ENGINEERING THE FUTURE
SINCE 1936

CITY OF PRAIRIE VIEW CAPITAL IMPROVEMENT PROJECT 22-007- GROUNDWATER SUPPLY WELL NO. 4

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT
WELL PERMIT APPLICATION PACKAGE

EHRA ENGINEERING
JANUARY 2025

EHRA Job No. 221-103-11

TBPE No. F-726
TBPLS No. 10092300

January 13, 2025

Sent via email: BGCD@bluebonnetgroundwater.org

Mr. Zach Holland
Bluebonnet Groundwater Conservation District
1903 Dove Crossing, Suite A
P.O. Box 269
Navasota, Texas 77868

Re: City of Prairie View
Remote Groundwater Well No. 4
BGCD Well ID No.- None Assigned
Waller County, Texas
EHRA Project No. 221-103-11

Dear Mr. Holland:

The City of Prairie View (Owner) proposes to operate Remote Groundwater Well No. 4. The facility will be located approximately 0.13 miles Southeast of the intersection of Wyatt Chapel Rd and Williams St in Waller County, TX within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The City's existing water distribution can serve 2,229 equivalent single-family connections (ESFC) and proposes to serve an ultimate 3,365 ESFC.

The City's distribution system also has an emergency interconnect with the nearest neighboring distribution system owned by Prairie View A&M University. Other neighboring developments are unable to provide sufficient capacity for the primary water service, at this time. If approved, the Owner will also design and submit construction plans for Remote Groundwater Well No. 4 to include an emergency generator.

The proposed Remote Groundwater Well No. 4 Facility has been designed in accordance with TAC 30 Chapter 290 – Rules and Regulations for Public Water Systems. The facility will be constructed in one (1) phase.

Phase One will consist of:

- One (1) 800 gpm vertical turbine water well;

Additional construction includes but not limited to:

- One (1) 250 kW diesel generator for emergency stand-by power;

Other items of note for the design of the proposed facility include:

- Drilling operations will be in accordance with all AWWA standards and TCEQ 290.41 rules as directed in the Gravel Wall Water Well technical specification.
- The disinfection system will be gas chlorination.
- A Utility will provide electrical power to the facility.
- In case of a power interruption/prolonged power outage an emergency stand-by diesel generator with an automatic transfer switch will be provided.

Submitted herein are the following District required documents in accordance with the **April 13, 2023 adopted Rules of the BGCD**.

- Attachment 1: Non-Exempt Well Registration Application Form;
- Attachment 2: Well Operating Permit Application;
- Attachment 3: Map for the Proposed Remote Well;
- Attachment 4: Projected Effect of the Proposed Withdrawal;
- Attachment 5: Applicant's declaration of compliance with BGCD's management plan;
- Attachment 6: Applicant's declaration of compliance with well plugging guidelines and notification of applicable authorities, including the BGCD;
- Attachment 7: Gravel Wall Water Well With Driller Qualifications
- Phase I-a Hydrogeologic Report to be performed by the District;
- Exhibit 1- Well Construction Diagram
- Exhibit 2- ½ Mile Radius Nearby Well; and
- Exhibit 3- Nearby Property Owner Information Map

It is our hope that we have provided the appropriate information for BGCD approval of this Remote Groundwater well. Should you require any additional information, please do not hesitate to contact myself or Edgar Sanchez, E.I.T. at 713-784-4500 or by email at or panderson@ehra.team or esanchez@ehra.team respectively.

We appreciate your attention to this important project and look forward to hearing from you.

Sincerely,

Paul Anderson, P.E.
Practice Area Leader
Water and Wastewater Facilities

PAE/es
Attachments

cc: City of Prairie View
c/o Wendy F. Parker, MBA
TCEQ Region 12 – Houston
Edgar Sanchez, E.I.T. – Firm

Attachment 1 – Non-Exempt Well Registration Form

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5, Page 24 of 76)

Bluebonnet Groundwater Conservation District
1903 Dove Crossing Lane Suite A, P.O. Box 269
Navasota, TX 77868
Phone: 936-825-7303 Fax: 936-825-7331
Email: BGCD@bluebonnetgroundwater.org

BGCD Well ID #: _____

NON-EXEMPT WATER WELL REGISTRATION APPLICATION

Please complete all questions. Please print or type information, or place an "x" in the appropriate space.

Drill New Well: X Register an Existing Well: _____ Replace Existing Well: _____ Increase Size of Existing Well: _____

Increase Pump Size of Existing Well: _____ Abandon/Cap/Plug Existing Well: _____ Perform Dye Trace: _____

Well Owner City of Prairie View Phone 936-857-3711

Address PO Box 817 Prairie View, Tx 77446-0817

Fax: _____ Email: wparker@prairieviewtexas.gov

Drilling Company TBD. Spec with Qualified Drillers included for reference Phone _____

Address _____

Fax: _____ Email: _____

Driller TBD. Spec with Qualified Drillers included for reference License# _____

Well Location: County Waller Well Site Address or Location: TBD

Latitude 30° 6'13.84" **Longitude** 95°59'18.04"

Proposed Water Use: Public Water Supply: X Industrial: _____ Recreational: _____ Commercial: _____

Hydraulic Fracturing: _____ Transport Outside of District: _____

Proposed depth: 1400 ft. Aquifer Jasper Date drilling is scheduled to begin TBD

Proposed casing size: 14 in. Proposed casing depth: 425 ft. Pump depth: 280 ft. Pump size 125 hp.

Type Pump**:** Turbine: X Submersible: _____ Windmill: _____ Other (specify): _____

Pump fuel or power source**:** Electricity: X Natural Gas: _____ Wind: _____ Other (specify): _____

Pump Bowls**:** Size 14 # of Stages: 8 Pump Column**:** Inside Diameter: 10 in. Length: 280 ft.

Pump discharge pipe: Size 10 in. Rated pump horsepower: 125 **Pump Discharge**: 800 gpm

Water bearing formation: Fleming Formation

Estimated Annual Water Production: _____ Acre-Feet or 133,000,000 Gallons

If the water produced from this well will be used in whole or in part on property other than the property where the well is located, **describe the location where the water will be used.** Transportation of water produced and moved to another location may require a District Transportation Permit. See District Rules, Section 10 or contact the District office for information.

Groundwater well supply will serve approximately 1,333 single family home connections in the City of Prairie View, Waller County, Texas. Water will be treated with chlorine gas at the remote well location and will be pumped into the water system as shown on the construction plans.

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT

Permit form approved on: _____ By: _____ Zach Holland, General Manger

(Continued) NON-EXEMPT WATER WELL DRILLING PERMIT FORM (Continued)

The following documentation, attachments and fee payments must accompany this form when it is submitted for consideration by the District.

a. Plat or map showing location of the property and location on property of well for which form is submitted.
b. If owner and/or operator of a well is different from property owner, provide written documentation from property owner authorizing construction and operation of this well.
c. All the information and documentation required for the type and class of well for which authorization is requested by Section 8 of the District Rules and that information and documentation required by Rule 8.5.
d. Forms for non-exempt well authorizations must be accompanied by the information required by Rule 8.5A1:
    a. 8.5A1(e) – a statement of the projected effect of the proposed withdrawal on the aquifer or aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users in the District;
    b. 8.5A1(f) – the applicant's water conservation plan or a declaration the applicant and subsequent user will comply with the District's management plan;
    c. 8.5A1(g)(2) – well construction diagram;
    d. 8.5A1(g)(3) – a map showing the location of the proposed well or wells, all existing well, hydrologic features, and geologic features located within half (1/2) mile radius of the proposed well or wells site;
    e. 8.5A1(h) – the applicant's well closure plan or a declaration the applicant will comply with well plugging guidelines and report closure to the applicable authorities, including the District.
e. Payment for applicable fees must accompany the form. Additional fees may apply as documented in the District's adopted Fee Schedule.

Well Development Fee	$75.00	
Operating Permit Application Fee	$375.00	
Hydrogeologic Report Fee – applicable if well completed with eight (8) inches or greater inside casing diameter		
	Phase I-a Report (less than 200MG/yr)	Phase I-b Report (> 200MG/yr)
District Prepared Report	$1,500.00	$7,500.00
Applicant Prepared/District Review	$500.00	$1,500.00

f. Forms for new non-exempt wells must be accompanied by an Operating Permit Application and, if appropriate, a Transport Permit Application.

I, the undersigned applicant, hereby agree and certify that:

a. this well will be drilled within 30 feet of the location specified and not elsewhere;
b. I will furnish the District with a copy of the completed driller's log, any electric log, the well completion report, and any water quality test report within 60 days of completion of this well and prior to production of water there from (other than such production as may be necessary to the drilling and testing of such well);
c. in using this well, I will avoid waste, achieve water conservation, protect groundwater quality and the water produced from this well will be for a beneficial use;
d. I will comply with all District and State well plugging and capping guidelines in effect at the time of well closure;
e. I agree to abide by the terms of the District Rules, the District Management Plan, and orders of the District Board of Directors currently in effect and as they may be modified, changed, and amended from time to time;
f. I hereby certify that the information contained herein is true and correct to the best of my knowledge and belief.

Signature: _____ Date: 1/08/2025

Printed Name: Paul Anderson, P.E. Title: Practice Area Leader

Attachment 2 – Well Operating Permit Application

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5, Page 24 of 76)

Bluebonnet Groundwater Conservation District
303 E. Washington Ave., P.O. Box 269
Navasota, TX 77868
Phone: 936-825-7303 Fax: 936-825-7331
Email: BGCD@bluebonnetgroundwater.org

BGCD Well ID #: _____

WELL OPERATING PERMIT APPLICATION

Please complete all questions. Please print or type information or place an "x" in the appropriate space.

Drill New Well: X Register an Existing Well: _____ Replace Existing Well: _____ Increase Size of Existing Well: _____

Increase Pump Size of Existing Well: _____ Abandon/Cap/Plug Existing Well: _____ Perform Dye Trace: _____

Well Owner City of Prairie View Phone 936-857-3711

Address PO Box 817 Prairie View, Tx 77446-0817

Fax: _____ Email: wparker@prairieviewtexas.gov

Drilling Company TBD, Spec with Qualified Drillers included for reference Phone _____

Address _____

Fax: _____ Email: _____

Driller TBD, Spec with Qualified Drillers included for reference License# _____

Well Location: County Waller 911 address of well site _____

Latitude 30°6'13.84" Longitude 95°59'18.04"

Proposed Water Use: Public Water Supply: X Industrial: _____ Recreational: _____ Commercial: _____

Hydraulic Fracturing: _____ Transport Outside of District: _____

Status of well as of application date:

_____ Operating Well (Date drilled _____)

_____ Well Completed but not operating (Date Drilled _____)

X Well Development permit attached or awaiting approval

Authorization to produce the following quantity of water annually from this well is: 133,000,000 Gallons

A well operating permit is normally issued for a period of one year (12 months). If a permit for a longer period of time is requested, attach a statement detailing the reasons for a longer permit period and the period of time requested.

If the water produced from this well will be used in whole or in part on property other than the property where the well is located, **describe the location where the water will be used.** Transportation of water produced and moved to another location may require a District Transportation Permit. See District Rules, Section 10 or contact the District office for information.

Groundwater well supply will serve approximately 1,333 single family home connections in the City of Prairie View, Waller County, Texas. Water will be treated with chlorine gas at the remote well location and will be pumped into the water system as shown on the construction plans.

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT

Permit application approved on: _____ By: _____ Zach Holland, General Manger

(Continued) WELL OPERATING PERMIT APPLICATION (Continued)

The following documentation, attachments and fee payments must accompany this application when it is submitted for consideration by the District.

a. Plat or map showing location of the property and location on property of well for which application is submitted.
b. If the owner and/or the operator of well is different from the property owner, provide written documentation from the property owner authorizing construction and operation of this well.
c. All the information and documentation required for the type and class of well for which authorization is requested by Section 8 of the District Rules and in particular that information and documentation required by Rule 8.5.
d. If this permit application is for a well completed with an inside casing diameter of eight (8) inches or greater, or for any of the conditions enumerated in District Rule 8.5 F, a current hydrogeological report (a report completed within 18 months of the date of this application is considered current) shall be submitted with this application.
e. Payment for applicable fees must accompany application. For a non-exempt well the appropriate Operating Permit Application Fee ($375.00 +$750.00 if inside casing diameter is eight (8) inches or greater) must be included.
f. The applicant's water conservation plan and if any subsequent user of the water is a municipality or entity providing retail water services, the water conservation plan of that municipality or entity shall also be provided. In lieu of a water conservation plan, a declaration that the applicant and/or a subsequent user if any subsequent user is a municipality or entity providing retail water services will comply with the District Management Plan.
g. The applicant's Drought Contingency Plan and a copy of any subsequent user's Drought Contingency Plan or a declaration that the applicant or a subsequent user will comply with District rules, policies and Board actions in drought conditions.

I, the undersigned applicant, hereby agree and certify that:

a. in using this well, I will avoid waste, achieve water conservation, protect groundwater quality and the water produced from this well will be for a beneficial use;
b. I will comply with all District and State well plugging and capping guidelines in effect at the time of well closure;
c. I agree to abide by the terms of the District Rules, the District Management Plan and orders of the District Board of Directors currently in effect and as they may be modified, changed and amended from time to time;
d. I hereby certify that the information contained herein is true and correct to the best of my knowledge and belief.

Signature: _____ Date: 1/08/2025

Printed Name: Paul Anderson, P.E Title: Practice Area Leader

Attachment 3 – Map for the Proposed Remote Well

(Corresponds to Non-Exempt Water Well Drilling Form, item a, page 2 of 2)

P:\221-103-11\Drawings_Prarie View Well No 4\Exhibits\PVWELL_NO4_EXHIBIT.dwg Dec 19, 2024-2:22pm Edited by: ESanchez

EHRA
ENGINEERING THE FUTURE
SINCE 1936
10011 Meadowglen Lane
Houston, Texas 77042
EHRAinc.com | 713.784.4500
TBPE No. F-726 | TBPLS No. 10092300

ATTACHMENT 3
REMOTE WELL NO. 4 MAP

Attachment 4 – Projected Effect of the Proposed Withdrawal

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.e., Page 25 of 76)

EHRA
ENGINEERING THE FUTURE
SINCE 1936

TBPE No. F-726
TBPLS No. 10092300

January 13, 2025

Sent via email: BGCD@bluebonnetgroundwater.org

Mr. Zach Holland
Bluebonnet Groundwater Conservation District
1903 Dove Crossing, Suite A
P.O. Box 269
Navasota, Texas 77868

Re: City of Prairie View
Remote Groundwater Well No. 4
Projected Effect of the Proposed Withdrawal
BGCD Well ID No.- None Assigned
Waller County, Texas
EHRA Project No. 221-103-11

Dear Mr. Holland:

The purpose of this letter is to respond to the Non-Exempt Water Well Drilling Permit Form item 8.5A1(e) which requires:

> *"A statement of the projected effect of the proposed withdrawal on the aquifer or aquifer conditions, depletion subsidence, or effects on the existing permit holders or other groundwater users in the District"*

The details of the effects of groundwater withdrawal would be contained in the Well No. 4 Hydrogeologic Report. EHRA, the Engineer for the City of Prairie View (Owner), wishes to engage the Bluebonnet Groundwater Conservation District (BGCD) to prepare this report for the operation of Remote Groundwater No. 4 well which is anticipated to produce 800 gallons per minute. The City's existing water distribution can serve 2,229 equivalent single-family connections (ESFC) and proposes to serve an ultimate 3,365 ESFCs.

The purpose of this proposed water well is to upgrade the current undersized PWS. This proposed well is anticipated to have a depth of 1,400 feet as shown in **Exhibit 1- Well Construction Diagram**. The four nearby water wells located within a 0.5-mile radius from our proposed well, as depicted in **Exhibit 2- ½ Mile Radius Well Map**, are primarily private wells for domestic and public supply use. By constructing this well, we expect it to serve as an additional water well for the City of Prairie View. Additionally, the average depth of the nearby wells is 586 feet, which is significantly lower than the proposed depth for the City of Prairie View water Well No. 4. Due to the differences in depth between the proposed water well and existing wells, we can conclude that there will be no impact on the

existing well permit holders. The proposed Well No. 4 would be constructed 0.02 miles from the nearest other existing water well, owned by the City of Prairie View.

Should you require any additional information, please do not hesitate to contact myself or Edgar Sanchez, E.I.T at 713-784-4500 or by email at panderson@ehra.team or esanchez@ehra.team, respectively.

Sincerely,

Paul Anderson, P.E.
Practice Area Leader
Water and Wastewater Facilities

PEA/es
Attachments

cc: City of Prairie View
c/o Wendy F. Parker, MBA
TCEQ Region 12 – Houston
Edgar Sanchez, E.I.T.- Firm

Attachment 5 – Applicant's Declaration of Compliance with BGCD's Management Plan

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.f., Page 25 of 76)

EHRA
ENGINEERING THE FUTURE
SINCE 1936

TBPE No. F-726
TBPLS No. 10092300

January 13, 2025

Sent via email: BGCD@bluebonnetgroundwater.org

Mr. Zach Holland
Bluebonnet Groundwater Conservation District
1903 Dove Crossing, Suite A
P.O. Box 269
Navasota, Texas 77868

Re: City of Prairie View
Remote Groundwater Well No. 4
Declaration of Compliance with BGCD's Management Plan
BGCD Well ID No.- None Assigned
Waller County, Texas
EHRA Project No. 221-103-11

Dear Mr. Holland:

The City of Prairie View Remote Groundwater Well No. 4 will be located in Waller County within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The City's existing water distribution can serve 2,229 equivalent single-family connections (ESFC) and proposes to serve an ultimate 3,365 ESFC.

EHRA, Engineer for the City of Prairie View (owner), has reviewed the BGCD Groundwater Management Plan dated January 20, 2021 for requirements related to the above referenced application. EHRA and the Owner hereby declare compliance with the BGCD Groundwater Management Plan and any future adopted versions of the plan for this proposed groundwater well.

Should you require any additional information, please do not hesitate to contact myself or Edgar Sanchez, E.I.T. at 713-784-4500 or by email at panderson@ehra.team or esanchez@ehra.team, respectively.

We appreciate your attention to this important project and look forward to hearing from you.

Sincerely,

Paul Anderson, P.E.
Practice Area Leader
Water and Wastewater Facilities

PEA/es
Attachments

cc: City of Prairie View
c/o Wendy F. Parker, MBA
TCEQ Region 12 – Houston
Edgar Sanchez, E.I.T.- Firm

Attachment 6 – Applicant's Declaration of Compliance with Well Plugging Guidelines

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.h., Page 25 of 76)

EHRA
ENGINEERING THE FUTURE
SINCE 1936

TBPE No. F-726
TBPLS No. 10092300

January 13, 2025

Sent via email: BGCD@bluebonnetgroundwater.org

Mr. Zach Holland
Bluebonnet Groundwater Conservation District
1903 Dove Crossing, Suite A
P.O. Box 269
Navasota, Texas 77868

Re: City of Prairie View
Remote Groundwater Well No. 4
Declaration of Compliance with Well Plugging Guidelines
BGCD Well ID No.- None Assigned
Waller County, Texas
EHRA Project No. 221-103-11

Dear Mr. Holland:

The City of Prairie View Remote Groundwater Well No. 4 will be located in Waller County within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The City's existing water distribution can serve 2,229 equivalent single-family connections (ESFC) and proposes to serve an ultimate 3,365 ESFC.

The proposed Remote Groundwater Well facility will be designed in accordance with TAC 30 Chapter 290 – Rules and Regulations for Public Water Systems. The facility will be constructed in one (1) phase. The single phase will consist of:

- One (1) 800 gpm vertical turbine water well;

Additional construction includes but not limited to:

- One (1) 250 kW diesel generator for emergency stand-by power;

Drilling operations will be in accordance with all AWWA standards, TCEQ 290.41 rules, and the Texas Department of Licensing and Regulation's Water Well Drillers and Pump Installers Program, as directed in the Gravel Wall Water Well technical specification included with this submittal. EHRA understands that The BGCD Board of Directors shall adopt, and may periodically amend, Well Construction Standards for wells drilled within the District. Approved Well Construction Standards will be made available to the public at the District office.

Upon the BGCD's conditional approval for the construction of the above-referenced facility, EHRA will submit the following documentation to BGCD within sixty (60) days after drilling and/or completion of the well for approval of the well for public use. Items to be included are:

a) Site maps at appropriate scales;
b) Copy of recorded deed for the well site deeded to the City of Prairie View;
c) Copy of the recorded easement and map showing the sanitary control easement as filed at the County Courthouse and bearing the County Clerk's stamp;
d) Copy of a Sanitary Control Easement within 150 feet of the well;
e) Construction Data for the completed well:
    a. Material Settings
    b. Driller's Log
    c. State of Texas Well Report
    d. Cementing Certificate
    e. Pumping Equipment Information
f) USGS Topographic Map showing the location of the completed well;
g) 36-Hour Pump Test;
h) Three (3) bacteriological sample results; and
i) Chemical Analysis report for well water samples.

EHRA and the City of Prairie View (Owner) will comply with the BGCD's rules for well operation. No person shall operate any well drilled and equipped within the BGCD, except operations necessary to the drilling and testing of such well and equipment, unless or until the BGCD has been furnished an accurate driller's log, any special purpose log or data which have been generated during well development, and a registration of the well correctly furnishing all available information required on the forms furnished by the BGCD.

EHRA and the Owner will close and abandon public water supply wells by plugging with cement according to 16 TAC Chapter 76 (relating to Water Well Drillers and Water Well Pump Installer).

All wells which are required to be plugged or capped under Texas Occupations Code, Chapters 1901 and 1902 or this chapter shall be plugged and capped by a licensee or well owner in accordance with the technical specifications and in compliance with BGCD rules or incorporated city ordinances.

It is our hope that we have provided the appropriate information for approval of this groundwater well. Should you require any additional information, please do not hesitate to contact myself or Edgar Sanchez, E.I.T. at 713-784-4500 or by email at panderson@ehra.team or esanchez@ehra.team, respectively.

We appreciate your attention to this important project and look forward to hearing from you.

Sincerely,

Paul Anderson, P.E.
Practice Area Leader
Water and Wastewater Facilities

PEA/es
Attachments

cc: City of Prairie View
c/o Wendy F. Parker, MBA
TCEQ Region 12 – Houston
Edgar Sanchez, E.I.T.- Firm

Attachment 7 – Gravel Wall Water Well with Driller Qualifications

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.i., Page 25 of 76)

GRAVEL WALL WATER WELL

GENERAL

The work to be performed under this specification shall consist of the drilling, casing, screening, developing and testing of gravel wall water well, described as follows, and all other incidentals to complete the work in accordance with the specifications and terms hereof. The well shall be drilled and developed in accordance with AWWA A100 standards.

QUALITY ASSURANCE

A. The well Contractor shall employ competent workmen for the execution of the work, and all work at all times shall be performed under the direct supervision of an experienced well driller(s) and drilling superintendent(s) having current Texas Water Well Drillers licenses from the Texas Department of Licensing and Regulation (TDLR). The well driller(s) and drilling superintendent(s) must be employees of the well Contractor. The water well driller(s), drilling superintendent(s) and pump installer(s) shall be currently licensed in the State of Texas by the TDLR. As evidence of his qualifications, the license number of each driller shall be on display during all rig operations. The well Contractor shall be able to provide documentation and/or shall meet the following requirements:

1. At least ten (10) years of experience with water well construction of similar or larger size, depths, weights, and type required on this Contract, and shall have constructed at least five (5) such wells for public water supply in the last five (5) years in Harris, Fort Bend, Montgomery and/or Waller Counties in Texas.

2. Shall employ on this project and shall place in responsible charge of the work only a licensed Texas water well driller(s) and drilling superintendent(s) who have at least five (5) years of experience with water well construction of similar or larger size, depths, weights, and type required in this contract and who has constructed at least five (5) such wells for public water supply in Harris, Fort Bend, Montgomery and/or Waller Counties in Texas. Should the individual so qualified leave the employ of the Contractor prior to project close-out, all work shall cease until an individual of like or superior qualifications is placed in responsible charge of the work. No additional contract time will be extended in the event of such substitution.

3. Own drilling rig(s) and service rig(s) and construction and test pumping equipment that are in good condition and satisfactory in type, size and capacity to drill, construct, test and equip the production well, as specified.

4. The Owner and Engineer have pre-approved the following firms:

a. Alsay Inc., Houston, Texas
b. J&S Water Wells, Bellville, Texas
c. Weisinger, Inc., Willis, Texas
d. Felder Water Well & Pump Service, Angleton, Texas

B. Provide adequate safety equipment, including hard hats, hard-toe shoes, and gloves. Enforce use of the equipment by the drilling crew while on job site.

C. Pump installers must be licensed by the State of Texas for the type of pump being installed.

All welders must have a current certificate recognized by the American Welding Society.

KIND AND QUALITY OF MATERIAL

All material used in the well shall be in accordance with the latest Standards of the American Petroleum Institute, and the latest specifications of the American Society for Testing Materials and the American Welding Society. The materials shall be new and of the best grade and quality.

For all well drilling and construction operations, protect the quality of water supply by using potable water to mix drilling mud, pump gravel, washing and maintain one-half (0.5) milligrams per liter (mg/l) minimum chlorine residual, Drilling mud used shall be suitable for public supply water wells, do not use oilfield spud mud. Additional specifications and information for the water supply, disinfection and drilling mud are included in this Section.

To minimize the contamination of the underground water during the drilling operation, all methods, materials, tools and drilling equipment and well drilling, construction disinfection, protection and testing operations shall meet or exceed the conditions and requirements of Title 30 of the Texas Administrative Code Chapter 290, Subchapter D, Sections 290.41(c)(2) and 290.41(c)(3), which follow:

- The premises, materials, tools, and drilling equipment shall be maintained so as to minimize contamination of groundwater during drilling operation.
- Water used in any drilling operation shall be safe sanitary quality. Water used in the mixing of drilling fluids or mud shall contain a chlorine residual of at least 0.5 mg/l.
- No temporary toilet facilities shall be maintained within 150 feet of the well being constructed unless they are sealed, leakproof type.
- Safeguards shall be taken to prevent possible contamination of the water or damage by trespassers following completion of the well and prior to installation of the permanent pump equipment.

DIAMETER, DEPTH AND QUANTITY CONDITIONS

The well to be constructed hereunder shall be located at a site furnished and staked by the Owner. The elevations shown on the well profile and in these specifications for static water level and sand stratas are taken and related from existing nearby water wells, and must be verified at the time of drilling. Contractor shall utilize these elevations as guide only

The following diameters, depth and quantities of materials shall apply:

a.	Test Hole Depth	1,450 feet
b.	Steel surface casing 14-inch diameter	425 feet
c.	Steel blank production casing 8-inch diameter	325 feet
d.	Stainless steel screen 8-inch diameter	100 feet
e.	Diameter of under reaming	18 inches
f.	Production	800 GPM
g.	Specific capacity	15 GPM per foot

TEST HOLES

The Contractor shall drill a test hole not less than 9-7/8-inch in diameter to the depths specified in the above schedule, provided that should the drill be in sand at this depth, the Contractor shall continue the test hole until he has penetrated the sand formation and approximately five feet into the impervious strata underlying the sand formation.

During the drilling of the test hole, the Contractor shall collect sand samples, which shall be analyzed to determine the proper size gauge of the screen opening to be set opposite the water-bearing sand formations. The Contractor shall keep an accurate driller's log during the drilling of the test holes and upon completion of the test hole drilling shall have logging services performed.

After the well test hole has been drilled, the Contractor shall have the following logging or testing performed:

1. Contact Caliper Log
2. Induction Electric Log
3. Neutron Density Log
4. Three (3) water quality samples taken by Temporary Test Well Method from anticipated water-producing strata.
5. Spectra gamma ray analysis (as required per the County)

In the event the test holes provide to be satisfactory in the judgment of the Engineer, the Contractor shall be directed by the Engineer to proceed with the drilling of the water well in the holes already drilled for the tests.
In the event it becomes necessary to abandon a test hole, it shall be permanently sealed by the Contractor from the bottom by pumping drilling mud within twenty-five (25) feet of the top, and filling the top twenty-five (25) feet with neat cement to insure no contamination can enter the hole from the ground surface.

REAMING AND CASING

The Contractor shall ream the test hole to a diameter of twenty-six (26) inches to five (5) feet above the first water-bearing sand to be used in the completed water well.

Prior to setting casing the Contractor shall run an Eastman Survey at 20-foot intervals to the depth of the bottom of the approved casing setting utilizing an Eastman D-X multiple shot instrument. If deviation from plumb exceeds one (1º) degree for one-hundred (100) feet, the Contractor shall, at no additional contract cost, re-ream the hole to bring it within tolerance.

The Contractor shall furnish and install in the reamed test hole new casing which shall be either T & C or field welded as set in the holes. The well shall be vented with 4-inch galvanized pipe and screened with corrosion resistant No. 16 mesh or finer.

CEMENTING

After the casing has been set in the hole, the annular space shall be completely filled with cement from the bottom of the casing up to the ground surface, using Portland cement Class A with six (6%) percent gel additive and clean water. The actual placing of the cement shall be performed by Halliburton process. The cement shall be allowed to set for a period of not less than twenty-four (24) hours before drilling the cement plug. The cementing shall be accomplished in accordance with standard practice for cement water wells, and shall be continuous to surface of ground.

UNDERREAMING

After the cement plug has been drilled, the well below the casing shall be under reamed to a minimum diameter of not less than twenty-four (24) inches. The under reaming shall be done by the use of a hydraulically expanded under reamer such as the Baker or equal, and in such a manner as will assure a minimum diameter of twenty-four (24) inches throughout that portion of the well to be under reamed. Twenty (20) feet of hole into the impervious strata underlying the lower water-bearing sand, shall be three (3) inches larger than the internal diameter of the screen and production casing, and shall act as means of centering the lower end of the screen in the under reamed hole. A caliper log shall be run in the under reamed hole to insure proper hole gauge.

SCREEN AND PRODUCTION CASING

That portion of the well below the casing shall be cased with new screen and blank type and size shown on plans, which shall extend from the bottom of the well back up into the surface casing to one-hundred (100) feet above the bottom of the casing to serve as gravel magazine. The blank shall be new black steel pipe, 0.50 inches wall thickness, the size is to be as shown on plans, which shall also be set opposite any shale or clay strata, with new Barlugged stainless steel wire-wrapped screen made on new black steel pipe, 0.50 inches wall thickness, of same size as blank set opposite the water-bearing sands to be used in the completed water well. The lower end of the screens and shall be closed with backpressure valves. That portion of the blank lapping up through the casing shall be fitted with two sets of centering guides to hold it concentric with the casing.

The production casing shall conform to the specifications and requirements of ANSI/AWWA A100 (latest revision), ANSI/AWWA C200, ASTM A53, ASTM A139 Grade B, API-5L and TCEQ Chapter 290 Subchapter D Section 290.41(c)(3)(B).

The blank production casing shall have a lead content of less than 0.25 percent (0.25%)

Prior to the actual setting of the screen, the Contractor shall furnish to the Engineer the depths and thicknesses of the water-bearing and or sands to be developed and the mechanical analysis of the same. Using the information thus obtained and the recommendations of the Contractor, the Engineer will furnish the Contractor the actual length of screen to be used and the size openings to be used.

GRAVEL WALL

After the screens are set in the holes, the annular space around the outside of the screens shall be completely filled with specially selected washed and screened gravel filler, such as Colorado Silica or Oglebay Norton Industrial Sands (Brady, Texas). The special gravel used shall be conveyed from the hydraulic graveling machine to the point of deposit in the bottom of the well through a graveling tube. As the annular space, on the outside of the screens, is filled, the graveling tube shall be gradually raised so as to maintain the bottom of the graveling tube near the point of deposit at all times. Gravel shall be thoroughly disinfected with a 50 mg/l chlorine solution as it is added. The graveling procedure shall continue until the gravel reaches a point approximately five (5) feet below the tops of the blank liners. Centering guides shall be used to keep pipe centered in under reamed hole.

DEVELOPING AND TESTING

The well shall be continuously washed while the gravel pack is being placed in the annular space around the screens. Immediately upon completion of the graveling, the well shall be thoroughly developed by means of washing, agitating and pumping until the gravel pack and water sands are stabilized, until the water well is made to produce the maximum quantity of water with the minimum lowering of water level and until it becomes evident that the drilling fluid is removed from the face of the sands and gravel packs. Development of the well shall not be considered complete until all test data has been submitted and development judged complete.

TESTING

The Contractor shall furnish, install and utilize his own equipment for testing purposes. Calculations of proposed orifice sizes, and quality of equipment used, indicating anticipated accuracy expected, shall be submitted to the Engineer for approval. During pumping periods, flow and elevation readings shall be taken at intervals of fifteen (15) minutes for the first hour of pumping, then intervals of one (1) hour for subsequent hours of pumping. Elevation readings shall be taken at 10-minute intervals during the first hour of recovery and 30-minute intervals during subsequent hours of recovery. Elevation readings shall be given to the nearest one-tenth (1/10) foot.

When the Contractor feels development is complete, a twenty four (24) hour notice shall be given, and the following tests performed:

1. Development Test:

Flowing	(60% capacity) - 480 GPM	3 Hours
Recovery		3 Hours
Flowing	(80% capacity) - 640 GPM	3 Hours
Recovery		3 Hours
Flowing	(100% capacity) - 800 GPM	3 Hours
Recovery		3 Hours
Flowing	(120% capacity) - 960 GPM	3 Hours
Recovery		3 Hours

If the curves generated by plotting the specific capacities obtained by the development tests indicate a general decrease in specific capacity as flow decreases, the well shall be considered not fully developed and additional development and testing shall be required at the Contractor's expense.

2. Production Test:

Recovery	10 Hours

Flowing	(100% capacity) - 800 GPM	36 Hours
Recovery		8 Hours

WELL GUARANTEES

A. Production:

The Contractor shall attempt to reach a specific capacity of 15-gpm per foot of drawdown at a pumping rate of 800 gpm after thirty-six (36) hours of continuous pumping. The drawdown used for the calculation of specific capacity will be the water level at the end of thirty-six (36) hours of pumping minus the water level at the end of the 4-hour recovery test. If the well does not produce the guaranteed capacity of specific capacity as specified, the following procedure will be used:

1. The Contractor will, at his expense, hire a Hydrologist approved by the Engineer to determine the efficiency of the well of a method acceptable to the Engineer.

2. If the Engineer and Hydrologist determine that the well is at eighty (80%) percent efficient or better, the well will be accepted.

3. If the efficiency of the well is less than eighty (80%) percent and the Engineer and Hydrologist determine that the efficiency can be obtained, the driller, at no cost to the Owner shall resume well development. Well development will continue until eighty (80%) percent efficiency is obtained or until the Engineer and Hydrologist determine further development will not increase the efficiency of the well.

B. Sand Content:

The Contractor shall guarantee the average sand content of the water from the well will not exceed 5-milligrams per liter after two (2) hours of pumping at the designated capacity, as per most recent version of AWWA A100.

C. Quality of Water:

It is understood that the Contractor cannot control the quality of water contained in any sub-surface water-bearing formation. It is the Contractor's responsibility, however, to produce water from only those strata as are contemplated herein, and to exclude any water production from other water-bearing strata.

D. Disinfection:

The Contractor shall chlorinate the gravel during the placement into the wells with a chlorine rinse of 50-PPM chlorine residual. The Contractor shall disinfect the completed well according to current AWWA Standard A100. Disinfectant shall remain in the well for at least six (6) hours, per 30 TAC 290.41(c)(3)(F).

After flushing all chlorinated water from the well, samples of water collected on three (3) successive days shall be submitted for bacteriological analysis. If the water produced does not meet Texas Commission on Environmental Quality's (TCEQ) "Drinking Water Standards" after repeated disinfection, appropriate treatment shall be provided in accordance with TCEQ Rules and Regulations for Public Water Systems.

E. Records:

At the end of each working shift, a written report shall be prepared, showing a detail of the progress made during that shift, and such other information, as may be required, to ascertain the progress being made by the Contractor. This report shall be signed by the driller or the Contractor's duly authorized representative and a copy of such report shall be delivered to the Engineer.

After the well head concrete foundation is poured and the surface casing cut off to match, a TV survey shall be run to visually observe material settings, condition of materials and fill up of blank section below bottom screen after testing. If more than five (5) foot of fill exists in the twenty (20) foot blank below the bottom screen, it will be jetted out.

The Contractor shall furnish to the Owner, in triplicate, a complete graphic and written log of the well showing the formations encountered, the thickness, the location of all material setting, the static level, the pumping level, and other necessary information as may be required to complete the records of the well. Such records shall also include a chemical analysis of water from the completed well.

PUMP BASES

The Contractor shall install as part of this contract reinforced concrete pump bases. The pump bases shall be as shown on the plans.

WASTE

The Contractor shall be responsible for the proper disposal of the wastewater produced during the drilling, developing and testing of the water wells.

SITE CONDITIONS

The proposed well site is shown on Location Map. Contractor shall be responsible for clearing and preparing for drilling equipment as required.

TEMPORARY SEALING

In the event that permanent pumping equipment is not installed immediately upon completion of the well, a metal cap shall be welded or screwed securely over the exposed opening to prevent contamination of the water or damage by trespassers.

DRILLING MUD PITS

Mud or sand pits shall not be excavated on this well site. The Contractor shall provide and use at his own expense, mobile mud pits. All water, sand, mud and other wastes which result from drilling, construction, and testing operations of the Contractor shall be disposed of, as approved by the Owner, and by any local agencies responsible for drainage in the vicinity of the well site. The location of such disposal shall be outside of the Utility District. The Contractor shall obtain all necessary permits for the hauling and disposal of such waste. All expenses involved shall be considered as included as part of the cost of the construction of the well.

END OF SECTION

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Exhibit 1 – Well Construction Diagram

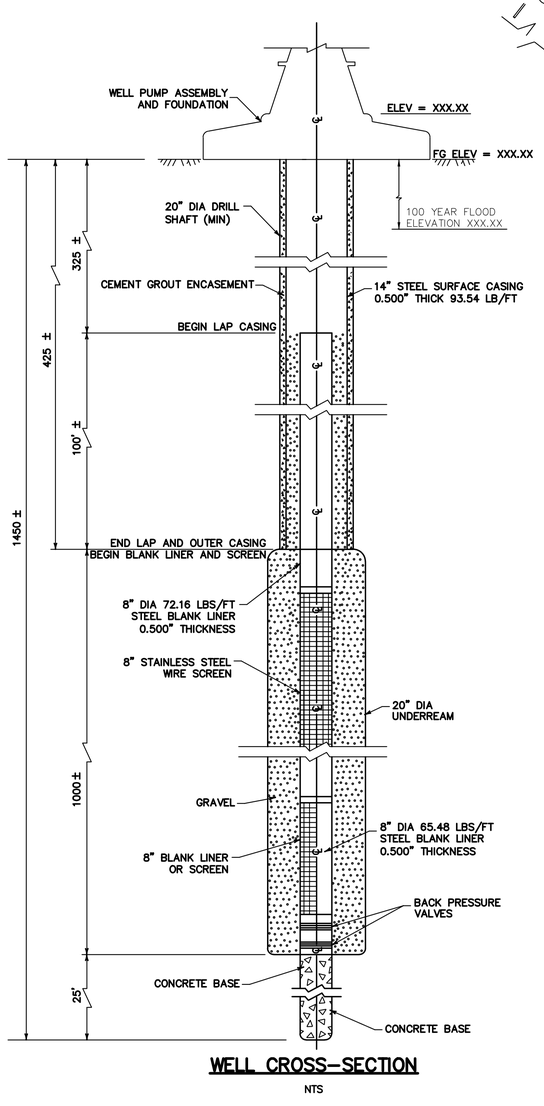
(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.g.2., Page 25 of 76)

WARNING

OVERHEAD AND UNDERGROUND UTILITIES MAY EXIST IN THE VICINITY OF THIS PROJECT. LOCATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE AND OTHER UTILITIES MAY EXIST IN THE VICINITY OF THE PROJECT WHICH ARE NOT SHOWN ON THE PLANS.

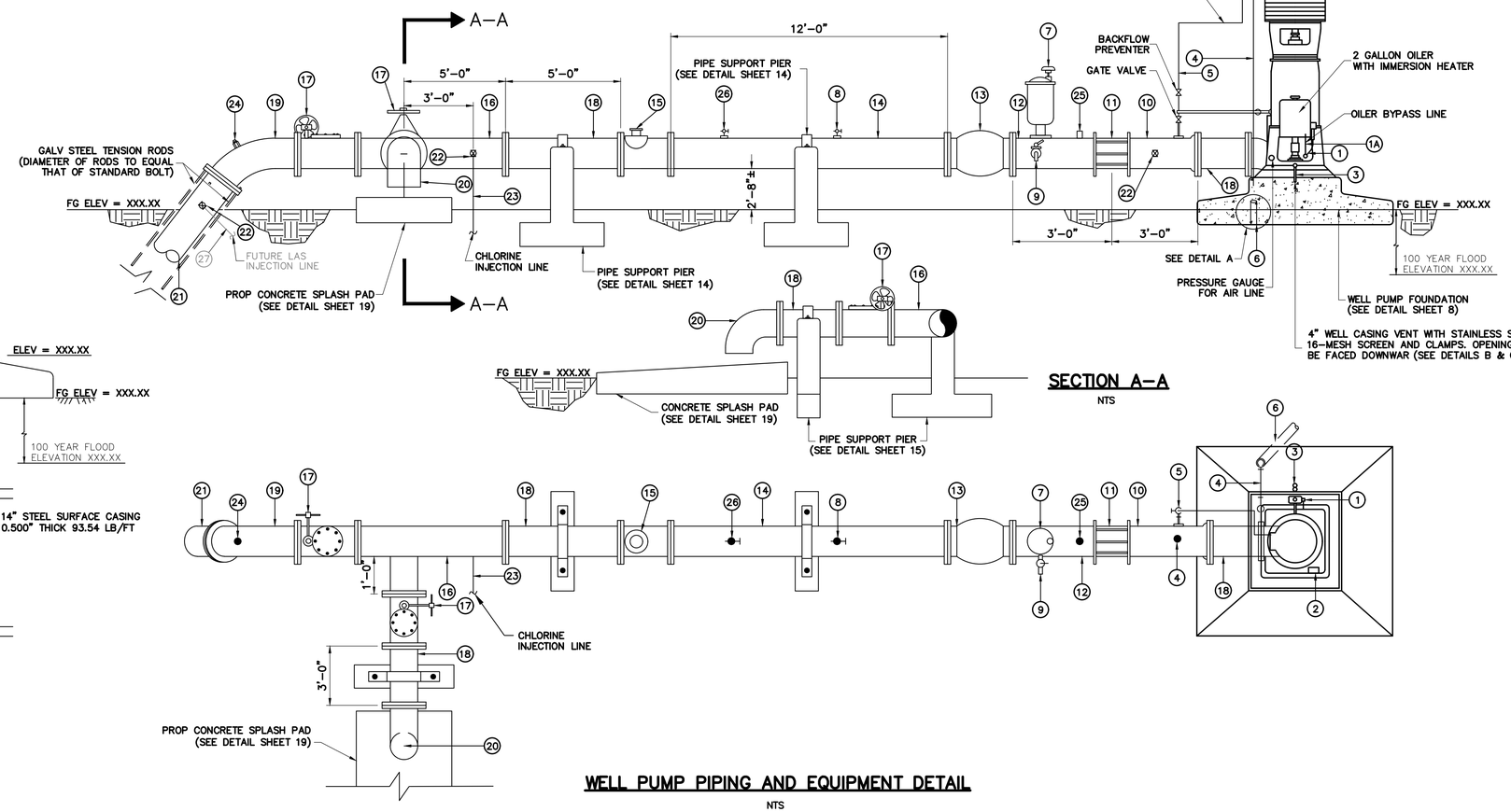
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES, IN THE VICINITY OF THE PROJECT, PRIOR TO BEGINNING CONSTRUCTION.

NOTE:
LENGTHS SHOWN ARE ESTIMATED. ACTUAL LENGTHS SHALL BE DETERMINED FROM LOG AND TEST RESULTS AND QUANTITIES ADJUSTED ACCORDINGLY, PER ENGINEERS APPROVAL



WELL CROSS-SECTION

NTS



SECTION A–A

NTS

WELL PUMP PIPING AND EQUIPMENT DETAIL

NTS

PIPE, VALVE, AND FITTING SCHEDULE

ITEM	SIZE	DESCRIPTION	ITEM	SIZE	DESCRIPTION
①	1/4"	SOFT COPPER OIL LINE	⑭	10"	WELDED STEEL PIPING WITH FLANGED ENDS, 1/2" THREAD–O–LET FOR NEEDLE VALVE, 1" THREAD–O–LET FOR CORPORATION STOP
⑴A	1/4"	SOFT COPPER OIL BYPASS LINE	⑮	10"	WATER FLOW METER (SPARLING TYPE 102 OR APPROVED EQUAL)
②	–	STANDING WATER LEVEL GAUGE WITH SNIFTER FITTING	⑯	10"	WELDED STEEL HEADER WITH FLANGED ENDS AND FLANGED OUTLET
③	4"	GALV STEEL WELL CASING VENT WITH GALV MALLEABLE IRON TEE, PLUG, AND STAINLESS STEEL SCREEN AND CLAMPS	⑰	10"	GEAR OPERATED FE/FE GATE VALVE
④	1/2"	GALV STEEL COOLING WATER PIPING	⑱	10"	WELDED STEEL PIPING WITH FLANGED ENDS
⑤	1/2"	SOFT COPPER COOLING WATER SUPPLY WITH BRONZE GLOBE VALVE AND BRONZE CHECK VALVE	⑲	10"	STEEL FE/FE 45° LONG RADIUS ELBOW
⑥	2"	PVC COOLING WATER DRAIN PIPE	⑳	10"	WELDED STEEL 90° ELBOW WITH FLANGED END
⑦	4"	WELL SERVICE AIR RELEASE AND VACUUM RELIEF VALVE WITH SCREENED VENT CAP (CITY OF HOUSTON STANDARD)	㉑	10"	DUCTILE IRON FE/PE SPOOL
⑧	1/2"	BRONZE NEEDLE VALVE (WITH PRESSURE GAUGE) PER CITY OF HOUSTON STANDARD	㉒	1"	PVC "UNION" BALL VALVE
⑨	3/4"	SAMPLE VALVE W/ THREADS REMOVED (CITY OF HOUSTON STANDARD)	㉓	1"	SCH 80 PVC PIPE (CHLORINE INJECTION)
⑩	10"	WELDED STEEL PIPING WITH FLANGED END, 1/2" THREAD–O–LET COOLING WATER CONNECTION	㉔	1–1/2"	CORPORATION STOP
⑪	10"	FLEXIBLE COUPLING (DRESSER STYLE) WITH HARNESS	㉕	3/4"	3/4" THREAD–O–LET WITH PLUG W/ CITY OF HOUSTON STANDARD HIGH PRESSURE MERCOID SWITCH) (FUTURE)
⑫	10"	WELDED STEEL PIPING WITH FLANGED END AND 1/2" THREAD–O–LET SAMPLE CONNECTION..LENGTH = 3' & 4' FLANGED OUTLET FOR AIR RELEASE VALVE ASSEMBLY	㉖	1–1/4"	BRONZE CORPORATION STOP & 1–1/4" CAP
⑬	10"	FE/FE SILENT CHECK VALVE	㉗	3/4"	SCH. 80 PVC PIPE (LAS INJECTION) (FUTURE)

WELL PUMP SCHEDULE

CAPACITY	800 GPM
TDH	344 FT
COLUMN LENGTH	380' SUCTION TUBE
STATIC WATER ELEVATION	180' (ANTICIPATED)
DRAWDOWN	16
RPM	1,770
HORSEPOWER	125 HP (MIN)
VOLTAGE, PHASE	480 V – 3 PHASE
MFG–MODEL	FLOWAY VERTICAL TURBINE DEEP WELL PUMP, MODEL 14DOL

FBC ENGINEERING APPROVAL

NO.	DATE	REVISION	APP.

DWG NO.
JOB NO. 221–103–11

NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINE CAN BE MARKED.
THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

Date:
CENTERPOINT ENERGY NATURAL GAS UTILITIES SHOWN. (GAS SERVICE LINES ARE NOT SHOWN) THIS SIGNATURE NOT TO BE USED FOR CONFLICT VERIFICATION.
SIGNATURE VALID FOR SIX MONTHS

Date:
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.)
SIGNATURE VALID FOR SIX MONTHS

Date:
APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR.

EHRA
ENGINEERING THE FUTURE
SINCE 1936
10011 MEADOWGLEN LANE
HOUSTON, TEXAS 77042
(713) 784–4500
WWW.EHRAINC.COM
TBPE No. F–726
TBPLS No. 10092300

PRAIRIE VIEW WELL NO.4

WELL DETAILS

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

WATER
WASTE WATER
STORM WATER
STORM WATER QUALITY
FACILITIES
TRAFFIC & TRANSPORTATION/ STREET & BRIDGE

FILE NO.
HORIZ:
VERT:
DWN MA
CHKD PA
APPR XXX

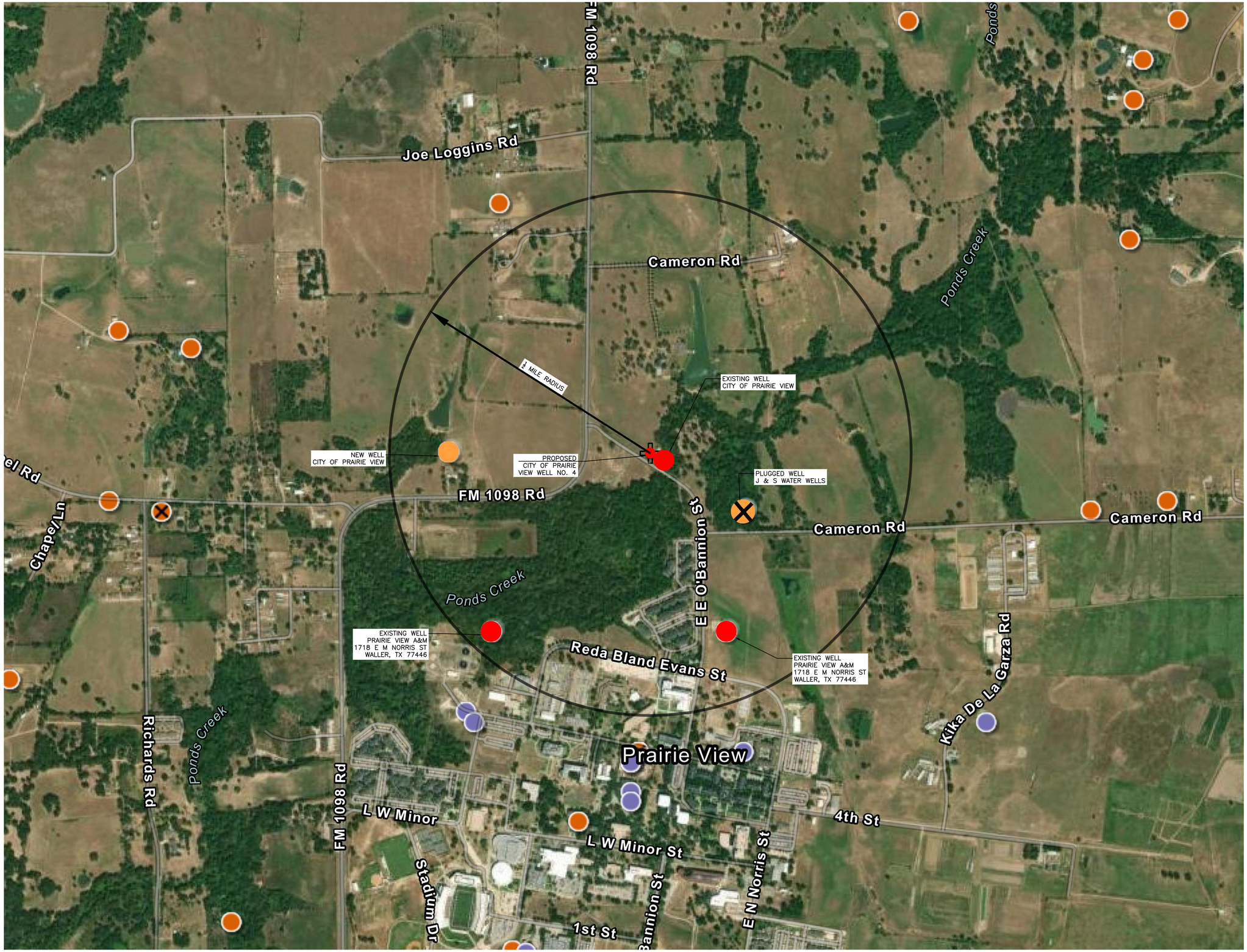
SHEET NO. XX OF XX
DRAWING SCALE
FOR CITY OF HOUSTON USE ONLY

PLOT STYLE: Xerox 510 24x36 Engineering.ctb

P:\221-103-11\Drawings_Prarie View Well No 4\WELL DETAILS.dwg Nov 29, 2023-4:49pm Edited by: EGarcia

Exhibit 2 – ½ Mile Radius Nearby Well Map

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.g.3., Page 25 of 76)



500 250 0 500

LEGEND:

- EXISTING WELLS
- NEW WELL
- PLUGGED WELL

EHRA
ENGINEERING THE FUTURE SINCE 1936
10011 Meadowglen Lane
Houston, Texas 77042
EHRAinc.com | 713.784.4500
TBPE No. F-726 | TBPLS No. 10092300

CITY OF PRAIRIE VIEW– WELL NO. 4

EXHIBIT 2
1/2 MILE RADIUS
WELL MAP

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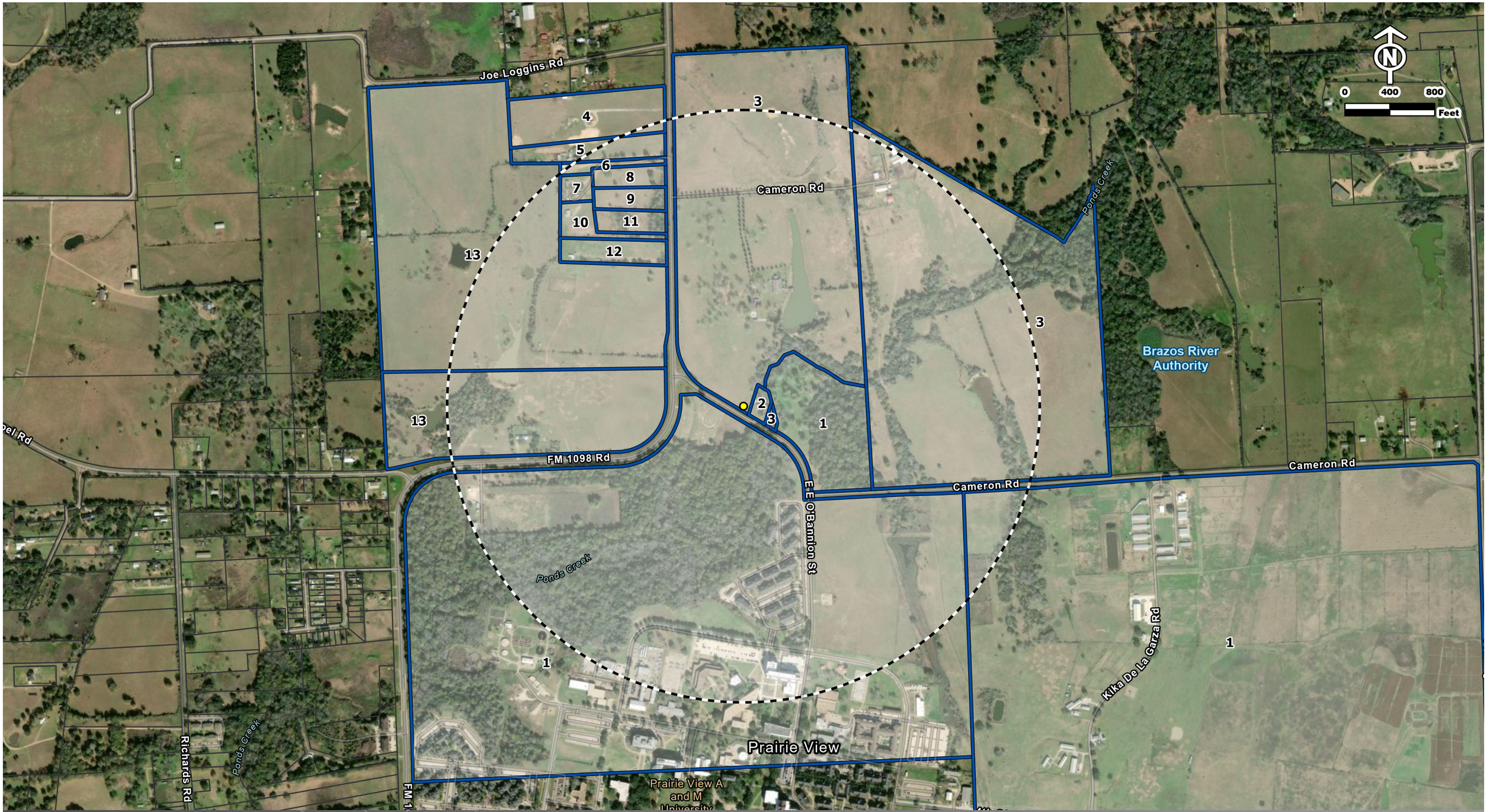
Exhibit 3 – Nearby Property Owner Information Map

(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.j., Page 25 of 76)



City of Prairie View - Remote Well

Affected Landowners

- Proposed Well
- .50 Mile Buffer
- Affected Landowners
- Parcels
- Water Districts

EHRA
Engineering the Future
Since 1936

December 2024

Corresponding List of Nearby Property Owners

(Corresponds to Rules of Bluebonnet GCD 1.0, Rule 8.5.A, item 1.j., Page 25 of 76)

1. PRAIRIE VIEW A & M UNIV
301 TARROW STREET 6TH
FLOOR
COLLEGE STATION TX 77840

2. CITY OF PRAIRIE VIEW
P O BOX 817
PRAIRIE VIEW TX 77446

3. SGJGM FAMILY LP
PO BOX 40468
HOUSTON TX 77240

4. ARGUETA JORGE
16914 PENICK ROAD
WALLER TX 77484

5. GREEN CASSIAN
1059 COTTAGE OAK
HOUSTON TX 77091

6. LINDSEY JAYLON RAY
PO BOX 1917
WALLER TX 77484

7. BAKER ANNETTE R
23377 FM 1098
HEMPSTEAD TX 77445

8. GAMBLE MARGARET
268 LINKWOOD DRIVE
PORT ARTHUR TX 77640

9. HORNBEAK DOROTHY
CARROLL ESTATE
13606 IMPERIAL ISLAND LANE
PEARLAND TX 77584

10. SMITH ORA MAE ET AL
220 EMORY LN
PORT ARTHUR TX 77642

11. EDISON NAOMI
4138 DACCA DRIVE
HOUSTON TX 77047

12. VBB REAL ESTATE
INVESTMENTS LLC
20283 SANTA MARIA AVENUE
20627
CASTRO VALLEY CA 94546

13. UNIVERSITY OAKS LLC
3040 POST OAK BLVD
HOUSTON TX 77056

William R. Hutchison, Ph.D., P.E., P.G.
Independent Groundwater Consultant
909 Davy St.
Brenham, TX 77833
512-745-0599
billhutch@texasgw.com
www.texasgw.com

January 27, 2025

Mr. Zach Holland
General Manager
Bluebonnet Groundwater Conservation District
PO Box 269
Navasota, TX 77868-0269

RE: Phase I-a Report: City of Prairie View Well No. 4

Dear Mr. Holland,

This letter represents the Phase I-a report for the City of Prairie View No. 4 Well permit application that I received from Arantza Cabrera via email on January 20, 2025.

"Estimated Annual Water Production" is 133 million gallons per year, which is below the 200 million gallon per year threshold for Phase I of the permit application process. Therefore, the application requires the preparation of a Phase I-a analysis of potential drawdown.

Well Locations on HAGM Grid

The latitude and longitude data on the application were used to convert the location data to x- and y-coordinates in the GAM coordinate system using Surfer, a commercial gridding program. The FORTRAN program *PointRC.exe* was used to find the HAGM cell for those x- and y-coordinates. The results of this effort yielded that the well is in HAGM row 33, column 84.

The applications noted well depth of 1,400 feet, which would place the bottom of the well within the upper 111 feet of the Jasper Aquifer (HAGM layer 4).

Grid Parameters, HAGM Parameters, HAGM Results, Theis Parameters

The Excel spreadsheet named *BGCD Parameters.xlsx* contains the data needed for the review and Phase I-a calculations for cells designated in the four counties of the Bluebonnet Groundwater Conservation District. The data for row 33, column 84 were copied and transposed into the spreadsheet *COP4 Phase I-a Tables.xlsx*. Results from all model layers (except for the Thies Results) are summarized into four tables as follows:

- Table 1: Grid Parameters
- Table 2: HAGM Parameters
- Table 3: HAGM Results
- Table 4: Theis Parameters

Table 1. Grid Parameters for City of Prairie View No. 4 Well

County Name	Waller	Waller	Waller	Waller
County Code	237	237	237	237
Outcrop Layer	1	1	1	1
Layer	1	2	3	4
Row	33	33	33	33
Column	84	84	84	84
x-coordinate (GAM-ft)	6187569	6187569	6187569	6187569
y-coordinate (GAM-ft)	19288148	19288148	19288148	19288148
Surface Elevation (ft MSL)	275	275	275	275
Cell Top Elevation (ft MSL)	275	144	-706	-1014
Cell Bottom Elevation (ft MSL)	144	-706	-1014	-1633
Cell Thickness (ft)	131	850	308	619
Clay Thickness (ft)	101	333	142	412
Clay Thickness (% of Cell Thickness)	77.10	39.18	46.13	66.56

Table 2. HAGM Parameters for Prairie View No. 4 Well

County Name	Waller	Waller	Waller	Waller
County Code	237	237	237	237
Outcrop Layer	1	1	1	1
Layer	1	2	3	4
Row	33	33	33	33
Column	84	84	84	84
Hydraulic Conductivity (ft/day)	7.85	2.00	0.01	1.88
Transmissivity (gpd/ft)	7,689	12,716	27	8,690
Leakage (1/day)	2.20E-05	6.30E-06	8.38E-09	0.00E+00
Storativity (dimensionless)	1.00E-01	9.00E-04	3.00E-04	1.87E-04
Elastic Storativity (dimensionless)	1.95E-05	8.22E-05	1.40E-07	4.06E-06
Inelastic Storativity (dimensionless)	1.95E-03	8.22E-03	1.40E-05	4.06E-04

Table 3. HAGM Results for Prairie View No. 4 Well

County Name	Waller	Waller	Waller	Waller
County Code	237	237	237	237
Outcrop Layer	1	1	1	1
Layer	1	2	3	4
Row	33	33	33	33
Column	84	84	84	84
Groundwater Elevation in 2009 (ft MSL)	185	176	176	105
Groundwater Elevation in 2080 (ft MSL)	130	90	91	-126
DFC Drawdown (ft)	54	86	85	232
Artesian Head (ft)	-90	32	882	1119
Subsidence in 2009 (ft)	0.3	0.3	0.3	0.3
Subsidence in 2080 (ft)	0.86	0.86	0.86	0.86
Subsidence from 2009 to 2080 (ft)	0.56	0.56	0.56	0.56
Cell Pumping in 2009 (AF/yr)	0	50.69	0	0
Cell Pumping in 2080 (AF/yr)	0	1069.83	0	0

Table 4. Theis Parameters for Prairie View No. 4 Well

County Name	Waller
County Code	237
Outcrop Layer	1
Layer	4
Row	33
Column	84
Drawdown in Production Well at 100 gpm for 36 hours	24.06
Drawdown 1/2 mile from Production Well at 100 gpm for 36 hours	1.69
Drawdown 1/2 miles from Production Well at 100 gpm for 1 year	8.70
Drawdown-Pumping Ratio for Production Well for 36 hours	0.24056
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 36 hours	0.01689
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 1 yr	0.08695

Theis Equation Calculations

Groundwater production data from the permit applications were used along with the drawdown-pumping ratios contained in Table 4 to develop three estimates of drawdown for each well:

- Scenario 1: drawdown in the production well after 36-hours of pumping at three times the average annual pumping rate
- Scenario 2: drawdown in a well ½ mile from the production well after 36 hours of pumping at three times the annual pumping rate

- Scenario 3: drawdown in a well ½ mile from the production well after one year at the average pumping rate.

Results of these calculations are presented in Table 5.

Table 5. Theis Results for Prairie View No. 4 Well

Production Summary	Value
Annual Permit Production Limit (gallons)	133,000,000
Annual Permit Production Limit (acre-feet)	408
Average Pumping Rate (gpm)	253
3X Average Pumping Rate (gpm)	759
Permit Capacity (gpm)	250

	Evangeline	
Drawdown Calculations	Drawdown-Pumping Ratios	Calculated Drawdown (ft)
Production Well - 36 hours (3X avg pumping)	0.24056	182.62
1/2 mile from Production Well - 36 hours (3X avg pumping)	0.01689	12.82
1/2 mile from Production Well - one year (avg pumping)	0.08695	22.00

These data represent the best integrated data of the area from a regional perspective. The local-scale data will be developed as part of the Phase II investigation. This will include more site-specific information and data on aquifer depth, clay content, and aquifer parameters calculated from the 36-hour pumping test.

Recommendation

Based on the results of the Phase I-a report, the application should be approved, and the Phase II investigation should proceed to verify the Phase I-a estimates related to the aquifer (e.g. depth to bottom of Chicot Aquifer and clay content) and related to aquifer performance (e.g. drawdown at the end of the 36-hour pumping test and aquifer transmissivity).

I appreciate the opportunity to work with you on this effort. Please call me at 512-745-0599 or email me at billhutch@texasgw.com if you have any questions.

Sincerely,

William R. Hutchison, Ph.D., P.E., P.G.