

I. DISTRICT MISSION

The mission of the Hill Country Underground Water Conservation District (District) is to protect and enhance the groundwater resources of Gillespie County while protecting groundwater users and maintain the economic viability of the community it serves by adopting and enforcing rules consistent with State law.

II. PURPOSE OF THE MANAGEMENT PLAN

Senate Bill 1 (SB 1), enacted by the 75th Texas Legislature in 1997, and Senate Bill 2 (SB 2), enacted by the 77th Texas Legislature in 2001, established a comprehensive statewide planning process and the actions necessary for districts to manage and conserve the groundwater resources of the state of Texas. These bills required all underground water conservation districts to develop a management plan which defines the water needs and supply within each district and the goals each district will use to manage the underground water in order to meet its needs. In addition, the 79th Texas Legislature enacted HB 1763 in 2005 that requires joint planning among districts that are in the same Groundwater Management Area (GMA). These districts must establish the Desired Future Conditions (DFCs) of the aquifers within their respective GMAs. Through this process, the districts will submit the DFCs to the executive administrator of the Texas Water Development Board (TWDB) who will provide each district with the estimates concerning the Managed Available Groundwater (MAG) in the management area based on the DFCs of the aquifers in the area. Technical information, such as the DFCs of the aquifers within the District's jurisdiction and the amount of MAG from such aquifers is required by statute to be included in the District's management plan and will guide the District's regulatory and management policies. This management plan is intended to satisfy the requirements of SB 1, SB 2, HB 1763, the statutory requirements of Texas Water Code (TWC) Chapter 36, and the rules and requirements of the TWDB.

This plan is required by the Texas Commission on Environmental Quality (TCEQ) and developed in accordance with instructions from the TWDB. The TCEQ and the TWDB require use of certain data provided by the TWDB. The projections of future water demands, surface water availability, water management strategies, and groundwater use in Gillespie County were all provided to the District by TWDB. This document should be considered as a PLAN and will be used to identify activities or programs that the District will develop. The District considers the collection and development of site-specific data on groundwater use in Gillespie County and the groundwater sources of Gillespie County to be a high priority. This Plan will be updated as the District develops the site-specific data on the local groundwater use and aquifer conditions. The District is not restricted by the TCEQ or TWDB as to the frequency with which the Plan may be updated if considered it is appropriate by the District.

III. STATEMENT OF GUIDING PRINCIPLES

The District recognizes that the groundwater resources of Gillespie County and the Hill Country area are of vital importance. The District will strive to manage and preserve this most valuable resource in a prudent and cost effective manner through education, cooperation and developing a comprehensive understanding of the aquifers. The District's management plan is intended to serve as a tool to focus the thoughts and actions of those given the responsibility for the execution of the District's activities.

IV. DISTRICT INFORMATION

A. Creation

The District was created to cover Gillespie County by the Acts of the 70th Legislative Session (1987), HB 792, Chapter 865 in accordance with Article XVI, Section 59 of the Texas Constitution, and Chapter 35 and 36 of the Texas Water Code, as amended. The citizens of Gillespie County confirmed creation of the District by an election held in August 1987. The District was formed to protect the underground water resources for the citizens of Gillespie County so that proper management techniques could be implemented at the local level to address local conditions within the county. The creation of the District was in advance of the Hill Country Area, which included Gillespie County, being declared a Priority Groundwater Management Area by the then Texas Water Commission in 1990. This declaration gave notice to the residents of the area that water availability and quality will be at risk within the next 50 years. To manage the groundwater resources under its jurisdiction the District is charged with the rights and responsibilities specified in its enabling legislation; the provisions of Chapter 36 of the Texas Water Code; this Management Plan, and the District Rules.

B. Directors

The Board of Directors (Board) consists of five members. These five directors are elected by the voters of Gillespie County and serve a four-year term. The District observes the same four precincts as the Gillespie County Commissioners with one at-large position. Director terms are staggered on a two-year interval. Elections are held in May, in odd numbered years. A director may serve consecutive terms. The current Board members is comprised of Alton Klier - Chairman, Voy Althaus - Vice Chairman, Harold Sohner - Secretary/Treasurer, James Barnhouse - Director and Vaughn Usener - Director. The Board employs a General Manager to manage the District. The District's General Manager is Paul Tybor.

C. Authority

The District's authority and power is granted through Chapters 35 and 36 of the Texas Water Code, Vernon's Texas Civil Statutes. The District has rule-making authority to

implement the policies and procedures needed to manage the groundwater resources of Gillespie County. The District's rules were first adopted by the Board in 1988 with subsequent amendments made to the rules on an on-going basis, as warranted. The District's rules and other District activities and information may be viewed at the District's web site (www.hcuwcd.org)

D. Location and Extent

The District includes all of Gillespie County (Figure 1) and covers roughly 1,061 square miles. The District lies immediately to the south of the geologic feature termed the "Llano Uplift", which is the geologic heart of the State of Texas.

FIGURE 1



The largest city in the District is Fredericksburg with a population of less than 10,000 people. The small communities (<500 people) of Stonewall to the east of Fredericksburg and Harper to the west of Fredericksburg are also in the District.

Gillespie County has a vibrant economy through agricultural and tourism. The agricultural economy is derived from cattle, goats and sheep with significant

contributions from the cultivation of peaches, pecans, grapes, grains and produce. Wildlife hunting also contributes to the economy. The average annual rainfall is 28 inches.

The District is located in the Lower Colorado Regional Water Planning Area (Region K) (Figure 2). The Lower Colorado Regional Water Planning Area was formed pursuant to Senate Bills 1 and 2, which require all areas of the State of Texas to conduct a comprehensive water planning program. The plans that were created as a result of this legislation are the most detailed and encompassing regional level water plans created to date.

FIGURE 2

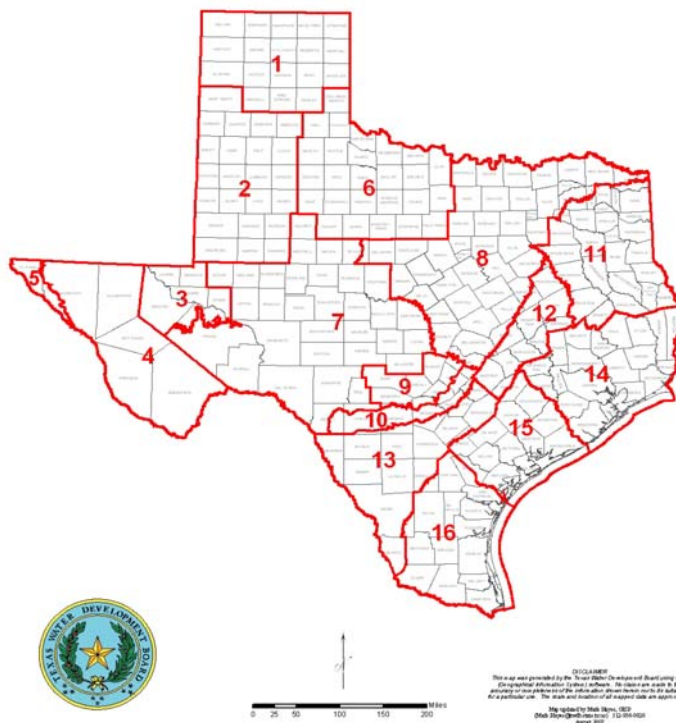
Regional Water Planning Areas



The District is located in Groundwater Management Area 7(GMA 7) (Figure 3). Section 36.108, Texas Water Code, obligates the District to meet annually with the other groundwater conservation districts (“GCDs”) in GMA 7 to conduct joint planning and to review the management plans and accomplishments for the management area.

FIGURE 3

Groundwater Management Areas in Texas



No later than September 1, 2010 and every five years after, the GCDs in GMA 7 shall consider groundwater availability models and other data or information for the management area and shall establish desired future conditions for the relevant aquifers within the management area.

E. Topography and Drainage

The District is within the Pedernales River basin which is the southernmost tributary to the Colorado River, and is in the jurisdiction of the Lower Colorado River Authority. Drainage within the district is from west to east.

The District contains two major geologic features. The Llano Uplift located to the north extends into the northeastern portion of the district. This feature is made up of very old rocks ranging in age from 1.0 to 1.2 billion years and is comprised of granite and older metamorphic rocks. The other major feature is the Edwards Plateau. This is an elevated structure made up of Cretaceous age Edwards' limestone, dolomite and marl. The

Edwards Plateau extends west and covers many West Texas counties. Gillespie County lies at the eastern edge of the Plateau. The headwaters for the Pedernales River, like many other Hill Country rivers is located at the edge and base of the Plateau.

Elevation within the District ranges from a low of approximately 1,100 feet above sea level in extreme northeastern Gillespie County to approximately 2,200 feet above sea level in extreme western Gillespie County.

F. Groundwater Resources within the District

Within the District there are four aquifers which are the primary source for groundwater. These are as follows with their estimated storage and effective annual recharge rates for Gillespie County:

TABLE I

Aquifer	Recoverable Storage (ac-ft)	Effective Annual Recharge (ac-ft/yr)
Edwards	21,261	1,500
Hensel	16,346	3,400
Ellenburger	7,111	5,600
Hickory	9,965	2,000
Total	54,683	12,500

The Edwards aquifer within Gillespie County is comprised of limestone and dolomite that is an extension of the Edwards Plateau into Gillespie County from the west. Yields from the Edwards are generally low (5-10 gpm) and it is used primarily for rural domestic and livestock demands. Unconfined aquifer conditions exist in the Edwards. Recharge is from local precipitation which occurs on the outcrop. The Edwards thickness is greatest along the center of the west to east Plateau extension and groundwater moves north and south from this extension. It discharges at the base of the Edwards and is the headwaters for the Pedernales River and the streams within the county.

The Hensel aquifer is comprised primarily of sand with secondary amounts of clay and silt. It extends across the majority of Gillespie County, except along the northern border and the northeastern sector of the county where it has been eroded. The Hensel outcrops in the Pedernales River Valley, but it is in the subsurface where the Edwards Plateau is present. Yields from the Hensel are generally 10 to 20 gpm and used for rural domestic and livestock demands. Some drip irrigation occurs from the Hensel for peaches and vegetables. It is recharged from local precipitation on its outcrop and through the overlying units where it is in the subsurface. Regionally, groundwater movement within the Hensel is generally to the southeast, however locally it is from groundwater highs and towards the surface drainage system within the county.

The Ellenburger aquifer is a fractured limestone and dolomite and is present in the southeastern, northern and western portions of the county. It is absent in a broad area extending from the north central portion of the county continuing to the south, southwest part of Gillespie County. This is a faulted uplifted area where the Ellenburger and other older Paleozoic rocks were eroded prior to Cretaceous sea transgression and subsequent Hensel deposition. The area is termed “the Fredericksburg High” in the TWDB Report 339 “Evaluation of the Groundwater Resources of the Paleozoic and Cretaceous Aquifers in the Hill Country of Central Texas”. In some areas significant cavity development has occurred within the Ellenburger resulting in it being able to produce very large amounts of groundwater (>500 gpm) in some locations. It is utilized extensively by the City of Fredericksburg and many peach and grape growers in Gillespie County. Recharge to the Ellenburger is mainly through the overlying Hensel. Groundwater movement is away from groundwater highs and towards the surface drainage system or lows that have developed as a result of production in the large municipal well fields.

The Hickory aquifer is comprised of sand, and like the Hensel, it extends across much of Gillespie County except across the northern border where it has been eroded. Although it is extensive in area, it only produces groundwater along the above mentioned Fredericksburg High. Off of the Fredericksburg High due to faulting, the Hickory is deeply buried and of the few wells that have penetrated it, very little groundwater has been produced due to an apparent lack of porosity and permeability and possible restrictions to recharge. Along the Fredericksburg High yields from the Hickory vary from very low (5 gpm) to good (>100 gpm). The City of Fredericksburg has three municipal wells completed in the Hickory. In the Eckert area the Hickory is used to drip irrigate grapes that are grown on the Hickory outcrop. Recharge to the Hickory occurs from local precipitation on its outcrop in northeastern Gillespie County and through the overlying units, where it is in the subsurface. Groundwater movement appears to be controlled by the elevation of the Hickory. That is, groundwater movement occurs away from the area where the Hickory is elevated towards the areas of the Hickory where it is lower in elevation. The highest elevated area of the Hickory is to the northwest of Fredericksburg along the Fredericksburg High. From here, groundwater movement radiates to the northeast, east and southeast.

V. CRITERIA FOR PLAN CERTIFICATION

A. Planning Horizon

The time period for this plan is 5 years from the date of approval by the TWDB. The District’s first 5 year management plan was approved in 1990. The District’s original management plan was approved by the TWDB on September 1, 1998 and in accordance with TWC § 36.1072(e), it has been reviewed every 5 years thereafter. The District reviewed the plan and a revised groundwater management plan was adopted by the Board on August 12, 2003 with subsequent approval by the TWDB. Upon approval in 2008, this management plan will remain in effect until either a revised management plan is

approved by the TWDB or October 30, 2013, whichever is earlier. This plan will be reviewed in five years. The District will consider the necessity to amend the plan and re-adopt in accordance with the requirements of the Texas Water Code.

B. Board Resolution

A certified copy of the Hill Country Underground Water Conservation District resolution adopting the plan is located in Appendix A – District Resolution.

C. Plan Adoption

Public notices documenting that the plan was adopted following appropriate public meetings and hearing are located in Appendix B – Notice of Meetings

D. Coordination with Surface Water Management Entities

A letter transmitting a copy of this plan to the Lower Colorado River Authority and Gillespie County Control and Improvement District is located in Appendix C – Letter to Surface Water Management Entities.

VI. TECHNICAL DISTRICT INFORMATION

A. Estimate of Managed Available Groundwater in the District based on the Desired Future Condition Established in Joint Planning – 31 TAC §356.5 (a)(5)(A); TWC §36.1071 (e)(3)(A)

Managed available groundwater is defined in TWC §36.001 as “the amount of water that may be permitted by a district for beneficial use in accordance with DFCs of the aquifer.” The DFCs of the aquifer may only be determined through joint planning with groundwater conservation districts (GCDs) in the same groundwater management area (GMA) as required by the 79th Legislature with the passage of HB 1763 into law. The District is located in GMA 7. The GCDs of the GMA 7 have not completed the joint planning process to determine the DFCs of the aquifers. Therefore, because GMA 7 has not completed the joint process, the DFCs of the groundwater within the District have not yet been established and the managed available groundwater estimates are not presently available. In establishing the DFCs, the GCDs in GMA 7 shall consider uses or condition of an aquifer within the management area that differ substantially from one geographic area to another. The districts may establish different DFCs for each aquifer, subdivision of an aquifer, or geologic strata, or each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 7.

Although the GMA process in establishing DFCs has not been completed, the District has in previous Management Plans identified available groundwater for the four main

aquifers within the District. These are the effective annual recharge for each aquifer listed on Table I and were developed using TWDB's calculations (TWDB Report #339) along with the District's calculations used in previous management plans, and are the groundwater availability numbers used in the 2007 State Water Plan. They have also been used in GAM Run #07-37 to assist GMA #7 in determining DFCs for the Edwards-Trinity aquifer.

On Table I, in addition to Effective Annual Recharge, values of Recoverable Storage are shown for each aquifer. The District utilized the following formula to determine this value.

$$\text{Recoverable Storage} = \text{aquifer area} \times \text{aquifer saturated thickness} \times \text{coefficient of storage} \times \% \text{ recoverable water}$$

Table II list these parameters and the calculated recoverable storage:

TABLE II

Aquifer	Aquifer Acres (ac)	Average Aquifer Saturated Thickness (ft)	Average Coefficient Storage	% Recoverable	Recoverable Storage (ac-ft/yr)
Edwards	269,768	97	0.01625	0.05	21,261
Hensel	577,184	118	0.00160	0.15	16,346
Ellenburger	206,122	200	0.00115	0.15	7,111
Hickory	218,387	260	0.00117	0.15	9,965
Total					54,683

The above acreages and saturated thickness were determined from calculations made on well data in the District's GIS database. The coefficients of storage were obtained from pump tests on wells in Gillespie County to satisfy the Gillespie County Water Availability Subdivision Ordinance requirements. Fifteen percent recovery from storage was estimated for the Hensel, Ellenburger and Hickory aquifers. Only five percent recoverable water in storage is estimated for the Edwards due to the relatively low yields (<10 gpm) from Edwards wells in Gillespie County.

A total of 54,683 acre feet of water is estimated to be recoverable from all four aquifers within Gillespie County. This is above the 12,500 acre feet per year of Effective Annual Recharge that is available to these four aquifers and included in the 2007 State Water Plan for Gillespie County.

The District has in the past selected to manage the development of the District's aquifers below the effective annual recharge of 12,500 acre feet per year. To go beyond this amount would require removing water from storage and begin mining the aquifers. Until MAG numbers have been set for these aquifers, the Effective Annual Recharge values

will be used in the plan for management purposes.

Therefore for management criteria, 90% of annual effective aquifer recharge will be available for permitting and exempt well users. Of this 90%, 30% will be allocated for exempt well use in the Edwards, Hensel and Hickory aquifers, while 10% will be reserved for exempt well use in the Ellenburger aquifer. Based on these criteria's, the volume of water available from each aquifer for permitting and exempt use is shown in Table III.

TABLE III

Aquifer	Effective Annual Recharge (ac-ft/yr)	90% Annual Effective Recharge (ac-ft/yr)	Amount Available For Permit Use (ac-ft/yr)	Amount Available For Exempt Use (ac-ft/yr)
Edwards	1,500	1,350	945	405
Hensel	3,400	3,060	2,142	918
Ellenburger	5,600	5,040	4,536	504
Hickory	2,000	1,800	1,260	540
Total	12,500	11,250	8,883	2,367

B. Estimate of Amount of Groundwater Being Used Within the District on an Annual Basis – 31 TAC 356.5 (a)(5)(B); TWC §36.1071 (e)(3)(B)

To estimate the annual amount of groundwater being used in the District, the District has relied on the TWDB Annual Water Use Survey Data. The TWDB estimate of the amount of groundwater being used in the District on an annual basis is 6,675 acre feet per year. This estimate is from the TWDB Annual Water Use Survey for the Year 2003, which is the most recent data available and is presented below on Table IV. The District does not dispute the totals provided, however the District disagrees with the amounts assigned to each aquifer. For example, the Edwards-Trinity Plateau aquifer is estimated to provide only 0 to 16 acre-feet of water per year for municipal use. This aquifer is the sole provider for domestic and livestock demand in a large portion of western Gillespie County and the District believes that the actual demand is probably more than the estimates given in the table. Likewise, the Ellenburger-San Saba aquifer's irrigation estimates appear to be too low. This aquifer probably provides water for 60% of the total irrigation within Gillespie County. On the other hand, the Trinity aquifer's municipal and irrigation estimates appear to be too high for what is actually used in the county. The District suspects that some municipal and irrigation amounts assigned to the Hensel should in fact be allocated to the Ellenburger. On Table V, estimates by the District are provided for the contributions that each of the county's aquifers make toward the county's water demand through the year 2060.

TABLE IV

Historical Groundwater Pumpage Summary for Gillespie County

Unit: Acre Feet (ACFT)

GILLESPIE COUNTY								
Year	Aquifer	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1980	EDWARDS- TRINITY PLATEAU	6	0	0	0	0	0	6
1980	ELLENBURGER- SAN SABA	1,898	0	0	701	0	36	2,635
1980	HICKORY	64	0	0	0	0	29	93
1980	TRINITY	810	0	0	99	0	599	1,508
	Total	2,778	0	0	800	0	664	4,242
1984	EDWARDS- TRINITY PLATEAU	6	0	0	0	0	0	6
1984	ELLENBURGER- SAN SABA	2,121	0	0	3,308	32	48	5,509
1984	HICKORY	71	0	0	0	0	38	109
1984	TRINITY	908	0	0	466	0	806	2,180
	Total	3,106	0	0	3,774	32	892	7,804
1985	EDWARDS- TRINITY PLATEAU	6	0	0	0	0	0	6
1985	ELLENBURGER- SAN SABA	2,042	0	0	3,000	32	50	5,124
1985	HICKORY	43	0	0	0	0	40	83
1985	TRINITY	850	0	0	422	0	822	2,094
	Total	2,941	0	0	3,422	32	912	7,307
1986	EDWARDS- TRINITY PLATEAU	7	0	0	0	0	0	7
1986	ELLENBURGER- SAN SABA	2,091	0	0	1,249	17	29	3,386
1986	HICKORY	44	0	0	0	0	23	67
1986	TRINITY	865	0	0	176	0	481	1,522
	Total	3,007	0	0	1,425	17	533	4,982
1987	EDWARDS- TRINITY PLATEAU	3	0	0	0	0	0	3
1987	ELLENBURGER- SAN SABA	2,117	0	0	408	14	27	2,566
1987	HICKORY	44	0	0	0	0	22	66

TABLE IV continued

1987	TRINITY	867	0	0	57	0	449	1,373
	Total	3,031	0	0	465	14	498	4,008
1988	EDWARDS- TRINITY PLATEAU	7	0	0	0	0	0	7
1988	ELLENBURGER- SAN SABA	2,306	0	0	110	15	29	2,460
1988	HICKORY	49	0	0	0	0	23	72
1988	TRINITY	854	1	0	15	0	474	1,344
	Total	3,216	1	0	125	15	526	3,883
1989	EDWARDS- TRINITY PLATEAU	7	0	0	0	0	0	7
1989	ELLENBURGER- SAN SABA	2,441	0	0	1,713	14	28	4,196
1989	HICKORY	62	0	0	0	0	22	84
1989	TRINITY	1,063	0	0	241	0	459	1,763
	Total	3,573	0	0	1,954	14	509	6,050
1990	EDWARDS- TRINITY PLATEAU	7	0	0	0	0	0	7
1990	ELLENBURGER- SAN SABA	2,354	0	0	1,525	14	29	3,922
1990	HICKORY	79	0	0	0	0	23	102
1990	TRINITY	1,009	0	0	215	0	476	1,700
	Total	3,449	0	0	1,740	14	528	5,731
1991	EDWARDS- TRINITY PLATEAU	11	0	0	0	0	0	11
1991	ELLENBURGER- SAN SABA	2,224	0	0	1,703	9	30	3,966
1991	HICKORY	74	0	0	0	0	24	98
1991	TRINITY	1,022	0	0	240	0	490	1,752
	Total	3,331	0	0	1,943	9	544	5,827
1992	EDWARDS- TRINITY PLATEAU	13	0	0	0	0	0	13
1992	ELLENBURGER- SAN SABA	2,230	0	0	1,706	9	36	3,981
1992	HICKORY	74	0	0	0	0	29	103
1992	TRINITY	1,066	0	0	240	0	583	1,889
	Total	3,383	0	0	1,946	9	648	5,986
1993	EDWARDS- TRINITY PLATEAU	13	0	0	0	0	0	13
1993	ELLENBURGER- SAN SABA	2,344	0	0	2,297	9	37	4,687
1993	HICKORY	77	0	0	0	0	30	107
1993	TRINITY	1,092	0	0	323	0	598	2,013
	Total	3,526	0	0	2,620	9	665	6,820

TABLE IV continued

1994	EDWARDS- TRINITY PLATEAU	13	0	0	0	0	0	13
1994	ELLENBURGER- SAN SABA	2,336	0	0	570	9	35	2,950
1994	HICKORY	78	0	0	127	0	28	233
1994	TRINITY	1,099	0	0	1,603	0	560	3,262
	Total	3,526	0	0	2,300	9	623	6,458
1995	EDWARDS- TRINITY PLATEAU	15	0	0	0	0	0	15
1995	ELLENBURGER- SAN SABA	2,473	0	0	567	9	35	3,084
1995	HICKORY	81	0	0	126	0	28	235
1995	TRINITY	1,093	0	0	1,595	0	566	3,254
	Total	3,662	0	0	2,288	9	629	6,588
1996	EDWARDS- TRINITY PLATEAU	13	0	0	0	0	0	13
1996	ELLENBURGER- SAN SABA	2,601	9	0	645	9	51	3,315
1996	HICKORY	81	0	0	143	0	41	265
1996	TRINITY	1,082	0	0	1,815	0	826	3,723
	Total	3,777	9	0	2,603	9	918	7,316
1997	EDWARDS- TRINITY PLATEAU	13	0	0	0	0	0	13
1997	ELLENBURGER- SAN SABA	2,420	4	0	528	9	33	2,994
1997	HICKORY	85	0	0	117	0	27	229
1997	TRINITY	1,124	0	0	1,484	0	534	3,142
	Total	3,642	4	0	2,129	9	594	6,378
1998	EDWARDS- TRINITY PLATEAU	15	0	0	0	0	0	15
1998	ELLENBURGER- SAN SABA	2,815	8	0	544	9	27	3,403
1998	HICKORY	99	0	0	121	0	22	242
1998	TRINITY	1,308	0	0	1,529	0	440	3,277
	Total	4,237	8	0	2,194	9	489	6,937
1999	EDWARDS- TRINITY PLATEAU	16	0	0	0	0	0	16
1999	ELLENBURGER- SAN SABA	3,026	3	0	173	9	27	3,238
1999	HICKORY	106	0	0	38	0	22	166
1999	TRINITY	1,405	0	0	488	0	440	2,333
	Total	4,553	3	0	699	9	489	5,753
2000	EDWARDS- TRINITY	14	0	0	0	0	0	14

PLATEAU TABLE IV continued

2000	ELLENBURGER-SAN SABA	2,546	6	0	487	9	29	3,077
2000	HICKORY	89	0	0	108	0	24	221
2000	TRINITY	1,182	0	0	1,369	0	478	3,029
	Total	3,831	6	0	1,964	9	531	6,341
2001	EDWARDS-TRINITY PLATEAU	1	0	0	0	0	0	1
2001	ELLENBURGER-SAN SABA	2,575	5	0	557	9	29	3,175
2001	HICKORY	88	0	0	123	0	24	235
2001	TRINITY	1,102	0	0	1,566	0	466	3,134
	Total	3,766	5	0	2,246	9	519	6,545
2002	EDWARDS-TRINITY PLATEAU	2	0	0	0	0	0	2
2002	ELLENBURGER-SAN SABA	2,471	5	0	557	9	28	3,070
2002	HICKORY	85	0	0	123	0	23	231
2002	TRINITY	1,150	0	0	1,566	0	459	3,175
	Total	3,708	5	0	2,246	9	510	6,478
2003	EDWARDS-TRINITY PLATEAU	2	0	0	0	0	0	2
2003	ELLENBURGER-SAN SABA	2,299	5	0	557	9	41	2,911
2003	HICKORY	80	0	0	123	0	33	236
2003	TRINITY	1,300	0	0	1,566	0	660	3,526
	Total	3,681	5	0	2,246	9	734	6,675

Source: Texas Water Development Board Water Use Survey

TABLE V

PERCENT ESTIMATED CONTRIBUTION BY AQUIFER TO THE COUNTY DEMAND

	Edwards	Hensel	Ellenburger	Hickory
Municipal				
Fredericksburg	0%	0%	96%	4%
County-Other	25%	25%	25%	25%
Industrial	0%	20%	60%	20%
Irrigation	0%	30%	60%	10%
Livestock	25%	25%	25%	25%

ESTIMATED INDIVIDUAL AQUIFER CONTRIBUTION TO THE COUNTY DEMAND

Edwards (Estimated Annual Sustained Yield 1,500 Acre-Feet Per Year)

Year	2000	2010	2020	2030	2040	2050	2060
Municipal							
Fredericksburg	0	0	0	0	0	0	0
County-Other	367	409	454	462	453	448	448
Industrial	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0
Livestock	266	266	266	266	266	266	266
Total Demand	633	675	720	728	719	714	714
% of Sustainable Yield	42%	45%	48%	49%	48%	48%	48%

Hensel (Estimated Annual Sustained Yield 3,400 Acre-Feet Per Year)

Year	2000	2010	2020	2030	2040	2050	2060
Municipal							
Fredericksburg	0	0	0	0	0	0	0
County-Other	367	409	454	462	453	448	448
Industrial	90	103	109	115	120	124	133
Irrigation	620	612	604	596	588	581	574
Livestock	266	266	266	266	266	266	266
Total Demand	1,343	1,390	1,433	1,439	1,427	1,419	1,421
% of Sustainable Yield	40%	41%	42%	42%	42%	42%	42%

Ellenburger (Estimated Annual Sustained Yield 5,600 Acre-Feet Per Year)

Year	2000	2010	2020	2030	2040	2050	2060
Municipal							
Fredericksburg	2,358	2,684	3,028	3,134	3,108	3,095	3,095
County-Other	367	409	454	462	453	448	448
Industrial	269	308	328	347	359	372	398
Irrigation	1,239	1,223	1,208	1,192	1,176	1,162	1,147
Livestock	266	266	266	266	266	266	266
Total Demand	4,499	4,890	5,284	5,401	5,362	5,343	5,354
% of Sustainable Yield	80%	87%	94%	96%	96%	95%	96%

Hickory (Estimated Annual Sustained Yield 2,000 Acre-Feet Per Year)

Year	2000	2010	2020	2030	2040	2050	2060
Municipal							
Fredericksburg	98	112	126	131	130	129	129
County-Other	367	409	454	462	453	448	448
Industrial	90	103	109	115	120	124	133
Irrigation	207	204	201	199	196	194	191
Livestock	266	266	266	266	266	266	266
Total Demand	1,028	1,094	1,156	1,173	1,165	1,161	1,167
% of Sustainable Yield	51%	55%	58%	59%	58%	58%	58%

C. Estimate of the Annual Amount of Recharge from Precipitation to the Groundwater Resources within the District – 31 TAC §356.5 (a)(5)(C); TWC §36.1071(e)(3)(C)

The estimate of the annual amount of recharge to the Edwards-Trinity aquifer in the District is based on the simulations performed in the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium GAM 08-27 (Appendix D). Recharge to the Edwards Plateau aquifer is 9,899 acre feet per year. For the Trinity, recharge is 35,877 acre feet per year. These recharge values are considerably higher for these aquifers than the identified Effective Annual Recharge values of 1500 acre feet per year for the Edwards and 3400 acre feet per year for the Hensel, shown on the table below. Clearly the numbers do not represent the same thing. The recharge values computed from the GAM 08-27 are total recharge, which provides water to aquifer storage, springs and river base flow, flow to other county(s), and flow to other aquifers. The calculated Effective Annual Recharge values represent that water which is available annually for withdrawal, without upsetting the water balance to all of the components of the aquifer (i.e. storage, spring and river discharge, inter aquifer flow). As a result the value is considerably less than total recharge. Consequently the District did not use the GAM determined Total Recharge in computing Percent Estimated Individual Aquifer Contribution to the County Demand on Table V. The District feels that this would erroneously over inflate the amount of water available from these aquifers and lead to aquifer over development.

For the Ellenburger and Hickory aquifers, GAMs have not been developed. The District estimates the amount of recharge to these minor aquifer based on District calculations outlined in previous management plans and the recharge rates provided in TWDB Report 339. These values have been identified as Effective Annual Recharge on Table I and repeated as follows.

Aquifer	Effective Annual Recharge (ac-ft/yr)
Edwards	1,500
Hensel	3,400
Ellenburger	5,600
Hickory	2,000
Total	12,500

D. For each aquifer, annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers – 31 TAC §356.5 (a)(5)(D); TWC §36.1071(e)(3)(D)

For the Edwards and Trinity aquifers within the District, the annual volume of water that discharges from these aquifers to spring and surface water bodies were determined from the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium GAM 08-27 (Appendix D). For the Edwards (Plateau), 10,898 acre feet per year discharges to surface water bodies, while the Trinity discharges 31,177 acre feet per year to surface water bodies in Gillespie County.

For the Ellenburger-San Saba and Hickory aquifers no GAM has been developed. As a result estimates for the amount of discharge from these aquifers to surface water bodies in not available.

E. Estimate of the Annual Volume of Flow Into and Out of the District Within Each Aquifer and Between Aquifers in the District; 31 TAC §356.5 (a)(5)(E); TWC §36.1071(e)(3)(E)

The estimated amount of flow into the District from the Edwards (Plateau) is 3,633 acre feet per year. For the Trinity flow into the District is 1,091 acre feet per year. These flow estimates were taken from the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium GAM 08-27 (Appendix D). Estimates of flow into the Ellenburger-Saba and Hickory aquifers are not available since GAMs have not been developed at this time.

The estimated amount of flow out of the District from the Edwards (Plateau) is 1,884 acre feet per year (Appendix D). For the Trinity flow out of the District is 8,443 acre feet per year. Estimates of flow out of the District from the Ellenburger-San Saba and Hickory aquifers are not available since GAMs have not been developed at this time.

The estimated amount of net volume of flow from the Edwards (Plateau) to the Trinity is 1,375 acre feet per year (Appendix D). This number has not been calculated for the Ellenburger-San Saba and Hickory aquifers due to the lack of a GAM for these aquifers.

F. Estimate of the Projected surface water supply within the district, according to the most recently adopted state water plan – 31 TAC §356.5(a)(5)(F); TWC §36.1071(e)(3)(F)

The 2007 State Water Plan indicates that a projected surface water supply for Gillespie County is 1,566 acre feet for year 2010. Table VI lists all of the sources for surface water in Gillespie County and projected to the year 2060.

TABLE VI
2007 State Water Plan Projected Gillespie County Surface Water Supplies
(In acre feet per year)

RWPG	WUG	River Basin	Source Name	2000	2010	2020	2030	2040	2050	2060
K	Manufacturing	Colorado	Other Local Supply	0	158	158	158	158	158	158
K	Irrigation	Colorado	Colorado River Combined Run-of-River Irrigation	880	880	880	880	880	880	880
K	Livestock	Colorado	Livestock Local Supply	0	515	515	515	515	515	515
K	Livestock	Guadalupe	Livestock Local Supply	0	13	13	13	13	13	13
Total Projected Surface Water Supplies (acre-feet per year) =				880	1,566	1,566	1,566	1,566	1,566	1,566

Source: Volume 3, 2007 State Water Planning Database

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G. Estimate of the Projected total demand for water in the district according to the most recently adopted state water plan – 31 TAC §356.5 (a)(5)(G); TWC §36.1071(e)(3)(G)

The 2007 State Water Plan indicates that the Projected Water Demands for Gillespie County will be 9,072 acre feet for the year 2060. Table VII lists these projected demands for every decade for all of the water user groups in Gillespie County through the year 2060.

TABLE VII
2007 State Water Plan Projected Gillespie County Water Demands
(In acre feet per year)

RWPG	WUG	County	River Basin	2000	2010	2020	2030	2040	2050	2060
K	Fredericksburg	Gillespie	Colorado	2,455	2,842	3,245	3,403	3,403	3,403	3,403
K	County Other	Gillespie	Colorado	1,417	1,640	1,873	1,964	1,964	1,964	1,964
K	County Other	Gillespie	Guadalupe	49	57	65	68	68	68	68
K	Manufacturing	Gillespie	Colorado	440	506	539	566	591	612	655
K	Mining	Gillespie	Colorado	9	8	8	8	8	8	8
K	Irrigation	Gillespie	Colorado	2,065	2,039	2,013	1,987	1,960	1,936	1,912
K	Livestock	Gillespie	Colorado	1,041	1,041	1,041	1,041	1,041	1,041	1,041
K	Livestock	Gillespie	Guadalupe	21	21	21	21	21	21	21
Total Projected Water Demands (acre-feet per year) =				7,497	8,154	8,805	9,058	9,056	9,053	9,072

Source: Volume 3, 2007 State Water Planning Database

04/02/07

VII. CONSIDER THE WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES INCLUDED IN THE ADOPTED STATE WATER PLAN

The 2007 State Water Plan identifies projected water shortages for water user groups throughout the State of Texas. However due to the projected population projections and adequate existing water supplies that are currently in place, no water supply needs are identified for Gillespie County in the 2007 State Water Plan. Consequently no water management strategies are included in the State Water Plan for Gillespie County as listed in Table VIII.

TABLE VIII

2007 State Water Plan Projected Gillespie County
Water Management Strategies
(In acre feet per year)

RWPG	WUG	WUG County	River Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
K	ND	Gillespie	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Projected Water Management Strategies(acre-feet per year) =							0	0	0	0	0	0

Source: Volume 3, 2007 State Water Planning Database

04/02/07

VIII. MANAGEMENT OF GROUNDWATER SUPPLIES

The District has and will continue to manage the use and supply of groundwater within the District in order to conserve the resource while seeking to maintain the economic viability of all resource user groups, public and private. In consideration of the economic and cultural activities occurring within the District, the District will identify and engage in such activities, that when implemented would result in more efficient use of groundwater. The District seeks to manage the groundwater resources of the District as practicably as possible in a sustainable manner as defined in the plan by the management goals established for each aquifer. The Texas Legislature established that groundwater conservation districts are the preferred method of groundwater management in Section 36.0015 of the Texas Water Code. The District will manage groundwater resources through rules developed and implemented in accordance with Chapter 36 of the Texas Water Code and the provisions of the District’s Enabling Legislation. The observation and monitoring network will continue to be reviewed and maintained in order to monitor changing conditions of groundwater within the District. If necessary the network may be expanded. The District will undertake as necessary and cooperate with investigations of the groundwater resources within the District and will make the results of investigations available to the public.

The District will monitor groundwater conditions closely through its water level and water quality monitoring programs that are currently in place and will continue to maintain and update the District's database, which was started in 1990. Computer modeling projects currently underway at the District and those that will be undertaken in the future will also aid in the decision making process by this District in the management of groundwater.

The District has and will continue to adopt rules to regulate groundwater withdrawals by means of spacing and production limits. In addition the District may choose to identify areas within the District which, based on its monitoring programs are high historical use areas, potential groundwater depletion sites or drought sensitive areas. These areas when identified may require specific District action to ensure that groundwater supply is maintained and protected. The relevant factors to be considered in making a determination to grant or deny a permit or limit groundwater withdrawals shall include those set forth in the District Act, Chapter 36 of the Texas Water Code, the District Rules and Management Plan. The District Rules may be viewed on the District's web site at www.hcuwcd.org.

The District will maintain and update as needed the District's Drought Management Plan that was adopted on December 14, 2004. The District's Drought Management Plan is comprised of two components; trigger conditions and drought management strategies. Trigger conditions are those drought sensitive parameters that correspond to the intensification of drought and are used to trigger the initiation of drought management strategies. The trigger conditions used in this plan have been developed by the District and are based on local drought sensitive parameter. Drought management strategies are those practices that are meant to curtail water usage during a drought so that water supplies will not become depleted. The drought management strategies that are contained in the plan correspond closely to those in the City of Fredericksburg's drought management plan, but the trigger conditions are different in the two plans. The City and all other water suppliers within Gillespie County will continue to use their own drought management plans until the District declares a Category 1 Critical Groundwater Depletion Area. The District's Drought Management Plan may be viewed on the District's web site at www.hcuwcd.org.

The District may employ technical resources at its disposal, as needed to evaluate the groundwater resources available within the District and to determine the effectiveness of regulatory or conservation measures. In consideration of particular individual, localized or District-wide conditions, including without limitation climactic conditions, the District may by rule allow an increase or impose a decrease in the total production in a management zone above or below the sustainable amount for a period of time considered necessary by the District in order to accomplish the purposes set forth in Chapter 36, Water Code, or the District Act. The exercise of said discretion by the Board shall not be construed as limiting the power of the Board.

IX. ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE FOR PLAN IMPLEMENTATION

The District will implement and utilize the provisions of this plan as a guidepost for determining the direction or priority for all District activities. All operations of the District, all agreements entered into by the District, and any additional planning efforts in which the District may participate will be consistent with the provisions of this plan.

Rules adopted by the District for permitting of wells and the use of groundwater shall comply with TWC Chapter 36 and the provisions of this management plan. All rules will be adhered to and enforced. The promulgation and enforcement of the rules will be based on the best technical evidence available to the District.

The District shall treat all citizens with equality. Citizen may apply to the District for discretion in enforcement of the rules on grounds of adverse economic effect or unique local aquifer characteristic. In granting of discretion to any rule, the Board shall consider the potential for adverse effect on adjacent landowners and aquifer conditions. The exercise of said discretion by the Board shall not be construed as limiting power of the Board.

The District will seek cooperation and coordination in the implementation of this plan, and all District activities, with appropriate state, regional or local water management entities.

X. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS

The District's General Manager will prepare and present an annual report to the Board of Directors on District performance in regards to achieving management goals and objectives for the calendar year. The report will be presented during the January board meeting beginning in January 2009. The report will include the number of instances each activity was engaged in during the year. The Board will maintain the report on file, for public inspections at the District's offices upon adoption in a regular noticed meeting of the Board.

GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

The management goals, objectives, and performance standards of the District in the areas specified in 31TAC§356.5 are addressed below.

**A. Providing the most efficient use of groundwater – 31 TAC 356.5(a)(1)(A);
TWC §36.1071 (a)(1)**

A.1 Objective – Each year the District will assist the Gillespie County Commissioners Court in the evaluation of water availability studies submitted in accordance with Gillespie County Subdivision requirements.

A.1 Performance Standard – Each year the District will report the number of groundwater availability reports that the District reviewed and certified as having sufficient or insufficient water resources available.

A.2 Objective – Each year the District will require all new exempt wells that are constructed within the boundaries of the District to be registered with the District in accordance with the District Rules.

A.2 Performance Standard – The number of exempt wells registered by the District for the year will be incorporated into the Annual Report submitted to the Board of Directors.

A.3 Objective – Each year the District will regulate the production of groundwater by maintaining a system of permitting the use and production of groundwater within the boundaries of the District in accordance with the District Rules.

A.3 Performance Standard – Each year the District will accept and process applications for the permitted use of groundwater in the District in accordance with the permitting process established by the District Rules. The number and type of applications made for the permitted use of groundwater in the District, and the number and type of permits issued by the District will be included in the Annual Report given to the Board of Directors.

**B. Controlling and preventing waste of groundwater – 31 TAC 356.5(a)(1)(B);
TWC §36.1071(a)(2)**

B.1 Objective - Each year the District will provide information on eliminating and reducing the waste of groundwater and focusing on water quality protection. This may be accomplished annually by one of the following methods:

- a) When requested conduct classroom presentations;
- b) When requested sponsor an educational program/curriculum
- c) Post information on the District’s web site;
- d) Submit newspaper articles for publication;
- e) Conduct public presentations
- f) Distribute brochures/literature

B.1 Performance Standard - The annual report will include a summary of the District activities during the year to disseminate educational information on eliminating and reducing the wasteful use of groundwater focusing on water quality protection. The number of instances for each activity utilized by the District will be included in the report.

B.2 Objective - The District has and will continue to perform an audit of water usage within the City of Fredericksburg from the data provided by the City to help identify wasteful practices.

B.2 Performance Standard - One audit will be conducted every other year using data from even numbered years with the results provided to the City and the Board of Directors.

C. Address conjunctive surface water management issues – 31 TAC 356.5(a)(1)(D); TWC §36.1071(a)(4)

C.1 Objective - To evaluate the ground to surface water interrelationships within the District, each year the District will conduct stream flow measurements along eight (8) sites of the Pedernales River between Bear Creek and Palo Alto Creek at least six (6) times per year.

C.1 Performance Standard - Each year the number of stream flow measurements taken annually will be presented in the District's annual report.

C.2 Objective - Each year, the District will participate in the regional planning process by attending a minimum of two meetings of the Lower Colorado Regional Water Planning Group (Region K) per fiscal year.

C.2 Performance Standard- Each year, attendance at Region K meetings by a representative of the District will be reflected in the District's annual report and will include the number of meetings attended and the dates.

D. Addressing natural resources issues that impact the use and availability of groundwater and which are impacted by the use of groundwater – 31 TAC 356.5(a)(1)(E); TWC §36.1071(a)(5)

D.1. Objective – Each year the District will monitor water levels within the District by measuring the water level on selected wells representative of the various aquifers within the District. The water level monitoring network and measuring schedule is as follows:

Measurement

<u>Aquifer</u>	<u># of Wells</u>	<u>Frequencies</u>
Ellenburger	35	6 times per year
Hensel	40	2 times per year
Edwards, Hickory, Mid Cambrian and Pre Cambrian	50	2 times per year

D.1 Performance Standard – Each year the District’s annual report will provide a status on the number of monitor wells measured.

E. Addressing Drought Conditions – 31 TAC 356.5(a)(1)(F); §36.1071(a)(6)

E.1 Objective - Continue to monitor aquifer conditions in response to drought conditions to improve and refine trigger conditions and update, as warranted, the District’s Drought Management Plan adopted on December 14, 2004.

E.1 Performance Standard - Each year the District’s annual report will provide to the Board the number of any new trigger conditions identified and changes made to the Drought Management Plan.

E.2 Objective - Review applicable data to determine status of drought condition, and if necessary, report to the Board on the need to implement the drought management plan.

E.2 Performance Standard – Each year the District’s annual report will include the number of times reported to the Board on the need to implement the drought management plan.

E.3 Objective - Each year the District will provide to the public at least one (1) article through the local newspaper information concerning the status of drought conditions and stage of drought.

E.4 Performance Standard – Each year the District’s annual report will include the number of drought notices or articles submitted to the local newspaper.

F. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, and Brush Control

F.1 Objective - Each year the District will promote conservation by one or more of the following methods:

- a) Distribute conservation literature packets to schools in Gillespie County (ie. Book covers, pencils, etc.);

- b) Upon request conduct classroom conservation presentations;
- c) Post conservation information on the District's web site;
- d) Provide a newspaper article on conservation for publication;
- e) Publish an article on conservation in the District's newsletter;
- f) Upon request conduct a public conservation presentation;
- g) Distribute conservation brochures/literature to the public

F.1 Performance Standard – Each year the District's annual report will include a summary of the District's activity during the year to promote conservation. The number of instances for each activity utilized by the District will be included in the report.

F.2 Objective – Each year the District will provide information about recharge enhancement on the District web site or by brochures/literature available at the District office.

F.2 Performance Standard – Each year the District annual report will include a summary of the District's activity regarding recharge enhancement.

F.3 Objective – Each year the District will provide information about brush control on the District web site or by brochures/literature available at the District office.

F.3 Performance Standard – Each year the District annual report will include a summary of the District's activity regarding brush control.

F.4 Objective – Each year, the District will promote rainwater harvesting by posting information on rainwater harvesting on the District web site or by brochures/literature available at the District office.

F.4 Performance Standard – Each year the District annual report will include a summary of the District's activity regarding rainwater harvesting.

SB-1 MANAGEMENT GOALS DETERMINED NOT-APPLICABLE TO THE DISTRICT 31 TAC 356.5(a)(1) MANAGEMENT GOALS

A. Control and prevention of subsidence – 31TAC§356.5(a)(1)(C)

The rigid geologic framework of the region precludes significant subsidence from occurring thereby this goal is not applicable to the operations of the District.

B. Addressing in a Quantitative Manner the Desired Future Conditions of the Groundwater Resources – 31TAC 356.5(a)(1)(H); TWC §36.1071(a)(8)

At this time, Desired Future Conditions have not been established and therefore, the amount of Managed Available Groundwater cannot be determined. The District has been working towards establishing the Desired Future Conditions by the September 2010 deadline with other members in Groundwater Management Area 7. This goal is not applicable to the District at this time.

C. Addressing Precipitation Enhancement

Precipitation enhancement is not an appropriate or cost-effective program for the District at this time because there is not an existing precipitation enhancement program operating in nearby counties which the District could participate and share costs. The cost of operating a single-county precipitation enhancement program is prohibitive. Therefore, this goal is not applicable to the District at this time.

***Summary Definitions:**

“Waste” - as defined by Chapter 36 of Texas Water Code means any one or more of the following:

- 1.) Withdrawal of groundwater from a groundwater reservoir at a rate and in an amount that causes or threatens to cause intrusion into the reservoir of water unsuitable for agricultural, gardening, domestic, or stock raising purposes;
- 2.) The flowing or producing of wells from a groundwater reservoir if the water produced is not used for a beneficial purpose;
- 3.) Escape of groundwater from a groundwater reservoir to any other reservoir or geologic strata that does not contain groundwater;
- 4.) Pollution or harmful alteration of groundwater in groundwater reservoir by salt water or by other deleterious matter admitted from another stratum or from the surface of the ground;
- 5.) Willfully or negligently causing, suffering, or allowing groundwater to escape into any river, creek, natural watercourse, depression, lake, reservoir, drain, sewer, street, highway, road, or road ditch, or onto any land other than that of the owner of the well unless such discharge is authorized by permit, rule, or order issued by the Commission under Chapter 26 of the Texas Water Code;

- 6.) Groundwater pumped for irrigation that escapes as irrigation tailwater onto land other than that of the owner of the well unless permission has been granted by the occupant of the land receiving the discharge; or
- 7.) For water produced from an artesian well “waste” has the meaning assigned by Section 11.205 of the Texas Water Code.

“Board” - the Board of Directors of the Hill Country Underground Water Conservation District

“District” – Hill Country Underground Water Conservation District

“DFC” – Desired Future Conditions

“GCDs” – groundwater conservation districts

“GMA” - Groundwater Management Area

“GMA 7” – Groundwater Management Area #7

“MAG” – Managed Available Groundwater

“Region K” - Lower Colorado Regional Water Planning Area

“SB 1” – Senate Bill 1

“SB 2” – Senate Bill 2

“TWC” – Texas Water Code

“TWDB” - Texas Water Development Board

“TCEQ” - Texas Commission on Environmental Quality

APPENDIX A

To be inserted

(Resolution Adopting Management Plan)

APPENDIX B

To be inserted

(Notice of Public Hearing on Proposed New Management Plan)

APPENDIX C

To be inserted

(Letter to Surface Water Management Entities)

APPENDIX D