



June 13, 2023

Mr. Alan M. Day, General Manager
Brazos Valley Groundwater Conservation District
112 West 3rd Street
Hearne, Texas 77859

Re: Supplemental Information for Corpora Farms Permit Applications –
Responses to Questions/Comments from District Consultants

Dear Mr. Day:

Thornhill Group, Inc. (TGI) received from you on June 2, 2023 the e-mailed transmittal of questions and comments from Ground Water Consultants (GWC) and Advanced Groundwater Solutions (AGS) regarding the Corpora Farms Aquifer Evaluation Report that TGI prepared and is dated March 17, 2023. This letter provides our responses to those questions and comments.

Note that the report was primarily prepared by Mr. Wesley Bluvstein, P.G. and was signed and sealed by him as a professional geoscientist licensed in Texas. Mr. Bluvstein is no longer with our firm. Therefore, the responses are prepared and submitted by Mr. Eric Seeger, P.G. and me. The GWC/AGS comments are provided below followed by our responses. In-text tables are provided within this letter under the comment in which they are addressed. Otherwise, applicable tables, maps, and other information are provided in the Attachment section to this letter.

GWC/AGS Questions and Comments and TGI Responses

- 1. Table 2 does not provide information on all of the wells screening sands of the Simsboro Aquifer located within one mile of the proposed wells as shown on Figures 2, 2-A, 2-B, 2-C, and 2-D. Please add the missing wells to Table 2.*

Table 2 has been corrected and the missing wells have been added (see Attachment).

- 2. The estimated base of the Simsboro Aquifer at the Corpora_1 location is listed as 1,112 feet, yet the total depth of the nearby City of Calvert Well screening sands of the Simsboro Aquifer is 738 feet. Can additional data be provided supporting the estimated depth to the base of the Simsboro Aquifer at Corpora_1?*

The estimated depth to the base of the Simsboro Formation at the Corpora_1 location is 1,112 feet below ground level (BGL) based on the dataset found in the Groundwater Availability Model for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (October, 2020) herein referenced as “the GAM”.

Plate 5 from the University of Texas Bureau of Economic Geology (BEG) report titled *The Wilcox Group and Carrizo Sand (Paleogene) in East-Central Texas: Depositional Systems and Deep-Basin Lignite* shows that the thickness of major sands in the Simsboro at the City of Calvert is at least 400 feet. Plate 28 from the same report shows that the overburden above the top of the Simsboro is 600 feet thick at Calvert. Therefore, it is reasonable to assume that the depth to the base of the Simsboro is closer to 1,112 feet than it is to 738 feet (the reported depth of one of Calvert’s nearby wells).

TGI searched the BVGCD and TWDB databases to find information regarding the well completion for the well cited by GWC/AGS, which is Well 59-03-210 (BVOP-0011). The records note that no drillers log could be found for the well and there is no completion information (i.e., screen settings) available in the records. It is certainly possible, if not likely, that only the upper portion of the Simsboro was screened in the subject Calvert well.

TGI believes that there is no correction to be made for Item No. 2.

- 3. Pages 10 and 11 of the report text refers to “infinitesimal reduction in pore pressure”. Please explain what is meant by the statement.*

TGI has completed several Aquifer Evaluation Reports for clients within the BVGCD (see Circle X, Harlan Farms, James Brien, and Trey Skiles reports as examples). TGI has noted in every BVGCD report that, while artesian pressure will be reduced, the aquifer will experience “an infinitesimal reduction in STORAGE”.

We are unsure as to why Mr. Bluvstein reported that there would be an “infinitesimal reduction in pore pressure”. However, Mr. Bluvstein’s statement infinitesimal reduction in pore pressure is erroneous. In fact, reduction in artesian pressure is the primary impact of pumping as was modeled in the Corpora report.

Please correct the report as follows:

- Page 10 of 11
 - Replace the sentence, “It is highly likely that all wells will only experience an infinitesimal reduction in pore pressure at depth even under the longest evaluated time frame” with “The Simsboro Aquifer will exhibit an infinitesimal reduction of aquifer storage throughout decades of pumping.”
- Page 11 of 11
 - Replace the words “pore pressure” with “storage”.

4. What GAM stress period/year are the extracted GAM heads from in the table on Page 7 of the Aquifer Evaluation Report?

TGI does not know which GAM stress period Mr. Bluvstein used for the water-level elevations in the referenced table on Page 7 of the Aquifer Evaluation Report. TGI believes that monitored water levels provide a more accurate basis for the evaluations. Therefore, we have replaced the table on Page 7 with the table below which utilizes measured water levels from the most recent (i.e., 2023) available measurements in the BVGCD dataset. The water-level elevations are rounded as these are estimated values at each of the proposed Corpora well sites.

Well Identification	Estimated Water Level Elevation (ft AMSL)	Simsboro Top (ft AMSL)	Artesian Head (ft)
Corpora_1	175	-382	557
Corpora_2	200	-344	544
Corpora_3	200	-189	389
Corpora_4	200	-344	544
Corpora_5	175	-563	738
Corpora_6	175	-494	669
Corpora_7	175	-503	378
Corpora_8	150	-703	853
Corpora_9	150	-784	934
Corpora_10	150	-882	1,032
Corpora_11	150	-874	1,024
Corpora_12	150	-1,352	1,502
Corpora_13	150	-1,362	1,512

Notes: Estimated water level elevation is based on the depth to water level reported on the BVGCD Groundwater Map for surrounding monitoring wells completed in the Simsboro aquifer. The Simsboro top is from the GAM geodatabase (October, 2020).

5. *On page 7 of the report a table lists artesian heads in the Simsboro Aquifer and data available from the District show that the heads are somewhat lower at numerous well locations than listed on the table.*

TGI agrees with the GWC/AGS assessment of water levels from the GAM compared to measured values. Accordingly, we have replaced the table on Page 7 and have utilized the most recent available water-level measurements in the BVGCD database (see Item No. 4 above).

6. *Please check the 1-year and 10-year GAM and analytical modeling results shown in the table on Page 10 of 11 of the TGI Aquifer Evaluation Report. Some drawdown values shown in the table on Page 10 of the TGI report are not in agreement with the contours shown on Figures 5, 6, 7, and 8 in the TGI Aquifer Evaluation Report.*

TGI reviewed the contour maps illustrating the GAM simulations drawdown and analytical drawdown calculations and noted discrepancies in the table on Page 10 of 11 of the Aquifer Evaluation Report. TGI has submitted corrections as noted in Item 6.a. and Item 6.b. below.

- a. *GAM verification runs result in drawdown contours that are generally similar to the GAM contours shown on Figures 5 and 6 of the TGI Aquifer Evaluation Report. The contours developed from the GAM verification runs are in general agreement with the 1-year and 10-year GAM simulated drawdown values for most wells shown on Table 1 of the TGI Aquifer Evaluation Report.*

The contour maps illustrating drawdown from GAM simulations are correct. However, TGI noted some discrepancies in the tabulated values on Page 10 of 11 in comparison to Figure 5 and Figure 6. TGI has corrected the table in accordance with the contours in Figure 5 and Figure 6, and re-submits it herein. Please replace the table on Page 10 of 11 in the original Aquifer Evaluation Report with the table below (see 6.b.).

- b. *We were able to generally recreate the 1-year and 10-year analytical model results for most of the wells shown on Table 1 of the Aquifer Evaluation Report; however, there are large differences between the simulated drawdown results at the Corpora wells shown in the table on Page 10 of 11 of the TGI Aquifer Evaluation Report and the results obtained during the AGS analytical modeling verification simulations. AGS used the Corpora well production rates and aquifer properties outlined in the Aquifer Evaluation Report to estimate drawdown values at 1-foot from the well(s). Please elaborate on the TGI methodology, if different from the above, used to estimate the*

analytical model results at the Corpora wells shown in the table on Page 10 of 11 of the TGI Aquifer Evaluation Report.

TGI noted discrepancies in the analytical values. We could not replicate Mr. Bluvstein’s Theis calculations and noted that several of the well location inputs were in error; therefore, TGI re-constructed the analytical calculations in accordance with the methodology used in our previous reports submitted to BVGCD. We have re-created the drawdown maps and corrected the tabulation. Please replace Figure 7 and Figure 8 in the original Aquifer Evaluation Report with Figure 7 (Revised) and Figure 8 (Revised), respectively. Also, please replace the table on Page 10 of 11 of the original Aquifer Evaluation Report with the tabulation below.

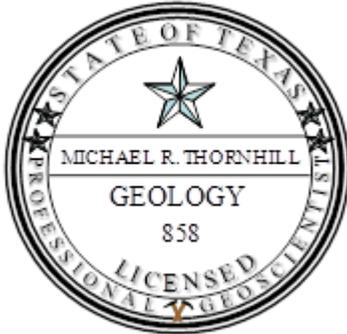
Well Identification	1-Year GAM Drawdown (ft)	10-Year GAM Drawdown (ft)	1-Year Analytical Drawdown (ft)	10-Year Analytical Drawdown (ft)
Corpora_1	57	67	82	94
Corpora_2	70	75	97	110
Corpora_3	65	70	95	108
Corpora_4	70	78	98	111
Corpora_5	64	73	90	102
Corpora_6	78	88	98	110
Corpora_7	70	80	93	105
Corpora_8	53	65	108	121
Corpora_9	54	66	104	116
Corpora_10	40	50	83	95
Corpora_11	40	50	83	95
Corpora_12	28	40	59	71
Corpora_13	28	40	64	75

If you have any questions, please feel free to contact me or Mr. Eric Seeger directly at (512) 244-2172.

Sincerely,
THORNHILL GROUP, INC.



Michael R. Thornhill, P.G.
President



The seal appearing on this document was authorized
by Michael R. Thornhill, P.G. on June 13, 2023.

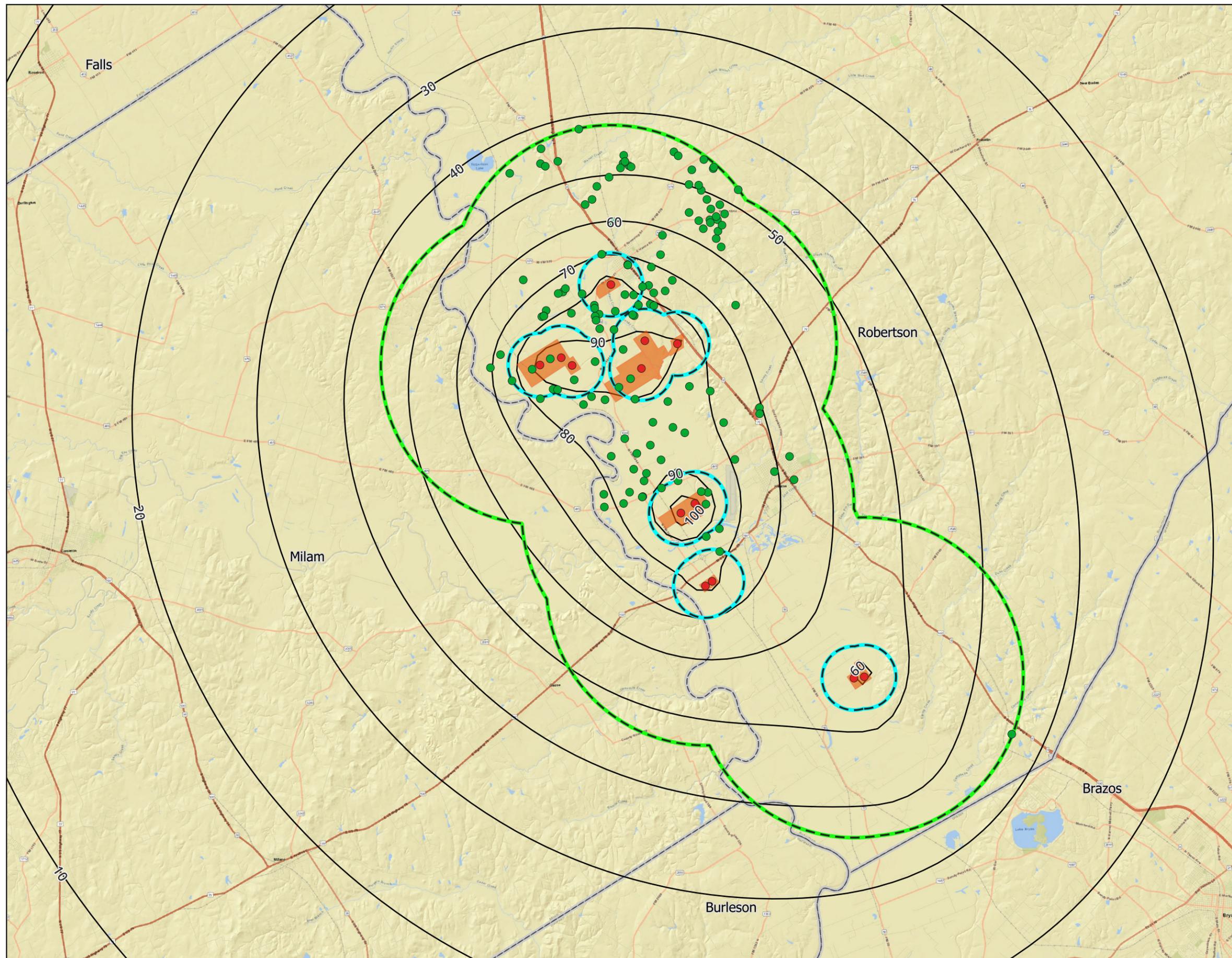
Attachments

cc: Mr. Ed McCarthy, McCarthy & McCarthy LLP
Ms. Sandra C. Ryan, Sandra C. Ryan Trust (Corpora)
Ms. Bernadette C. Priestly, Bernadette C. Priestly Trust (Corpora)

Attachment 1 – Table and Figures

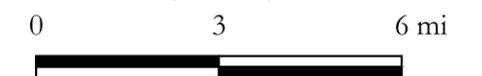
Table 2. Registered/Permitted Simsboro Wells Within a One-Mile Radius - Revised 06/11/2023

Registration or Permit Number	Latitude	Longitude	Name of Well	Owner	Well Depth	Casing Diameter	Casing Depth	Screen Diameter	Screen Depth	Aquifer
BVDO-0055	30.920306	-96.679457	Well #1 Hall Farm	Sandra Ryan & Bernadette Sloat	840	16	675	16	830	Simsboro
BVDO-0090	30.934265	-96.715276	Anderson Well #1	Sandra Ryan & Bernadette Sloat	656	16	546	16	646	Simsboro
BVDO-0091	30.929765	-96.725049	Anderson Well #2	Sandra Ryan & Bernadette Sloat	565	24	421	16	565	Simsboro
BVDO-0292	30.932321	-96.691592	Well B	UW/Brazos Valley Farms	Null	Null	Null	Null	Null	Simsboro
BVDO-0295	30.937419	-96.676559	PS10	UW/Brazos Valley Farms	Null	Null	Null	Null	Null	Simsboro
BVDO-0303	30.954950	-96.680068	PS10	UW/Brazos Valley Farms	Null	Null	Null	Null	Null	Simsboro
BVHU1058D	30.873823	-96.658700	Null	UW/Brazos Valley Farms	1,113	16	1,011	16	1,111	Simsboro
BVHU-1058E	30.876867	-96.649833	Null	UW/Brazos Valley Farms	1,175	16	984	16	1,173	Simsboro
BVHU-1058J	30.914647	-96.671122	Null	UW/Brazos Valley Farms	875	16	Null	Null	Null	Simsboro
BVHU-1058K	30.924333	-96.702966	Null	UW/Brazos Valley Farms	720	16	497	16	537	Simsboro
BVHU-1058L	30.920417	-96.714283	B68S	UW/Brazos Valley Farms	691	16	Null	Null	Null	Simsboro
BVOP-0010	30.976071	-96.672705	Well #1	City of Calvert	683	16	534	16	679	Simsboro
BVOP-0011	30.975810	-96.672639	Well #5	City of Calvert	738	Null	Null	Null	Null	Simsboro
BVOP-0012	30.975019	-96.673443	Well #6	City of Calvert	661	16	517	9	659	Simsboro
BVR-0023	30.953885	-96.688707	Null	Deason, Jack	510	4	452	2.5	500	Simsboro
BVR-0242	30.920142	-96.711937	Null	UW/Brazos Valley Farms	610	4	560	2.5	607	Simsboro
BVR-0380	30.867554	-96.636420	Well #2	Ryan, Melvin & Sandra	1,100	4	400	2	1,079	Simsboro
BVR-0846	30.958966	-96.674405	Null	Triple C Ranch	590	4	540	2	570	Simsboro
BVR-0985	30.923989	-96.673093	House Well	Sandra Ryan & Bernadette Sloat	735	4	640	2	735	Simsboro
BVR-1479	30.871121	-96.634251	Well #3	Zeig, Joey	1,080	4	850	2	1,050	Simsboro
BVR-1845	30.871595	-96.637759	Null	Wallace, Zane & Virginia	1,100	4	760	2	1,079	Simsboro
BVR-1894	30.958068	-96.691089	Null	Fleming, Nancy	515	4	490	2.5	515	Simsboro
BVR-2975	30.952629	-96.670163	Null	Broadus, Gene	654	4	210	2	654	Simsboro
BVR-3043	30.956639	-96.690810	Null	Dixon, Kimona K.	482	4	466	2	487	Simsboro
BVR-3044	30.953063	-96.670911	Null	Howard, D.S,	660	4	563	2	650	Simsboro
BVR-3048	30.965671	-96.665187	Null	Calvert Livestock Auction	667	4	463	2.5	647	Simsboro
BVR-3104	30.962379	-96.674672	Null	Naranjo, Andencio	460	4	216	2	450	Simsboro
BVR-4137	30.963367	-96.697307	Well #1	Moy, Duane	485	5	444	4	484	Simsboro
BVR-4219	30.844030	-96.629023	Null	Cangemi, Frank	1,142	4	1,100	2	1,142	Simsboro
BVR-4524	30.981080	-96.686232	Null	Williams, Howard	390	4	350	2	370	Simsboro



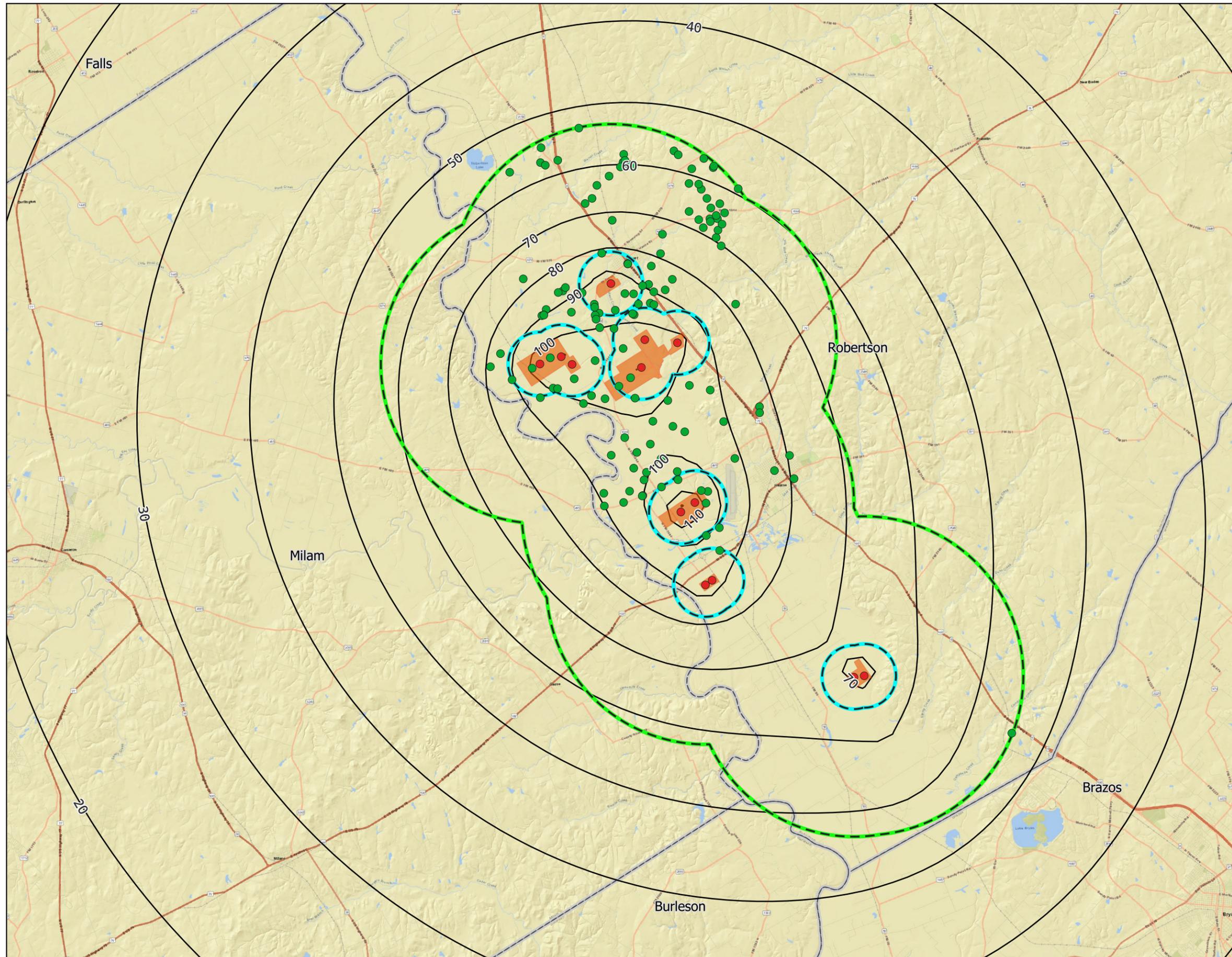
Explanation

- BVGCD Reported Well Completed in the Simsboro and W/in 5 Miles
- Proposed Corpora Well
- 1-Yr Modeled Drawdown Contour Interval = 10 feet
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Corpora Property Boundary
- Counties



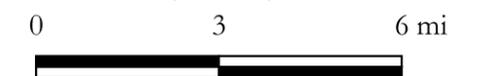
Corpora Farms

Revised Figure 7:
1-Year Analytical Drawdown



Explanation

- BVGCD Reported Well Completed in the Simsboro and W/in 5 Miles
- Proposed Corpora Well
- 10-Yr Modeled Drawdown Contour Interval = 10 feet
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Corpora Property Boundary
- Counties



Corpora Farms

Revised Figure 8:
10-Year Analytical Drawdown