF_{DESIGN} = 127,260 gpd

88.4 gpm

Inflow & Infiltration Rate(I&I) = 750 gpd/ac * Service Area (ac)

$I\&I_{DESIGN}$ = 21,097 gpd

14.7 gpm

Peak Wet Flow (PWF) = PDF_{DESIGN} + $I\&I_{DESIGN}$

PWF_{DESIGN} = 148,357 gpd

103.0 gpm **Design Flow**

Rating Table for 8" Sewer Running Full

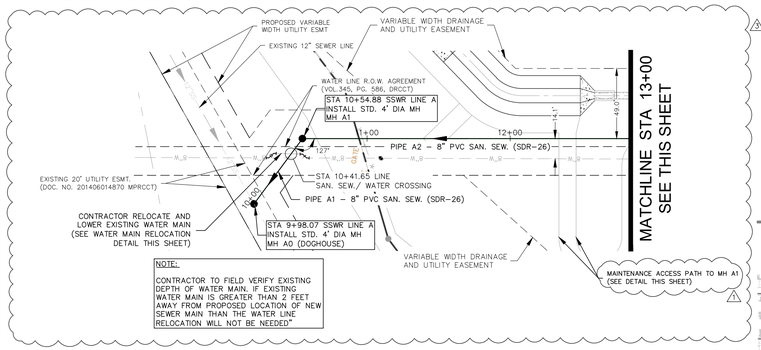
Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	8.000 %
Normal Depth	8.0 in
Diameter	8.0 in
Discharge	2,208,930.92 gal/day

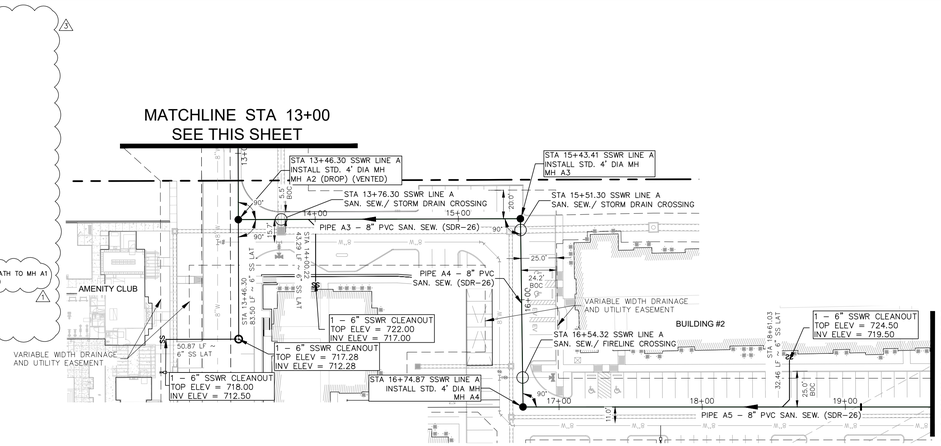
Channel Slope (%)	Normal Depth (in)	Discharge (gal/day)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.400	8.0	493,931.97	2.19	0.3	2.1	0.00
0.500	8.0	552,232.73	2.45	0.3	2.1	0.00
0.600	8.0	604,940.65	2.68	0.3	2.1	0.00
0.700	8.0	653,410.58	2.90	0.3	2.1	0.00
0.800	8.0	698,525.29	3.10	0.3	2.1	0.00
0.900	8.0	740,897.95	3.28	0.3	2.1	0.00
1.000	8.0	780,975.01	3.46	0.3	2.1	0.00
1.100	8.0	819,093.51	3.63	0.3	2.1	0.00
1.200	8.0	855,515.26	3.79	0.3	2.1	0.00
1.300	8.0	890,448.52	3.95	0.3	2.1	0.00
1.400	8.0	924,062.10	4.10	0.3	2.1	0.00
1.500	8.0	956,495.14	4.24	0.3	2.1	0.00
1.600	8.0	987,863.94	4.38	0.3	2.1	0.00
1.700	8.0	1,018,266.84	4.51	0.3	2.1	0.00
1.800	8.0	1,047,787.93	4.64	0.3	2.1	0.00
1.900	8.0	1,076,499.77	4.77	0.3	2.1	0.00
2.000	8.0	1,104,465.46	4.90	0.3	2.1	0.00
2.100	8.0	1,131,740.32	5.02	0.3	2.1	0.00
2.200	8.0	1,158,373.14	5.13	0.3	2.1	0.00
2.300	8.0	1,184,407.25	5.25	0.3	2.1	0.00
2.400	8.0	1,209,881.29	5.36	0.3	2.1	0.00
2.500	8.0	1,234,829.92	5.47	0.3	2.1	0.00
2.600	8.0	1,259,284.37	5.58	0.3	2.1	0.00
2.700	8.0	1,283,272.90	5.69	0.3	2.1	0.00
2.800	8.0	1,306,821.15	5.79	0.3	2.1	0.00
2.900	8.0	1,329,952.53	5.89	0.3	2.1	0.00
3.000	8.0	1,352,688.41	6.00	0.3	2.1	0.00
3.100	8.0	1,375,048.41	6.09	0.3	2.1	0.00
3.200	8.0	1,397,050.58	6.19	0.3	2.1	0.00
3.300	8.0	1,418,711.57	6.29	0.3	2.1	0.00
3.400	8.0	1,440,046.77	6.38	0.3	2.1	0.00
3.500	8.0	1,461,070.47	6.48	0.3	2.1	0.00
3.600	8.0	1,481,795.91	6.57	0.3	2.1	0.00
3.700	8.0	1,502,235.44	6.66	0.3	2.1	0.00
3.800	8.0	1,522,400.57	6.75	0.3	2.1	0.00

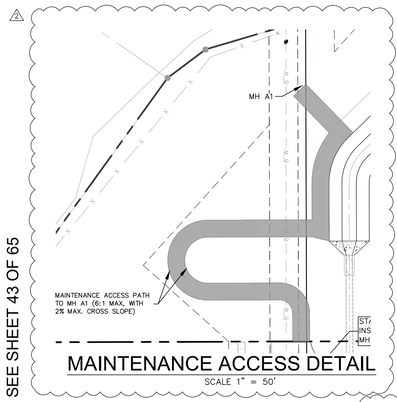
Rating Table for 8" Sewer Running Full

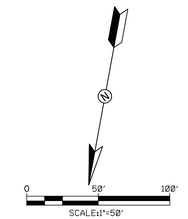
Channel Slope (%)	Normal Depth (in)	Discharge (gal/day)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
3.900	8.0	1,542,302.08	6.84	0.3	2.1	0.00
4.000	8.0	1,561,950.03	6.92	0.3	2.1	0.00
4.100	8.0	1,581,353.88	7.01	0.3	2.1	0.00
4.200	8.0	1,600,522.51	7.09	0.3	2.1	0.00
4.300	8.0	1,619,464.26	7.18	0.3	2.1	0.00
4.400	8.0	1,638,187.01	7.26	0.3	2.1	0.00
4.500	8.0	1,656,698.19	7.34	0.3	2.1	0.00
4.600	8.0	1,675,004.80	7.42	0.3	2.1	0.00
4.700	8.0	1,693,113.49	7.50	0.3	2.1	0.00
4.800	8.0	1,711,030.53	7.58	0.3	2.1	0.00
4.900	8.0	1,728,761.89	7.66	0.3	2.1	0.00
5.000	8.0	1,746,313.22	7.74	0.3	2.1	0.00
5.100	8.0	1,763,689.90	7.82	0.3	2.1	0.00
5.200	8.0	1,780,897.04	7.89	0.3	2.1	0.00
5.300	8.0	1,797,939.50	7.97	0.3	2.1	0.00
5.400	8.0	1,814,821.94	8.04	0.3	2.1	0.00
5.500	8.0	1,831,548.76	8.12	0.3	2.1	0.00
5.600	8.0	1,848,124.20	8.19	0.3	2.1	0.00
5.700	8.0	1,864,552.29	8.26	0.3	2.1	0.00
5.800	8.0	1,880,836.90	8.34	0.3	2.1	0.00
5.900	8.0	1,896,981.72	8.41	0.3	2.1	0.00
6.000	8.0	1,912,990.29	8.48	0.3	2.1	0.00
6.100	8.0	1,928,866.00	8.55	0.3	2.1	0.00
6.200	8.0	1,944,612.10	8.62	0.3	2.1	0.00
6.300	8.0	1,960,231.73	8.69	0.3	2.1	0.00
6.400	8.0	1,975,727.87	8.76	0.3	2.1	0.00
6.500	8.0	1,991,103.42	8.83	0.3	2.1	0.00
6.600	8.0	2,006,361.14	8.89	0.3	2.1	0.00
6.700	8.0	2,021,503.70	8.96	0.3	2.1	0.00
6.800	8.0	2,036,533.68	9.03	0.3	2.1	0.00
6.900	8.0	2,051,453.54	9.09	0.3	2.1	0.00
7.000	8.0	2,066,265.67	9.16	0.3	2.1	0.00
7.100	8.0	2,080,972.37	9.22	0.3	2.1	0.00
7.200	8.0	2,095,575.87	9.29	0.3	2.1	0.00
7.300	8.0	2,110,078.29	9.35	0.3	2.1	0.00
7.400	8.0	2,124,481.73	9.42	0.3	2.1	0.00
7.500	8.0	2,138,788.16	9.48	0.3	2.1	0.00
7.600	8.0	2,152,999.54	9.54	0.3	2.1	0.00
7.700	8.0	2,167,117.72	9.61	0.3	2.1	0.00
7.800	8.0	2,181,144.52	9.67	0.3	2.1	0.00
7.900	8.0	2,195,081.68	9.73	0.3	2.1	0.00
8.000	8.0	2,208,930.92	9.79	0.3	2.1	0.00



Lyndon Ranch Unit 1 - Sewer Line A Summary								
Sanitary Sewer Line	Diameter (in)	$Slope_{min}$ (%)	Peak Dry Weather Flow (gpd)	% Capacity	PDW Velocity (ft/s)	Peak Wet Weather Flow (gpd)	% Capacity	PWW Velocity (ft/s)
SSL A1	8	0.40	127,260	27.5%	1.83	136,693	29.6%	1.87
SSL A2	8	8.00	127,260	27.5%	5.32	136,693	29.6%	5.44
SSL A3	8	3.00	127,260	27.5%	3.77	136,693	29.6%	3.85
SSL A4	8	2.50	127,260	27.5%	3.53	136,693	29.6%	3.61
SSL A5	8	0.70	127,260	27.5%	2.24	136,693	29.6%	2.29

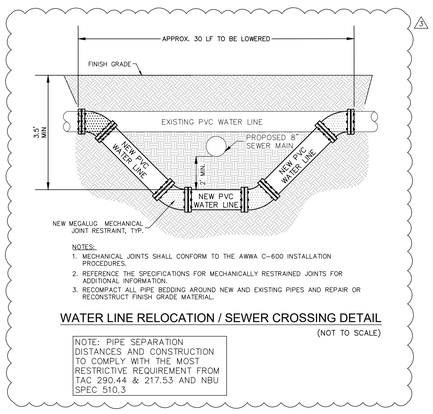






LEGEND

- NEW SANITARY SEWER
- NEW MANHOLE
- NEW SEWER LATERAL
- NEW WATER MAIN
- NEW DOUBLE METERED DUAL WATER SERVICE
- NEW FIRE HYDRANT
- EXISTING 12" SEWER
- EXISTING 8" WATER

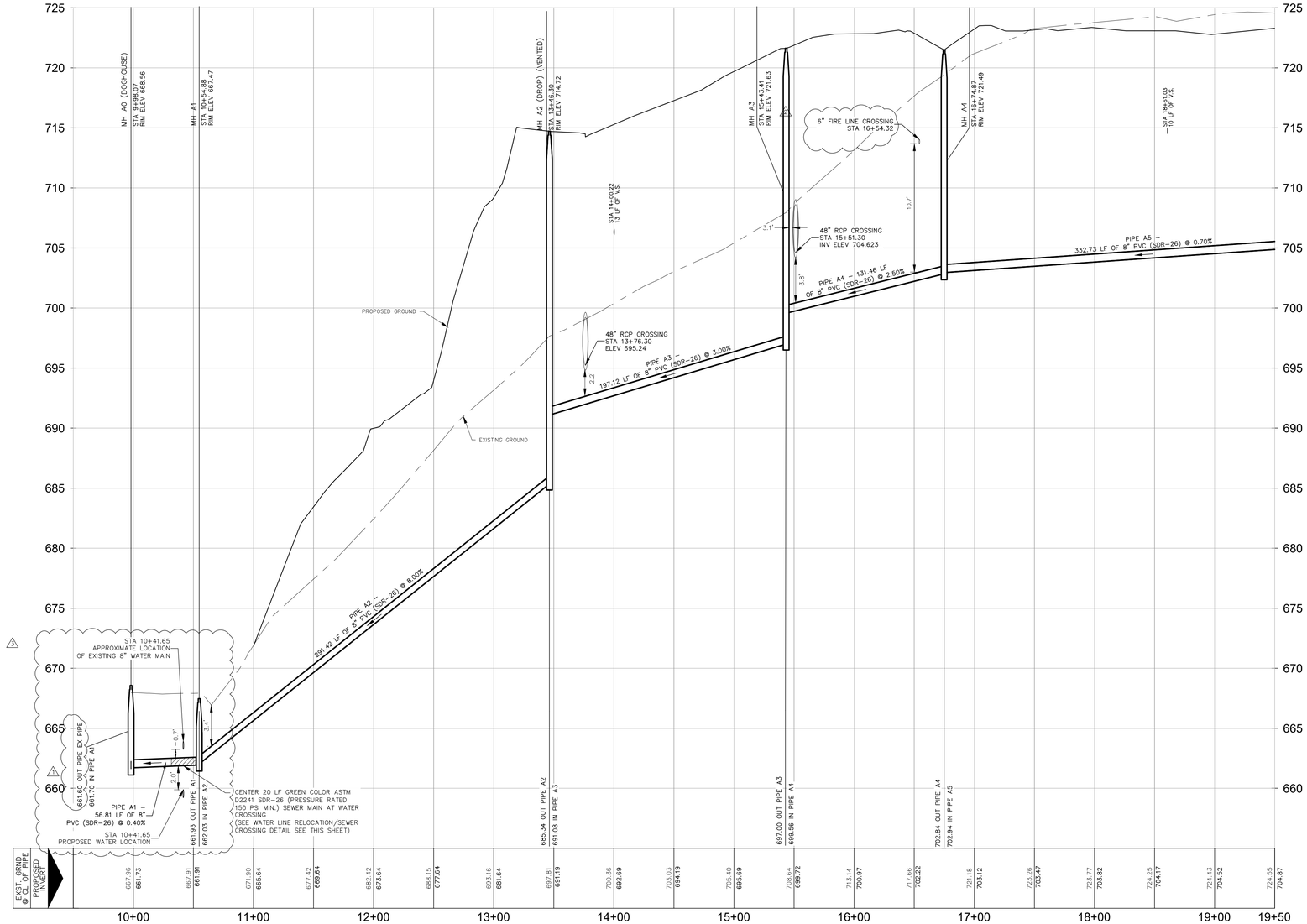


WATER LINE RELOCATION / SEWER CROSSING DETAIL

(NOT TO SCALE)

NOTE: PIPE SEPARATION DISTANCES AND CONSTRUCTION TO COMPLY WITH THE MOST RESTRICTIVE REQUIREMENT FROM TAC 290.44 & 217.53 AND NBU SPEC 510.3

SANITARY SEWER LINE A STA 10+00 TO STA 19+50



NOTES:

1. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS TWO INCHES (2") ABOVE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREA. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.
2. SERVICES SHALL HAVE A MINIMUM OF THIRTY-SIX (36) INCHES OF COVER.
3. SERVICES SHALL HAVE A MINIMUM SLOPE OF 2% AND A MAXIMUM SLOPE OF 12.35%.
4. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO STREETS.
5. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND CITY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO CITY PRIOR TO UTILITY INSTALLATIONS.

CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES 48 HOURS PRIOR TO EXCAVATION:

New Braunfels Utilities	830-629-8400
Spectrum Cable	830-625-3408
Centerpoint Gas	830-643-6434
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

C.P.E. LOCATOR

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.

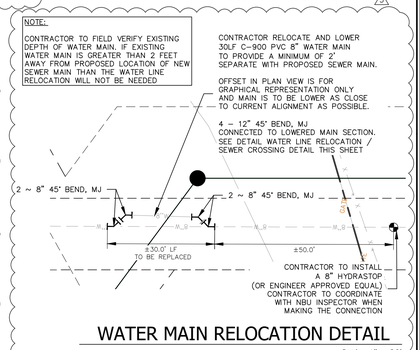
TELEPHONE LOCATOR

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.

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.



WATER MAIN RELOCATION DETAIL

Scale: 1" = 20'

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

SANITARY SEWER LINE A
STA 10+00 TO STA 19+50

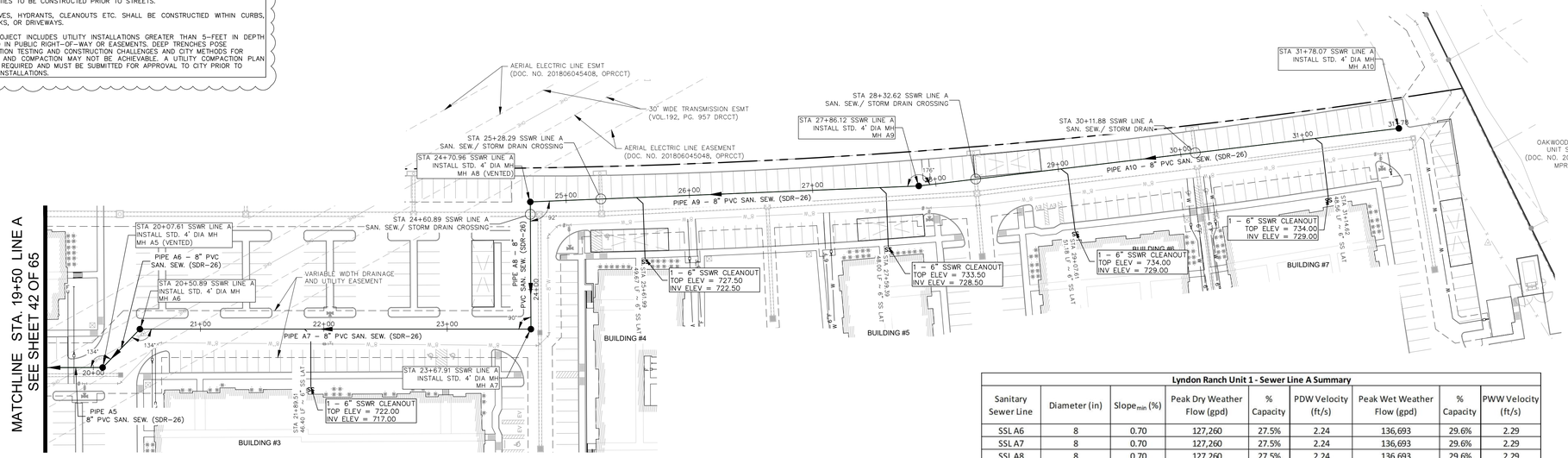
SHEET 42 OF 65

NO	DATE	ISSUES AND REVISIONS
1	7/14/23	UPDATED PER NBU COMMENTS
2	8-11-2023	UPDATED PER CONB COMMENTS
3	9-26-2023	UPDATED PER NBU COMMENTS

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

NOTES:

1. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS TWO INCHES (2") ABOVE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAVED AREA. IN PAVED AREAS, THE MANHOLE RING SHALL BE FLUSH WITH PAVEMENT.
2. SERVICES SHALL HAVE A MINIMUM OF THIRTY-SIX (36) INCHES OF COVER.
3. SERVICES SHALL HAVE A MINIMUM SLOPE OF 2%, AND A MAXIMUM SLOPE OF 12.35%.
4. ALL UTILITIES TO BE CONSTRUCTED PRIOR TO STREETS.
5. NO VALVES, HYDRANTS, CLEANOUTS ETC. SHALL BE CONSTRUCTIED WITHIN CURBS, SIDEWALKS, OR DRIVEWAYS.
6. THIS PROJECT INCLUDES UTILITY INSTALLATIONS GREATER THAN 5-FEET IN DEPTH LOCATED IN PUBLIC RIGHT-OF-WAY OR EASEMENTS. DEEP TRENCHES POSE COMPACTION TESTING AND CONSTRUCTION CHALLENGES AND CITY METHODS FOR TESTING AND COMPACTION MAY NOT BE ACHIEVABLE. A UTILITY COMPACTION PLAN WILL BE REQUIRED AND MUST BE SUBMITTED FOR APPROVAL TO CITY PRIOR TO UTILITY INSTALLATIONS.

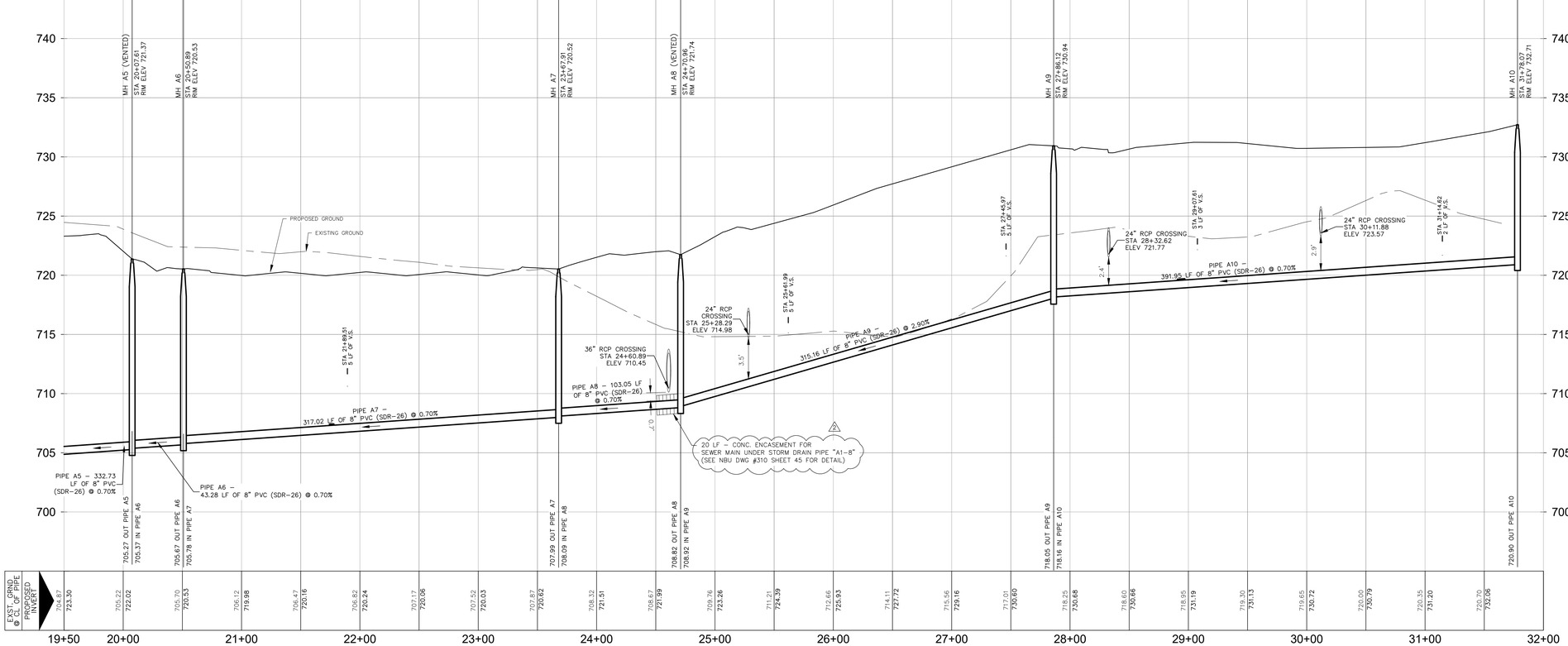


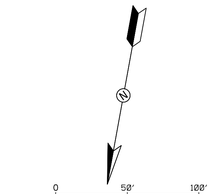
Lyndon Ranch Unit 1 - Sewer Line A Summary

Sanitary Sewer Line	Diameter (in)	$Slope_{min}$ (%)	Peak Dry Weather Flow (gpd)	% Capacity	PDW Velocity (ft/s)	Peak Wet Weather Flow (gpd)	% Capacity	PWW Velocity (ft/s)
SSL A6	8	0.70	127,260	27.5%	2.24	136,693	29.6%	2.29
SSL A7	8	0.70	127,260	27.5%	2.24	136,693	29.6%	2.29
SSL A8	8	0.70	127,260	27.5%	2.24	136,693	29.6%	2.29
SSL A9	8	2.90	127,260	27.5%	3.72	136,693	29.6%	3.80
SSL A10	8	0.70	127,260	27.5%	2.24	136,693	29.6%	2.29

SANITARY SEWER LINE A STA 19+50 TO END

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





LEGEND

- NEW SANITARY SEWER
- NEW MANHOLE
- NEW SEWER LATERAL
- NEW WATER MAIN
- NEW DOUBLE METERED DUAL WATER SERVICE
- NEW FIRE HYDRANT
- EXISTING 12" SEWER
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STATE OF TEXAS
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10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
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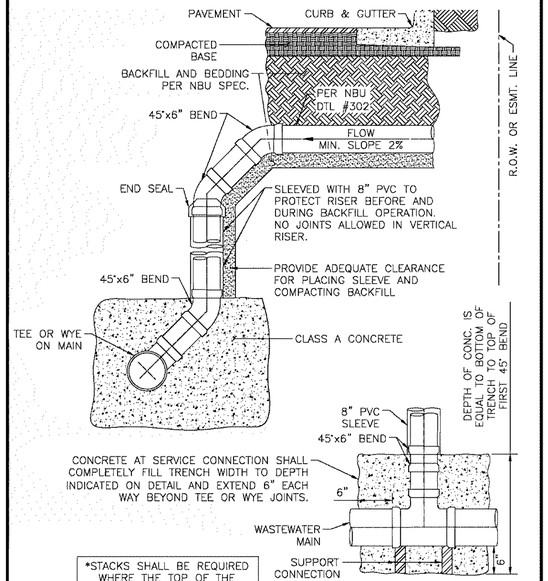
LYNDON RANCH

SANITARY SEWER LINE A STA 19+50 TO END

SHEET 43 OF 65

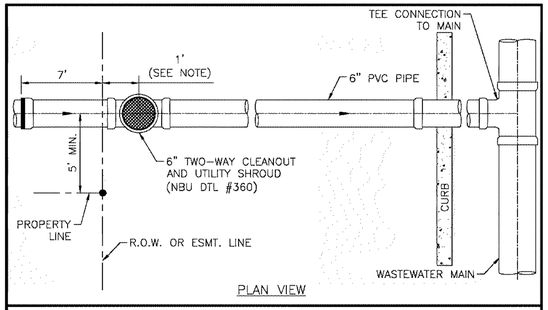
NO	DATE	ISSUES AND REVISIONS
1	7/14/23	UPDATED PER NBU COMMENTS
2	8-11-2023	UPDATED PER CONB COMMENTS

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

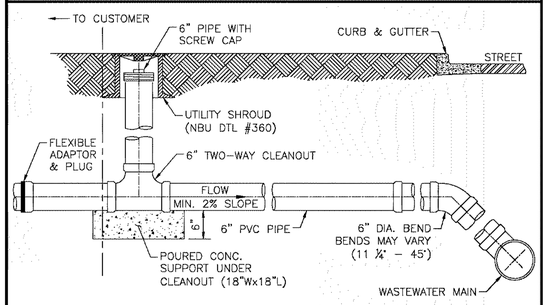


CONCRETE ENCASEMENT FOR SERVICE CONNECTION

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWINGS: WASTEWATER DEEP SERVICE CONNECTION DETAIL	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 301



PLAN VIEW



PROFILE VIEW

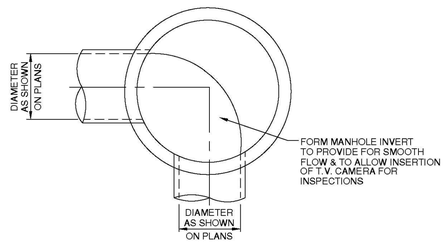
*CLEANOUT SHALL NOT BE PLACED WITHIN SIDEWALK OR DRIVEWAY. IF SIDEWALK EXISTS AT EDGE OF PROPERTY LINE, CLEANOUT CAN BE LOCATED UP TO 1' WITHIN PROPERTY. CONSISTENT PLACEMENT IS REQUIRED.

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWINGS: SINGLE WASTEWATER SERVICE CONNECTION DETAIL	SCALE: N.T.S.	SHEET: 1 OF 2	DRAWING NO.: 302

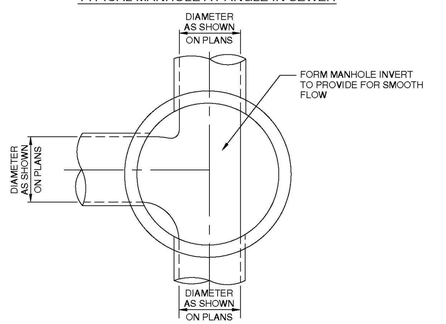
NOTES:

1. UTILITY CONTRACTOR, DURING SUBDIVISION CONSTRUCTION, SHALL INSTALL WASTEWATER CONNECTION TO MAIN, 6" STUB WITH 6" SERVICE BRANCH WITH 2-WAY CLEANOUT, CONCRETE SUPPORT (MIN. 18"Wx18"Lx6"H), RISER FOR CLEAN OUT (CAPPED), UTILITY SHROUD, 7' EXTENSION, AND PLUG. ALL WASTEWATER PIPING SHALL HAVE ELASTOMERIC GASKET TYPE JOINTS AND SHALL SLOPE DOWNWARD TO MAIN 2%, 1/4" PER FOOT, MINIMUM TO 45° MAXIMUM. DEPTH OF SERVICE STUB AT PROPERTY LINE WILL BE SHOWN ON PLANS BY ENGINEER OR DESIGNATED REPRESENTATIVE IF GREATER THAN 4', OTHERWISE, THE INSTALLED DEPTH WILL TYPICALLY BE 4' TO 6'. IF WASTEWATER SERVICE LINE TO MAIN REQUIRES DEFLECTION EXCEEDING 45°, REFER TO DETAIL DRAWING 301. ALL INSTALLATIONS SHALL BE MADE IN ACCORDANCE WITH INFORMATION SHOWN ON APPLICABLE STANDARD DRAWINGS AND WILL BE INSPECTED BY NBU CONSTRUCTION INSPECTION PERSONNEL.
2. CUSTOMER SHALL REMOVE PLUG, INSTALL 4" WASTEWATER LINE [EXTEND 4" PIPE 6" MINIMUM INTO 6" PIPE AND JOINT WITH FLEXIBLE ADAPTOR]. IF WASTEWATER WILL NOT SATISFACTORILY FLOW BY GRAVITY TO SEWER MAIN ADJACENT TO PROPERTY, PUMP EQUIPMENT MUST BE PROVIDED BY THE CUSTOMER AS PART OF CUSTOMER'S WASTEWATER SYSTEM.
3. CUSTOMER IS RESPONSIBLE FOR PIPING SYSTEM UNTIL WASTEWATER IS CONNECTED. ANY MISSING OR DAMAGED PARTS SHALL BE REINSTALLED BY CUSTOMER WHO SHALL GUARANTEE, FOR A PERIOD OF TWO (2) YEARS FROM DATE OF FINAL ACCEPTANCE, THAT CONNECTIONS TO NBU SYSTEMS ARE FREE FROM DEFECTS IN WORKMANSHIP OR MATERIALS. CUSTOMER ALSO HAS THE RESPONSIBILITY TO ASSURE THAT 2-WAY CLEANOUTS REMAIN CLEAR OF SIDEWALKS AND OTHER OBSTRUCTIONS.
4. NBU ACTIVITY IS LIMITED TO INSPECTION OF CONNECTIONS TO NBU'S WASTEWATER SYSTEM. FOR MAINTENANCE PURPOSES, NBU'S RESPONSIBILITY ENDS AT THE CUSTOMER'S WASTEWATER CONNECTION TO THE 2-WAY CLEANOUT OR THE PROPERTY LINE, WHICHEVER IS CLOSER TO WASTEWATER MAIN.
5. PIPING IN STREET RIGHT-OF-WAY AND IN EASEMENT AREA SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY NBU STANDARD SPECIFICATION; MATERIALS SHALL BE AS SPECIFIED; BACKFILL ABOVE THE GRANULAR BEDDING. SERVICE LINES IN THESE AREAS SHALL HAVE A MINIMUM COVER BELOW FINAL STREET GRADE OF 42"; ANY EXCEPTION MUST BE SPECIFICALLY APPROVED BY THE ENGINEER.

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWINGS: SINGLE WASTEWATER SERVICE CONNECTION DETAIL	SCALE: N.T.S.	SHEET: 2 OF 2	DRAWING NO.: 302



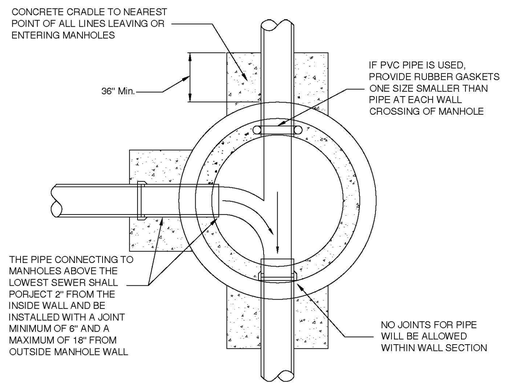
TYPICAL MANHOLE AT ANGLE IN SEWER



TYPICAL JUNCTION MANHOLE

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: JD Amaro	APPROVED BY:	STANDARD DRAWING: MANHOLE INVERT PLAN	UPDATED: 4-16-03	SCALE: N.T.S.	SHEET: 1 OF 2	DRAWING NO.: 320

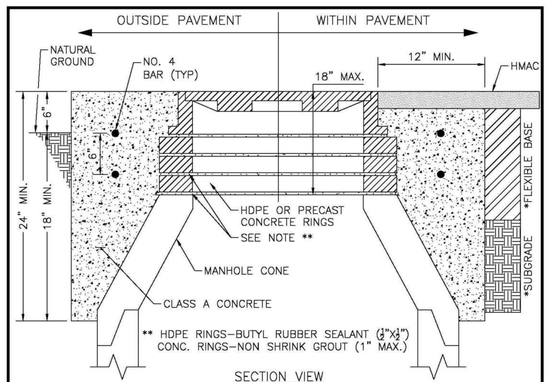
STANDARD MANHOLE



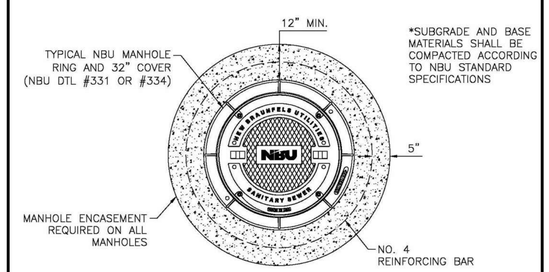
MANHOLE FLOOR PLAN

AUGUST 1998

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: H.Shadrock	APPROVED BY:	STANDARD DRAWING: STANDARD MANHOLE MANHOLE FLOOR PLAN	UPDATED: 5-5-03	SCALE: N.T.S.	SHEET: 2 OF 2	DRAWING NO. 320



SECTION VIEW



TOP VIEW

NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING: NEW MANHOLE CONSTRUCTION AND MINOR MANHOLE ADJUSTMENT	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 322

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

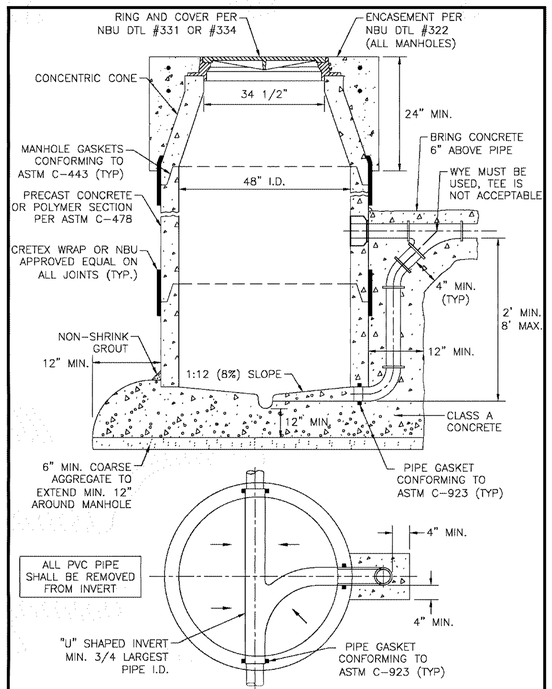
LYNDON RANCH

SANITARY SEWER DETAILS I

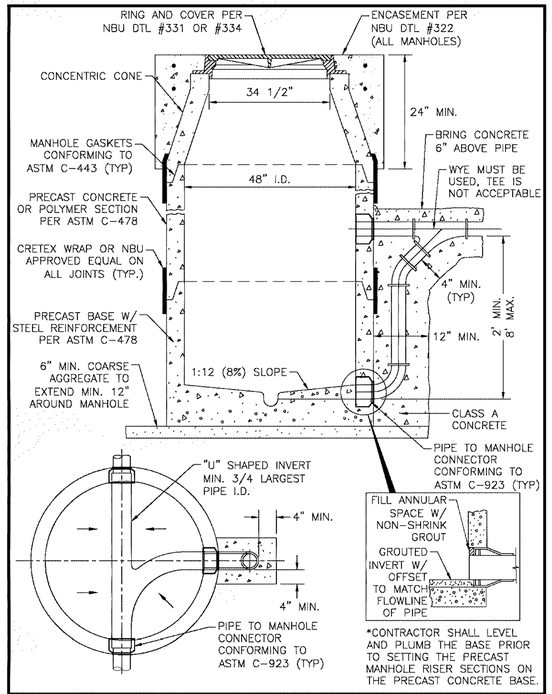
SHEET 44 OF 65

NO	DATE	ISSUES AND REVISIONS
1		

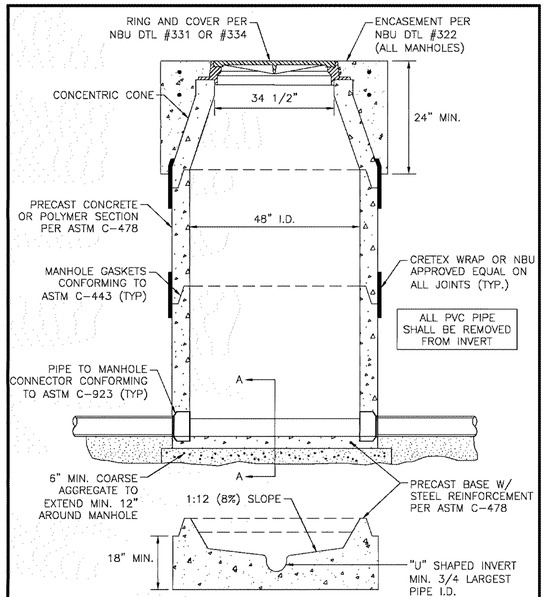
INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351



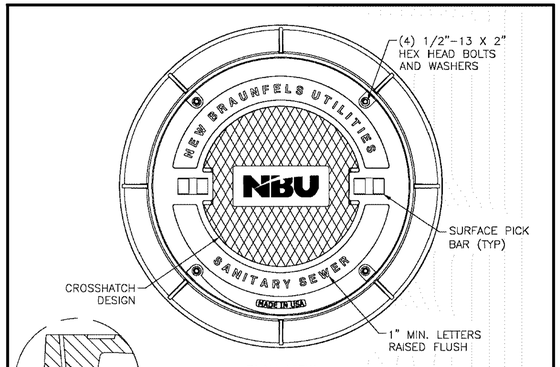
NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING	WASTEWATER MANHOLE W/ DROP INLET ON CAST IN PLACE BASE	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 324



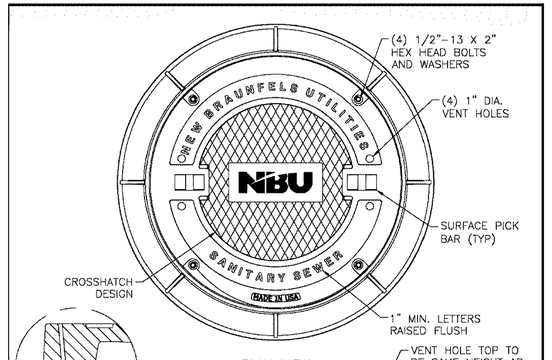
NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING	WASTEWATER MANHOLE W/ DROP INLET ON PRECAST BASE	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 325



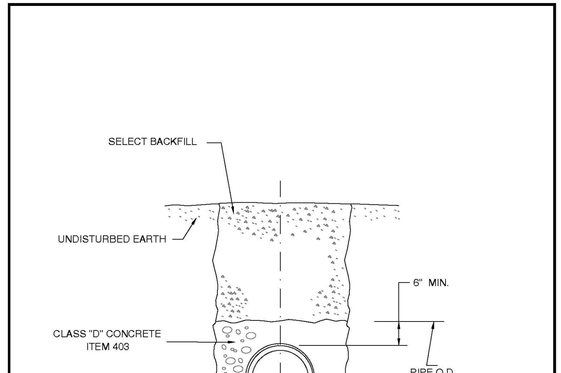
NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING	WASTEWATER MANHOLE ON PRECAST BASE	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 328



NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING	SANITARY SEWER MANHOLE COVER	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 331



NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: A. Willard	APPROVED BY: A. Willard	DRAWING DATE: 8/17/21	STANDARD DRAWING	VENTED SANITARY SEWER MANHOLE COVER	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 334



NBU NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING	DRAWN BY: JD Amaro	APPROVED BY:	STANDARD DRAWING	CONCRETE ENCASEMENT	UPDATED: 4-16-03	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO. 310

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

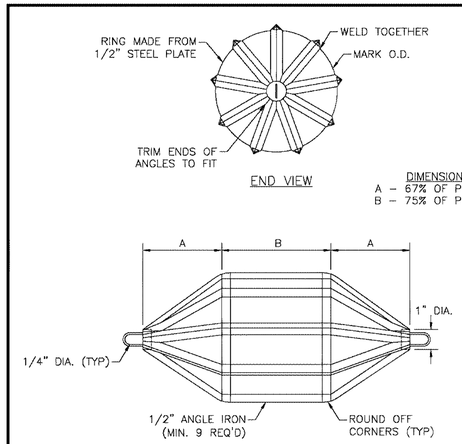
LYNDON RANCH

SANITARY SEWER DETAILS II

SHEET 45 OF 65

NO	DATE	ISSUES AND REVISIONS
1	8-11-2023	UPDATED PER CONB COMMENTS

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351



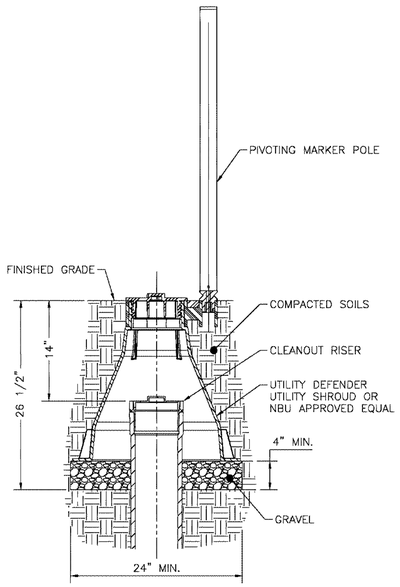
MANDREL REQUIREMENTS:

1. O.D. NOT LESS THAN 95% OF THE I.D. OF THE PIPE, AS SPECIFIED BY THE ASTM, AWWA, UNI-BELL OR ANSI.
2. ABLE TO WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
3. ODD NUMBER OF RUNNERS OR LEGS.

*THIS INFORMATION IS PROVIDED AS A REFERENCE. ALL DEFLECTION TESTING SHALL BE DONE IN ACCORDANCE WITH TCEQ CHAPTER 217.

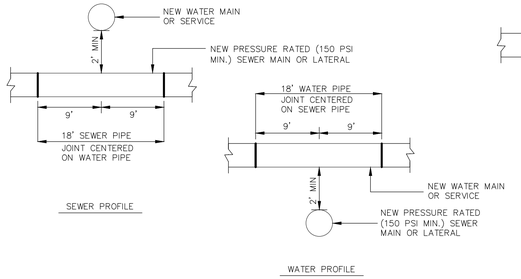
NBU — NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING

DRAWN BY: A. Willard	STANDARD DRAWING:	GO, NO GO DEFLECTION TESTING MANDREL	
APPROVED BY: A. Willard			
DRAWING DATE: 8/17/21	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 350



NBU — NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING

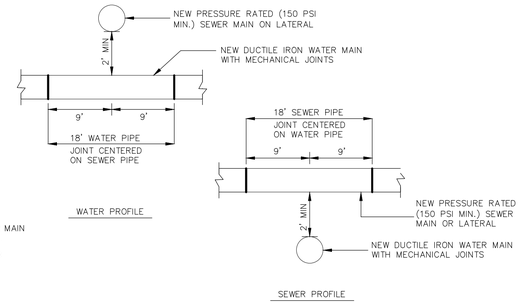
DRAWN BY: A. Willard	STANDARD DRAWING:	UTILITY SHROUD FOR SEWER CLEANOUT ASSEMBLY	
APPROVED BY: A. Willard			
DRAWING DATE: 8/17/21	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 360



NEW WATER OVER NEW SEWER CROSSING DETAIL

Scale: NTS

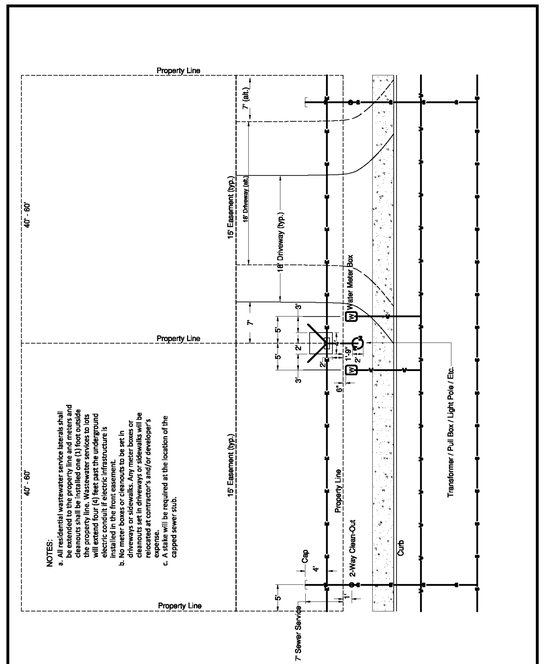
NOTE: PIPE SEPARATION DISTANCES AND CONSTRUCTION TO COMPLY WITH THE MOST RESTRICTIVE REQUIREMENT FROM TAC 290.44 & 217.53 AND NBU SPEC 510.3



NEW SEWER OVER NEW WATER CROSSING DETAIL

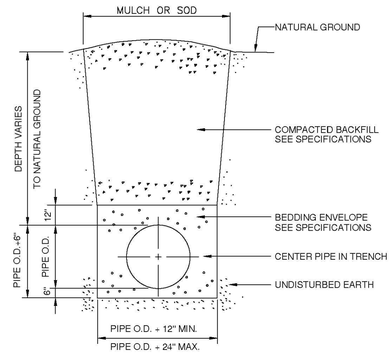
Scale: NTS

NOTE: PIPE SEPARATION DISTANCES AND CONSTRUCTION TO COMPLY WITH THE MOST RESTRICTIVE REQUIREMENT FROM TAC 290.44 & 217.53 AND NBU SPEC 510.3



NBU — NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING

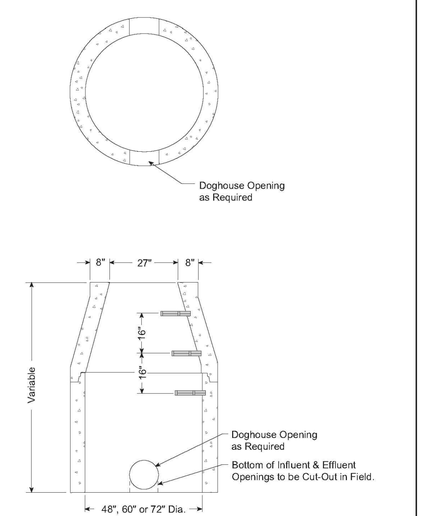
DRAWN BY: D. A.	STANDARD DRAWING:	NARROW LOT WATER & SEWER SERVICE ALIGNMENT SCENARIO	
APPROVED BY: N. P.			
DATED: 12/20/18	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 410



NBU — NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING

DRAWN BY: H Shadrock	STANDARD DRAWING:	TYPICAL TRENCH WITH UNFINISHED SURFACE	
APPROVED BY:			
UPDATED: 4-30-03	SCALE: N.T.S.	SHEET: 1 OF 1	DRAWING NO.: 422

Precast Sanitary or Storm Structures



Note:

- Pipe size will determine manhole diameter.
- 60" and 72" diameter manholes will require a flat top with a transition to 48" diameter.
- All doghouse manholes will be cast without a bottom.

-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	STATE	SECTION/PAGE	DATE	
Doghouse Manhole Detail	AL	7.15	07-15-07	Hanson

STATE OF TEXAS — JAMES INGALLS — 107416 — LICENSED PROFESSIONAL ENGINEER — 10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

SANITARY SEWER DETAILS III

SHEET 46 OF 65

NO	DATE	ISSUES AND REVISIONS
1	9-26-2023	UPDATED PER NBU COMMENTS

INK CIVIL
2021 W SH46, STE 105
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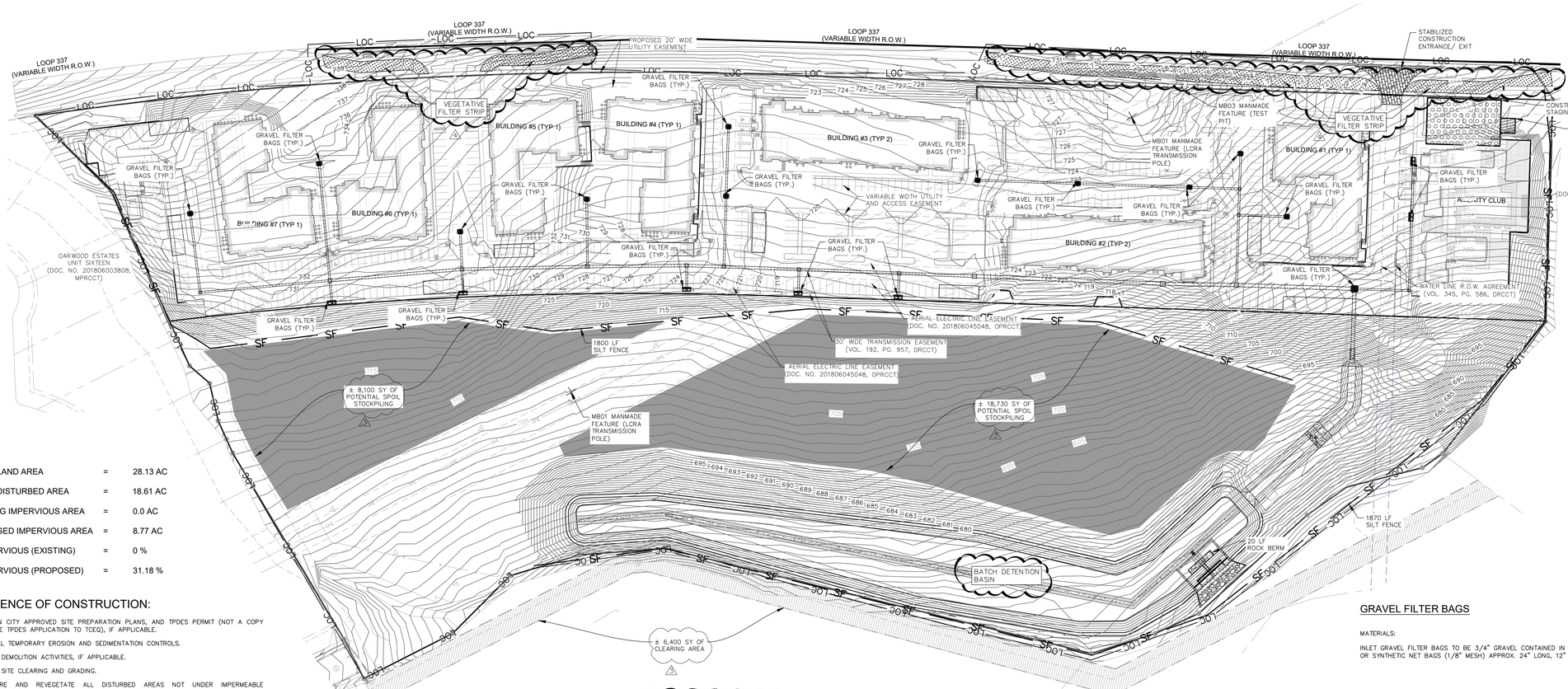


TOTAL LAND AREA	=	28.13 AC
TOTAL DISTURBED AREA	=	18.61 AC
EXISTING IMPERVIOUS AREA	=	0.0 AC
PROPOSED IMPERVIOUS AREA	=	8.77 AC
% IMPERVIOUS (EXISTING)	=	0 %
% IMPERVIOUS (PROPOSED)	=	31.18 %

SEQUENCE OF CONSTRUCTION:

1. OBTAIN CITY APPROVED SITE PREPARATION PLANS, AND TPDES PERMIT (NOT A COPY OF THE TPDES APPLICATION TO TCEQ), IF APPLICABLE.
2. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS.
3. BEGIN DEMOLITION ACTIVITIES, IF APPLICABLE.
4. BEGIN SITE CLEARING AND GRADING.
5. RESTORE AND REVEGETATE ALL DISTURBED AREAS NOT UNDER IMPERMEABLE IMPROVEMENTS.
6. COMPLETE ANY REMAINING "PUNCH LIST" ITEMS.
7. CONTRACTOR SHALL REMOVE TEMPORARY EROSION CONTROLS AFTER PERMANENT STABILIZATION IS AT LEAST 70% EVENLY ESTABLISHED. RYE IS NOT ACCEPTED. THE SITE WILL BE PERMANENTLY STABILIZED WHEN ALL IMPROVEMENTS ARE CONSTRUCTED PER THE DESIGN PLANS WHICH INCLUDES PAVEMENT, BUILDING, AND OTHER LANDSCAPE IMPROVEMENTS PER LANDSCAPE PLANS. ALL PERVIOUS SURFACES TO BE SOD OR OTHER PERVIOUS IMPROVEMENTS PER LANDSCAPE PLAN.

SOIL STABILIZATION NOTE

PER TPDES REQUIREMENTS, DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITIES HAVE CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITY RESUMES WITHIN 21 DAYS. SEEDING DOES NOT CONSTITUTE AS STABILIZATION.

SUBSTANTIAL GRADING IS PROPOSED WITH THIS UNIT. PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC. 13.2(N), STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE TIME.

CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES 48 HOURS PRIOR TO EXCAVATION:

New Braunfels Utilities	830-629-8400
Spectrum Cable	830-625-3408
Centerpoint Gas	830-643-6434
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

C.P.E. LOCATOR

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.

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.

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.

VEGETATIVE FILTER STRIP MAINTENACE:

(1) PEST MANAGEMENT: AN INTEGRATED PEST MANAGEMENT (IPM) PLAN SHOULD BE DEVELOPED FOR VEGETATED AREAS. THIS PLAN SHOULD SPECIFY HOW PROBLEM INSECTS AND WEEDS WILL BE CONTROLLED WITH MINIMAL TO NO USE OF INSECTICIDES AND HERBICIDES.

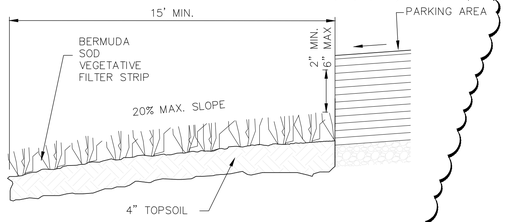
(2) SEASONAL MOWING AND LAWN CARE: IF THE FILTER STRIP IS MADE UP OF TURF GRASS, IT SHOULD BE MOWED AS NEEDED TO LIMIT VEGETATION HEIGHT TO 18 INCHES, USING A MULCHING MOWER (OR REMOVAL OF CLIPPINGS). IF NATIVE GRASSES ARE USED, THE FILTER MAY REQUIRE LESS FREQUENT MOWING, BUT A MINIMUM OF TWICE ANNUALLY. GRASS CLIPPINGS AND BRUSH DEBRIS SHOULD NOT BE DEPOSITED ON VEGETATED FILTER STRIP AREAS. REGULAR MOWING SHOULD ALSO INCLUDE WEED CONTROL PRACTICES, HOWEVER HERBICIDE USE SHOULD BE KEPT TO A MINIMUM (URBONAS ET AL, 1992). HEALTHY GRASS CAN BE MAINTAINED WITHOUT USING FERTILIZERS BECAUSE RUNOFF USUALLY CONTAINS SUFFICIENT NUTRIENTS. IRRIGATION OF THE SITE CAN HELP ASSURE A DENSE AND HEALTHY VEGETATIVE COVER.

(3) INSPECTION: INSPECT FILTER STRIPS AT LEAST TWICE ANNUALLY FOR EROSION OR DAMAGE TO VEGETATION; HOWEVER, ADDITIONAL INSPECTION AFTER PERIODS OF HEAVY RUNOFF IS MOST DESIRABLE. THE STRIP SHOULD BE CHECKED FOR UNIFORMITY OF GRASS COVER, DEBRIS AND LITTER, AND AREAS OF SEDIMENT ACCUMULATION. MORE FREQUENT INSPECTIONS OF THE GRASS COVER DURING THE FIRST FEW YEARS AFTER ESTABLISHMENT WILL HELP TO DETERMINE IF ANY PROBLEMS ARE DEVELOPING, AND TO PLAN FOR LONG-TERM RESTORATIVE MAINTENANCE NEEDS. BARE SPOTS AND AREAS OF EROSION IDENTIFIED DURING SEMI-ANNUAL INSPECTIONS MUST BE REPLANTED AND RESTORED TO MEET SPECIFICATIONS. CONSTRUCTION OF A LEVEL SPREADER DEVICE MAY BE NECESSARY TO REESTABLISH SHALLOW OVERLAND FLOW.

(4) DEBRIS AND LITTER REMOVAL: TRASH TENDS TO ACCUMULATE IN VEGETATED AREAS, PARTICULARLY ALONG HIGHWAYS. ANY FILTER STRIP STRUCTURES (I.E. LEVEL SPREADERS) SHOULD BE KEPT FREE OF OBSTRUCTIONS TO REDUCE FLOATABLES BEING FLUSHED DOWNSTREAM, AND FOR AESTHETIC REASONS. THE NEED FOR THIS PRACTICE IS DETERMINED THROUGH PERIODIC INSPECTION, BUT SHOULD BE PERFORMED NO LESS THAN 4 TIMES PER YEAR.

(5) SEDIMENT REMOVAL: SEDIMENT REMOVAL IS NOT NORMALLY REQUIRED IN FILTER STRIPS, SINCE THE VEGETATION NORMALLY GROWS THROUGH IT AND BINDS TO THE SOIL. HOWEVER, SEDIMENT MAY ACCUMULATE ALONG THE UPSTREAM BOUNDARY OF THE STRIP PREVENTING UNIFORM OVERLAND FLOW. EXCESS SEDIMENT SHOULD BE REMOVED BY HAND OR WITH FLAT-BOTTOMED SHOVELS.

(6) GRASS RESEEDING AND MULCHING: A HEALTHY DENSE GRASS SHOULD BE MAINTAINED ON THE FILTER STRIP. IF AREAS ARE ERODED, THEY SHOULD BE FILLED, COMPACTED, AND RESEEDED SO THAT THE FINAL GRADE IS LEVEL. GRASS DAMAGED DURING THE SEDIMENT REMOVAL PROCESS SHOULD BE PROMPTLY REPLACED USING THE SAME SEED MIX USED DURING FILTER STRIP ESTABLISHMENT. IF POSSIBLE, FLOW SHOULD BE DIVERTED FROM DAMAGED AREAS UNTIL THE GRASS IS FIRMLY ESTABLISHED. BARE SPOTS AND AREAS OF EROSION IDENTIFIED DURING SEMI-ANNUAL INSPECTIONS MUST BE REPLANTED AND RESTORED TO MEET SPECIFICATIONS. CORRECTIVE MAINTENANCE, SUCH AS WEEDING OR REPLANTING SHOULD BE DONE MORE FREQUENTLY IN THE FIRST TWO TO THREE YEARS AFTER INSTALLATION TO ENSURE STABILIZATION. DENSE VEGETATION MAY REQUIRE IRRIGATION IMMEDIATELY AFTER PLANTING, AND DURING PARTICULARLY DRY PERIODS, PARTICULARLY AS THE VEGETATION IS INITIALLY ESTABLISHED.



SECTION A-A
VEGETATIVE FILTER STRIP

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.)

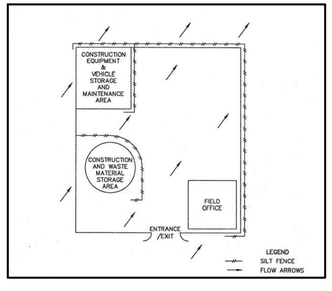
BONDED FIBER MATRIX: BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SYSTEM OF FIBERS AND ADHESIVES THAT UPON DRYING FORMS AN EROSION RESISTANT BLANKET THAT PROMOTES VEGETATION, AND PREVENTS SOIL EROSION. BFMS ARE TYPICALLY APPLIED AT RATES FROM 3,000 LB/ACRE TO 4,000 LB/ACRE BASED ON THE MANUFACTURER'S 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.
4. 4" OF TOP SOIL SHALL BE PLACED.

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.

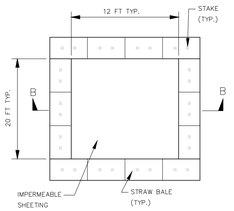


TYPICAL CONSTRUCTION STAGING AREA

GRAVEL FILTER BAGS

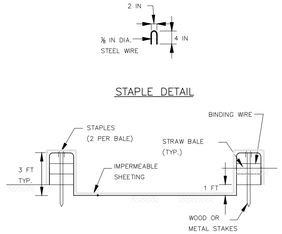
MATERIALS:

INLET GRAVEL FILTER BAGS TO BE 3/4" GRAVEL CONTAINED IN PERVIOUS BURLAP BAGS OR SYNTHETIC NET BAGS (1/8" MESH) APPROX. 24" LONG, 12" WIDE AND 6" HIGH.



PLAN

TYPICAL CONCRETE TRUCK WASHOUT PIT



STAPLE DETAIL

SECTION B-B

EROSION CONTROL NOTES:

1. LIMITS OF CONSTRUCTION AND OTHER EROSION CONTROL IMPROVEMENTS SHOWN OUTSIDE THE PROPERTY ARE SHOWN FOR GRAPHICAL PURPOSE ONLY. IF NEAR PROPERTY LINE, THE INTENT IS TO BE PLACED NEAR THE PROPERTY LINE, NOT ON THE ADJACENT PROPERTY.
2. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.
3. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.
4. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED IN THE SWPPP DOCUMENTS AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.
5. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.
6. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.
7. STORM WATER POLLUTION PREVENTION STRUCTURES SHOULD BE CONSTRUCTED WITHIN THE SITE BOUNDARIES. SOME OF THESE FEATURES MAY BE SHOWN OUTSIDE THE SITE BOUNDARIES ON THIS PLAN FOR VISUAL CLARITY.
8. AS SOON AS PRACTICAL, ALL DISTURBED SOIL THAT WILL NOT BE COVERED BY IMPERVIOUS COVER SUCH AS PARKWAY AREAS, EASEMENT AREAS, EMBANKMENT SLOPES, ETC. WILL BE STABILIZED PER APPLICABLE PROJECT SPECIFICATIONS.
9. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UP-GRADIENT AREAS.
10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED IN ACCORDANCE WITH TPDES REQUIREMENTS.
11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.
12. STRIPPING OF VEGETATION FROM PROJECT SITES SHALL BE PHASED SO AS TO EXPOSE THE MINIMUM AMOUNT OF AREA TO SOIL EROSION FOR THE SHORTEST POSSIBLE PERIOD OF TIME PER THE NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL SEC. 12.2(N).

LEGEND

- SF — SILT FENCE
- LOC — LIMITS OF CONSTRUCTION
- 900 — EXISTING CONTOURS
- 900 — PROPOSED CONTOURS
- FLOW ARROWS
- STABLIZED CONSTRUCTION ENTRANCE/EXIT
- TRUCK WASH OUT PIT
- CONSTRUCTION STAGING AREA
- ROCK BERM
- GRAVEL FILTER BAGS
- PROPOSED GRATE INLET
- PROPOSED JUNCTION BOX
- EXISTING STORM DRAIN MANHOLE
- AREA FOR POTENTIAL ONSITE SPOILS STOCKPILING (2)
- AREA TO BE CLEARED OF TREES AND SHRUBBERY FOR PROPOSED NBU ESMT (3)

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

WPAP SITE PLAN

SHEET 47 OF 65

NO	DATE	ISSUES AND REVISIONS
1	8-11-2023	UPDATED PER CONB COMMENTS
2	9-26-2023	UPDATED PER NBU COMMENTS
3	10-05-2023	UPDATED WATER QUALITY BMP

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

Drawing Name: N:\Projects\VARIOUS\ LP 337 Townhomes\Civil\Construction Drawings\COMMERCIAL SET\47 WPAP SITE PLAN.dwg User: brjenders Oct 05, 2023 - 6:03pm

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

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

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

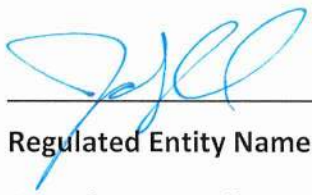
Signature

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

Print Name of Customer/Agent: James Ingalls, P.E.

Date: 10-5-23

Signature of Customer/Agent:



Regulated Entity Name: Lyndon Ranch

Project Information

Potential Sources of Contamination

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

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

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

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

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

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

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

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

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

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

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

Sequence of Construction

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

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

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

6. ☑ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Comal/Guadalupe River

Temporary Best Management Practices (TBMPs)

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

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

- [x] 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.
- [x] 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.
- [x] A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
- [x] 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. [x] The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.

   - [ ] **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
   - [x] There will be no temporary sealing of naturally-occurring sensitive features on the site.

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

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

    - [ ] For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
    - [ ] For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
    - [ ] For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
    - [ ] There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

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

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

☑ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

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

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

Administrative Information

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

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

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

ATTACHMENT "A"
Spill Response Actions

Spill Prevention and Control

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

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

Education

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

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

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

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

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

General Measures

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

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

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

(4) Train employees in spill prevention and cleanup.

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

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

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

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

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

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

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

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

Cleanup

(1) Clean up leaks and spills immediately.

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

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

Minor Spills

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

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

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

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

(5) Contain the spread of the spill.

(6) Recover spilled materials.

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

Semi-Significant Spills

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

Spills should be cleaned up immediately:

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

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

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

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

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

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

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

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

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

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

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

Vehicle and Equipment Maintenance

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

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

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

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

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

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

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

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

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

Vehicle and Equipment Fueling

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

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

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

ATTACHMENT "B"
Potential Sources of Contamination

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

ATTACHMENT "C"
Sequence of Major Activities

Stages of Construction:

1. Installation of temporary BMP's.
2. Minor site grading and trenching: This includes the removal of organic material and other debris within the proposed utility easement. Approximate total disturbed area = 1.01 acres.
3. Utility installation: All sewer mains will be installed.
4. Finished grading: Final fill and grading of the utility main trenches. Approximate total disturbed area = 1.01 acres.

ATTACHMENT "D"
Temporary BMP's and Measures

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

1. Silt fence will be constructed on the downgradient side of proposed site.
2. A stabilized construction exit will be installed prior to any site work.

A. Silt Fence will be installed on the most downgradient side of the site and will reduce potential pollution from any stormwater that originates onsite or offsite. A stabilized construction exit will be constructed at the entrance of the site; this will reduce the amount of contaminants leaving the site.

B. Silt fence will be placed on the downgradient side of each proposed improvement to contain pollutants generated from onsite runoff. Disturbed areas will be seeded to replace destroyed vegetation. The existing vegetation located downgradient of each proposed improvement will work in conjunction with the silt fence and stabilized construction entrance to prevent pollution of water originating onsite and/or flowing offsite.

C. The proposed silt fences, and stabilized construction entrance constructed upgradient of the existing streams will prevent pollutants from entering them, as well as the aquifer. According to the Geologic Assessment, there is one sensitive features with the project boundary that will be requested to be permanently sealed prior to site work.

ATTACHMENT "E"
Request to Temporarily Seal a Feature

There will be no request to temporarily seal a geologic feature.

ATTACHMENT "F"
Structural Practices

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

ATTACHMENT "G"
Drainage Area Map

See Drainage Area Map at the end of this section.

ATTACHMENT "H"
Temporary Sediment Pond Plans and Calculations

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

ATTACHMENT "I"
Inspection and Maintenance for BMP's

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

Temporary Construction Entrance/Exit: The entrance should be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor. When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

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

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

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

Owner's Information:

Owner: PARAVEL NEW BRAUNFELS I, LP
Contact: Curtis Thigpen
Address: 1509 Old W 38th St, Ste. 3
Austin, Texas 78731

Design Engineer:

Company: INK Civil
Contact: James Ingalls, P.E.
Phone: (830) 358-7127
Address: 2021 SH 46W, Ste. 105
New Braunfels, Texas 78132

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

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

Materials:

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

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

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

Seed Mixtures:

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

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

Installation:

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

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

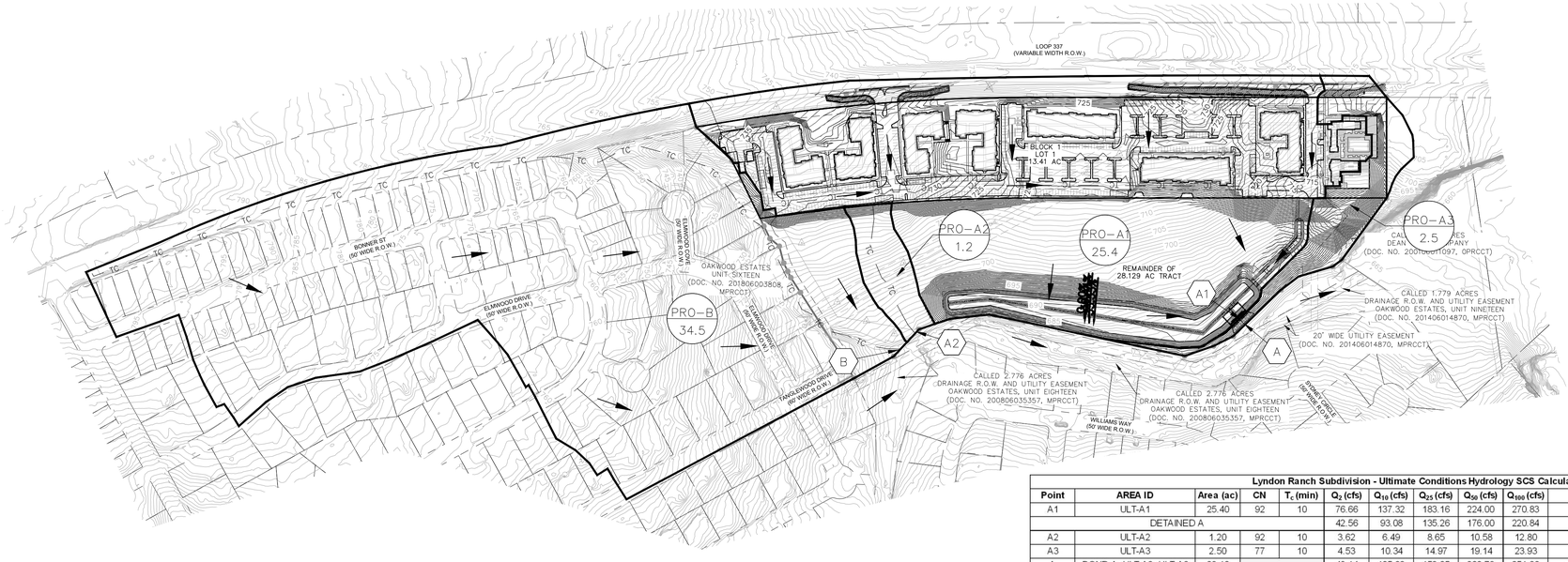
(3) Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

Lyndon Ranch Subdivision - Existing Conditions Hydrology SCS Calculations										
Point	AREA ID	Area (ac)	CN	T_c (min)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	Location
A	EX-A	27.00	78	10	51.05	114.38	164.48	209.50	261.19	Low along property line
B	EX-B	36.70	90	17	88.69	163.37	219.84	270.07	327.59	Low at property line east of Tanglewood Dr

EXISTING CONDITIONS

SCALE: 1"=200'

Lyndon Ranch Subdivision - Proposed Conditions Hydrology SCS Calculations										
Point	AREA ID	Area (ac)	CN	T_c (min)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	Location
A1	PRO-A1	25.40	87	10	66.84	128.41	175.16	216.73	264.28	Detention Pond A
DETAINED A					37.08	93.48	135.00	173.20	216.50	Detention Pond A outfall to property line
A2	PRO-A2	1.20	77	10	2.17	4.96	7.19	9.19	11.49	Low along property line
A3	PRO-A3	2.50	77	10	4.53	10.34	14.97	19.14	23.93	Low along property line
A	POND A+PRO-A2+PRO-A3	29.10			41.15	93.48	151.79	173.20	245.65	Property line downstream of Detention Pond A outfall
B	PRO-B	34.50	90	17	83.38	153.58	206.66	253.88	307.96	Low at property line east of Tanglewood Dr



PROPOSED CONDITIONS

SCALE: 1"=300'

Lyndon Ranch Subdivision - Ultimate Conditions Hydrology SCS Calculations										
Point	AREA ID	Area (ac)	CN	T_c (min)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	Location
A1	ULT-A1	25.40	92	10	76.66	137.32	183.16	224.00	270.83	Detention Pond A
DETAINED A					42.56	93.08	135.26	176.00	220.84	Detention Pond A outfall to property line
A2	ULT-A2	1.20	92	10	3.62	6.49	8.65	10.58	12.80	Low along property line
A3	ULT-A3	2.50	77	10	4.53	10.34	14.97	19.14	23.93	Low along property line
A	POND A+ULT-A2+ULT-A3	29.10			48.14	105.33	153.05	200.79	251.36	Property line downstream of Detention Pond A outfall
B	ULT-B	34.70	92	17	87.75	157.38	210.01	256.88	310.63	Low at property line east of Tanglewood Dr

NOTE:

ULTIMATE CONDITIONS TABLE ABOVE IS SHOWN FOR REFERENCE. POND A HAS BEEN SIZED FOR ULTIMATE CONDITIONS INCLUDING THE DEVELOPMENT OF LYNDON RANCH UNIT 2 WHICH IS CURRENTLY ZONED R-2. ADJACENT CONTRIBUTING PROPERTIES ARE FULLY DEVELOPED IN THE EXISTING CONDITION.

NOTE:

THIS MAP IS FOR THE SIZING OF THE POND INFRASTRUCTURE AND THE COMPARISON FROM EXISTING TO PROPOSED USING THE SCS METHOD ONLY.

SEE SHEET 15 FOR THE STORM DRAIN SIZING USING THE RATIONAL METHOD.

Existing/Proposed Comparison Table			
	EX A	PRO A	
Storm Event	Q (CFS)	Q (CFS)	Delta Q (CFS)
2	51.05	41.15	-9.90
10	114.38	93.48	-20.90
25	164.48	151.79	-12.69
50	209.50	173.20	-36.30
100	261.19	245.65	-15.54

0 100' 200'

SCALE: 1"=200'

LEGEND

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

STATE OF TEXAS
JAMES INGALLS
107416
LICENSED
PROFESSIONAL ENGINEER
10-5-23

PARAVEL CAPITAL
1509 OLD W 38TH ST. #3
AUSTIN TX, 78731

LYNDON RANCH

DRAINAGE AREA MAPS - SCS

SHEET 14 OF 65

NO	DATE	ISSUES AND REVISIONS
1	7/14/23	UPDATED PER NBU COMMENTS

INK CIVIL
2021 W SH46, STE 105
NEW BRAUNFELS, TX. 78132
PH: 830-358-7127 ink-civil.com
TBPE FIRM F-13351

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

I Curtis Thigpen,
Print Name

Principal,
Title - Owner/President/Other

of Paravel New Braunfels I, LP,
Corporation/Partnership/Entity Name

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

of INK Civil
Print Name of Firm

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

I also understand that:

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

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

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

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

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

SIGNATURE PAGE:

Applicant's Signature

5-2-23
Date

THE STATE OF Texas §

County of Travis §

BEFORE ME, the undersigned authority, on this day personally appeared Curtis Thigpen 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 2 day of May 2023

Amy L Burtnett
NOTARY PUBLIC

Amy L Burtnett
Typed or Printed Name of Notary

Amy L Burtnett
My Commission Expires
1/30/2027
Notary ID 125069441

MY COMMISSION EXPIRES: 1-30-2027

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Lyndon Ranch
Regulated Entity Location: South of LP 337, approx. 0.44 miles west of intersection of River Rd. and LP 337
Name of Customer: Paravel New Braunfels I, LP
Contact Person: Curtis Thigpen Phone: 512-467-4441
Customer Reference Number (if issued):CN 606063501
Regulated Entity Reference Number (if issued):RN 111578712

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

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

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

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

Site Location (Check All That Apply):

☑ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	*Size*	*Fee Due*
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	$
Sewage Collection System	2158 L.F.	$ 1079
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 10-5-23

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

Application Fee Schedule

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

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

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

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

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

☒ Other SCS Modification

2. Customer Reference Number *(if issued)*

CN 606063501

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

3. Regulated Entity Reference Number *(if issued)*

RN 111578712

SECTION II: Customer Information

4. General Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☒ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*

If new Customer, enter previous Customer below:

PARAVEL NEW BRAUNFELS I, LP

7. TX SOS/CPA Filing Number

0804645088

8. TX State Tax ID (11 digits)

32085409178

9. Federal Tax ID (9 digits)

N/A

10. DUNS Number *(if applicable)*

N/A

11. Type of Customer:

☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited

Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees

☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?

☒ **Yes** ☐ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:

1509 OLD W 38TH ST. #3

City	State	ZIP	ZIP + 4
AUSTIN	TX	78731	

16. Country Mailing Information *(if outside USA)*

17. E-Mail Address *(if applicable)*

CTHIGPEN@PARAVELCAP.COM

18. Telephone Number

19. Extension or Code

20. Fax Number *(if applicable)*

(512) - 934-8923		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☒ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

LYNDON RANCH

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

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	SOUTH OF LOOP 337, APPROX. 0.44 MILES WEST OF THE RIVER RD & LOOP 337 INTERSECTION

26. Nearest City	**State**	**Nearest ZIP Code**
NEW BRAUNFELS	TX	78132

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	29.72611		**28. Longitude (W) In Decimal:**	98.13389	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	43	34.0	98	08	02.0

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
6552	1521	237210	N/A

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

REAL ESTATE

34. Mailing Address:							
	City	NEW BRAUNFELS	**State**	TX	**ZIP**	78730	**ZIP + 4**
35. E-Mail Address:							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
( ) -		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☒ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

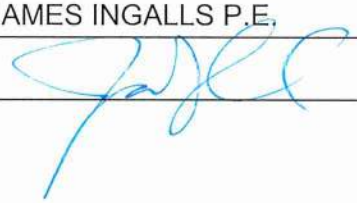
SECTION IV: Preparer Information

40. Name:	CHADFRIESENHAHN, EIT	41. Title:	GRADUATE ENGINEER

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(830) - 358-7127		( ) -	CHADFRIESENHAHN@INK-CIVIL.COM

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	INK CIVIL	Job Title:	PROFESSIONAL ENGINEER
Name *(In Print)*:	JAMES INGALLS P.E.	Phone:	(830) - 358-7127
Signature:		Date:	10-5-23