440 QUARRY IMPROVEMENTS

Water Pollution Abatement Plan Modification and Sewage Collection System Application

April 2024

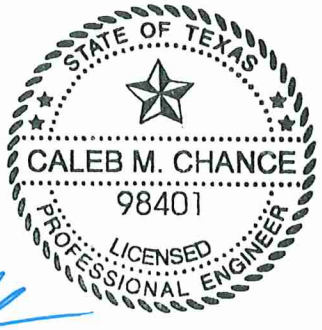
PAPE-DAWSON ENGINEERS

Transportation | Water Resources | Land Development | Surveying | Environmental

440 QUARRY IMPROVEMENTS

Water Pollution Abatement Plan Modification and Sewage Collection System Application

April 2024



4/5/24

PAPE-DAWSON ENGINEERS

PAPE-DAWSON ENGINEERS

April 3, 2024

Mr. Robert Sadlier
Texas Commission on Environmental Quality (TCEQ)
Region 13
14250 Judson Road
San Antonio, Texas 78233-4480

Re: 440 Quarry Improvements
Water Pollution Abatement Plan Modification and Sewage Collection System

Dear Mr. Sadlier:

Please find included herein the 440 Quarry Improvements Water Pollution Abatement Plan Modification. This Water Pollution Abatement Plan Modification has been prepared in accordance with the regulations of the Texas Administrative Code (30 TAC 213) and current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan Modification applies to an approximate 27.08-acre site as identified by the project limits. Please review the plan information for the items it is intended to address. If acceptable, please provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Appropriate review fees ($6,500 for the WPAP and $1,155.50 for the SCS) and fee application are included. If you have questions or require additional information, please do not hesitate to contact me at your earliest convenience.

Sincerely,
Pape-Dawson Engineers, Inc.

Caleb Chance, P.E.
Vice President

Attachments

P:\129\34\00\Word\Reports\WPAP-SCS\2024 - WPAP Modification Cover Letter 032724.docx

EDWARDS AQUIFER APPLICATION COVER PAGE (TCEQ-20705)

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: 440 Quarry Improvements						**2. Regulated Entity No.:** 102748860			
3. Customer Name: Shavano Quarry Development, LTD						**4. Customer No.:** 606106151			
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):**			28.07
9. Application Fee:	$7,655.50		**10. Permanent BMP(s):**			Batch Detention Basin, VFS			
11. SCS (Linear Ft.):	2,311		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Bexar		**14. Watershed:**			Upper Salado Creek			

Application Distribution

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

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

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

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	☐	☐	☐
Region (1 req.)	☐	☐	☐
County(ies)	☐	☐	☐
Groundwater Conservation District(s)	☐ Edwards Aquifer Authority ☐ Barton Springs/ Edwards Aquifer ☐ Hays Trinity ☐ Plum Creek	☐ Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	☐ Austin ☐ Buda ☐ Dripping Springs ☐ Kyle ☐ Mountain City ☐ San Marcos ☐ Wimberley ☐ Woodcreek	☐ Austin ☐ Bee Cave ☐ Pflugerville ☐ Rollingwood ☐ Round Rock ☐ Sunset Valley ☐ West Lake Hills	☐ Austin ☐ Cedar Park ☐ Florence ☐ Georgetown ☐ Jerrell ☐ Leander ☐ Liberty Hill ☐ Pflugerville ☐ Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	✔	☐	☐	☐	☐
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. Caleb Chance, P.E. Print Name of Customer/Authorized Agent
Signature of Customer/Authorized Agent — Date: 3/27/24

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 (TCEQ-0587)

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.

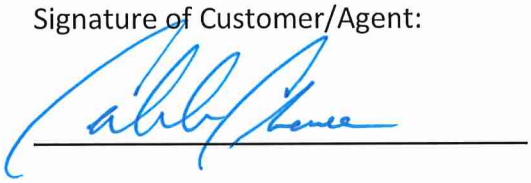
Signature

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: Caleb Chance, P.E.

Date: 3/27/24

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: 440 Quarry Improvements
2. County: Bexar
3. Stream Basin: Upper Salado Creek
4. Groundwater Conservation District (If applicable): Edwards Aquifer Authority, Trinity-Glen Rose
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

   ☒ WPAP
   ☒ SCS
   ☒ Modification
   ☐ AST

☐ UST ☐ Exception Request

7. Customer (Applicant):

Contact Person: Lloyd Denton
Entity: Shavano Quarry Development, LTD.
Mailing Address: 11 Lynn Batts Lane, Suite 100
City, State: San Antonio, Texas Zip: 78218
Telephone: (210) 828-6131 FAX: _____
Email Address: laddiedenton@bitterblue.com

8. Agent/Representative (If any):

Contact Person: Caleb Chance, P.E.
Entity: Pape-Dawson Engineers
Mailing Address: 2000 NW Loop 410
City, State: San Antonio, Texas Zip: 78213
Telephone: (210) 375-9000 FAX: (210) 375-9010
Email Address: cchance@pape-dawson.com

9. Project Location:

☒ The project site is located inside the city limits of San Antonio.
☐ 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.

From TCEQ's regional office, head north on Judson Road approximately 2.6 miles to Loop 1604. Travel west on Loop 1604 approximately 10.8 miles and exit toward FM 1535/Military Hwy/Shavano Park and turn right onto Shavano Ranch. The site is located approx. 0.25 miles north of the Shavano Ranch and NW Military Hwy intersection.

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: When advised by TCEQ of site visit

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: Existing Quarry

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)

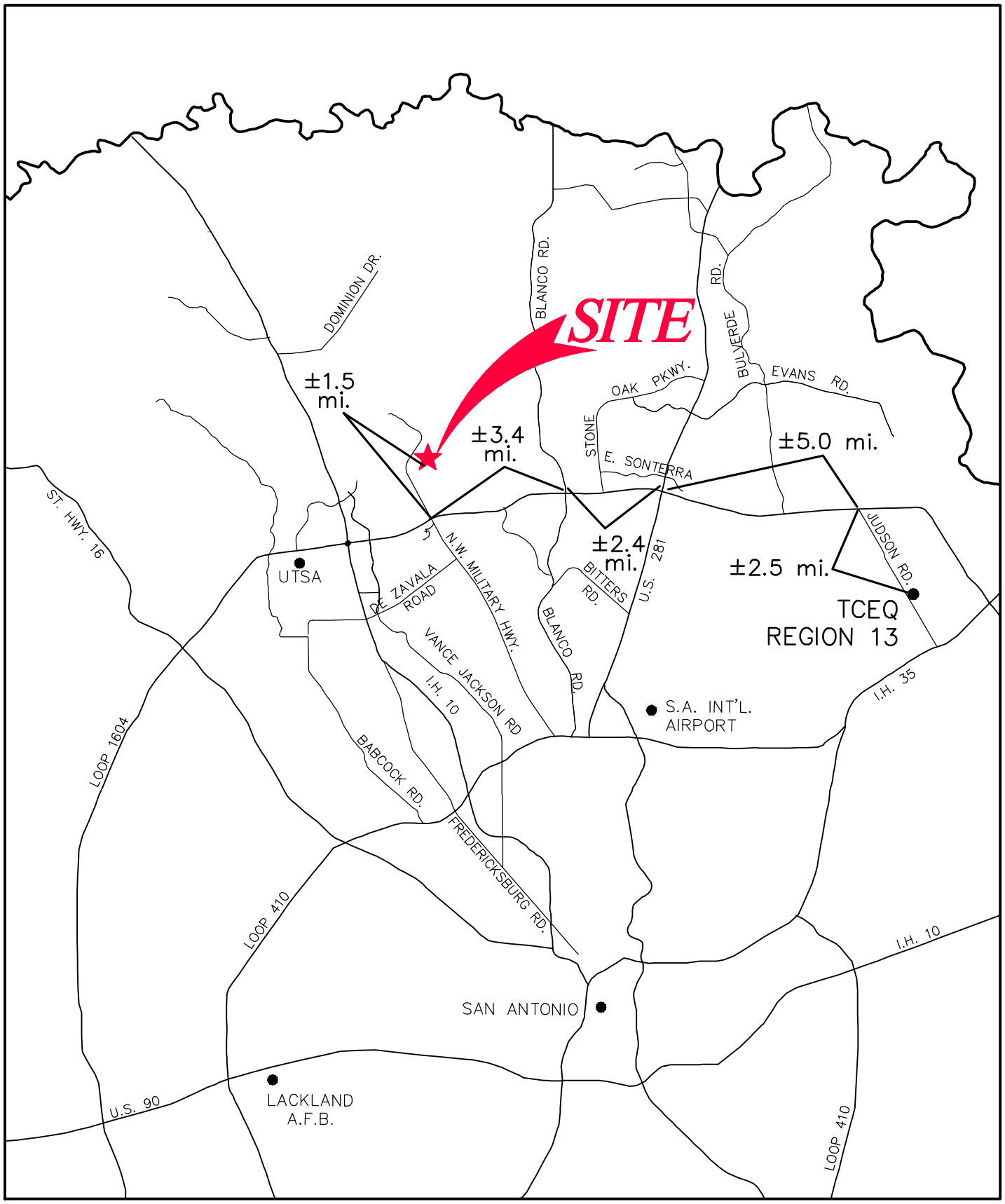
20. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies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

ATTACHMENT A

440 QUARRY IMPROVEMENTS
Water Pollution Abatement Plan Modification

N
NOT TO SCALE



Pape-Dawson Engineers, Inc.
Date: Aug 29, 2023, 7:08pm User ID: dlevine
File: P:\129\34\00\Design\Environmental\WPAP\RM-1293400.dwg

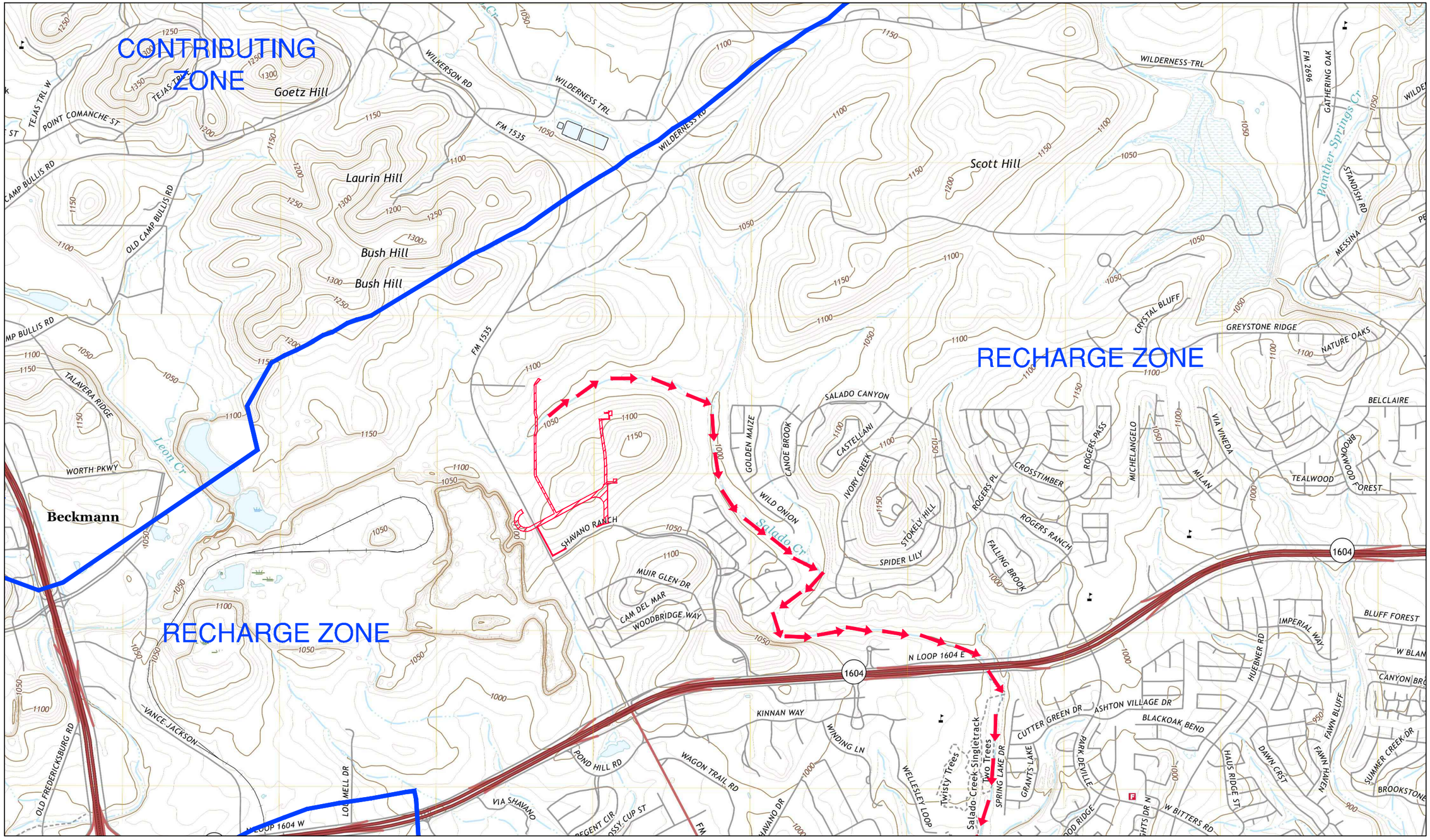
ATTACHMENT A
Road Map

ATTACHMENT B

440 QUARRY IMPROVEMENTS
Water Pollution Abatement Plan Modification

N

SCALE: 1" = 2000'



Date: Jan 03, 2024, 4:43pm User ID: dlevine
File: P:\129\34\00\Design\Environmental\WPAP\00-1293400.dwg

GENERAL LOCATION MAP - CASTLE HILLS, TX QUAD

DRAINAGE FLOW → →

Pape-Dawson Engineers, Inc.

MATCHLINE See Sheet 2 of 2

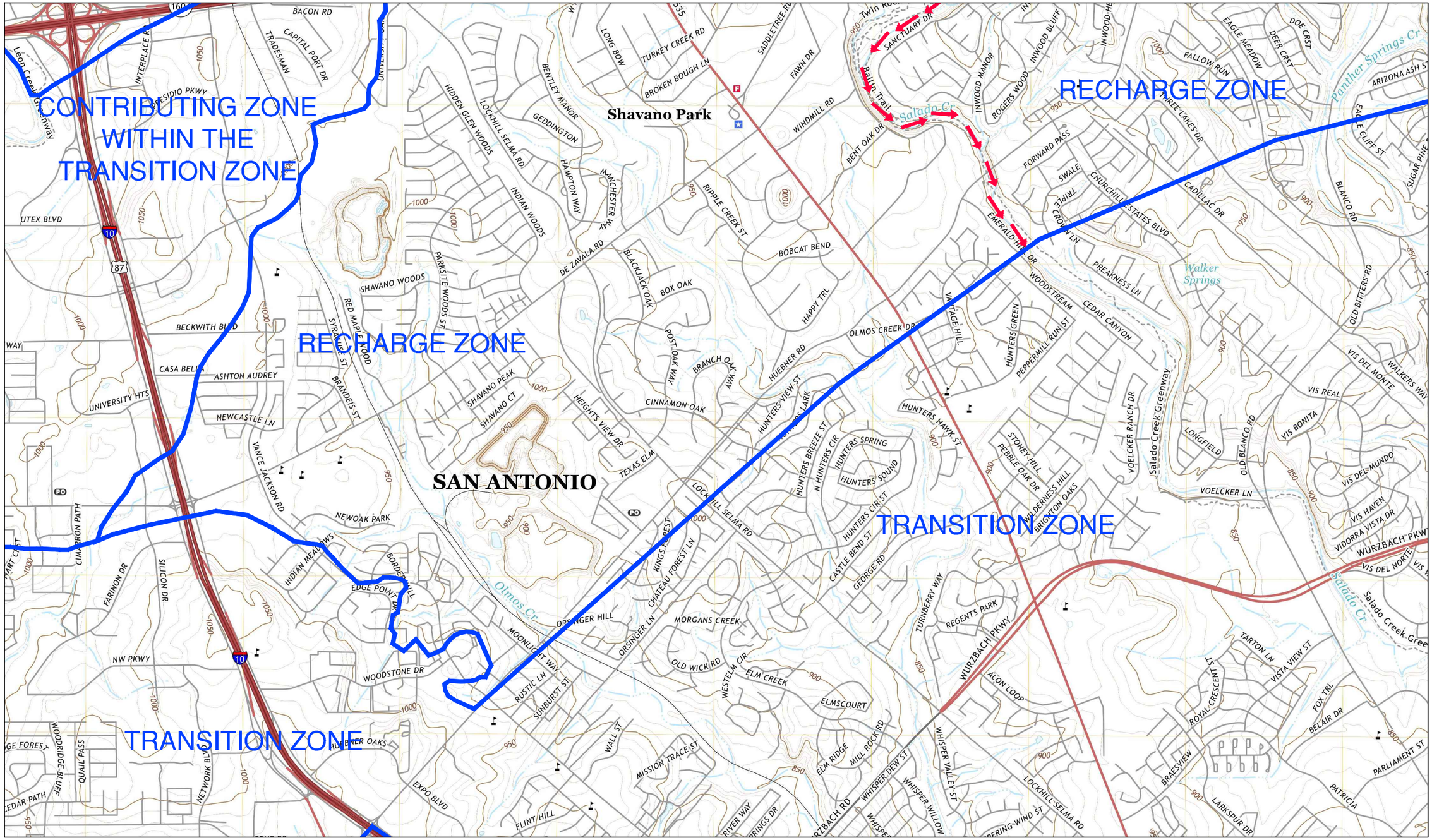
USGS/EDWARDS RECHARGE ZONE MAP
ATTACHMENT B

440 QUARRY IMPROVEMENTS
Water Pollution Abatement Plan Modification

N

SCALE: 1" = 2000'

MATCHLINE See Sheet 1 of 2



Date: Jan 03, 2024, 4:44pm User ID: dtevine
File: P:\129\34\00\Design\Environmental\WPAP\QD-1293400.dwg

GENERAL LOCATION MAP - CASTLE HILLS, TX QUAD
DRAINAGE FLOW
Pape-Dawson Engineers, Inc.

USGS/EDWARDS RECHARGE ZONE MAP
ATTACHMENT B

ATTACHMENT C

Attachment C – Project Description

440 Quarry Improvements Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the original Redland Stone NW Military Hwy Quarry WPAP, approved by the Texas Natural Resources Conservation Commission on September 3, 1997, as a 440.20-acre quarry. Since the original approval, Texas Commission on Environmental Quality has approved four (4) modifications for the quarry site, including the most recent modification, the Beckam Quarry 440-Acres (EAPP ID No. 13000655), approved on September 17, 2018, which approved clearing and mass grading to prepare for future development. 440 Quarry Improvements Abatement Plan proposes the construction of both a public and private street, utilities, batch detention basin, retention basin, lift station site, pressure reducing valve site, and associated drainage structures on approximately 27.08 acres. The impervious cover will be 9.61 acres which will account for the paving that will occur on the site for street, sidewalk, drainage, and utility facilities.

440 Quarry Improvements will be platted across 19.397 acres of land and will be located within the city limits of San Antonio approximately 0.3 miles northeast of NW Military Hwy and Shavano Ranch Road. The site is located within the city limits of San Antonio in Bexar County, Texas and is entirely over the Edwards Aquifer Recharge Zone. No naturally occurring sensitive features were identified due to the site being a pre-existing rock quarry.

This WPAP proposes clearing, grading, excavation, and construction for a roadway and utility facility foundations. Approximately 9.61 acres of impervious cover is proposed for this project or 35.49% of the 27.08-acre site. Out of the total 9.61 acres of impervious cover, 5.48 acres of impervious cover will be directly treated by the proposed batch detention basin "A". Water Quality Basin "A" will be a Batch Detention Basin with the removal efficiency of 91% as assigned by TCEQ. Four (4) fifteen-foot (15') wide Engineered Vegetative Filter Strips (VFS) will provide treatment for 2.60 acres of impervious cover. Area "I" was previously untreated within the Cornerstone High School WPAP (RN102748860). The 1.57 acres of impervious cover is converted to direct treatment via Basin A and swapped with approximately 1.53 acres of untreated impervious cover from watersheds G and H.

The proposed PBMPs for this project consists of one (1) batch detention basin (Basin "A") and four (4) fifteen-foot (15') engineered vegetative filter strip (VFS) designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements.

The SCS will be proposing a Lift Station and force main that is designed to accept and convey sanitary flow from a new Cornerstone development that will be located in the north quarry. The lift station will convey sanitary sewer flow to an existing downstream manhole and gravity main system using a dual 6-inch force main and an 8-inch gravity main system.

GEOLOGIC ASSESSMENT
(1 OF 2)

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: Roman C. Pineda, P.G.

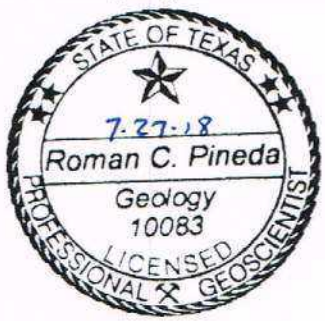
Telephone: (210) 698-5544

Fax: (210) 698-5544

Date: July 27, 2018

Representing: Forster Engineering, TBPE Firm #12385 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



Regulated Entity Name: Beckmann Quarry 440 Acres Tract

Project Information

1. Date(s) Geologic Assessment was performed: March 21, 2013 and July 26, 2018
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)
Trinity and Frio soils, frequently flooded (Tf)	C	2-6
Tarrant association, gently undulating (TaB)	C	1-2
Tarrant association, rolling (TaC)	C	1-2
Crawford and Bexar stony soils (Cb)	D	2-3

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

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 13 (#) 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.

ATTACHMENT A
Geologic Assessment Table

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: *BECKMANN QUARRY 440 ACRES TRACT*																	
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	INCD	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-29	29°37'6.1"	98°34'3.6"	F	20	Kek	--	4255	--	N50°E	10	--	--	F	5	35	X			X	Hillside
S-35	29°37'10.5"	98°33'40.5"	SF	20	Kek	22	27	1	N50°E	10	0.3	0.5	C,O	35	65		X		X	Floodplain
S-49	29°36'57.3"	98°34'11.9"	SF	20	Kek	20	92	1	N60°E	10	0.6	0.5	C,O	35	65		X		X	Floodplain
S-64	29°36'45.4"	98°33'41.6"	MB	30	Kek	--	--	--	--	0	--	--	X	10	40		X	X		Hillside
S-76	29°37'22.8"	98°34'9.9"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-77	29°37'26.7"	98°34'2.2"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-78	29°37'8.5"	98°33'33.6"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-79	29°37'33.8"	98°33'51.1"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-80	29°36'53.3"	98°33'58.0"	MB	30	Kek	2920	6055	205	--	0	--	--	N	5	35	X			X	Hillside/Floodplain
S-81	29°36'33.6"	98°34'4.5"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-82	29°36'39.5"	98°33'51.6"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-83	29°36'47.5"	98°33'39.1"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-84	29°37'2.6"	98°33'35.9"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-85	29°37'19.9"	98°33'31.5"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-86	29°37'32.6"	98°33'36.9"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-87	29°37'5.3"	98°34'10.5"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside
S-88	29°36'44.7"	98°33'43.6"	MB	30	Kek	--	--	--	--	0	--	--	X	5	35	X		X		Hillside

* DATUM: NAD 83

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.

Date 7-27-18

STATE OF TEXAS
Roman C. Pineda
Geology
10083
LICENSED
PROFESSIONAL GEOSCIENTIST

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

ATTACHMENT A
Sheet 1 of 2

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: *BECKMANN QUARRY 440 ACRES TRACT*																		
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING			
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12	
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	WOO	DENSITY (#/#FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY	
						X	Y	Z		10						<40	>40	<1.6	>1.6		
S-200	29°36'40.9"	98°34'07.1"	C	30	Kek	~4	~15	~8	--	0	--	--	N	5	35	X		X		Cliff	
S-201	29°36'44.6"	98°34'09.7"	C	30	Kek	~18	~20	~8	--	0	--	--	N	5	35	X		X		Cliff	
S-202	29°36'58.5"	98°34'06.9"	C	30	Kek	~4	~5	~12	--	0	--	--	N	5	35	X		X		Cliff	
S-203	29°37'07.6"	98°34'09.3"	C	30	Kek	~3	~6	~8	--	0	--	--	N	5	35	X		X		Cliff	
S-204	29°37'27.2"	98°34'04.0"	SC	20	Kek	~2	~3	~2	--	0	--	--	N	5	25	X		X		Cliff	
S-205	29°37'27.3"	98°34'04.0"	SC	20	Kek	~2	~4	~6	--	0	--	--	N	5	25	X		X		Cliff	
S-206	29°37'29.5"	98°33'58.8"	SC	20	Kek	~2	~3	~2	--	0	--	--	N	5	25	X		X		Cliff	
S-207	29°37'32.2"	98°33'54.4"	SC	20	Kek	~1	~3	~5	--	0	--	--	N	5	25	X		X		Cliff	
S-208	29°37'32.6"	98°33'52.6"	C	30	Kek	~15	~15	~8	--	0	--	--	N	5	35	X		X		Cliff	
S-209	29°37'36.9"	98°33'48.4"	C	30	Kek	~10	~15	~5	--	0	--	--	N	5	35	X		X		Cliff	
S-210	29°37'22.6"	98°33'34.7"	C	30	Kek	~10	~10	~15	--	0	--	--	N	5	35	X		X		Cliff	
S-211	29°37'08.4"	98°33'45.8"	C	30	Kek	~10	~15	~10	--	0	--	--	N	5	35	X		X		Cliff	
S-212	29°37'09.9"	98°33'51.8"	C	30	Kek	~10	~15	~2	--	0	--	--	N	5	35	X		X		Cliff	
S-213	29°36'49.3"	98°33'45.1"	C	30	Kek	~15	~15	~8	--	0	--	--	N	5	35	X		X		Cliff	

* DATUM: NAD 83

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.

Date 7-27-18

STATE OF TEXAS
Roman C. Pineda
Geology
10083
LICENSED
PROFESSIONAL GEOSCIENTIST

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

ATTACHMENT A
Sheet 2 of 2

ATTACHMENT B
Stratigraphic Column

BECKMANN QUARRY, 440 ACRES TRACT

Stratigraphic Column

Hydrogeologic subdivision			Group, formation, or member			Hydrologic function	Thickness (feet)	Lithology	Field Identification	Cavern development	Porosity/ permeability type
	V	*Edwards Aquifer*	*Edwards Group*	*Kainer Formation (Kek)*	Grainstone member	AQ	50-60	*Miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone	Few	Not fabric/ recrystallization reduces permeability
	VI				Kirschberg evaporite member	AQ	50-60	Highly altered crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame	Probably extensive cave development	Majority fabric/one of the most permeable
	VII				Dolomitic member	AQ	110 -130	Mudstone to grainstone; crystalline limestone; chert	Massively bedded light gray, *Toucasia* abundant	Caves related to structure or bedding planes	Mostly not fabric; some bedding plane-fabric/water-yielding
	VIII				Basal nodular member	Karst AQ; not karst CU	50-60	Shaly, nodular limestone mudstone and *miliolid* grainstone	Massive, nodular and mottled, *Exogyra texana*	Large lateral caves at surface; a few caves near Cibolo Creek	Fabric; stratigraphically controlled/large conduit flow at surface; no permeability in subsurface
	Lower confining unit		Upper member of the Glen Rose Limestone (Kgru)			CU; evaporite beds AQ	350-500	Yellowish tan, thinly bedded limestone and marl	Stair-step topography; alternating limestone and marl	Some surface cave development	Some water production at evaporite beds / relatively impermeable

Reference: U.S.G.S. Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Recharge Zone, Bexar County, Texas; Water-Resources Investigations Report 95-4030

ATTACHMENT C
Site Geology

BECKMANN QUARRY, 440 ACRES TRACT

Narrative of Site Specific Geology

The project site consists of an active quarry. Raba-Kistner Consultant, Inc. (R-K) conducted previous mapping of the project site prior to development as a quarry. The Geologic Assessment report, prepared by R-K dated May, 21, 1997, was reviewed during preparation of this report. Previously identified featured were re-evaluated during the site visit. Numerous features identified in the R-K Geologic Assessment report were no longer present due to quarrying activities. This report presents only those features that are still present and meet the current TCEQ criteria for mapping as described in the TCEQ Guidance Document titled *Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones*, (TCEQ-0585).

The overall potential of recharge to the Edward Aquifer at the site is low. Two sensitive geologic features were identified in the on-site floodplain. The dominant trend for the site is approximately N50°E, based on an average of the trends of faults identified on site and faults mapped by the BEG (Barnes, 1983) and USGS (1988) in the vicinity of the property. On-site non-quarried outcropping units include the kirschberg evaporite (Kekk) and dolomitic (Kekd) members of the Kainer Formation of the Edwards Group.

The Kekk is characterized by highly altered, crystalline limestone with chert. Cave development can be extensive in the Kekk. The Kekd member is characterized as massively bedded, mudstone to grainstone, crystalline limestone. Karst development in the Kekd is characterized be few small sinkholes, and caves developed as vertical shafts. No caves or sinkholes were identified on site.

Feature S-29
Feature S-29 is an intraformational fault identified by R-K based on their identification of lineations on aerial photographs and field observation. No karst features or other evidence of enhanced permeability were visible along observed areas of the reported fault. Therefore, the probability of rapid infiltration is low. This feature is ranked as non-sensitive.

Feature S-35
Feature S-35 is an outcrop of solution enlarged fractures located in a floodplain. The dominate trend of the fractures is N50°E. Hand excavation revealed loose, dark, organic soil and coarse infilling. Due to the interpreted karst origin, indirect evidence of rapid infiltration, and the location of the feature within a large natural catchment area, the probability of rapid infiltration is high. This feature is ranked as sensitive.

Feature S-49
Feature S-49 is an outcrop of solution enlarged fractures located in a streambed. The dominate trend of the fractures is N60°E. Hand excavation revealed loose, dark, organic soil and coarse infilling. Due to the interpreted karst origin, indirect evidence of rapid infiltration, and the location of the feature within a large natural catchment area, the probability of rapid infiltration is high. This feature is ranked as sensitive.

Feature S-64
Feature S-64 is an old farm water well. The well has 11-inch diameter steel casing that extends approximately nine inches above the ground surface. The well is located beneath a windmill and is not in operation. The well has a small, broken concrete slab surrounding the casing. The well has a cap, but it is not water tight. Because the well has casing that extends above the ground surface, the probability of rapid infiltration is low. However, due to the improperly capped status, this feature is ranked as sensitive.

Feature S-76
Feature S-76 is a new water well. The well has 11-inch diameter steel casing that extends approximately four feet above the ground surface. The well is surrounded by an 8' x 8' concrete pad. The well is not currently in use, and it has a welded cap in place. Because the well has casing that extends above the ground surface and has a cap, the probability of rapid infiltration is low. This feature is ranked as non-sensitive.

Feature S-77
Feature S-77 is a new water well. The well has 14-inch diameter steel casing that extends approximately three feet above the ground surface. The well is not surrounded by a concrete pad. The well is not currently in use,

and it has a welded cap in place. Because the well has casing that extends above the ground surface and has a cap, the probability of rapid infiltration is low. This feature is ranked as non-sensitive.

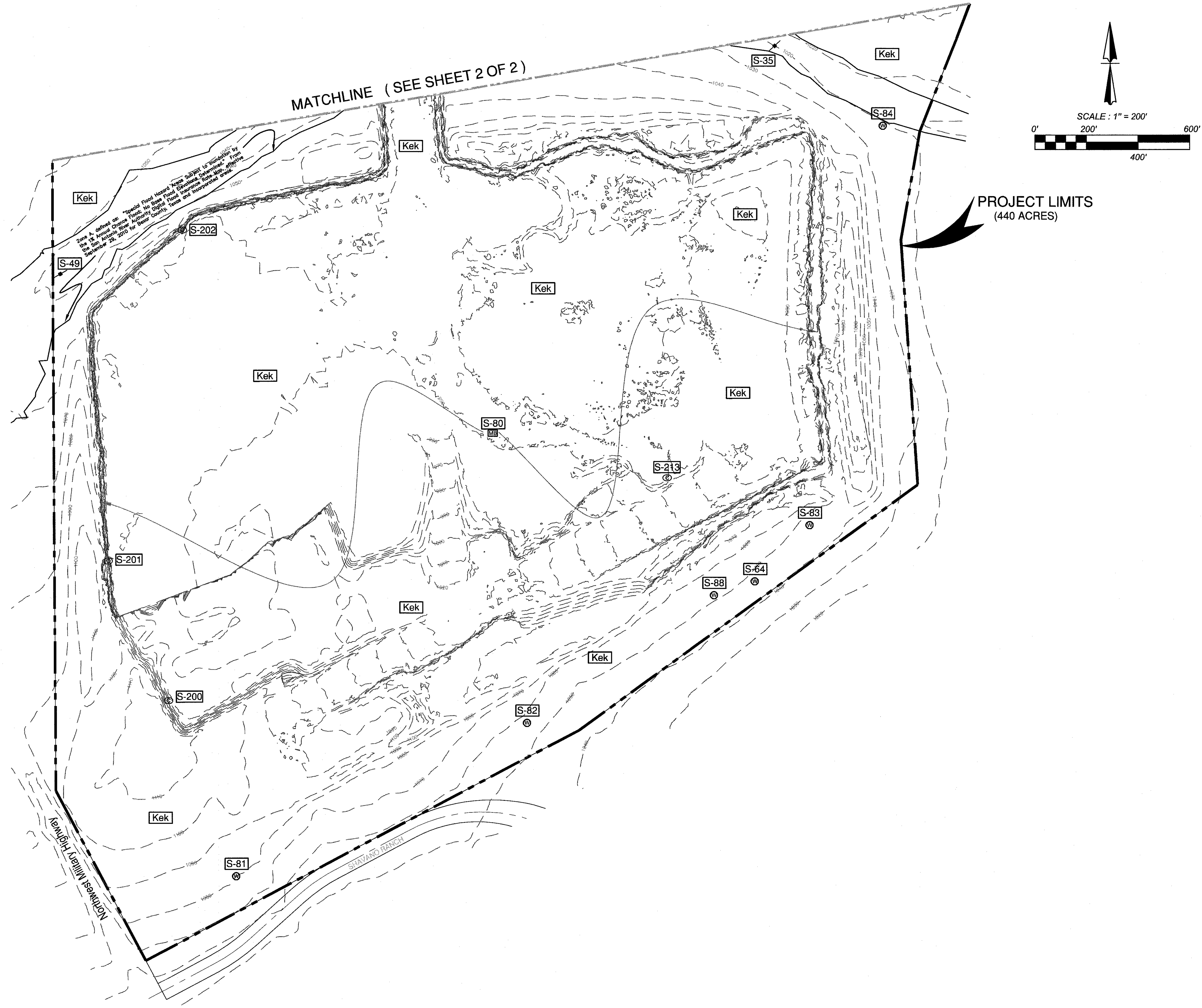
Feature S-78
Feature S-78 is a new water well. The well has 11-inch diameter steel casing that extends approximately two feet above the ground surface. The well is surrounded by an 8' x 8' concrete pad. The well is not currently in use, and it has a welded cap in place. Because the well has casing that extends above the ground surface and has a cap, the probability of rapid infiltration is low. This feature is ranked as non-sensitive.

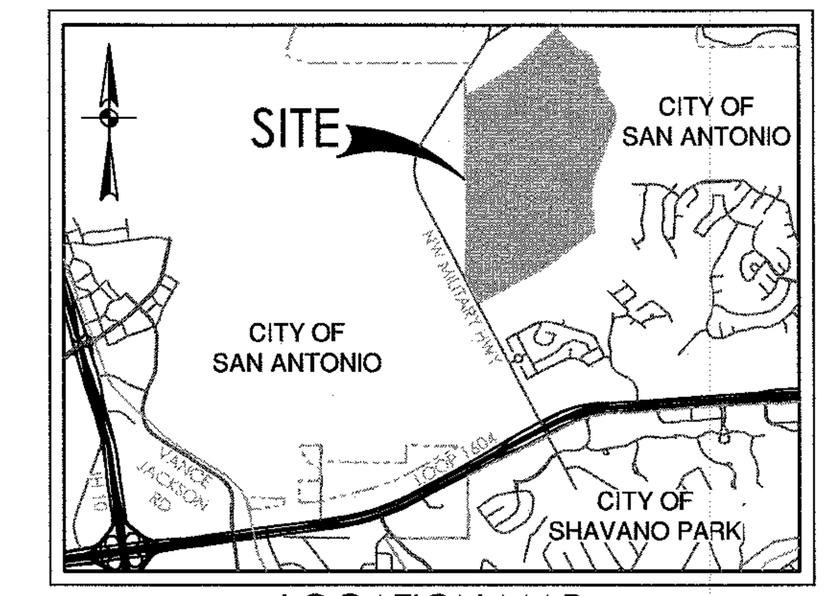
Features S-79 and S-81 through S-88
These features are new water wells. Because the entire site was not remapped, these wells were not directly observed. Based on observed conditions of features S-76 through S-78, these wells are new, properly constructed, and ranked as non-sensitive.

Feature S-80
Feature S-80 is a man-made feature in bedrock, the quarry. Observations of the quarry floors and walls were not required for this geologic assessment.

Features S-200 through S-213
Features S-200 through S-213 include solution cavities and caves within excavated quarry cliff walls. These features were revealed during excavation and mining activities within the quarry. All features identified lie within exposed bedrock in the cliff walls. No infilling was observed at the time of the site visit. The features exist above the final grade of the quarry floor from 5-feet up to approximately 80-feet. Due to safety concerns, all features identified within the quarry walls were evaluated from a safe distance in accordance with Martin Marietta safety protocols and MSHA standards. All measurements were approximated due to the inaccessibility of the features. Because features lie within a vertical cliff wall above the final grade of the quarry floor, the probability for rapid infiltration is low.

ATTACHMENT D
Site Geologic Map(s)





LOCATION MAP

NOT-TO-SCALE

LEGEND

Qal	ALLUVIUM
Kbu	BUDA LIMESTONE
Kdr	DEL RIO CLAY
Kgt	GEORGETOWN FORMATION
Kep	PERSON FORMATION
Kek	KAINER FORMATION
Kgru	GLEN ROSE FORMATION (UPPER)
Kgrl	GLEN ROSE FORMATION (LOWER)
S-1	POTENTIAL RECHARGEFEATURE
	DRAINAGE PATHWAY
	CONTACT, LOCATED APPROXIMATELY
U / D	FAULT, LOCATED APPROXIMATELY (D,DOWNTHROWN SIDE;U,UPTHROWN SIDE)
? ? ?	FAULT EXISTANCEUNCERTAIN
	POSSIBLE FAULT (AS LOCATED BY AERIAL PHOTOGRAPHS)
10	STRIKE AND DIP OF BEDDING
	STRIKE AND DIP OF JOINTS
	STRIKE OF VERTICAL JOINTS
C	CAVE
	NON-KARST CLOSED DEPRESSION
	SINKHOLE
	SOLUTION CAVITY
	OTHER NATURAL BEDROCK FEATURES: VUGGY ROCK, REEF DEPOSITS
	ZONE
MB	MAN-MADE FEATURE IN BEDROCK
W	WATER WELL
	PROPOSED SANITARY SEWER LINE
SS	EXISTING SANITARY SEWER LINE
	50' SEWER ENVELOPE
	PROPOSED MANHOLE
SS	EXISTING MANHOLE

NOTE: THE GEOSCIENTIST SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR PURPOSES OF GEOLOGIC INFORMATION. ALL OTHER INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SIGNED AND SEALED CIVIL ENGINEERING DRAWINGS

NO.	REVISION	DATE

STATE OF TEXAS
ROMAN C. PINEDA
GEOLOGY
10083
LICENSED
PROFESSIONAL GEOSCIENTIST
7-30-18

FORSTER ENGINEERING
TBPE firm # 12385
19915 WITTENBURG, SAN ANTONIO, TEXAS 78256
PHONE: (210) 698-5544, Fax (210) 698-5544
WWW.FORSTERENGINEERING.COM

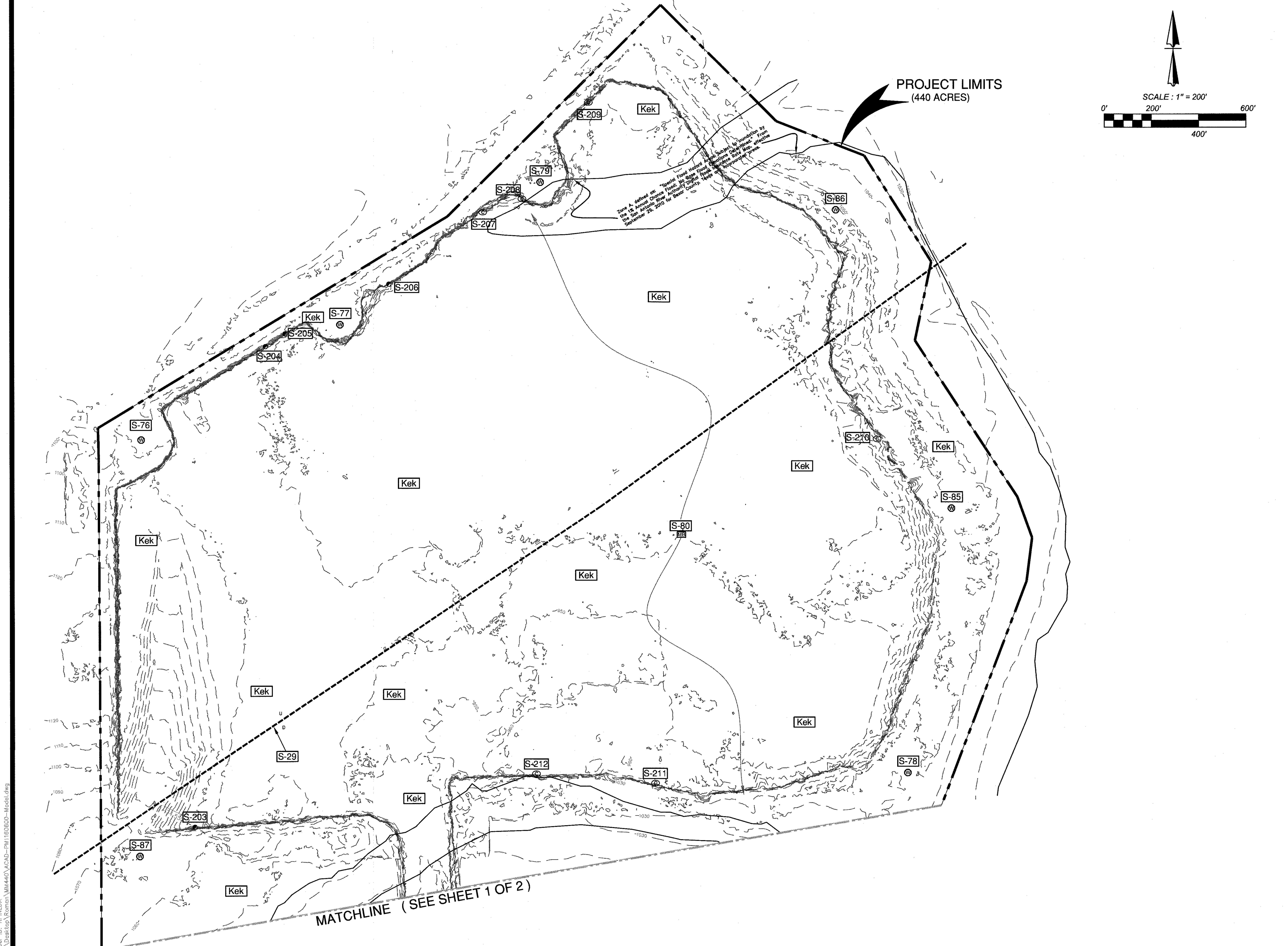
BECKMAN QUARRY 440 ACRE TRACT

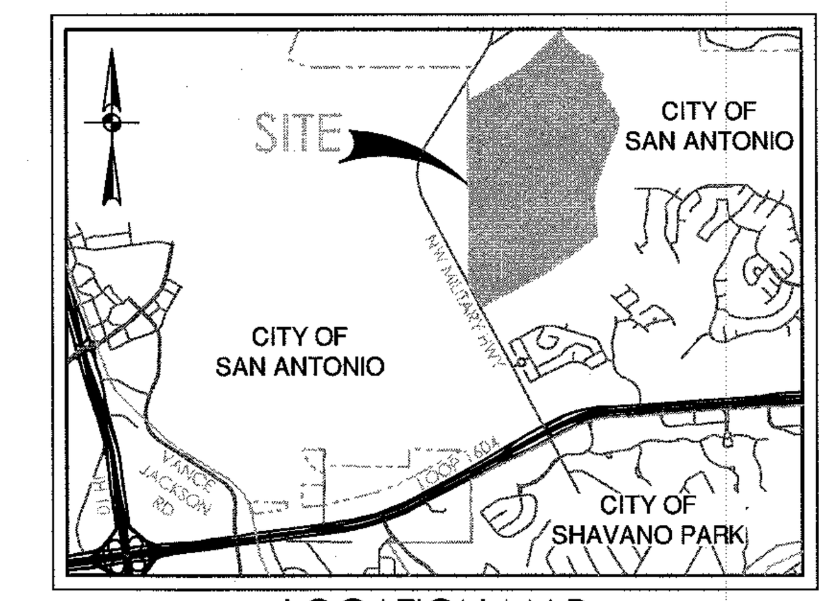
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN
SITE GEOLOGIC MAP

JOB NO. 1149-18
DATE JULY 2018
GEOLOGIST RCP
CHECKED CFP DRAWN RCP
SHEET 1 OF 2

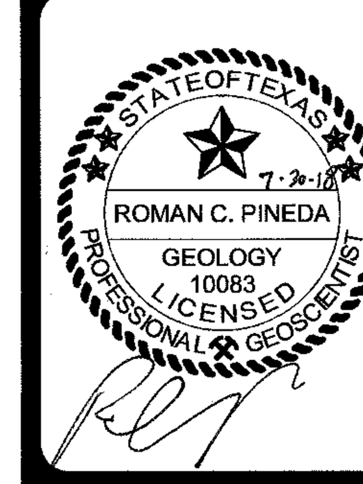
ATTACHMENT D





LOCATION MAP

NOT-TO-SCALE



LEGEND

Qal	ALLUVIUM
Kbu	BUDA LIMESTONE
Kdr	DEL RIO CLAY
Kgt	GEORGETOWN FORMATION
Kep	PERSON FORMATION
Kek	KAINER FORMATION
Kgru	GLEN ROSE FORMATION (UPPER)
Kgrl	GLEN ROSE FORMATION (LOWER)
S-1	POTENTIAL RECHARGEFEATURE
	DRAINAGE PATHWAY
	CONTACT, LOCATED APPROXIMATELY
U / D	FAULT, LOCATED APPROXIMATELY (D,DOWNTHROWN SIDE;U,UPTHROWN SIDE)
? ? ?	FAULT EXISTANCEUNCERTAIN
	POSSIBLE FAULT (AS LOCATED BY AERIAL PHOTOGRAPHS)
10	STRIKE AND DIP OF BEDDING
	STRIKE AND DIP OF JOINTS
	STRIKE OF VERTICAL JOINTS
C	CAVE
	NON-KARST CLOSED DEPRESSION
	SINKHOLE
	SOLUTION CAVITY
	OTHER NATURAL BEDROCK FEATURES: VUGGY ROCK, REEF DEPOSITS
	ZONE
MB	MAN-MADE FEATURE IN BEDROCK
W	WATER WELL
	PROPOSED SANITARY SEWER LINE
SS	EXISTING SANITARY SEWER LINE
	50' SEWER ENVELOPE
	PROPOSED MANHOLE
	EXISTING MANHOLE

NOTE: THE GEOSCIENTIST SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR PURPOSES OF GEOLOGIC INFORMATION. ALL OTHER INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SIGNED AND SEALED CIVIL ENGINEERING DRAWINGS

NO.	REVISION	DATE

FORSTER ENGINEERING

TBPE firm # 12385

19915 WITTENBURG, SAN ANTONIO, TEXAS 78256
PHONE: (210) 698-5544, Fax (210) 698-5544
WWW.FORSTERENGINEERING.COM

BECKMAN QUARRY 440 ACRE TRACT

SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN
SITE GEOLOGIC MAP

JOB NO. 1149–18
DATE JULY 2018
GEOLOGIST RCP
CHECKED CFP DRAWN RCP
SHEET 2 OF 2

ATTACHMENT D

BECKMANN QUARRY
440 ACRES TRACT
SITE SOILS MAP

FORSTER ENGINEERING

SOURCE: UNITED SATES DEPARTMENT OF AGRICULTURE, 1966, SOIL SURVEY-BEXAR COUNTY, TEXAS, USDA, SHEET NUMBERS 15 & 21

0' 500' 1000' 2000'

SCALE: 1" = 1000'

GEOLOGIC ASSESSMENT
(2 OF 2)

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

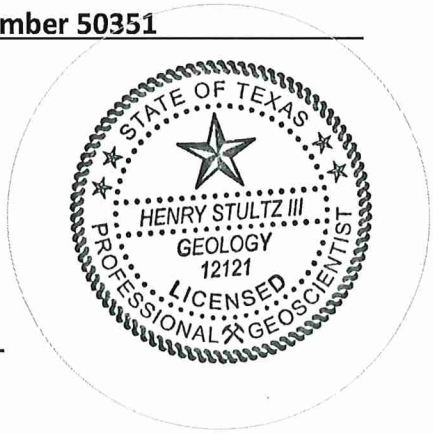
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: **Henry E. Stultz III, P.G.** Telephone: **210-375-9000**

Date: July 10, 2023 Fax: **210-375-9090**

Representing: **Pape-Dawson Engineers, Inc., TBPG registration number 50351**

Signature of Geologist:



Regulated Entity Name: BECKMANN QUARRY 440 ACRE TRACT

Project Information

1. Date(s) Geologic Assessment was performed: **June 30, 2023**
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)
Eckrant very cobbly clay, 5-15% slopes (TaC)	D	1-2

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

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.

ATTACHMENT A
Geologic Assessment Table

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: BECKMANN QUARRY 440 ACRE TRACT																	
LOCATION			FEATURE CHARACTERISTICS											EVALUATION			PHYSICAL SETTING			
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	≥40	<1.6	≥1.6	
Additional geologic or manmade features were not discovered on the project site during the field investigation.																				

** DATUM: NAD 83

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

STATE OF TEXAS
HENRY STULTZ III
GEOLOGY
12121
LICENSED
PROFESSIONAL GEOSCIENTIST

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

Date July 10, 2023

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

ATTACHMENT A

ATTACHMENT B
Stratigraphic Column

Attachment B – Stratigraphic Column

Period	Epoch	Group	Formation	Member	Thickness	Lithology	Hydro-logic Unit	Hydro-stratigraphic Unit	Hydrologic Function	Porosity	Cavern Development
Cretaceous	Early Cretaceous	Edwards	Kainer	Grainstone	40–50	Hard, dense limestone that consists mostly of a tightly cemented miliolid skeletal fragment grainstone; contains interspersed chalky mudstone and wackestone; chert as beds and nodules; crossbedding and ripple marks are common primarily at the contact with the overlying regional dense bed	Edwards Aquifer	V	Aquifer	IP, IG, BU, FR, BP, CV	Few
				Kirsch-berg Evaporite	40–50	Highly altered crystalline limestone and chalky mudstone with occasional grainstone associated with tidal channels; chert as beds and nodules, boxwork molds are common, matrix recrystallized to a coarse grain spar; intervals of collapse breccia and travertine deposits		VI	Aquifer	IG, MO, VUG, FR, BR, CV	Probably extensive cave development
				Dolomitic	90–120	Hard, dense to granular, dolomitic limestone; chert as beds and nodules (absent in lower 20 ft); *Toucasia* sp. abundant; lower three-fourths composed of sucrosic dolomites and grainstones with hard, dense limestones interspersed; upper one-fourth composed mostly of hard, dense mudstone, wackestone, packstone, grainstone, and recrystallized dolomites with bioturbated beds		VII	Aquifer	IP, IC, IG, MO, BU, VUG, FR, BP, CV	Cave development as shafts with minor horizontal extent
				Basal nodular	40–50	Moderately hard, shaly, nodular, burrowed mudstone to miliolid grainstone that also contains dolomite; contains dark, spherical textural features known as black rotund bodies; *Ceratostreon texana*, *Caprina* sp., miliolids, and gastropods		VIII	Aquifer, confining unit in areas without caves	IP, MO, BU, BP, FR, CV	Large lateral caves at surface
		Trinity	Glen Rose Limestone	Upper Glen Rose	0–120 (absent in northern Comal Co.)	Alternating resistant and nonresistant beds of blue shale, nodular marl, and impure, fossiliferous limestone; gray to yellowish gray; stair-step topography; contains two distinct evaporite zones; distinct *Corbula* sp. bed marks the contact with the underlying lower member of the Glen Rose Limestone; *Orbitulina texana*	Upper Trinity Lower confining unit to the Edwards aquifer	Cavernous	Aquifer	MO, BR, BP, FR, CV	Some surface cave development
					120–230 (thicker in northern Comal Co.)			Camp Bullis	Confining	BU, BP, FR, occasional CV	
					0–10			Upper evaporite	Aquifer	IP, MO, BU, BR	
					0–40			Fossil-iferous – Upper	Aquifer	MO, BU, FR, CV	
					80–150			Fossil-iferous – Lower	Confining	MO, BU, FR	
					8–10			Lower evaporite	Aquifer	IP, MO, BU, BR	

Source: Clark, Golab, and Morris (2016); Cavern development modified from Stein and Ozuna (1995). Porosity types - Fabric selective: IP, interparticle porosity; IG, intergranular porosity; IC, intercrystalline porosity; SH, shelter porosity; MO, moldic porosity; BU, burrowed porosity; FE, fenestral; BP, bedding plane porosity. Not fabric selective: FR, fracture porosity; CH, channel porosity; BR, breccia; VUG, vug porosity; CV, cave porosity.

ATTACHMENT C
Site Geology

BECKMANN QUARRY 440 ACRE TRACT
Geologic Assessment

Attachment C – Site Geology

SUMMARY

The Beckmann Quarry 440-acre tract is located along NW Military Hwy, approximately 0.8 miles north of Loop 1604 in Bexar County, Texas.

This assessment is a supplement to the Geologic Assessment, dated July 27, 2018, completed by Roman C. Pineda of Forster Engineering. The additional area is 2.3 acres of land outside of the previously assessed tract.

Based on the results of the field survey conducted in accordance with *Instructions for Geologists for Geologic Assessments in the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 Instructions),* no additional naturally occurring sensitive features were identified on site. Subsequently, no overall potential for fluid migration to the Edwards Aquifer for the site was added.

SITE GEOLOGY

As observed through field evidence, the geologic formation which outcrops at the surface within the subject site is the Kirschberg (Kekk) member of the Kainer formation. The Kekk is a highly altered, crystalline limestone with chert. Karst development within the Kekk is characterized by extensive cave formation.

The predominant trend of faults in the vicinity of the site is approximately N55°E, based on faults identified during the previous mapping of the area.

REFERENCES

Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers Within Northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, scale 1:24,000, 20 p. pamphlet.

Nationwide Environmental Title Research, LLC. Historical Aerials, HistoricAerials.com. https://www.historicaerials.com/viewer, July 3, 2023.

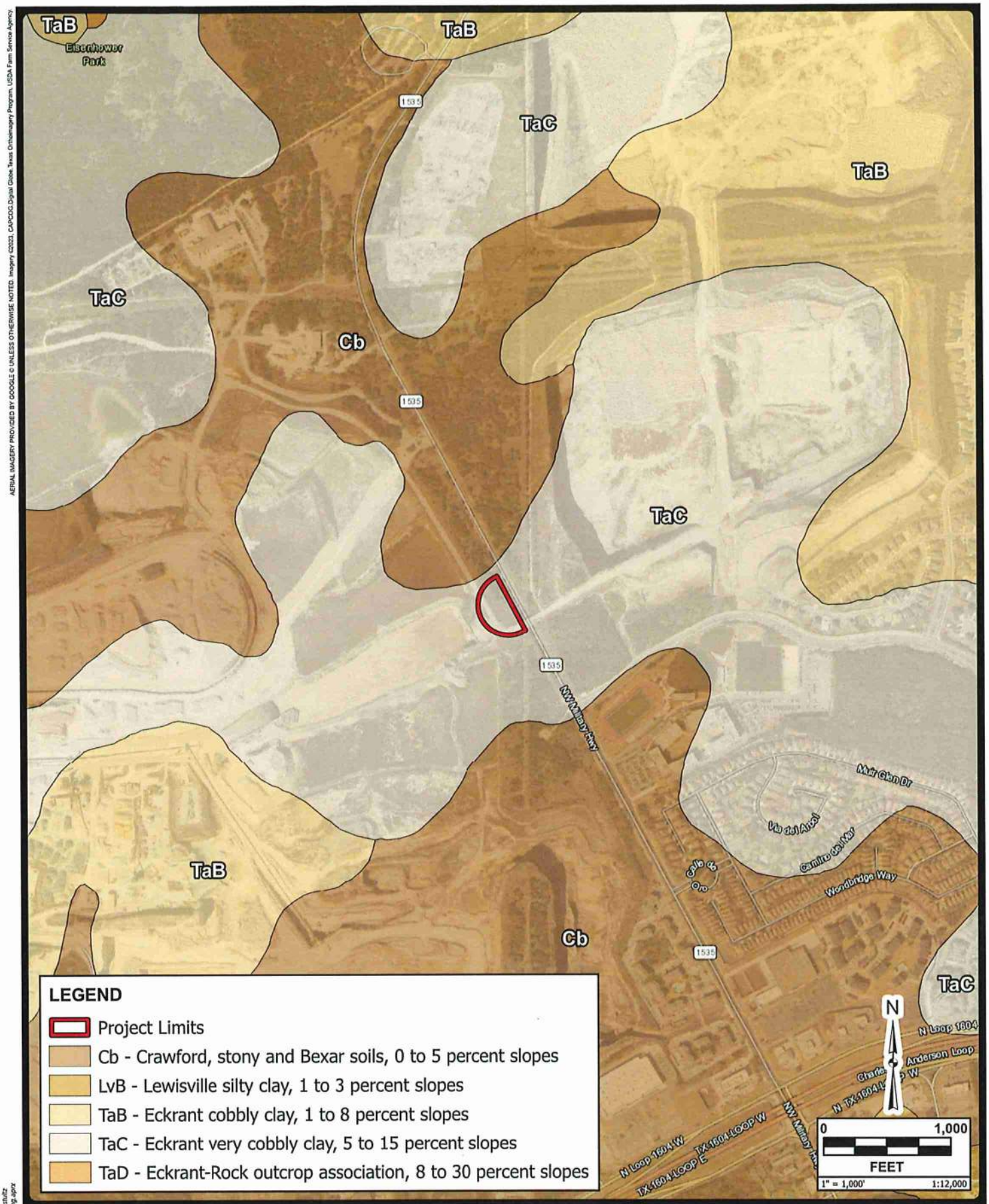
Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/, July 3, 2023.

Stein, W.G., and Ozuna, G.B., 1995, Geologic framework and hydrogeologic characteristics of the Edwards Aquifer recharge zone, Bexar County, Texas: U.S. Geological Survey Water-Resources Investigations Report 95–4030, 8 p.

Texas Water Development Board, Wells in TWDB Groundwater Database Viewer, https://www3.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer, July 3, 2023.

U.S. Geological Survey, National Water Information System: Mapper, https://maps.waterdata.usgs.gov/mapper/index.html, July 3, 2023.

ATTACHMENT D
Site Geologic Map(s)



LEGEND

- Project Limits
- Cb - Crawford, stony and Bexar soils, 0 to 5 percent slopes
- LvB - Lewisville silty clay, 1 to 3 percent slopes
- TaB - Eckrant cobbly clay, 1 to 8 percent slopes
- TaC - Eckrant very cobbly clay, 5 to 15 percent slopes
- TaD - Eckrant-Rock outcrop association, 8 to 30 percent slopes

JOB NO.	12934-00
DATE	Jul 2023
DESIGNER	HS
CHECKED	HDJ
SHEET	ATTACHMENT D

BECKMAN QUARRY 440 ACRE TRACT

BEXAR COUNTY, TEXAS
SITE SOILS MAP

PAPE-DAWSON ENGINEERS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Date: Jul 03, 2023 11:49 AM User: hstultz
File: P:\12934\00\ENV\GA10\S\Working.aprx

MODIFICATION OF A PREVIOUSLY APPROVED WATER POLLUTION ABATEMENT PLAN (TCEQ-0590)

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.

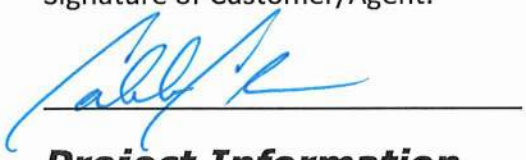
Signature

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: Caleb Chance, P.E.

Date: 4/4/24

Signature of Customer/Agent:



Project Information

1. Current Regulated Entity Name: 440 Quarry Improvements
   Original Regulated Entity Name: Beckman Quarry 440-Acre Tract
   Regulated Entity Number(s) (RN): 102748860
   Edwards Aquifer Protection Program ID Number(s): 13-13061101
   ☐ The applicant has not changed and the Customer Number (CN) is: _____
   ☒ 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	440.2	27.08
Type of Development	Commercial	Transportation
Number of Residential Lots	N/A	N/A
Impervious Cover (acres)	0.334	9.61
Impervious Cover (%	0.5	35.49
Permanent BMPs	Earthen berm, prelim	15' VFS, WQ Basin
Other	Sed/filtration basin	_____

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

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

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

5. ☒ **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.

ATTACHMENT A

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 3, 1997

Mr. Kevin Moore
Redland Stone Products Co.
17910 IH 10 West
San Antonio, TX 78257

Re: EDWARDS AQUIFER, Bexar County
PROJECT: Redland Stone N.W. Military Hwy Quarry, Project number 591, Located on the east side of NW Military Hwy, approximately 2,400' north of Loop 1604, San Antonio, Texas
TYPE: Request for Approval of Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) §213.5(b); Edwards Aquifer Protection Program

Dear Mr. Moore:

The Texas Natural Resource Conservation Commission (TNRCC) has completed its review of the WPAP application for the referenced project that was submitted by MBC Engineers on behalf of Redland Stone Products Co. to the San Antonio Regional Office on June 5, 1997. Final review of the WPAP submittal was completed after additional material was received on September 2, 1997. The WPAP proposed in the application is in general compliance with 30 TAC § 213.5(b); therefore, approval of the plan is hereby granted subject to applicable state rules and the conditions in this approval letter. *This approval expires two (2) years from the date of this approval unless, prior to the expiration date, construction has commenced on the project or an extension of time has been requested.*

PROJECT DESCRIPTION

The proposed industrial project will have an area of 440.2 acres and consist of a rock quarry and crusher. To minimize on-site traffic, crushed rock will be transported by conveyer through a tunnel under N.W. Military Road to the existing Redland Stone Products quarry on the west side of N.W. Military Road. No cement production, concrete production, or fine crushing is proposed. There will be no wastewater produced by this project. The proposed impervious cover for the development is approximately 0.334 acres (0.5%) for a paved entrance drive. The site is located within the City of San Antonio, and must conform with applicable codes and requirements of the City of San Antonio.

GEOLOGY ON SITE

According to the geologic assessment included with the submittal, 75 potentially sensitive features were found on the project site. Twenty-eight (28) features were assessed as not sensitive, and forty-six (46) features were assessed as being possibly sensitive. One (1) feature, a cave zone, was assessed as being a sensitive feature. The San Antonio Regional Office site inspection of August 28, 1997, revealed no additional features.

GEOLOGY DOWNGRADIENT OF SITE

According to the geologic assessment included with the submittal, there were sixty-six (66) potential sensitive features found within one-half mile downgradient of the project site. Eleven (11) features were assessed as not sensitive, forty-three (43) features were assessed as being possibly sensitive. Two (2) features were assessed as being sensitive features.

PERMANENT POLLUTION ABATEMENT MEASURES

The following measures will be taken to prevent pollution of stormwater originating on-site or up-gradient from the project site and potentially flowing across and off the site after construction:

1. A grass stabilized earthen berm will surround the quarry to prevent stormwater runoff from leaving the site before hilltops are excavated below the berm elevation.

2. The preliminary partial sedimentation/filtration basin is designed in accordance with the City of Austin Environmental Design Criteria Manual and should be sized to capture the first one-half inch (½") of stormwater run-off from 231 acres, providing a total capture volume of 422,619 cubic feet. The filtration system will consist of:

    1. an appropriately sized sand filter bed, which is at least 18 inches thick,
    2. an underdrain piping wrapped with geotextile membrane, and
    3. an impervious liner.

3. Prior to the construction of the partial sedimentation/filtration basin, final design plans shall be submitted to the TNRCC for review and approval. The basin will be constructed prior to the actual interception of flow in the tributary to Salado Creek.

4. On-site stormwater runoff and upgradient stormwater runoff, not captured in the sedimentation/filtration basin, will be directed to the open mine area.

5. The majority of the assessed features, fifty-seven (57), will be mined out, seven (7) features will be behind or under the earth berm, ten (10) will be in areas that will not be disturbed and one (1) will be protected with a gabion with a silt fence.

SPECIAL CONDITIONS

1. If any potentially sensitive features are encountered during construction, a geologist shall evaluate the significance of the features. The evaluation shall include representative photographs and a description of the feature forwarded to the San Antonio office. Construction in the vicinity of the features may only continue with written approval from the TNRCC.

2. Placement of hydrocarbon or hazardous substance storage facilities regulated pursuant to 30 TAC 213.5(d) and 30 TAC 213.5(e), requires submittal of all appropriate applications with appropriate fees and must receive prior approval from the TNRCC.

3. The sedimentation/filtration basins are designed in accordance with the City of Austin Environmental Design Criteria Manual. The basins will incorporate sedimentation and filtration as described above.

4. A formal maintenance plan and schedule for all permanent pollution abatement measures shall be submitted to the San Antonio office for review and possible modification prior to completion of construction. The plan shall include a responsible party and the anticipated cleaning schedule. Upon approval, the plan shall be implemented in accordance with the approved schedule.

5. All permanent pollution abatement measures shall be operational prior to completion of construction.

6. The TNRCC may monitor stormwater discharges from the site to evaluate the adequacy of permanent erosion and sedimentation (E&S) control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

7. By the TNRCC letter dated March 18, 1997, a water pollution abatement plan was approved for this 440.2 acre tract. This approval letter supersedes the March 18, 1997 approval and all conditions and requirements of the March 18, 1997 letter are null and void.

STANDARD CONDITIONS

1. 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, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity, upon which that person or entity shall assume responsibility for all provisions and conditions of this approval.

2. Any modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a WPAP to amend this approval, including the payment of appropriate fees and all information necessary for its review and approval.

3. Prior to commencing any regulated activity, the applicant or his agent must notify the San Antonio Regional Office in writing of the date on which the regulated activity will begin.

4. The applicant or his agent shall record this WPAP approval in the county deed records within 30 days of receiving this notice of approval and prior to commencing any regulated activity at the project location. Proof of deed recordation shall be submitted to the San Antonio Regional Office. A suggested format that you may use to deed record the approved WPAP is enclosed.

5. 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 WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.

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

7. If any significant recharge feature [sensitive feature] 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 potential adverse impacts to water quality.

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

9. Approval of the design of the sewage collection system for this proposed project shall be obtained from the TNRCC prior to commencement of construction of any sewage collection system.

10. One (1) well exists on the site. Any abandoned wells shall be plugged in accordance with 30 TAC § 338 or an equivalent method, as approved by the Executive Director.

Any drill holes resulting from core sampling on-site or down-gradient of the site shall be plugged with native soil, from the bottom of the hole to the top of the hole, so as to not allow water or contaminants to enter the subsurface environment.

11. Pursuant to §26.136 of the Texas Water Code, any violations of the requirements in 30 TAC §213 may result in administrative penalties.

12. A formal maintenance plan and schedule for all permanent abatement measures shall be signed by the responsible party and submitted to the San Antonio Regional Office for review and possible modification prior to completion of construction.

If you have any questions or require additional information, please contact John Mauser of the Edwards Aquifer Protection Program at 210/490-3096. Please reference project number 591.

Sincerely,

Richard Garcia

Dan Pearson
Executive Director

DP/JKM/eg

Enclosure: Deed Recordation Affidavit

cc: Bob Liesman, MBC Engineers
Rebecca Cedillo, San Antonio Water System
Renee Green, Bexar County Public Works
Greg Ellis, Edwards Aquifer Authority
Steve Musick, TNRCC Groundwater Section
TNRCC Field Operations, Austin

Book Volm Page
D 07131 01040

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

September 17, 2018

Mr. Lloyd A. Denton, Jr.
Bitterblue Rogers Water Interest, Ltd
11 Lynn Batts Lane, Suite 100
San Antonio, Texas 78218

Re: Edwards Aquifer, Bexar County

NAME OF PROJECT: Beckmann Quarry 440-Acres; Located at 18495 NW Military HWY; San Antonio, Texas

PLAN TYPE: Request for the Modification of an Approved Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Regulated Entity No. RN102748860; Additional ID No. 13000655

Dear Mr. Denton:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP application for the above-referenced project submitted to the San Antonio Regional Office by Pape Dawson Engineering on behalf of Bitterblue Rogers Water Interest, Ltd on April 9, 2018. Final review of the WPAP was completed after additional material was received on August 20, 2018 and September 7, 2018. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Edwards Aquifer Protection Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. *This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10 percent of the construction has commenced on the project or an extension of time has been requested.*

BACKGROUND

Beckman Quarry (formerly known as Redland Stone Quarry) was originally approved by the Texas Natural Resource Conservation Commission by letter dated September 3, 1997. The project area was 440.2 acres and consisted of quarry activity with a rock crusher. Impervious cover was approximately 0.334 acres. Stabilized earthen berms were the approved permanent BMP(s), a sedimentation filtration basin would be submitted in the future. Martin Marietta

Bridge WPAP was approved on January 28, 2000 (13-99120901) for a one-acre site within the 440-overall site.

A modification was approved on February 9, 2000, for clearing two perimeter areas to provide access to a portable rock crusher and truck traffic. Stormwater was directed from the modified site into the existing quarry on the west side. Earthen berms and stabilization were approved permanent BMP(s).

A second modification was approved on May 17, 2001, for changing the limits of excavation within the 440-acre property; increasing the height of the earthen berm on the east portion of the site; modifying the permanent best management practices to eliminate the use of sedimentation filtration basin; and a request to seal two features. No changes to impervious cover.

Beckmann Quarry 440 Acres WPAP Modification (13-13061101) was approved on August 20, 2013. The proposed commercial project had an area of 440 acres. The modification changed the setback distance from 200 feet to 60 feet along the northern property line except for setback distances from three existing wells. Impervious cover was not changed and remained at 0.334 acres. Natural vegetated buffers were the approved permanent BMP(s).

PROJECT DESCRIPTION

The proposed project includes the redevelopment of the 440-acre site following the full quarry operation completion. The major activity includes mass grading, clearing and grubbing of vegetation and brush berms where applicable to prepare for future development. Construction includes grading of the quarry pit floor for temporary sedimentation ponds and cutting in the access road to Shavano Ranch Rd. The two sedimentation ponds will collect stormwater within their respective watershed. The ponds are designed to retain two consecutive 100-year storm events, silt will be removed from the ponds when design capacity is reduced by 50%, and the pond area will be compacted to a 95% standard proctor density to not allow seepage. Stormwater will evaporate naturally. No additional impervious cover is proposed on the site and will remain as 0.334 acres. No wastewater will be generated. Future development will be submitted under a subsequent WPAP.

PERMANENT POLLUTION ABATEMENT MEASURES

No additional impervious cover is proposed within this application. The existing impervious cover, paved road from NW Military Hwy Bridge, will continue to be treated by the approved 50-ft vegetated buffer. The natural vegetated buffer around the perimeter of the site will be maintained, with the exception of the road cut, and disturbance will only occur within approximately 225 acres of the 440 acres site.

The original approval established the minimum separation distance of 25 feet between the quarry-pit floor and groundwater level as 940 mean sea level (msl); however, this elevation point was not defined through onsite exploration. A letter with supportive documentation dated September 5, 2018, signed by Mr. Richard Klar, P.G., justifies a level of 915-msl to allow the grading for the two temporary sedimentation ponds.

GEOLOGY

According to the geologic assessment included with the application, the site is located on the Kainer Formation. A total of thirty-one (31) features were evaluated by the project geologist, with seventeen (17) geologic features and fourteen (14) manmade features. Two (2) geologic features were rated sensitive (S-35 and S-49) which are located within the established buffer surrounding the quarry pit and outside the 225-acre proposed disturbance area. No regulated activities such as construction or soil disturbing activities will take place within the established the natural buffers. The San Antonio Regional Office site assessment conducted on July 12, 2018 revealed that the site was generally as described in the application.

SPECIAL CONDITIONS

I. This modification is subject to all Special and Standard Conditions listed in the WPAP approval letter dated September 3, 1997 and subsequent modifications dated January 28, 2000, February 9, 2000, May 17, 2001, and August 20, 2013.

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

III. Intentional discharges of sediment laden water from regulated activities are not allowed. If dewatering becomes necessary, appropriate measures must be taken.

IV. This approval does not authorize the construction or installation of aboveground storage tanks at the site on the Edwards Aquifer recharge zone.

V. The application did not propose the use of fill material to establish final grade. Any material used for the primary purpose of filling an excavation must consist of inert materials as defined by 30 TAC 330.3.

STANDARD CONDITIONS

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

Prior to Commencement of Construction:

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

5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

<u>During Construction:</u>

10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.
12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the San Antonio Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.
13. Thirteen wells exist on site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing

and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.

14. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.
16. The following records shall be maintained and made available to the executive director upon request: the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

18. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the San Antonio Regional Office within 30 days of site completion.
19. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.

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

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 Ms. Lillian Butler of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4026.

Sincerely,

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

LB/LB/eg

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625

cc: Mr. Rick Wood, P.E., Pape Dawson Engineers
Ms. Renee Green, P.E., Bexar County Public Works
Mr. Scott Halty, San Antonio Water System
Mr. Roland Ruiz, Edwards Aquifer Authority
Mr. George Wissmann, Trinity Glen Rose Groundwater Conservation District

ATTACHMENT B

Attachment B – Project Description

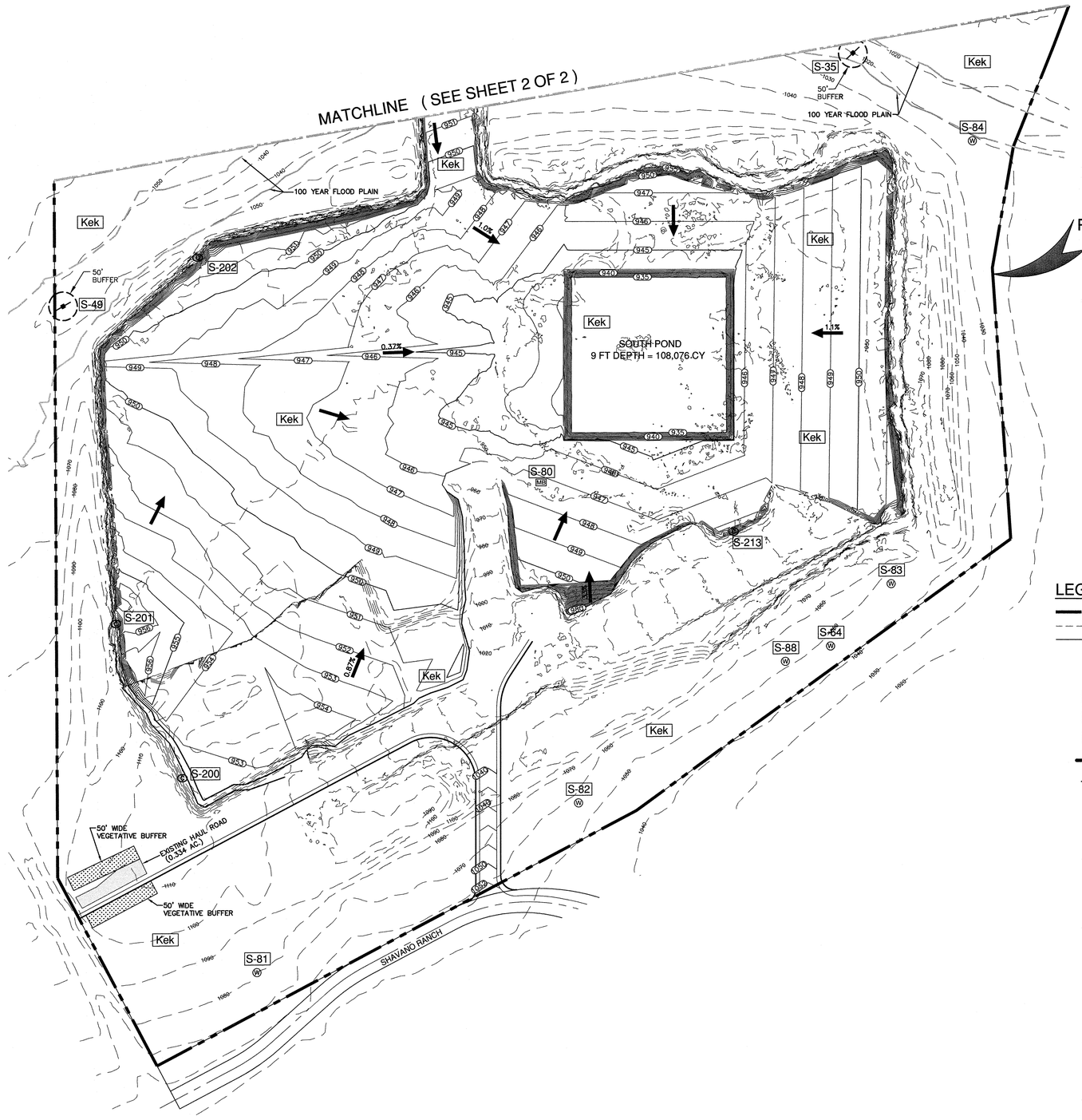
440 Quarry Improvements Water Pollution Abatement Plan Modification (WPAP MOD) is a modification of the original Redland Stone NW Military Hwy Quarry WPAP, approved by the Texas Natural Resources Conservation Commission on September 3, 1997, as a 440.20-acre quarry. Since the original approval, Texas Commission on Environmental Quality has approved four (4) modifications for the quarry site, including the most recent modification, the Beckam Quarry 440-Acres (EAPP ID No. 13000655), approved on September 17, 2018, which approved clearing and mass grading to prepare for future development. 440 Quarry Improvements Abatement Plan proposes the construction of both a public and private street, utilities, batch detention basin, retention basin, lift station site, pressure reducing valve site, and associated drainage structures on approximately 27.08 acres. The impervious cover will be 9.61 acres which will account for the paving that will occur on the site for street, sidewalk, drainage, and utility facilities.

The project site is located within the city limits of San Antonio approximately 0.3 miles northeast of NW Military Hwy and Shavano Ranch Road. The site is located within the city limits of San Antonio in Bexar County, Texas and is entirely over the Edwards Aquifer Recharge Zone. No naturally occurring sensitive features were identified due to the site being a pre-existing rock quarry.

This WPAP proposes clearing, grading, excavation, and construction for a roadway and utility facility foundations. Approximately 9.61 acres of impervious cover is proposed for this project or 35.49% of the 27.08-acre site. Out of the total 9.61 acres of impervious cover, 5.48 acres of impervious cover will be directly treated by the proposed batch detention basin “A”. Water Quality Basin “A” will be a Batch Detention Basin with the removal efficiency of 91% as assigned by TCEQ. Four (4) fifteen-foot (15’) wide Engineered Vegetative Filter Strips (VFS) will provide treatment for 2.60 acres of impervious cover. Area “I” was previously untreated within the Cornerstone High School WPAP (RN102748860). The 1.57 acres of impervious cover is converted to direct treatment via Basin A and swapped with approximately 1.53 acres of untreated impervious cover from watersheds G and H.

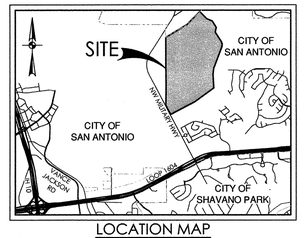
The proposed PBMPs for this project consists of one (1) batch detention basin (Basin “A”) and four (4) fifteen-foot (15’) engineered vegetative filter strip (VFS) designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements.

ATTACHMENT C



SCALE: 1"= 200'

0' 200' 400' 600'



LOCATION MAP
NOT-TO-SCALE

LEGEND

- PROJECT LIMITS
- 950 EXISTING GRADE
- 950 PROPOSED GRADE
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- 50' WIDE VEGETATIVE FILTER STRIP
- Kek KAINER FORMATION
- S-1 POTENTIAL RECHARGE FEATURE
- FAULT, LOCATED APPROXIMATELY (D, downthrown side; U, upthrown side)
- STRIKE OF VERTICAL JOINTS
- C CAVE
- MB MANMADE FEATURE IN BEDROCK
- W WATER WELL

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES:

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG-348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG-348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG-348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 0.3% TO 68%

NOTES:

1.) CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION FOR SOIL STABILIZATION PRIOR TO SITE CLOSEOUT.

2.) ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 3

NO.	REVISION	DATE

STATE OF TEXAS
W.R. WOOD
65364
LICENSED PROFESSIONAL ENGINEER
8-20-18

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

BECKMAN QUARRY 440 ACRE TRACT
SAN ANTONIO, TEXAS

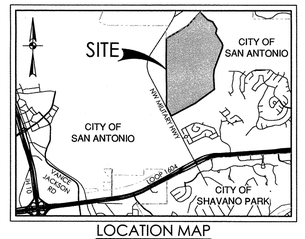
WATER POLLUTION ABATEMENT PLAN
PERMANENT WATER POLLUTION ABATEMENT PLAN

PLAT NO.
JOB NO. 11606-00
DATE MARCH 2018
DESIGNER JP
CHECKED TB DRAWN RO
SHEET 1 OF 2

Date: Aug 20, 2018, 1:41pm User ID: ROlivarez
File: P:\116\06\00\Design\Environmental\WPAP\PM116060O.dwg

SCALE: 1"= 200'

0' 200' 400' 600'



LOCATION MAP
NOT-TO-SCALE

LEGEND

- PROJECT LIMITS
- 950 EXISTING GRADE
- 950 PROPOSED GRADE
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- Kek KAINER FORMATION
- S-1 POTENTIAL RECHARGE FEATURE
- FAULT, LOCATED APPROXIMATELY (D, downthrown side; U, upthrown side)
- STRIKE OF VERTICAL JOINTS
- C CAVE
- MB MANMADE FEATURE IN BEDROCK
- W WATER WELL

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES:

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG-348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG-348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG-348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 0.3% TO 68%

NOTES:

1.) CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION FOR SOIL STABILIZATION PRIOR TO SITE CLOSEOUT.

2.) ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 3

NO.	REVISION	DATE

STATE OF TEXAS
W.R. WOOD
65364
LICENSED
PROFESSIONAL ENGINEER
8-20-18

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

BECKMAN QUARRY 440 ACRE TRACT
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN
PERMANENT WATER POLLUTION ABATEMENT PLAN

PLAT NO.
JOB NO. 11606-00
DATE MARCH 2018
DESIGNER JP
CHECKED TB DRAWN RO
SHEET 2 OF 2

Date: Aug 20, 2018, 1:41pm User ID: ROlivarez
File: P:\116\06\07\Design\Environmental\WPAP\Pal116060D.dwg

WATER POLLUTION ABATEMENT PLAN APPLICATION FORM (TCEQ-0584)

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

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

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

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

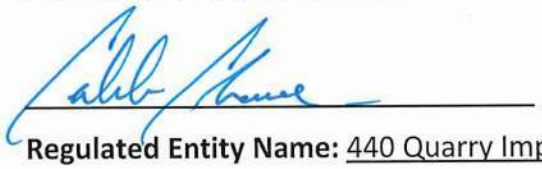
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Caleb Chance, P.E.

Date: 3/27/24

Signature of Customer/Agent:



Regulated Entity Name: 440 Quarry Improvements

Regulated Entity Information

1. The type of project is:

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

2. Total site acreage (size of property):27.08

3. Estimated projected population:N/A

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

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops		÷ 43,560 =	
Parking		÷ 43,560 =	
Other paved surfaces	418,612	÷ 43,560 =	9.61
Total Impervious Cover	418,612	÷ 43,560 =	9.61

Total Impervious Cover 9.61 **÷ Total Acreage** 27.08 **X 100 =** 35.49**% Impervious Cover**

5. ☒ **Attachment A - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.

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

For Road Projects Only

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

7. Type of project:

   ☐ TXDOT road project.
   ☐ County road or roads built to county specifications.
   ☐ City thoroughfare or roads to be dedicated to a municipality.
   ☒ Street or road providing access to private driveways.

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

   ☐ Concrete
   ☒ Asphaltic concrete pavement
   ☐ Other: _____

9. Length of Right of Way (R.O.W.): 4649 feet.

   Width of R.O.W.: Variable feet.
   L x W = Variable Ft^2 ÷ 43,560 Ft^2/Acre = 5.25 acres.

10. Length of pavement area: 4949 feet.

    Width of pavement area: Variable feet.
    L x W = Variable Ft^2 ÷ 43,560 Ft^2/Acre = 4.10 acres.
    Pavement area Variable acres ÷ R.O.W. area Variable acres x 100 = 78.1% impervious cover.

11. ☐ A rest stop will be included in this project.

    ☐ A rest stop will not be included in this project.

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

Stormwater to be generated by the Proposed Project

13. ☒ **Attachment B - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

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

_____% Domestic	_Gallons/day
_____% Industrial	_____Gallons/day
_____% Commingled	_____Gallons/day
TOTAL gallons/day _____	

15. Wastewater will be disposed of by:

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

- ☐ **Attachment C - Suitability Letter from Authorized Agent**. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.
- ☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☐ Sewage Collection System (Sewer Lines):

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

- ☐ The SCS was previously submitted on_____.
- ☒ The SCS was submitted with this application.
- ☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

☒ The sewage collection system will convey the wastewater to the Steven M. Clouse Water Recycling Center (name) Treatment Plant. The treatment facility is:

☒ Existing.
☐ Proposed.

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

Site Plan Requirements

Items 17 – 28 must be included on the Site Plan.

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

Site Plan Scale: 1" = 300'.

18. 100-year floodplain boundaries:

☒ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
☐ No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA DFIRM (Digital Flood Insurance Rate Map for Bexar County, Texas and Incorporated areas) Map Number 48029C0235G, dated September 29, 2010.

19. ☒ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, open space, etc. are shown on the plan.

☐ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

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

☐ There are 0 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

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

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

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

☐ All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.
☒ No sensitive geologic or manmade features were identified in the Geologic Assessment.

☐ **Attachment D - Exception to the Required Geologic Assessment**. A request and justification for an exception to a portion of the Geologic Assessment is attached.

22. ☒ The drainage patterns and approximate slopes anticipated after major grading activities.
23. ☒ Areas of soil disturbance and areas which will not be disturbed.
24. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
25. ☒ Locations where soil stabilization practices are expected to occur.
26. ☐ Surface waters (including wetlands).

    ☒ N/A
27. ☐ Locations where stormwater discharges to surface water or sensitive features are to occur.

    ☒ There will be no discharges to surface water or sensitive features.
28. ☒ Legal boundaries of the site are shown.

Administrative Information

29. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
30. ☒ Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

ATTACHMENT A

Attachment A – Factors Affecting Surface Water Quality

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

- Soil erosion due to the clearing of the site;
- Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle drippings;
- Hydrocarbons from asphalt paving operations;
- Miscellaneous trash and litter from construction workers and material wrappings;
- Concrete truck washout.
- Potential overflow/spills from portable toilets

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

- Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings;
- Dirt and dust which may fall off vehicles; and
- Miscellaneous trash and litter.

ATTACHMENT B

Attachment B – Volume and Character of Stormwater

Stormwater runoff will increase as a result of this development. For a 25-year storm event the overall project will generate approximately 96.4 cfs. The runoff coefficient (C) for the site changes from approximately 0.72 before development to 0.97 after development. C-Values are based on the Rational Method using runoff coefficients per the City of San Antonio Storm Water Design Criteria Manual, Table 5.5.3A.

ORGANIZED SEWAGE COLLECTION SYSTEM PLAN (TCEQ-0582)

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: 440 Quarry Improvments

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: Lloyd Denton
   Entity: Shavano Quarry Development, Ltd
   Mailing Address: 11 Lynn Batts Lane, Suite 100
   City, State: San Antonio, TX Zip: 78218
   Telephone: (210) 828-6131 Fax: _____
   Email Address: laddiedenton@bitterblue.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: Caleb Chance
   Texas Licensed Professional Engineer's Number: 98401
   Entity: Pape-Dawson Engineers, Inc.
   Mailing Address: 2000 NW Loop 410
   City, State:San Antonio, Texas Zip: 78213
   Telephone:(210) 375-9000 Fax:(210) 375-9010
   Email Address:cchance@pape-dawson.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: _____
   ☐ Multi-family: Number of residential units: ____
   ☒ Commercial
   ☐ Industrial
   ☐ Off-site system (not associated with any development)
   ☐ Other: _____

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

100% Domestic	324,000 gallons/day
_____% Industrial	_____ gallons/day
_____% Commingled	_____ gallons/day

   Total gallons/day: 324,000 gpd

6. Existing and anticipated infiltration/inflow is 600 gallons/day. This will be addressed by: adequate sizing of the sewer main.

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 concurrently, but has not been approved.
   ☐ A WPAP application is required for an associated project, but it has not been submitted.
   ☐ There is no associated project requiring a WPAP application.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	***Linear Feet (1)***	***Pipe Material (2)***	***Specifications (3)***
8" Gravity	135	PVC, SDR 26	ASTM D3034, ASTM D3212
Dual 6" - Class 200 DIPS, Pressure Rated (160-psi)	2176	Class 200 DIPS HDPE, DR 11	ASTM D2241, Class 160, ASTM D3139

Total Linear Feet: 2,311

(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.

9. The sewage collection system will convey the wastewater to the Steven M. Clouse Water Recycling Center (name) Treatment Plant. The treatment facility is:

☒ Existing
☐ Proposed

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

☒ The City of San Antonio 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

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
Gravity Main	C5.08 Of C5.08	STA: 1+31.07	M.H. "LS1"
	Of		
	Of		
	Of		

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	Of		
	Of		
	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" = 50'.

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:

☒ 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:

☒ 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*
N/A	N/A of N/A	N/A to N/A
	of	to
	of	to
	of	to

23. 5-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or 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*
N/A	N/A of N/A	N/A to N/A
	of	to
	of	to
	of	to

24. ☒ Legal boundaries of the site are shown.

25. ☒ 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*
See attached				

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*
N/A	N/A	N/A	N/A

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*
N/A			

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*
N/A	N/A	N/A	N/A	N/A	N/A

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]**	N/A of N/A
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	H of C5.04
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	N/A of N/A
Typical trench cross-sections **[Required]**	I of C5.02
Bolted manholes **[Required]**	H of C5.10
Sewer Service lateral standard details **[Required]**	N/A of N/A
Clean-out at end of line **[Required, if used]**	N/A of N/A
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	N/A of N/A

Standard Details	*Shown on Sheet*
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	C of C5.04
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	N/A of N/A
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	N/A of N/A

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: Once advised of TCEQ site visit

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: Caleb Chance, P.E.

Date: _____

Place engineer's seal here:

Signature of Licensed Professional Engineer:

3/27/24

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)

440 QUARRY IMPROVEMENTS

Engineering Design Report – 8” Gravity Main

April 2024

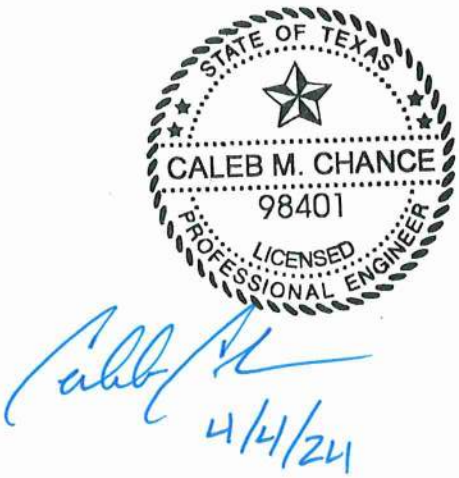
PAPE-DAWSON ENGINEERS

Transportation | Water Resources | Land Development | Surveying | Environmental

440 QUARRY IMPROVEMENTS

Engineering Design Report – 8" Gravity Main

April 2024



PAPE-DAWSON ENGINEERS

440 QUARRY IMPROVEMENTS
Engineering Design Report
8" PVC SDR 26

TABLE OF CONTENTS

440 QUARRY IMPROVEMENTS
Engineering Design Report
8" PVC SDR 26

INTRODUCTION

This Engineering Design Report has been prepared to comply with the Texas Commission on Environmental Quality's Design Criteria for Domestic Wastewater Systems (30 TAC 217), and regulations over the Edwards Aquifer Recharge Zone (30 TAC 213). Please note, throughout this application, the more stringent of SAWS, COSA or TCEQ regulations shall apply.

PROJECT INFORMATION

440 Quarry Improvements Water Pollution Abatement Plan proposes the construction of a public and private street, utilities, public and private drainage, and batch detention basin on approximately 38.69 acres. This acreage includes the project drainage areas and the fifty-foot (50') sewer envelope. The project site is located within the San Antonio city limits, approximately 0.3-mile northeast of NW Military Hwy and Shavano Ranch Road. The project site is entirely over the Edwards Aquifer Recharge Zone. No naturally occurring sensitive features were identified in the Geologic Assessment.

440 Quarry Improvements Sewage Collection System (SCS) Application proposes the construction of a total of 135 LF of 8-inch (8") PVC, SDR 26 gravity sewer main. Regulated activities proposed include excavation, construction of sewer mains, backfill and compaction. Approximately 0.80 acres 27.08-acre overall project site may be disturbed for this SCS installation.

The contributing acreage for inflow and infiltration is 174 acres. The proposed development will generate approximately 79,200 gallons per day (average flow) of additional domestic wastewater based on the assumption of 200 EDUs for the 396 EDUs. Potable water services are also provided by San Antonio Water Systems (SAWS). Wastewater treatment and disposal for the area will be provided by the existing Steven M. Clouse Water Recycling Center (WRC) operated by SAWS. Refer to included EDR and SCS application for additional details. Please refer to Sheet C2.00 of the attached sewer plans, which shows the proposed service area and its topographic features. This system is designed to have a minimum structural life of 50 years. Safety considerations are the responsibility of the contractor.

440 QUARRY IMPROVEMENTS
Engineering Design Report
8" PVC SDR 26

GRAVITY SANITARY SEWER PIPING: FLOW & CAPACITY ANALYSIS

Basis for average flow used for design of collection system (**check one or more**):

Per Capita Contributions:	✓
Service Connections:	
Land Area and Use:	✓
Fixture Analysis:	

Odor Control

Odor Control is not necessary on this project as it is a gravity line and there will be no conditions where sewage is standing and will become septic.

Flow Calculation

Peaking Factor used for design: **2.5**

Peaking Factor is based on: **SAWS Specifications for peak dry weather flow (from SAWS USR 11.3.1)**

Total EDUs = 396 *****

***** *The total number of EDUs includes flow from both currently proposed as well as previously approved Line "A" construction, as based on SAWS criteria for this Unit.*

1 EDU = 200 gallons per day (average sewage flow)
= 500 gallons per day (peak flow)

Infiltration = 600 gallons per acre served

Avg. Flow = 396 EDUs x (200 gpd/EDU) + [(600 gpd/acre) x 174 acres] = ***183,600*** *gpd =* ***127.5*** *gpm*

Peak Flow = 396 EDUs x (500 gpd/EDU) + [(600 gpd/acre) x 174 acres] = ***302,400*** *gpd =* ***210*** gpm

Please note that capacities are determined using Manning's equation for pipes flowing full with an "n" value of 0.013. A reference for Manning's Equation can be found in "The Uni-Bell Handbook of PVC Pipe: Design and Construction".

440 QUARRY IMPROVEMENTS
Engineering Design Report
8" PVC SDR 26

Capacity Calculation

Characteristics of 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe:

Nominal Size = 8"

Outer Diameter (D_o) = 8.625"

Minimum Wall Thickness (t) = 0.332"

Inner Diameter (D_i) = 7.961"

Manning's Equation:

$Q = (k/n)(A)(R^{2/3})(S^{1/2})$

$v = Q/A$

Where:

Q = Discharge (cfs)

k = Constant [(1.49 $ft^{1/3}$)/sec.]

n = Manning's roughness coefficient (unitless)

A = Flow area (ft^2)

R = Hydraulic Radius (ft)

= A/P = Cross sectional area of flow (ft^2)/Wetted perimeter (ft.)

S = Slope (ft/ft)

v = Velocity of flow (ft/s)

n = 0.013 [as required by 30 TAC 213.53 A(i)]

Calculations for 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe:

$A = \pi(D_i^2)/4 = \pi(7.961\ in)^2/4 = 49.76\ in^2 = 0.35\ ft^2$

$P = \pi(D_i) = \pi(7.961\ in) = 25.01\ in = 2.08\ ft$

$R = A/P = 0.35\ ft^2/2.08\ ft. = 0.17\ ft$

$S = 0.004$

$Q = [(1.49\ ft^{1/3}/sec)/0.013](0.35\ ft^2)(0.17\ ft)^{2/3}(0.004)^{1/2}$

$Q = 0.78\ cfs = 350\ gpm = Q_{full}$

*v = 0.78 cfs/0.35 ft^2=**2.23 ft/s***

*Qmax = 0.78 cfs (0.90)(7.48 gallons/1 cf)(60 sec/1 min.)=**315 gpm***

Nominal Main Size (in)	Outer Diameter (in)	Minimum Slope (%)	Area (ft^2)	Hydraulic Radius (A/P) ft	$R^{2/3}$	$S^{1/2}$	Q-Full (cfs)	Max Pipe (%)	Velocity (ft/s)	Q-Max (gpm)
8	*8.625*	*0.40*	*0.35*	*0.17*	*0.31*	*0.063*	*0.78*	*90*	*2.23*	*315*

Conclusion

The proposed 8" pipe with a minimum slope of 0.40% has sufficient capacity to convey the projected average and peak flows.

GENERAL STRUCTURAL COMPONENTS

Project Materials (Pipe and Joints):

Nominal Pipe Diameter (in)	Linear Feet	Pipe Material	National Standard Specification for Pipe Material	National Standard for Pipe Joints
8	*135.03*	*PVC SDR 26*	*ASTM 2241, Class 160*	*ASTM D3139*

Note: Section 217.53 (j)(4) requires a minimum pipe diameter of 6 inches for all gravity sanitary sewer collection system piping.

Watertight, size on size resilient connectors conforming to ASTM C-923 have been specified for connecting pipe to manholes. See SAWS Standard Specification for Construction Detail DD-852-01.

Where a collection system parallels a water supply pipe and a nine-foot separation distance cannot be achieved, Section 217.53 (d)(3)(A)(i) requires a collection system pipe be constructed of cast iron, ductile iron, or PVC meeting ASTM specifications with at least a 150 pounds per square inch (psi) rating for both the pipe and joints. The proposed project will comply with these requirements.

Where a collection system pipe crosses a water supply line and a nine-foot separation distance cannot be achieved, Section 217.53(d)(3)(B)(i) requires the collection system pipe be constructed of cast iron, ductile iron, or PVC with a minimum pressure rating of 150 psi. The proposed project will comply with this requirement and that of 217.53(d)(3)(B)(iii).

Project Materials (Bedding):

The specified bedding will comply with ASTM D2321-11 Class I, II or III for materials and densification. A minimum of 6 inches of bedding is required for all pipe.

Pipe Diameter (in)	Pipe Material	Bedding Class
8	*PVC*	*Class I & Class III*

The selection of bedding class is based on SAWS detail DD-804-01 for sanitary sewer pipe laid in a trench. Initial backfill for the pipe sizes shown above will be Class I. Secondary backfill will be Class III. See Table 2 of ASTM D2321-11 "Soil Classes" in Appendix A of this subsection.

Project Materials (Manholes):

Section 217.55 (f) prohibits the use of bricks to adjust a manhole cover to grade or construct a manhole. The proposed project will comply with this requirement.

The inside diameter of a manhole must be no less than 48 inches.

Section 217.55 (n) requires watertight, size-on-size resilient connectors that allow for differential settlement and must conform to American Society for Testing and Materials C-923. The proposed project complies with this requirement.

Under 30 TAC 213.5(C)(3)(A), all manholes over the Recharge Zone must be watertight, with watertight rings and covers. The proposed project complies with this requirement.

The materials specified for manhole construction are **precast concrete.**

Project Materials (Manhole Covers):

Manhole covers must be constructed of impervious materials. If personnel entry is required, a minimum 30-inch diameter clear opening must be provided. Inclusion of steps in a manhole is prohibited. If a manhole must be located within a 100-year flood plain, then a means of preventing inflow is required. A manhole cover that is located in a roadway must meet or exceed the American Association of State Highways and Transportation Officials Standard M-306 for load bearing.

Under 30 TAC 213.5 (c)(3)(A), all manholes over the Edwards Aquifer Recharge Zone must be watertight, with watertight rings and covers. This proposed project complies with this requirement.

Minimum and Maximum Slopes

Note: All pipes are designed with a slope that will provide a velocity of at least 2 ft/s flowing full, as calculated using Manning's equation with an "n" value of 0.013. Additionally, the collection system is designed to ensure that, with pipes flowing full, the velocities will be less than 10 feet per second.

The following are the minimum and maximum slopes for each pipe diameter:

Pipe Diameter: ***8" (PVC)*** Min. Slope: ***0.40%*** Max. Slope: ***0.40%***

Backfill

Note: The backfill will be free of stones greater than 6 inches in diameter and free of organic or any other unstable material. See SAWS Item No. 804 for additional specifications.

Trenching

Note: The trench width will be minimized while still allowing adequate width for proper compaction of backfill, and while still ensuring that at least 6 inches of backfill exists below and on each side of the pipe. The trench walls will be vertical to at least one foot above the pipe.

Trenching will occur over the Recharge Zone and will comply with 30 TAC 213.5.

Minimum and Maximum Trench Width

Based on SAWS Standard Drawing DD-804-01 and 30 TAC 217.54:

Pipe Diameter: ***8" (160 psi)*** Min. Trench Width: ***23***" Max. Trench Width: ***35"***

These trench widths account for the bell diameter.

Corrosion Prevention

Proposed collection system components (pipes, manholes, etc.) will not be susceptible to deterioration through the corrosive effects of an anaerobic sewage environment. The interior of the manholes, however, are to be coated with a SAWS approved sewer structural coating per SAWS April 2014 Standard Specifications (Item No. 852, Section 852.3, Item 5). Epoxy coating specifically approved. The epoxy coating on the interior walls of the manhole provide interior corrosion protection.

Manholes (General)

Note: Manholes are provided at all changes in size, grade or alignment of pipe, at the intersection of all pipes and at the end of all lines that may be extended at a future date. A clean-out with watertight plugs may be installed instead of a manhole if no extensions are anticipated. Clean outs must pass all testing requirements outlined for gravity collection pipes.

The project complies with the maximum manhole spacing allowed by the TCEQ:

Pipe Diameter (in)	Max. Manhole Spacing (ft)
6 - 15	500
18 - 30	800
36 - 48	1000

54 or larger	2000

Manhole Spacing:

Pipe Diameter: ***8"*** Max. Spacing: ***103.96 LF***

See SAWS Standard Specification in Appendix B for additional manhole specifications.

Manholes (Inverts)

The bottom of a manhole must contain a U-shaped channel, which is a smooth continuation of the inlet, and outlet pipes. The bench above the channel must be sloped a minimum of 0.5 inches per foot. See SAWS detail DD-852-01, which complies with these requirements. Note, a manhole connected to a pipe less than 15 inches in diameter must have a channel depth equal to at least half the largest pipe's diameter.

Manholes (Ventilation)

Vented manholes are proposed for this SCS. Manholes are proposed to be vented to minimize inflow at intervals no more than 1,500-feet. Please see SAWS Detail DD-852-02 when proposed.

FLEXIBLE PIPE COMPUTATIONS

Please note, all flexible pipe computations are based on engineering principles and practices for the design of buried PVC pipe systems. Equations used can be found in "The Uni-Bell PVC Pipe Association Handbook of PVC Pipe: Design and Construction". Please note, the equations used may be in a different format than shown in the Uni-Bell Handbook. Throughout this application "160 psi" pipe refers to the pressure rating of the ASTM 2241, Class 160, SDR 26 pipe used throughout the SCS.

Live Load Calculations

Minimum burial depth without concrete encasement is eight (8) feet. Based on Table 6-6 Live Loads on PVC pipe (from Uni-Bell Handbook for PVC) for this sewer line would be 0.69 psi.

Buckling Pressure Calculations

This area of the Edwards Aquifer is unsaturated; consequently, there are no anticipated areas where sewer pipe will be placed below the water table. The value of hw=0 as there will be no height or time period of perched water or groundwater above the pipe crowns of the proposed sewer line.

The value of H for use in these calculations is twenty (20) feet as it exceeds the maximum burial depth for this line. The value of γ_s equals 143 pcf is a conservative value based on a dry unit weight of 135 pcf and a moisture content of 6%. This value is conservative as it corresponds to saturated unit weights of commonly used backfill materials. Please see information from Raba-Kistner provided in Appendix C.

Allowable Buckling Pressure:

$$q_a = 0.4 * \sqrt[2]{32 * R_w * B' * E_b * (E * I / D^3)}$$ *Equation 1*

$$q_a = 0.4 * \sqrt[2]{32 * 1 * 0.49 * 400(400{,}000 * 0.003/8.29^3)} = 45.96 \ psi(8" \ PVC \ SDR \ 26, 160 \ psi)$$

$$R_w = 1 - 0.33 * (h_w / h)$$ *Equation 2*

$$R_w = 1 - 0.33 * (0/240) = 1$$

$$B' = \frac{1}{1 + 4 * e^{-0.065H}}$$ *Equation 3*

$$B' = \frac{1}{1 + 4 * e^{-0.065(20)}} = 0.49$$

$$I = (t^3 / 12) * (inches^4 / linear \ inch)$$ *Equation 4*

$$I = (0.323^3 / 12) = 0.003 in^3 \ (8" \ PVC, SDR \ 26, NR)$$

$$I = (0.332^3 / 12) = 0.003 in^3 \ (8" \ PVC, SDR \ 26, 160 \ psi)$$

$$D = D_o - t$$ *Equation 5*

$$D = 8.40 inches - 0.323 inches = 8.08 \ inches (8" \ PVC, SDR \ 26, NR)$$

$$D = 8.625 inches - 0.332 inches = 8.29 inches (8" PVC, SDR 26, 160 psi)$$

Where:

- q_a = Allowable buckling pressure, pounds per square inch (psi)
- h = Height of soil surface above top of pipe in inches (in)
- h_w = Height of water surface above top of pipe in inches (in) (groundwater elevation)
- R_w = Water buoyancy factor. If hw = 0, Rw = 1. If 0 ≤ hw ≤ h (groundwater elevation is between the top of the pipe and the ground surface), calculate Rw with Equation 2
- H = Depth of burial in feet (ft) from ground surface to crown of pipe.
- B' = Empirical coefficient of elastic support
- E_b = Modulus of soil reaction for the bedding material (psi)
- E = Modulus of elasticity of the pipe material (psi)
- I = Moment of inertia of the pipe wall cross section per linear inch of pipe, inch4/linear inch = inch3. For solid wall pipe, "I" can be calculated with Equation 4
- t = Pipe structural wall thickness (in)
- D = Mean pipe diameter (in)
- D_o = Pipe outer diameter (in)

Pressure Under Installed Conditions

$$q_p = \gamma_w * h_w + R_w * (W_c / D) + L_l \qquad \textit{Equation 6}$$

$$q_p = 0.0361 * 0 + 1 * (166.89/8.08) + 0.69 = 21.34 psi (8" PVC, SDR 26, NR)$$

$$q_p = 0.0361 * 0 + 1 * (171.24/8.29) + 0.69 = 21.34 psi (8" PVC, SDR 26, 160 psi)$$

Where:

- q_p = Pressure applied to pipe under installed conditions (psi)
- γ_w = 0.0361 pounds per cubic inch (pci), specific weight of water
- W_c = Vertical soil load on the pipe per unit length in pounds per linear inch (lb/in)
- L_l = Live load (lbs)

$$W_c = \gamma_s * H * (D+t)/144$$ *Equation 7*

$$W_c = 143 * 20 * (8.08+0.323)/144 = 166.89\,lb/in\,(8"\,PVC, SDR\,26, NR)$$

$$W_c = 143 * 20 * (8.29+0.332)/144 = 171.24\,lb/in\,(8"\,PVC, SDR\,26, 160\,psi)$$

γs = Specific weight of soil in pounds per cubic foot (pcf)

D = Mean pipe diameter (in)

Pipe Diameter: ***8" (160 psi)*** Pipe Material: ***PVC, SDR 26*** q_a: ***45.96*** q_p: ***21.34***

Since $q_a \geq q_p$, the specific pipe is acceptable for the proposed installation.

Wall Crushing Calculations

No portion of the proposed SCS is located in the 5-year floodplain.

$$H = (24 * P_c * A)/(\gamma_s * D_o)$$ (*Equation 8)*

$$A = t(in) \times 12(in/ft)$$ (*Equation 9)*

H=(24*4,000*3.984)/(143*8.4) = 318.40(8"PVC,SDR26, 160psi)

$A = 0.332(in) \times 12(in/ft) = 3.984$

D_o = outside pipe diameter, in.

P_c = compressive stress or hydrostatic design basis (HDB). For typical PVC pipe assume 4,000 psi. For any other pipe material, the HDB must be supplied by the pipe manufacturer.

A = surface area of the pipe wall, in.^{2}/ft [conversion factor of 12 applied to change from ft. to in.]

γ_s = specific weight of soil in pounds per cubic foot (pcf)

H = Depth of burial in feet (ft) from ground surface to crown of pipe.

24 = conversions and coefficients

Installation Temperature Effects

Flexible pipe will be installed under favorable ambient conditions, per pipe manufacturer's specifications.

Tensile Strength

The information below is from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" Table 2.1 pages 14-15. This applies to all PVC SDR-26 pipe.

Pipe Material: ***PVC SDR 26*** Tensile Strength: ***7,000*** Cell Class (PVC only) ***12454***

Strain

The conditions of this installation are such that strain-related failure will not be a problem. Strain is generally not a performance-limiting factor for buried PVC pipe or a design-limiting criterion for PVC pipes according to the Uni-Bell Handbook of PVC Pipe (Chapter VII, Pages 255 and 257). As pipe deflection will be below 5%, strain-related failure is not anticipated.

Modulus of Soil Reaction

The modulus of soil reaction for the bedding material, $E_{b,}$ is **400 psi**.

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class III material was chosen. As the secondary backfill (Class III) has a lower Modulus of Soil Reaction than initial backfill (Class I), its value was used in the calculations that follow. Class III on Table 2 corresponds to coarse-grained soils with fines (GM, GC, SM or SC) and sandy or gravelly fine-grained soils (CL or ML). On Table 7.3, coarse-grained soils with fines at a slight compaction have an E' equal to 400 psi.

The modulus of soil reaction for the in-situ soil, $E'_{n,}$ is **3,000 psi**

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D 2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class I material was chosen, which includes crushed rock as shown on Table 2. Compacted crushed rock on Table 7.3 has an E' equal to 3,000 psi. Values in Table 7.3 are based on empirical data and derived from laboratory and field tests for buried pipe.

Bedding to in-situ soil modulus of soil reaction ratio = E_b/E'_n = **400 psi/3,000 psi = 0.13**

Zeta Calculation

Where native soil is significantly weaker than bedding material, or where predicted deflection approaches 5%, the effect of native soil must be quantified using Leonhardt's Zeta factor. If the ration of bedding modulus to soil modulus is not equal to 1.0, a zeta factor must be calculated by using the equations below, where zeta is a factor, which corrects for the effect of in-situ soil on pipe stability (Uni-Bell Handbook of Pipe, page 267). To calculate zeta, directly use the formulas below. The calculations that are done to determine the zeta factors for the different pipe diameters must be included with this submittal.

$$zeta = \frac{1.44}{f + (1.44 - f) * (E_b / E_{n'})}$$ *(Equation 9)*

$$zeta = \frac{1.44}{1.22 + (1.44 - 1.22) * 0.13} = 1.15 (8" PVC SDR 26, NR)$$

$$zeta = \frac{1.44}{1.22 + (1.44 - 1.22) * 0.13} = 1.15 (8" PVC SDR 26, 160 psi)$$

$$f = \frac{b/d_a - 1}{1.154 + 0.444 * (b/d_a - 1)}$$ *(Equation 10)*

$$f = \frac{34/8.40 - 1}{1.154 + 0.444 * (34/8.40 - 1)} = 1.22 (8" PVC, SDR 26, NR)$$

$$f = \frac{35/8.625 - 1}{1.154 + 0.444 * (35/8.625 - 1)} = 1.22 (8" PVC, SDR 26, 160 psi)$$

Where:

- f = Pipe/trench width coefficient
- b = Trench width (in)
- d_a = Pipe diameter (in)
- E_b = Modulus of soil reaction for the bedding material (psi)
- E'_n = Modulus of soil reaction for the in-situ soil (psi)

Pipe Diameter: ***8" (160 psi)*** Trench Width: ***35"*** Zeta: ***1.15***

Pipe Stiffness

Ps is based on National Reference Standards and manufacturer's data. Please see Table 7.1 of the "The Uni-Bell Handbook of PVC Pipe: Design and Construction" listing the pipe stiffness of 8" PVC SDR 26 as 115 psi for E = 400,000 psi.

Pipe Diameter: ***8"*** Pipe Material: ***PVC SDR 26*** Ps: ***115 psi***

Deflection

Maximum allowable deflection in installed lines is 5% (per 30 TAC 217), as determined by the deflection analysis and verified by a mandrel test. It is recommended that the percent of vertical deflection is below this range; however, a 7.5% deflection limit (recommended by ASTM D3034) provides a conservative factor of safety against structural failure (Handbook of PVC Pipe, page 249).

Note: Per Table 7.2 attached in Appendix A of the SCS Application, K = 0.096 when the bedding angle is 90 degrees. A bedding angle of 90 degrees is required as shown on SAWS detail DD-804-01.

$$\Delta Y / D(\%) = \frac{K * (L_p + L_1) * 100}{(0.149 * P_s) + (0.061 * zeta * E_b)}$$

(Equation 11)

$$\Delta Y/D(\%) = \frac{(0.096)(19.86 + 0.69)* 100}{(0.149* 115) + (0.061* 1.15* 400)} = 4.37\% \text{ for } 8" \text{ NR pipe}$$

$$\Delta Y/D(\%) = \frac{(0.096)(19.86 + 0.69)* 100}{(0.149* 115) + (0.061* 1.15* 400)} = 4.37\% \text{ for } 8" \text{ 160 psi pipe}$$

$$L_p = \frac{\gamma_s * H}{144} \qquad \text{(Equation 12)}$$

$$L_p = \frac{143* 20}{144} = 19.86 \text{ psi}$$

%ΔY/D = Predicted % vertical deflection under load

ΔY = Change in vertical pipe diameter under load

D = Undeflected mean pipe diameter (in)

K = Bedding angle constant

γ_s = Unit weight of soil (pcf)

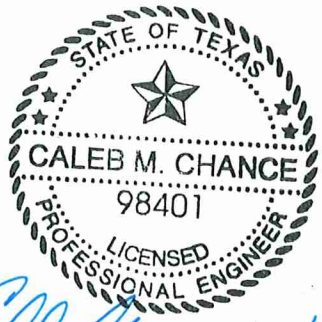
H = Depth of burial (ft) from ground surface to crown of pipe

L_p = Prism load (psi)

Type of Pipe Material	P_s (psi)	Zeta Factor Assumed or Calculated	E_b (psi)	% Deflection
8" PVC SDR 26 160 psi	*115*	*1.15*	*400*	*4.22*

All pipes proposed for this project have a maximum predicted deflection below 5.0%

Signature, Seal and Date of the Texas Professional Engineer Below:



4/5/24

ATTACHMENT B

PAPE-DAWSON ENGINEERS
2000 NW Loop 410
San Antonio, TX 78213-2251

UTILITY SERVICE AGREEMENT

STATE OF TEXAS §
§
COUNTY OF BEXAR §

This Utility Service Agreement ("Agreement") is entered into by and between the San Antonio Water System ("SAWS") and Bitterblue, Inc. ("Developer") together the Parties ("Parties").

Recitals

Whereas, Developer has requested that SAWS provide water and wastewater service (the "Services") to an approximate 1851.1-acre tract of land, (the "Rogers Ranch Tract" or "Tract"), which is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required; and

Whereas, the Tract is located over the Edwards Aquifer Recharge or Contributing Zone, which is located within the 5-mile Awareness Zone of Camp Bullis, such Tract being more particularly described in Attachment VI hereto, as accepted by SAWS; and

Whereas, SAWS desires to provide the Services to the Developer pursuant to this Agreement, the SAWS Utility Service Regulations, and all applicable local, state, and federal regulations, as amended.

Now Therefore, The Parties Hereto Agree To The Following Terms and Conditions:

1.00 Interpretation of Agreement.

1.01 The Parties acknowledge that the Services contemplated by this Agreement shall be provided in accordance with the SAWS Utility Service Regulations, Design Criteria, Schedules, Attachments and Instruments thereto, as amended (together "USR"). In the event the specific terms of this Agreement are in conflict with the USR, the specific terms of this Agreement shall apply. The above notwithstanding, for the specific conflicting terms to prevail, the conflict must be expressly noted in the Agreement. The Parties further acknowledge that this Agreement is subject to future acts of the City Council of the City of San Antonio with respect to the adoption or amendment of impact fee ordinances/resolutions.

1.02 The Parties agree that the purpose of this Agreement is the reservation of the designated water supply and /or wastewater discharge capacity for the Tract. Any rights that the Developer claims arise under Chapter 245, Texas Local Government Code, that are related to this Agreement shall be determined pursuant to the terms of the Settlement Agreement approved by the San Antonio City Council on October 29, 2015 between The Rogers Shavano Ranch, Ltd., Rogers 1604 Commercial, Ltd., Bitterblue, Inc., and Denton Development Corporation and the City of San Antonio through Ordinance Number 2015-10-29-0926 effective October 29, 2015.

Preparer's Initials

2.00 Obligation Conditioned.

The obligation of SAWS to provide the Services is conditioned upon present rules, regulations and statutes of the United States of America and the State of Texas and any court order that directly affects the SAWS' Regional Water Production and Distribution System and/or Regional Wastewater Transportation and Treatment System and/or the utility infrastructure directly servicing the Tract. Developer acknowledges that if the rules, regulations and statutes of the United States of America and/or the State of Texas that are in effect upon the execution date of this Agreement are repealed, revised or amended to such an extent that SAWS becomes incapable of, or prevented from, providing the Services, then no liability of any nature is to be imposed upon SAWS as a result of SAWS' compliance with such legal or regulatory mandates. SAWS agrees that it will use its best efforts to prevent the enactment of such legal or regulatory mandates.

3.00 Term.

3.01 The term of this Agreement shall be seven (7) years from the Effective Date if the Developer complies with the requirements set out in G.C. 19.00 (attached) within the time period therein stated. This Agreement shall automatically expire if Developer fails to comply with the requirements of G.C. 19.00 within the time period therein provided. The term of this Agreement may be extended to fifteen (15) years from the Effective Date, if Developer complies with the requirements to extend the term set forth in G.C. 19.00 within the time period therein stated. Certain obligations of SAWS (described in Section 3.03 below) may survive the expiration of the term of this Agreement, to the extent that Developer has (i) paid all applicable impact fees for the Services at the then-current rate, and (ii) complied with all On-Site and Off-Site utility infrastructure requirements of this Agreement (described in the Special Conditions), including over-sizing requirements.

3.02 To the extent that SAWS' obligations do not survive the expiration of this Agreement, Developer understands and agrees that a new Utility Service Agreement must be entered into with SAWS to receive the Services for the development project that is the subject of this Agreement.

3.03 To the extent that Developer timely pays all applicable impact fees and complies with all On-Site and Off-Site utility infrastructure requirements prior to the expiration of this Agreement, the following obligations will survive expiration of this Agreement:

(i) SAWS' recognition of the EDUs referenced as the subject of this agreement as Guaranteed Capacity.
(ii) SAWS' continued recognition of impact fee credits previously earned by the Developer pursuant to Sections 15.8 and 15.9 of the USR.
(iii) SAWS' continued provision of the Services to retail customers located in the Tract, so long as such customers pay for the services and comply with the regulations applicable to individual customers.

4.00 Entire Agreement.

The following documents attached hereto and incorporated herein are as fully a part of this Agreement as if herein repeated in full, together with this Agreement, comprise the Agreement in its entirety:

Preparer's Initials JY

Attachment I:	General Conditions
Attachment II:	Special Conditions
Attachment III:	Description of Proposed Water and/or Wastewater Infrastructure
Attachment IV:	Board Summary & Recommendation and Resolution (if necessary)
Attachment V:	Developer Water and/or Wastewater Master Plan (if necessary)
Attachment VI:	Engineering Study Including Description of the Tract
Attachment VII:	Lift Station & Force Main Supplemental Agreement (if necessary)
Attachment VIII:	Water Recycling and Conservation Plan (if necessary)

Any of the above attachments that are created and submitted by the Developer as an attachment to this USA shall be limited to providing relevant engineering, planning or managing information for the purposes of setting aside or reserving water and/or wastewater service capacity as specified in the body of this USA, the General Conditions and the Special Conditions. Developer agrees that it will not attempt to rely on, and SAWS does not authorize, any of the contents of any attachments created and submitted by the Developer as a basis for claiming rights under Chapter 245 of the Texas Local Government Code, except as specifically required by Section 1.02 of this USA.

Developer understands that this Agreement, including, its General Conditions, Special Conditions and Attachments, is subject to the Texas Public Information Act; and, therefore, agrees that it will not claim that any of the information contained herein is subject to any third party exception under that Act.

5.00 Developer's Obligations.

The Developer acknowledges and agrees that the capacity provided by this Agreement runs with the land and shall be an appurtenance to the Tract. The Developer acknowledges that recordation of this Agreement in the Real Property Records of the County in which the Tract is located within three (3) years of the Effective Date of this Agreement is required; otherwise, this Agreement will automatically terminate. Developer shall record the Agreement and the delivery of a recorded copy to the Director within three (3) years of the Effective date of this Agreement or before any transfer of property or EDUs as specified in G.C. 20.00, whichever is sooner, is required. The Developer shall maintain records of EDU's remaining on the Tract pursuant to the approved Developer Master Plan. Developer shall provide SAWS with such records upon SAWS written request.

6.00 Indemnity.

TO THE EXTENT ALLOWED BY LAW AND TEXAS CONSTITUTION, THE DEVELOPER FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS SAWS AND ITS SUCCESSOR AND ASSIGNS FROM THE CLAIMS OF THIRD PARTIES ARISING OUT OF SAWS' RECOGNITION OF THE TRANSFER OF CAPACITY UNDER THIS AGREEMENT TO DEVELOPER'S SUBSEQUENT PURCHASERS, SUCCESSORS AND ASSIGNS.

Preparer's Initials JG

7.00 Notices.

Any notice, request, demand, report, certificate or other instrument which may be required or permitted to be furnished to or served upon the parties shall be deemed sufficiently given or furnished or served if in writing and deposited in the United States mail, registered or certified, return receipt requested, addressed to such party at the address set forth below:

IF TO SAN ANTONIO WATER SYSTEM:

SAN ANTONIO WATER SYSTEM
POST OFFICE BOX 2449
SAN ANTONIO, TEXAS 78298-2449
ATTN: SAM MILLS, P.E., DIRECTOR, DEVELOPMENT

IF TO DEVELOPER:

Bitterblue, Inc.
11 Lynn Batts Lane, Suite 100
San Antonio, Texas 78218
Attn: Llyod A. Denton, Jr.

8.00 Severability.

If for any reason any one or more paragraph of this Agreement are held legally invalid, such judgment shall not prejudice, affect impair or invalidate the remaining paragraphs of the Agreement as a whole, but shall be confined to the specific sections, clauses, or paragraphs of this contract held legally invalid.

9.00 Effective Date.

The Effective Date of this Agreement shall be the date signed by the authorized representative of the San Antonio Water System.

10.00 Ownership.

By signing this Agreement the Developer represents and warrants that it is the owner of the Tract or has the authority of the Tract owner to develop the area. Any misrepresentation of authority or ownership by Developer shall make this Agreement voidable by SAWS. If the Developer does not own the Tract, then the Developer must provide documentation from the owner of the Tract to show that Developer has the proper authority to develop the Tract.

Preparer's Initials

ACCEPTED AND AGREED TO IN ALL THINGS:

San Antonio Water System

Signature: _____

Print Name: Robert R. Puente

Title: President/ Chief Executive Officer

Date: 7-31-17

Developer

Signature: _____

Print Name: Lloyd A. Denton, Jr.

Title: PRESIDENT

Date: July 13, 2017

ACKNOWLEDGEMENTS

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Robert R. Puente known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as President/CEO for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 31 **day of** July **, 2017.**

(seal)

CAROLINE G. GONZALES
My Notary ID # 130329928
Expires August 13, 2019

_____
Notary Public

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Lloyd A. Denton, Jr. known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as PRESIDENT for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 13 **day of** July **, 2017.**

(seal)

SARAH E. CARRINGTON
ID #7745531
My Commission Expires
August 02, 2020

_____
Notary Public

Preparer's Initials JG

GENERAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

G.C.1.00 Definitions.

G.C.1.01 Developer.

Owner of the tract, his subsequent purchasers, successors, and/or assigns.

G.C.1.02 Director of Infrastructure Planning.

The Director of Infrastructure Planning of the San Antonio Water System or his/her designated representative.

G.C. 1.03 Definition of Terms.

Unless defined in the Utility Service Agreement (the "Agreement"), the terms used in this General Conditions of the Utility Service Agreement (the "General Conditions") shall have the same definitions and meaning as those set out in Chapter 2, Definitions, of the Utility Service Regulations ("USR"). In the event a term is specifically defined in the General Conditions, and the definition is in conflict with that found in the USR, and such conflict is acknowledged in the General Conditions, the definition set out in the General Conditions shall apply.

G.C.2.00 Required Submittals.

If determined to be necessary by the Director of Infrastructure Planning ("Director"), the Developer hereby agrees to submit the following documents prior to the execution of the Agreement: Developer Master Plan, Developer Utility Layout, Water Recycling and Conservation Plan, and Engineering Report. The Parties agree that such documents are included instruments to the Agreement. The submittal of such documents is a condition precedent to plat recordation and initiation of Services. Developer shall modify such documents as may be reasonably required by the Director. Such documents shall be updated as required by the Director and the USR.

G.C.3.00 Dedication to SAWS.

The Developer agrees to dedicate, grant, and convey to SAWS all rights, title and interest of Developer in both the Off-Site and On-Site utility infrastructure that the Developer is required to construct under the Special Conditions of the Utility Service Agreement (the "Special Conditions"), and to dedicate, grant, and convey to SAWS easements for such utility infrastructure. Upon written acceptance of Off-Site and On-Site utility infrastructure by SAWS, the infrastructure shall be owned, operated and maintained by SAWS.

G.C.4.00 Design and Construction Requirements.

The design and construction of all Off-Site and On-Site utility infrastructure shall, at a minimum, comply with the requirements established by SAWS, including the USR, the City of San Antonio, the County of Bexar, the State of Texas, and any agency thereof with jurisdiction, including but not limited to the Texas Commission on Environmental Quality and the Texas Department of Health. Off-Site and On-Site utility infrastructure shall be constructed under the inspection of SAWS. Provision of the Services to the Tract shall not commence until the Director has accepted and approved Off-Site and On-Site utility infrastructure in writing.

G.C.5.00 Joint Venture Agreements.

In the event the Developer enters into a Joint Venture Agreement covering the costs for supplying the Services to the Tract, the Developer shall send a copy of such agreement to the attention of the Director.

Preparer's Initials JG

G.C.6.00 Assignment.

This Agreement may not be assigned in whole or in part; however, Developer may assign, convey or transfer EDU capacity ("EDU capacity transfer") to buyers of portions of the Tract in accordance with the terms in G.C. 20.00.

G.C.7.00 Event of Foreclosure.

In the event Developer's interest in the Tract described in Attachment VI are extinguished by an act of foreclosure, and the foreclosing party has supplied sufficient evidence to SAWS that they are the successor in interest to the Tract as a result of such foreclosure, and that there are no lawsuits pending concerning the Tract, SAWS shall consider the foreclosing party a successor in interest if the foreclosing party executes a utility service agreement with SAWS after the Director determines that the execution of such an agreement will not be adverse to SAWS' interest.

G.C.8.00 Payment for Provision of Utility Service.

In the event payment for the Services provided to a subdivision plat within the Tract is not billed by SAWS, the amount of the monthly fees for the provision of the Services will be those charged to the various customer classifications as set by City Ordinances, with the billing and collection thereof on behalf of SAWS, being the responsibility of the billing utility purveyor. To facilitate this arrangement, Developer is to insert into any utility agreement with whatever utility purveyor is to bill for utility services to a subdivision plat within the Tract, a provision requiring said purveyor to enter into a Contract with SAWS to bill and collect SAWS' monthly utility services fees and transmit said fees to SAWS. The billing utility purveyor shall advise customers that delinquent non-payment of any of SAWS' fees will result in interruption and/or termination of the Services provided by SAWS, in accordance with applicable interruption and termination policies and procedures, as amended. SAWS shall not be obligated to provide the Services to any plat within the Tract unless and until the utility purveyor has executed a contract with SAWS to provide for the billing and collection of the Services provided by SAWS.

G.C.9.00 Enforcement of Industrial Waste Ordinance if Required by SAWS.

The Developer shall cause to be recorded in the Deed and Plat Records of the counties in which the Tract is located, a restrictive covenant covering the entire Tract. This restrictive covenant shall run with the land in the Tract described in Attachment VI. Such covenant shall contain language expressly granting to SAWS the right, should SAWS so elect, to enforce and or otherwise pursue to the extent provided at law or in equity, the provisions of the City's Industrial Waste Ordinance No. 57214, as amended or as may be amended (codified as Chapter 34, Article V, Division 3 of the City Code). SAWS' right shall include, to the extent provided at law or in equity, the right to inspection, sampling and monitoring of the collection system to assure ordinance compliance.

Recordation of the Covenant shall be a condition precedent for SAWS' provision of the Services to any portion of said Tract.

G.C.10.00 Oversizing.

Developer must pay for all mains and other utility facilities needed to serve the Tract. SAWS may require the installation of oversized water mains and wastewater mains and related facilities. SAWS' requirements for over-sizing, if any, are set forth in the Special Conditions. SAWS will execute a trilateral contract with Developer and a contractor for the construction of oversized facilities. Contracts for the construction of oversized facilities must be competitively bid as required by law. SAWS will reimburse the Developer for the oversize construction cost differential upon completion of the approved facility installation and SAWS' acceptance of such facility. SAWS will determine whether to provide such reimbursement in the form of a cash reimbursement or in credits to be applied to impact fees. All oversizing shall be done in accordance with the USR.

Preparer's Initials JRJ

G.C.11.00 Off-Site /On-Site Facilities.

Developer shall construct and install all required Off-Site and On-Site utility infrastructure in accordance with the USR and Special Conditions, at no cost to SAWS. Any specific requirements related to the facilities are set forth in the Special Conditions.

G.C.12.00 Impact Fee Payment.

Developer agrees that the Agreement does not constitute an assessment of impact fees. Developer agrees to pay all applicable impact fees at the time and in the amount prescribed by ordinance or resolution of the City Council of the City of San Antonio and the USR, as amended. An estimate of the impact fees for the development Tract is provided in the Special Conditions. The estimate does not constitute an assessment of impact fees, and the amount of impact fees is subject to change by the City Council of the City of San Antonio as provided by law.

G.C.13.00 SAWS' Obligation to Supply Service.

To the extent that Developer pays all applicable impact fees and complies with all Off-Site and On-Site utility infrastructure requirements, Developer shall be entitled to the permanent use and benefit of the Services and is entitled to receive immediate service from any existing facilities with actual capacity to serve the development for which impact fees were paid, subject to compliance with other valid regulations. If, after collecting the impact fees, there is no actual capacity in existing facilities to provide the Services, SAWS will provide the Services within a reasonable period of time not to exceed five (5) years, as prescribed by Chapter 395 of the Local Government Code, as amended. In the event Services are required by Developer earlier than the five (5) year period, Developer and SAWS may agree that Developer may construct or finance the capital improvements or facility expansions required to provide Services, and the costs incurred or funds advanced will be credited against impact fees otherwise due from the new development or reimbursed to Developer from impact fees paid from other new developments that will use such capital improvements or facility expansions, which fees shall be collected and reimbursed to Developer at the time the other new development records it plat.

G.C.14.00 Facility Design and Construction.

The Developer shall design and construct all On-Site and Off-Site utility infrastructure described in the Special Conditions, including any oversizing, in accordance with the USR and all applicable local, state and federal requirements. Developer further recognizes that SAWS' approval in all respects as to facility right-of-way adequacy, location, size, grade and invert elevation is a condition precedent to any further obligation of SAWS. Specific design and construction requirements are set forth in the Special Conditions.

G.C.15.00 Use of Capacity by SAWS.

Developer understands that capacity in Off-Site and On-Site utility infrastructure resulting from the Agreement for the Tract may be utilized by SAWS for other tracts requesting service from SAWS. SAWS shall keep accurate records of the capacity provided to the Tract under the Agreement, whether Set-Aside or Guaranteed Capacity, and in no event will Developer be denied capacity as a result of SAWS' utilization of such capacity for another tract. Set-Aside capacity shall not survive the expiration of the Agreement.

G.C.16.00 Utility Master Plan Requirements.

The Developer will prepare a utility master plan, which details the water and/or wastewater systems for the Tract pursuant to the USR, as amended.

G.C.17.00 Phased Utility Master Plans.

If the Developer's water and/or wastewater systems are to be installed in phases or units, the Developer shall submit overall utility master plans to SAWS for review and approval. The overall utility master plan(s) shall be submitted before the first construction phase is submitted for plat approval. The overall utility master plan(s) shall show the development phases or units including the sequence and a timetable for build-out. The Developer shall also provide

Preparer's Initials JG

SAWS with a digital version of the proposed recorded plat, as submitted for plat recordation in a format acceptable to SAWS, for each phase or unit of the devolvement project.

G.C.18.00 Conformance of Plans to Utility Master Plan.

All water and wastewater system facilities to serve the Tract shall be designed and constructed in conformance with the approved utility master plan. Changes in the water and wastewater system design shall be resubmitted to SAWS for written approval.

G.C.19.00 Timing Requirements for Submission of Plans.

Developer shall have three (3) years from the Effective Date of the Agreement to complete and submit the required utility master plan and to start construction of the Off-Site and On-Site utility infrastructure described in the Special Conditions. Developer agrees that the Agreement for the provision of Services shall automatically expire if Developer has not submitted a utility master plan and started construction of required Off-Site and On-Site utility infrastructure within three (3) years of the Effective Date of the Agreement, and a new request for the Services must be submitted to SAWS, which SAWS will grant based on then existing policies and regulations. In the event Developer meets the above-mentioned requirements within the three (3) year period provided, the Agreement shall remain in effect for seven (7) years from the Effective Date. If Developer submits a revised Utility Master Plan in accordance with the USR prior to the expiration of the seven (7) year period, the Agreement for the provision of Services may be extended to a maximum term of fifteen (15) years from the Effective Date.

G.C. 20.00 EDU Transfers.

The transfer of EDU capacity outside the original boundaries of this Utility Service Agreement will not be allowed. The San Antonio Water System considers this Agreement to run with the land; however, EDU capacity transfers to subdivided tracts within the Tract of this Agreement are the responsibility of the Developer and approval of such transfers is not required by the San Antonio Water System. The Developer shall maintain an accounting of the EDU capacity that is used by the Developer and/or transferred after the effective date of this Agreement to portions of the Tract. If the Developer sells a portion of the Tract and transfers part of the EDU capacity contained in this Agreement, then that EDU capacity transfer must be included in the deed, bill of sale or instrument conveying the land and the Developer must require the buyer of the land who receives the allocated EDUs to record the instrument effectuating the transfer. Developer may file a Master Development Plan or an EDU Plan, prepared by an engineer, that shows specific EDU capacity allocations within the Tract and shall ensure that the Master Development Plan or EDU Plan is attached to this Agreement and properly recorded. SAWS will recognize the capacity allocations within the Master Development Plan or EDU Plan so long as those allocations are within the parameters of this Agreement. For properties that have areas of unplanned use, the demand will be calculated at four (4) EDUs per acre unless the engineering report specifies otherwise or there is not enough EDU capacity remaining for the Tract to allocate four (4) EDUs per acre.

In no event will the System be responsible to 3rd parties for providing water supply or wastewater discharge capacity beyond the total EDU capacity identified in this Agreement for the Tract. Developer expressly disclaims, releases and holds harmless SAWS from any liability, damages, costs or fees, and agrees to indemnify SAWS for any liability, including, costs and attorney's fees, associated with any dispute related to the transfer of all or a portion of EDU capacity approved for the Tract in this Utility Services Agreement.

G.C. 21.00 Camp Bullis Awareness Zone.

In the event that the Tract is located within, or partially within, the Camp Bullis Awareness Zone, the Developer acknowledges that certain lighting regulations may apply within at least a 3-mile radius of Camp Bullis, commonly referred to as down-lighting or dark sky lighting, and Developer will comply with those regulations. Developer agrees to comply with any local, state or federal law, rule or regulation related to the protection of the environment or endangered species, including but not limited to, any site assessments or surveys and notice to the United States Fish & Wildlife when required by law, rule or regulation. Developer acknowledges that any required assessment, survey or notice shall be current or updated as may be required by law, rule or regulation.

Preparer's Initials TG

SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Rogers Ranch, an 1851.1-acre tract inside the City of San Antonio limits, is located just north of N Loop 1604 and east of NW Military HWY, as shown in Attachment VI (the "Tract"). The tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required.

On August 10, 1993 the San Antonio Water System approved a water commitment for a 1780-acre tract at Loop 1604 and Military HWY (also known as Rogers Ranch) for 4,005 EDUs of water service. This water commitment is still valid until February 17, 2018.

The ultimate demand from the proposed development, on SAWS' water infrastructure, shall not exceed 4,005 equivalent dwelling units (EDUs) of water supply.

S.C.2.00 Infrastructure Requirements.

Water Supply to the tract will be from SAWS Pressure Zone 8 and Pressure Zone 11. The flow capacity of a 30-inch main is required to supply water to the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR).

Pressure Zone 8 (2,014 EDUs)

To supply water to the portion of the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR), located within PZ 8 (any development below ground elevation 1,040 feet) the flow capacity of a 16-inch main is required. There are existing looped 12-inch mains and 16-inch mains along N Loop 1604. There is also an existing 16-inch main traversing through the PZ 8 portion of the Tract from the existing 16-inch main along N Loop 1604. The Developer may connect services to a combination of the existing looped 12-inch and 16-inch mains along N Loop 1604 and the 16-inch main traversing through the PZ 8 portion of the Tract.

Pressure Zone 11 (1,991 EDUs)

To supply water to the portion of the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR), located within PZ 11 (any development above ground elevation 1,040 feet) the flow capacity of a 16-inch main is required. There is a series of 12-inch and 16-inch mains extending from the 20-inch and 30-inch main traversing through the PZ 11 portion of the Tract. The Developer is required to supply a stub out to the undeveloped area within the northwest portion of the Tract. The Developer may then connect services to the series of 12-inch and 16-inch mains traversing through the PZ 11 portion of the Tract.

Preparer's Initials JG

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Rogers Ranch, Utility Service Agreement Engineering Report", by Pape-Dawson Engineers, dated July 2006 is included as Attachment VI.

S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer shall acquire any right-of-way or easements, and install all On-Site and Off-Site utility infrastructure required to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Requirement to Install Approved Pressure Regulators and/or Booster Pumps.

Pressure Zone 8

A section of the PZ8 portion of the tract is below ground elevation of 985 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

Pressure Zone 11

The entire PZ11 portion of the tract is below ground elevation of 1,215 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

S.C.8.00 Time for Water Impact Fee Assessment and Payment.

Water Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Impact fees will be collected at either the time of plat recordation or connection to the SAWS' water system, at the discretion of the Developer.

Preparer's Initials JG

S.C.9.00 Water Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on current impact fee rates. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by the San Antonio City Council.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Flow Development	4,005	$1,182	$ 4,733,910.00
System Development Middle	2,014	$799	$ 1,609,186.00
System Development High	1,991	$883	$ 1,758,053.00
Water Supply	4,005	$2,796	$ 11,197,980.00
Total			$ 19,299,129.00

S.C.10.00 Pro-Rata Charge Requirement.

Developer shall be required to pay a Pro-Rata Charge pursuant to the USR, as amended, prior to connection to the SAWS water system if Developer is tying into a main that is subject to a pro-rata refund.

Preparer's Initials 

SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WASTEWATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Rogers Ranch, a 1,851.1-acre tract inside the City of San Antonio limits, is located just north of N Loop 1604 and east of NW Military HWY, as shown in Attachment VI (the "Tract") and lies within SAWS' Upper Collection and Treatment Area (UCTA). The tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required.

On March 12, 1996 the San Antonio Water System approved a sewer contract for a 1,696-acre tract at Loop 1604 and Military HWY (also known as Rogers Ranch) for 4,100 EDUs of wastewater service. The sewer contract expired March 12, 2006.

The ultimate demand from the proposed development, on SAWS' wastewater infrastructure, shall not exceed 4,100 equivalent dwelling units (EDUs) of wastewater discharge.

S.C.2.00 Infrastructure Requirements.

The Tract is situated within SAWS' Upper Collection and Treatment Area (UCTA) and lies within the Lewis Creek-Salado Creek, Panther Spring Creek-Salado Creek, and Olmos Creek-San Antonio River Watersheds. The capacity of a 21-inch gravity main at 0.11 percent minimum slope is required to provide wastewater service to the tract, in conformance with SAWS' USR. There is an existing 24-inch gravity sewer main crossing N Loop 1604 near the southern boundary of the Tract. The Developer may connect a maximum of 4,100 EDUs of total capacity to a combination of the existing 8-inch, 10-inch and 18-inch gravity sewer mains which discharge into the existing 24-inch gravity sewer main crossing N Loop 1604 near the southern boundary of the Tract.

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Rogers Ranch, Utility Service Agreement Engineering Report", by Pape-Dawson Engineers, dated July 2006 is included as Attachment VI.

Preparer's Initials JJ

S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer will also be required to acquire any right-of-way and easements, install all On-Site and Off-Site utility infrastructure, and upgrade existing lift stations necessary to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site utility infrastructure requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Lift Stations and Force Mains.

Lift stations and force mains are only allowed by prior written supplemental agreement with SAWS. Applicable fees, as set out in the supplemental agreement, must be paid in full prior to service connection. Whenever a lift station is proposed, a Present Value analysis of the lift station vs. gravity solutions, shall be included in the Engineering Report/Study in conformance with the requirements of SAWS' USR.

S.C.8.00 Time for Wastewater Impact Fee Assessment and Payment.

Wastewater Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Wastewater Impact Fees will be collected at either the time of plat recordation or connection to the SAWS wastewater system, at the discretion of the Developer.

S.C.9.00 Wastewater Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on impact fee rates in effect as of the Effective Date of the Agreement. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by action of the San Antonio City Council as permitted by law.

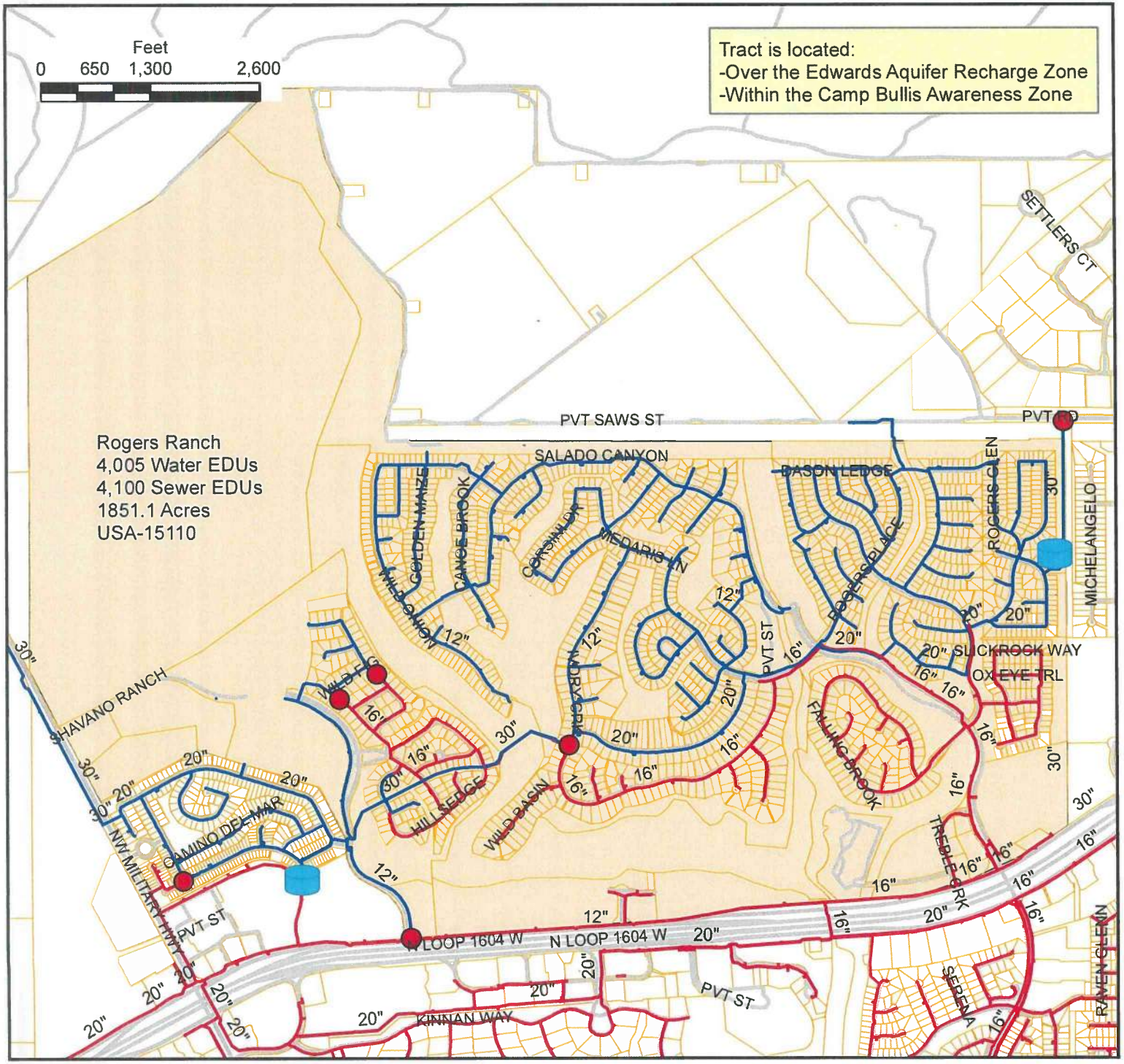
Type of Impact Fee	EDUs	$/EDUs	Current Total
Wastewater Collection Upper	4,100	$2,520	$ 10,332,000.00
Wastewater Treatment Dos Rios/Leon Creek	4,100	$786	$ 3,222,600.00
Total			$ 13,554,600.00

S.C.10.00 Pro-Rata Payment Fee Requirement.

Developer shall be required to pay a pro-rata fee pursuant to the USR, as amended, prior to connection to the wastewater system, if Developer is tapping into a main that is subject to a pro-rata refund.

Preparer's Initials 

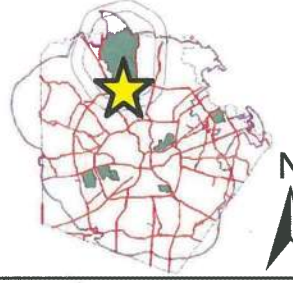
Attachment III:
USA-15110
Rogers Ranch Tract
Proposed Water Infrastructure
1,851.1 Acres



Legend

- Existing PZ8 Main
- Existing PZ11 Main
- USA Tract
- SAWS Facility
- Division Valve (DV)
- Pressure Reducing Valve (PRV)

Project Location

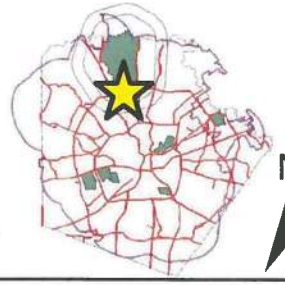


Attachment III:
USA-15110
Rogers Ranch Tract
Proposed Sewer Infrastructure
1,851.1 Acres

Legend

- Existing Sewer Main
- USA Tract

Project Location



RECORDER'S MEMORANDUM
AT THE TIME OF RECORDATION, THIS INSTRUMENT WAS FOUND TO BE INADEQUATE FOR THE BEST PHOTOGRAPHIC REPRODUCTION BECAUSE OF ILLEGIBILITY, CARBON OR PHOTO COPY, DISCOLORED PAPER ETC.

Any provision herein which restricts the sale, or use of the described real property because of race is invalid and unenforceable under Federal law
STATE OF TEXAS, COUNTY OF BEXAR
I hereby Certify that this instrument was FILED in File Number Sequence on this date and at the time stamped hereon by me and was duly RECORDED in the Official Public Record of Real Property of Bexar County, Texas on:

AUG 04 2017

COUNTY CLERK BEXAR COUNTY, TEXAS

Doc# 20170153394 Fees: $90.00
08/04/2017 9:39AM # Pages 17
Filed & Recorded in the Official
Public Records of BEXAR COUNTY
GERARD C. RICKHOFF COUNTY CLERK

Receipt# 2660396

GERARD C. RICKHOFF
COUNTY CLERK
BEXAR COUNTY
100 DOLOROSA SUITE 104
SAN ANTONIO, TX
78205
(210) 335-2216

Doc#: 20170153394 Pgs: 17
Type: AGREEMENT
Book: 18667 Pages: 1444-1460

RECORDING	$	69.00
RECORDS ARCHIVE	$	10.00
RECORDS MANAGEMENT	$	10.00
COURTHOUSE SECURITY	$	1.00

Total	$	90.00
Cash Tendered	$	90.00
Balance	$	0.00

Total Documents: 1
Total Fees: 4

Client Name GENERAL PUBLIC
Filed By PAPE DAWSON
Aug 4 2017 9:39:09 AM

Cashier: Daniel

Comment:
WALK-IN

APPENDIX A

TABLE 6.6
LIVE LOADS ON PVC PIPE
From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

Height of Cover (ft)	Live Load Transferred to Pipe, lb/in^2			Height of Cover (ft)	Live Load Transferred to Pipe, lb/in^2		
	Highway H20[1]	Railway E80[2]	Airport [3]		Highway H20[1]	Railway E80[2]	Airport [3]
1	12.50			14	*	4.17	3.06
2	5.56	26.39	13.14	16	*	3.47	2.29
3	4.17	23.61	12.28	18	*	2.78	1.91
4	2.78	18.40	11.27	20	*	2.08	1.53
5	1.74	16.67	10.09	22	*	1.91	1.14
6	1.39	15.63	8.79	24	*	1.74	1.05
7	1.22	12.15	7.85	26	*	1.39	*
8	0.69	11.11	6.93	28	*	1.04	*
10	*	7.64	6.09	30	*	0.69	*
12	*	5.56	4.76	35	*	*	*
				40	*	*	*

[1] *Simulates 20 ton truck traffic + impact (Source: ASTM A 796)*

[2] *Simulates 80,000 lb/ft railway load + impact (Source: ASTM A 796)*

[3] *180,000 lbs. dual tandem gear assembly. 26 inch spacing between tires and 66 inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.*

* *Negligible live load influence.*

FIGURE 7.4
BEDDING ANGLE
From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

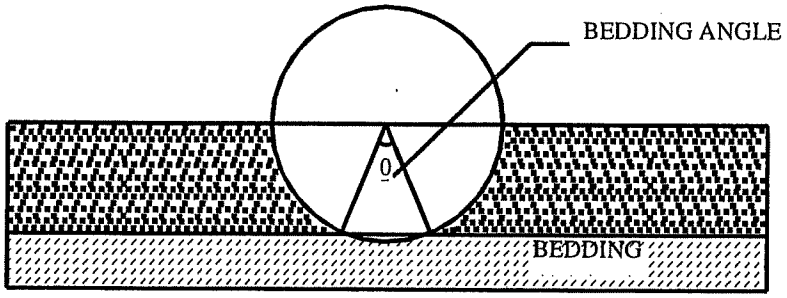


TABLE 7.1
PVC PIPE STIFFNESS (psi)

DR or SDR	Min. E = 400,000 psi	Min. E = 500,000 psi
64	7	9
51	14	18
42	26	32
41	28	35
35	46	57
33.5	52	65
32.5	57	71
28	91	114
26	115	144
25	129	161
21	224	279
18	364	455
17	437	546
14	815	1,019
13.5	916	1,145

TABLE 7.2
VALUES OF BEDDING CONSTANT, K

BEDDING ANGLE (DEGREES)	K
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083

TABLE 7.3
AVERAGE VALUES OF MODULUS OF SOIL REACTION, E'
(For Initial Flexible Pipe Deflection)

	E' for Degree of Compaction of Bedding, in pounds per square inch			
Soil type-pipe bedding material (Unified Classification System[a]) (1)	Dumped (2)	Slight, <85% Proctor, <40% relative density (3)	Moderate, 85%-95% Proctor, 40%-70% relative density (4)	High, >95% Proctor, >70% relative density (5)
Fine-grained Soils (LL>50)[b] Soils with medium to high plasticity, CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E' = 0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles	50	200	400	1,000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles Coarse-grained Soils with Fines GM, GC, SM, SC[c] contains less than 12% fines	100	400	1,000	2,000
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP[c] contains less than 12% fines	200	1,000	2,000	3,000
Crushed Rock	1,000	3,000	3,000	3,000
Accuracy in Terms of percentage Deflection [d]	±2	±2	±1	±0.5

[a]ASTM Designation D 2487, USBR Designation E-3.

[B]LL = Liquid limit.

[c]Or any borderline soil beginning with one of these symbols (i.e., GM-GC, GC-SC).

[d]For± 1% accuracy and predicted deflection of 3%, actual deflection would be between 2% and 4%,

Note: Values applicable only for fills less than 50 ft (15m). Table does not include any safety factor. For use in predicting initial deflections only, appropriate Deflection Lag Factor must be applied for long-term deflections. If bedding falls on the borderline between two compaction categories, select lower E' value or average the two values. Percentage Proctor based on laboratory maximum dry density from test standards using about 12,500 ft-lb/cu ft (598,000 J/m^3) (ASTM D 698, AASHTO T-99, USBR Designation E-11). 1 psi = 6.9 kPa.

SOURCE: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver, Colorado. Reprinted with permission from American Society of Civil Engineers.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 1 Soil Classification Chart (see Classification D2487)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification	
					Group Symbol	Group Name[B]
Coarse-Grained Soils	Gravels	Clean gravels	$C \geq 4$ and $1 \leq Cc \leq 3^C$		GW	Well-graded gravel[D]
More than 50% retained on No. 200 sieve	More than 50% of coarse fraction retained on No. 4 sieve	Less than 5% of fines[E]	Cu < 4 and/or 1> Cc>3[C]		GP	Poorly graded gravel[D]
		Gravels with more than 12% fines[E]	Fines classify as ML or MH		GM	Silty gravel[DFG]
			Fines classify as CL or CH		GC	Clayey gravel[DFG]
	Sands	Clean sands	$Cu \geq 6$ and $1 \leq Cc \leq 3^C$		SW	Well-graded sand[H]
	50% or more of coarse fraction passes on No. 4 sieve	Less than 5% fines[I]	Cu < 6 and/or 1 > Cc > 3[C]		SP	Poorly graded sand[H]
		Sand with fines	Fines classify as ML or MH		SM	Silty sand[FGH]
		More than 12% fines[I]	Fines classify as CL or CH		SC	Clayey sand[FGH]
Fine-Grained Soils	Silts and clays	Inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[KLM]
50% or more passes the No. 200 Sieve	Liquid limit less than 50		PI < 4 and plots below "A" line[J]		ML	silt[KLM]
		Organic	Liquid Limit-Oven dried	<0.75	OL	Organic clay[KLMN]
			Liquid Limit-Not dried			Organic silt[KLMO]
	Silts and clays	Inorganic	PI plots on or above "A" line		CH	Fat clay[KLM]
	Liquid limit 50 or more		Plots below "A" line		MH	Elastic silt[KLM]
		Organic	Liquid Limit-Oven Dried	<0.75	OH	Organic clay[KLMP]
			Liquid Limit-Not Dried			Organic silt[KLMQ]
Highly organic soils	Primarily organic matter, dark in color, and organic odor				PT	peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] $Cu = D_{60} / D_{10}$

$$Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$$

[D] If soil contains ≥15 % sand, add "with sand" to group name.
[E] Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt:
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
[F] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[G] If fines are organic, add "with organic fines" to group name.
[H] If soil contains ≥ 15 % gravel, add "with gravel" to group name.
[I] Sands with 5 to 12 % fines require dual symbols:
SW-SM well graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay (see Test Method D4318).
[K] If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel", whichever is predominant.
[L] If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 2 Soil Classes

Soil Group [A,B]	Soil Class	American Association of State Highway and Transportation Officials (AASHTO) Soil Groups [C]
Crushed rock, angular [D], 100% passing 1-1/2 in. sieve, </=15 % passing #4 sieve, </= 25 % passing 3/8 in. sieve and </= 12 % passing #200 sieve	Class I	--
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with </= 12 % passing #200 sieve[E,F]	Class II	A1, A3
Coarse grained soils with fines: GM, GC, SM, SC or any soil beginning with one of these symbols, containing > 12 % passing #200 sieve; Sandy or gravelly fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with >/= 30 % retained on #200 sieve	Class III	A-2-4, A-2-5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve
Fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with <30 % retained on #200 sieve	Class IV	A-2-7, or A-4, or A-6 soils with 30% or less retained on #200 sieve
MH, CH, OL, OH, PT	Class V Not for use as embedment	A5, A7

[A] See Classification D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
[B] Limits may be imposed on the soil group to meet project or local requirements if the specified soil remains within the group. For example, some project applications require a Class I material with minimal fines to address specific structural or hydraulic conditions and the specification may read "Use Class I soil with a maximum of 5% passing the #200 sieve."
[C] AASHTO M145, Classification of Soils and Soil Aggregate Mixtures.
[D] All particle face shall be fractured.
[E] Materials such as broken coral, shells, and recycled concrete, with $\leq$ = 12% passing a No. 200 sieve, are considered to be Class II materials. These materials should only be used when evaluated and approved by the Engineer.
[F] Uniform fine sands (SP) with more than 50% passing a No. 100 sieve (0.006 in., 0.15 mm) are very sensitive to moisture and should not be used as backfill unless specifically allowed in the contract documents. If use of these materials is allowed, compaction and handling procedures should follow the guidelines for Class III materials.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 3 Recommendations for Installation and Use of Soils and Aggregates for Foundation and Pipe-Zone Embedment

Soil Class[A]	Class I[B]	Class II	Class III	Class IV
General Recommendations and Restrictions	Acceptable and common where no migration is probable or when combined with a geotextile filter media. Suitable for use as a drainage blanket and under drain where adjacent material is suitably graded or when used with a geotextile filter fabric (see X1.8).	Where hydraulic gradient exists check gradation to minimize migration. Clean groups are suitable for use as a drainage blanket and underdrain (see Table 2). Uniform fine sands (SP) with more than 50 % passing a #100 sieve (0.006 in., 0.15 mm) behave like silts and should be treated as Class IV soils.	Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.	Difficult to achieve high-soil stiffness. Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.
Foundation	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above.	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above. Install and compact in 12 in. (300 mm) maximum layers.	Suitable for replacing over-excavated trench bottom as restricted above. Install and compact in 6 in. (150 mm) maximum layers.	Suitable for replacing over-excavated trench bottom as restricted above. Install and compact in 6-in (150 mm) maximum layers.
Pipe Embedment	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Difficult to place and compact in the haunch zone.	Suitable as restricted above. Difficult to place and compact in the haunch zone.
Embedment Compaction: Min Recommended Percent Compaction, SPD[D]	See Note[C]	85 % (SW and SP soils) For GW and GP soils See Note[E]	90 %	95 %
Relative Compactive Effort Required to Achieve Minimum Percent Compaction	Low	Moderate	High	Very high
Compaction Methods	Vibration or impact	Vibration or impact	Impact	Impact
Required Moisture Control	None	None	Maintain near optimum to minimize compactive effort	Maintain near optimum to minimize compactive effort

[A] Class V materials are unsuitable as embedment. They may be used as final backfill as permitted by the engineer.
[B] Class I materials have higher stiffness than Class II materials, but data on specific soil stiffness of placed, uncompacted Class I materials can be taken equivalent to Class II materials compacted to 95% of maximum standard Proctor density (SPD95), and the soil stiffness of compacted Class I materials can be taken equivalent to Class II materials compacted to 100% of maximum standard Proctor density (SPD100). Even if placed uncompacted (that is, dumped), Class I materials should always be worked into the haunch zone to assure completed placement.
[C] Suitable compaction typically achieved by dumped placement (that is, uncompacted but worked into haunch zone to ensure complete placement).
[D] SPD is standard Proctor density as determined by Test Method D698.
[E] Place and compact GW and GP soils with at least two passes of compaction equipment.

APPENDIX B

Raba Kistner

January 14, 2009

Raba-Kistner Consultants, Inc.
12821 W. Golden Lane
P.O. Box 690287, San Antonio, TX 78269-0287
(210) 699-9090 • FAX (210) 699-6426
www.rkci.com

Charles P. "Frosty" Forster, P.E., P.G.
Pape Dawson Engineers
555 East Ramsey
San Antonio, Texas 78216

RE: Soil Unit Weight Values for Backfill Materials
Various Projects
San Antonio, Texas

Dear Mr. Forster:

Raba-Kistner Consultants Inc. (R-K) is pleased to submit this letter providing general guidance for selecting design soil unit weights for use in utility trench design.

In general, the following table contains a list of the frequently used trench backfill materials in the San Antonio area. The table also contains approximate values for the soil dry unit weight, moist unit weight and saturated unit weight for these materials assuming 90 to 95 percent compaction utilizing a standard Proctor (ASTM D 698.)

MATERIAL DESCRIPTION	DRY UNIT WEIGHT, PCF	MOIST UNIT WEIGHT, PCF	SATURATED UNIT WEIGHT, PCF
TxDOT TEX-113E Type A, Gr. 1 or 2	130	137	143
TxDOT TEX-113E Type A, Gr. 3 thru 5	128	135	143
Limestone Millings	115	124	134
Gravelly Clay	110	120	132
Clay	100	120	127
Clayey Sand	95	106	123
Gravel (Clean)	115	120	134
Sand (Clean)	92	98	120
Pit Run Gravel	127	137	142

We appreciate the opportunity to be of service to you. If you have any questions or need additional assistance, please call.

Very truly yours,

RABA-KISTNER CONSULTANTS, INC.

STATE OF TEXAS
CHRIS L. SCHULTZ
80680
LICENSED
PROFESSIONAL ENGINEER

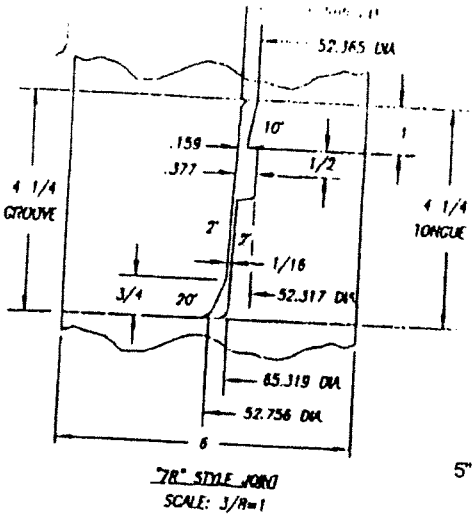
1/14/09

Chris L. Schultz, P.E.
Senior Vice President

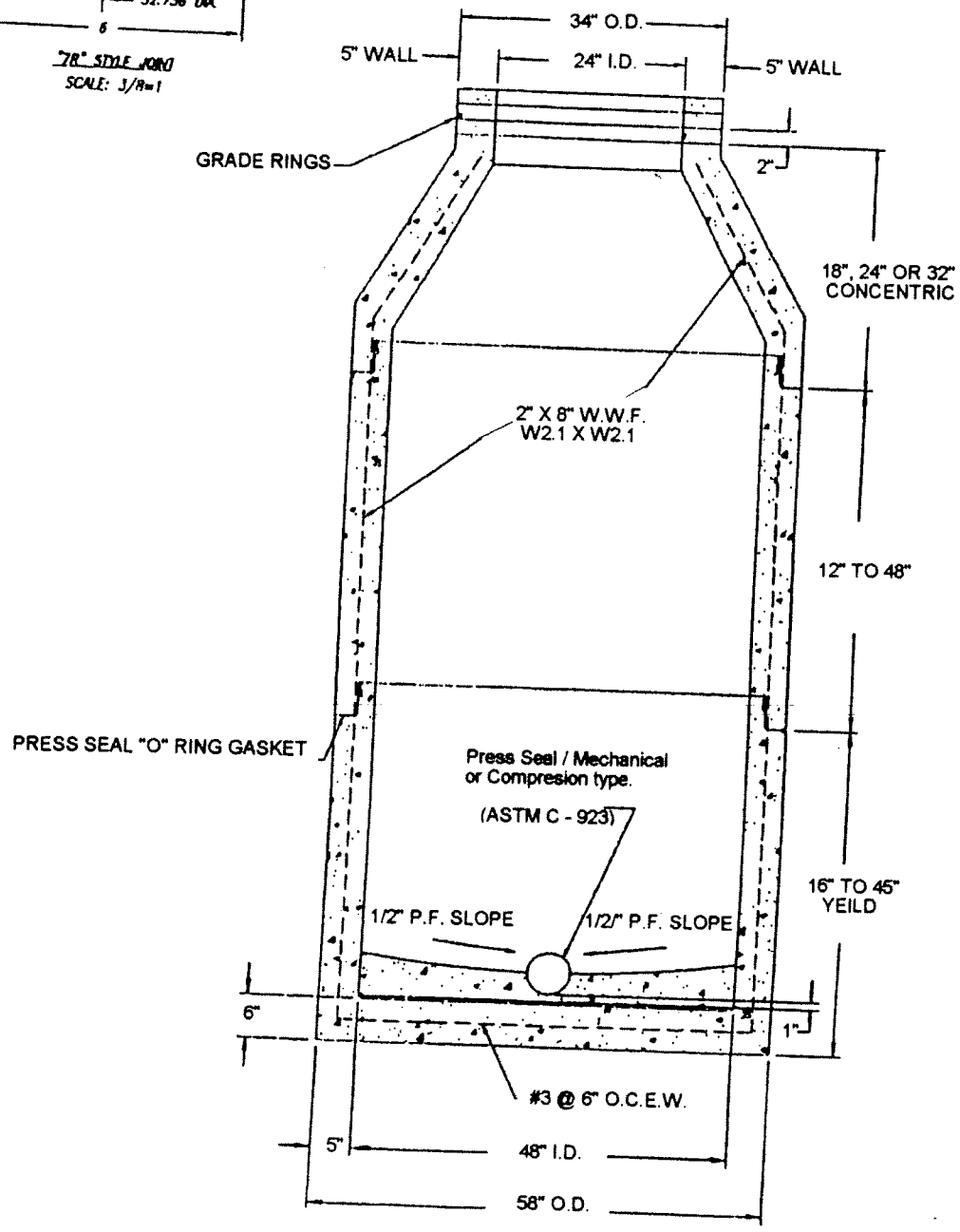
CLS/mem

O:\Admin - Non Project\San Antonio\PD back fill letter.doc

PRE-CAST MANHOLE DRAWINGS & SPECIFICATIONS

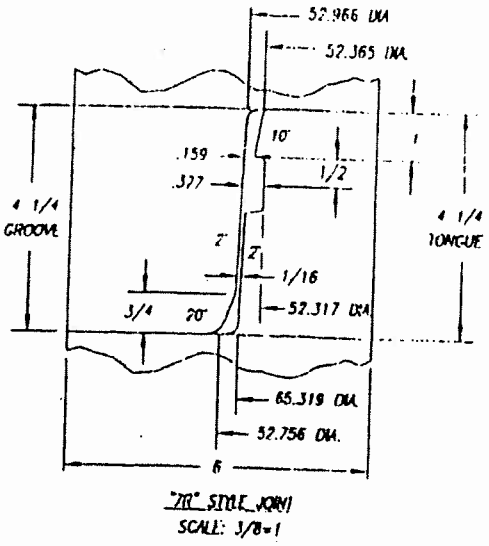


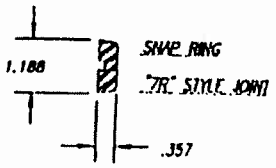
78" STYLE JOINT
SCALE: 3/8"=1

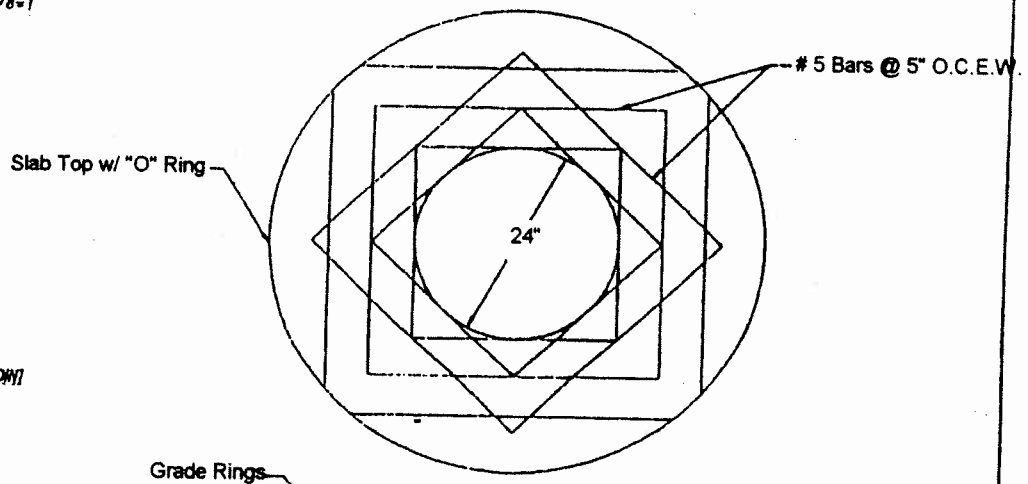


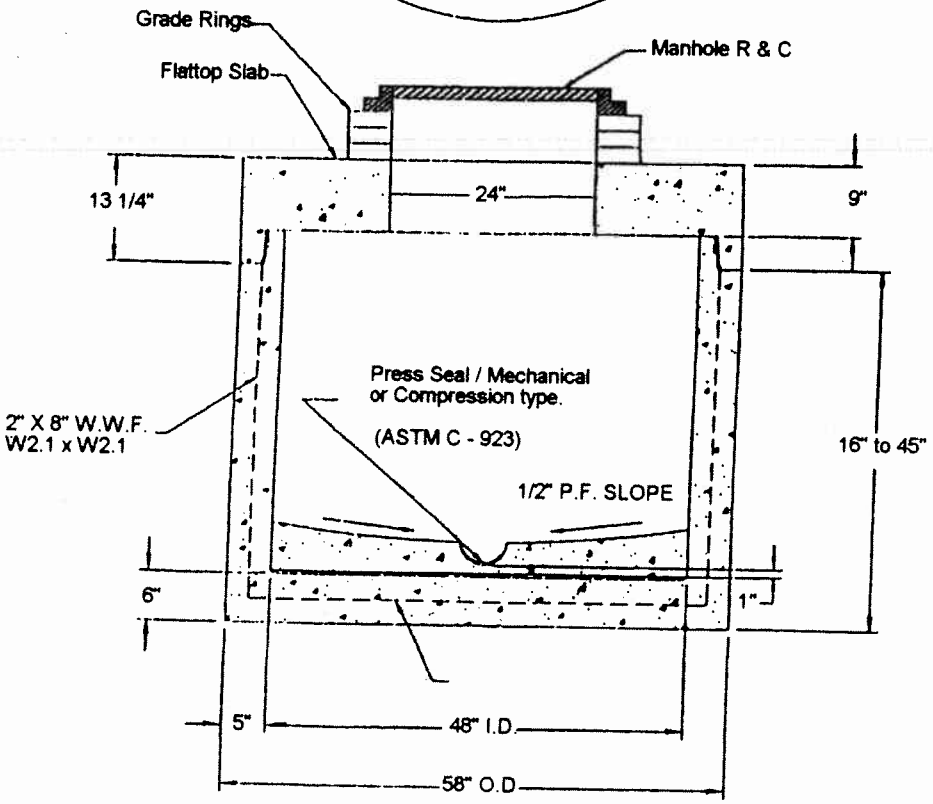
ALL MATERIALS MEET
OR EXCEED ASTM C-478

CHARLOTTES CONCRETE
40 x 45 BASE/STACK-UP
W/ FLAT TOP 78" JOINT
CHARLOTTES







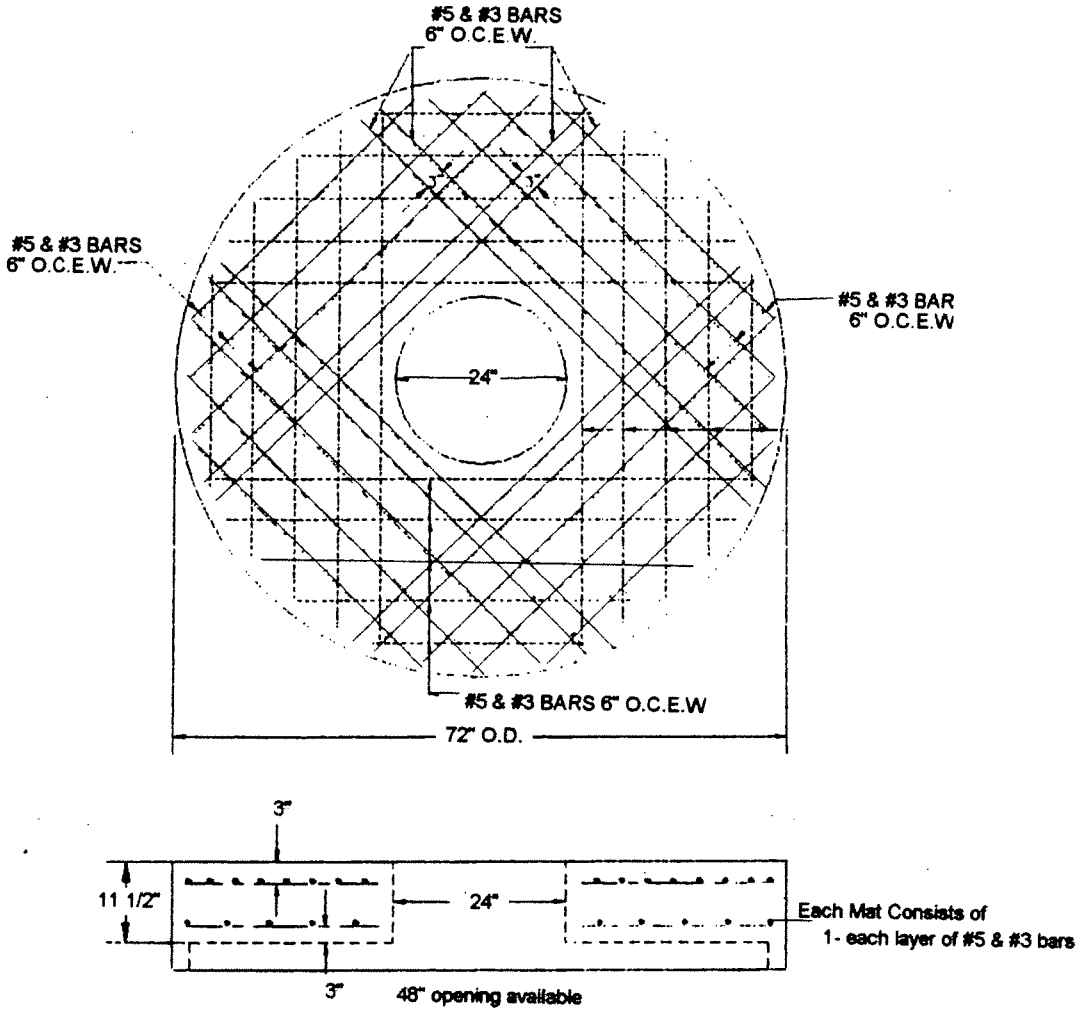


CHARLOTTES CONCRETE

48 x 45 BASE/STACK-UP
w/ FLAT TOP TR JOINT

CHARLOTTES

Concrete @ 4000 psi
Steel Grade 60
ASTM C - 478
H - 20 Traffic Rated

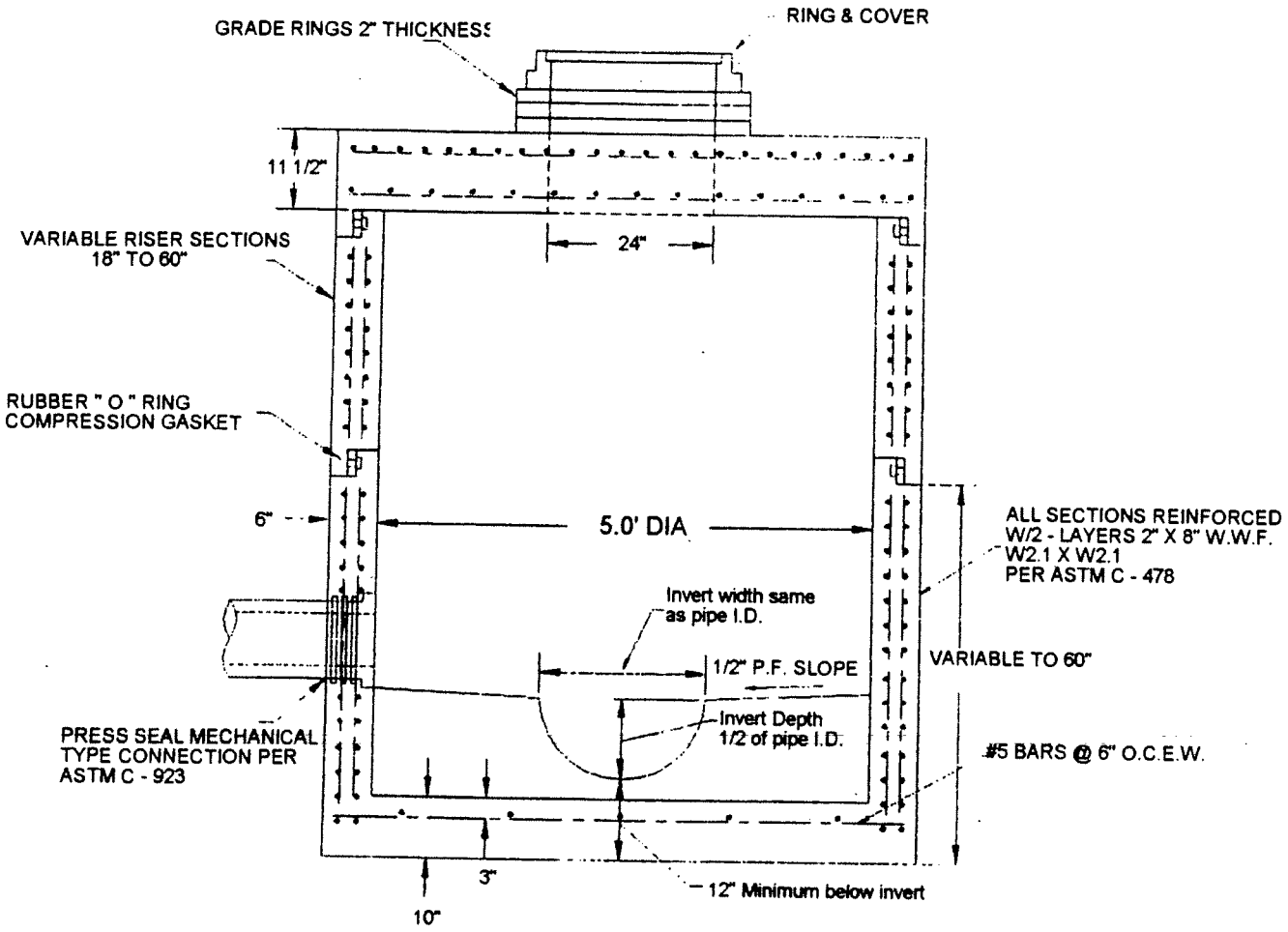


(N.T.S.)

Charlotte's Concrete, Inc.

60 " I.D.
FLATTOP SLAB

CONCRETE @ 4000psi
STEEL GRADE 60
ASTM C - 478
H - 20 TRAFFIC RATED

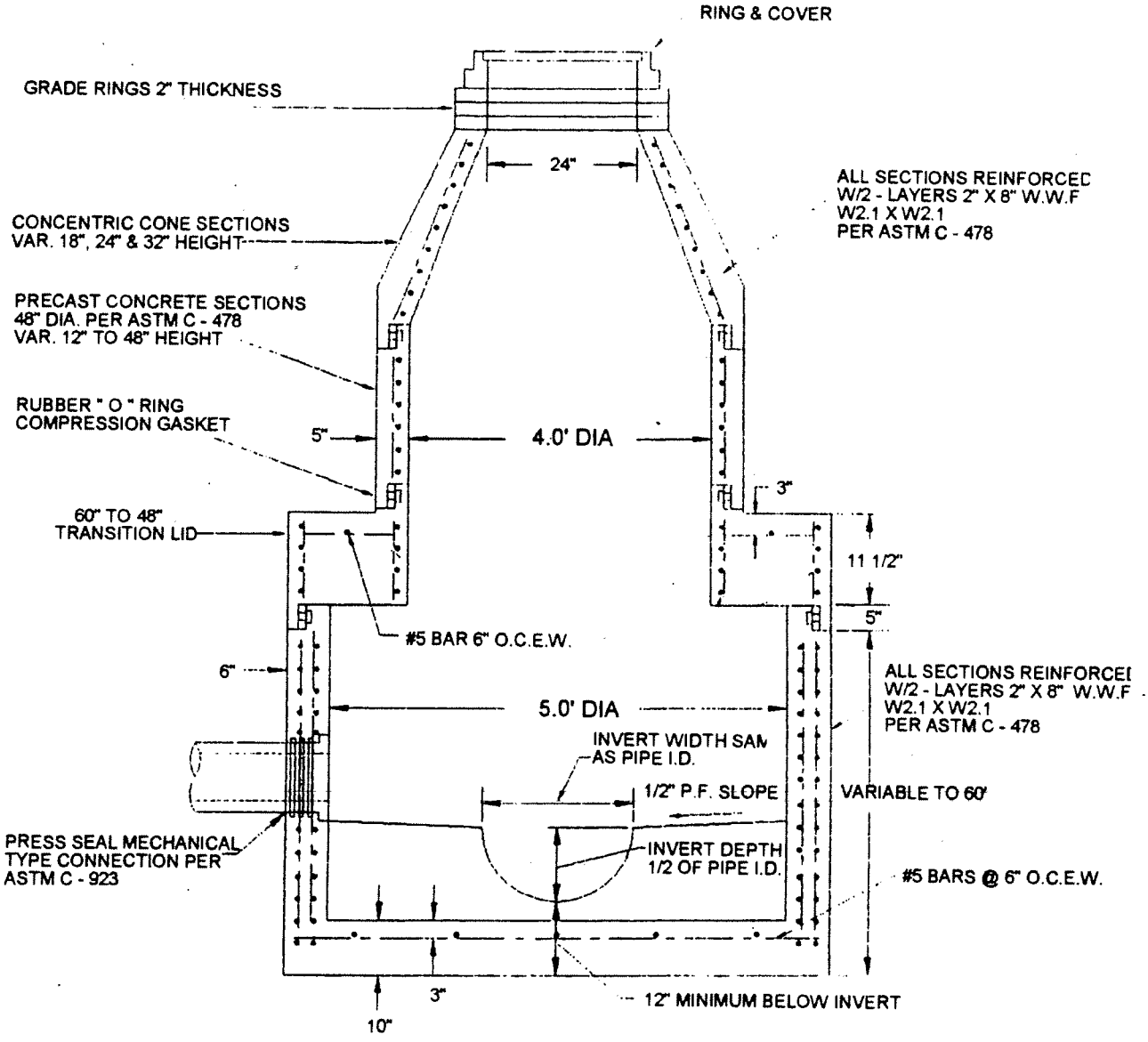


(N.T.S.)

Charlotte's Concrete, Inc.

60" DIA. MANHOLE
W/ FLATTOP

CONCRETE @ 4000psi
STEEL GRADE 60
ASTM C - 478
H - 20 TRAFFIC RATED

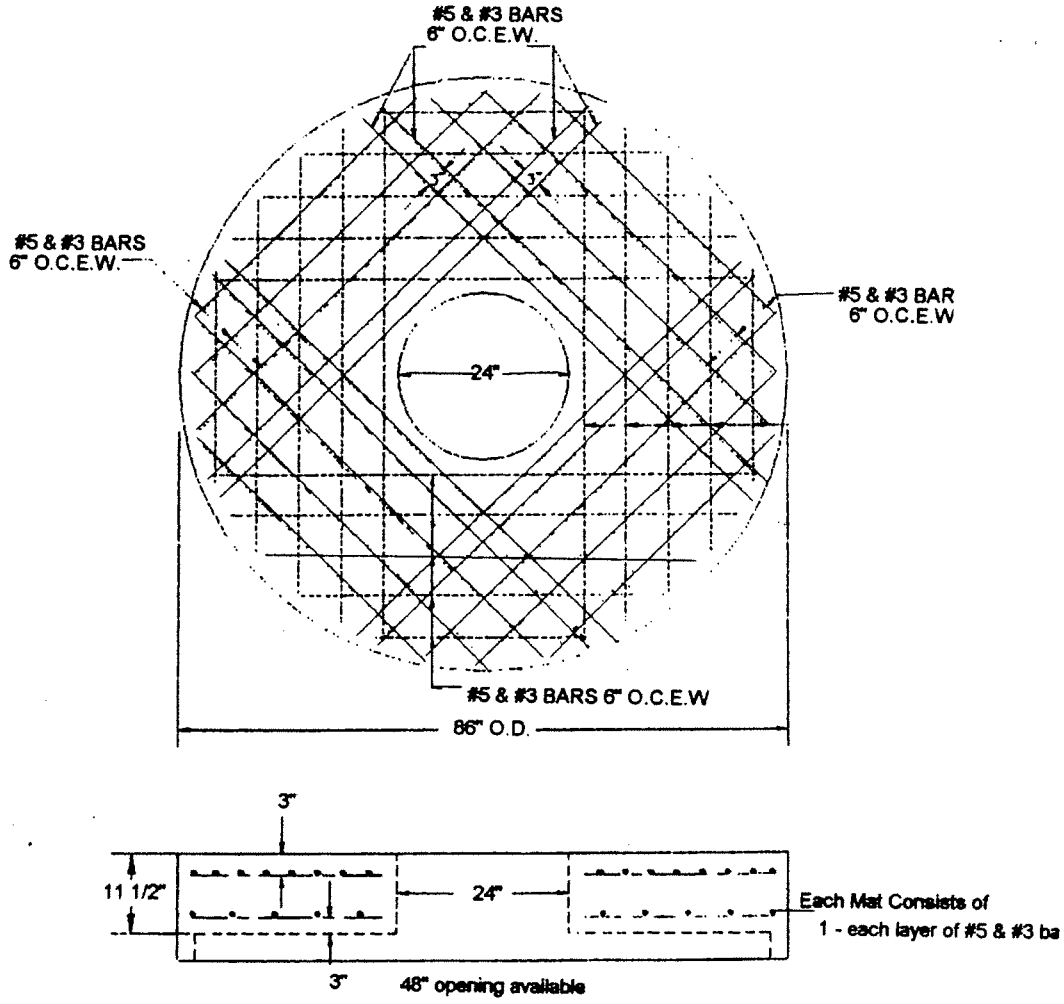


(N.T.S.)

Charlotte's Concrete, Inc.

60" DIA. M.H. TO
48" DIA. M.H.

Concrete @ 4000 psi
Steel Grade 60
ASTM C - 478
H - 20 Traffic Rated

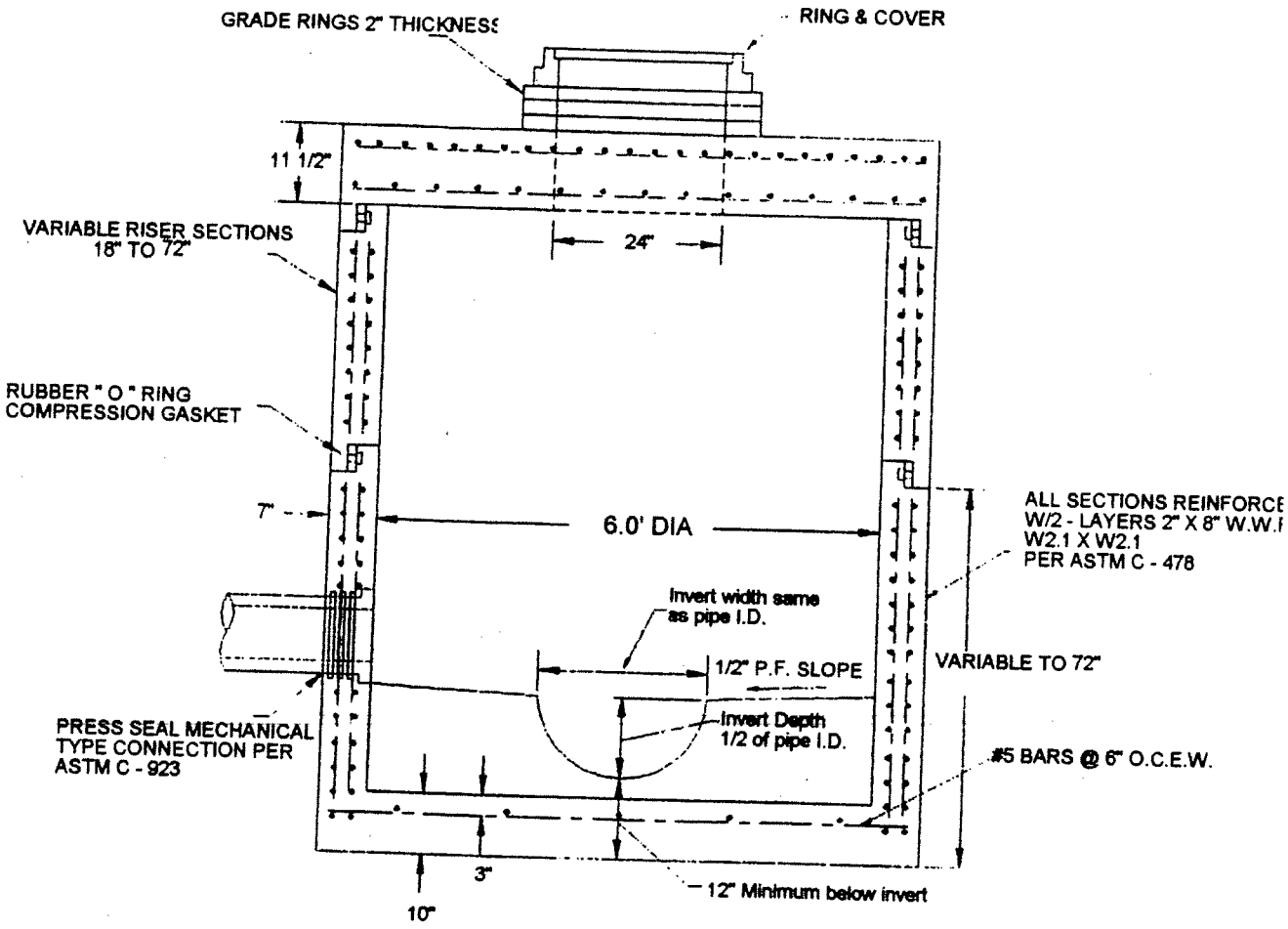


(N.T.S.)

Charlotte's Concrete, Inc.

72" I.D.
FLATTOP SLAB

CONCRETE @ 4000psi
STEEL GRADE 60
ASTM C - 478
H - 20 TRAFFIC RATED

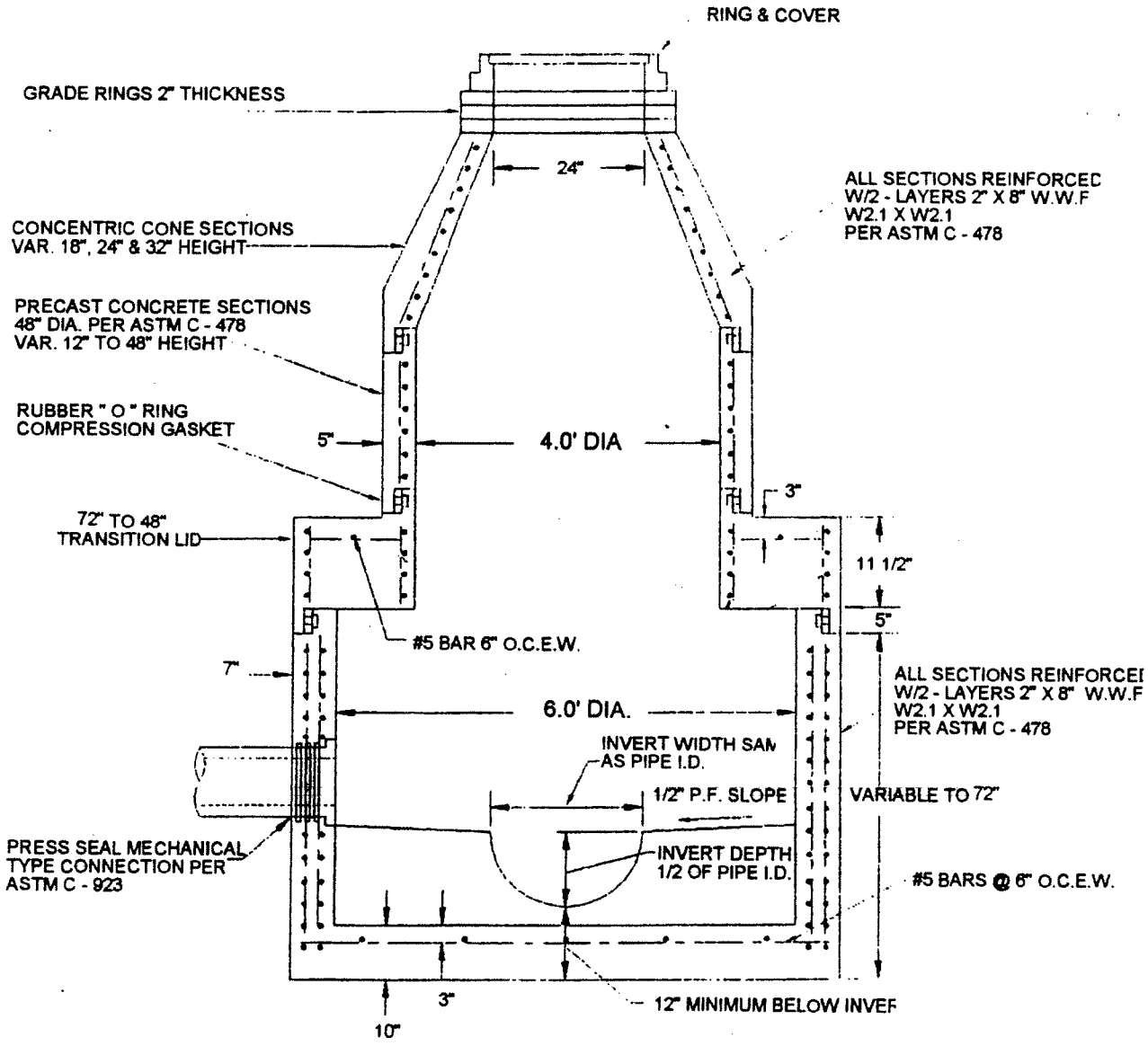


(N.T.S.)

Charlotte's Concrete, Inc.

72" DIA. MANHOLE
W/ FLATTOP

CONCRETE @ 4000psi
STEEL GRADE 60
ASTM C - 478
H - 20 TRAFFIC RATED

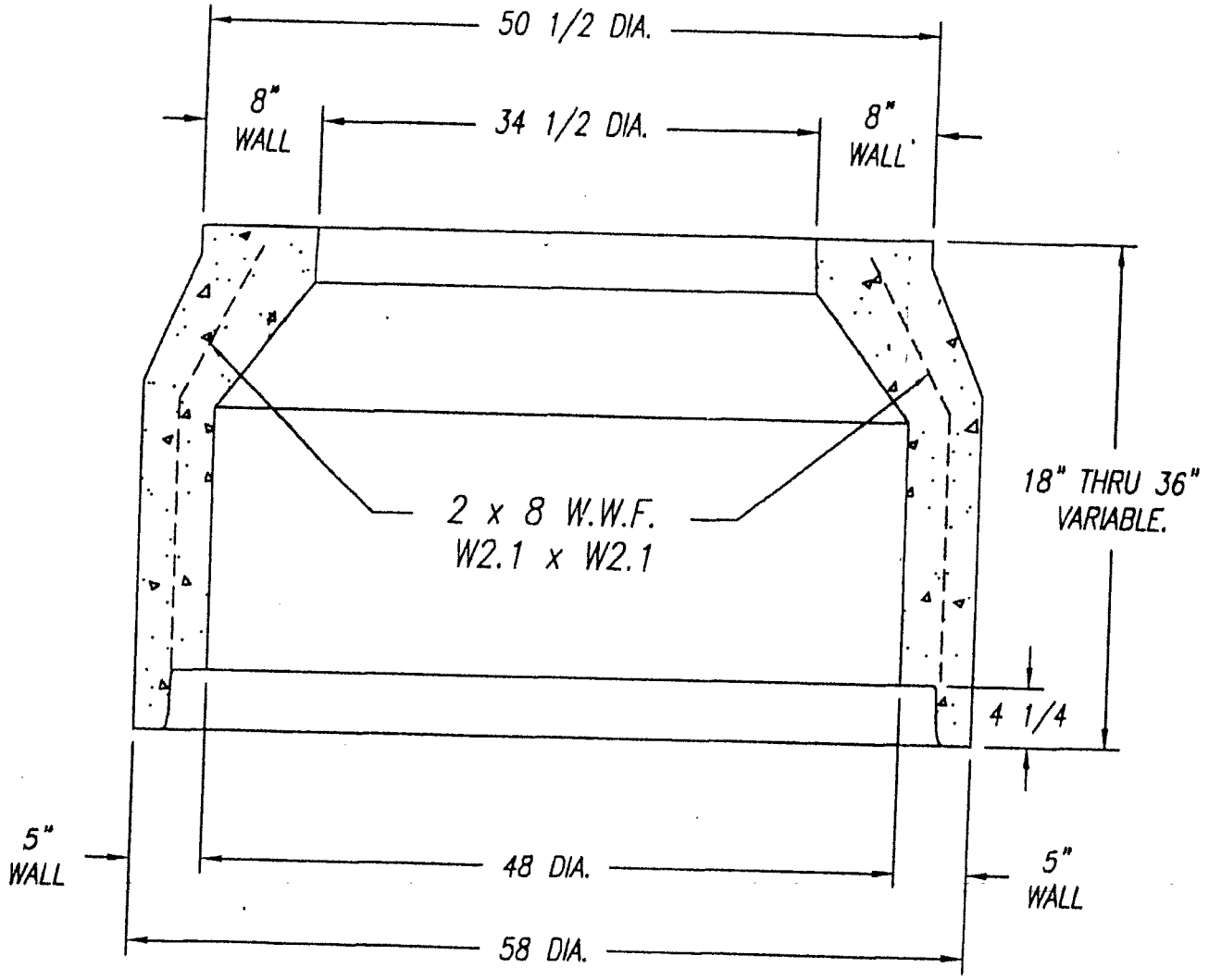


(N.T.S.)

Charlotte's Concrete, Inc.

72" DIA. M.H. TO
48" DIA. M.H.

\APPROVAL\CONCENTRIC.DWG



(7R JOINT)

REF. FORM DWG. 3-303-5561

INTERNATIONAL PIPE MACHINERY

QUINN

MACHINE & FOUNDRY CORP.

A MEMBER OF THE BESSER FAMILY OF COMPANIES

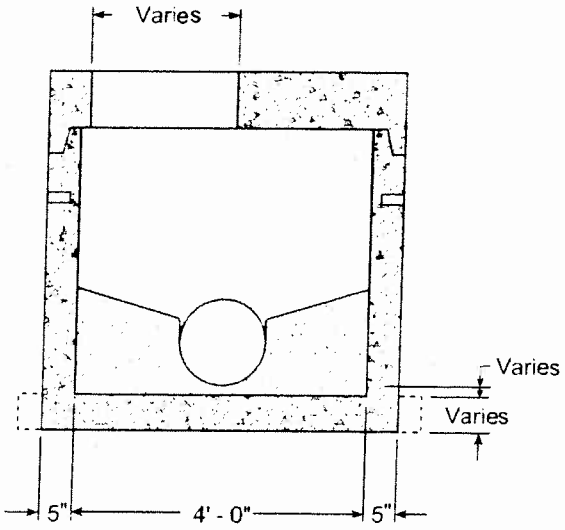
BOONE, IOWA U.S.A.

CHARLOTTES

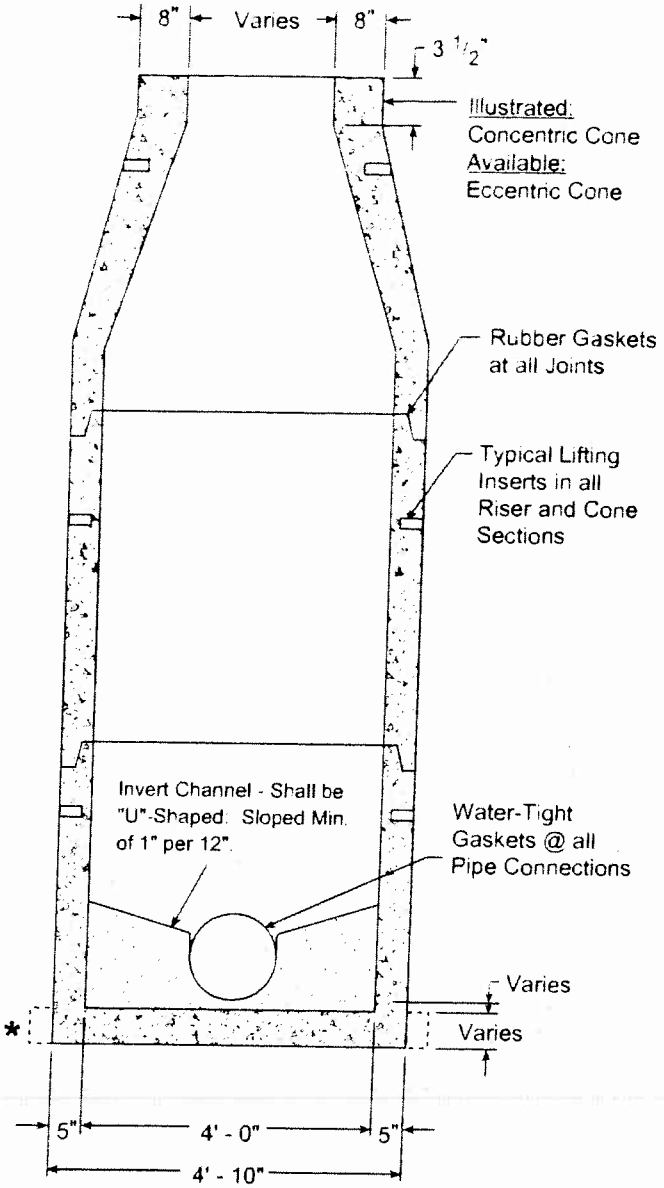
48 x 5 x 34 1/2 x 8 x 36 & 18

CONCENTRIC CONCRETE SECTION

DRAFTER	JJK	4/19/02	CONCENTRIC	REV.
CHECKED				
SCALE:	1/12" = 1"			



Flattop Illustration
for Shallow Manhole



Section View
4' I.D. Manhole - Regular Base
with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: Max diameter = 32"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Estimated weight of riser and cone sections = 870 lbs. / vt. ft.

* - Extended base is available to meet local requirements.

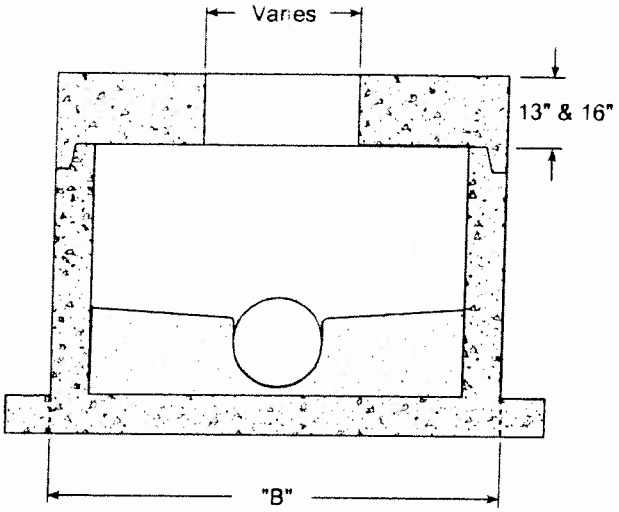
In the event a boot is loose contact your Hanson representative to resolve.

"Manufactured to your specifications."

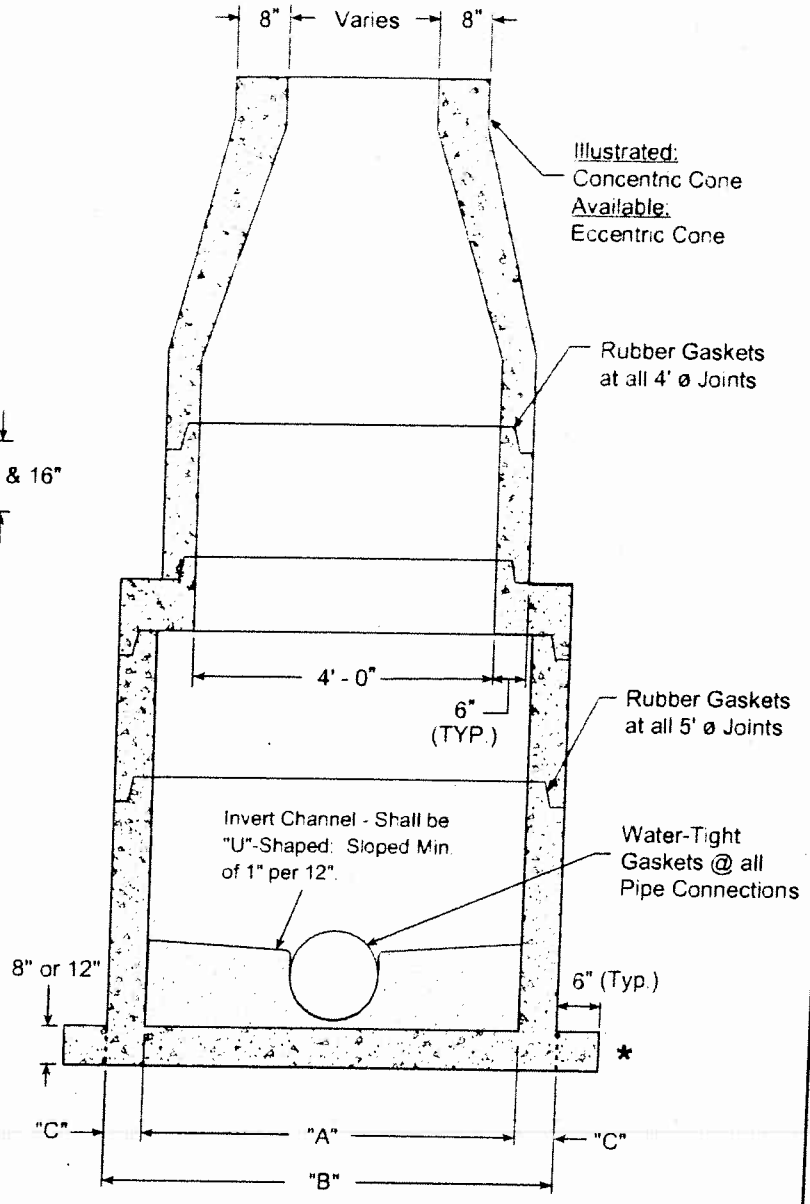
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION/PAGE	DATE	
4' I.D. Manhole **Regular Base w/ Reducing Cone**	All Plants	TX	5.5	08-15-06	Hanson

Precast Manholes



Flattop Illustration
for Shallow Manhole



Section View
5'/4' & 6'/4' I.D. Manhole
Extended Base with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: for 5' I.D. max diameter = 40"
for 6' I.D. max diameter = 54"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert:
for 5' I.D. = 7,500 lbs.
for 6' I.D. = 10,600 lbs.
Estimated weight of riser and sections:
for 5' I.D. = 1,325 lbs. / vt. ft.
for 6' I.D. = 1,800 lbs. / vt. ft.
For pipe sizes 15" and larger, invert shall be equal to the larger pipe diameter.
* - Extended base shown. Regular base also available."
In the event a boot is loose contact your Hanson representative to resolve.

Pipe Size	I.D. "A"	O.D. "B"	Wall Thk. "C"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

"Manufactured to your specifications."

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

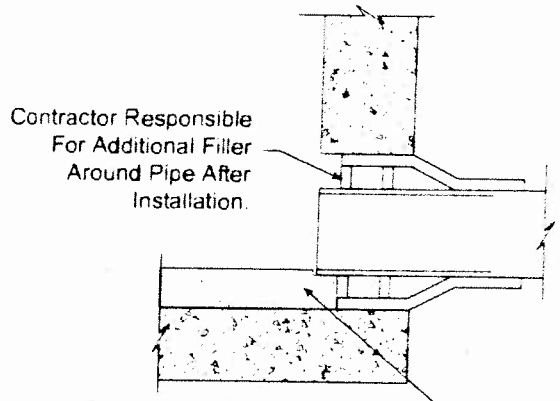
TITLE	PLANT	STATE	SECTION-PAGE	DATE
5'/4' & 6'/4'I.D. Manhole **Extended Base w/Reducing Cone**	All Plants	TX	5.6	08-15-06

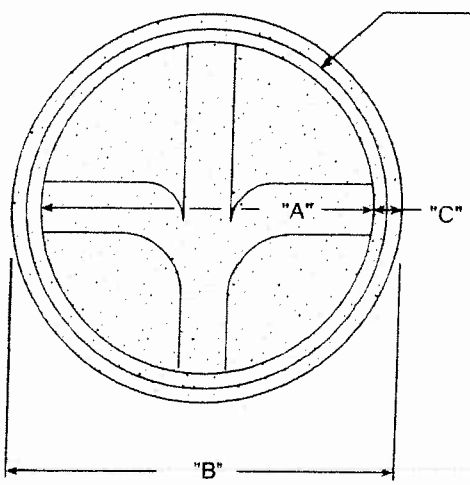
Hanson

Contact Hanson | Go to Index | EXIT

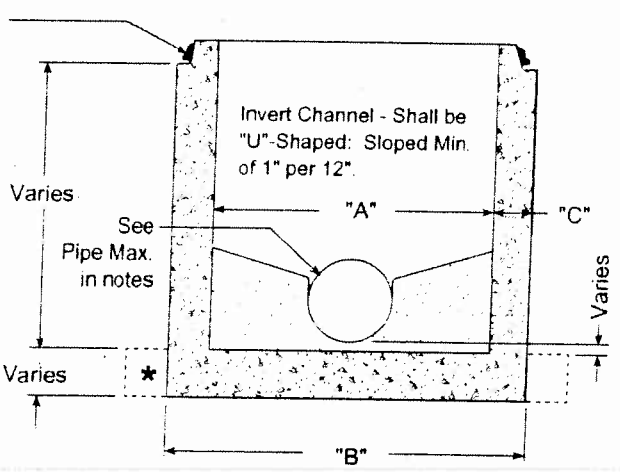
Precast Manholes

For Pipe Entering the Manhole at Excessive Depths Above the Flow Line Out, the Contractor May be Responsible for Grout Work Necessary to Bring Channel up to Flow Line on Inlet Pipe.





Plan View



Section View

Pipe Size	I.D. "A"	O.D. "B"	Wall Thk. "C"
4'	4' - 0"	4' - 10"	5"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

Materials & Features

HOLES AS SPECIFIED:
- For 4' I.D. max. diameter = 32"
- For 5' I.D. max. diameter = 40"
- For 6' I.D. max. diameter = 54"

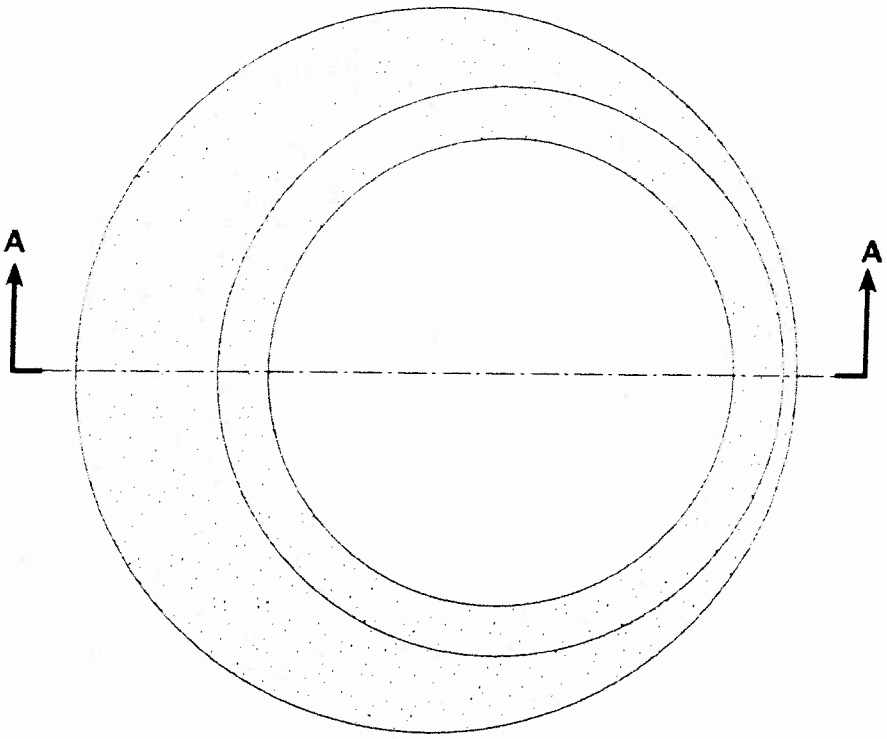
CONCRETE: 5,000 PSI, 28 day strength
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Water-tight gaskets at all pipe connections.
* - Regular base shown. Extended base also available.
In the event a boot is loose contact your Hanson representative to resolve.

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

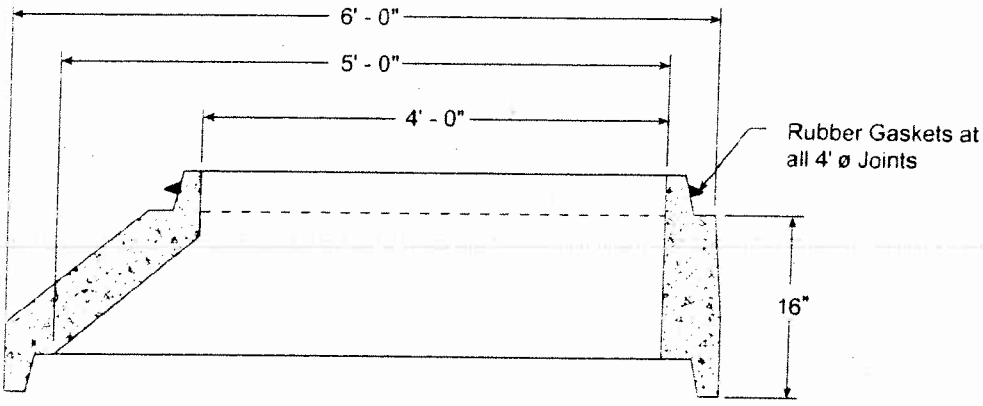
TITLE	PLANT	STATE	SECTION.PAGE	DATE
Details: 4', 5' & 6' I.D. Precast Regular Manhole Base	All Plants	TX	5.7	08-15-06

Hanson

Contact Hanson | Go to Index | EXIT



Plan View



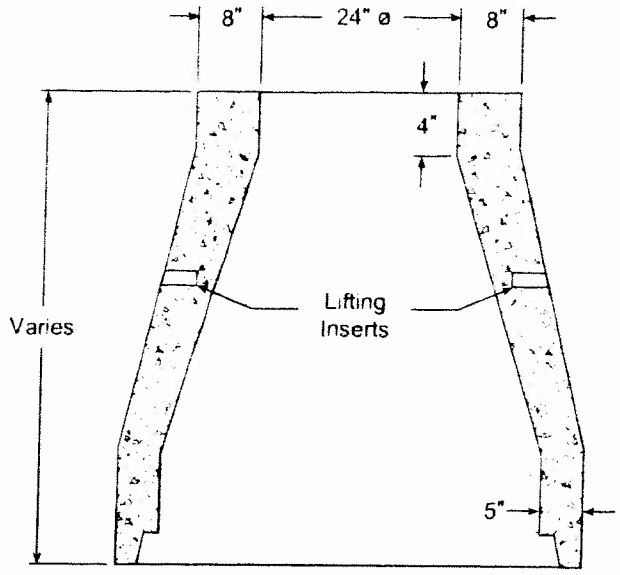
Section View

Materials & Features

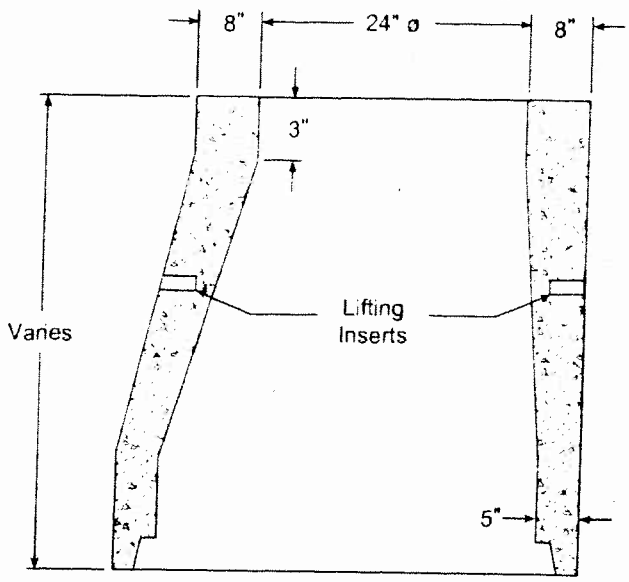
CONCRETE. 5,000 PSI. 28 day strength.
REINFORCING. Meets or exceeds ASTM C478 requirements.
CONSTRUCTION OF PRECAST is in accordance with ASTM C478.
Concrete is poured according to ACI-500.

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

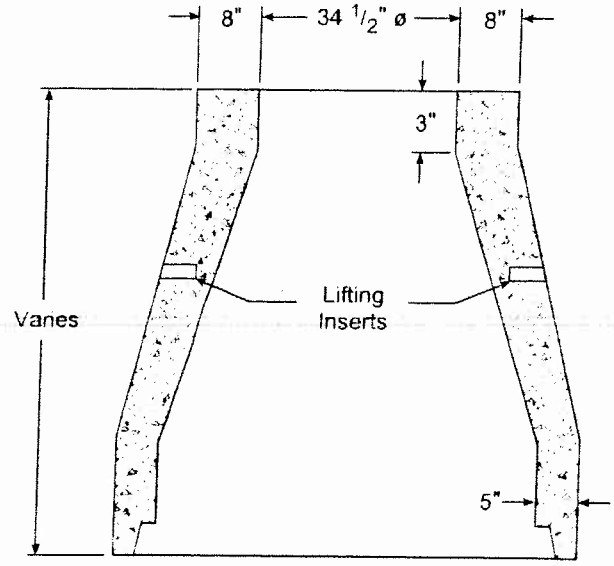
TITLE	PLANT	STATE	SECTION.PAGE	DATE	
5' x 4' Conical Adaptor	Waco	TX	5 8	08-15-06	Hanson



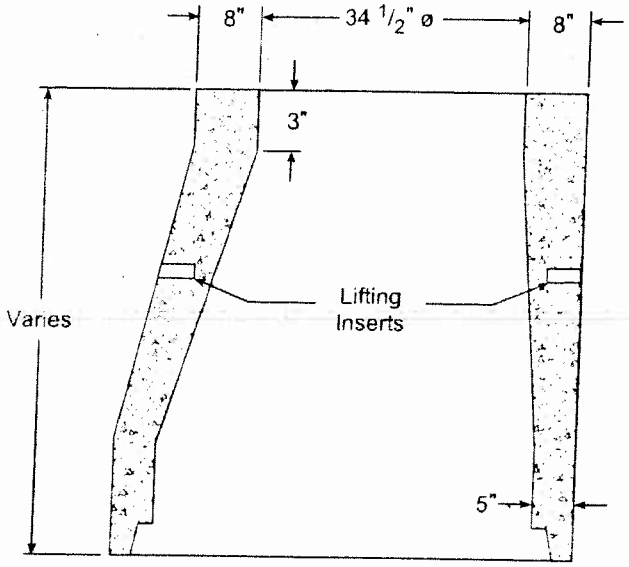
Concentric Cone
24" ø Opening



Eccentric Cone
24" ø Opening



Concentric Cone
34 1/2" ø Opening



Eccentric Cone
34 1/2" ø Opening

Materials & Features

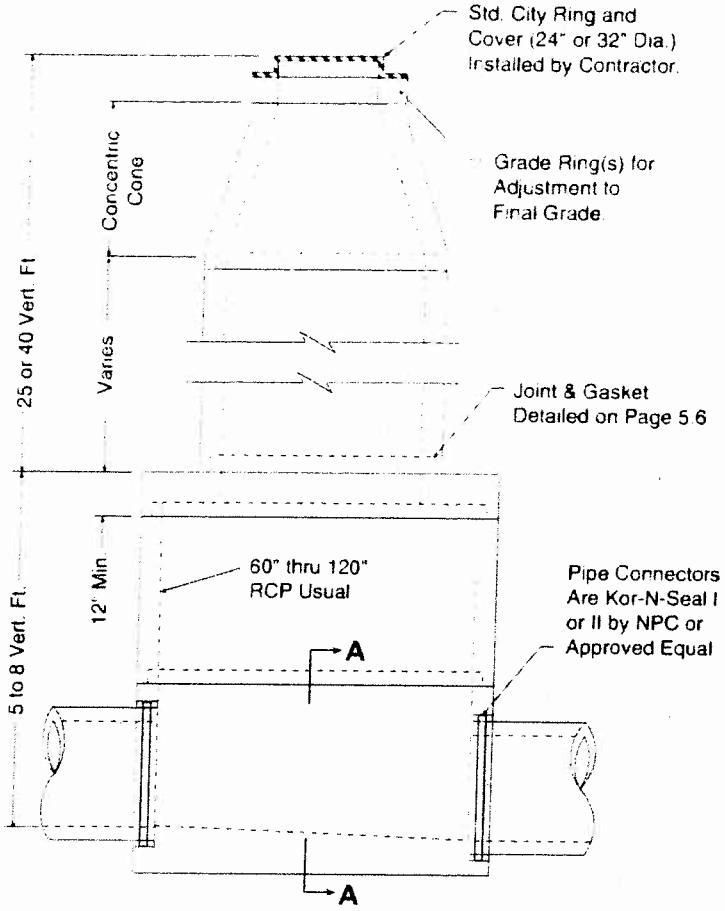
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
30" ø also available in North Texas.

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

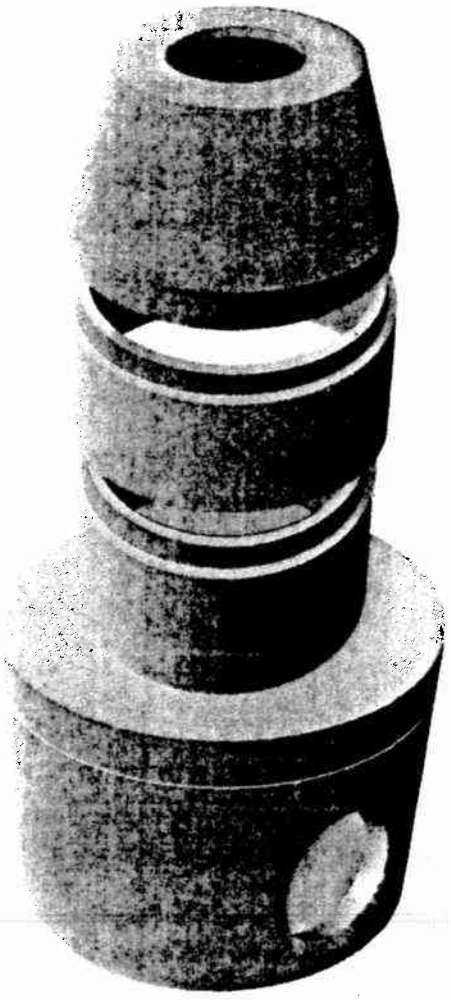
TITLE	PLANT	STATE	SECTION/PAGE	DATE
Hanson 48" Manhole Reducing Cone Detail	Waco Houston	TX	5.9	08-15-06

Hanson

Precast Manholes



w/ Precast Base



Isometric View

Section A-A

Base Slab Reinforcing

30' Deep Structure
60"ø - 6" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 8" Thick Slab min. - #5 @ 6" ea.way
96"ø - 10" Thick Slab min. - #5 @ 6" ea.way

45' Deep Structure
60"ø - 8" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 10" Thick Slab min. - #5 @ 6" ea.way
96"ø - 12" Thick Slab min. - #5 @ 6" ea.way

All Reinforcing has $1\frac{1}{2}$" cover from top of slab.

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615, Grade 60.

REINFORCING to meet AASHTO HS 20-44 Loading.

DESIGN EQUAL TO OR EXCEEDS ASTM C-478

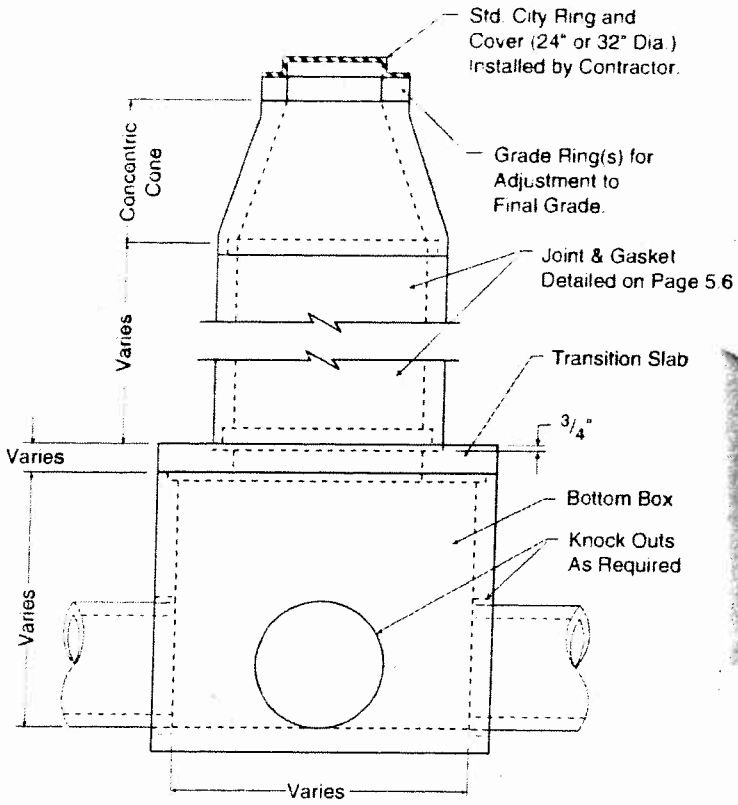
In the event a boot is loose contact your Hanson representative to resolve.

Note:

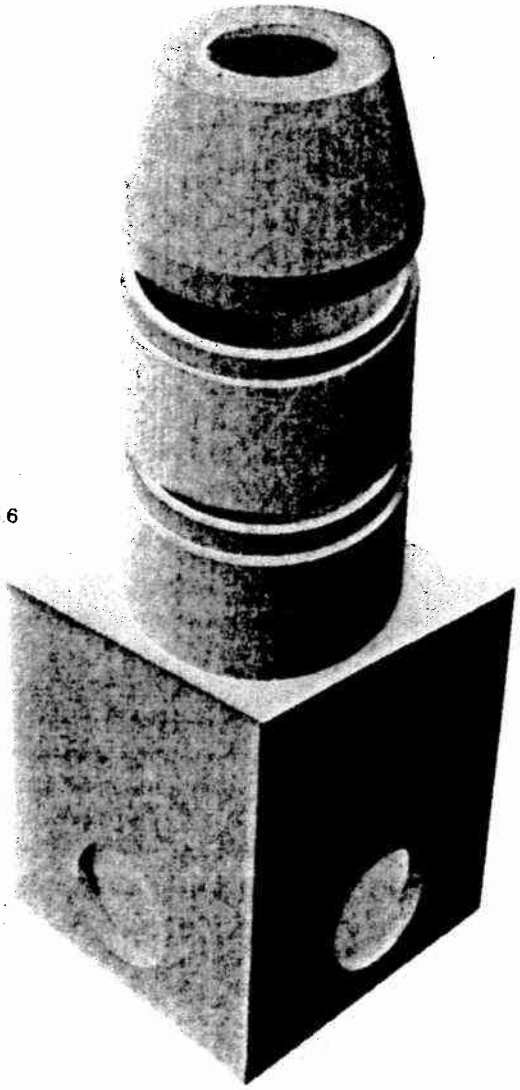
- Inverts shall be specifically sized for connecting pipes; and shall be U-Shaped with the min. depth 3/4 of the largest pipe diameter.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
30 & 45 Ft. Depth 60" thru 96"Large Base Manhole	Houston San Antonio	TX	5.10	08-15-06	Hanson



Side View



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

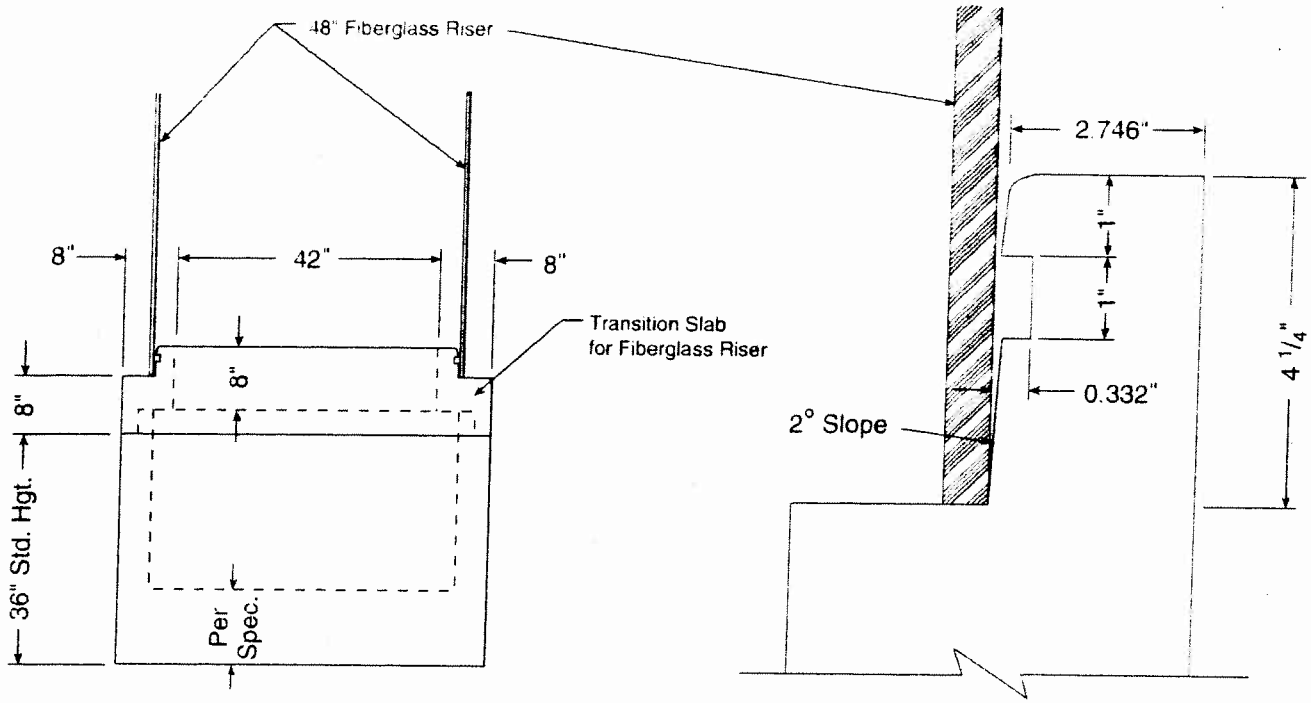
BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

In the event a boot is loose contact your Hanson representative to resolve.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Type "C" Manhole	Houston San Antonio	TX	5.11	08-15-06	Hanson



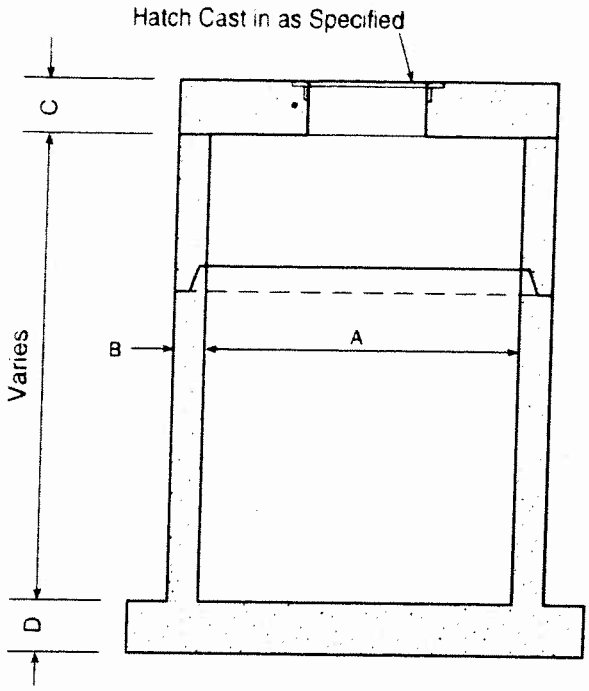
Profile **Joint Detail**

Materials & Features

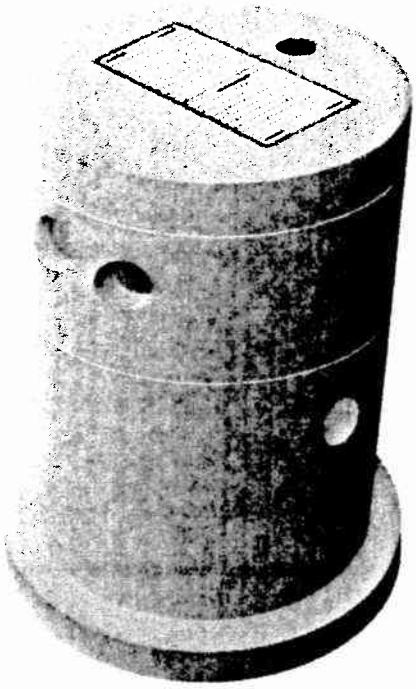
CONCRETE: 5,000 PSI in 28 days.
REINFORCING STEEL: per ASTM A-615, Grade 60.
REINFORCING to meet AASHTO HS 20-44 Loading.
DESIGN EQUAL TO OR EXCEEDS ASTM C-478

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
ASTM C-478 Special Base	Houston	TX	5.12	08-15-06	Hanson

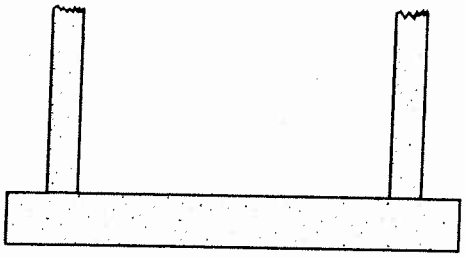


Section View
(Base configuration for 60", 72" & 84")

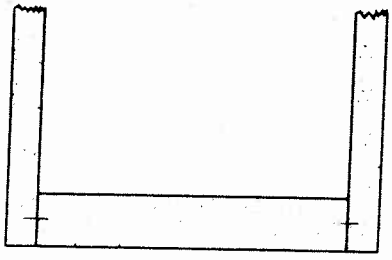


Isometric View

Product Dimensions			
A	B	C	D
60"	Contact your local Hanson representative for product dimensions.		
72"			
84"			
96"			
108"			
120"			
132"			
144"			



Section View
Base configuration for 96"



Section View
Base configuration for 108"-144"

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

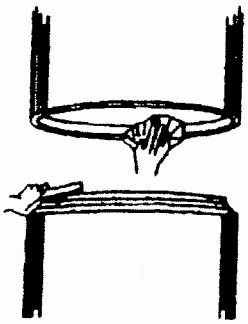
(A). Hatches as specified by Engineer.

In the event a boot is loose contact your Hanson representative to resolve.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Typical Wetwells - Various Diameters	All Plants	TX	5.13	08-15-06	Hanson

① "O"-Ring Gasket

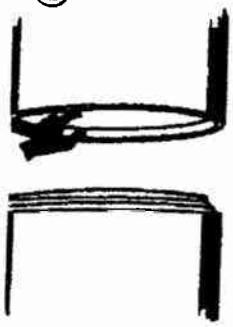


Carefully clean all dirt & foreign objects from the joining surface of the bell or groove end of pipe.

Carefully clean spigot or tongue end of pipe, including the gasket recess. Inspect the bell and spigot ends of each section to make sure they are free from cracks, chips or voids that will interfere with gasket.

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

② Lubricate bell joint surface liberally, covering entire inside surface using proper pipe gasket lubricant.

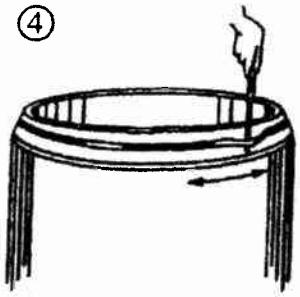


③

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

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

④

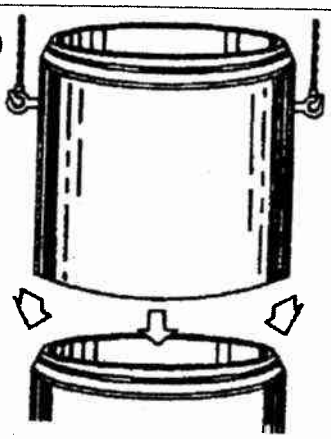


****IMPORTANT****

Fit the gasket carefully, equalizing the rubber gasket stretch by running a smooth, round object (inserted between the gasket & 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 & spigot to be joined. Before homing the joint, check that the gasket is in contact with the bell end entrance taper around the entire circumference.

Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.

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

Profile Gasket

1. Manhole sections should be handed with extreme caution to avoid chipping of the bell or spigot ends. Proper lifting devices must be used on all sections.
2. Inspect gasket sealing area for any voids or rough edges that may interfere with the seal.
3. Place the 4-G Gasket in the step of the spigot. (Making sure that the pointed end of the gasket is toward the end of the pipe as shown in Fig A.)
4. ****IMPORTANT**** Equalize the stretch on the gasket by pulling the sealing lube away from the spigot at least one inch and then releasing the gasket. Repeat this every three or four inches around the circumference of the pipe. Equalization of stretch makes sure that the gasket has the same stretched cross-section and tension throughout. **Do not lube the gasket or spigot end of the pipe.**
5. Remove all dirt and other foreign matter from the inside surface of the bell. Apply lube to the inner surface of the bell including the lead-in taper surface on the outer edge of the bell. Align spigot with the bell. Gasket should touch lead-in taper around the entire circumference before pushing the pipe home.
6. Push the manhole section carefully, until the spigot is all the way home. (Fig B) Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.
7. Every manhole will not come home exactly the same. Differences in application, consistency of lubricants, dimensions in the spigot and groove will cause variations in installation. If joining problems arise, please contact the manhole manufacturer immediately rather than forcing manhole sections together with subsequent damage to the manhole.
8. All testing should be performed prior to backfill of the manhole. Problems can not be detected after the manhole is backfilled. **Testing the manhole after backfill voids all warranties.**

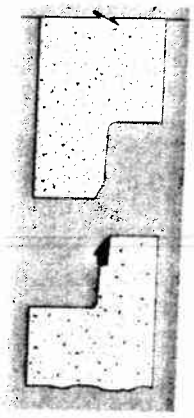


Fig. A

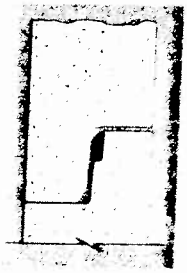
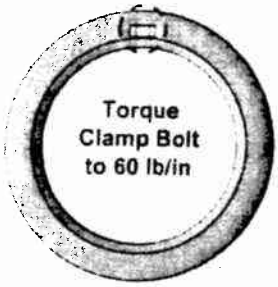


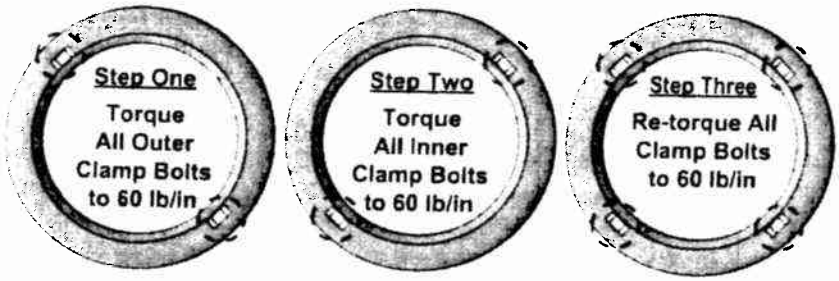
Fig. B

Note: Manholes in excess of 30' in depth must be vacuum tested prior to backfill. The loads presented by soils and possible groundwater at 30' in addition to the load from the vacuum may exceed the design capacity of the pipe to manhole connector.

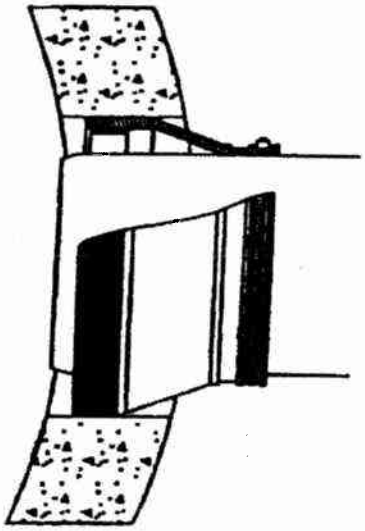
TITLE	PLANT	STATE	SECTION.PAGE	DATE	
O-Ring & Profile Gasket Installation on Manholes	All Plants	TX	5.14	08-15-06	Hanson



Single Clamp



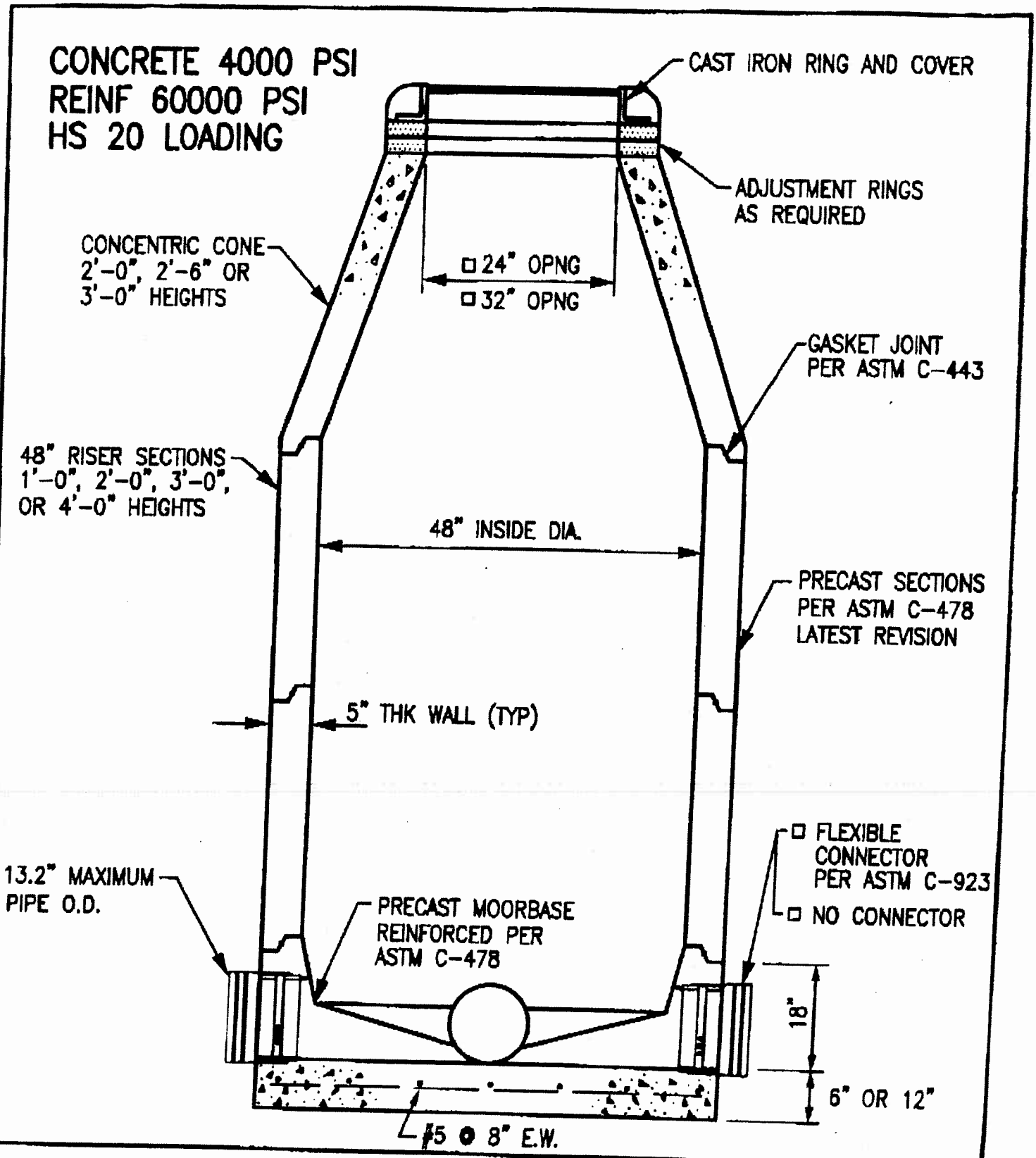
Multiple Clamps



Instructions

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 is at least equal to the inside plane of the manhole.
4. Attach take-up clamps(s) and stagger screw(s) of clamps(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 equal compression of all clamps.
7. If system is to be tested, testing shall be completed prior to backfilling, following all recommendations and requirements of the test system manufacturer. Vacuum testing shall be conducted in accordance with ASTM C-1244.
8. Adjust pipe to line and grade. Use proper bedding, backfill materials and techniques so that pipe deflection and deformation is minimized.
9. Any pipe stubs installed in the manhole must be positively restrained from movement.
10. Vacuum testing after backfill voids warranty.

For more information contact yor local Hanson Representative.



Rinker MATERIALS Moor-Tex
2735 HWY. 36 NORTH
MAILING: P.O. BOX 1088
SEALY, TEXAS 77474
PH: (979) 885-7403
(281) 375-6121
FAX:(979) 885-7001

REV.	DESCRIPTION	DATE
DATE: 8-09-02	SCALE: 3/4"=1'-0"	BY: RB

48" PRECAST CONCENTRIC MANHOLE WITH MOORBASE

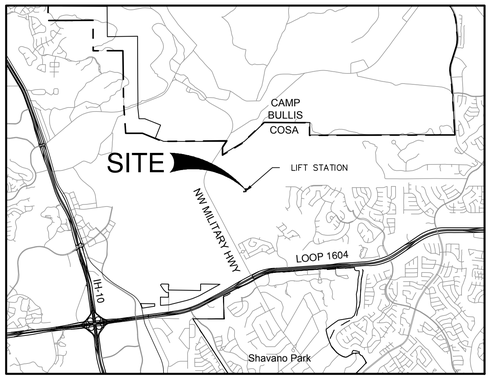
JOB: 2002	FILE: 48CM	DWG. NO. 48CM

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

BEXAR COUNTY, TEXAS

CIVIL CONSTRUCTION PLANS

SAWS JOB. 23-3000



LOCATION MAP
NOT-TO-SCALE

SHEET INDEX

BITTERBLUE, INC.
11 LYNN BATTS LANE, SUITE 100
SAN ANTONIO, TEXAS 78218

MARCH 2024

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

STATE OF TEXAS
KIM KEEFER
117746
LICENSED
PROFESSIONAL ENGINEER
11/22/23

SHEET C0.00

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" SS, 135 LF-8" SS PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

SAWS JOB NO. 23-3000 CORNERSTONE LIFT STATION #2 AND FORCE MAIN - 1293400

Date: Mar 18, 2024, 9:32am User ID: eloughlin
File: P:\129\3A\00\Design\Civil\LS\CS-1293400.dwg

SAWS GENERAL CONSTRUCTION NOTES

GENERAL SECTION:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

   A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.
   B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE."
   C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION."
   D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR CONSTRUCTION."
   E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).

2. THE CONTRACTOR SHALL OBTAIN SAWS STANDARD DETAILS FROM SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN DESIGN PLANS.

3. THE CONTRACTOR IS TO NOTIFY AND MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500, AND PROVIDE NOTIFICATION PROCEDURES THE CONTRACTOR WILL USE TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 72 HOURS PRIOR TO EXCAVATION.

4. LOCATIONS AND DEPTHS OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

5. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

   SAN ANTONIO WATER SYSTEM:
   SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES

   COSA DRAINAGE 210-207-8048
   COSA TRAFFIC SIGNAL OPERATIONS 210-207-7720
   TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION AS A RESULT OF DAMAGES DONE BY THE PROJECT'S CONSTRUCTION.

7. ALL WORK IN TEXAS HIGHWAY DEPARTMENT AND BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT.

8. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

9. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

10. ANY WORK COMPLETED WITHOUT PRIOR WRITTEN AUTHORIZATION WHICH IS NOT INCLUDED IN THESE PLANS AND SPECIFICATIONS WILL NOT BE COMPENSATED BY THE SAN ANTONIO WATER SYSTEM.

11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. PRE CON SITE VIDEO: BEFORE THE START OF ANY CONSTRUCTION. THE SITE MUST BE VIDEO RECORDED BY THE CONTRACTOR WITH ONE COPY SUBMITTED TO SAWS INSPECTIONS. A PRE-SITE VIDEO WILL PROVIDE ACCURATE DOCUMENTATION OF THE EXISTING CONDITIONS (NSPI).

13. POWER POLE BRACING: CONTRACTORS SHOULD BE ADVISED THAT THERE ARE EXISTING OVERHEAD UTILITY POLES ALONG THE PROJECT CORRIDOR. CONTRACTORS SHOULD FURTHER BE ADVISED THAT IF THE DISTANCE FROM THE OUTSIDE FACE OF A UTILITY TRENCH TO THE FACE OF A UTILITY POLE IS LESS THAN 5 FEET, SAID UTILITY POLE IS SUBJECT TO BRACING, BASED ON A DETERMINATION MADE BY UTILITY POLE OWNER. COSTS INCURRED BY CONTRACTOR FOR BRACING OF THESE UTILITY POLES IS SUBSIDIARY TO THAT RESPECTIVE UTILITY COMPANY'S WORK. IT IS ADVISABLE FOR THE CONTRACTOR TO REVIEW THE CONSTRUCTION DOCUMENTS, AND VISIT THE CONSTRUCTION SITE TO DETERMINE POTENTIAL IMPACTS.

14. CONSTRUCTION SEQUENCING: IT IS THE CONTRACTOR SOLE RESPONSIBILITY TO SCHEDULE SEQUENCING FOR REMOVAL AND INSTALLATION OF EXISTING AND PROPOSED SAWS UTILITIES IN CONJUNCTION WITH GENERAL PROJECT CONSTRUCTION. SEQUENCE OF CONSTRUCTION ACTIVITIES SHALL BE CONSIDERED IN ORDER TO MINIMIZE THE EXTENT AND DURATION OF DISTURBANCES.

SEWER SECTION:

15. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:

   A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT 210-704-SAWS (210-704-7297). PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.
   B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.
   C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.
   D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) ND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.
   E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.
   F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS.

SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA.

NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.

19. THE CONTRACTOR SHALL PROVIDE BYPASS PUMPING OF SEWAGE AROUND EACH SEGMENT OF PIPE TO BE REPLACED, IN ACCORDANCE WITH SAWS SPECIAL SPECIFICATION ITEM NO. 864-S1, "BYPASS PUMPING SMALL DIAMETER SANITARY SEWERS" AND ITEM NO. 864-S2, "BYPASS PUMPING LARGE DIAMETER SANITARY SEWERS". PAYMENT FOR SUCH WORK WILL BE MADE UNDER THE BID ITEM "SANITARY SEWER (BYPASS PUMPING)" (LUMP SUM) AS PER SAWS SPECIAL SPECIFICATION.

20. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500 AND/OR SAWS PRODUCTION GROUPS AT LEAST ONE WEEK OR MORE IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.

21. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECTS IMPROVEMENTS (NSPI).

22. SMART MANHOLE COVERS: THE CONTRACTOR SHALL NOTIFY JUAN C. RAMIREZ AT 210-233-3558 AND SAWS EOC AT 210-704-SAWS (210-233-7297) A MINIMUM OF 72 HOURS, NOT COUNTING WEEKENDS OR SAWS HOLIDAYS, BEFORE WORKING ON THE PIPE OR MANHOLE, IN ORDER TO HAVE SAWS REMOVE THE SMART COVER. ANY DAMAGE DONE TO THE SMART COVER WILL BE CHARGED TO THE CONTRACTOR THROUGH A CHANGE ORDER.

CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS

I. WHERE A SEWER MAIN CROSSES OVER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE (9) FEET, ALL PORTIONS OF THE SEWER MAIN WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED USING 160 PSI PRESSURE RATED HDPE AND JOINED WITH EQUALLY PRESSURE RATED PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 160 PSI PRESSURE RATED PIPE AT LEAST EIGHTEEN (18) FEET IN LENGTH MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM.)

II. WHERE A SEMI-RIGID OR RIGID SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET BUT GREATER THAN TWO FEET, THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF THE SEWER WITHIN NINE FEET OF THE WATER MAIN.

III. WHERE A SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN TWO FEET, THE SEWER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON OR C900 PVC PIPE WITH A MINIMUM PRESSURE RATING OF 160 PSI WITHIN NINE FEET OF THE WATER MAIN, SHALL BE PLACED NO CLOSER THAN SIX (6") INCHES BETWEEN OUTER DIAMETERS, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE OF A LENGTH GREATER THAN EIGHTEEN (18) FEET MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM)

IV. WHERE A SEWER MAIN PARALLELS A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET, THE SEWER MAIN SHALL BE BELOW THE WATER MAIN, SHALL BE CONSTRUCTED OF DUCTILE IRON OR C900 PVC PIPE WITH A MINIMUM PRESSURE RATING OF 160 PSI FOR BOTH PIPE AND JOINTS FOR A DISTANCE OF NINE FEET BEYOND THE POINT OF CONFLICT, SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE BETWEEN OUTER DIAMETERS OF TWO FEET VERTICALLY AND FOUR FEET HORIZONTALLY, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL.

V. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED ANY CLOSER THAN NINE FEET TO WATER MAINS.

ADDITIONAL GENERAL NOTES

1. PROJECT SPECIFICATIONS TAKE PRECEDENCE OVER PROJECT PLANS. SPECIAL CONDITIONS TAKE PRECEDENCE OVER SPECIFICATIONS AND PLANS. ADDENDUMS TAKE PRECEDENCE OVER ALL.

2. CONTRACTOR IS RESPONSIBLE FOR ALL SITE SAFETY CONSIDERATIONS.

EXCAVATION

1. 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. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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 EXCAVATION.

2. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS UPON PROJECT COMPLETION. THE CONTRACTOR SHALL NOT PERMANENTLY PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.

3. WATER JETTING THE BACKFILL WITHIN A STREET WILL NOT BE PERMITTED. EXPLOSIVES AND BLASTING ARE NOT PERMITTED.

SUPPLEMENTARY NOTES

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR OBTAINING ALL PERMITS.

2. ALL WORK IN THE 100 YEAR FLOODPLAIN SHALL BE ACCOMPLISHED UNDER AN APPROVED FLOODPLAIN PERMIT.

3. CONTRACTOR SHALL PROTECT OR REMOVE AND REPLACE ALL TRAFFIC SIGNS (NSPI).

4. CONTRACTOR SHALL PROTECT OR REMOVE AND REPLACE ALL MAILBOXES (NSPI).

5. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER IN ADVANCE OF ANY WORK IN THE OWNERS' PROPERTY.

STORM WATER PROTECTION AND EROSION CONTROL NOTES

1. CONTRACTOR SHALL PROVIDE HIS/HER OWN STORM WATER POLLUTION PREVENTION PLAN (SW3P).

2. CONTRACTOR SHALL INSTALL STORM WATER POLLUTION PREVENTION STRUCTURES INCLUDING BUT NOT LIMITED TO, SILT FENCING AND/OR ROCK BERMS IN ALL AREAS TO BE IMPACTED BY CURRENT AND ONGOING CONSTRUCTION AND MAINTAIN SUCH STRUCTURES UNTIL SUITABLE GROUNDCOVER/REVEGETATION IS ACCEPTED. ALL STORM WATER POLLUTION PREVENTION STRUCTURES SHALL BE CONSTRUCTED WITHIN THE COUNTY RIGHT-OF-WAY AND WATER LINE EASEMENTS. ANY FEATURES ON THE PLANS SHOWN OUTSIDE THESE AREAS ARE SHOWN FOR VISUAL CLARITY ONLY.

3. THE LOCATION OF ANY BEST MANAGEMENT PRACTICES (B.M.P.'S) SUCH AS SILT FENCING, ROCK BERMS, STABILIZED CONSTRUCTION ENTRANCE/EXIT, ETC. THAT MAY BE SHOWN ON THESE PLANS ARE SUBJECT TO FIELD VERIFICATION. CONTRACTOR SHALL ADJUST THE LOCATIONS OF B.M.P.'S TO BEST ACCOMMODATE THE CONDITIONS AND TOPOGRAPHY ENCOUNTERED DURING CONSTRUCTION. QUESTIONS REGARDING THE PLACEMENT AND/OR CHANGES CONCERNING B.M.P.'S SHALL BE REFERRED TO THE OWNER AND THE COUNTY. THE CONTRACTOR IS TO ENSURE THAT SEDIMENTATION AND EROSION WILL BE CONTAINED WITHIN THE PROJECT WORK AREAS AND KEPT OFF ROADWAYS AND ADJACENT PROPERTIES AND OUT OF DRAINAGE CHANNELS AND WATER COURSES.

HAULING AND STORAGE

- HAULING AND/OR TEMPORARY STORAGE OF EQUIPMENT AND MATERIALS MAY BE NECESSARY, INCLUDING EXCAVATED MATERIAL AND SPOILS. CONTRACTOR SHALL INCLUDE IN HIS BID PRICE ALL COSTS ASSOCIATED WITH HAULING AND OFF-SITE STORAGE OF ALL MATERIALS AND/OR EQUIPMENT. ALSO REFER TO THE PROJECT SPECIFICATIONS.

EXISTING IMPROVEMENTS

- ALL EXISTING IMPROVEMENTS WITHIN THE PROJECT AREA, WHICH ARE NOT COVERED UNDER THE UNIT PRICE BID PROPOSAL, SHALL BE PROTECTED OR REMOVED AND REPLACED TO EXISTING CONDITION OR BETTER AT NO ADDITIONAL COST TO THE OWNER.

TREE PROTECTION NOTES

1. CONTRACTOR TO PROTECT ALL TREES WHEREVER POSSIBLE. DAMAGE TO TREES IDENTIFIED TO BE PROTECTED WILL BE MITIGATED AT THE CONTRACTOR'S SOLE EXPENSE. ALSO, ALL WORK IN PUBLIC RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH THE CONTROLLING ENTITIES STANDARDS, SPECIFICATIONS AND PERMIT REQUIREMENTS.

2. PROTECT EXISTING TREES SIX INCH (6") DIAMETER AND LARGER. ALL TREES TO BE PRESERVED AS PART OF THE PROJECT SHALL BE PROTECTED AGAINST INJURY OR DAMAGE, INCLUDING CUTTING, SOIL COMPACTION, BREAKING OR SKINNING OF ROOTS, TRUNKS, OR BRANCHES DURING CONSTRUCTION OPERATIONS BY FENCING AS DESCRIBED BELOW. THE TREE PROTECTION SHALL BE PLACED BEFORE ANY EXCAVATION OR GRADING IS BEGUN AND MAINTAINED FOR THE DURATION OF THE CONSTRUCTION WORK. PROTECTION WILL ENCOMPASS THE ROOT PROTECTION ZONE WHICH WILL BE AT MINIMUM ONE FOOT (1.0') RADIUS PER INCH DIAMETER OF THE TREE TRUNK AT 4.5' ABOVE GROUND. NO MATERIAL SHALL BE STORED OR CONSTRUCTION OPERATION SHALL BE CARRIED ON WITHIN THE TREE PROTECTION FENCING, UNLESS AUTHORIZED BY THE OWNER. THE PROTECTION SHALL REMAIN UNTIL ALL WORK IS COMPLETED.

3. NO CONSTRUCTION ACTIVITIES SHALL BE PERFORMED WITHIN 5' FROM THE TRUNK OF A TREE THAT IS PROTECTED. TRENCH SHORING WILL BE REQUIRED INSIDE OF A ROOT PROTECTION ZONE. THE ROOT PROTECTION ZONE IS CALCULATED AS A RADIUS FROM THE TREE TRUNK EQUAL TO ONE FOOT PER DIAMETER INCH OF THE TREE.

4. THIS PROJECT IS SUBJECT TO REGULATIONS ESTABLISHED BY THE CITY OF SAN ANTONIO TREE ORDINANCE.

TEMPORARY LIVESTOCK CONTROL

- WHEN WORKING IN AN AREA WITH LIVESTOCK, THE CONTRACTOR SHALL INSTALL AND MAINTAIN (AT CONTRACTOR'S EXPENSE) THE NECESSARY TEMPORARY FENCING TO KEEP THE LIVESTOCK FROM EXITING THE AREA. ANY ESCAPED LIVESTOCK WILL BE CAPTURED AND RETURNED TO THE AREA AT THE CONTRACTOR'S EXPENSE.

CONTRACTOR STAKING NOTE

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL CONSTRUCTION STAKING AND CUT SHEETS NECESSARY FOR THE CONSTRUCTION OF THE WATER MAIN AND ALL ASSOCIATED APPURTENANCES. ALL CONSTRUCTION SURVEY VERIFICATION AND CONSTRUCTION STAKING SHALL BE PERFORMED BY OR UNDER THE SUPERVISION OF A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR. THE DESIGN ENGINEER WILL, AT NO ADDITIONAL COST, PROVIDE A DIGITAL PROJECT FILE OF THE PROJECT'S HORIZONTAL AND VERTICAL CONTROL (MINIMUM OF THREE CONTROL POINTS) FOR THE CONTRACTOR. ALL COORDINATES ARE DISPLAYED IN STATE PLANE SURFACE VALUES.

FORCE MAIN NOTES

1. ALL FORCE MAIN PIPE MATERIAL SHALL CONSIST OF HDPE UNLESS OTHERWISE SHOWN ON THE PLANS. PIPE SHALL CONSIST OF HDPE SOLID WALL REFERRED TO AS DRISCO 1000, DRISCO 8600, QUALI PIPE, POLY PIPE, AND PLEXO PIPE THAT IS IN COMPLIANCE WITH ASTM F714. ALL PIPE FITTINGS SHALL BE HIGH DENSITY POLYETHYLENE PIPE AND MADE OF VIRGIN MATERIAL, AND SHALL HAVE A MINIMUM WORKING PRESSURE RATING 200 PSI. HIGH DENSITY POLYETHYLENE MATERIAL SHALL COMPLY WITH PE4710 POLYETHYLENE THAT SHALL MEET OR EXCEED THE REQUIREMENT OF THE ASTM 3350 CELL CLASSIFICATION OF PE445574C/E, TYPE III, GRADE PE47. SOLID WALL PIPE SHALL BE PRODUCED WITH A PLAIN END CONSTRUCTION FOR HEAT-JOINING (BUTT FUSION) CONFORMING TO ASTM 2620, PPI TR-33. NO FLANGED OR SLIP-ON JOINTS WILL BE ACCEPTED. SEE SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION, ITEM NO. 900: "RECONSTRUCTION OF SANITARY SEWER BY PIPE BURSTING/CRUSHING REPLACEMENT PROCESS", SECTION 900.2.1.

2. COLOR CODING OF FORCE MAIN PIPING METALLIC TAPE (6" WIDE MINIMUM) SHALL BE APPLIED TO ALL FORCE MAIN PIPE. THE METALLIC TAPE SHALL BE LABELED "SEWER PIPE". PIPE SHALL HAVE A MINIMUM OF THREE GREEN STRIPES POSITIONED IN SUCH A MANNER THAT THE STRIPE(S) ARE VISIBLE REGARDLESS OF THE ROTATION OF THE PIPE IN THE TRENCH.

3. ALL FORCE MAINS SHALL BE TESTED IN ACCORDANCE WITH 30 TAC 217.68 AT 50 PSI ABOVE THE NORMAL OPERATING PRESSURE OF THE FORCE MAIN.

4. MINIMIZE THE NUMBER OF PEAKS/VALLEYS ALONG THE FORCE MAIN PROFILE TO LIMIT THE ACCUMULATION OF GASES. ALL HIGH POINTS SHALL HAVE AN AIR AND VACUUM RELEASE VALVE RATED FOR RAW SEWAGE, AS SHOWN ON THE PLANS.

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

GENERAL NOTES

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C1.00

Date: Mar 18, 2024, 9:32am User ID: dloughlin
File: P:\12934\00\Design\Civil\LS\QN-12934001.dwg

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
ORGANIZED SEWAGE COLLECTION SYSTEM (SCS)
GENERAL CONSTRUCTION NOTES

1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROPOSED REGULATED PROJECT MUST BE PROVIDED WITH COPIES OF THE SCS PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

4. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED SCS APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF AN SCS APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

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

7. SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUST BE CAPPED WITH CONCRETE TO PREVENT SCOURING OF BACKFILL, OR THE SEWER LINES MUST BE ENCASED IN CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES.

8. BLASTING PROCEDURES FOR PROTECTION OF EXISTING SEWER LINES AND OTHER UTILITIES WILL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA. SAND IS NOT ALLOWED AS BEDDING OR BACKFILL IN TRENCHES THAT HAVE BEEN BLASTED. IF ANY EXISTING SEWER LINES ARE DAMAGED, THE LINES MUST BE REPAIRED AND RETESTED.

9. ALL MANHOLES CONSTRUCTED OR REHABILITATED ON THIS PROJECT MUST HAVE WATERTIGHT SIZE ON SIZE RESILIENT CONNECTORS ALLOWING FOR DIFFERENTIAL SETTLEMENT. IF MANHOLES ARE CONSTRUCTED WITHIN THE 100-YEAR FLOODPLAIN, THE COVER MUST HAVE A GASKET AND BE BOLTED TO THE RING. WHERE GASKETED MANHOLE COVERS ARE REQUIRED FOR MORE THAN THREE MANHOLES IN SEQUENCE OR FOR MORE THAN 1500 FEET, ALTERNATE MEANS OF VENTING WILL BE PROVIDED. BRICKS ARE NOT AN ACCEPTABLE CONSTRUCTION MATERIAL FOR ANY PORTION OF THE MANHOLE.

   THE DIAMETER OF THE MANHOLES MUST BE A MINIMUM OF FOUR FEET AND THE MANHOLE FOR ENTRY MUST HAVE A MINIMUM CLEAR OPENING DIAMETER OF 30 INCHES. THESE DIMENSIONS AND OTHER DETAILS SHOWING COMPLIANCE WITH THE COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON PLAN SHEET N/A.

   IT IS SUGGESTED THAT ENTRANCE INTO MANHOLES IN EXCESS OF FOUR FEET DEEP BE ACCOMPLISHED BY MEANS OF A PORTABLE LADDER. THE INCLUSION OF STEPS IN A MANHOLE IS PROHIBITED.

10. WHERE WATER LINES AND NEW SEWER LINE 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).

11. WHERE SEWERS LINES DEVIATE FROM STRAIGHT ALIGNMENT AND UNIFORM GRADE ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER: PP 819 TN (PLASTICS PIPE BULLETIN).

    IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: ASTM D2657.

    SPECIFIC CARE MUST BE TAKEN TO ENSURE THAT THE JOINT IS PLACED IN THE CENTER OF THE TRENCH AND PROPERLY BEDDED IN ACCORDANCE WITH 30 TAC §217.54.

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES.

    IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON PLAN SHEET N/A OF N/A, (FOR POTENTIAL FUTURE LATERALS). NOT USED. NO LATERALS SHALL BE CONNECTED TO THE LIFT STATION.

    THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET N/A OF N/A AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET N/A OF N/A, NOT USED. NO STUBOUTS WILL BE INSTALLED FOR THE LIFT STATION.

13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2) CLASSES A, B OR C.

14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).

15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. 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. TESTING METHOD WILL BE:
    (a) FOR A COLLECTION SYSTEM PIPE THAT WILL TRANSPORT WASTEWATER BY GRAVITY FLOW, THE DESIGN MUST SPECIFY AN INFILTRATION AND EXFILTRATION TEST OR A LOW-PRESSURE AIR TEST. A TEST MUST CONFORM TO THE FOLLOWING REQUIREMENTS:
        (1) LOW PRESSURE AIR TEST.
            (A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED IN AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) C-828, ASTM C-924, OR ASTM F-1417 OR OTHER PROCEDURE APPROVED BY THE EXECUTIVE DIRECTOR, EXCEPT AS TO TESTING TIMES AS REQUIRED IN TABLE C.3 IN SUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(ii) OF THIS PARAGRAPH.
            (B) FOR SECTIONS OF COLLECTION SYSTEM PIPE LESS THAN 36 INCH AVERAGE INSIDE DIAMETER, THE FOLLOWING PROCEDURE MUST APPLY, UNLESS A PIPE IS TO BE TESTED AS REQUIRED BY PARAGRAPH (2) OF THIS SUBSECTION.
                (i) A PIPE MUST BE PRESSURIZED TO 3.5 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE PRESSURE EXERTED BY GROUNDWATER ABOVE THE PIPE.
                (ii) ONCE THE PRESSURE IS STABILIZED, THE MINIMUM TIME ALLOWABLE FOR THE PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED FROM THE FOLLOWING EQUATION:

EQUATION C.3

$$T = \frac{0.085 \times D \times K}{Q}$$

WHERE:
T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS
K = 0.000419 X D X L, BUT NOT LESS THAN 1.0
D = AVERAGE INSIDE PIPE DIAMETER IN INCHES
L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET
Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE FOOT INTERNAL SURFACE

(C) SINCE A K VALUE OF LESS THAN 1.0 MAY NOT BE USED, THE MINIMUM TESTING TIME FOR EACH PIPE DIAMETER IS SHOWN IN THE FOLLOWING TABLE C.3:

PIPE DIAMETER (INCHES)	MINIMUM TIME (SECONDS)	MAXIMUM LENGTH FOR MINIMUM TIME (FEET)	TIME FOR LONGER LENGTH (SECONDS/FOOT)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.
(E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF A TESTING PERIOD, THEN THE TEST MUST CONTINUE FOR THE ENTIRE TEST DURATION AS OUTLINED ABOVE OR UNTIL FAILURE.
(F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.
(G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR.

(2) INFILTRATION/EXFILTRATION TEST.
(A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE.
(B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST WHEN PIPES ARE INSTALLED BELOW THE GROUNDWATER LEVEL.
(C) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE, OR AT LEAST TWO FEET ABOVE EXISTING GROUNDWATER LEVEL, WHICHEVER IS GREATER.
(D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH (C) OF THIS PARAGRAPH.
(E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER TO REDUCE THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION.

(b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:
(1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.
(A) MANDREL SIZING.
(i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS ASSOCIATION, UNI-BELL, OR AMERICAN NATIONAL STANDARDS INSTITUTE, OR ANY RELATED APPENDIX.
(ii) IF A MANDREL SIZING DIAMETER IS NOT SPECIFIED IN THE APPROPRIATE STANDARD, THE MANDREL MUST HAVE AN OD EQUAL TO 95% OF THE ID OF A PIPE. IN THIS CASE, THE ID OF THE PIPE, FOR THE PURPOSE OF DETERMINING THE OD OF THE MANDREL, MUST EQUAL BE THE AVERAGE OUTSIDE DIAMETER MINUS TWO MINIMUM WALL THICKNESSES FOR OD CONTROLLED PIPE AND THE AVERAGE INSIDE DIAMETER FOR ID CONTROLLED PIPE.
(iii) ALL DIMENSIONS MUST MEET THE APPROPRIATE STANDARD.
(B) MANDREL DESIGN.
(i) A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTIC MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
(ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS.
(iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER OF A PIPE.
(iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING.
(C) METHOD OPTIONS.
(i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.
(ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.
(iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOMETER OR A MANDREL WITH REMOVABLE LEGS OR RUNNERS ON A CASE-BY-CASE BASIS.
(2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL DEFLECTION.
(3) A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.
(4) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.
(5) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).
(6) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE PROBLEM AND CONDUCT A SECOND TEST AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS.

16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC §217.58.
    (a) ALL MANHOLES MUST PASS A LEAKAGE TEST.
    (b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR.
        (1) HYDROSTATIC TESTING.
            (A) THE MAXIMUM LEAKAGE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.
            (B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO A MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.
            (C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.
        (2) VACUUM TESTING.
            (A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.
            (B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.
            (C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.
            (D) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.
            (E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
            (F) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.
            (G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.
            (H) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.

17. 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

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
LIFT STATIONS AND FORCE MAINS
GENERAL CONSTRUCTION NOTES

1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) EDWARDS AQUIFER RULES, AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

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

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

4. UPON COMPLETION OF ANY LIFT STATION EXCAVATION, A GEOLOGIST MUST CERTIFY THAT THE EXCAVATION HAS BEEN INSPECTED FOR THE PRESENCE OF SENSITIVE FEATURES. THE CERTIFICATION MUST BE SIGNED, SEALED, AND DATED BY THE GEOLOGIST PREPARING THE CERTIFICATION. CERTIFICATION THAT THE EXCAVATION HAS BEEN INSPECTED MUST BE SUBMITTED TO THE APPROPRIATE REGIONAL OFFICE.
   - IF SENSITIVE FEATURE(S) ARE IDENTIFIED, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY AND MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY FROM THE LIFT STATION.
   - CONSTRUCTION MAY CONTINUE IF THE GEOLOGIST CERTIFIES THAT NO SENSITIVE FEATURE OR FEATURES WERE PRESENT.

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

6. ALL FORCE MAIN LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.68. TESTING METHOD WILL BE:
   - A PRESSURE TEST MUST USE 50 POUNDS PER SQUARE INCH ABOVE THE NORMAL OPERATING PRESSURE OF A FORCE MAIN.
   - A TEMPORARY VALVE FOR PRESSURE TESTING MAY BE INSTALLED NEAR THE DISCHARGE POINT OF A FORCE MAIN AND REMOVED AFTER A TEST IS SUCCESSFULLY COMPLETED.
   - A PUMP ISOLATION VALVE MAY BE USED AS AN OPPOSITE TERMINATION POINT.
   - A TEST MUST INVOLVE FILLING A FORCE MAIN WITH WATER.
   - A PIPE MUST HOLD THE DESIGNATED TEST PRESSURE FOR A MINIMUM OF 4.0 HOURS.
   - THE LEAKAGE RATE MUST NOT EXCEED 10.0 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER DAY. THE FOLLOWING EQUATION MUST BE USED TO CALCULATE THE ACCEPTABLE LEAKAGE RATE IN GALLONS PER HOUR PER 1,000 FEET OF PIPE.

FIGURE: 30 TAC §217.68(q)

EQUATION C.5.

$$L = \frac{SD\,P}{155{,}400}$$

WHERE:
L = ACCEPTABLE LEAKAGE RATE (GALLONS/HOUR/1,000 FEET OF PIPE, BASED ON A LEAKAGE RATE OF 10.0 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER DAY)
S = LENGTH OF PIPE
D = NOMINAL DIAMETER OF PIPE (INCHES)
P = AVERAGE TEST PRESSURE (POUNDS/SQUARE INCH)

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

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/20/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

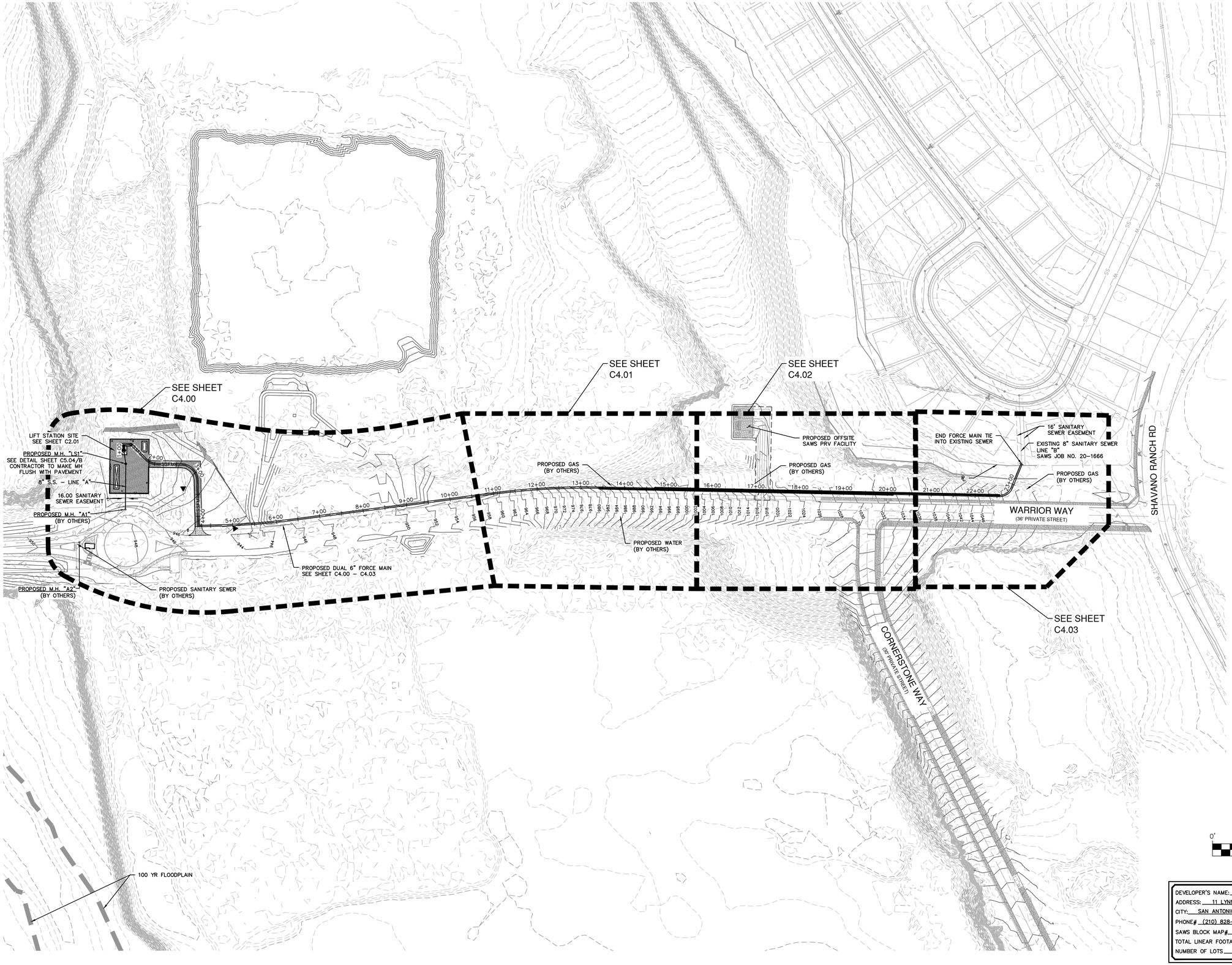
CORNERSTONE LIFT STATION #2
AND FORCE MAIN
SAN ANTONIO, TX

GENERAL NOTES

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C1.01

Date: Mar 18, 2024, 9:32am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LSVON-123400.dwg



NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

OVERALL SITE PLAN

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C2.00

Date: Mar 18, 2024, 9:34am User ID: dloughlin
File: P:\1293\34\00\Design\Civil\LS1\0A-1293400.dwg

PROPOSED MOW STRIP C5.02 A

124 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP RAISED 4" ABOVE ADJACENT FINISHED GRADE C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

LIGHT POLE (SEE ELECTRICAL PLANS)

CONCRETE PAD FOR ELECTRICAL CONTROL PANEL AND ROOF CANOPY (SEE STRUCTURAL AND ELECTRICAL SHEETS)

CONTRACTOR SHALL INSTALL 3/4" WATER SERVICE W/ HOSE BIB AND VACUUM BREAKER (CONTRACTOR SHALL PROVIDE FREEZE PROTECTION) C5.02 E

PROPOSED MOW STRIP C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

89 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP RAISED 4" ABOVE ADJACENT FINISHED GRADE C5.02 A

WET WELL JUNCTION BOXES

AERATOR BLOWER

PROPOSED M.H. "LS1" SEE DETAIL SHEET C5.04/B CONTRACTOR TO MAKE MH FLUSH WITH PAVEMENT

WET WELL CONCRETE PAD (SEE STRUCTURAL SHEETS)

PROPOSED 8" SANITARY SEWER (BY OTHERS)

16.00' LF SANITARY SEWER EASEMENT

126°16'12"

PROPOSED M.H. "A1" (BY OTHERS)

PROPOSED METER POLE

PROPOSED 8" SDR 26 GRAVITY MAIN SANITARY SEWER (SEE SHEET C3.00)

170°47'39"

SEE SHEET C5.00 FOR DISCHARGE AND HEADER PIPING DETAILS

PROPOSED 8" SDR 26 GRAVITY MAIN SANITARY SEWER (SEE SHEET C3.00)

WET WELL VENT

ASPHALT PAVEMENT

8' DIAMETER WET WELL

EDGE OF PAVEMENT (BY OTHERS)

PROPOSED WATER MAIN (BY OTHERS)

PROPERTY LINE

C5.02 A PROPOSED MOW STRIP

C5.02 A 89 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT

C5.02 C PROP EDGE OF ASPHALT PAVEMENT

C5.02 G PROPOSED 3/4" METER W/ H-20 RATED METER BOX AND COVER

3/4" WATER SERVICE

LIGHT POLE (SEE ELECTRICAL PLANS)

GENERATOR PAD (SEE STRUCTURAL AND ELECTRICAL SHEETS)

PROPOSED MOW STRIP C5.02 A

48 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

3' PEDESTRIAN GATE

3'X7' CONC. SIDEWALK

16' WIDE DOUBLE SWING GATE C5.02 B

EDGE OF PAVEMENT

PROPOSED MOW STRIP C5.02 A

59 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

C5.02 D CONCRETE DRIVEWAY

PROPERTY LINE

PROPOSED DUAL 6" HDPE FORCE MAIN SANITARY SEWER (SEE SHEET C4.00-C4.03)

PROPERTY LINE

3/4" WATER SERVICE CONNECTION C5.02 E

3/4" WATER SERVICE

SSFM

SSFM

C5.02 D CONCRETE DRIVEWAY

PROPOSED GAS MAIN (BY OTHERS)

PROPOSED WATER MAIN (BY OTHERS)

50' UTILITY AND LIFT STATION EASEMENT

SCALE: 1"= 10'

0' 10' 20' 30'

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" FM 135 LF-8" SS PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

NO. | REVISION | DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

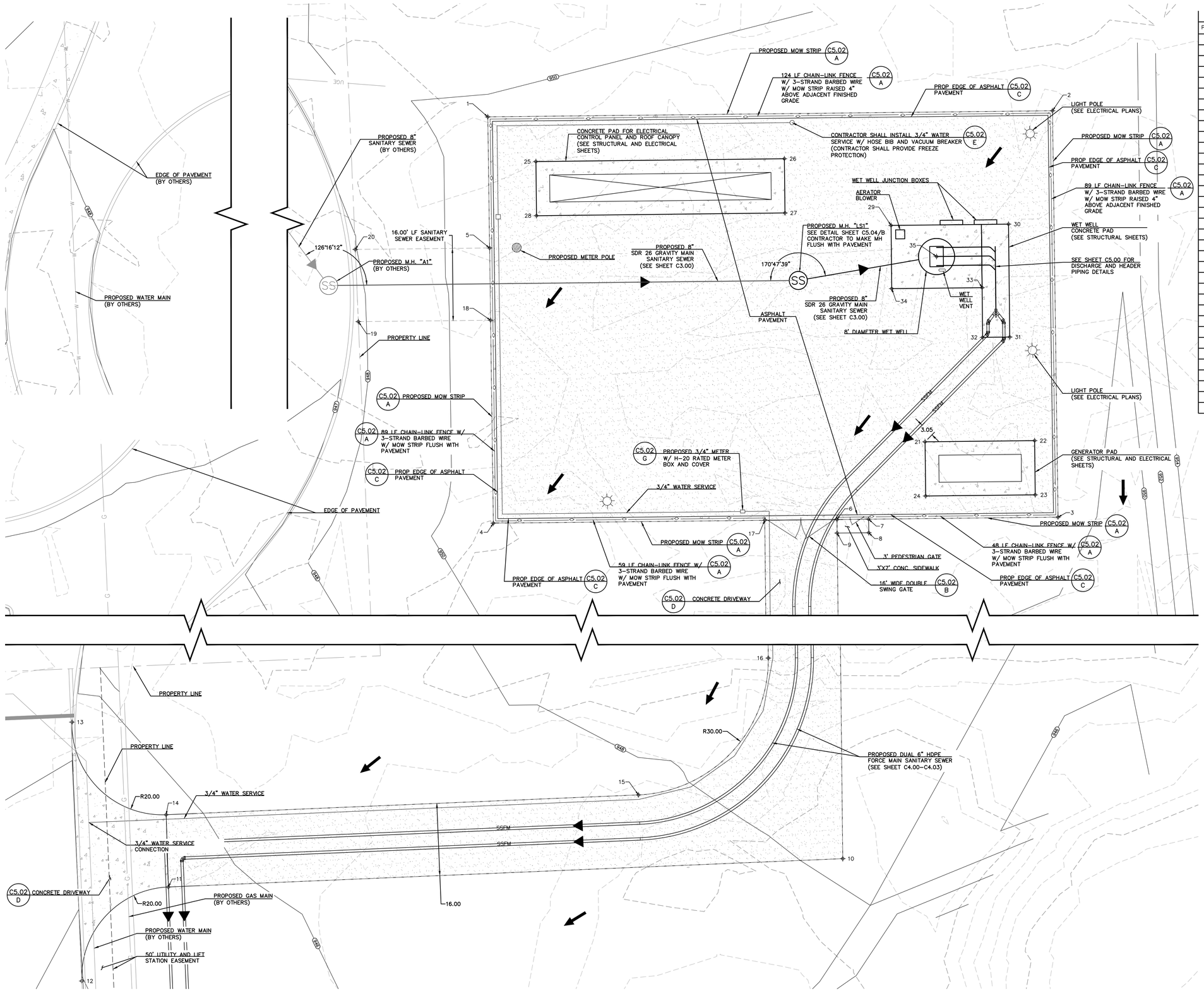
CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

SITE PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ

SHEET C2.01

Date: Mar 18, 2024, 9:40am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\SP129400.dwg



POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13774364.84	2106975.39	951.00	MOW STRIP EDGE
2	13774366.18	2107100.38	951.00	MOW STRIP EDGE
3	13774276.19	2107101.61	951.00	MOW STRIP EDGE
4	13774274.85	2106976.62	951.00	MOW STRIP EDGE
5	13774335.80	2106975.79	951.00	MOW STRIP EDGE
6	13774275.67	2107052.69	951.00	DRIVEWAY
7	13774275.74	2107059.69	951.00	CONC. SIDEWALK
8	13774272.74	2107059.72	950.84	CONC. SIDEWALK
9	13774272.67	2107052.72	950.92	CONC. SIDEWALK
10	13774158.28	2107053.96	948.16	DRIVEWAY
11	13774152.00	2106904.69	945.68	DRIVEWAY FLARE
12	13774131.18	2106885.54	944.84	DRIVEWAY FLARE
13	13774188.51	2106883.37	945.43	DRIVEWAY FLARE
14	13774168.00	2106904.20	945.85	DRIVEWAY FLARE
15	13774172.39	2107008.74	947.74	DRIVEWAY
16	13774202.69	2107037.48	948.79	DRIVEWAY
17	13774275.49	2107036.69	951.00	DRIVEWAY
18	13774319.80	2106976.01	951.00	EASEMENT EDGE
19	13774319.49	2106946.74	947.81	EASEMENT EDGE
20	13774335.48	2106946.07	947.96	EASEMENT EDGE
21	13774292.88	2107072.18	952.00	GENERATOR PAD
22	13774293.14	2107096.43	952.00	GENERATOR PAD
23	13774281.14	2107096.56	952.00	GENERATOR PAD
24	13774280.88	2107072.31	952.00	GENERATOR PAD
25	13774354.94	2106986.04	0.00	ELEC. CONTROL PANEL PAD
26	13774355.56	2107041.04	0.00	ELEC. CONTROL PANEL PAD
27	13774343.56	2107041.17	0.00	ELEC. CONTROL PANEL PAD
28	13774342.95	2106986.17	0.00	ELEC. CONTROL PANEL PAD
29	13774340.80	2107064.66	951.50	LIFT STATION PAD
30	13774341.08	2107090.65	951.50	LIFT STATION PAD
31	13774316.08	2107090.92	0.00	LIFT STATION PAD
32	13774316.01	2107084.92	0.00	LIFT STATION PAD
33	13774327.01	2107084.81	951.50	LIFT STATION PAD
34	13774326.80	2107064.81	951.50	LIFT STATION PAD
35	13774333.91	2107074.73	951.50	CENTER OF WET WELL

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

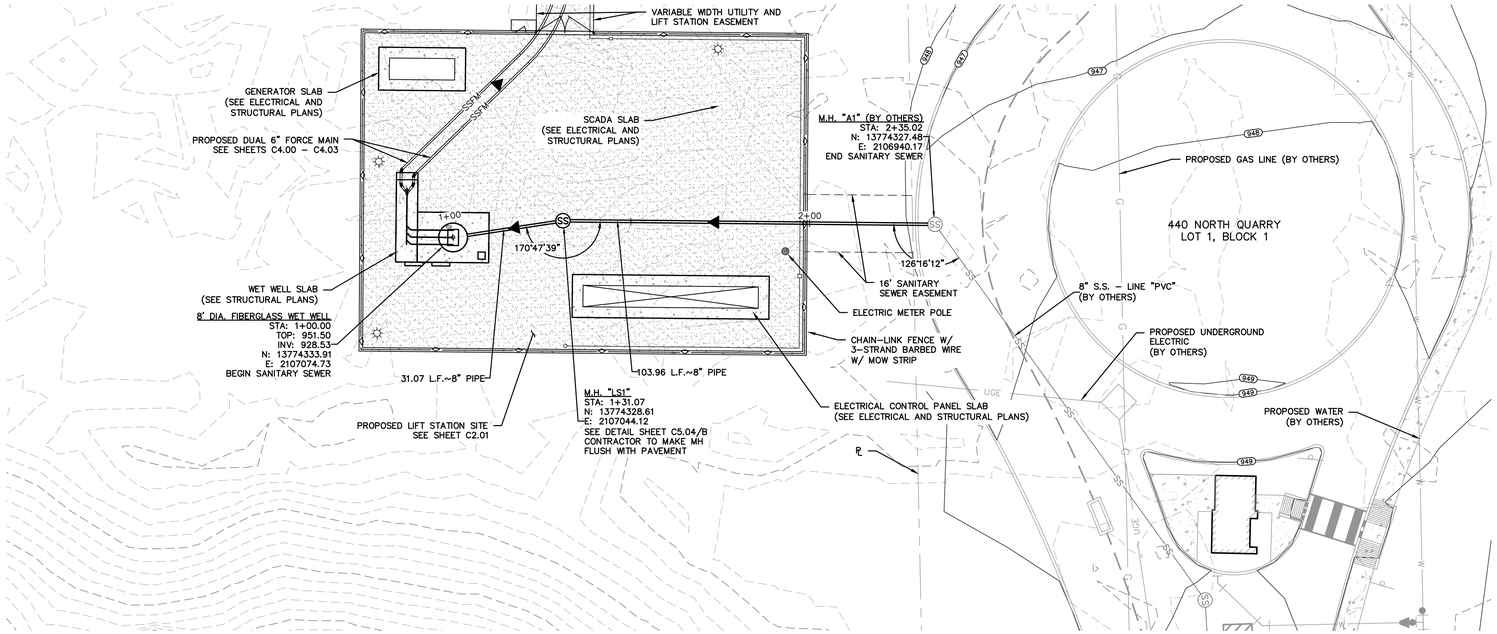
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

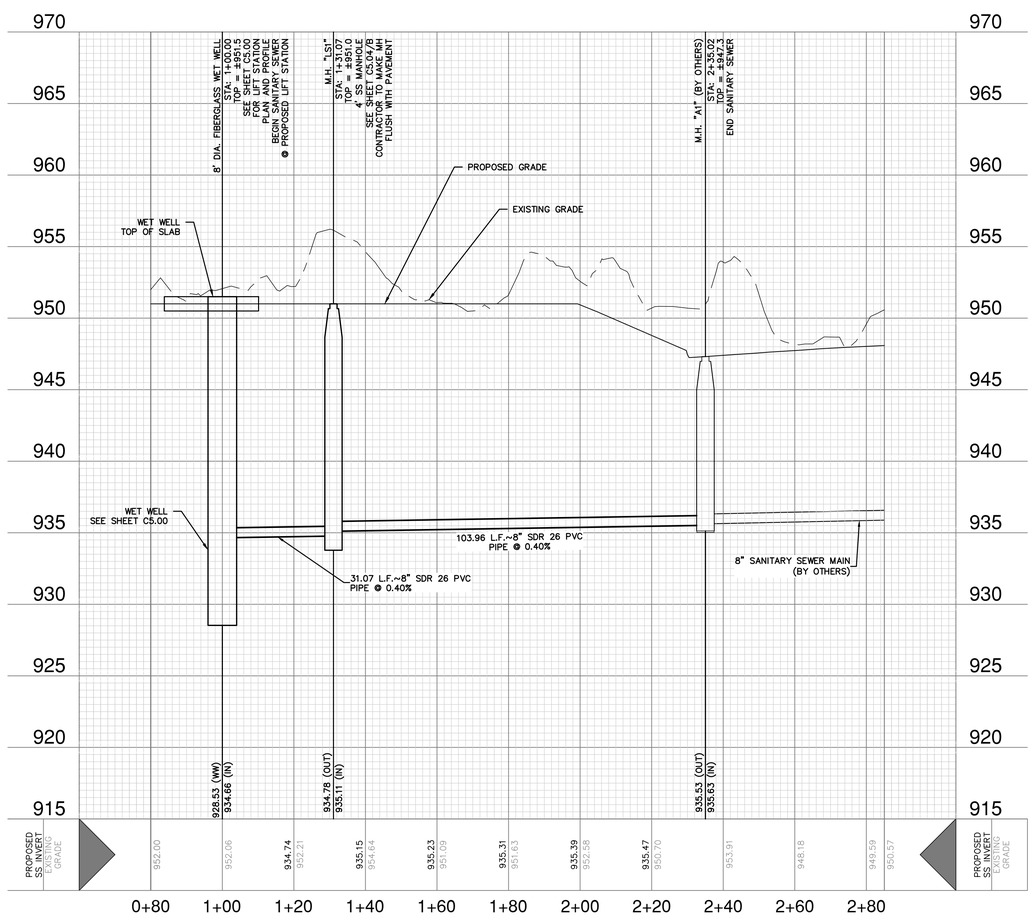
CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

DIMENSIONAL CONTROL PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C2.02

Date: Mar 18, 2024, 9:40am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\SP129340O.dwg





LEGEND

- PROPOSED GRAVITY MAIN — SS
- PROPOSED FORCE MAIN — SSFM
- PROPOSED GRAVITY MAIN (BY OTHERS) — SS SS SS
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPERTY LINE
- PROPOSED EASEMENT LINE

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

SCALE: 1" = 20'
0' 20' 40' 60'

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

LIFT STATION GRAVITY MAIN

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS 4,502 LF-8" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C3.00

Date: Mar 18, 2024, 9:44am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\GMP-1293400.dwg

LIFT STATION/FORCE MAIN SYSTEM APPLICATION (TCEQ-0624)

Lift Station/Force Main System Application

Texas Commission on Environmental Quality

for Regulated Activities On the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(c)(3)(B)and(c), Effective June 1, 1999

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: 440 Quarry Improvements

Customer Information

(If different than customer information provided on core data form)

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

   Contact Person: Lloyd Denton
   Entity: Shavno Quarry Development, Ltd
   Mailing Address: 11 Lynn Batts Lane, Suite 100
   City, State: San Antonio, TX Zip: 78218
   Telephone: 210-828-6131 Fax: _____
   Email Address: laddiedenton@bitterblue.com

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

   Contact Person: Caleb Chance
   Entity: Pape-Dawson Engineers, Inc.
   Mailing Address: 2000 NW Loop 410
   City, State: San Antonio, TX Zip: 78213
   Telephone: 210-375-9000 Fax: _____
   Email Address: cchance@pape-dawson.com
   Texas Licensed Professional Engineer's Serial Number: 98401

Project Information

3. This project is for the construction or replacement of:

   ☐ Lift Station only.

☐ Lift Station and Force Main system.
☒ Lift Station, Force Main, and Gravity system.

4. The sewage collection system will convey the wastewater to the Steven M. Couse Waste Recycling Center (name) Treatment Plant. The treatment facility is:

   ☒ Existing
   ☐ Proposed

5. All components of this lift station/force main system will comply with:

   ☒ The City of San Antonio standard specifications.
   ☐ Other. Specifications are attached.

Site Plan Requirements

Items 6-14 must be included on the Site Plan.

6. ☐ The Site Plan must have a minimum scale of 1" = 400'.

   Site Plan Scale: 1" = 10‘.

7. ☐ Lift station/force main system layout meets all requirements of 30 TAC Chapter 217.

8. Geologic or Manmade Features:

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

Table 1 - Geologic or Manmade Features

Line	*Station to Station*	*Type of Feature*
N/A	N/A to N/A	N/A
	to	
	to	
	to	
	to	
	to	
	to	
	to	

9. ☐ Existing topographic contours are shown and labeled. The contour interval is _____ feet. (Contour interval must not be greater than 5 feet).

10. ☐ Finished topographic contours are shown and labeled. The contour interval is _____ feet. (Contour interval must not be greater than 5 feet).

    ☐ Finished topographic contours will not differ from the existing topographic configuration and are not shown.

11. 100-year floodplain boundaries

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

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

12. 5-year floodplain:

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

Table 2 - 5-Year Floodplain

Line	***Sheet***	***Station to Station***
N/A	N/A of N/A	N/A to N/A
	of	to
	of	to
	of	to

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

    If applicable, this must agree with Item No. 15 on the Geologic Assessment Form.
    ☐ 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 plugged.
    ☐ The wells are not in use and will be properly plugged.
    ☐ 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.

14. ☒ Legal boundaries of the site are shown.

Plan and Profile Sheets

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

Items 15 – 18 must be included on the Plan and Profile sheets.

15. ☒ The equipment installation construction plans must have a minimum scale of 1" = 10'.

    Plan sheet scale: 1" = 10 '.

16. ☒ Locations, descriptions and elevations of all required equipment and piping for the lift station and force main are shown and labeled.

17. ☒ Air Release/Vacuum Valves will be provided at all peaks in elevation of the proposed force main. These locations are listed in the table below and labeled on the appropriate plan and profile sheets.

Table 3 - Air Release/Vacuum Valves

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

18. ☒ 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.

19. ☒ **Attachment A - Engineering Design Report**. An engineering design report with the following required items is attached:

    ☒ The report is dated, signed, and sealed by a Texas Licensed Professional Engineer.
    ☒ Calculations for sizing system.
    ☒ Pump head calculations, including, but not limited to, system head and pump capacity curves, head loss calculations, and minimum and maximum static head C values for normal and peak operational conditions.
    ☐ 100-year and 25-year flood considerations.
    ☒ Total lift station pumping capacity with the largest pump out of service.
    ☒ Type of pumps, including standby units.
    ☒ Type of pump controllers, including standby air supply for bubbler controllers, as applicable.

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

Administrative Information

20. ☒ Upon completion of the wet well excavation, a geologist must certify that the excavation was inspected for the presence of sensitive features and submit the signed, sealed, and dated certification to the appropriate regional office.

21. ☒ The TCEQ Lift Stations and Force Mains General Construction Notes (TCEQ-0591) are included on the General Notes Sheet of the Final Construction Plans for this lift station and/or force main system.

22. ☒ 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.

23. ☒ Any modification of this lift station/force main system application will require TCEQ approval, prior to construction, and may require submission of a revised application, with appropriate fees.

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 **Lift Station/Force Main 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)(3)(C) and 30 TAC Chapter 217, and prepared by:

Print Name of Licensed Professional Engineer: Caleb Chance

Place engineer's seal here:

Date: _____

Signature of Licensed Professional Engineer:

ATTACHMENT A

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

Engineering Design Report

11/22/23

November 2023

PAPE-DAWSON ENGINEERS

Transportation | Water Resources | Land Development | Surveying | Environmental

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

Engineering Design Report

November 2023

TABLE OF CONTENTS

TABLES

EXHIBITS

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
Engineering Design Report

SEWER SYSTEM INFORMATION

Introduction

The Cornerstone Lift Station #2 and force main is designed to accept and convey sanitary sewer flow(s) from the new Cornerstone development. The proposed lift station is located southeast of the proposed Cornerstone development; approximately 1.2 miles north of the Loop 1604 and NW Military Highway intersection (Exhibit 1). The property is located within the Camp Bullis 5-Mile Awareness Zone. The tract is located over the Edwards Aquifer Recharge Zone. A total service area of approximately 174 acres will be conveyed to the proposed lift station. The lift station will convey sanitary sewer flow to an existing downstream manhole and gravity main system. Due to downstream gravity main capacity constraints, the maximum peak wet weather flow from the sewershed that will be allowed to be conveyed to the proposed lift station is limited to 210 gallons per minute (gpm). The maximum peak wet weather flow of 210 gpm is equivalent to a total of 396 equivalent dwelling units (EDU) generating sanitary sewer flows over the previously mentioned sewershed area of 174 acres and using SAWS' average dry weather design flow of 200 gallons per day per EDU (GPD/EDU) and 2.5 peaking factor.

The sanitary sewer gravity main design to the proposed Cornerstone #2 lift station will be done by a separate project. The proposed lift station will then convey the flows through a proposed dual 6-inch HDPE DIPS (DR 11.0) force main system to an existing 8-inch gravity main located south of the Cornerstone development, approximately 320 feet north of Shavano Ranch. The downstream gravity main eventually discharges into an existing 24-inch sanitary sewer main (SAWS 24" PVC 94-1560).

Proposed Lift Station and Force Main Sewer System

The intended design for the Cornerstone #2 lift station will be sized to receive flows from the Cornerstone development. Flows from the Cornerstone #2 lift station pump and force main will be discharged to an existing 8-inch gravity main. The lift station will be a triplex system that includes one (1) lead pump and two (2) standby pumps to handle the flows from the Cornerstone development. The pumps were selected and requested by SAWS staff. In addition, the second standby pump that is being provided was requested by SAWS due to the anticipated efficiency of the selected pump model. According to the attached pump manufacturer's pump literature, each pump can convey the FIRM pumping capacity. The proposed

Cornerstone #2 Lift Station will be equipped with an emergency power generator, odor control and aeration equipment, SCADA communication.

The lift station will convey flow through a dual 6-inch HDPE (DR 11.0 – Class 200) force main system. The length of the 6-inch force mains is approximately 2,250 linear feet. Only one of the two force mains will be in operation during pump discharging. The second force main (considered a back-up force main) is a SAWS requirement based on the location of the lift station over the Edwards Aquifer Recharge Zone. Upon completion of the project, it will be SAWS' responsibility to determine which of the two force mains will be the primary and which will be the back-up force main.

PUMP STATION AND FORCE MAIN DESIGN CALCULATIONS

Average Dry Weather Flow

As mentioned earlier, it is estimated that the peak wet weather flow over the sewershed area (174 Ac.) coverts to a total of approximately 396 EDUs will flow to the lift station. For each EDU, the average daily flow is 200 gallons per day (gpd) per SAWS 2019 Utility Service Regulation (11.3.1). This yields an average daily flow into the lift station of 79,200 gallons (396 EDUs x 200 gpd). Dividing by 1,440 minutes/day gives a flow of 55 gallons per minute (gpm).

Peak Dry Weather Flow

To determine peak flows for the collection system a peaking factor of 2.5 (SAWS Utility Service Regulation, Section 11.3.1) is applied to the average daily flow for each phase. This yields a peak flow of 198,000 gpd (396 EDU x 200 gpd x 2.5). Dividing by 1,440 minutes/day gives a design peak dry weather flow of approximately 138 gpm.

Peak Wet Weather Flow

As indicated earlier in this report, maximum peak wet weather flow will be limited to 210 gpm.

Minimum Dry Weather Flow

The minimum dry weather flow is used to determine the maximum detention time in the wet well. The formula for computing the minimum dry weather flow (as given in the SAWS Lift Station Design and

Construction Guidelines, dated January 2012) is:

$$MDWF = 0.2 \times (0.0144 \times ADF)^{.198} \times ADF,$$

where:

MDWF = minimum dry weather flow, gpm

ADF = average dry weather flow, gpm

Using the above equation and an average dry weather flow of 59 gpm gives a value of approximately 11 gpm for the minimum dry weather flow.

Minimum Pump Requirements

According to the 2012 SAWS lift station design guidelines, lift stations with flows 500 gpm or less of peak weather flow are required to provide a duplex pump system consisting of one lead pump and one standby pump. For a duplex pump system, one pump must be capable of handling the peak wet-weather flow at the total dynamic head.

The total dynamic head (TDH) can be described by the following equation:

$$TDH = H_s + L_f + L_M$$

where:

H_s = static head

L_f = loss due to friction in the force main pipe

L_M = minor loss in the force main pipe

The static head can be described by the following equation:

$$H_s = E_H - E_L$$

where:

E_H = maximum elevation of the proposed force main, feet

E_{L1} = low water elevation of the wet well, feet

Per SAWS Lift Station Design & Construction Guidelines dated January 2012, a static head must be computed using the lowest water elevation in the wet well which is the "All Pumps Off" Elevation (E_{L1}).

Frictional and minor losses are shown in the following paragraphs. The computations for these are for only one 6-inch force main under the condition where one pump is operating at a total capacity of 225 gpm.

The frictional losses (L_f) in the force main pipe can be described by the following equation:

$$L_f = \mathrm{L\ x}\left(\frac{2.313\ \mathrm{x\ Q}}{\mathrm{C\ x\ D}^{2.63}}\right)^{1.85}$$

where:

L	=	length of force main, feet
Q	=	flow, cubic feet per second (cfs)
C	=	Hazen-Williams factor of the pipe
D	=	diameter of the force main, feet

Per SAWS Lift Station Design & Construction Guidelines dated January 2012, the losses due to friction must be computed using a C value of 140.

The minor losses in the force main pipe can be described by the following equation:

$$L_M = \frac{\mathrm{Kv}^2}{2\mathrm{g}}$$

where:

K	=	headloss coefficient for the minor losses
v	=	velocity in the force main $\left(\frac{Q}{\pi(D/2)^2}\right)$, feet per second
g	=	gravitational constant (32.2 ft^2/sec)

See Table 1 below for the K value calculations.

Table 1. K Value Calculations

Minor Loss Item	K-Value	Qty.	Total
Discharge Into Manhole	1.00	1	1.00
90° Bend	0.70	4	2.80
45° Bend	0.50	8	4.00

Minor Loss Item	K-Value	Qty.	Total
Gate Valve	2.50	6	15.00
Check Valve	1.50	1	1.50
Reducers	0.50	2	1.00
		$K_{(total)}$	26.10

Thus, the equation for determining TDH can be written as follows:

$$\text{TDH} = E_H\text{-}\text{E}_L + \text{L x } \left(\frac{2.313 \text{ x Q}}{\text{C x D}^{2.63}}\right)^{1.85} + \frac{K}{2g} \text{ x } \left(\frac{Q}{\pi\left(D/2\right)^2}\right)^2$$

Using the C value (C=140), the TDH value will be determined. Table 2 contains the remaining variables from the TDH equation and the resulting TDH value.

Table 2. TDH Equation Variables and Values

Variable	Value
E_h (ft) – Elevation Head	1,054.32
E_{L1} (ft) – All Pumps Off Elevation	932.78
E_{L2} (ft) – First Pump On Elevation	933.68
L (ft) – Force Main Length	2,250
Q (cfs) – Flow	225
C	140
D (ft) – Force Main Inner Diameter	0.46
K	26.10
TDH (ft)	138.6

The flow (Q) to be used in these equations is determined using pump curves selected for the conditions in this lift station. A Q value of 210 gpm (0.5 cfs with one pump operating under incoming peak flow conditions) was selected. In addition, the alignment, and bends in the proposed dual 6-inch force main between the proposed lift station location and the proposed force main discharge location were used.

The design point for the proposed Cornerstone lift station will have a flow of 225 gpm and a total dynamic head of 138.6 feet with one pump in service. This discharge rate exceeds the peak wet weather flow of 210 gpm and is therefore enough to serve the required area.

Exhibit 2 contains pump curves and supporting information for a Xylem Pump, model NP3153 SH3-275 which was selected by SAWS staff. Exhibit 2 also contains graphs of the system curves and the proposed pump curves condition. The pump curve is based on the information supplied by Xylem for the NP 3153 SH3-275 pump with a 167 mm impeller and a 23-horsepower motor. The intersection of these curves indicates the operating point of 225 gpm at 138.6 feet of TDH, with one pump operating. The anticipated discharge rate will be approximately 225 gpm at a TDH of approximately 138.6 feet with one pump in operation.

Net Positive Suction Head (NPSH)

NPSH calculations are not critical for submersible pumps. Since the Cornerstone Off-Site lift station will use three Flygt Submersible, Non-Clog NP3153 SH3-275 pumps, NPSH calculations are not required.

Force Main Velocity

The force mains proposed for this project are recommended to be 6-inch DIPS HDPE (DR 11.0) force mains, each with a minimum working pressure rating of 200 PSI (DR 11.0). The velocity (v) in the existing PVC force main can be described by the following equation:

$$v = \frac{Q}{A}$$

where:

Q = flow in the force main, cfs

A = area of the force main [$\pi(D/2)^2$], square feet

For the proposed 6-inch DIPS HDPE (DR 11.0) force main, the inner diameter is 5.571 inches, and the cross-sectional area is 0.169 square feet. Converting the design flow of 225 gpm to cfs gives a flow of 0.50 cfs

[225 gpm / (7.480519 gallons/cubic foot x 60 seconds / minute)]. This yields a velocity in the force main of 2.96 feet per second.

Surge Pressures

Surge pressures in a force main system are the result of a sudden change in liquid velocity. This can be caused by the pump suddenly starting or stopping or a valve in the system being quickly closed. As the fluid suddenly starts or stops, a shock wave is created in the force main. The velocity of that wave can be described by the following equation:

Equation 1

$$a = \frac{4660}{\sqrt{1+\frac{kd}{Et}}}$$

where:

a	=	wave velocity, feet per second
k	=	fluid bulk modulus (300,000 psi for water), pounds per square inch
d	=	pipe ID, inches
E	=	modulus of elasticity of the pipe (200,000 psi for HDPE pipe), pounds per square inch
t	=	wall thickness, inches

The maximum pressure surge may be calculated using Equation 2 below:

Equation 2

$$P = \frac{aV}{2.31g}$$

where:

V	=	maximum velocity change, feet per second
g	=	gravitational constant (32.2 ft^2/sec)
P	=	pressure surge, pounds per square inch

Using a pipe diameter (d) of 5.571 inches and wall thickness (t) of 0.627 inches and solving for wave velocity (a) yields:

$$a = \frac{4660}{\sqrt{1+\frac{(300{,}000\text{psi})(5.571\text{ in})}{(200{,}000\text{ psi})(0.627\text{ in})}}} = \pm 1231.11 \text{ ft/sec}$$

Inserting this value into Equation 2 along with a maximum velocity change (V) of 2.96 ft/s (assuming instantaneous stoppage of flow) yields:

$$P = \frac{(1231.11 \text{ ft/sec})(2.96 \text{ ft/sec})}{(2.31)(32.2)\text{ft/sec}} = 48.99 \text{ psi}$$

Based on the normal operating pressure (with one pump running) of approximately 59.98 psi (total operating head of 138.6 ft x 0.4329 psi/ft), the system may be subjected to a maximum pressure of approximately 108.97 psi (59.98 psi system pressure + 48.99 psi surge pressure). The force main is rated at 200 psi and therefore will be capable of completely containing the surge pressures within the system. (Design Note: The pressure rating of the proposed force mains was intentionally increased by the design engineer from the SAWS minimum requirement of 160 psi pressure rated pipe to the 200 psi rated pipe shown in the design in order to develop a slightly higher force main fluid velocity. This design criteria modification was acceptable to SAWS staff.)

Storage Requirements

The required wet well volume (volume between the "First Pump On" Elevation and the "All Pumps Off" Elevation) is governed by TCEQ Regulations (30 TAC 217.60(b)(7) Table C.5, December 5, 2015) which states that submersible pump cycle time, based on peak flow, for pumps with motors less than 50 horsepower (hp), must equal or exceed 6 minutes. This rule can be described by the following equation:

$$V_r = (Q^* T)/4$$

Where V_r is the required volume in gallons, Q is the pump flow in GPM, and T is 6 minutes for submersible pumps with a motor less than 50 hp.

Using the design single pump flow of 225 gpm, the required volume in gallons for a six-minute run time for the Cornerstone Off-Site lift station wet well is 337.5 gallons. Using an 8-foot diameter wet well gives

a necessary depth of approximately 0.9 feet between the "First Pump On" and the "All Pumps Off" Elevations.

This lift station is located within the Recharge Zone of the Edwards Aquifer; therefore the proposed Cornerstone lift station #2 will be equipped with an emergency generator. According to the 2012 SAWS Lift Station Design and Construction Guidelines, a minimum of 1 hour of storage at the average dry weather flow must be provided within the wetwell when an onsite emergency generator is provided (the storage time increases to two hours when an emergency generator is not provided). Emergency storage required within the wet well can be calculated using the following equation:

Vs (gal) = ADWF * 1 hr storage

Vs (gal) = 3,300 gallons

Using the average daily flow calculated earlier, the one-hour storage volume is calculated to be 3,300 gallons (59 gpm x 60 min). Using an 8-foot diameter wet well gives a necessary depth of 8.78 feet between the “First Pump On” elevation (ELEV 933.68) and two feet below the spill level elevation (ELEV 947.30). Therefore, to effectively contain one hour of the average daily flow within the 8-foot diameter wetwell, the difference in elevation between the “First Pump On” elevation and two feet below ELEV 948.24 must be greater than, or equal to 8.78 feet. The lead pump initiates operation at elevation 933.68. The evaluation of available emergency storage depth is shown below:

Available Storage Depth = (ELEV 947.30’ – 2.0’) – ELEV 933.68’= 11.62 ’

Required 1-hr Storage Depth = 8.78’

The available storage depth in the wetwell satisfies the 1-hr required storage depth.

Buoyancy Calculations

The SAWS Lift Station Guidelines (Rule J.2.C.9) require that a buoyancy check be completed for all wet wells. It must be shown that the combined weight of the wet well, pumps and concrete slabs is greater

than the maximum buoyancy force that the system can encounter. The force of buoyancy (F_B) can be described by the following equation:

$$F_B = W_G \pi \left(\frac{D}{2}\right)^2 d$$

where:

W_G = specific weight of water (approximately 62.4 lbs/ft^3)

D = diameter of the wet well, feet

d = empty depth of the wet well, feet.

The empty depth of the wet well can be determined by subtracting the "All Pumps Off" Elevation from the top elevation of the wet well. This will give the maximum possible volume of the empty wet well and therefore yields the largest possible buoyancy force that the system could be subject to. See Table 3 below for the calculation of the buoyancy force that the lift station could be subject to.

Table 3. Buoyancy Force Calculation

Item (units)	Value
Specific Weight of Water (lb/ft^3)	62.4
All Pumps Off Elevation (ft)	932.78
Top of Wet Well Elevation (ft)	957.5
Wet well Diameter (ft)	8
Buoyancy Force (lb)	77,536

The lift station is comprised of several components whose weight will counteract the buoyancy force calculated in Table 3 above. These components are the weight of the concrete slabs that constitute the top and bottom of the wet well, the weight of the fiberglass wet well, the weight of the stored sewage, the weight of soil above the foundation of the wet well, etc. See Table 4 for calculations of these weights and the total weight of the lift station.

Table 4. Lift Station Weight Calculation

Item (units)	Value
Top Wet Well Slab Length (ft)	36
Top Wet Well Slab Width (ft)	20
Top Slab Thickness (in)	12
Bottom Slab Length and Width (ft)	16
Bottom Slab Thickness (in)	12
Specific Weight of Concrete (lb/ft^3)	144
Wet Well Depth (ft)	29.97
Wet well Unit Weight (lb/ft of depth)	151
All Pumps Off Elevation (ft)	932.78
Wet well Invert Elevation (ft)	928.53
Wet well Diameter (ft)	8
Volume of Concrete/Flowable Fill above Bottom Slab (ft^3)	1,490
Specific Weight of Flowable Fill (lb/ft^3)	144
Specific Weight of Sewage (lb/ft^3)	62.4
Weight of Stored Sewage (lb)	13,330
Pump Weight (lb)	765
Weight of Wet Well (lb)	6,713
Total Weight of Concrete Slabs (lb)	118,080
Weight of Concrete/Flowable Fill (lb)	214,638
Total Lift Station Weight (lb)	351,339

The buoyancy force was calculated in Table 3 to be approximately 77,536 pounds. The total lift station weight was calculated in Table 4 to be approximately 351,339 pounds. It appears that the lift station will not float if it is submerged.

Detention Times and Cycle Times

The amount of time that sewage is detained in the wet well is important for several reasons. In order to avoid a septic situation, the waste must be removed in a reasonable amount of time. Per the SAWS lift station guidelines, if the flow is detained in the wet well for more than 180 minutes, odor control measures must be implemented.

The detention times must be computed for Average Dry Weather Flow, Maximum Wet Weather Flow and Minimum Dry Weather Flow. The detention time (T_d) for the Average Dry Weather Flow and Minimum Dry Weather Flow can be computed as follows:

$$T_d = \frac{V_r}{i} + \frac{V_r}{Q - i}$$

The T_d for the Maximum Wet Weather flow is based on the one and two pump flow rates and the operating levels for one pump in operation and two pumps in operation.

where:

i	=	inflow
Q	=	outflow from the wet well
V_r	=	volume of the wet well between First Pump On and All Pumps Off

The volume (V_r) of the wetwell (between the "All Pumps Off" Elevation and the "First Pump On" Elevation) is 337.5 gallons as calculated in the Storage Requirements section of this report. The outflow (Q) from the wetwell is 225 gpm.

Average Dry Weather Flow

Using V_r, an outflow (Q) value of 225 for one pump operating, and an inflow (*i*) value of 55 gpm for the Average Dry Weather Flow and the known parameters from the detention time equation shown above yields a detention time (T_d) of 8 minutes.

Peak Wet Weather Flow

Using an inflow (i) value of 210 gpm for the Peak Wet Weather Flow, an outflow (Q) value of 225 gpm for one pump operating, and the known parameters from the detention time equation shown previously yields a detention time (T_d) of approximately 24 minutes to the following cycle level at “first pump on”.

Minimum Dry Weather Flow

Using an inflow value of approximately 11 gpm for the Minimum Dry Weather Flow, an outflow (Q) value of 225 for one pump operating, and the known parameters from the detention time equation shown above yields a detention time (T_d) of approximately 34 minutes. Note that this value represents the maximum detention time. Since the maximum detention time does not exceed 180 minutes, odor control measures are not necessary.

Total Cycle Times

The proposed pumps for the Cornerstone Off-Site lift station will alternate starts to equalize the wear on the pumps. Therefore, under normal operation, the cycle time of Pump A can be described as the time that Pump A runs, plus the time that it takes for the lift station to fill again, plus the time for Pump B to empty the lift station, plus the time that it takes for the lift station to fill to the "First Pump On" elevation again.

The cycle time for the average and minimum dry weather flows can be determined by the following equation:

$$T_c = \frac{2V_r}{i} + \frac{2V_r}{Q}$$

where:

T_c	=	total cycle time, minutes
V_r	=	storage volume in the wetwell (volume between the "All Pumps Off" Elevation and "First Pump On" Elevation, gallons
i	=	inflow into the lift station, gpm
Q	=	rate of outflow from the lift station, gpm

Table 5. Cycle Times Calculations

Flow	V_{r1} (gal)	*i* (gpm)	Q (gpm)	T_c (min)
Average Dry Weather	337.5	55	225	15
Peak Wet Weather	337.5	210	225	6
Minimum Dry Weather	337.5	11	225	67

Force Main Flush Time

The force main flush time (FT) was calculated for the proposed lift station. To calculate FT, the wetwell filling time (WWFT), pump run time (PRT), and wetwell detention time (WWDT) was also calculated. The calculations are shown below.

The parameters for these equations are as follows:

D = wetwell diameter, in feet

$\Delta h_{on\text{-}off}$ = distance between lead pump on and all pumps off, in feet

Q_i = Average Daily Inflow, in gpm (55 gpm at ADF)

Q_o = Pumped flow, in gpm (225 gpm at ADF)

L = Force Main lengths, in feet (2,250 LF)

v = Force main velocity, in feet per second (with one pump operating = 2.96 fps)

Wetwell Filling Time:

$$WWFT = \frac{7.4841 \prod D^2 (\Delta h_{on\text{-}off})}{4Qi} \text{ where,}$$

Where D = 8’

$\Delta h_{on\text{-}off}$ = 0.9’

Qi = 55 gpm

WWFT = 6.14 minutes

Pump Run Time:

$$PRT = \frac{7.4841 \prod D^2 (\Delta h_{on\text{-}off})}{4 (Qo - Qi)} \text{ where,}$$

Where D = 8'

$\Delta h_{on\text{-}off}$ = 0.9'

Qi = 55 gpm

Qo = 225 gpm

PRT = 1.99 minutes

Wetwell Detention Time; where

WWDT = WWFT + PRT

WWDT = 8.12 minutes

Flushing Cycles; where

FC = L/60v(PRT)

L = 2,250 feet

V = 2.96 fps

FC = 6.48 cycles

Flushing Time; where

$FT = (FC_w)(WWDT) + (FC_D)(PRT)$

FT = 49.69 minutes

where:

FC_w = the whole number part of the flushing cycles (FC) = 6

FC_D = the decimal number part of the flushing cycles (FC) = 0.48

The results are summarized in Table 6 below.

Table 6. Average Flush Time Results

Wetwell Diameter, feet	8
$Dh_{on\text{-}off}$, feet	0.9
Average Daily Flow, gpm	55

Pumped Flow, gpm	225
Force Main Length, feet	2,250
Flow velocity in FM, fps	2.96
Average WWFT, mins	6.14
Average PRT, mins	1.99
Average WWDT, mins	8.12
Average FC, cycles	6.48
Average FT, mins	49.69

**with one pump operating at ADWF conditions.*

Since the average flush time (FT) is below 180 minutes, odor control measures are not required by SAWS.

Results from the Design Calculations:

1. EDU count: 396 (estimated from allowable peak wet weather flow)
2. Acreage: 174 acres
3. Average Daily Flow: 55 gpm
4. Peak Dry Weather Flow: 138 gpm
5. Peak Wet Weather Daily Flow: 210 gpm
6. Volume of Retention Chamber (for ADF and MDWF): 337.5 gallons
7. Static Head: 121.54'
8. Total Dynamic Head: 138.6'
9. Net Positive Suction Head: Not applicable for submersible pumps
10. Pump Selected: Flygt (Xylem) NP3153 SH3-275 167 mm impeller, 23 Hp, 460 V, 3,510 rpm
11. Pump Discharge Rate: 225 gpm
12. Total Cycle Times:

    Minimum Dry Weather Flow Total Cycle Time = 67 minutes, 1.99 minutes ON Time, 65.01 minutes OFF Time

    Average Dry Weather Flow Total Cycle Time = 154 minutes, 1.99 minutes ON Time, 13.01 minutes OFF Time
13. Total Detention Times:

Minimum Dry Weather Flow = 34 minutes

Peak Wet Weather Flow = 24 minutes

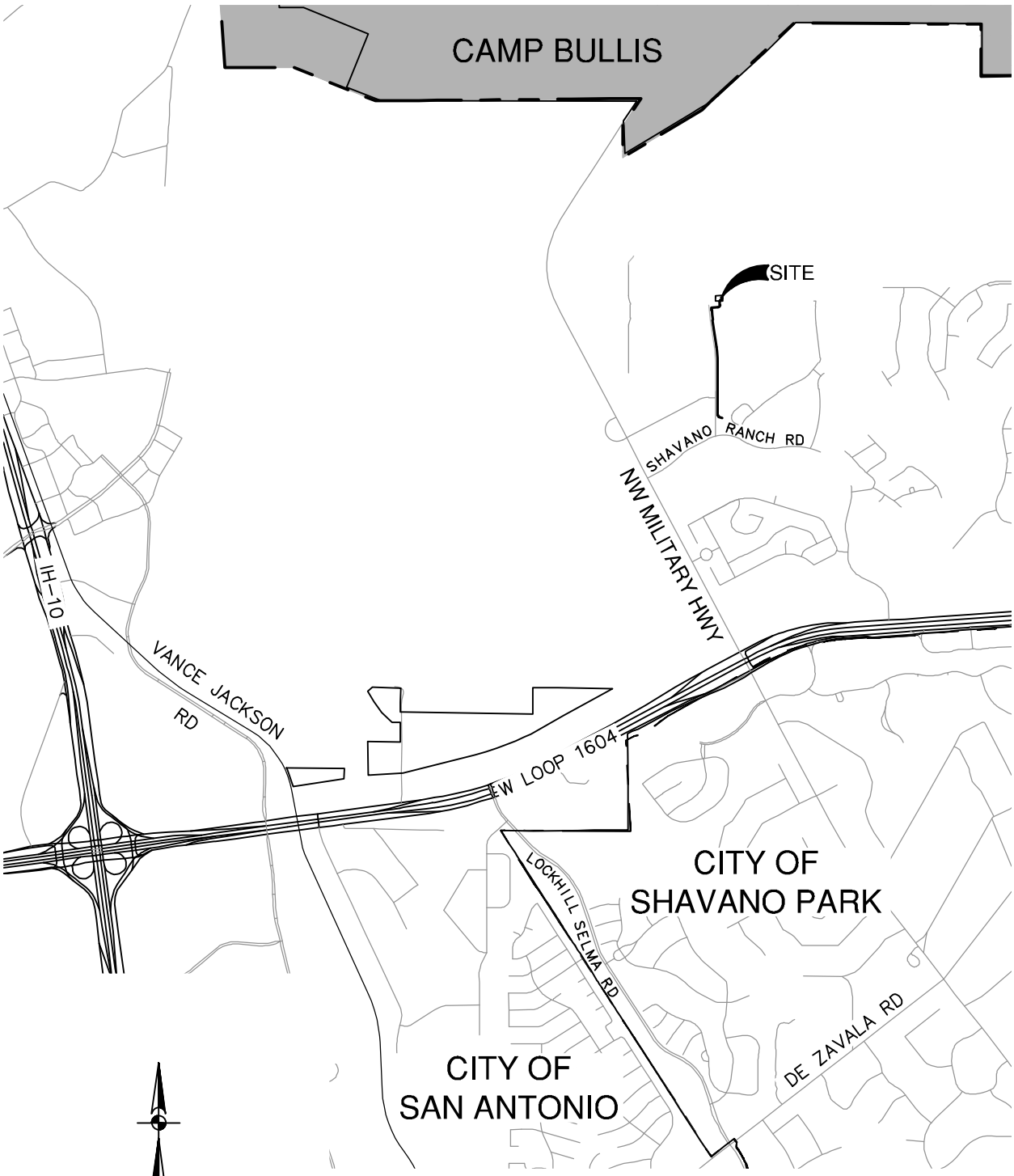
Average Dry Weather Flow = 8 minutes

14. Size and Length of Dual Force Main: Dual 6” HDPE DIPS (DR 11.0), 2,250 LF

15. Velocity Maintained in Force Main: 2.96 ft/sec

EXHIBITS

EXHIBIT 1
Location Map



SCALE: 1"= 1/2 MILE

1/2 MILE 0 1/4 MILE 1/2 MILE

JOB NO. 12175-02
DATE SEPTEMBER 2023
DESIGNER RM
CHECKED KK DRAWN RJ
SHEET 1 of 1

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

BEXAR COUNTY, TEXAS

SITE LOCATION MAP

PAPE-DAWSON ENGINEERS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

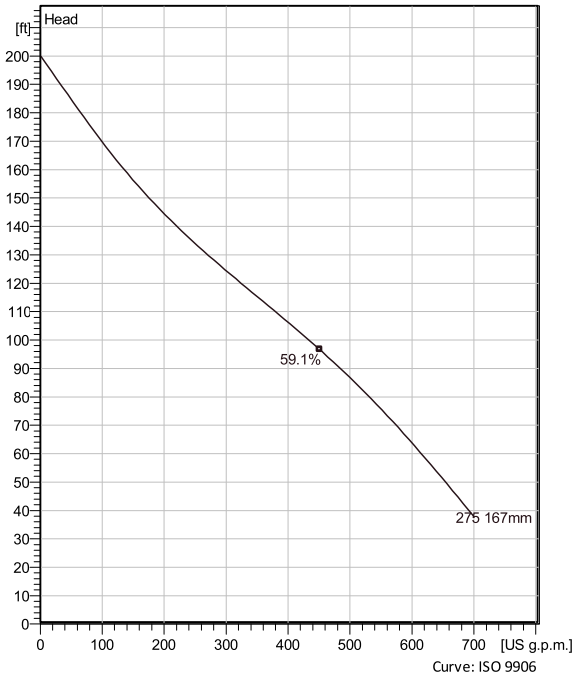
EXHIBIT 2
Pump Curve and Supporting Information

NP 3153 SH 3~ 275

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number
N3153.660 21-18-2BB-W 23hp

Installation type
P - Semi permanent, Wet

Impeller diameter
167 mm

Discharge diameter
3 inch

Pump information

Impeller diameter
167 mm

Discharge diameter
3 inch

Inlet diameter
150 mm

Maximum operating speed
3510 rpm

Number of blades
2

Max. fluid temperature
40 °C

Configuration

Material

Impeller
Stainless steel

Project	Xylect-20691122	**Created by**			
Block		**Created on**	6/8/2023	**Last update**	6/8/2023

NP 3153 SH 3~ 275

Technical specification

Motor - General

Motor number N3153.660 21-18-2BB-W 23hp	**Phases** 3~	**Rated speed** 3510 rpm	**Rated power** 23 hp
ATEX approved No	**Number of poles** 2	**Rated current** 26 A	**Stator variant** 4
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 660			

Motor - Technical

Power factor - 1/1 Load 0.91	**Motor efficiency - 1/1 Load** 91.2 %	**Total moment of inertia** 0.729 lb ft²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.87	**Motor efficiency - 3/4 Load** 91.9 %	**Starting current, direct starting** 207 A	
Power factor - 1/2 Load 0.79	**Motor efficiency - 1/2 Load** 91.7 %	**Starting current, star-delta** 69 A	

Project	Xylect-20691122	**Created by**			
Block		**Created on**	6/8/2023	**Last update**	6/8/2023

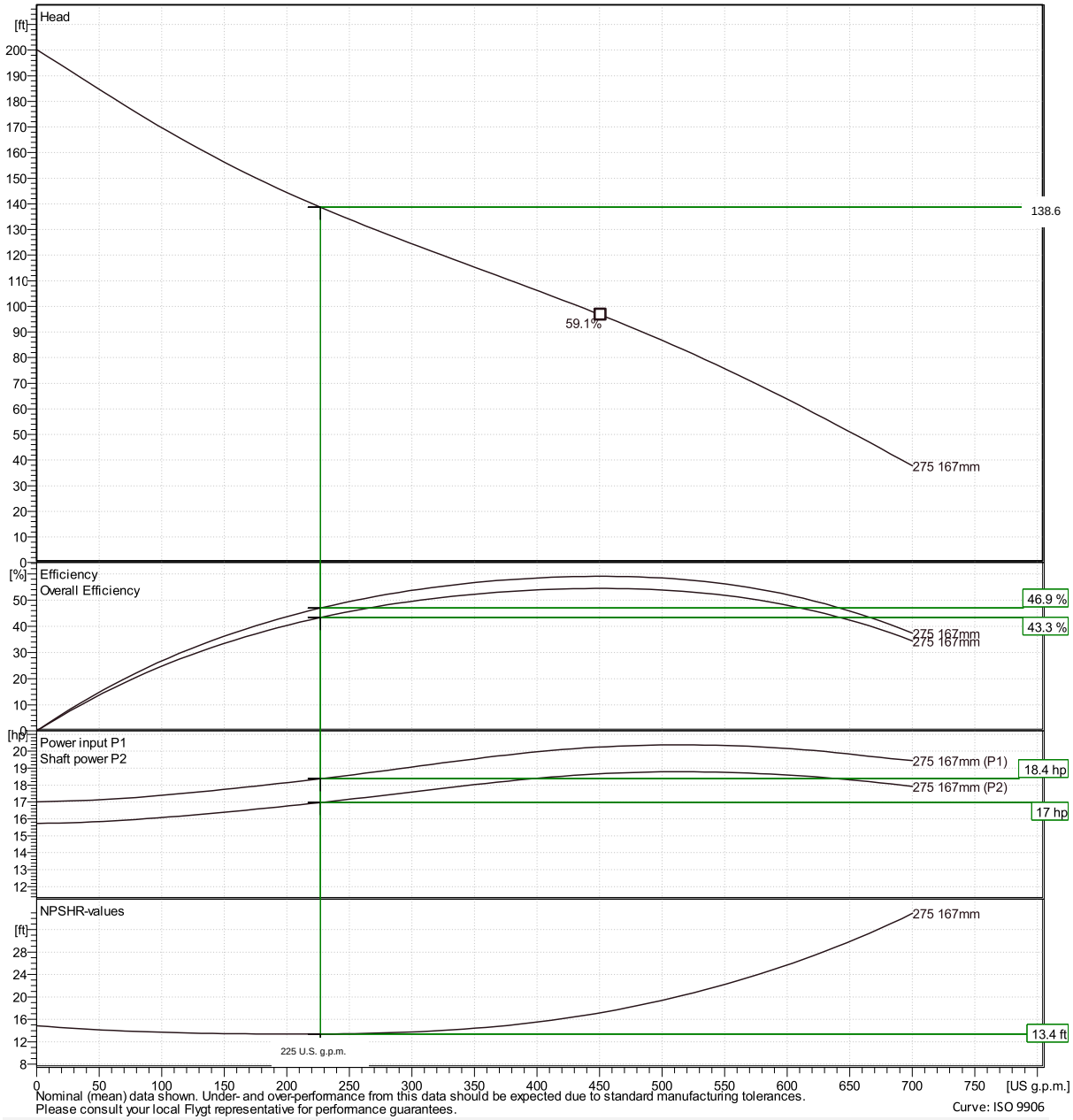
NP 3153 SH 3~ 275

Performance curve

Duty point

Flow	Head
227 US g.p.m.	139 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

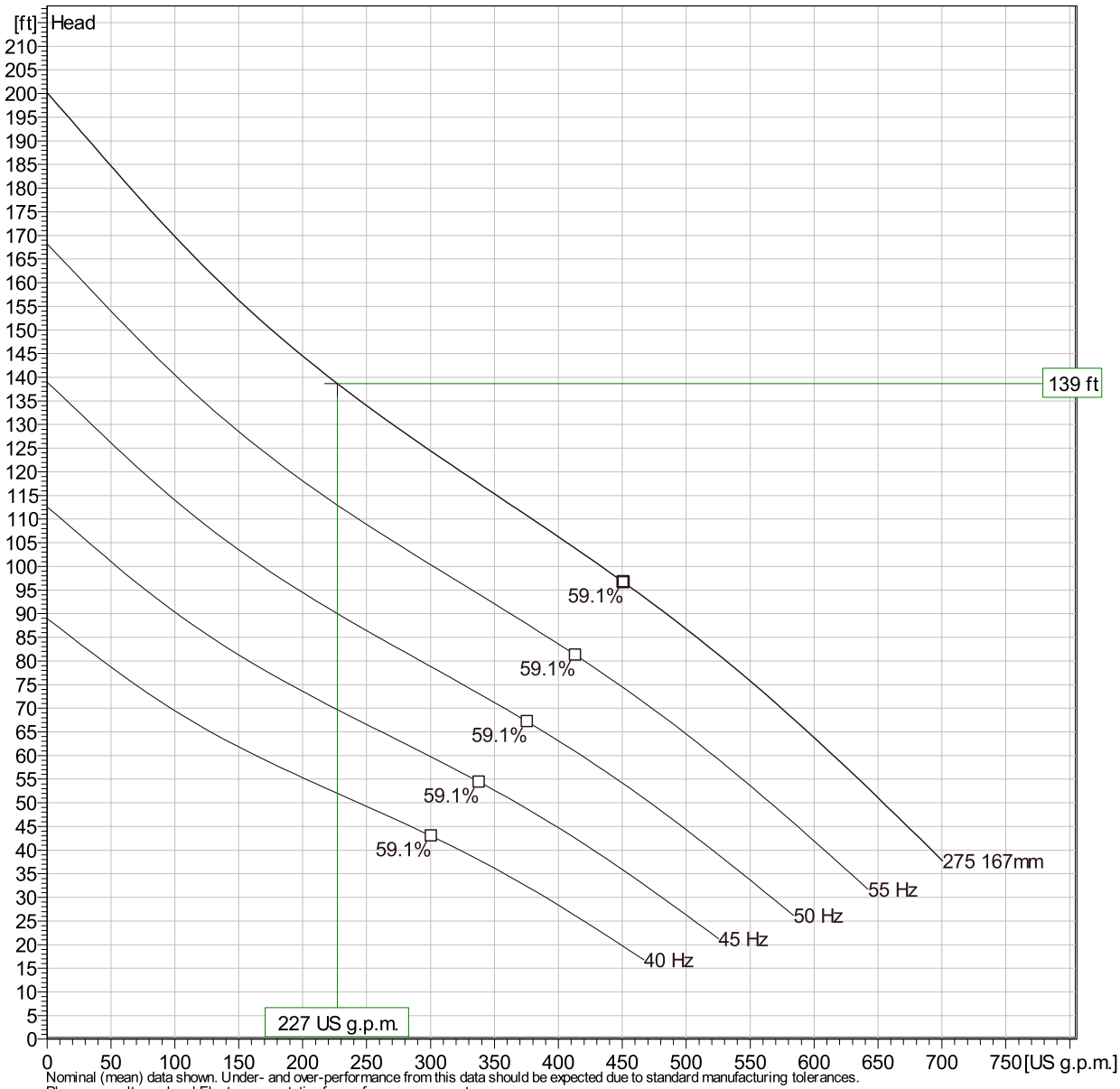
Xylect-20691122

Created on 6/8/2023 **Last update** 6/8/2023

NP 3153 SH 3~ 275

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances.
Please consult your local Flygt representative for performance guarantees.

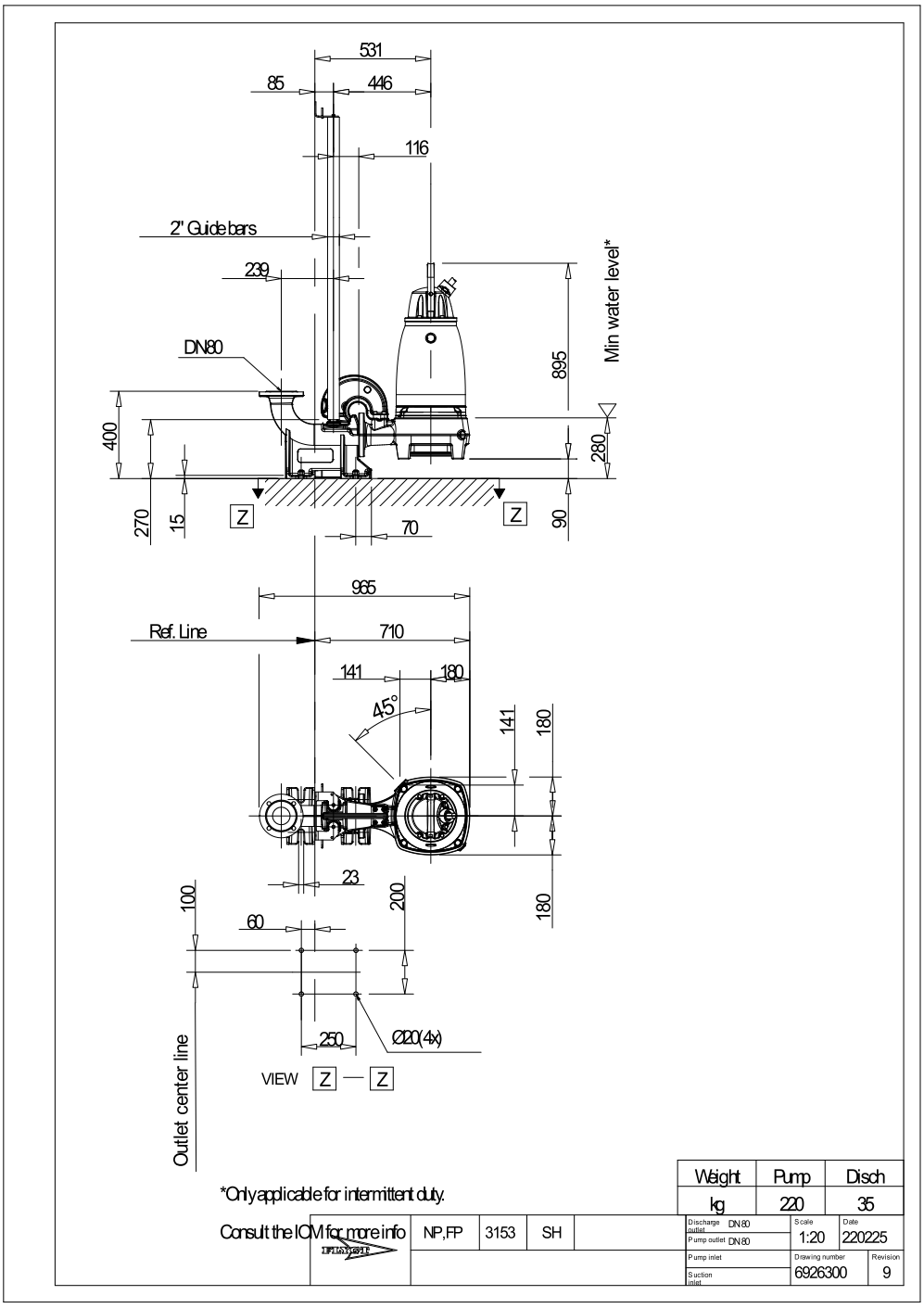
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1	227	139	17	227	139	17	46.9 %	1010	13.4

Project		**Created by**			
Block	Xylect-20691122	**Created on**	6/8/2023	**Last update**	6/8/2023

NP 3153 SH 3~ 275

Dimensional drawing



Project	Xylect-20691122	**Created by**			
Block		**Created on**	6/8/2023	**Last update**	6/8/2023

ATTACHMENT B

PAPE-DAWSON ENGINEERS
2000 NW Loop 410
San Antonio, TX 78213-2251

UTILITY SERVICE AGREEMENT

STATE OF TEXAS §
§
COUNTY OF BEXAR §

This Utility Service Agreement ("Agreement") is entered into by and between the San Antonio Water System ("SAWS") and Bitterblue, Inc. ("Developer") together the Parties ("Parties").

Recitals

Whereas, Developer has requested that SAWS provide water and wastewater service (the "Services") to an approximate 1851.1-acre tract of land, (the "Rogers Ranch Tract" or "Tract"), which is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required; and

Whereas, the Tract is located over the Edwards Aquifer Recharge or Contributing Zone, which is located within the 5-mile Awareness Zone of Camp Bullis, such Tract being more particularly described in Attachment VI hereto, as accepted by SAWS; and

Whereas, SAWS desires to provide the Services to the Developer pursuant to this Agreement, the SAWS Utility Service Regulations, and all applicable local, state, and federal regulations, as amended.

Now Therefore, The Parties Hereto Agree To The Following Terms and Conditions:

1.00 Interpretation of Agreement.

1.01 The Parties acknowledge that the Services contemplated by this Agreement shall be provided in accordance with the SAWS Utility Service Regulations, Design Criteria, Schedules, Attachments and Instruments thereto, as amended (together "USR"). In the event the specific terms of this Agreement are in conflict with the USR, the specific terms of this Agreement shall apply. The above notwithstanding, for the specific conflicting terms to prevail, the conflict must be expressly noted in the Agreement. The Parties further acknowledge that this Agreement is subject to future acts of the City Council of the City of San Antonio with respect to the adoption or amendment of impact fee ordinances/resolutions.

1.02 The Parties agree that the purpose of this Agreement is the reservation of the designated water supply and /or wastewater discharge capacity for the Tract. Any rights that the Developer claims arise under Chapter 245, Texas Local Government Code, that are related to this Agreement shall be determined pursuant to the terms of the Settlement Agreement approved by the San Antonio City Council on October 29, 2015 between The Rogers Shavano Ranch, Ltd., Rogers 1604 Commercial, Ltd., Bitterblue, Inc., and Denton Development Corporation and the City of San Antonio through Ordinance Number 2015-10-29-0926 effective October 29, 2015.

Preparer's Initials

2.00 Obligation Conditioned.

The obligation of SAWS to provide the Services is conditioned upon present rules, regulations and statutes of the United States of America and the State of Texas and any court order that directly affects the SAWS' Regional Water Production and Distribution System and/or Regional Wastewater Transportation and Treatment System and/or the utility infrastructure directly servicing the Tract. Developer acknowledges that if the rules, regulations and statutes of the United States of America and/or the State of Texas that are in effect upon the execution date of this Agreement are repealed, revised or amended to such an extent that SAWS becomes incapable of, or prevented from, providing the Services, then no liability of any nature is to be imposed upon SAWS as a result of SAWS' compliance with such legal or regulatory mandates. SAWS agrees that it will use its best efforts to prevent the enactment of such legal or regulatory mandates.

3.00 Term.

3.01 The term of this Agreement shall be seven (7) years from the Effective Date if the Developer complies with the requirements set out in G.C. 19.00 (attached) within the time period therein stated. This Agreement shall automatically expire if Developer fails to comply with the requirements of G.C. 19.00 within the time period therein provided. The term of this Agreement may be extended to fifteen (15) years from the Effective Date, if Developer complies with the requirements to extend the term set forth in G.C. 19.00 within the time period therein stated. Certain obligations of SAWS (described in Section 3.03 below) may survive the expiration of the term of this Agreement, to the extent that Developer has (i) paid all applicable impact fees for the Services at the then-current rate, and (ii) complied with all On-Site and Off-Site utility infrastructure requirements of this Agreement (described in the Special Conditions), including over-sizing requirements.

3.02 To the extent that SAWS' obligations do not survive the expiration of this Agreement, Developer understands and agrees that a new Utility Service Agreement must be entered into with SAWS to receive the Services for the development project that is the subject of this Agreement.

3.03 To the extent that Developer timely pays all applicable impact fees and complies with all On-Site and Off-Site utility infrastructure requirements prior to the expiration of this Agreement, the following obligations will survive expiration of this Agreement:

(i) SAWS' recognition of the EDUs referenced as the subject of this agreement as Guaranteed Capacity.
(ii) SAWS' continued recognition of impact fee credits previously earned by the Developer pursuant to Sections 15.8 and 15.9 of the USR.
(iii) SAWS' continued provision of the Services to retail customers located in the Tract, so long as such customers pay for the services and comply with the regulations applicable to individual customers.

4.00 Entire Agreement.

The following documents attached hereto and incorporated herein are as fully a part of this Agreement as if herein repeated in full, together with this Agreement, comprise the Agreement in its entirety:

Preparer's Initials JY

Attachment I:	General Conditions
Attachment II:	Special Conditions
Attachment III:	Description of Proposed Water and/or Wastewater Infrastructure
Attachment IV:	Board Summary & Recommendation and Resolution (if necessary)
Attachment V:	Developer Water and/or Wastewater Master Plan (if necessary)
Attachment VI:	Engineering Study Including Description of the Tract
Attachment VII:	Lift Station & Force Main Supplemental Agreement (if necessary)
Attachment VIII:	Water Recycling and Conservation Plan (if necessary)

Any of the above attachments that are created and submitted by the Developer as an attachment to this USA shall be limited to providing relevant engineering, planning or managing information for the purposes of setting aside or reserving water and/or wastewater service capacity as specified in the body of this USA, the General Conditions and the Special Conditions. Developer agrees that it will not attempt to rely on, and SAWS does not authorize, any of the contents of any attachments created and submitted by the Developer as a basis for claiming rights under Chapter 245 of the Texas Local Government Code, except as specifically required by Section 1.02 of this USA.

Developer understands that this Agreement, including, its General Conditions, Special Conditions and Attachments, is subject to the Texas Public Information Act; and, therefore, agrees that it will not claim that any of the information contained herein is subject to any third party exception under that Act.

5.00 Developer's Obligations.

The Developer acknowledges and agrees that the capacity provided by this Agreement runs with the land and shall be an appurtenance to the Tract. The Developer acknowledges that recordation of this Agreement in the Real Property Records of the County in which the Tract is located within three (3) years of the Effective Date of this Agreement is required; otherwise, this Agreement will automatically terminate. Developer shall record the Agreement and the delivery of a recorded copy to the Director within three (3) years of the Effective date of this Agreement or before any transfer of property or EDUs as specified in G.C. 20.00, whichever is sooner, is required. The Developer shall maintain records of EDU's remaining on the Tract pursuant to the approved Developer Master Plan. Developer shall provide SAWS with such records upon SAWS written request.

6.00 Indemnity.

TO THE EXTENT ALLOWED BY LAW AND TEXAS CONSTITUTION, THE DEVELOPER FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS SAWS AND ITS SUCCESSOR AND ASSIGNS FROM THE CLAIMS OF THIRD PARTIES ARISING OUT OF SAWS' RECOGNITION OF THE TRANSFER OF CAPACITY UNDER THIS AGREEMENT TO DEVELOPER'S SUBSEQUENT PURCHASERS, SUCCESSORS AND ASSIGNS.

Preparer's Initials JG

7.00 Notices.

Any notice, request, demand, report, certificate or other instrument which may be required or permitted to be furnished to or served upon the parties shall be deemed sufficiently given or furnished or served if in writing and deposited in the United States mail, registered or certified, return receipt requested, addressed to such party at the address set forth below:

IF TO SAN ANTONIO WATER SYSTEM:

SAN ANTONIO WATER SYSTEM
POST OFFICE BOX 2449
SAN ANTONIO, TEXAS 78298-2449
ATTN: SAM MILLS, P.E., DIRECTOR, DEVELOPMENT

IF TO DEVELOPER:

Bitterblue, Inc.
11 Lynn Batts Lane, Suite 100
San Antonio, Texas 78218
Attn: Llyod A. Denton, Jr.

8.00 Severability.

If for any reason any one or more paragraph of this Agreement are held legally invalid, such judgment shall not prejudice, affect impair or invalidate the remaining paragraphs of the Agreement as a whole, but shall be confined to the specific sections, clauses, or paragraphs of this contract held legally invalid.

9.00 Effective Date.

The Effective Date of this Agreement shall be the date signed by the authorized representative of the San Antonio Water System.

10.00 Ownership.

By signing this Agreement the Developer represents and warrants that it is the owner of the Tract or has the authority of the Tract owner to develop the area. Any misrepresentation of authority or ownership by Developer shall make this Agreement voidable by SAWS. If the Developer does not own the Tract, then the Developer must provide documentation from the owner of the Tract to show that Developer has the proper authority to develop the Tract.

Preparer's Initials

ACCEPTED AND AGREED TO IN ALL THINGS:

San Antonio Water System

Signature: _____

Print Name: Robert R. Puente

Title: President/ Chief Executive Officer

Date: 7-31-17

Developer

Signature: _____

Print Name: Lloyd A. Denton, Jr.

Title: PRESIDENT

Date: July 13, 2017

ACKNOWLEDGEMENTS

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Robert R. Puente known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as President/CEO for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 31 **day of** July **, 2017.**

(seal)

CAROLINE G. GONZALES
My Notary ID # 130329928
Expires August 13, 2019

_____
Notary Public

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Lloyd A. Denton, Jr. known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as PRESIDENT for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 13 **day of** July **, 2017.**

(seal)

SARAH E. CARRINGTON
ID #7745531
My Commission Expires
August 02, 2020

_____
Notary Public

Preparer's Initials JG

GENERAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

G.C.1.00 Definitions.

G.C.1.01 Developer.

Owner of the tract, his subsequent purchasers, successors, and/or assigns.

G.C.1.02 Director of Infrastructure Planning.

The Director of Infrastructure Planning of the San Antonio Water System or his/her designated representative.

G.C. 1.03 Definition of Terms.

Unless defined in the Utility Service Agreement (the "Agreement"), the terms used in this General Conditions of the Utility Service Agreement (the "General Conditions") shall have the same definitions and meaning as those set out in Chapter 2, Definitions, of the Utility Service Regulations ("USR"). In the event a term is specifically defined in the General Conditions, and the definition is in conflict with that found in the USR, and such conflict is acknowledged in the General Conditions, the definition set out in the General Conditions shall apply.

G.C.2.00 Required Submittals.

If determined to be necessary by the Director of Infrastructure Planning ("Director"), the Developer hereby agrees to submit the following documents prior to the execution of the Agreement: Developer Master Plan, Developer Utility Layout, Water Recycling and Conservation Plan, and Engineering Report. The Parties agree that such documents are included instruments to the Agreement. The submittal of such documents is a condition precedent to plat recordation and initiation of Services. Developer shall modify such documents as may be reasonably required by the Director. Such documents shall be updated as required by the Director and the USR.

G.C.3.00 Dedication to SAWS.

The Developer agrees to dedicate, grant, and convey to SAWS all rights, title and interest of Developer in both the Off-Site and On-Site utility infrastructure that the Developer is required to construct under the Special Conditions of the Utility Service Agreement (the "Special Conditions"), and to dedicate, grant, and convey to SAWS easements for such utility infrastructure. Upon written acceptance of Off-Site and On-Site utility infrastructure by SAWS, the infrastructure shall be owned, operated and maintained by SAWS.

G.C.4.00 Design and Construction Requirements.

The design and construction of all Off-Site and On-Site utility infrastructure shall, at a minimum, comply with the requirements established by SAWS, including the USR, the City of San Antonio, the County of Bexar, the State of Texas, and any agency thereof with jurisdiction, including but not limited to the Texas Commission on Environmental Quality and the Texas Department of Health. Off-Site and On-Site utility infrastructure shall be constructed under the inspection of SAWS. Provision of the Services to the Tract shall not commence until the Director has accepted and approved Off-Site and On-Site utility infrastructure in writing.

G.C.5.00 Joint Venture Agreements.

In the event the Developer enters into a Joint Venture Agreement covering the costs for supplying the Services to the Tract, the Developer shall send a copy of such agreement to the attention of the Director.

Preparer's Initials JG

G.C.6.00 Assignment.

This Agreement may not be assigned in whole or in part; however, Developer may assign, convey or transfer EDU capacity ("EDU capacity transfer") to buyers of portions of the Tract in accordance with the terms in G.C. 20.00.

G.C.7.00 Event of Foreclosure.

In the event Developer's interest in the Tract described in Attachment VI are extinguished by an act of foreclosure, and the foreclosing party has supplied sufficient evidence to SAWS that they are the successor in interest to the Tract as a result of such foreclosure, and that there are no lawsuits pending concerning the Tract, SAWS shall consider the foreclosing party a successor in interest if the foreclosing party executes a utility service agreement with SAWS after the Director determines that the execution of such an agreement will not be adverse to SAWS' interest.

G.C.8.00 Payment for Provision of Utility Service.

In the event payment for the Services provided to a subdivision plat within the Tract is not billed by SAWS, the amount of the monthly fees for the provision of the Services will be those charged to the various customer classifications as set by City Ordinances, with the billing and collection thereof on behalf of SAWS, being the responsibility of the billing utility purveyor. To facilitate this arrangement, Developer is to insert into any utility agreement with whatever utility purveyor is to bill for utility services to a subdivision plat within the Tract, a provision requiring said purveyor to enter into a Contract with SAWS to bill and collect SAWS' monthly utility services fees and transmit said fees to SAWS. The billing utility purveyor shall advise customers that delinquent non-payment of any of SAWS' fees will result in interruption and/or termination of the Services provided by SAWS, in accordance with applicable interruption and termination policies and procedures, as amended. SAWS shall not be obligated to provide the Services to any plat within the Tract unless and until the utility purveyor has executed a contract with SAWS to provide for the billing and collection of the Services provided by SAWS.

G.C.9.00 Enforcement of Industrial Waste Ordinance if Required by SAWS.

The Developer shall cause to be recorded in the Deed and Plat Records of the counties in which the Tract is located, a restrictive covenant covering the entire Tract. This restrictive covenant shall run with the land in the Tract described in Attachment VI. Such covenant shall contain language expressly granting to SAWS the right, should SAWS so elect, to enforce and or otherwise pursue to the extent provided at law or in equity, the provisions of the City's Industrial Waste Ordinance No. 57214, as amended or as may be amended (codified as Chapter 34, Article V, Division 3 of the City Code). SAWS' right shall include, to the extent provided at law or in equity, the right to inspection, sampling and monitoring of the collection system to assure ordinance compliance.

Recordation of the Covenant shall be a condition precedent for SAWS' provision of the Services to any portion of said Tract.

G.C.10.00 Oversizing.

Developer must pay for all mains and other utility facilities needed to serve the Tract. SAWS may require the installation of oversized water mains and wastewater mains and related facilities. SAWS' requirements for over-sizing, if any, are set forth in the Special Conditions. SAWS will execute a trilateral contract with Developer and a contractor for the construction of oversized facilities. Contracts for the construction of oversized facilities must be competitively bid as required by law. SAWS will reimburse the Developer for the oversize construction cost differential upon completion of the approved facility installation and SAWS' acceptance of such facility. SAWS will determine whether to provide such reimbursement in the form of a cash reimbursement or in credits to be applied to impact fees. All oversizing shall be done in accordance with the USR.

Preparer's Initials JRJ

G.C.11.00 Off-Site /On-Site Facilities.

Developer shall construct and install all required Off-Site and On-Site utility infrastructure in accordance with the USR and Special Conditions, at no cost to SAWS. Any specific requirements related to the facilities are set forth in the Special Conditions.

G.C.12.00 Impact Fee Payment.

Developer agrees that the Agreement does not constitute an assessment of impact fees. Developer agrees to pay all applicable impact fees at the time and in the amount prescribed by ordinance or resolution of the City Council of the City of San Antonio and the USR, as amended. An estimate of the impact fees for the development Tract is provided in the Special Conditions. The estimate does not constitute an assessment of impact fees, and the amount of impact fees is subject to change by the City Council of the City of San Antonio as provided by law.

G.C.13.00 SAWS' Obligation to Supply Service.

To the extent that Developer pays all applicable impact fees and complies with all Off-Site and On-Site utility infrastructure requirements, Developer shall be entitled to the permanent use and benefit of the Services and is entitled to receive immediate service from any existing facilities with actual capacity to serve the development for which impact fees were paid, subject to compliance with other valid regulations. If, after collecting the impact fees, there is no actual capacity in existing facilities to provide the Services, SAWS will provide the Services within a reasonable period of time not to exceed five (5) years, as prescribed by Chapter 395 of the Local Government Code, as amended. In the event Services are required by Developer earlier than the five (5) year period, Developer and SAWS may agree that Developer may construct or finance the capital improvements or facility expansions required to provide Services, and the costs incurred or funds advanced will be credited against impact fees otherwise due from the new development or reimbursed to Developer from impact fees paid from other new developments that will use such capital improvements or facility expansions, which fees shall be collected and reimbursed to Developer at the time the other new development records it plat.

G.C.14.00 Facility Design and Construction.

The Developer shall design and construct all On-Site and Off-Site utility infrastructure described in the Special Conditions, including any oversizing, in accordance with the USR and all applicable local, state and federal requirements. Developer further recognizes that SAWS' approval in all respects as to facility right-of-way adequacy, location, size, grade and invert elevation is a condition precedent to any further obligation of SAWS. Specific design and construction requirements are set forth in the Special Conditions.

G.C.15.00 Use of Capacity by SAWS.

Developer understands that capacity in Off-Site and On-Site utility infrastructure resulting from the Agreement for the Tract may be utilized by SAWS for other tracts requesting service from SAWS. SAWS shall keep accurate records of the capacity provided to the Tract under the Agreement, whether Set-Aside or Guaranteed Capacity, and in no event will Developer be denied capacity as a result of SAWS' utilization of such capacity for another tract. Set-Aside capacity shall not survive the expiration of the Agreement.

G.C.16.00 Utility Master Plan Requirements.

The Developer will prepare a utility master plan, which details the water and/or wastewater systems for the Tract pursuant to the USR, as amended.

G.C.17.00 Phased Utility Master Plans.

If the Developer's water and/or wastewater systems are to be installed in phases or units, the Developer shall submit overall utility master plans to SAWS for review and approval. The overall utility master plan(s) shall be submitted before the first construction phase is submitted for plat approval. The overall utility master plan(s) shall show the development phases or units including the sequence and a timetable for build-out. The Developer shall also provide

Preparer's Initials JG

SAWS with a digital version of the proposed recorded plat, as submitted for plat recordation in a format acceptable to SAWS, for each phase or unit of the devolvement project.

G.C.18.00 Conformance of Plans to Utility Master Plan.

All water and wastewater system facilities to serve the Tract shall be designed and constructed in conformance with the approved utility master plan. Changes in the water and wastewater system design shall be resubmitted to SAWS for written approval.

G.C.19.00 Timing Requirements for Submission of Plans.

Developer shall have three (3) years from the Effective Date of the Agreement to complete and submit the required utility master plan and to start construction of the Off-Site and On-Site utility infrastructure described in the Special Conditions. Developer agrees that the Agreement for the provision of Services shall automatically expire if Developer has not submitted a utility master plan and started construction of required Off-Site and On-Site utility infrastructure within three (3) years of the Effective Date of the Agreement, and a new request for the Services must be submitted to SAWS, which SAWS will grant based on then existing policies and regulations. In the event Developer meets the above-mentioned requirements within the three (3) year period provided, the Agreement shall remain in effect for seven (7) years from the Effective Date. If Developer submits a revised Utility Master Plan in accordance with the USR prior to the expiration of the seven (7) year period, the Agreement for the provision of Services may be extended to a maximum term of fifteen (15) years from the Effective Date.

G.C. 20.00 EDU Transfers.

The transfer of EDU capacity outside the original boundaries of this Utility Service Agreement will not be allowed. The San Antonio Water System considers this Agreement to run with the land; however, EDU capacity transfers to subdivided tracts within the Tract of this Agreement are the responsibility of the Developer and approval of such transfers is not required by the San Antonio Water System. The Developer shall maintain an accounting of the EDU capacity that is used by the Developer and/or transferred after the effective date of this Agreement to portions of the Tract. If the Developer sells a portion of the Tract and transfers part of the EDU capacity contained in this Agreement, then that EDU capacity transfer must be included in the deed, bill of sale or instrument conveying the land and the Developer must require the buyer of the land who receives the allocated EDUs to record the instrument effectuating the transfer. Developer may file a Master Development Plan or an EDU Plan, prepared by an engineer, that shows specific EDU capacity allocations within the Tract and shall ensure that the Master Development Plan or EDU Plan is attached to this Agreement and properly recorded. SAWS will recognize the capacity allocations within the Master Development Plan or EDU Plan so long as those allocations are within the parameters of this Agreement. For properties that have areas of unplanned use, the demand will be calculated at four (4) EDUs per acre unless the engineering report specifies otherwise or there is not enough EDU capacity remaining for the Tract to allocate four (4) EDUs per acre.

In no event will the System be responsible to 3rd parties for providing water supply or wastewater discharge capacity beyond the total EDU capacity identified in this Agreement for the Tract. Developer expressly disclaims, releases and holds harmless SAWS from any liability, damages, costs or fees, and agrees to indemnify SAWS for any liability, including, costs and attorney's fees, associated with any dispute related to the transfer of all or a portion of EDU capacity approved for the Tract in this Utility Services Agreement.

G.C. 21.00 Camp Bullis Awareness Zone.

In the event that the Tract is located within, or partially within, the Camp Bullis Awareness Zone, the Developer acknowledges that certain lighting regulations may apply within at least a 3-mile radius of Camp Bullis, commonly referred to as down-lighting or dark sky lighting, and Developer will comply with those regulations. Developer agrees to comply with any local, state or federal law, rule or regulation related to the protection of the environment or endangered species, including but not limited to, any site assessments or surveys and notice to the United States Fish & Wildlife when required by law, rule or regulation. Developer acknowledges that any required assessment, survey or notice shall be current or updated as may be required by law, rule or regulation.

Preparer's Initials TG

SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Rogers Ranch, an 1851.1-acre tract inside the City of San Antonio limits, is located just north of N Loop 1604 and east of NW Military HWY, as shown in Attachment VI (the "Tract"). The tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required.

On August 10, 1993 the San Antonio Water System approved a water commitment for a 1780-acre tract at Loop 1604 and Military HWY (also known as Rogers Ranch) for 4,005 EDUs of water service. This water commitment is still valid until February 17, 2018.

The ultimate demand from the proposed development, on SAWS' water infrastructure, shall not exceed 4,005 equivalent dwelling units (EDUs) of water supply.

S.C.2.00 Infrastructure Requirements.

Water Supply to the tract will be from SAWS Pressure Zone 8 and Pressure Zone 11. The flow capacity of a 30-inch main is required to supply water to the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR).

Pressure Zone 8 (2,014 EDUs)

To supply water to the portion of the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR), located within PZ 8 (any development below ground elevation 1,040 feet) the flow capacity of a 16-inch main is required. There are existing looped 12-inch mains and 16-inch mains along N Loop 1604. There is also an existing 16-inch main traversing through the PZ 8 portion of the Tract from the existing 16-inch main along N Loop 1604. The Developer may connect services to a combination of the existing looped 12-inch and 16-inch mains along N Loop 1604 and the 16-inch main traversing through the PZ 8 portion of the Tract.

Pressure Zone 11 (1,991 EDUs)

To supply water to the portion of the 1851.1-acre Tract, in conformance with SAWS' Utility Service Regulations (USR), located within PZ 11 (any development above ground elevation 1,040 feet) the flow capacity of a 16-inch main is required. There is a series of 12-inch and 16-inch mains extending from the 20-inch and 30-inch main traversing through the PZ 11 portion of the Tract. The Developer is required to supply a stub out to the undeveloped area within the northwest portion of the Tract. The Developer may then connect services to the series of 12-inch and 16-inch mains traversing through the PZ 11 portion of the Tract.

Preparer's Initials JG

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Rogers Ranch, Utility Service Agreement Engineering Report", by Pape-Dawson Engineers, dated July 2006 is included as Attachment VI.

S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer shall acquire any right-of-way or easements, and install all On-Site and Off-Site utility infrastructure required to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Requirement to Install Approved Pressure Regulators and/or Booster Pumps.

Pressure Zone 8

A section of the PZ8 portion of the tract is below ground elevation of 985 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

Pressure Zone 11

The entire PZ11 portion of the tract is below ground elevation of 1,215 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

S.C.8.00 Time for Water Impact Fee Assessment and Payment.

Water Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Impact fees will be collected at either the time of plat recordation or connection to the SAWS' water system, at the discretion of the Developer.

Preparer's Initials JG

S.C.9.00 Water Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on current impact fee rates. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by the San Antonio City Council.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Flow Development	4,005	$1,182	$ 4,733,910.00
System Development Middle	2,014	$799	$ 1,609,186.00
System Development High	1,991	$883	$ 1,758,053.00
Water Supply	4,005	$2,796	$ 11,197,980.00
Total			$ 19,299,129.00

S.C.10.00 Pro-Rata Charge Requirement.

Developer shall be required to pay a Pro-Rata Charge pursuant to the USR, as amended, prior to connection to the SAWS water system if Developer is tying into a main that is subject to a pro-rata refund.

Preparer's Initials 

SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WASTEWATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Rogers Ranch, a 1,851.1-acre tract inside the City of San Antonio limits, is located just north of N Loop 1604 and east of NW Military HWY, as shown in Attachment VI (the "Tract") and lies within SAWS' Upper Collection and Treatment Area (UCTA). The tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required.

On March 12, 1996 the San Antonio Water System approved a sewer contract for a 1,696-acre tract at Loop 1604 and Military HWY (also known as Rogers Ranch) for 4,100 EDUs of wastewater service. The sewer contract expired March 12, 2006.

The ultimate demand from the proposed development, on SAWS' wastewater infrastructure, shall not exceed 4,100 equivalent dwelling units (EDUs) of wastewater discharge.

S.C.2.00 Infrastructure Requirements.

The Tract is situated within SAWS' Upper Collection and Treatment Area (UCTA) and lies within the Lewis Creek-Salado Creek, Panther Spring Creek-Salado Creek, and Olmos Creek-San Antonio River Watersheds. The capacity of a 21-inch gravity main at 0.11 percent minimum slope is required to provide wastewater service to the tract, in conformance with SAWS' USR. There is an existing 24-inch gravity sewer main crossing N Loop 1604 near the southern boundary of the Tract. The Developer may connect a maximum of 4,100 EDUs of total capacity to a combination of the existing 8-inch, 10-inch and 18-inch gravity sewer mains which discharge into the existing 24-inch gravity sewer main crossing N Loop 1604 near the southern boundary of the Tract.

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Rogers Ranch, Utility Service Agreement Engineering Report", by Pape-Dawson Engineers, dated July 2006 is included as Attachment VI.

Preparer's Initials JJ

S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer will also be required to acquire any right-of-way and easements, install all On-Site and Off-Site utility infrastructure, and upgrade existing lift stations necessary to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site utility infrastructure requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Lift Stations and Force Mains.

Lift stations and force mains are only allowed by prior written supplemental agreement with SAWS. Applicable fees, as set out in the supplemental agreement, must be paid in full prior to service connection. Whenever a lift station is proposed, a Present Value analysis of the lift station vs. gravity solutions, shall be included in the Engineering Report/Study in conformance with the requirements of SAWS' USR.

S.C.8.00 Time for Wastewater Impact Fee Assessment and Payment.

Wastewater Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Wastewater Impact Fees will be collected at either the time of plat recordation or connection to the SAWS wastewater system, at the discretion of the Developer.

S.C.9.00 Wastewater Impact Fee Estimates Based Upon Current Charges.

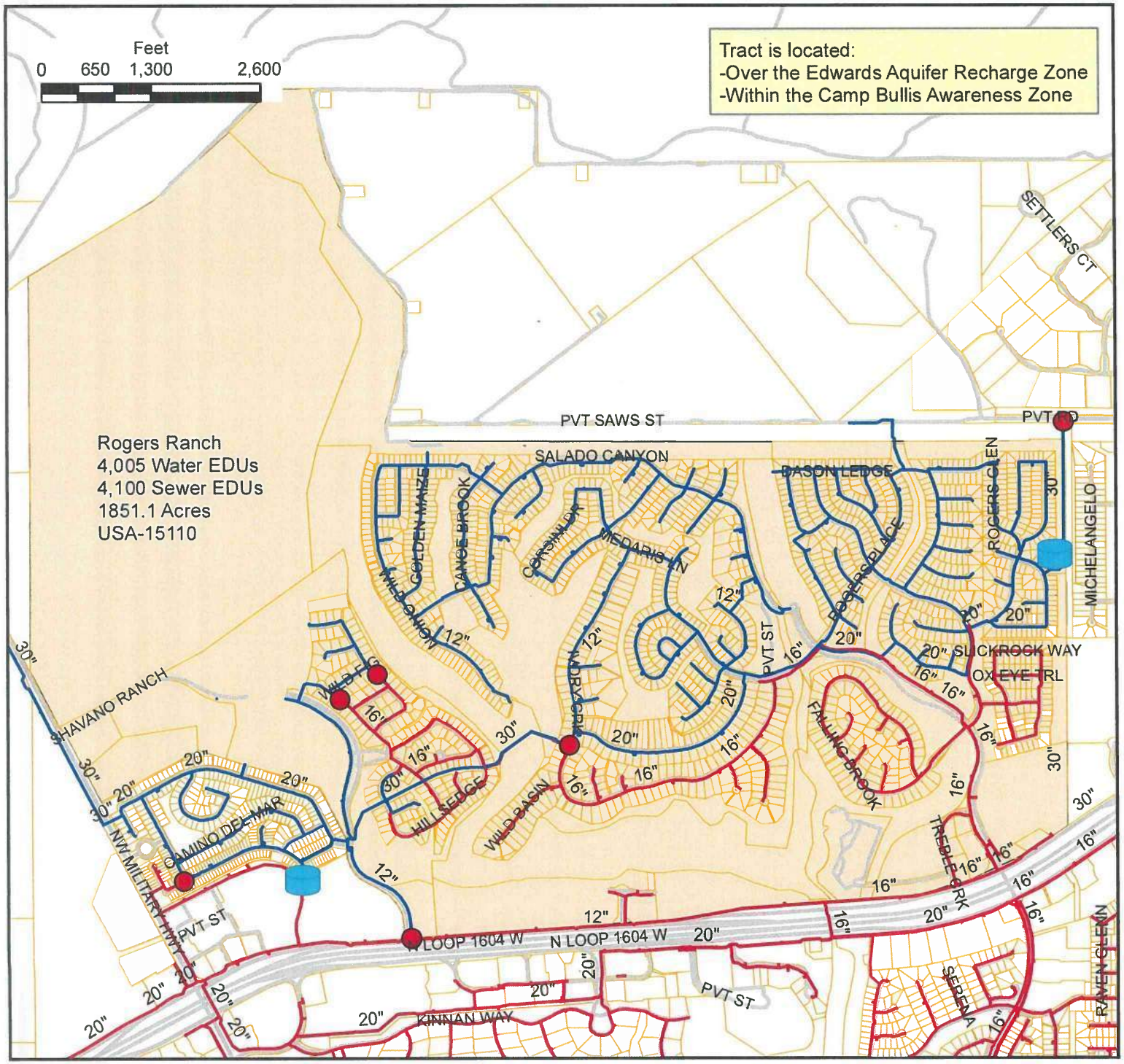
Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on impact fee rates in effect as of the Effective Date of the Agreement. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by action of the San Antonio City Council as permitted by law.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Wastewater Collection Upper	4,100	$2,520	$ 10,332,000.00
Wastewater Treatment Dos Rios/Leon Creek	4,100	$786	$ 3,222,600.00
Total			$ 13,554,600.00

S.C.10.00 Pro-Rata Payment Fee Requirement.

Developer shall be required to pay a pro-rata fee pursuant to the USR, as amended, prior to connection to the wastewater system, if Developer is tapping into a main that is subject to a pro-rata refund.

Preparer's Initials 



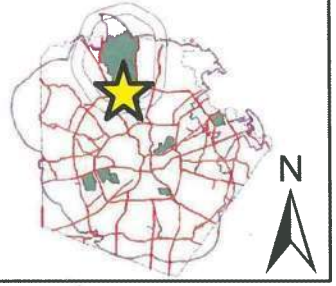
Attachment III:
USA-15110
Rogers Ranch Tract
Proposed Water Infrastructure
1,851.1 Acres

San Antonio Water System

Legend

- Existing PZ8 Main
- Existing PZ11 Main
- USA Tract
- SAWS Facility
- Division Valve (DV)
- Pressure Reducing Valve (PRV)

Project Location

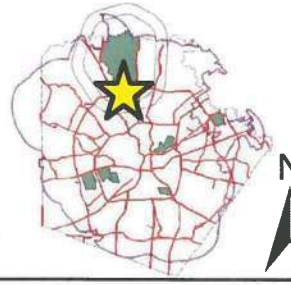


Attachment III:
USA-15110
Rogers Ranch Tract
Proposed Sewer Infrastructure
1,851.1 Acres

Legend

- Existing Sewer Main
- USA Tract

Project Location



RECORDER'S MEMORANDUM
AT THE TIME OF RECORDATION, THIS INSTRUMENT WAS FOUND TO BE INADEQUATE FOR THE BEST PHOTOGRAPHIC REPRODUCTION BECAUSE OF ILLEGIBILITY, CARBON OR PHOTO COPY, DISCOLORED PAPER ETC.

Any provision herein which restricts the sale, or use of the described real property because of race is invalid and unenforceable under Federal law
STATE OF TEXAS, COUNTY OF BEXAR
I hereby Certify that this instrument was FILED in File Number Sequence on this date and at the time stamped hereon by me and was duly RECORDED in the Official Public Record of Real Property of Bexar County, Texas on:

AUG 04 2017

COUNTY CLERK BEXAR COUNTY, TEXAS

Doc# 20170153394 Fees: $90.00
08/04/2017 9:39AM # Pages 17
Filed & Recorded in the Official
Public Records of BEXAR COUNTY
GERARD C. RICKHOFF COUNTY CLERK

Receipt# 2660396

GERARD C. RICKHOFF
COUNTY CLERK
BEXAR COUNTY
100 DOLOROSA SUITE 104
SAN ANTONIO, TX
78205
(210) 335-2216

Doc#: 20170153394 Pgs: 17
Type: AGREEMENT
Book: 18667 Pages: 1444-1460

RECORDING	$	69.00
RECORDS ARCHIVE	$	10.00
RECORDS MANAGEMENT	$	10.00
COURTHOUSE SECURITY	$	1.00
Total	$	90.00
Cash Tendered	$	90.00
Balance	$	0.00

Total Documents: 1
Total Fees: 4

Client Name GENERAL PUBLIC
Filed By PAPE DAWSON
Aug 4 2017 9:39:09 AM

Cashier: Daniel

Comment:
WALK-IN

ATTACHMENT A

TABLE 6.6
LIVE LOADS ON PVC PIPE
From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

Height of Cover (ft)	Live Load Transferred to Pipe, lb/in^2			Height of Cover (ft)	Live Load Transferred to Pipe, lb/in^2		
	Highway H20[1]	Railway E80[2]	Airport [3]		Highway H20[1]	Railway E80[2]	Airport [3]
1	12.50			14	*	4.17	3.06
2	5.56	26.39	13.14	16	*	3.47	2.29
3	4.17	23.61	12.28	18	*	2.78	1.91
4	2.78	18.40	11.27	20	*	2.08	1.53
5	1.74	16.67	10.09	22	*	1.91	1.14
6	1.39	15.63	8.79	24	*	1.74	1.05
7	1.22	12.15	7.85	26	*	1.39	*
8	0.69	11.11	6.93	28	*	1.04	*
10	*	7.64	6.09	30	*	0.69	*
12	*	5.56	4.76	35	*	*	*
				40	*	*	*

[1] *Simulates 20 ton truck traffic + impact (Source: ASTM A 796)*

[2] *Simulates 80,000 lb/ft railway load + impact (Source: ASTM A 796)*

[3] *180,000 lbs. dual tandem gear assembly. 26 inch spacing between tires and 66 inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.*

* *Negligible live load influence.*

FIGURE 7.4
BEDDING ANGLE
From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

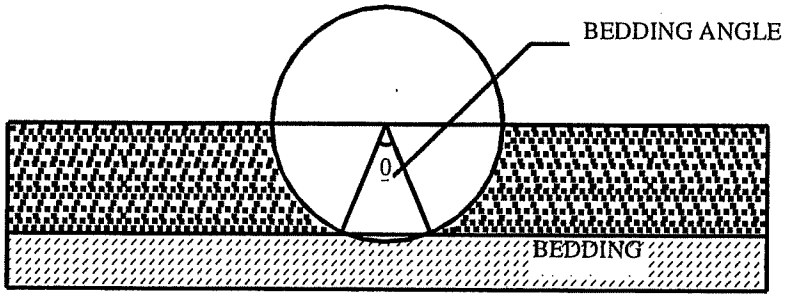


TABLE 7.1
PVC PIPE STIFFNESS (psi)

DR or SDR	Min. E = 400,000 psi	Min. E = 500,000 psi
64	7	9
51	14	18
42	26	32
41	28	35
35	46	57
33.5	52	65
32.5	57	71
28	91	114
26	115	144
25	129	161
21	224	279
18	364	455
17	437	546
14	815	1,019
13.5	916	1,145

TABLE 7.2
VALUES OF BEDDING CONSTANT, K

BEDDING ANGLE (DEGREES)	K
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083

TABLE 7.3
AVERAGE VALUES OF MODULUS OF SOIL REACTION, E'
(For Initial Flexible Pipe Deflection)

	E' for Degree of Compaction of Bedding, in pounds per square inch			
Soil type-pipe bedding material (Unified Classification System[a]) (1)	Dumped (2)	Slight, <85% Proctor, <40% relative density (3)	Moderate, 85%-95% Proctor, 40%-70% relative density (4)	High, >95% Proctor, >70% relative density (5)
Fine-grained Soils (LL>50)[b] Soils with medium to high plasticity, CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E' = 0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles	50	200	400	1,000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles Coarse-grained Soils with Fines GM, GC, SM, SC[c] contains less than 12% fines	100	400	1,000	2,000
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP[c] contains less than 12% fines	200	1,000	2,000	3,000
Crushed Rock	1,000	3,000	3,000	3,000
Accuracy in Terms of percentage Deflection [d]	±2	±2	±1	±0.5

[a]ASTM Designation D 2487, USBR Designation E-3.

[B]LL = Liquid limit.

[c]Or any borderline soil beginning with one of these symbols (i.e., GM-GC, GC-SC).

[d]For± 1% accuracy and predicted deflection of 3%, actual deflection would be between 2% and 4%,

Note: Values applicable only for fills less than 50 ft (15m). Table does not include any safety factor. For use in predicting initial deflections only, appropriate Deflection Lag Factor must be applied for long-term deflections. If bedding falls on the borderline between two compaction categories, select lower E' value or average the two values. Percentage Proctor based on laboratory maximum dry density from test standards using about 12,500 ft-lb/cu ft (598,000 J/m^3) (ASTM D 698, AASHTO T-99, USBR Designation E-11). 1 psi = 6.9 kPa.

SOURCE: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver, Colorado. Reprinted with permission from American Society of Civil Engineers.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 1 Soil Classification Chart (see Classification D2487)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification	
					Group Symbol	Group Name[B]
Coarse-Grained Soils	Gravels	Clean gravels	$C_u \geq 4$ and $1 \leq C_c \leq 3^C$		GW	Well-graded gravel[D]
More than 50% retained on No. 200 sieve	More than 50% of coarse fraction retained on No. 4 sieve	Less than 5% of fines[E]	$C_u < 4$ and/or $1 > C_c > 3^C$		GP	Poorly graded gravel[D]
		Gravels with more than 12% fines[E]	Fines classify as ML or MH		GM	Silty gravel[DFG]
			Fines classify as CL or CH		GC	Clayey gravel[DFG]
	Sands	Clean sands	$C_u \geq 6$ and $1 \leq C_c \leq 3^C$		SW	Well-graded sand[H]
	50% or more of coarse fraction passes on No. 4 sieve	Less than 5% fines[I]	$C_u < 6$ and/or $1 > C_c > 3^C$		SP	Poorly graded sand[H]
		Sand with fines	Fines classify as ML or MH		SM	Silty sand[FGH]
		More than 12% fines[I]	Fines classify as CL or CH		SC	Clayey sand[FGH]
Fine-Grained Soils	Silts and clays	Inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[KLM]
50% or more passes the No. 200 Sieve	Liquid limit less than 50		PI < 4 and plots below "A" line[J]		ML	silt[KLM]
		Organic	Liquid Limit-Oven dried	<0.75	OL	Organic clay[KLMN]
			Liquid Limit-Not dried			Organic silt[KLMO]
	Silts and clays	Inorganic	PI plots on or above "A" line		CH	Fat clay[KLM]
	Liquid limit 50 or more		Plots below "A" line		MH	Elastic silt[KLM]
		Organic	Liquid Limit-Oven Dried	<0.75	OH	Organic clay[KLMP]
			Liquid Limit-Not Dried			Organic silt[KLMQ]
Highly organic soils	Primarily organic matter, dark in color, and organic odor				PT	peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] $C_u = D_{60} / D_{10}$

$$C_c = \frac{(D_{30})^2}{D_{10} x D_{60}}$$

[D] If soil contains ≥15 % sand, add "with sand" to group name.
[E] Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt:
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
[F] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[G] If fines are organic, add "with organic fines" to group name.
[H] If soil contains ≥ 15 % gravel, add "with gravel" to group name.
[I] Sands with 5 to 12 % fines require dual symbols:
SW-SM well graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay (see Test Method D4318).
[K] If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel", whichever is predominant.
[L] If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 2 Soil Classes

Soil Group [A,B]	Soil Class	American Association of State Highway and Transportation Officials (AASHTO) Soil Groups [C]
Crushed rock, angular [D], 100% passing 1-1/2 in. sieve, </=15 % passing #4 sieve, </= 25 % passing 3/8 in. sieve and </= 12 % passing #200 sieve	Class I	--
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with </= 12 % passing #200 sieve[E,F]	Class II	A1, A3
Coarse grained soils with fines: GM, GC, SM, SC or any soil beginning with one of these symbols, containing > 12 % passing #200 sieve; Sandy or gravelly fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with >/= 30 % retained on #200 sieve	Class III	A-2-4, A-2-5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve
Fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with <30 % retained on #200 sieve	Class IV	A-2-7, or A-4, or A-6 soils with 30% or less retained on #200 sieve
MH, CH, OL, OH, PT	Class V Not for use as embedment	A5, A7

[A] See Classification D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
[B] Limits may be imposed on the soil group to meet project or local requirements if the specified soil remains within the group. For example, some project applications require a Class I material with minimal fines to address specific structural or hydraulic conditions and the specification may read "Use Class I soil with a maximum of 5% passing the #200 sieve."
[C] AASHTO M145, Classification of Soils and Soil Aggregate Mixtures.
[D] All particle face shall be fractured.
[E] Materials such as broken coral, shells, and recycled concrete, with $\leq$ = 12% passing a No. 200 sieve, are considered to be Class II materials. These materials should only be used when evaluated and approved by the Engineer.
[F] Uniform fine sands (SP) with more than 50% passing a No. 100 sieve (0.006 in., 0.15 mm) are very sensitive to moisture and should not be used as backfill unless specifically allowed in the contract documents. If use of these materials is allowed, compaction and handling procedures should follow the guidelines for Class III materials.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 3 Recommendations for Installation and Use of Soils and Aggregates for Foundation and Pipe-Zone Embedment

Soil Class[A]	Class I[B]	Class II	Class III	Class IV
General Recommendations and Restrictions	Acceptable and common where no migration is probable or when combined with a geotextile filter media. Suitable for use as a drainage blanket and under drain where adjacent material is suitably graded or when used with a geotextile filter fabric (see X1.8).	Where hydraulic gradient exists check gradation to minimize migration. Clean groups are suitable for use as a drainage blanket and underdrain (see Table 2). Uniform fine sands (SP) with more than 50 % passing a #100 sieve (0.006 in., 0.15 mm) behave like silts and should be treated as Class IV soils.	Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.	Difficult to achieve high-soil stiffness. Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.
Foundation	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above.	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above. Install and compact in 12 in. (300 mm) maximum layers.	Suitable for replacing over-excavated trench bottom as restricted above. Install and compact in 6 in. (150 mm) maximum layers.	Suitable for replacing over-excavated trench bottom as restricted above. Install and compact in 6-in (150 mm) maximum layers.
Pipe Embedment	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Difficult to place and compact in the haunch zone.	Suitable as restricted above. Difficult to place and compact in the haunch zone.
Embedment Compaction: Min Recommended Percent Compaction, SPD[D]	See Note[C]	85 % (SW and SP soils) For GW and GP soils See Note[E]	90 %	95 %
Relative Compactive Effort Required to Achieve Minimum Percent Compaction	Low	Moderate	High	Very high
Compaction Methods	Vibration or impact	Vibration or Impact	Impact	Impact
Required Moisture Control	None	None	Maintain near optimum to minimize compactive effort	Maintain near optimum to minimize compactive effort

[A] Class V materials are unsuitable as embedment. They may be used as final backfill as permitted by the engineer.
[B] Class I materials have higher stiffness than Class II materials, but data on specific soil stiffness of placed, uncompacted Class I materials can be taken equivalent to Class II materials compacted to 95% of maximum standard Proctor density (SPD95), and the soil stiffness of compacted Class I materials can be taken equivalent to Class II materials compacted to 100% of maximum standard Proctor density (SPD100). Even if placed uncompacted (that is, dumped), Class I materials should always be worked into the haunch zone to assure completed placement.
[C] Suitable compaction typically achieved by dumped placement (that is, uncompacted but worked into haunch zone to ensure complete placement).
[D] SPD is standard Proctor density as determined by Test Method D698.
[E] Place and compact GW and GP soils with at least two passes of compaction equipment.

ATTACHMENT B

Raba Kistner

January 14, 2009

Raba-Kistner Consultants, Inc.
12821 W. Golden Lane
P.O. Box 690287, San Antonio, TX 78269-0287
(210) 699-9090 • FAX (210) 699-6426
www.rkci.com

Charles P. "Frosty" Forster, P.E., P.G.
Pape Dawson Engineers
555 East Ramsey
San Antonio, Texas 78216

RE: Soil Unit Weight Values for Backfill Materials
Various Projects
San Antonio, Texas

Dear Mr. Forster:

Raba-Kistner Consultants Inc. (R-K) is pleased to submit this letter providing general guidance for selecting design soil unit weights for use in utility trench design.

In general, the following table contains a list of the frequently used trench backfill materials in the San Antonio area. The table also contains approximate values for the soil dry unit weight, moist unit weight and saturated unit weight for these materials assuming 90 to 95 percent compaction utilizing a standard Proctor (ASTM D 698.)

MATERIAL DESCRIPTION	DRY UNIT WEIGHT, PCF	MOIST UNIT WEIGHT, PCF	SATURATED UNIT WEIGHT, PCF
TxDOT TEX-113E Type A, Gr. 1 or 2	130	137	143
TxDOT TEX-113E Type A, Gr. 3 thru 5	128	135	143
Limestone Millings	115	124	134
Gravelly Clay	110	120	132
Clay	100	120	127
Clayey Sand	95	106	123
Gravel (Clean)	115	120	134
Sand (Clean)	92	98	120
Pit Run Gravel	127	137	142

We appreciate the opportunity to be of service to you. If you have any questions or need additional assistance, please call.

Very truly yours,

RABA-KISTNER CONSULTANTS, INC.

STATE OF TEXAS
CHRIS L SCHULTZ
80680
LICENSED
PROFESSIONAL ENGINEER
1/14/09

Chris L. Schultz, P.E.
Senior Vice President

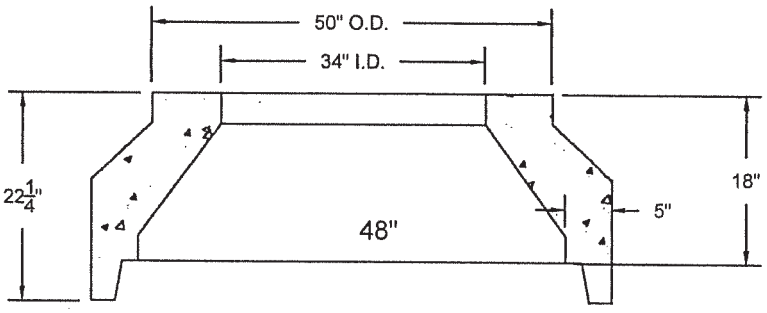
CLS/mem

ATTACHMENT C

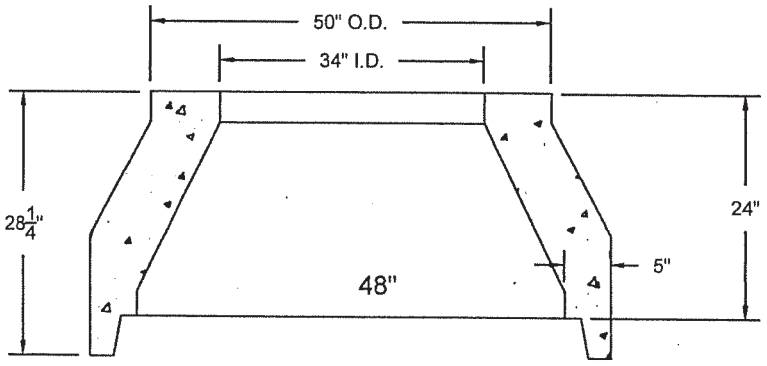
PRE-CAST MANHOLE DRAWINGS & SPECIFICATIONS

48" Dia. Concentric Cones

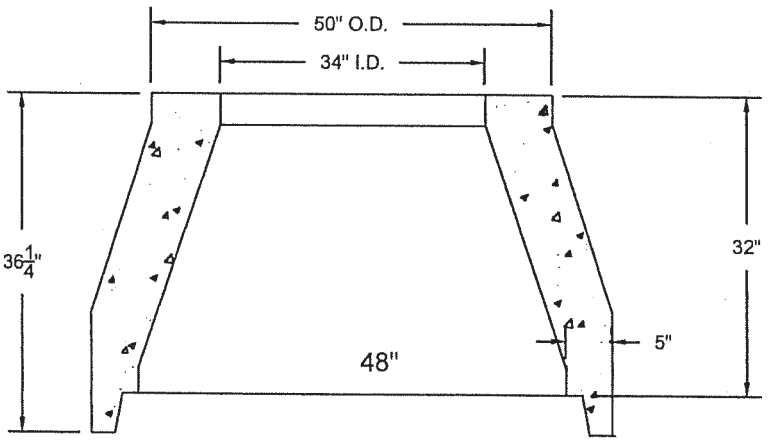
18" Yeild



24" Yeild



32" Yeild



NOTES:
1. Concrete: 4,000 PSI, 28 day Strength. Exceeds ASTM C - 478 - 11
2. Welded wire fabric strength fy = 65,000 psi.
3. Live Load - AASHOT HS-20.

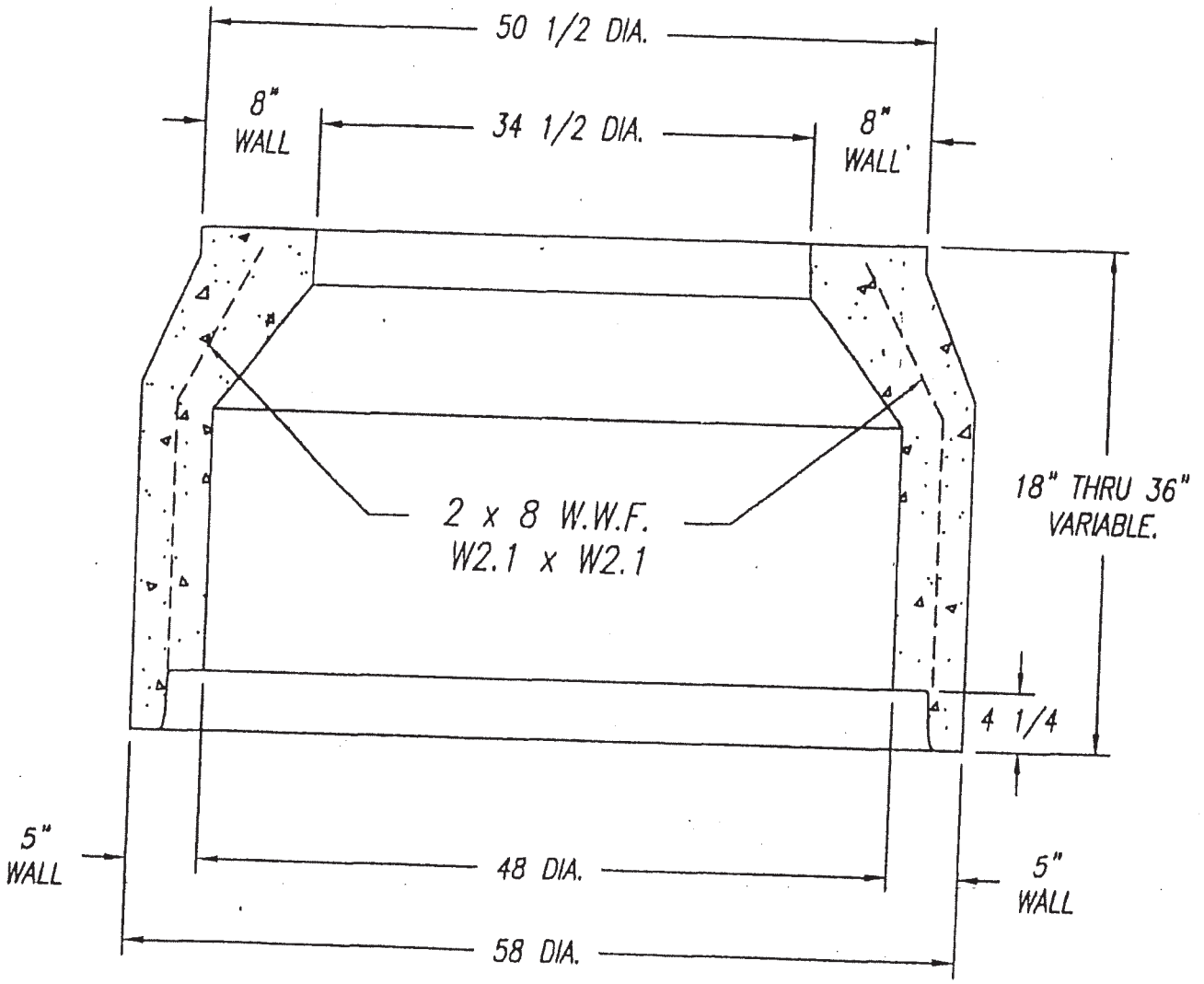
Charlotte's Concrete, Inc.

Charlotte's Concrete, Inc.
4950 Lane Dr.
San Antonio, Tx. 78263
Ph. (210) 648-4774

NPCA CERTIFIED PLANT

FOR 18", 24" & 32" Concentric Cones			
JOB			
DRAWN BY CA	DATE 08-06-15	REV. NO. -	SHEET 1 OF 1
FILE			

\APPROVAL\CONCENTRIC.DWG



(7R JOINT)

REF. FORM DWG. 3-303-5561

INTERNATIONAL PIPE MACHINERY

QUINN

MACHINE & FOUNDRY CORP.

A MEMBER OF THE BESSER FAMILY OF COMPANIES

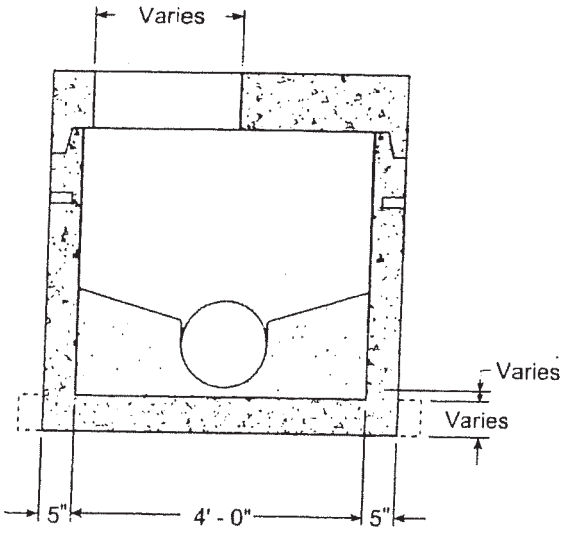
BOONE, IOWA U.S.A.

CHARLOTTES

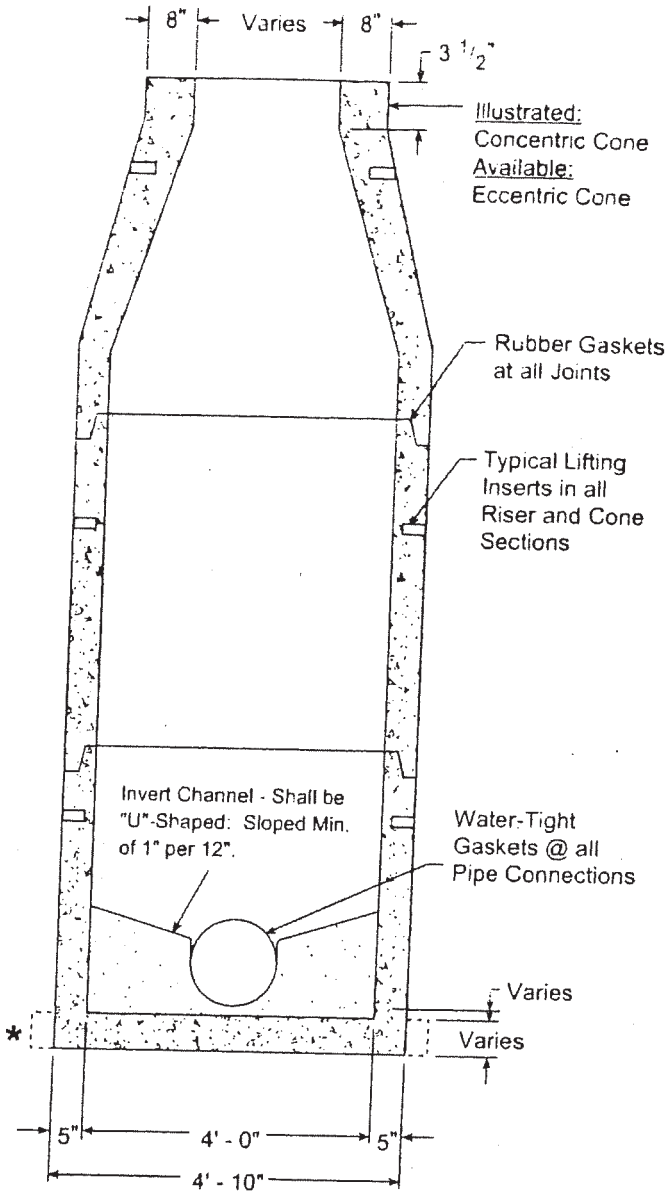
48 x 5 x 34 1/2 x 8 x 36 & 18

CONCENTRIC CONCRETE SECTION

DRAFTER	JJK	4/19/02	CONCENTRIC	REV.
CHECKED				
SCALE:	1/13" = 1"			



Flattop Illustration
for Shallow Manhole



Section View
4' I.D. Manhole - Regular Base
with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: Max diameter = 32"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements
Average weight of 24" depth base w/8" invert = 4,500 lbs
Estimated weight of riser and cone sections = 870 lbs. / vt. ft

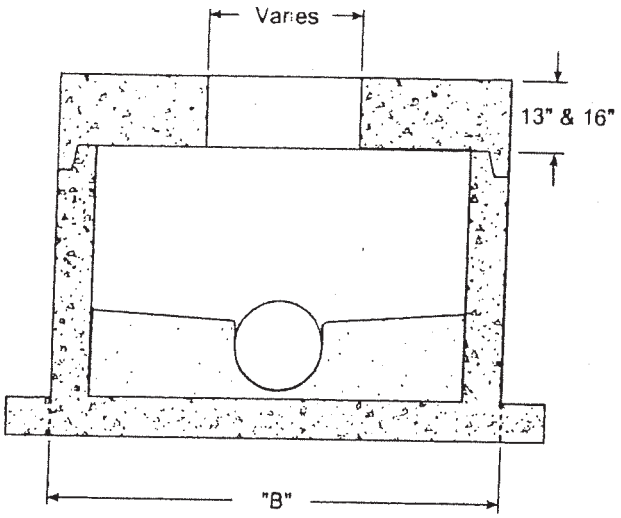
★ - Extended base is available to meet local requirements.

In the event a boot is loose contact your Hanson representative to resolve.

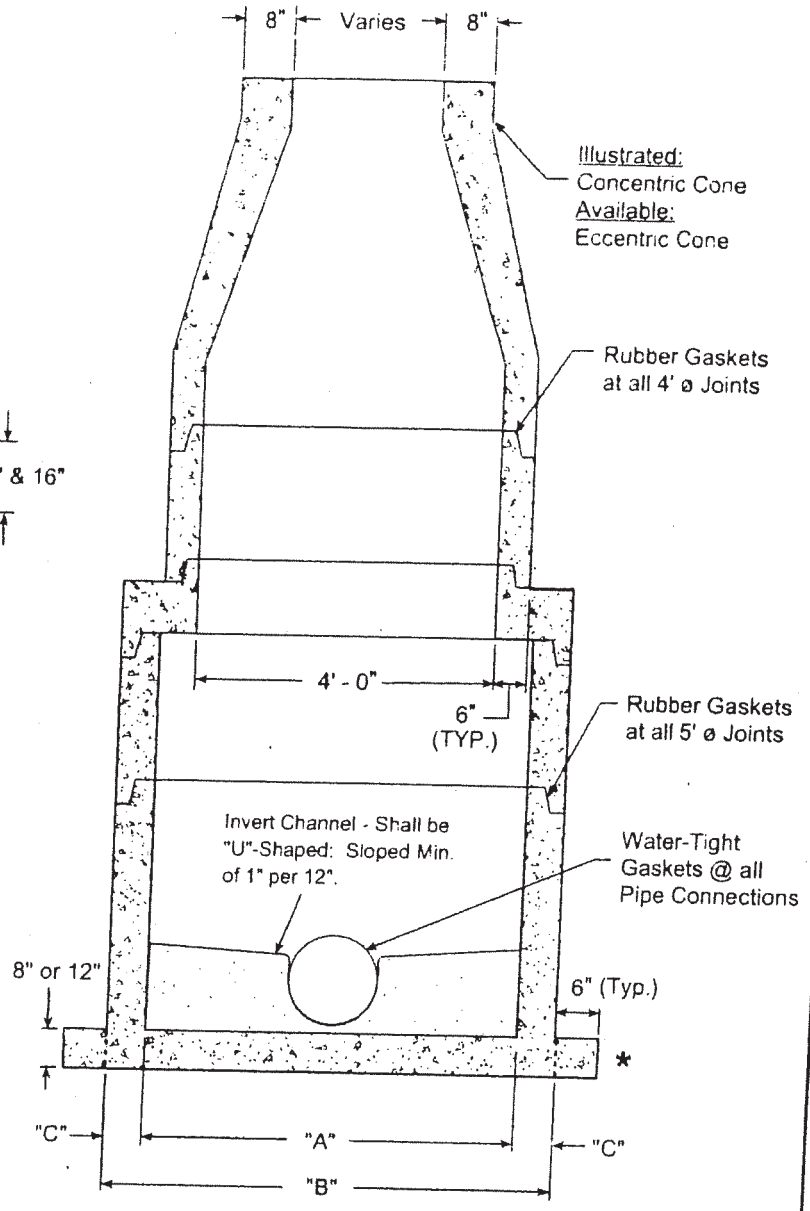
"Manufactured to your specifications."

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

TITLE	PLANT	STATE	SECTION/PAGE	DATE	
4' I.D. Manhole **Regular Base w/ Reducing Cone**	All Plants	TX	5.5	08-15-06	Hanson



Flattop Illustration
for Shallow Manhole



Section View
5'/4' & 6'/4' I.D. Manhole
Extended Base with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: for 5' I.D. max diameter = 40"
for 6' I.D. max diameter = 54"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert:
for 5' I.D. = 7,500 lbs.
for 6' I.D. = 10,600 lbs.
Estimated weight of riser and sections:
for 5' I.D. = 1,325 lbs. / vt. ft.
for 6' I.D. = 1,800 lbs. / vt. ft.
For pipe sizes 15" and larger, invert shall be equal to the larger pipe diameter.
* - Extended base shown: Regular base also available."
In the event a boot is loose contact your Hanson representative to resolve.

"Manufactured to your specifications."

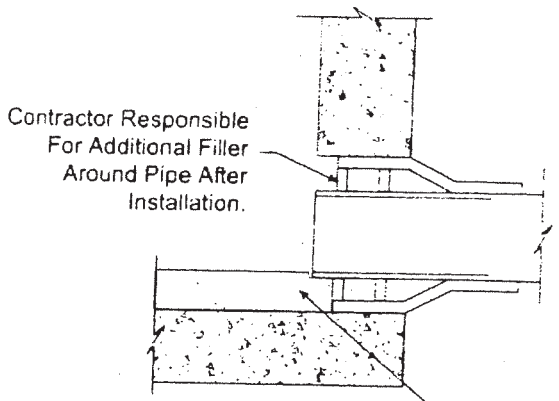
Pipe Size	I.D. "A"	O.D. "B"	Wall Thk "C"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

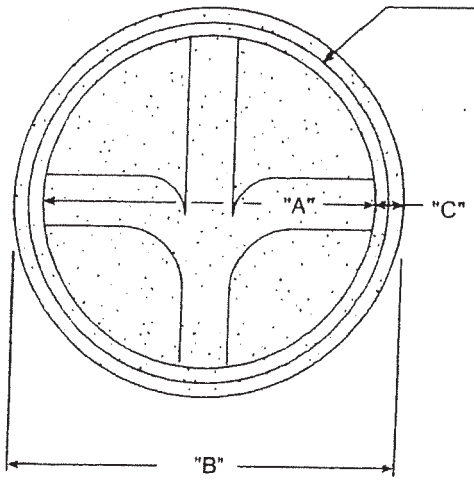
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION/PAGE	DATE
5'/4' & 6'/4'I.D. Manhole **Extended Base w/Reducing Cone**	All Plants	TX	5.6	08-15-06

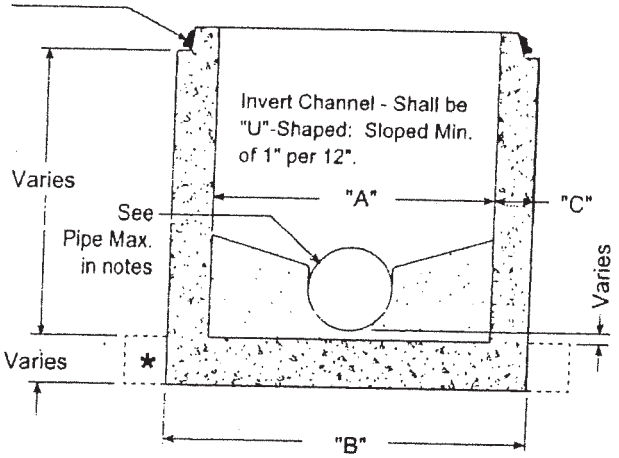
Hanson

For Pipe Entering the Manhole at Excessive Depths Above the Flow Line Out, the Contractor May be Responsible for Grout Work Necessary to Bring Channel up to Flow Line on Inlet Pipe.





Plan View



Section View

Materials & Features

HOLES AS SPECIFIED:
- For 4' I.D. max. diameter = 32"
- For 5' I.D. max. diameter = 40"
- For 6' I.D. max. diameter = 54"

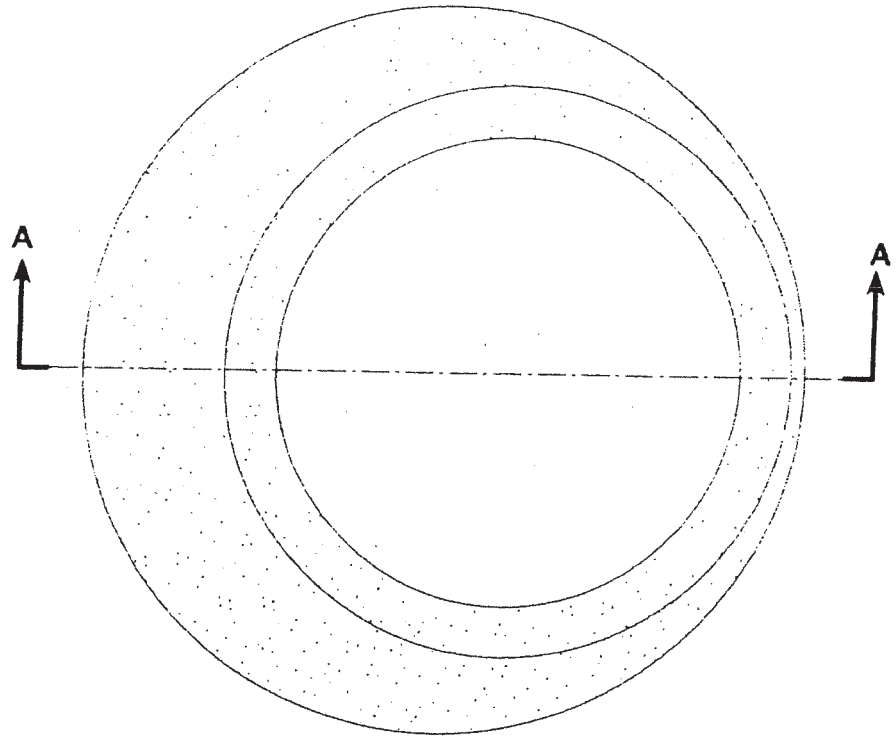
CONCRETE: 5,000 PSI, 28 day strength
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs
Water-tight gaskets at all pipe connections.
* - Regular base shown: Extended base also available.
In the event a boot is loose contact your Hanson representative to resolve.

Pipe Size	I D "A"	O D "B"	Wall Thk "C"
4'	4' - 0"	4' - 10"	5"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

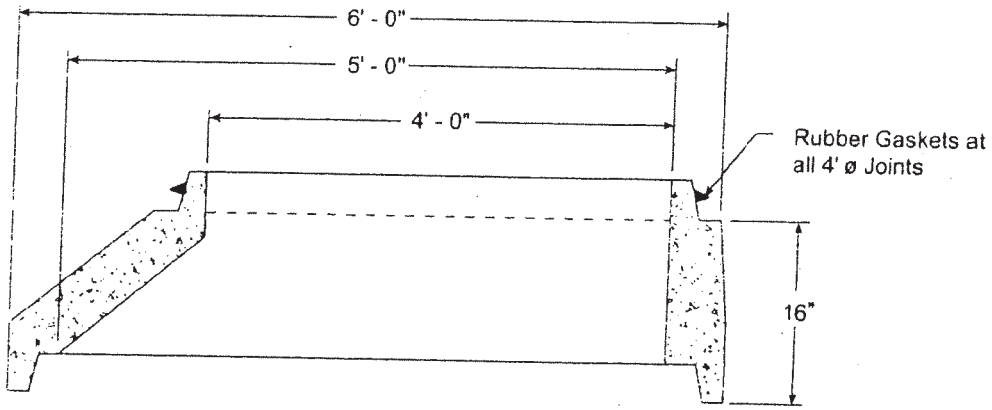
-No Scale-
All dimensions subject to allowable specification tolerances

TITLE	PLANT	STATE	SECTION,PAGE	DATE
Details: 4', 5' & 6' I.D. Precast Regular Manhole Base	All Plants	TX	5.7	08-15-06

Hanson



Plan View



Section View

Materials & Features

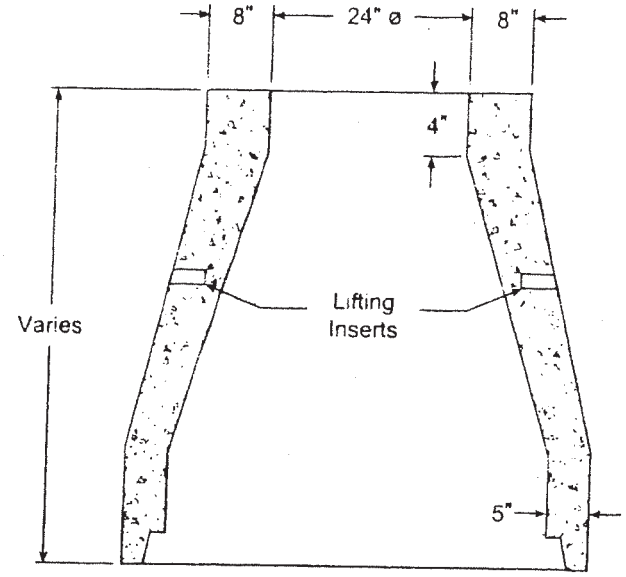
CONCRETE. 5,000 PSI. 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
CONSTRUCTION OF PRECAST is in accordance with ASTM C478.
Concrete is poured according to ACI-500.

-No Scale-
All dimensions subject to allowable specification tolerances

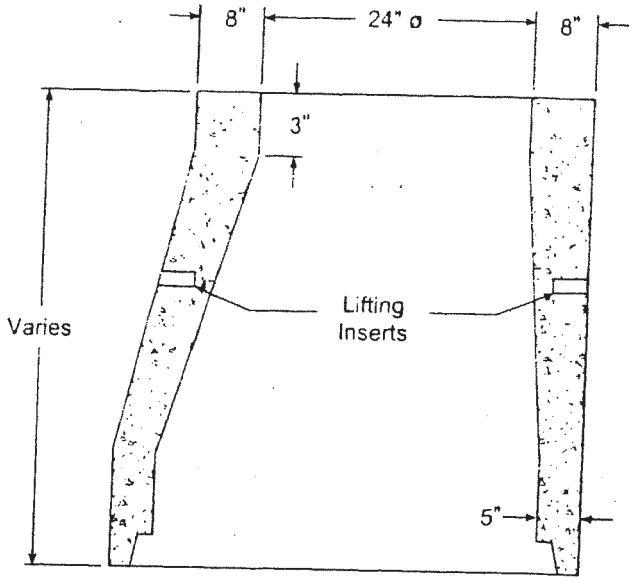
TITLE	PLANT	STATE	SECTION.PAGE	DATE
5' x 4' Conical Adaptor	Waco	TX	5 8	08-15-06

Hanson

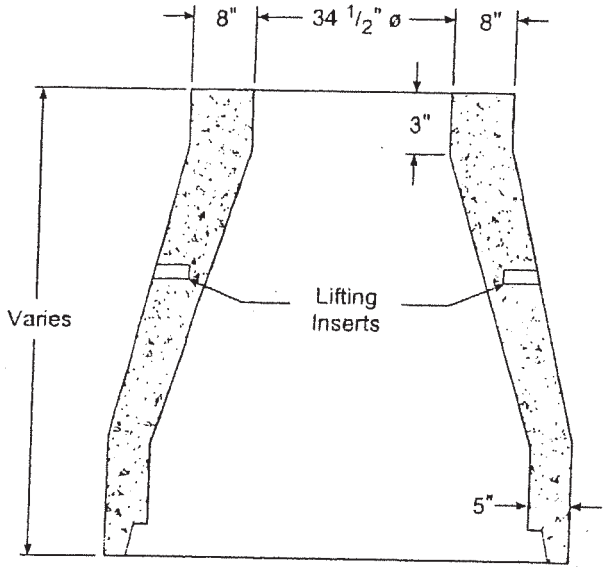
Precast Manholes



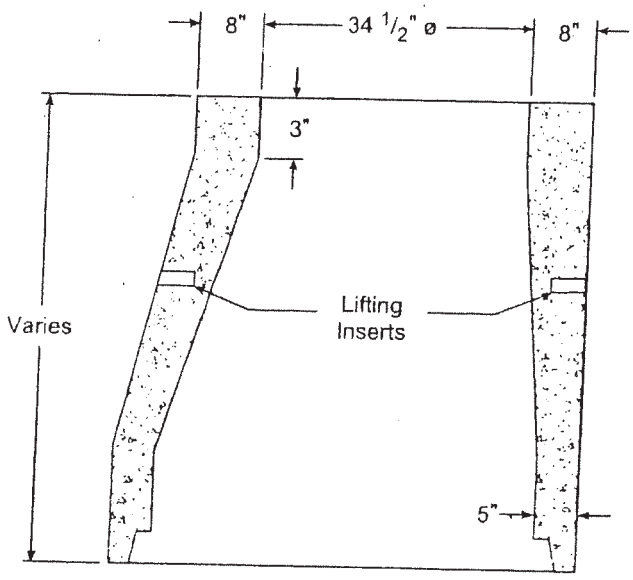
Concentric Cone
24" ø Opening



Eccentric Cone
24" ø Opening



Concentric Cone
34 1/2" ø Opening



Eccentric Cone
34 1/2" ø Opening

Materials & Features

CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
30" ø also available in North Texas.

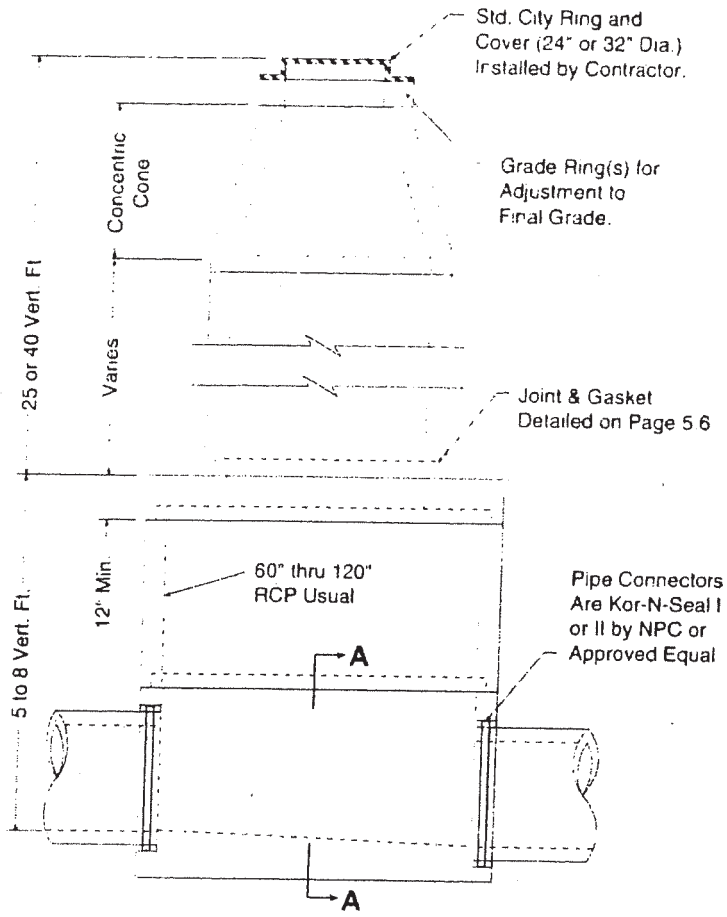
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION/PAGE	DATE
Hanson 48" Manhole Reducing Cone Detail	Waco Houston	TX	5.9	08-15-06

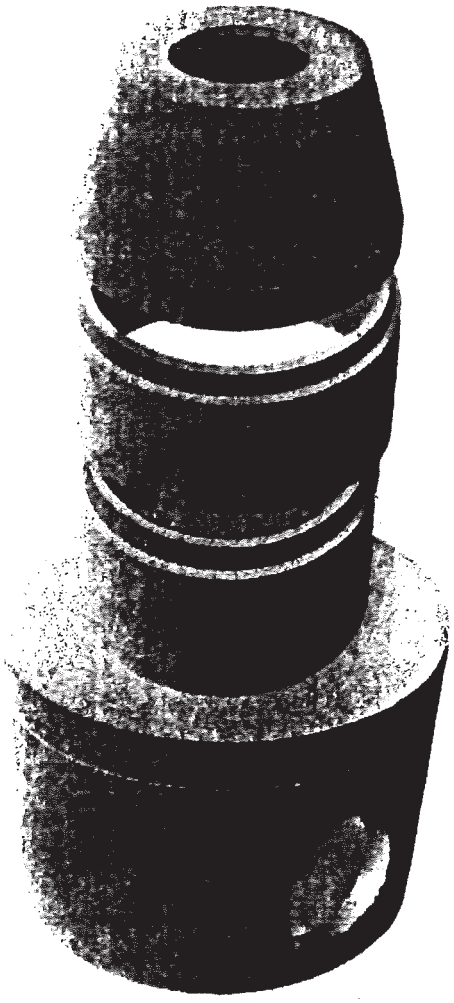
Hanson

Contact Hanson | Go to Index | EXIT

Precast Manholes



w/ Precast Base



Isometric View

Section A-A

Base Slab Reinforcing

30' Deep Structure
60"ø - 6" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 8" Thick Slab min. - #5 @ 6" ea.way
96"ø - 10" Thick Slab min. - #5 @ 6" ea.way

45' Deep Structure
60"ø - 8" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 10" Thick Slab min. - #5 @ 6" ea.way
96"ø - 12" Thick Slab min. - #5 @ 6" ea.way

All Reinforcing has 1 1/2" cover from top of slab.

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615, Grade 60.

REINFORCING to meet AASHTO HS 20-44 Loading.

DESIGN EQUAL TO OR EXCEEDS ASTM C-478

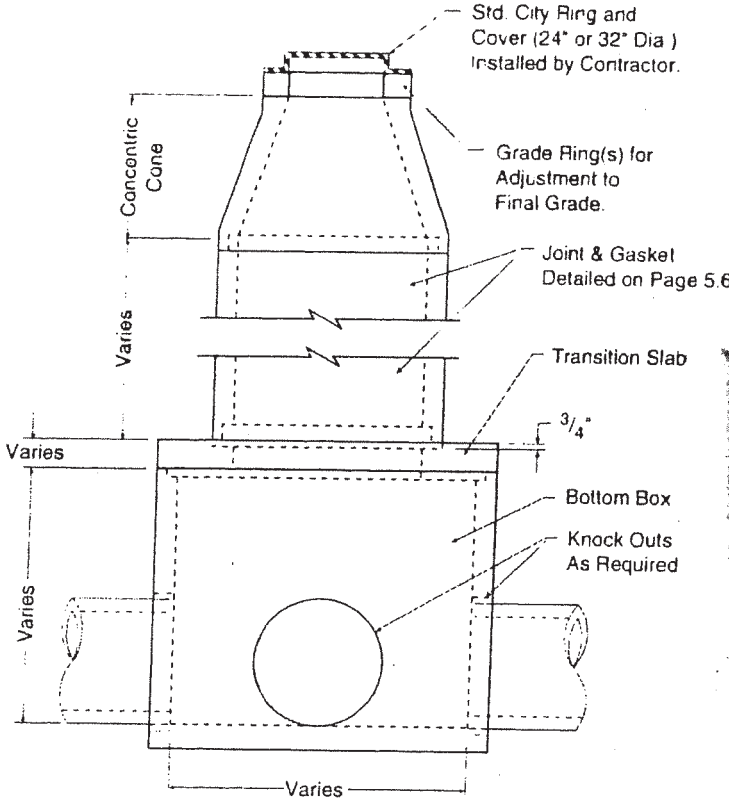
In the event a boot is loose contact your Hanson representative to resolve.

Note:

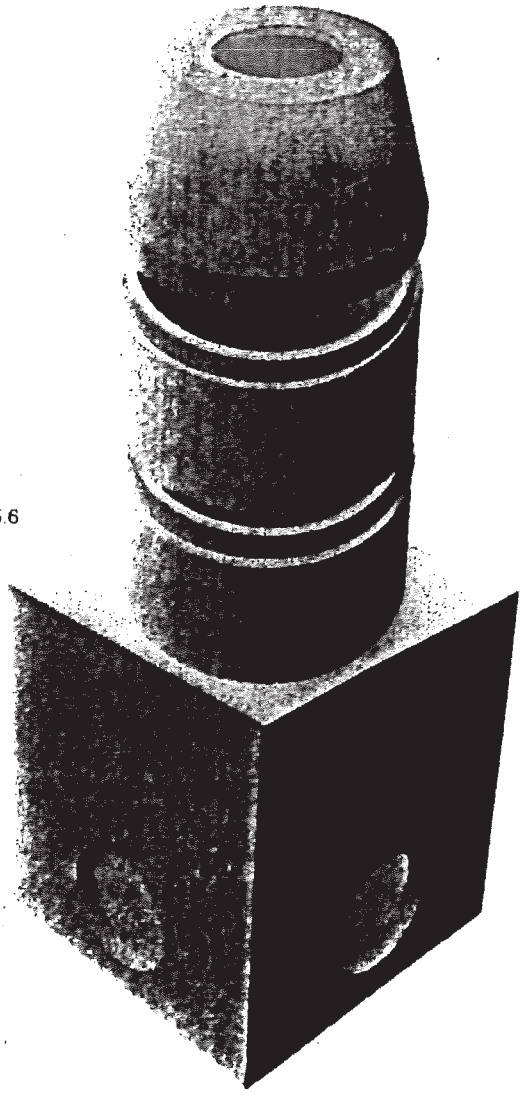
- Inverts shall be specifically sized for connecting pipes; and shall be U-Shaped with the min. depth 3/4 of the largest pipe diameter.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
30 & 45 Ft. Depth 60" thru 96"Large Base Manhole	Houston San Antonio	TX	5.10	08-15-06	Hanson



Side View



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

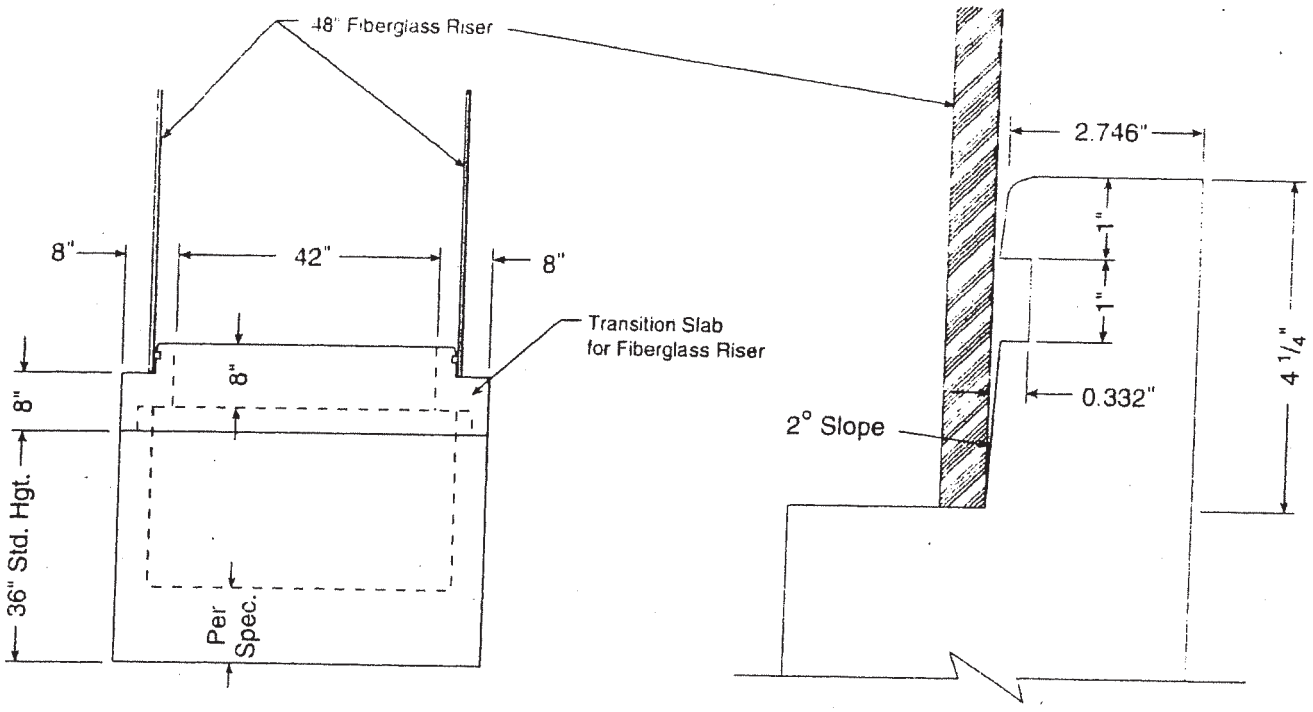
BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

In the event a boot is loose contact your Hanson representative to resolve.

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

TITLE	PLANT	STATE	SECTION/PAGE	DATE	
Type "C" Manhole	Houston San Antonio	TX	5.11	08-15-06	Hanson



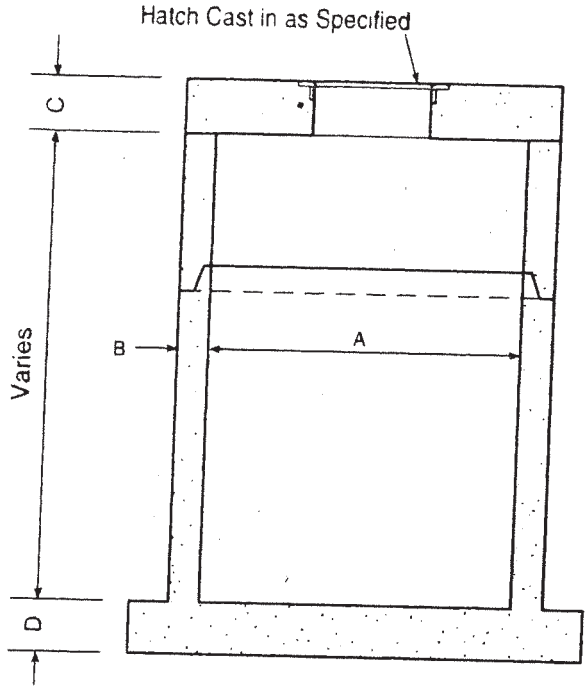
Profile **Joint Detail**

Materials & Features

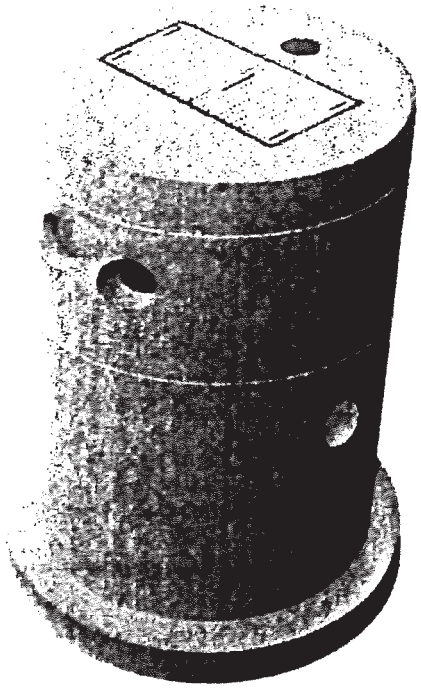
CONCRETE: 5,000 PSI in 28 days.
REINFORCING STEEL: per ASTM A-615, Grade 60.
REINFORCING to meet AASHTO HS 20-44 Loading.
DESIGN EQUAL TO OR EXCEEDS ASTM C-478

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

TITLE	PLANT	STATE	SECTION/PAGE	DATE	
ASTM C-478 Special Base	Houston	TX	5.12	08-15-06	Hanson



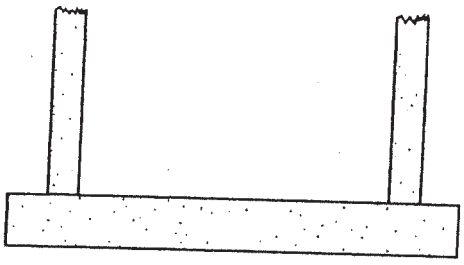
Section View
(Base configuration for 60", 72" & 84")



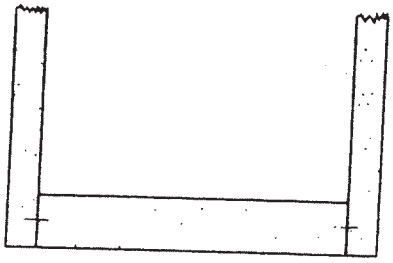
Isometric View

Product Dimensions			
A	B	C	D
60"			
72"			
84"			
96"			
108"			
120"			
132"			
144"			

Contact your local Hanson representative for product dimensions.



Section View
Base configuration for 96"



Section View
Base configuration for 108"-144"

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

(A). Hatches as specified by Engineer.

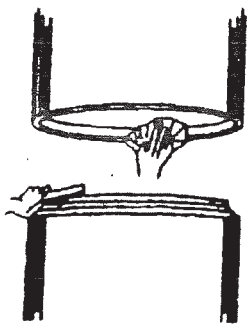
In the event a boot is loose contact your Hanson representative to resolve.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE
Typical Wetwells - Various Diameters	All Plants	TX	5.13	08-15-06

Hanson

① "O"-Ring Gasket

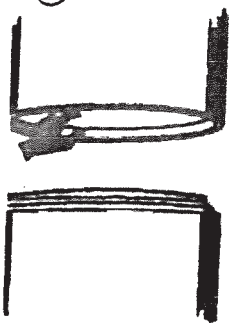


Carefully clean all dirt & foreign objects from the joining surface of the bell or groove end of pipe.

Carefully clean spigot or tongue end of pipe, including the gasket recess. Inspect the bell and spigot ends of each section to make sure they are free from cracks, chips or voids that will interfere with gasket.

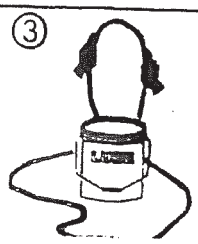
Improperly prepared bell and spigot surfaces may prevent homing of the pipe or keep the gasket from sealing.

②



Lubricate bell joint surface liberally, covering entire inside surface using proper pipe gasket lubricant.

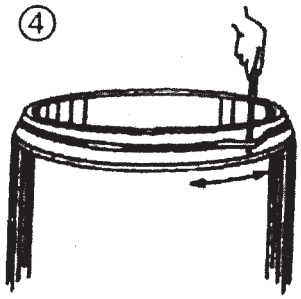
③



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

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

④

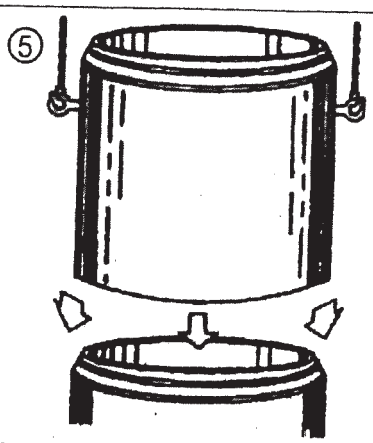


****IMPORTANT****

Fit the gasket carefully, equalizing the rubber gasket stretch by running a smooth, round object (inserted between the gasket & 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 & spigot to be joined. Before homing the joint, check that the gasket is in contact with the bell end entrance taper around the entire circumference.

Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.

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

Profile Gasket

1. Manhole sections should be handed with extreme caution to avoid chipping of the bell or spigot ends. Proper lifting devices must be used on all sections.
2. Inspect gasket sealing area for any voids or rough edges that may interfere with the seal.
3. Place the 4-G Gasket in the step of the spigot. (Making sure that the pointed end of the gasket is toward the end of the pipe as shown in Fig A.)
4. ****IMPORTANT**** Equalize the stretch on the gasket by pulling the sealing lube away from the spigot at least one inch and then releasing the gasket. Repeat this every three or four inches around the circumference of the pipe. Equalization of stretch makes sure that the gasket has the same stretched cross-section and tension throughout. **Do not lube the gasket or spigot end of the pipe.**
5. Remove all dirt and other foreign matter from the inside surface of the bell. Apply lube to the inner surface of the bell including the lead-in taper surface on the outer edge of the bell. Align spigot with the bell. Gasket should touch lead-in taper around the entire circumference before pushing the pipe home.
6. Push the manhole section carefully, until the spigot is all the way home. (Fig B) Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.
7. Every manhole will not come home exactly the same. Differences in application, consistency of lubricants, dimensions in the spigot and groove will cause variations in installation. If joining problems arise, please contact the manhole manufacturer immediately rather than forcing manhole sections together with subsequent damage to the manhole.
8. All testing should be performed prior to backfill of the manhole. Problems can not be detected after the manhole is backfilled. **Testing the manhole after backfill voids all warranties.**

Fig. A

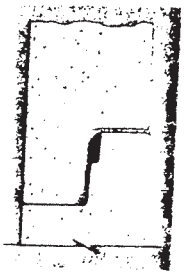
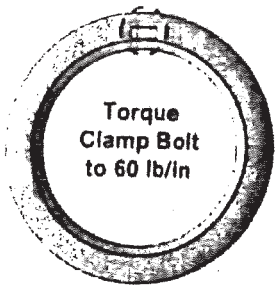


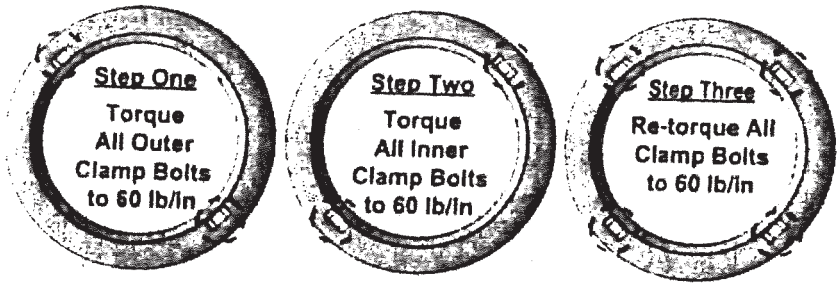
Fig. B

Note: Manholes in excess of 30' in depth must be vacuum tested prior to backfill. The loads presented by soils and possible groundwater at 30' in addition to the load from the vacuum may exceed the design capacity of the pipe to manhole connector.

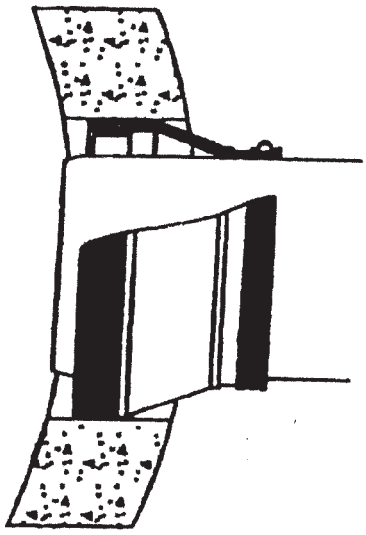
TITLE	PLANT	STATE	SECTION.PAGE	DATE	
O-Ring & Profile Gasket Installation on Manholes	All Plants	TX	5.14	08-15-06	Hanson



Single Clamp



Multiple Clamps

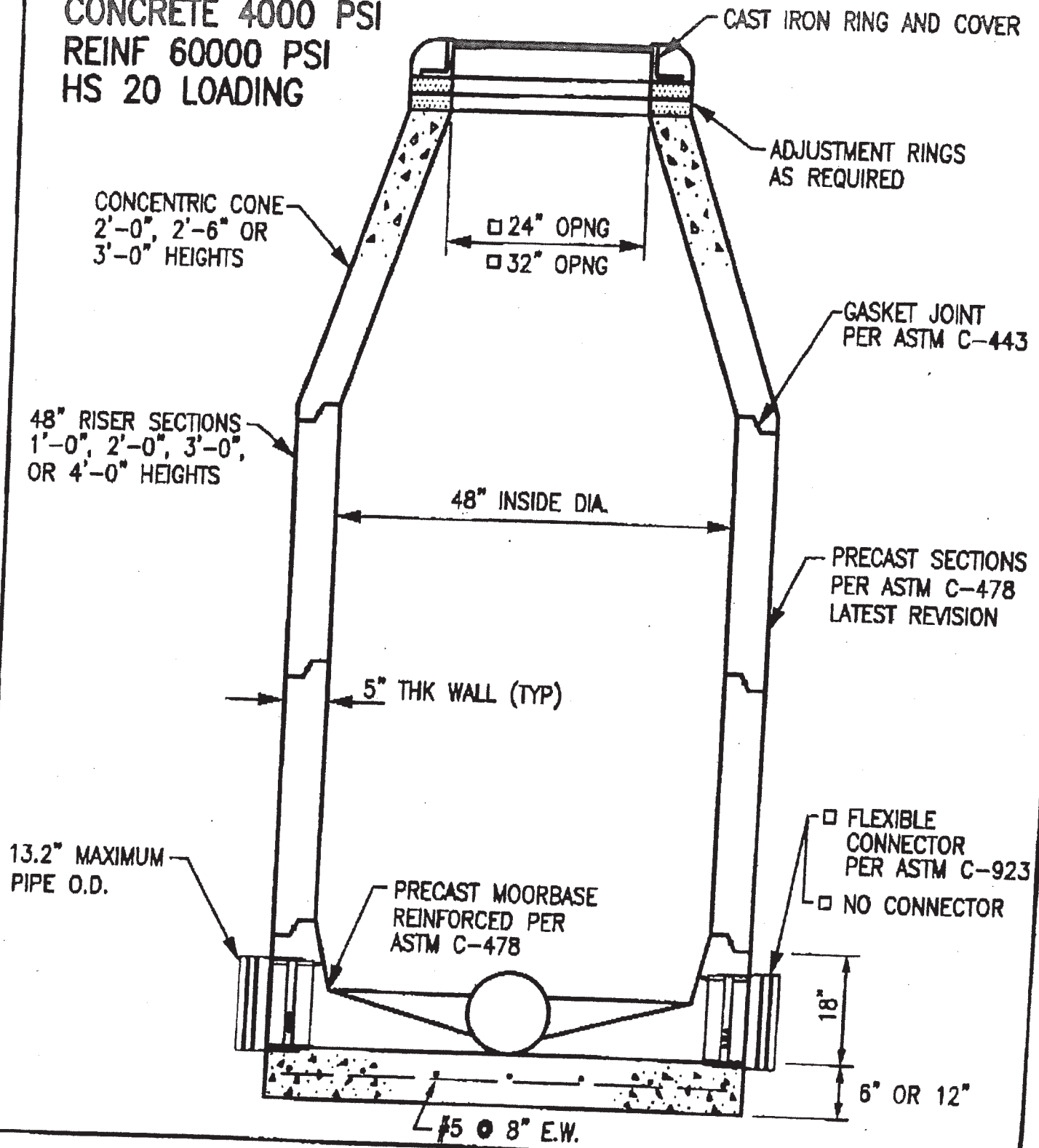


Instructions

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 is at least equal to the inside plane of the manhole.
4. Attach take-up clamps(s) and stagger screw(s) of clamps(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 equal compression of all clamps.
7. If system is to be tested, testing shall be completed prior to backfilling, following all recommendations and requirements of the test system manufacturer. Vacuum testing shall be conducted in accordance with ASTM C-1244.
8. Adjust pipe to line and grade. Use proper bedding, backfill materials and techniques so that pipe deflection and deformation is minimized.
9. Any pipe stubs installed in the manhole must be positively restrained from movement.
10. Vacuum testing after backfill voids warranty.

For more information contact yor local Hanson Representative.

CONCRETE 4000 PSI
REINF 60000 PSI
HS 20 LOADING



Rinker MATERIALS Moor-Tex
2735 HWY. 36 NORTH
MAILING: P.O. BOX 1088
SEALY, TEXAS 77474
PH: (979) 885-7403
(281) 375-6121
FAX:(979) 885-7001

REV.	DESCRIPTION	DATE
DATE: 8-09-02	SCALE: 3/4"=1'-0"	BY: RB

48" PRECAST CONCENTRIC MANHOLE WITH MOORBASE

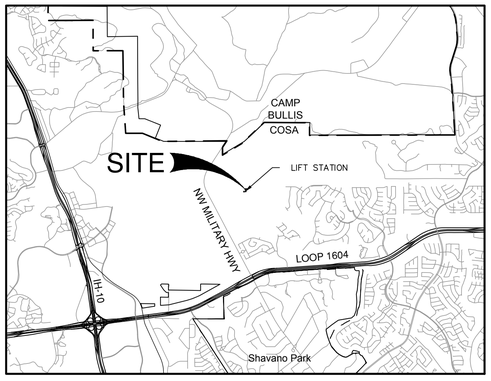
JOB: 2002 FILE: 48CM DWG. NO. 48CM

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

BEXAR COUNTY, TEXAS

CIVIL CONSTRUCTION PLANS

SAWS JOB. 23-3000



LOCATION MAP
NOT-TO-SCALE

SHEET INDEX

BITTERBLUE, INC.
11 LYNN BATTS LANE, SUITE 100
SAN ANTONIO, TEXAS 78218

MARCH 2024

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

STATE OF TEXAS
KIM KEEFER
117746
LICENSED
PROFESSIONAL ENGINEER
11/22/23

SHEET C0.00

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" SS, 135 LF-8" SS PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

SAWS JOB NO. 23-3000 CORNERSTONE LIFT STATION #2 AND FORCE MAIN - 1293400

Date: Mar 18, 2024, 9:32am User ID: eloughlin
File: P:\129\3A\00\Design\Civil\LS\CS-1293400.dwg

SAWS GENERAL CONSTRUCTION NOTES

GENERAL SECTION:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

   A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.
   B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE."
   C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION."
   D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR CONSTRUCTION."
   E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).

2. THE CONTRACTOR SHALL OBTAIN SAWS STANDARD DETAILS FROM SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN DESIGN PLANS.

3. THE CONTRACTOR IS TO NOTIFY AND MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500, AND PROVIDE NOTIFICATION PROCEDURES THE CONTRACTOR WILL USE TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 72 HOURS PRIOR TO EXCAVATION.

4. LOCATIONS AND DEPTHS OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

5. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

   SAN ANTONIO WATER SYSTEM:
   SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES

   COSA DRAINAGE 210-207-8048
   COSA TRAFFIC SIGNAL OPERATIONS 210-207-7720
   TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION AS A RESULT OF DAMAGES DONE BY THE PROJECT'S CONSTRUCTION.

7. ALL WORK IN TEXAS HIGHWAY DEPARTMENT AND BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT.

8. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

9. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

10. ANY WORK COMPLETED WITHOUT PRIOR WRITTEN AUTHORIZATION WHICH IS NOT INCLUDED IN THESE PLANS AND SPECIFICATIONS WILL NOT BE COMPENSATED BY THE SAN ANTONIO WATER SYSTEM.

11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG. ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. PRE CON SITE VIDEO: BEFORE THE START OF ANY CONSTRUCTION. THE SITE MUST BE VIDEO RECORDED BY THE CONTRACTOR WITH ONE COPY SUBMITTED TO SAWS INSPECTIONS. A PRE-SITE VIDEO WILL PROVIDE ACCURATE DOCUMENTATION OF THE EXISTING CONDITIONS (NSPI).

13. POWER POLE BRACING: CONTRACTORS SHOULD BE ADVISED THAT THERE ARE EXISTING OVERHEAD UTILITY POLES ALONG THE PROJECT CORRIDOR. CONTRACTORS SHOULD FURTHER BE ADVISED THAT IF THE DISTANCE FROM THE OUTSIDE FACE OF A UTILITY TRENCH TO THE FACE OF A UTILITY POLE IS LESS THAN 5 FEET, SAID UTILITY POLE IS SUBJECT TO BRACING, BASED ON A DETERMINATION MADE BY UTILITY POLE OWNER. COSTS INCURRED BY CONTRACTOR FOR BRACING OF THESE UTILITY POLES IS SUBSIDIARY TO THAT RESPECTIVE UTILITY COMPANY'S WORK. IT IS ADVISABLE FOR THE CONTRACTOR TO REVIEW THE CONSTRUCTION DOCUMENTS, AND VISIT THE CONSTRUCTION SITE TO DETERMINE POTENTIAL IMPACTS.

14. CONSTRUCTION SEQUENCING: IT IS THE CONTRACTOR SOLE RESPONSIBILITY TO SCHEDULE SEQUENCING FOR REMOVAL AND INSTALLATION OF EXISTING AND PROPOSED SAWS UTILITIES IN CONJUNCTION WITH GENERAL PROJECT CONSTRUCTION. SEQUENCE OF CONSTRUCTION ACTIVITIES SHALL BE CONSIDERED IN ORDER TO MINIMIZE THE EXTENT AND DURATION OF DISTURBANCES.

SEWER SECTION:

15. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:

   A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT 210-704-SAWS (210-704-7297). PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.
   B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.
   C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.
   D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) ND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.
   E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.
   F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS.

SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA.

NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.

19. THE CONTRACTOR SHALL PROVIDE BYPASS PUMPING OF SEWAGE AROUND EACH SEGMENT OF PIPE TO BE REPLACED, IN ACCORDANCE WITH SAWS SPECIAL SPECIFICATION ITEM NO. 864-S1, "BYPASS PUMPING SMALL DIAMETER SANITARY SEWERS" AND ITEM NO. 864-S2, "BYPASS PUMPING LARGE DIAMETER SANITARY SEWERS". PAYMENT FOR SUCH WORK WILL BE MADE UNDER THE BID ITEM "SANITARY SEWER (BYPASS PUMPING)" (LUMP SUM) AS PER SAWS SPECIAL SPECIFICATION.

20. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500 AND/OR SAWS PRODUCTION GROUPS AT LEAST ONE WEEK OR MORE IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.

21. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECTS IMPROVEMENTS (NSPI).

22. SMART MANHOLE COVERS: THE CONTRACTOR SHALL NOTIFY JUAN C. RAMIREZ AT 210-233-3558 AND SAWS EOC AT 210-704-SAWS (210-233-7297) A MINIMUM OF 72 HOURS, NOT COUNTING WEEKENDS OR SAWS HOLIDAYS, BEFORE WORKING ON THE PIPE OR MANHOLE, IN ORDER TO HAVE SAWS REMOVE THE SMART COVER. ANY DAMAGE DONE TO THE SMART COVER WILL BE CHARGED TO THE CONTRACTOR THROUGH A CHANGE ORDER.

CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS

I. WHERE A SEWER MAIN CROSSES OVER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE (9) FEET, ALL PORTIONS OF THE SEWER MAIN WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED USING 160 PSI PRESSURE RATED HDPE AND JOINED WITH EQUALLY PRESSURE RATED PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 160 PSI PRESSURE RATED PIPE AT LEAST EIGHTEEN (18) FEET IN LENGTH MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM.)

II. WHERE A SEMI-RIGID OR RIGID SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET BUT GREATER THAN TWO FEET, THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF THE SEWER WITHIN NINE FEET OF THE WATER MAIN.

III. WHERE A SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN TWO FEET, THE SEWER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON OR C900 PVC PIPE WITH A MINIMUM PRESSURE RATING OF 160 PSI WITHIN NINE FEET OF THE WATER MAIN, SHALL BE PLACED NO CLOSER THAN SIX (6") INCHES BETWEEN OUTER DIAMETERS, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE OF A LENGTH GREATER THAN EIGHTEEN (18) FEET MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM)

IV. WHERE A SEWER MAIN PARALLELS A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET, THE SEWER MAIN SHALL BE BELOW THE WATER MAIN, SHALL BE CONSTRUCTED OF DUCTILE IRON OR C900 PVC PIPE WITH A MINIMUM PRESSURE RATING OF 160 PSI FOR BOTH PIPE AND JOINTS FOR A DISTANCE OF NINE FEET BEYOND THE POINT OF CONFLICT, SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE BETWEEN OUTER DIAMETERS OF TWO FEET VERTICALLY AND FOUR FEET HORIZONTALLY, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL.

V. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED ANY CLOSER THAN NINE FEET TO WATER MAINS.

ADDITIONAL GENERAL NOTES

1. PROJECT SPECIFICATIONS TAKE PRECEDENCE OVER PROJECT PLANS. SPECIAL CONDITIONS TAKE PRECEDENCE OVER SPECIFICATIONS AND PLANS. ADDENDUMS TAKE PRECEDENCE OVER ALL.

2. CONTRACTOR IS RESPONSIBLE FOR ALL SITE SAFETY CONSIDERATIONS.

EXCAVATION

1. 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. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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 EXCAVATION.

2. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS UPON PROJECT COMPLETION. THE CONTRACTOR SHALL NOT PERMANENTLY PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.

3. WATER JETTING THE BACKFILL WITHIN A STREET WILL NOT BE PERMITTED. EXPLOSIVES AND BLASTING ARE NOT PERMITTED.

SUPPLEMENTARY NOTES

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR OBTAINING ALL PERMITS.

2. ALL WORK IN THE 100 YEAR FLOODPLAIN SHALL BE ACCOMPLISHED UNDER AN APPROVED FLOODPLAIN PERMIT.

3. CONTRACTOR SHALL PROTECT OR REMOVE AND REPLACE ALL TRAFFIC SIGNS (NSPI).

4. CONTRACTOR SHALL PROTECT OR REMOVE AND REPLACE ALL MAILBOXES (NSPI).

5. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER IN ADVANCE OF ANY WORK IN THE OWNERS' PROPERTY.

STORM WATER PROTECTION AND EROSION CONTROL NOTES

1. CONTRACTOR SHALL PROVIDE HIS/HER OWN STORM WATER POLLUTION PREVENTION PLAN (SW3P).

2. CONTRACTOR SHALL INSTALL STORM WATER POLLUTION PREVENTION STRUCTURES INCLUDING BUT NOT LIMITED TO, SILT FENCING AND/OR ROCK BERMS IN ALL AREAS TO BE IMPACTED BY CURRENT AND ONGOING CONSTRUCTION AND MAINTAIN SUCH STRUCTURES UNTIL SUITABLE GROUNDCOVER/REVEGETATION IS ACCEPTED. ALL STORM WATER POLLUTION PREVENTION STRUCTURES SHALL BE CONSTRUCTED WITHIN THE COUNTY RIGHT-OF-WAY AND WATER LINE EASEMENTS. ANY FEATURES ON THE PLANS SHOWN OUTSIDE THESE AREAS ARE SHOWN FOR VISUAL CLARITY ONLY.

3. THE LOCATION OF ANY BEST MANAGEMENT PRACTICES (B.M.P.'S) SUCH AS SILT FENCING, ROCK BERMS, STABILIZED CONSTRUCTION ENTRANCE/EXIT, ETC. THAT MAY BE SHOWN ON THESE PLANS ARE SUBJECT TO FIELD VERIFICATION. CONTRACTOR SHALL ADJUST THE LOCATIONS OF B.M.P.'S TO BEST ACCOMMODATE THE CONDITIONS AND TOPOGRAPHY ENCOUNTERED DURING CONSTRUCTION. QUESTIONS REGARDING THE PLACEMENT AND/OR CHANGES CONCERNING B.M.P.'S SHALL BE REFERRED TO THE OWNER AND THE COUNTY. THE CONTRACTOR IS TO ENSURE THAT SEDIMENTATION AND EROSION WILL BE CONTAINED WITHIN THE PROJECT WORK AREAS AND KEPT OFF ROADWAYS AND ADJACENT PROPERTIES AND OUT OF DRAINAGE CHANNELS AND WATER COURSES.

HAULING AND STORAGE

- HAULING AND/OR TEMPORARY STORAGE OF EQUIPMENT AND MATERIALS MAY BE NECESSARY, INCLUDING EXCAVATED MATERIAL AND SPOILS. CONTRACTOR SHALL INCLUDE IN HIS BID PRICE ALL COSTS ASSOCIATED WITH HAULING AND OFF-SITE STORAGE OF ALL MATERIALS AND/OR EQUIPMENT. ALSO REFER TO THE PROJECT SPECIFICATIONS.

EXISTING IMPROVEMENTS

- ALL EXISTING IMPROVEMENTS WITHIN THE PROJECT AREA, WHICH ARE NOT COVERED UNDER THE UNIT PRICE BID PROPOSAL, SHALL BE PROTECTED OR REMOVED AND REPLACED TO EXISTING CONDITION OR BETTER AT NO ADDITIONAL COST TO THE OWNER.

TREE PROTECTION NOTES

1. CONTRACTOR TO PROTECT ALL TREES WHEREVER POSSIBLE. DAMAGE TO TREES IDENTIFIED TO BE PROTECTED WILL BE MITIGATED AT THE CONTRACTOR'S SOLE EXPENSE. ALSO, ALL WORK IN PUBLIC RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH THE CONTROLLING ENTITIES STANDARDS, SPECIFICATIONS AND PERMIT REQUIREMENTS.

2. PROTECT EXISTING TREES SIX INCH (6") DIAMETER AND LARGER. ALL TREES TO BE PRESERVED AS PART OF THE PROJECT SHALL BE PROTECTED AGAINST INJURY OR DAMAGE, INCLUDING CUTTING, SOIL COMPACTION, BREAKING OR SKINNING OF ROOTS, TRUNKS, OR BRANCHES DURING CONSTRUCTION OPERATIONS BY FENCING AS DESCRIBED BELOW. THE TREE PROTECTION SHALL BE PLACED BEFORE ANY EXCAVATION OR GRADING IS BEGUN AND MAINTAINED FOR THE DURATION OF THE CONSTRUCTION WORK. PROTECTION WILL ENCOMPASS THE ROOT PROTECTION ZONE WHICH WILL BE AT MINIMUM ONE FOOT (1.0') RADIUS PER INCH DIAMETER OF THE TREE TRUNK AT 4.5' ABOVE GROUND. NO MATERIAL SHALL BE STORED OR CONSTRUCTION OPERATION SHALL BE CARRIED ON WITHIN THE TREE PROTECTION FENCING, UNLESS AUTHORIZED BY THE OWNER. THE PROTECTION SHALL REMAIN UNTIL ALL WORK IS COMPLETED.

3. NO CONSTRUCTION ACTIVITIES SHALL BE PERFORMED WITHIN 5' FROM THE TRUNK OF A TREE THAT IS PROTECTED. TRENCH SHORING WILL BE REQUIRED INSIDE OF A ROOT PROTECTION ZONE. THE ROOT PROTECTION ZONE IS CALCULATED AS A RADIUS FROM THE TREE TRUNK EQUAL TO ONE FOOT PER DIAMETER INCH OF THE TREE.

4. THIS PROJECT IS SUBJECT TO REGULATIONS ESTABLISHED BY THE CITY OF SAN ANTONIO TREE ORDINANCE.

TEMPORARY LIVESTOCK CONTROL

- WHEN WORKING IN AN AREA WITH LIVESTOCK, THE CONTRACTOR SHALL INSTALL AND MAINTAIN (AT CONTRACTOR'S EXPENSE) THE NECESSARY TEMPORARY FENCING TO KEEP THE LIVESTOCK FROM EXITING THE AREA. ANY ESCAPED LIVESTOCK WILL BE CAPTURED AND RETURNED TO THE AREA AT THE CONTRACTOR'S EXPENSE.

CONTRACTOR STAKING NOTE

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL CONSTRUCTION STAKING AND CUT SHEETS NECESSARY FOR THE CONSTRUCTION OF THE WATER MAIN AND ALL ASSOCIATED APPURTENANCES. ALL CONSTRUCTION SURVEY VERIFICATION AND CONSTRUCTION STAKING SHALL BE PERFORMED BY OR UNDER THE SUPERVISION OF A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR. THE DESIGN ENGINEER WILL, AT NO ADDITIONAL COST, PROVIDE A DIGITAL PROJECT FILE OF THE PROJECT'S HORIZONTAL AND VERTICAL CONTROL (MINIMUM OF THREE CONTROL POINTS) FOR THE CONTRACTOR. ALL COORDINATES ARE DISPLAYED IN STATE PLANE SURFACE VALUES.

FORCE MAIN NOTES

1. ALL FORCE MAIN PIPE MATERIAL SHALL CONSIST OF HDPE UNLESS OTHERWISE SHOWN ON THE PLANS. PIPE SHALL CONSIST OF HDPE SOLID WALL REFERRED TO AS DRISCO 1000, DRISCO 8600, QUALI PIPE, POLY PIPE, AND PLEXO PIPE THAT IS IN COMPLIANCE WITH ASTM F714. ALL PIPE FITTINGS SHALL BE HIGH DENSITY POLYETHYLENE PIPE AND MADE OF VIRGIN MATERIAL, AND SHALL HAVE A MINIMUM WORKING PRESSURE RATING 200 PSI. HIGH DENSITY POLYETHYLENE MATERIAL SHALL COMPLY WITH PE4710 POLYETHYLENE THAT SHALL MEET OR EXCEED THE REQUIREMENT OF THE ASTM 3350 CELL CLASSIFICATION OF PE445574C/E, TYPE III, GRADE PE47. SOLID WALL PIPE SHALL BE PRODUCED WITH A PLAIN END CONSTRUCTION FOR HEAT-JOINING (BUTT FUSION) CONFORMING TO ASTM 2620, PPI TR-33. NO FLANGED OR SLIP-ON JOINTS WILL BE ACCEPTED. SEE SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION, ITEM NO. 900: "RECONSTRUCTION OF SANITARY SEWER BY PIPE BURSTING/CRUSHING REPLACEMENT PROCESS", SECTION 900.2.1.

2. COLOR CODING OF FORCE MAIN PIPING METALLIC TAPE (6" WIDE MINIMUM) SHALL BE APPLIED TO ALL FORCE MAIN PIPE. THE METALLIC TAPE SHALL BE LABELED "SEWER PIPE". PIPE SHALL HAVE A MINIMUM OF THREE GREEN STRIPES POSITIONED IN SUCH A MANNER THAT THE STRIPE(S) ARE VISIBLE REGARDLESS OF THE ROTATION OF THE PIPE IN THE TRENCH.

3. ALL FORCE MAINS SHALL BE TESTED IN ACCORDANCE WITH 30 TAC 217.68 AT 50 PSI ABOVE THE NORMAL OPERATING PRESSURE OF THE FORCE MAIN.

4. MINIMIZE THE NUMBER OF PEAKS/VALLEYS ALONG THE FORCE MAIN PROFILE TO LIMIT THE ACCUMULATION OF GASES. ALL HIGH POINTS SHALL HAVE AN AIR AND VACUUM RELEASE VALVE RATED FOR RAW SEWAGE, AS SHOWN ON THE PLANS.

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

GENERAL NOTES

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C1.00

Date: Mar 18, 2024, 9:32am User ID: dloughlin
File: P:\12934\00\Design\Civil\LS\QN-12934001.dwg

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
ORGANIZED SEWAGE COLLECTION SYSTEM (SCS)
GENERAL CONSTRUCTION NOTES

1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROPOSED REGULATED PROJECT MUST BE PROVIDED WITH COPIES OF THE SCS PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

4. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED SCS APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF AN SCS APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

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

7. SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUST BE CAPPED WITH CONCRETE TO PREVENT SCOURING OF BACKFILL, OR THE SEWER LINES MUST BE ENCASED IN CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES.

8. BLASTING PROCEDURES FOR PROTECTION OF EXISTING SEWER LINES AND OTHER UTILITIES WILL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA. SAND IS NOT ALLOWED AS BEDDING OR BACKFILL IN TRENCHES THAT HAVE BEEN BLASTED. IF ANY EXISTING SEWER LINES ARE DAMAGED, THE LINES MUST BE REPAIRED AND RETESTED.

9. ALL MANHOLES CONSTRUCTED OR REHABILITATED ON THIS PROJECT MUST HAVE WATERTIGHT SIZE ON SIZE RESILIENT CONNECTORS ALLOWING FOR DIFFERENTIAL SETTLEMENT. IF MANHOLES ARE CONSTRUCTED WITHIN THE 100-YEAR FLOODPLAIN, THE COVER MUST HAVE A GASKET AND BE BOLTED TO THE RING. WHERE GASKETED MANHOLE COVERS ARE REQUIRED FOR MORE THAN THREE MANHOLES IN SEQUENCE OR FOR MORE THAN 1500 FEET, ALTERNATE MEANS OF VENTING WILL BE PROVIDED. BRICKS ARE NOT AN ACCEPTABLE CONSTRUCTION MATERIAL FOR ANY PORTION OF THE MANHOLE.

   THE DIAMETER OF THE MANHOLES MUST BE A MINIMUM OF FOUR FEET AND THE MANHOLE FOR ENTRY MUST HAVE A MINIMUM CLEAR OPENING DIAMETER OF 30 INCHES. THESE DIMENSIONS AND OTHER DETAILS SHOWING COMPLIANCE WITH THE COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON PLAN SHEET N/A.

   IT IS SUGGESTED THAT ENTRANCE INTO MANHOLES IN EXCESS OF FOUR FEET DEEP BE ACCOMPLISHED BY MEANS OF A PORTABLE LADDER. THE INCLUSION OF STEPS IN A MANHOLE IS PROHIBITED.

10. WHERE WATER LINES AND NEW SEWER LINE 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).

11. WHERE SEWERS LINES DEVIATE FROM STRAIGHT ALIGNMENT AND UNIFORM GRADE ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER: PP 819 TN (PLASTICS PIPE BULLETIN).

    IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: ASTM D2657.

    SPECIFIC CARE MUST BE TAKEN TO ENSURE THAT THE JOINT IS PLACED IN THE CENTER OF THE TRENCH AND PROPERLY BEDDED IN ACCORDANCE WITH 30 TAC §217.54.

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES.

    IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON PLAN SHEET N/A OF N/A, (FOR POTENTIAL FUTURE LATERALS). NOT USED. NO LATERALS SHALL BE CONNECTED TO THE LIFT STATION.

    THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET N/A OF N/A AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET N/A OF N/A, NOT USED. NO STUBOUTS WILL BE INSTALLED FOR THE LIFT STATION.

13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2) CLASSES A, B OR C.

14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).

15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. 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. TESTING METHOD WILL BE:
    (a) FOR A COLLECTION SYSTEM PIPE THAT WILL TRANSPORT WASTEWATER BY GRAVITY FLOW, THE DESIGN MUST SPECIFY AN INFILTRATION AND EXFILTRATION TEST OR A LOW-PRESSURE AIR TEST. A TEST MUST CONFORM TO THE FOLLOWING REQUIREMENTS:
        (1) LOW PRESSURE AIR TEST.
            (A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED IN AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) C-828, ASTM C-924, OR ASTM F-1417 OR OTHER PROCEDURE APPROVED BY THE EXECUTIVE DIRECTOR, EXCEPT AS TO TESTING TIMES AS REQUIRED IN TABLE C.3 IN SUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(ii) OF THIS PARAGRAPH.
            (B) FOR SECTIONS OF COLLECTION SYSTEM PIPE LESS THAN 36 INCH AVERAGE INSIDE DIAMETER, THE FOLLOWING PROCEDURE MUST APPLY, UNLESS A PIPE IS TO BE TESTED AS REQUIRED BY PARAGRAPH (2) OF THIS SUBSECTION.
                (i) A PIPE MUST BE PRESSURIZED TO 3.5 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE PRESSURE EXERTED BY GROUNDWATER ABOVE THE PIPE.
                (ii) ONCE THE PRESSURE IS STABILIZED, THE MINIMUM TIME ALLOWABLE FOR THE PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED FROM THE FOLLOWING EQUATION:

EQUATION C.3

$$T = \frac{0.085 \times D \times K}{Q}$$

WHERE:
T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS
K = 0.000419 X D X L, BUT NOT LESS THAN 1.0
D = AVERAGE INSIDE PIPE DIAMETER IN INCHES
L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET
Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE FOOT INTERNAL SURFACE

(C) SINCE A K VALUE OF LESS THAN 1.0 MAY NOT BE USED, THE MINIMUM TESTING TIME FOR EACH PIPE DIAMETER IS SHOWN IN THE FOLLOWING TABLE C.3:

PIPE DIAMETER (INCHES)	MINIMUM TIME (SECONDS)	MAXIMUM LENGTH FOR MINIMUM TIME (FEET)	TIME FOR LONGER LENGTH (SECONDS/FOOT)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.
(E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF A TESTING PERIOD, THEN THE TEST MUST CONTINUE FOR THE ENTIRE TEST DURATION AS OUTLINED ABOVE OR UNTIL FAILURE.
(F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.
(G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR.

(2) INFILTRATION/EXFILTRATION TEST.
(A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE.
(B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST WHEN PIPES ARE INSTALLED BELOW THE GROUNDWATER LEVEL.
(C) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE, OR AT LEAST TWO FEET ABOVE EXISTING GROUNDWATER LEVEL, WHICHEVER IS GREATER.
(D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH (C) OF THIS PARAGRAPH.
(E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER TO REDUCE THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION.

(b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:
(1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.
(A) MANDREL SIZING.
(i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS ASSOCIATION, UNI-BELL, OR AMERICAN NATIONAL STANDARDS INSTITUTE, OR ANY RELATED APPENDIX.
(ii) IF A MANDREL SIZING DIAMETER IS NOT SPECIFIED IN THE APPROPRIATE STANDARD, THE MANDREL MUST HAVE AN OD EQUAL TO 95% OF THE ID OF A PIPE. IN THIS CASE, THE ID OF THE PIPE, FOR THE PURPOSE OF DETERMINING THE OD OF THE MANDREL, MUST EQUAL BE THE AVERAGE OUTSIDE DIAMETER MINUS TWO MINIMUM WALL THICKNESSES FOR OD CONTROLLED PIPE AND THE AVERAGE INSIDE DIAMETER FOR ID CONTROLLED PIPE.
(iii) ALL DIMENSIONS MUST MEET THE APPROPRIATE STANDARD.
(B) MANDREL DESIGN.
(i) A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTIC MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
(ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS.
(iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER OF A PIPE.
(iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING.
(C) METHOD OPTIONS.
(i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.
(ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.
(iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOMETER OR A MANDREL WITH REMOVABLE LEGS OR RUNNERS ON A CASE-BY-CASE BASIS.
(2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL DEFLECTION.
(3) A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.
(4) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.
(5) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).
(6) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE PROBLEM AND CONDUCT A SECOND TEST AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS.

16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC §217.58.
    (a) ALL MANHOLES MUST PASS A LEAKAGE TEST.
    (b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR.
        (1) HYDROSTATIC TESTING.
            (A) THE MAXIMUM LEAKAGE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.
            (B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO A MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.
            (C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.
        (2) VACUUM TESTING.
            (A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.
            (B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.
            (C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.
            (D) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.
            (E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
            (F) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.
            (G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.
            (H) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.

17. 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

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
LIFT STATIONS AND FORCE MAINS
GENERAL CONSTRUCTION NOTES

1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) EDWARDS AQUIFER RULES, AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

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

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

4. UPON COMPLETION OF ANY LIFT STATION EXCAVATION, A GEOLOGIST MUST CERTIFY THAT THE EXCAVATION HAS BEEN INSPECTED FOR THE PRESENCE OF SENSITIVE FEATURES. THE CERTIFICATION MUST BE SIGNED, SEALED, AND DATED BY THE GEOLOGIST PREPARING THE CERTIFICATION. CERTIFICATION THAT THE EXCAVATION HAS BEEN INSPECTED MUST BE SUBMITTED TO THE APPROPRIATE REGIONAL OFFICE.
   - IF SENSITIVE FEATURE(S) ARE IDENTIFIED, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY AND MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY FROM THE LIFT STATION.
   - CONSTRUCTION MAY CONTINUE IF THE GEOLOGIST CERTIFIES THAT NO SENSITIVE FEATURE OR FEATURES WERE PRESENT.

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

6. ALL FORCE MAIN LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.68. TESTING METHOD WILL BE:
   - A PRESSURE TEST MUST USE 50 POUNDS PER SQUARE INCH ABOVE THE NORMAL OPERATING PRESSURE OF A FORCE MAIN.
   - A TEMPORARY VALVE FOR PRESSURE TESTING MAY BE INSTALLED NEAR THE DISCHARGE POINT OF A FORCE MAIN AND REMOVED AFTER A TEST IS SUCCESSFULLY COMPLETED.
   - A PUMP ISOLATION VALVE MAY BE USED AS AN OPPOSITE TERMINATION POINT.
   - A TEST MUST INVOLVE FILLING A FORCE MAIN WITH WATER.
   - A PIPE MUST HOLD THE DESIGNATED TEST PRESSURE FOR A MINIMUM OF 4.0 HOURS.
   - THE LEAKAGE RATE MUST NOT EXCEED 10.0 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER DAY. THE FOLLOWING EQUATION MUST BE USED TO CALCULATE THE ACCEPTABLE LEAKAGE RATE IN GALLONS PER HOUR PER 1,000 FEET OF PIPE.

FIGURE: 30 TAC §217.68(q)

EQUATION C.5.

$$L = \frac{SD\,P}{155{,}400}$$

WHERE:
L = ACCEPTABLE LEAKAGE RATE (GALLONS/HOUR/1,000 FEET OF PIPE, BASED ON A LEAKAGE RATE OF 10.0 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER DAY)
S = LENGTH OF PIPE
D = NOMINAL DIAMETER OF PIPE (INCHES)
P = AVERAGE TEST PRESSURE (POUNDS/SQUARE INCH)

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

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/20/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

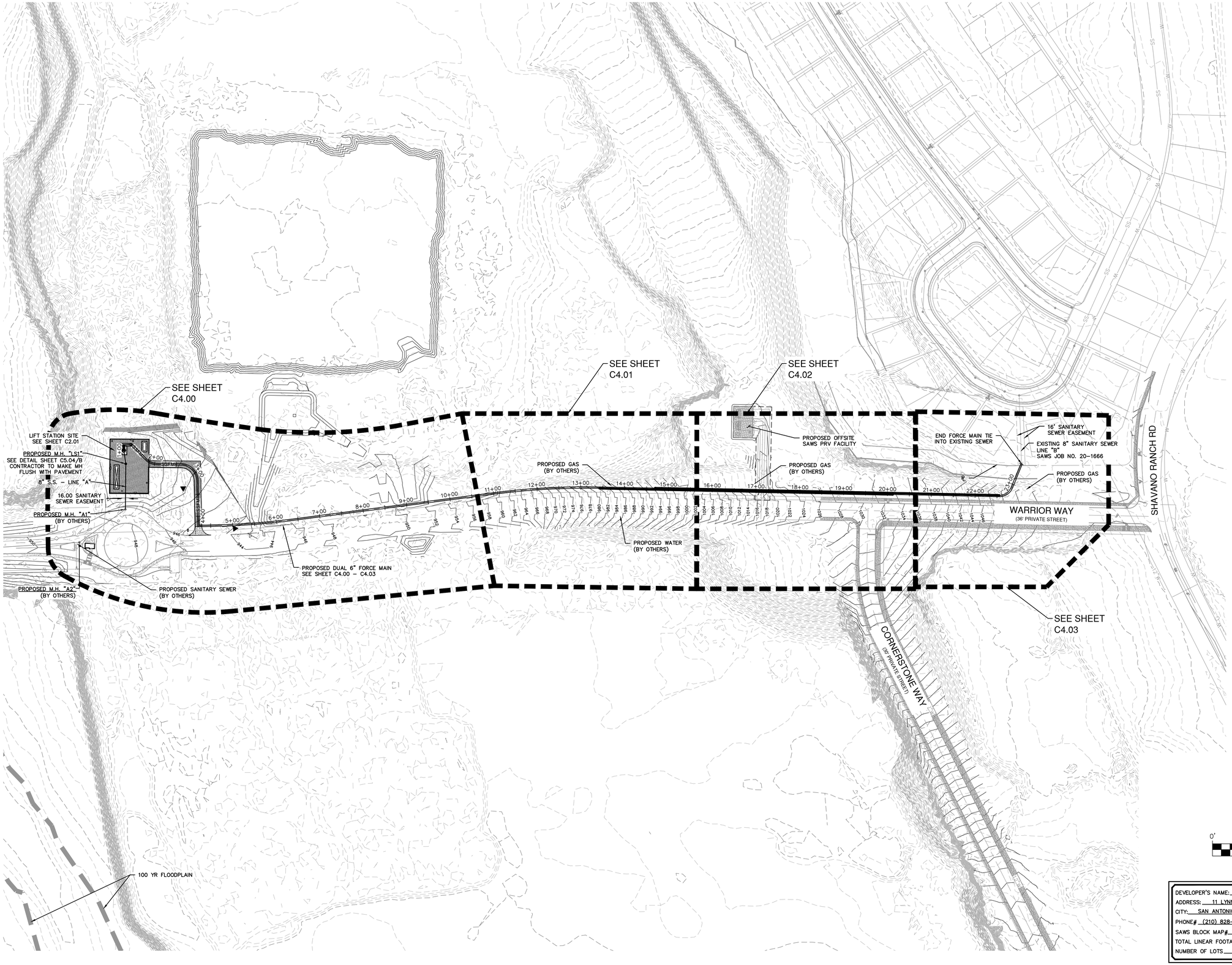
CORNERSTONE LIFT STATION #2
AND FORCE MAIN
SAN ANTONIO, TX

GENERAL NOTES

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C1.01

Date: Mar 18, 2024, 9:32am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LSVON-123400.dwg



NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

OVERALL SITE PLAN

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C2.00

Date: Mar 18, 2024, 9:34am User ID: dloughlin
File: P:\1293\34\00\Design\Civil\LS1\0A-1293400.dwg

PROPOSED MOW STRIP C5.02 A

124 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP RAISED 4" ABOVE ADJACENT FINISHED GRADE C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

LIGHT POLE (SEE ELECTRICAL PLANS)

CONCRETE PAD FOR ELECTRICAL CONTROL PANEL AND ROOF CANOPY (SEE STRUCTURAL AND ELECTRICAL SHEETS)

CONTRACTOR SHALL INSTALL 3/4" WATER SERVICE W/ HOSE BIB AND VACUUM BREAKER (CONTRACTOR SHALL PROVIDE FREEZE PROTECTION) C5.02 E

PROPOSED MOW STRIP C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

89 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP RAISED 4" ABOVE ADJACENT FINISHED GRADE C5.02 A

WET WELL JUNCTION BOXES

AERATOR BLOWER

PROPOSED M.H. "LS1" SEE DETAIL SHEET C5.04/B CONTRACTOR TO MAKE MH FLUSH WITH PAVEMENT

WET WELL CONCRETE PAD (SEE STRUCTURAL SHEETS)

PROPOSED 8" SANITARY SEWER (BY OTHERS)

16.00' LF SANITARY SEWER EASEMENT

126°16'12"

PROPOSED M.H. "A1" (BY OTHERS)

PROPOSED METER POLE

PROPOSED 8" SDR 26 GRAVITY MAIN SANITARY SEWER (SEE SHEET C3.00)

170°47'39"

SEE SHEET C5.00 FOR DISCHARGE AND HEADER PIPING DETAILS

PROPOSED 8" SDR 26 GRAVITY MAIN SANITARY SEWER (SEE SHEET C3.00)

WET WELL VENT

ASPHALT PAVEMENT

8' DIAMETER WET WELL

EDGE OF PAVEMENT (BY OTHERS)

PROPOSED WATER MAIN (BY OTHERS)

PROPERTY LINE

C5.02 A PROPOSED MOW STRIP

C5.02 A 89 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT

C5.02 C PROP EDGE OF ASPHALT PAVEMENT

C5.02 G PROPOSED 3/4" METER W/ H-20 RATED METER BOX AND COVER

3/4" WATER SERVICE

LIGHT POLE (SEE ELECTRICAL PLANS)

GENERATOR PAD (SEE STRUCTURAL AND ELECTRICAL SHEETS)

PROPOSED MOW STRIP C5.02 A

48 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

3' PEDESTRIAN GATE

3'X7' CONC. SIDEWALK

16' WIDE DOUBLE SWING GATE C5.02 B

EDGE OF PAVEMENT

PROPOSED MOW STRIP C5.02 A

59 LF CHAIN-LINK FENCE W/ 3-STRAND BARBED WIRE W/ MOW STRIP FLUSH WITH PAVEMENT C5.02 A

PROP EDGE OF ASPHALT PAVEMENT C5.02 C

C5.02 D CONCRETE DRIVEWAY

PROPERTY LINE

PROPOSED DUAL 6" HDPE FORCE MAIN SANITARY SEWER (SEE SHEET C4.00-C4.03)

PROPERTY LINE

3/4" WATER SERVICE CONNECTION C5.02 E

3/4" WATER SERVICE

SSFM

SSFM

C5.02 D CONCRETE DRIVEWAY

PROPOSED GAS MAIN (BY OTHERS)

PROPOSED WATER MAIN (BY OTHERS)

50' UTILITY AND LIFT STATION EASEMENT

SCALE: 1"= 10'

0' 10' 20' 30'

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 4,502 LF-6" FM 135 LF-8" SS PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

NO. | REVISION | DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

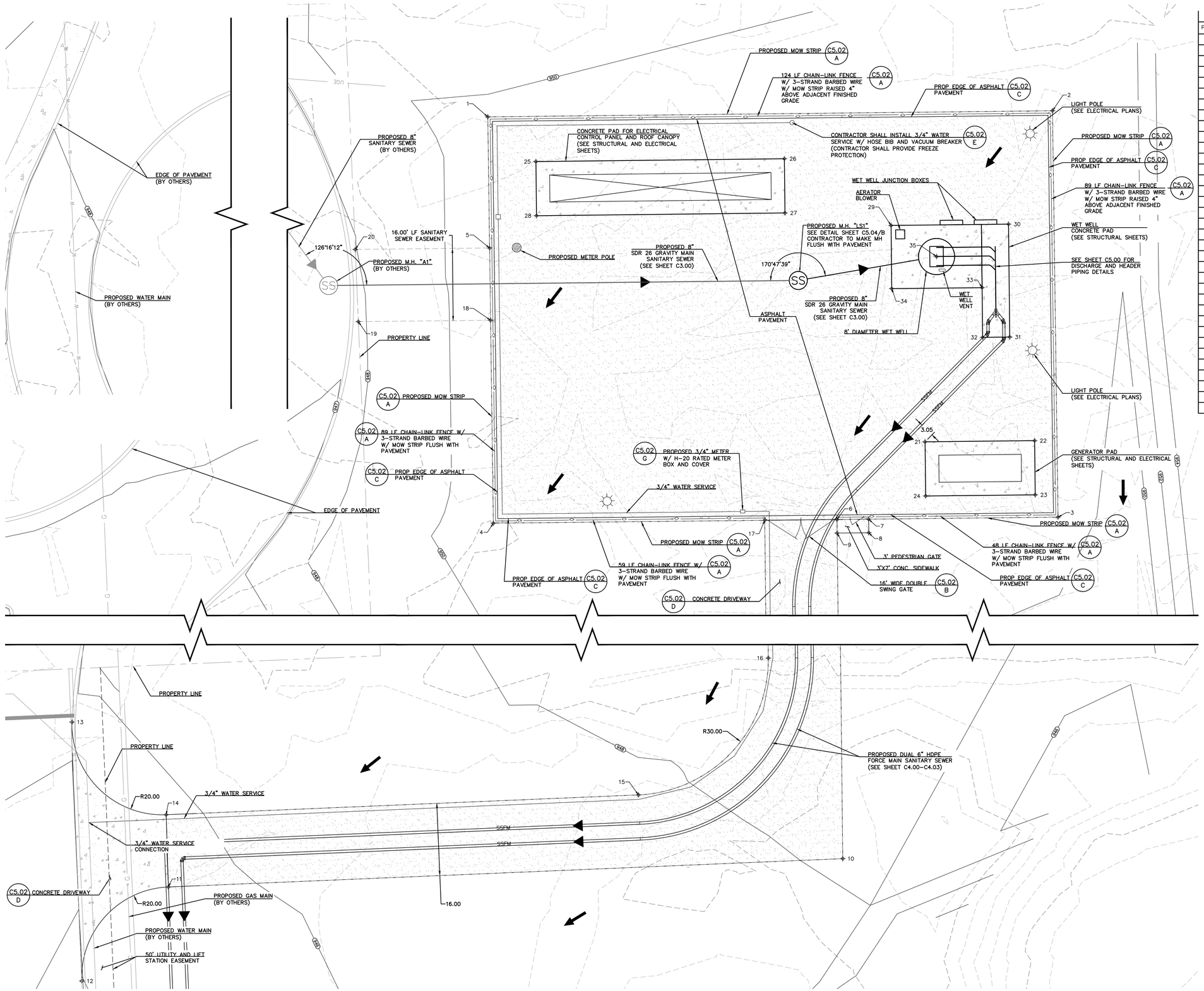
CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

SITE PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ

SHEET C2.01

Date: Mar 18, 2024, 9:40am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\SP129400.dwg



POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13774364.84	2106975.39	951.00	MOW STRIP EDGE
2	13774366.18	2107100.38	951.00	MOW STRIP EDGE
3	13774276.19	2107101.61	951.00	MOW STRIP EDGE
4	13774274.85	2106976.62	951.00	MOW STRIP EDGE
5	13774335.80	2106975.79	951.00	MOW STRIP EDGE
6	13774275.67	2107052.69	951.00	DRIVEWAY
7	13774275.74	2107059.69	951.00	CONC. SIDEWALK
8	13774272.74	2107059.72	950.84	CONC. SIDEWALK
9	13774272.67	2107052.72	950.92	CONC. SIDEWALK
10	13774158.28	2107053.96	948.16	DRIVEWAY
11	13774152.00	2106904.69	945.68	DRIVEWAY FLARE
12	13774131.18	2106885.54	944.84	DRIVEWAY FLARE
13	13774188.51	2106883.37	945.43	DRIVEWAY FLARE
14	13774168.00	2106904.20	945.85	DRIVEWAY FLARE
15	13774172.39	2107008.74	947.74	DRIVEWAY
16	13774202.69	2107037.48	948.79	DRIVEWAY
17	13774275.49	2107036.69	951.00	DRIVEWAY
18	13774319.80	2106976.01	951.00	EASEMENT EDGE
19	13774319.49	2106946.74	947.81	EASEMENT EDGE
20	13774335.48	2106946.07	947.96	EASEMENT EDGE
21	13774292.88	2107072.18	952.00	GENERATOR PAD
22	13774293.14	2107096.43	952.00	GENERATOR PAD
23	13774281.14	2107096.56	952.00	GENERATOR PAD
24	13774280.88	2107072.31	952.00	GENERATOR PAD
25	13774354.94	2106986.04	0.00	ELEC. CONTROL PANEL PAD
26	13774355.56	2107041.04	0.00	ELEC. CONTROL PANEL PAD
27	13774343.56	2107041.17	0.00	ELEC. CONTROL PANEL PAD
28	13774342.95	2106986.17	0.00	ELEC. CONTROL PANEL PAD
29	13774340.80	2107064.66	951.50	LIFT STATION PAD
30	13774341.08	2107090.65	951.50	LIFT STATION PAD
31	13774316.08	2107090.92	0.00	LIFT STATION PAD
32	13774316.01	2107084.92	0.00	LIFT STATION PAD
33	13774327.01	2107084.81	951.50	LIFT STATION PAD
34	13774326.80	2107064.81	951.50	LIFT STATION PAD
35	13774333.91	2107074.73	951.50	CENTER OF WET WELL

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

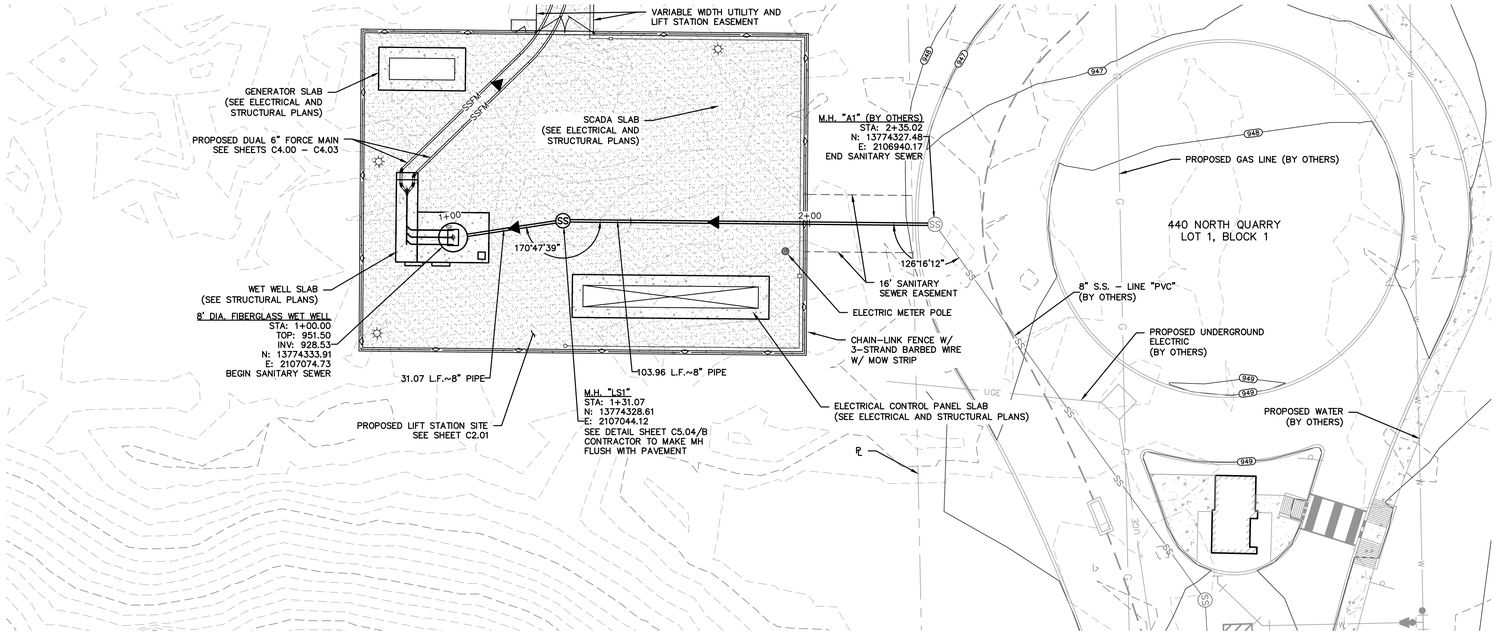
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

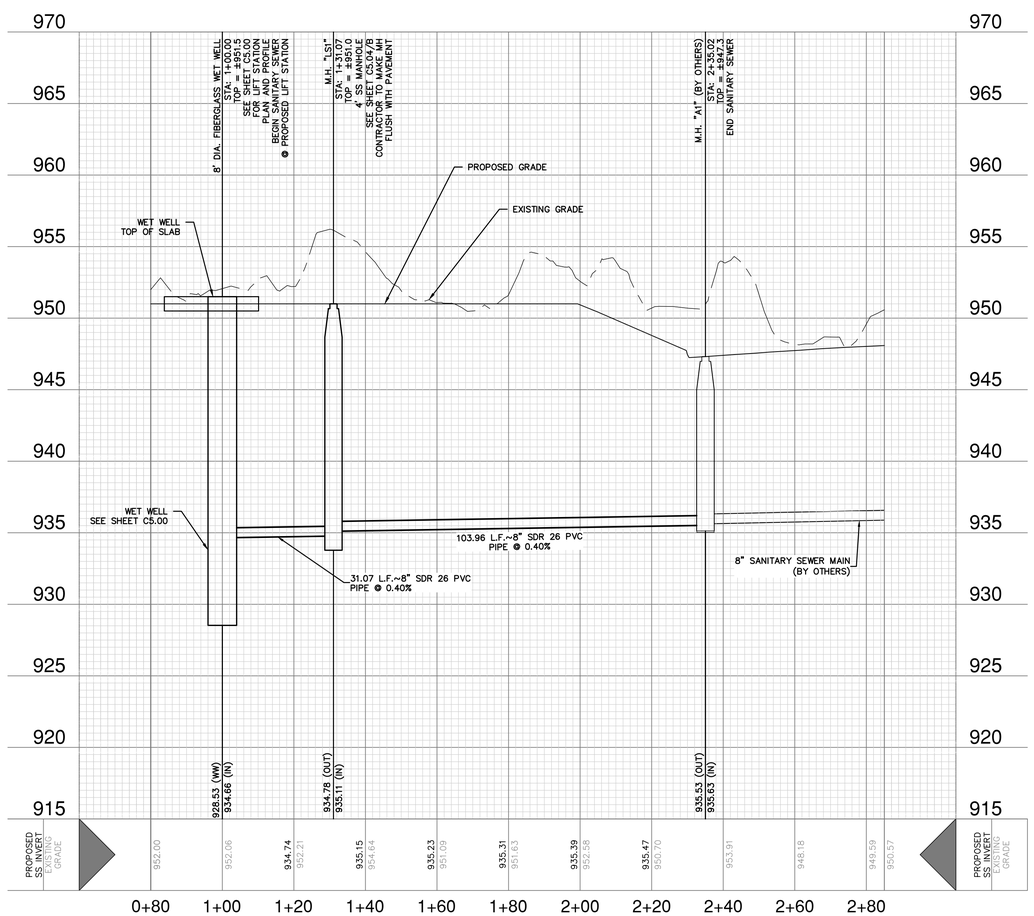
CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

DIMENSIONAL CONTROL PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C2.02

Date: Mar 18, 2024, 9:40am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\SP129340O.dwg





LEGEND

- PROPOSED GRAVITY MAIN — SS
- PROPOSED FORCE MAIN — SSFM
- PROPOSED GRAVITY MAIN (BY OTHERS) — SS SS SS
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPERTY LINE
- PROPOSED EASEMENT LINE

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

SCALE: 1" = 20'
0' 20' 40' 60'

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

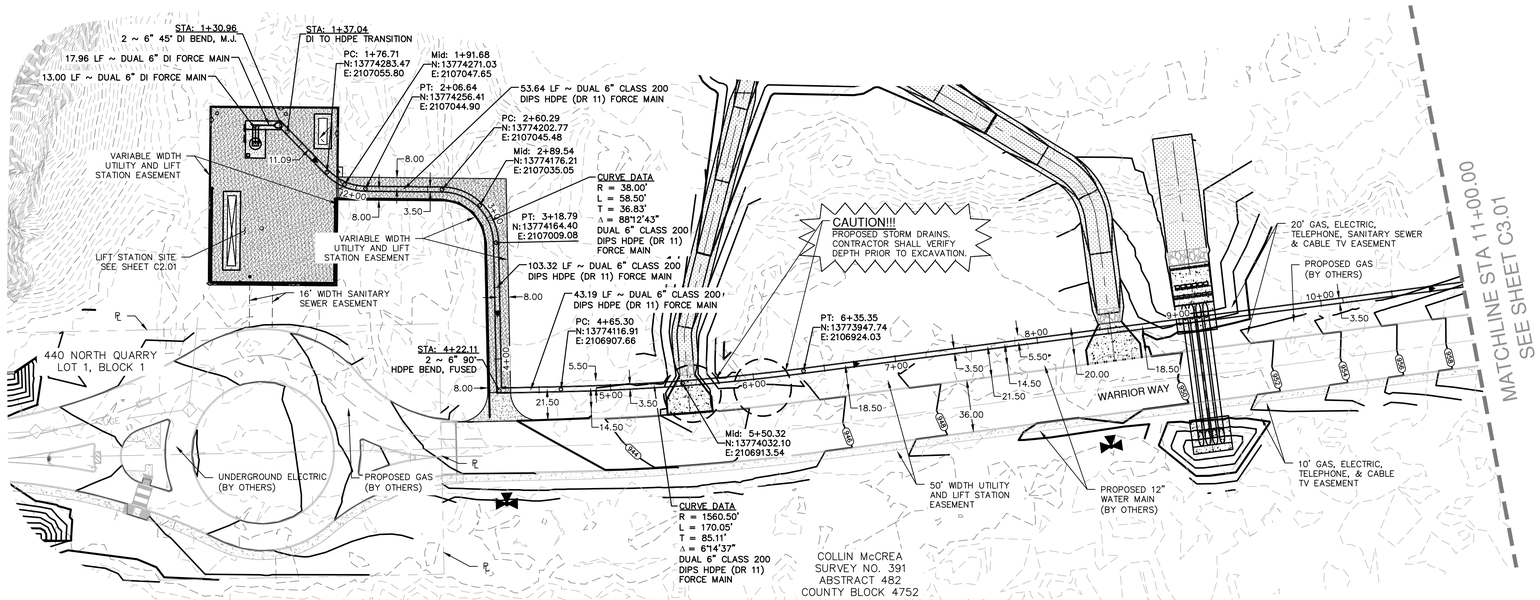
SAN ANTONIO, TX

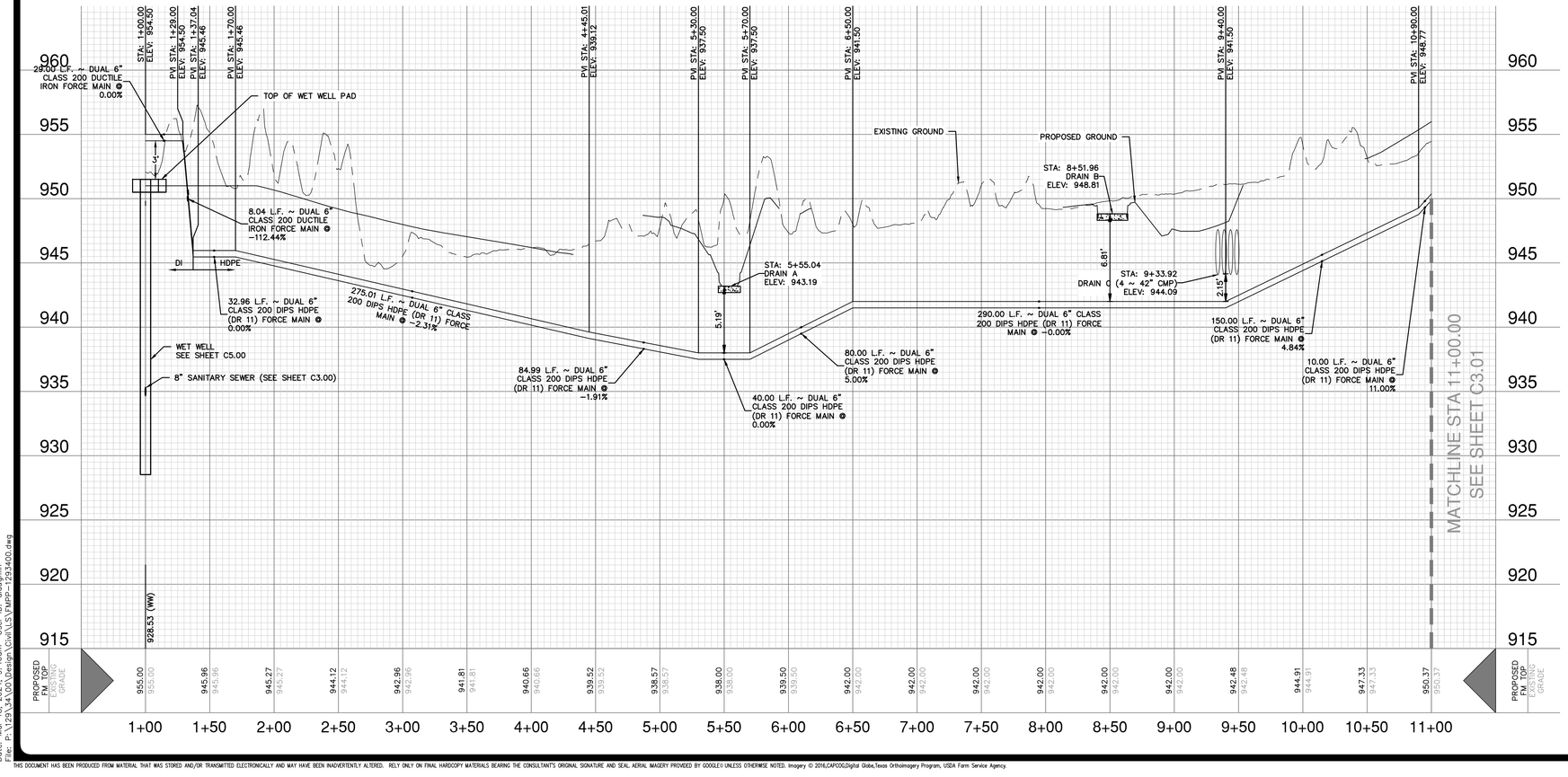
LIFT STATION GRAVITY MAIN

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS 4,502 LF-8" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C3.00

Date: Mar 18, 2024, 9:44am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\GMP-1293400.dwg





LEGEND

- PROPOSED GRAVITY MAIN (MANHOLE)
- PROPOSED FORCE MAIN — SSFM
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPOSED GRAVITY MAIN
- PROPERTY LINE
- PROPOSED EASEMENT LINE

SCALE: 1"= 50'
0' 50' 100' 150'

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

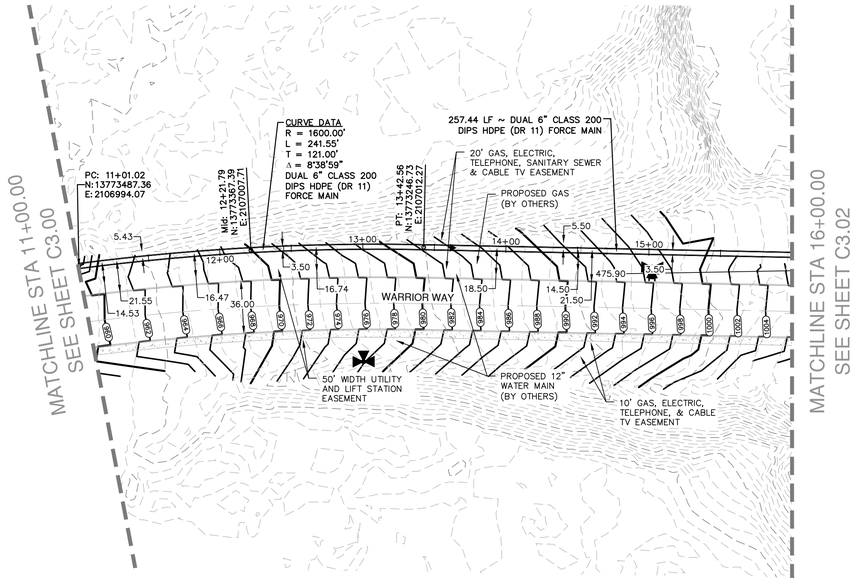
SAN ANTONIO, TX

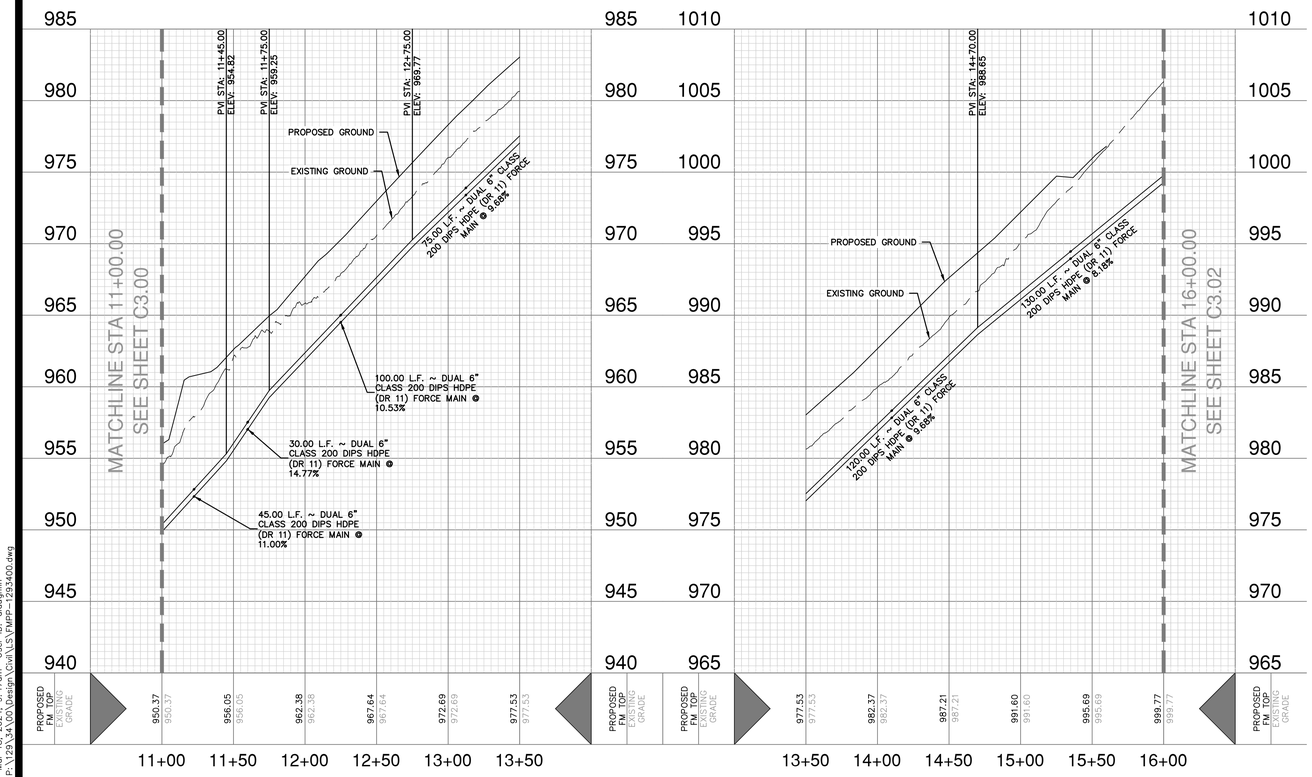
FORCE MAIN PLAN AND PROFILE STA 1+00.00 TO 11+00.00

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8"SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C4.00

Date: Mar 18, 2024, 9:46am User ID: dloughlin
File: P:\1293\34\00\Design\Civil\LS\FMPP-1293400.dwg





LEGEND

- PROPOSED GRAVITY MAIN (MANHOLE)
- PROPOSED FORCE MAIN (SSFM)
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPOSED GRAVITY MAIN
- PROPERTY LINE
- PROPOSED EASEMENT LINE

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

FORCE MAIN PLAN AND PROFILE STA 11+00.00 TO 16+00.00

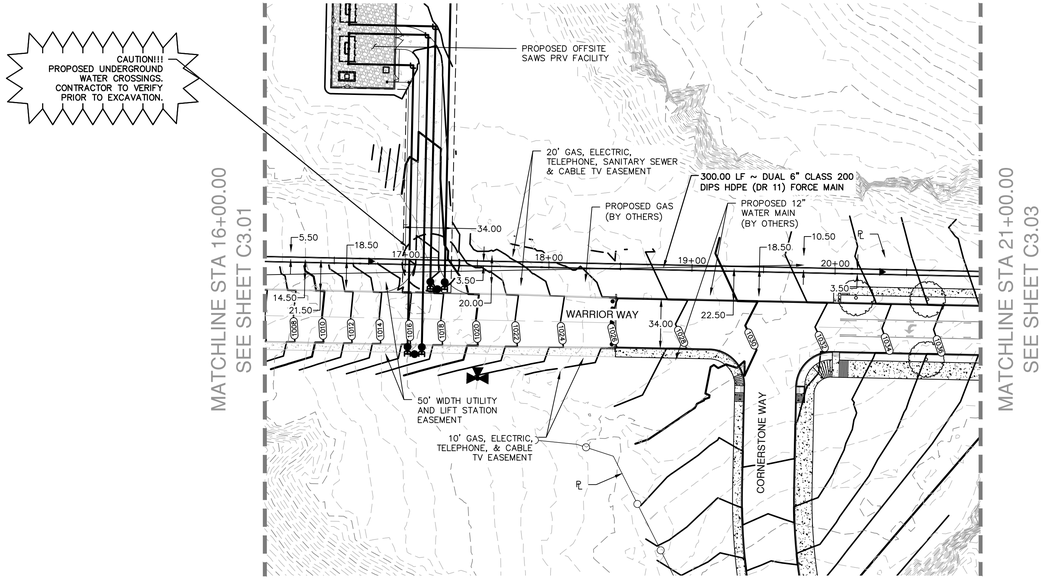
SCALE: 1"= 50'

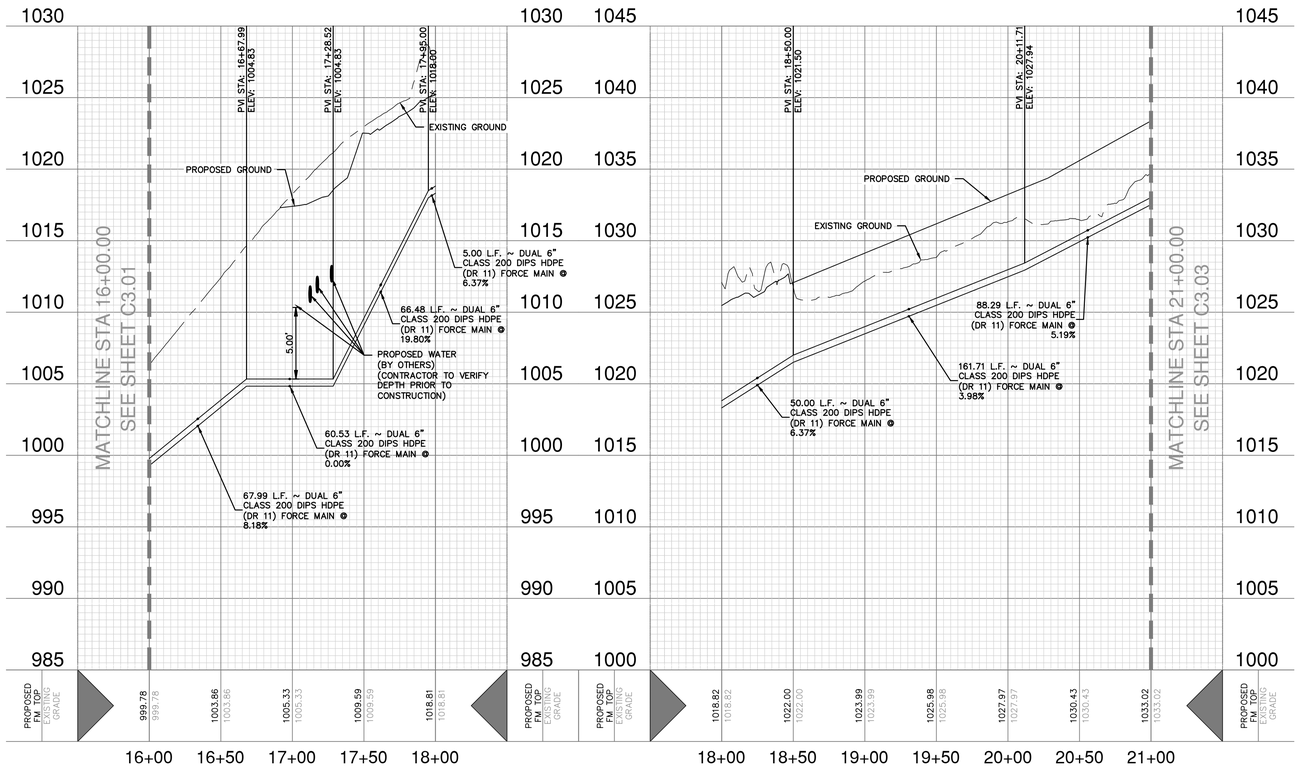
0' 50' 100' 150'

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C4.01

Date: Mar 18, 2024, 9:47am User ID: dloughlin
File: P:\1291\34\00\Design\Civil\LS\FMPP-1293400.dwg





LEGEND

- PROPOSED GRAVITY MAIN (MANHOLE)
- PROPOSED FORCE MAIN (SSFM)
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPOSED GRAVITY MAIN
- PROPERTY LINE
- PROPOSED EASEMENT LINE

SCALE: 1"= 50'

0' 50' 100' 150'

DEVELOPER'S NAME: BITTERBLUE, INC.
ADDRESS: 11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO STATE: TX ZIP: 78218
PHONE# (210) 828-6131 FAX#
SAWS BLOCK MAP# TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS, 4,502 LF-6" FM PLAT NO. 23-11800125
NUMBER OF LOTS SAWS JOB NO. 23-3000

DATE
NO. REVISION

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

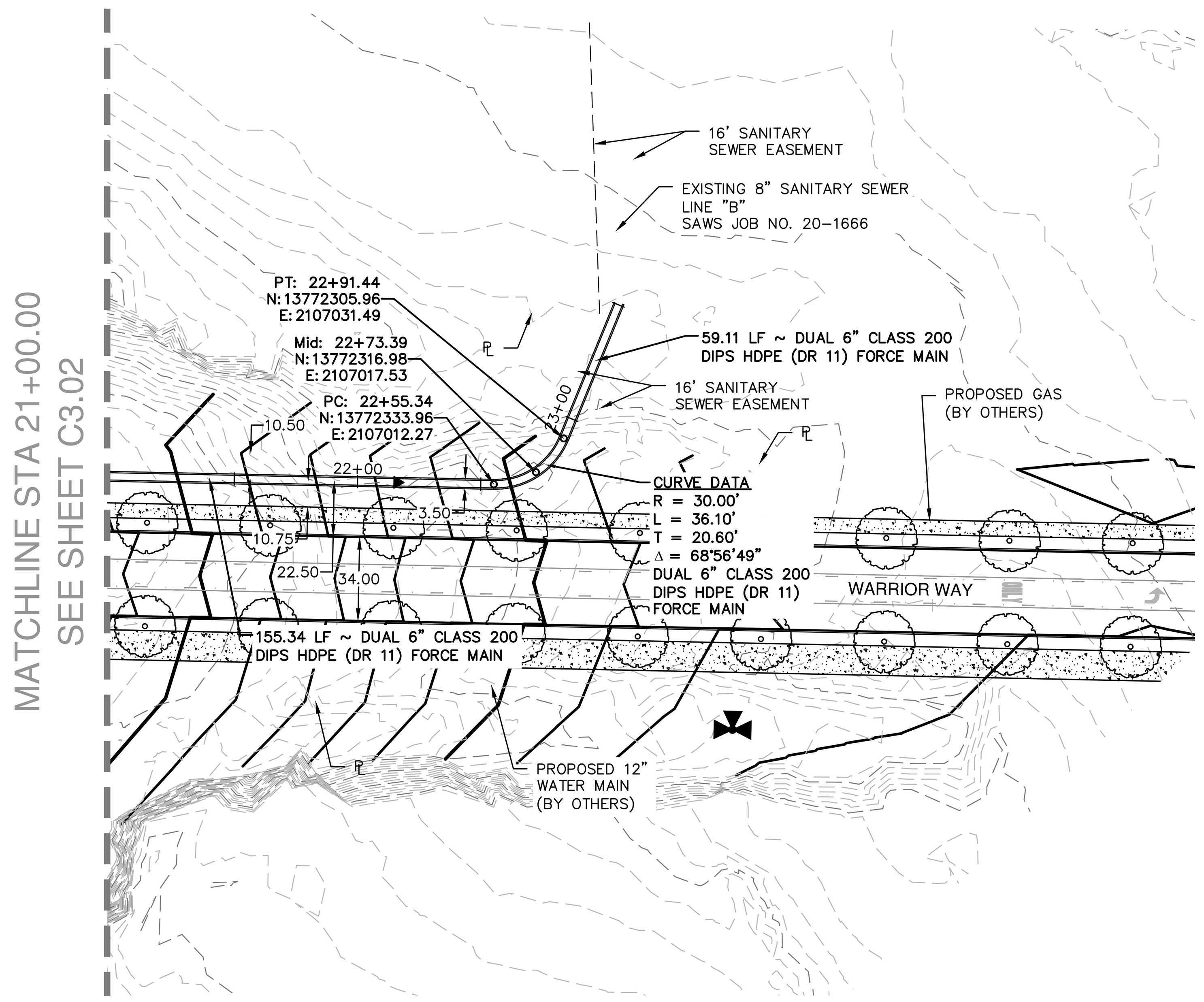
CORNERSTONE LIFT STATION #2
AND FORCE MAIN
SAN ANTONIO, TX
FORCE MAIN PLAN AND PROFILE STA
16+00.00 TO 21+00.00

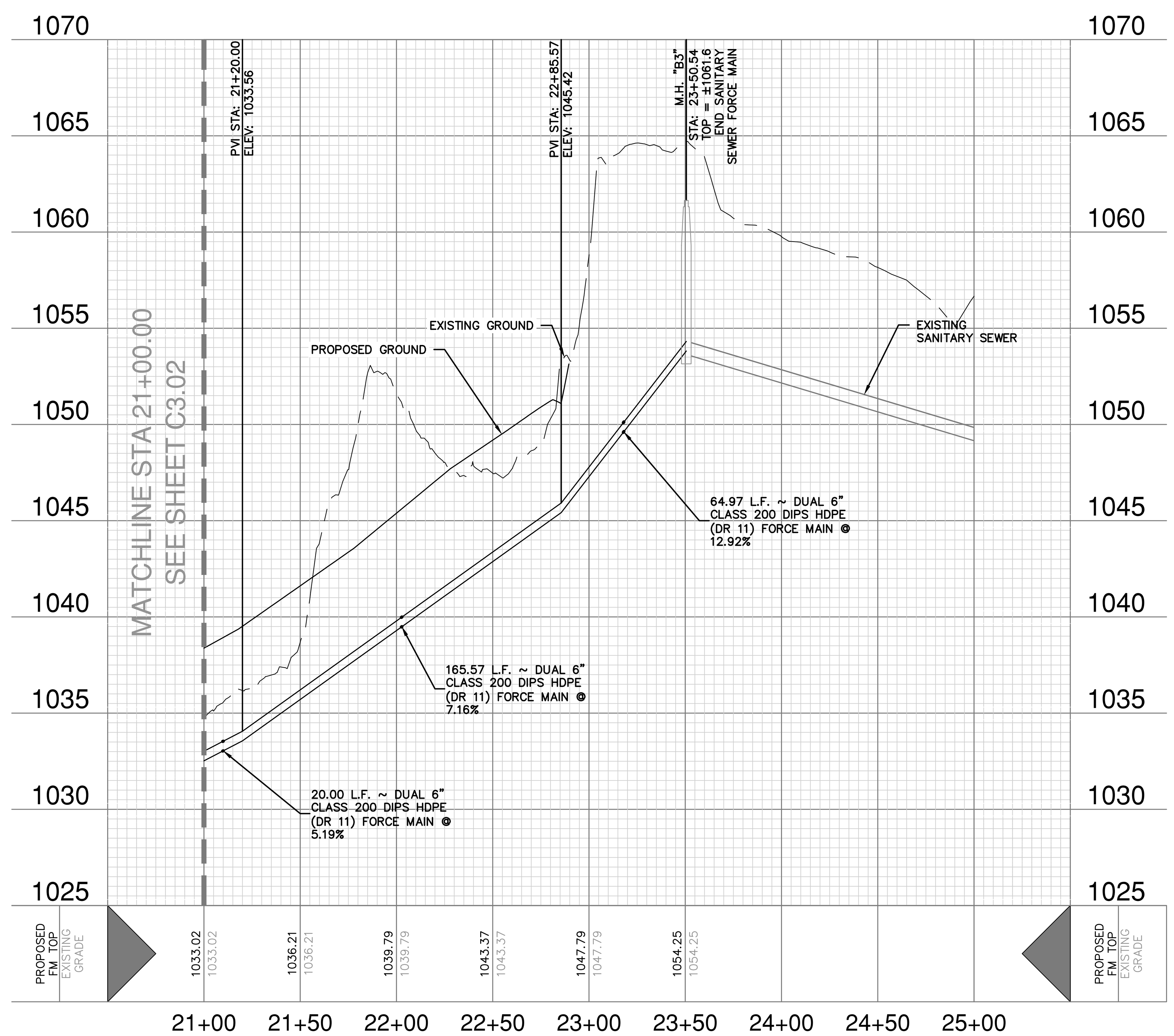
PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C4.02

Date: Mar 18, 2024, 9:47am User ID: dloughlin
File: P:\1293\34\00\Design\Civil\LS\FMPP-1293400.dwg

LEGEND

- PROPOSED GRAVITY MAIN
- PROPOSED FORCE MAIN — SSFM
- ASPHALT PAVEMENT
- CONCRETE PAD
- FENCE
- PROPOSED LIGHT POLE
- PROPOSED ELECTRIC METER POLE
- PROPOSED GRAVITY MAIN
- PROPERTY LINE
- PROPOSED EASEMENT LINE



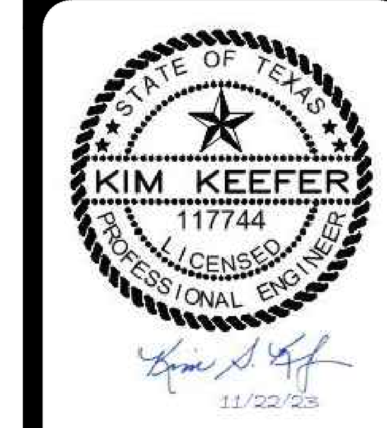


SCALE: 1"= 50'

0' 50' 100' 150'

DEVELOPER'S NAME:	BITTERBLUE, INC.
ADDRESS:	11 LYNN BATTS LANE, SUITE 100
CITY: SAN ANTONIO	STATE: TX ZIP: 78218
PHONE# (210) 828-6131	FAX#
SAWS BLOCK MAP#	TOTAL EDU'S 425 TOTAL ACREAGE 174
TOTAL LINEAR FOOTAGE OF PIPE: 135 LF-8" SS 4,502 LF-6" FM	PLAT NO. 23-11800125
NUMBER OF LOTS	SAWS JOB NO. 23-3000

NO.	REVISION	DATE



PAPE-DAWSON ENGINEERS

SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

FORCE MAIN PLAN AND PROFILE STA 21+00.00 TO 23+86.96

PLAT NO.	23-11800125
JOB NO.	12934-00
DATE	MARCH 2024
DESIGNER	JK
CHECKED	RM DRAWN RJ
SHEET	C4.03

Date: Mar 18, 2024, 9:47am User ID: dlaughlin
File: P:\129\34\00\Design\Civil\LS\FMPP-1293400.dwg

NOTE TO CONTRACTOR

NO MODIFICATIONS CAN BE MADE TO THE LIFT STATION PRIOR TO APPROVAL BY THE ENGINEER AND SAWS. CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE SAWS INSPECTOR WHEN LIFT STATION CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES.

1. THE CONTRACTOR SHALL NOTIFY THE PROJECT GEOLOGIST AND TCEQ FOR OBSERVATION IF ANY SENSITIVE FEATURES ARE DISCOVERED IN ACCORDANCE WITH 30 TAC 213.5 (f)(2).
2. WHEN LIFT STATION PUMPS ARRIVE AT THE SITE.
3. PRIOR TO PLACEMENT OF HMAC, AND CONCRETE DRIVEWAY.
4. PIPELINE AND WET WELL HYDROSTATIC TESTING, FACILITY STARTUP, ALL FUNCTIONAL TESTING, PROJECT WALKTHROUGH(S), AND FINAL ACCEPTANCE.
5. COMPLETION OF STRUCTURAL STEEL PLACEMENT AND ERECTION OF FORMS, BUT PRIOR TO CONCRETE PLACEMENT OF ALL CONCRETE FOUNDATIONS, AND PADS.
6. UPON COMPLETION OF CONTROL PANEL CANOPY ERECTION.
7. SEE SHEET E.2 FOR ELECTRICAL, AND SCADA CONSTRUCTION OBSERVATION MILESTONES.

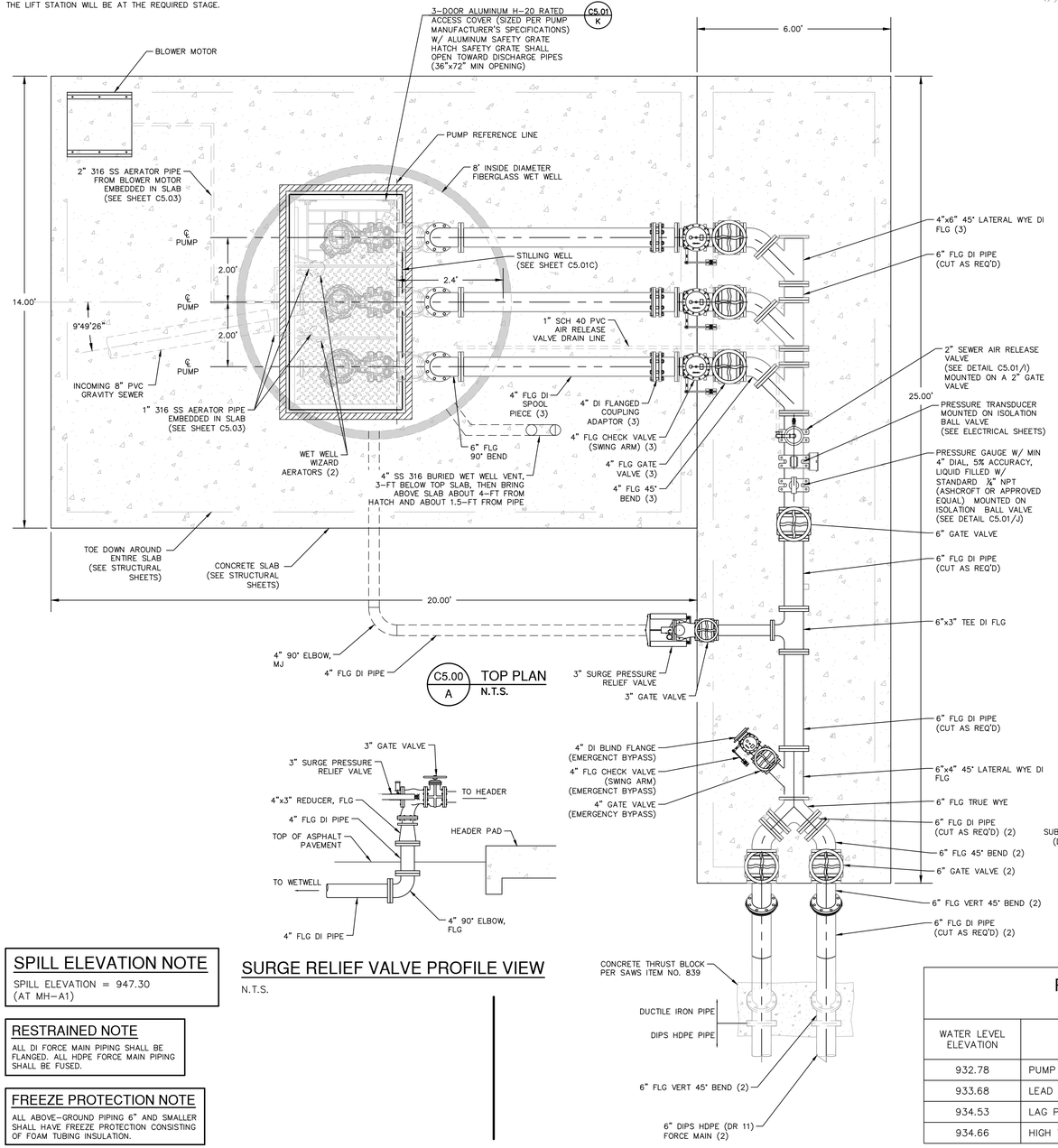
WORK SHALL NOT CONTINUE ON THE LIFT STATION UNTIL THE ENGINEER AND SAWS HAVE HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER AND SAWS 48 HOURS ADVANCED NOTICE PRIOR TO THE TIME THAT THE LIFT STATION WILL BE AT THE REQUIRED STAGE.

NOTES

1. EPOXY GROUT SEAL PIPING GOING THROUGH WALLS.
2. WET WELLS MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC 213.5(c) (3) (E) AND 30 TAC 217.60 (b).
3. ALL HARDWARE (BRACKETS, SCREWS, ETC.) IN WET WELL SHALL BE 316 STAINLESS STEEL.
4. ALL EXPOSED PIPE, VALVES AND FITTINGS OUTSIDE THE WET WELL MUST RECEIVE, AFTER INSTALLATION, AN EPOXY COATING SYSTEM WITH A TOP COAT SYSTEM OF URETHANE SUITABLE FOR THE ENVIRONMENT. APPLY PANTONE 431U GRAY FINISH COAT. APPROVED MANUFACTURERS ARE TNEMEC, CARBOLINE, SHERWIN-WILLIAMS, PPG AND M.A.B. PAINTS.
5. ALL PUMP DISCHARGE PIPE AND FITTINGS WITHIN WET WELL, EXCEPT SS 316, MUST RECEIVE, AFTER INSTALLATION, A 100% COAL TAR EPOXY COATING SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. APPROVED MANUFACTURERS ARE TNEMEC, CARBOLINE, SHERWIN-WILLIAMS, PPG AND M.A.B. PAINTS.
6. ALL FORCE MAIN PIPING WITHIN LIFT STATION SITE SHALL BE RESTRAINED.
7. TRACER WIRE SHALL BE BURIED AT A MAXIMUM DEPTH OF 4 FEET ALONG ENTIRE LENGTH OF FORCE MAIN. TRACER WIRE SHALL BE OF SOLID CORE (14 GAUGE INSULATION), AND SHALL BE CONNECTED TO THE MAIN AT 10" INCREMENTS. WIRE SHALL ALSO COME UP TO THE TOP OF AIR RELEASE, VACUUM VALVES, COMBINATION VALVES AND TOP OF GROUND AT LIFT STATION SITE AND AT THE DISCHARGE POINT.
8. CONTRACTOR WILL ALLOW A MINIMUM OF 2' OF SPACING BETWEEN ABOVE GROUND SURGE PRESSURE ASSEMBLY AND PIPING AND THE EMERGENCY BYPASS CONNECTION.

BLOWER/AIR EJECTOR NOTES

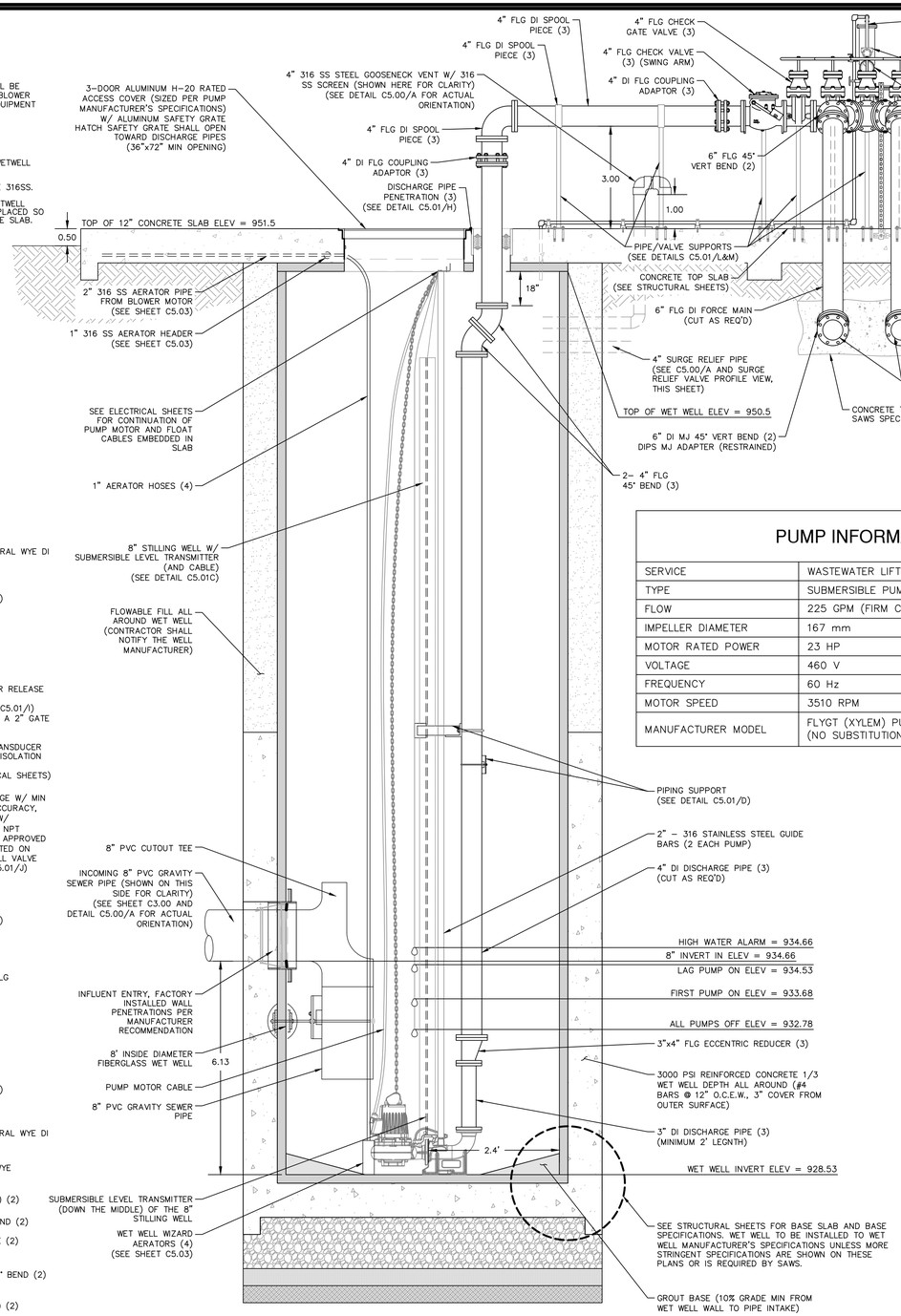
1. BLOWER MOTOR, AIR EJECTORS(2), AND AIR SUPPLY HOSES SHALL BE SUPPLIED BY RELIANT WATER TECHNOLOGIES (504-400-1239). BLOWER MOTOR, AIR EJECTORS(2), AIR SUPPLY HOSES, AN ALL OTHER EQUIPMENT SHALL BE INSTALLED PER RELIANT WATER TECHNOLOGIES RECOMMENDATIONS.
2. BLOWER MOTOR SHALL BE FPZ MODEL R20-MD, 1.5 HP, 60 HZ, 460/230-208 VAC.
3. AIR EJECTORS SHALL BE PLACED ON A FLAT SURFACE OF THE WETWELL FLOOR.
4. ALL AIR DISTRIBUTION PIPING, VALVES, AND HARDWARE SHALL BE 316SS.
5. AIR DISTIBUTION PIPING SHALL BE EMBEDDED WITHIN THE TOP WETWELL SLAB WITH A MIMIMUM CONCRETE COVER OF 3", AND SHALL BE PLACED SO AS NOT TO CONFLICT WITH ANY ELECTRICAL CONDUITS WITHIN THE SLAB.
6. SEE THIS SHEET AND C5.04 FOR DETAILS



C5.00 A **TOP PLAN** N.T.S.

SURGE RELIEF VALVE PROFILE VIEW

N.T.S.



C5.00 B **WET WELL PROFILE** N.T.S.

PUMP INFORMATION

SERVICE	WASTEWATER LIFT STATION
TYPE	SUBMERSIBLE PUMPS
FLOW	225 GPM (FIRM CAPACITY EACH)
IMPELLER DIAMETER	167 mm
MOTOR RATED POWER	23 HP
VOLTAGE	460 V
FREQUENCY	60 Hz
MOTOR SPEED	3510 RPM
MANUFACTURER MODEL	FLYGT (XYLEM) PUMP MODEL NP 3153-275 (3) (NO SUBSTITUTION)

SPILL ELEVATION NOTE

SPILL ELEVATION = 947.30 (AT MH-A1)

RESTRAINED NOTE

ALL DI FORCE MAIN PIPING SHALL BE FLANGED. ALL HDPE FORCE MAIN PIPING SHALL BE FUSED.

FREEZE PROTECTION NOTE

ALL ABOVE-GROUND PIPING 6" AND SMALLER SHALL HAVE FREEZE PROTECTION CONSISTING OF FOAM TUBING INSULATION.

RISING LEVEL CYCLE

(TOP OF PUMPS = ±976.93)

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
932.78	PUMP OFF LEVEL	ALL PUMPS ARE OFF
933.68	LEAD PUMP LEVEL	LEAD PUMPS ON
934.53	LAG PUMP LEVEL	LEAD & LAG PUMP ON
934.66	HIGH WATER ALARM LEVEL	HIGH WATER ALARM SOUND

FALLING LEVEL CYCLE

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
934.53	LAG PUMP LEVEL	LEAD & LAG PUMP ON, HIGH LEVEL ALARM RESETS
933.68	LEAD PUMP LEVEL	LEAD PUMP ON, LAG PUMP OFF
932.78	ALL PUMPS OFF LEVEL	ALL PUMPS STOPPED - LAG PUMP SWITCHES TO LEAD PUMP

NO.	REVISION	DATE

STATE OF TEXAS · KIM KEEFER · 117744 · LICENSED · PROFESSIONAL ENGINEER · 11/20/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

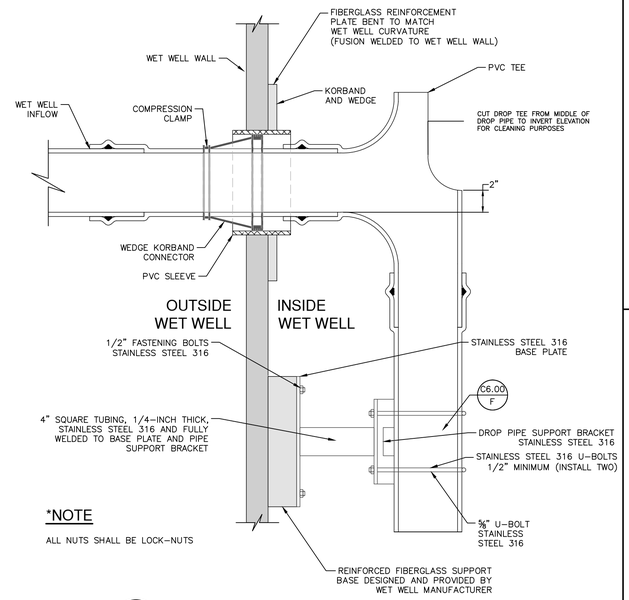
CORNERSTONE LIFT STATION #2 AND FORCE MAIN

SAN ANTONIO, TX

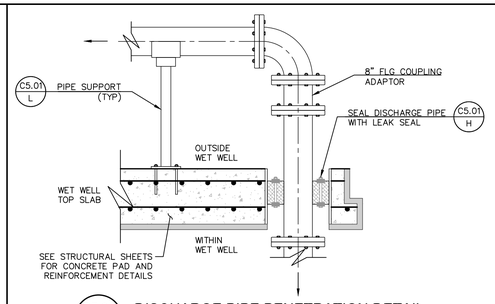
LIFT STATION PLAN AND PROFILE VIEWS

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.00

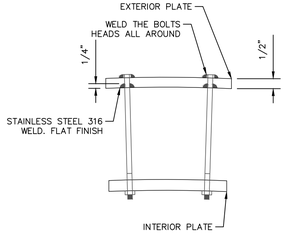
Date: Mar 18, 2024, 9:48am User ID: dloughlin
File: P:\1293\34\00\Design\Civil\LS\DTPP-1293400.dwg



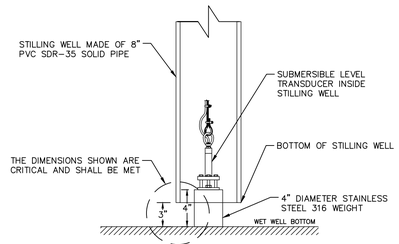
C5.01 A — WET WELL INFLOW PENETRATION DETAIL
N.T.S.



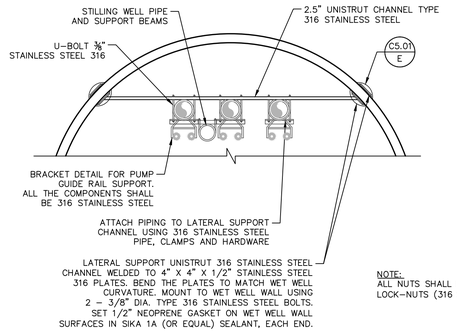
C5.01 B — DISCHARGE PIPE PENETRATION DETAIL
N.T.S.



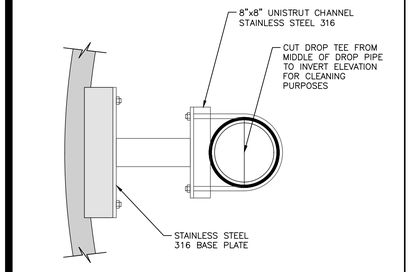
C5.01 E — PLATES DETAIL
N.T.S.



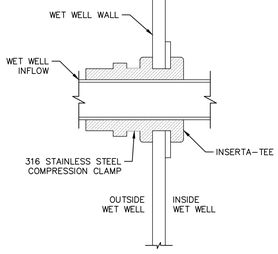
C5.01 C — SUBMERSIBLE LEVEL TRANSDUCER INSTALLATION
N.T.S.



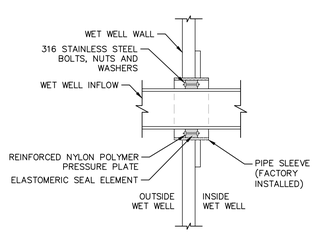
C5.01 D — WET WELL PIPING SUPPORT DETAIL
N.T.S.



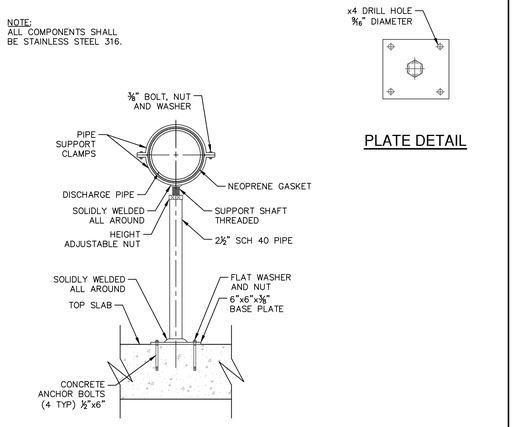
C5.01 F — INFLOW TOP VIEW DETAIL
N.T.S.



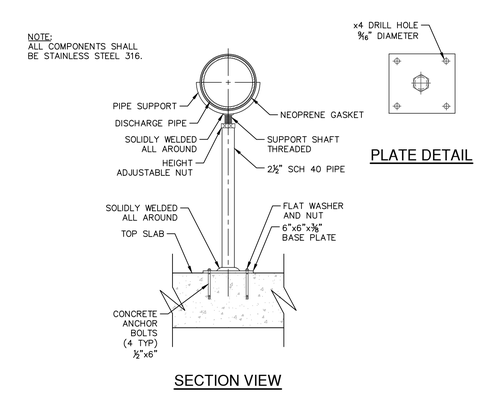
C5.01 G — INSERTA-TEE DETAIL
N.T.S.



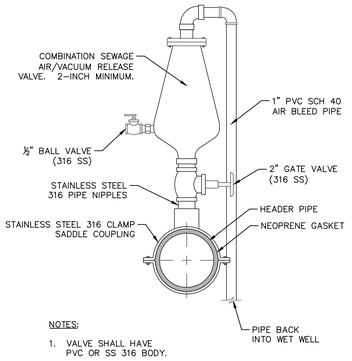
C5.01 H — LINK SEAL DETAIL
N.T.S.



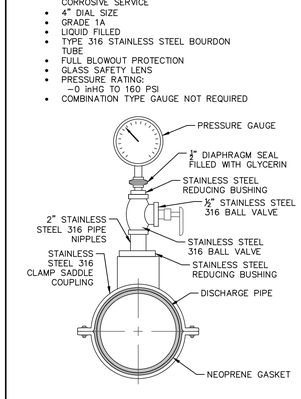
C5.01 L — PIPE SUPPORT DETAIL
N.T.S.



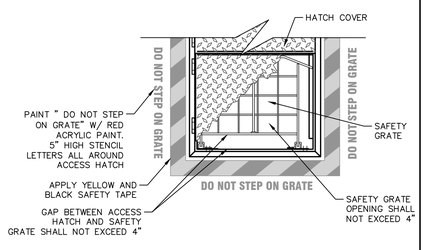
C5.01 M — VALVE SUPPORT DETAIL
N.T.S.



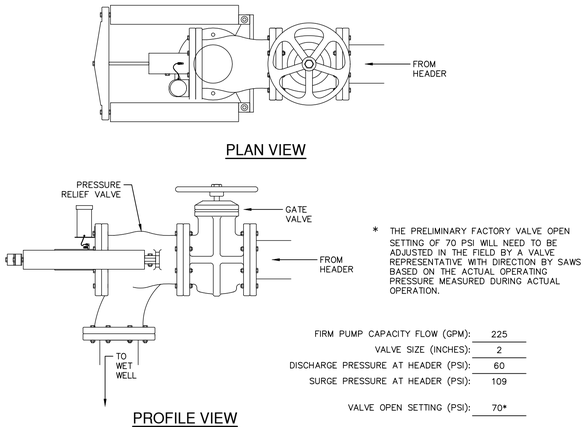
C5.01 I — AIR\VACUUM RELEASE VALVE INSTALLATION DETAIL
N.T.S.



C5.01 J — PRESSURE GAUGE INSTALLATION DETAIL
N.T.S.



C5.01 K — ACCESS COVER W/ SAFETY GRATE DETAIL
N.T.S.



C5.01 N — 3" SURGE PRESSURE RELIEF VALVE MOUNTING DETAIL
N.T.S.

NO.	REVISION	DATE

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

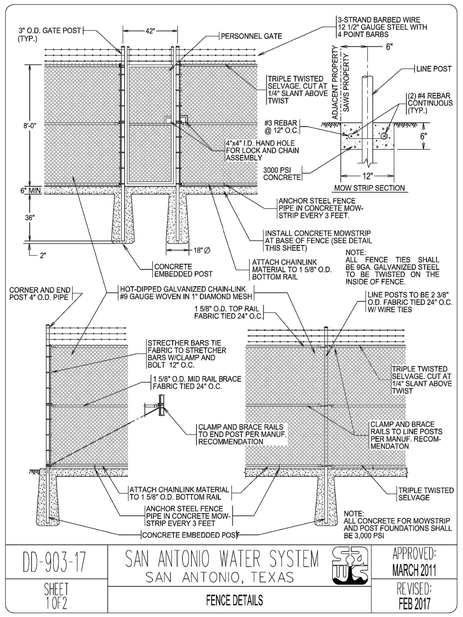
STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

LIFT STATION DETAILS I

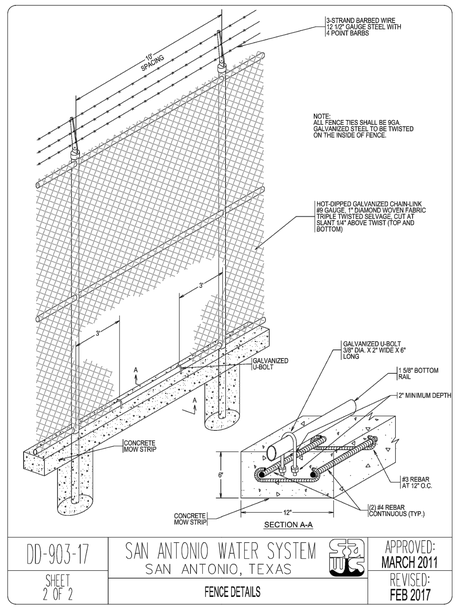
PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.01

Date: Mar 18, 2024, 9:48am User ID: oloughlin
File: P:\129\34\03\Design\Civil\LS\DT-12934-00.dwg



DD-903-17	SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	APPROVED: MARCH 2011
SHEET 1 OF 2	FENCE DETAILS	REVISED: FEB 2017

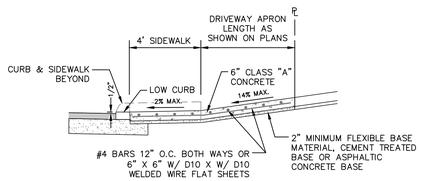
C5.02 A — FENCE DETAILS
N.T.S.



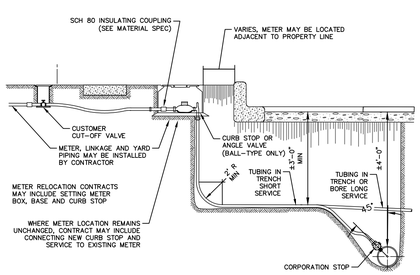
DD-903-17	SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	APPROVED: MARCH 2011
SHEET 2 OF 2	FENCE DETAILS	REVISED: FEB 2017

NOTE
BARBED WIRE SHALL BE TILTED TOWARDS OUTSIDE THE LIFT STATION. CHAIN-LINK FENCE MUST BE INSTALLED 1' INSIDE THE LIFT STATION EASEMENT. WHERE SHOWN ON SITE PLAN, TOP OF MOW STRIP SHALL BE FLUSH WITH THE PAVEMENT, OTHERWISE TOP OF MOW STRIP SHALL BE 6" ABOVE THE ADJACENT FINISHED GRADES.

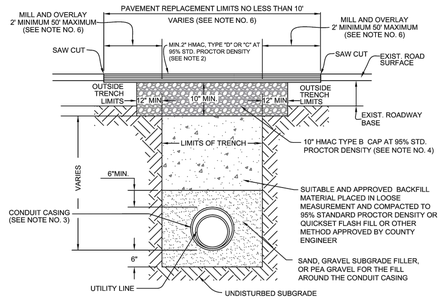
NOTE
IF THE SUBGRADE HAS A PLASTICITY INDEX OF 20 OR LESS, LIME STABILIZATION IS NOT REQUIRED. HOWEVER THE SUBGRADE SHALL BE COMPACTED TO 95% OF THE STANDARD PROCTOR (ASTM D-698). THE SUBGRADE SHALL BE MOISTURE CONDITIONED TO THE OPTIMUM MOISTURE CONTENT (MINIMUM) TO +4%



C5.02 D — CONCRETE DRIVEWAY DETAIL
N.T.S.



C5.02 E — 3/4" WATER SERVICE
N.T.S.



NOTES:
1. ALL UTILITIES WILL BE BORED UNDER EXISTING PAVEMENT. ONLY AT THOSE LOCATIONS AT WHICH IT IS PHYSICALLY IMPOSSIBLE TO BORE WILL THE PAVEMENT BE ALLOWED TO BE CUT AND RESTORED ACCORDING TO THIS DETAIL.

2. THE TYPE OF THE PAVEMENT REPLACEMENT WILL BE DETERMINED AT THE TIME A PERMIT IS REVIEWED AND MUST BE SAW CUT STRAIGHT. TACK OIL AT A RATE OF 0.10 GAL/SY SHALL BE PLACED PRIOR TO PLACEMENT OF 2 INCHES HMAC TYPE "C" OR "D" FINISHED SURFACE. LONGITUDINAL ROADWAY CUTS WILL BE PAVED WITH THE CLOSEST LINE EXTENSION OF THE EXISTING PAVEMENT EDGE AS A MINIMUM. IF EXISTING ROAD SURFACE IS CHIP SEAL, 2 INCHES OF HMAC TYPE "C" WILL BE PLACED PRIOR TO APPLICATION OF FINAL CHIP SEAL COURSE.

3. CONDUIT CASING TO BE PROVIDED AND INSTALLED BY UTILITY COMPANY FOR ALL UTILITIES, EXCEPT FOR SANITARY SEWER GRAVITY LINES AND NATURAL GAS SERVICE LINES. MATERIAL TO BE USED SHALL BE DUCTILE IRON (FOR DEPTH LESS THAN OR EQUAL TO 36 INCHES),SCHEDULE 40 PVC PIPE (GREATER THAN 36 INCHES DEEP), OR APPROVED EQUAL BY COUNTY ENGINEER. THE CONDUIT CASING SHALL EXTEND A MINIMUM OF FIVE FEET OUTSIDE THE EDGE OF SHOULDER OR CURBING DEPENDING ON FUTURE EXPANSION OF STREET WIDTH.

4. A 10" THICKNESS OF HMAC TYPE "B", BENCHED NO LESS THAN 1 FOOT EACH SIDE OF TRENCH, WILL BE USED FOR THE FINAL LIFT OF THE TRENCH REPAIR. THE TYPE "B" ASPHALT, PLACED IN 5 INCH LIFTS, SHALL BE BROUGHT UP TO WITHIN 2 INCHES OF THE EXISTING PAVEMENT SURFACE.

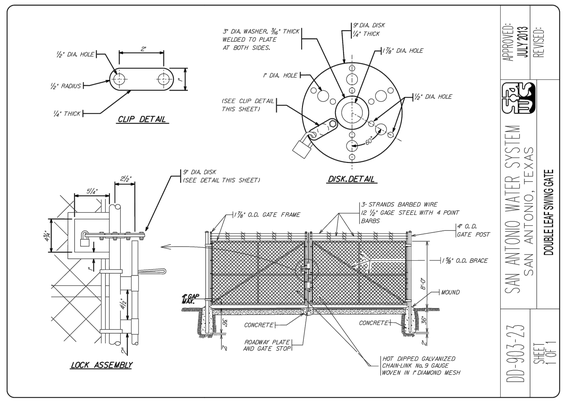
5. THE UTILITY COMPANY OR CONTRACTOR WILL BE RESPONSIBLE FOR THE MAINTENANCE OF OF THE STREET CUT THEREAFTER UNTIL AND IF THE COUNTY REMOVES THE STREET CUT THROUGH RECONSTRUCTION.

6. PAVEMENT REPLACEMENT LIMITS WILL BE DETERMINED AT THE TIME OF PERMIT REVIEW OR INSPECTION. WHERE EXISTING SURFACE IS ASPHALT, SURFACE MUST BE MILLED AND REPLACED NO LESS THAN 10 FT OVERALL OR UP TO 50 FT IN EACH DIRECTION BEYOND THE LIMITS OF THE TRENCH UNLESS OTHERWISE DETERMINED BY ON-SITE INSPECTION. IF EXISTING SURFACE IS CHIP SEAL, THE LIMITS OF SURFACE REPLACEMENT WILL BE A MINIMUM OF 5 FT IN EACH DIRECTION BEYOND LIMITS OF THE TRENCH. (SEE NOTE 2 FOR SURFACE REPLACEMENT GUIDELINES)

7. UNLESS OTHERWISE NOTED IN THE ROW STANDARD SPECIFICATIONS, WHEN GEOGRID OR OTHER GEOSYNTHETIC SUBGRADE/BASE REINFORCEMENT IS PRESENT, THE CONTRACTOR SHALL CONDUCT EXCAVATION TO PROVIDE APPROPRIATE OVERLAP (2' MIN.) AND TIE TO EXISTING UNDISTURBED REINFORCEMENT AS REQUIRED BY MANUFACTURER FOR EACH LAYER OF REINFORCEMENT ENCOUNTERED.

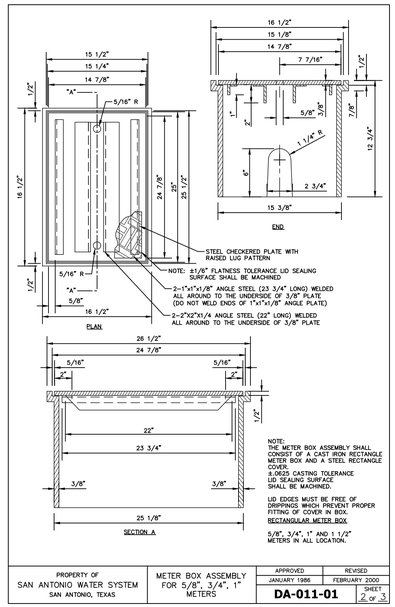
PREPARED BY: BEXAR COUNTY PUBLIC WORKS DEPARTMENT — June 4, 2013

C5.02 F — STREET CUT DETAIL
N.T.S.



APPROVED: JULY 2013
REVISED:
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS DOUBLE LEAF SWING GATE
DD-903-23
SHEET 1 OF 1

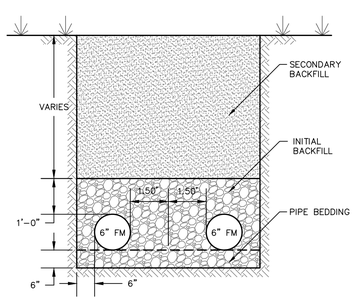
C5.02 B — DOUBLE LEAF SWING GATE DETAILS
N.T.S.



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	METER BOX ASSEMBLY FOR 5/8", 3/4", 1" METERS	APPROVED JANUARY 1986	REVISED FEBRUARY 2000
		DA-011-01	SHEET 2 OF 3

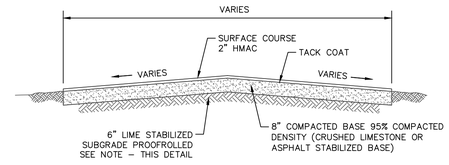
C5.02 G — METER BOX ASSEMBLY FOR 5/8", 3/4", 1" METERS
N.T.S.

NOTES
1. DEPTH OF GRAVEL SUBGRADE FILLER TO BE DETERMINED IN FIELD BY OWNER IN CONDITIONS WHERE TRENCH BOTTOM IS UNSTABLE
2. BEDDING SHALL HAVE A MINIMUM THICKNESS OF 6-INCHES BELOW OUTSIDE DIAMETER OF PIPE AND BE PLACED AND SHAPED TO CONFORM TO PIPE BARREL AND BELL OR FLANGES SUCH THAT THE ENTIRE LENGTH OF THE BARREL IS SUPPORTED BY THE BEDDING MATERIAL, NO SEPARATE PAY ITEM (NSPI).
3. INITIAL BACKFILL TO BE A MINIMUM OF 1-FOOT ABOVE OUTSIDE DIAMETER OF PIPE PLACED WITH A TEMPORARY SHIELD OVER THE PIPE TO PROTECT THE PIPE COATING AND/OR POLYWRAP, NO SEPARATE PAY ITEM (NSPI).
4. ALL BEDDING OR GRAVEL SUBGRADE FILLER IF USED TO BE PLACED ON UNDISTURBED SOILS.
5. CONTRACTOR SHALL INCORPORATE THE USE OF A TRENCH BOX OR OTHER ACCEPTABLE SAFETY SYSTEM IN ANY TRENCH THAT EXCEEDS FIVE (5) FEET IN DEPTH.
6. ALL BACKFILL SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OR DETERMINED BY TxDOT TEST METHOD TEX-113E.

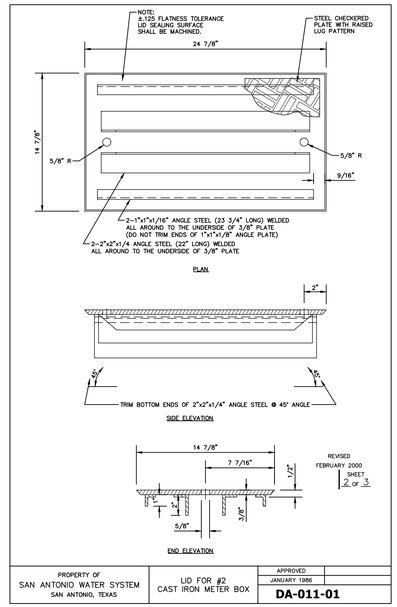


C5.02 I — DUAL 6" FORCE MAIN TRENCH DETAIL
N.T.S.

NOTE
IF THE SUBGRADE HAS A PLASTICITY INDEX OF 20 OR LESS, LIME STABILIZATION IS NOT REQUIRED. HOWEVER THE SUBGRADE SHALL BE COMPACTED TO 95% OF THE STANDARD PROCTOR (ASTM D-698). THE SUBGRADE SHALL BE MOISTURE CONDITIONED TO THE OPTIMUM MOISTURE CONTENT (MINIMUM) TO +4%



C5.02 C — LIFT STATION ASPHALT PAVEMENT DETAIL
N.T.S.



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	LID FOR #2 CAST IRON METER BOX	APPROVED JANUARY 1986	
		DA-011-01	

C5.02 H — LID FOR #2 CAST IRON METER BOX
N.T.S.

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

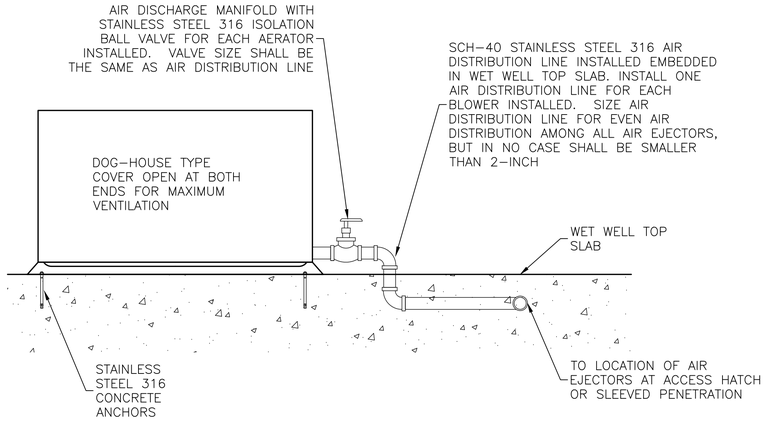
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2
AND FORCE MAIN
SAN ANTONIO, TX

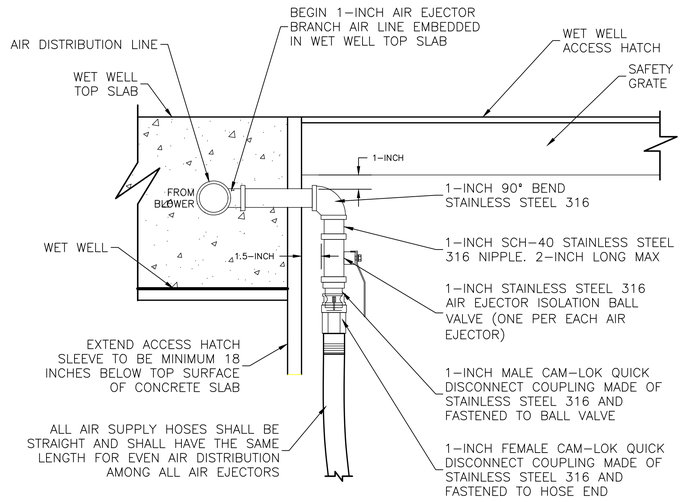
LIFT STATION DETAILS II

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.02

Date: Mar 18, 2024, 9:48am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\01-1293400.dwg



C5.03 A — AERATOR BLOWER INSTALLATION
N.T.S.

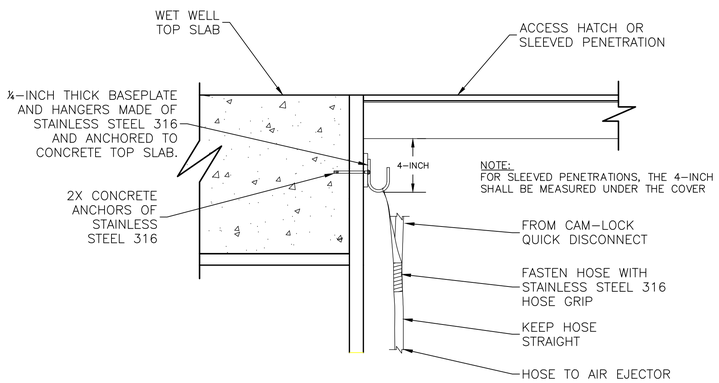


C5.03 B — AIR EJECTOR BRANCH LINE HOSE AND INSTALLATION ACCESS HATCH
N.T.S.

NOTES:

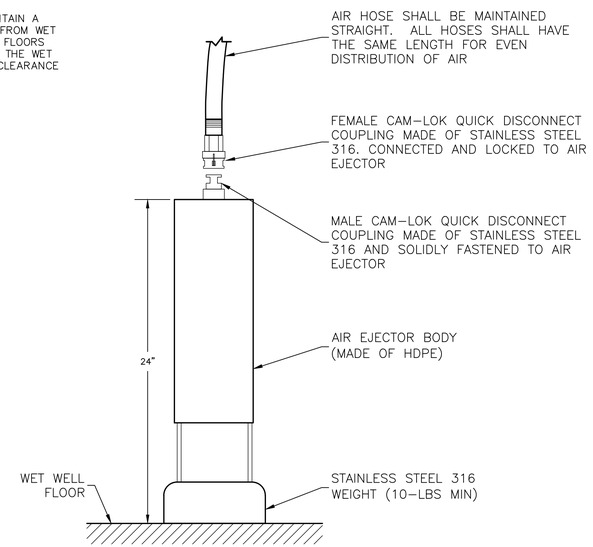
1. WHERE POSSIBLE, AIR EJECTORS SHALL TERMINATE AT ACCESS HATCHES. ANY AIR EJECTOR THAT CANNOT TERMINATE AT A WET WELL ACCESS HATCH SHALL TERMINATE AT A DEDICATED SLEEVED PENETRATION 12-INCH DIAMETER AND SHALL BE PROVIDED WITH A HEAVY DUTY POLYETHYLENE COVER FLUSHED WITH THE TOP SLAB SURFACE.
2. THE LOCATION OF ALL AIR ELECTORS AND ASSOCIATED BRANCH LINES, VALVES, FITTINGS AND HANGERS SHALL BE LOCATED IN A DEDICATED AREA THAT IS FREE OF CONDUITS, CABLES, LIFTING CHAINS, TRANSDUCERS, GUIDERAILS, AND BE SET IN A MANNER THAT NO OBSTRUCTION WILL OCCUR WHEN INSTALLING AND REMOVING PUMPS, FLOATS AND LEVEL TRANSDUCERS.
3. ALL PIPING, VALVES AND FITTINGS USED FOR BOTH AIR DISTRIBUTION LINES AND AIR EJECTOR BRANCH LINES SHALL BE SCHEDULE 40, THREADED AND BE MADE OF STAINLESS STEEL 316.
4. ALL ANCHOR BOLTS, STRUT CHANNELS, PIPE CLAMPS AND FASTENERS USED FOR INSTALLATION OF THE AERATOR SYSTEM SHALL BE MADE OF STAINLESS STEEL 316.
5. ALL THREADED JOINTS SHALL BE SEALED WITH SUFFICIENT TEFLON TAPE TO PREVENT AIR LEAK.
6. THE HANGER FOR HOSE SHALL BE SET IN A MANNER THAT THE AIR HOSE IS MAINTAINED STRAIGHT AND WITHOUT BENDS. ALL HOSES SHALL HAVE THE SAME LENGTH.

NOTE:
HANGER SHALL BE LOCATED ADJACENT TO BALL VALVE AND WITHOUT OBSTRUCTING THE BALL VALVE AND THE AIR EJECTOR



C5.03 C — AIR EJECTOR AIR HOSE HANGER DETAIL
N.T.S.

NOTE:
ALL AIR EJECTORS SHALL MAINTAIN A 12-INCH MINIMUM CLEARANCE FROM WET WELL WALL, SLOPED WET WELL FLOORS PUMPS AND ANY ITEMS WITHIN THE WET WELL, AND 24-INCH MINIMUM CLEARANCE AMONG OTHER AIR EJECTORS.



C5.03 D — AIR EJECTOR INSTALLATION DETAIL
N.T.S.

NO.	REVISION	DATE

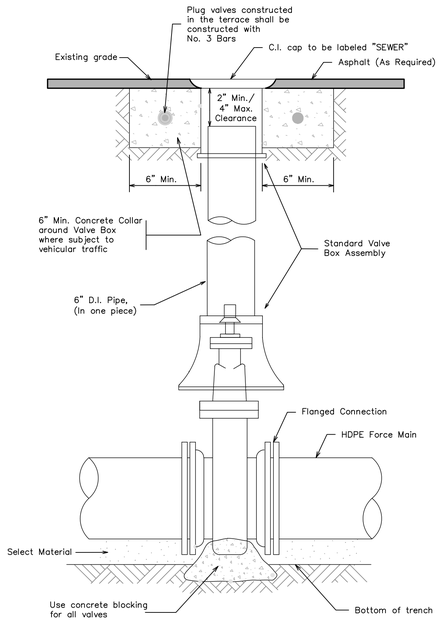
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

STATE OF TEXAS — KIM KEEFER — 117744 — LICENSED PROFESSIONAL ENGINEER — 11/22/24

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

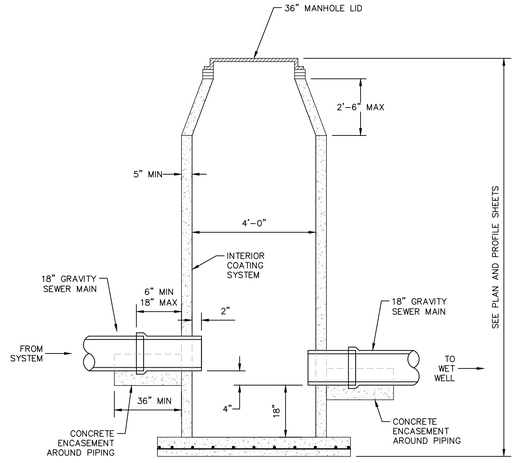
ODOR CONTROL DETAILS

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.03

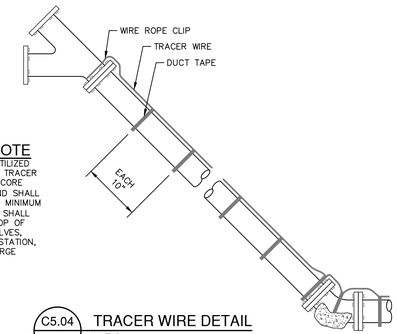


Note:
Contractor shall provide a valve stem riser that elevates the valve to within 3' to 4' of the surface (NSPI).

C5.04 A — INSTALLATION OF BURIED PLUG VALVE WITH VALVE BOX AND EXTENSION DETAIL
N.T.S.



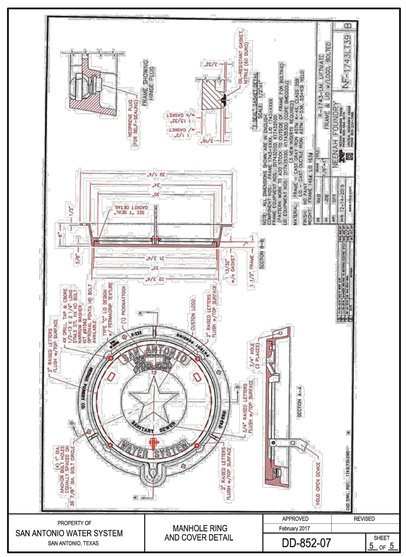
C5.04 B — LIFT STATION SITE MANHOLE "MH-LS-1"
N.T.S.



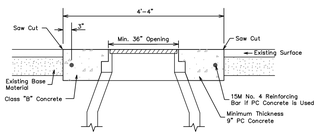
TRACER WIRE NOTE

TRACER WIRE SHALL BE UTILIZED FOR LOCATION PURPOSES. TRACER WIRE SHALL BE OF SOLID CORE (14 GAUGE INSULATED) AND SHALL BE TAPED TO THE MAIN A MINIMUM OF 10' INCREMENTS. WIRE SHALL ALSO COME UP TO THE TOP OF AIR RELEASE, VACUUM VALVES, TOP OF GROUND AT LIFT STATION, AND AT THE MAIN DISCHARGE POINT.

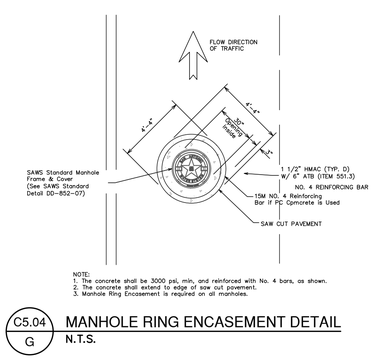
C5.04 F — TRACER WIRE DETAIL
N.T.S.



C5.04 E — MANHOLE RING AND COVER DETAIL
N.T.S.

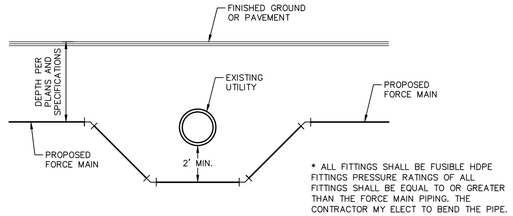


SECTION A–A



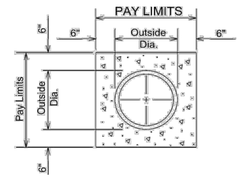
NOTE:
1. The concrete shall be 3000 psi, min, and reinforced with No. 4 bars, as shown.
2. The concrete shall extend to edge of saw cut pavement.
3. Manhole Ring Encasement is required on all manholes.

C5.04 G — MANHOLE RING ENCASEMENT DETAIL
N.T.S.

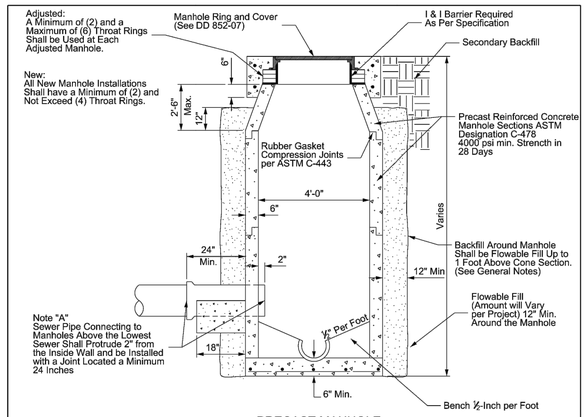


* ALL FITTINGS SHALL BE FUSIBLE HDPE FITTINGS PRESSURE RATINGS OF ALL FITTINGS SHALL BE EQUAL TO OR GREATER THAN THE FORCE MAIN PIPING. THE CONTRACTOR MY ELECT TO BEND THE PIPE.

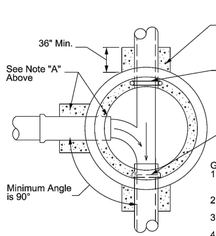
C5.04 C — TYPICAL UTILITY CROSSING DETAIL
N.T.S.



C5.04 D — SINGLE FORCE MAIN CONCRETE ENCASEMENT DETAIL
N.T.S.



PRECAST MANHOLE



Concrete Cradle to Nearest Point of all Lines Leaving or Entering Manholes
All Pipe is Used, Provide Rubber Gasket One Size Smaller than Pipe at Each Wall Crossing of Manhole, If HDPE Pipe is Used a Non-Shrink Grout to be Applied within the Wall Sections, Gasket is also, Required.

No Joints for Pipe will be Allowed within Wall Section

PRECAST MANHOLE

General Notes:
1. Material for Sanitary Sewer Pipe must be the Same from Manhole to Manhole. Changes In Type of Pipe may be Made Only at Manholes, or Special Structures, except as Approved by the SAWS Inspector.
2. Adapters and Concrete Collars shall be Used as Directed and Approved by theSAWS Inspector.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.
4. The Minimum Angle of Flow for a Connecting Sewer to the Direction of Flow Defined by a Collection System is 90 Degrees, unless Approved by the Engineer.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	STANDARD PRECAST MANHOLE	APPROVED MAY 2013	REVISED AUG 2019
		DD-852-01	SHEET 1 OF 2

C5.04 H — STANDARD PRECAST MANHOLE
N.T.S.

NO.	REVISION	DATE

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

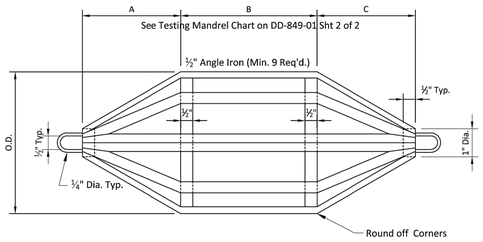
STATE OF TEXAS
KIM KEEFER
117744
LICENSED PROFESSIONAL ENGINEER
11/22/24

CORNERSTONE LIFT STATION #2 AND FORCE MAIN
SAN ANTONIO, TX

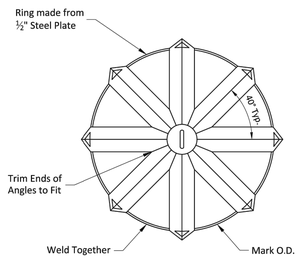
FORCE MAIN AND SANITARY SEWER DETAILS I

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.04

Date: Mar 18, 2024, 9:48am User ID: dloughlin
File: P:\129\34\00\Design\Civil\LS\DT-12934400.dwg



SIDE OR TOP VIEW



END VIEW

Note:
All Mandrels must be Approved by SAWS Construction Inspection Dept. and Stamped before Use.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL	March 2008	December 2019
		DD-849-01	SHEET 1 OF 2

C5.05 A DEFLECTION TESTING MANDREL
N.T.S.

SIZE	A	B*	MANDREL O.D. PVC (SDR -26)	RING O.D. PVC (SDR -26)
6"	4.0"	4.5"	5.50	4.79
8"	5.5"	6"	7.37	6.66
10"	7.0"	7.5"	9.21	8.50
12"	8.0"	9"	10.96	10.25
15"	10.0"	11"	13.42	12.71
18"	12.0"	13.5"	———	———
21"	14.0"	16"	———	———
24"	16.0"	18"	———	———
27"	18.0"	20"	———	———

*Minimum Length

CHART

Notes:
PVC Pipes and Fittings 6" to 15" in Diameter shall Conform to ASTM D-2241
PVC Pipes and Fittings 18" to 27" in Diameter shall Conform to ASTM F-679

This information is provided as a reference. All deflection testing shall be done in accordance with TCEQ Capter 217.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL CHART	March 2008	December 2019
		DD-849-01	SHEET 2 OF 2

C5.05 B DEFLECTION TESTING MANDREL
N.T.S.

NO.	REVISION	DATE

STATE OF TEXAS
KIM KEEFER
117744
LICENSED
PROFESSIONAL ENGINEER
11/22/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CORNERSTONE LIFT STATION #2
AND FORCE MAIN
SAN ANTONIO, TX
FORCE MAIN AND SANITARY SEWER DETAILS II

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER JK
CHECKED RM DRAWN RJ
SHEET C5.05

ELECTRICAL LEGEND

ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION
	CONVENIENCE RECEPTACLE-DUPLEX UNLESS SPECIFIED OTHERWISE CR = CORROSION RESISTANT WP = WEATHERPROOF GFI = GROUND FAULT INTERRUPTER
	RECEPTACLE - 240V., 1ϕ OR 208V., 1ϕ
	CONTACT - NORMALLY OPEN
	CONTACT - NORMALLY CLOSED
	THERMAL OVERLOAD HEATER - AMBIENT COMPENSATED
	CIRCUIT BREAKER - THERMAL MAGNETIC 3 POLE UNLESS INDICATED OTHERWISE CONTINUOUS AMP TRIP SETTING INDICATED
	MOMENTARY PUSHBUTTON NORMALLY OPEN
	MOMENTARY PUSHBUTTON NORMALLY CLOSED
150A	FUSED SWITCH - SWITCH AND FUSE CURRENT RATING INDICATED. 3 POLE UNLESS INDICATED OTHERWISE.
100A	SWITCH - CURRENT RATING INDICATED. 3 POLE UNLESS INDICATED OTHERWISE
	FUSED TERMINAL BLOCK
R	ALARM HORN AND BEACON
O H A POLE 1 XOO POLE 2 OOX	SELECTOR SWITCH-MAINTAINED CONTACT. CHART DEFINES OPERATION: X = CLOSED CONTACT 0 = OPEN CONTACT

	POSITION		
POLE	HAND	OFF	AUTO
1	X	0	0
2	0	0	X

	GROUND
	TRANSFORMER
M	MOTOR, SQUIRREL CAGE INDUCTION-HORSEPOWER INDICATED ON ONE LINE.
	LUMINAIRE, POLE MOUNTED. ● INDICATES FOUNDATION
A PTT	INDICATING LIGHT-PUSH TO TEST (PTT) LETTER INDICATES COLOR. A = AMBER Y = YELLOW G = GREEN B = BLUE R = RED W = WHITE
	MOTOR OR STARTER ENCLOSURE SPACE HEATER
*	BASIC RELAY SYMBOL-SOME RELAY FUNCTIONS: ALT = ALTERNATOR CR = CONTROL RELAY TR = TIMING RELAY M = MOTOR CONTACTOR
	THERMOSTAT
	LEVEL FLOAT
	GROUNDING CONNECTION EXOTHERMIC OR COMPRESSION
	GATE FLEXIBLE GROUNDING STRAP.
	GROUND ROD CONNECTION 3/4" X 10' LONG.
	TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG.
	ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.
	GROUND MOISTURIZING PORT

SWITCHGEAR / MCC SYMBOLS

SYMBOL	DESCRIPTION
SSOLR	SOLID STATE OVERLOAD RELAY MOTOR OVERLOAD, PHASE LOSS,AND CURRENT UNBALANCE PROTECTION

I/O SYMBOL LEGEND

SYMBOL	DESCRIPTION
▲	DIGITAL INPUT
△	ANALOG INPUT

ELECTRICAL ABBREVIATIONS

ATS	AUTOMATIC TRANSFER SWITCH	LS,LMS	LIMIT SWITCH
AUTO	AUTOMATIC	G	GREEN INDICATING LIGHT
AUX	AUXILIARY	M	MAGNETIC CONTACTOR COIL
BC	BYPASS CONTACTOR	M	ELECTRIC MOTOR
CC	CONTROL CABLE	M	MAIN CONTACTOR AUXILIARY
CPT	CONTROL POWER TRANSFORMER	MIN	MINUTES
CR	CONTROL RELAY	MTS	MANUAL TRANSFER SWITCH
CS	CONTROL SWITCH	N	NEUTRAL GROUNDED CONDUCTOR
CT	CURRENT TRANSFORMER	OC	OVERCURRENT
EI	ELECTRICAL INTERRUPT	PH	PHASE
ETM	ELAPSED TIME METER	RVSS	REDUCED VOLTAGE SOFT START
FLA	FULL LOAD AMPERE	SA	SURGE ARRESTOR
FU	FUSE	SEC	SECONDS
FVNR	FULL VOLTAGE NON-REVERSING	SPD	SURGE PROTECTIVE DEVICE
HOA	HAND OFF AUTOMATIC SWITCH	TR	TIMER
ISW	ISOLATION SWITCH	V	VOLT
J,JB	JUNCTION BOX	WP	WEATHER PROOF
KVA	KILOVOLT-AMPERE	XFMR	TRANSFORMER
KW	KILOWATT		
LC	LINE CONTACTOR		

P& ID INSTRUMENTATION IDENTIFICATION SYMBOL

INSTRUMENTATION IDENTIFICATION LEGEND

LETTER	PROCESS OR INITIATING VALUE	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)	ALARM		
B	BURNER FLAME	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
C	CONDUCTIVITY		CONTROL	
D	DENSITY (3.0)			
E	VOLTAGE	PRIMARY ELEMENT		
F	FLOW RATE			
G	GAUGE	GLASS	GATE	
H	HAND (MANUAL)			HIGH
I	CURRENT	INDICATE		
J	POWER			
K	TIME OR SCHEDULE		CONTROL STATION	
L	LEVEL	LIGHT (PILOT)		LOW
M	MOTION			MIDDLE
N	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
O	USERS CHOICE (*)	ORIFICE		
P	PRESSURE (OR VACUUM)	POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTEGRATE		
R		RECORD OR PRINT		
S	SPEED OR FREQUENCY		SWITCH	
T	TEMPERATURE		TRANSMIT	
U	MULTIVARIABLE (*)	MULTIFUNCTION (*)	MULTIFUNCTION (*)	MULTIFUNCTION (*)
V	VISCOSITY		VALVE OR DAMPER	
W	WEIGHT OR FORCE	WELL		
X	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	USERS CHOICE (*)		RELAY OR COMPUTE (*)	
Z	POSITION		DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

P&ID SYMBOLS

SYMBOL	DESCRIPTION
	SWING CHECK VALVE
	GATE VALVE
	PUMP

INSTRUMENTATION SYMBOLS

SYMBOL	DESCRIPTION
FIT	FIELD MOUNTED INSTRUMENT
YL	LOCAL CONTROL PANEL MOUNTED INSTRUMENT
YL	POINT MONITORED BY SCADA

INSTRUMENTATION IDENTIFICATION

LIC	LEVEL INDICATING CONTROLLER
PIT	PRESSURE INDICATING TRANSMITTER
LAH	LEVEL ALARM HIGH
TAH	TEMPERATURE ALARM HIGH
TT	TEMPERATURE TRANSMITTER

P&ID ABBREVIATION INDEX

BYP/SS	BYPASS OR SOFT START SELECTION
ETM	ELAPSED TIME METER
HOA	HAND OFF AUTOMATIC
HLR	HIGH LEVEL RELAY
ILP	INFLUENT LIFT PUMP
IR	ISOLATION RELAY
LC	LINE CONTACTOR
LLR	LOW LEVEL RELAY
LS	LIFT STATION
OL	MOTOR OVERLOAD
OT	OVERTEMPERATURE
PLR	PHASE LOSS RELAY
TR	TIMING RELAY
SL	SEAL LEAK
SS	SELECTOR SWITCH
TF	TRANSFER FAIL RELAY

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. TEL. NO. 210-658-7250
SAN ANTONIO, TX 78212 FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

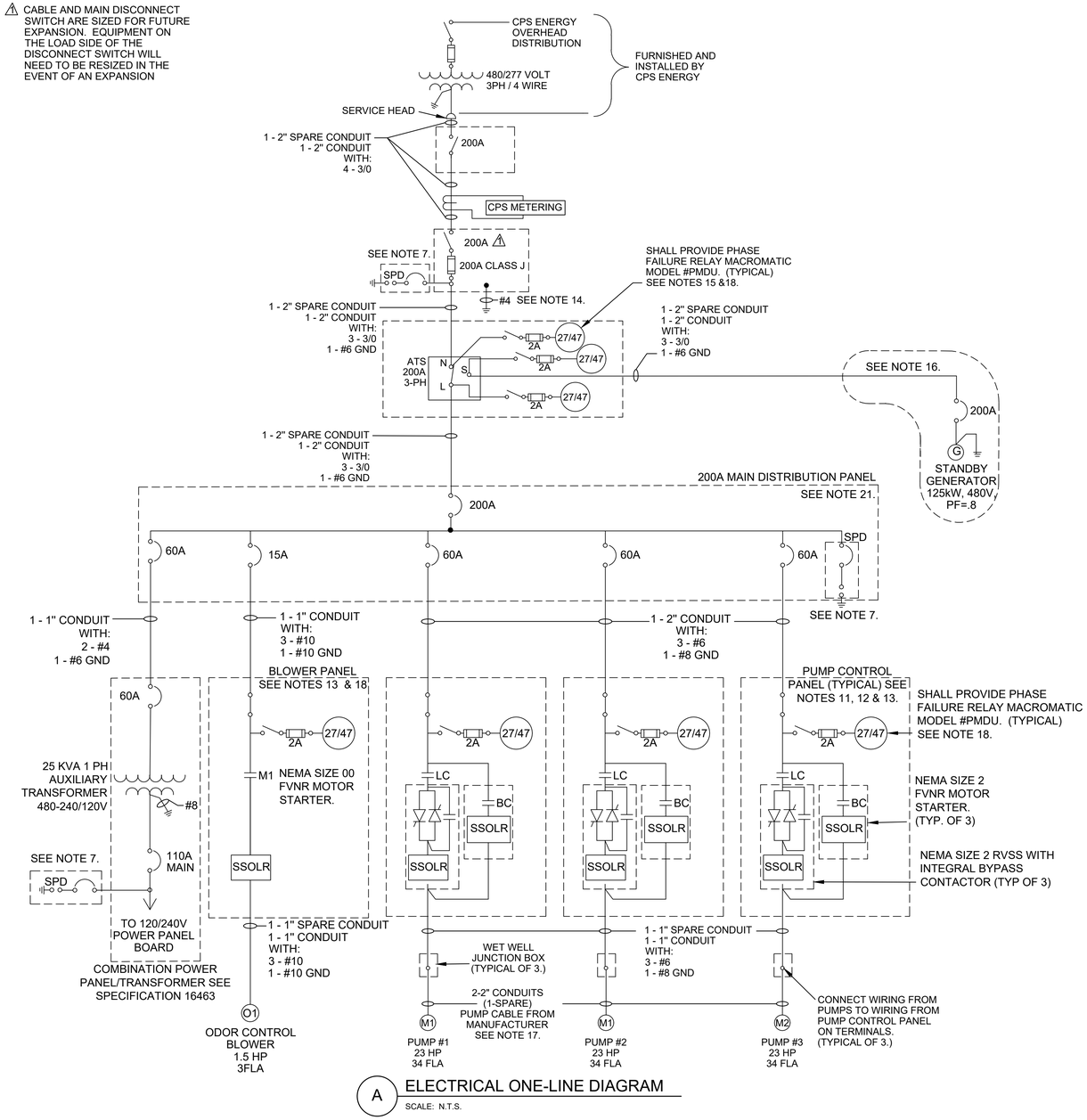
PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS
ELECTRICAL LEGEND

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E1

Date: Dec 06, 2023, 4:14pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-1 elect legend.dwg

⚠ CABLE AND MAIN DISCONNECT SWITCH ARE SIZED FOR FUTURE EXPANSION. EQUIPMENT ON THE LOAD SIDE OF THE DISCONNECT SWITCH WILL NEED TO BE RESIZED IN THE EVENT OF AN EXPANSION



A ELECTRICAL ONE-LINE DIAGRAM

SCALE: N.T.S.

LOAD SCHEDULE		
DESCRIPTION	CONNECTED LOAD	ESTIMATED DEMAND
PUMP 1	23.0KVA	23.0KVA
PUMP 2	23.0KVA	23.0KVA
PUMP 3	23.0KVA	23.0KVA
BLOWER	1.5KVA	1.5KVA
TRANSFORMER	25.0KVA	20.0KVA
TOTAL	95.5KVA	90.5KVA

NOTE TO CONTRACTOR

NO MODIFICATIONS CAN BE MADE TO THE LIFT STATION PRIOR TO APPROVAL BY THE ENGINEER AND SAWS.

CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE SAWS INSPECTOR WHEN LIFT STATION CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

- WHEN PUMP CONTROL PANEL ARRIVES AT THE SITE
- WHEN SCADA PANEL ARRIVES AT THE SITE
- DUCTBANKS PRIOR TO POUR
- GROUNDING PRIOR TO POUR
- SCADA MAST FOUNDATION PRIOR TO POUR
- UPON COMPLETION OF ALL TERMINATIONS
- ELECTRICAL SERVICE RACK PAD PRIOR TO POUR
- GENERATOR FOUNDATION PRIOR TO POUR

WORK SHALL NOT CONTINUE ON THE LIFT STATION UNTIL THE ENGINEER AND SAWS HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER AND SAWS 48 HOURS ADVANCED NOTICE PRIOR TO THE TIME THAT THE LIFT STATION WILL BE AT THE REQUIRED STAGE.

TYPE: 225A COPPER BUS
110A MAIN BREAKER
120/240V
1-PHASE, 3-WIRE

POWER PANEL 'A'

LABEL	CONDUIT	WIRE	LOAD	BREAKER SIZE	POLE	CKT.	CKT.	POLE	BREAKER SIZE	LOAD	WIRE	CONDUIT	LABEL
GENERATOR BLOCK HEATER	1"	2 - #10 1 - #10 GND	1.0 KW	20	2	1	2	1	20	0.2 KW	2 - #10 1 - #10 GND	1"	GENERATOR BATTERY CHARGER
						3	4	1	20	0.6 KW	2 - #10 1 - #10 GND	1"	HEAT TRACE CONTROL PANEL
AREA LIGHT #1	1"	2 - #10 1 - #10 GND	0.3 KW	20	1	5	6	1	20	0.2 KW	2 - #10 1 - #10 GND	1"	SPD FOR COMBO XFMR
CANOPY LIGHTS	1"	2 - #10 1 - #10 GND	0.2 KW	20	1	7	8	1	20	1.9 KW	2 - #10 1 - #10 GND	1"	PUMP CONTROL PANEL #1
SCADA UPS	1"	2 - #10 1 - #10 GND	2.0 KW	20	1	9	10	1	20	1.9 KW	2 - #10 1 - #10 GND	1"	SCADA PANEL RECEPT. & LTS
SCADA PANEL AIR COND.	1"	2 - #10 1 - #10 GND	2.0 KW	20	1	11	12	1	20	1.9 KW	2 - #10 1 - #10 GND	1"	LEVEL CONTROL PANEL
PUMP CONTROL PANEL #2	1"	2 - #10 1 - #10 GND	1.9 KW	20	1	13	14	1	20	0.1 KW	2 - #10 1 - #10 GND	1"	SCADA HEATER
ELECTRICAL RACK RECEPTACLE	1"	2 - #10 1 - #10 GND	1.9 KW	20	1	15	16	1	20	1.9 KW	2 - #10 1 - #10 GND	1"	ODOR CONTROL BLOWER
PUMP CONTROL PANEL #3	1"	2 - #10 1 - #10 GND	1.9 KW	20	1	15	16	1	20	0.3 KW	2 - #10 1 - #10 GND	1"	AREA LIGHT #3
AREA LIGHT #2	1"	2 - #10 1 - #10 GND	0.3 KW	20	1	17	18	1	20	-			SPARE
SPARE			-			19	20			-			SPARE
SPARE			-			21	22			-			MOVE
SPARE			-			23	24			-			SPARE
SPARE			-			25	26			-			SPARE
SPARE			-			27	28			-			SPARE
			11.5 KW			20.4 KW			9.0 KW				

NOTES:
1. CONTRACTOR TO COORDINATE BREAKER AND CABLE RATING WITH GENERATOR REQUIREMENTS.
2. EACH CIRCUIT SHALL HAVE SEPARATE HOT, NEUTRAL, GROUND WIRES. DO NOT SHARE NEUTRAL GROUND WIRE FROM OTHER CIRCUITS.

B 120/240V POWER PANEL

SCALE: N.T.S.

1. ALL ELECTRIC CONDUIT SHALL BE CONCRETE ENCASED 24 INCHES BELOW GRADE.
2. ABOVE GROUND CONDUIT SHALL BE RIGID ALUMINUM. PVC COATED ALUMINUM CONDUIT SHALL BE PROVIDED ON AREAS WHERE CONCRETE COMES IN CONTACT WITH ALUMINUM CONDUIT.
3. UNDER GROUND CONDUIT SHALL BE PVC SCHEDULE 40 CONDUIT. SEE DETAILS B AND D ON SHEET E13.
4. ALL ENCLOSURES AND DISCONNECT SWITCHES MUST BE PAD-LOCKABLE. PUMP CONTROL PANELS SHALL BE SINGLE DOOR, WALL MOUNTED TYPE WITH 480V EQUIPMENT LOCATED IN THE RIGHT SIDE FOR EACH PUMP INSTALLED. LEVEL CONTROL PANEL SHALL BE COMMON TO ALL PUMP CONTROL PANELS FOR AUTOMATIC CONTROL. ALL ENCLOSURES AND JUNCTION BOXES MUST BE WHITE ENAMELED COATED.
5. ALL DISCONNECTS SHALL BE NEMA 4X, 316 STAINLESS STEEL.
6. PROVIDE SEALING FITTINGS FOR ALL CONDUIT LEAVING THE RACK. SEALS MUST BE LOCATED WITHIN 18" OF ENCLOSURE PER NEC.
7. PROVIDE A SURGE PROTECTIVE DEVICE IN A SEPARATE WHITE ENAMELED COATED ENCLOSURE ADJACENT TO THE MDP, (IF MANUFACTURER DOES NOT MAKE AN INTEGRATED SPD.) POWER PANEL AND SAFETY SWITCHES. DEVICE MUST ADHERE TO UL1449 4TH EDITION STANDARDS. REFER TO SPECIFICATION 16451. PROVIDE BREAKER FOR SURGE PROTECTIVE DEVICE AS RECOMMENDED BY MANUFACTURER. TAPPED FEEDER SIZE SHALL BE MINIMUM OF 3/0 AWG UNLESS REQUIRED TO BE LARGER PER MANUFACTURER REQUIREMENTS. CABLE LENGTH BETWEEN THE EQUIPMENT THE SPD IS PROTECTING AND THE SPD PANEL MUST BE AS SHORT AS POSSIBLE PER 2017 NEC ARTICLE 285.12 (2020 NEC ARTICLE 242.24) UNLESS DIRECTED OTHERWISE BY MANUFACTURER.
8. NOT ALL SPARE CONDUITS ARE SHOWN ON THIS SHEET. SEE SITE PLAN FOR ADDITIONAL SPARE CONDUITS.
9. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS AT ANY POINT.
10. ALL ELECTRICAL COMPONENTS SHALL BE NEMA RATED.
11. IF PROVIDED PUMPS ARE NOT SIZED PER PROJECT PLANS, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ENGINEERING REQUIRED FOR RESIZING ALL EQUIPMENT AT NO CHARGE TO SAWS AND/OR DEVELOPER.
12. PROTECTIVE DEVICES ARE SIZED PER NEC GUIDELINES. CONTRACTOR SHALL SIZE PROTECTIVE DEVICES PER NEC AND PER RESULT OF POWER SYSTEM STUDY.
13. MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURE MUST BE UTILIZED DURING EQUIPMENT INSTALLATION START-UP TO AVOID EQUIPMENT DAMAGE. IF EQUIPMENT IS DAMAGED DURING START-UP DUE TO NOT FOLLOWING MANUFACTURER'S PROCEDURE, THEN CONTRACTOR IS RESPONSIBLE FOR COST ASSOCIATED WITH EQUIPMENT REPLACEMENT.
14. BOND NEUTRAL TO GROUNDING ELECTRODE CONDUCTOR.
15. INSTALL THE THREE (3) PHASE FAILURE RELAYS FOR INCOMING POWER WITHIN THE ATS ENCLOSURE. THE ENCLOSURE OF THE ATS SHALL BE LARGE ENOUGH TO ALLOW THE INTERNAL INSTALLATION OF THE THREE PHASE LOSS RELAYS AND THEIR COMPACT CIRCUIT PROTECTORS. THESE PHASE LOSS RELAYS ARE TO PROVIDE SCADA INDICATION.
16. GENERATOR SIZE TO BE VERIFIED BY GENERATOR MANUFACTURER BASED ON PERFORMANCE TEST REQUIREMENTS IN SPECIFICATION 16600. GENERATOR SHALL BE PROVIDED WITH OVER CURRENT PROTECTION BREAKER AS RECOMMENDED BY MANUFACTURER.
17. MOTOR BRANCH CIRCUIT CONDUITS FROM WET WELL HATCH TO WET WELL JUNCTION BOX, WHERE THE MOTOR POWER CABLES WILL BE RUN. CONDUIT SHALL BE TWO (2) INCHES. SEE SHEET E12.
18. CONTRACTOR TO PROVIDE PHASE FAILURE RELAY (PLR) MACROMATIC MODEL #PMDU. FUSES FOR PHASE FAILURE RELAY BE DISCONNECTABLE AS MANUFACTURED BY BUSSMAN MODEL CCP2-3-30CF. ROTARY HANDLE NOT REQUIRED.
19. AUTOMATIC TRANSFER SWITCH (ATS) SHALL HAVE A COMMON SOLID GROUND CONDUCTOR TO THE GENERATOR AND SERVICE.
20. MAIN DISTRIBUTION PANELBOARD (MDP) SHALL BE OF THE BOLTED TYPE CIRCUIT BREAKERS.
21. ALL BREAKERS MUST BE INDIVIDUALLY LOCKABLE. LOCKING MEANS MUST NOT BE READILY REMOVABLE. PORTABLE LOCKING MEANS ARE NOT ALLOWED.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

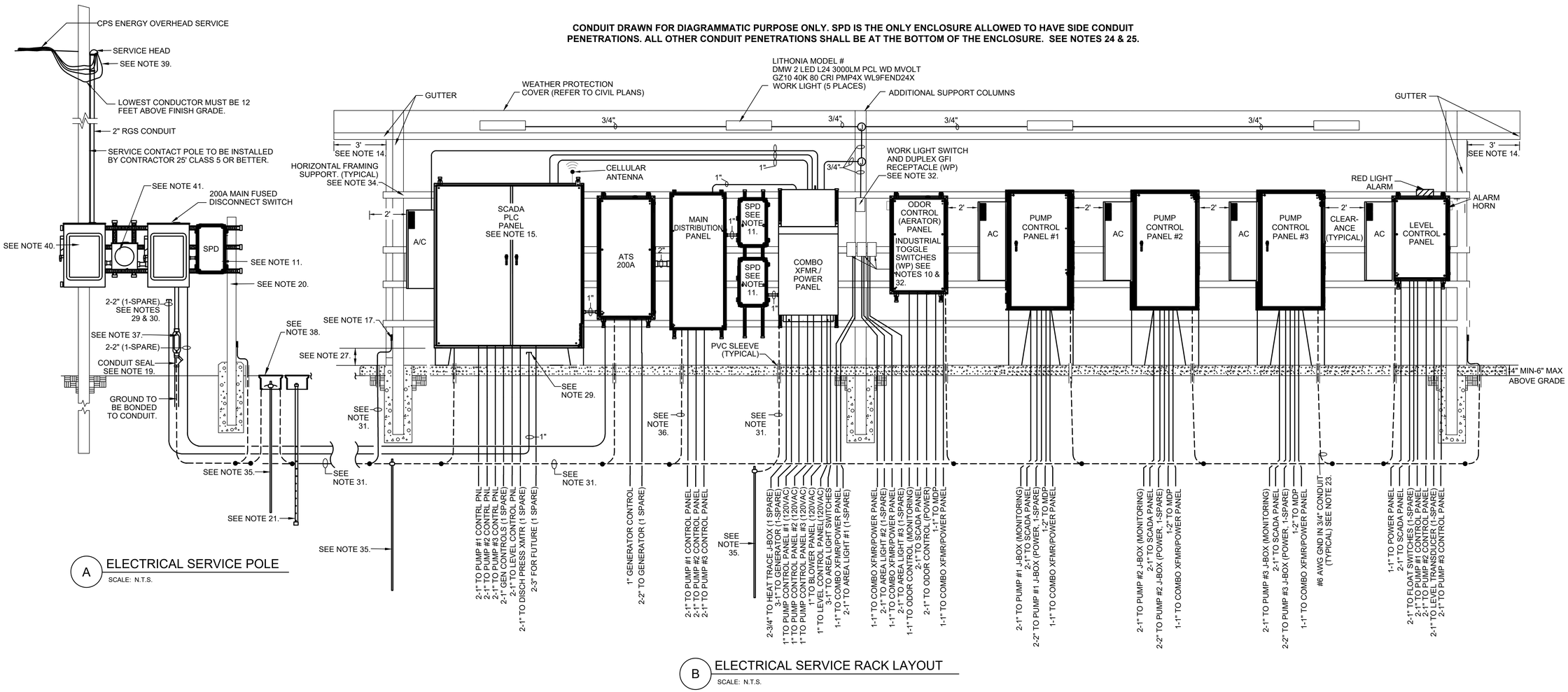
CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS
ELECTRICAL ONE-LINE DIAGRAM

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E2

Date: Dec 06, 2023, 4:14pm User ID: SGraf
File: K:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-2 ELECTRICAL\One-line Diagram.dwg

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805

NO.	REVISION	DATE



NOTES:

1. ALL ELECTRIC CONDUIT SHALL BE CONCRETE ENCASED 24 INCHES BELOW GRADE.
2. ABOVE GROUND CONDUIT SHALL BE RIGID ALUMINUM. PVC COATED ALUMINUM CONDUIT SHALL BE PROVIDED ON AREAS WHERE CONCRETE COMES IN CONTACT WITH ALUMINUM CONDUIT.
3. UNDER GROUND CONDUIT SHALL BE PVC SCHEDULE 40 CONDUIT. SEE DETAILS C AND E ON SHEET E12.
4. ALL ENCLOSURES AND DISCONNECT SWITCHES MUST BE PAD-LOCKABLE. PUMP CONTROL PANEL SHALL BE SINGLE DOOR, WALL MOUNTED TYPE WITH 480V EQUIPMENT LOCATED IN THE RIGHT SIDE. INSTALL ONE PUMP CONTROL PANEL FOR EACH PUMP. LEVEL CONTROL PANEL SHALL BE COMMON TO ALL PUMP CONTROL PANELS FOR AUTOMATIC CONTROL. ALL ENCLOSURES AND JUNCTION BOXES MUST BE WHITE ENAMELED COATED ON EXTERIOR.
5. ALL MOUNTING HARDWARE, FITTINGS AND STRUT CHANNEL SHALL BE 316 STAINLESS STEEL. ALL ENCLOSURES SHALL BE NEMA 4X, 316 STAINLESS STEEL WITH WHITE ENAMELED COATING ON EXTERIOR.
6. ALL DISCONNECTS SHALL BE NEMA 4X, 316 STAINLESS STEEL.
7. SERVICE RACK STRUTS NEED TO BE 1-1/2" MINIMUM 316 STAINLESS STEEL AND SHALL BE MOUNTED ON 4" DIAMETER, 1/2" THICK STRUCTURAL HOT DIP GALVANIZED STEEL TUBE. STRUT CHANNEL ENDS SHALL BE PROTECTED WITH END CAPS.
8. THERE SHALL BE 6" MINIMUM SPACING BETWEEN EQUIPMENT MOUNTED ON THE RACK WITH THE EXCEPTION OF THE SPD. ALLOW 2 FEET CLEARANCE FOR SERVICE OF PANEL A/C UNIT.
9. ELECTRICAL RACK SHALL HAVE SUPPORT COLUMNS EVERY 5 FEET.
10. 20 AMP, SPDT, CENTER OFF, INDUSTRIAL TOGGLE SWITCH.
11. PROVIDE A SURGE PROTECTIVE DEVICE IN A SEPARATE WHITE ENAMEL COATED EXTERIOR ENCLOSURE ATTACHED TO THE ADJACENT TO THE SAFETY SWITCHES, MDP AND COMBO TRANSFORMER/POWER PANEL (IF MANUFACTURER DOES NOT MAKE AN INTEGRATED SPD FOR THE MDP AND COMBO/TRANSFORMER/POWER PANEL.) DEVICE MUST ADHERE TO UL1449 4TH EDITION STANDARDS. REFER TO SPECIFICATION 16451. PROVIDE BREAKER FOR SURGE PROTECTIVE DEVICE AS RECOMMENDED BY MANUFACTURER. TAPPED FEEDER SIZE SHALL BE MINIMUM OF #10 AWG UNLESS REQUIRED TO BE LARGER PER MANUFACTURER REQUIREMENTS. LENGTH MUST BE AS SHORT AS POSSIBLE, UNLESS DIRECTED OTHERWISE BY MANUFACTURER, BETWEEN THE EQUIPMNENT THE SPD IS PROTECTING TO THE SPD PANEL PER 2017 NEC ARTICLE 285.12 (2022 NEC ARTICLE 242.24)
12. NOT ALL SPARE CONDUITS ARE SHOWN ON THIS SHEET. SEE SITE PLAN FOR ADDITIONAL SPARE CONDUITS.
13. ALL EQUIPMENT SHALL BE MOUNTED ON THE FRONT OF THE SERVICE RACK. NO EQUIPMENT SHALL BE MOUNTED ON THE BACK OF RACK. ANY LENGTHENING OF THE RACK TO BE APPROVED BY THE STRUCTURAL ENGINEER.
14. CANOPY SHALL EXTEND 3 FEET BEYOND THE ENCLOSURE SIDE EDGE. (THE AIR CONDITIONER IS CONSIDERED THE ENCLOSURES SIDE EDGE.)
15. SEE SHEETS E-9 AND E-10 FOR SCADA PANEL INFORMATION.
16. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS AT ANY POINT.
17. GROUNDING CONNECTION TO SERVICE RACK. SEE SHEET E-13 DETAIL A. (TYPICAL).
18. ALL ELECTRICAL COMPONENTS SHALL BE NEMA RATED.
19. SEALS MUST BE LOCATED WITHIN 18" OF ENCLOSURE PER NEC.
20. CONTRACTOR SHALL FOLLOW CPS ENERGY STANDARDS FOR RACK INSTALLATION.
21. MOISTURIZING PORT SHALL BE LOCATED ADJACENT TO TEST WELL. MOISTURIZING PORT IS 1-INCH PVC SCH 80 PIPE WITH 1/8-INCH DIAMETER PERFORATIONS TO ALLOW WATER SEEPAGE 1 FOOT AWAY FROM GROUNDING ROD.
22. REFER TO STRUCTURAL DRAWINGS FOR CANOPY AND RACK STRUCTURAL DETAILS.
23. ALL PANELS SHALL BE GROUNDED WITH #6 COPPER GROUNDING CONDUCTOR PER SAWS DIRECTION.
24. RACK SHOWN IS FOR DIAGRAMMATIC PURPOSE ONLY. PLEASE SEE STRUCTURAL DRAWINGS FOR CANOPY AND RACK CONSTRUCTION AND FOUNDATION DETAILS.
25. CONDUIT TOP PENETRATIONS, BACK PENETRATIONS AND SIDE PENETRATIONS ON ALL PANELS AND JUNCTION BOXES REGARDLESS OF LOCATION ARE NOT ALLOWED. SURGE PROTECTIVE DEVICE IS THE ONLY ENCLOSURE TO HAVE SIDE PENETRATIONS. CONDUIT SHOWN ARE DRAWN FOR DIAGRAMMATIC PURPOSE ONLY.
26. PROTECTIVE DEVICES ARE SIZED PER NEC GUIDELINES. CONTRACTOR SHALL SIZE PROTECTIVE DEVICES PER NEC AND PER RESULT OF POWER SYSTEM STUDY.
27. 24" MINIMUM FROM GRADE TO BOTTOM OF ENCLOSURES.
28. DIELECTRIC COUPLINGS SHALL BE INSTALLED BETWEEN DISSIMILAR METALS IN ALL CASES.
29. TWO (2) - ONE (1) INCH CONDUITS FOR FUTURE TELEPHONE LINE. CONTRACTOR TO TERMINATE CONDUIT ON TYPE "C" CONDUIT BODIES WITH CAP OPEN END TO PREVENT INTRUSION OF MOISTURE AND DEBRIS BEHIND SCADA PANEL..
30. CONTRACTOR TO TERMINATE THE SPARE CONDUITS ON TYPE "C" CONDUIT BODIES AND CAP FOR FUTURE ENCLOSURE INSTALLATION.
31. #4/0 COPPER GROUND CONDUCTOR FURNISHED AND INSTALLED BY CONTRACTOR (TYPICAL).
32. PROVIDE LABELS FOR LIGHT SWITCHES AND RECEPTACLE.
33. EQUIPMENT MUST BE MOUNTED FACING SOUTH.
34. CONTRACTOR TO MOUNT HORIZONTAL FRAMING TO SUPPORT COLUMNS USING U-BOLTS. DO NOT DRILL IN SUPPORT COLUMN.
35. APPROVED GROUNDING ELECTRODE AND CLAMP FURNISHED AND INSTALLED BY CONTRACTOR. GROUND ROD SHALL BE 3/4" X 10'. CONNECTION IS TO BE MADE BELOW FINISH GRADE. GROUND RESISTANCE OF INSTALLED ROD W/O CONNECTIONS SHALL BE MEASURED AND REPORTED TO THE ENGINEER. REFER TO SECTION 16950.
36. #6 COPPER TINNED GROUND CONDUCTOR (TYPICAL OF 9).
37. ALUMINUM CONDUIT BODY TYPE C. CONTRACTOR WILL LEAVE A GROUNDING CONDUCTOR LOOP TO ALLOW GROUND RESISTANCE MEASUREMENT
38. 6" DUCTILE IRON COVER FOR GROUND TEST WELL AND MOISTURIZING PORT. PVC PIPE PROVIDED WITH THREADED CAP. SEE NOTE 21 AND 35.
39. CONTRACTOR MUST PROVIDE 24" OF WIRE ENDS EXTENDING OUT OF SERVICE HEAD FOR CPS TO MAKE CONNECTIONS AND FOR FORMING A DRIP LOOP CONDUCTOR 4-3/0 CU.
40. INCOMING MAIN 200A NON FUSED DISCONNECT SWITCH. TOP OF ENCLOSURE MUST BE 5 FEET ABOVE FINISHED GRADE FOR BOTH FUSED AND NON FUSED DISCONNECT SWITCHES.
41. POWER METER FURNISHED BY CPS, AND INSTALLED BY CONTRACTOR

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

ELECTRICAL SERVICE POLE AND RACK LAYOUT

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E3

Date: Dec 06, 2023, 4:15pm User ID: SCraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-3 ELECTRICAL SERVICE RACK LAYOUT.dwg

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST.
SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805

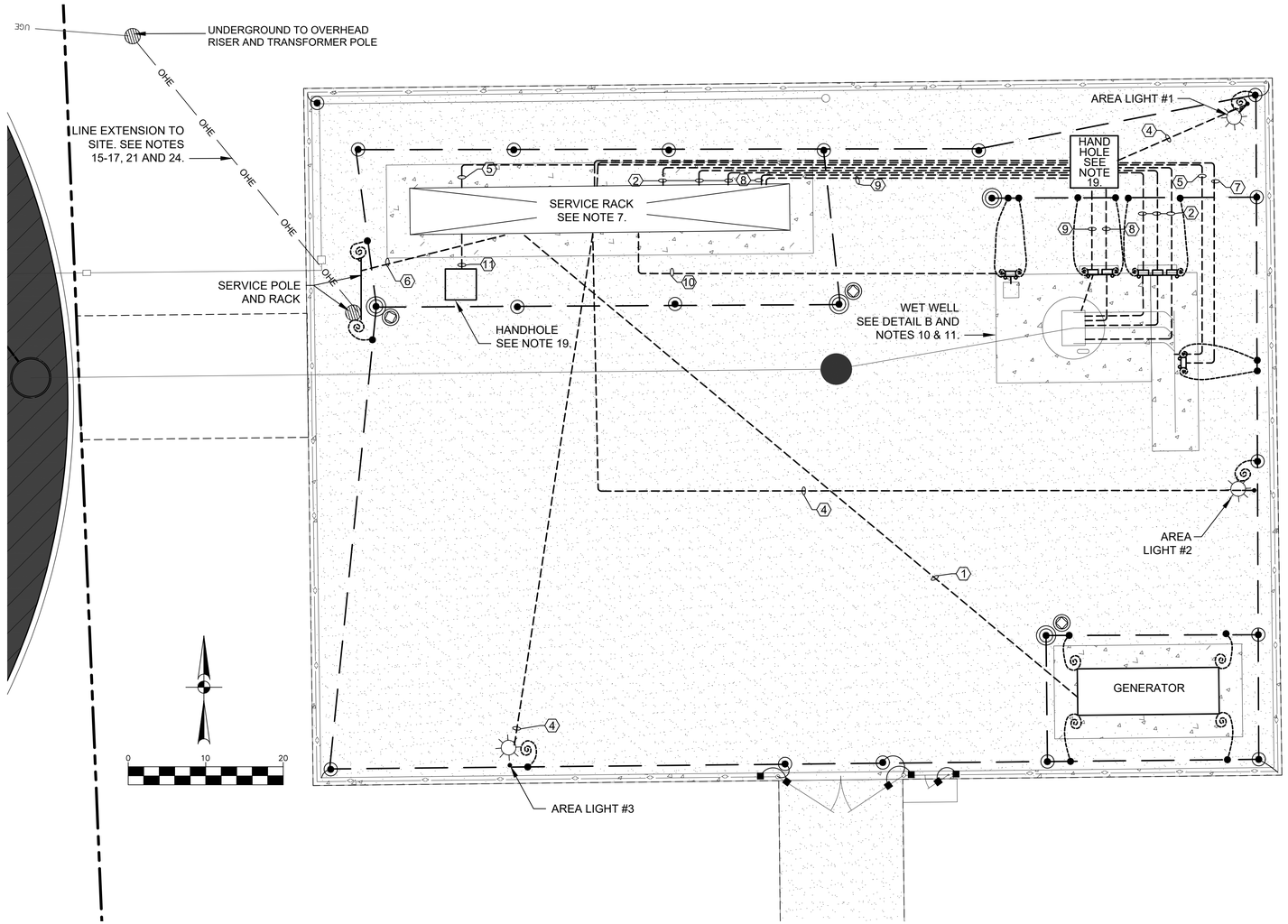
NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

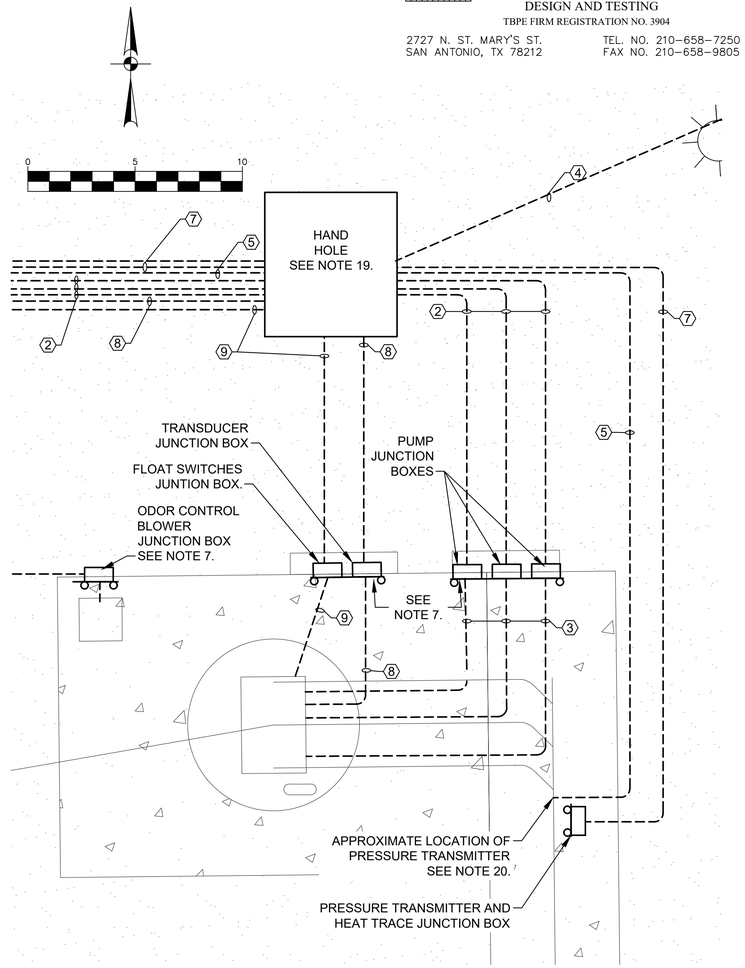
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

ELECTRICAL SITE PLAN



A SITE PLAN
SCALE: AS SHOWN



B WET WELL
SCALE: AS SHOWN

	GROUND MOISTURIZING PORT
	GROUNDING CONNECTION EXOTHERMIC OR COMPRESSION
	GATE FLEXIBLE GROUNDING STRAP.
	GROUND ROD CONNECTION 3/4" X 10' LONG.
	TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG.
	ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.
—— ——	#4/0 STRANDED BARE TINNED COPPER WIRE, SOFT DRAWN AS SHOWN ON PLANS
- - - - - - -	UNDERGROUND ELECTRIC DUCTBANK
—— OH ——	OVERHEAD SERVICE
—— OHE ——	PROPOSED CPS ENERGY OVERHEAD ELECTRIC
—— OHE ——	EXISTING CPS ENERGY OVERHEAD ELECTRIC

KEYED NOTES

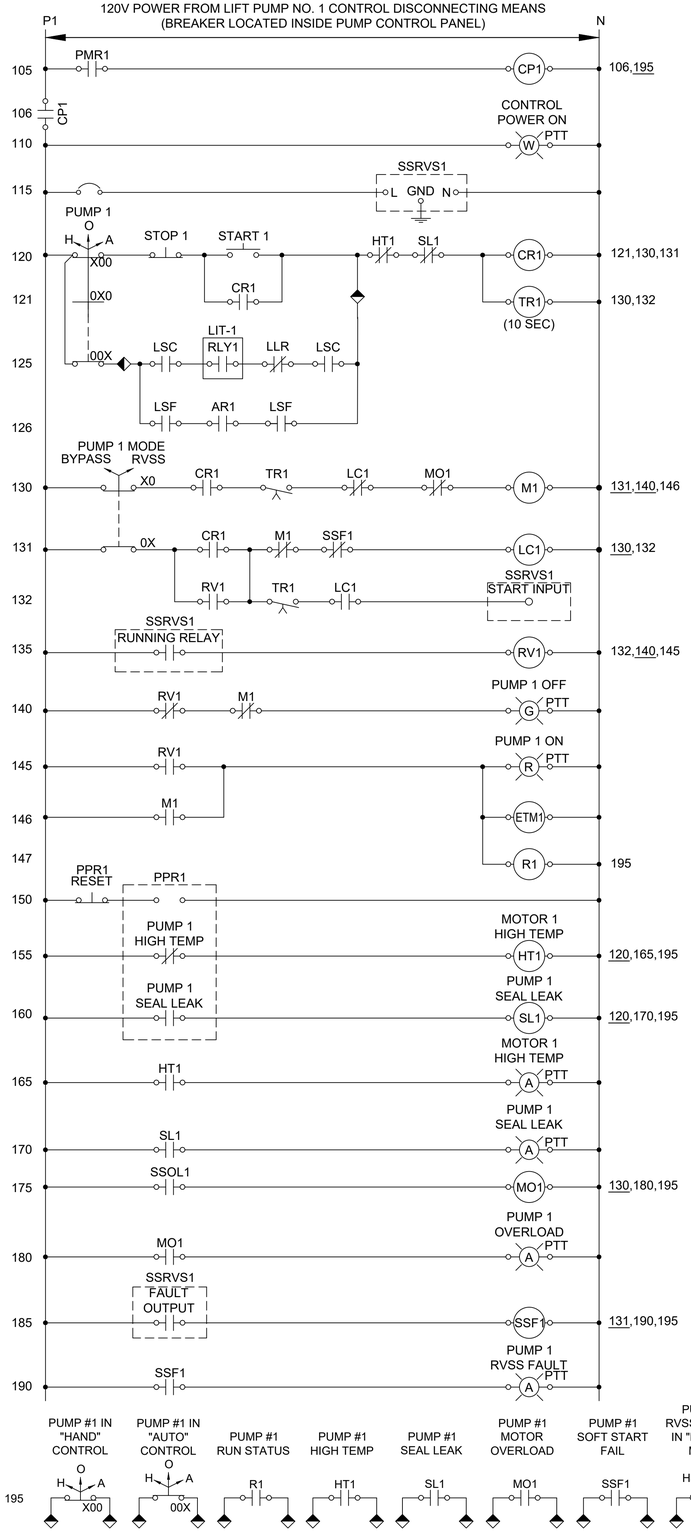
1. 2-2" C TO GENERATOR (1 SPARE) REFER TO SHEET E2 FOR CABLE SIZES.
   1-1" C TO GENERATOR CONTROL 4 -1/C #12, W/ 2- #12 GND
   1-1" C TO GENERATOR BATTERY CHARGER REFER TO SHEET E2 DETAIL B FOR CABLE SIZES.
   2-1" C TO GENERATOR HEATER (1 SPARE) REFER TO SHEET E2 DETAIL B FOR CABLE SIZES.
2. 2-1" C TO PUMP (1 SPARE) REFER TO SHEET E2 FOR CABLE SIZES.
   2-1" C TO PUMP MONITORING PER CONTROLS
3. 2-2" C TO PUMP (1 SPARE) CABLE PER PUMP MANUFACTURER
4. 2-1" C TO AREA LIGHT (1 SPARE) TYPICAL 1"C, 2-#10 W/ 1-#12GND
5. 2-1" C (1 SPARE) TO DISCHARGE PRESSURE TRANSMITTER. 2X(#16 TW/SH/PR) SEE CIVIL DRAWINGS FOR LOCATION.
6. 2-2" C TO ELECTRICAL SERVICE POLE (1 SPARE) REFER TO SHEET E2 FOR CABLE SIZES.
   2-1" C SPARE CONDUITS FOR FUTURE TELEPHONE LINE
7. 2-3/4" C (1 SPARE) TO JUNCTION BOX FOR PRESSURE TRANSMITTER & HEAT TRACE POWER. SEE SHEET E12 DETAIL B.
8. 2-1" C TO TRANSDUCER (1 SPARE) CABLE PER MANUFACTURER
9. 2-1" C TO LEVEL FLOAT SWITCHES (1 SPARE) 8-#12
10. 2-1"C TO ODOR CONTROL BLOWER (1 SPARE) REFER TO SHEET E2 DETAILS A & B FOR CABLE DETAILS.
    2-1"C TO ODOR CONTROL BLOWER CONTROLS PER CONTROLS
11. 2-3"C FOR FUTURE SCADA

NOTES:

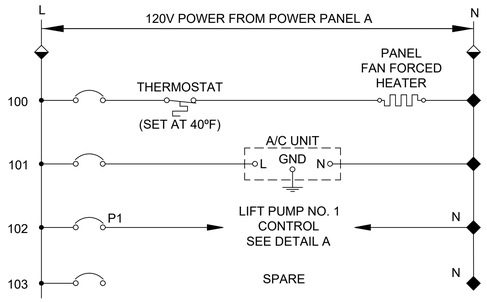
1. FENCE SHALL BE GROUNDED AT EACH CORNER WITH 3/4" X 10' GROUND ROD. RODS SHALL BE LOCATED INSIDE THE FENCE.
2. ALL GATES SHALL BE EQUIPPED WITH GROUNDING STRAPS. SEE LEGEND.
3. THERE SHALL BE A 20' SEPARATION BETWEEN GROUND RODS. SPACING SHOWN ON PLAN IS FOR REFERENCE ONLY AND MIGHT NOT BE TO SCALE.
4. ALL ABOVE GROUND CONDUIT SHALL BE INSTALLED AS TO NOT CREATE A TRIPPING HAZARD.
5. PVC COATED ALUMINUM CONDUIT SHALL BE PROVIDED IN AREAS WHERE CONCRETE COMES INTO CONTACT WITH ALUMINUM CONDUIT AND SHALL BE USED FOR ALL BURIED AND CONCRETE STUB-UPS.
6. GENERATOR SHALL BE BONDED TO GROUNDING RING AT GROUNDING POINTS.
7. SEE SHEET E13 DETAIL A FOR GROUNDING DETAILS FOR ALL RACKS AND FREE STANDING ENCLOSURES.
8. CONTRACTOR SHALL OBSERVE NEC WORKING SPACE REQUIREMENTS WHEN LOCATING EQUIPMENT.
9. PROVIDE BARRIER PER NEC IN JUNCTION BOX TO SEPARATE POWER AND SIGNAL CABLES.
10. PANELS SHALL OPEN AWAY FROM WET WELL.
11. SEE SHEET E12 DETAILS C, D, E & F FOR JUNCTION BOX DETAIL. SEE CIVIL DRAWINGS FOR EXACT LOCATION OF ACCESS COVER, STILLING WELL AND PUMP NUMBERS. DO NOT EXTEND SPARE CONDUIT INSIDE WET WELL.
12. ALL GROUND GRID CONDUCTORS SHALL BE CONTINUOUS EXCEPT WHERE SPLICING IS UNAVOIDABLE.
13. MOISTURIZING PORT SHALL BE LOCATED ADJACENT TO TEST WELL LESS THAN 1' APART.
14. SEPARATION AMONG GROUNDING ELECTRODE RODS AND WET WELL SHALL BE 10-FEET.
15. IF LOCATION OF ELECTRIC SERVICE POLE CHANGES DURING CONSTRUCTION PHASE, CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY FOR APPROVAL.
16. OVERHEAD CONDUCTORS MUST HAVE A HORIZONTAL CLEARANCE WITHOUT WIND OF 10 FEET FOR VOLTAGES UP TO 50KV.
17. UTILITIES NOT SHOWN FOR CLARITY. EXISTING UNDERGROUND DUCTBANK AND OVERHEAD LINES ARE APPROXIMATION. PLEASE SEE CIVIL DRAWINGS FOR UTILITIES.
18. GROUND RESISTANCE MEASURE 5 OHMS OR LESS. CONTRACTOR TO ADD SUPPLEMENTAL GROUND RODS WHERE NECESSARY TO ACHIEVE THE RESISTANCE REQUIRED.
19. REFER TO SHEET E13 DETAIL G FOR HAND HOLE DETAILS.
20. DISCHARGE PRESSURE TRANSMITTER TO BE INSTALLED IN A LOCATION WHICH MAXIMIZES ACCURACY. MODIFY PIPING AS NEEDED TO MEET THIS REQUIREMENT. REFER TO CIVIL PLANS FOR EXACT LOCATION.
21. CONTRACTOR SHALL COORDINATE WITH CPS ENERGY AND COVER ALL COST FOR LINE EXTENSION AND SERVICE DROP INSTALLATION.
22. REFER TO SHEET SHEET E2 FOR ADDITIONAL CABLES NOT LISTED IN DUCTBANKS ON THIS SHEET.
23. EQUIPMENT MUST BE MOUNTED FACING SOUTH.
24. CPS ENERGY TRANSFORMER POLE MUST HAVE 28 FOOT EASEMENT.
25. DUCTBANKS AND CONDUIT RUNS FOR POWER SCADA SIGNAL WIRING SHALL BE SEPARATED AND CONTRACTOR SHALL MAINTAIN A MINIMUM OF 12-INCH SEPARATION BETWEEN DUCTBANKS.
26. GROUND GRID MUST USE ALL EXOTHERMIC WELD TO MAKE A SOLID COMMON GROUNDING LOOP.

SAWS JOB NO.	22-XXXX
JOB NO.	12632-06
DATE	DECEMBER 2023
DESIGNER	BD
CHECKED	SM
DRAWN	BD
SHEET	E4

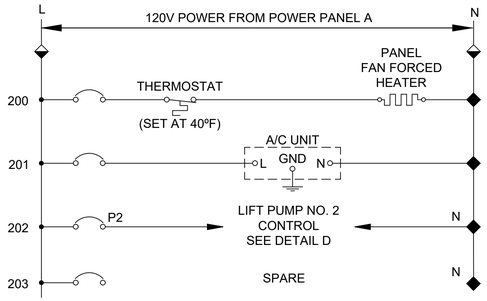
Date: Dec 06, 2023, 4:15pm User ID: SGrof
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-4 ELECTRICAL SITE PLAN.dwg



A PUMP #1 MOTOR CONTROL SCHEMATIC
SCALE: N.T.S.



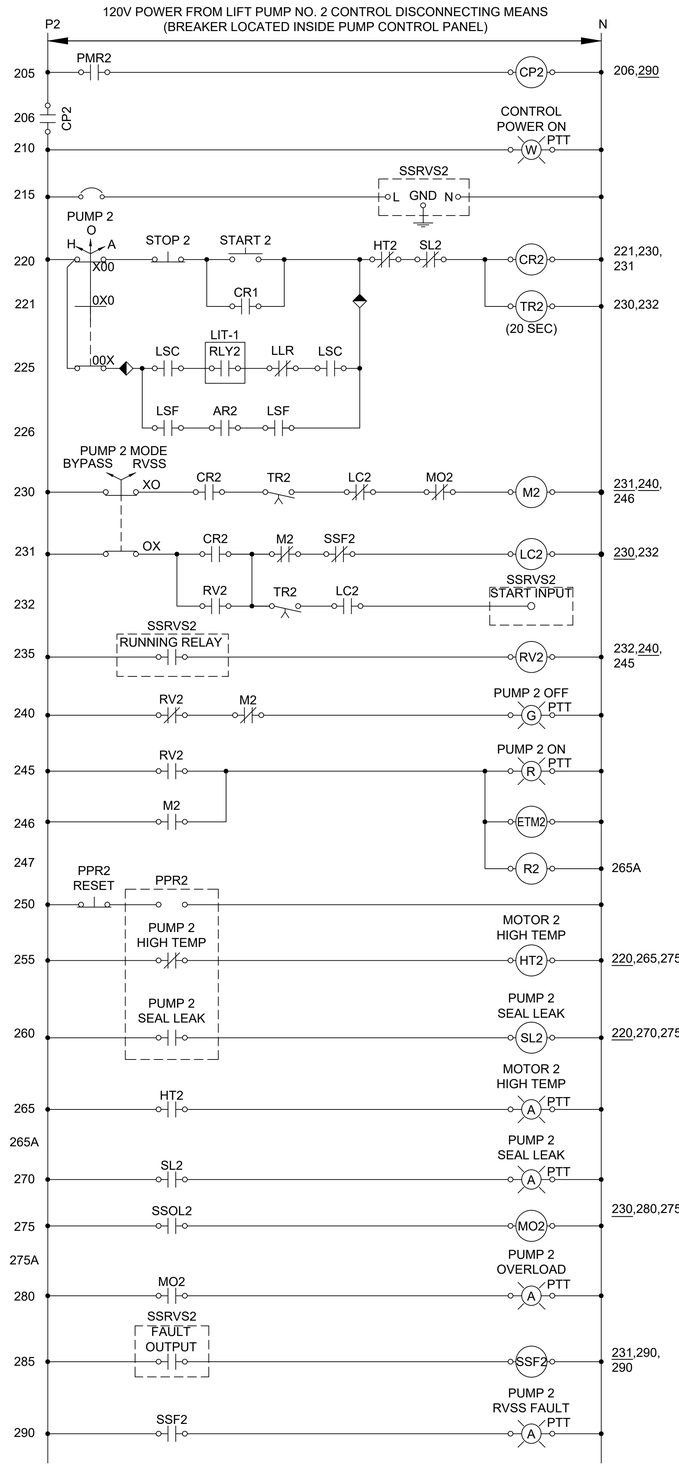
B PUMP CONTROL PANEL #1 CONTROL POWER DISTRIBUTION SCHEMATIC
SCALE: N.T.S.



C PUMP CONTROL PANEL #2 CONTROL POWER DISTRIBUTION SCHEMATIC
SCALE: N.T.S.

ELECTRICAL ABBREVIATIONS

AR	ALTERNATING RELAY FOR FLOAT MODE
CCP	COMPACT CIRCUIT PROTECTOR
CP	CONTROL POWER RELAY
CR	CONTROL RELAY
ETM	ELAPSED TIME METER
HT	MOTOR HIGH TEMPERATURE RELAY
LC	RVSS LINE CONTACTOR
LIT	LEVEL CONTROLLER
LLR	LOW LEVEL RELAY CUTOFF
LSC	LEVEL SYSTEM WITH CONTROLLER
LSF	LEVEL SYSTEM WITH FLOATS
M	FULL VOLTAGE BYPASS STARTER
MO	MOTOR OVERLOAD RELAY
PMR	PHASE MONITORING RELAY
PPR	PUMP PROTECTION RELAY
PPT	PUSH-TO-TEST
R	RUN INDICATION RELAY
RV	SSRVS RUN AUXILIARY RELAY
SC	SSRVS INTERNAL SHORTING CONTACTOR
SL	SEAL LEAK RELAY
SS	COIL SURGE SUPPRESSOR
SSF	SOFT STARTER FAULT RELAY
SSOL	SOLID STATE OVERLOAD RELAY
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TR	TIMING RELAY



D PUMP #2 MOTOR CONTROL SCHEMATIC
SCALE: N.T.S.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904

2727 N. ST. MARY'S ST.
SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805

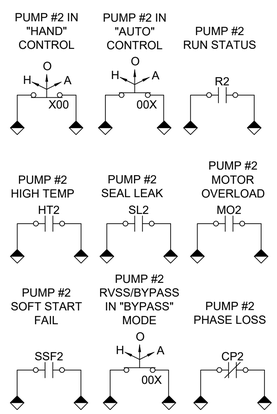
GENERAL NOTES

1. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
2. A PUMP PROTECTION RELAY SHALL BE PROVIDED FOR EACH PUMP INSTALLED AND SHALL PROVIDE PROTECTION AGAINST MOTOR HIGH TEMPERATURE AND PUMP SEAL LEAK.
3. LEVEL SENSOR PROBES FOR PUMP CONTROL ARE NOT ALLOWED.
4. NOT USED.
5. PUMP PROTECTION RELAY CONTACT LOGIC SHALL BE AS FOLLOW:
   - 5.A. UNDER NORMAL CONDITIONS, N.C. HIGH TEMP CONTACT IS OPEN, AND N.O. SEAL LEAK CONTACT IS OPEN.
   - 5.B. UNDER MOTOR HIGH TEMP CONDITION, THE N.C. HIGH TEMP CONTACT CLOSES.
   - 5.C. UNDER PUMP SEAL LEAK CONDITION, THE N.O. SEAL LEAK CONTACT CLOSES.
6. SOFT STARTER FAULT OUTPUT RELAY SHALL BE OPEN UNDER NORMAL CONDITION AND SHALL CLOSE UNDER SOFT STARTER FAULT CONDITION.
7. THE CONTACT OF THE OVERLOAD RELAY FOR THE FULL VOLTAGE BYPASS STARTER SHALL BE OPEN UNDER NORMAL CONDITION AND SHALL CLOSE UNDER OVERLOAD CONDITION.

LEGEND

- PUMP CONTROL PANEL (DARK SIDE INDICATES CONNECTION INTERNAL TO PANEL.)
- EXTERNAL PANEL WIRING
- INTERNAL PANEL WIRING

DISCRETE SIGNALS FOR SCADA SYSTEM



NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

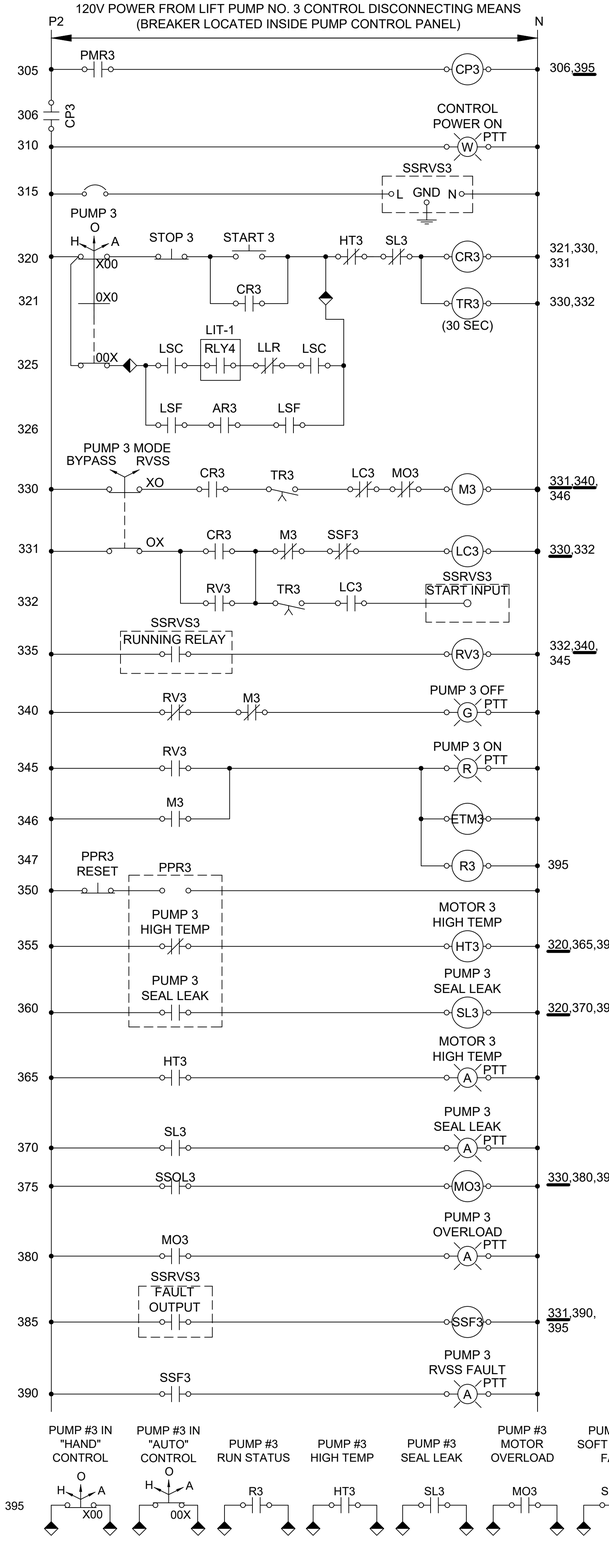
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION CONTROL DETAILS #1 PUMP CONTROL PANEL SCHEMATIC

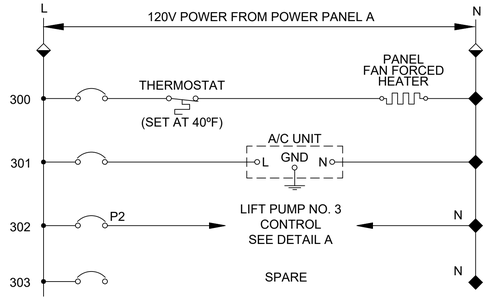
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E5

Date: Dec 06, 2023, 4:17pm User ID: SGof
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-5 LIFT STATION CONTROL DETAILS #1 PUMP CONTROL PANEL.dwg



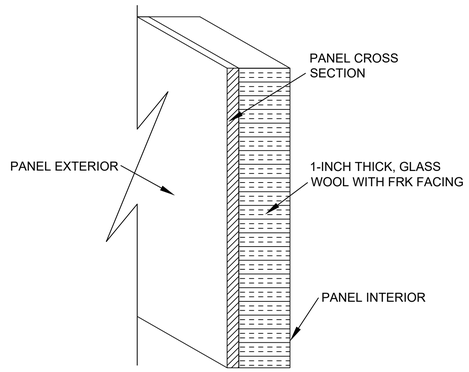
A PUMP #3 MOTOR CONTROL SCHEMATIC

SCALE: N.T.S.



B PUMP CONTROL PANEL #3 CONTROL POWER DISTRIBUTION SCHEMATIC

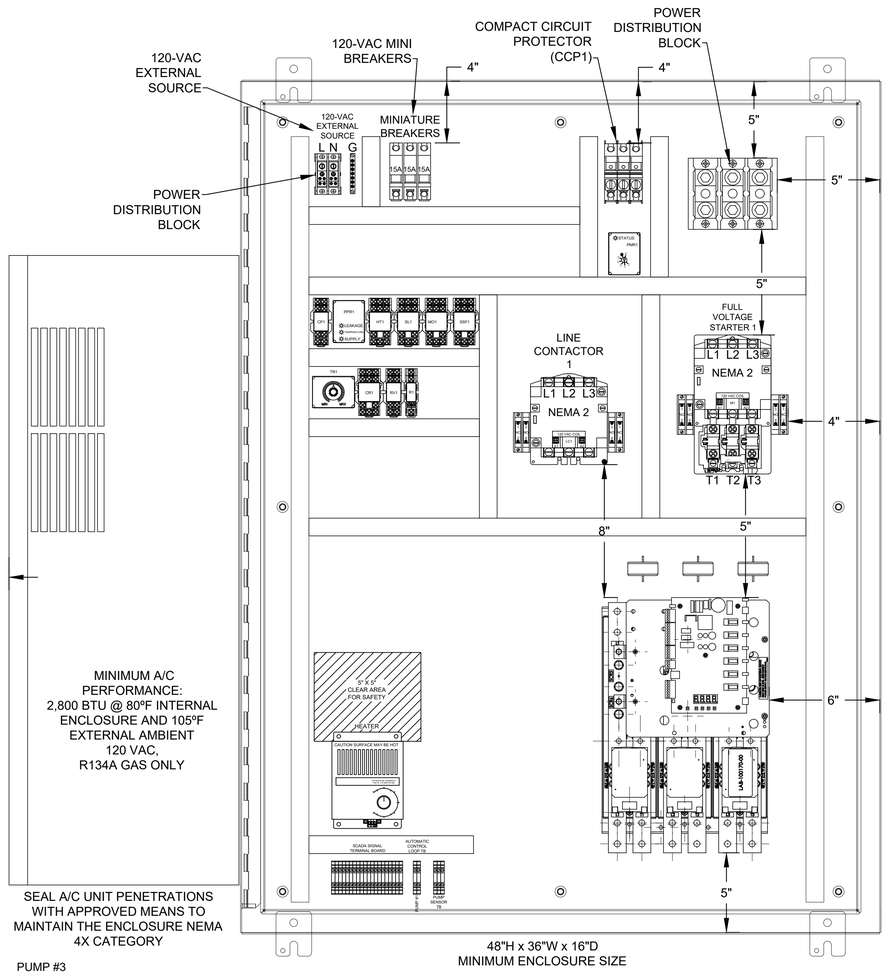
SCALE: N.T.S.



C CLIMATE CONTROLLED PANEL INSULATION

SCALE: N.T.S.

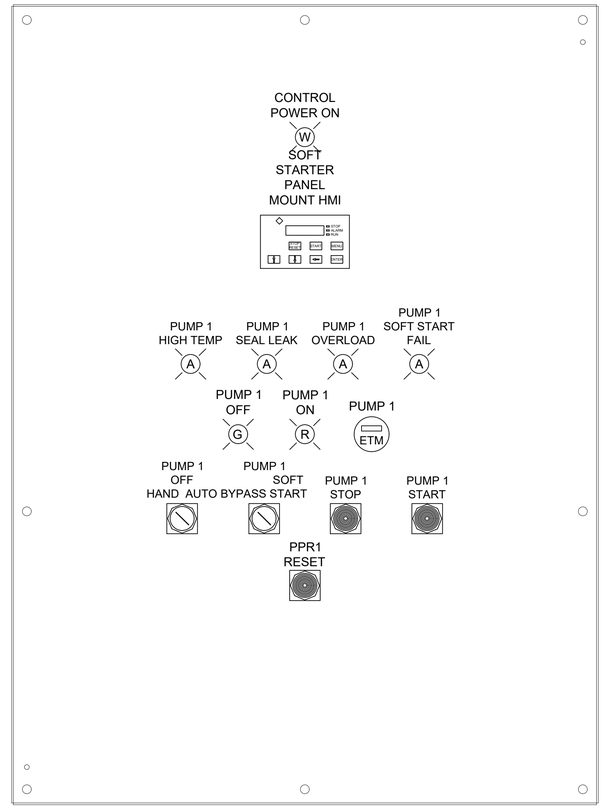
SEE NOTES 10-11.



D PUMP CONTROL PANEL LAYOUT (TYPICAL OF 3)

SCALE: N.T.S.

SEE NOTES 1-11



INTERNAL SWING PANEL

NOTES:

1. DISTANCE BETWEEN INTERIOR PANEL AND ANY COMPONENT SHALL BE AT LEAST 5".
2. DISTANCE BETWEEN EXTERIOR PANEL AND INTERIOR PANEL SHALL BE AT LEAST 2".
3. DESIGN WILL COMPLY WITH MINIMUM SEPARATION DISTANCES AMONG INTERNAL COMPONENTS AS SHOWN.
4. THE CONTRACTOR SHALL REFER TO THE PLANS AND SPECIFICATIONS FOR MORE DETAILED EQUIPMENT REQUIREMENTS.
5. SEE INTERNAL LAYOUTS FOR FURTHER PANEL DETAILS.
6. PANEL MOUNT AIR CONDITIONER SIZE IS AN APPROXIMATION. CONTRACTOR TO SIZE AIR CONDITIONER PER EQUIPMENT AND ENCLOSURE SIZE. SEAL A/C UNIT PENETRATIONS WITH APPROVED MEANS TO MAINTAIN THE ENCLOSURE NEMA 4X CATEGORY. ENCLOSURE INTERNAL TEMPERATURE SHALL BE 80°F AND EXTERNAL AMBIENT TEMPERATURE OF 105°F.
7. CONTRACTOR SHALL PROVIDE BARRIER BETWEEN ALL DISSIMILAR VOLTAGES.
8. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
9. PUMP PROTECTION RELAYS SHALL BE PROVIDED FOR EACH PUMP INSTALLED. AT A MINIMUM PROVIDE PROTECTION AGAINST MOTOR HIGH TEMPERATURE AND PUMP SEAL LEAK.
10. INSULATION IS REQUIRED FOR ALL ENCLOSURES EQUIPPED WITH A/C UNIT, INCLUDING SCADA ENCLOSURES, RVSS ENCLOSURES AND LEVEL CONTROL ENCLOSURES. SEE DETAIL C.
11. INSTALL INSULATING SHEETS IN THE INTERIOR SURFACES OF THE PANEL, INCLUDING DOOR(S). NOT REQUIRED FOR INTERNAL SWING PANELS.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

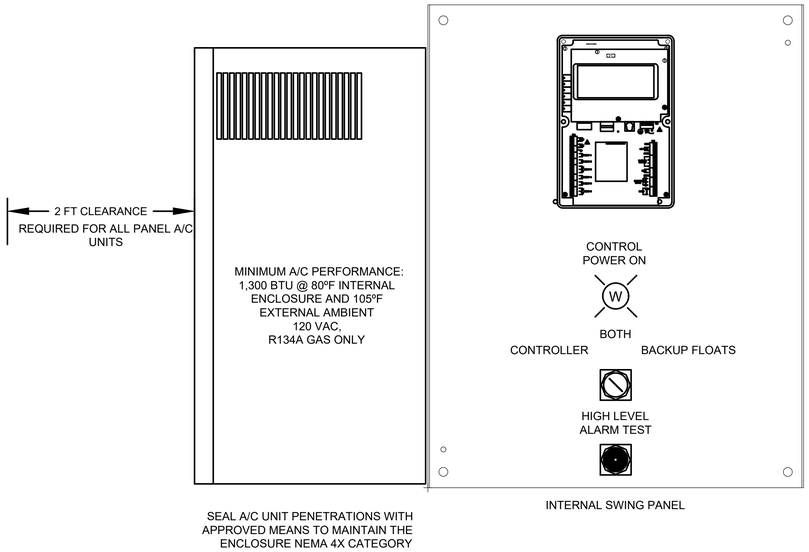
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

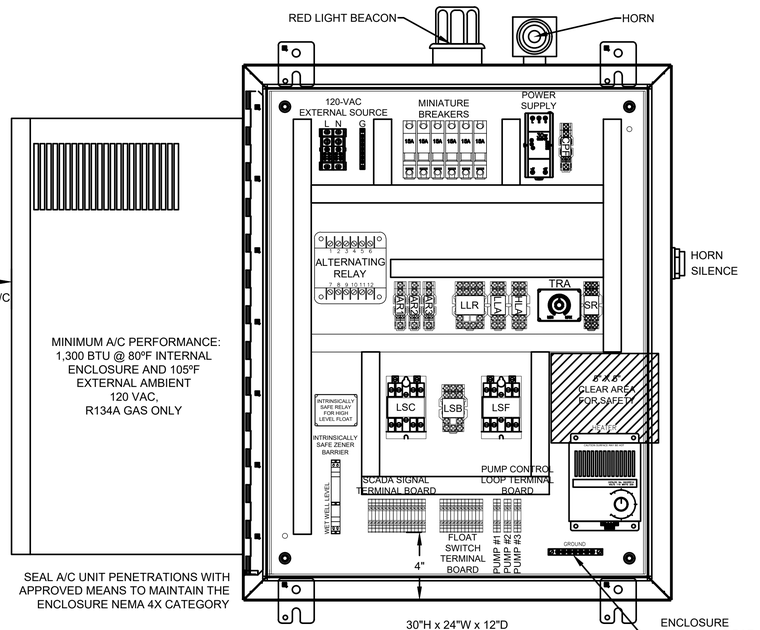
CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION CONTROL DETAILS #2
PUMP CONTROL PANEL LAYOUTS

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E6

Date: Dec 06, 2023, 4:17pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-6 LIFT STATION CONTROL DETAILS #2 PUMP CONTROL PANEL.dwg

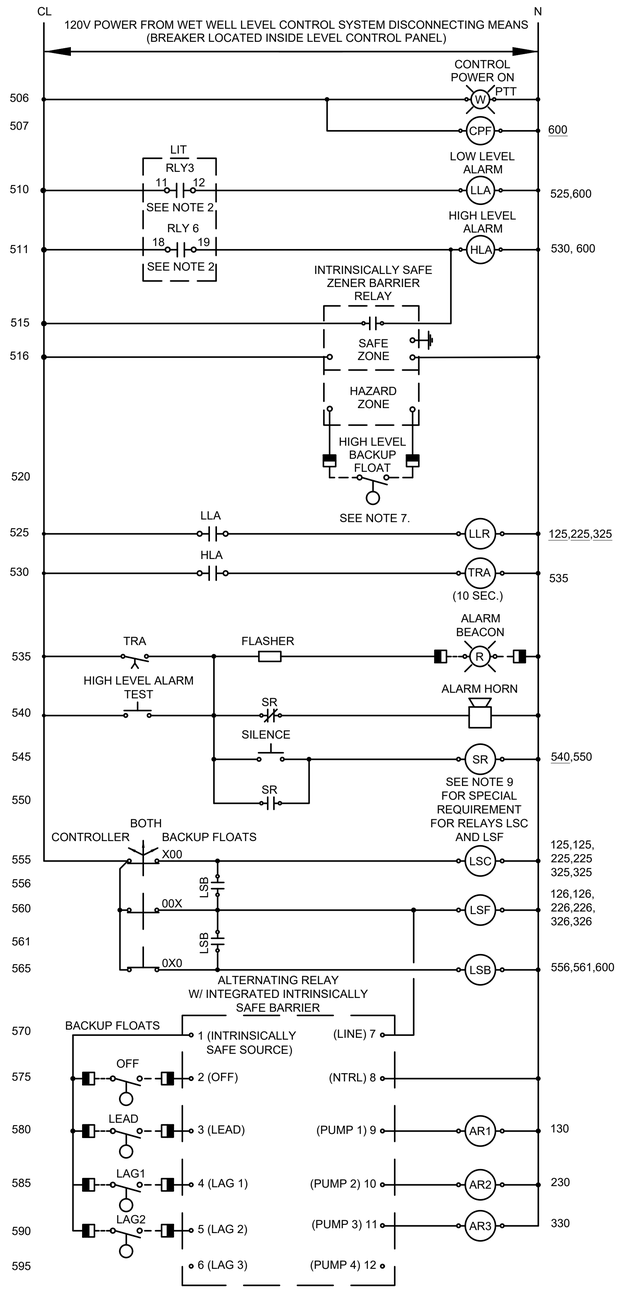




A LEVEL CONTROL PANEL LAYOUT

SCALE: N.T.S.

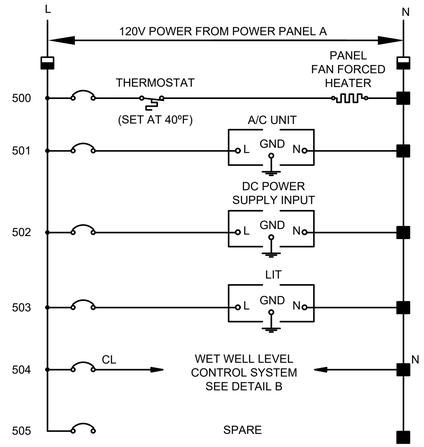
LEGEND	
▬	LEVEL CONTROL PANEL (DARK SIDE INDICATES CONNECTION INTERNAL TO PANEL.)
- - - -	EXTERNAL PANEL WIRING
———	INTERNAL PANEL WIRING



B LEVEL CONTROL SCHEMATIC LOCATED IN LEVEL CONTROL PANEL

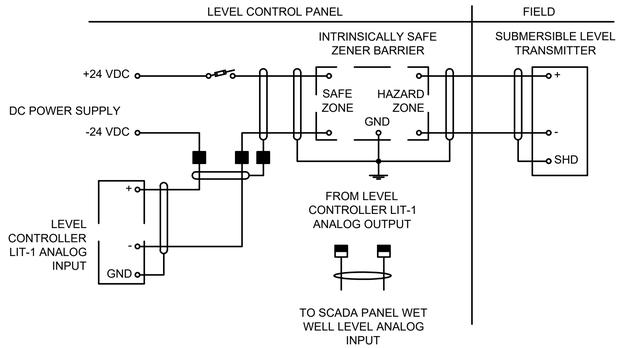
SCALE: N.T.S.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST.
SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805



C LEVEL CONTROL PANEL CONTROL POWER DISTRIBUTION SCHEMATIC

SCALE: N.T.S.



D WET WELL LEVEL TRANSMITTER INSTRUMENT WIRING SCHEMATIC

SCALE: N.T.S.

NOTES:

1. LEVEL CONTROLLER OUTPUT RELAYS RLY1, RLY2 AND RLY4 SHALL BE ASSIGNED TO A PUMP FUNCTION AND SHALL BE MANAGED BY A PUMPING ALGORITHM TO ALTERNATE THE LEAD PUMP AND LAG PUMP FOR EACH PUMPING CYCLE.
2. LEVEL CONTROLLER OUTPUT RELAYS RLY3 AND RLY6 SHALL BE ASSIGNED FOR WET WELL LOW LEVEL ALARM AND HIGH LEVEL ALARM RESPECTIVELY. UNDER NORMAL WET WELL LEVEL CONDITION, BOTH RELAYS SHALL BE DE-ENERGIZED AND CONTACTS OPEN. UNDER WET WELL LEVEL ALARM CONDITION, THE RESPECTIVE RELAY SHALL BE ENERGIZED AND CONTACT CLOSED.
3. RELAY RLY3 (LOW LEVEL) IS A COMMON RELAY FOR ALL PUMPS INSTALLED.
4. HIGH LEVEL ALARM SHALL BE GENERATED WITH BOTH RELAY RLY6 (HIGH LEVEL) AND THE HIGH LEVEL FLOAT.
5. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
6. THE LOAD OF EACH INTERNAL DIGITAL RELAY OF THE LEVEL CONTROLLER MUST BE LIMITED TO NO MORE THAN ONE GENERAL PURPOSE RELAY COIL AND ONE TIME DELAY RELAY COIL, OR TWO GENERAL PURPOSE RELAY COILS.
7. BACKUP FLOAT SWITCHES SHALL BE PROVIDED AS SHOWN.
8. ENCLOSURE SHALL INCLUDE A PANEL MOUNT A/C UNIT. THE CAPACITY OF THE A/C UNIT, FOR THE ENCLOSURE SIZE INDICATED, SHALL BE 1,300-BTU/HR FOR AN ENCLOSURE INTERNAL TEMPERATURE OF 80ºF AND AND EXTERNAL AMBIENT TEMPERATURE OF 105ºF.
9. RELAYS LSC AND LSF SHALL BE OF THE NEMA INDUSTRIAL CONTROL RELAY TYPE WITH STACKABLE MULTIPLE CONTACTS, AND EACH RELAY SHALL BE PROVIDED WITH TWO (2) INDEPENDENT N.O. CONTACTS FOR EACH PUMP INSTALLED AND CONTROLLED RESPECTIVELY.
10. INSTALL #6-AWG BARE STRANDED COPPER AND BOND TO COMMON GROUND FOR SUPPLEMENTAL GROUNDING

NO.	REVISION	DATE

12/6/2023

STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

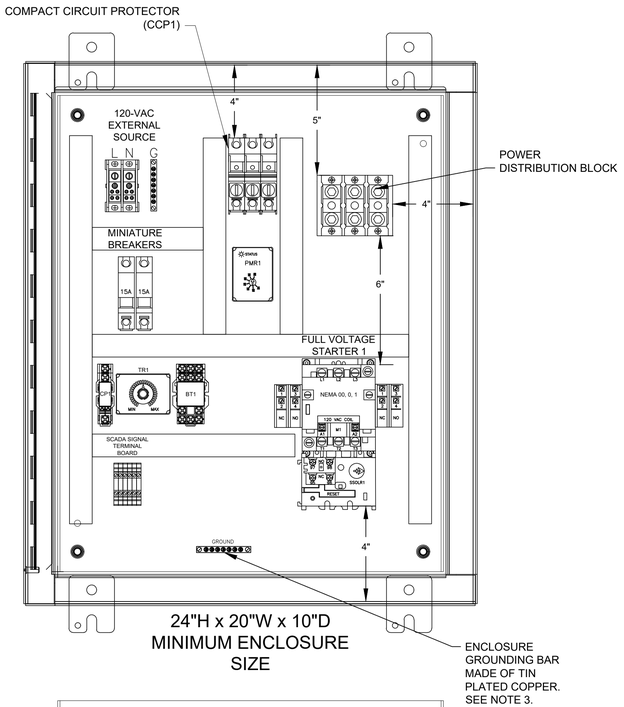
PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION CONTROL DETAILS #3 LEVEL CONTROL
PANEL LAYOUT AND CONTROL SCHEMATIC

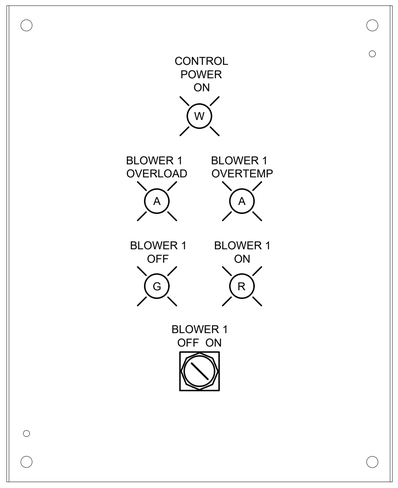
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E7

Date: Dec 06, 2023, 4:16pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E7 LIFT STATION CONTROL DETAILS #2 LEVEL CONTROL PANEL.dwg



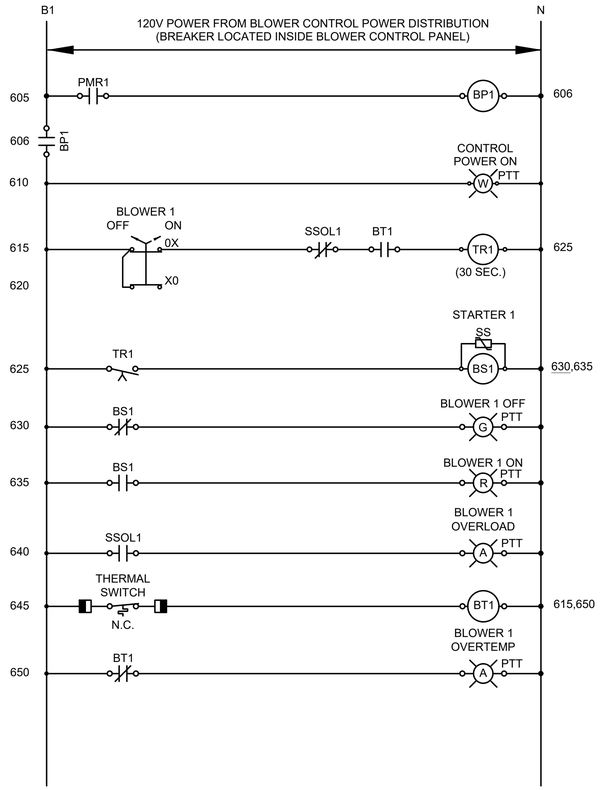
24"H x 20"W x 10"D
MINIMUM ENCLOSURE
SIZE

ENCLOSURE
GROUNDING BAR
MADE OF TIN
PLATED COPPER.
SEE NOTE 3.



INTERNAL SWING PANEL

A ODOR CONTROL BLOWER PANEL LAYOUT
SCALE: N.T.S.

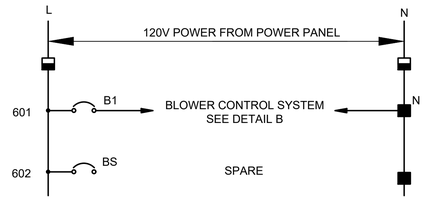


B ODOR CONTROL BLOWER CONTROL SCHEMATIC
SCALE: N.T.S.

NOTES:

1. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
2. THE BLOWER INTERNAL THERMAL SWITCH IS CLOSED UNDER NORMAL CONDITION AND SHALL OPEN UNDER BLOWER OVERTEMPERATURE CONDITION.
3. INSTALL #6-AWG BARE STRANDED COPPER AND BOND TO COMMON GROUND FOR SUPPLEMENTAL GROUNDING.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. TEL. NO. 210-658-7250
SAN ANTONIO, TX 78212 FAX NO. 210-658-9805



C ODOR CONTROL BLOWER CONTROL
POWER DISTRIBUTION SCHEMATIC
SCALE: N.T.S.

ELECTRICAL ABBREVIATIONS	
BS	BLOWER FULL VOLTAGE STARTER
BT	BLOWER OVER TEMPERATURE RELAY
CCP	COMPACT CIRCUIT PROTECTOR
CP	CONTROL POWER
PMR	PHASE MONITORING RELAY
PTT	PUSH-TO-TEST
SS	COIL SURGE SUPPRESSOR
SSOL	SOLID STATE OVERLOAD RELAY
TR	TIMING RELAY

LEGEND	
	BLOWER CONTROL PANEL (DARK SIDE INDICATES CONNECTION INTERNAL TO PANEL.)
- - - -	EXTERNAL PANEL WIRING
———	INTERNAL PANEL WIRING

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

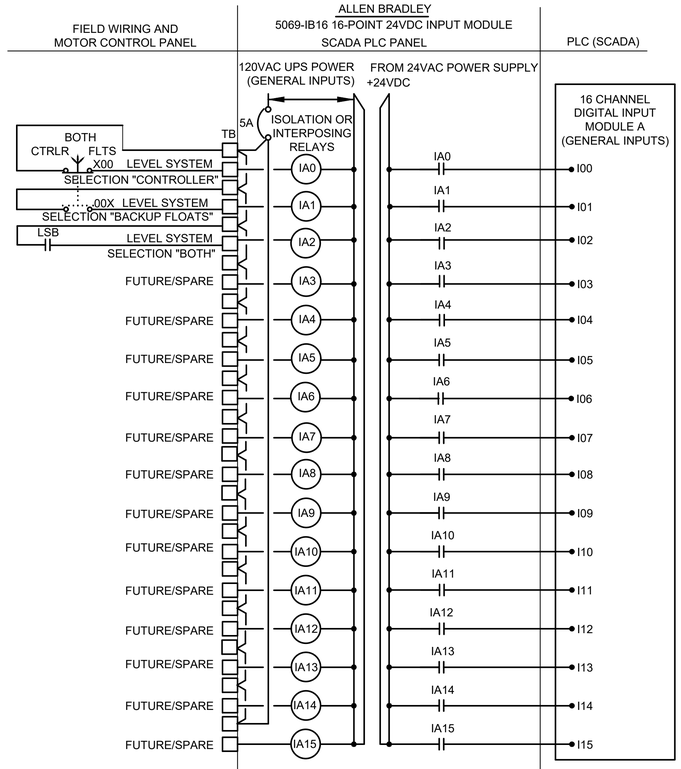
PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800

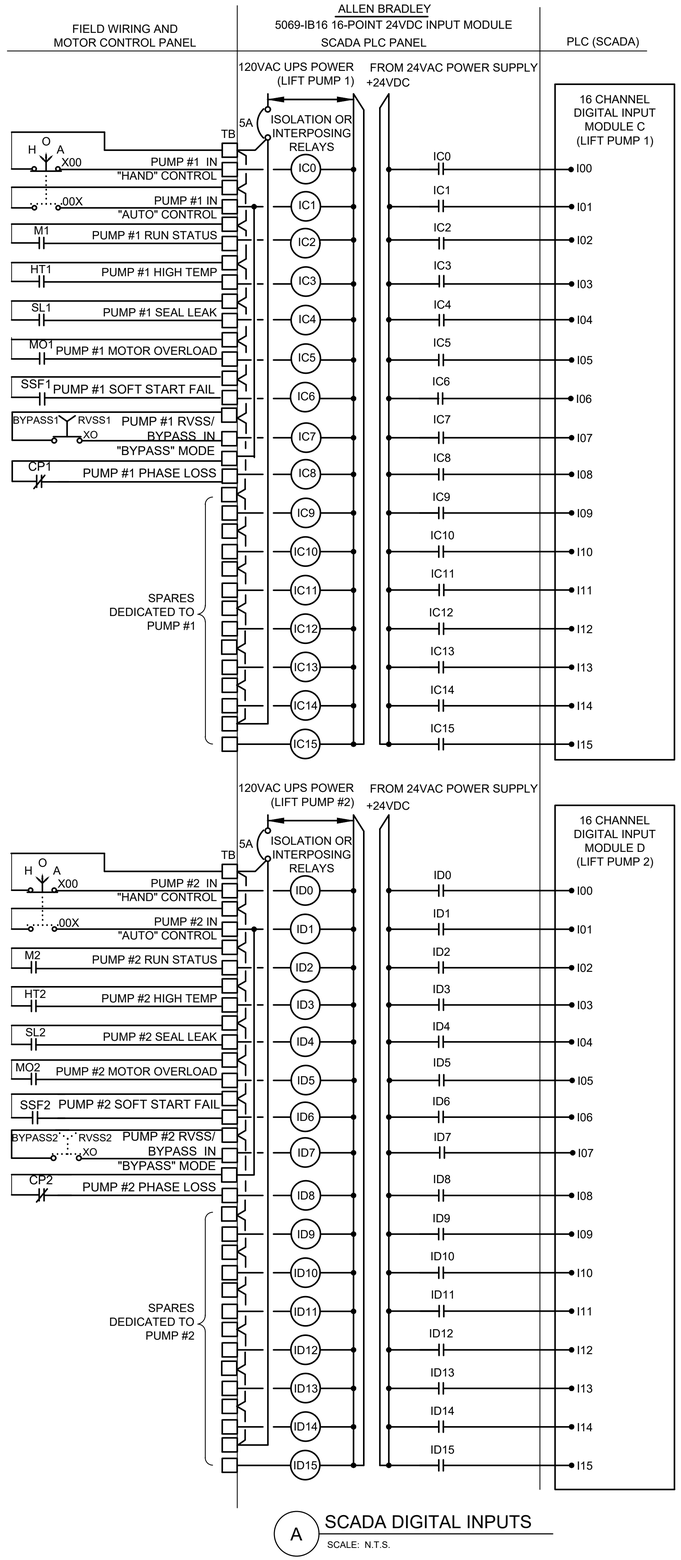
CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION CONTROL DETAILS #4 BLOWER CONTROL
PANEL LAYOUT AND CONTROL SCHEMATIC

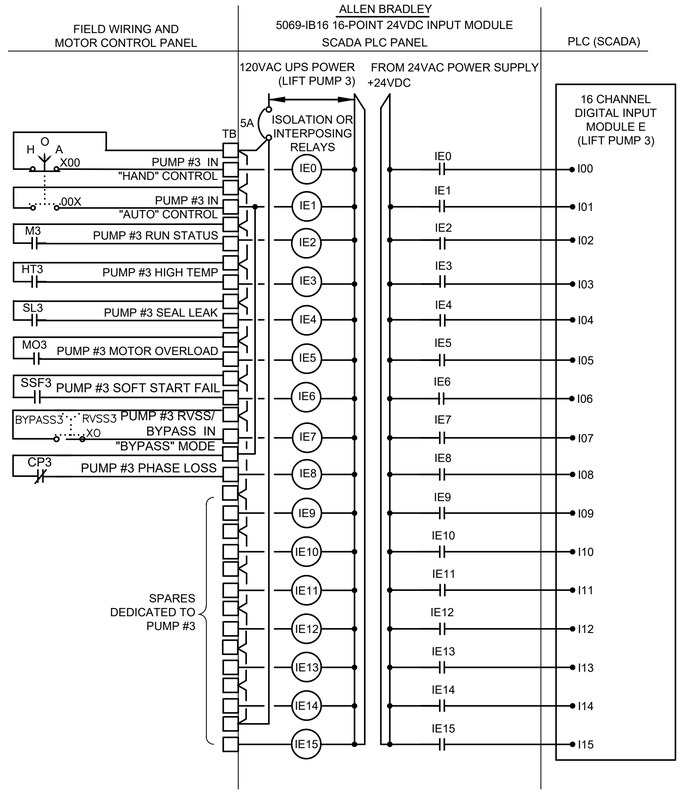
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E8

Date: Dec 06, 2023, 4:16pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-8 LIFT STATION CONTROL DETAILS #4 BLOWER CONTROL PANEL.dwg





A SCADA DIGITAL INPUTS
SCALE: N.T.S.



NOTES:

1. ISOLATION RELAYS (IR*) ARE SINGLE POLE SINGLE THROW. WIRE ALL RELAYS TO INPUT CARDS INCLUDING SPARES.
2. DESIGNATED POINTS MAY CHANGE DURING COORDINATION MEETING WITH SAWS. REFER TO SPECIFICATION 16921.
3. INPUT SIGNALS SHALL BE DE-ENERGIZED (0) FOR ANY NORMAL CONDITION, AND EQUIPMENT AT REST. INPUT SIGNALS SHALL BE ENERGIZED (1) FOR ANY ALARM CONDITION AND FOR EQUIPMENT OPERATING.

LEGEND

PFR PHASE FAILURE RELAY

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

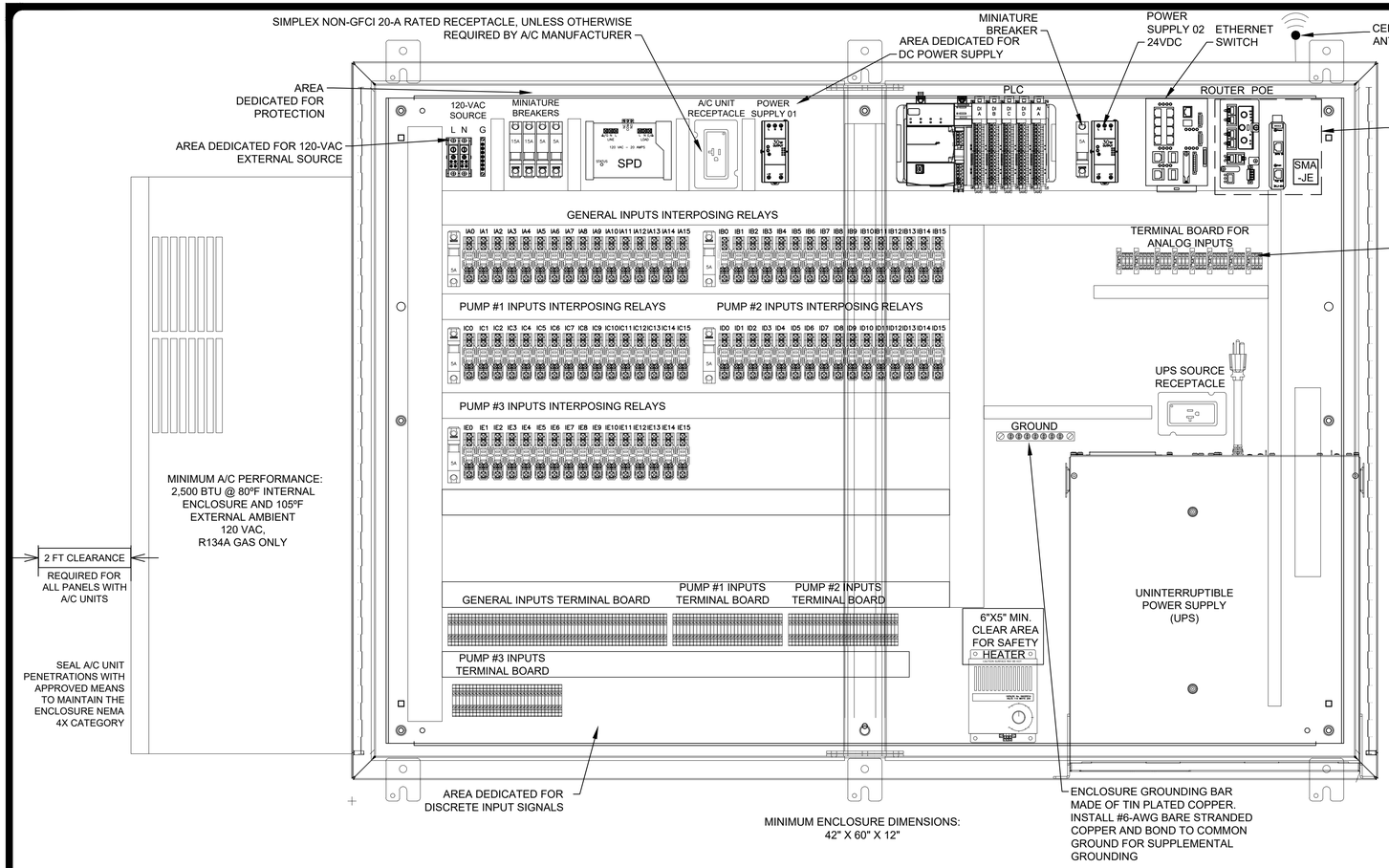
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
SCADA DETAILS #1

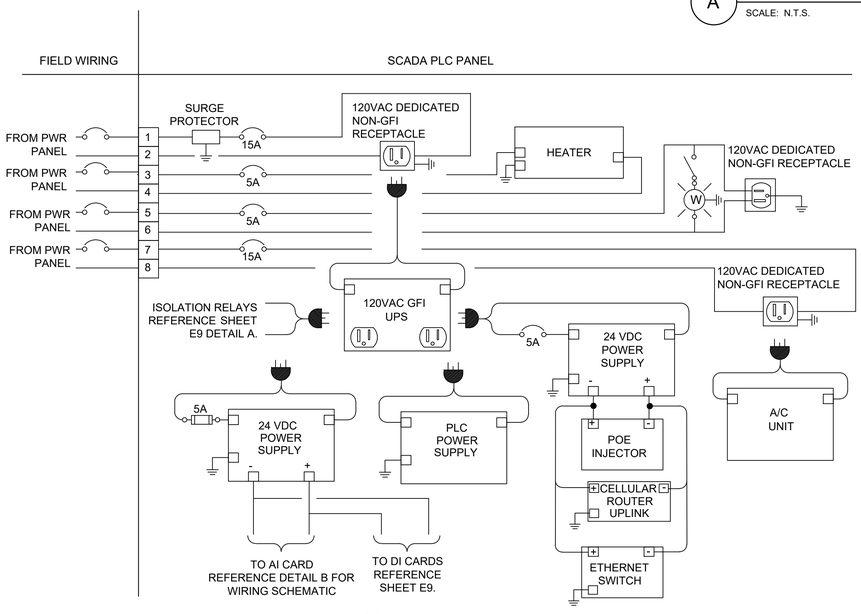
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E9

Date: Dec 06, 2023, 4:16pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-9 LIFT STATION SCADA DETAILS #1.dwg



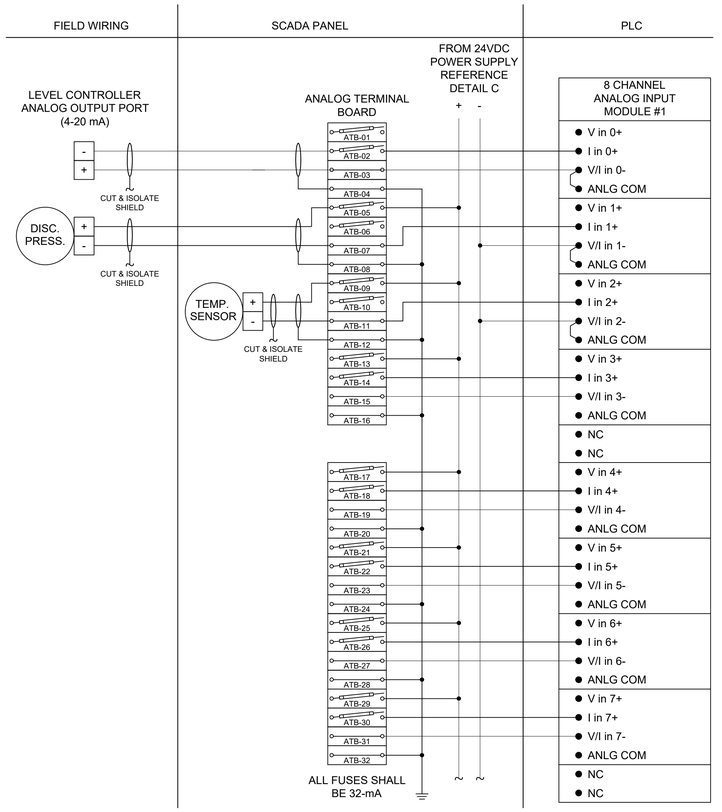
A SCADA INTERIOR PANEL LAYOUT

SCALE: N.T.S. SEE NOTES 1-22



C SCADA POWER DISTRIBUTION

SCALE: N.T.S. SEE NOTE 8, 17-19

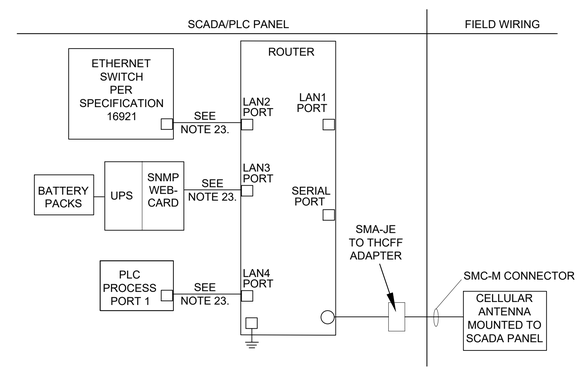


B SCADA ANALOG INPUTS

SCALE: N.T.S. SEE NOTES 15-18, 20

NOTES:

1. THIS DETAIL IS SHOWN PER SAWS LIFT STATION SCADA DESIGN GUIDELINES.
2. INSTALL ONE ISOLATION RELAY FOR EACH DISCRETE INPUT PROVIDED PER EACH MODULE INSTALLED. EACH DISCRETE INPUT LOOP SHALL BE PRE WIRED FROM THE TERMINAL BOARD, TO ISOLATION RELAY TO MODULE INPUT CHANNEL. SIMILARLY, INSTALL ONE FUSED TERMINAL BOARD WITH A 32-MA FUSE AND ASSOCIATED NEGATIVE AND GROUND TERMINAL BOARDS FOR EACH ANALOG INPUT CHANNEL PROVIDED BY THE MODULE AND ALSO PRE WIRE THE ANALOG LOOPS. ALL ISOLATION RELAYS TO BE SINGLE POLE SINGLE THROW. WIRE ALL RELAYS TO INPUT CARDS, INCLUDING SPARES.
3. CONTRACTOR SHALL PROVIDE ADEQUATE SPACE FOR COMPONENT REMOVAL. SCADA PANEL SUBMITTAL SHALL SHOW OFFSET DISTANCES OF COMPONENTS FROM ENCLOSURE EDGES AND BETWEEN COMPONENTS.
4. AIR CONDITIONER SIZE IS AN APPROXIMATION. CONTRACTOR TO SIZE AIR CONDITIONER PER EQUIPMENT AND ENCLOSURE SIZE. CATEGORY ENCLOSURE INTERNAL TEMPERATURE SHALL BE 80°F AND EXTERNAL AMBIENT TEMPERATURE OF 105°F
5. NOT USED.
6. REFER TO SPECIFICATION 16050 AND SHEET E9.
7. ALL INSTRUMENT SIGNAL CABLES (SHIELDED CABLES) SHALL BE CONTINUOUS WITHOUT SPLICES.
8. THE UNINTERRUPTIBLE POWER SUPPLY SHALL BE INSTALLED WITHIN THE SCADA ENCLOSURE WITHOUT INTERFERING WITH ACCESS TO TERMINAL STRIPS, RELAYS, SPACE HEATER OR ANY OTHER TYPE OF DEVICE. THE SIZING OF THE UPS AND EXTERNAL BATTERY TO PROVIDE 2 HOURS OF EXTENDED RUNTIME AT 125% OF CONSTANT LOAD.
9. THE ENCLOSURE TEMPERATURE TRANSDUCER SHALL BE PROVIDED WITH RTD TO COVER A TEMPERATURE RANGE OF 0 TO 150-ºF.
10. ENCLOSURE SHALL BE RATED NEMA 4X, BE MADE OF STAINLESS STEEL 316 AND SHALL BE WHITE ENAMELED COATED.
11. SPACE HEATER SHALL BE PROVIDED WITH MINIMUM SAFETY CLEARANCES INDICATED BY MANUFACTURER TO PREVENT DAMAGE DUE TO CLOSENESS TO HEATER.
12. THE ENCLOSURE DOOR SHALL BE PROVIDED WITH AN INTERNAL FOLDING TABLE. AND A POCKET TO STORE WIRING DIAGRAMS AND O&M INFORMATION.
13. INSULATION IS REQUIRED FOR ALL ENCLOSURES EQUIPPED WITH A/C UNIT, INCLUDING SCADA ENCLOSURES, AND LEVEL CONTROL ENCLOSURES. SEE SHEET E6 DETAIL C.
14. INSTALL INSULATING SHEETS IN THE INTERIOR SURFACES OF THE PANEL, INCLUDING DOOR(S). NOT REQUIRED FOR INTERNAL SWING PANELS.
15. ALL CABLES, CONNECTORS, & PINOUT CONNECTIONS SHALL BE SUBMITTED TO OWNER FOR APPROVAL.
16. CONTRACTOR TO INTEGRATE, CONFIGURE AND PROGRAM RELAYS.
17. CONTRACTOR SHALL FURNISH AND INSTALL ADDITIONAL 8-POINT ANALOG INPUT CARD AND CONNECTION CABLES FOR FUTURE ANALOG INPUTS.
18. PROVIDE SPARE TERMINALS FOR ALL SPARE INPUTS.
19. ALL CONNECTIONS TO BE HARDWIRED. PLUGS ARE SHOWN FOR DIAGRAMMATIC PURPOSE ONLY.
20. REFER TO SPECIFICATION 16921 FOR EQUIPMENT DETAILS.
21. TIA/EIA 568B OSP CAT 6, #23 AWG ETHERNET OUTDOOR, UL LISTED, 23 AWG WITH WATERPROOF WATERTIGHT RATED IP67 RATED RJ45 CONNECTORS AT EACH END. (DO NOT EXCEED 300 FEET.) CABLING WILL BE SUPERIOR ESSEX TYPE BBDGE CABLE, COPPER CLAD CABLING, PART NUMBER#: ENDURAGAIN OSP SHIELDED SUPERIOR ESSEX 04-001-64, NO SUBSTITUTIONS.
22. MOUNT CELLULAR ANTENNA ON TOP OF SCADA PANEL IF CELLULAR SERVICE IS DEEMED ACCEPTABLE TO SAWS INSPECTIONS. USE OUTDOOR RATED COAXIAL CABLE FOR CONNECTION.
23. UTP CAT6 JUMPER USE PURPLE COLOR FOR SCADA DEVICES.



D SCADA PANEL COMMUNICATIONS

SCALE: N.T.S. SEE NOTES 15-16, 20-22

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
SCADA DETAILS #2

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E10

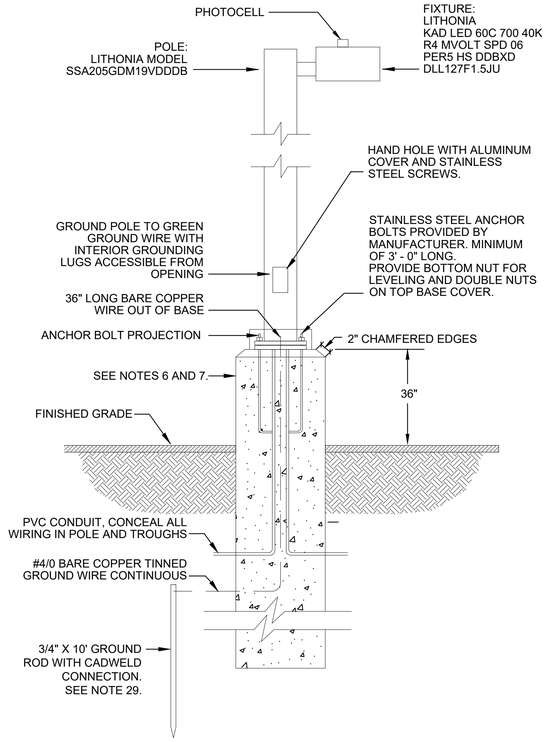
Date: Dec 06, 2023, 4:19pm User ID: SGraf
File: R:\Page-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-10 LIFT STATION SCADA DETAILS #2.dwg

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. TEL. NO. 210-658-7250
SAN ANTONIO, TX 78212 FAX NO. 210-658-9805

NO.	REVISION	DATE

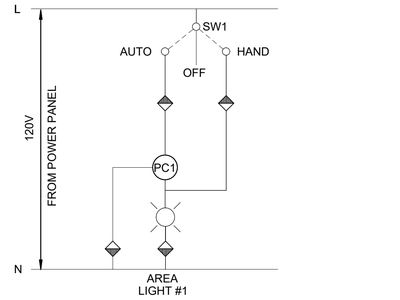
12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800



A LIGHT POLE FOUNDATION (TYP. OF 2)
SCALE: N.T.S. SEE NOTES 6-9.

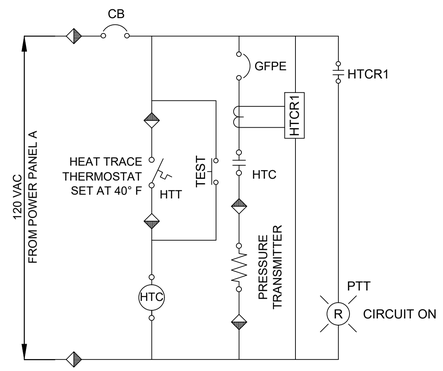
PC -PHOTO CELL CONTACTOR
SW -20 AMP, SPDT, CENTER OFF, INDUSTRIAL TOGGLE SWITCH



B AREA LIGHT WIRING DIAGRAM (TYPICAL OF 3)
SCALE: N.T.S. SEE NOTE 12.

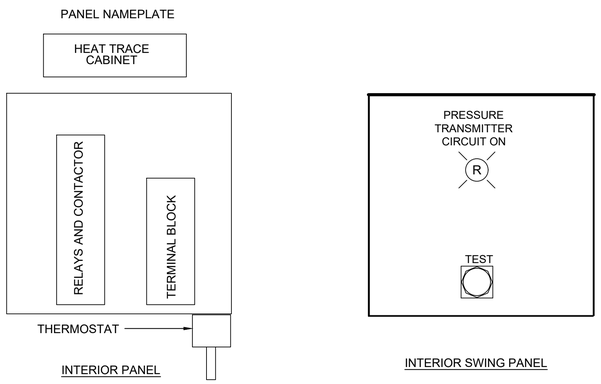
TERMINAL POINT IN SWITCH ENCLOSURE. DARK SIDE INDICATES CONNECTIONS INTERNAL TO ENCLOSURE.

NOTES:
1. ALL UNDERGROUND ELECTRIC CONDUIT SHALL BE CONCRETE ENCASED 24 INCHES BELOW GRADE.
2. ALL ENCLOSURESSHALL BE PAD-LOCKABLE.
3. ALL MOUNTING HARDWARE AND STRUT CHANNEL SHALL BE 316 STAINLESS STEEL. ALL ENCLOSURES SHALL BE NEMA 4X, UNLESS OTHERWISE NOTED.
4. GROUND RESISTANCE SHALL BE AS MINIMUM AS POSSIBLE, BUT IN NO CASE SHALL EXCEED 5 OHMS.
5. REFER TO SPECIFICATION 16050 FOR SWITCH AND NAMEPLATE REQUIREMENTS.
6. SEE STRUCTURAL PLAN DRAWINGS FOR FOUNDATION.
7. CONTRACTOR TO REMOVE IRREGULARITIES AND TO PROVIDE SMOOTH FINISH, PAINT EXPOSED AREA SAFETY YELLOW.
8. GROUND ROD SHALL BE BONDED TO SITE GROUNDING SYSTEM.
9. LIGHT FIXTURE TO BE MOUNTED TWENTY-THREE FEET ABOVE GRADE, WHICH INCLUDES THE 3' BASE.
10. HTCR* IMPLIES HEAT TRACE CURRENT SENSING RELAY.
11. PROVIDE LITTELFUSE CURRENT SENSING RELAY ECS40A.
12. PHOTOCELL SHALL BE LOCATED ON RESPECTIVE LIGHT FIXTURE.
13. CONTRACTOR SHALL PROVIDE ADEQUATE SPACE FOR COMPONENTS FROM ENCLOSURE EDGES
14. INSTALL TAG AS SHOWN ON FRONT EXTERIOR OF PANEL.



TERMINAL POINT IN HEAT TRACE PANEL DARK SIDE INDICATES CONNECTIONS INTERNAL TO PANEL.

C PRESSURE TRANSMITTER HEAT TRACE CONTROL
SCALE: N.T.S. SEE NOTES 10-11



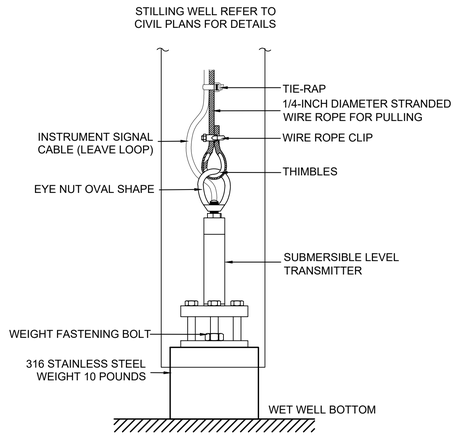
D HEAT TRACE PANEL
SCALE: N.T.S. SEE NOTES 13-14

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
MISCELLANEOUS DETAILS #1

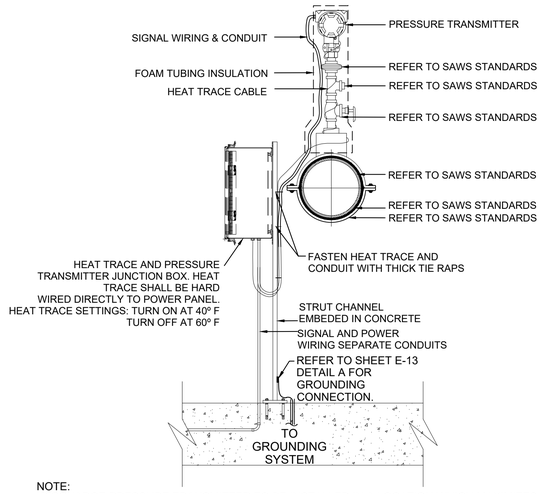
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E11

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805



A SUBMERSIBLE LEVEL TRANSDUCER MOUNTING DETAIL

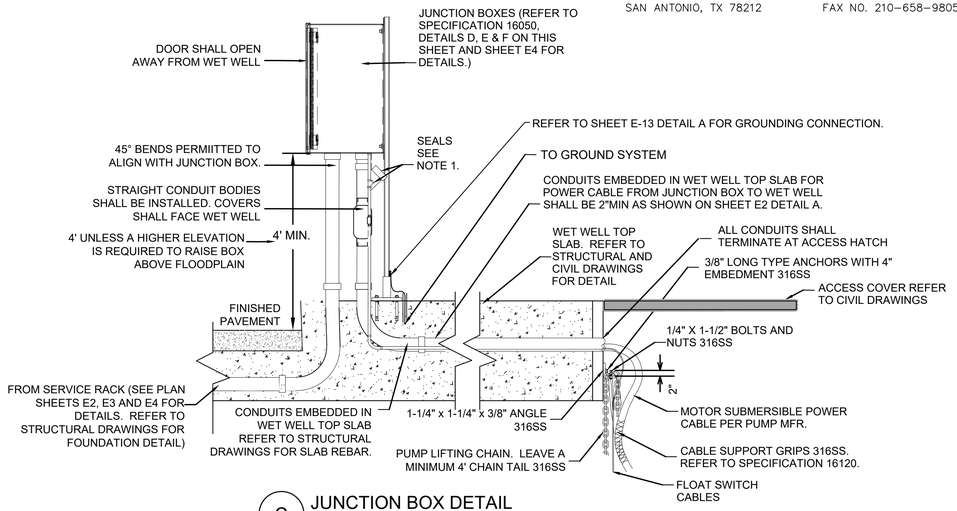
SCALE: N.T.S. SEE NOTES 16-22.



NOTE:
DISCHARGE PRESSURE TRANSMITTER TO BE INSTALLED IN A LOCATION WHICH MAXIMIZES ACCURACY. MODIFY PIPING AS NEEDED TO MEET THE REQUIREMENTS.

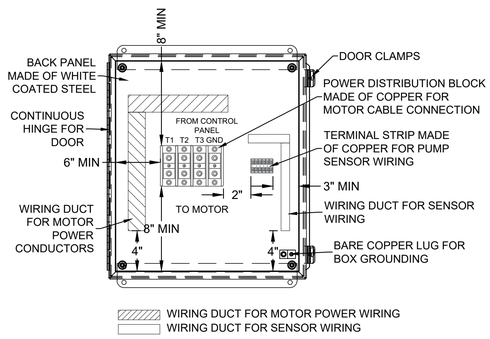
B DISCHARGE PRESSURE TRANSMITTER MOUNTING DETAIL

SCALE: N.T.S. SEE NOTES 12-15, 22-29.



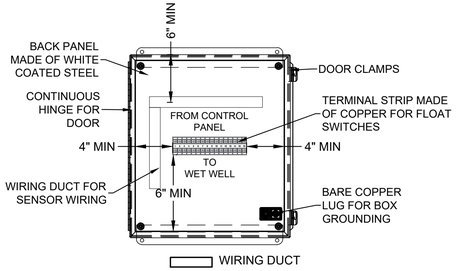
C JUNCTION BOX DETAIL

SCALE: N.T.S. SEE NOTES 1-2, 26-27.



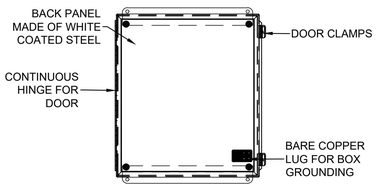
D MOTOR JUNCTION BOX INTERNAL DETAIL

SCALE: N.T.S. SEE NOTES 3-7.



E INSTRUMENTATION AND CONTROL JUNCTION BOX INTERNAL DETAIL

SCALE: N.T.S. SEE NOTES 7-10.



F ANALOG SIGNAL WIRING JUNCTION BOX DETAIL

SCALE: N.T.S. SEE NOTES 7, 11-15.

NOTES:

1. SEAL ALL CONDUITS ENTERING WET WELL. SEALS SHALL BE INSTALLED ABOVE STRAIGHT CONDUIT BODIES. SEALS MUST BE LOCATED WITHIN 18" OF THE ENCLOSURE PER NEC. SEAL CONDUITS PROPERLY TO PREVENT GASES FROM ENTERING ELECTRICAL BOXES.
2. SUBMERSIBLE TRANSDUCER CABLE SHALL BE ROUTED THROUGH CONDUIT EMBEDDED IN WET WELL TOP SLAB DIRECTLY TO LEVEL CONTROL PANEL.
3. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED TO CONNECT MOTORS SUCH AS PUMPS, BLOWERS, OR ANY SPECIAL MOTOR APPLICATION REQUIRED BUT NOT SHOWN ON THESE STANDARD DRAWINGS.
4. JUNCTION BOXES SHALL BE SIZED TO MEET THE INTERNAL DIMENSIONS, BASED ON THE REQUIRED SIZE OF POWER DISTRIBUTION BLOCK, WIRING DUCTS AND NUMBER OF TERMINAL STRIPS FOR PUMP SENSOR SIGNALS, BUT IN NO CASE SHALL THE PUMP JUNCTION BOXES BE SMALLER THAN 20(H)X16(W)X8(D)-INCHES.
5. POWER DISTRIBUTION BLOCKS SHALL HAVE A SHORT CIRCUIT RATING THAT EXCEEDS THE MAXIMUM AVAILABLE FAULT CURRENT AT THE SERVICE ENTRANCE.
6. SHOWN INTERNAL DIMENSIONS SHALL BE MEASURED FROM EDGE OF BACK PANEL AND NOT FROM THE ENCLOSURE BODY.
7. ALL ALUMINUM CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS AND SHALL BE GROUNDED.
8. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED TO CONNECT FLOAT SWITCHES, OR ANY INSTRUMENTATION AND CONTROL DEVICE THAT IS INSTALLED BUT NOT SHOWN ON THESE DRAWINGS, IN WHICH THE WIRING CONSIST OF DISCRETE SIGNALS THAT OPERATE AT 120-VAC, OR ANY OTHER VOLTAGE SYSTEM, PROVIDED EACH VOLTAGE SYSTEM HAS ITS OWN DEDICATED JUNCTION BOX.
9. INSTRUMENT WIRING SUCH AS FLOAT SWITCH CABLES SHALL TERMINATE AT THE TERMINAL STRIP.
10. JUNCTION BOXES SHALL BE SIZED TO MEET THE INTERNAL DIMENSIONS, BASED ON THE REQUIRED SIZE AND NUMBER OF TERMINAL STRIPS, AND THE SIZE AND NUMBER OF WIRING DUCTS, BUT IN NO CASE SHALL THE INSTRUMENTATION AND CONTROL JUNCTION BOXES BE SMALLER THAN 16(H)X12(W)X8(D)-INCHES.
11. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED FOR ANALOG SIGNAL WIRING FOR INSTRUMENTATION AND CONTROL DEVICES SUCH AS SUBMERSIBLE LEVEL TRANSMITTERS, DISCHARGE PRESSURE TRANSMITTERS, OR ANY INSTRUMENTATION AND CONTROL DEVICE THAT IS INSTALLED BUT NOT SHOWN ON THESE DRAWINGS.
12. ANALOG SIGNAL CABLES SHALL BE CONTINUOUS AND WITHOUT SPLICES, FROM INSTRUMENT, THROUGH JUNCTION BOX, TO RESPECTIVE ANALOG I/O MODULE OR DEVICE. ANALOG SIGNAL CABLE SHALL BE LOOPED AND TIED IN A NEAT MANNER AND WITHOUT OVER BENDING.
13. ANALOG SIGNAL WIRING SHALL NOT BE MIXED WITH ANY OTHER POWER, CONTROL OR SIGNAL WIRING.
14. JUNCTION BOXES SHALL BE SIZED BASED ON THE SIZE, BENDING RADIUS, NUMBER OF LOOPS, AND TOTAL NUMBER OF ANALOG SIGNAL CABLES CONTAINED, BUT IN NO CASE SHALL THE INSTRUMENTATION AND CONTROL JUNCTION BOXES BE SMALLER THAN 16(H)X12(W)X8(D)-INCHES.
15. A DEDICATED GROUNDING CABLE SHALL BE INSTALLED TO GROUND THE JUNCTION BOX AND EACH CONDUIT BUSHINGS.
16. INSTRUMENT, WIRE ROPE AND ALL FASTENERS SHALL BE OF STAINLESS STEEL 316 TYPE.
17. WEIGHT SHALL BE DRILLED AND TAPPED AT THE CENTER TO ALLOW A BOLT TO SOLIDLY FASTEN INSTRUMENT TO WEIGHT.
18. INSTRUMENT SIGNAL CABLE SHALL BE FASTENED TO WIRE ROPE WITH THICK HEAVY DUTY PLASTIC TIE-RAPS.
19. EYE NUT THREADED TO INSTRUMENT AND OVAL SIZE SHALL BE LARGE ENOUGH TO ALLOW SIGNAL CABLE TO FREELY BEND AND PASS THROUGH.
20. THIS DETAIL IS SHOWN PER SAWS LIFT STATION SCADA DESIGN GUIDELINES.
21. REFER TO CIVIL DRAWINGS FOR SUBMERSIBLE LEVEL TRANSDUCER INSTALLATION WITHIN STILLING WELL DETAIL.
22. INSTRUMENT SIGNAL CABLE SHALL NOT BE SPLICED AND SHALL BE CONTINUOUS FROM THE TRANSDUCER TO THE PUMP CONTROL PANEL.
23. REFER TO DETAIL C AND D OF SHEET E11.
24. ALL PIPING NIPPLES AND FITTINGS SHALL BE MADE OF STAINLESS STEEL 316.
25. INSTALL TAG LABELED "HEAT TRACE AND PRESSURE TRANSMITTER" ON FRONT EXTERIOR OF PANEL.
26. CONTRACTOR SHALL PROVIDE ADEQUATE SPACE FOR COMPONENTS FROM ENCLOSURE EDGES.
27. ENCLOSURE SHALL BE NEMA 4X 316SS WITH WHITE ENAMELED EXTERIOR.
28. DISCHARGE PRESSURE TRANSMITTER TO BE INSTALLED IN A LOCATION WHICH MAXIMIZES ACCURACY. MODIFY PIPING AS NEEDED TO MEET THE REQUIREMENTS.
29. CONTRACTOR TO REQUEST THE DETAILS FROM SAWS INSPECTOR.

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

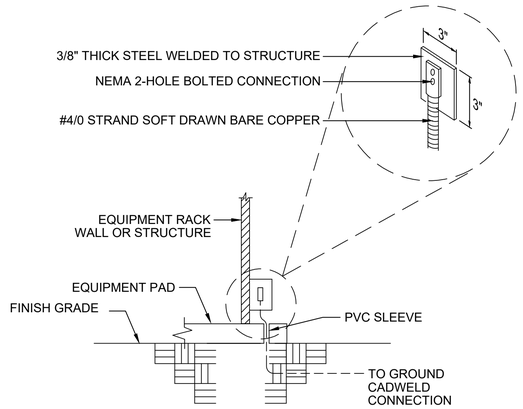
CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
JUNCTION BOXES & INSTRUMENTATION SCHEMATICS

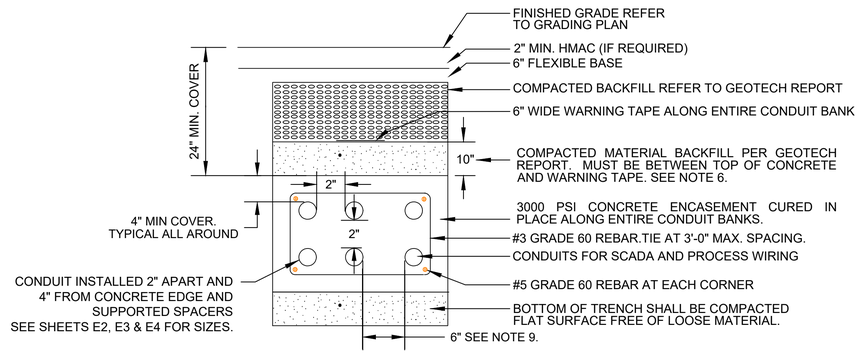
SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E12

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805

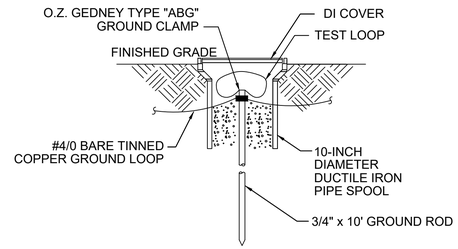
NO.	REVISION	DATE



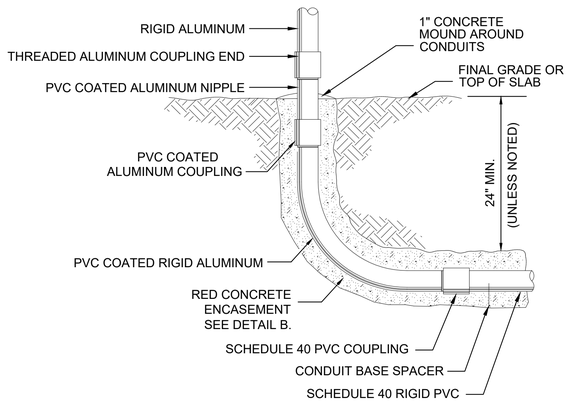
A TYPICAL STRUCTURE GROUND DETAIL
SCALE: N.T.S. SEE NOTES 1-2.



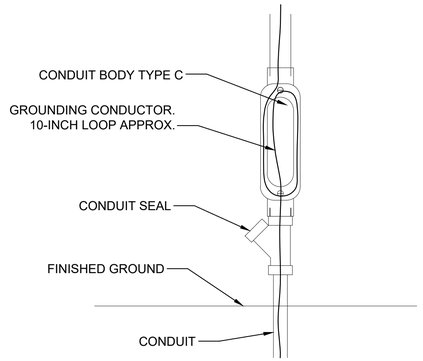
B TYPICAL LOW VOLTAGE DUCT BANK SECTION
SCALE: N.T.S. SEE NOTES 3-10.



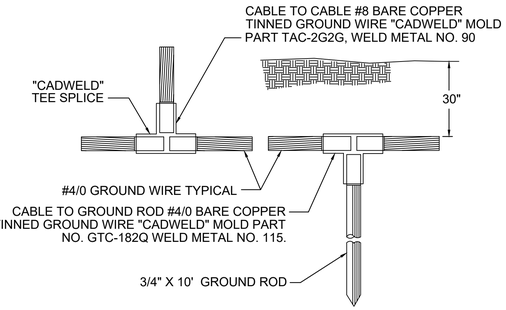
C GROUND TEST WELL ARRANGEMENT
SCALE: N.T.S.



D TYPICAL DUCT-BANK TRANSITION DETAIL
SCALE: N.T.S.



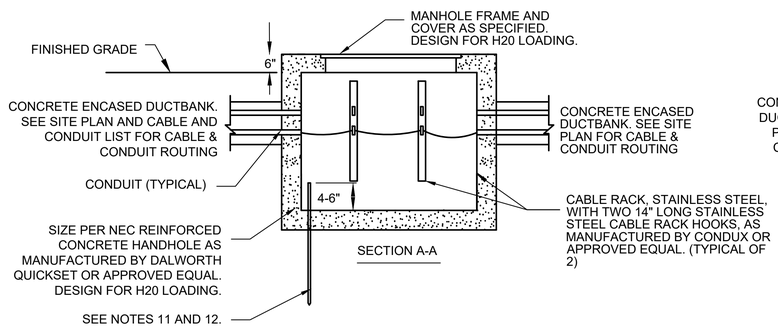
E CONDUIT BODY FOR GROUND RESISTANCE TEST DETAIL
SCALE: N.T.S.



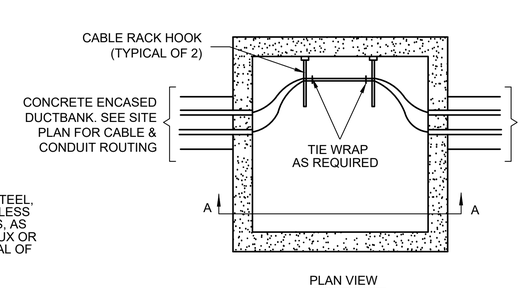
NOTE: THIS DETAIL DOES NOT EXCLUDE CONTRACTOR FROM USING OTHER APPROVED PRODUCTS.

F TYPICAL GROUND DETAIL
SCALE: N.T.S.

NOTES:
1. IF METAL STRUCTURES ARE NOT FURNISHED WITH PROVISION FOR BOLTED CONNECTION TO GROUNDING SYSTEM, CONTRACTOR SHALL PROVIDE WELDED PAD FOR GROUND CONNECTION. ALL RACKS MUST BE GROUNDED AT EACH END.
2. CABLES SHALL NOT BE DIRECTLY BOLTED TO STRUCTURES.
3. PROVIDE 100% CONCRETE ENCASEMENT BOTH HORIZONTALLY AND VERTICALLY.
4. CONTRACTOR SHALL COORDINATE LOCATION WITH EXISTING AND NEW UNDERGROUND WATER PIPE, AND ELECTRIC CABLE/CONDUIT.
5. REBAR SHALL BE WIRE TIED TO REBAR STIRRUPS TO PROVIDE STABILITY DURING CONCRETE POUR.
6. ALL BACKFILL SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OR DETERMINED BY TXDOT TEST METHOD TEX-113E
7. REFER TO GEOTECH REPORT AND STRUCTURAL DRAWINGS FOR BACKFILL MATERIAL TYPE AND BACKFILL MOISTURE CONTENT.
8. REFER TO GEOTECH REPORT AND STRUCTURAL DRAWINGS FOR EXCAVATION.
9. 6" SEPARATION BETWEEN CONDUITS FOR POWER AND CONDUITS FOR SCADA AND PROCESS WIRING.
10. UNDERGROUND DUCT BANK BENDS 25 DEGREES AND LARGER SHALL BE PVC-COATED RIGID ALUMINUM. ALL PIPING NIPPLES AND FITTINGS SHALL BE MADE OF STAINLESS STEEL 316.
11. CONTRACTOR SHALL PROVIDE HANDHOLE EQUIPPED WITH 1" PENETRATION FOR GROUND ROD. PENETRATION SHALL BE SEALED TO AVOID SEEPAGE AFTER GROUND ROD IS DRIVEN TO HEIGHT AS SHOWN.
12. CONNECT ALL NON CURRENT-CARRYING METAL PART AN ANY METALLIC RACEWAY GROUNDING BUSHINGS TO GROUND ROD CONNECTOR WITH #4/0 AWG COPPER CONDUCTOR.



G PRE-CAST VAULT DETAIL
SCALE: N.T.S. SEE NOTES 11 AND 12.



12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

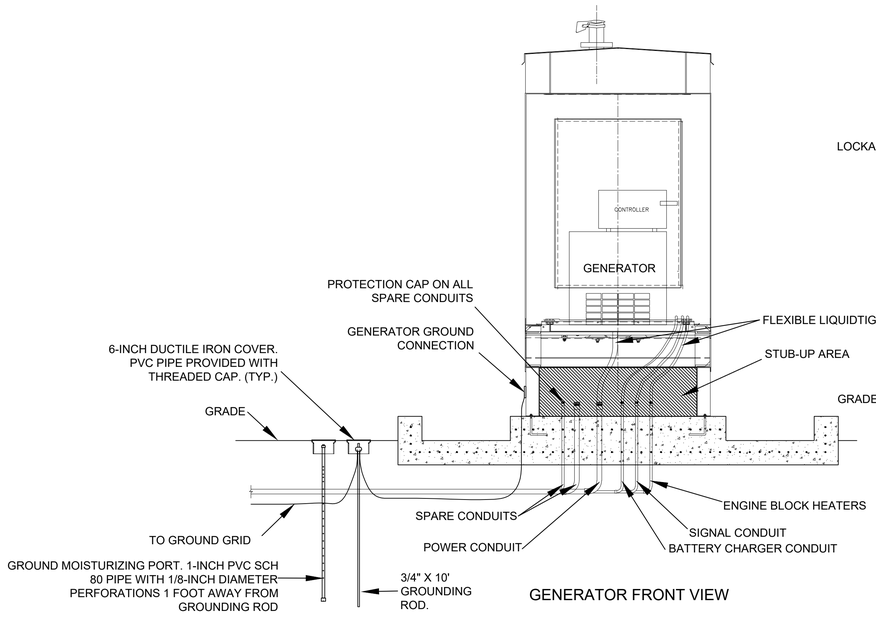
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

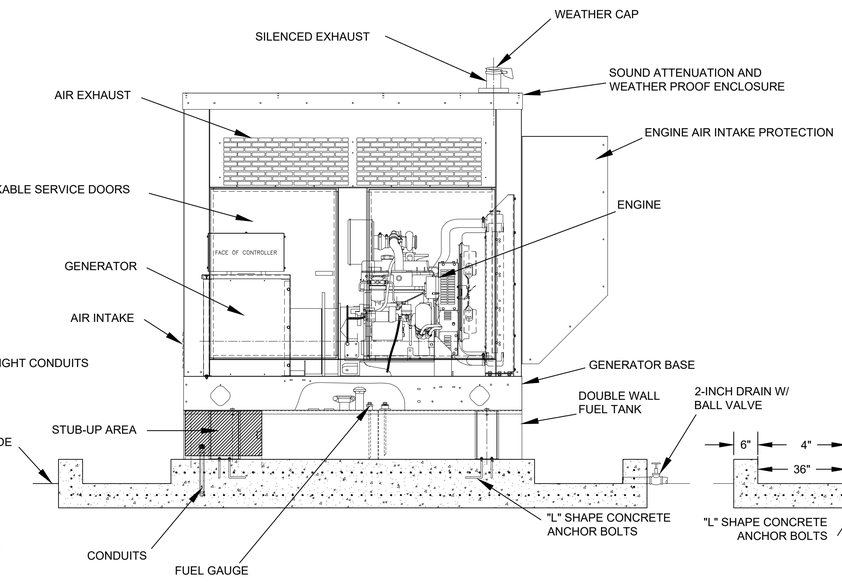
LIFT STATION
DUCTBANK AND GROUNDING DETAILS

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E13

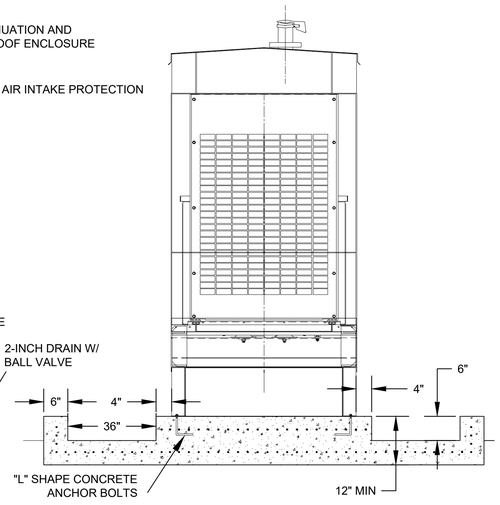
GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805



GENERATOR FRONT VIEW



GENERATOR SIDE VIEW



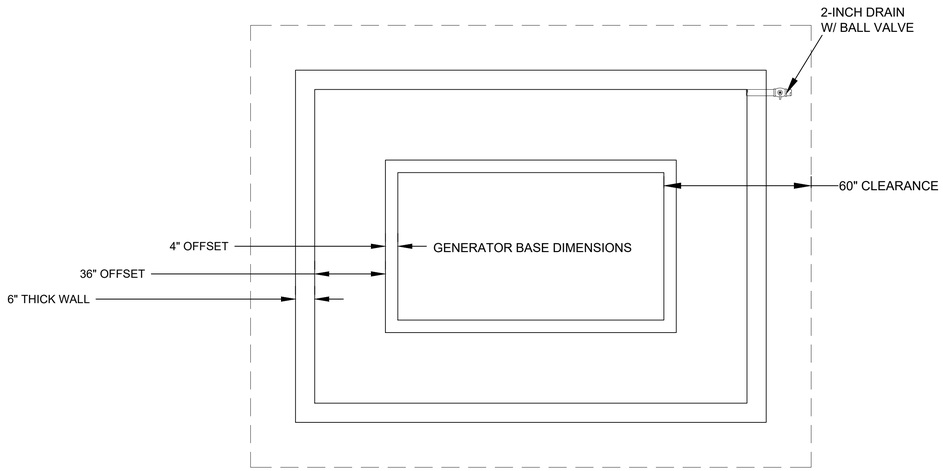
GENERATOR BACK VIEW

A STAND BY GENERATOR INSTALLATION DETAILS

SCALE: N.T.S.

NOTES

1. GENERATOR GROUND AND FRAME SHALL BE SOLIDLY BONDED TO THE REST OF THE GROUNDING SYSTEM AT EACH CORNER. GROUND RESISTANCE MEASURED AT THE GENERATOR SHALL HAVE THE SAME MAGNITUDE AS THE REST OF THE GROUNDING SYSTEM, AND IT SHALL NOT EXCEED 5 OHMS.
2. GENERATOR SHALL BE PROVIDED WITH SOUND ATTENUATION ENCLOSURE AND EXHAUST, AND MUST BE WEATHER PROOF. SEE SPECIFICATIONS FOR OTHER GENERATOR REQUIREMENTS.
3. GENERATOR FRAME SHALL BE SOLIDLY ANCHORED TO CONCRETE SLAB. ALL COMPONENTS USED TO FASTEN THE GENERATOR SHALL BE MADE OF STAINLESS STEEL 316.
4. CONDUITS SHALL INCLUDE AC POWER, BATTERY CHARGER, ENGINE BLOCK HEATER, SIGNAL AND SPARE.
5. FUEL TANK SHALL BE DOUBLE WALL TYPE.
6. CONCRETE SLAB SHALL BE MADE OF CONCRETE MIX WITH A COMPRESSIVE STRENGTH OF 3,000 PSI. CONCRETE SLAB MUST INCLUDE A CONTAINMENT STRUCTURE AS SHOWN IN DETAIL B OF THIS SHEET. A 2-INCH DRAIN PIPE AND BALL VALVE SHALL BE PROVIDED. REFER TO STRUCTURAL SHEETS FOR PAD DETAILS.
7. A 5-FOOT DEDICATED CLEARANCE AROUND GENERATOR CONTAINMENT SLAB SHALL BE PROVIDED IN STRICT COMPLIANCE WITH SAWS LIFT STATION STANDARDS.
8. CONDUIT STUB-UP AREA SHOWN IN THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR MUST VERIFY THE LOCATION OF THE STUB-UP AREA WITH THE GENERATOR MANUFACTURER.
9. CONTRACTOR SHALL VERIFY GENERATOR INSTALLATION REQUIREMENTS WITH GENERATOR MANUFACTURER.
10. VOLTAGE DIP SHALL NOT DROP BELOW 15% AND FREQUENCY SHALL NOT DROP BELOW 5% WHEN STARTING ACROSS-THE-LINE THE LARGEST MOTOR WHILE ALL OTHER LIFT STATION MOTORS AND AUXILIARY TRANSFORMER ARE RUNNING AT FULL LOAD.
11. GENERATOR SHALL BE WIRED AS A NON-SEPARATELY DERIVED SYSTEM, IN STRICT COMPLIANCE WITH NEC CURRENT REQUIREMENT.



B CONTAINMENT BASE DETAILS

SCALE: N.T.S.

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
GENERATOR DETAILS

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E14

Date: Dec 06, 2023, 4:21pm User ID: SGref
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-14 LIFT STATION GENERATOR DETAILS.dwg

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250 FAX NO. 210-658-9805

NO.	REVISION	DATE

12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS
LIFT STATION P&ID

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E15

Date: Dec 06, 2023, 4:21pm User ID: SGraf
File: R:\Pape-Dawson\2023 Cornerstone Lift Station\100% Design\Drawings\E-15 LIFT STATION P&ID.dwg

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST. SAN ANTONIO, TX 78212
TEL. NO. 210-658-7250
FAX NO. 210-658-9805

NO.	REVISION	DATE

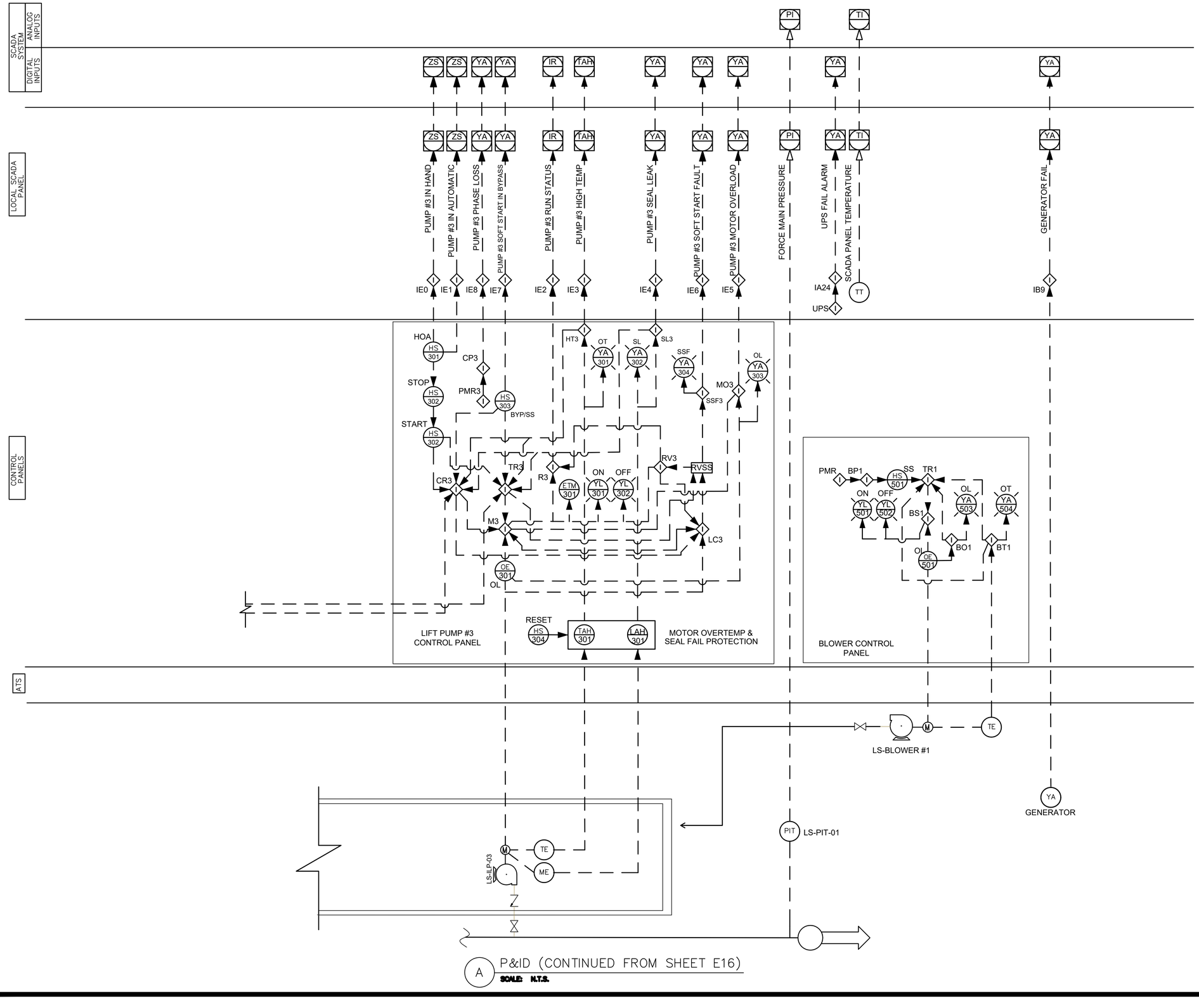
12/6/2023
STATE OF TEXAS
STEVEN MOUSER
103671
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

CORNERSTONE LIFT STATION AND FORCE MAIN
SAN ANTONIO, TEXAS

LIFT STATION
P&ID

SAWS JOB NO. 22-XXXX
JOB NO. 12632-06
DATE DECEMBER 2023
DESIGNER BD
CHECKED SM DRAWN BD
SHEET E16



CONCRETE NOTES:

CN-1 ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 301 "SPECIFICATION FOR STRUCTURAL CONCRETE BUILDINGS" AND ACI 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE."

CN-2 CONSTRUCTION TOLERANCES SHALL CONFORM TO ACI 117 "STANDARD TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS."

CN-3 CONTRACTOR SHALL SUBMIT THE FOLLOWING SHOP DRAWINGS:

REINFORCING STEEL – DETAILING FABRICATION AND ERECTION OF ALL REINFORCING BARS INCLUDING ACCESSORIES IN ACCORDANCE WITH THE LATEST EDITION OF ACI 315 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE."

CONCRETE MIX DESIGN – FOR EACH TYPE OF CONCRETE TO BE USED BASED ON AGGREGATE SIZE AND CEMENT PROPORTION. MIX DESIGN SHALL INCLUDE CERTIFICATION OF COMPLIANCE WITH SPECIFIED MATERIALS BASED ON FIELD SAMPLES AND COMPRESSION TEST DATA FOR LABORATORY PREPARED TRIAL MIX OR FIELD TEST DATA FOR SPECIFIED MIX. FIELD TEST DATA SHALL BE FROM AN IDENTICAL MIX DESIGN SUPPLIED FROM PROPOSED BATCH PLANT AND SHALL HAVE BEEN PREPARED WITHIN THE PRECEDING SIX MONTHS.

CN-4 CONTRACTOR SHALL DESIGN, CONSTRUCT, ERECT, SHORE, BRACE AND MAINTAIN FORM WORK ACCORDING TO ACI 301. WOOD FORM WORK SHALL BE #2 COMMON OR BETTER PLYWOOD, EXPOSED SURFACES SHALL BE NEW OR LIKE NEW MOISTURE RESISTANT FIR FORM PLYWOOD. LIGHTLY COAT FORMS WITH NON-STAINING FORM OIL, REMOVE SURPLUS OIL.

CN-5 REINFORCING STEEL SHALL BE DOMESTIC NEW BILLET STEEL CONFORMING TO ASTM A615 GRADE 60, EXCEPT TIES AND STIRRUPS MAY BE GRADE 40. BARS DESIGNATED AS CONTINUOUS SHALL BE LAPPED 48 BAR DIAMETERS. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 AND SHALL BE LAPPED 8" MINIMUM AT SPLICE POINTS OR 1 1/2 MESHES, WHICHEVER IS GREATER.

CN-6 PORTLAND CEMENT SHALL COMPLY WITH ASTM C-150, TYPE 1. FLY ASH SHALL CONFORM TO ASTM C-618. NORMAL WEIGHT AGGREGATE SHALL COMPLY WITH ASTM C33. WATER SHALL BE POTABLE AND COMPLY WITH ASTM C1602. ADMIXRURES SHALL COMPLY WITH THE FOLLOWING PROVISIONS; WATER REDUCTION AND SETTING TIME MODIFICATION: ASTM C494, PRODUCING FLOWING CONCRETE: ASTM C1017, AIR ENTRAINMENT: ASTM C260, INHIBITING CHOLRIDE-INDUCED CORROSION: ASTM C1582.

CN-7 CONCRETE SHALL BE NORMAL WEIGHT, LABORATORY DESIGNED TO DEVELOP MINIMUM SPECIFIED 28 DAY COMPRESSIVE STRENGTH AND PROPORTIONED AS FOLLOWS:

CONCRETE MIXTURE REQUIREMENTS

APPL.	DESIGN STRN, f'c	w/cm RATIO	MAX AGGR. SIZE	AIR ENTR.	EXPOSURE CLASS
SLAB ON GRADE	3000	NA	1 1/2	NA	NA

w/cm RATIOS NOT SPECIFIED SHALL BE AS REQUIRED TO ACHIEVE DESIGN STRENGTH
IF AN EXPOSURE CLASS IS SPECIFIED, PROVIDE MIX DESIGNS PER ACI 301

CN-8 ALL REINFORCING STEEL SHALL BE FREE OF RUST, SCALE, AND DRIED CONCRETE, AND SHALL BE ACCURATELY BENT AND SECURELY TIED INTO POSITION TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT. RAISING REINFORCEMENT DURING POUR WILL NOT BE PERMITTED.

CN-9 CONCRETE COVER SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

A. CONCRETE CAST AGAINST EARTH – 3"

B. CONCRETE EXPOSED TO EARTH OR WEATHER:
BARS 3/4" AND LARGER IN DIAMETER – 2 INCHES
BARS SMALLER THAN 3/4" DIAMETER – 1 1/2"

C. CONCRETE NOT EXPOSED TO WEATHER OR GROUND:
SLAB ON GRADE – 1 1/2" FROM TOP OF SLAB

CN-10 SET AND BUILD ANCHORAGE AND OTHER EMBEDDED ITEMS INTO FORM WORK AS REQUIRED FOR OTHER WORK THAT IS ATTACHED TO OR SUPPORTED BY CONCRETE. COORDINATE WITH OTHER DISCIPLINES.

CN-11 CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH ASTM C-94 "STANDARD SPECIFICATION FOR READY-MIXED CONCRETE."

CN-12 CONCRETE WHEN DEPOSITED SHALL HAVE A TEMPERATURE NOT BELOW 50°F OR ABOVE 90°F. APPROPRIATE MEASURES SHALL BE TAKEN TO MAINTAIN TEMPERATURE RANGE AND PREVENT WATER EVAPORATION FOR 5 DAYS AFTER PLACEMENT. SALT OR OTHER CHEMICALS SHALL NOT BE ADDED TO PREVENT FREEZING.

CN-13 CONCRETE SHALL BE CONVEYED TO AND DEPOSITED IN FORM WORK NEAR ITS FINAL POSITION, WITH A FREE VERTICAL DROP NOT EXCEEDING 3 FEET. PLACE CONCRETE IN 12 INCH MAXIMUM LAYERS AND COMPACT EACH LAYER BY MECHANICAL VIBRATING.

CN-14 CONSTRUCTION JOINTS IN MONOLITHIC FRAMING SHALL HAVE PRIOR APPROVAL OF THE ARCHITECT/ENGINEER, U.N.O.

CN-15 SCREENING, RE-STRAIGHTENING, AND FINISHING OPERATIONS SHALL COMPLY WITH ACI 302.1R. COORDINATE ALL FINISHES WITH ARCHITECTURAL DRAWINGS AND FLOOR FINISH REQUIREMENTS. CAREFULLY TOOL ALL EXPOSED EDGES.

CN-16 CURE CONCRETE FOR AT LEAST SEVEN DAYS BY MOISTURE CURING, SEALED MOISTURE RETAINING COVER CURING, OR A CLEAR WATERBORNE CURING COMPOUND CONFORMING TO ASTM C309.

CN-17 SIDE FORMS MAY BE REMOVED AFTER CUMULATIVE CURING AT NOT LESS THAN 50°F FOR 24 HOURS AFTER PLACING CONCRETE. SOFFITS OF SUSPENDED CONCRETE MAY BE REMOVED AFTER CURING FOR AT LEAST SEVEN DAYS AND COMPRESSIVE TEST RESULTS INDICATE AT LEAST 75% OF SPECIFIED DESIGN STRENGTH. RESHORE AS REQUIRED FOR CONSTRUCTION LOADS.

CN-18 PATCH HONEYCOMB, TIE HOLES, AND MINOR DEFECTS WITH ONE PART CEMENT AND TWO PARTS SAND IMMEDIATELY AFTER REMOVING FORMS.

CN-19 EXPOSED CONCRETE SHALL BE RUBBED WITH CARBORUNDUM BRICKS AND WATER AFTER 48 HOURS BUT BEFORE ONE WEEK. PLASTERING SURFACES WILL NOT BE PERMITTED.

CN-20 NOTIFY ENGINEER WHEN FORM WORK AND REINFORCING IS IN PLACE SO ENGINEER CAN OBSERVE REINFORCING STEEL PRIOR TO ALL CONCRETE POURS.

CN-21 INDEPENDENT TESTING LABORATORY SHALL TAKE SAMPLES AND PERFORM SLUMP AND COMPRESSION TESTS PER ASTM C-39 ON CONCRETE PLACED EACH DAY AT THE RATE OF ONE SET OF FOUR CYLINDERS FOR EACH 80 CU. YDS. OR FRACTION THEREOF WITH A MINIMUM INTERVAL OF 50 CU. YDS. BETWEEN SAMPLES.

STEEL FRAMING NOTES:

SF-1 STRUCTURAL STEEL SHAPES SHALL CONFORM TO ASTM 992, Fy=50 KSI. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B, Fy=46 KSI. PIPES SHALL CONFORM TO ASTM A501, Fy=36 KSI OR ASTM A-53, TYPE E OR S, GRADE B, Fy=35 KSI. STEEL PLATES, BARS, AND OTHER SHAPES SHALL CONFORM TO ASTM A36, Fy=36 KSI. CONNECTIONS SHALL CONFORM TO REQUIREMENTS OF AISC.

SF-2 WELDING SHALL BE BY WELDERS HOLDING VALID CERTIFICATES AND CURRENT EXPERIENCE IN THE TYPE OF WELD SHOWN ON THE DRAWINGS ALL WELDING DONE BY E70XX SERIES LOW HYDROGEN RODS. FOR ASTM A615 GRADE 60 REINFORCING BARS, USE 706 SERIES. ALL WELDS ON DRAWINGS ARE SHOWN AS SHOP WELDS, UNLESS NOTED OTHERWISE.

SF-3 STRUCTURAL FRAMING CONNECTIONS SHALL BE SEATED COLUMN CAPS, CLIP ANGLES OR WEB PLATES AS INDICATED ON DETAILS. USE A325 HIGH STRENGTH BOLTS OR WELDS SUFFICIENT TO DEVELOP REACTION CAPACITY ALLOWABLE UNIFORM LOAD/SPAN DIVIDED BY TWO AS SHOWN IN AISC MANUAL SECTION 2 (9TH EDITION).

SF-4 DECK STOP ANGLES, FASCIA ANGLES, HANGERS, CLIPS AND OTHER STRUCTURAL AND MISCELLANEOUS MEMBERS SHALL BE CONNECTED OR JOINED USING 3/16" OR LARGER FILLET OR GROOVE WELDS AS REQUIRED FOR ADEQUATE CONNECTION.

SF-5 WHERE OPENINGS THROUGH ROOF ARE REQUIRED, FRAME AS DETAILED.

STEEL FRAMING NOTES CONT:

SF-6 ALL EXPOSED STRUCTURAL STEEL AND LINTEL ANGLES SHALL BE CLEANED AND GALVANIZED. APPLY ZINC COATING BY THE HOT-DIP PROCESS AND ACCORDING TO A.S.T.M. A123. FIELD WELDS, BOLTED CONNECTIONS AND ABRADED AREAS SHALL BE CLEANED AND "TOUCHED UP" WITH GALVANIZING REPAIR PAINT IN ACCORDANCE WITH A.S.T.M. A780. THE GALVANIZING REPAIR PAINT SHALL HAVE A HIGH ZINC-DUST CONTENT WITH DRY FILM CONTAINING NO LESS THAN 95% ZINC-DUST BY WEIGHT, AND COMPLYING WITH THE DOD-P-21035A OR SSPC-PAINT 20.

SF-7 CONTRACTOR SHALL PROVIDE PROTECTION FOR ALL EXISTING CONSTRUCTION DURING ALL FIELD WELDING OPERATIONS. A FIRE EXTINGUISHER SHALL BE ON THE JOB SITE AND IN THE IMMEDIATE WORKING AREA OF ALL FIELD WELDING.

SF-8 CONTRACTOR SHALL SUBMIT STRUCTURAL STEEL SHOP DRAWINGS SHOWING ANCHORAGE PLACING PLANS, ERECTION PLANS, AND DETAIL DRAWINGS FOR ALL STEEL FRAMING MEMBERS INCLUDING BRIDGING, BRACING, CONNECTIONS, METHODS OR ASSEMBLY, ETC.

STEEL COLUMN SCHEDULE

MK	SECTION	BASE PLATE			TOP CONN.	REMARKS
		W x D x t	ANCHORS	DETAIL		
C1	HSS5x5x3/8	N/A	N/A	6/S2.0	6/S2.0	

LEHMANN ENGINEERING, Inc.
1006 Beckett, San Antonio, TX 78213
Ph (210)348-8889
TX Firm Reg. No. F-5298

GENERAL NOTES:

GN-1 THIS STRUCTURE IS DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (2015) AS AMENDED AND ADOPTED BY THE CITY OF _____, AND APPLICABLE INDUSTRY STANDARDS (AISC, ACI, ETC.).

GN-2 DESIGN CRITERIA:
DEAD LOADS – THE WEIGHT OF THE MATERIALS FORMING THE PERMANENT PART OF THE BUILDING. A SUPERIMPOSED DEAD LOAD OF 5 PSF HAS BEEN APPLIED FOR MECHANICAL DUCTS, CONDUITS, CEILING, ETC.

LIVE LOADS - IN ACCORDANCE WITH IBC SECTION 1607	
FLOORS:	LOADS
RESIDENTIAL – ATTICS WITH STORAGE	20 PSF
RESIDENTIAL – HABITABLE ATTICS AND SLEEPING AREAS	30 PSF
RESIDENTIAL – ALL OTHER AREAS EXCEPT BALCONIES	40 PSF
RESIDENTIAL – BALCONIES	60 PSF
STADIUMS AND ARENAS – BLEACHERS	100 PSF
STADIUMS AND ARENAS – FIXED SEATING	60 PSF
WALKWAYS AND ELEVATED PLATFORMS (OTHER THAN EXIT WAYS)	60 PSF
BALCONIES (UNLESS NOTED OTHERWISE)	100 PSF
CORRIDORS (UNLESS NOTED OTHERWISE)	100 PSF
MOVABLE PARTITION	15 PSF
DECKS	SAME AS OCCUPANCY
STAIRS AND EXITS (UNLESS NOTED OTHERWISE)	100 PSF OR 300 LBS.
MECHANICAL ROOM	150 PSF
ROOFS:	LOADS
ROOF	20 PSF
AWNINGS AND CANOPIES	5 PSF
MECHANICAL EQUIPMENT	AS INDICATED ON PLANS
LIVE LOADS REDUCTIONS - FLOORS IN ACCORDANCE WITH IBC SECTION 1607.9	
LIVE LOADS REDUCTIONS - ROOFS IN ACCORDANCE WITH IBC SECTION 1607.11	
WIND LOADS - PER IBC SECTION 1609	
ULTIMATE DESIGN WIND SPEED (3 SECOND GUST), V-ult	115 MPH
NOMINAL DESIGN WIND SPEED, V-asd	89 MPH
EXPOSURE CATEGORY	C
RISK CATERGORY	II
SNOW LOADS - PER IBC SECTION 1608	5 PSF
EARTHQUAKE LOADS - PER IBC SECTIONS 1613	
IMPORTANCE FACTOR	1
OCCUPANCY CATEGORY	11
0.2 SEC SPECTRAL RESPONSE ACCELERATION (Ss)	0.1000
1 SEC SPECTRAL RESPONSE ACCELERATION (S1)	0.030
SITE CLASS	D
0.2 SEC SPECTRAL RESPONSE COEFFICIENT (SDs)	0.1070
1 SEC SPECTRAL RESPONSE COEFFICIENT (SD1)	0.048
SEISMIC DESIGN CATEGORY	A
RESISTING SYSTEM	WOOD SHEAR WALLS
ANALYSIS PROCEDURE	ASCE 7-11.7
RESPONSE COEFFICIENT	N/A
MODIFICATION FACTOR	N/A
BASE SHEAR	N/A

GN-3 THE STRUCTURE HAS BEEN DESIGNED TO RESIST DESIGN LOADS ONLY AS A COMPLETED STRUCTURE. CONTRACTOR SHALL CONSIDER ALL LOADS APPLIED TO THE PARTIALLY COMPLETED STRUCTURE AND PROVIDE TEMPORARY BRACING AS REQUIRED UNTIL ALL PERMANENT CONNECTIONS ARE MADE. ANY PROPOSED APPLICATION OF CONSTRUCTION LOADS WHICH EXCEED THE DESIGN LOADS WILL REQUIRE REANALYSIS AND PROBABLE REDESIGN.

GN-4 THE FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL ENGINEERING STUDY PREPARED BY INTEC (PROJECT NO. S231712, JUNE 5, 2023). THE GEOTECHNICAL ENGINEERING STUDY REPORT INCLUDES OTHER RECOMMENDATIONS THAT EFFECT THE LONG TERM PERFORMANCE OF THE FOUNDATION WHICH ARE BEYOND THE SCOPE OF LEHMANN ENGINEERING'S SERVICES. THE CONTRACTOR AND OWNER SHALL REVIEW THE SOILS REPORT AND IMPLEMENT RECOMMENDATIONS PROVIDED WITH (I.E. LANDSCAPING VEGETATION, ROOT BARRIERS, SITE DRAINAGE, ROOF DRAINS, SOIL MOISTURE MAINTENANCE, ETC.)

GN-5 PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR AND FABRICATOR SHALL VERIFY ALL QUANTITIES, DIMENSIONS AND CONDITIONS AND NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

GN-6 VERIFY REQUIREMENTS OF OTHER TRADES (MECHANICAL, ELECTRICAL, ETC.) PRIOR TO PROCEEDING WITH FABRICATION OR INSTALLATION OF MATERIALS.

GN-7 UTILITIES PENETRATING BUILDING SHALL BE FLEXIBLE, USING SLEEVE JOINTS, BENDS, LOOPS, ETC. TO PERMIT MOVEMENTS DUE TO EXPANSIVE UNDERLYING SOILS.

GN-8 THE DETAILS DESIGNATED AS "TYPICAL DETAILS", APPLY GENERALLY TO THE DRAWINGS IN ALL AREAS WHERE CONDITIONS ARE SIMILAR TO THOSE DESCRIBED IN DETAILS.

GN-9 COMPLETED SHOP DRAWINGS SHALL BE PROVIDED FOR FABRICATED ITEMS, REFERENCE INDIVIDUAL SECTIONS FOR SPECIFIC REQUIREMENTS. SUBMIT A MINIMUM OF FOUR COPIES OF EACH SUBMITTAL WITH ADDITIONAL COPIES AS DIRECTED BY THE ARCHITECT. SHOP DRAWINGS SHALL BE REVIEWED BY THE GENERAL CONTRACTOR AND SUBMITTED THROUGH THE ARCHITECT/ENGINEER PRIOR TO FABRICATION. THE STRUCTURAL DRAWINGS ARE COPYRIGHTED AND SHALL NOT BE REPRODUCED FOR SHOP DRAWINGS.

GN-10 CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER AT LEAST 24 HOURS IN ADVANCE OF ANY CONCRETE POUR OR OTHER ACTION THAT WILL COVER UP STRUCTURAL ELEMENTS SO THE ENGINEER CAN CONDUCT PERIODIC SITE OBSERVATIONS AS REQUIRED TO PROVIDE A FINAL LETTER OF GENERAL COMPLIANCE TO THE OWNER AND/OR BUILDING AUTHORITY. PERIODIC SITE OBSERVATIONS ARE SOLELY FOR THE PURPOSE OF DETERMINING IF THE WORK IS PROCEEDING IN GENERAL ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND ARE NOT INTENDED TO BE A COMPREHENSIVE OR EXHAUSTIVE CHECK OF THE QUALITY AND/OR QUANTITY OF THE WORK. THESE OBSERVATIONS DO NOT CONSTITUTE THE SPECIAL INSPECTION REQUIREMENTS OF THE IBC SECTION 1704.

GN-11 THE ENGINEER SHALL NOT HAVE CONTROL OF, AND SHALL NOT BE RESPONSIBLE FOR, CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

GN-12 THE OWNER SHALL EMPLOY AN INDEPENDENT TESTING LABORATORY TO PERFORM CONSTRUCTION MATERIALS TESTING FOR THE PROJECT. REFERENCE SPECIFIC SECTIONS FOR TESTING REQUIREMENTS. THE CONTRACTOR SHALL NOTIFY THE OWNER OF THIS REQUIREMENT AND COORDINATE THESE SERVICES AS NECESSARY THROUGHOUT THE PROCESS OF CONSTRUCTION.

GN-13 ASSUMPTIONS HAVE BEEN MADE BY THIS OFFICE REGARDING EXISTING CONDITIONS. ACTUAL CONDITIONS MAY VARY FROM THOSE ASSUMED. THE CONTRACTOR IS TO REPORT ANY SUCH DISCREPANCIES TO THE ENGINEER FOR POSSIBLE MODIFICATIONS NEEDED TO THE CONTRACT DRAWINGS BEFORE PROCEEDING WITH FURTHER WORK.

NO.	REVISION	DATE
1	REVISION	03.15.24

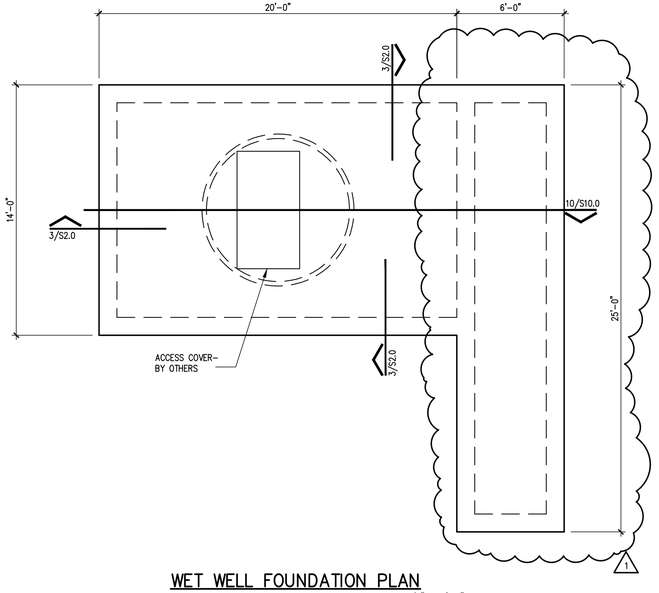
STATE OF TEXAS
AARON M. STAAS
104806
LICENSED PROFESSIONAL ENGINEER
JANUARY 24, 2024

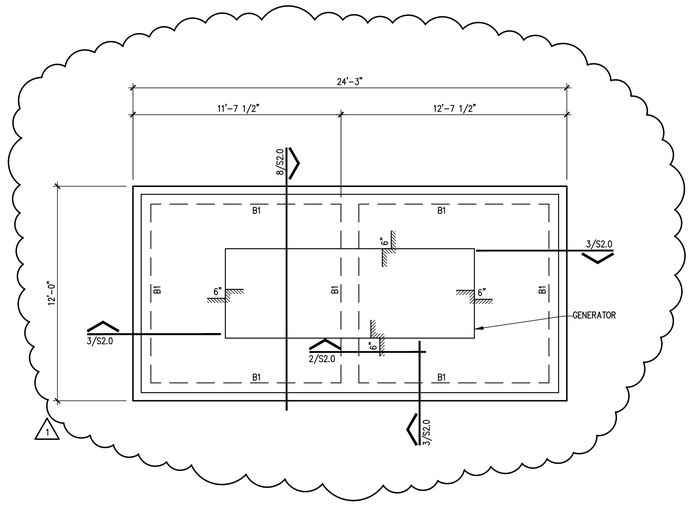
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

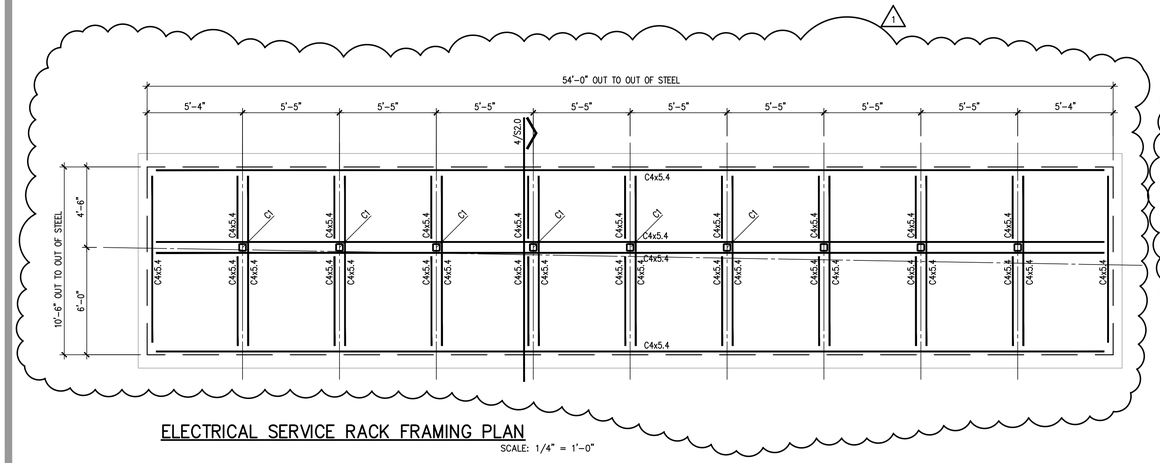
440 QUARRY IMPROVEMENTS PRV ASSEMBLIES
SAN ANTONIO, TX

PLAT NO. _____
JOB NO. 12934-00
DATE APRIL 2023
DESIGNER CD
CHECKED AMS DRAWN JR
SHEET S1.0

LE PROJECT NO.: 23-03875
LE FILE NO.: S1.0







LEHMANN ENGINEERING, Inc.
1006 Beckett, San Antonio, TX 78213
Ph (210)348-8889
TX Firm Reg. No. F-5298

WET WELL FOUNDATION PLAN
SCALE: 3/8" = 1'-0"

TEXAS ONE CALL SYSTEM
CALL BEFORE YOU DIG
UNDERGROUND UTILITIES
1-800-245-4545
CALL 48 HOURS BEFORE YOU DIG, DRILL, OR BLAST.

GENERATOR FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

TEXAS ONE CALL SYSTEM
CALL BEFORE YOU DIG
UNDERGROUND UTILITIES
1-800-245-4545
CALL 48 HOURS BEFORE YOU DIG, DRILL, OR BLAST.

PLAN NOTES:

1. B1 – REF. GRADE BEAM SCHEDULE ON SHEET S2.0
2. T.O.C.=? DENOTES TOP OF CONCRETE ELEVATION RELATIVE TO STRUCTURAL DATUM

ELECTRICAL SERVICE RACK FRAMING PLAN
SCALE: 1/4" = 1'-0"

TEXAS ONE CALL SYSTEM
CALL BEFORE YOU DIG
UNDERGROUND UTILITIES
1-800-245-4545
CALL 48 HOURS BEFORE YOU DIG, DRILL, OR BLAST.

ELECTRICAL SERVICE RACK FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

NO.	REVISION	DATE
1	REVISION	03.15.24

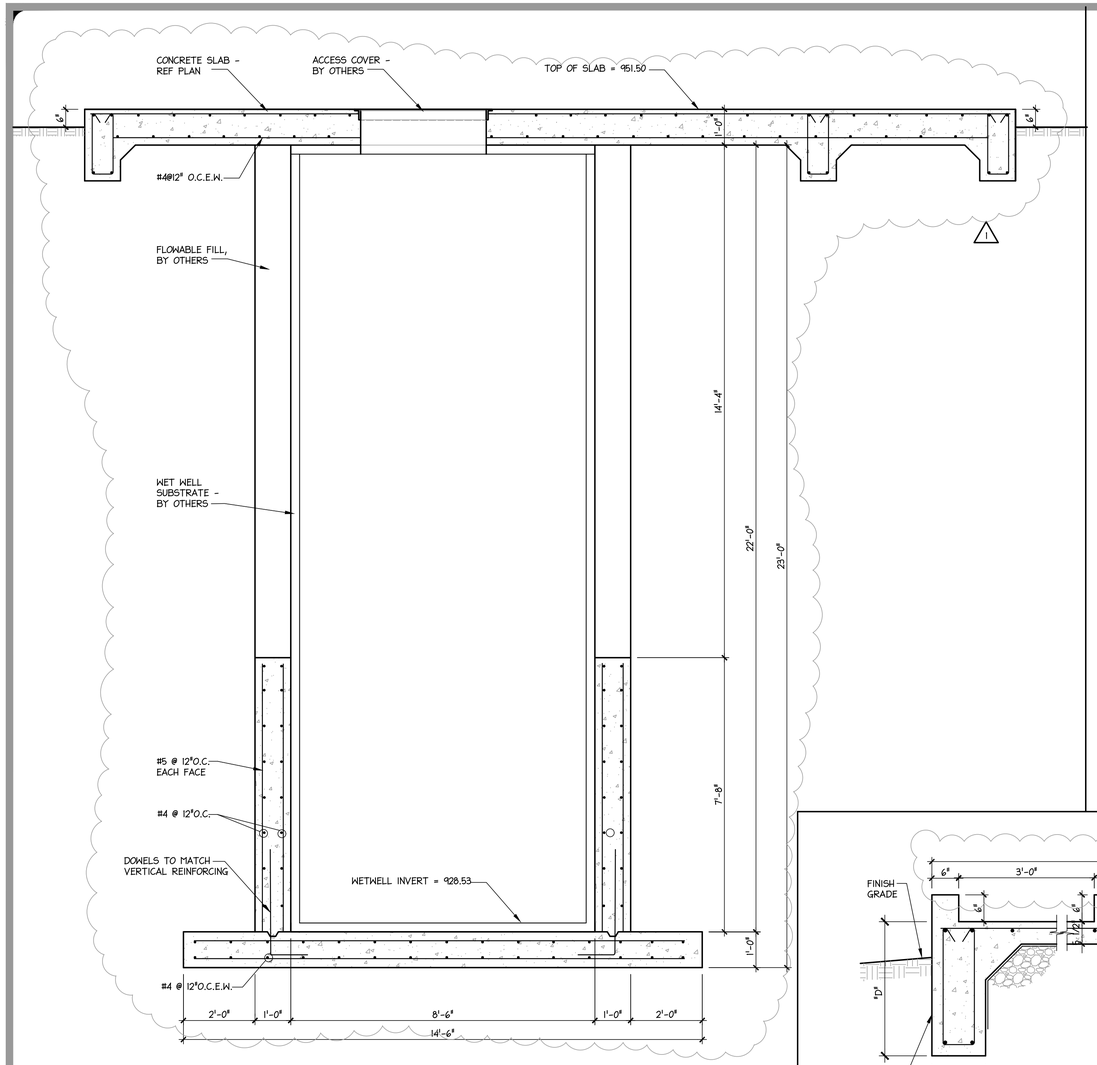
AARON M. STAAS
104806
Aaron Staas
JANUARY 24, 2024

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

440 QUARRY IMPROVEMENTS PRV ASSEMBLIES
SAN ANTONIO, TX

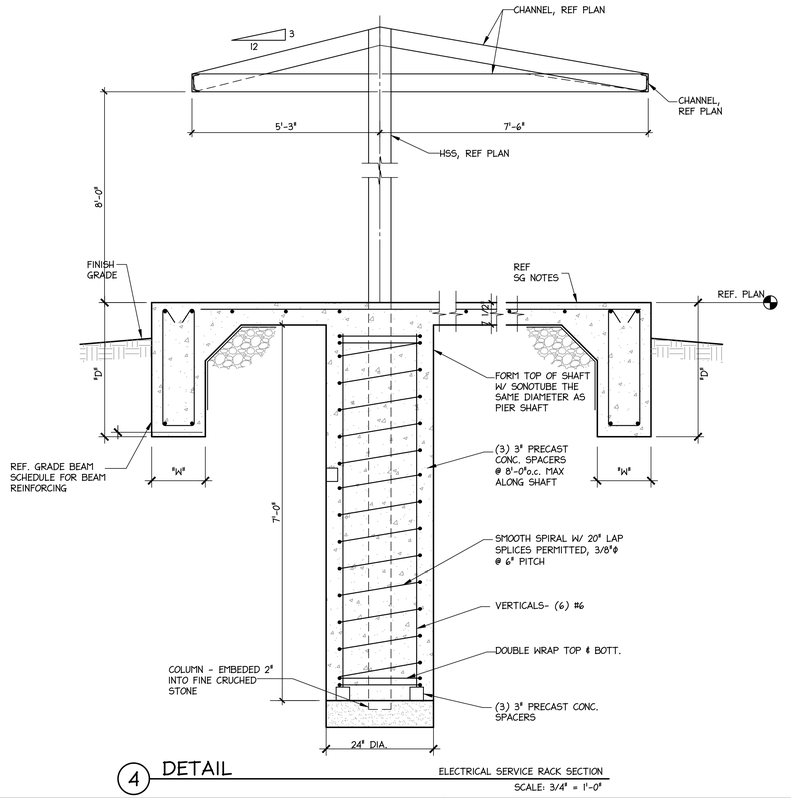
PLAT NO.
JOB NO. 12934-00
DATE APRIL 2023
DESIGNER CD
CHECKED AMS DRAWN JR
SHEET S1.1

LE PROJECT NO.: 23-03875
LE FILE NO.: S1.0



10 SECTION

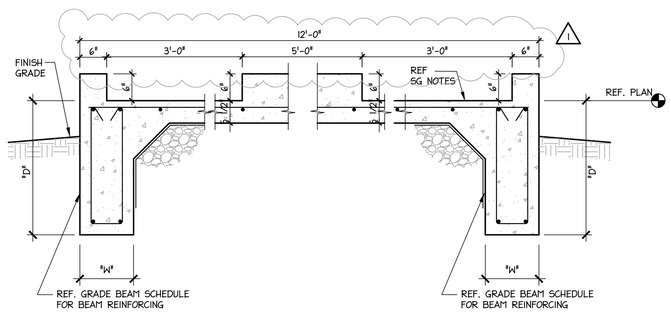
SCALE: 1/2" = 1'-0"



4 DETAIL

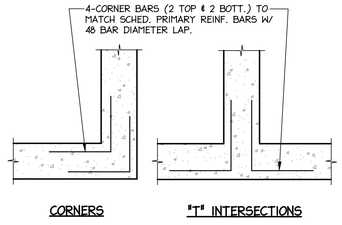
ELECTRICAL SERVICE RACK SECTION

SCALE: 3/4" = 1'-0"



8 SECTION

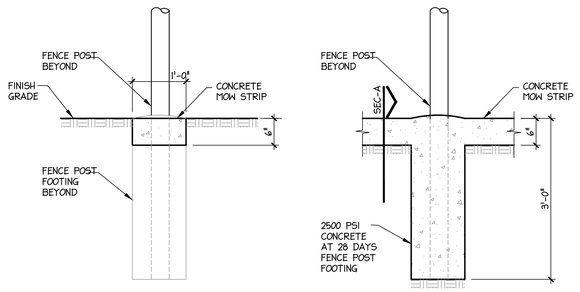
SCALE: 3/4" = 1'-0"



5 DETAIL

TYP. CORNER BARS

SCALE: 1/2" = 1'-0"



SEC-A

11 SECTION AT MOW STRIP/FENCE POST

SCALE: 1/2" = 1'-0"

LIGHT POLE FOOTING SCHEDULE

MK	SHAFT			DEPTH	REMARKS
	DIA.	VERT. BARS	SPIRAL		
LPI	24"	(6) #6	3/8"ϕ @ 6" PITCH	5'-0"	

LIGHT POLE FOOTING NOTES:

LP-1 FORM TOP OF SHAFT WITH FIBERFORM AT LEAST 2'-0" BELOW GRADE, OR DEEPER IF IMPROPERLY DRILLED OVERSIZE OR OUT OF ROUND.

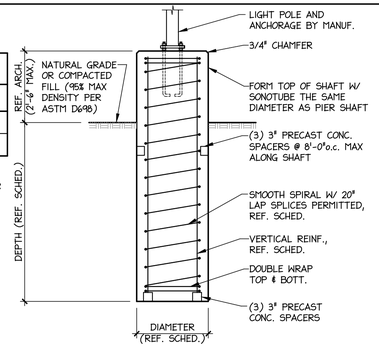
LP-2 REINFORCING CAGE SHALL BE HELD SECURELY AWAY FROM EARTH AT SIDES & BOTTOM BY SETS OF 3 PRECAST CONCRETE SPACER BLOCKS EVERY 8'-0" ALONG CAGE AND AT BOTTOM. DO NOT RAISE CAGE OFF OF BOTTOM.

LP-3 ALL FOOTING EXCAVATIONS SHALL BE FREE OF WATER PRIOR TO PLACING CONCRETE.

LP-4 PIER SHAFT SHALL BE DRILLED PLUMB ALONG ITS TOTAL LENGTH WITHIN 1/2" PER 10'-0" OF DEPTH.

LP-5 BOTTOM OF FOOTING SHALL BE CLEAN AND FREE OF ALL LOOSE MATERIALS AND RECOMPACTED CUTTING PRIOR TO PLACING CONCRETE.

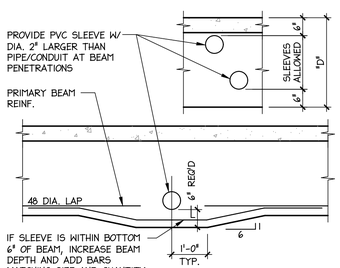
LP-6 PLACEMENT OF CONCRETE AND REINFORCING IN SHAFT SHALL BE THE SAME DAY OF DRILLING.



9 DETAIL

TYPICAL LIGHT POLE FOOTING

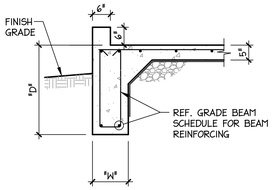
SCALE: N.T.S.



6 DETAIL

TYP. BEAM PENETRATION

SCALE: 1/2" = 1'-0"



3 SECTION

SCALE: 1/2" = 1'-0"

GRADE BEAM SCHEDULE

MK	"W"	"D"	MAIN REINFORCEMENT	STIRRUPS
B1	12"	24"	(2) #6 x CONT. TOP & BOTTOM	#3 @ 24"o.c.
B2	12"	36"	(2) #7 x CONT. TOP & BOTTOM	#3 @ 24"o.c.

SLAB ON GRADE FOUNDATION NOTES:

SG-1 PREPARE BUILDING PAD PER "STRUCTURAL EARTHWORK FOR GRADE SUPPORTED FOUNDATION" NOTES.

SG-2 CAREFULLY TRENCH AND SHAPE GRADE BEAMS AND SLAB TURNDOWNS WITH A SMOOTH-MOUTHED BUCKET. IF A TOOTHED BUCKET IS USED, EXCAVATION SHALL BE STOPPED 6" ABOVE FINAL GRADE AND THE REMAINING EXCAVATION ACCOMPLISHED WITH A SMOOTH MOUTHED BUCKET OR BY HAND LABOR TO REMOVE ALL LOOSE SOILS DISTURBED BY THE BUCKET TEETH.

SG-3 PROVIDE 10 MIL POLYOLEFIN (STEGO WRAP OR EQUIVALENT) VAPOR BARRIER ON TOP OF SELECT FILL WITH 12" LAPPED AND TAPED JOINTS. CUT AROUND ROUGH-IN PIPES AND SEAL WITH TAPE. DO NOT INSTALL VAPOR BARRIER ON BEAM SOFFITS AND BOTTOM 6" OF TRENCHES, ATTACH TO TRENCH WALLS TO PREVENT FROM HANGING LOOSELY.

SG-4 WOODFORM EXPOSED FACES TO A DEPTH OF 8" BELOW FINISHED GRADE.

SG-5 ALL BEAM SOFFITS SHALL BEAR 12" MINIMUM INTO NATURAL GRADE OR COMPACTED FILL ON PERIMETER, INCREASE SCHEDULED BEAM DEPTH AS REQUIRED FOR SOFFIT TO BEAR 12" MINIMUM BELOW FINISH GRADE. CONTRACTOR COORDINATE BEAM DEPTHS WITH REINFORCING STEEL SUPPLIER TO ALLOW PROPER REINFORCING BARS AT TRANSITIONS.

SG-6 WHEN SOLID ROCK IS ENCOUNTERED AT BEAM TRENCHES, THE BEAM DEPTH MAY BE REDUCED TO TOP OF SOLID ROCK BUT NOT LESS THAN 18" DEEP.

SG-7 TRENCHES SHALL BE VERIFIED FOR SIZE TO MAINTAIN CLEARANCES AROUND REINFORCEMENT PRIOR TO PLACING REINFORCEMENT.

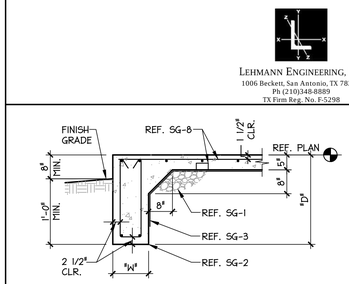
SG-8 PROVIDE 5" THICK CONCRETE SLAB REINFORCED W/ #4 @ 12"o.c. EACH WAY IN TOP, TYPICAL UNLESS NOTED OTHERWISE. SUPPORT MAT AT 4'-0"o.c. EACH WAY WITH CONCRETE BLOCKS OR BRICKS. SUPPORT BOTTOM BEAM REINFORCEMENT AT 4'-0" INTERVALS.

SG-9 GRADE BEAM AND SLAB REINFORCEMENT SHALL BE CONTINUOUS WITH 48 BAR DIAMETER LAP SPLICES.

SG-10 PROVIDE FOUR CORNER BARS AT ALL BEAM CORNERS & T-INTERSECTIONS (2 TOP AND 2 BOTTOM). BARS TO EQUAL SIZE OF SCHEDULED BEAM REINFORCEMENT AND SHALL LAP BEAM REINFORCMENT 48 BAR DIAMETERS.

SG-11 WHERE BEAM DEPTH EXCEEDS 36", ADD #4 @ 12"o.c. IN EACH FACE OF BEAM.

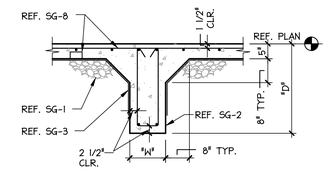
SG-12 CONDUITS IN SLAB SHALL RUN UNDER THE TOP LAYER OF SLAB REINFORCING. PROVIDE A MINIMUM OF 1 1/2" CLEAR BETWEEN CONDUITS AND BETWEEN CONDUITS AND PARALLEL REINFORCING. DO NOT BUNDLE CONDUITS.



1 SECTION

TYPICAL EXTERIOR BEAM

SCALE: 1/2" = 1'-0"



2 SECTION

TYPICAL INTERIOR BEAM

SCALE: 1/2" = 1'-0"

LEHMANN ENGINEERING, Inc.
1006 Beckett, San Antonio, TX 78213
Ph (210)348-8889
TX Firm Reg. No. F-5298

NO.	REVISION	DATE
1	REVISION	05.15.24

STATE OF TEXAS
AARON M. STAAS
104806
LICENSED PROFESSIONAL ENGINEER
JANUARY 24, 2024

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

440 QUARRY IMPROVEMENTS PRV ASSEMBLIES

SAN ANTONIO, TX

PLAT NO.
JOB NO. 12934-00
DATE APRIL 2023
DESIGNER CD
CHECKED AMS DRAWN JR
SHEET S2.0

LE PROJECT NO.: 23-03875
LE FILE NO.: S2.0

TEMPORARY STORMWATER SECTION (TCEQ-0602)

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.

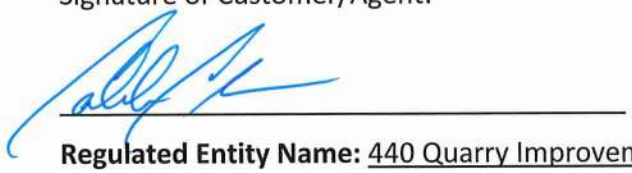
Signature

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: Caleb Chance, P.E.

Date: 3/27/24

Signature of Customer/Agent:



Regulated Entity Name: 440 Quarry Improvements

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: Construction staging area

   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: Upper Salado Creek

Temporary Best Management Practices (TBMPs)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

☒ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

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

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

Administrative Information

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

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

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

ATTACHMENT A

Attachment A – Spill Response Actions

In the event of an accidental leak or spill:

- Spill must be contained and cleaned up immediately.
- Spills will not be merely buried or washed with water.
- Contractor shall take action to contain spill. Contractor may use sand or other absorbent material stockpiled on site to absorb spill. Absorbent material should be spread over the spill area to absorb the spilled product.
- In the event of an uncontained discharge the contractor shall utilize onsite equipment to construct berms downgradient of the spill with sand or other absorbent material to contain and absorb the spilled product.
- Spill containment/absorbent materials along with impacted media must be collected and stored in such a way so as not to continue to affect additional media (soil/water). Once the spill has been contained, collected material should be placed on poly or plastic sheeting until removed from the site. The impacted media and cleanup materials should be covered with plastic sheeting and the edges weighed down with paving bricks or other similarly dense objects as the material is being accumulated. This will prevent the impacted media and cleanup materials from becoming airborne in windy conditions or impacting runoff during a rain event. The stockpiled materials should not be located within an area of concentrated runoff such as along a curb line or within a swale.
- Contaminated soils and cleanup materials will be sampled for waste characterization. When the analysis results are known the contaminated soils and cleanup materials will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.
- The contractor will be required to notify the owner, who will in turn contact TCEQ to notify them in the event of a significant hazardous/reportable quantity spill. Additional notifications as required by the type and amount of spill will be conducted by owner or owner's representative.

In the event of an accidental significant or hazardous spill:

- The contractor will be required to report significant or hazardous spills in reportable quantities to:
  - 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.
  - 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.
  - Notification should first be made by telephone and followed up with a written report.

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

- Contaminated soils will be sampled for waste characterization. When the analysis results are known the contaminated soils will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.

Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 1.4.16. Contractor shall review this section.

ATTACHMENT B

Attachment B – Potential Sources of Contamination

Other potential sources of contamination during construction include:

- *Potential Source* — *Asphalt products used on this project.*
  - *Preventative Measure*
    - *After placement of asphalt, emulsion or coatings, the contractor will be responsible for immediate cleanup should an unexpected rain occur. For the duration of the asphalt product curing time, the contractor will maintain standby personnel and equipment to contain any asphalt wash-off should an unexpected rain occur. The contractor will be instructed not to place asphalt products on the ground within 48 hours of a forecasted rain.*
- *Potential Source* — *Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle dripping.*
  - *Preventative Measure*
    - *Vehicle maintenance when possible will be performed within the construction staging area.*
    - *Construction vehicles and equipment shall be checked regularly for leaks and repaired immediately.*
- *Potential Source* — *Accidental leaks or spills of oil, petroleum products and substances listed under 40 CFR parts 110, 117, and 302 used or stored temporarily on site.*
  - *Preventative Measure*
    - *Contractor to incorporate into regular safety meetings, a discussion of spill prevention and appropriate disposal procedures.*
    - *Contractor's superintendent or representative overseer shall enforce proper spill prevention and control measures.*
    - *Hazardous materials and wastes shall be stored in covered containers and protected from vandalism.*
    - *A stockpile of spill cleanup materials shall be stored on site where it will be readily accessible.*
- *Potential Source* — *Miscellaneous trash and litter from construction workers and material wrappings.*
  - *Preventive Measure*
    - *Trash containers will be placed throughout the site to encourage proper trash disposal.*
- *Potential Source* — *Construction debris.*
  - *Preventive Measure*
    - *Construction debris will be monitored daily by contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring immediate attention will be addressed on a case by case basis.*

- *Potential Source* — *Spills/Overflow of waste from portable toilets*
- *Preventative Measure*
  - *Portable toilets will be placed away from high traffic vehicular areas and storm drain inlets.*
  - *Portable toilets will be placed on a level ground surface.*
  - *Portable toilets will be inspected regularly for leaks and will be serviced and sanitized at time intervals that will maintain sanitary conditions.*

ATTACHMENT C

Attachment C – Sequence of Major Activities

The sequence of major activities which disturb soil during construction on this site will be divided into two stages. The first is site preparation that will include installation of temporary best management practices (TBMPs) as illustrated on Exhibit 1, clearing, and grubbing of vegetation where applicable. This will disturb approximately 27.08 acres. The second is construction that will include construction of a street, sewer line, residential development and one (1) batch detention basin, utility installation, and site cleanup. This will disturb approximately 27.08 acres.

ATTACHMENT D

Attachment D – Temporary Best Management Practices and Measures

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

No upgradient stormwater will cross the project limits. All TBMPs are adequate for the drainage areas they serve.

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

Site preparation, which is the initiation of all activity on the project, will disturb the largest amount of soil. Therefore, before any of this work can begin, the clearing and grading contractor will be responsible for the installation of all on-site control measures. The methodology for pollution prevention of on-site stormwater will include: (1) erection of silt fences along the downgradient boundary of construction activities for temporary erosion and sedimentation controls, (2) installation of rock berms downgradient from areas of concentrated stormwater flow for temporary erosion control, (3) installation of stabilized construction entrance/exit(s) to reduce the dispersion of sediment from the site, (4) installation of construction staging area(s), (5) placement of gravel filter bags, and (6) installation of grate inlet protection.

Prior to the initiation of construction, all previously installed control measures will be repaired or reestablished for their designed or intended purpose. This work, which is the remainder of all activity on the project, may also disturb additional soil. The construction contractor will be responsible for the installation of all remaining on-site control measures that includes installation of the concrete truck washout pit(s), as construction phasing warrants.

Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features.

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

No naturally occurring sensitive geological features were identified on the site. Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features. All TBMPs are adequate for the drainage areas served.

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

No naturally occurring sensitive geological features were identified on the site. Temporary measures utilized in this plan are intended to allow stormwater to continue downstream after passing through the BMPs. This will allow stormwater runoff to continue downgradient to streams or features that may exist downstream of the site. All TBMPs are adequate for the drainage areas they serve.

ATTACHMENT F

Attachment F – Structural Practices

The following structural measures will be installed prior to the initiation of site preparation activities:

- *Erection of silt fences along the downgradient boundary of construction activities and rock berms/gravel filter bags for secondary protection, as located on Exhibit 1 and detailed on Exhibit 2.*
- *Installation of stabilized construction entrance/exit(s) and construction staging area(s), as located on Exhibit 1 and detailed on Exhibit 2.*
- *Installation of inlet protection, as located on Exhibit 1 and detailed on Exhibit 2.*

The following structural measures will be installed at the initiation of construction activities or as appropriate based on the construction sequencing:

- *Installation of concrete truck washout pit(s) and construction staging area, as required and located on Exhibit 1 and detailed on Exhibit 2.*

ATTACHMENT G

Attachment G – Drainage Area Map

Please refer to Exhibit 3 – Permanent Pollution Abatement Plan for Drainage Area Map. Although drainage areas of more than ten (10) acres of a drainage area will be disturbed, drainage areas are formed of sub-basins that are made up of less than ten acres each. All TBMPs utilized are adequate for the drainage areas served.

ATTACHMENT I

INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures weekly and within 24 hours after a storm event. An inspection report that summarizes the scope of the inspection, names and qualifications of personnel conducting the inspection, date of the inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water TPDES data for a period of three years after the Notice of Termination (NOT) has been filed. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over `6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, (6) concrete truck rinse-out pit for signs of potential failure, (7) embankment, spillways, and outlet of sediment basin (where applicable) for erosion damage, and (8) sediment basins (where applicable) for evidence that basin has accumulated 50% of its volume in silt. Deficiencies noted during the inspection will be corrected and documented within seven calendar days following the inspection or before the next anticipated storm event if practicable.

Contractor shall review Sections 1.3 and 1.4 of TCEQ's Technical Guidance Manual for additional BMP inspection and maintenance requirements.

440 QUARRY IMPROVEMENTS
Water Pollution Abatement Plan

Pollution Prevention Measure	Inspected in Compliance	Corrective Action Required	
		Description (use additional sheet if necessary)	Date Completed
Best Management Practices			
Natural vegetation buffer strips			
Temporary vegetation			
Permanent vegetation			
Sediment control basin			
Silt fences			
Rock berms			
Gravel filter bags			
Drain inlet protection			
Other structural controls			
Vehicle exits (off-site tracking)			
Material storage areas (leakage)			
Equipment areas (leaks, spills)			
Concrete washout pit (leaks, failure)			
General site cleanliness			
Trash receptacles			
Evidence of Erosion			
Site preparation			
Roadway or parking lot construction			
Utility construction			
Drainage construction			
Building construction			
Major Observations			
Sediment discharges from site			
BMPs requiring maintenance			
BMPs requiring modification			
Additional BMPs required			

_____ A brief statement describing the qualifications of the inspector is included in this SWP3.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

"I further certify I am an authorized signatory in accordance with the provisions of 30 TAC §305.128."

Inspector's Name _____ Inspector's Signature _____ Date _____

PROJECT MILESTONE DATES

Date when major site grading activities begin:

Construction Activity	Date
Installation of BMPs	

Dates when construction activities temporarily or permanently cease on all or a portion of the project:

Construction Activity	Date

Dates when stabilization measures are initiated:

Stabilization Activity	Date
Removal of BMPs	

ATTACHMENT J

Attachment J – Schedule of Interim and Permanent Soil Stabilization Practices

Interim on-site stabilization measures, which are continuous, will include minimizing soil disturbances by exposing the smallest practical area of land required for the shortest period of time and maximizing use of natural vegetation. As soon as practical, all disturbed soil will be stabilized as per project specifications in accordance with pages 1-35 to 1-60 of TCEQ's Technical Guidance Manual (TGM) RG-348 (2005). Mulching, netting, erosion blankets and seeding are acceptable.

Stabilization measures will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and except as provided below, will be initiated no more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures do not have to be initiated on that portion of site. In areas experiencing droughts where the initiation of stabilization measures by the 14^{th} day after construction activity has temporarily or permanently ceased is precluded by seasonably arid conditions, stabilization measures must be initiated as soon as practicable.

PERMANENT STORMWATER SECTION (TCEQ-0600)

Permanent Stormwater Section

Texas Commission on Environmental Quality

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

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

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

Signature

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

Print Name of Customer/Agent: Caleb Chance, P.E.

Date: 4/4/24

Signature of Customer/Agent

Regulated Entity Name: 440 Quarry Improvements

Permanent Best Management Practices (BMPs)

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

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

   ☐ N/A

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

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

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

☐ N/A

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

   ☐ N/A

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

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

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

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

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

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

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

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

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

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

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

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

☐ N/A

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

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

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

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

☒ Design calculations (TSS removal calculations)

☒ TCEQ construction notes

☒ All geologic features

☒ All proposed structural BMP(s) plans and specifications

☐ N/A

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

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

    ☐ N/A

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

    ☒ N/A

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

    ☐ N/A

Responsibility for Maintenance of Permanent BMP(s)

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

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

    ☐ N/A

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

    ☐ N/A

ATTACHMENT B

Attachment B – BMPs for Upgradient Stormwater

No upgradient stormwater will cross the project limits.

One (1) proposed batch detention basin (Basin "A"), and four (4) proposed fifteen-foot (15') engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT C

Attachment C – BMPs for Onsite Stormwater

One (1) proposed batch detention basin (Basin "A"), and four (4) proposed fifteen-foot (15') engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT D

Attachment D – BMPs for Surface Streams

Upper Salado Creek is located immediately adjacent to the site.

One (1) proposed batch detention basin (Basin "A") and four (4) proposed fifteen-foot (15') engineered vegetative filter strips (VFS) are the Permanent Best Management Practices (PBMPs) for this site. The PBMPs were designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the proposed improvements. All PBMPs provided are adequate for the drainage area served.

ATTACHMENT F

Attachment F – Construction Plans

Please refer to the Exhibits Section of this application for Water Pollution Abatement Site Plans.

ATTACHMENT G

PERMANENT POLLUTION ABATEMENT MEASURES
MAINTENANCE SCHEDULE AND MAINTENANCE PROCEDURES

This document has been prepared to provide a description and schedule for the performance of maintenance on permanent pollution abatement measures. Maintenance measures to be performed will be dependent on what permanent pollution abatement measures are incorporated into the project. The project specific water pollution abatement plan should be reviewed to determine what permanent pollution abatement measures are incorporated in to a project.

It should also be noted that the timing and procedures presented herein are general guidelines, adjustment to the timing and procedures may have to be made depending on project specific characteristics as well as weather related conditions but may not be altered without TCEQ approval.

Where a project is occupied by the owner, the owner may provide for maintenance with his own skilled forces or contract for recommended maintenance of Permanent Best Management Practices. Where a project is occupied or leased by a tenant, the owner shall require tenants to contract for such maintenance services either through a lease agreement, property owners association covenants, or other binding document.

I understand that I am responsible for maintenance of the Permanent Pollution Abatement Measures included in this project until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property or ownership is transferred.

I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule.

Lloyd A. Denton, Jr.
Shavano Quarry Development, Ltd.

01.09.24
Date

INSPECTION AND MAINTENANCE SCHEDULE
FOR
PERMANENT POLLUTION ABATEMENT MEASURES

Recommended Frequency	Task to be Performed												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
After Rainfall	√							√			√		√
Biannually*	√	√	√	√	√	√	√	√	√	√	√	√	√

At least one biannual inspection must occur during or immediately after a rainfall event.
√Indicates maintenance procedure that applies to this specific site.

See description of maintenance task to be performed on the following pages. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather related conditions but may not be altered without TCEQ approval.

A w*ritten record should be kept of inspection results and maintenance performed.*

Task No. & Description	***Included in this project***	
1. Mowing	**Yes**	~~No~~
2. Litter and Debris Removal	**Yes**	~~No~~
3. Erosion Control	**Yes**	~~No~~
4. Level Sensor	**Yes**	~~No~~
5. Nuisance Control	**Yes**	~~No~~
6. Structural Repairs and Replacement	**Yes**	~~No~~
7. Discharge Pipe	**Yes**	~~No~~
8. Detention and Drawdown Time	**Yes**	~~No~~
9. Sediment Removal	**Yes**	~~No~~
10. Logic Controller	**Yes**	~~No~~
11. Vegetated Filter Strips	**Yes**	~~No~~
12. Visually Inspect Security Fencing for Damage or Breach	**Yes**	~~No~~
13. Recordkeeping for Inspections, Maintenance, and Repairs	**Yes**	~~No~~

MAINTENANCE PROCEDURES FOR PERMANENT POLLUTION ABATEMENT MEASURES

Note: Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 3.5.

Inspections. Inspections should take place a minimum of twice a year. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. The remaining inspections should occur between storm events so that manual operation of the valve and controller can be verified. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. The outlet structure and the trash screen should be inspected for signs of clogging. Debris and sediment should be removed from the orifice and outlet(s) as described in previous sections. Debris obstructing the valve should be removed. During each inspection, erosion areas inside and downstream of this BMP should be identified and repaired/revegetated immediately. *A written record should be kept of inspection results and corrective measures taken*

1. Mowing. The basin, basin side-slopes, and embankment of the basin must be mowed to prevent woody growth and control weeds. A mulching mower should be used, or the grass clippings should be caught and removed. Mowing should take place at least twice a year, or more frequently if vegetation exceeds 18 inches in height. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas.

2. Litter and Debris Removal. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin. Particular attention should be paid to floatable debris around the outlet structure. The outlet should be checked for possible clogging or obstructions and any debris removed.

3. Erosion control. The basin side slopes and embankment all may periodically suffer from slumping and erosion. To correct these problems, corrective action, such as regrading and revegetation, may be necessary. Correction of erosion control should take place whenever required based on the periodic inspections.

4. Level Sensor. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin.

5. Nuisance Control. Standing water or soggy conditions may occur in the basin. Some standing water may occur after a storm event since the valve may close with 2 to 3 inches of water in the basin. Some flow into the basin may also occur between storms due to spring flow and residential water use that enters the storm sewer system. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.).

6. Structural Repairs and Replacement. With each inspection, any damage to structural elements of the basin (pipes, concrete drainage structures, retaining walls, etc.) should be identified and

repaired immediately. An example of this type of repair can include patching of cracked concrete, sealing of voids, removal of vegetation from cracks and joints. The various inlet/outlet structures in a basin will eventually deteriorate and must be replaced. *A written record should be kept of inspection results and corrective measures taken.*

7. Discharge Pipe. The basin discharge pipe shall be checked for accumulation of silt, debris or other obstructions which could block flow. Soil accumulations, vegetative overgrowth and other blockages should be cleared from the pipe discharge point. Erosion at the point of discharge shall be monitored. If erosion occurs, the addition of rock rubble to disperse the flow should be accomplished. *A written record should be kept of inspection results and corrective measures taken.*

8. Detention and Drawdown Time. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. This characteristic can be a sign of the need for maintenance. The minimum drawdown time is 24 hours. If drawdown time is less than 24 hours, the actuator valve shall be checked and partially closed to limit the drawdown time. Extensive drawdown time greater than 48 hours may indicated blockage of the discharge pipe. Corrective actions should be performed and completed within 15 working days. *A written record of the inspection findings and corrective actions performed should be made.*

9. Sediment Removal. A properly designed batch detention basin will accumulate quantities of sediment over time. The accumulated sediment can detract from the appearance of the facility and reduce the pollutant removal performance of the facility. The sediment also tends to accumulate near the outlet structure and can interfere with the level sensor operation. Sediment shall be removed from the basin at least every 5 years, when sediment depth exceeds 6 inches, when the sediment interferes with the level sensor or when the basin does not drain within 48 hours. Care should be taken not to compromise the basin lining during maintenance.

10. Logic Controller. The Logic Controller should be inspected as part of the twice-yearly investigations. Verify that the external indicators (active, cycle in progress) are operating properly by turning the controller off and on, and by initiating a cycle by triggering the level sensor in the basin. The valve should be manually opened and closed using the open/close switch to verify valve operation and to assist in inspecting the valve for debris. The solar panel should be inspected and any dust or debris on the panel should be carefully removed. The controller and all other circuitry and wiring should be inspected for signs of corrosion, damage from insects, water leaks, or other damage. At the end of the inspection, the controller should be reset.

11. Vegetated Filter Strips. Vegetation height for native grasses shall be limited to no more than 18-inches. When vegetation exceeds that height, the filter strip shall be cut to a height of approximately 4 inches. Turf grass shall be limited to a height of 4-inches with regular maintenance that utilizes a mulching mower. Trash and debris shall be removed from filter strip prior to cutting. Check filter strip for signs of concentrated flow and erosion. Areas of filter strip showing signs of erosion shall be repaired by scarifying the eroded area, reshaping, regrading

and placement of solid block sod over the affected area. *A written record of the inspection findings and corrective actions performed should be made.*

12. Visually Inspect Security Fencing for Damage or Breach. Check maintenance access gates for proper operation. Damage to fencing or gates shall be repaired within 5 working days. *A written record should be kept of inspection results and maintenance performed.*

13. Recordkeeping Procedures for Inspections, Maintenance, Repairs, and Retrofits.
    - Written records shall be kept by the party responsible for maintenance or a designated representative.
    - Written records shall be retained for a minimum of five years.

ATTACHMENT I

Attachment I – Measures Minimizing Surface Stream Contamination

Any points where discharge from the site is concentrated and erosive velocities exist will include appropriately sized energy dissipators to reduce velocities to non-erosive levels.

AGENT AUTHORIZATION FORM (TCEQ-0599)

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

I ***Lloyd A. Denton, Jr.***,
Print Name

President,
Title - Owner/President/Other

of ***Shavano Quarry Developments, LTD***,
Corporation/Partnership/Entity Name

have authorized ***Pape-Dawson Engineers***
Print Name of Agent/Engineer

of ***Pape-Dawson Engineers***
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

01.09.24
Date

THE STATE OF Texas §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared Lloyd A. Denton, Jr. 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 9th day of January.

NOTARY PUBLIC

Brenda Armstrong
Typed or Printed Name of Notary

MY COMMISSION EXPIRES:

BRENDA ARMSTRONG
Notary Public, State of Texas
Comm. Expires 01-29-2025
Notary ID 12227048

FEE FORM

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: 440 Quarry Improvements

Regulated Entity Location: 0.25 miles north of Shavano Ranch and NW Military Hwy intersection

Name of Customer: Shavano Quarry Developments, LTD

Contact Person: Lloyd A. Denton, Jr. Phone: (210) 828-6131

Customer Reference Number (if issued):CN 606106151

Regulated Entity Reference Number (if issued):RN 102748860

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	27.08 Acres	$ 6,500.00
Sewage Collection System	2,311 L.F.	$ 1155.50
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: 3/27/24

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

EXHIBITS

CORE DATA FORM
(TCEQ-10400)

TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

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

- [x] New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)
- [ ] Renewal (*Core Data Form should be submitted with the renewal form*)
- [ ] Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 606106151		RN 102748860

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:*

Shavano Quarry Developments, LTD

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (*if applicable*)

11. Type of Customer:

- [ ] Corporation
- [ ] Individual
- Partnership: [ ] General [x] Limited
- Government: [ ] City [ ] County [ ] Federal [ ] State [ ] Other
- [ ] Sole Proprietorship
- [ ] Other:

12. Number of Employees

- [x] 0-20
- [ ] 21-100
- [ ] 101-250
- [ ] 251-500
- [ ] 501 and higher

13. Independently Owned and Operated?

- [x] 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:*

- [x] Owner
- [ ] Operator
- [ ] Owner & Operator
- [ ] Occupational Licensee
- [ ] Responsible Party
- [ ] Voluntary Cleanup Applicant
- [ ] Other:

15. Mailing Address:

11 Lynn Batts Lane, Suite 100

City	State	ZIP	ZIP + 4
San Antonio	TX	78218	3077

16. Country Mailing Information (*if outside USA*)	17. E-Mail Address (*if applicable*)
	laddiedenton@bitterblue.com

18. Telephone Number	19. Extension or Code	20. Fax Number (*if applicable*)
(210) 828-6131		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (*If 'New Regulated Entity" is selected below this form should be accompanied by a permit application*)

- [x] New Regulated Entity
- [ ] Update to Regulated Entity Name
- [ ] Update to Regulated Entity Information

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

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

440 Quarry Improvements

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

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Approximately 0.25 miles north of Shavano Ranch and NW Military Hwy intersection

26. Nearest City	**State**	**Nearest ZIP Code**
San Antonio	TX	78257

27. Latitude (N) In Decimal:	29.610089		**28. Longitude (W) In Decimal:**	-98.565252	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	36	36	98	33	54

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)

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

Construction of commerical development

34. Mailing Address:	11 Lynn Batts Lane, Suite 100							
	City	San Antonio	**State**	TX	**ZIP**	78218	**ZIP + 4**	3077

35. E-Mail Address:	laddiedenton@bitterblue.com

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(210)828-6131		( ) -

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

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

SECTION IV: Preparer Information

40. Name:	Deunte Levine	**41. Title:**	Engineer IV, EIT

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(210)375-9000		( ) -	DLevine@pape-dawson.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:	Pape-Dawson Engineers	**Job Title:**	Vice President	
Name *(In Print)* **:**	Caleb Chance, P.E.		**Phone:**	(210) 375-9000
Signature:			**Date:**	4/5/2024

POLLUTANT LOAD AND REMOVAL CALCULATIONS

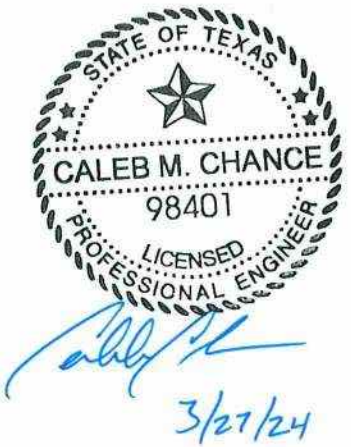
440 QUARRY IMPROVEMENTS

Treatment Summary by Watershed

Watershed	Total Watershed Area (ac)	Proposed Impervious Cover (ac)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	1.53	0.79	15' Engineered VFS (A)	645	707
B	3.25	1.20	15' Engineered VFS (B)	979	1,087
C+I	12.11	5.48	Water Quality Basin "A"	4,472	5,000
D	0.36	0.25	15' Engineered VFS (C)	204	222
E	1.14	0.36	15' Engineered VFS (D)	294	328
G	2.37	1.32	Overtreatment	1,077	0
H	0.34	0.21	Overtreatment	171	0
I	1.57	1.57	Treated With Cornerstone High School WPAP (RN102748860)	0	1,281
TOTAL	**21.10**	**9.61**	---	**7,842**	**8,625**

Water Quality Basin Summary

Basin	Designed Capture Volume (cf)	Required Volume (cf)	Excess Volume Capacity (cf)
Batch Detention "A"	54,553	45,614	8,939



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: 440 Quarry
Date Prepared: 1/4/2024

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreads

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

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

where:

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

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

County =	Bexar	
Total project area included in plan * =	21.10	acres
Predevelopment impervious area within the limits of the plan * =	0.26	acres
Total post-development impervious area within the limits of the plan * =	9.61	acres
Total post-development impervious cover fraction * =	0.46	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	7630	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. =	**Basin A**		
Total drainage basin/outfall area =	**12.11**	acres	
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres	
Post-development impervious area within drainage basin/outfall area =	**5.48**	acres	
Post-development impervious fraction within drainage basin/outfall area =	**0.45**		
$L_{M\ THIS\ BASIN}$ =	**4472**	lbs.	

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **91** percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

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

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

where:

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

A_C =	**12.11**	acres
A_I =	**5.48**	acres
A_P =	**6.63**	acres
L_R =	**5274**	lbs

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

Desired $L_{M\ THIS\ BASIN}$ =	**5000**	lbs.
F =	**0.95**	

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348

Rainfall Depth =	**2.60**	inches
Post Development Runoff Coefficient =	**0.33**	
On-site Water Quality Volume =	**38012**	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**7602**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**45614**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

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

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: 440 Public Improver
Date Prepared: 1/3/2024

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spre

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

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

where:

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

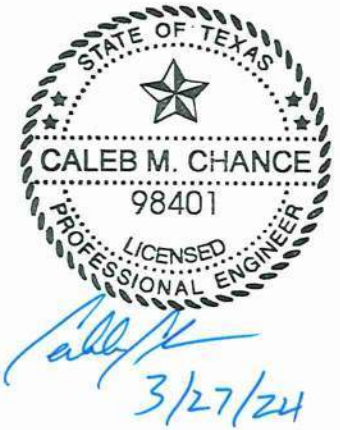
Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan * =	21.10	acres
Predevelopment impervious area within the limits of the plan * =	0.26	acres
Total post-development impervious area within the limits of the plan * =	9.61	acres
Total post-development impervious cover fraction * =	0.46	
P =	30	inches

$L_{M\ TOTAL\ PROJECT}$ = **7630** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5



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

Drainage Basin/Outfall Area No. =	**VFS A**		
Total drainage basin/outfall area =	**1.53**	acres	
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres	
Post-development impervious area within drainage basin/outfall area =	**0.79**	acres	
Post-development impervious fraction within drainage basin/outfall area =	**0.52**		
$L_{M\ THIS\ BASIN}$ =	**645**	lbs.	

3. Indicate the proposed BMP Code for this basin.

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

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

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

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

where:

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

A_C =	**1.53**	acres
A_I =	**0.79**	acres

A_P =	**0.74**	acres
L_R =	**707**	lbs

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

			additional for OT
Desired $L_{M\ THIS\ BASIN}$ =	**707**	lbs.	62
F =	**1.00**		

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-3

Rainfall Depth =	**4.00**	inches
Post Development Runoff Coefficient =	**0.37**	
On-site Water Quality Volume =	**8146**	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**1629**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**9775**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Irrigation Area Calculations:

Soil infiltration/permeability rate =	**0.1**	in/hr	**Enter determined permeability rate or assum**

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: 440 Quarry
Date Prepared: 1/3/2024

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the s

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

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

where:

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

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

County =	Bexar	
Total project area included in plan * =	21.10	acres
Predevelopment impervious area within the limits of the plan * =	0.26	acres
Total post-development impervious area within the limits of the plan* =	9.61	acres
Total post-development impervious cover fraction * =	0.46	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	7630	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

3/27/24

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

Drainage Basin/Outfall Area No. =	**VFS B**	
Total drainage basin/outfall area =	**3.25**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**1.20**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.37**	
$L_{M\ THIS\ BASIN}$ =	**979**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**

Removal efficiency = **85** percent

Aqualogic Cartridge
Bioretention
Contech StormFilter
Constructed Wetlanc
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Stri
Vortechs
Wet Basin
Wet Vault

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

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

where:

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

A_C =	**3.25**	acres
A_I =	**1.20**	acres
A_P =	**2.05**	acres
L_R =	**1087**	lbs

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

			additional for OT
Desired $L_{M\ THIS\ BASIN}$ =	**1087**	lbs.	108
F =	**1.00**		

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348

Rainfall Depth =	**4.00**	inches
Post Development Runoff Coefficient =	**0.29**	
On-site Water Quality Volume =	**13787**	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**2757**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**16545**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: 440 Quarry
Date Prepared: 1/3/2024

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spre

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

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

where:

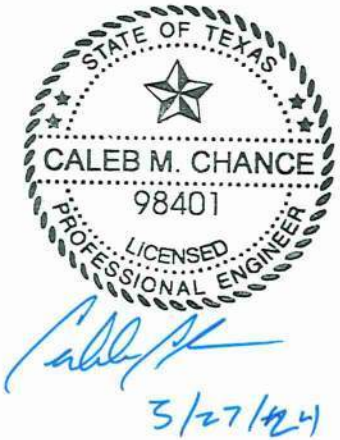
$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of inc
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

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

County =	Bexar	
Total project area included in plan * =	21.10	acres
Predevelopment impervious area within the limits of the plan * =	0.26	acres
Total post-development impervious area within the limits of the plan* =	9.61	acres
Total post-development impervious cover fraction * =	0.46	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	7630	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5



3/27/24

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

Drainage Basin/Outfall Area No. =	**VFS D**	
Total drainage basin/outfall area =	**1.14**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.36**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.32**	
$L_{M\ THIS\ BASIN}$ =	**294**	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**

Removal efficiency = **85** percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

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

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

where:

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

A_C =	**1.14**	acres
A_I =	**0.36**	acres
A_P =	**0.78**	acres
L_R =	**328**	lbs

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

			additional for OT
Desired $L_{M\ THIS\ BASIN}$ =	**328**	lbs.	34
F =	**1.00**		

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-3

Rainfall Depth =	**4.00**	inches
Post Development Runoff Coefficient =	**0.27**	
On-site Water Quality Volume =	**4405**	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**881**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**5286**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

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

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: 440 Quarry
Date Prepared: 1/3/2024

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the ce
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in th

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

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

where:

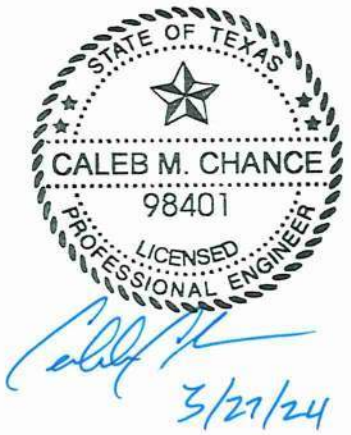
$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 8(
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

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

County =	Bexar	
Total project area included in plan * =	21.10	acres
Predevelopment impervious area within the limits of the plan * =	0.26	acres
Total post-development impervious area within the limits of the plan* =	9.61	acres
Total post-development impervious cover fraction * =	0.46	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	7630	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5



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

Drainage Basin/Outfall Area No. =	**VFS C**	
Total drainage basin/outfall area =	**0.36**	acres
Predevelopment impervious area within drainage basin/outfall area =	**0.00**	acres
Post-development impervious area within drainage basin/outfall area =	**0.25**	acres
Post-development impervious fraction within drainage basin/outfall area =	**0.69**	
$L_{M\ THIS\ BASIN}$ =	**204**	lbs.

3. Indicate the proposed BMP Code for this basin.

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

Aqualogic Cartrid
Bioretention
Contech StormFil
Constructed Wetl
Extended Detenti
Grassy Swale
Retention / Irrigat
Sand Filter
Stormceptor
Vegetated Filter S
Vortechs
Wet Basin
Wet Vault

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

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

where:

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

A_C =	**0.36**	acres
A_I =	**0.25**	acres
A_P =	**0.11**	acres
L_R =	**222**	lbs

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

additional for OT

Desired $L_{M\ THIS\ BASIN}$ =	**222**	lbs.	18
F =	**1.00**		

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348

Rainfall Depth =	**4.00**	inches
Post Development Runoff Coefficient =	**0.50**	
On-site Water Quality Volume =	**2614**	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	**0.00**	acres
Off-site Impervious cover draining to BMP =	**0.00**	acres
Impervious fraction of off-site area =	**0**	
Off-site Runoff Coefficient =	**0.00**	
Off-site Water Quality Volume =	**0**	cubic feet
Storage for Sediment =	**523**	
Total Capture Volume (required water quality volume(s) x 1.20) =	**3137**	cubic feet

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

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-4

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

FINAL PLAN AND PROFILE SHEETS

TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

TEMPORARY POLLUTION ABATEMENT NOTES

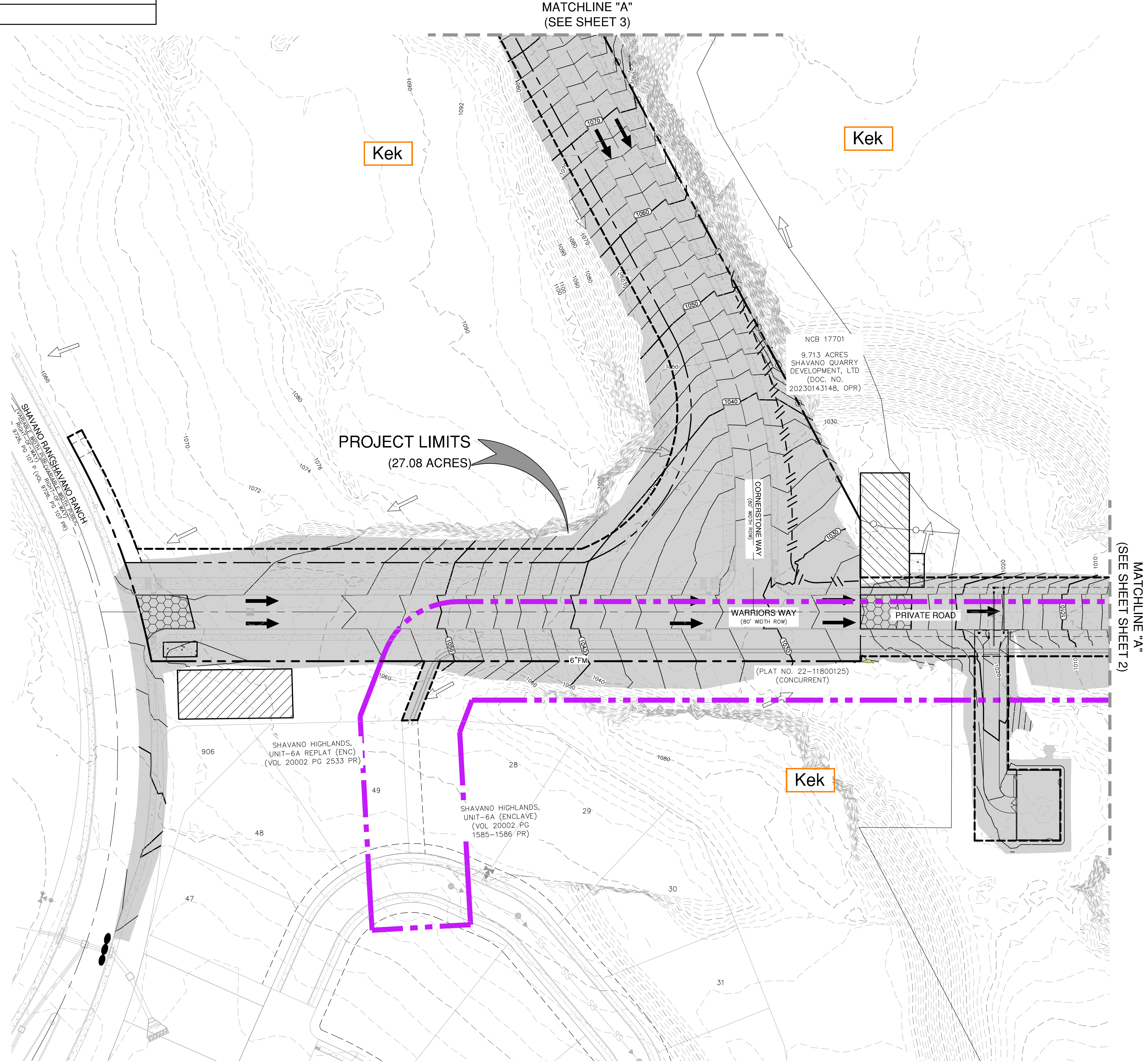
1. CONSTRUCTION OF LOTS, DRIVEWAYS, AND DRAINAGE STRUCTURES MAY BEGIN UPON APPROVAL. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTURBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

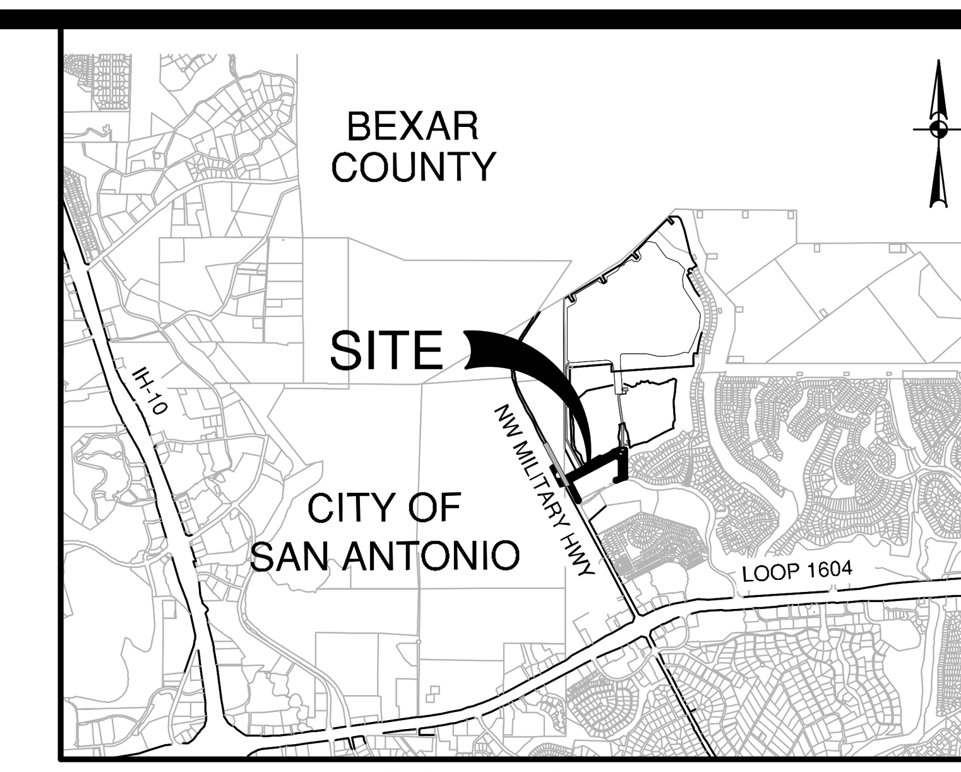
2. GRAVEL FILTER BAGS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS AT DRAINAGE STRUCTURES. THESE BAGS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. CONSTRUCTION WITHIN THE DEVELOPMENT MAY NOT BE CONTINUOUS. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF EACH PAD DURING BUILDING CONSTRUCTION. ALL SILT FENCE SHALL BE PLACED PERPENDICULAR TO DRAINAGE FLOW.

0' 60' 120' 180'

SCALE: 1"= 60'





LOCATION MAP

NOT-TO-SCALE

LEGEND

- PLATTED BOUNDARY
- PROJECT AREA
- 980 EXISTING GRADE
- 980 PROPOSED GRADE
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- CONSTRUCTION FENCE
- ROCK BERM
- INLET PROTECTION
- GRAVEL FILTER BAGS
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- SANITARY SEWER ENVELOPE
- 6" FM 6" FORCE MAIN
- Kek KAINER FORMATION

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

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 UPGRADIENT 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. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

13. SHADED AREA DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

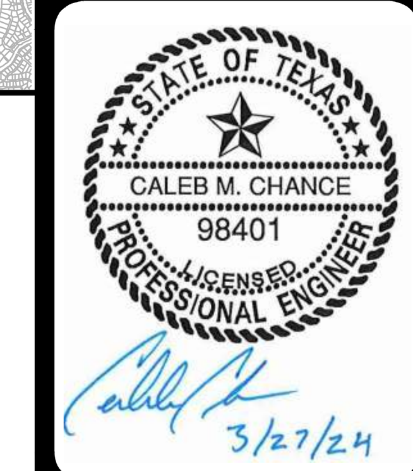
14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

15. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND WILL BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1

NO.	REVISION	DATE



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

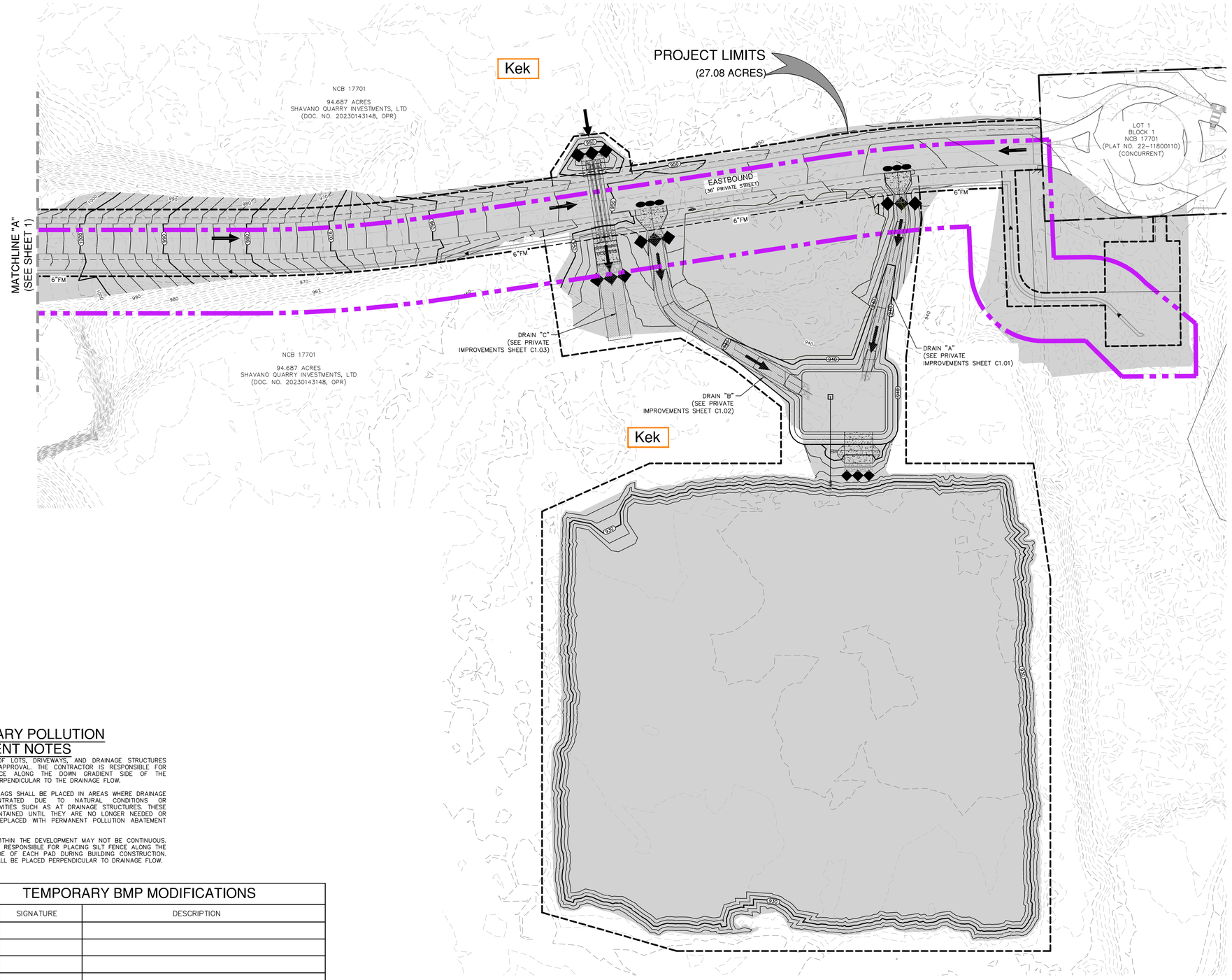
440 QUARRY IMPROVEMENTS

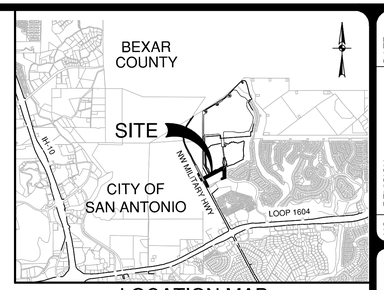
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
TEMPORARY POLLUTION ABATEMENT PLAN

PLAT NO. 23-118XXXXX
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 1 OF 5

Date: Mar 20, 2024, 2:54pm User ID: dlevine
File: P:\129\34\00\Design\Environmental\WPAP\TM-1293400.dwg





LOCATION MAP
NOT-TO-SCALE

LEGEND

- PLATTED BOUNDARY
- PROJECT AREA
- 980 EXISTING GRADE
- 980 PROPOSED GRADE
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- CONSTRUCTION FENCE
- ROCK BERM
- INLET PROTECTION
- GRAVEL FILTER BAGS
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- SANITARY SEWER ENVELOPE
- 6" FM 6" FORCE MAIN
- Kek KAINER FORMATION

0' 60' 120' 180'

SCALE: 1"= 60'

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

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 UPGRADIENT 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. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

13. SHADED AREA DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

15. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND WILL BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.

TEMPORARY POLLUTION ABATEMENT NOTES

1. CONSTRUCTION OF LOTS, DRIVEWAYS, AND DRAINAGE STRUCTURES MAY BEGIN UPON APPROVAL. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTURBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. GRAVEL FILTER BAGS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS AT DRAINAGE STRUCTURES. THESE BAGS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. CONSTRUCTION WITHIN THE DEVELOPMENT MAY NOT BE CONTINUOUS. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF EACH PAD DURING BUILDING CONSTRUCTION. ALL SILT FENCE SHALL BE PLACED PERPENDICULAR TO DRAINAGE FLOW.

TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1

NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

440 QUARRY IMPROVEMENTS
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
TEMPORARY POLLUTION ABATEMENT PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 2 OF 5

Date: Mar 19, 2024, 3:04pm User ID: dlevine
File: C:\Users\LOCAL_~1\Temp\AcPublish_7024\TM-1293400.dwg

TEMPORARY BMP MODIFICATIONS

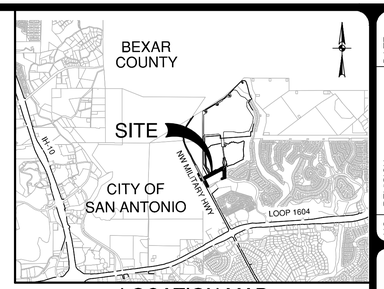
DATE	SIGNATURE	DESCRIPTION

TEMPORARY POLLUTION ABATEMENT NOTES

1. CONSTRUCTION OF LOTS, DRIVEWAYS, AND DRAINAGE STRUCTURES MAY BEGIN UPON APPROVAL. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTURBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. GRAVEL FILTER BAGS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS AT DRAINAGE STRUCTURES. THESE BAGS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. CONSTRUCTION WITHIN THE DEVELOPMENT MAY NOT BE CONTINUOUS. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF EACH PAD DURING BUILDING CONSTRUCTION. ALL SILT FENCE SHALL BE PLACED PERPENDICULAR TO DRAINAGE FLOW.



LOCATION MAP
NOT-TO-SCALE

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

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 UPGRADIENT 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.

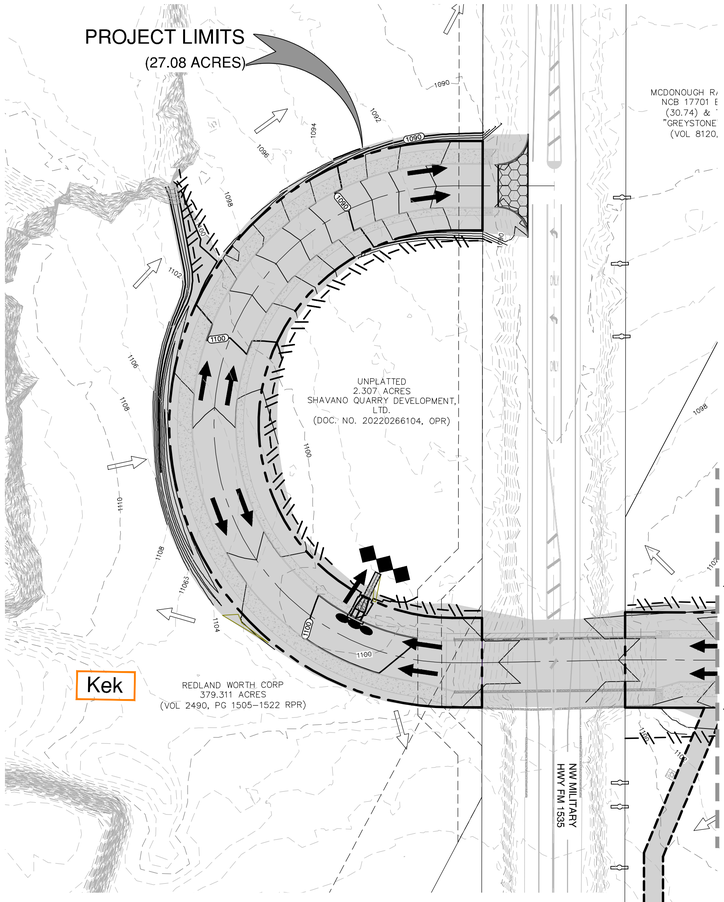
11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.

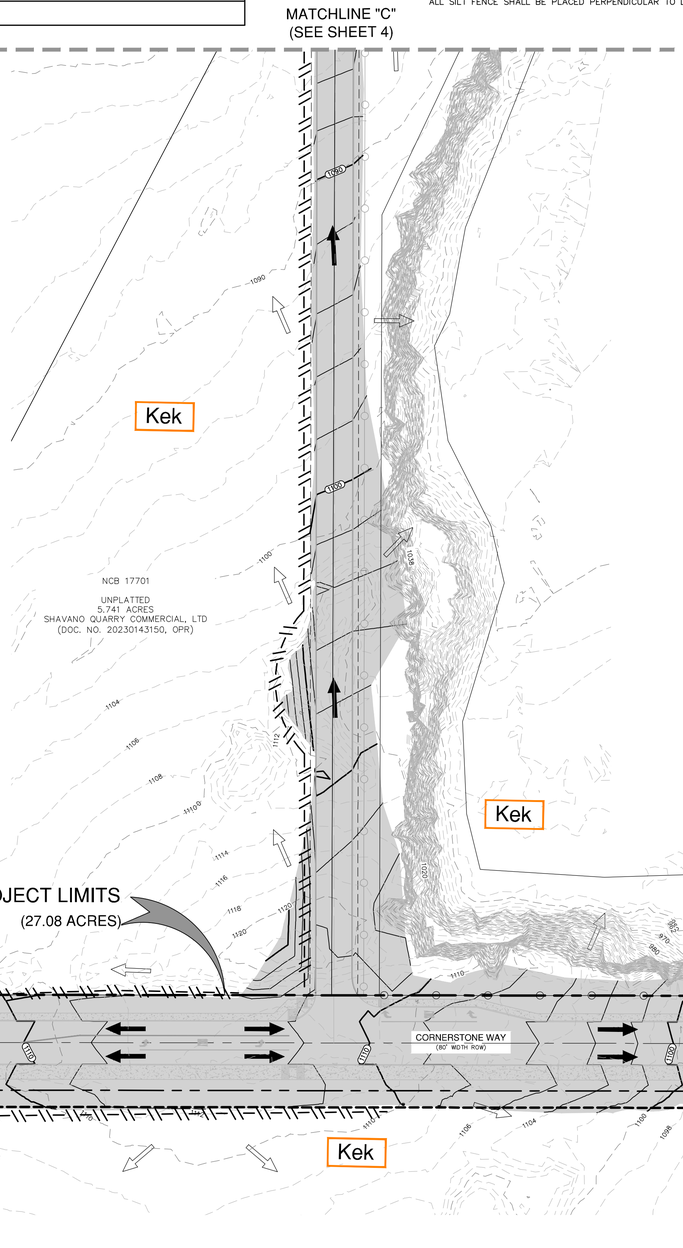
12. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

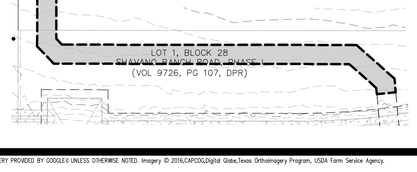
13. SHADED AREA DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

15. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND WILL BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.







LEGEND

- PLATTED BOUNDARY
- PROJECT AREA
- 980 EXISTING GRADE
- 980 PROPOSED GRADE
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- CONSTRUCTION FENCE
- ROCK BERM
- INLET PROTECTION
- GRAVEL FILTER BAGS
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- SANITARY SEWER ENVELOPE
- Kek KAINER FORMATION

0' 60' 120' 180'
SCALE: 1"= 60'

NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

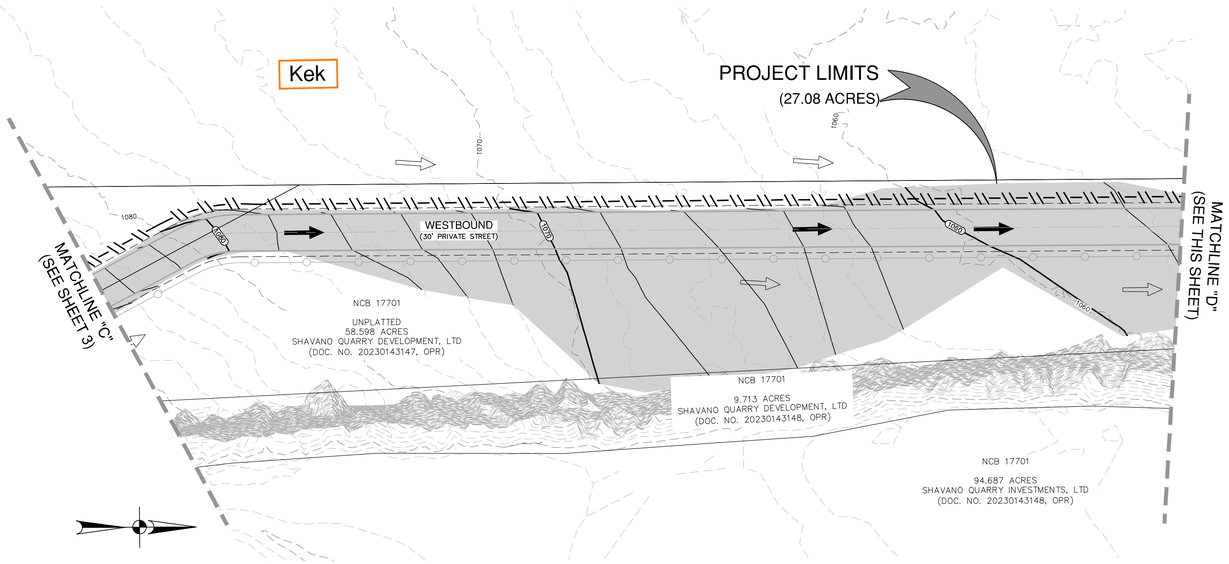
440 QUARRY IMPROVEMENTS
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
TEMPORARY POLLUTION ABATEMENT PLAN

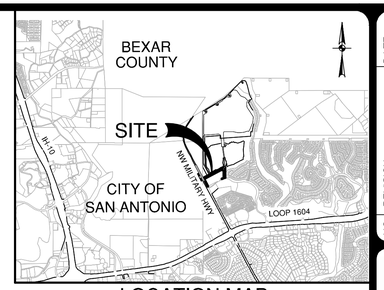
PLAT NO. 23-118XXXXX
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 3 OF 5

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1



TEMPORARY BMP MODIFICATIONS		
DATE	SIGNATURE	DESCRIPTION



LOCATION MAP
NOT-TO-SCALE

LEGEND

- PLATTED BOUNDARY
- PROJECT AREA
- EXISTING GRADE (980)
- PROPOSED GRADE (980)
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- CONSTRUCTION FENCE
- ROCK BERM
- INLET PROTECTION
- GRAVEL FILTER BAGS
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)
- SANITARY SEWER ENVELOPE
- Kek — KAINER FORMATION

0' 60' 120' 180'

SCALE: 1"= 60'

TEMPORARY POLLUTION ABATEMENT NOTES

1. CONSTRUCTION OF LOTS, DRIVEWAYS, AND DRAINAGE STRUCTURES MAY BEGIN UPON APPROVAL. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTURBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. GRAVEL FILTER BAGS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS AT DRAINAGE STRUCTURES. THESE BAGS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. CONSTRUCTION WITHIN THE DEVELOPMENT MAY NOT BE CONTINUOUS. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF EACH PAD DURING BUILDING CONSTRUCTION. ALL SILT FENCE SHALL BE PLACED PERPENDICULAR TO DRAINAGE FLOW.

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASH-OUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS EXHIBIT AND SIGNED AND DATED BY THE RESPONSIBLE PARTY.

4. RESTRICT ENTRY/EXIT TO THE PROJECT SITE TO DESIGNATED LOCATIONS BY USE OF ADEQUATE FENCING, IF NECESSARY.

5. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITIONS AT ALL TIMES.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS REFER TO THE TPDES STORM WATER POLLUTION PREVENTION PLAN.

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 UPGRADIENT 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. WHERE VEGETATED FILTER STRIPS ARE INDICATED, CONTRACTOR SHALL VERIFY THAT SUFFICIENT VEGETATION EXISTS, OTHERWISE CONTRACTOR SHALL PLACE SILT FENCING IN LIEU OF VEGETATED FILTER STRIP.

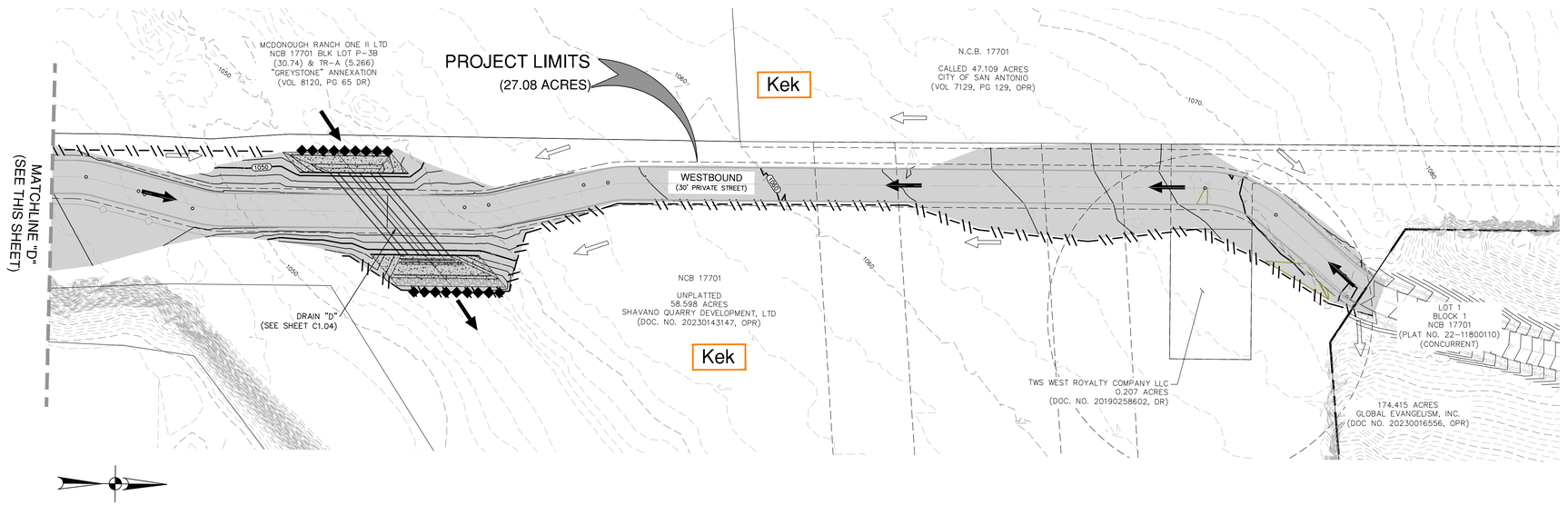
13. SHADED AREA DENOTES LIMITS OF DISTURBED AREAS. OTHER AREAS WITHIN THE PROJECT LIMITS, WITH THE EXCEPTION OF A CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD, ARE NOT A PART OF THIS TPDES STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND WILL NOT BE DISTURBED BY CIVIL CONSTRUCTION ACTIVITIES. HOUSE CONSTRUCTION ACTIVITIES WILL REQUIRE A SEPARATE STORM WATER POLLUTION PREVENTION PLAN.

14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

15. CPS ENERGY WILL FUNCTION AS A SECONDARY OPERATOR ON THIS PROJECT AND WILL BE INSTALLING ELECTRIC UTILITIES FOR ON-SITE CONSTRUCTION AND OFF-SITE FEED TO THE PROJECT.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1



NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/27/24

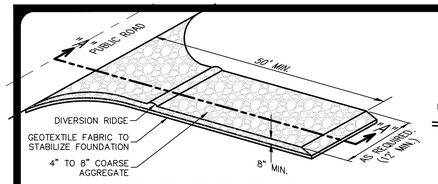
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

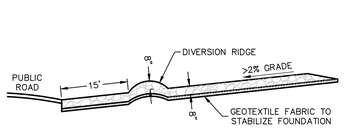
440 QUARRY IMPROVEMENTS
SAN ANTONIO, TEXAS

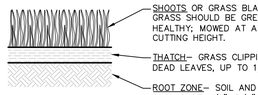
WATER POLLUTION ABATEMENT PLAN APPLICATION
TEMPORARY POLLUTION ABATEMENT PLAN

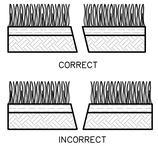
PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 4 OF 5

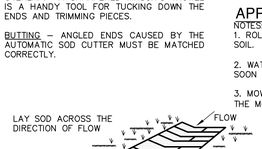
Date: Mar 19, 2024, 3:05pm User ID: dlevine
File: C:\Users\LOCAL~1\Temp\AcPublish_7024\TM-1293400.dwg

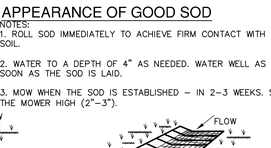


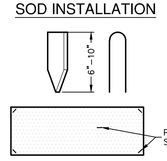


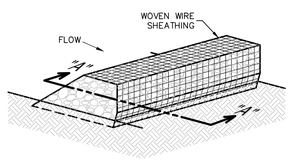


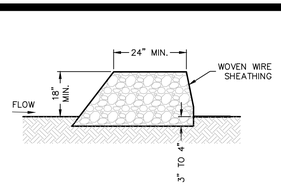


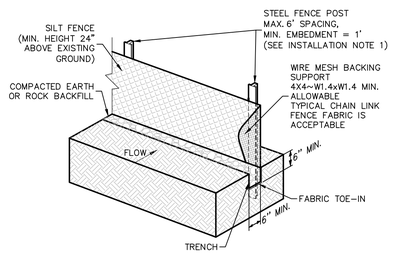


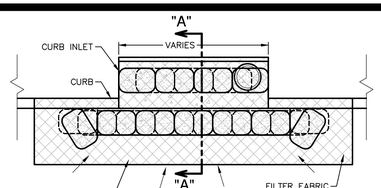


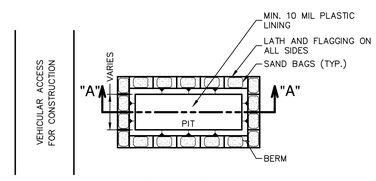


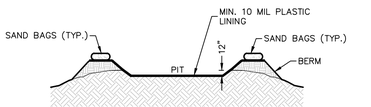












SCHEMATIC OF TEMPORARY CONSTRUCTION ENTRANCE/EXIT

SECTION "A-A" OF A CONSTRUCTION ENTRANCE/EXIT

MATERIALS

1. THE AGGREGATE SHOULD CONSIST OF 4-INCH TO 8-INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.

2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8-INCHES.

3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD², A MULLEN BURST RATING OF 140 LB/IN², AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.

4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4-INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

INSTALLATION

1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.

2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.

3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.

4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6-INCHES TO 8-INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.

5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.

6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.

7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN.

8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

COMMON TROUBLE POINTS

1. INADEQUATE RUNOFF CONTROL–SEDIMENT WASHES ONTO PUBLIC ROAD.

2. STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL.

3. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC–EXTEND PAD BEYOND THE MINIMUM 50-FOOT LENGTH AS NECESSARY.

4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD.

5. UNSTABLE FOUNDATION – USE GEOTEXTILE FABRIC UNDER PAD AND/OR IMPROVE FOUNDATION DRAINAGE.

INSPECTION AND MAINTENANCE GUIDELINES

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.

3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

NOT-TO-SCALE

ISOMETRIC PLAN VIEW

SECTION "A-A"

ROCK BERMS

THE PURPOSE OF A ROCK BERM IS TO SERVE AS A CHECK DAM IN AREAS OF CONCENTRATED FLOW, TO INTERCEPT SEDIMENT-LADEN RUNOFF, DETAIN THE SEDIMENT AND RELEASE THE WATER IN SHEET FLOW. THE ROCK BERM SHOULD BE USED WHEN THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 5 ACRES. ROCK BERMS ARE USED IN AREAS WHERE THE VOLUME OF RUNOFF IS TOO GREAT FOR A SILT FENCE TO CONTAIN. THEY ARE LESS EFFECTIVE FOR SEDIMENT REMOVAL THAN SILT FENCES, PARTICULARLY FOR FINE PARTICLES, BUT ARE ABLE TO WITHSTAND HIGHER FLOWS THAN A SILT FENCE. AS SUCH, ROCK BERMS ARE OFTEN USED IN AREAS OF CHANNEL FLOWS (DITCHES, GULLIES, ETC.). ROCK BERMS ARE MOST EFFECTIVE AT REDUCING BED LOAD IN CHANNELS AND SHOULD NOT BE SUBSTITUTED FOR OTHER EROSION AND SEDIMENT CONTROL MEASURES FARTHER UP THE WATERSHED.

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.

2. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION.

3. REPAIR ANY LOOSE WIRE SHEATHING.

4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.

5. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

MATERIALS

1. THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOAT RINGS.

2. CLEAN, OPEN GRADED 3-INCH TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5-INCH TO 8-INCH DIAMETER ROCKS MAY BE USED.

INSTALLATION

1. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE. THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

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

3. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM TO A HEIGHT NOT LESS THAN 18".

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

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

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

COMMON TROUBLE POINTS

1. INSUFFICIENT BERM HEIGHT OR LENGTH (RUNOFF QUICKLY ESCAPES OVER THE TOP OR AROUND THE SIDES OF BERM).

2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).

ROCK BERM DETAIL

NOT-TO-SCALE

LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.

APPEARANCE OF GOOD SOD

NOTES:

1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

3. MOW WHEN THE SOD IS ESTABLISHED – IN 2–3 WEEKS. SET THE MOWER HIGH (2"–3").

SOD INSTALLATION

USE PEGS OR STAPLES TO FASTEN SOD FIRMLY – AT THE ENDS OF STRIPS AND IN THE CENTER, OR EVERY 3–4 FEET IF THE STRIPS ARE LONG. WHEN READY TO MOW, DRIVE PEGS OR STAPLES FLUSH WITH THE GROUND.

IN CRITICAL AREAS, SECURE SOD WITH NETTING. USE STAPLES.

MATERIALS

1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

SITE PREPARATION

1. PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

1. SOD STRIPS IN WATERWAYS SHOULD BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY (SEE FIGURE ABOVE).

2. AFTER ROLLING OR TAMPING, SOD SHOULD BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.

GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)

1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS (SEE FIGURE ABOVE).

4. ON SLOPES 3:1 OR GREATER, OR WHEREVER EROSION MAY BE A PROBLEM, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. AFTER ROLLING, SOD SHOULD BE IRRIGATED TO A DEPTH SUFFICIENT THAT THE UNDERSIDE OF THE SOD PAD AND THE SOIL 4 INCHES BELOW THE SOD IS THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

8. THE FIRST MOWING SHOULD NOT BE ATTEMPTED UNTIL THE SOD IS FIRMLY ROOTED, USUALLY 2–3 WEEKS. NOT MORE THAN ONE THIRD OF THE GRASS LEAF SHOULD BE REMOVED AT ANY ONE CUTTING.

INSPECTION AND MAINTENANCE GUIDELINES

1. SOD SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.

2. DAMAGE FROM STORMS OR NORMAL CONSTRUCTION ACTIVITIES SUCH AS TIRE RUTS OR DISTURBANCE OF SWALE STABILIZATION SHOULD BE REPAIRED AS SOON AS PRACTICAL.

SOD INSTALLATION DETAIL

NOT-TO-SCALE

ISOMETRIC PLAN VIEW

SILT FENCE

A SILT FENCE IS A BARRIER CONSISTING OF GEOTEXTILE FABRIC SUPPORTED BY METAL POSTS TO PREVENT SOIL AND SEDIMENT LOSS FROM A SITE. WHEN PROPERLY USED, SILT FENCES CAN BE HIGHLY EFFECTIVE AT CONTROLLING SEDIMENT FROM DISTURBED AREAS. THEY CAUSE RUNOFF TO POND, ALLOWING HEAVIER SOLIDS TO SETTLE OUT. IF NOT PROPERLY INSTALLED, SILT FENCES ARE NOT LIKELY TO BE EFFECTIVE.

THE PURPOSE OF A SILT FENCE IS TO INTERCEPT AND DETAIN WATER-BORN SEDIMENT FROM UNPROTECTED AREAS OF A LIMITED EXTENT. SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHOULD REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OR DRAINAGE WAY. IF CONCENTRATED FLOW OCCURS AFTER INSTALLATION, CORRECTIVE ACTION MUST BE TAKEN SUCH AS PLACING A ROCK BERM IN THE AREAS OF CONCENTRATED FLOW.

SILT FENCING WITHIN THE SITE MAY BE TEMPORARILY MOVED DURING THE DAY TO ALLOW CONSTRUCTION ACTIVITY PROVIDED IT IS REPLACED AND PROPERLY ANCHORED TO THE GROUND AT THE END OF THE DAY. SILT FENCES ON THE PERIMETER OF THE SITE OR AROUND DRAINAGE WAYS SHOULD NOT BE MOVED AT ANY TIME.

MATERIALS

1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NUMBER 30.

2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM WEIGHT 1.25 LB/FT, AND BRINDELL HARDNESS EXCEEDING 140.

3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

INSTALLATION

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

2. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.

3. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN-SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

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

5. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3-FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

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

COMMON TROUBLE POINTS

1. FENCE NOT INSTALLED ALONG THE CONTOUR CAUSING WATER TO CONCENTRATE AND FLOW OVER THE FENCE.

2. FABRIC NOT SEATED SECURELY TO GROUND (RUNOFF PASSING UNDER FENCE).

3. FENCE NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND SIDES).

4. FENCE TREATING TOO LARGE AN AREA, OR EXCESSIVE CHANNEL FLOW (RUNOFF OVERTOPS OR COLLAPSES FENCE).

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECT ALL FENCING WEEKLY, AND AFTER RAINFALL.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.

3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

4. REPLACE OR REPAIR SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.

5. WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL.

SILT FENCE DETAIL

NOT-TO-SCALE

PLAN VIEW

SECTION "A-A"

GENERAL NOTES

1. CONTRACTOR TO INSTALL 2"x4"–W1.4xW1.4 WIRE MESH SUPPORTING FILTER FABRIC OVER THE INLET OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR WIRE TIES AT THIS LOCATION. SAND BAGS FILLED WITH WASHED PEA GRAVEL SHOULD BE PLACED ON TOP OF WIRE MESH ON TOP OF THE INLET AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SANDBAGS FILLED WITH WASHED PEA GRAVEL SHOULD ALSO BE PLACED ALONG THE GUTTER AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SAND BAGS TO BE STACKED TO FORM A CONTINUOUS BARRIER AROUND INLETS.

2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

3. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.

4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.

5. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

BAGGED GRAVEL CURB INLET PROTECTION DETAIL

NOT-TO-SCALE

PLAN VIEW

SECTION "A-A"

GENERAL NOTES

1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.

2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.

3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

4. LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES OR WATER BODIES.

5. TEMPORARY CONCRETE WASHOUT FACILITY SHOULD BE CONSTRUCTED WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

MATERIALS

PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

MAINTENANCE

1. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHOULD BE REMOVED AND DISPOSED OF.

2. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF.

3. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

CONCRETE TRUCK WASHOUT PIT DETAIL

NOT-TO-SCALE

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

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
   - THE NAME OF THE APPROVED PROJECT;
   - THE ACTIVITY START DATE; AND
   - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.

3. IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.

4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

6. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.

7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.

8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.

9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.

10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.

11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST:
   - THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
   - THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
   - THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
   A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
   B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
   C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

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

CONSTRUCTION STAGING AREA

NOT-TO-SCALE

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE TPDES–STORM WATER POLLUTION PREVENTION PLAN (SWP3) REGULATIONS.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF THE SWP3 ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 2

NO.	REVISION	DATE

CALEB M. CHANCE
98401
3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

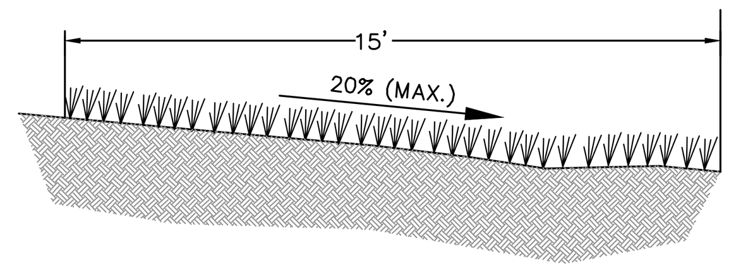
440 QUARRY IMPROVEMENTS
SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
TEMPORARY POLLUTION ABATEMENT PLAN

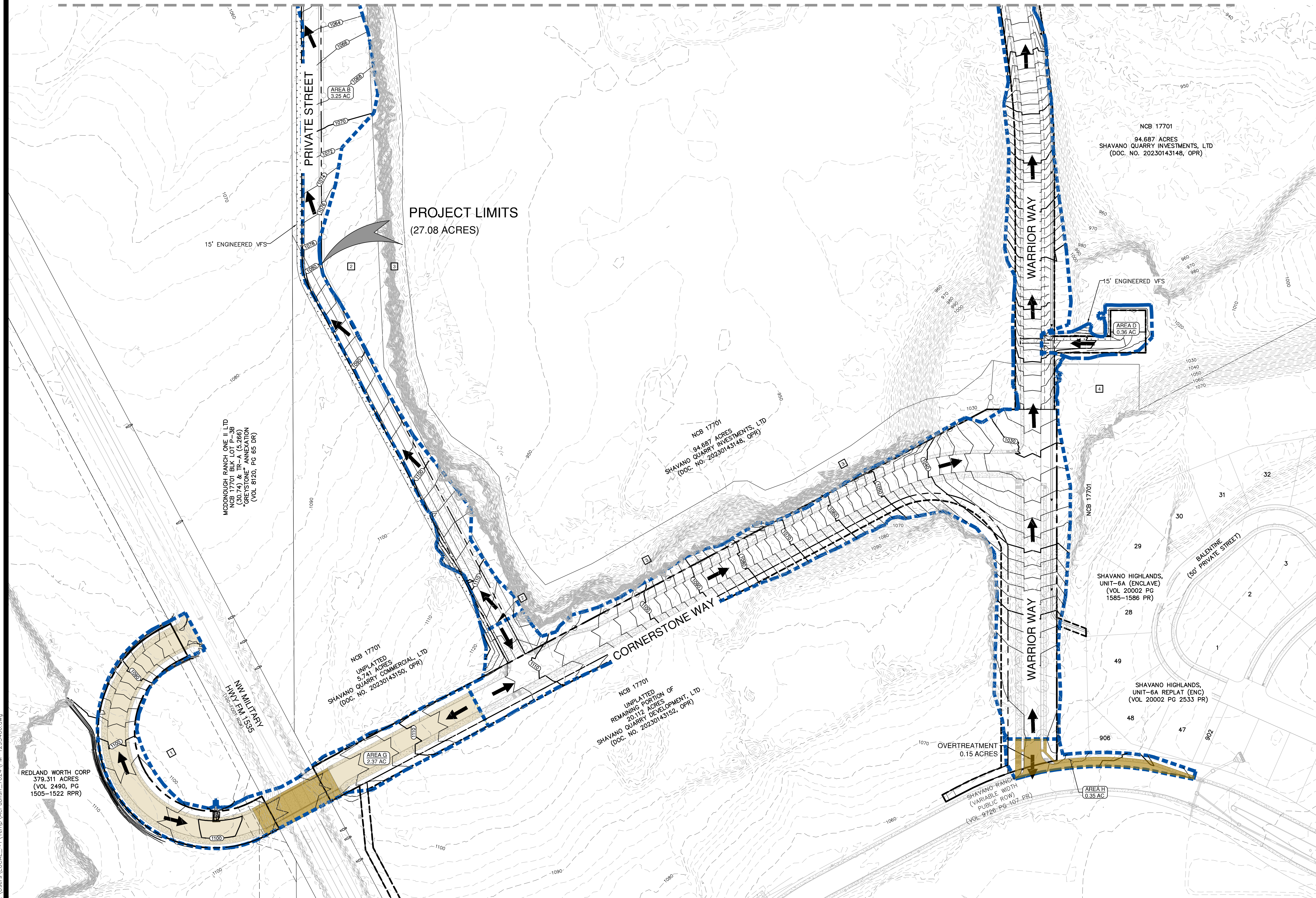
PLAT NO. 23-11800125
JOB NO. 12934–00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 5 OF 5

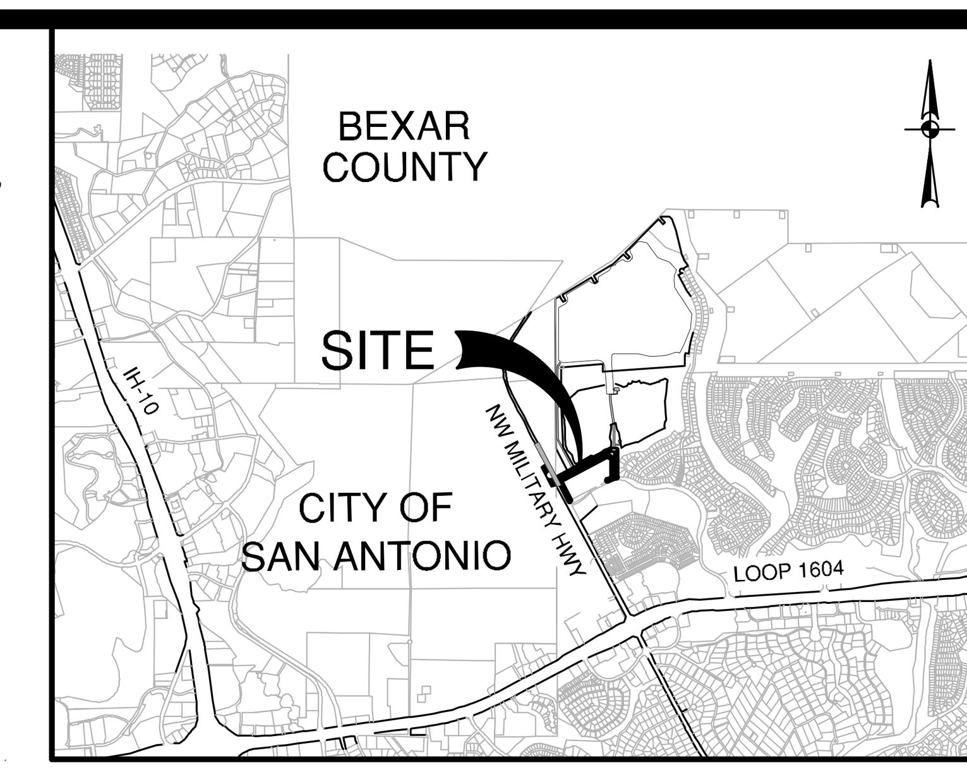
Date: Mar 27, 2024, 9:29am User ID: dlevine
File: P:\129\34\00\Design\Environmental\WPAP\TM-1293400.dwg

Watershed	Total Watershed Area (ac)	Proposed Impervious Cover (ac)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	1.53	0.79	15' Engineered VFS (A)	645	707
B	3.25	1.20	15' Engineered VFS (B)	979	1,087
C+I	12.11	5.48	Water Quality Basin "A"	4,472	5,000
D	0.36	0.25	15' Engineered VFS (C)	204	222
E	1.14	0.36	15' Engineered VFS (D)	294	328
G	2.37	1.32	Overtreatment	1,077	0
H	0.34	0.21	Overtreatment	171	0
I	1.57	1.57	Treated With Cornerstone High School WPAP (RN102748860)	0	1,281
TOTAL	**21.10**	**9.61**	---	**7,842**	**8,625**



SECTION A–A
15' ENGINEERED VFS DETAIL





LOCATION MAP

NOT–TO–SCALE

LEGEND

- PROJECT LIMITS (38.67 AC)
- DRAINAGE AREA
- 1190 EXISTING CONTOURS
- PROPOSED CONTOURS
- FLOW ARROW
- VEGETATIVE FILTER STRIP
- AREA X X.XX AC — WATERSHED AREA
- OVERTREATED/UNCAPTURED AREA

1 UNPLATTED 2.307 ACRES SHAVANO QUARRY DEVELOPMENT, LTD. (DOC.NO. 20220266104, OPR)

2 UNPLATTED 58.598 ACRES SHAVANO QUARRY DEVELOPMENT, LTD. (DOC.NO. 20230143147, OPR)

3 UNPLATTED 9.713 ACRES SHAVANO QUARRY DEVELOPMENT, LTD. (DOC.NO. 20230143148, OPR)

4 UNPLATTED REMAINING PORTION OF 28.926 ACRES SHAVANO QUARRY DEVELOPMENT, LTD. (DOC.NO. 20230143148, OPR)

5 UNPLATTED REMAINING PORTION OF 20.112 ACRES SHAVANO QUARRY DEVELOPMENT, LTD. (DOC.NO. 20230143152, OPR)

6 UNPLATTED 94.687 ACRES SHAVANO QUARRY INVESTMENTS, LTD (DOC.NO. 20230143148, OPR)

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES:

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG–348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG–348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG–348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) PERMANENT BMP'S FOR THIS SITE INCLUDE A SEDIMENTATION/FILTRATION BASIN AND AN ENGINEERED VEGETATIVE FILTER STRIP. THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE 38.67 ACRES IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG–348 (2005).

5.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 0.50% TO 50.00%.

PERMANENT POLLUTION ABATEMENT MEASURES:

1.) SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.

2.) A SEDIMENTATION/FILTRATION BASIN AND AN ENGINEERED VEGETATIVE FILTER STRIP WILL SERVE AS THE PERMANENT BEST MANAGEMENT PRACTICE (BMP) FOR DRAINAGE AREAS "A","B", "D","E", & "F".

3.) ENERGY DISSIPATORS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.

NOTES:

1.) CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION FOR SOIL STABILIZATION PRIOR TO SITE CLOSEOUT.

2.) ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT

NO.	REVISION	DATE

STATE OF TEXAS — CALEB M. CHANCE — 98401 — LICENSED PROFESSIONAL ENGINEER — 3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

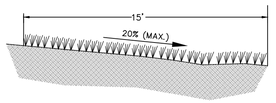
440 QUARRY IMPROVEMENTS

SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
PERMANENT POLLUTION ABATEMENT PLAN

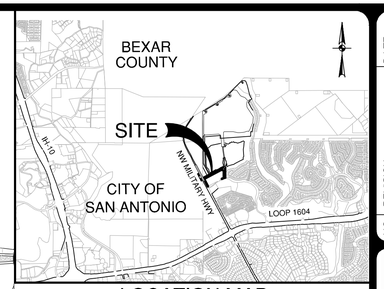
PLAT NO. 23-11800125
JOB NO. 12934–00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 1 OF 2

Watershed	Total Watershed Area (ac)	Proposed Impervious Cover (ac)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	1.53	0.79	15' Engineered VFS (A)	645	707
B	3.25	1.20	15' Engineered VFS (B)	979	1,087
C+I	12.11	5.48	Water Quality Basin "A"	4,472	5,000
D	0.36	0.25	15' Engineered VFS (C)	204	222
E	1.14	0.36	15' Engineered VFS (D)	294	328
G	2.37	1.32	Overtreatment	1,077	0
H	0.34	0.21	Overtreatment	171	0
I	1.57	1.57	Treated With Cornerstone High School WPAP (RN102748860)	0	1,281
TOTAL	**21.10**	**9.61**	---	**7,842**	**8,625**



SECTION A–A
15' ENGINEERED VFS DETAIL

SCALE: 1"= 100'
0' 100' 200' 300'



LOCATION MAP
NOT-TO-SCALE

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES:

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG-348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG-348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG-348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) PERMANENT BMP'S FOR THIS SITE INCLUDE A SEDIMENTATION/FILTRATION BASIN AND AN ENGINEERED VEGETATIVE FILTER STRIP. THESE PERMANENT BMP'S HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE 38.67 ACRES IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).

5.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 0.50% TO 50.00%.

PERMANENT POLLUTION ABATEMENT MEASURES:

1.) SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.

2.) A SEDIMENTATION/FILTRATION BASIN AND AN ENGINEERED VEGETATIVE FILTER STRIP WILL SERVE AS THE PERMANENT BEST MANAGEMENT PRACTICE (BMP) FOR DRAINAGE AREAS "A","B", "D","E", & "F".

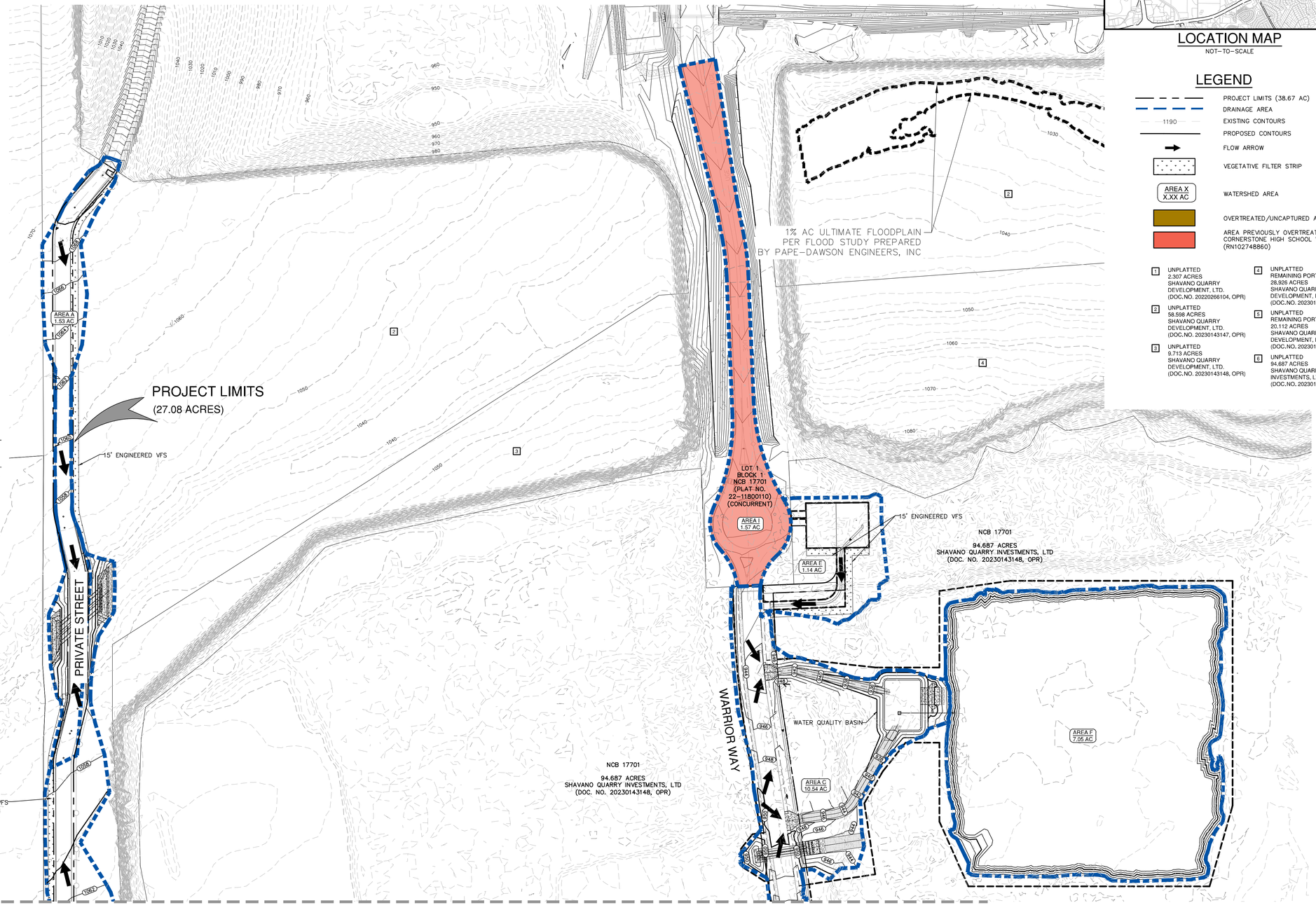
3.) ENERGY DISSIPATORS (TO HELP REDUCE EROSION) WILL BE PROVIDED AT POINTS OF CONCENTRATED DISCHARGE WHERE EXCESSIVE VELOCITIES MAY BE ENCOUNTERED.

NOTES:

1.) CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION FOR SOIL STABILIZATION PRIOR TO SITE CLOSEOUT.

2.) ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.



LEGEND

- PROJECT LIMITS (38.67 AC)
- DRAINAGE AREA
- 1190 EXISTING CONTOURS
- PROPOSED CONTOURS
- FLOW ARROW
- VEGETATIVE FILTER STRIP
- AREA X X.XX AC — WATERSHED AREA
- OVERTREATED/UNCAPTURED AREA
- AREA PREVIOUSLY OVERTREATED WITH CORNERSTONE HIGH SCHOOL WPAP MOD (RN102748860)

1 UNPLATTED
2.307 ACRES
SHAVANO QUARRY DEVELOPMENT, LTD.
(DOC.NO. 20220026104, OPR)

2 UNPLATTED
58.598 ACRES
SHAVANO QUARRY DEVELOPMENT, LTD.
(DOC.NO. 20230143147, OPR)

3 UNPLATTED
9.713 ACRES
SHAVANO QUARRY DEVELOPMENT, LTD.
(DOC.NO. 20230143148, OPR)

4 UNPLATTED
REMAINING PORTION OF
28.926 ACRES
SHAVANO QUARRY DEVELOPMENT, LTD.
(DOC.NO. 20230143148, OPR)

5 UNPLATTED
REMAINING PORTION OF
20.112 ACRES
SHAVANO QUARRY DEVELOPMENT, LTD.
(DOC.NO. 20230143152, OPR)

6 UNPLATTED
94.687 ACRES
SHAVANO QUARRY INVESTMENTS, LTD
(DOC.NO. 20230143148, OPR)

NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

440 QUARRY IMPROVEMENTS
SAN ANTONIO, TEXAS

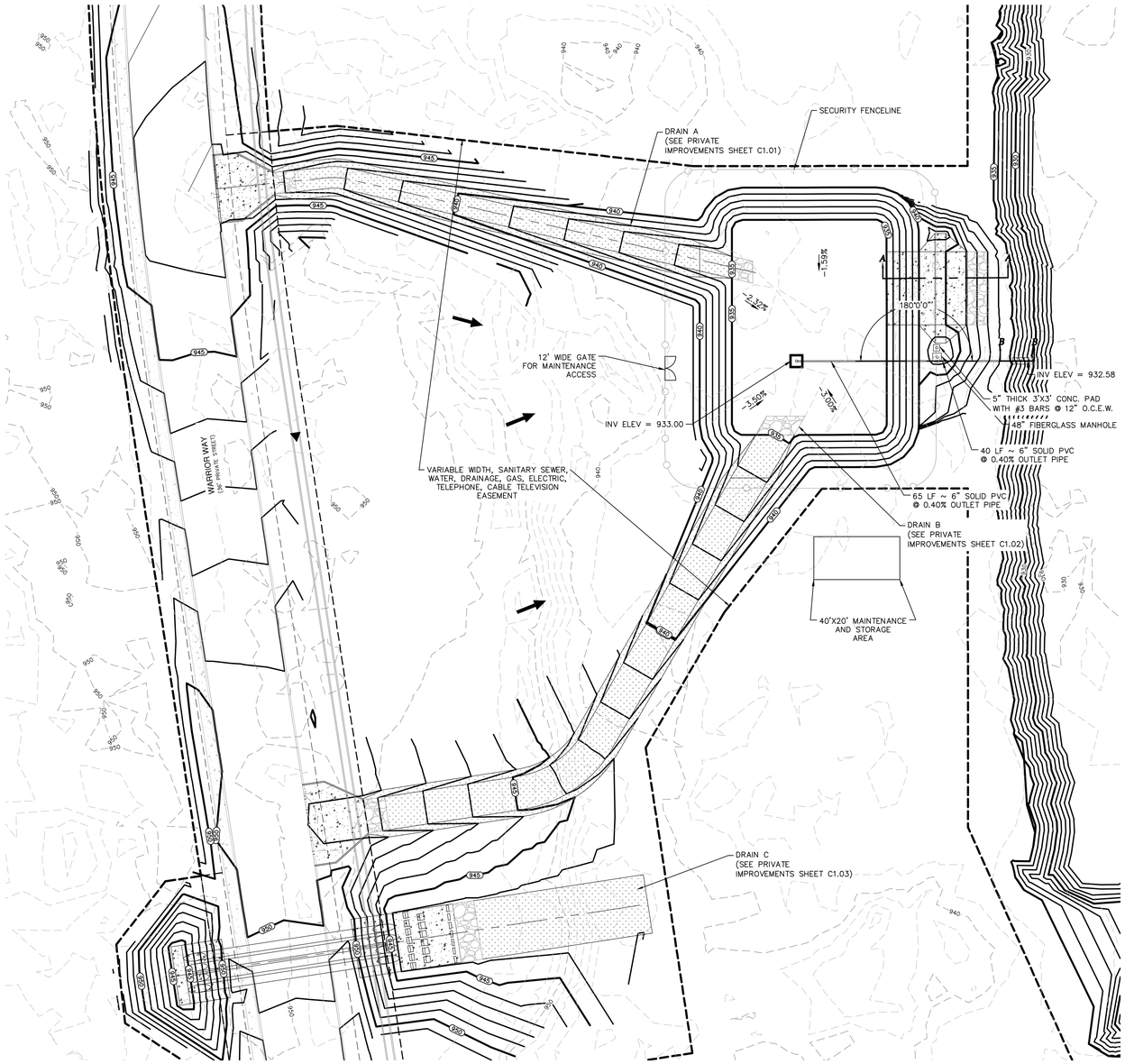
CONTRIBUTING ZONE PLAN APPLICATION
PERMANENT POLLUTION ABATEMENT PLAN

PLAT NO. 23-11800125
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 2 OF 2

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT

Date: Mar 19, 2024, 2:58pm User ID: dlevine
File: C:\Users\LOCAL_~1\Temp\AcPublish_7024\PM-1293400.dwg



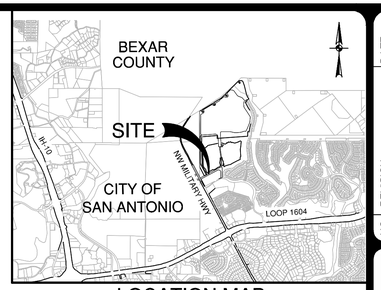
BASIN DESIGN DATA

BASIN WATERSHED AREA	=	10.53 AC
RUN OFF DEPTH	=	4.00 INCH
REQUIRED CAPTURE VOLUME	=	45,614 CF
REQUIRED SAND AREA	=	N/A
BASIN STORM WATER DEPTH	=	5.0 FT
BASIN CAPTURE VOLUME	=	54,553 CF
BASIN SAND AREA	=	N/A

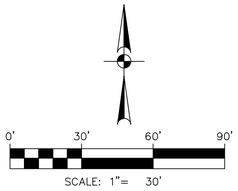
BASIN DRAWDOWN IS CONTROLLED BY THE 6" DISCHARGE PIPE SLOPED AT 0.4%
BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 31 HOURS.

OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	96.4 cfs
C	=	3.087
L	=	34 ft
96.4	=	$(3.087)(34)(h)^{3/2}$
h	=	0.94 ft

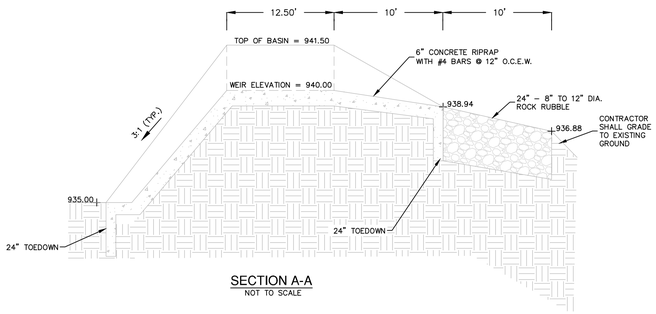


LOCATION MAP
NOT-TO-SCALE

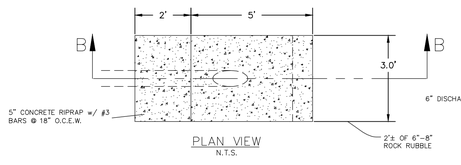


LEGEND

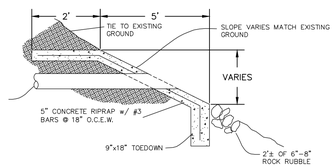
- PROPOSED SPOT ELEVATION
- PROPOSED "TOP OF WALL" SPOT ELEVATION
- 1050 — EXISTING CONTOUR
- (1050) — PROPOSED CONTOUR
- FLOW ARROW (PROPOSED)



SECTION A-A
NOT TO SCALE

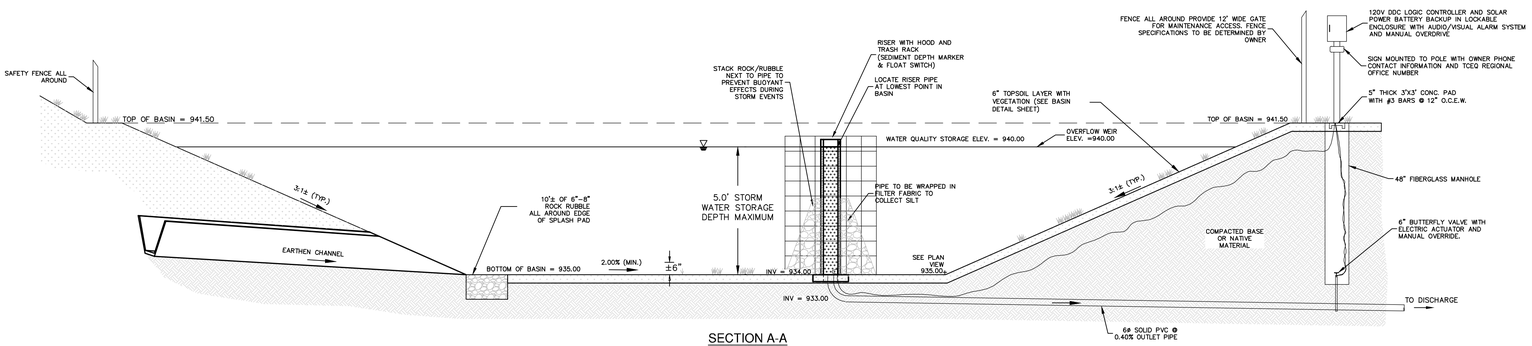


PLAN VIEW
N.T.S.



SECTION "B–B"
N.T.S.

SECTION B-B
NOT TO SCALE



SECTION A-A
NOT TO SCALE

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 31 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 4

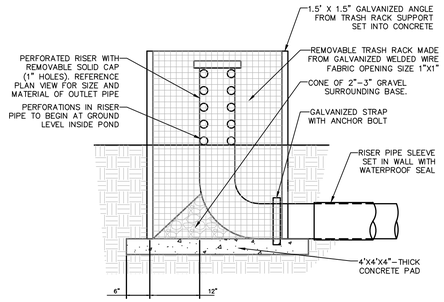
NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED
PROFESSIONAL ENGINEER
3/27/24

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

440 QUARRY IMPROVEMENTS (PRIVATE)
SAN ANTONIO, TEXAS
WATER POLLUTION ABATEMENT PLAN APPLICATION
WATER QUALITY BASIN

PLAT NO. ____
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 1 OF 2



TRASH RACK/RISER PIPE DETAIL

N.T.S.

NOTES

1. CONTRACTOR SHALL ENGAGE A TEXAS LICENSED STRUCTURAL ENGINEER TO PROVIDE A SIGNED AND SEALED SET OF STRUCTURAL PLANS, DETAILS AND SPECIFICATION FOR THE STRUCTURAL COMPONENTS OF THE POLLUTION ABATEMENT BASIN INCLUDING INLET DISCHARGE AND BYPASS COMPONENTS. CONTRACTOR SHALL ALSO PROVIDE FOR STRUCTURAL ENGINEER'S INSPECTION DURING BASIN CONSTRUCTION AND STRUCTURAL ENGINEER'S CONSTRUCTION CERTIFICATION UPON COMPLETION OF BASIN.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.

4. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).

5. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL. ACTUAL STRUCTURAL PLANS FOR CONSTRUCTION TO BE DESIGNED BY STRUCTURAL ENGINEER AT A LATER DATE.

6. BASIN DRAWDOWN IS CONTROLLED BY THE 4" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY 31 HOURS.

7. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

NOTES TO CONTRACTOR

FOR EACH PHASE OF BATCH DETENTION BASIN CONSTRUCTION

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a.) REINFORCING STEEL FOR BASIN OVERFLOW WALL OR RIP-RAP LINER HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN AND RISER PIPE IS IN PLACE. CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.

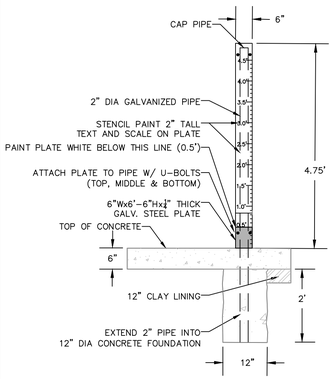
b.) BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION AT EACH STAGE. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

- TOP OF BANK/WALL AT EACH CORNER OF BASIN
- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIR

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.



SEDIMENT DEPTH MARKER

NOT TO SCALE

NOTE: ONCE SEDIMENT IS ABOVE THE 6" DESIGNATION, THE BASIN MUST BE CLEANED OUT TO DESIGN ELEVATIONS AND VOLUMES PER PLAN.

FILTER FABRIC SPECIFICATIONS

THE SEPARATION LAYER BETWEEN THE SAND FILTER AND GRAVEL LAYERS SHALL BE A DRAINAGE MATTING CONSISTING OF NON-WOVEN FILTER FABRIC MEETING THE FOLLOWING SPECIFICATIONS:

PROPERTY	TEST METHOD	SPECIFICATION
WEIGHT (OZ/SY)	ASTM D 5261	≥ 4.0
GRAB STRENGTH (LBS.)	ASTM D 4632	≥ 90
ELONGATIONS (%)	ASTM D 4632	≤ 55
TRAPEZOID TEAR (LBS)	ASTM D 4533	≥ 50
CBR PUNCTURE STRENGTH (LBS)	ASTM D 6241	≥ 300
UV RESISTANCE AFTER 500 HRS. (%)	ASTM D 4355	≥ 70
AOS (SIEVE #)	ASTM D 4751	70-80
FLOW RATE (GPM/SF)	ASTM D 4491	≥ 125

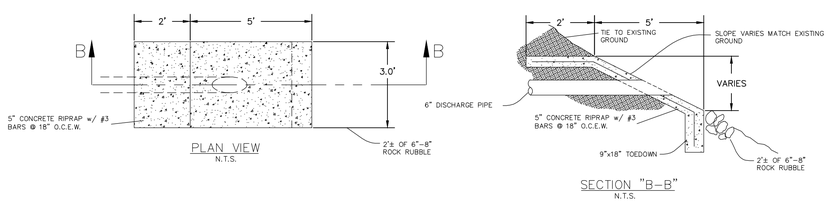
FABRIC OVERLAP SHALL BE A MINIMUM OF 24".
ALL OVERLAPS SHALL BE WIRE TIED AT A MAXIMUM OF 36" INTERVALS

NOTES:

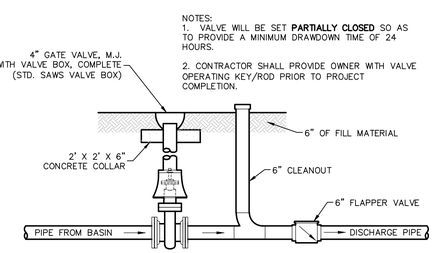
1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASINS PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASINS) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASINS SHALL BE REVEGATATED PRIOR TO COMPLETION.

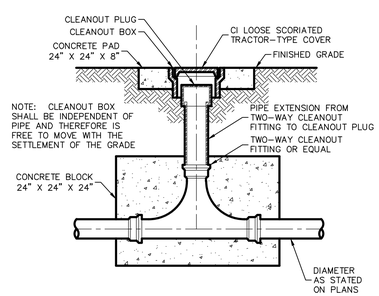


DISCHARGE HEADWALL DETAIL



6" GATE & FLAPPER VALVE DETAIL

NOT-TO-SCALE



CLEANOUT DETAIL

NOT-TO-SCALE

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

NO.	REVISION	DATE

STATE OF TEXAS
CALEB M. CHANCE
98401
LICENSED PROFESSIONAL ENGINEER
3/27/24

440 QUARRY IMPROVEMENTS (PRIVATE)

SAN ANTONIO, TEXAS

WATER POLLUTION ABATEMENT PLAN APPLICATION
WATER QUALITY DETAILS AND NOTES

PLAT NO.
JOB NO. 12934-00
DATE MARCH 2024
DESIGNER DL
CHECKED AS DRAWN DD
SHEET 2 OF 2

Date: Mar 19, 2024, 2:24pm User ID: dlevine
File: P:\129\34\00\Design\Environmental\WPAP\BA&BADT-1293400.dwg