ENGINEERING THE FUTURE
SINCE 1936

WALLER COUNTY
MUNICIPAL UTILITY DISTRICT NO. 46

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT
WELL PERMIT APPLICATION PACKAGE

EHRA ENGINEERING
NOVEMBER 2024

EHRA Job No. 231-088-11

TBPE No. F-726
TBPLS No. 10092300

November 7, 2024

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: Century Land Holdings of Texas, LLC
Water Supply and Storage Facility
BGCD Well ID No. – None Assigned
Waller County, Texas
EHRA Project No. 231-088-11

Dear Mr. Holland:

Century Land Holdings of Texas, LLC (Owner) proposes to operate Waller County Municipal Utility District No. 46 Water Supply and Storage Facility (District). The facility will be located approximately 0.76 miles Northeast of the intersection of Farm-to-market Rd 529 and Farm-to-market Rd 362 in Waller County, TX within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The District is approximately 318-acres and will ultimately serve 1200 equivalent single-family connections (ESFC). The District is a single-family residential development.

EHRA, Engineer for the Century Land Holdings of Texas,LLC, has contacted neighboring utility districts including Brookshire Municipal Water District, and Waller County MUD 1 to determine the feasibility of obtaining primary water service. The neighboring developments are unable to provide sufficient capacity for the primary water service, at this time. The Owner will also design and submit construction plans for an additional well to provide a second source of drinking water once the development nears 250 ESFC under a separate cover.

The proposed Water Supply and Storage Facility has been designed in accordance with TAC 30 Chapter 290 – Rules and Regulations for Public Water Systems. The facility will be constructed in two (2) phases. Phase One will consist of:

- One (1) 900 gpm vertical turbine water well;
- Three (3) 400 gpm booster pumps (2- Duty, 1-Back-Up)
- One (1) 15,000-gallon welded steel hydro-pneumatic tank;
- One (1) 150,000-gallon bolted ground storage tank;
- One (1) control building to house the chlorine storage, metering equipment and the motor control center; and

- One (1) 600KW diesel generator for emergency stand-by power.

Phase Two construction will include:

- One (1) 900 gpm vertical turbine water well;
- Two (2) 15,000-gallon hydropneumatic tanks; and
- One (1) 400 gpm booster pump
- One (1) 150,000-gallon bolted ground storage tank;

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.
- Pressure maintenance facilities (booster pumps and hydro-pneumatic tanks) are designed to meet the maximum hourly demand.
- The disinfection system will be gas chlorination.
- The ground storage tanks are designed to operate under normal and emergency conditions.
- CenterPoint 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 is 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;
- Attachment 2: Well Operating Permit Application;
- Attachment 3: Plat for the Proposed Water Plant;
- 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 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 groundwater well. Should you require any additional information, please do not hesitate to contact myself or Paul Anderson, P.E. at 713-784-4500 or by email at or esanchez@ehra.team or panderson@ehra.team respectively.

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

Sincerely,

Edgar Sanchez, E.I.T
Engineer III
Water and Wastewater Facilities

ES
Attachments

cc: Century Land Holdings of Texas, LLC
c/o Allen Boone Humphries Robinson, LLP
TCEQ Region 12 – Houston
Cam Jackson, P.E. – Firm
Jonathan Pena, P.E. – Firm
Paul Anderson, P.E.- 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 Century Land Holdings of Texas, LLC Phone 281-303-6149

Address 333 Cypress Run, Suite 200 Houston, Tx 77094

Fax: _____ Email: Carlos.Vieira@centurycommunities.com

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 29°52'42.60" **Longitude** 95°56'53.93"

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

Hydraulic Fracturing: _____ Transport Outside of District: _____

Proposed depth: 910 ft. Aquifer Evangeline Date drilling is scheduled to begin May 2025

Proposed casing size: 20 in. Proposed casing depth: 620 ft. Pump depth: 480 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 11.2 # of Stages: TBD Pump Column: Inside Diameter: 8 in. Length: 480 ft.

Pump discharge pipe: Size 8 in. Rated pump horsepower: 125 **Pump Discharge**: 900 gpm

Water bearing formation: Lissie Formation

Estimated Annual Water Production: _____ Acre-Feet or 120,000,000 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 1200 single family home connections in the proposed Mirabella Development in Waller County, Texas. Water will be treated with chlorine gas at the water plant 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: 11/7/2024

Printed Name: Edgar Sanchez, E.I.T Title: Engineer III

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 Century Land Holdings of Texas, LLC Phone 281-303-6149

Address 333 Cypress Run, Suite 200 Houston, Tx 77094

Fax: _____ Email: Carlos.Vieira@centurycommunities.com

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 29°52'42.44" Longitude 95°56'53.99"

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: 120,000,000 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 1200 single family home connections in the proposed Mirabella Development in Waller County, Texas. Water will be treated with chlorine gas at the water plant 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: 11/7/2024

Printed Name: Edgar Sanchez E.I.T Title: Engineer III

Attachment 3 – Plat for the Proposed Water Plant

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

I, Debbie Hollan, Clerk of the County Court of Waller County, Texas, do hereby certify that the within instrument with the certificate of authentication was filed for registration in my office on the _____ day of _____, 20_, A.D. at ____ o'clock ____.M., in File No. _____ of the Official Public Records of Waller County for said county.

Witness my hand and seal of office, at Hempstead, the day and date last above written.

_____
Debbie Hollan
Clerk of the County Court
Waller County, Texas

By:_____
Deputy

This is to certify that I, A. Munroe Kelsay, a Registered Professional Land Surveyor of the State of Texas, have platted the above subdivision from an actual survey on the ground; and that all block corners, lot corners and permanent referenced monuments have been set, that permanent control points will be set at completion of construction and that this plat correctly represents that survey made by me.

No Portion of this subdivision lies within the boundaries of any municipality's corporate city limits, or area of extra territorial jurisdiction.

No Portion of this subdivision lies within the boundaries of the 1% annual chance (100 year) floodplain as delineated on Waller County Community Panel No. 48473C0275E, dated February 18, 2009.

No Portion of this subdivision lies within the boundaries of the 0.2% annual chance (500 year) floodplain as delineated on Waller County Community Panel No. 48473C0275E, dated February 18, 2009.

_____
A. Munroe Kelsay,
Registered Professional Land Surveyor
Texas Registration No. 5580
amkelsay@ehra.team

STATE OF TEXAS

COUNTY OF _____

BEFORE ME, the undersigned authority, on this day personally appeared A. Munroe Kelsay, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and considerations therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this _ day of _____, _____.

_____
Notary Public in and for the State of Texas

My Commission expires: _____

APPROVED by Commissioners Court of Waller County, Texas, this ___ day of _____, 20__ A.D.

_____
Carbett "Trey" J. Duhon III
County Judge

_____
John A. Amsler
Commissioner, Precinct 1

_____
Walter E. Smith, P.E., R.P.L.S.
Commissioner, Precinct 2

_____
Kendric D. Jones
Commissioner, Precinct 3

_____
Justin Beckendorff
Commissioner, Precinct 4

NOTE: Acceptance of the above plat by the Commissioners Court does not signify Waller county acceptance of the dedicated roads for integration into the County Road System. The developer is required to comply with Sections 5 and 6 of the then current Waller County Subdivision and Development Regulations, in this regard.

I, J. Ross McCall, P.E., County Engineer of Waller County, Texas, certify that the plat of this subdivision complies with all existing rules and regulations of Waller County.

No construction or other development within this subdivision may begin until all Waller County permit requirements have been met.

_____
Date

_____
J. Ross McCall, P.E.,
County Engineer

STATE OF TEXAS

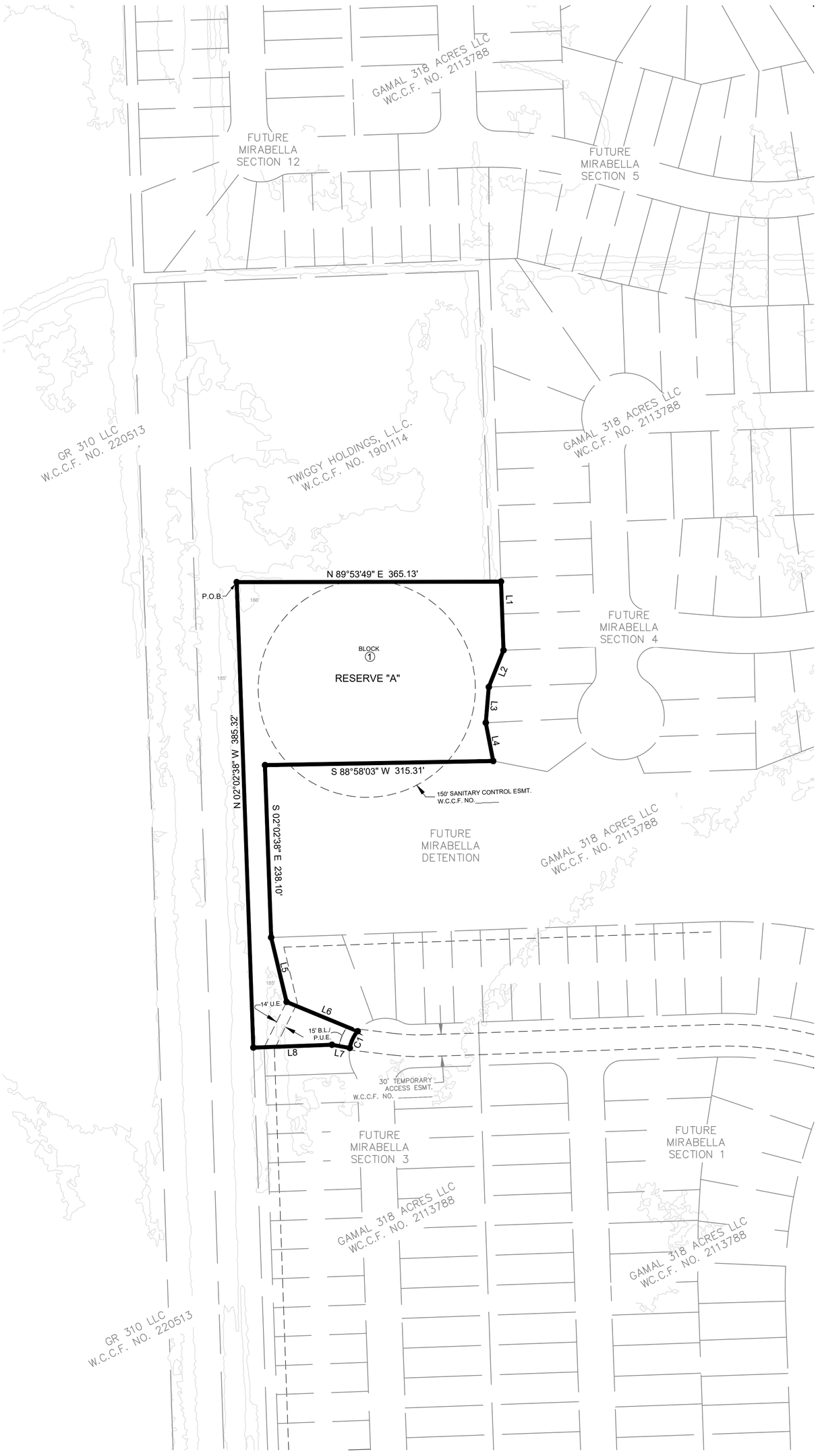
COUNTY OF _____

BEFORE ME, the undersigned authority, on this day personally appeared _____ (name), _____ (title) of Gamal 318 Acres LLC, a Texas limited liability company, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that they executed it for the purposes and considerations set forth.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this __ day of _____, _____.

_____
Notary Public in and for the State of Texas

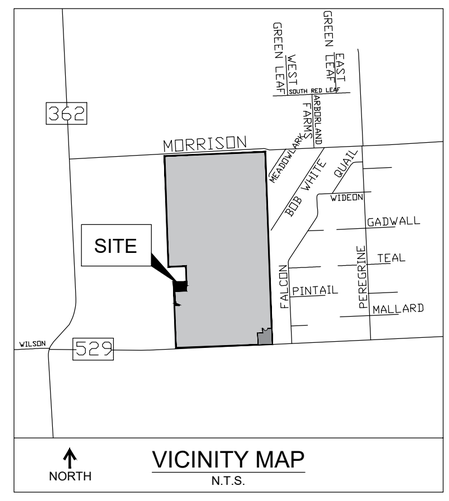
My Commission expires: _____



GENERAL NOTES:

1. Bearing orientation is based on the Texas State Plane Coordinate System of 1983, South Central Zone as determined by GPS measurements.
2. The Coordinates shown hereon are Texas South Central Zone No. 4204 state plane grid coordinates (NAD 83) and may be brought to surface by applying the following scale factor: 0.99990836.
3. According to the Federal Emergency Management Agency Flood Insurance Rate Map, Waller County, Texas, Community Panel No. 48473C0275E, dated February 18, 2009, the property lies within Unshaded Zone X.

   This flood statement does not imply that the property or structures thereon will be free from flooding or flood damage. On rare occasions floods can and will occur and flood heights may be increased by man-made or natural causes. The location of the flood zone was determined by scaling from said FEMA map. The actual location, as determined by elevation contours, may differ. Edminster, Hinshaw, Russ & Associates, Inc. d/b/a EHRA, assumes no liability as to the accuracy of the location of the flood zone limits. This flood statement shall not create liability on the part of Edminster, Hinshaw, Russ & Associates, Inc. d/b/a EHRA.
4. B.L. indicates Building Line.
   D.E. indicates Drainage Easement.
   M.H. indicates Manhole.
   NO. indicates number.
   PG. indicates Page.
   P.A.E. indicates Permanent Access Easement.
   P.O.B. indicates Point of Beginning.
   P.U.E. indicates Public Utility Easement.
   PVT. indicates Private.
   R indicates Radius.
   R.O.W. indicates Right-Of-Way.
   S.S.E. indicates Sanitary Sewer Easement.
   STM.S.E. indicates Storm Sewer Easement.
   U.E. indicates Utility Easement.
   VOL. indicates Volume.
   W.C.C.F. indicates Waller County Clerk's File.
   W.C.D.R. indicates Waller County Deed Records.
   W.L.E indicates Water Line Easement.
   ⌇ indicates change in street name.
5. The property subdivided in the foregoing plat lies in Waller County, Royal Independent School District, and Brookshire-Katy Drainage District.
6. A subdivision variance has been approved to allow a minimum lot width of 40 feet and compensating open space shall be provided for all lots smaller than 5,000 square feet by Waller County Commissioners Court on March 20, 2024.
7. A subdivision variance has been approved to allow cul-de-sacs to have a right-of-way radius of 60 feet and a pavement radius of 50 feet by Waller County Commissioners Court on March 20, 2024.
8. A subdivision variance has been approved to allow a minimum right-of-way width of a local street from 60 feet to 50 feet by Waller County Commissioners Court on March 20, 2024.
9. A subdivision variance has been approved to allow a minimum centerline radius for a local street of 300 feet with a minimum tangent of 50 feet between reverse curves by Waller County Commissioners Court on March 20, 2024.
10. A subdivision variance has been approved to allow a minimum right-of-way width of a collector street from 80 feet to 60 feet by Waller County Commissioners Court on March 20, 2024.
11. A subdivision variance has been approved to allow a minimum centerline radius for a collector street of 650 feet with a minimum tangent of 150 feet between reverse curves by Waller County Commissioners Court on March 20, 2024.
12. Preliminary, this document shall not be recorded for any purpose and shall not be used or viewed or relied upon as a final survey document.
12. No pipeline or pipeline easement exist within the boundaries of this plat.
13. The proposed land use for Waller County Municipal Utility District No. 46 Water Plant No. 1 shall consist of a water plant.



STATE OF TEXAS

COUNTY OF WALLER

We, Gamal 318 Acres, LLC, a Texas limited liability company owner (or owners) of the property subdivided in the above map of Waller County Municipal Utility District No. 46 Water Plant No. 1 make subdivision of the property, according to the lines, streets, lots, alleys, parks, building lines and easement as shown, and dedicate to the public, the streets, alleys, parks and easements shown, forever, and waive all claims for damages occasioned by the establishment of grades, as approved for the streets and drainage easements indicated, or occasioned by the alteration of the surface, or any portion of the streets or drainage easements to conform to the grades, and bind ourselves, our heirs, successors and assigns, to warrant and defend the title to the land so dedicated.

FURTHER, Owners have dedicated and by these presents do dedicate to the use of the public for public utility purpose forever unobstructed aerial easements. The aerial easements shall extend horizontally an additional eleven feet, six inches (11' 6") for ten feet (10' 0") perimeter ground easements or seven feet, six inches (7' 6") for fourteen feet (14' 0") perimeter ground easements or five feet, six inches (5' 6") for sixteen feet (16' 0") perimeter ground easements, from a plane sixteen feet (16' 0") above the ground level upward, located adjacent to and adjoining said public utility easements that are designated with aerial easements (U.E. and A.E.) as indicated and depicted hereon, whereby the aerial easement totals twenty one feet, six inches (21' 6") in width.

FURTHER, Owners have dedicated and by these presents do dedicate to the use of the public for public utility purpose forever unobstructed aerial easements. The aerial easements shall extend horizontally an additional ten feet (10' 0") for ten feet (10' 0") back-to-back ground easements, or eight feet (8' 0") for fourteen feet (14' 0") back-to-back ground easements or seven feet (7' 0") for sixteen feet (16' 0") back-to-back ground easements, from a plane sixteen feet (16' 0") above ground level upward, located adjacent to both sides and adjoining said public utility easements that are designated with aerial easements (U.E. and A.E.) as indicated and depicted hereon, whereby the aerial easement totals thirty feet (30' 0") in width.

FURTHER, all of the property subdivided in the above and foregoing plat shall be restricted in its use, which restrictions shall run with the title to the property and shall be enforceable at the option of Waller County, by Waller County, or any citizen thereof, by injunction as follows:

1. That drainage of septic tanks into roads, streets, alleys, or public ditches, streams, etc., either directly or indirectly is strictly prohibited.

2. All stock animals, horses, and fowl shall be fenced in and not allowed to run at large in the subdivision.

3. Drainage structures under private drives shall have a net drainage opening area of sufficient size to permit the free flow of water without backwater and shall be a minimum of one and one quarters (1-1/4) square feet (15" diameter pipe) reinforced concrete pipe, unless specified by the County Road Administrator, or County Engineer. Culverts and bridges must be used for all driveways and/or walks, although dipstyle driveways are encouraged where appropriate.

4. Property owners will obtain Development Permits/Permit Exemptions form the County Floodplain Administrator for all development.

5. The property subdivided herein is further restricted in its use as specified in the subdivision restrictions as filed separately for record at Page _____ Volume _____ of the Deed Records of Waller County, Texas. A copy of said restrictions will be furnished by the aforesaid Gamal 318 Acres, LLC, a Texas limited liability company, to the purchaser of each and every lot in the subdivision prior to culmination of each sale.

6. There are no underground pipelines within the confines of this subdivision except as shown on the above plat.

7. There shall be no sanitary sewer system or any water well constructed within 50 feet of any lot line that does not adjoin a public road.

WITNESS our hand in Waller County, Texas, this _____, day of _____, 2024.

OWNER
Gamal 318 Acres LLC,
a Texas limited liability company

BY: _____
_____ (name), _____ (title)
Gamal 318 Acres,LLC

Brookshire-Katy Drainage District Permit No. _____

Approved by the Board of Supervisors on _____
Date

_____
President

_____
Secretary

_____
District Engineer

The above have signed these plans and/or plat based on the recommendation of the District's Engineer who has reviewed all sheets provided and found them to be in general compliance with the district's "rules, regulations, and guidelines". This approval is only valid for three hundred sixty-five (365) calendar days. After that time re-approval is required. Please note, this does not necessarily mean that all the calculations provided in these plans and/or plats have been completely checked and verified. Plans submitted have been prepared, signed and sealed by a professional engineer licensed to practice engineering in the State of Texas and plat has been signed and sealed by a registered professional land surveyor licensed to practice in the State of Texas, which conveys the engineer's and/or surveyor's responsibility and accountability.

OWNER
GAMAL 318 ACRES LLC
2909 ROGERDALE RD #421249
HOUSTON, TX 77242
832-290-6932
PLATTING@EHRA.TEAM

DEVELOPER
CENTURY LAND HOLDINGS OF TEXAS, LLC
333 CYPRESS RUN, SUITE 200
HOUSTON, TX 77094
713-222-7000
PLATTING@EHRA.TEAM

LINE TABLE

LINE	BEARING	DISTANCE
L1	S 02°02'38" E	94.81'
L2	S 21°45'30" W	54.65'
L3	S 04°53'13" W	49.53'
L4	S 10°59'53" E	53.83'
L5	S 13°31'03" E	91.53'
L6	S 67°35'51" E	106.09'
L7	N 79°46'08" W	25.00'
L8	S 87°57'22" W	108.71'

CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1	50.00'	25.86'	S 25d02'44" W	25.57'

LAND USE ACREAGES

WATER PLANT	2.43

RESERVE TABLE

RESERVE	RESTRICTIONS	SQ. FT.	ACREAGE
A	WATER PLANT	105,729.94	2.43

PRELIMINARY PLAT OF WALLER COUNTY MUNICIPAL UTILITY DISTRICT NO. 46 WATER PLANT NO. 1

BEING A SUBDIVISION OF
2.43 ACRES OUT OF THE
H. & T.C.R.R. CO. SURVEY
SECTION 51
ABSTRACT NO. 143
WALLER COUNTY, TEXAS.

1 BLOCK 1 RESERVE

JULY 2024

0' 50' 100' 200'
SCALE: 1"=100'

NORTH

ENGINEER/PLANNER/SURVEYOR

EHRA
ENGINEERING THE FUTURE SINCE 1936
10011 MEADOWGLEN LN
HOUSTON, TEXAS 77042
713-784-4500
PLATTING@EHRA.TEAM
WWW.EHRA.TEAM
TBPE No. F-726
TBPLS No. 10092300

EHRA JOB NO.
231-088-11

P:\231-088-11\Plat\PPLAT\WCMUD No 46 WP No.1_PPlat 20240626.dwg Jun 26, 2024 - 9:46am Edited by: awaggoner

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

November 7, 2024

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: Century Land Holdings of Texas, LLC
WC MUD No. 46 Water Supply and Storage Facility
Projected Effect of the Proposed Withdrawal
BGCD Well ID No.- None Assigned
Waller County, Texas
EHRA Project No. 231-088-11

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 Phase 1 Hydrogeologic Report. EHRA, the Engineer for the Century Land Holdings of Texas, LLC (Owner), wishes to engage the Bluebonnet Groundwater Conservation District (BGCD) to prepare this report for the operation of Waller County Municipal Utility District No. 46 (WC MUD No. 46) water well which is anticipated to produce 900 gallons per minute. The Mirabella development is approximately 318-acres and will ultimately serve 1200 equivalent single-family connections (ESFC).

The purpose of this proposed water well is to serve the Mirabella development in Waller County. This proposed well is anticipated to have a depth of 910 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 or livestock use. By constructing this well, we expect it to serve as the primary water well for the Mirabella subdivision. Additionally, the average depth of the nearby wells is 350 feet, which is significantly lower than the proposed depth for WC MUD No. 46 water well. 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 WC MUD 46 water well would be constructed 0.1 miles from the nearest other existing water well, owned by Crown Sandblasting and Painting LLC.

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

Sincerely,

Edgar Sanchez, E.I.T
Engineer III
Water and Wastewater Facilities

ES
Attachments

cc: Century Land Holdings of Texas, LLC
c/o Allen Boone Humphries Robinson, LLP
TCEQ Region 12 – Houston
Cam Jackson, P.E. – Firm
Jonathan Pena, P.E. – Firm
Paul Anderson, P.E.- 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

November 7, 2024

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: Century Land Holdings of Texas, LLC
WC MUD No.46 Water Supply and Storage Facility
Management Plan Compliance
BGCD Well ID No. – None Assigned
Waller County, Texas
EHRA Project No. 231-088-11

Dear Mr. Holland:

Waller County Municipal Utility District No. 46 (District) will be located in Waller County within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The District will be approximately 318-acres and will ultimately serve 1200 equivalent single-family connections (ESFC). The District is a single-family residential development.

EHRA, Engineer for Century Land Holdings of Texas, LLC (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 Paul Anderson P.E. at 713-784-4500 or by email at esanchez@ehra.team or panderson@ehra.team, respectively.

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

Sincerely,

Edgar Sanchez, E.I.T
Engineer III
Water and Wastewater Facilities

ES
Attachments

cc: Century Land Holdings of Texas, LLC
c/o Allen Boone Humphries Robinson, LLP
TCEQ Region 12 – Houston
Cam Jackson, P.E. – Firm
Jonathan Pena, P.E. – Firm
Paul Anderson, P.E.- 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)

TBPE No. F-726
TBPLS No. 10092300

November 7, 2024

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: Century Land Holdings of Texas, LLC
WC MUD No. 46 Water Supply and Storage Facility
Well Closure Plan Compliance
BGCD Well ID No. – None Assigned
Waller County, Texas
EHRA Project No. 231-088-11

Dear Mr. Holland:

Waller County Municipal Utility District No. 46 (District) will be located in Waller County within boundaries of the Bluebonnet Groundwater Conservation District (BGCD). The District will be approximately 318-acres and will ultimately serve 1200 equivalent single-family connections (ESFC). The District will be a single-family residential development.

The proposed Water Supply and Storage Facility has been designed in accordance with TAC 30 Chapter 290 – Rules and Regulations for Public Water Systems. The facility will be constructed in two (2) phases. Phase One will consist of:

- One (1) 900 gpm vertical turbine water well;
- Three (3) 400 gpm booster pumps (2- Duty, 1-Back-Up)
- One (1) 15,000 gallon welded steel hydro-pneumatic tank;
- One (1) 150,000 gallon bolted ground storage tank;
- One (1) control building to house the chlorine storage, metering equipment and the motor control center; and
- One (1) 600KW diesel generator for emergency stand-by power.

Phase Two construction will include:

- One (1) 900 gpm vertical turbine water well;
- Two (2) 15,000 gallon hydropneumatic tanks; and
- One (1) 400 gpm booster pump
- One (1) 150,000 gallon bolted ground storage tank;

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 Century Land Holdings of Texas, LLC;
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 Century Land Holdings of Texas, LLC (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 Paul Anderson, P.E. at 713-784-4500 or by email at esanchez@ehra.team or panderson@ehra.team, respectively.

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

Sincerely,

Edgar Sanchez, E.I.T.
Engineer III
Water and Wastewater Facilities

ES
Attachments

cc: Century Land Holdings of Texas, LLC
c/o Allen Boone Humphries Robinson, LLP
TCEQ Region 12 – Houston
Cam Jackson, P.E. – Firm
Jonathan Pena, P.E. – Firm
Paul Anderson, P.E. - 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. Layne, Houston, Texas
c. Weisinger, Inc., Willis, 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	1,150 feet
b.	Steel surface casing 20-inch diameter	620 feet
c.	Steel blank production casing 14-inch diameter	250 feet
d.	Stainless steel screen 14-inch diameter	120 feet
e.	Diameter of under reaming	24 inches
f.	Production	900 GPM
g.	Specific capacity	9 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) - 540 GPM	3 Hours
Recovery		3 Hours
Flowing	(80% capacity) - 720 GPM	3 Hours
Recovery		3 Hours
Flowing	(100% capacity) - 900 GPM	3 Hours
Recovery		3 Hours
Flowing	(120% capacity) - 1080 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) - 900 GPM	36 Hours
Recovery		8 Hours

WELL GUARANTEES

A. Production:

The Contractor shall attempt to reach a specific capacity of 9-gpm per foot of drawdown at a pumping rate of 900 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

[This Page is Intentionally Blank]

Exhibit 1 – Well Construction Diagram

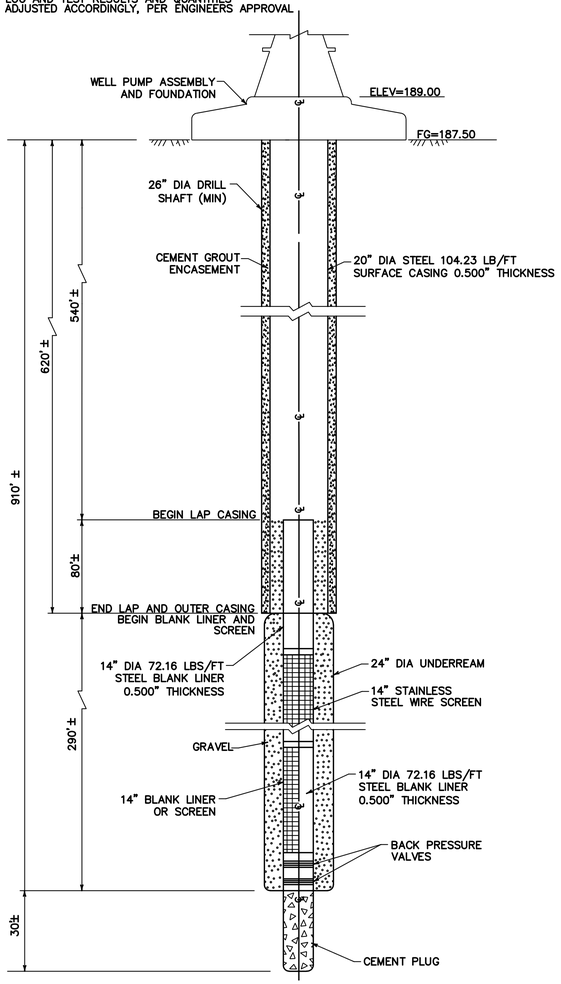
(Corresponds to Rules of the Bluebonnet GCD 1.0, Rule 8.5.A, item 1.g.2., Page 25 of 76)

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.

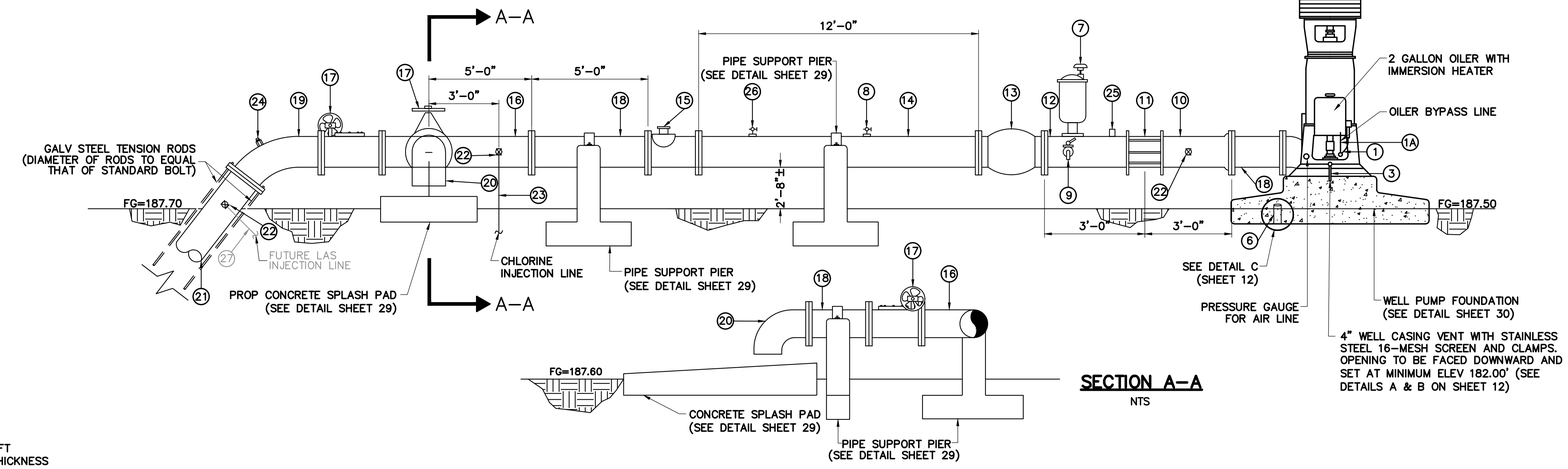
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES, IN THE VICINITY OF THE PROJECT, PRIOR TO BEGINNING CONSTRUCTION.

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



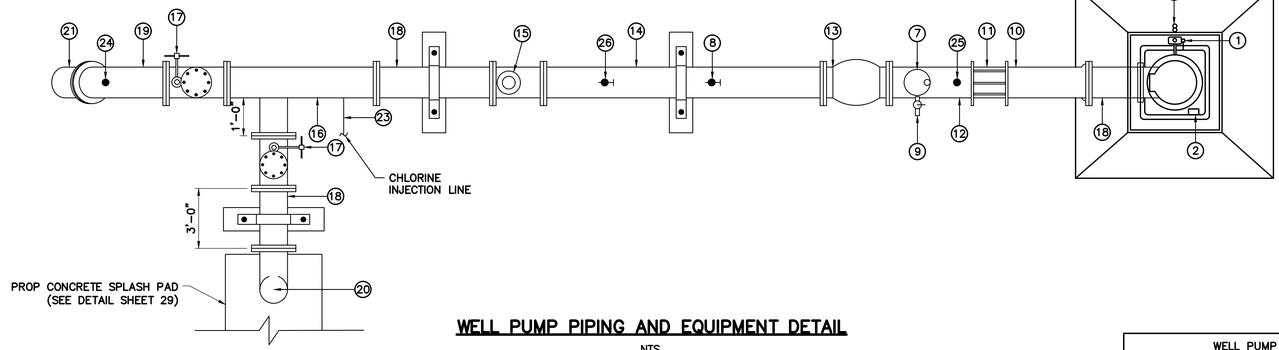
WELL CROSS-SECTION

NTS



SECTION A–A

NTS



WELL PUMP PIPING AND EQUIPMENT DETAIL

NTS

PIPE, VALVE, AND FITTING SCHEDULE					
ITEM	SIZE	DESCRIPTION	ITEM	SIZE	DESCRIPTION
①	¾"	SOFT COPPER OIL LINE	⑭	12"	WELDED STEEL PIPING WITH FLANGED ENDS, ¾" THREAD–O–LET FOR NEEDLE VALVE, 1" THREAD–O–LET FOR CORPORATION STOP
①A	¾"	SOFT COPPER OIL BYPASS LINE	⑮	12"	WATER FLOW METER (SPARLING TYPE 102 OR APPROVED EQUAL)
②	–	STANDING WATER LEVEL GAUGE WITH SNIFTER FITTING	⑯	12"	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	12"	GEAR OPERATED FE/FE GATE VALVE
④	–	NOT USED	⑱	12"	WELDED STEEL PIPING WITH FLANGED ENDS
⑤	–	NOT USED	⑲	12"	STEEL FE/FE 45° LONG RADIUS ELBOW
⑥	2"	P.V.C. COOLING WATER DRAINING PIPE	⑳	12"	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	12"	DUCTILE IRON FE/PE SPOOL
⑧	1" ½	BRONZE NEEDLE VALVE (WITH PRESSURE GAUGE) PER CITY OF HOUSTON STANDARD	㉒	1"	PVC "UNION" BALL VALVE
⑨	¾"	SAMPLE VALVE W/ THREADS REMOVED (CITY OF HOUSTON STANDARD)	㉓	1"	SCH 80 PVC PIPE (CHLORINE INJECTION)
⑩	12"	WELDED STEEL PIPING WITH FLANGED END, 1/2" THREAD–O–LET COOLING WATER CONNECTION	㉔	1– ½"	CORPORATION STOP
⑪	12"	FLEXIBLE COUPLING (DRESSER STYLE) WITH HARNESS	㉕	¾"	¾" THREAD–O–LET WITH PLUG W/ CITY OF HOUSTON STANDARD HIGH PRESSURE MERCOID SWITCH) (FUTURE)
⑫	12"	WELDED STEEL PIPING WITH FLANGED END AND ¾" THREAD–O–LET SAMPLE CONNECTION..LENGTH = 3' & 4' FLANGED OUTLET FOR AIR RELEASE VALVE ASSEMBLY	㉖	1– ½"	BRONZE CORPORATION STOP & 1– ½" CAP
⑬	12"	FE/FE SILENT CHECK VALVE	㉗	¾"	SCH. 80 PVC PIPE (LAS INJECTION) (FUTURE)

WELL PUMP SCHEDULE	
CAPACITY	900 GPM
TDH	420 FT
COLUMN LENGTH	480' SUCTION TUBE
STATIC WATER ELEVATION	175' (ANTICIPATED)
DRAWDOWN	140 FT
RPM	1,800
HORSEPOWER	125 HP
VOLTAGE, PHASE	460 VOLTS – 3 PHASE
MFG–MODEL	INTEGRITY VERTICAL TURBINE DEEP WELL PUMP MODEL 405T

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

W.C.M.U.D 46 WATER PLANT

EXHIBIT 1
WELL CONSTRUCTION DIAGRAM

Pump Data Sheet - Integrity Pump and Motor

Company:
Name:
Date: 05/29/2024

Pump:

Size:	11IDML (stages: 8)	Dimensions:	
Type:	Vertical	Suction:	8 in
Synch Speed:	1800 rpm	Discharge:	8 in
Dia:	8.52 in	Vertical Turbine:	
Curve:	---	Eye Area:	
Impeller:	ENCL	Bowl Size:	11.2 in
		Max Lateral:	2.25 in
		Thrust K Factor:	7.8 lb/ft

Search Criteria:

Flow:	900 US gpm	Near Miss:	---
Head:	420 ft	Static Head:	175 ft

Pump Selection Warnings:

None

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Pump Limits:

Temperature:	120 °F	Sphere Size:	0.68 in
Wkg Pressure:	700 psi g		

Motor:

Standard:	NEMA	Size:	125 hp
Enclosure:	WP1	Speed:	1800 rpm
Frame:	405T		
Sizing Criteria:	Max Power on Design Curve		

--- Duty Point ---

Flow:	900 US gpm
Head:	420 ft
Eff:	82%
Power:	116 hp
NPSHr:	12.5 ft
Speed:	1780 rpm

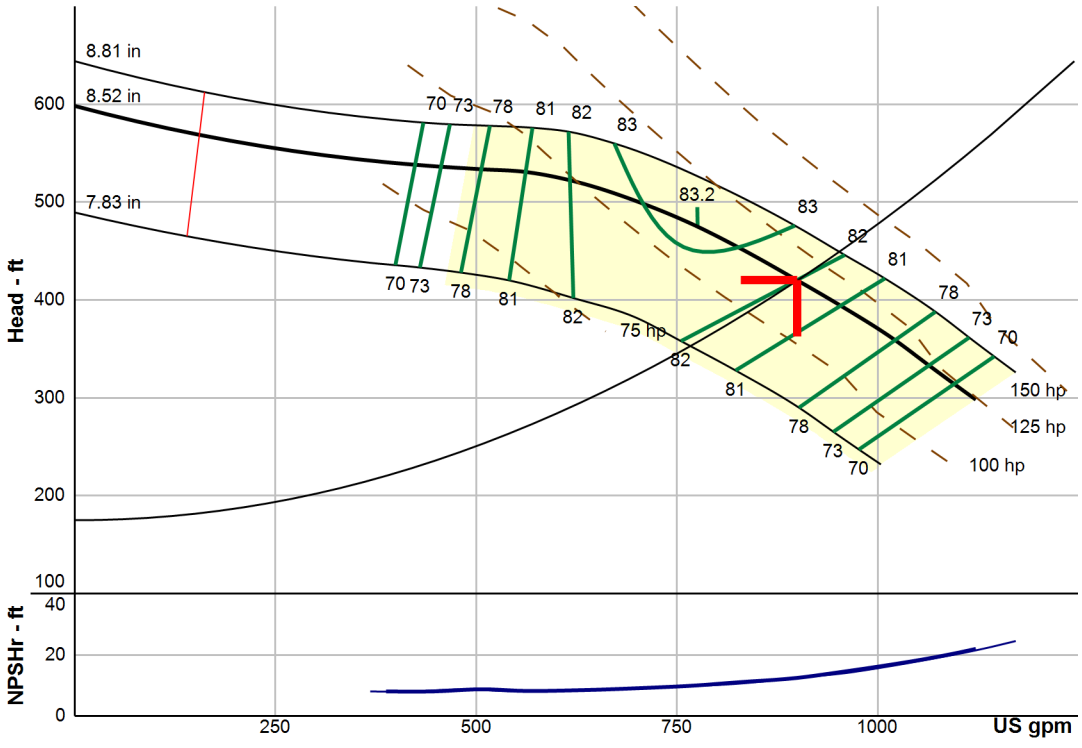
--- Design Curve ---

Shutoff Head:	598 ft
Shutoff dP:	259 psi
Min Flow:	155 US gpm

BEP: 83.2% @ 776 US gpm
NOL Power:
124 hp @ 1122 US gpm

--- Max Curve ---

Max Power:
142 hp @ 1172 US gpm

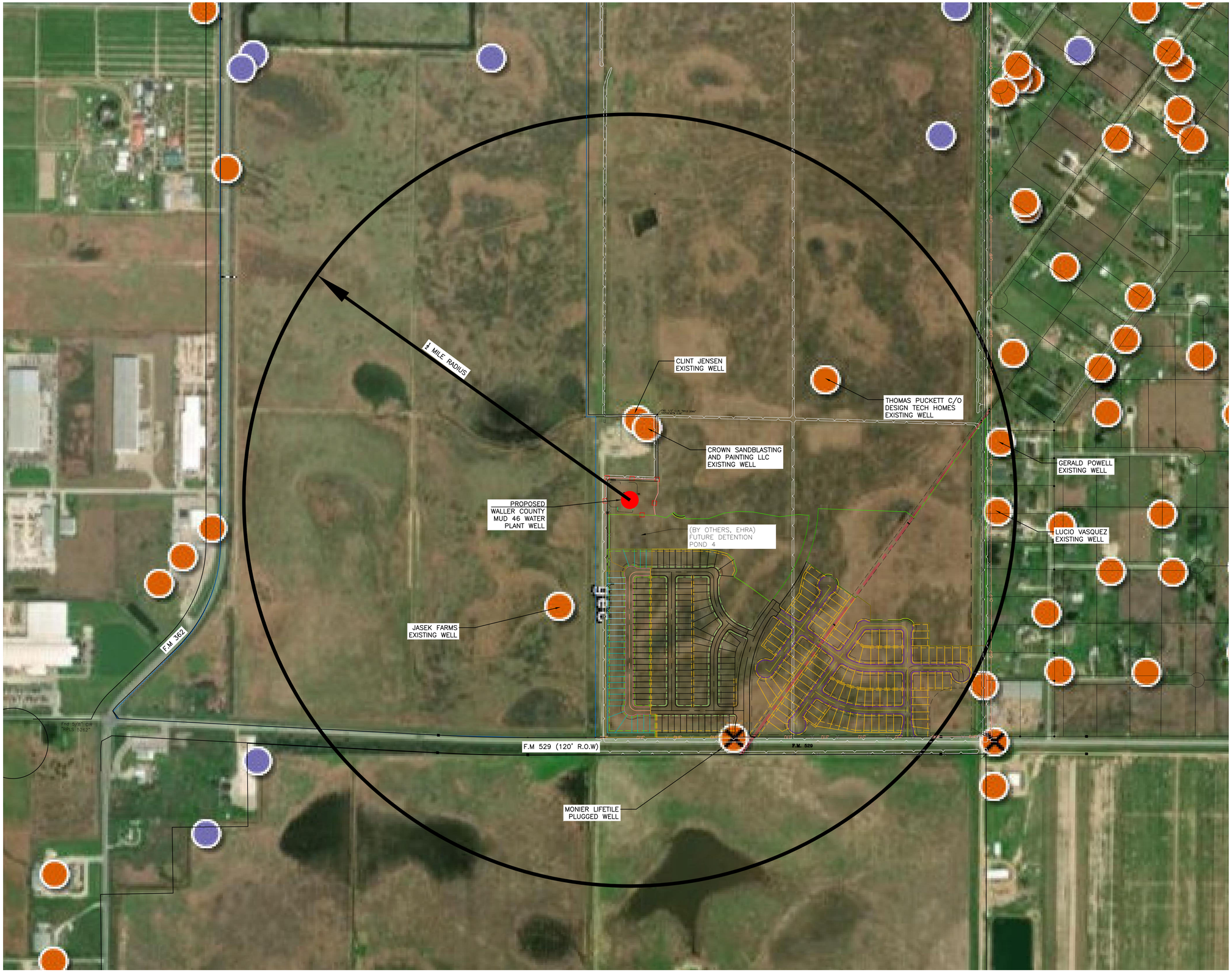


Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
1080	1780	323	71.5	123	19.7
900	1780	420	82	116	12.5
720	1780	494	83	108	9.32
540	1780	532	79.8	90.8	8.41
360	1780	545	64.7	76.5	8.05

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)



300 150 0 300

LEGEND:

- PROPOSED WATER WELL
- EXISTING WATER 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

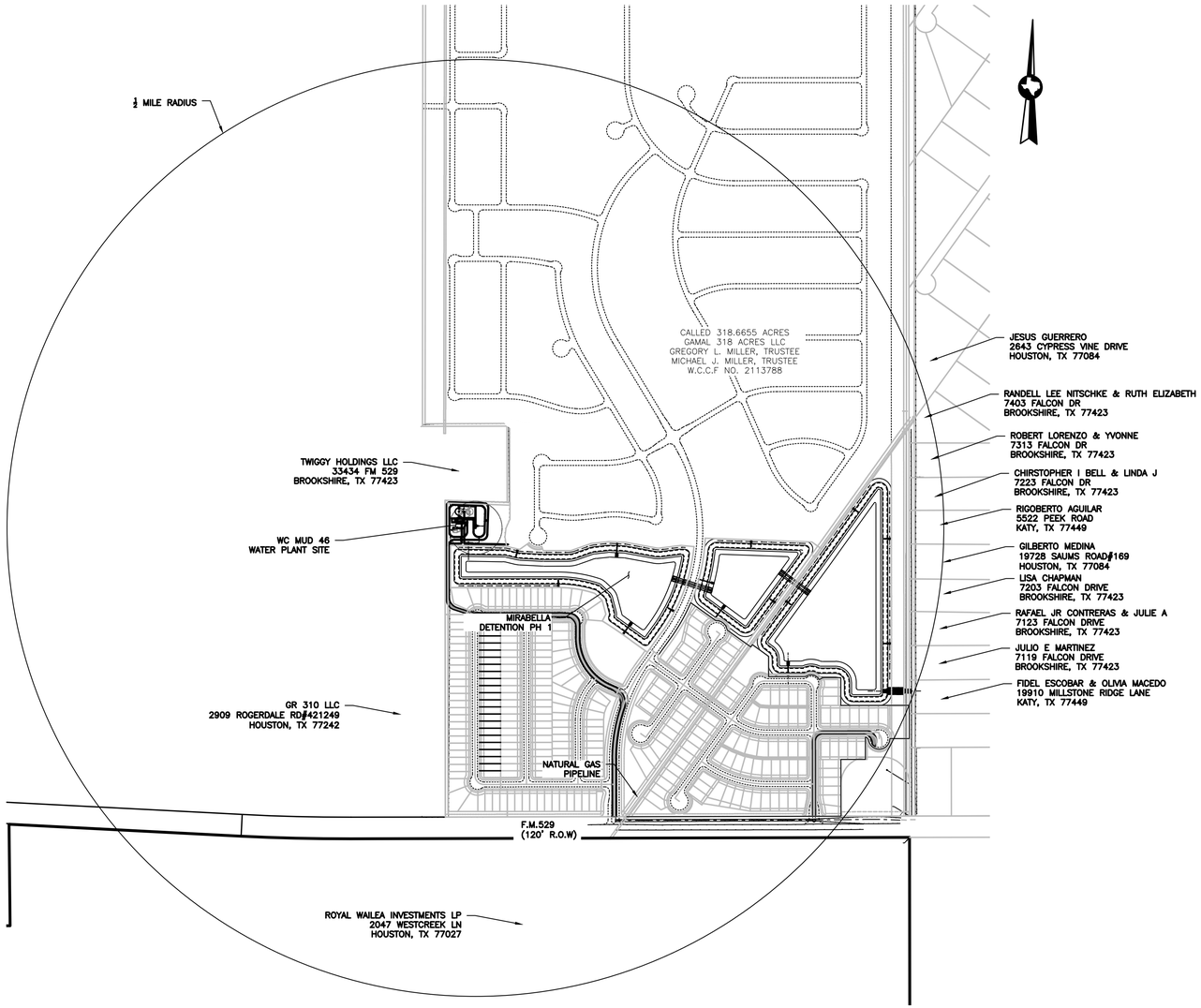
W.C.M.U.D 46 WATER PLANT

EXHIBIT 2
1/2 MILE RADIUS
WELL MAP

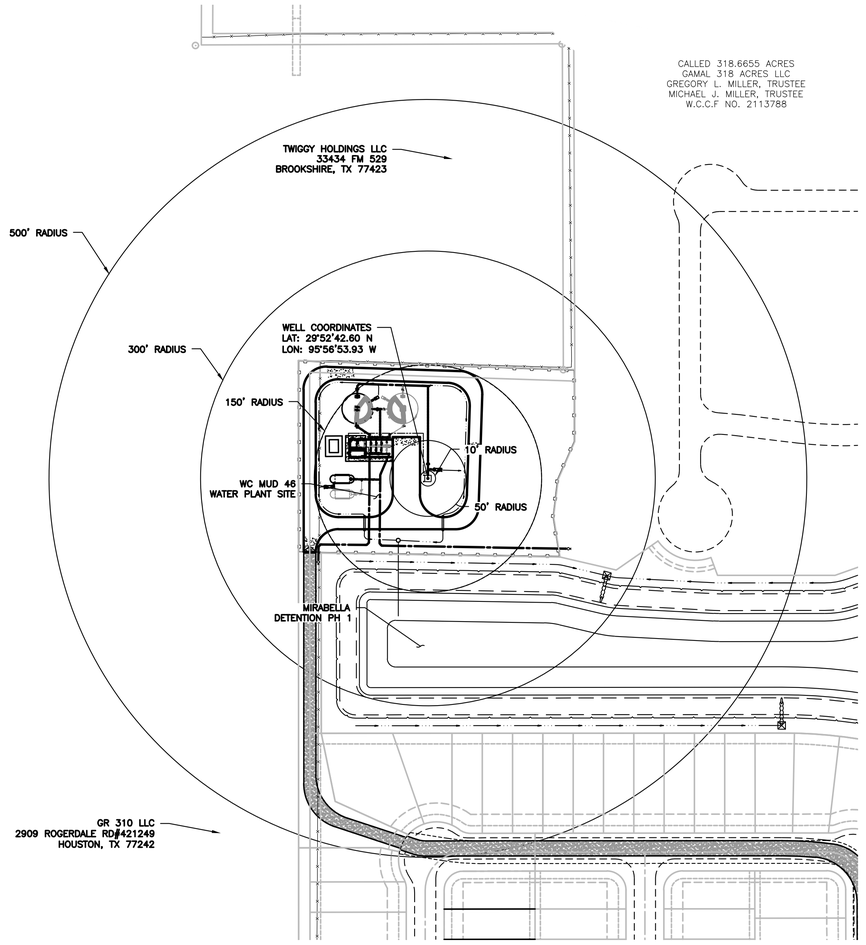
P:\231-088-11\Drawings\WC MUD No. 46 WSSF\Exhibits\BGCD Well Permit Exhibits\Exhibit 2- 0.5 mi rad map.dwg Aug 07, 2024-11:06am Edited by: ESanchez

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)



VICINITY MAP
SCALE: 1"=400'



WELL LOCATION
SCALE: 1"=100'

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

W.C.M.U.D. NO. 46

EXHIBIT 3
NEARBY PROPERTY OWNER MAP

P:\231-088-11\Drawings\WC MUD No. 46 WSSF\Exhibits\BGCD Well Permit Exhibits\Exhibit 3- Nearby Landowners.dwg Aug 07, 2024-11:15am Edited by: ESanchez

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

November 12, 2024

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

RE: Phase I-a Report: Waller County MUD No. 46

Dear Mr. Holland,

This letter represents the Phase I-a report for the Waller County Municipal Utility District No. 46 for Century Land Holdings of Texas LLC permit application that I received from Arantza Cabrera via email on November 8, 2024.

"Estimated Annual Water Production" is 120 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 47, column 77.

The applications noted well depths of 910 feet, which would place the bottom of the well within the Evangeline Aquifer (HAGM layer 2). Please note that the application noted that the "Water Bearing Formation" is the Lissie Formation, which is part of the overlying Chicot Aquifer. Based on the well depth, the water bearing formation will not be the Lissie Formation.

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 47, column 77 were copied and transposed into the spreadsheet *WCMUD 46 Phase I-a Tables.xlsx*. Results for the Evangeline Aquifer (layer 2) and the overlying Chicot Aquifer (layer 1) 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 WCMUD 46 Well

County Name	Waller	Waller
County Code	237	237
Outcrop Layer	1	1
Layer	1	2
Row	47	47
Column	77	77
x-coordinate (GAM-ft)	6203395	6203395
y-coordinate (GAM-ft)	19207034	19207034
Surface Elevation (ft MSL)	184	184
Cell Top Elevation (ft MSL)	184	1
Cell Bottom Elevation (ft MSL)	1	-1222
Cell Thickness (ft)	183	1223
Clay Thickness (ft)	89	738
Clay Thickness (% of Cell Thickness)	48.64	60.34

Table 2. HAGM Parameters for WCMUD 46 Well

County Name	Waller	Waller
County Code	237	237
Outcrop Layer	1	1
Layer	1	2
Row	47	47
Column	77	77
Hydraulic Conductivity (ft/day)	18.20	1.80
Transmissivity (gpd/ft)	24,918	16,466
Leakage (1/day)	1.20E-05	1.22E-05
Storativity (dimensionless)	1.00E-01	3.60E-04
Elastic Storativity (dimensionless)	4.50E-05	1.14E-04
Inelastic Storativity (dimensionless)	4.50E-03	1.14E-02

Table 3. HAGM Results for WCMUD 46 Well

County Name	Waller	Waller
County Code	237	237
Outcrop Layer	1	1
Layer	1	2
Row	47	47
Column	77	77
Groundwater Elevation in 2009 (ft MSL)	76	55
Groundwater Elevation in 2080 (ft MSL)	8	-48
DFC Drawdown (ft)	68	103
Artesian Head (ft)	-108	54
Subsidence in 2009 (ft)	0.96	0.96
Subsidence in 2080 (ft)	2.2	2.2
Subsidence from 2009 to 2080 (ft)	1.24	1.24
Cell Pumping in 2009 (AF/yr)	0	50.69
Cell Pumping in 2080 (AF/yr)	0	46.33

Table 4. Theis Parameters for WCMUD 46 Well

County Name	Waller
County Code	237
Outcrop Layer	1
Layer	2
Row	47
Column	77
Drawdown in Production Well at 100 gpm for 36 hours	12.69
Drawdown 1/2 mile from Production Well at 100 gpm for 36 hours	0.88
Drawdown 1/2 miles from Production Well at 100 gpm for 1 year	4.58
Drawdown-Pumping Ratio for Production Well for 36 hours	0.12685
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 36 hours	0.00883
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 1 yr	0.04579

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 WCMUD 46 Well

Production Summary	Value
Annual Permit Production Limit (gallons)	120,000,000
Annual Permit Production Limit (acre-feet)	368
Average Pumping Rate (gpm)	228
3X Average Pumping Rate (gpm)	685
Permit Capacity (gpm)	900

	Evangeline	
Drawdown Calculations	Drawdown-Pumping Ratios	Calculated Drawdown (ft)
Production Well - 36 hours (3X avg pumping)	0.12685	86.88
1/2 mile from Production Well - 36 hours (3X avg pumping)	0.00883	6.05
1/2 mile from Production Well - one year (avg pumping)	0.04579	10.45

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.