Bluebonnet Groundwater Conservation District

Groundwater Management Plan

September 19, 2018

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Bluebonnet Groundwater Conservation District Groundwater Management Plan – 2018

The Bluebonnet Groundwater Conservation District (the "District") was created by the 77th Texas Legislature under the authority of Section 59, Article XVI, of the Texas Constitution, and in accordance with Chapter 36 of the Texas Water Code ("Water Code"), by the Act of May 21, 2001, 77th Leg., R.S., ch. 1361, 2001 Tex. Gen. and Spec. Laws, codified May 29, 2009, 81st Leg., R.S., ch. 1139. sec. 8825 ("the District Act").

The District is a governmental agency and a body politic and corporate. The District was created to serve a public use and benefit, and is essential to accomplish the objectives set forth in Section 59, Article XVI, of the Texas Constitution. The District's boundaries are coextensive with the boundaries of Austin, Grimes, Walker, and Waller Counties, Texas, and lands and other property within these boundaries will benefit from the works and projects that will be accomplished by the District.

District Mission and Purpose of Management Plan

The 75th Texas Legislature in 1997 enacted Senate Bill 1 ("SB 1") to establish a comprehensive statewide water planning process. In particular, SB 1 contained provisions that required groundwater conservation districts to prepare management plans to identify the water supply resources and water demands that will shape the decisions of each district. SB 1 designed the management plans to include management goals for each district to manage and conserve the groundwater resources within their boundaries. In 2001, the Texas Legislature enacted Senate Bill 2 ("SB 2") to build on the planning requirements of SB 1 and to further clarify the actions necessary for districts to manage and conserve the groundwater resources of the state of Texas.

The Texas Legislature enacted significant changes to the management of groundwater resources in Texas with the passage of House Bill 1763 (HB 1763) in 2005. HB 1763 created a long-term planning process in which groundwater conservation districts (GCDs) in each Groundwater Management Area (GMA) are required to meet and determine the Desired Future Conditions (DFCs) for the groundwater resources within their boundaries by September 1, 2010. In addition, HB 1763 required GCDs, to share management plans with the other GCDs in the GMA for review by the other GCDs.

The Bluebonnet Groundwater Conservation District's management plan satisfies the requirements of SB 1, SB 2, HB 1763, the statutory requirements of Chapter 36 of the Texas Water Code, and the administrative requirements of the Texas Water Development Board's (TWDB) rules.

Technical District Information Required by Texas Administrative Code

Estimate of Modeled Available Groundwater in District Based on Desired Future Conditions

Texas Water Code § 36.001 defines modeled available groundwater as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108".

The joint planning process set forth in Texas Water Code § 36.108 must be collectively conducted by all groundwater conservation districts within the same GMA. The District is a member of GMA 14. GMA 14 adopted DFCs on April 29, 2016. The adopted DFCs were approved as administratively complete by the TWDB. The submittal package and explanatory report for the DFCs can be found here:

http://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA14_DFC_2016.pdf
http://www.twdb.texas.gov/groundwater/dfc/docs/GMA14_DFCExpRep.pdf

Desired future conditions and modeled available groundwater values applicable for the District are summarized below (MAG values for the Gulf Coast Aquifer (Chicot, Evangeline, Burkeville, and Jasper) were documented in TWDB GAM Run 16-024 (Wade, December 15, 2016). Please refer to Appendix G.):

Aquifer	County	Base Year	Desired Future Condition: Drawdown (2009 to 2070) (ft)	Modeled Available Groundwater (MAG) AF/yr						
				2010	2020	2030	2040	2050	2060	2070
Gulf Coast - Chicot	Austin	2009	39	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Gulf Coast - Chicot	Grimes	2009	5	0	0	0	0	0	0	0
Gulf Coast - Chicot	Walker	2009	n/a	0	0	0	0	0	0	0
Gulf Coast - Chicot	Waller	2009	39	300	300	300	300	300	300	300
Gulf Coast - Evangeline	Austin	2009	23	19,998	19,998	19,998	19,998	19,998	19,998	19,998
Gulf Coast - Evangeline	Grimes	2009	5	2,999	2,999	2,999	2,999	2,999	2,999	2,999
Gulf Coast - Evangeline	Walker	2009	9	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Gulf Coast - Evangeline	Waller	2009	39	40,994	40,994	40,994	40,994	40,994	40,994	40,994
Gulf Coast - Burkeville	Austin	2009	23	0	0	0	0	0	0	0
Gulf Coast - Burkeville	Grimes	2009	6	0	0	0	0	0	0	0
Gulf Coast - Burkeville	Walker	2009	4	0	0	0	0	0	0	0
Gulf Coast - Burkeville	Waller	2009	40	0	0	0	0	0	0	0
Gulf Coast - Jasper	Austin	2009	76	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Gulf Coast - Jasper	Grimes	2009	52	10,998	10,998	10,998	10,998	10,998	10,998	10,998
Gulf Coast - Jasper	Walker	2009	42	15,972	15,972	15,972	15,972	15,972	15,972	15,972
Gulf Coast - Jasper	Waller	2009	101	300	300	300	300	300	300	300

Aquifer	County	Base Year	Desired Future Condition: Maximum Subsidence by 2070 from Estimated 1890 Conditions	Modeled Available Groundwater (MAG) AF/yr						
				2010	2020	2030	2040	2050	2060	2070
Gulf Coast	Austin	1890	2.83	22,298	22,298	22,298	22,298	22,298	22,298	22,298
	Grimes	1890	0.12	13,997	13,997	13,997	13,997	13,997	13,997	13,997
	Walker	1890	0.04	17,972	17,972	17,972	17,972	17,972	17,972	17,972
	Waller	1890	4.73	41,594	41,594	41,594	41,594	41,594	41,594	41,594

MAG values for the Gulf Coast Aquifer (Chicot, Evangeline, Burkeville, and Jasper) were documented in TWDB GAM Run 16-024 (Wade, December 15, 2016). Please refer to Appendix G.

Estimate of the Annual Amount of Groundwater Being Used within the District on an Annual Basis

Please refer to Appendix A.

Estimate of the Annual Amount of Recharge from Precipitation to the Groundwater Resources within the District

Please refer to Appendix B.

Estimate of the Annual Volume of Water that Discharges from the Aquifer to Springs and Any Surface Water Bodies

Please refer to Appendix B.

Estimate of the Annual Volume of Flow into the District and out of the District Within Each Aquifer, and Between Aquifers in the District

Please refer to Appendix B.

Estimate of the Projected Surface Water Supply within the District

Please refer to Appendix A.

Estimate of the Projected Total Demand for Water within the District

Please refer to Appendix A.

Water Supply Needs

The TWDB 2017 State Water Plan identifies water supply needs for water user groups County-other, Manufacturing, Mining, and San Felipe in Austin County; Mining and Steam Electric Power in Grimes County; Riverside, The Consolidated WSC, and Trinity Rural WSC in Walker County; County-other, Hempstead, Manufacturing, and Pine Island in Waller County. The District will continue to work with both Region G and H Regional Water Planning Groups in the identification of projected water supply needs. Please refer to Appendix A.

Water Management Strategies

The District continues to encourage conservation, water loss reduction, and reuse to meet the projected strategies of the TWDB 2017 State Water Plan. Please refer to Appendix A.

Water management strategies identified for water user groups within Austin, Grimes, Walker, and Waller Counties fall into one of the following categories (number of individual strategies):

- Municipal conservation (18)
- Expanded use of groundwater (13)

- Irrigation conservation (4)
- Industrial conservation (6)
- Water loss reduction (8)
- Carrizo aquifer development (4)
- Municipal water conservation (1)
- Gibbons Creek Reservoir expansion (2)
- Gulf Coast aquifer development (2)
- Industrial water conservation (6)
- Reuse – Bryan (2)
- Reuse – College Station (2)
- HCWC Permit amendment (1)

These specific water management strategies were considered and included in the overall preparation of this management plan as most of the water user groups are solely dependent on groundwater. The surface water dependent strategies were considered in relation to their expanded use or development of groundwater. These strategies are considered feasible by TWDB and the Regional Water Planning Groups to be included in the TWDB 2017 State Water Plan. The actual feasibility and usefulness of these, and other, strategies will not be realized until, or if, they are implemented by the individual water user group.

42 of 69 (61%) account for less than or equal to 100 acre-feet of water attributable to individual strategies, with an additional 14 strategies falling between 100 acre-feet and 1,000 acre-feet. Water management strategies are considered as part of the desired future condition development criteria in TWC 36.108(d)(2) the District participates in with GMA 14. These considerations contribute to the MAG values exceeding current production to accommodate existing and future groundwater users. The District continues to encourage conservation, water loss reduction, and reuse to meet the projected needs of the TWDB 2017 State Water Plan.

How the District Will Manage Groundwater Supplies

The District's Management Plan is promulgated under the District's statutory authority to protect private property rights, balance the conservation and development of groundwater to meet the needs of this state, use the best available science in the conservation and development of groundwater and to achieve the following objectives; to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir of its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater. The District's orders, rules, regulation, requirements, resolutions, policies, guidelines, or similar measures have been implemented to fulfill these objectives to minimize as far as practicable the drawdown of the water table or the reduction of artesian pressure, to prevent or control subsidence, to prevent interference between wells, to prevent degradation of water quality, and to prevent waste.

Permits are reviewed individually and independently. The District reviews and analyzes any potential impacts to existing or future users of groundwater. The District requires the submittal of Phase I and Phase II hydrogeologic reports for non-exempt wells with an inside casing diameter of eight (8) inches or greater as part of the permit application process. In general, the Phase I report in intended to evaluate the impacts of pumping, such as drawdown, well interference, potential for measurable subsidence and other relevant impacts, using existing data

and the existing regional groundwater flow model of the area for the aquifer in which the well is to be completed. The Phase II report is intended to be a final report that relies on site specific data, information, test results and analyses. The District-provided guideline document sets standards and expectations for the investigations and reports. The District may exercise discretion in the application of the guidelines on an individual and site-specific basis in order to allow a practicable application of the guidelines while insuring a result yielding the information needed by the District to process the permit application. The data and analyses are used to address production limits, monitoring requirements, and permit conditions.

Production of groundwater in any manner, including volumes, rate, frequency, duration, or within a concentrated area, that causes the potential for measurable subsidence is prohibited. Controlling and preventing measurable subsidence will be addressed during review and processing of new, renewed, and amended permit applications. If numerical modeling, local hydrogeological conditions including subsurface clay content, aquifer testing or other reliable data demonstrate the potential for measurable subsidence, the District will implement actions to address subsidence that may include (a) permit denial, revocation, suspension, cancellation, modification, or amendment, (b) production limits, (c) spacing requirements, (d) permit conditions requiring extensometer installation, subsidence monitoring and reporting, (e) the establishment of threshold limits that trigger reduces production based on monitoring results and (f) any other action reasonably necessary to control and prevent measurable subsidence. If the District has reason to believe that a non-exempt well has the potential to cause measurable subsidence, the District may take all actions it deems necessary to address the potential subsidence.

Methodology for Tracking Progress

An annual report ("Annual Report") will be created by the general manager and staff of the District and provided to the members of the Board of the District. The Annual Report will cover the activities of the District including information on the District's performance in regard to achieving the District's management goals and objectives. The Annual Report will be delivered to the Board each year coordinating collection of permitted pumping data, downloaded available drought information, and water level monitoring. A copy of the Annual Report will be kept on file and available for public inspection at the District's offices upon adoption.

Actions, Procedures, Performance, and Avoidance for District Implementation of Management Plan

The District will implement the provisions of this management plan and will utilize the objectives of the plan as a guide for District actions, operations and decision-making. The District will ensure that planning efforts, activities and operations are consistent with the provisions of this plan.

The District has adopted rules in accordance with Chapter 36 of the Texas Water Code. The development of rules is based on the scientific information and technical evidence available to the District. Current rules are available under Appendix C and at:

http://www.bluebonnetgroundwater.org/wp-content/uploads/2012/06/APPROVED-Bluebonnet-GCD-Rules-21-096.pdf

The District will encourage cooperation and coordination in the implementation of this plan. All operations and activities will be performed in a manner that encourages the cooperation of the citizens of the District and with the appropriate water management entities at the local, regional and state level.

Management Goals

1. Providing for the Most Efficient Use of Groundwater in the District

1.1 Objective – Each year, the District will require all new exempt or non-exempt wells that are constructed within the boundaries of the District to be registered with the District in accordance with the District rules.

1.1 Performance Standard – The number of exempt and non-exempt wells registered by the District will be incorporated into the Managers Report submitted to the Board of Directors of the District at each regular meeting.

2. Controlling and Preventing the Waste of Groundwater in the District

2.1 Objective – Each year, the District will make an evaluation of the District Rules to determine whether any amendments are recommended to decrease the amount of waste of groundwater within the District.

2.1 Performance Standard – The District will include a discussion of the annual evaluation of the District Rules and whether any amendments to the rules are recommended to prevent the waste of groundwater in a report to the District provided to the Board of Directors at a regular meeting.

2.2 Objective – The District will provide information to the public on eliminating and reducing wasteful practices in the use of groundwater.

2.2 Performance Standard – The District will post and maintain an article or a link to an article relevant to the public on eliminating and reducing wasteful practices in the use of groundwater.

3. Controlling and Preventing Subsidence

3.1 Objective – Controlling and preventing subsidence will be addressed during the review and processing of new, renewed, and amended permit applications.

3.1 Performance Standard – If review results demonstrate potential subsidence, the District will implement actions ranging from reducing requested permitted pumping to including permit conditions imposing subsidence monitoring requirements and establishment of threshold limits that could result in reduced production based on monitoring results.

4. Addressing Conjunctive Surface Water Management Issues

4.1 Objective – The District will attend, either in-person or through recording, 75% of the Region G and Region H Regional Water Planning Group meetings.

4.1 Performance Standard – The minutes for all attended, either in-person or through recording, Region G and Region H Regional Water Planning Group meetings will be maintained at the District for a period of three (3) years from their accepted date. A report of all attended meetings will be given to the Board at the regular meeting.

5. Addressing Natural Resource Issues Affecting the Use and Availability of Groundwater or affected by the Use of Groundwater

Joint Planning in GMA 14

5.1 Objective – By attending GMA 14 meetings, there is the opportunity to participate in discussions, planning, and education concerning the interrelationship of groundwater with other natural resource issues. A District appointed representative will attend 75% of the GMA 14 meetings annually.

5.1 Performance Standard – The minutes for all attended meetings of GMA 14 will be maintained at the District for a period of (3) years from their accepted date. A report of all attended meetings will be given to the Board at the regular meeting.

6. Addressing Drought Conditions

6.1 Objective – Each month, the District will download available drought information, for the counties in the District, from available websites on the internet, such as https://waterdatafortexas.org/drought, etc..

6.1 Performance Standard – Quarterly, the District will make an assessment of the status of drought in the District and prepare a quarterly briefing for the Board of Directors. The downloaded maps, reports and information will be included with copies of the quarterly briefings and combined with results of groundwater monitoring data and permitted pumping data in the regular meeting of the Board.

7. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control

Conservation

7A.1 Objective – The District will provide information relevant to public education and awareness regarding groundwater conservation.

7A.1 Performance Standard – The District will post and maintain an article or a link to an article listed under water conservation on the District website.

Recharge Enhancement

This management goal is not applicable to the District as there is not a recharge enhancement program unique to the District.

Rainwater Harvesting

7C.1 Objective – The District will provide information relevant to public education and awareness regarding rainwater harvesting.

7C.1 Performance Standard – The District will post and maintain an article or a link to an article listed under rainwater harvesting on the District website.

Precipitation Enhancement

This management goal is not applicable to the District as there is not a precipitation enhancement program unique to the District.

Brush Control

This management goal is not applicable to the District as there is not a brush control program unique to the District. Brush control initiatives are focused by the Texas State Soil and Water Conservation Board and through the TWDB State Water Plan where applicable.

8. Addressing the desired future conditions (DFC) of the groundwater resources in the District

8.1 Objective – The desired future conditions established for the District were based on GMA 14 Northern Gulf Coast GAM Run 2. The model results include cell by cell estimates of groundwater elevations and drawdown for each year of the predictive period (2009 to 2070). To assess the desired future condition in the District, these model results will be compared annually to groundwater monitoring data that are available from the TWDB groundwater database.

8.1 Performance Standard –Each year, the District will download groundwater data from Austin, Grimes, Walker and Waller counties from the Texas Water Development Board groundwater database. The comparison of model results will be on a well-by-well basis for data that are available. 21 wells met the following comparison criteria for the Gulf Coast Aquifer: 1) the well was located within the District, 2) the TWDB database included data on the well's depth, and completion interval, 3) the well completion placed the well entirely within one model layer, and 4) the most recent groundwater elevation data from late 2010/early 2011 (the established starting point for drawdown calculations). These 21 wells and pertinent data are summarized below. The data downloaded from the database will be compared to model results each year and presented at a regular meeting in the form of tables and graphs as appropriate. These comparisons will be supplemented by data and information related to drought conditions and permitted pumping data.

State Well Number	County	TWDB Aquifer Code	Well Depth (ft)	Depth to Top of Well Screen (ft)	Depth to Bottom of Well Screen (ft)	Year with Earliest Data	Year with Most Recent Data	Model Row	Model Column	Model Layer
5940707	Grimes	122CTHL	272	210	260	1948	2017	14	90	4
5948106	Grimes	122CTHL	358	316	343	1970	2017	15	90	4
5948111	Grimes	122CTHL	365	295	355	2009	2017	15	90	4
5948207	Grimes	122CTHL	430	382	420	2009	2017	16	91	4
5948405	Grimes	111ABZR	83	63	83	1997	2018	17	86	3
5948707	Grimes	111ABZR	78	59	78	1997	2018	20	86	2
5956301	Grimes	121EVGL	292	282	292	1970	2017	23	88	2
5964201	Waller	121EVGL	728	694	724	1956	2016	30	79	2
6025804	Grimes	122CTHL	153	138	153	1970	2018	11	105	4
6029707	Walker	122JSPR	600	540	584	1985	2017	26	126	4
6057103	Waller	121EVGL	576	475	570	1930	2016	33	84	2
6057402	Waller	121EVGL	645	610	630	1977	2017	34	83	2
6057509	Waller	121EVGL	609	330	350	1985	2018	37	85	2
6604601	Austin	122JSPR	119	105	119	1965	2018	22	51	2
6606614	Austin	121EVGL	850	764	830	1986	2018	32	65	3
6614204	Austin	121EVGL	118	110	118	1982	2018	35	57	1
6615905	Austin	121EVGL	462	320	452	1971	2018	45	63	2
6616407	Austin	112CHCT	165	147	165	1966	2018	45	67	2
6623401	Austin	121EVGL	824	60	190	1956	2018	47	57	1
6624801	Austin	121EVGL	610	586	606	1957	2012	57	62	2
6624805	Austin	121EVGL	725	530	702	1973	2012	56	62	2

Appendices

Appendix A – Estimated Historical Water Use And 2017 State Water Plan Datasets: Bluebonnet Groundwater Conservation District

Appendix B – GAM Run 17-020: Bluebonnet Groundwater Conservation District Groundwater Management Plan

Appendix C – Rules of the Bluebonnet Groundwater Conservation District

Appendix D – Resolution Adopting the Management Plan

Appendix E – Evidence the Management Plan was adopted after notice and hearing

Appendix F – Evidence District coordinated development of the Management Plan with Surface Water Entities

Appendix G – GAM Run 16-024 MAG: Modeled Available Groundwater for the Gulf Coast Aquifer System in Groundwater Management Area 14