

Attachment E – Hydrogeologic Evaluation Report



THORNHILL GROUP, INC.

Professional Hydrogeologists • Water Resources Specialists

July 21, 2023

Mr. John Lutz
RH2O, LLC
3005 West Farm Road 979
Calvert, Texas 77837

Re: Aquifer Evaluation Report –
Drilling/Production Permit Applications for Five (5) New Simsboro Wells to be
Completed on the Red Hill Farms Property, Robertson County, Texas

Dear Mr. Lutz:

Per your request and in compliance with the rules of the Brazos Valley Groundwater Conservation District (BVGCD), Thornhill Group, Inc. (TGI) provides herein an evaluation of the projected effect of RH2O, LLC herein referenced as RH2O, completing five (5) new wells completed into the Simsboro Aquifer underlying the Red Hill Farms Property in Robertson County, Texas and producing an annual allocation of 8,130 acre-feet per year.

The subject Lutz property encompasses approximately 927 contiguous acres of land generally located about 2.6 miles north of the center of downtown Hearne, Texas. Red Hill Farms property extends from State Highway 6 (SH 6) at its eastern boundary. The western boundary of the subject property is about 1.3 miles east of Farm Road 1644 (FM 1644). The southern boundary of the property is as close as 0.75 mile from Farm Road 485 (FM 485) and the northern property line is within 1.25 miles of County Road 106 (CR 106). Red Hill Farms property is about 5.5 miles south-southeast of the City of Calvert. The Little Brazos River runs essentially north-south through the center portion of the subject farm.

TGI conducted its evaluations and prepared this report in compliance with the rules and guidelines provided by the BVGCD, specifically in Rule 8.4(b)(7)(B) for wells (and multiple wells) capable of producing 800 or more acre-feet per year. TGI's evaluations focused on assessing local aquifer conditions and parameters, and the extent to which production from the subject wells may influence other groundwater users in the BVGCD. TGI's evaluations are based on previous investigations conducted in the District, including permit applications and field-testing associated with several local landowners. Additionally, TGI relied upon reported data, published reports, the applicable groundwater availability model (GAM), and TGI's extensive experience with and knowledge of the Simsboro Aquifer in Central Texas, within

the BVGCD, and particularly in Robertson County. Specifically, TGI’s work was conducted to accomplish the following goals:

- ❖ Assessing the local hydrogeologic setting, focusing on the physical characteristics and hydraulic parameters of the local Simsboro Aquifer;
- ❖ Estimating and calculating the potential short-term and long-term drawdown at each of the wells, including interference drawdown between wells;
- ❖ Evaluating potential interference drawdown from other pumpage in the area and predicting long-term water levels in the proposed well-field area;
- ❖ Establishing a target maximum proposed pumping rate for each well and for the aggregated well field;
- ❖ Modeling to assess the feasibility of the targeted pumping rate and the potential impacts (e.g., artesian pressure reduction) to the aquifer and other nearby well owners (e.g., drawdown); and,
- ❖ Providing this Hydrogeological Evaluation Report in compliance with District rules.

For convenience, applicable illustrations and supporting documentation are included in the following attachments:

- Attachment 1 – Figures
- Attachment 2 – Tables
- Attachment 3 – Reference Materials
- Attachment 4 – Selected References

Proposed Pumping Locations and Permit Pumping Rates

Figure 1 illustrates the locations for the proposed Simsboro wells on the Red Hill Farms property. Proposed well identifications, coordinates, and estimated land-surface elevations in feet above mean sea level (MSL) as estimated from Google Earth are as follows:

<u>Well Identification</u>	<u>Longitude*</u>	<u>Latitude*</u>	<u>Est. Land Surface Elevation</u>
No. 1	96°37'18.21"W	30°54'40.84"N	330
No. 2	96°38'22.95"W	30°53'55.10"N	273
No. 3	96°38'46.50"W	30°53'38.11"N	274
No. 4	96°38'23.23"W	30°54'19.03"N	315
No. 5	96°37'43.58"W	30°54'33.43"N	345

*Coordinate system is NAD83 State Plane Texas Central (feet)

The proposed production capacities in gallons per minute (gpm) and requested permit allocations in acre-feet per year are as follows:

<u>Well Identification</u>	<u>Maximum Pumping Rate</u>	<u>Annual Permit Allocation</u>
No. 1	1,300 gpm	1,678 acre-feet
No. 2	1,700 gpm	2,194 acre-feet
No. 3	1,350 gpm	1,742 acre-feet
No. 4	1,150 gpm	1,484 acre-feet
No. 5	800 gpm	1,032 acre-feet
Total Annual Allocation		8,130 acre-feet

The radii attributed to the pumping rates for each of the wells lie within the Lutz property boundaries. The nearest known existing well completed into the Simsboro Aquifer is mapped by the BVGCD right on the Lutz property boundary and is more than 675 feet from the nearest proposed Simsboro well. The landowners will request in the permit application an internal waiver per BVGCD Rule 6.2 to allow for slight overlap between the radii of Well No. 2 and Well No. 3 (less than 400 feet) and between Well No. 2 and Well No. 4 (less than 600 feet). The proposed overlap of well radii will result in an additional 480 gpm of average combined pumping rate. As will be discussed later in this report, the slight overlap will have minimal effects on interference drawdown between the proposed Lutz wells and will not significantly change impacts on surrounding wells. With an approved waiver, the proposed well locations comply with the BVGCD rules regarding spacing between wells and allocation of acreage per well.

Hydrogeologic Conditions and Aquifer Characteristics

Surface Geologic Setting

Figure 2 illustrates that the entire Red Hill Farms property is underlain by downdip portions of the Carrizo-Wilcox Aquifer, a Major Aquifer delineated by the TWDB. Figure 3 shows that essentially the western half of the Lutz property lies atop the Brazos River Alluvium Aquifer, a Minor Aquifer in Texas. There are no other Major or Minor aquifers beneath the subject property.

Figure 4 is a Surface Geology Map reiterating that essentially the western half of the Lutz Farm property lies atop Brazos River alluvial and terrace deposits. The BEG infers the subcrop of the Carrizo Sands near the subject property (BEG, 1985). Apparently, the Carrizo subcrops the Brazos River alluvial and terrace deposits across much of the property. However, it is possible that the Reklaw occurs in the south-southeastern parts of the property and the

Calvert Bluff subcrops the alluvium in the northern parts of the farm. Regardless, the Reklaw and Carrizo formations, to the extent they occur, are relatively thin and shallow. Essentially, the entire local section of the Wilcox Group including, from younger to older, the Calvert Bluff, Simsboro, and Hooper formations occur beneath the subject property.

Due to the inherent nature of the floodplain and farming operations the topography across the western half of the Red Hill Farms property is relatively flat with land surface elevations ranging from 268 to 287 feet above mean sea level (MSL). Most of the western part of the property is around 275 feet above MSL. Immediately east of the Little Brazos River, a prominent rise in topography occurs with the elevation reaching as high as 361 feet AMSL. Most of the eastern half of the subject property is at an elevation of approximately 330 feet above MSL.

Geologic units dip generally from the north-northwest to the south-southeast and dip angles typically increase with depth in the geologic section. Locally, the dip along the base of the Wilcox Group is between 80 and 90 feet per mile (see Attachment 3). There are no faults mapped locally at land surface across the subject property. Based on available structural geology maps and GAM datasets estimates of the elevations and thicknesses of hydrostratigraphic layers beneath the Lutz property are summarized in the table below:

Layer	Elevation	Depth	Thickness
Land Surface	270 to 360 feet AMSL	Not Applicable	Not Applicable
Base of Alluvium	200 to 210 feet AMSL	60 to 70 feet BGL	60 to 70 feet
Base of Reklaw	165 to 195 feet AMSL	105 to 165 feet BGL	45 to 150 feet
Base of Carrizo	130 to 140 feet AMSL	140 to 230 feet BGL	30 to 65 feet
Base of Calvert Bluff	600 to 685 feet BMSL	870 to 1,045 feet BGL	745 to 820 feet
Base of Simsboro	1070 to 1165 feet BMSL	1,340 to 1,525 feet BGL	460 to 480 feet
Base of Hooper	1,555 to 1,660 feet BMSL	1,825 to 2,020 feet BGL	490 to 495 feet

[Aquifer Conditions and Hydraulic Parameters](#)

This report focuses on proposed permitted production from the Simsboro Aquifer. The top of the Simsboro Formation is estimated to be at depths of between 875 and 1,050 feet BGL based on GAM datasets and BEG mapping (BEG, 1985). Net sand thickness maps indicate productive sands of between 400 and 450 feet, with sands potentially as thick as 500 feet. As most of the Simsboro Formation is comprised of sand, it is likely that Simsboro wells on the Red Hill Farms property will be between 1,350 and 1,550 feet deep. Figure 5 illustrates locations for registered and permitted Simsboro wells within five (5) miles of the proposed Lutz wells. Attachment 4 provides available well records for selected nearby Simsboro wells. Figure 6 shows locations for registered and permitted Simsboro wells within one (1) mile of the proposed Lutz wells locations. Figure 6a and Figure 6b provide the locations for Simsboro

wells within one (1) mile of the proposed well locations on maps with a scale of 1"=1,000 feet per BVGCD Rules. One historic use Simsboro well now owned by Upwell/Brazos Valley Farms is located adjacent to the Lutz property line and there are three (3) additional Simsboro wells reportedly located within one (1) mile of the proposed Lutz wells.

TGI extracted hydraulic data for the subject property and nearby areas from the currently-used version of the groundwater availability model (GAM) for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (Young, et al., 2018). The following table provides a summary of estimated parameters extracted from the GAM datasets to those derived by TGI for the local Carrizo and Simsboro aquifers across the Astin Farms property:

<u>Parameter</u>	GAM	
	<u>Estimates Range</u>	<u>TGI Estimates*</u>
Sand Thickness	460 to 480 feet	400 to 450 feet
Hydraulic Conductivity	96 to 134 gpd/ft ²	125 to 175 gpd/ft ²
Transmissivity	44,120 to 64,200 gpd/ft	50,000 to 78,750 gpd/ft
Storage Coefficient	1.21 x 10 ⁻⁴ to 1.29 x 10 ⁻⁴	10 ⁻⁴

Figure 7 provides a hydrograph illustrating water-level measurements collected for nearby TWDB/BVGCD Simsboro monitoring well (BVGCD No. BVHU-0013, TWDB No. 59-04-701) which the City of Hearne Well No. 4 and is located within approximately 7,600 feet of the nearest proposed Lutz well (see Figure 5). Water levels in the well declined by between 110 and 140 feet from 1979 to 2021. AGS reported artesian head decline of 81 feet between 1999 and 2023 in TWDB Well No. 59-04-701 (AGS, May 11, 2023). The AGS map shows between 60 and 70 feet of artesian head decline in the Simboro beneath the Lutz property from 2000 to 2023. Based on the updated data provided by AGS, current depths to water on the subject property will likely range from 150 to 250 feet BGL. Therefore, water levels will probably rise between 600 and 900 feet above the top of the aquifer in the new wells, verifying that the local Simsboro is under artesian or confined conditions with hundreds of feet of artesian head.

Projected Effects of Proposed Pumping

The immediate impacts from production will be artesian head decline (i.e., drawdown) at the pumping wells. As the wells pump, artesian pressure or potentiometric head around the wells will decline forming a cone of depression. As production continues the cone of depression will extend radially from the well field until an aquifer boundary is reached or the production rate reaches equilibrium with the captured groundwater flows. Due to the distance of the proposed wells from the outcrop of the aquifer, reduction in artesian pressure

is the only anticipated measurable effect from the proposed pumping. The aquifer will remain completely full and there will be only an infinitesimal reduction in storage. Pumping from the Simsboro aquifers will cause some vertical leakage from overlying and underlying zones. While leakage can serve to dampen drawdown due to boundary effects and inflows, the leakage will likely not result in any identifiable water-level changes or water-quality variations in any of the overlying or underlying zones.

Drawdown Simulations Using the GAM

TGI utilized the recently released revision and update of the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers GAM to calculate drawdown due to the proposed pumping for continuous pumping periods of one (1) year and 10 years from the Simsboro Aquifer. Red Hill Farms has requested a permit allocation for the Simsboro Aquifer of 8,130 acre-feet per year. Figure 8 and Figure 9 provide maps showing modeled drawdown contours after one (1) year and 10 years of pumping at the maximum authorized rate, respectively. Table 1 and Table 2 provide modeled drawdown at specific registered and permitted Simsboro well sites after one (1) year and 10 years of continuous pumping, respectively. The GAM predicts that Simsboro artesian pressure will decline by as much as 50 feet immediately adjacent to the Lutz Farms property and from 27 to 36 feet one (1) mile from the proposed wells within the first year of pumping. Declines during the initial year are simulated to be less than 10 to 13 feet five (5) miles from the wells. After 10 years of pumping the proposed Simsboro wells drawdown (i.e., artesian head decline) will be as much as 55 feet adjacent to the subject property and range from 30 to 40 feet one (1) mile from the well locations. Simulated drawdown ranges from less than 10 to 18 feet five (5) miles from the wells. Based on the geologic structure, estimates of current artesian head, and drawdown calculated from the GAM simulations, the Simsboro aquifer will remain full and under artesian conditions in the well-field area and within the five-mile radius. Local wells will continue to maintain a few hundred feet of artesian head.

Drawdown Simulations Using Analytical Modeling

Due to the scale and configuration of the GAM grid, the GAM probably does not provide accurate drawdown calculations for the specific well sites and areas in the immediate vicinity of the proposed well field. Therefore, for comparison purposes and per the BVGCD rules TGI used an analytical modeling program based on the Theis non-equilibrium equation to calculate theoretical potentiometric head declines at and surrounding the proposed production wells. TGI has used the Theis model for several previous submittals to the BVGCD as well as for evaluations and submittals to numerous districts across the State of Texas. The Theis model incorporates many assumptions, most of which are sufficiently satisfied in the local Simsboro aquifer. However, the Theis model assumes an aquifer that is uniform over an infinite area. To account for recharge boundaries and possible inter-aquifer leakage into

the producing aquifers, TGI modeled long-term pumping (i.e., from one to 10 years) by incorporating a leaky artesian storage coefficient. However, it is likely that, while the Theis model likely provides more reliable results within and near the well field, it probably overstates drawdown at distance from the pumping center. Also, the Theis model is more accurate for shorter pumping durations; therefore, the 10-year calculation likely overestimates drawdown from the well fields.

Figure 10 and Figure 11 provide drawdown contours from Theis calculations due to pumping the Simsboro wells proposed for Red Hill Farms after one (1) and 10 years, respectively. Table 1 and Table 2 provide drawdown values at specific well locations. The analytical model calculated artesian pressure declines of as much as 80 feet adjacent to the subject property after one (1) year of pumping. Drawdown at a distance of one (1) mile was modeled to be 57 to 68 feet after the first year of pumping. At five (5) miles away the drawdown calculation resulted in 37 to 41 feet after a year. After 10 years the calculated drawdown at the Red Hill Farms property line is as much as 90 feet and the drawdown at a distance of a mile was modeled to be 65 to 74 feet. The drawdown at five (5) miles was modeled to be between 44 and 47 feet.

Conclusions

Based on our review of the BVGCD rules and the work conducted as described herein, TGI concludes the following:

- ❖ The proposed wells and pumping amounts for the Red Hill Farms property can be completed and produced in accordance with the well spacing and production-based acreage (i.e., allocation) rules set forth by the BVGCD;
- ❖ The predicted drawdown derived from the Theis analytical model are more accurate than the GAM predictions for the proposed well sites and areas near the well field;
- ❖ GAM-predicted drawdown probably provides a more reasonable estimate of future impacts at greater distances from the proposed well field and for longer time periods. The updated GAM predicts significantly less drawdown regionally than the previous version of the GAM; and,
- ❖ Production from the proposed pumping will cause only infinitesimal reduction in aquifer storage as the local Simsboro Aquifer will stay completely full and groundwater in the formation will remain under considerable artesian pressure within the well-field areas and the five-mile study radius.

We very much appreciate the opportunity to again assist you in our specialty. If you have any questions, please call.



The seal appearing on this document was authorized by Michael R. Thornhill, P.G. on July 21, 2023.

Attachments

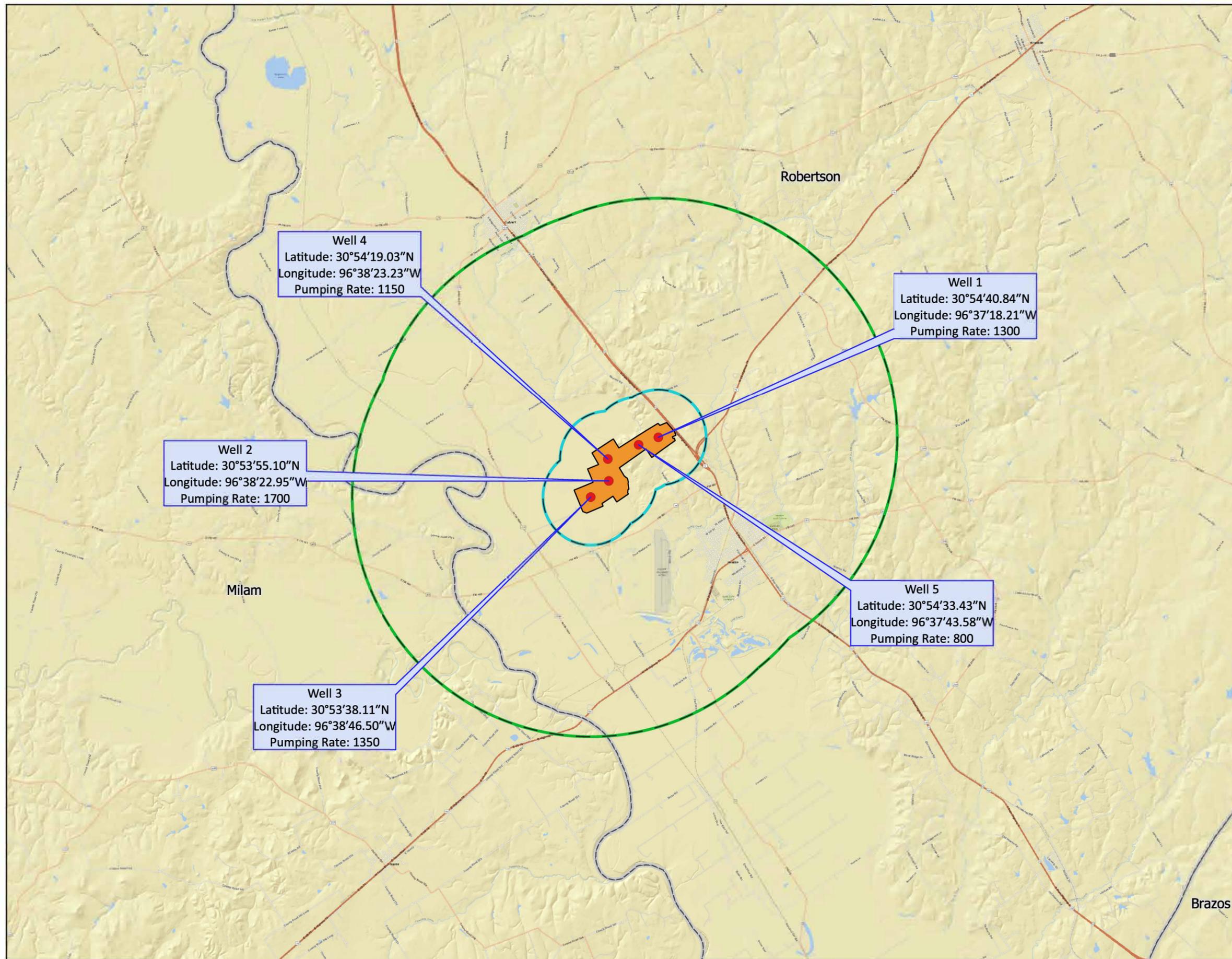
Sincerely,
THORNHILL GROUP, INC.



Michael R. Thornhill, P.G.
President

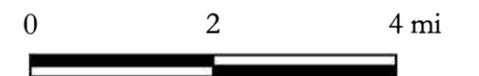


ATTACHMENT 1 –
FIGURES



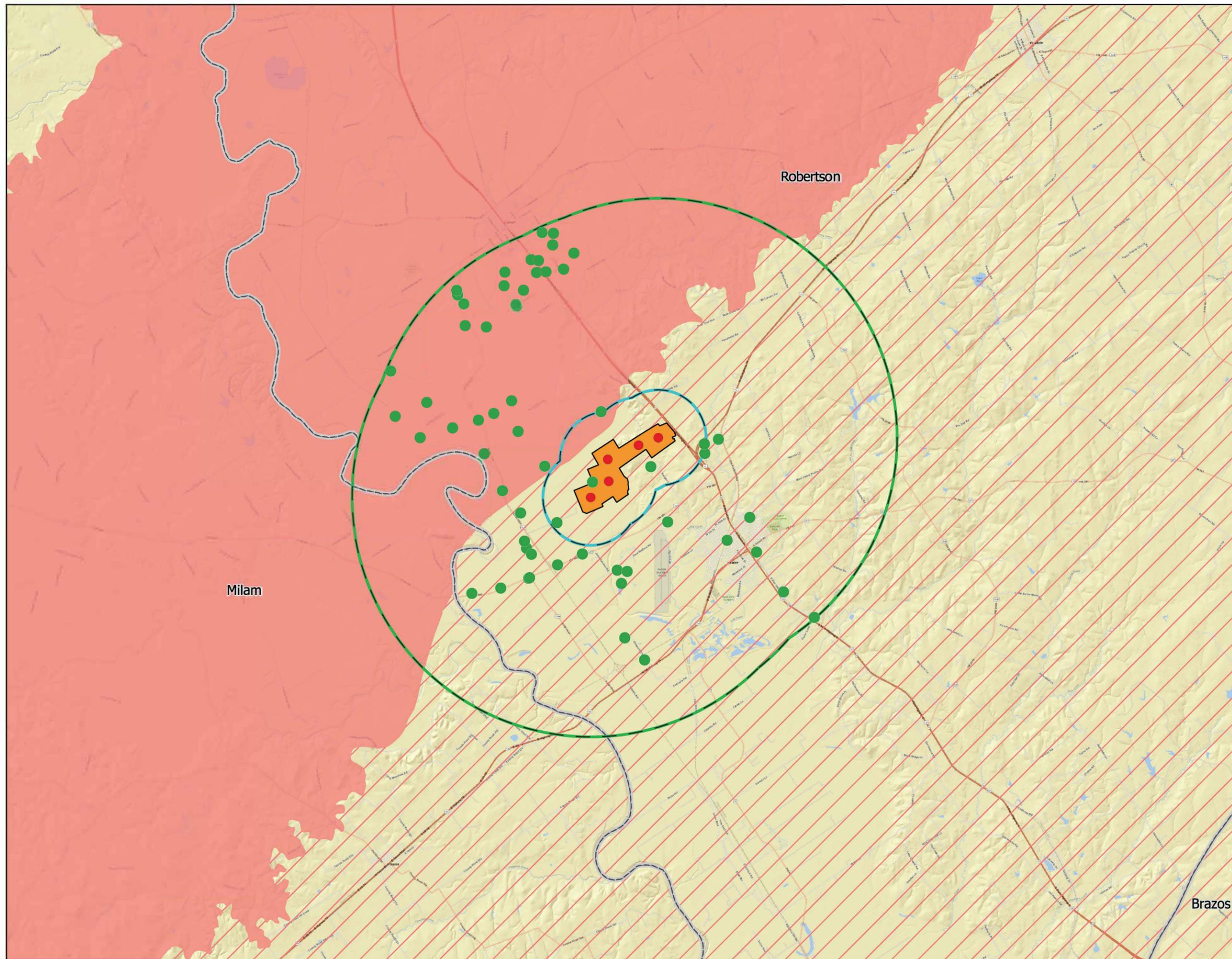
Explanation

- Proposed Wells
- Red Hill Farms Property
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Counties



RHF, LLC

Figure 1:
Location Map



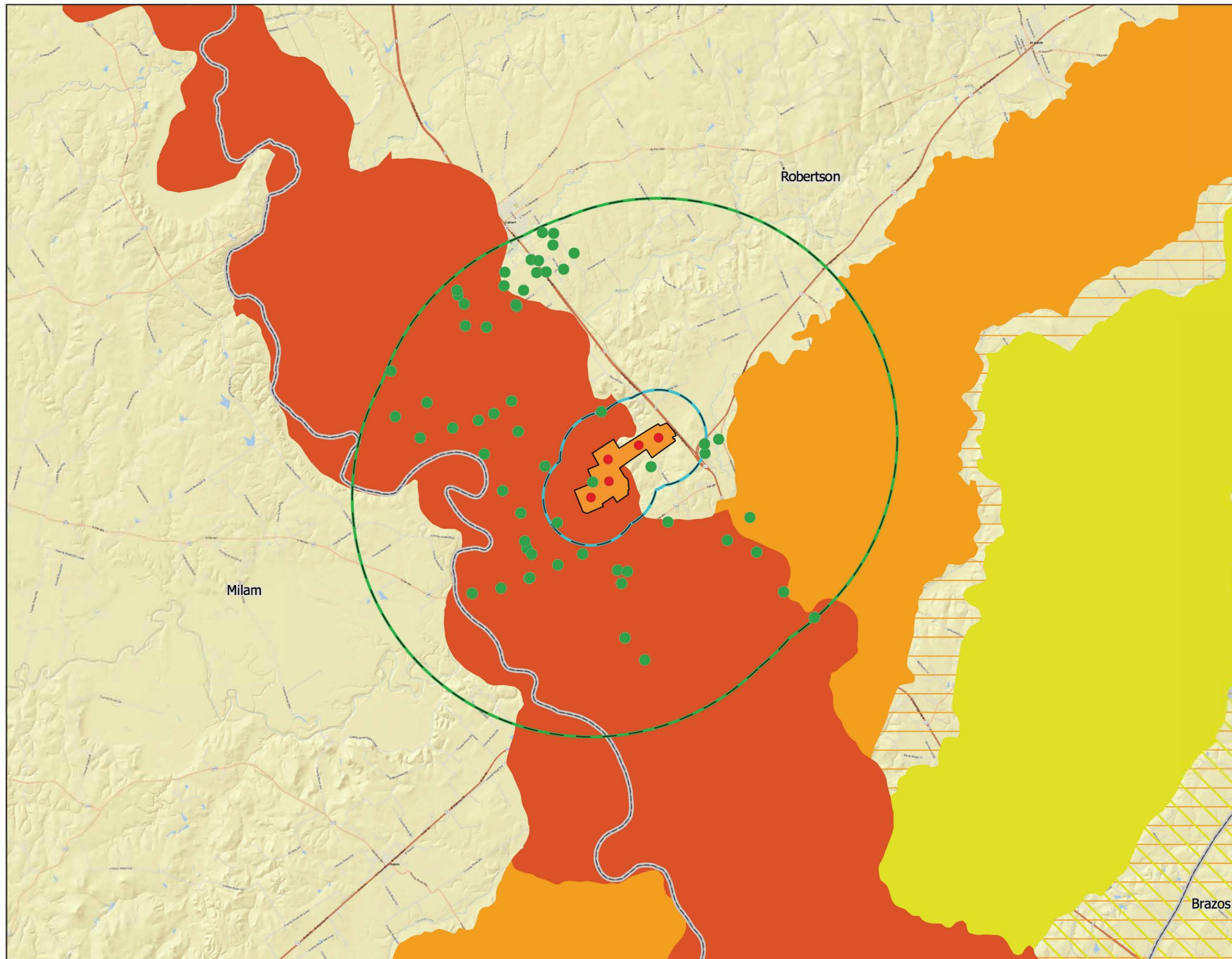
Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Red Hill Farms Property
- ▭ Counties
- Major Aquifers**
- Carrizo - Wilcox (outcrop)
- ▨ Carrizo - Wilcox (subcrop)
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



RHF, LLC

Figure 2:
Major Aquifers



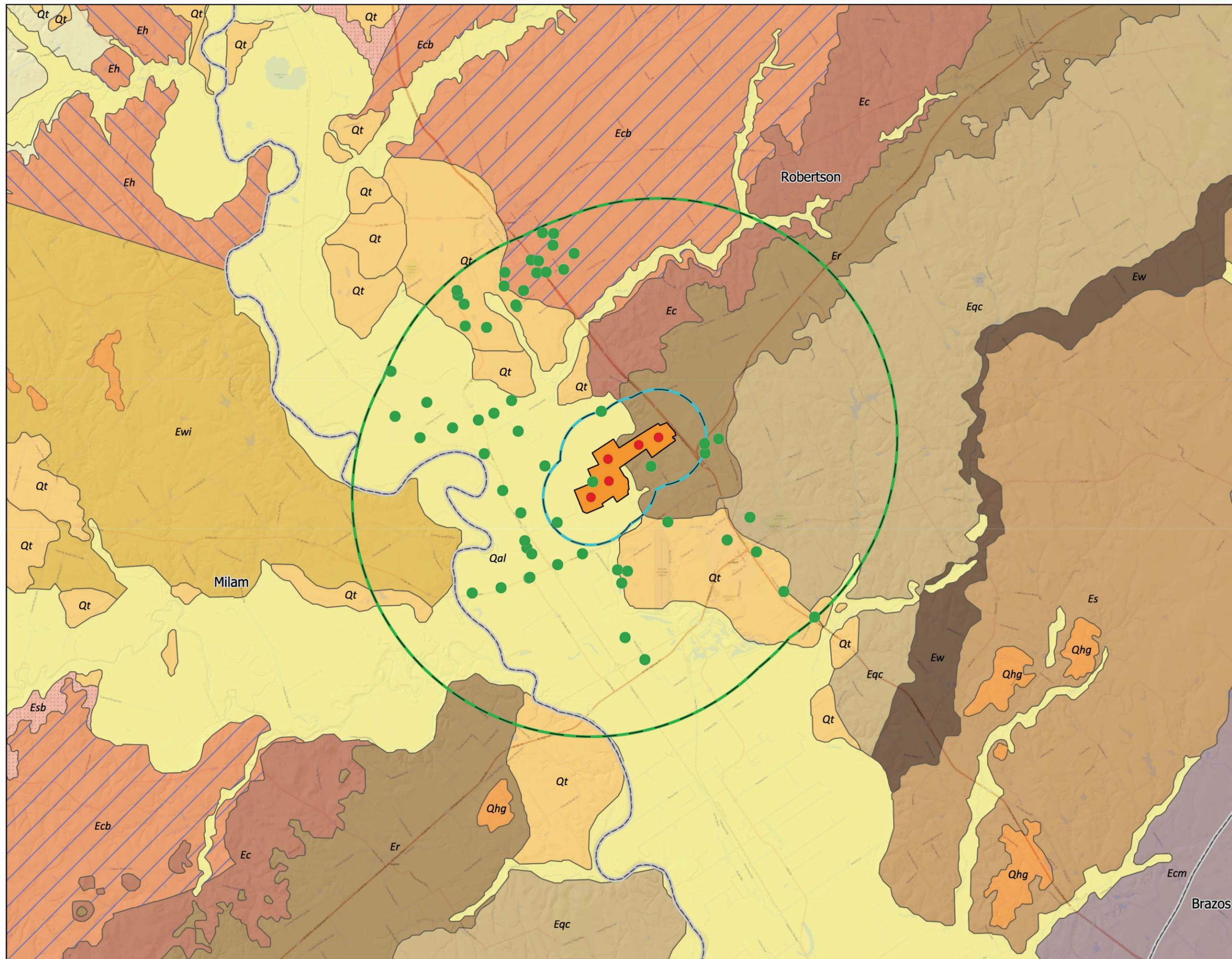
Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Red Hill Farms Property
- ▭ Counties
- Minor Aquifers**
- Brazos River Alluvium
- Queen City (outcrop)
- Queen City (subcrop)
- Sparta (outcrop)
- Sparta (subcrop)
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



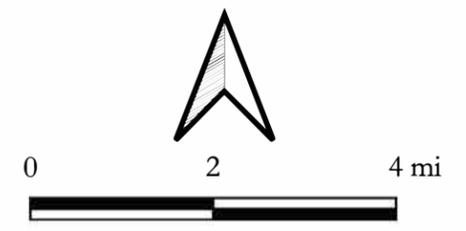
RHF, LLC

**Figure 3:
Minor Aquifers**



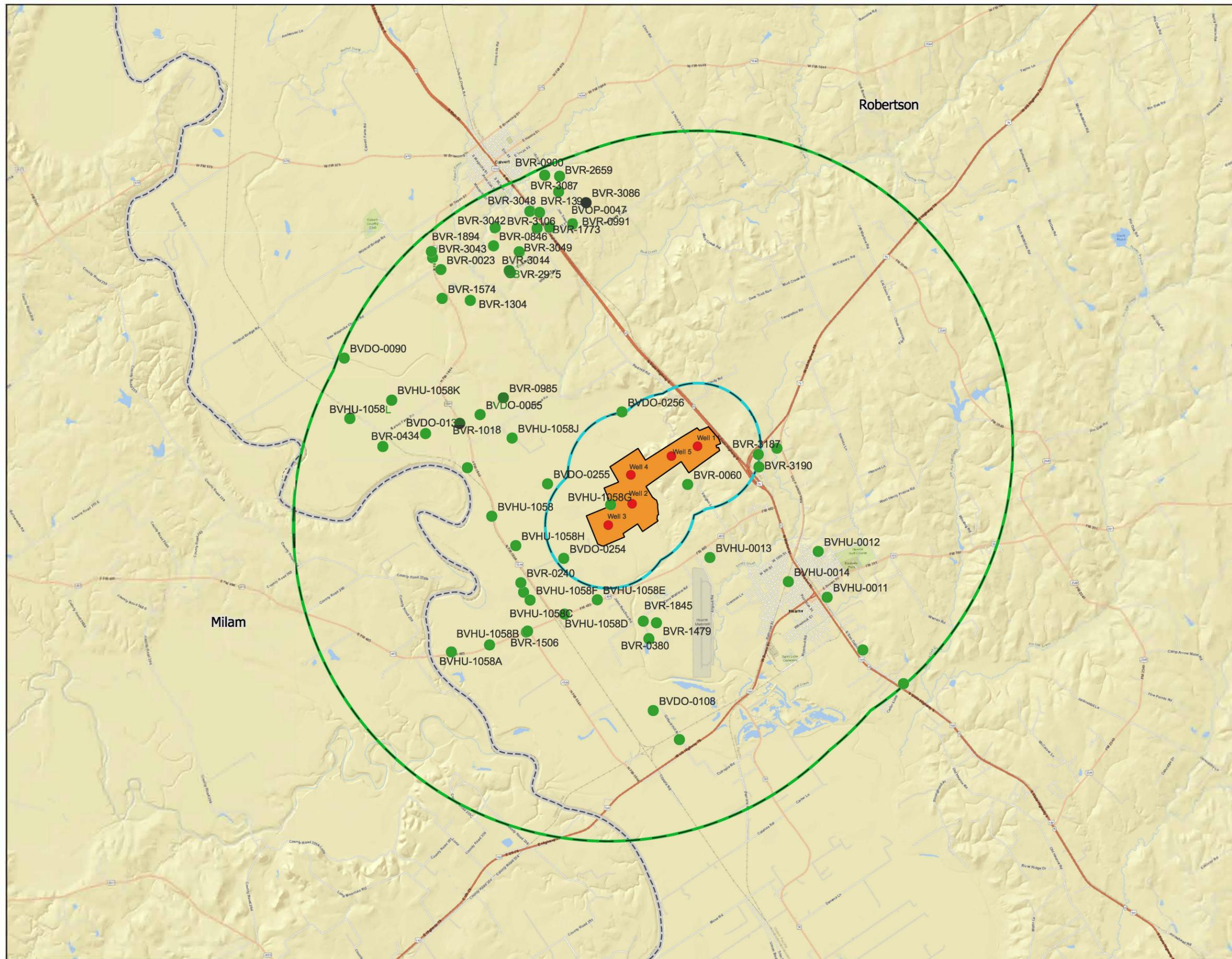
Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Red Hills Farms Property
- Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro
- Surface Geology**
- Qal - Alluvium
- Qt - Fluvatile terrace deposits
- Qhg - High gravel deposits
- Ecm - Cook Mountain Formation
- Es - Sparta Sand
- Ew - Weches Formation
- Eqc - Queen City Sand
- Er - Reklaw Formation
- Ec - Carrizo Sand
- Ewi - Wilcox Group
- Ecb - Calvert Bluff Formation
- Esb - Simsboro Formation
- Eh - Hooper Formation



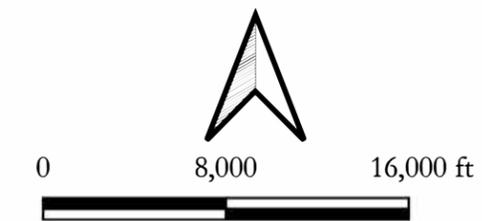
RHF, LLC

**Figure 4:
Surface Geology**



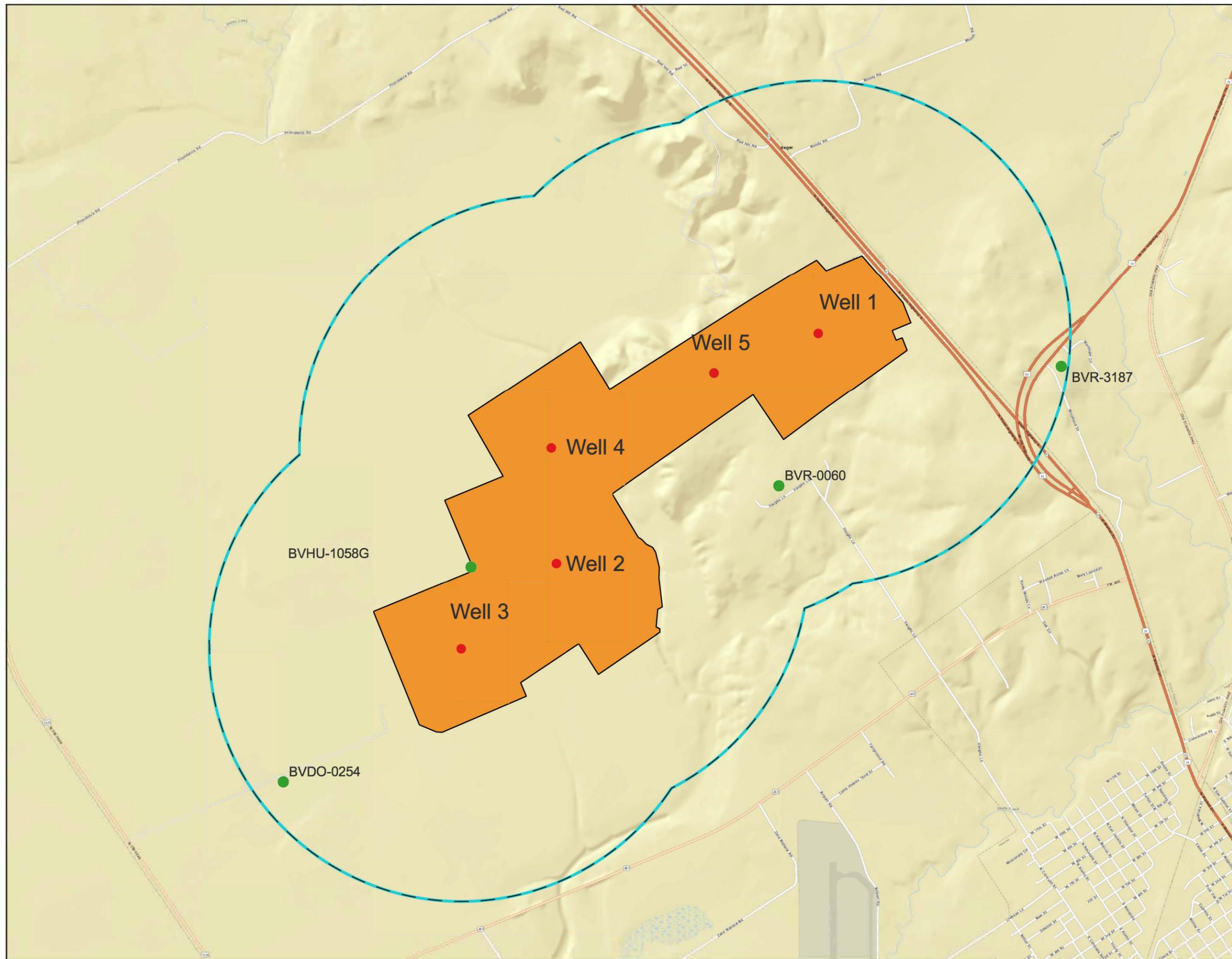
Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Red Hills Farms Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



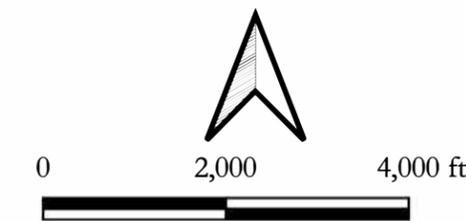
RHF, LLC

Figure 5: Well Locations w/in 5 Miles of Proposed Wells



Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Lutz Property
- Counties
- BVGCD Reported Wells w/in 1 Mile**
- Simsboro



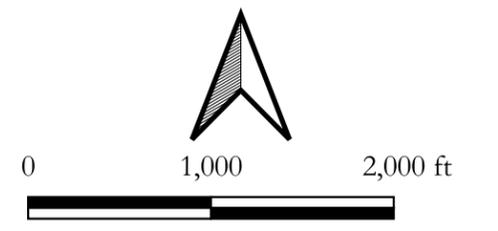
RHF, LLC

Figure 6: Well Locations w/in 1 Mile of Proposed Wells



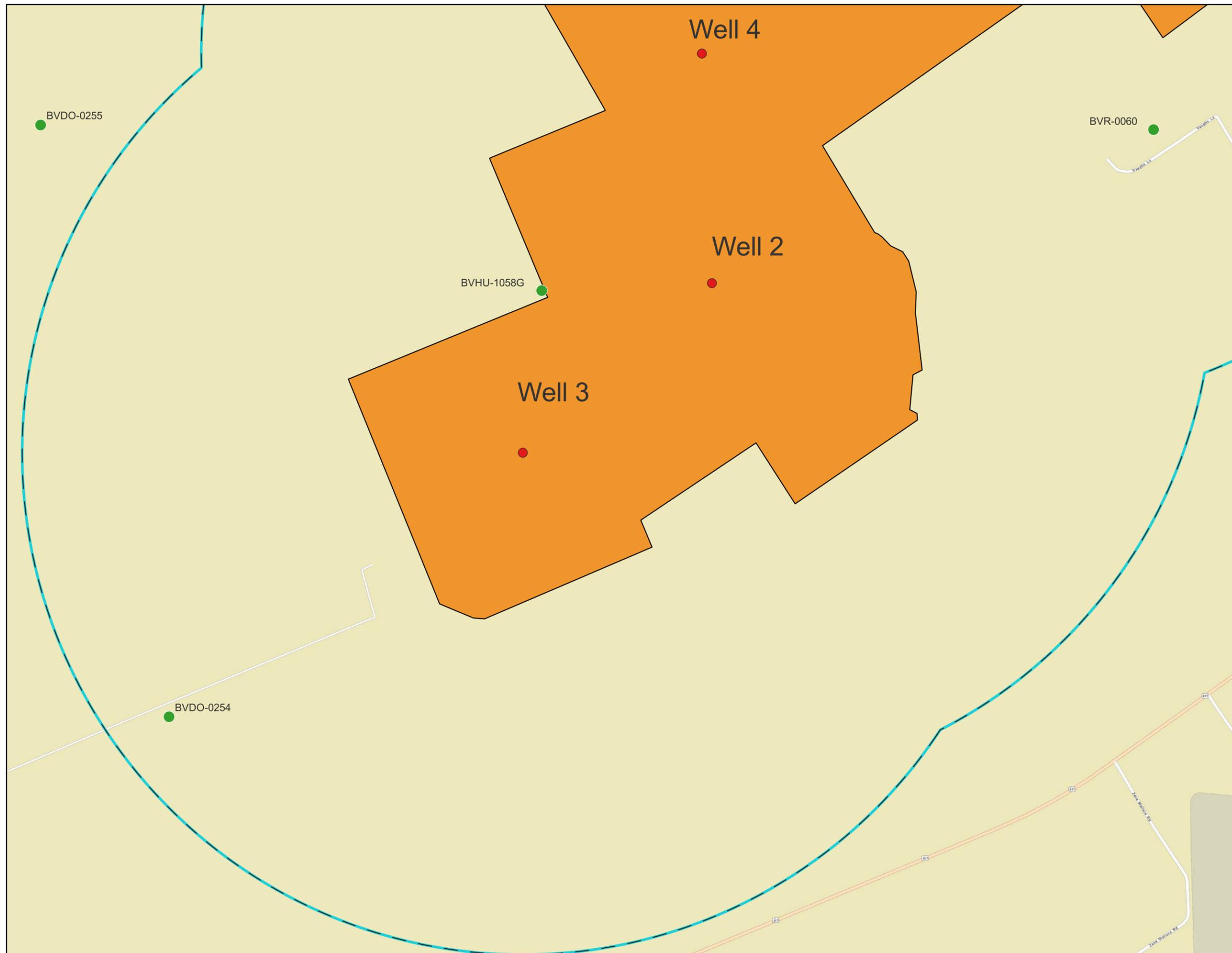
Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- Red Hill Farms Property
- - - Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



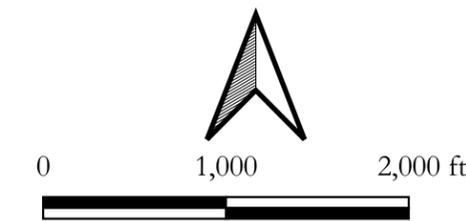
RHF, LLC

Figure 6a: Well Locations w/in 1 Mile of Proposed Wells



Explanation

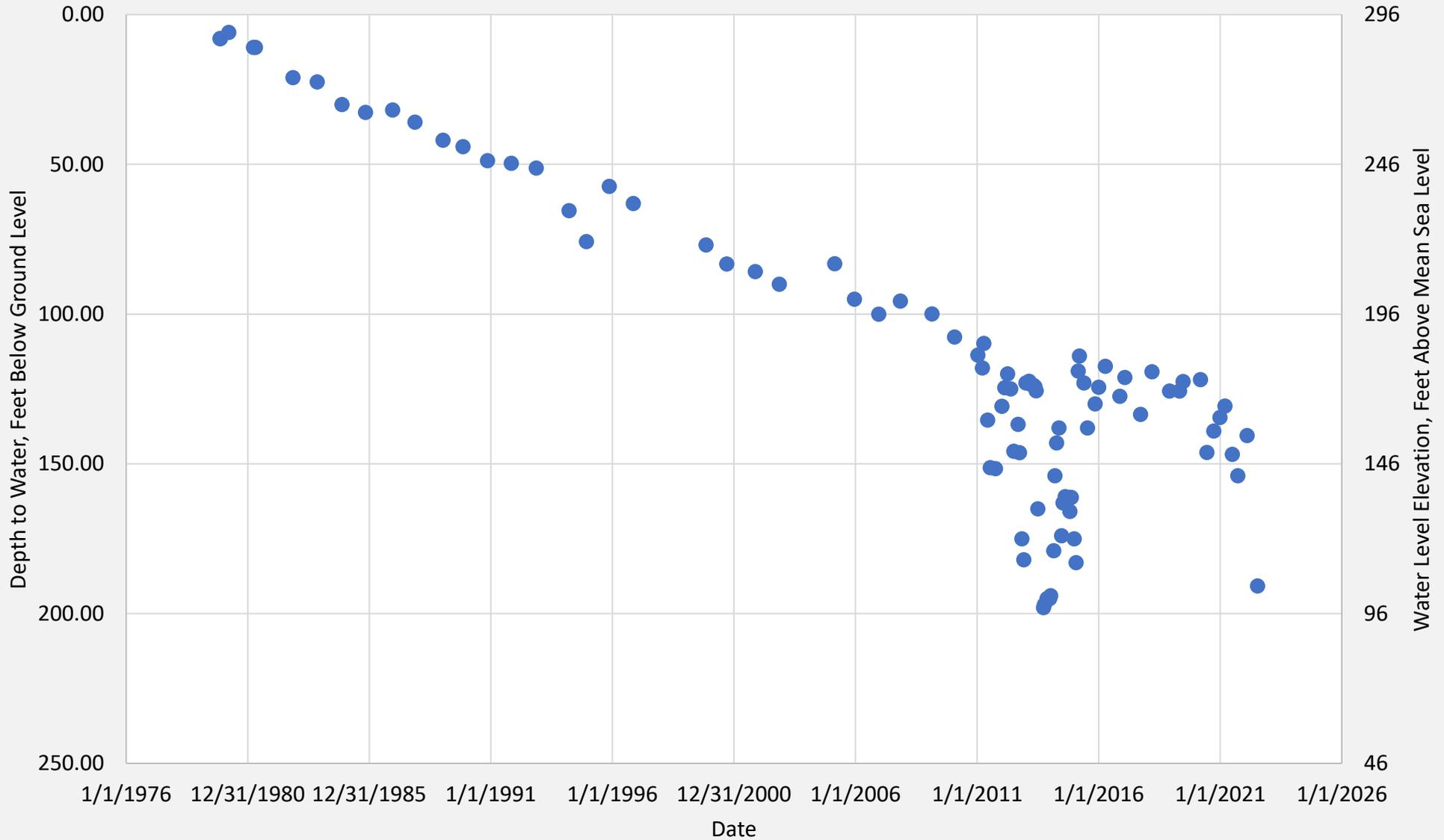
- Proposed Wells
- 1 Mile Radius from Well Locations
- Red Hill Farms Property
- - - Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro

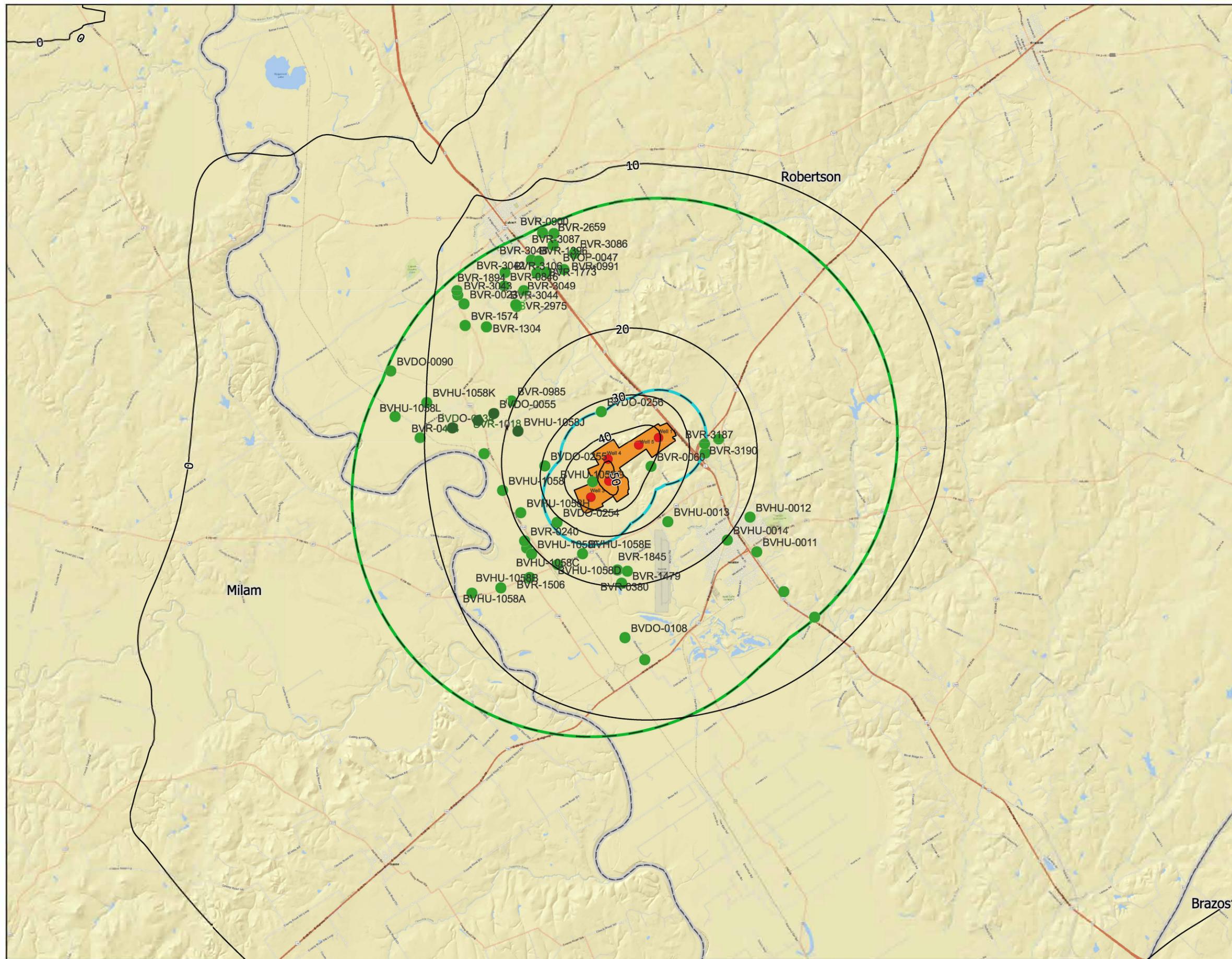


RHF, LLC

Figure 6b: Well Locations w/in 1 Mile of Proposed Wells

Figure 7 – City of Hearne Well No. 4
Texas Water Development Board Number 59-04-701





Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 1-Year Modeled Drawdown - GAM
Contour Interval = 10 feet
- Red Hill Farms Property
- Counties

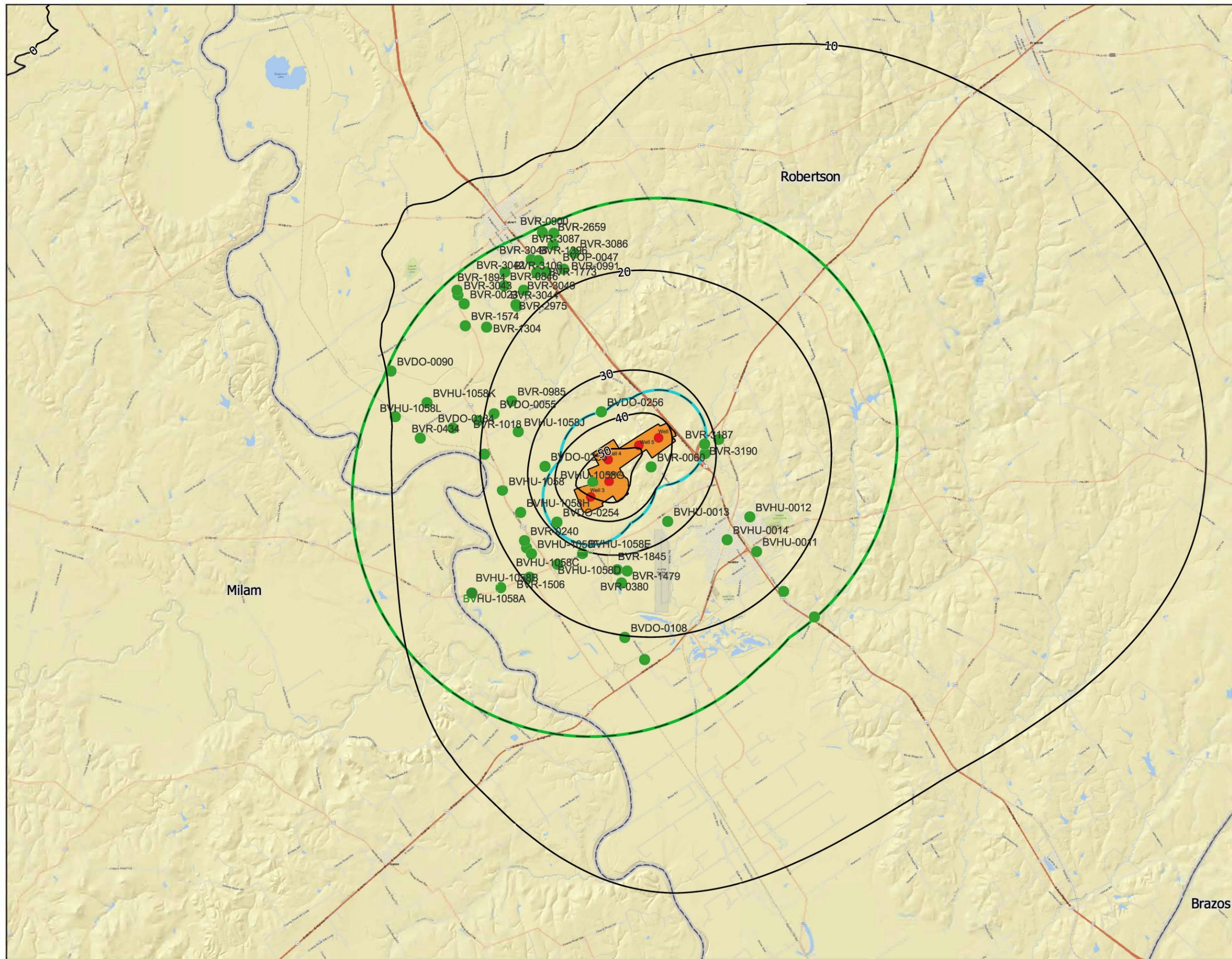
BVGCD Reported Wells w/in 5 Miles

- Simsboro



RHF, LLC

**Figure 9: 1-Year GAM
Drawdown Contours**



Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 10-Year Modeled Drawdown - GAM Contour Interval = 10 feet
- Red Hill Farms Property
- ▭ Counties

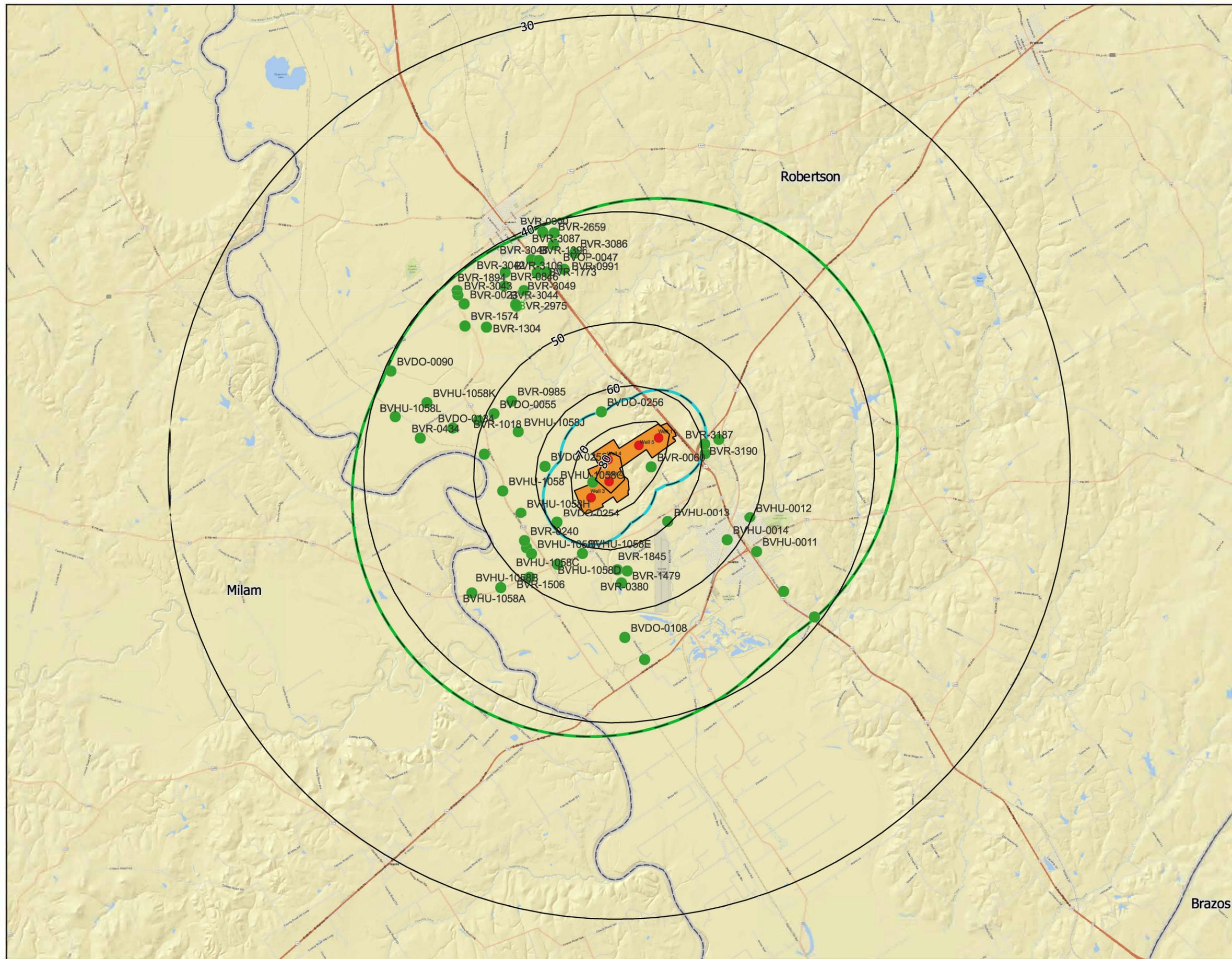
BVGCD Reported Wells w/in 5 Miles

- Simsboro



RHF, LLC

Figure 10: 10-Year GAM Drawdown Contours



Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 1-Yr Modeled Drawdown - Analytical Contour Interval = 10 feet
- Red Hills Farms Property
- Counties

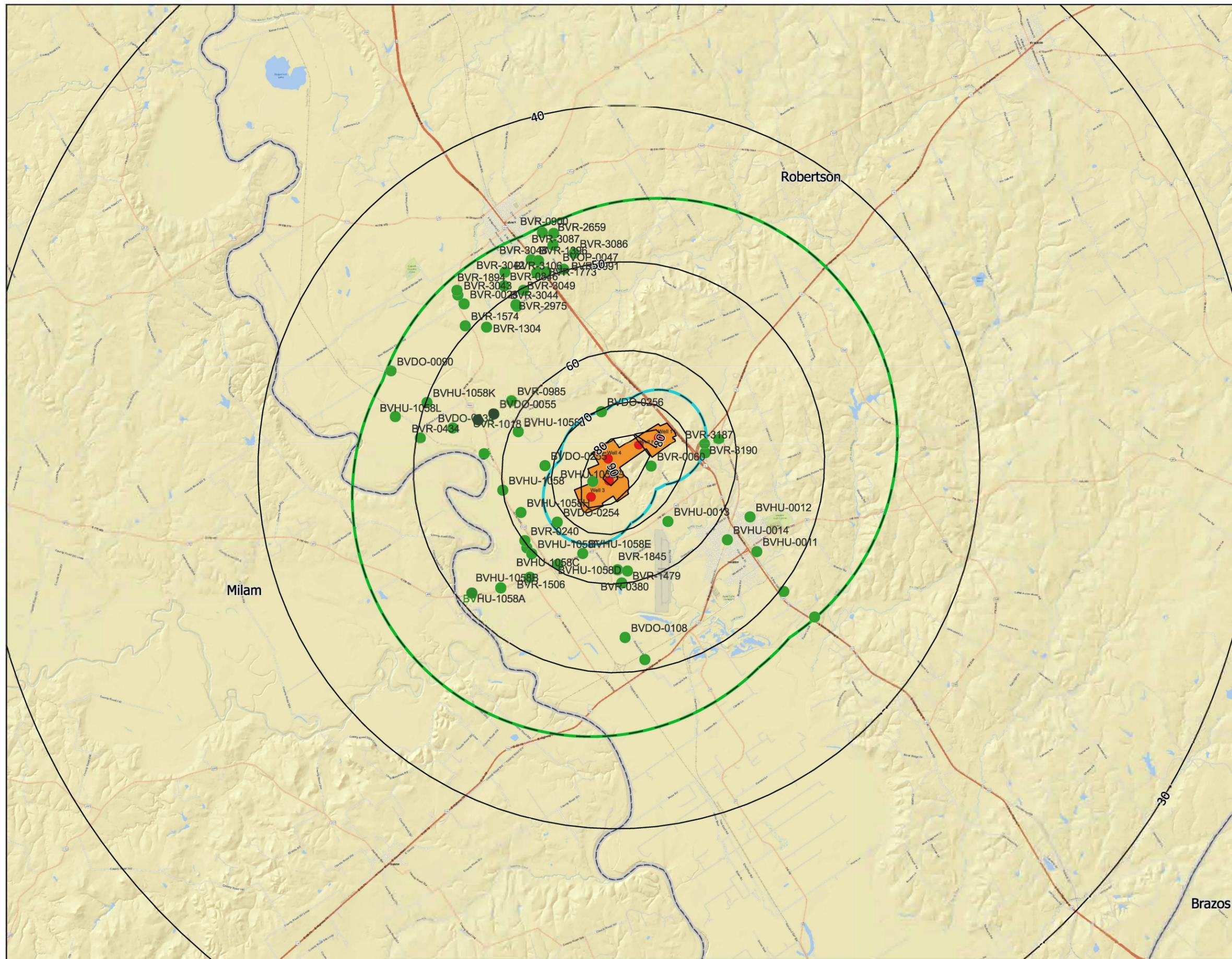
BVGCD Reported Wells w/in 5 Miles

- Simsboro



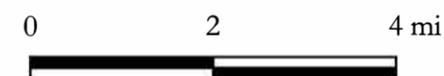
RHF, LLC

Figure 11: 1-Year Analytical Drawdown Contours



Explanation

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 10-Yr Modeled Drawdown - Analytical
Contour Interval = 10 feet
- Red Hills Farms Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



RHF, LLC

Figure 12: 10-Year Analytical Drawdown Contours





ATTACHMENT 2 –
TABLES

Table 1. Simulated Drawdown at Registered and Permitted Simsboro Wells Within a 1-Mile Radius

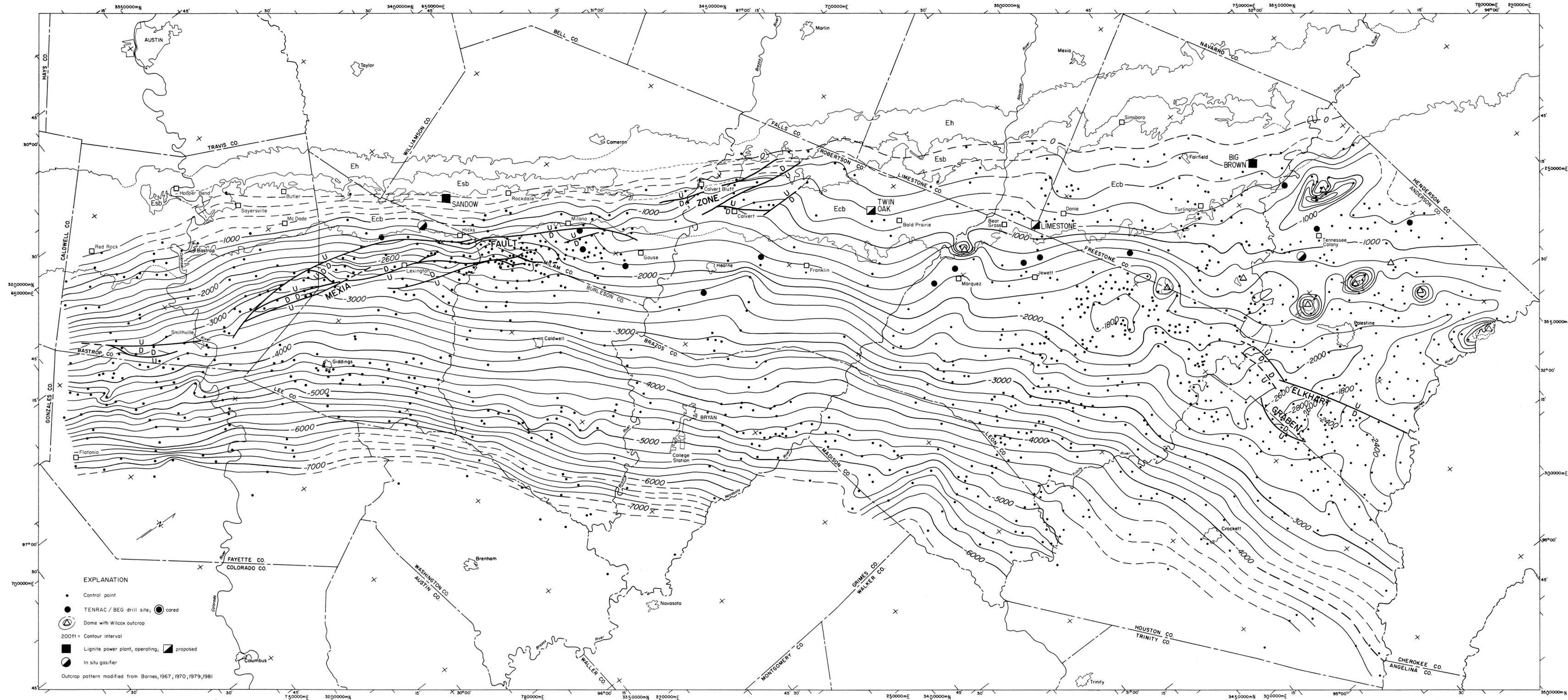
Owner	Registration or Permit Number	Latitude	Longitude	Well Depth	Aquifer	Casing Diameter (in)	1 Year Analytical Drawdown, ft.	10 Year Analytical Drawdown, ft.	1 Year GAM Drawdown, ft.	10 Year GAM Drawdown, ft.
CA Skiles Family Partnership, Ltd.	BVDO-0254	30.886626	-96.658433	0	Simsboro	30 , 18	61	67	29	33
CA Skiles Family Partnership, Ltd.	BVHU-1058G	30.898588	-96.645434	964	Simsboro	30 , 16	77	83	50	54
Bishop, Doris & Others	BVR-0060	30.902652	-96.624694	1,193	Simsboro	4 , 2	72	79	41	46

Table 2. Simulated Drawdown at Registered and Permitted Simsboro Wells Within a 5-Mile Radius

Owner	Registration or Permit Number	Latitude	Longitude	Well Depth	Aquifer	Casing Diameter (in)	1 Year Analytical Drawdown, ft.	10 Year Analytical Drawdown, ft.	1 Year GAM Drawdown, ft.	10 Year GAM Drawdown, ft.
Ryan, Sandra & Sloat, Bernadette	BVDO-0055	30.920306	-96.679457	840	Simsboro	30 , 16	51	57	18	22
Ryan, Sandra & Sloat, Bernadette	BVDO-0090	30.934265	-96.715276	656	Simsboro	16	41	47	7	10
Skiles, Clifford III	BVDO-0108	30.851042	-96.635889	1,242	Simsboro	30 , 16	47	53	15	20
Brien, James & Ellen	BVDO-0134	30.916389	-96.694167	778	Simsboro	30 , 16	47	53	13	16
CA Skiles Family Partnership, Ltd.	BVDO-0254	30.886626	-96.658433	0	Simsboro	30 , 18	61	67	29	33
CA Skiles Family Partnership, Ltd.	BVDO-0255	30.903856	-96.662094	0	Simsboro	30 , 18	62	68	31	36
CA Skiles Family Partnership, Ltd.	BVDO-0256	30.919825	-96.641585	0	Simsboro	30 , 18	64	71	33	38
City of Hearne	BVHU-0011	30.875673	-96.588479	1,433	Simsboro	14 , 8 5/8	48	54	17	22
City of Hearne	BVHU-0012	30.886263	-96.590453	1,430	Simsboro	12 , 6	50	56	19	25
City of Hearne	BVHU-0013	30.885707	-96.619201	1,441	Simsboro	10 , 8 , 6	61	67	28	33
City of Hearne	BVHU-0014	30.879554	-96.598692	1,275	Simsboro	12 , 10 , 8 , 7	51	58	20	25
Skiles Family Partnership, I	BVHU-1058	30.896850	-96.677267	930	Simsboro	16	54	60	20	24
CA Skiles Family Partnership, Ltd.	BVHU-1058A	30.866028	-96.689233	1,095	Simsboro	30 , 16	45	51	11	15
CA Skiles Family Partnership, Ltd.	BVHU-1058B	30.867349	-96.678991	1,090	Simsboro	30 , 16	48	54	13	17
CA Skiles Family Partnership, Ltd.	BVHU-1058C	30.870200	-96.668713	1,100	Simsboro	30 , 16	51	57	17	21
CA Skiles Family Partnership, Ltd.	BVHU-1058D	30.873824	-96.658706	1,131	Simsboro	30 , 16	55	61	20	25
CA Skiles Family Partnership, Ltd.	BVHU-1058E	30.876867	-96.649833	1,175	Simsboro	30 , 16	58	64	25	29
CA Skiles Family Partnership, Ltd.	BVHU-1058F	30.877300	-96.667783	1,065	Simsboro	30 , 16	53	60	19	23
CA Skiles Family Partnership, Ltd.	BVHU-1058G	30.898588	-96.645434	964	Simsboro	30 , 16	77	83	50	54
CA Skiles Family Partnership, Ltd.	BVHU-1058H	30.889917	-96.671117	979	Simsboro	30 , 16	56	62	22	26
CA Skiles Family Partnership, Ltd.	BVHU-1058J	30.914647	-96.671122	875	Simsboro	30 , 16	55	61	22	26
CA Skiles Family Partnership, Ltd.	BVHU-1058K	30.924333	-96.702966	720	Simsboro	30 , 16	44	50	10	13
CA Skiles Family Partnership, Ltd.	BVHU-1058L	30.920417	-96.714283	691	Simsboro	30 , 16	42	48	8	10
Epps, Frank N.	BVOP-0047	30.963442	-96.653281	660	Simsboro	4 , 2 1/2	44	50	14	19
Deason, Jack	BVR-0023	30.953885	-96.688707	510	Simsboro	4 , 2 1/2	42	48	12	15
Bishop, Doris & Others	BVR-0060	30.902652	-96.624694	1,193	Simsboro	4 , 2	72	79	41	46
CA Skiles Family Partnership, Ltd.	BVR-0240	30.881350	-96.670083	1,065	Simsboro	4	54	60	20	24
Ryan, Melvin & Sandra	BVR-0380	30.867554	-96.636420	1,100	Simsboro	4 , 2	54	60	20	25
Manterola, Jane Anderson	BVR-0434	30.913686	-96.705731	400	Simsboro	UNKN	44	50	10	13
Triple C Ranch	BVR-0846	30.958966	-96.674405	590	Simsboro	4 , 2	43	49	13	17
Closs, Barry	BVR-0900	30.974725	-96.660279	590	Simsboro	4 , 2 1/2	41	47	13	17
Ryan, Sandra & Sloat, Bernadette	BVR-0985	30.923989	-96.673093	735	Simsboro	4 , 2	52	58	20	24
Epps, Frank N.	BVR-0991	30.963396	-96.653204	640	Simsboro	4	44	50	14	19
Brien, James & Ellen	BVR-1018	30.918418	-96.685023	0	Simsboro	4	49	56	16	19
Bland, Andy	BVR-1304	30.946609	-96.681066	560	Simsboro	4 , 2	45	51	14	17
Wenger, Joshua R.	BVR-1396	30.966266	-96.661967	660	Simsboro	4	42	48	14	18
Zeig, Joey	BVR-1479	30.871121	-96.634251	1,080	Simsboro	8 , 4 , 2	56	62	22	27
Mears, Frank	BVR-1506	30.870019	-96.669033	1,250	Simsboro	2	51	57	16	20
Miles, Roger	BVR-1574	30.947231	-96.688573	530	Simsboro	4 , 2	43	50	12	16
Amos, Joe B., Jr.	BVR-1773	30.962757	-96.659386	720	Simsboro	4 , 2	44	50	14	18
Wallace, Zane & Virginia	BVR-1845	30.871595	-96.637759	1,100	Simsboro	4 , 2	56	62	22	27
Fleming, Nancy	BVR-1894	30.958068	-96.691089	515	Simsboro	4 , 2 1/2	41	47	11	15
Garza, Yvonne	BVR-2659	30.974381	96.656316	470	Simsboro	4	41	47	13	17
Broadus, Shirley L.	BVR-2975	30.952630	-96.670163	654	Simsboro	4 , 2	45	51	15	19
Sosa, Hilario Jr.	BVR-3042	30.963100	-96.673970	450	Simsboro	4 1/2 , 2 3/4	42	48	13	17
Dixon, Kimona K.	BVR-3043	30.956639	-96.690810	482	Simsboro	4 , 2	41	47	11	15
Howard, Shirley J.	BVR-3044	30.953124	-96.670470	660	Simsboro	4 , 2 1/2	45	51	15	19
Calvert Livestock, Inc.	BVR-3048	30.966589	-96.664572	667	Simsboro	4 , 2 1/2	42	48	13	17
Mears, Jeffrey L.	BVR-3049	30.957417	-96.667598	620	Simsboro	4 , 2	44	50	14	18
Lopez, Claude & Karen	BVR-3086	30.968145	-96.649334	627	Simsboro	4	43	49	14	18
Hoelscher, Carl	BVR-3087	30.970848	-96.656708	600	Simsboro	4 , 2	42	48	13	17
Wegwert Welding Service	BVR-3106	30.962635	-96.662779	656	Simsboro	4	43	49	14	18
Zeig, Larry J.	BVR-3187	30.909000	-96.605579	1,270	Simsboro	4 , 2	59	65	27	32
Swaner, Ronald & Elizabeth	BVR-3190	30.906118	-96.605514	1,225	Simsboro	4 , 2	59	66	27	32



ATTACHMENT 3 –
REFERENCE MATERIALS



- EXPLANATION**
- Control point
 - TENRAC / BEG drill site; ● cored
 - ⊙ Dome with Wilcox outcrop
 - 200ft = Contour interval
 - Lignite power plant, operating; ▣ proposed
 - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967, 1970, 1979, 1981

- Ecb Calvert Bluff Formation
- Esb Simsboro Formation
- Eh Hooper Formation

Base map adapted from Army Map Service base maps, 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

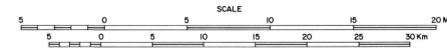
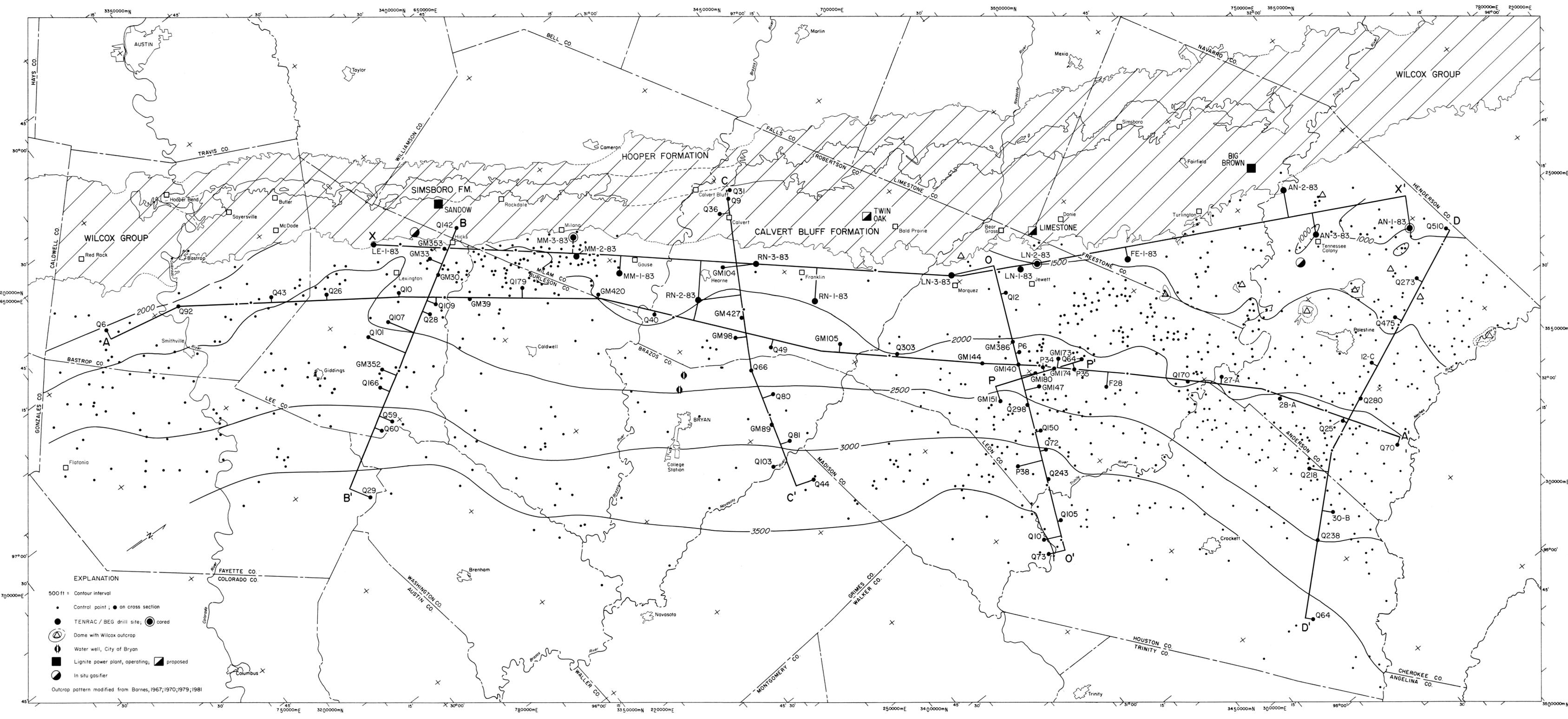


PLATE 2. WILCOX STRUCTURE MAP

1985

Generalized structure map drawn on the base of the Wilcox Group (sea-level datum) shows regional dip to the southeast. The angle of dip increases from the northeast (1/2°) to the southwest (2°). Major structural elements are the Mexia Fault Zone, the Elkhart Graben, salt structures in Anderson and Freestone Counties, and the East Texas Basin (fig. 2).



- EXPLANATION**
- 500 ft = Contour interval
 - Control point; ● on cross section
 - TENRAC / BEG drill site; ● cored
 - ⊙ Dome with Wilcox outcrop
 - ⊕ Water well, City of Bryan
 - Lignite power plant, operating; ▣ proposed
 - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967; 1970; 1979; 1981

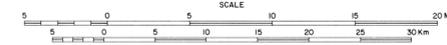


PLATE 3. WILCOX ISOPACH MAP AND LOCATIONS OF CROSS SECTIONS

1985

Base map adapted from Army Map Service base maps. 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

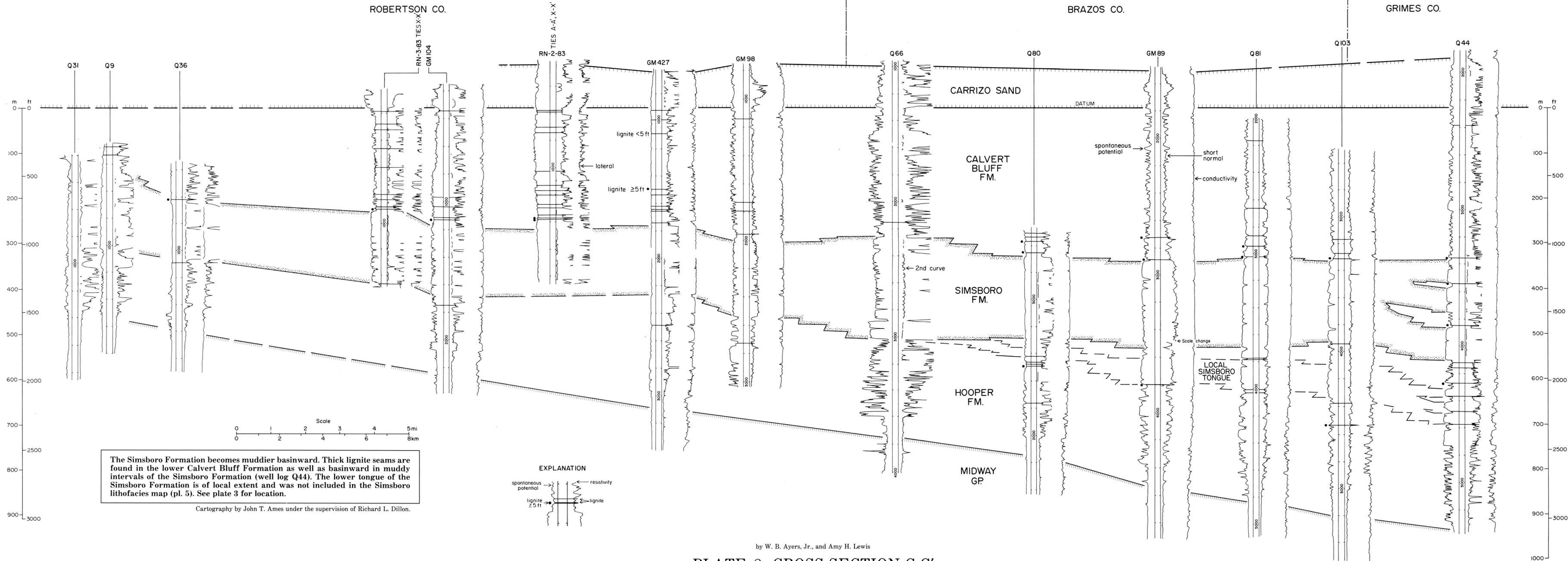
The Wilcox Group thickens from less than 1,000 ft (305 m) on the north to more than 3,500 ft (1,065 m) at the basinward margin of the study area. The local increase in thickness in central Lee County is attributed to syndepositional movement along the Mexia Fault Zone (fig. 2 and pl. 2).

C

NORTHWEST

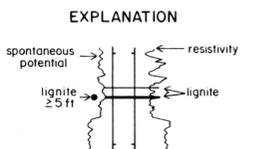
C'

SOUTHEAST



The Simsboro Formation becomes muddier basinward. Thick lignite seams are found in the lower Calvert Bluff Formation as well as basinward in muddy intervals of the Simsboro Formation (well log Q44). The lower tongue of the Simsboro Formation is of local extent and was not included in the Simsboro lithofacies map (pl. 5). See plate 3 for location.

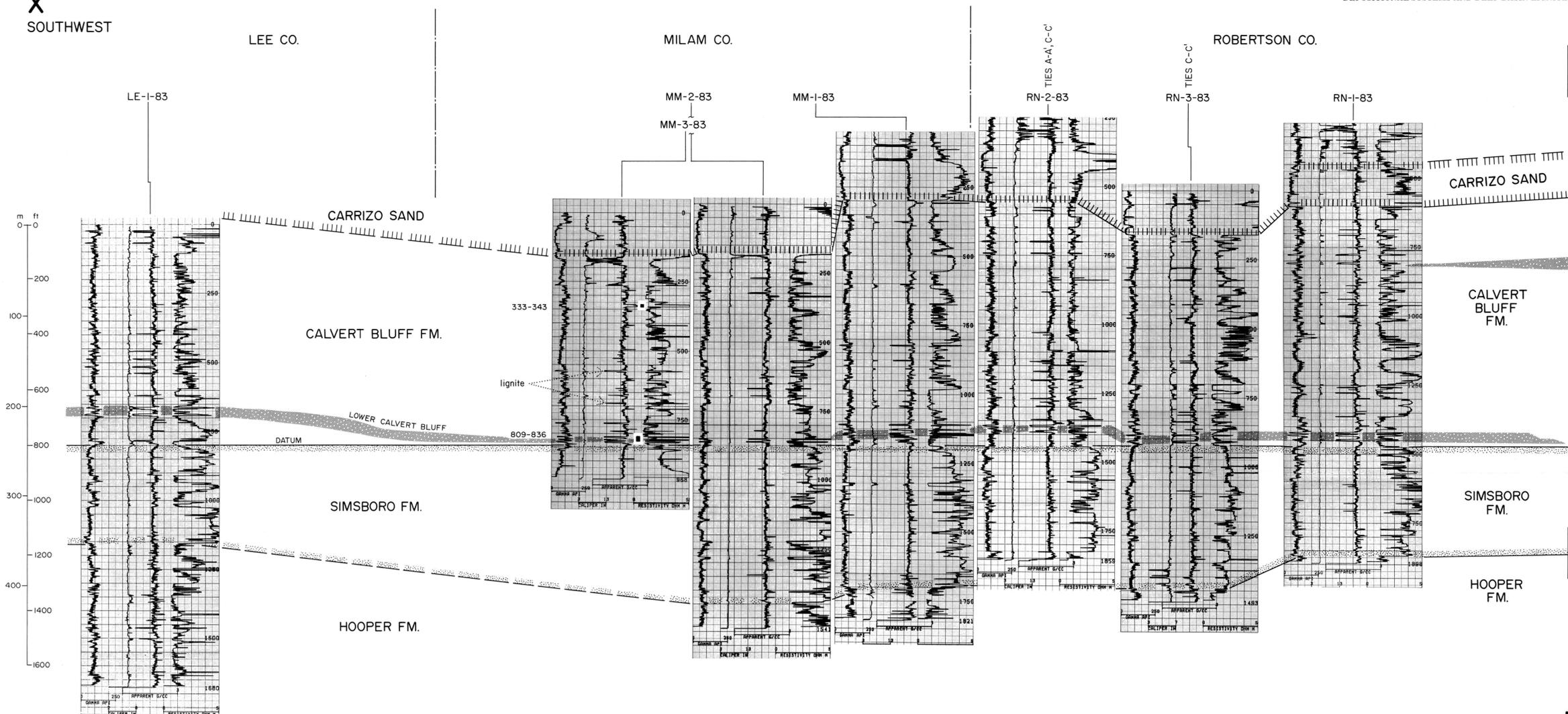
Cartography by John T. Ames under the supervision of Richard L. Dillon.



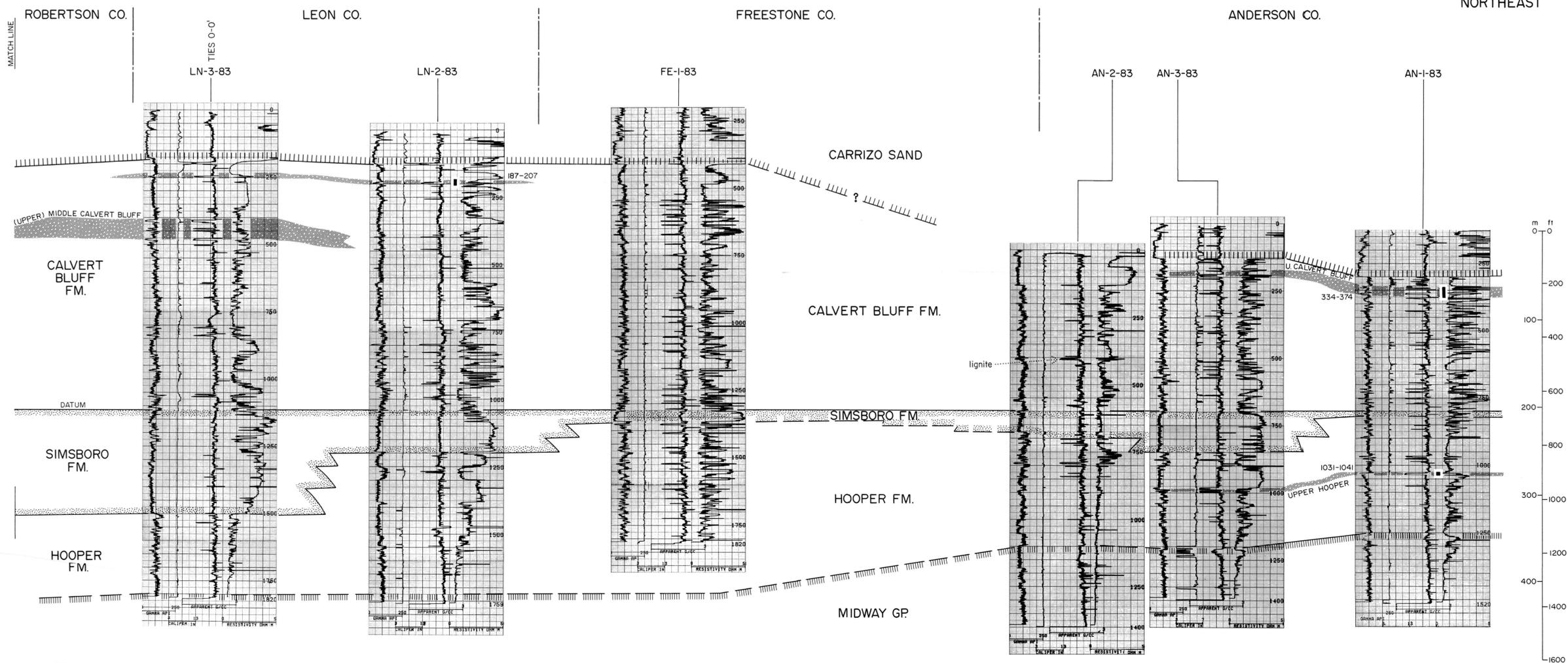
by W. B. Ayers, Jr., and Amy H. Lewis

PLATE 8. CROSS SECTION C-C'
 1985

X
SOUTHWEST



X'
NORTHEAST

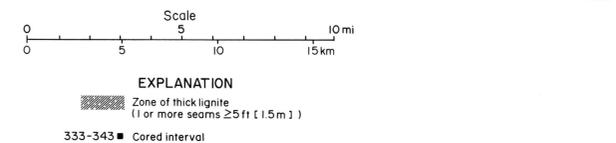


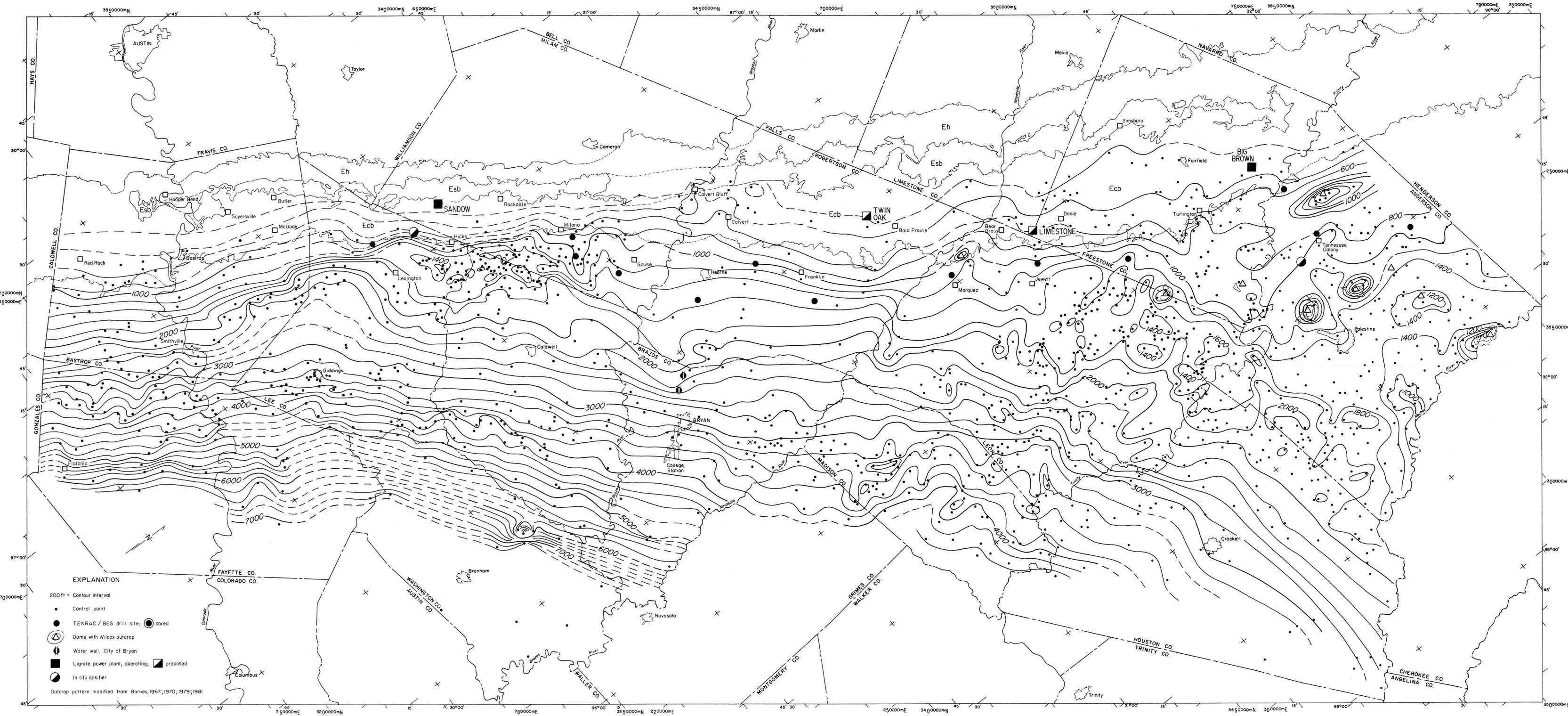
Geophysical logs from Texas Energy and Natural Resources Advisory Council/Bureau of Economic Geology wells show the stratigraphic occurrence of deep lignite (200 to 2,000 ft [61 to 610 m]) in east-central Texas. Thick lignite seams (seams 5 ft [1.5 m] or thicker) are found in the (a) upper Hooper Formation on the northeast, (b) lower Calvert Bluff Formation on the southwest, and (c) upper Calvert Bluff Formation on the northeast. Lateral continuity of individual lignite seams within the zones is neither implied nor true; wells were drilled in low-sand (floodbasin) areas between major-sand axes, which limit seam continuity. See plate 3 for location. Full-scale geophysical well logs are available from the Bureau of Economic Geology.

by W. B. Ayers, Jr., and Amy H. Lewis

PLATE 22. LIGNITE CROSS SECTION X-X'
1985

Cartography by John T. Ames under the supervision of Richard L. Dillon.





- EXPLANATION**
- 200 ft = Contour interval
 - Control point
 - TENRAC / BEG drill site; ● cored
 - ⊙ Dome with Wilcox outcrop
 - ⊕ Water well, City of Bryan
 - Lignite power plant, operating; ▨ proposed
 - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967; 1970; 1979; 1981

- Ecb Calvert Bluff Formation
- Esb Simsboro Formation
- Eh Hooper Formation

Base map adapted from Army Map Service base maps, 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

PLATE 28. SIMSBORO OVERBURDEN MAP

1985

The depth to the top of the Simsboro (Simsboro overburden) provides an estimate of the depth required to test the entire lignite-bearing Calvert Bluff Formation.

04E1984-28

Water Quality:	Strata Depth (ft.)	Water Type
	2328-2750	Desirable

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Weisinger Water Well, Inc.**
2200 East Davis
Conroe, TX 77301

Driller Name: **James Edward Murphy** License Number: **3153**

Comments: **45.39 specific capacity @ 3503 gpm after 1 hour**
30" underreamed 2322-2770
12-20 Unimin Gravel

Amended 12/15/05 ref#2702
TWDB assigned SWN 5921108.

Report Amended on by Request #2702

Report Amended on 4/6/2017 by Request #21125

Lithology:
 DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
 BLANK PIPE & WELL SCREEN DATA

Top (ft.)	Bottom (ft.)	Description
0	8	dirt
8	60	clay
60	100	shale
100	150	clay
150	245	Sand
245	274	dark clay
274	305	clay,sandy clay
305	336	sandy clay
336	356	sand
356	428	dark clay
428	460	shale,sand
460	490	sand,shale,sand

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
24	N	Surface Casing	0-800
16	N	Surface Casing	800-2322
10	N	Blank Liner	2122-2328
10	N	Pipe Base Screen	2328-2520 .025
10	N	Blank Liner	2520-2530
10	N	Pipe BaseScreen	2530-2588 .025
10	N	Blank Liner	2588-2598
10	N	Pipe Base Screen	2598-2606 .025
10	N	Blank Liner	2606-2612
10	N	Pipe Base Screen	2612-2647 .025
10	N	Blank Liner	2647-2654
10	N	Pipe Base Screen	2654-2690 .025
10	N	Blank Liner	2690-2704

490	525	dark clay
525	560	clay,sandy shale
560	585	shale,sand
585	615	sand,clay sandy
615	650	sandy,shale
650	680	sandy shale,sand
680	710	sand,shale
710	740	sand
740	771	sand,shale streak
771	802	shale
802	833	sand
833	864	shale & sand streak
864	900	shale
900	1060	shale,sand streaks
1060	1090	shale
1090	1120	shale,sandy shale
1120	1155	shale,sand
1155	1200	sand
1200	1240	shale,sand streaks
1240	1300	sandy shale
1300	1492	sticky shale
1492	1556	shale & sand streaks
1556	1587	shale & lignite
1587	1619	shale
1619	1635	sand
1635	1650	shale & sand streaks
1650	1680	shale
1680	1713	shale & sand streaks
1713	1745	shale & sand
1745	1810	sand
1810	1840	sand & shale
1840	1871	shale & sandy shale
1871	1960	sand
1960	1980	shale
1980	2000	sand
2000	2030	hard shale
2030	2090	shale

10 N Pipe Base Screen 2704-2750 .025
10 N Blank Liner & BPV 2750-2770

2090	2155	shale,sand streaks
2155	2182	shale,hard shale
2182	2215	shale
2215	2250	shale & sand streaks
2250	2320	shale
2320	2400	sand
2400	2412	shale
2412	2435	course sand
2435	2440	sand
2440	2465	sand & shale
2465	2495	shale
2495	2515	sand
2515	2527	shale
2527	2558	shale,sand
2558	2619	sand
2619	2651	shale,sand
2651	2685	shale
2685	2746	sand
2746	2809	shale
2809	2880	sand
2880	2900	hard shale

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

STATE OF TEXAS WELL REPORT for Tracking #172420

Owner:	City of College Station Well No.7	Owner Well #:	7
Address:	P.O. Box 9960 College Station, TX 77843	Grid #:	59-21-4
Well Location:	OSR/NW of Sandy Point Rd College Station, TX	Latitude:	30° 42' 21" N
Well County:	Brazos	Longitude:	096° 29' 19" W
		Elevation:	No Data
Type of Work: New Well		Proposed Use: Public Supply	

Drilling Start Date: **11/26/2007**

Drilling End Date: **3/26/2009**

Plans Approved by TCEQ - **YES**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	48	0	92
	26	0	800
	22	800	2389

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Under-reamed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	2389	2965	Gravel	12-20 #1

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	2389	2388-Cement

Seal Method: **Positive Displacement**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **199 ft.** below land surface on **2008-03-18** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Turbine** Pump Depth (ft.): **470**

Well Tests: **Pump** Yield: **3008 GPM with 65 ft. drawdown after 36 hours**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	2395-2945	Desirable

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Weisinger Water Well, Inc.**

**2200 East Davis
Conroe, TX 77301**

Driller Name: **Clint Gaskins** License Number: **54561**

Apprentice Name: **Bobby Terry** Apprentice Number: **57233**

Comments: **PWS ID#0210002
UNIMIN #1 12-20
SCREEN GAUGE .025
26" UNDERREAMED
Assigned SWN 59-21-415 by TWDB on 6/9/2010.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	60	Clay
60	173	Clay,Some Gravel
173	204	Clay,Gravel
204	235	Clay
235	298	Clay,Sand
298	330	Gravel,Sand
330	361	Clay,Gravel
361	423	Clay
423	486	Clay,Sand
486	517	Clay
517	547	Clay,some Gravel
547	578	Sand,little gravel
578	609	Clay,little sand
609	641	Clay,sand
641	672	Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
20 N		Surface Casing	2-800
16 N		Surface Casing	800-2389
10 N		Blank Liner	2239-2395
10 N		SS Screen	2395-2468
10 N		Blank Liner	2468-2485
10 N		SS Screen	2485-2666
10 N		Blank Liner	2666-2685
10 N		SS Screen	2685-2724
10 N		Blank Liner	2724-2740
10 N		SS Screen	2740-2746
10 N		Blank Liner	2746-2761
10 N		SS Screen	2761-2767
10 N		Blank Liner	2767-2783
10 N		SS Screen	2783-2827
10 N		Blank Liner	2827-2844
10 N		SS Screen	2844-2850

672	733	Sand,Clay
733	764	Sand
764	796	Clay
796	827	Sand,Clay
827	980	Sand,Gravel
980	1011	Sand,Clay
1011	1042	Clay
1042	1074	Sand,little clay
1074	1105	sand
1105	1136	Sand,Shale
1136	1167	Shale
1167	1197	Shale,Sand
1197	1228	Clay,Sand
1228	1290	Clay
1290	1322	Clay,Gravel
1322	1385	Gravel,Clay
1385	1417	Clay,Gravel
1417	1510	Clay
1510	1541	Lignite,Clay
1541	1572	Clay,Gravel
1572	1603	Gravel
1603	1634	Gravel,little Sand
1634	1665	Gravel,Sand
1665	1674	Clay
1674	1759	Sand,some Gravel
1759	1791	Gravel,Sand
1791	1822	Clay
1822	1853	Gravel
1853	1914	Sand
1914	1945	Sand,Gravel
1945	1977	Clay,Sand
1977	2007	Clay,some Sand
2007	2037	Clay
2037	2069	Shale,Clay
2069	2101	Shale,little Clay
2101	2163	Gravel,Clay
2163	2194	Clay,Sand

10 N Blank Liner 2850-2868
10 N SS Screen 2868-2945
10 N Blank Liner & BPV 2945-2965
Cement Plug 2970-3000

2194	2225	Clay,Sand
2225	2256	Lignite,Clay
2256	2287	Clay,little Gravel
2287	2319	Clay
2319	2382	Clay,Sand
2382	2413	Sand
2413	2475	Sand,little Clay
2475	2506	Clay,Sand
2506	2537	Sand,some Clay
2537	2569	Sand
2569	2630	Sand,Gravel
2630	2660	Gravel,little Sand
2660	2691	Clay,Gravel
2691	2723	Clay,Gravel,Shale
2723	2754	Gravel,Clay
2754	2785	Clay,Shale
2785	2817	Clay,Sand
2817	2848	Sand,Clay
2848	2879	Sand,little Clay
2879	2910	Sand
2910	2941	Sand,Gravel
2941	3000	Clay,Shale

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Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

STATE OF TEXAS WELL REPORT for Tracking #195663

Owner: City of College Station	Owner Well #: Sparta No. 1
Address: 1101 Texas Avenue College Station, TX 77842	Grid #: 59-21-5
Well Location: From OSR & FM 1687 - 2.5 mi on FM 1687 to water plant College Station, TX 77842	Latitude: 30° 41' 56" N
	Longitude: 096° 27' 06" W
Well County: Brazos	Elevation: No Data
Type of Work: New Well Proposed Use: Public Supply	

Drilling Start Date: **2/15/2006** Drilling End Date: **5/26/2006** Plans Approved by TCEQ - **YES**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	36	0	40
	24	40	441
	18	441	540

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; 24" Underream**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	361	540	Gravel	

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	441	546

Seal Method: **Positive Displacement**

Distance to Property Line (ft.): **No Data**

Sealed By: **Advanced Oilwell Service**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level:	132.4 ft. below land surface on 2006-06-08	Measurement Method: Unknown
Packers:	n/a	
Type of Pump:	Turbine	Pump Depth (ft.): 350
Well Tests:	Pump	Yield: 1218 GPM with 81.6 ft. drawdown after 36 hours

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **J & S Water Wells**
P.O. Box 675
Bellville, TX 77418

Driller Name: **Monte D. Richardson** License Number: **54385**

Comments: **Type pump: Goulds Model # 11CMC-7 / 125 HP USEM**
\$mew
TWDB SW #59-21-510
7/8/2010 Doc Jones

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	40	30-inch Conductor
40	44	Red Clay
44	65	Gray Sand & Rocks
65	92	Gray Clay & Sand Streaks
92	127	Gray Clay
127	185	Gray Shale
185	233	Rocks & Shale
233	243	Gray Sand & Shale Streaks
243	285	Gray Shale & Clay
285	333	Gray Semi-Coarse Sand
333	360	Gray Clay
360	365	Sand
365	420	Gray Clay
420	500	Light Gray Coarse Sand
500	520	Hard Rocks & Coarse Sand
520	577	Hard Gray Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
Installed Material Record & Figure attached to original form.			

577	600	Gray Sand & Rocks
600	630	Gray Sand
630	640	Rocks & Sand
640	688	Clay & Sand Streaks
688	780	Gray Sand Mixed with Some Rocks
780	790	Gray Clay
790	864	Gray Sand & Rocks

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

STATE OF TEXAS WELL REPORT for Tracking #212279

Owner:	CITY OF COLLEGE STATION WELL # 8	Owner Well #:	3
Address:	300 KRENEK RD, 2ND FLOOR COLLEGE STATION, TX 77840	Grid #:	59-20-3
Well Location:	4036 WEST OSR BRYAN, TX 77807	Latitude:	30° 42' 32" N
Well County:	Brazos	Longitude:	096° 30' 24" W
		Elevation:	No Data
Type of Work: New Well		Proposed Use: Public Supply	

Drilling Start Date: **10/19/2009**

Drilling End Date: **3/6/2010**

Plans Approved by TCEQ - **YES**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	42	0	86
	30	86	1200
	22	1200	2146

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Under-reamed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	1986	2749	Gravel	12/20

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	86	92
	0	2146	2083

Seal Method: **Positive Displacement**

Distance to Property Line (ft.): **50**

Sealed By: **SCHLUMBERGER**

Distance to Septic Field or other concentrated contamination (ft.): **150**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **ENGINEERING FIRM**

Surface Completion: **Surface Slab Installed**

Water Level: **103.33 ft. below land surface on 2010-03-06** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Turbine** Pump Depth (ft.): **585**

Well Tests: **Pump** Yield: **3002 GPM with 70 ft. drawdown after 36 hours**

Plug Information:	Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
	2790 TO 2750 40 SACKS		

Water Quality:	Strata Depth (ft.)	Water Type
	SEE ABOVE	FRESH

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **ALSAY INCORPORATED**
6615 GANT
HOUSTON, TX 77066

Driller Name: **BRITT ROLLIE** License Number: **4992**

Apprentice Name: **DAVID SIGMAN** Apprentice Number: **58292**

Comments: **Hammons, Travis P.**
58346
TWDB swm 5920317 added 3/19/2013

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

From (ft)	To (ft)	Description
0	6	Sub-structure
6	27	Dark Brown Clay
27	68	Gravel
68	132	Gray Sandy Clay
132	204	Dark Gray Coarse Sand w/ Lignite
204	244	Dark Gray Clay
244	256	Sand (Dark Gray)
256	266	Clay (Dark Gray)
266	332	Sand (w/ Clay Streaks)
332	362	Clay (Dark Gray)
362	400	Sand (Dark Gray)
400	424	Clay (Dark Gray)
424	610	Sand (Gray)
610	634	Clay (Dark Gray)

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
36	N	STEEL	0-86 .312
24	N	STEEL (ABOVE NAT. GRND LVL)	12-1200 .500
16	N	STEEL W/SWEDGE	1200-2146 .500
10-3/4	N	STEEL W/SS SCREEN	1976-2160 .500
10-3/4	N	STEEL W/SS SCREEN	2160-2284 .500
10-3/4	N	STEEL W/SS SCREEN	2284-2292 .500
10-3/4	N	STEEL W/SS SCREEN	2292-2466 .500
10-3/4	N	STEEL W/SS SCREEN	2466-2472 .500
10-3/4	N	STEEL W/SS SCREEN	2472-2484 .500
10-3/4	N	STEEL W/SS SCREEN	2484-2489 .500
10-3/4	N	STEEL W/SS SCREEN	2489-2550 .500
10-3/4	N	STEEL W/SS SCREEN	2550-2556 .500
10-3/4	N	STEEL W/SS SCREEN	2556-2577 .500
10-3/4	N	STEEL W/SS SCREEN	2577-2582 .500
10-3/4	N	STEEL W/SS SCREEN	2582-2592 .500

634 û 700 Sand (Gray)
700 û 870 Clay (Gray)
870 û 930 Gray Sandy Clay
930 û 1122 Sand (Few Clay Streaks)
1122 û 1228 Clay (Gray)
1228 û 1268 Sandy Clay (Gray)
1268 û 1282 Clay (Gray)
1282 û 1370 Sandy Gray Clay
1370 û 1702 Clay (Gray)
1702 û 1774 Sandy Gray Clay
1774 û 1804 Clay (Gray)
1804 û 1814 Sand (Gray)
1814 û 1842 Sandy Clay (Gray)
1842 û 1926 Sand (Gray)
1926 û 1960 Sandy Gray Clay
1960 û 1996 Sand (Gray)
1996 û 2010 Clay (Gray)
2010 û 2036 Sand (Gray)
2036 û 2050 Clay (Gray)
2050 û 2054 Sand
2054 û 2066 Clay (Gray)
2066 û 2132 Sand (Gray)
2132 û 2160 Sandy Clay (Gray)
2160 û 2284 Sand
2284 û 2292 Clay (Whitish Gray)
2292 û 2594 Sand (Some Lignite Streaks)
2594 û 2630 Clay (Gray)
2630 û 2816 Sand
2816 û 2860 Sandy Clay (Gray)
2860 û 2874 Sand
2874 û 2904 Clay (Gray)
2904 û 3007 Sandy Gray Clay

10-3/4 N STEEL W/SS SCREEN 2592-2631 .500
10-3/4 N STEEL W/SS SCREEN 2631-2724 .500
10-3/4 N STEEL W/SS SCREEN 2724-2749 .500

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

STATE OF TEXAS WELL REPORT for Tracking #332785

Owner: City of College Station	Owner Well #: No Data
Address: 1101 Texas Avenue College Station, TX 77842	Grid #: 59-21-4
Well Location: 6 mi. N Hwy21 on OSR College Station, TX 77842	Latitude: 30° 41' 54" N
Well County: Brazos	Longitude: 096° 29' 19" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Public Supply	

Drilling Start Date: **1/25/2006** Drilling End Date: **2/9/2006** Plans Approved by TCEQ - **YES**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	24	0	40
	22	40	1110
	18	1110	1360

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Under-reamed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	1020	1360	Gravel	

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	1110	1006

Seal Method: **Positive Displacement**

Distance to Property Line (ft.): **No Data**

Sealed By: **Advanced Oilwell Services**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **83.7 ft. below land surface on 2006-05-15** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Turbine** Pump Depth (ft.): **460**

Well Tests: **Pump** Yield: **863 GPM with 210 ft. drawdown after 36 hours**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information:

Driller Name: **Monte Richardson** License Number: **54385**

Comments: **Carrizo Well #1**
24 conductor 36' Hole
24' Underream

^CLH

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	40	24 inch conductor
40	126	gray clay
126	140	gray sand
140	170	clay
170	185	gray sand
185	240	rocks & clay
240	350	rocks & gray sand
350	380	hard gray shale
380	400	gray sand & rocks
400	413	gray clay
413	423	hard gray sand with coal streaks
423	454	gray clay & coal
454	510	gray clay & rocks
510	540	sand & coal

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
See Attached Installed Material record			

540	570	sand & rocks with coal streaks
570	618	gray clay & coal
618	628	gray sand
628	640	gray clay
640	685	gray sand
685	705	gray clay
705	826	gray sand
826	1030	hard gray clay
1030	1115	gray clay & rocks
1115	1260	white sand & rocks
1260	1290	white sand with clay streaks
1290	1330	gray clay
1330	1340	white sand & rocks
1340	1390	gray clay
1390	1400	white sand
1400	1415	coal
1415	1446	hard gray clay

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**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
Cement	2634	2800

Water Quality:

Strata Depth (ft.)	Water Type
2088 - 2610	Fresh

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Weisinger, Inc**
2200 E DAVIS ST
Conroe, TX 77301

Driller Name: **Larry Jernigin** License Number: **50285**

Apprentice Name: **Seth Flynt** Apprentice Number: **59915**

Comments: **Datum Point (FT): 12ft above ground level for lithology, Casing, Screen, Liner and well completion depths.**

Lithology:
 DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
 BLANK PIPE & WELL SCREEN DATA

Top (ft.)	Bottom (ft.)	Description
0	160	sand
160	220	sand with clay seams
220	305	sand
305	310	sandy clay
310	550	sand
550	580	sandy clay
580	635	sand
635	740	sandy clay
740	770	clay with sand seams
770	785	clay
785	795	clay/sand
795	1000	sand with clay seams
1000	1020	clay
1020	1070	sand
1070	1085	sandy clay

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
24	Surface Casing	New Steel	.500	2	1200
20	Surface Casing	New Steel	.500	1200	2078
14	Blank	New Steel	.500	1928	2088
14	Screen	New Pipe Base Stainless Steel	.500 0.025	2088	2358
14	Blank	New Steel	.500	2358	2368
14	Screen	New Pipe Base Stainless Steel	.500 0.025	2368	2430
14	Blank	New Steel	.500	2430	2444
14	Screen	New Pipe Base Stainless Steel	.500 0.025	2444	2610
14	Blank	New Steel	.500 0.5	2610	2630

1085	1290	sand/lignite
1290	1300	clay/lignite
1300	1335	sand lignite
1335	1350	clay/lignite
1350	1775	sand/lignite
1775	1800	sand
1800	1880	sandy clay/ lignite
1880	1970	sandy clay/lignite
1970	1985	clay
1985	2090	sand/clayseams/lignite
2090	2680	sand/lignite seams
2680	2800	sand seams/shale/lignite

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**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

Please use black ink.
Send original copy by certified mail to the Texas Water Commission P.O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER Robt. Earl Bishop (Name) Address P.O. Box 131 (Street or RFD) HEARNE, TX. (City) 77859 (State) (Zip)
2) LOCATION OF WELL: County ROBERTSON 1 miles in N direction from HEARNE (N.E., S.W., etc.) (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.
 Legal description: Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
#1. See attached map.

3) TYPE OF WORK (Check): New Well Deepening Reconditioning Plugging
4) PROPOSED USE (Check): Domestic Industrial Monitor Public Supply Irrigation Test Well Injection Other _____
5) DRILLING METHOD (Check): Mud Rotary Air Hammer Jetted Bored Air Rotary Cable Tool Other _____ Driven

6) WELL LOG: Date Drilling: Started 5-23 1988 Completed 5-28 1988
DIAMETER OF HOLE: Dia. (in.) From (ft.) To (ft.)
Surface 1 1/4 555
3/8 555 4193
7) BOREHOLE COMPLETION: Open Hole Straight Wall Underreamed Gravel Packed Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
0	45	CLAY, IRON ORE, + SAND						
45	60	GRAY CLAY						
60	75	SHALE	4	N	P.V.C.	0	540	
75	230	SAND	2	N	GALV. STEEL	507	1131	
230	285	SAND + S-SHALE	2	N	S.S. (U.B.) SCREEN	1131	1151	.020
285	307	SAND (B)	2	N	GALV. STEEL	1151	1193	
307	351	SHALE + S-SHALE						
351	353	COAL						
353	390	SHALE						
390	430	SAND						
430	460	" + S-SHALE						
460	485	SHALE + S-SHALE						
485	500	SHALE						
500	530	BROWN SHALE + COAL						
530	555	S-SHALE						
555	610	SHALE						
610	675	SAND						
675	678	COAL						
678	700	S-SHALE						
700	730	" + SAND						
730	804	" + SHALE						
804	828	SHALE 1093-1104 S-SHALE						
828	920	SAND 1104-1118 SHALE + COAL						
920	939	SHALE 1118-1153 SAND						
939	960	" + SAND						
960	968	COAL 1153-1193 SAND +						
968	1015	SHALE S-SHALE						
1015	1093	SAND (B)						

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 540 ft. No. of Sacks Used 26
ft. to _____ ft. No. of Sacks Used _____
Method used PRESSURE
Cemented by P. BRIEN

10) SURFACE COMPLETION
 Specified Surface Slab Installed [Rule 319.44(c)]
 Pitless Adapter Used [Rule 319.44(d)]
 Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 78 ft. below land-surface Date 5-28-88
Artesian flow _____ gpm. Date _____

12) PACKERS: Type _____ Depth _____

13) TYPE PUMP:
 Turbine Jet Submersible Cylinder
 Other _____
Depth to pump bowls, cylinder, jet, etc., 180 ft.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? Yes No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? Yes No

14) WELL TESTS:
Type Test: Pump Bailer Jetted Estimated
Yield: 50 gpm with _____ ft. drawdown after _____ hrs.

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BRIEN WATER WELLS (Type or Print) Water Well Driller's License No. 1750
ADDRESS Rt. 1 Box 702 (Street or RFD) HEARNE (City) TX. (State) 77859 (Zip)
(Signed) [Signature] (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. For TWC use only Well No. 59-03-9 Located on map _____

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Board and the Texas Water Commission are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

“Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a Commission copy, shall include the name, mailing address, and telephone number of the Board and the Commission. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record.”

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER LARRY ZEIG (Name) Address P.O. Box 653 HEARNE, TX 77859 (Street or RFD) (City) (State) (Zip)
 2) LOCATION OF WELL: County Robertson 1 miles in N direction from HEARNE (Town)

Legal description: Section No. _____ Block No. _____ Township _____
 Abstract No. _____ Survey Name _____
 Distance and direction from two intersecting section or survey lines _____
 See attached map. # 13 Map on 59-04-7E

3) TYPE OF WORK (Check):
 New Well Deepening Reconditioning Plugging
 Domestic Industrial Public Supply Irrigation Test Well Other _____
 5) DRILLING METHOD (Check):
 Mud Rotary Air Hammer Driven Bored
 Air Rotary Cable Tool Jetted Other _____

6) WELL LOG: DIAMETER OF HOLE
 Dia. (in.) From (ft.) To (ft.)
 Date drilled 10-22-84

<u>6 1/4</u>	Surface	<u>555</u>
<u>3 3/4</u>	<u>555</u>	<u>1270</u>

 7) BOREHOLE COMPLETION:
 Open Hole Straight Wall Underreamed
 Gravel Packed Other _____
 If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	To	Gage Casing Screen
		<u>0-49 SAND, CLAY, IRON ORE</u>						
		<u>49-135 Shale</u>						
		<u>135-185 SAND+S-SHALE</u>	<u>4</u>	<u>N</u>	<u>BK STEEL</u>	<u>0</u>	<u>549</u>	
		<u>185-209 SAND</u>	<u>2</u>	<u>N</u>	<u>GALV. ✓</u>	<u>540</u>	<u>1229</u>	
		<u>209-385 SAND+S-SHALE</u>	<u>2</u>	<u>N</u>	<u>S.S. UNDERBAR SCREEN</u>	<u>1229</u>	<u>1249</u>	<u>01.2</u>
		<u>385-453 S-SHALE</u>	<u>2</u>	<u>N</u>	<u>GALV. STEEL</u>	<u>1249</u>	<u>1270</u>	
		<u>453-455 COAL</u>						
		<u>455-568 S-SHALE</u>						
		<u>568-588 SAND (B)</u>						
		<u>588-708 SAND+S-SHALE</u>						
		<u>708-787 SAND (FINE)</u>						
		<u>787-861 S-SHALE</u>						
		<u>861-879 SAND (B)</u>						
		<u>879-887 COAL+SHALE</u>						
		<u>887-987 S-SHALE+SHALE</u>						
		<u>987-990 COAL</u>						
		<u>990-1033 Shale 1207-1213 SAND (FINE)</u>						
		<u>1033-1036 COAL 1213-1221 Shale</u>						
		<u>1036-1062 Shale 1221-1269 SAND</u>						
		<u>1062-1070 COAL 1269-1270 Shale</u>						
		<u>1070-1100 Shale</u>						
		<u>1100-1108 SAND</u>						
		<u>1108-1119 Shale</u>						
		<u>1119-1135 SAND (B)</u>						
		<u>1135-1163 ✓</u>						
		<u>1163-1178 ✓ (FINE+BROKEN)</u>						
		<u>1178-1207 Shale</u>						

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:
 CEMENTING DATA
 Cemented from 0 ft. to 549 ft.
 Method used PRESSURE
 Cemented by P. BRIEN (Company or Individual)

9) WATER LEVEL:
 Static level 115 ft. below land surface Date 11-8-84
 Artesian flow _____ gpm. Date _____

10) PACKERS: Type Depth
LEAD SEAL 540'
K-PACKER 541'
ESLAP 1092', 1197', & 1218'

11) TYPE PUMP:
 Turbine Jet Submersible Cylinder
 Other _____
 Depth to pump bowls, cylinder, jet, etc., 294 ft.

13) WATER QUALITY:
 Did you knowingly penetrate any strata which contained undesirable water? Yes No
 If yes, submit "REPORT OF UNDESIRABLE WATER"
 Type of water? _____ Depth of strata _____
 Was a chemical analysis made? Yes No

12) WELL TESTS:
 Type Test: Pump Bailer Jetted Estimated
 Yield: 30 gpm with _____ ft. drawdown after _____ hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

COMPANY NAME BRIEN WATER WELLS Water Well Driller's License No. 1750
 ADDRESS RT 1 Box 702 HEARNE TX 77859
 (Signed) P. Brien (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. For TDWR use only Well No. 59-04-7E Located on map YES DLE

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

"Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).

01-18-81
10:10 AM
NO. 1111
DEPARTMENT OF WATER RESOURCES

Please use black ink.
Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER RONNIE SWARNER (Name) Address 26 Woodland DR HEARNE, TX 77859 (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL: County ROBERTSON (County) miles in N (N.E., S.W., etc.) direction from HEARNE (Town)

Legal description: Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
 See attached map. # 1.

3) TYPE OF WORK (Check): New Well Deepening Reconditioning Plugging
4) PROPOSED USE (Check): Domestic Industrial Public Supply Irrigation Test Well Other _____
5) DRILLING METHOD (Check): Mud Rotary Air Hammer Driven Bored Air Rotary Cable Tool Jetted Other _____

6) WELL LOG: Date drilled 9-5-84
DIAMETER OF HOLE: Dia. (in.) From (ft.) To (ft.)
6 1/4 Surface 445
3 3/8 445 1225
7) BOREHOLE COMPLETION: Open Hole Straight Wall Underreamed Gravel Packed Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
0-35		Clay + Iron Ore						
35-125	800-822	Shale						
125-340	822-827	SAND (B)	4	N	P.V.C.	0	440	
340-361	827-828	S-Shale	2	N	Galv. Steel	409	1190	
361-365	828-835	Rock	2	N	S.S. Underbar Screen	1190	1210	dia 2
365-445	835-854	S-Shale	2	N	Galv. Steel	1210	1225	
445-450	854-856	SAND						
450-470	856-871	Shale + Coal						
470-488	871-880	SAND (B)						
488-490	880-895	S-Shale						
490-500	895-905	S-Shale						
500-510	905-910	SAND						
510-518	910-933	S-Shale						
518-530	933-946	S-Shale						
530-580	946-955	SAND						
580-628	955-973	Shale						
628-654	973-984	Rock						
654-655	984-981	Shale						
655-667	981-986	SAND + S-Shale						
667-699	986-1008	SAND (B)						
699-705	1008-1020	S-Shale						
705-715	1020-1106	SAND (B)						
715-740	1106-1166	Shale + Coal						
740-750	1166-1173	SAND						
750-777	1173-1195	S-Shale						
777-795	1195-1220	Shale						
795-800	1220-1225	Coal						

8) CASING, BLANK PIPE, AND WELL SCREEN DATA: (Data from table above)
9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 440 ft.
ft. to _____ ft.
Method used PRESSURE
Cemented by P. BRIEN

10) SURFACE COMPLETION
 Specified Surface Slab Installed [Rule 319.44(c)]
 Pitless Adapter Used [Rule 319.44(d)]
 Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 103 ft. below land surface Date 9-8-84
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth
Burlap 1075' & 1096'
K-PARKER 409' & 430'

13) TYPE PUMP:
 Turbine Jet Submersible Cylinder
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: Pump Bailer Jetted Estimated
Yield: 30 gpm with _____ ft. drawdown after _____ hrs.

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BRIEN WATER WELLS Water Well Driller's License No. 1750
(Type or Print)
ADDRESS RT. 1 Box 202 HEARNE TX 77859
(Street or RFD) (City) (State) (Zip)
(Signed) [Signature] (Signed) _____
(Licensed Water Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.
For TDWR use only
Well No. 59-04-7J
Located on map Yes C.F.S.

- #1 SWANER
- #2 BRADLEE
- #3 MIDDLETON
- #4 HORN
- #5 CONDOD
- #6 CODELAND
- #7 HARRIS
- #8 VOGELSMAN
- #9 KIRKNEY
- #10 LANGFORD
- #11 MARTIN
- #12 CRAYBELL
- #13 MARTINEZ
- #14 WILLKERSON



**GENERAL HIGHWAY MAP
ROBERTSON COUNTY
TEXAS**

PREPARED BY THE
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
TRANSPORTATION PLANNING DIVISION
IN COOPERATION WITH THE
FEDERAL DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

1969
1970 CENSUS FIGURES
HIGHWAYS REVISED TO MARCH 1, 1969.

Scale: 1 inch = 10 miles
Copyright © 1969 by the State Department of Highways and Public Transportation, Austin, Texas 78701.
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Approved by U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.



ATTACHMENT 4 –
SELECTED REFERENCES

SELECTED REFERENCES

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<http://www.twdb.texas.gov/groundwater/data/index.asp>

Theis, C.V., 1935, *The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Groundwater Storage: Transactions of the American Geophysical Union*, v. 16, p. 519-524.

Thornhill Group, Inc., 2018, Calvert Mine, Permit No. 27H – 2017 Annual Simsboro Depressurization/Drawdown Report, Prepared for Walnut Creek Mining Company for Submittal to the Surface Mining Division of the Texas Railroad Commission, October 19, 2018.

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