

# Water Supply Study for Parker and Wise Counties

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**April 2009**

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Planning Group**

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**Water Supply Study for Parker and Wise Counties  
Region C Water Planning Group**

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# **Region C Water Planning Group Water Supply Study for Parker and Wise Counties**

## **1. Executive Summary**

The 2007-08 regional water planning effort includes special projects aimed at bringing the recommended water management strategies in the regional water plans closer to implementation. The Parker-Wise County Study is one of these projects. While the regional water plans have a 50 year planning period, this study focuses on the 2010 through 2030 time frame.

The study area includes Parker and Wise Counties, which are projecting steady growth in the next 30 years. Growth in recent years appears to be greater than what was projected in the *2006 Region C Water Plan*<sup>(1)</sup>. To meet the higher water demands, the recommended water management strategies have been revised as discussed in this report. The currently planned water management strategies for most of the water user groups are in line with the strategies presented in the *2006 Region C Water Plan*<sup>(1)</sup>. In most cases, increasing the amount of supply from TRWD sources was the only change necessary to meet higher projected demands.

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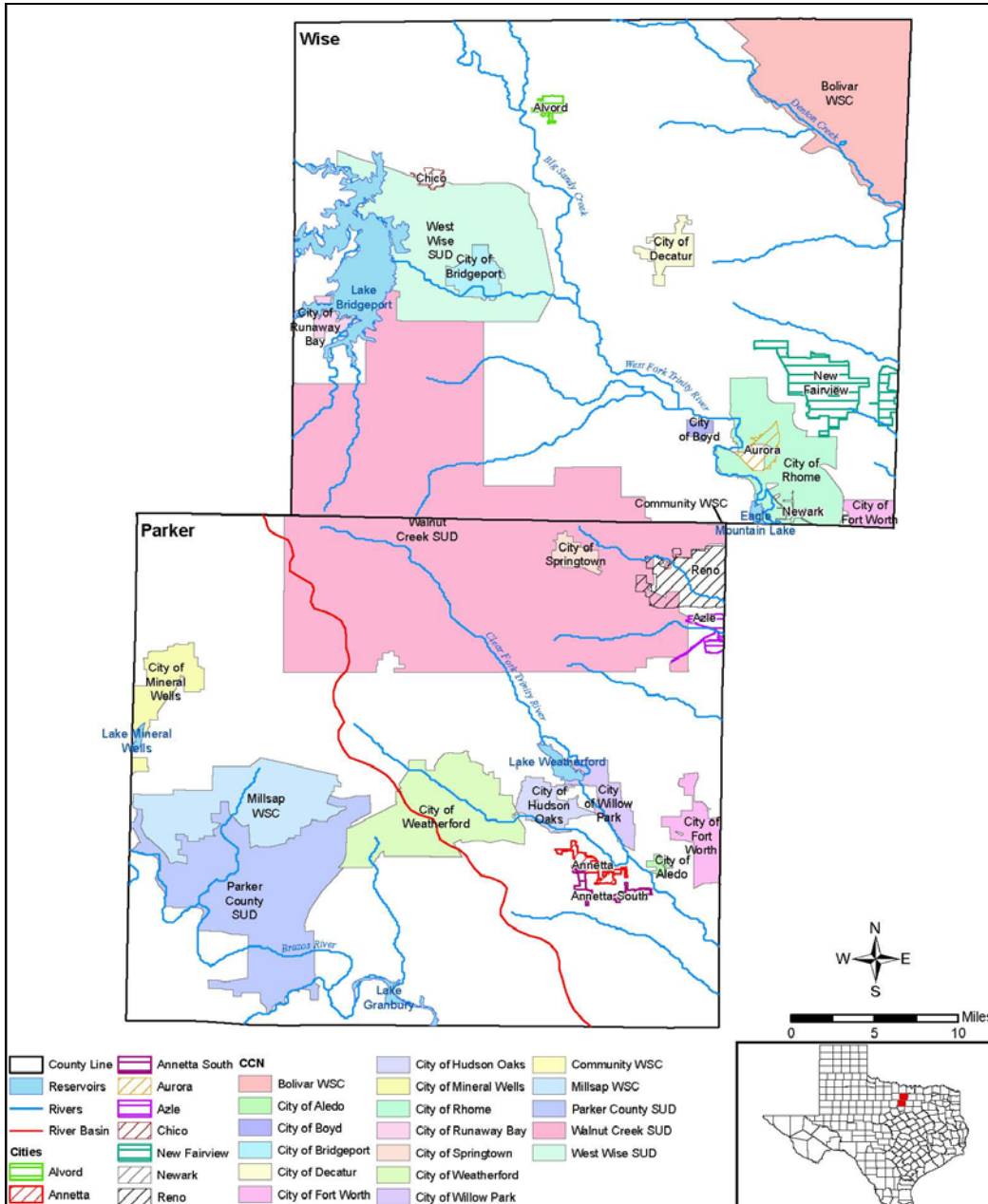
<sup>(1)</sup> Superscripted numbers in parenthesis match references in Appendix A.

## **2. Introduction**

The 2007-08 regional water planning effort includes special projects funded by the Texas Water Development Board (TWDB). The goal of these studies is to bring the recommended water management strategies closer to implementation. The Parker-Wise County Study is one of these projects. While the regional water plans have a 50 year planning period, this study focuses on the 2010 through 2030 time frame.

The study area shown in Figure 2.1 includes Parker and Wise Counties, which are projecting steady growth in the next 30 years. Growth in recent years appears to be greater than what was projected in the *2006 Region C Water Plan*<sup>(1)</sup>. This report summarizes the analysis and recommendations for meeting water demand projections for water user groups in the Parker-Wise County Study area. Any increases to TRWD supplies will be considered in the *2011 Region C Water Plan* update.

**Figure 2.1  
Parker-Wise County Study Area**



### **3. Population and Demand Projections**

#### **3.1 Meetings to Collect Data**

Freese and Nichols, Inc. (FNI) met with fifteen water user groups (WUGs) and wholesale water providers (WWPs) in Parker and Wise Counties in early 2008. FNI conducted telephone meetings with four additional WUGs. (The five remaining WUGs in the study area did not return telephone calls.) Table 3.1 lists the meetings held and the meeting participants. At each meeting, FNI presented the population and demand projections as shown in the regional water plans. The current population and water use estimates of the entity and their existing and/or potential future customers were discussed. Many entities provided information related to recent water use and numbers of connections.

The current water supply for each entity, the recommended water management strategies as presented in the regional water plans, and any suggested adjustments to those recommendations were discussed. In most cases, the entities plan to implement the recommended strategies, although the amounts of supply may change. In a few cases, the entities are pursuing other options for water supply to meet their future needs.

The information obtained in these meetings was used to develop updated population and demand projections presented in this report. The updated information related to water supply was used to supplement or update proposed management strategies.

A public meeting was also held on August 28, 2008 in Springtown to discuss the recommendations of the study. All WUGs and WWPs in the study area were invited to attend the meeting. The following WUGs and WWPs were represented at the meeting: Decatur, Alvord, Tarrant Regional Water District, Walnut Creek SUD, Willow Park, and Springtown. The meeting notes, list of participants, meeting announcement and presentation are included in Appendix F.

#### **3.2 Revisions to Population and Demand Projections**

The following section discusses the revisions to population and demand as recommended in this study. Municipal per capita water use<sup>2</sup> and population are used to determine water demand. Municipal per capita water use is the sum of residential,

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<sup>2</sup>“Municipal per capita water use” is commonly referred to as “gpcd”.



commercial, and institutional water use divided by the population served. Note that the recommended population and demand projections fall in the middle of a range of projections. It is estimated that the actual population and demand values could be 15 percent higher or lower than the recommended values.

**Table 3.1  
Meetings with WUGs and WWP**

<b>Date</b>	<b>Entity</b>	<b>Meeting Type</b>	<b>Attendees</b>
January 23, 2008	Boyd	In person	John Hamilton, Stephanie Griffin
January 23, 2008	Bridgeport	In person	Russell Hanson, Stephanie Griffin
January 23, 2008	Decatur	In person	Earl Smith, Brian McDonald, Stephanie Griffin
January 23, 2008	Rhome	In person	Preston Gilliam, David Wilson, Stephanie Griffin
January 23, 2008	West Wise SUD	In person	James Ward, Stephanie Griffin
January 25, 2008	Alvord	In person	Ricky Tow, Stephanie Griffin
January 25, 2008	Runaway Bay	In person	Mike Jump, Stephanie Griffin
January 25, 2008	Wise County SUD	In person	Brett Shannon, Stephanie Griffin
January 28, 2008	Aurora	In person	Toni Richardson, Stephanie Griffin
January 28, 2008	Aledo	In person	Ken Pfeifer, Gordon Smith, Stephane Griffin
January 29, 2008	Springtown	In person	Melvin Webb, Jeremy Rice, Stephanie Griffin
January 30, 2008	Hudson Oaks	In person	Robert Hanna, Patrick Lawler, Will McDonald, Stephanie Griffin
January 30, 2008	Weatherford	In person	Kraig Kahler, Paul Phillips, James Hotopp, John Minahan, Will McDonald, Stephanie Griffin
January 30, 2008	Willow Park	In person	Candy Scott, Stephanie Griffin
February 8, 2008	Walnut Creek SUD	In person	Jerry Holsomback, Bill Lohrke, John Minahan, Stephanie Griffin
February 21, 2008	Mineral Wells	Telephone	Lance Howerton, Jeremy Rice
February 27, 2008	Azle	Telephone	Rick White, Jeremy Rice
March 5, 2008	Reno	Telephone	Jody (City Secretary), Jeremy Rice
April 23, 2008	Chico	Telephone	Ed Cowley, Jeremy Rice

## **Parker County**

### **Aledo**

The City of Aledo provided the updated population and demand projections it prefers to use. These projections were developed as part of a hydraulic study for the City and are higher than the projections shown in the *2006 Region C Water Plan*<sup>(1)</sup>.

### **Hudson Oaks**

Revised population projections for the City of Hudson Oaks were developed assuming the City's 2000-2007 growth rate (approximately 2 percent per year) would continue through the year 2030. The historical municipal per capita water use for 2006 was calculated to be 206 gallons per person per day. This per capita water use was multiplied by the revised population projections to develop revised demand projections. The City indicated that it is working on a master plan that will have population projections, but those numbers are not available at this time.

### **Weatherford**

The City of Weatherford provided revised population projections, which are higher than both the *2006 Region C Water Plan*<sup>(1)</sup> and the North Central Texas Council of Governments (NCTCOG) projections<sup>(2)</sup>. Weatherford also provided revised municipal per capita water use information. Multiplying the revised population projections by the revised municipal per capita produces demands that are slightly higher than those presented in the *2006 Region C Water Plan*<sup>(1)</sup>.

### **Willow Park**

The City of Willow Park provided revised population projections based on a 3.5 percent annual growth rate. The City's projections are higher than those presented in the *2006 Region C Water Plan*<sup>(1)</sup>, higher than NCTCOG projections<sup>(2)</sup> for the year 2010, and lower than NCTCOG projections<sup>(2)</sup> for years 2020 and 2030. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan*<sup>(1)</sup>.

## **Wise County**

### **Alvord**

The City of Alvord has seen approximately 4 percent per year population growth per year in the last four years. Revised recommended population projections assume the 4 percent annual growth rate will continue through the year 2030. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan* <sup>(1)</sup>.

### **Aurora**

The City of Aurora provided revised population projections, which are higher than those presented in the *2006 Region C Water Plan* <sup>(1)</sup>. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan* <sup>(1)</sup>.

### **Boyd**

The City of Boyd provided revised population projections, which are higher than both NCTCOG projections<sup>(2)</sup> and the projections presented in the *2006 Region C Water Plan* <sup>(1)</sup>. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan* <sup>(1)</sup>.

### **Decatur (Wise County Water Supply District)**

The City of Decatur provided revised population and demand projections. The population projections are higher than both NCTCOG projections<sup>(2)</sup> and the projections in the *2006 Region C Water Plan* <sup>(1)</sup>. The demand projections are also higher than the *2006 Region C Water Plan* <sup>(1)</sup> projections.

### **Rhome**

The City of Rhome provided revised population projections, which are lower than the projections presented in the *2006 Region C Water Plan* <sup>(1)</sup>. Rhome has had slower growth than previously projected. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan* <sup>(1)</sup>.

## Runaway Bay

Revised population projections for Runaway Bay assume a 2 percent annual growth rate starting with a January 2008 population estimate of 1,330. The 2008 population estimate was provided by Runaway Bay. Revised demand projections are calculated by multiplying the revised population projections by the municipal per capita water use presented in the *2006 Region C Water Plan*<sup>(1)</sup>.

## Walnut Creek SUD

Walnut Creek SUD provides wholesale treated water to West Wise SUD, Paradise (Wise County–Other), Boyd, Rhome, and Reno. Newark and New Fairview are potential future customers. TCEQ has told Walnut Creek SUD that it must expand its water treatment plant capacity to equal the amount of supply specified in its water contracts. Recent water use records do not indicate that an expansion to the water treatment plant is warranted. Walnut Creek SUD's water supply contracts specify contract maximum purchases with no take or pay requirements.

The recommended population and demand projections for regional planning purposes do not consider the TCEQ's requirements for Walnut Creek SUD's treatment capacity. Meeting the TCEQ requirements is considered a separate water treatment plant capacity issue. The recommended population projections are based on the populations provided by the water user groups served by Walnut Creek SUD. Several water user groups have water supply sources other than Walnut Creek SUD. As a result, only a portion of the population and resulting demand are supplied by Walnut Creek SUD. The projected population for Walnut Creek SUD's service area outside of city limits assumes a 5 percent annual growth rate.

Walnut Creek SUD provided a preferred municipal per capita water use projection. The recommended demand projections are calculated by multiplying the Walnut Creek SUD per capita projection by the recommended population projections.

## West Wise SUD

West Wise SUD sells treated water to residential and commercial customers and to the City of Chico. West Wise SUD provided revised population projections, which are similar to those presented in the *2006 Region C Water Plan*<sup>(1)</sup>, although slightly higher in 2020 and

2030. The revised municipal per capita water use projections are based on recent historical water use data. The recommended demand projections are calculated by multiplying the West Wise SUD population projections by the recommended per capita projections.

### Additional County Aggregated Projections

Freese and Nichols, Inc. (FNI) collected the demand projections developed in the regional water planning process for county-other, manufacturing, mining, irrigation, livestock, and steam electric power. Only the mining demands are adjusted in this study. The mining demands in Parker and Wise Counties are adjusted to account for the increased mining demands that have occurred in recent years as a result of the Barnett Shale development. FNI applied water demands for mining as developed by the Bureau of Economic Geology in the 2007 Texas Water Development Board study *Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development*<sup>(3)</sup>. Note that the Parker County Steam Electric demand is shown as an unmet demand in this report. The steam electric demand will be studied further in the *2011 Region C Water Plan* update.

### Water User Groups Whose Population and Demand Projections are Unchanged

Population and demand projections remain unchanged for several water user groups. The population and demand projections presented in the *2006 Region C Water Plan*<sup>(1)</sup> are recommended to remain as previously projected for the following water user groups:

- Annetta
- Annetta South
- Azle
- Bridgeport
- Mineral Wells
- New Fairview
- Newark
- Reno
- Springtown

### 3.3 Recommended Population Projections

Freese and Nichols, Inc. (FNI) collected available historical and projected population data for each entity through the in-person or phone meetings. Additional historical population data was gathered from the Texas State Data Center <sup>(4)</sup>, the U.S. Census <sup>(5)</sup>, and the North Central Texas Council of Governments (NCTCOG)<sup>(2)</sup>. FNI also gathered population projections developed by the NCTCOG and those approved by the Texas Water Development Board for regional water planning.

The population information was used to review growth in the cities. In general, the population in Parker and Wise Counties is growing faster than what was projected in the *2006 Region C Water Plan* <sup>(1)</sup>. The revised recommended projections are based on information provided by the entities and are usually higher than the *2006 Region C Water Plan* <sup>(1)</sup> projections. Although the revised recommended projections for some of the cities in the study area are higher than the NCTCOG projections<sup>(2)</sup>, the total recommended population projections for both Parker and Wise Counties are lower than the NCTCOG projections<sup>(2)</sup>.

Table 3.2 presents recommended population projections for each water user group in the study area, as well as what was previously projected in the *2006 Region C Water Plan* <sup>(1)</sup>. Table 3.3 provides the total recommended population projections for entities split by county. Figures 3.1 and 3.2 show the population projections for Parker and Wise Counties, respectively. Figure 3.3 shows the population projections for the entire study area.

**Table 3.2  
Recommended Population Projections in Study Area**

Water User Group	2006 Plan			Recommended		
	2010	2020	2030	2010	2020	2030
<b>Parker County</b>						
Aledo	2,612	3,473	4,426	3,690	7,918	13,258
Annetta	1,579	1,972	2,289	1,579	1,972	2,289
Annetta South	708	836	939	708	836	939
Azle <sup>1</sup>	2,191	2,795	3,473	2,191	2,795	3,473
Hudson Oaks	2,960	4,262	5,673	2,000	2,438	2,972
Mineral Wells <sup>1</sup>	4,000	4,000	4,000	4,000	4,000	4,000
Parker County Other	38,144	37,824	38,905	38,144	37,824	38,905
Reno	2,569	2,676	2,763	2,569	2,676	2,763

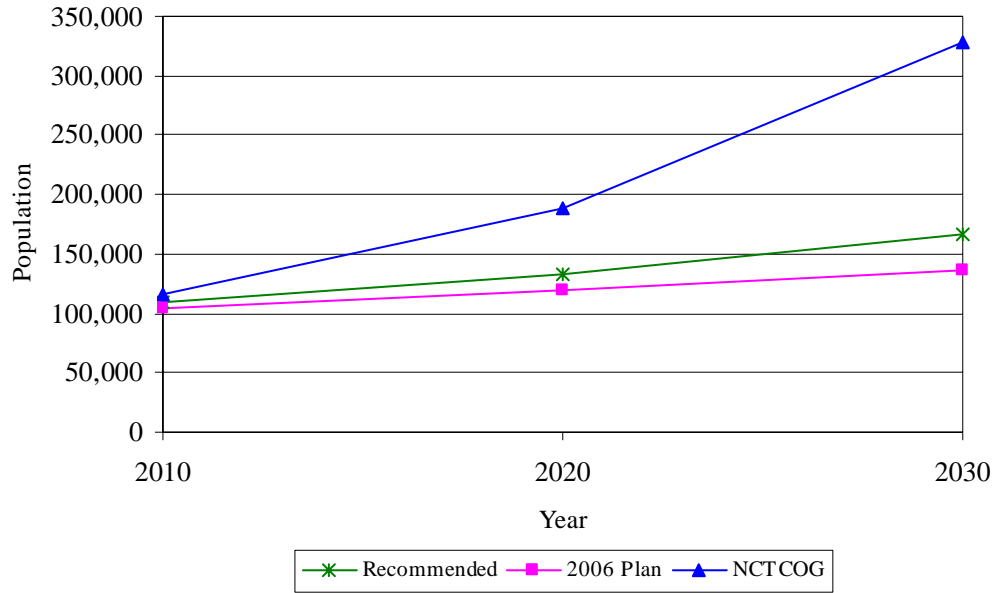
**Table 3.2, Continued**

Water User Group	2006 Plan			Recommended		
	2010	2020	2030	2010	2020	2030
Springtown	3,000	4,000	5,000	3,000	4,000	5,000
Walnut Creek SUD - Service Area Outside other WUGs <sup>2</sup>	16,522	21,373	25,294	19,632	29,663	46,777
Weatherford	25,412	32,161	38,365	26,877	33,000	38,584
Willow Park	3,832	4,764	5,829	4,164	5,871	8,278
<b>Parker County Total</b>	<b>103,529</b>	<b>120,136</b>	<b>136,956</b>	<b>108,554</b>	<b>132,993</b>	<b>167,238</b>
<b>Wise County</b>						
Alvord	1,157	1,280	1,399	1,378	2,040	3,019
Aurora	1,096	1,295	1,489	1,500	1,600	2,000
Bolivar WSC <sup>1</sup>	1,558	1,745	1,963	1,558	1,745	1,963
Boyd	1,500	2,000	2,200	1,500	2,400	3,200
Bridgeport	6,803	8,352	12,001	6,803	8,352	12,001
Chico	1,300	1,500	1,800	1,300	1,500	1,800
Community WSC <sup>1</sup>	140	141	142	140	141	142
Decatur	6,804	8,508	11,738	8,018	12,656	15,780
New Fairview	1,587	2,167	2,732	1,587	2,167	2,732
Newark	1,137	1,772	2,339	1,137	1,772	2,339
Rhome	2,300	4,519	6,461	1,621	2,640	4,300
Runaway Bay	1,532	1,881	2,221	1,411	1,720	2,097
Walnut Creek SUD - Service Area Outside other WUGs <sup>2</sup>	2,027	2,602	3,162	2,426	3,666	5,781
West Wise SUD (less Chico's population served by WWSUD)	3,581	3,957	4,323	3,501	4,005	4,506
Wise County Other	32,364	35,909	35,909	32,364	35,909	35,909
<b>Wise County Total</b>	<b>64,886</b>	<b>77,628</b>	<b>89,879</b>	<b>66,244</b>	<b>82,313</b>	<b>97,570</b>
<b>Total Study Area</b>	<b>168,415</b>	<b>197,764</b>	<b>226,835</b>	<b>174,798</b>	<b>215,306</b>	<b>264,807</b>

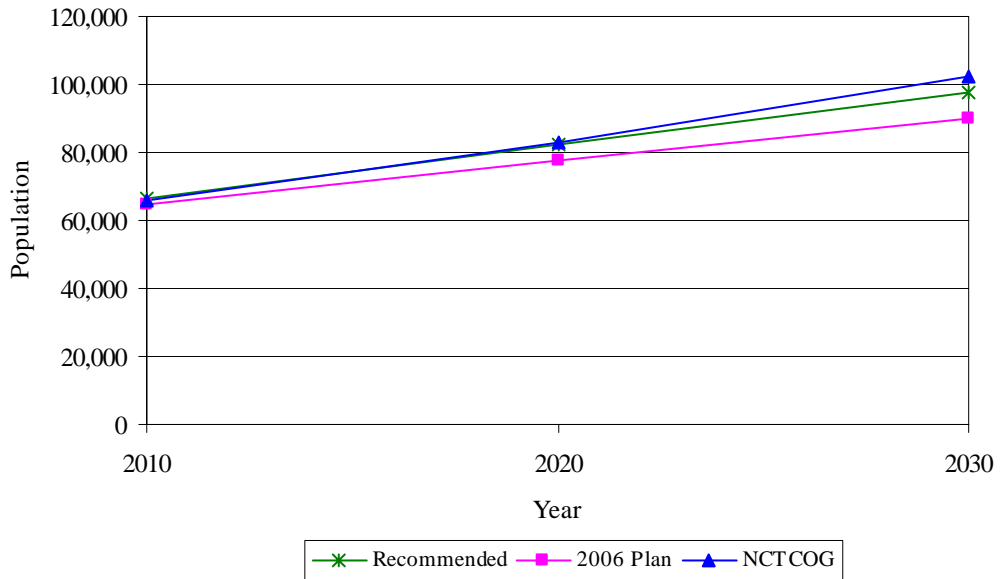
<sup>1</sup> Only the Parker and/or Wise County portions of Azle, Mineral Wells, Bolivar WSC, and Community WSC population projections are shown in this table.

<sup>2</sup> Table 3.6 shows the total population for Walnut Creek SUD and its customers.

**Figure 3.1**  
**Recommended Population Projections for Parker County**

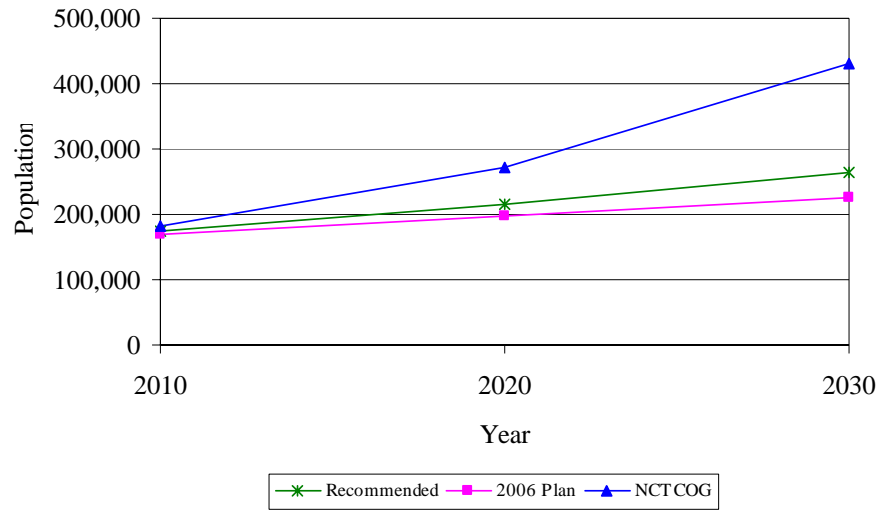


**Figure 3.2**  
**Recommended Population Projections for Wise County**





**Figure 3.3**  
**Recommended Total Population Projections for the Study Area**



**Table 3.3**  
**Population Projections for Entities Split by County <sup>1</sup>**

Water User Group	Recommended		
	2010	2020	2030
Azle	12,108	16,795	23,473
Mineral Wells <sup>(3)</sup>	19,074	20,200	21,123
Bolivar WSC	10,386	12,465	21,806
Community WSC	3,536	3,588	3,642

<sup>1</sup> The total shown is for the entire entity, including that portion of the entity located outside of the study area. Note these projections did not change from the 2006 Plan.

### **3.4 Recommended Water Demands for Water User Groups**

Freese and Nichols, Inc. (FNI) reviewed the historical and projected water demands. A number of entities provided recent water use data, and some entities provided water demand projections for consideration as well.

FNI compared the municipal per capita water use from the 2006 regional water plans to the recent municipal per capita water use information provided by the water user groups and made recommendations to adjust the municipal per capita water use projection when necessary. Table 3.4 summarizes the municipal per capita water use projections for this study. Municipal per capita water use is the sum of residential, commercial, and institutional water use divided by the population served.

**Table 3.4**  
**Recommended Municipal Per Capita Water Use Projections**  
**in Gallons per Person per Day**

<b>Water User Group</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Parker County</b>			
Aledo	177	182	185
Annetta	110	107	106
Annetta South	110	107	105
Azle	144	140	137
Hudson Oaks	206	206	206
Mineral Wells	171	168	166
Parker County Other	112	109	107
Reno	111	107	104
Springtown	150	147	144
Weatherford	185	185	185
Willow Park	146	142	140
<b>Wise County</b>			
Alvord	133	129	126
Aurora	110	108	106
Bolivar WSC	110	122	138
Boyd	128	124	121
Bridgeport	206	203	201
Chico	143	140	137
Community WSC	112	109	106
Decatur	200	199	199
New Fairview	113	112	111
Newark	121	117	115
Rhome	223	221	220
Runaway Bay	187	185	183
Walnut Creek SUD	114	113	113
West Wise SUD	140	138	136
Wise County Other	106	108	107

The population projection was multiplied by the projected municipal per capita water use to establish the projected demand for each entity. For the entities who did not provide information, FNI assumed the projections developed in the 2006 Plan were still appropriate for use in this study. Table 3.5 lists the recommended demand projections for this study.

**Table 3.5  
Recommended Demand Projections in Acre-Feet per Year**

Water User Group	2006 Plan			Recommended		
	2010	2020	2030	2010	2020	2030
<b>Parker County</b>						
Aledo	439	591	744	732	1,610	2,750
Annetta	195	236	272	195	236	272
Annetta South	87	100	110	87	100	110
Azle <sup>1</sup>	1,953	2,633	3,602	1,953	2,633	3,602
Hudson Oaks	361	511	674	462	563	686
Mineral Wells <sup>1</sup>	766	753	744	766	753	744
Parker County-Irrigation	422	422	422	422	422	422
Parker County-Livestock	1,856	1,856	1,856	1,856	1,856	1,856
Parker County-Manufacturing	779	879	974	779	879	974
Parker County-Mining	98	112	122	7,328	2,132	2,582
Parker County-Other	4,785	4,618	4,663	4,785	4,618	4,663
Parker County-Steam Electric Power	30	4,617	5,397	30	4,617	5,397
Reno	319	321	322	319	321	322
Springtown	504	659	807	504	659	807
Walnut Creek SUD - Service Area Outside other WUGs <sup>2</sup>	2,017	2,562	2,975	2,367	3,516	5,526
Weatherford	5,209	6,448	7,607	5,574	6,844	8,002
Willow Park	627	758	914	682	935	1,299
<b>Parker County Total</b>	<b>20,447</b>	<b>28,076</b>	<b>32,205</b>	<b>28,840</b>	<b>32,694</b>	<b>40,013</b>
<b>Wise County</b>						
Alvord	172	185	197	205	295	425
Aurora	136	157	177	185	194	238
Bolivar WSC <sup>1</sup>	1,279	1,703	3,371	1,279	1,703	3,371
Boyd	215	278	298	215	333	434
Bridgeport	1,570	1,899	2,702	1,570	1,899	2,702
Chico	208	235	276	208	235	276
Community WSC <sup>1</sup>	444	438	433	444	438	433
Decatur	1,639	2,011	2,748	1,794	2,825	3,520

**Table 3.5, Continued**

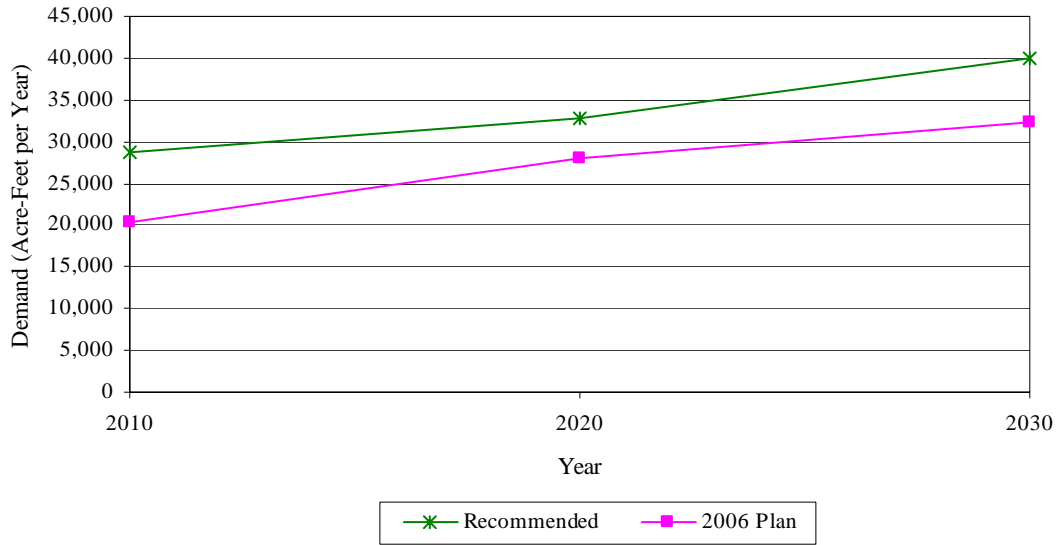
Water User Group	2006 Plan			Recommended		
	2010	2020	2030	2010	2020	2030
New Fairview	201	272	340	201	272	340
Newark	154	232	301	154	232	301
Rhome	575	1,119	1,592	405	654	1,060
Runaway Bay	321	390	455	296	357	430
Walnut Creek SUD - Service Area Outside other WUGs <sup>2</sup>	247	312	372	293	435	683
West Wise SUD (less Chico's demand met by WWSUD)	497	536	571	460	503	529
Wise County-Irrigation	502	502	502	502	502	502
Wise County-Livestock	1,714	1,714	1,714	1,714	1,714	1,714
Wise County- Manufacturing	2,313	2,660	2,979	2,313	2,660	2,979
Wise County-Mining	25,017	28,644	31,490	25,017	28,644	31,490
Wise County-Other	3,843	4,344	4,304	3,843	4,344	4,304
Wise County-Steam Electric Power	3,949	5,653	6,609	3,949	5,653	6,609
<b>Wise County Total</b>	<b>44,996</b>	<b>53,284</b>	<b>61,431</b>	<b>45,046</b>	<b>53,891</b>	<b>62,340</b>
<b>Total Study Area</b>	<b>65,443</b>	<b>81,360</b>	<b>93,636</b>	<b>73,886</b>	<b>86,585</b>	<b>102,353</b>

<sup>1</sup> Only the Parker and/or Wise County portions of Azle, Mineral Wells, Bolivar WSC, and Community WSC demand projections are shown in this table.

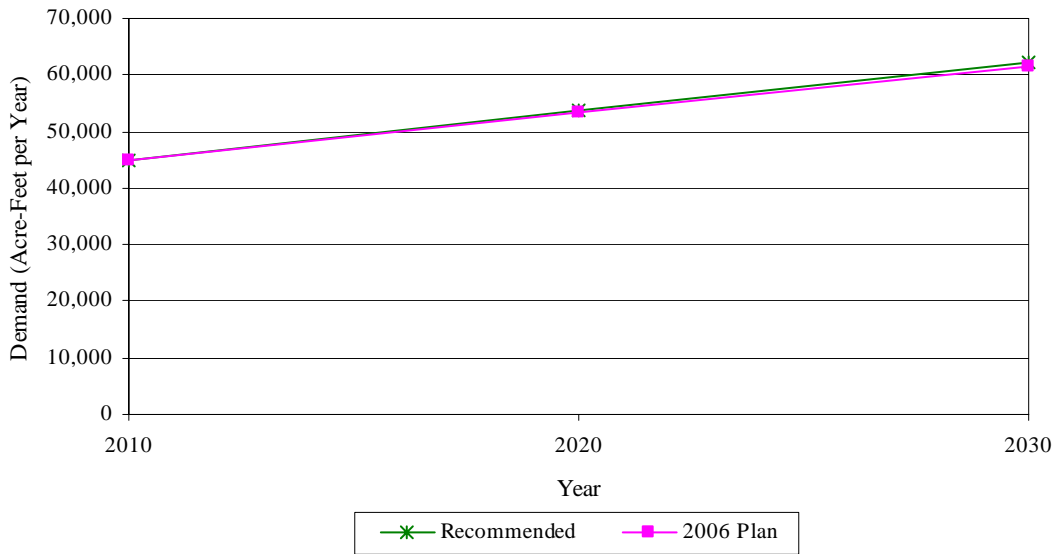
<sup>2</sup> Table 3.6 shows the total demand for Walnut Creek SUD and its customers.

Figures 3.4 and 3.5 present the demand projections for Parker and Wise Counties, respectively. Figure 3.6 shows the total demand projection for the study area. The recommended demand is typically based on the information provided by entities.

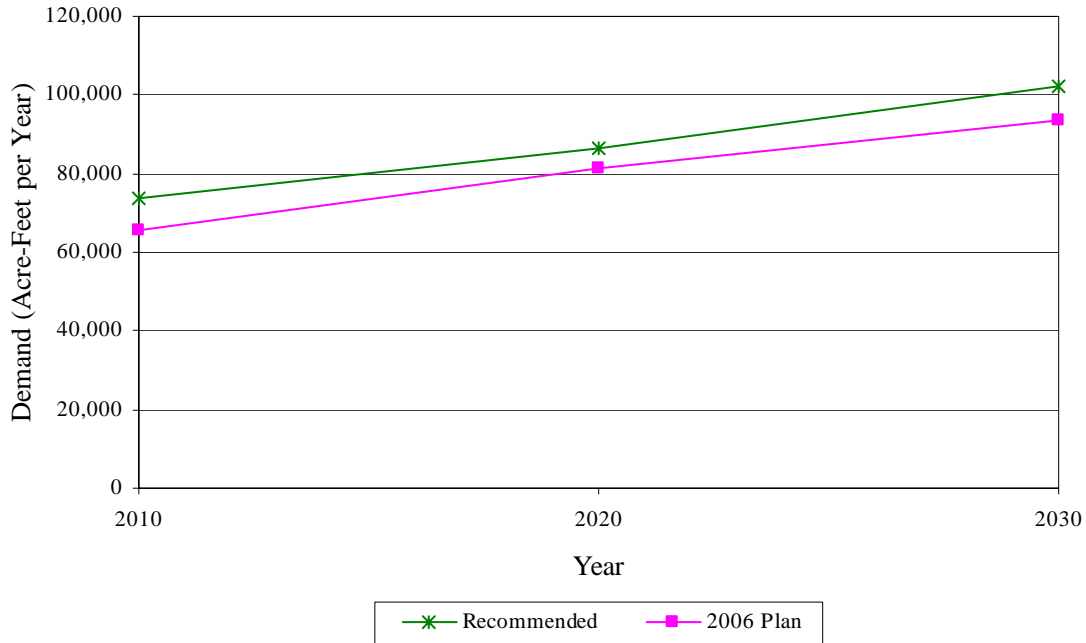
**Figure 3.4**  
**Recommended Demand Projections for Parker County**



**Figure 3.5**  
**Recommended Demand Projections for Wise County**



**Figure 3.6  
Recommended Total Demand Projections for Study Area**



**3.5 Recommended Water Demands for Wholesale Water Providers**

The Tarrant Regional Water District (TRWD) has contracts in place to provide water service to a number of entities in the study area. The study area also has a number of local wholesale water providers. The two largest local wholesale water providers are:

- Walnut Creek Special Utility District (SUD)
- City of Weatherford

Other local wholesale water providers include:

- West Wise SUD (serves rural customers and part of Chico)
- City of Springtown (serves Reno)
- City of Mineral Wells (serves Milsap WSC and Parker County WSC)
- City of Rhome (serves Aurora Vista)
- Wise County WSD (serves Decatur)

Table 3.6 shows the recommended population and demand projections expected to be supplied by TRWD and indicates which entities currently have contracts for TRWD supplies.

**Table 3.6**  
**Recommended Population and Demand Projections in Study Area**  
**Expected to be Supplied by Tarrant Regional Water District**

TRWD Customers in Study Area	2010	2020	2030	Does Entity Currently Have a Contract?
<b>Population Projections</b>				
Aledo (through Fort Worth)	2,222	7,102	12,458	No
Alvord (direct or through West Wise SUD)	612	1,252	2,210	No
Azle	2,191	2,795	3,473	Yes
Bridgeport	6,803	8,352	12,001	Yes
Community WSC	140	141	142	Yes
Decatur (Wise County SUD)	8,018	12,656	15,780	Yes
Runaway Bay	1,411	1,720	2,097	Yes
Springtown	1,595	2,568	3,538	Yes
Reno (Population served by Springtown)	551	578	599	Yes
Walnut Creek SUD				Yes
Boyd	454	1,320	2,093	Yes
Newark	458	1,069	1,624	No
Reno (Population served by WCSUD)	673	706	732	Yes
Rhome	1,120	2,135	3,793	Yes
Aurora (through Rhome)	705	791	1,175	Yes
New Fairview (through Rhome)	774	1,346	1,904	No
Walnut Creek SUD Service Area Outside City Limits and other WUGs	22,058	33,329	52,558	Yes
West Wise SUD and Chico (Population Served by WCSUD)	647	772	928	Yes
<b>Total TRWD through WCSUD</b>	<b>26,889</b>	<b>41,469</b>	<b>64,807</b>	
Weatherford	15,068	21,664	27,812	Yes
Hudson Oaks	863	1,546	2,080	Yes
Willow Park	0	1,839	4,187	No
Annetta	0	811	1,119	No
Annetta South	0	201	290	No
Parker County – Other	0	8,994	7,995	No
<b>Total TRWD through Weatherford</b>	<b>15,931</b>	<b>35,054</b>	<b>43,483</b>	
West Wise SUD and Chico	3,531	4,156	4,914	Yes
Wise County-Other	1,255	9,308	10,287	
<b>Total Population Served by TRWD</b>	<b>71,150</b>	<b>127,149</b>	<b>175,789</b>	

**Table 3.6, Continued**

<b>TRWD Customers in Study Area</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>Does Entity Currently Have a Contract?</b>
<b>Demand Projections (Ac-Ft/Yr)</b>				
Aledo (through Fort Worth)	441	1,444	2,584	No
Alvord (direct or through West Wise SUD)	91	181	311	No
Azle	1,953	2,633	3,602	Yes
Bridgeport	1,570	1,899	2,702	Yes
Community WSC	444	438	433	Yes
Decatur (Wise County SUD)	1,794	2,825	3,520	Yes
Parker County-Manufacturing	131	234	345	
Runaway Bay	296	357	430	Yes
Springtown	268	423	571	Yes
Reno (Demand served by Springtown)	68	69	70	Yes
Walnut Creek SUD				Yes
Boyd	65	183	284	Yes
Newark	62	140	209	No
Reno (Demand served by WCSUD)	84	85	85	Yes
Rhome	280	529	935	Yes
Aurora (through Rhome)	87	96	140	Yes
New Fairview (through Rhome)	98	169	237	No
Walnut Creek SUD Service Area Outside City Limits and other WUGs	2,660	3,951	6,209	Yes
West Wise SUD and Chico (Demand served by WCSUD)	85	97	109	Yes
<b>Total TRWD through WCSUD</b>	<b>3,420</b>	<b>5,249</b>	<b>8,207</b>	
Weatherford	3,125	4,493	5,768	Yes
Hudson Oaks	199	357	480	Yes
Parker County-Manufacturing	169	168	171	
Willow Park	0	293	657	No
Annetta	0	97	133	No
Annetta South	0	24	34	No
Parker County – Other	0	1,099	959	No
<b>Total TRWD through Weatherford</b>	<b>3,493</b>	<b>6,531</b>	<b>8,202</b>	
West Wise SUD and Chico	464	522	577	Yes
Wise County-Irrigation	112	112	112	
Wise County-Manufacturing	2,299	2,646	2,965	



**Table 3.6, Continued**

<b>TRWD Customers in Study Area</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>Does Entity Currently Have a Contract?</b>
Wise County-Mining	2,199	3,570	3,810	
Wise County-Other	149	1,126	1,233	
Wise County-Steam Electric Power	3,949	5,653	6,609	
<b>Total TRWD Demand in Study Area</b>	<b>23,140</b>	<b>35,912</b>	<b>46,282</b>	

## **4. Evaluation of Current Supplies**

### **4.1 Surface Water**

The surface water sources for water user groups in the study area include TRWD supplies, Lake Weatherford, Lake Mineral Wells, Lake Palo Pinto, and Possum Kingdom Lake (for Parker County Mining and Parker County Steam-Electric Power). Eight of the water user groups are currently relying completely on groundwater, and all intend to begin purchasing surface water from TRWD sources in the future. The eight entities currently relying on groundwater in the study area are Aledo, Alvord, Annetta, Annetta South, Bolivar WSC, New Fairview, Newark, and Willow Park.

### **4.2 Groundwater**

Most of the water user groups in the study area intend to continue using the same amount of groundwater or decrease their reliance on groundwater in the future. The City of Aurora has indicated that they intend to increase their groundwater use. FNI compared the amount of groundwater shown to be available in the Trinity aquifer Groundwater Availability Model (Trinity GAM) to the information provided by the water user groups. The findings are summarized below.

#### **Parker County**

In Parker County, the City of Aledo is converting from groundwater to surface water supplied by TRWD. Aledo plans to reduce its use of the Trinity aquifer, which will remain a back-up supply. The City of Hudson Oaks is planning to rely completely on surface water in the future. The City of Willow Park currently relies entirely on groundwater and has expressed uncertainty about connecting to surface water before 2020. Although Aledo and Hudson Oaks plan to reduce their demands on the Trinity aquifer, there is not enough groundwater available to meet Willow Park's projected 2020 demand based on the results of the Trinity GAM. Therefore, the water management strategy for Willow Park to begin using surface water before 2020 is still recommended in this study.

#### **Wise County**

The City of Aurora has expressed interest in solely using groundwater to meet their future demand. None of the other water user groups in Wise County have indicated that they

plan reductions in their demand on the Trinity aquifer. The current and future Trinity aquifer supply is fully appropriated in the *2006 Region C Water Plan*<sup>(1)</sup> based on the results of the Trinity GAM. For regional water planning purposes, the groundwater supply will not meet the projected water needs for Aurora. The Region C Water Planning Group may consider allowing a temporary overdraft in 2010, but this overdraft would be temporary in nature and would not be planned to continue long term.

## **5. Comparison of Current Supplies to Projected Demand**

In general, the revised projected demands in the study area are higher than those shown in the *2006 Region C Water Plan*<sup>(1)</sup>. Ten of the water user groups in the study area have revised demands that exceed the total of their current supplies plus the recommended water management strategies in the *2006 Region C Water Plan*<sup>(1)</sup>. These entities include Aledo, Alvord, Aurora, Boyd, Decatur, Hudson Oaks, Parker County Mining, Weatherford, Willow Park, and Walnut Creek SUD. To meet the higher water demands, the water management strategies need to be revised. The proposed revisions are discussed in the following section.

## **6. Proposed Revisions to Water Management Strategies**

This report includes recommendations for adjustments to water management strategies for the Region C Water Planning Group to consider in its 2011 Plan. This section describes the proposed adjustments for the entities with changed conditions. Attachment B includes a summary table of demand and supply for each water user group in the study area.

The Parker-Wise County Supply System is made up of the Weatherford subsystem and the Walnut Creek SUD subsystem. The Weatherford subsystem currently includes Weatherford, Hudson Oaks, and some Parker County Mining demand. Based on the recommended water management strategies described in this section, the future Weatherford subsystem may also include Willow Park, Annetta, Annetta South, and some Parker County Other demand. The Walnut Creek SUD subsystem currently includes Boyd, Reno, Rhome, Aurora (through Rhome), West Wise SUD, Chico, and additional service area outside city limits. Walnut Creek SUD also plans to serve Newark and New Fairview (through Rhome) in the future. The improvements required for future system connections are described in the following sections, and cost estimates are included in Appendix C.

### **6.1 Parker County**

#### **Aledo**

The City of Aledo currently relies on the Trinity aquifer. Aledo plans to construct a pipeline to Fort Worth and begin purchasing treated surface water by August 2009. Aledo is not currently a wholesale water provider. However, Aledo may be interested in becoming a wholesale water provider after connecting to Fort Worth, depending on what the contract allows. When the surface water from Fort Worth becomes available, the City plans to mix the surface and groundwater supplies. At some point, Aledo plans to decrease its reliance on groundwater and use it to shave peaks and as a backup supply.

Aledo's current water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. However, the amount of water supplied by the Trinity aquifer will be much lower in 2020 and beyond. For this reason, the supply from the Trinity aquifer in 2020 and 2030 is reduced from 291 to 166 acre-feet per year. The amount of supply from

Fort Worth (TRWD sources) is added as shown in Table 6.1 to compensate for the reduction in groundwater and the increased projected demands.

**Table 6.1  
Summary Information for Aledo**

<b>Aledo</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	3,690	7,918	13,258
<b>Projected Water Demand</b>			
Municipal Demand	732	1,610	2,750
<b><i>Total Projected Water Demand</i></b>	<b>732</b>	<b>1,610</b>	<b>2,750</b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	291	166	166
<b><i>Total Supply</i></b>	<b>291</b>	<b>166</b>	<b>166</b>
<b>Water Management Strategies</b>			
Water Conservation – Basic Package	15	37	53
Water Conservation – Expanded Package	0	4	6
Purchase water from Fort Worth (TRWD)	313	1,484	2,662
Overdrafting Trinity Aquifer using existing wells	149	0	0
Supplemental wells in Trinity (Paluxy) aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b>477</b>	<b>1,525</b>	<b>2,721</b>
<b>Total Supply Less Projected Demand</b>	<b>37</b>	<b>81</b>	<b>137</b>

### Hudson Oaks

Hudson Oaks currently relies on its own groundwater wells and treated water purchased from Parker County Utility District (Weatherford supplies). The surface water and groundwater are blended. The City’s contract with Weatherford prevents them from becoming a wholesale water provider.

The City’s currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. The amount of supply from Weatherford (TRWD sources) is increased to meet increased projected demands. Table 6.2 summarizes the updates to the water management strategies for Hudson Oaks.

**Table 6.2  
Summary Information for Hudson Oaks**

<b>Hudson Oaks</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	2,000	2,438	2,972
<b>Projected Water Demand</b>			
Municipal Demand	462	563	686
<b><i>Total Projected Water Demand</i></b>	<b><i>462</i></b>	<b><i>563</i></b>	<b><i>686</i></b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	206	206	206
TRWD Sources (through Weatherford)	102	102	102
<b><i>Total Supply</i></b>	<b><i>308</i></b>	<b><i>308</i></b>	<b><i>308</i></b>
<b>Water Management Strategies</b>			
Water Conservation – Basic Package	6	26	36
Purchase water from Weatherford (from TRWD)	114	257	483
Overdrafting Trinity Aquifer (existing wells)	57	0	0
Supplemental wells in Trinity aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>177</i></b>	<b><i>283</i></b>	<b><i>519</i></b>
<b>Total Supply Less Projected Demand</b>	<b>23</b>	<b>28</b>	<b>141</b>

### Weatherford

The current water supply for the City of Weatherford includes Lake Weatherford, TRWD supplies, and a small amount of groundwater. Weatherford’s water treatment plant has been expanded since the *2006 Region C Water Plan* <sup>(1)</sup> and is now rated at 14 MGD. Otherwise, the current water supply is the same as was presented in the *2006 Region C Water Plan* <sup>(1)</sup>.

Weatherford plans to be a regional wholesale water provider in Parker County. The City will begin providing wholesale water directly to Hudson Oaks in June 2008. The reuse water originally planned for Weatherford municipal use has been redirected to the gas industry (mining demand). The City recommends planning for 90 percent of their future reuse being sold to the gas industry with 10 percent being sent to Lake Weatherford. Weatherford’s estimated total available reuse was obtained from the report *Weatherford*

*Reuse Water for Gas Exploration and the Beneficial Uses Study* <sup>(7)</sup>.

Weatherford’s currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. The amount of supply from TRWD is increased to meet increased projected demands. Table 6.3 is a summary table for the City of Weatherford. It does not include information for Weatherford’s existing and potential customers. Refer to Table 3.6 for the list of Weatherford’s existing and potential customers.

Figures 6.1 and 6.2 show recommended population and demand projections for Weatherford and their existing and potential customers. Figure 6.3 compares projected demands and proposed water management strategies for Weatherford and their customers.

**Table 6.3  
Summary Information for Weatherford**

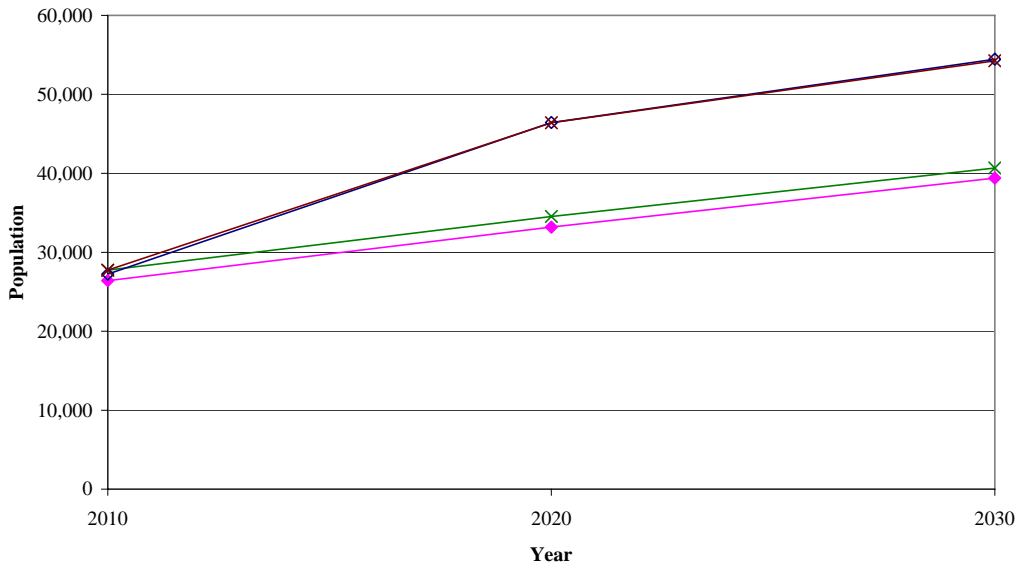
<b>Weatherford</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population (City of Weatherford)</b>	26,877	33,000	38,584
<b>Projected Water Demand</b>			
Municipal Demand (City of Weatherford)	5,574	6,844	8,002
Existing Customers	368	525	651
Potential Customers	0	1,513	1,783
<b>Total Projected Water Demand</b>	<b>5,942</b>	<b>8,882</b>	<b>10,436</b>
<b>Currently Available Water Supplies</b>			
Lake Weatherford	2,399	2,301	2,184
Trinity Aquifer	50	50	50
TRWD Sources	1,556	1,706	1,857
<b>Total Supply</b>	<b>4,005</b>	<b>4,057</b>	<b>4,091</b>
<b>Water Management Strategies</b>			
Water Conservation – Basic Package	156	355	484
Water Conservation – Expanded Package	3	40	147
Purchase water from TRWD	1,937	4,825	6,345
<b>New Water Treatment Plant</b>			
New WTP of 8 MGD (2030)	0	0	0



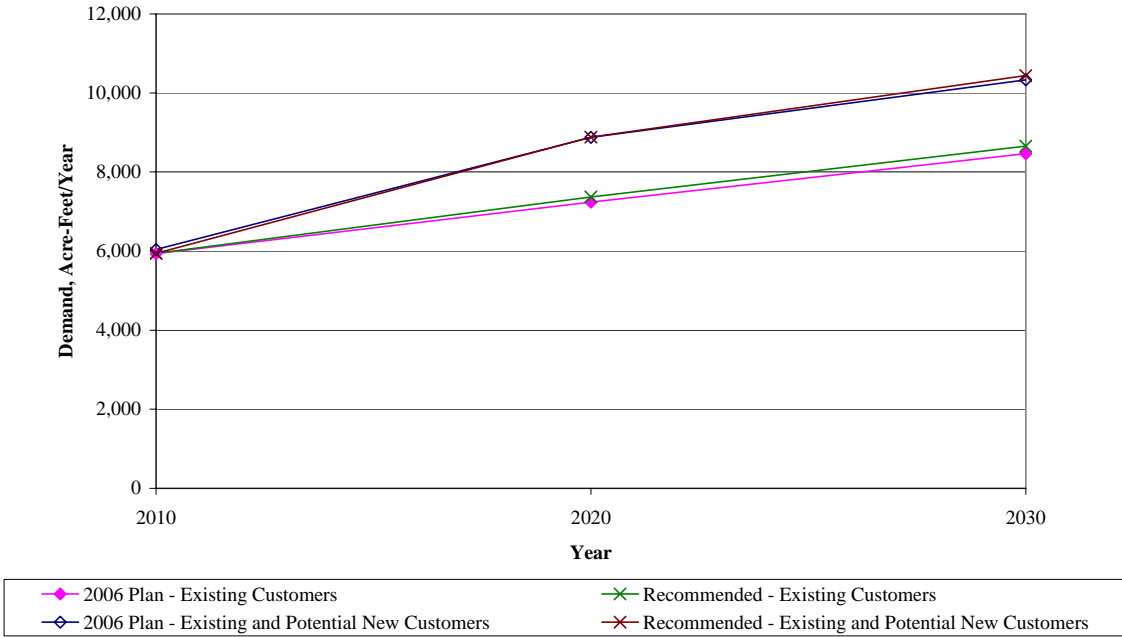
**Table 6.3, Continued**

<b>Weatherford</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Water Treatment Expansions</b>			
WTP Expansion of 4 MGD (18 MGD total) (2020)	0	0	0
<b>Total Water Management Strategies</b>	<b>2,096</b>	<b>5,220</b>	<b>6,976</b>
<b>Total Supply Less Projected Demand</b>	<b>159</b>	<b>395</b>	<b>631</b>

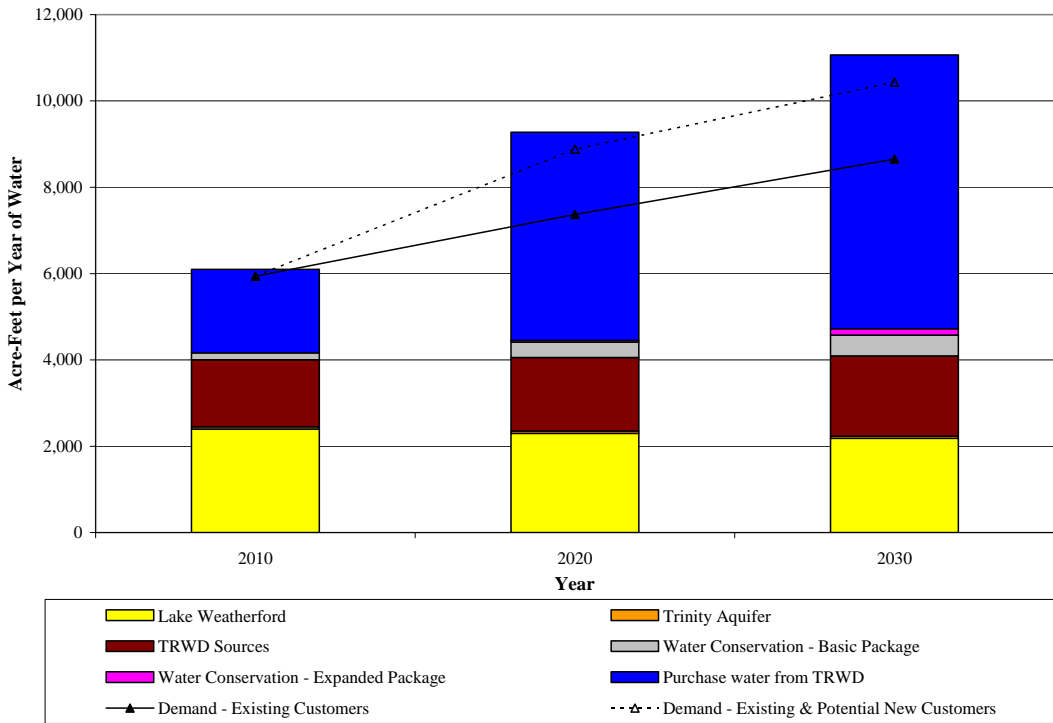
**Figure 6.1  
Recommended Population Projections for Weatherford and Customers**



**Figure 6.2**  
**Recommended Demand Projections for Weatherford and Customers**



**Figure 6.3**  
**Demands and Supplies for Weatherford and Customers**



## Willow Park

The City of Willow Park currently relies entirely on groundwater. In addition, Dyegard and Deer Creek are private utilities that provide water to certain areas of Willow Park. In an emergency, the City's system could be connected to Dyegard relatively quickly.

Willow Park is uncertain about the strategy to add surface water to the system by 2020. The Trinity GAM indicates that, based on water management strategies presented in the *2006 Region C Water Plan* <sup>(1)</sup>, there is not enough groundwater available to provide a reliable source to meet all of Willow Park's projected demands in 2020. Even if neighboring cities decrease groundwater use in 2020, there will not be enough groundwater available to meet Willow Park's projected 2020 demands. Therefore, the water management strategy for Willow Park to purchase TRWD water through Weatherford is recommended for 2020 and later. The amount of supply from Weatherford (TRWD sources) is increased in 2020 and 2030 to meet increased projected demands. Willow Park has expressed an interest in purchasing treated water from the City of Fort Worth instead of Weatherford. Fort Worth indicated that they are not interested in selling water to Willow Park. This strategy is not currently recommended but should be reviewed for the *2011 Region C Water Plan* update. Purchasing water from Fort Worth is listed as an alternative strategy for Willow Park in Section 9.

**Table 6.4**  
**Summary Information for Willow Park**

<b>Willow Park</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	4,164	5,871	8,278
<b>Projected Water Demand</b>			
Municipal Demand	682	935	1,299
<b><i>Total Projected Water Demand</i></b>	<b>682</b>	<b>935</b>	<b>1,299</b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	642	642	642
<b><i>Total Supply</i></b>	<b>642</b>	<b>642</b>	<b>642</b>
<b>Water Management Strategies</b>			
Water Conservation - Basic Package	20	49	40
Purchase water from TRWD (Weatherford)	0	291	682

**Table 6.4, Continued**

<b>Willow Park</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Overdrafting Trinity aquifer (existing wells)	54	0	0
Supplemental wells in Trinity aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b>74</b>	<b>340</b>	<b>722</b>
<b>Total Supply Less Projected Demand</b>	<b>34</b>	<b>47</b>	<b>65</b>

### Parker County Mining

The water management strategies for Parker County Mining have been adjusted as shown in Table 6.5 to meet the increased projected demands. The City of Weatherford indicated that 90 percent of its future reuse water will be sold to the gas industry. The City has also sold treated water to the gas industry recently, approximately 5 to 10 percent of Weatherford's total water use. Aledo, Azle, and Reno have also sold water to the gas industry. In 2010, it is assumed that these three cities will sell approximately 5 percent of their municipal demand to the gas industry. It is assumed that the gas industry will temporarily overdraft the Trinity aquifer in 2010 to meet the remaining water demands.

**Table 6.5  
Summary Information for Parker County Mining**

<b>Parker County Mining</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Water Demand</b>			
Mining Demand	7,328	2,132	2,582
<b><i>Total Projected Water Demand</i></b>	<b>7,328</b>	<b>2,132</b>	<b>2,582</b>
<b>Currently Available Water Supplies</b>			
Other Local Supply	16	16	15
Other Local Supply	4	4	5
Possum Kingdom (BRA)	2,000	2,000	2,000
City of Weatherford	418	0	0
City of Aledo	37	0	0
City of Azle	98	0	0
City of Reno	37	0	0
Trinity Aquifer	59	59	59
<b><i>Total Supply</i></b>	<b>2,668</b>	<b>2,079</b>	<b>2,079</b>

**Table 6.5, Continued**

<b>Parker County Mining</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Water Management Strategies</b>			
Reuse water from Weatherford	3,128	3,935	4,641
Overdraft Trinity aquifer	1,532	0	0
Supplemental wells in Trinity aquifer	0	0	0
<b>Total Water Management Strategies</b>	<b>4,660</b>	<b>3,935</b>	<b>4,641</b>
<b>Total Supply Less Projected Demand</b>	<b>0</b>	<b>3,882</b>	<b>4,138</b>

### Parker County-Other

The Parker County Special Utility District (PCSUD) is included as part of Parker County-Other. The PCSUD has requested a consistency waiver to allow them to use TWDB funding to construct a pipeline and water treatment plant for transmitting and treating raw water purchased from the Brazos River Authority. This water management strategy was not included in the *2006 Region C Water Plan*<sup>(1)</sup>. The Region C Water Planning Group approved the request for a consistency waiver at their meeting on September 22, 2008. As an alternative to this strategy, PCSUD could purchase treated water supplies from the City of Weatherford. Obtaining treated water supplies from Weatherford was a recommended strategy for Parker County Other, including PCSUD, in the *2006 Region C Water Plan*<sup>(1)</sup>.

### Water User Groups with No Revisions to Water Management Strategies

The water user groups in Parker County that have no revisions to water management strategies as presented in the *2006 Region C Water Plan*<sup>(1)</sup> include the following:

- Annetta
- Annetta South
- Azle
- Mineral Wells

- Reno
- Springtown

## 6.2 Wise County

### Alvord

The City of Alvord currently relies on the Trinity aquifer for water supply and is currently expanding its groundwater system. Alvord will add surface water to its water system by purchasing supplies from TRWD, possibly through West Wise SUD. When Alvord adds surface water into its water system, the City will likely continue to use its existing groundwater supplies as long as they are cost effective. Alvord has considered developing a reuse supply and is interested in the treatment of brackish groundwater. The City will not sell water to the gas industry for frac-ing purposes. However, they will sell water for the operation of the facilities (water for restrooms and potable uses). Alvord is not interested in becoming a wholesale water provider.

Alvord’s currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. The amount of supply from TRWD needs to increase to meet increased projected demands.

**Table 6.6**  
**Summary Information for Alvord**

<b>Alvord</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	1,378	2,040	3,019
<b>Projected Water Demand</b>			
Municipal Demand	205	295	425
<b>Total Projected Water Demand</b>	<b>205</b>	<b>295</b>	<b>425</b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	114	114	114
<b>Total Supply</b>	<b>114</b>	<b>114</b>	<b>114</b>
<b>Water Management Strategies</b>			
Water Conservation – Basic Package	2	8	9
Purchase water from TRWD	72	188	324
New well in Trinity Aquifer - Overdraft 2010	137	0	0

**Table 6.6, Continued**

<b>Alvord</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Supplemental wells in Trinity (Paleozoic Erathem) aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>211</i></b>	<b><i>196</i></b>	<b><i>333</i></b>
<b>Potential Water Management Strategies</b>			
Reuse			
Treat brackish groundwater			
<b>Total Supply Less Projected Demand</b>	<b>120</b>	<b>15</b>	<b>21</b>

### Aurora

The City of Aurora currently uses both surface water and groundwater for water supply. Aurora purchases treated surface water from a private water utility called Aurora Vista (Walnut Creek SUD through Rhome). This water is used in one area of the city. The other portion of the city is served by groundwater provided by Palo Duro, a private water utility. Aurora is in the process of developing its own water system with plans to drill deep groundwater wells. The City plans to take over the Palo Duro system and replace all of the pipelines. Aurora plans to work with Aurora Vista and sell them wholesale water.

As mentioned in Section 4, Aurora would like to rely entirely on groundwater in the future. However, for regional water planning purposes, the groundwater supply will not meet the projected water needs for Aurora. The Region C Water Planning Group may consider allowing a temporary overdraft in 2010, but this overdraft would be temporary in nature and would not be planned to continue for the long term. For regional planning purposes, it is assumed that the amount of supply from Walnut Creek SUD through Rhome (TRWD sources) will increase to meet Aurora's increased projected demands.

**Table 6.7  
Summary Information for Aurora**

<b>Aurora</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	1,500	1,600	2,000
<b>Projected Water Demand</b>			
Municipal Demand	185	194	238
<b><i>Total Projected Water Demand</i></b>	<b><i>185</i></b>	<b><i>194</i></b>	<b><i>238</i></b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	98	98	98
TRWD Sources (through Rhome)	33	37	40
<b><i>Total Supply</i></b>	<b><i>131</i></b>	<b><i>135</i></b>	<b><i>138</i></b>
<b>Water Management Strategies</b>			
Water Conservation – Basic Package	2	8	10
Purchase water from Rhome (from Walnut Creek SUD)	61	60	102
Supplemental wells in Trinity aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>63</i></b>	<b><i>68</i></b>	<b><i>112</i></b>
<b>Total Supply Less Projected Demand</b>	<b>9</b>	<b>10</b>	<b>12</b>

## Boyd

The City of Boyd currently relies on the Trinity aquifer for water supply. Boyd supplements its groundwater supply with treated surface water purchased from Walnut Creek SUD (TRWD sources). This will likely be the case in the future. At some point, the supply may come directly from TRWD with less reliance on groundwater. Boyd primarily provides water to residential and commercial customers. The City does not sell any water for industrial or mining purposes but would be interested in doing so. Boyd does not have any wholesale customers and does not expect to have any wholesale customers in the near future.

Boyd's currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan*<sup>(1)</sup>. The amount of supply from Walnut Creek SUD (TRWD sources) is increased to meet increased projected demands.



**Table 6.8  
Summary Information for Boyd**

<b>Boyd</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	1,500	2,400	3,200
<b>Projected Water Demand</b>			
Municipal Demand	215	333	434
<b><i>Total Projected Water Demand</i></b>	<b><i>215</i></b>	<b><i>333</i></b>	<b><i>434</i></b>
<b>Currently Available Water Supplies</b>			
Trinity Aquifer	150	150	150
TRWD Sources (through Walnut Creek SUD)	56	80	75
<b><i>Total Supply</i></b>	<b><i>206</i></b>	<b><i>230</i></b>	<b><i>225</i></b>
<b>Water Management Strategies</b>			
Water Conservation - Basic Package	3	12	14
Purchase water from Walnut Creek SUD (from TRWD)	25	108	216
Supplemental wells in Trinity aquifer	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>28</i></b>	<b><i>120</i></b>	<b><i>230</i></b>
<b>Total Supply Less Projected Demand</b>	<b>19</b>	<b>17</b>	<b>22</b>

Decatur (Wise County WSD)

The City of Decatur purchases all of its water from TRWD through the Wise County WSD. The City does not have any groundwater supplies. Some residents have groundwater wells for irrigation purposes.

The gas industry has approached Decatur for water. At this time, Decatur is not in a position to sell water to the gas industry as it would impact the amount of treated water available to residents. The current supply allocated to Decatur is limited by the water treatment plant capacity of 3 MGD. As the treatment plant is expanded, additional water from Lake Bridgeport will be made available to the City. Decatur does not plan to become a wholesale water provider.

Decatur's currently planned water management strategies are in line with the strategies in the 2006 Region C Water Plan <sup>(1)</sup>. The amount of supply from TRWD is increased to meet increased projected demands.

**Table 6.9  
Summary Information for Decatur (Wise County WSD)**

<b>Decatur (Wise County WSD)</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	8,018	12,656	15,780
<b>Projected Water Demand</b>			
Municipal Demand	1,794	2,825	3,520
<b><i>Total Projected Water Demand</i></b>	<b><i>1,794</i></b>	<b><i>2,825</i></b>	<b><i>3,520</i></b>
<b>Currently Available Water Supplies</b>			
TRWD Sources	1,754	1,753	1,754
<b><i>Total Supply</i></b>	<b><i>1,754</i></b>	<b><i>1,753</i></b>	<b><i>1,754</i></b>
<b>Water Management Strategies</b>			
Water Conservation - Basic Package	47	102	163
Water Conservation – Expanded Package	1	10	35
Purchase water from TRWD	270	1,101	1,744
<b>New Water Treatment Plant</b>			
New WTP of 2 MGD (2020)	0	0	0
<b>Water Treatment Expansions</b>			
WTP Expansion of 1 MGD (4 MGD total) (2010)	0	0	0
New WTP Expansion of 2 MGD (2030)	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>318</i></b>	<b><i>1,213</i></b>	<b><i>1,942</i></b>
<b>Total Supply Less Projected Demand</b>	<b>279</b>	<b>141</b>	<b>176</b>

### Walnut Creek SUD

As mentioned in Section 3, Walnut Creek SUD provides wholesale treated water to West Wise SUD, Paradise (Wise County–Other), Boyd, Rhome, and Reno. Newark and New Fairview are potential future customers. TCEQ told Walnut Creek SUD that it must expand its water treatment plant capacity to equal the amount of supply specified in its water contracts. Walnut Creek just completed a 6 MGD water treatment plant expansion. Walnut Creek’s water supply contracts specify contract maximum purchases with no take or pay requirements.

Walnut Creek SUD purchases all of its raw water from TRWD (Lake Bridgeport). Walnut Creek has spoken with TRWD about locating a future 12 MGD water treatment plant on Eagle Mountain Lake. Walnut Creek has begun a study for this plant and will likely

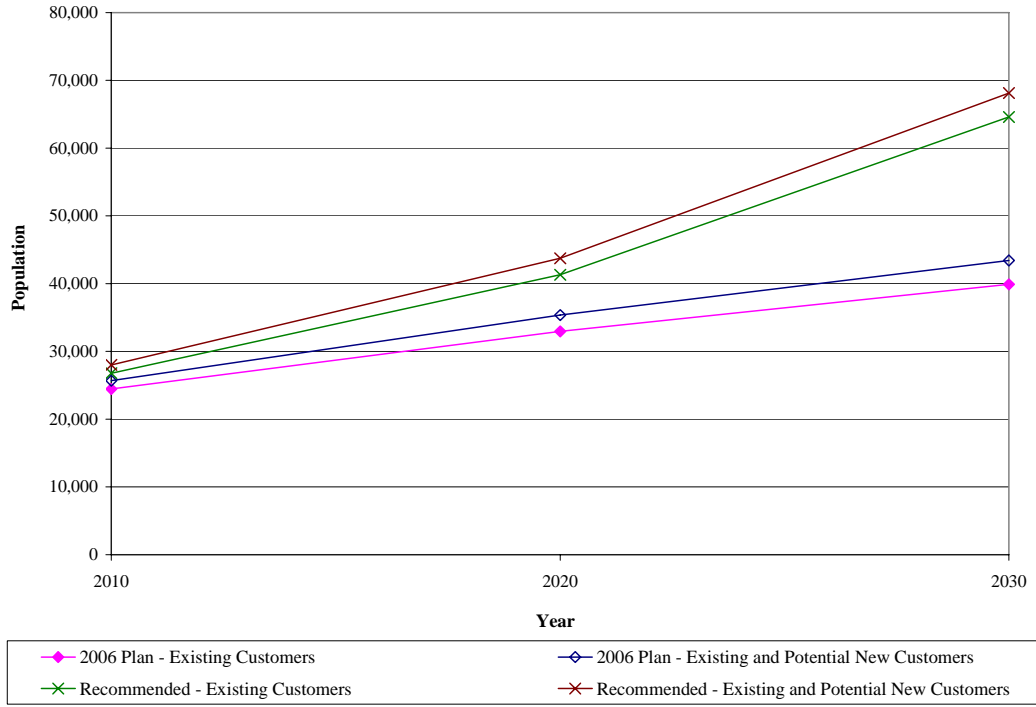
develop it in 2 MGD increments. This is considered an alternative water management strategy and is discussed in more detail in Section 9.

Walnut Creek SUD’s currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. The amount of supply from TRWD is increased to meet increased projected demands. Figures 6.4 through 6.5 show the recommended population projections, demand projections, and how the projected demands compare to proposed water management strategies for Walnut Creek SUD.

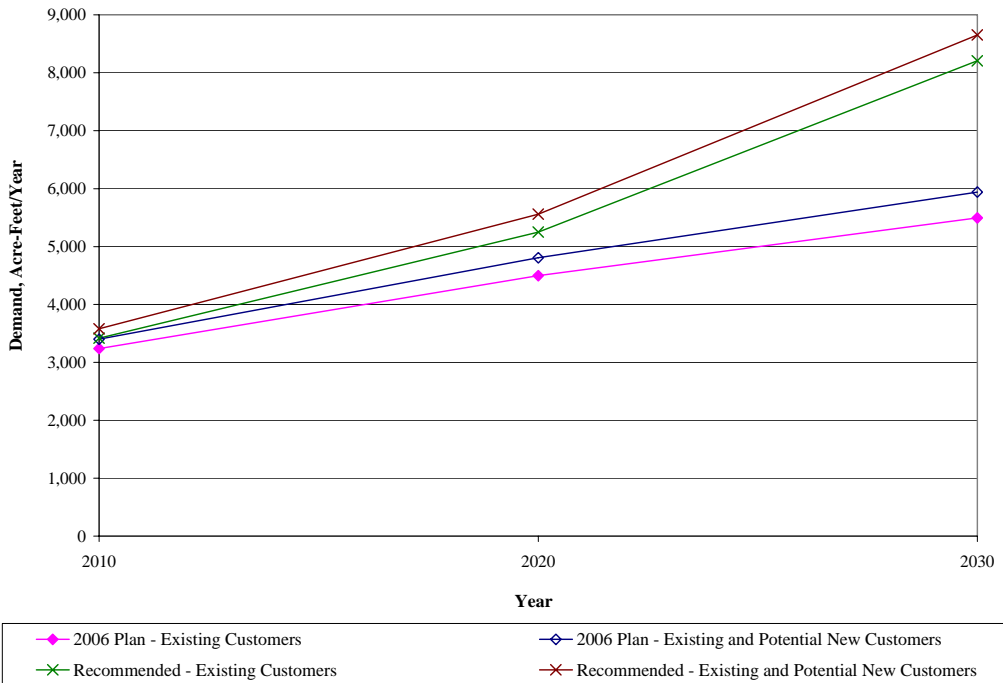
**Table 6.10  
Summary Information for Walnut Creek SUD**

<b>Walnut Creek SUD</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population (Existing and Potential New Customers)</b>	26,784	41,324	64,595
<b>Projected Water Demand</b>			
Municipal Demand (Existing and Potential New Customers)	3,420	5,249	8,207
<b>Total Projected Water Demand</b>	<b>3,420</b>	<b>5,249</b>	<b>8,207</b>
<b>Currently Available Water Supplies</b>			
TRWD Sources	1,956	1,789	1,706
<b>Total Supply</b>	<b>1,956</b>	<b>1,789</b>	<b>1,706</b>
<b>Water Management Strategies</b>			
Water Conservation - Basic Package	37	140	177
Purchase water from TRWD	1,598	3,582	6,734
<b>New Water Treatment Plant</b>			
New WTP of 2 MGD (2015)	0	0	0
New WTP Expansion of 2 MGD	0	0	0
New WTP Expansion of 2 MGD	0	0	0
New WTP Expansion of 2 MGD	0	0	0
New WTP Expansion of 2 MGD	0	0	0
New WTP Expansion of 2 MGD	0	0	0
<b>Total Water Management Strategies</b>	<b>1,635</b>	<b>3,722</b>	<b>6,911</b>
<b>Total Supply Less Projected Demand</b>	<b>171</b>	<b>262</b>	<b>410</b>

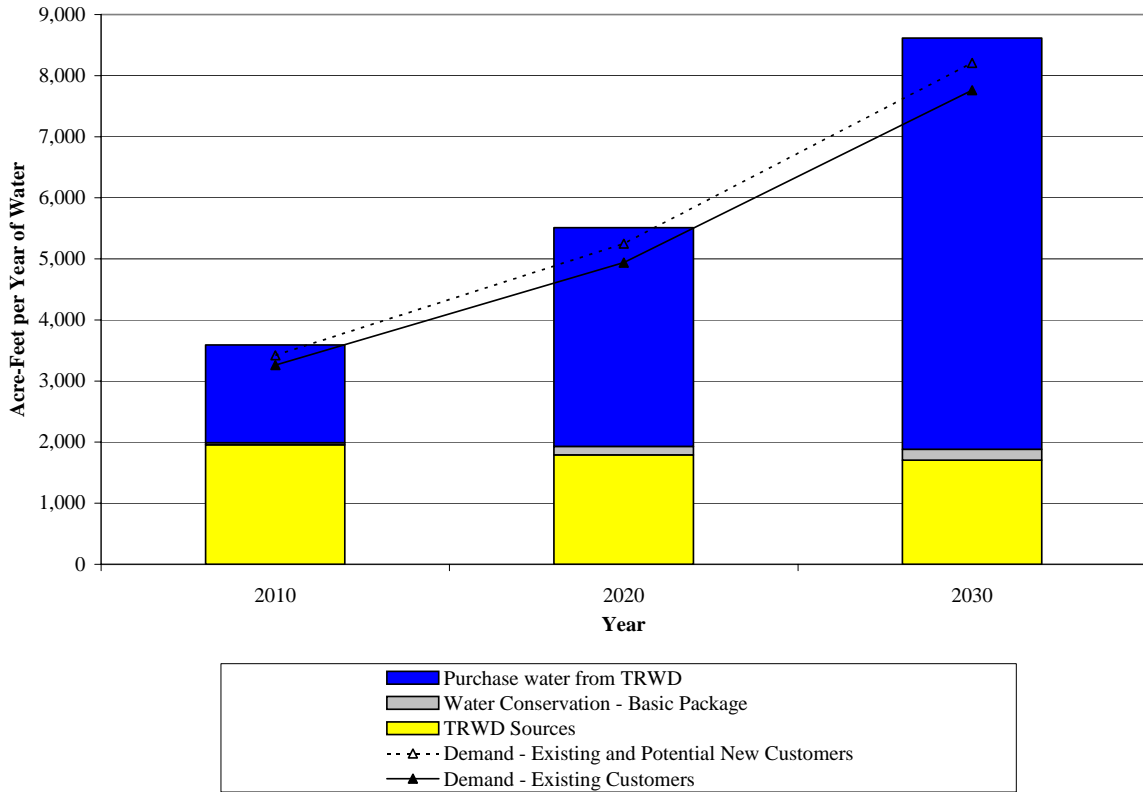
**Figure 6.4**  
**Recommended Population Projections for Walnut Creek SUD**



**Figure 6.5**  
**Recommended Demand Projections for Walnut Creek SUD**



**Figure 6.6  
Demands and Supplies for Walnut Creek SUD**



### West Wise SUD

West Wise SUD has a contract with Walnut Creek SUD for 8.5 million gallons per year. The SUD typically uses this supply in the summer to shave peak usage. West Wise SUD also has a direct contract with TRWD for up to 986 acre-feet per year with no minimum purchase required. The TRWD direct supply costs less than the treated water purchased from Walnut Creek SUD. This impacts how West Wise SUD uses its water supplies. The current water treatment plant capacity is 1 MGD.

West Wise SUD's currently planned water management strategies are in line with the strategies in the *2006 Region C Water Plan* <sup>(1)</sup>. The amount of supply currently available from TRWD has been increased. The amount of supply shown is equal to the contract amount.

**Table 6.11  
Summary Information for West Wise SUD**

<b>West Wise SUD</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Projected Population</b>	3,501	4,005	4,506
<b>Projected Water Demand</b>			
Municipal Demand	549	619	686
<b><i>Total Projected Water Demand</i></b>	<b><i>549</i></b>	<b><i>619</i></b>	<b><i>686</i></b>
<b>Currently Available Water Supplies</b>			
TRWD Sources (Walnut Creek SUD)	521	435	383
TRWD Sources (Direct from TRWD)	986	986	986
<b><i>Total Supply</i></b>	<b><i>1,507</i></b>	<b><i>1,421</i></b>	<b><i>1,369</i></b>
<b>Water Management Strategies</b>			
Water Conservation - Basic Package	6	23	27
Purchase water from Walnut Creek SUD (from TRWD)	0	0	0
Purchase water from TRWD	0	0	0
<b><i>Total Water Management Strategies</i></b>	<b><i>6</i></b>	<b><i>23</i></b>	<b><i>27</i></b>
<b>Total Supply Less Projected Demand</b>	<b>964</b>	<b>825</b>	<b>710</b>

**Water User Groups with No Revisions to Water Management Strategies**

The water user groups in Wise County that have no revisions to water management strategies as presented in the *2006 Region C Water Plan*<sup>(1)</sup> include the following:

- Bolivar WSC
- Bridgeport
- Chico
- Community WSC
- New Fairview
- Newark
- Rhome
- Runaway Bay

## 7. Estimated Costs for Proposed Water Management Strategies

The estimated costs for proposed water management strategies were updated and are included in Appendix C. Total capital cost for the Parker-Wise County Study Area through the year 2030 is estimated to be \$251,200,000. The capital costs are broken down by category in Table 7.1. Refer to Appendix C for additional details.

**Table 7.1**  
**Capital Costs for Proposed Water Management Strategies**

<b>Water Management Strategy Category</b>	<b>Capital Cost During Study Period</b>
Transmission Facilities	\$75,300,000
Supplemental Wells	\$35,400,000
New Water Treatment Plants	\$64,500,000
Water Treatment Plant Expansions	\$76,000,000
<b>Total Capital Costs for Study Area</b>	<b>\$251,200,000</b>

The water management strategies for Wise County Steam Electric Power include constructing new pipelines after 2030. Cost estimates for those pipelines are not included in this report, as the projects are beyond the study period.

## 8. Implementation Plan for Proposed Water Management Strategies

Implementation of the Parker/Wise County Water Supply System includes developing water management strategies for both surface water and groundwater sources. For surface water sources, the implementation plan for water management strategies includes the following components:

- Obtain water rights and/or develop water supply contracts
- Obtain required permits
- Design and construct required facilities

For groundwater sources, the implementation plan for water management strategies includes the following components:

- Obtain required permits
- Design and construct required facilities

Table 8.1 is a list of recommended water management strategies with approximate in-service dates.

**Table 8.1  
Implementation of Proposed Water Management Strategies**

Owner	Project	Approximate In-service Year
<b>Parker County</b>		
Annetta, Annetta South, Willow Park	East Parker County System - Pipeline from Weatherford to Annetta, Annetta South and Willow Park	2020
Azle	Water Treatment Plant Expansion of 3 MGD	2030
Weatherford	Weatherford Increase Pump Station Capacity by 7 MGD	2020
Weatherford	Water Treatment Plant Expansion of 4 MGD	2020
Weatherford	New 8 MGD Water Treatment Plant	2030
<b>Wise County</b>		
Alvord	Alvord - New Well in Trinity Aquifer in 2010	2010
Alvord	Alvord - Pipeline to Chico (TRWD)	2010
Aurora	Aurora – Pipeline to Rhome	2020



**Table 8.1, Continued**

<b>Owner</b>	<b>Project</b>	<b>Approximate In-service Year</b>
Bridgeport	Bridgeport Pump Station Capacity Increase in 2010	2010
Bridgeport	Water Treatment Plant Expansion of 0.9 MGD	2010
Bridgeport	Bridgeport Parallel Pipeline Connection to TRWD in 2020	2020
Bridgeport	New 2 MGD Water Treatment Plant	2020
Chico	Chico - Pipeline to Bridgeport	2020
Community WSC	Water Treatment Plant Expansion of 0.5 MGD	2020
Decatur	Wise County Decatur - Water Treatment Plant Expansion of 1 MGD	2010
Decatur	Wise County Decatur - Parallel Pipeline to Bridgeport	2020
Decatur	Wise County Decatur - New 2 MGD Water Treatment Plant	2020
Decatur	Wise County Decatur - New Water Treatment Plant Expansion of 2 MGD	2030
New Fairview	New Fairview - Pipeline to Rhome	2010
Newark	Newark - Pipeline to Rhome	2010
Runaway Bay	Water Treatment Plant Expansion of 0.5 MGD	2030
Walnut Creek SUD	Walnut Creek SUD Pipeline to Boyd and Rhome	2015
Walnut Creek SUD	New 2 MGD Water Treatment Plant	2015
Walnut Creek SUD	New Water Treatment Plant 2 MGD Expansion	2020
Walnut Creek SUD	New Water Treatment Plant 2 MGD Expansion	2020
Walnut Creek SUD	New Water Treatment Plant 2 MGD Expansion	2020
Walnut Creek SUD	New Water Treatment Plant 2 MGD Expansion	2030
Walnut Creek SUD	New Water Treatment Plant 2 MGD Expansion	2030
West Wise SUD	New 0.5 MGD Water Treatment Plant	2030

## 9. Alternative Water Management Strategies

In general, most of the water user groups and wholesale water providers in the study area indicated that their future water supply plans are in line with the *2006 Region C Water Plan*<sup>(1)</sup>. However, five possible alternative water management strategies were identified in this study:

- Aledo – Become a wholesale water provider if the contract with the City of Fort Worth allows them to do so
- Willow Park – Purchase treated water from Fort Worth instead of Weatherford
- Parker County Other (Parker County SUD) - Purchase treated water supplies from the City of Weatherford
- Aurora – Rely entirely on groundwater for future water supply
- Walnut Creek SUD – Construct new water treatment plant at Eagle Mountain Lake with associated raw water and treated water infrastructure

As mentioned in Section 6, the alternative strategies for Willow Park and Aurora are not recommended. Cost estimates have not been prepared for these two alternatives.

The alternative for Aledo to become a wholesale water provider was not analyzed in detail because the particulars of the possible strategy are not known. It is also unknown if Aledo's agreement with Fort Worth would allow them to become a wholesale water provider.

As mentioned in Section 6, Parker County SUD, which is considered part of Parker County Other, plans to treat brackish water from the Brazos River Authority. The alternative strategy for PCSUD is to purchase treated water from the City of Weatherford. This alternative was included in the *2006 Region C Water Plan*<sup>(1)</sup> as a recommended strategy.

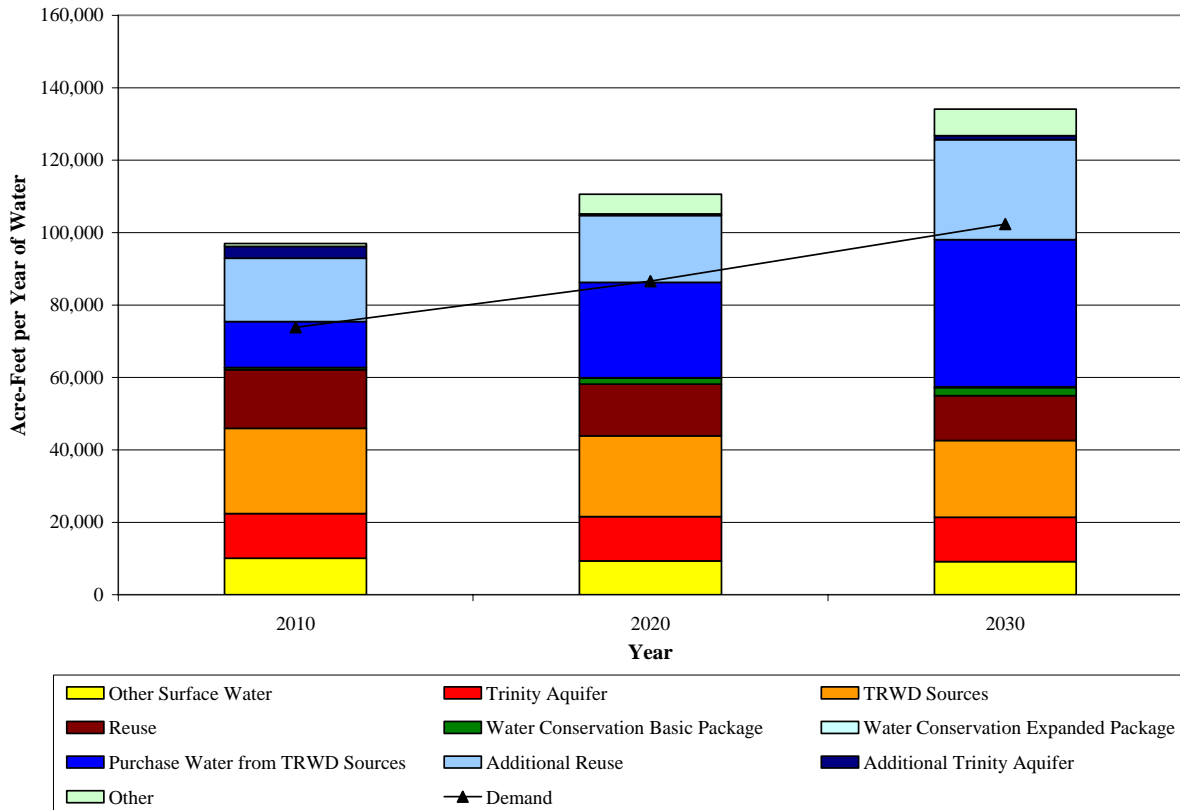
A new Walnut Creek SUD water treatment plant on Eagle Mountain Lake would require new raw water and treated water facilities. The raw water facilities would include a new lake intake structure, pump station, and pipeline to the water treatment plant. The treated water facilities would include the water treatment plant with high service pump station and pipeline from the plant to the Walnut Creek SUD system. If this strategy is implemented, it will replace the recommended water management strategy that includes a new 2 MGD water treatment plant and subsequent 2 MGD plant expansions at Lake Bridgeport. The total capital

cost for the alternative strategy of locating a new water treatment plant at Eagle Mountain Lake is \$56,954,000. Detailed cost estimates are included in Appendix E.

## 10. Conclusion

The water user groups in the Parker-Wise County Study area are projecting steady growth in the next 30 years. In general, recent growth appears to be greater than what was projected in the *2006 Region C Water Plan*<sup>(1)</sup>. To meet the higher water demands, the recommended water management strategies have been revised as discussed in this report. For most of the water user groups, their currently planned water management strategies are in line with the strategies presented in the *2006 Region C Water Plan*<sup>(1)</sup>. In most cases, increasing the amount of supply from TRWD sources was the only change necessary to meet higher projected demands. Any increases to TRWD supplies will be considered in the *2011 Region C Water Plan* update. Figure 10.1 shows the total projected demands, current water supplies, and recommended water management strategies for the Parker-Wise County Study area.

**Figure 10.1**  
**Total Demands and Supplies for the Study Area**



**APPENDIX A**

**REFERENCES**

## APPENDIX A

### REFERENCES

- (1) Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, January 2006.
- (2) North Central Texas Council of Governments: 2007 Population Estimates by City and County, [Online], Available URL: <http://www.nctcog.org/ris/demographics/population.asp>, September 2007.
- (3) R.W. Harden & Associates, Inc., Freese and Nichols, Inc., and Bureau of Economic Geology: *Northern Trinity/Woodbine Aquifer Groundwater Availability Model Assessment of Groundwater Use in the Northern Trinity Aquifer Due To Urban Growth and Barnett Shale Development*, prepared for the Texas Water Development Board, January 2007.
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- (6) HDR Engineering, Inc., Freese and Nichols, Inc., R.W. Harden and Associates, Inc., Hicks and Company, Inc., and Fletcher Communications: *Regional Water Plan*, prepared for the Brazos G Regional Water Planning Group, January 2006.
- (7) Alan Plummer Associates, Inc.: *Weatherford Reuse Water for Gas Exploration and the Beneficial Uses Study*, prepared for the City of Weatherford, May 2007.

**APPENDIX B**

**SUMMARY TABLES BY WATER USER GROUP**

**Table B - 1  
Summaries by Water User Group**

WUG	Description	2010	2020	2030	Notes
Aledo	<b>Projected Population</b>	3,690	7,918	13,258	Increased
	<b>Projected Water Demand</b>				
	Municipal Demand	732	1,610	2,750	Increased
	<b>Total Projected Water Demand</b>	<b>732</b>	<b>1,610</b>	<b>2,750</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	291	166	166	City plans to reduce in future: amount of 2020 & 2030 reduction assumed.
	<b>Total Supply</b>	<b>291</b>	<b>166</b>	<b>166</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	15	37	53	
	Water Conservation - Expanded Package	0	4	6	
	Purchase water from Fort Worth (TRWD)	313	1,484	2,662	Increased supply to meet needs.
	Overdrafting Trinity Aquifer using existing wells	149	0	0	
	Supplemental wells in Trinity (Paluxy) aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>477</b>	<b>1,525</b>	<b>2,721</b>	
	<b>Total Supply Less Projected Demand</b>	<b>37</b>	<b>81</b>	<b>137</b>	
	Alvord	<b>Projected Population</b>	1,378	2,040	3,019
<b>Projected Water Demand</b>					
Municipal Demand		205	295	425	Increased
<b>Total Projected Water Demand</b>		<b>205</b>	<b>295</b>	<b>425</b>	
<b>Currently Available Water Supplies</b>					
Trinity Aquifer		114	114	114	
<b>Total Supply</b>		<b>114</b>	<b>114</b>	<b>114</b>	
<b>Water Management Strategies</b>					
Water Conservation - Basic Package		2	8	9	
Purchase water from TRWD		72	188	324	Increased supply to meet needs (2020 & 2030). City may purchase water from West Wise SUD.
New well in Trinity Aquifer - Overdraft 2010		137	0	0	
Supplemental wells in Trinity (Paleozoic Erathem) aquifer		0	0	0	
<b>Total Water Management Strategies</b>		<b>211</b>	<b>196</b>	<b>333</b>	
<b>Potential Water Management Strategies</b>					
Reuse					
Treat brackish groundwater					
<b>Total Supply Less Projected Demand</b>	<b>120</b>	<b>15</b>	<b>21</b>		
Annetta	<b>Projected Population</b>	1,579	1,972	2,289	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	195	236	272	No change
	<b>Total Projected Water Demand</b>	<b>195</b>	<b>236</b>	<b>272</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	139	139	139	
	<b>Total Supply</b>	<b>139</b>	<b>139</b>	<b>139</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	3	13	16	
	Purchase water from TRWD	0	113	166	
	Overdrafting Trinity Aquifer (existing wells)	57	0	0	
	Supplemental wells in aquifer	0	0	0	
<b>Total Water Management Strategies</b>	<b>60</b>	<b>126</b>	<b>182</b>		
<b>Total Supply Less Projected Demand</b>	<b>4</b>	<b>29</b>	<b>49</b>		



WUG	Description	2010	2020	2030	Notes
Annetta South	<b>Projected Population</b>	708	836	939	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	87	100	110	No change
	<b>Total Projected Water Demand</b>	<b>87</b>	<b>100</b>	<b>110</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	76	76	76	
	<b>Total Supply</b>	<b>76</b>	<b>76</b>	<b>76</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	1	5	6	
	Purchase water from TRWD	0	28	43	
	Overdrafting Trinity Aquifer (existing wells)	12	0	0	
	Supplemental wells in aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>13</b>	<b>33</b>	<b>49</b>	
	<b>Total Supply Less Projected Demand</b>	<b>2</b>	<b>9</b>	<b>15</b>	
Aurora	<b>Projected Population</b>	1,500	1,600	2,000	Increased
	<b>Projected Water Demand</b>				
	Municipal Demand	185	194	238	Increased
	<b>Total Projected Water Demand</b>	<b>185</b>	<b>194</b>	<b>238</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	98	98	98	
	TRWD Sources (through Rhome)	33	37	40	City wants to rely entirely on groundwater
	<b>Total Supply</b>	<b>131</b>	<b>135</b>	<b>138</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	2	8	10	
	Purchase water from Rhome (from Walnut Creek SUD)	61	60	102	Increased supply to meet demands. Not enough groundwater available.
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>63</b>	<b>68</b>	<b>112</b>	
	<b>Total Supply Less Projected Demand</b>	<b>9</b>	<b>10</b>	<b>12</b>	
Azle	<b>Projected Population</b>	12,108	16,795	23,473	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	1,953	2,633	3,602	No change
	<b>Total Projected Water Demand</b>	<b>1,953</b>	<b>2,633</b>	<b>3,602</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources	1,376	1,401	1,431	
	TRWD Sources	304	279	249	
	<b>Total Supply</b>	<b>1,680</b>	<b>1,680</b>	<b>1,680</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	97	96	146	
	Water Conservation - Expanded Package	2	1	0	
	Purchase water from TRWD	739	1,395	2,823	
	<b>New Water Treatment Plant</b>				
	New WTP of 3 MGD	0	0	0	
	<b>Water Treatment Expansions</b>				
	WTP expansion of 3 MGD	0	0	0	
	New WTP Expansion of 3 MGD	0	0	0	
	<b>Total Water Management Strategies</b>	<b>838</b>	<b>1,492</b>	<b>2,969</b>	
	<b>Total Supply Less Projected Demand</b>	<b>565</b>	<b>539</b>	<b>1,047</b>	

WUG	Description	2010	2020	2030	Notes
Bolivar WSC	<b>Projected Population</b>	10,386	12,465	21,806	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	1,279	1,703	3,371	No change
	<b>Total Projected Water Demand</b>	<b>1,279</b>	<b>1,703</b>	<b>3,371</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	1,074	1,074	1,074	
	<b>Total Supply</b>	<b>1,074</b>	<b>1,074</b>	<b>1,074</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	21	85	163	
	Cooke County Water Supply Project	0	68	128	
	Purchase water from UTRWD	250	850	2,700	
	Additional Trinity Aquifer (Existing Wells)	50	100	400	
	Overdraft Trinity Aquifer (Existing Wells)	180	0	0	
	Additional Trinity Aquifer (New Wells)	460	460	800	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>961</b>	<b>1,563</b>	<b>4,191</b>	
	<b>Total Supply Less Projected Demand</b>	<b>756</b>	<b>934</b>	<b>1,894</b>	
Boyd	<b>Projected Population</b>	1,500	2,400	3,200	Increased
	<b>Projected Water Demand</b>				
	Municipal Demand	215	333	434	Increased
	<b>Total Projected Water Demand</b>	<b>215</b>	<b>333</b>	<b>434</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	150	150	150	
	TRWD Sources (through Walnut Creek SUD)	56	80	75	
	<b>Total Supply</b>	<b>206</b>	<b>230</b>	<b>225</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	3	12	14	
	Purchase water from Walnut Creek SUD (from TRWD)	25	108	216	Increased supply to meet demands (2020 & 2030).
	Supplemental wells in Trinity aquifer	0	0	0	
<b>Total Water Management Strategies</b>	<b>28</b>	<b>120</b>	<b>230</b>		
<b>Total Supply Less Projected Demand</b>	<b>19</b>	<b>17</b>	<b>22</b>		
Bridgeport	<b>Projected Population</b>	6,803	8,352	12,001	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	1,570	1,899	2,702	No change
	<b>Total Projected Water Demand</b>	<b>1,570</b>	<b>1,899</b>	<b>2,702</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources	1,686	1,656	1,700	
	<b>Total Supply</b>	<b>1,686</b>	<b>1,656</b>	<b>1,700</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	47	99	164	
	Water Conservation - Expanded Package	1	7	23	
	Purchase water from TRWD	259	562	1,678	
	<b>New Water Treatment Plant</b>				
	New WTP of 2 MGD	0	0	0	
	<b>Water Treatment Expansions</b>				
	WTP Expansion (0.9 MGD)	0	0	0	
	New WTP Expansion of 2 MGD	0	0	0	
	New WTP Expansion of 2 MGD	0	0	0	
<b>Total Water Management Strategies</b>	<b>307</b>	<b>668</b>	<b>1,865</b>		
<b>Total Supply Less Projected Demand</b>	<b>423</b>	<b>425</b>	<b>863</b>		

WUG	Description	2010	2020	2030	Notes
Chico	<b>Projected Population</b>	1,300	1,500	1,800	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	208	235	276	No change
	<b>Total Projected Water Demand</b>	<b>208</b>	<b>235</b>	<b>276</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	119	119	119	
	TRWD Sources (through West Wise WSC)	96	101	111	
	<b>Total Supply</b>	<b>215</b>	<b>220</b>	<b>230</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	7	10	12	
	Purchase water from West Wise Rural WSC (from TRWD)	99	124	185	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>106</b>	<b>134</b>	<b>197</b>	
	<b>Total Supply Less Projected Demand</b>	<b>113</b>	<b>119</b>	<b>151</b>	
Community WSC	<b>Projected Population</b>	3,536	3,588	3,642	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	444	438	433	No change
	<b>Total Projected Water Demand</b>	<b>444</b>	<b>438</b>	<b>433</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources	477	382	320	
	<b>Total Supply</b>	<b>477</b>	<b>382</b>	<b>320</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	6	22	24	
	Purchase water from TRWD	73	130	221	
	<b>Water Treatment Expansions</b>				
	Water treatment plant expansion (0.5 MGD)	0	0	0	
	<b>Total Water Management Strategies</b>	<b>79</b>	<b>152</b>	<b>245</b>	
	<b>Total Supply Less Projected Demand</b>	<b>112</b>	<b>96</b>	<b>132</b>	
Decatur	<b>Projected Population</b>	8,018	12,656	15,780	Increased
	<b>Projected Water Demand</b>				
	Municipal Demand	1,794	2,825	3,520	Increased
	<b>Total Projected Water Demand</b>	<b>1,794</b>	<b>2,825</b>	<b>3,520</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources	1,754	1,753	1,754	
	<b>Total Supply</b>	<b>1,754</b>	<b>1,753</b>	<b>1,754</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	47	102	163	
	Water Conservation - Expanded Package	1	10	35	
	Purchase water from TRWD	270	1,101	1,744	Increased supply to meet demands (2020 & 2030).
	<b>New Water Treatment Plant</b>				
	New WTP of 2 MGD (2020)	0	0	0	
	<b>Water Treatment Expansions</b>				
	WTP Expansion of 1 MGD (4 MGD total) (2010)	0	0	0	Revised
	New WTP Expansion of 2 MGD (2030)	0	0	0	
	<b>Total Water Management Strategies</b>	<b>318</b>	<b>1,213</b>	<b>1,942</b>	
<b>Total Supply Less Projected Demand</b>	<b>279</b>	<b>141</b>	<b>176</b>		

WUG	Description	2010	2020	2030	Notes
Hudson Oaks	<b>Projected Population</b>	2,000	2,438	2,972	Decreased per Hudson Oaks
	<b>Projected Water Demand</b>				
	Municipal Demand	462	563	686	Increased
	<b>Total Projected Water Demand</b>	<b>462</b>	<b>563</b>	<b>686</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	206	206	206	
	TRWD Sources (through Weatherford)	102	102	102	
	<b>Total Supply</b>	<b>308</b>	<b>308</b>	<b>308</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	6	26	36	
	Purchase water from Weatherford (from TRWD)	114	257	483	Increased supply to meet demands (2010 & 2020).
	Overdrafting Trinity Aquifer (existing wells)	57	0	0	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>177</b>	<b>283</b>	<b>519</b>	
	<b>Total Supply Less Projected Demand</b>	<b>23</b>	<b>28</b>	<b>141</b>	
Mineral Wells	<b>Projected Population</b>				
	Projected Population (Region C)	4,000	4,000	4,000	No change
	Projected Population (Region G)	15,074	16,200	17,123	No change
	<b>Total Projected Population</b>	<b>19,074</b>	<b>20,200</b>	<b>21,123</b>	
	<b>Projected Water Demand</b>				
	Municipal Demand (Region C)	766	753	744	No change
	Municipal Demand (Region G)	2,887	3,049	3,184	No change
	<b>Total Projected Water Demand</b>	<b>3,653</b>	<b>3,802</b>	<b>3,928</b>	
	<b>Currently Available Water Supplies</b>				
	Lake Mineral Wells (Region C)	0	0	0	
	Lake Mineral Wells (Region G)	2,505	2,490	2,475	
	Lake Palo Pinto (Region C)	766	753	744	
	Lake Palo Pinto (Region G)	3,653	3,472	3,174	
	<b>Total Supply</b>	<b>6,924</b>	<b>6,715</b>	<b>6,393</b>	
	<b>Water Management Strategies</b>				
Water Conservation - (Region G)	23	38	52		
<b>Total Water Management Strategies</b>	<b>23</b>	<b>38</b>	<b>52</b>		
<b>Total Supply Less Projected Demand</b>	<b>3,294</b>	<b>2,951</b>	<b>2,517</b>		
New Fairview	<b>Projected Population</b>	1,587	2,167	2,732	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	201	272	340	No change
	<b>Total Projected Water Demand</b>	<b>201</b>	<b>272</b>	<b>340</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	103	103	103	
	<b>Total Supply</b>	<b>103</b>	<b>103</b>	<b>103</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	4	15	20	
	Purchase water from Rhome (Walnut Creek SUD)	121	197	296	
	Supplemental wells in aquifer	0	0	0	
<b>Total Water Management Strategies</b>	<b>125</b>	<b>212</b>	<b>316</b>		
<b>Total Supply Less Projected Demand</b>	<b>27</b>	<b>43</b>	<b>79</b>		
Newark	<b>Projected Population</b>	1,137	1,772	2,339	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	154	232	301	No change
	<b>Total Projected Water Demand</b>	<b>154</b>	<b>232</b>	<b>301</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	92	92	92	
	<b>Total Supply</b>	<b>92</b>	<b>92</b>	<b>92</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	2	10	15	
	Purchase water from Walnut Creek SUD (from TRWD)	77	164	261	
	Supplemental wells in Trinity aquifer	0	0	0	
<b>Total Water Management Strategies</b>	<b>79</b>	<b>174</b>	<b>276</b>		
<b>Total Supply Less Projected Demand</b>	<b>17</b>	<b>34</b>	<b>67</b>		

WUG	Description	2010	2020	2030	Notes
Parker County- Irrigation	<b>Projected Water Demand</b>				
	Irrigation Demand	422	422	422	No change
	<b>Total Projected Water Demand</b>	<b>422</b>	<b>422</b>	<b>422</b>	
	<b>Currently Available Water Supplies</b>				
	Direct reuse	202	202	202	
	Irrigation Local Supply	122	122	122	
	Irrigation Local Supply	117	117	117	
	Trinity Aquifer	88	88	88	
	<b>Total Supply</b>	<b>529</b>	<b>529</b>	<b>529</b>	
	<b>Water Management Strategies</b>				
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>0</b>	<b>0</b>	<b>0</b>	
	<b>Total Supply Less Projected Demand</b>	<b>107</b>	<b>107</b>	<b>107</b>	
Parker County- Livestock	<b>Projected Water Demand</b>				
	Livestock Demand	1,856	1,856	1,856	No change
	<b>Total Projected Water Demand</b>	<b>1,856</b>	<b>1,856</b>	<b>1,856</b>	
	<b>Currently Available Water Supplies</b>				
	Livestock Local Supply	903	903	903	
	Livestock Local Supply	1,019	1,019	1,019	
	Trinity Aquifer	213	213	213	
	<b>Total Supply</b>	<b>2,135</b>	<b>2,135</b>	<b>2,135</b>	
	<b>Water Management Strategies</b>				
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>0</b>	<b>0</b>	<b>0</b>	
	<b>Total Supply Less Projected Demand</b>	<b>279</b>	<b>279</b>	<b>279</b>	
	Parker County- Manufacturing	<b>Projected Water Demand</b>			
Manufacturing Demand		779	879	974	No change
<b>Total Projected Water Demand</b>		<b>779</b>	<b>879</b>	<b>974</b>	
<b>Currently Available Water Supplies</b>					
Lake Palo Pinto (Mineral Wells)		25	25	25	
Lake Weatherford (Weatherford)		268	233	207	
Trinity Aquifer		18	18	18	
TRWD Sources (Weatherford)		169	168	171	
<b>Total Supply</b>		<b>480</b>	<b>444</b>	<b>421</b>	
<b>Water Management Strategies</b>					
Water Conservation		0	0	6	
Purchase water from TRWD		194	291	414	
Purchase water from Mineral Wells		250	250	250	
Supplemental wells in Trinity aquifer		0	0	0	
<b>Total Water Management Strategies</b>		<b>444</b>	<b>541</b>	<b>670</b>	
<b>Total Supply Less Projected Demand</b>	<b>145</b>	<b>106</b>	<b>117</b>		

WUG	Description	2010	2020	2030	Notes
Parker County-Mining	<b>Projected Water Demand</b>				
	Mining Demand	7,328	2,132	2,582	Includes 2006 recommendation plus Barnett Shale use. (p. 2-65 of Northern Trinity / Woodbine Aquifer GAM Report, 2007)
	<b>Total Projected Water Demand</b>	<b>7,328</b>	<b>2,132</b>	<b>2,582</b>	
	<b>Currently Available Water Supplies</b>				
	Other Local Supply	16	16	15	
	Other Local Supply	4	4	5	
	Possum Kingdom (BRA)	2,000	2,000	2,000	
	City of Weatherford	418	0	0	Added per meeting with Weatherford (5-10% of City's water use)
	City of Aledo	37	0	0	Assumed 5% of municipal demand
	City of Azle	98	0	0	Assumed 5% of municipal demand
	City of Reno	37	0	0	Based on 12 MG sold in 2007.
	Trinity Aquifer	59	59	59	
	<b>Total Supply</b>	<b>2,668</b>	<b>2,079</b>	<b>2,079</b>	
	<b>Water Management Strategies</b>				
	Reuse water from Weatherford	3,128	3,935	4,641	Assumed 90% of treated effluent (p. 2-5 of Weatherford Reuse Water for Gas Exploration and the Beneficial Uses Study report, 2007)
	Overdraft Trinity aquifer	1,532	0	0	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>4,660</b>	<b>3,935</b>	<b>4,641</b>	
	<b>Total Supply Less Projected Demand</b>	<b>0</b>	<b>3,882</b>	<b>4,138</b>	
	Parker County-Other	<b>Projected Population</b>	38,144	37,824	38,905
<b>Projected Water Demand</b>					
County-Other Demand		4,785	4,618	4,663	No change
<b>Total Projected Water Demand</b>		<b>4,785</b>	<b>4,618</b>	<b>4,663</b>	
<b>Currently Available Water Supplies</b>					
Lake Palo Pinto (Mineral Wells)		479	479	479	
Lake Weatherford (Weatherford)		15	12	11	
Other Aquifer		33	33	33	
Trinity Aquifer		4,815	4,815	4,815	
TRWD Sources (through Weatherford)		173	125	102	
<b>Total Supply</b>		<b>5,515</b>	<b>5,464</b>	<b>5,440</b>	
<b>Water Management Strategies</b>					
Water Conservation - Basic Package		55	222	243	
Purchase water from TRWD (Weatherford)		0	0	0	
Purchase water from Parker County SUD		0	1,284	1,199	
Purchase water from Mineral Wells		280	280	280	
Supplemental wells in Trinity & Other aquifer		0	0	0	
<b>Total Water Management Strategies</b>	<b>335</b>	<b>1,786</b>	<b>1,722</b>		
<b>Total Supply Less Projected Demand</b>	<b>1,065</b>	<b>2,632</b>	<b>2,499</b>		
Parker County-Steam Electric Power	<b>Projected Water Demand</b>				
	Steam Electric Power Demand	30	4,617	5,397	
	<b>Total Projected Water Demand</b>	<b>30</b>	<b>4,617</b>	<b>5,397</b>	
	<b>Currently Available Water Supplies</b>				
	Lake Weatherford	30	24	28	
	<b>Total Supply</b>	<b>30</b>	<b>24</b>	<b>28</b>	
	<b>Water Management Strategies</b>				
	Purchase water from BRA (Possum Kingdom Lake)	0	4,000	4,000	
	Purchase reuse from Weatherford		437	516	Decreased because 90% of Weatherford's reuse is going to gas industry
	<b>Total Water Management Strategies</b>	<b>0</b>	<b>4,437</b>	<b>4,516</b>	
<b>Total Supply Less Projected Demand</b>	<b>0</b>	<b>-156</b>	<b>-853</b>	Unmet need to be studied further	

WUG	Description	2010	2020	2030	Notes
Reno	<b>Projected Population</b>	2,569	2,676	2,763	No change
	<b>Projected Water Demand</b>				
	Municipal Demand (Region C)	319	321	322	No change
	<b>Total Projected Water Demand</b>	<b>319</b>	<b>321</b>	<b>322</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	167	167	167	
	TRWD Sources (Springtown & Walnut Creek SUD))	164	129	109	
	<b>Total Supply</b>	<b>331</b>	<b>296</b>	<b>276</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	4	16	18	
	Purchase water from Springtown (TRWD)	15	27	47	
	Purchase water from Walnut Creek SUD (from TRWD)	25	8	39	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>44</b>	<b>51</b>	<b>104</b>	
	<b>Total Supply Less Projected Demand</b>	<b>56</b>	<b>26</b>	<b>58</b>	
Rhome	<b>Projected Population</b>	1,621	2,640	4,300	Decreased per Rhome
	<b>Projected Water Demand</b>				
	Municipal Demand	405	654	1,060	Decreased per Rhome
	<b>Total Projected Water Demand</b>	<b>405</b>	<b>654</b>	<b>1,060</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	125	125	125	
	TRWD Sources (Walnut Creek SUD)	389	619	748	
	<b>Total Supply</b>	<b>514</b>	<b>744</b>	<b>873</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	19	60	99	
	Purchase water from Walnut Creek SUD (from TRWD)	168	542	1,086	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>187</b>	<b>602</b>	<b>1,185</b>	
	<b>Total Supply Less Projected Demand</b>	<b>296</b>	<b>692</b>	<b>998</b>	
	Runaway Bay	<b>Projected Population</b>	1,411	1,720	2,097
<b>Projected Water Demand</b>					
Municipal Demand		296	357	430	Decreased per Runaway Bay
<b>Total Projected Water Demand</b>		<b>296</b>	<b>357</b>	<b>430</b>	
<b>Currently Available Water Supplies</b>					
TRWD Sources		345	340	336	
<b>Total Supply</b>		<b>345</b>	<b>340</b>	<b>336</b>	
<b>Water Management Strategies</b>					
Water Conservation - Basic Package		10	21	29	
Purchase water from TRWD		53	115	233	
<b>Water Treatment Expansions</b>					
WTP Expansion of 0.5 MGD		0	0	0	
<b>Total Water Management Strategies</b>		<b>63</b>	<b>136</b>	<b>262</b>	
<b>Total Supply Less Projected Demand</b>		<b>112</b>	<b>119</b>	<b>169</b>	

WUG	Description	2010	2020	2030	Notes
Springtown	<b>Projected Population</b>	3,000	4,000	5,000	No change
	<b>Projected Water Demand</b>				
	Municipal Demand	504	659	807	No change
	<b>Total Projected Water Demand</b>	<b>504</b>	<b>659</b>	<b>807</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	236	236	236	
	TRWD Sources	288	369	422	
	<b>Total Supply</b>	<b>524</b>	<b>605</b>	<b>658</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	17	42	58	
	Water Conservation - Expanded Package	4	10	16	
	Purchase water from TRWD	44	125	292	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>65</b>	<b>177</b>	<b>366</b>	
<b>Total Supply Less Projected Demand</b>	<b>85</b>	<b>123</b>	<b>217</b>		
Walnut Creek SUD	<b>Projected Population (Existing and Potential New Customers)</b>	26,784	41,324	64,595	Increased
	<b>Projected Water Demand</b>				
	Municipal Demand (Existing and Potential New Customers)	3,420	5,249	8,207	Increased
	<b>Total Projected Water Demand</b>	<b>3,420</b>	<b>5,249</b>	<b>8,207</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources	1,956	1,789	1,706	
	<b>Total Supply</b>	<b>1,956</b>	<b>1,789</b>	<b>1,706</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	37	140	177	
	Purchase water from TRWD	1,598	3,582	6,734	Increased supply to meet demands.
	<b>New Water Treatment Plant</b>				
	New WTP of 2 MGD (2015)	0	0	0	Per Walnut Creek SUD.
	New WTP Expansion of 2 MGD	0	0	0	
	New WTP Expansion of 2 MGD	0	0	0	
	New WTP Expansion of 2 MGD	0	0	0	
	New WTP Expansion of 2 MGD	0	0	0	
	<b>Total Water Management Strategies</b>	<b>1,635</b>	<b>3,722</b>	<b>6,911</b>	
<b>Total Supply Less Projected Demand</b>	<b>171</b>	<b>262</b>	<b>410</b>		
Weatherford	<b>Projected Population (City of Weatherford)</b>	26,877	33,000	38,584	Revised per Weatherford
	<b>Projected Water Demand</b>				
	Municipal Demand (City of Weatherford)	5,574	6,844	8,002	Revised per Weatherford
	Existing Customers	368	525	651	
	Potential Customers	0	1,513	1,783	
	<b>Total Projected Water Demand</b>	<b>5,942</b>	<b>8,882</b>	<b>10,436</b>	
	<b>Currently Available Water Supplies</b>				
	Lake Weatherford	2,399	2,301	2,184	
	Trinity Aquifer	50	50	50	
	TRWD Sources	1,556	1,706	1,857	
	<b>Total Supply</b>	<b>4,005</b>	<b>4,057</b>	<b>4,091</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	156	355	484	
	Water Conservation - Expanded Package	3	40	147	
	Purchase water from TRWD	1,937	4,825	6,345	Increased supply to meet demands.
	<b>New Water Treatment Plant</b>				
	New WTP of 8 MGD (2030)	0	0	0	
<b>Water Treatment Expansions</b>					
WTP Expansion of 4 MGD (18 MGD total) (2020)	0	0	0		
<b>Total Water Management Strategies</b>	<b>2,096</b>	<b>5,220</b>	<b>6,976</b>		
<b>Total Supply Less Projected Demand</b>	<b>159</b>	<b>395</b>	<b>631</b>		



WUG	Description	2010	2020	2030	Notes
West Wise SUD	<b>Projected Population</b>	3,501	4,005	4,506	Increased 2020 & 2030
	<b>Projected Water Demand</b>				
	Municipal Demand	549	619	686	Increased
	<b>Total Projected Water Demand</b>	<b>549</b>	<b>619</b>	<b>686</b>	
	<b>Currently Available Water Supplies</b>				
	TRWD Sources (Walnut Creek SUD)	521	435	383	
	TRWD Sources (Direct from TRWD)	986	986	986	Contract amount
	<b>Total Supply</b>	<b>1,507</b>	<b>1,421</b>	<b>1,369</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	6	23	27	
	Purchase water from Walnut Creek SUD (from TRWD)	0	0	0	Reduced based on preference for direct supply from TRWD.
	Purchase water from TRWD	0	0	0	Reduced because entire contract amount is listed under "Currently Available Water Supplies"
	<b>Total Water Management Strategies</b>	<b>6</b>	<b>23</b>	<b>27</b>	
<b>Total Supply Less Projected Demand</b>	<b>964</b>	<b>825</b>	<b>710</b>		
Willow Park	<b>Projected Population</b>	4,164	5,871	8,278	Decreased in 2020 & 2030 per City
	<b>Projected Water Demand</b>				
	Municipal Demand	682	935	1,299	Increased
	<b>Total Projected Water Demand</b>	<b>682</b>	<b>935</b>	<b>1,299</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	642	642	642	
	<b>Total Supply</b>	<b>642</b>	<b>642</b>	<b>642</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	20	49	40	
	Purchase water from TRWD (Weatherford)	0	291	682	Increased supply to meet demands (2020 & 2030).
	Overdrafting Trinity aquifer (existing wells)	54	0	0	Added for 2010.
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>74</b>	<b>340</b>	<b>722</b>	
<b>Total Supply Less Projected Demand</b>	<b>34</b>	<b>47</b>	<b>65</b>		
Wise County-Irrigation	<b>Projected Water Demand</b>				
	Irrigation Demand	502	502	502	No change
	<b>Total Projected Water Demand</b>	<b>502</b>	<b>502</b>	<b>502</b>	
	<b>Currently Available Water Supplies</b>				
	Irrigation Local Supply	139	139	139	
	Trinity Aquifer	251	251	251	
	TRWD Sources	124	108	92	
	<b>Total Supply</b>	<b>514</b>	<b>498</b>	<b>482</b>	
	<b>Water Management Strategies</b>				
	Water Conservation	0	5	10	
	Purchase water from TRWD	21	37	63	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>21</b>	<b>42</b>	<b>73</b>	
<b>Total Supply Less Projected Demand</b>	<b>33</b>	<b>38</b>	<b>53</b>		

WUG	Description	2010	2020	2030	Notes
Wise County- Livestock	<b>Projected Water Demand</b>				
	Livestock Demand	1,714	1,714	1,714	No change
	<b>Total Projected Water Demand</b>	<b>1,714</b>	<b>1,714</b>	<b>1,714</b>	
	<b>Currently Available Water Supplies</b>				
	Livestock Local Supply	1,117	1,117	1,117	
	Trinity Aquifer	807	807	807	
	<b>Total Supply</b>	<b>1,924</b>	<b>1,924</b>	<b>1,924</b>	
	<b>Water Management Strategies</b>				
	Supplemental wells in Trinity aquifer	0	0	0	
	Reduce Trinity Aquifer use (reallocated to others)	-100	-100	-100	
	<b>Total Water Management Strategies</b>	<b>-100</b>	<b>-100</b>	<b>-100</b>	
	<b>Total Supply Less Projected Demand</b>	<b>110</b>	<b>110</b>	<b>110</b>	
	Wise County- Manufacturing	<b>Projected Water Demand</b>			
Manufacturing Demand		2,313	2,660	2,979	No change
<b>Total Projected Water Demand</b>		<b>2,313</b>	<b>2,660</b>	<b>2,979</b>	
<b>Currently Available Water Supplies</b>					
Other Aquifer		14	14	14	
Other Local Supply		0	0	0	
TRWD Sources		2,469	2,307	2,191	
<b>Total Supply</b>		<b>2,483</b>	<b>2,321</b>	<b>2,205</b>	
<b>Water Management Strategies</b>					
Water Conservation		0	1	12	
Purchase water from TRWD		379	783	1,516	
Supplemental wells in Other aquifer		0	0	0	
<b>Total Water Management Strategies</b>		<b>379</b>	<b>784</b>	<b>1,528</b>	
<b>Total Supply Less Projected Demand</b>		<b>549</b>	<b>445</b>	<b>754</b>	
Wise County-Mining	<b>Projected Water Demand</b>				
	Mining Demand	25,017	28,644	31,490	Includes 2006 recommendation plus Barnett Shale use. (p. 2-66 of Northern Trinity / Woodbine Aquifer GAM Report, 2007)
	<b>Total Projected Water Demand</b>	<b>25,017</b>	<b>28,644</b>	<b>31,490</b>	
	<b>Currently Available Water Supplies</b>				
	Reuse Supply	15,930	14,074	12,152	
	Run-of-river - Trinity	51	51	51	
	Trinity Aquifer	239	239	239	
	TRWD Sources	2,896	2,525	2,140	
	<b>Total Supply</b>	<b>19,116</b>	<b>16,889</b>	<b>14,582</b>	
	<b>Water Management Strategies</b>				
	Purchase water from TRWD	4,779	4,711	5,607	
	Reuse - Recycled water	14,337	14,133	22,428	
	Reduce Trinity Aquifer use (reallocated to others)	0	0	0	
	Supplemental wells in Trinity aquifer	0	0	0	
<b>Total Water Management Strategies</b>	<b>19,116</b>	<b>18,844</b>	<b>28,035</b>		
<b>Total Supply Less Projected Demand</b>	<b>13,215</b>	<b>7,089</b>	<b>11,127</b>		

WUG	Description	2010	2020	2030	Notes
Wise County-Other	<b>Projected Population</b>	32,364	35,909	35,909	
	<b>Projected Water Demand</b>				
	County-Other Demand	3,843	4,344	4,304	No change
	<b>Total Projected Water Demand</b>	<b>3,843</b>	<b>4,344</b>	<b>4,304</b>	
	<b>Currently Available Water Supplies</b>				
	Trinity Aquifer	2,161	2,161	2,161	
	TRWD Sources (Walnut Creek SUD)	1,024	926	772	
	<b>Total Supply</b>	<b>3,185</b>	<b>3,087</b>	<b>2,933</b>	
	<b>Water Management Strategies</b>				
	Water Conservation - Basic Package	57	209	223	
	Purchase water from Walnut Creek SUD (from TRWD)	17	40	57	
	Purchase water from TRWD	149	1,126	1,233	
	Overdrafting Trinity Aquifer (existing wells)	676	0	0	
	Supplemental wells in Trinity aquifer	0	0	0	
	<b>Total Water Management Strategies</b>	<b>899</b>	<b>1,375</b>	<b>1,513</b>	
	<b>Total Supply Less Projected Demand</b>	<b>241</b>	<b>118</b>	<b>142</b>	
	Wise County-Steam Electric Power	<b>Projected Water Demand</b>			
Steam Electric Power Demand		3,949	5,653	6,609	No change
<b>Total Projected Water Demand</b>		<b>3,949</b>	<b>5,653</b>	<b>6,609</b>	
<b>Currently Available Water Supplies</b>					
TRWD sources		4,600	4,010	3,400	
<b>Total Supply</b>		<b>4,600</b>	<b>4,010</b>	<b>3,400</b>	
<b>Water Management Strategies</b>					
Purchase water from TRWD		1,098	2,592	3,863	
Purchase reuse water from Bridgeport		0	0	0	
Purchase reuse water from Decatur		0	0	0	
<b>Total Water Management Strategies</b>		<b>1,098</b>	<b>2,592</b>	<b>3,863</b>	
<b>Total Supply Less Projected Demand</b>	<b>1,749</b>	<b>949</b>	<b>654</b>		

**APPENDIX C**  
**COST ESTIMATES**

**APPENDIX C**  
**COST ESTIMATES**

Appendix C includes detailed cost estimates for recommended water management strategies. The cost estimating assumptions are summarized in the memorandum in Appendix D.

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**Table C-1  
Costs Estimates for Supplemental Wells to Maintain Current Groundwater Production Capacity**

Water User Group	County	Aquifer	# Wells in 2005	Well Capacity (gpm)	Well Depth (ft)	Installation Schedule			Construction Costs (including engineering, contingencies, and permitting)		
						2010	2020	2030	2010	2020	2030
Aledo	Parker	Trinity (Paluxy)	6	76	389	1	1	1	\$546,788	\$546,788	\$546,788
Annetta	Parker		10	50	350	2	2	2	\$1,054,920	\$1,054,920	\$1,054,920
Annetta South	Parker		10	50	350	2	2	2	\$1,054,920	\$1,054,920	\$1,054,920
Hudson Oaks	Parker	Trinity (Paluxy)	21	40	343	4	3	4	\$2,095,963	\$1,571,972	\$2,095,963
Reno	Parker	Trinity (Paluxy)	6	39	486	1	1	1	\$594,862	\$594,862	\$594,862
Springtown	Parker	Trinity (Paluxy)	2	398	391	1			\$695,421		
Springtown	Parker	Trinity (Travis Peak)	1	33	364			1			\$534,398
Willow Park	Parker	Trinity (Paluxy)	17	50	200	3	3	3	\$1,359,360	\$1,359,360	\$1,359,360
Weatherford	Parker	Trinity (Paluxy)	1	50	200		1			\$453,120	
Parker County-Other	Parker	Trinity & Other	1	50	200	1			\$453,120		
Parker County Irrigation	Parker	Trinity	1	50	200	1			\$453,120		
Parker County Livestock	Parker	Trinity	1	50	200	1			\$453,120		
Parker County Manufacturing	Parker	Trinity	1	50	200	1			\$453,120		
Parker County Mining	Parker	Trinity	1	50	200	1			\$453,120		
Alvord	Wise	Trinity (Paleozoic Erathem)	4	100	394	1		1	\$614,355		\$614,355
Aurora	Wise		4	100	400	1	1		\$618,320	\$618,320	
Bolivar WSC	Wise	Trinity	2	100	250	1			\$519,200		
Boyd	Wise	Trinity (Paleozoic Erathem)	2	123	397	1			\$616,338		
Chico	Wise	Trinity (Antlers)	7	71	125	2	1	1	\$831,900	\$415,950	\$415,950
New Fairview	Wise		4	75	200	1	1		\$453,120	\$453,120	
Newark	Wise	Trinity (Paluxy)	6	36	543	1	1	1	\$623,111	\$623,111	\$623,111
Rhome	Wise	Trinity (Paluxy)	3	79	497	1		1	\$600,313		\$600,313
Wise County-Other	Wise	Trinity	1	100	250	1			\$519,200		
Wise County Irrigation	Wise	Trinity	1	100	250	1			\$519,200		
Wise County Livestock	Wise	Trinity	1	100	250	1			\$519,200		
Wise County Manufacturing	Wise	Other	1	100	250	1			\$519,200		
Wise County Mining	Wise	Trinity	1	100	250	1			\$519,200		

**Table C-2  
Cost Estimates for New Water Treatment Plants**

Water User Group	Water Management Strategy	County	Construction Time (Months)	Capital Costs (including engineering, contingencies & interest)		
				2010	2020	2030
Walnut Creek SUD	New WTP of 2 MGD	Parker	18	\$10,964,000		
Weatherford	New WTP of 8 MGD	Parker	18			\$25,512,000
Bridgeport	New WTP of 2 MGD	Wise	18		\$10,964,000	
West Wise SUD	New WTP of 0.5 MGD	Wise	12			\$6,047,000
Wise County WSD (Decatur)	New WTP of 2 MGD	Wise	18		\$10,964,000	

**Table C-3  
Water Treatment Plant Expansions**

Water User Group	Water Management Strategy	County	Construction Time (Months)	Capital Costs (including engineering, contingencies & interest)		
				2010	2020	2030
Azle	WTP expansion of 3 MGD	Tarrant	18			\$10,319,000
Community WSC	WTP expansion of 0.5 MGD	Tarrant	12		\$2,936,000	
Weatherford	WTP Expansion of 4 MGD (18 MGD total capacity)	Parker	18		\$11,717,000	
Bridgeport	WTP Expansion of 0.9 MGD	Wise	12	\$3,516,000		
Runaway Bay	WTP Expansion of 0.5 MGD	Wise	12			\$2,320,000
Walnut Creek SUD	New WTP expansion of 2 MGD (4 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (6 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (8 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (10 MGD total)	Parker	18			\$6,880,000
Walnut Creek SUD	New WTP expansion of 2 MGD (12 MGD total)	Parker	18			\$6,880,000
Wise County WSD (Decatur)	WTP Expansion of 1 MGD (4 MGD total capacity)	Wise	18	\$3,870,000		
Wise County WSD (Decatur)	New WTP Expansion of 2 MGD	Wise	18			\$6,880,000



**Table C-4  
Walnut Creek SUD Parallel Pipeline to Boyd and Rhome**

Owner: Walnut Creek SUD  
Amount: 3,900 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	24 in.	156,000	LF	\$108	\$16,848,000
Right of Way Easements (ROW)	20 ft.	72	Acre	\$25,000	\$1,791,000
Engineering and Contingencies (30%)					\$5,592,000
<b>Subtotal of Pipeline</b>					<b>\$24,231,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	350 HP	1	LS	\$1,505,000	\$1,505,000
Ground Storage at Boyd	0.01 MG	1	LS	\$70,000	\$70,000
Ground Storage at Rhome	.75 MG	1	LS	\$499,000	\$499,000
Engineering and Contingencies (35%)					\$726,000
<b>Subtotal of Pump Station(s)</b>					<b>\$2,800,000</b>
<b>Permitting and Mitigation</b>					<b>\$227,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$27,258,000</b>
<b>Interest During Construction</b>			<b>(12 months)</b>		<b>\$1,136,000</b>
<b>TOTAL COST</b>					<b>\$28,394,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$2,063,000
Electricity (\$0.09 kWh)					\$70,000
Operation & Maintenance					\$264,000
<b>Total Annual Costs</b>					<b>\$2,397,000</b>
<b>UNIT COSTS (Pre-Amort.)</b>					
Per Acre-Foot					\$615
Per 1,000 Gallons					\$1.89
<b>UNIT COSTS (Post-Amort.)</b>					
Per Acre-Foot					\$86
Per 1,000 Gallons					\$0.26

**Table C-5  
Weatherford Increase Pump Station Capacity by 7 MGD**

Probable Owner:       Weatherford  
Quantity:                6,278 AF/Y

**Existing Infrastructure**

Pipeline                               36 in.  
Distance                            100,000 LF  
Pump Capacity                      15 MGD  
Pump Station Can Accommodate   22 MGD

**CONSTRUCTION COSTS**

**TRANSMISSION FACILITIES**

<b>Pump Station(s)</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
Add Pump to Existing Pump Station		1	LS	\$400,000	\$400,000
Engineering and Contingencies (35%)					\$140,000
<b>Subtotal of Pump Station(s)</b>					<b>\$540,000</b>

**CONSTRUCTION TOTAL** **\$540,000**

**Permitting and Mitigation** **\$0**

**Interest During Construction** **(6 months)** **\$12,000**

**TOTAL COST** **\$552,000**

**ANNUAL COSTS**

Debt Service (6% for 30 years)	\$40,000
Electricity (\$0.09 kWh)	\$67,000
Raw water purchase (\$0.68/ kgal)	\$1,391,000
Operation & Maintenance	\$12,000
<b>Total Annual Costs</b>	<b>\$1,510,000</b>

**UNIT COSTS - (With Debt Service)**

Per Acre-Foot	\$241
Per 1,000 gallons	\$0.74

**UNIT COSTS - (After Debt Service)**

Per Acre-Foot	\$234
Per 1,000 gallons	\$0.72

**Table C-6**  
**East Parker County System - Pipeline from Weatherford**  
**to Annetta, Annetta South and Willow Park**

Owner:	Unknown		
Amount:	800 Ac-Ft/Yr	Willow Park	34%
	250 Ac-Ft/Yr	Annetta	11%
	100 Ac-Ft/Yr	Annetta South	4%
	1,200 Ac-Ft/Yr	County Other	51%
	2,350 Ac-Ft/Yr	Total	

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline (everyone)	18 in.	38,000	LF	\$108	\$4,104,000
Right of Way Easements (ROW)	20 ft.	17	Acre	\$25,000	\$436,000
Engineering and Contingencies (30%)					\$1,362,000
Permitting and Mitigation					\$49,000
<b>Subtotal of Pipeline (everyone)</b>					<b>\$5,951,000</b>
Pipeline (County-other)	12 in.	15,840	LF	\$72	\$1,140,000
Right of Way Easements (ROW)	20 ft.	7	Acre	\$25,000	\$182,000
Engineering and Contingencies (30%)					\$397,000
Permitting and Mitigation					\$14,000
<b>Subtotal of Pipeline (County-other)</b>					<b>\$1,733,000</b>
Pipeline (Willow park)	10 in.	8,000	LF	\$60	\$480,000
Right of Way Easements (ROW)	15 ft.	3	Acre	\$25,000	\$69,000
Engineering and Contingencies (30%)					\$165,000
Permitting and Mitigation					\$6,000
<b>Subtotal of Pipeline (Willow Park)</b>					<b>\$720,000</b>
Pipeline (Annetta & Annetta S.)	8 in.	13,300	LF	\$48	\$638,000
Right of Way Easements (ROW)	15 ft.	5	Acre	\$25,000	\$114,000
Engineering and Contingencies (30%)					\$226,000
Permitting and Mitigation					\$8,000
<b>Subtotal of Pipeline (Annetta &amp; Annetta S.)</b>					<b>\$986,000</b>
Pipeline (Annetta S.)	6 in.	27,000	LF	\$36	\$972,000
Right of Way Easements (ROW)	15 ft.	9	Acre	\$25,000	\$232,000
Engineering and Contingencies (30%)					\$361,000
Permitting and Mitigation					\$12,000
<b>Subtotal of Pipeline (Annetta S.)</b>					<b>\$1,577,000</b>

**Table C-6, Continued**

<b>Total of Pipeline Cost</b>					<b>\$10,967,000</b>
<i>County-Other portion of pipelines</i>	<i>51% of 18 in line, 100% of 12 in line</i>				\$4,771,809
<i>Willow Park portion of pipelines</i>	<i>34% of 18 in line, 100% of 10 in line</i>				\$2,745,872
<i>Annetta portion of pipelines</i>	<i>11% of 18 n line, 71% of 8 in line</i>				\$1,337,371
<i>Annetta S. portion of pipelines</i>	<i>4% of 18 in line, 29% of 8 in line, 100% 6 in</i>				\$2,111,948
					<b>\$10,967,000</b>
<b>Pump Stations</b>					
Booster Pump Station 1	140	1	LS	\$830,000	\$830,000
Engineering and Contingencies (35%)					\$291,000
Permitting and Mitigation					\$10,000
<b>Subtotal of Pump Station 1</b>					<b>\$1,131,000</b>
Booster Pump Station 2	120	1	LS	\$760,000	\$760,000
Engineering and Contingencies (35%)					\$266,000
Permitting and Mitigation					\$9,000
<b>Subtotal of Pump Station 2</b>					<b>\$1,035,000</b>
<b>Total of Pump Stations</b>					<b>\$2,166,000</b>
<i>County-Other portion of P.S</i>	<i>51% of P.S 1, 61% of P.S 2</i>				\$1,210,000
<i>Willow Park portion of P.S</i>	<i>34% of P.S 1, 17% of P.S 2</i>				\$561,000
<i>Annetta portion of P.S</i>	<i>11% of P.S 1, 13% of P.S 2</i>				\$255,000
<i>Annetta S. portion of P.S</i>	<i>4% of P.S 1, 9% of P.S 2</i>				\$140,000
					<b>\$2,166,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$13,133,000</b>
<b>Interest During Construction (12 months)</b>					<b>\$547,000</b>
<b>TOTAL COST</b>					<b>\$13,680,000</b>
<i>County-Other</i>					\$6,230,000
<i>Willow Park</i>					\$3,445,000
<i>Annetta portion</i>					\$1,659,000
<i>Annetta S. portion</i>					\$2,346,000
					<b>\$13,680,000</b>

**Table C-6, Continued**

**ANNUAL COSTS**

**County-Other**

Debt Service (6% for 30 years)	\$453,000
Electricity (\$0.09 kWh)	\$26,000
Treated Water* (\$2.98 per 1,000 gallons)	\$1,165,000
Operation & Maintenance	\$50,000
<b>Total Annual Costs</b>	<b>\$1,694,000</b>

**Willow Park**

Debt Service (6% for 30 years)	\$250,000
Electricity (\$0.09 kWh)	\$11,000
Treated Water* (\$2.98 per 1,000 gallons)	\$777,000
Operation & Maintenance	\$28,000
<b>Total Annual Costs</b>	<b>\$1,066,000</b>

**Annetta**

Debt Service (6% for 30 years)	\$121,000
Electricity (\$0.09 kWh)	\$6,000
Treated Water* (\$2.98 per 1,000 gallons)	\$243,000
Operation & Maintenance	\$13,000
<b>Total Annual Costs</b>	<b>\$383,000</b>

**Annetta S.**

Debt Service (6% for 30 years)	\$170,000
Electricity (\$0.09 kWh)	\$4,000
Treated Water* (\$2.98 per 1,000 gallons)	\$97,000
Operation & Maintenance	\$17,000
<b>Total Annual Costs</b>	<b>\$288,000</b>

**TOTAL ANNUAL COSTS**

Debt Service (6% for 30 years)	\$994,000
Electricity (\$0.09 kWh)	\$48,000
Treated Water* (\$2.98 per 1,000 gallons)	\$2,282,000
Operation & Maintenance	\$108,000
<b>Total Annual Costs</b>	<b>\$3,432,000</b>

**Table C-6, Continued**

**UNIT COSTS**

**County-Other**

Per Acre-Foot	\$1,412
Per 1,000 Gallons	\$4.33

**Willow Park**

Per Acre-Foot	\$1,333
Per 1,000 Gallons	\$4.09

**Annetta**

Per Acre-Foot	\$1,532
Per 1,000 Gallons	\$4.70

**Annetta S.**

Per Acre-Foot	\$2,880
Per 1,000 Gallons	\$8.84

\*Treated water rate was provided by City of Weatherford, August 2008.

**Table C-7**  
**Aledo - Cost of Overdrafting with Existing Wells until 2010**  
**Parker County, Trinity Aquifer**

Owner:	Aledo
Amount:	148 Acre-Feet per Year
Water Depth	131 ft
Well Depth	389 ft
Well Yield	185 gpm
Well Size	8 in
Yield per well	298 Acre-Feet per Year (peak)
Yield per well	149 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	48,226	1000 gal	\$0.12	\$5,800
Pumping Costs	39,000	kW-h	\$0.09	\$3,510
<b>Total Annual Cost</b>				<b>\$9,310</b>

**UNIT COSTS**

Cost per acre-foot	\$62.91
Cost per 1000 gallons	\$0.19

**Table C-8**  
**Annetta - Cost of Overdrafting with Existing Wells until 2010**  
**Parker County, Trinity Aquifer**

Owner:	Annetta
Amount:	56 Acre-Feet per Year
Water Depth	131 ft
Well Depth	389 ft
Well Yield	70 gpm
Well Size	6 in
Yield per well	113 Acre-Feet per Year (peak)
Yield per well	57 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	18,248	1000 gal	\$0.12	\$2,200
Pumping Costs	20,000	kW-h	\$0.09	\$1,800
<b>Total Annual Cost</b>				<b>\$4,000</b>

**UNIT COSTS**

Cost per acre-foot	\$71.43
Cost per 1000 gallons	\$0.22



**Table C-9**  
**Annetta South - Cost of Overdrafting with Existing Wells until 2010**  
**Parker County, Trinity Aquifer**

Owner:	Annetta South
Amount:	11 Acre-Feet per Year
Water Depth	131 ft
Well Depth	389 ft
Well Yield	15 gpm
Well Size	6 in
Yield per well	24 Acre-Feet per Year (peak)
Yield per well	12 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	3,584	1000 gal	\$0.12	\$400
Pumping Costs	7,000	kW-h	\$0.09	\$630
<b>Total Annual Cost</b>				<b>\$1,030</b>

**UNIT COSTS**

Cost per acre-foot	\$93.64
Cost per 1000 gallons	\$0.29

**Table C-10**  
**Hudson Oaks - Cost of Overdrafting with Existing Wells until 2010**  
**Parker County, Trinity Aquifer**

Owner:	Annetta South
Amount:	53 Acre-Feet per Year
Water Depth	131 ft
Well Depth	216 ft
Well Yield	70 gpm
Well Size	6 in
Yield per well	113 Acre-Feet per Year (peak)
Yield per well	57 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	17,270	1,000 gal	\$0.12	\$2,100
Pumping Costs	20,000	kW-h	\$0.09	\$1,800
<b>Total Annual Cost</b>				<b>\$3,900</b>

**UNIT COSTS (First 30 Years)**

Cost per acre-foot	\$73.58
Cost per 1000 gallons	\$0.23

**Table C-11**  
**Alvord - Overdraft of Trinity Aquifer Using New Wells**

Owner:	Alvord
Amount:	135 Acre-Feet per Year
Water Depth	94 ft
Well Depth	394 ft
Well Yield	170 gpm
Well Size	8 in
Yield per well	274 Acre-Feet per Year (peak)
Yield per well	137 Acre-Feet per Year (average)
Wells Needed	1

<b>Item No. &amp; Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Total Cost</b>
<b>WELLS</b>				
Groundwater wells	394	LF	\$280	\$110,320
Connection to distribution	1		\$150,000	\$150,000
Engineering and Contingencies	30%			\$78,000
<b>Subtotal of Well(s)</b>				<b>\$338,320</b>
<b>Permitting and mitigation</b>	1%			\$3,124
<b>CONSTRUCTION TOTAL</b>				<b>\$341,444</b>
<b>Interest During Construction</b>		6 months		<b>\$7,399</b>
<b>TOTAL CAPITAL COST</b>				<b>\$348,843</b>
<b>ANNUAL COSTS</b>				
Debt Service - Total Capital				\$25,000
Operation and Maintenance				
Transmission	1.0%			\$1,800
Well(s)	2.5%			\$3,310
Chlorination	43,990	1000 gal	\$0.12	\$5,300
Pumping Costs	33,000	kW-h	\$0.09	\$2,970
<b>Total Annual Cost</b>				<b>\$38,380</b>
<b>UNIT COSTS (First 30 Years)</b>				
Cost per acre-foot				\$284.29
Cost per 1000 gallons				\$0.87
<b>UNIT COSTS (After 30 Years)</b>				
Cost per acre-foot				\$99.11
Cost per 1000 gallons				\$0.30

**Table C-12**  
**Wise County Alvord - Pipeline to Chico (TRWD)**

Owner: Alvord  
Amount: 324 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	6 in.	39,400	LF	\$24	\$946,000
Right of Way Easements (ROW)	15 ft.	14	Acre	\$10,000	\$136,000
Engineering and Contingencies (30%)					\$325,000
<b>Subtotal of Pipeline</b>					<b>\$1,407,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	90 HP	1	LS	\$672,000	\$672,000
Engineering and Contingencies (35%)					\$235,000
<b>Subtotal of Pump Station(s)</b>					<b>\$907,000</b>
<b>Permitting and Mitigation</b>					<b>\$19,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$2,333,000</b>
<b>Interest During Construction (12 Months)</b>					<b>\$97,000</b>
<b>TOTAL COST</b>					<b>\$2,430,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$177,000
Electricity (\$0.09 kWh)					\$10,000
Treated Water (\$3 per 1,000 gallons)					\$317,000
Operation & Maintenance					\$31,000
<b>Total Annual Costs</b>					<b>\$535,000</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$1,651
Per 1,000 Gallons					\$5.07

**Table C-13**  
**Aurora - Cost of Overdrafting with Existing Wells until 2010**  
**Wise County, Trinity Aquifer**

Owner:	Aurora
Amount:	38 Acre-Feet per Year
Water Depth	94 ft
Well Depth	395 ft
Well Yield	50 gpm
Well Size	6 in
Yield per well	81 Acre-Feet per Year (peak)
Yield per well	41 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	12,382	1000 gal	\$0.12	\$1,500
Pumping Costs	13,000	kW-h	\$0.09	\$1,170
<b>Total Annual Cost</b>				<b>\$2,670</b>

**UNIT COSTS**

Cost per acre-foot	\$70.26
Cost per 1000 gallons	\$0.22

**Table C-14  
Wise County Aurora - Pipeline to Rhome**

Owner: Aurora  
Amount: 120 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	6 in.	9,979	LF	\$24	\$239,000
Right of Way Easements (ROW)	15 ft.	3	Acre	\$10,000	\$34,000
Engineering and Contingencies (30%)					\$82,000
<b>Subtotal of Pipeline</b>					<b>\$355,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	2 HP	1	LS	\$400,000	\$400,000
Ground storage Tank	0.04 MG	1	LS	\$116,000	\$116,000
Engineering and Contingencies (35%)					\$181,000
<b>Subtotal of Pump Station(s)</b>					<b>\$697,000</b>
<b>Permitting and Mitigation</b>					<b>\$9,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$1,061,000</b>
<b>Interest During Construction</b>					<b>\$44,000</b>
<b>TOTAL COST</b>					<b>\$1,105,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$80,000
Electricity (\$0.09 kWh)					\$414
Operation & Maintenance					\$18,000
<b>Total Annual Costs</b>					<b>\$98,414</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$820
Per 1,000 Gallons					\$2.52

**Table C-15**  
**Bolivar WSC - Cost of Overdrafting with Existing Wells until 2010**  
**Wise County, Trinity Aquifer**

Owner:	Bolivar WSC
Amount:	90 Acre-Feet per Year
Water Depth	94 ft
Well Depth	397 ft
Well Yield	56 gpm
Well Size	6 in
Yield per well	90 Acre-Feet per Year (peak)
Yield per well	45 Acre-Feet per Year (average)
Wells Needed	2

**ANNUAL COSTS**

Chlorination	29,327	1000 gal	\$0.12	\$3,500
Pumping Costs	20,000	kW-h	\$0.09	\$1,800
<b>Total Annual Cost</b>				<b>\$5,300</b>

**UNIT COSTS (First 30 Years)**

Cost per acre-foot	\$58.89
Cost per 1000 gallons	\$0.18

**Table C-16**  
**Boyd - Cost of Overdrafting with Existing Wells until 2010**  
**Wise County, Trinity Aquifer**

Owner:	Boyd
Amount:	19 Acre-Feet per Year
Water Depth	94 ft
Well Depth	397 ft
Well Yield	24 gpm
Well Size	6 in
Yield per well	39 Acre-Feet per Year (peak)
Yield per well	20 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	6,191	1000 gal	\$0.12	\$700
Pumping Costs	7,000	kW-h	\$0.09	\$630
<b>Total Annual Cost</b>				<b>\$1,330</b>

**UNIT COSTS (First 30 Years)**

Cost per acre-foot	\$70.00
Cost per 1000 gallons	\$0.21



**Table C-17  
Bridgeport Pump Station Capacity Increase in 2010**

Owner: Bridgeport  
Amount: Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pump Station(s)</b>					
Pump Station Upgrade		1	LS	\$608,000	\$608,000
Engineering and Contingencies (35%)					\$213,000
<b>Subtotal of Pump Station(s)</b>					<b>\$821,000</b>
 <b>CONSTRUCTION TOTAL</b>					 <b>\$821,000</b>
 <b>Interest During Construction</b>			<b>(6 months)</b>		 <b>\$18,000</b>
 <b>TOTAL COST</b>					 <b>\$839,000</b>
 <b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$61,000
Operation & Maintenance					\$18,000
<b>Total Annual Costs</b>					<b>\$79,000</b>

**Table C-18**  
**Bridgeport Parallel Pipeline Connection to TRWD in 2020**

Owner: Bridgeport  
Amount: 3,363 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Parallel pipeline to Bridgeport	24 in.	26,000	LF	\$108	\$2,808,000
Right of Way Easements (ROW)	20 ft.	12	Acre	\$10,000	\$119,000
Engineering and Contingencies (30%)					\$878,000
<b>Subtotal of Pipeline</b>					<b>\$3,805,000</b>
<b>Pump Station(s)</b>					
Pump Station with Intake Structure	150 HP	1	LS	\$1,200,000	\$1,200,000
Engineering and Contingencies (35%)					\$420,000
<b>Subtotal of Pump Station(s)</b>					<b>\$1,620,000</b>
<b>Permitting and Mitigation</b>					<b>\$48,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$5,473,000</b>
<b>Interest During Construction</b>			<b>(12 months)</b>		<b>\$228,000</b>
<b>TOTAL COST</b>					<b>\$5,701,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$414,000
Electricity (\$0.09 kWh)					\$30,100
Operation & Maintenance					\$70,000
<b>Total Annual Costs</b>					<b>\$514,100</b>
<b>UNIT COSTS (2010-2030)</b>					
Per Acre-Foot					\$153
Per 1,000 Gallons					\$0.47
<b>UNIT COSTS (2040-2060)</b>					
Per Acre-Foot					\$30
Per 1,000 Gallons					\$0.09

**Table C-19**  
**Wise County Chico - Pipeline to Bridgeport**

Owner: Chico  
Amount: 365 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	10 in.	34,200	LF	\$40	\$1,368,000
Right of Way Easements (ROW)	20 ft.	16	Acre	\$10,000	\$157,000
Engineering and Contingencies (30%)					\$458,000
<b>Subtotal of Pipeline</b>					<b>\$1,983,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	20 HP	1	LS	\$525,000	\$525,000
Engineering and Contingencies (35%)					\$184,000
<b>Subtotal of Pump Station(s)</b>					<b>\$709,000</b>
<b>Permitting and Mitigation</b>					<b>\$23,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$2,715,000</b>
<b>Interest During Construction</b>					<b>\$113,000</b>
<b>TOTAL COST</b>					<b>\$2,828,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$205,000
Electricity (\$0.09 kWh)					\$4,000
Treated Water (\$3 per 1,000 gallons)					\$357,000
Operation & Maintenance					\$32,000
<b>Total Annual Costs</b>					<b>\$598,000</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$1,638
Per 1,000 Gallons					\$5.03

**Table C-20**  
**Wise County Decatur - Parallel Pipeline to Bridgeport**

Owner: Decatur/Wise County WSD  
Amount: 3,631 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	24 in.	68,640	LF	\$135	\$9,266,000
Right of Way Easements (ROW)	20 ft.	32	Acre	\$10,000	\$315,000
Engineering and Contingencies (30%)					\$2,874,000
<b>Subtotal of Pipeline</b>					<b>\$12,455,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	300 HP	1	LS	\$1,340,000	\$1,340,000
Engineering and Contingencies (35%)					\$469,000
<b>Subtotal of Pump Station(s)</b>					<b>\$1,809,000</b>
<b>Permitting and Mitigation</b>					<b>\$127,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$14,391,000</b>
<b>Interest During Construction</b>					<b>\$600,000</b>
<b>TOTAL COST</b>					<b>\$14,991,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$1,089,000
Electricity (\$0.09 kWh)					\$65,000
Operation & Maintenance					\$151,000
<b>Total Annual Costs</b>					<b>\$1,305,000</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$359
Per 1,000 Gallons					\$1.10

**Table C-21**  
**Wise County New Fairview - Pipeline to Rhome**

Owner: New Fairview  
Amount: 476 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	10 in.	23,540	LF	\$40	\$942,000
Right of Way Easements (ROW)	20 ft.	11	Acre	\$10,000	\$108,000
Engineering and Contingencies (30%)					\$315,000
<b>Subtotal of Pipeline</b>					<b>\$1,365,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	15 HP	1	LS	\$513,000	\$513,000
Ground Storage Tank	0.1 MG	1	LS	\$170,000	\$170,000
Engineering and Contingencies (35%)					\$239,000
<b>Subtotal of Pump Station(s)</b>					<b>\$922,000</b>
<b>Permitting and Mitigation</b>					<b>\$20,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$2,307,000</b>
<b>Interest During Construction</b>					<b>\$96,000</b>
<b>TOTAL COST</b>					<b>\$2,403,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$175,000
Electricity (\$0.09 kWh)					\$2,000
Operation & Maintenance					\$31,000
<b>Total Annual Costs</b>					<b>\$208,000</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$437
Per 1,000 Gallons					\$1.34

**Table C-22**  
**Wise County Newark - Pipeline to Rhome**

Owner: Newark  
Amount: 695 Ac-Ft/Yr

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	10 in.	20,000	LF	\$40	\$800,000
Right of Way Easements (ROW)	20 ft.	9	Acre	\$10,000	\$92,000
Engineering and Contingencies (30%)					\$268,000
<b>Subtotal of Pipeline</b>					<b>\$1,160,000</b>
<b>Pump Station(s)</b>					
Booster Pump Station	35 HP	1	LS	\$570,000	\$570,000
Ground storage Tank	0.20 MG	1	LS	\$230,000	\$230,000
Engineering and Contingencies (35%)					\$280,000
<b>Subtotal of Pump Station(s)</b>					<b>\$1,080,000</b>
<b>Permitting and Mitigation</b>					<b>\$19,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$2,259,000</b>
<b>Interest During Construction</b>					<b>\$94,000</b>
<b>TOTAL COST</b>					<b>\$2,353,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$171,000
Electricity (\$0.09 kWh)					\$4,000
Operation & Maintenance					\$34,000
<b>Total Annual Costs</b>					<b>\$209,000</b>
<b>UNIT COSTS</b>					
Per Acre-Foot					\$301
Per 1,000 Gallons					\$0.92

**Table C-23**  
**Wise County Other - Cost of Overdrafting with Existing Wells until 2010**  
**Wise County, Trinity Aquifer**

Owner:	Wise County Other
Amount:	674 Acre-Feet per Year
Water Depth	131 ft
Well Depth	300 ft
Well Yield	840 gpm
Well Size	16 in
Yield per well	1,352 Acre-Feet per Year (peak)
Yield per well	676 Acre-Feet per Year (average)
Wells Needed	1

**ANNUAL COSTS**

Chlorination	219,624	1000 gal	\$0.12	\$26,400
Pumping Costs	170,000	kW-h	\$0.09	\$15,300
<b>Total Annual Cost</b>				<b>\$41,700</b>

**UNIT COSTS (First 30 Years)**

Cost per acre-foot	\$61.87
Cost per 1000 gallons	\$0.19

**APPENDIX D**

**ASSUMPTIONS FOR COST ESTIMATES**





## MEMORANDUM

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**TO:** File, NTD07286  
**FROM:** Simone Kiel, Rachel Ickert  
**SUBJECT:** Cost Estimating for SB1 Projects  
**DATE:** September 4, 2008

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### Introduction

1. The evaluation of water management strategies requires developing cost estimates. Guidance for cost estimates may be found in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)", Section 4.1.2. Costs are to be reported in second quarter 2007 dollars.
2. All cost estimates should be checked by construction services and discipline leaders in the appropriate areas, including Environmental Science.
3. We have developed standard unit costs for installed pipe, pump stations and standard treatment facilities developed from experience with similar projects throughout the State of Texas. These estimates are to be used for all SB1 projects, unless more detailed costing is available. All unit costs include the contractors' mobilization, overhead and profit. The unit costs **do not** include engineering, contingency, financial and legal services, costs for land and rights-of-way, permits, environmental and archeological studies, or mitigation.
4. The information presented in this memorandum is intended to be 'rule-of-thumb' guidance. Specific situations may call for alteration of the procedures and costs. Note that the costs in this memorandum provide a planning level estimate for comparison purposes.
5. It is important that when comparing alternatives that the cost estimates be similar and include similar items. If an existing reliable cost estimate is available for a project it should be used where appropriate. All cost estimates must meet the requirements set forth in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)".
6. The cost estimates have two components:
  - Initial capital costs, including engineering and construction costs, and
  - Average annual costs, including annual operation and maintenance costs and debt service.

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TWDB does not require the consultant to determine life cycle or present value analysis. In general, unless you are putting together a complex scenario with phased implementation or are planning on using State funding, annual costs are sufficient for comparison purposes and a life-cycle analysis is not required.

### ***ASSUMPTIONS FOR CAPITAL COSTS:***

#### **Conveyance Systems**

Standard pipeline costs used for these cost estimates are shown in Table 1. Pump station costs are based on required Horsepower capacity and are listed in Table 2. The power capacity is to be determined from the hydraulic analyses conducted from a planning level hydraulic grade line evaluation (or detailed analysis if available). Pipelines and pump stations are to be sized for peak pumping capacity.

- Pump efficiency is assumed to be 75 percent.
- Peaking factor of 2 times the average demand for strategies when the water is pumped directly to a water treatment plant. (or historical peaking factor, if available)
- Peaking factor of 1.2 to 1.5 is to be used if there are additional water sources and/or the water is transported to a terminal storage facility.
- Ground storage is to be provided at each booster pump station along the transmission line.
- Ground storage tanks should provide sufficient storage for 2.5 to 4 hours of pumping at peak capacity. Costs for ground storage are shown in Table 3. Covered storage tanks are used for all strategies transporting treated water.
- Costs for elevated storage tanks are shown in Table 3A.

#### **Water Treatment Plants**

Water treatment plants are to be sized for peak day capacity (assume peaking factor of 2 if no specific data is available). Costs estimated for new conventional surface water treatment facilities and expansions of existing facilities are listed in Table 4. Conventional treatment does not include advanced technologies, such as ozone or UV treatment. **All treatment plants are to be sized for finished water capacity.**

- For reverse osmosis plants for surface water, increase construction costs shown on Table 4 by the amount shown on Table 5 for the appropriate size plant that will be used for RO. If groundwater is the raw water source, use only the costs in Table 5. These costs were based on actual cost estimates of similar facilities.
- The amount of reject water generated by reverse osmosis treatment is dependent upon the incoming quality of the raw water. Final treatment goals should be between 600 and 800 mg/l of TDS. (This provides a safety margin in meeting

secondary treatment standards.) For reverse osmosis treatment of brackish water (1,000 – 3,000 mg/l of TDS), assume that 20 percent of the raw water treated with membranes is discharged as reject water, unless project-specific data is available. For brackish water with TDS concentrations between 3,000 and 10,000 mg/l, assume 30% reject water. Desalination of seawater or very high TDS water will have a higher percent of reject water (50 to 60%). Minimal losses are assumed for conventional treatment facilities.

- Costs for ion exchange facilities are shown on Table 6. For these facilities it is assumed that 2 to 3 percent of the raw water would be discharged as reject water.

### **New Groundwater Wells**

The per-linear-foot costs for new water wells shown in Table 7 are based on a price per square foot of casing material. The costs for public water supply and industrial wells were developed using \$130 to \$150 per square foot of casing material. It is assumed that the cost of irrigation wells is approximately 60% of the cost for municipal and industrial wells. Well depth will be estimated by county and aquifer.

For expansion of existing well fields for municipal water providers, an additional \$150,000 per well for connection to the existing distribution system is assumed. Connection costs and conveyance systems for new well fields will be determined on a case-by-case basis.

### **New Reservoirs**

Site-specific cost estimates will be made for reservoir sites. The elements required for reservoir sites are included in Table 8. Lake intake structures for new reservoirs will be determined on a case-by-case basis. Generally, costs for construction of such facilities prior to filling of the reservoir will be less than shown on Table 2.

### **Other Costs**

- Engineering, contingency, construction management, financial and legal costs are to be estimated at 30 percent of construction cost for pipelines and 35 percent of construction costs for pump stations, treatment facilities and reservoir projects. (Exhibit B)
- Permitting and mitigation for transmission and treatment projects are to be estimated at 1 percent of the total construction costs. For reservoirs, mitigation and permitting costs are assumed equal to twice the land purchase cost, unless site specific data is available.
- Right-of-way costs for transmission lines are estimated per acre of ROW using the unit costs in Table 9. If a small pipeline follows existing right-of-ways (such

as highways), no additional right-of-way cost is assumed. Large pipelines will require ROW costs regardless of routing.

- The costs for property acquisition for reservoirs are to be based on previous cost estimates, if available. A minimum of \$3,500 per acre is assumed if no site specific data is available.

Interest during construction is the total of interest accrued at the end of the construction period using a 6 percent annual interest rate on total borrowed funds, less a 4 percent rate of return on investment of unspent funds. This is calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction. These factors were used in cost estimating and are presented in Table 10.

#### ***ASSUMPTIONS FOR ANNUAL COSTS:***

Annual costs are to be estimated using the following assumptions:

- Debt service for all transmission and treatment facilities is to be annualized over 30 years, but not longer than the life of the project. Debt service for reservoirs is to be annualized over 30 years. [Note: uniform amortization periods should be used when evaluating similar projects for an entity.]
- Annual interest rate for debt service is 6 percent.
- Water purchase costs are to be based on wholesale rates reported by the selling entity when possible. In lieu of known rates, a typical regional cost for treated water and raw water will be developed.
- Operation and Maintenance costs are to be calculated based on the construction cost of the capital improvement. Engineering, permitting, etc. should not be included as a basis for this calculation. However, a 20% allowance for construction contingencies should be included for all O&M calculations. Per the “General Guidelines for Regional Water Plan Development (2007-2012)”, O&M should be calculated at:
  - 1 percent of the construction costs for pipelines
  - 1.5 percent for dams
  - 2.5 percent of the construction costs for pump stations, storage tanks, meters and SCADA systems
  - Assume O&M costs for treatment facilities are included in the treatment cost

- Surface water treatment costs are estimated at \$0.65 per 1,000 gallons for conventional plants and \$1.15 per 1,000 gallons of finished water for surface water plants with reverse osmosis. Assume cost for treatment of groundwater by reverse osmosis is \$0.60 per 1,000 gallons. If only a portion of the water will be treated with RO, apply costs proportionately. Treatment for nitrates is estimated at \$0.35 per 1,000 gallons. Treatment for groundwater (assuming chlorination only) is estimated at \$0.25 per 1,000 gallons. These costs include chemicals, labor and electricity and should be applied to amount of finished water receiving the treatment.
- Reject water disposal for treatment of brackish water is to be estimated on a case-by-case basis depending on disposal method. If no method is defined, assume a cost of \$0.30 per 1,000 gallons of reject water. [This value represents a moderate cost estimate. If the water were returned to a brackish surface water source, the costs would be negligible. If evaporation beds or deep well injection were used, the costs could be much higher.]
- Pumping costs are to be estimated using an electricity rate of \$0.09 per Kilowatt Hour. If local data is available, this can be used.

**Table 1**  
**Pipeline Costs (does not include ROW)**

<b>Diameter</b>	<b>Base Installed Cost</b>	<b>Rural Cost with Appurtenances</b>	<b>Urban Cost with Appurtenances</b>	<b>Assumed ROW Width</b>	<b>Assumed Temporary Easement Width</b>
(Inches)	(\$/Foot)	(\$/Foot)	(\$/Foot)	(Feet)	(Feet)
6	22	24	36	15	50
8	29	32	48	15	50
10	36	40	60	20	60
12	44	48	72	20	60
14	51	56	84	20	60
16	58	64	96	20	60
18	65	72	108	20	60
20	76	84	126	20	60
24	98	108	162	20	60
30	123	135	200	20	60
36	155	171	257	20	60
42	182	200	300	30	70
48	227	250	348	30	70
54	268	295	405	30	70
60	309	340	460	30	70
66	373	410	550	30	70
72	436	480	648	30	70
78	500	550	743	40	80
84	573	630	850	40	80
90	655	720	972	40	80
96	727	800	1,080	40	80
102	809	890	1,200	40	80
108	909	1,000	1,350	40	80
114	1,000	1,100	1,485	50	100
120	1,127	1,240	1,675	50	100
132	1,364	1,500	2,025	50	100
144	1,609	1,770	2,390	50	100

- Notes:
- a Costs are based on PVC class 150 pipe for the smaller long, rural pipelines.
  - b Appurtenances assumed to be 10% of installed pipe costs.
  - c For urban pipelines, costs were increased by 35% for cost with appurtenances. For pipes 42" and smaller, additional costs were added.
  - d Adjust costs for obstacles (rock, forested areas) and easy conditions (soft soil in flat country).

**Table 2**  
**Pump Station Costs for Transmission Systems**

	<b>Booster PS</b>	<b>Lake PS with Intake</b>
<b>Horsepower</b>	<b>Costs</b>	<b>Costs</b>
5	\$480,000	
10	\$500,000	
20	\$525,000	
25	\$550,000	
50	\$600,000	
100	\$690,000	
200	\$1,040,000	\$1,380,000
300	\$1,340,000	\$1,780,000
400	\$1,670,000	\$2,220,000
500	\$1,890,000	\$2,510,000
600	\$2,000,000	\$2,660,000
700	\$2,110,000	\$2,810,000
800	\$2,340,000	\$3,110,000
900	\$2,450,000	\$3,260,000
1,000	\$2,670,000	\$3,551,000
2,000	\$3,890,000	\$5,174,000
3,000	\$4,670,000	\$6,211,000
4,000	\$5,670,000	\$7,541,000
5,000	\$6,500,000	\$8,645,000
6,000	\$7,500,000	\$9,975,000
7,000	\$8,300,000	\$11,039,000
8,000	\$9,200,000	\$12,236,000
9,000	\$10,200,000	\$13,566,000
10,000	\$11,400,000	\$15,162,000
20,000	\$19,000,000	\$25,270,000
30,000	\$25,000,000	\$33,250,000
40,000	\$31,000,000	\$41,230,000
50,000	\$36,000,000	\$47,880,000
60,000	\$41,000,000	\$54,530,000
70,000	\$46,000,000	\$61,180,000

Note:

1. Lake PS with intake costs include intake and pump station.
2. Adjust pump station costs upward if the pump station is designed to move large quantities of water at a low head (i.e. low horsepower). See Rusty Gibson for appropriate factor.
3. Assumed multiple pump setup for all pump stations.

**Table 3**  
**Ground Storage Tanks**

<b>Size (MG)</b>	<b>With Roof</b>	<b>Without Roof</b>
0.05	\$116,000	\$99,000
0.1	\$170,000	\$145,000
0.5	\$407,000	\$310,000
1.0	\$590,000	\$436,000
1.5	\$740,000	\$550,000
2.0	\$890,000	\$664,000
2.5	\$1,010,000	\$764,000
3.0	\$1,130,000	\$863,000
3.5	\$1,260,000	\$952,000
4.0	\$1,400,000	\$1,040,000
5.0	\$1,600,000	\$1,212,000
6.0	\$1,930,000	\$1,400,000
7.0	\$2,275,000	\$1,619,000
8.0	\$2,625,000	\$1,925,000
10.0	\$3,485,000	\$2,560,000
14.0	\$5,205,000	\$3,800,000

Note: Costs assume steel tanks smaller than 1 MG, concrete tanks 1 MG and larger.

**Table 3A**  
**Elevated Storage Tanks**

<b>Size (MG)</b>	<b>Cost</b>
0.5	\$1,240,000
0.75	\$1,430,000
1.0	\$1,620,000
1.5	\$2,140,000
2.0	\$2,670,000
2.5	\$3,140,000



**Table 4**  
**Conventional Water Treatment Plant Costs**

<b>Plant Capacity (MGD)</b>	<b>New Conventional Plants</b>	<b>Conventional Plant Expansions</b>
1	\$5,400,000	\$2,700,000
3	\$9,900,000	\$6,900,000
7	\$16,300,000	\$12,000,000
10	\$20,800,000	\$14,900,000
15	\$27,100,000	\$19,400,000
20	\$32,900,000	\$24,300,000
30	\$44,300,000	\$33,200,000
40	\$55,800,000	\$42,300,000
50	\$67,500,000	\$50,600,000
60	\$79,000,000	\$59,100,000
70	\$89,900,000	\$67,200,000
80	\$100,400,000	\$75,700,000
90	\$110,200,000	\$84,200,000
100	\$121,100,000	\$93,200,000

Note: Plant is sized for finished peak day capacity.

**Table 5**  
**Additional Cost for Reverse Osmosis Treatment**

<b>Plant Capacity (MGD)</b>	<b>Reverse Osmosis Facilities Cost</b>
0.5	\$1,200,000
1	\$1,500,000
3	\$3,000,000
7	\$6,700,000
10	\$9,100,000
15	\$13,200,000
20	\$17,000,000
30	\$23,700,000
40	\$29,200,000
50	\$34,000,000
60	\$37,900,000

Note: Plant is sized for finished water capacity.

**Table 6**  
**Groundwater Nitrate Treatment**

<b>Treatment Capacity (MGD)</b>	<b>Ion Exchange Plant Cost</b>
0.25	\$700,000
1.0	\$1,600,000
3.0	\$3,600,000

Note: Plant is sized for finished water capacity.

**Table 7**  
**Cost Elements for Water Wells**

<b>Well Diameter (inches)</b>	<b>Typical Production Range (gpm)</b>	<b>Estimated Cost per LF a=1 for PWS/Industrial or 0.6 for Irrigation</b>
6	50-100	\$210a
8	100-250	\$280a
10	250-400	\$370a
12	400-500	\$470a
15	500-600	\$560a

**Table 8**  
**Cost Elements for Reservoir Sites**

<b>Capital Costs</b>	<b>Studies and Permitting</b>
Embankment	Environmental and archeological studies
Spillway	Permitting
Outlet works	Terrestrial mitigation tracts
Site work	Engineering and contingencies
Land	Construction management
Administrative facilities	
Supplemental pumping facilities	
Flood protection	

**Table 9**  
**Pipeline Easement Costs**

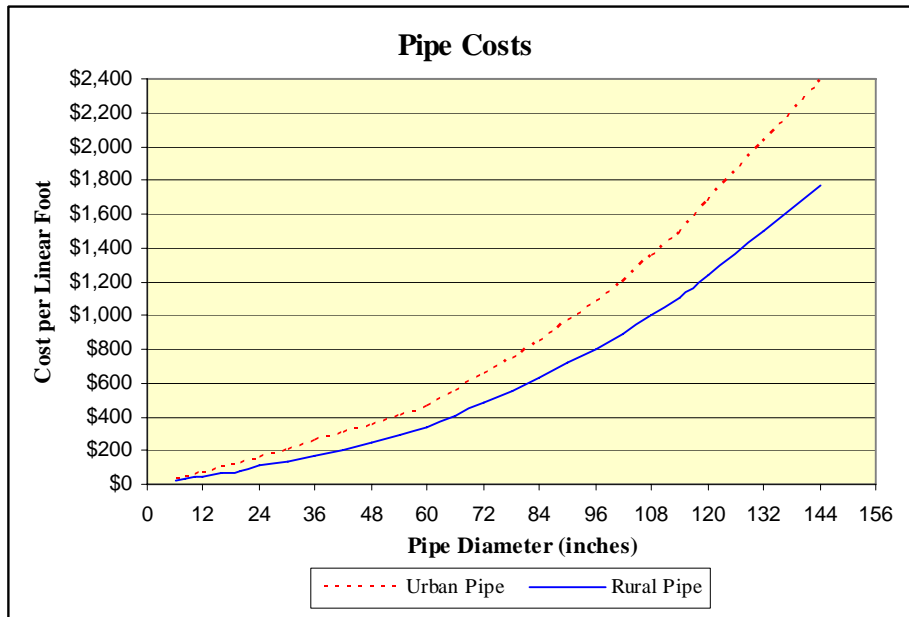
Description of Land	Cost per Acre
Rural County	\$ 10,000
Suburban County	\$ 25,000
Urban County	\$ 60,000
Highly Urbanized Area	Evaluate on a case-by-case basis

Note: Suburban County is defined as a county immediately bordering the Dallas/Fort Worth Metroplex.

**Table 10**  
**Factors for Interest During Construction**

Construction Period	Factor
6 months	0.02167
12 months	0.04167
18 months	0.06167
24 months	0.08167
36 month construction	0.12167

**Figure 1**



**APPENDIX E**

**COST ESTIMATES FOR ALTERNATIVE STRATEGIES**

## **APPENDIX E**

### **COST ESTIMATES FOR ALTERNATIVE STRATEGIES**

Appendix E includes detailed cost estimates for alternative water management strategies. The cost estimating assumptions are summarized in the memorandum in Appendix D.

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Table E-1	Cost Estimates for New Water Treatment Plant
Table E-2	Water Treatment Plant Expansions
Table E-3	Walnut Creek SUD Intake and Pipeline from Eagle Mountain Lake to New WTP
Table E-4	Walnut Creek SUD Pipeline from Eagle Mountain Lake to Boyd and Rhome

**Table E-1  
 Cost Estimates for New Water Treatment Plants**

Water User Group	Water Management Strategy	County	Construction Time (Months)	Capital Costs (including engineering, contingencies & interest)		
				2010	2020	2030
Walnut Creek SUD	New WTP of 2 MGD	Parker	18	\$10,964,000		

**Table E-2  
Water Treatment Plant Expansions**

Water User Group	Water Management Strategy	County	Construction Time (Months)	Capital Costs (including engineering, contingencies & interest)		
				2010	2020	2030
Walnut Creek SUD	New WTP expansion of 2 MGD (4 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (6 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (8 MGD total)	Parker	18		\$6,880,000	
Walnut Creek SUD	New WTP expansion of 2 MGD (10 MGD total)	Parker	18			\$6,880,000
Walnut Creek SUD	New WTP expansion of 2 MGD (12 MGD total)	Parker	18			\$6,880,000

**Table E-3**  
**Walnut Creek SUD Intake and Pipeline from Eagle Mountain Lake to New WTP**

Owner: Walnut Creek SUD  
Amount: 6,700 Ac-Ft/Yr (When new WTP is built-out at 12 MGD)

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	24 in.	5,000	LF	\$108	\$540,000
Right of Way Easements (ROW)	20 ft.	2	Acre	\$25,000	\$57,000
Engineering and Contingencies (30%)					\$179,000
<b>Subtotal of Pipeline</b>					<b>\$776,000</b>
<b>Pump Station(s)</b>					
Intake Pump Station	230 HP	1	LS	\$1,500,000	\$1,500,000
Engineering and Contingencies (35%)					\$525,000
<b>Subtotal of Pump Station(s)</b>					<b>\$2,025,000</b>
<b>Permitting and Mitigation</b>					<b>\$24,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$2,825,000</b>
<b>Interest During Construction</b>			<b>(12 months)</b>		<b>\$118,000</b>
<b>TOTAL COST</b>					<b>\$2,943,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$214,000
Electricity (\$0.09 kWh)					\$57,000
Operation & Maintenance					\$51,000
<b>Total Annual Costs</b>					<b>\$322,000</b>
<b>UNIT COSTS (Pre-Amort.)</b>					
Per Acre-Foot					\$48
Per 1,000 Gallons					\$0.15
<b>UNIT COSTS (Post-Amort.)</b>					
Per Acre-Foot					\$16
Per 1,000 Gallons					\$0.05



**Table E-4**  
**Walnut Creek SUD Pipeline from Eagle Mountain Lake to Boyd and Rhome**

Owner: Walnut Creek SUD  
Amount: 6,700 Ac-Ft/Yr (When new WTP is built-out at 12 MGD)

<b>CAPITAL COSTS</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>Pipeline</b>					
Pipeline	24 in.	53,000	LF	\$108	\$5,724,000
Right of Way Easements (ROW)	20 ft.	24	Acre	\$25,000	\$608,000
Engineering and Contingencies (30%)					\$1,900,000
<b>Subtotal of Pipeline</b>					<b>\$8,232,000</b>
<b>Permitting and Mitigation</b>					<b>\$69,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$8,301,000</b>
<b>Interest During Construction</b>			<b>(12 months)</b>		<b>\$346,000</b>
<b>TOTAL COST</b>					<b>\$8,647,000</b>
<b>ANNUAL COSTS</b>					
Debt Service (6% for 30 years)					\$628,000
Electricity (\$0.09 kWh)					\$115,000
Operation & Maintenance					\$69,000
<b>Total Annual Costs</b>					<b>\$812,000</b>
<b>UNIT COSTS (Pre-Amort.)</b>					
Per Acre-Foot					\$121
Per 1,000 Gallons					\$0.37
<b>UNIT COSTS (Post-Amort.)</b>					
Per Acre-Foot					\$27
Per 1,000 Gallons					\$0.08

**APPENDIX F**

**PUBLIC MEETING**



## MEMORANDUM

**TO:** Region C Water Planning Group

**FROM:** Stephanie W. Griffin, P.E.  
Rachel A. Ickert, P.E.

**SUBJECT:** Summary of Meeting to Discuss Parker-Wise County Study Draft Report

**DATE:** September 4, 2008

### Overview

The consultant team for the Region C Water Planning Group hosted a meeting to discuss the proposed recommendations in the Parker-Wise County Study draft report. The meeting was held on Thursday, August 28, 2008 at 2:00 PM in the conference room of the Springtown Fire Hall located at 215 Goshen Rd., Springtown, TX 76082. A letter invitation was sent to all water user groups and wholesale water providers in the study area two weeks prior to the meeting. A copy of the letter is included in Attachment A.

### Meeting Attendees

Name	Affiliation
Earl Smith	City of Decatur
Paul Phillips	Region C Board of Directors
Frank Knittel	Mayor of City of Alvord
Earnest DeByns	City of Alvord
Laura Blaylock	Tarrant Regional Water District
Jerry Holsomback	Walnut Creek SUD
Lance Petty	City of Willow Park
Marvin Glasgow	Mayor of City of Willow Park
Candy Scott	City of Willow Park
Melvin Webb	City of Springtown
Tina Ptak	Tarrant Regional Water District
Wayne Owen	Tarrant Regional Water District
John Minahan	Alan Plummer Associates, Inc.
Stephanie Griffin	Freese and Nichols, Inc.
Rachel Ickert	Freese and Nichols, Inc.

### **Discussion Prior to the Meeting**

Prior to the meeting, Mayor Frank Knittel asked how the Region C Water Planning Group is related to the Upper Trinity Groundwater Conservation District (UTGCD). Stephanie Griffin stated that the UTGCD is not affiliated with the Region C Water Planning Group. She stated that the district was established based on the TCEQ's report on Priority Groundwater Management Areas. However, the Planning Group will consider any rules and regulations established by the UTGCD when preparing the Region C Water Plan. Ms. Griffin provided Mayor Knittel with the TCEQ groundwater website information after the meeting.

### **Presentation and Meeting Discussion**

Stephanie Griffin presented the summary of the Parker-Wise County Study draft report. The presentation is included in Attachment B.

Ms. Griffin elaborated on the reasons for the study. The population projections for the *2006 Region C Water Plan* were prepared in 2002. The North Central Texas Council of Governments (NCTCOG) then updated their population projections, which were higher in Parker and Wise Counties than the Region C projections.

It was noted that Willow Park should be listed under "Water User Groups with Increased Population Projections" rather than under "Water User Groups with Decreased Population Projections", as shown in the presentation. Willow Park's increased demand projections were shown correctly in the draft report.

Ms. Griffin stated that the values for water supply in the Trinity Aquifer were based on the Trinity Groundwater Availability Model (Trinity GAM). A provision for temporarily overdrafting the aquifer was included only for entities planning to begin using surface water that may not be able to do so before 2010.

Jerry Holsomback (Walnut Creek SUD) said that the 6 MGD water treatment plant expansion shown for 2010 was just completed. He noted that they have started a study for the new 12 MGD water treatment plant, which will most likely be completed in 2 MGD increments.

Mayor Marvin Glasgow of Willow Park stated that their future water management strategies have changed. He did not want to discuss with the entire group but did discuss with Stephanie Griffin after the meeting. He said that instead of purchasing treated water from the City of Weatherford, they intend to purchase treated water from the City of Fort Worth. Mayor Glasgow indicated that Willow Park has had informal discussions with the City of Fort Worth. Ms. Griffin said that she needed to discuss the concept with Frank Crumb to verify that Fort Worth is agreeable to the strategy before it can be recommended in this report or included in the next *Region C Water Plan*.

Wayne Owen (TRWD) stated that the current Weatherford/Parker County Special Utility District (PCSUD) exercise is at a crossroads. PCSUD has a new agreement to purchase water from the Brazos River Authority. PCSUD has a contact with TRWD to purchase 1 MGD raw water. PCSUD is looking to market this TRWD water. TRWD wants this water to stay in Parker County. Treatment and distribution was not ever agreed upon with the City of Weatherford. TRWD wants to

MEMORANDUM TO REGION C WATER PLANNING GROUP Summary of Meeting to  
Discuss Parker-Wise County Study Draft Report  
August 28, 2008  
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contract the water based on real need, not speculation.

Mr. Owen asked if the intake structure at Lake Bridgeport was included in this report, and if not, should it be? The intake structure would be a joint project between Bridgeport, West Wise SUD, Decatur, and Suez Power. This was discussed in more detail after the meeting, and all agreed that it should not be included in this report, but it may be included in the 2011 Plan.

Jerry Holsomback (Walnut Creek SUD) asked what the group knew about Weatherford's agreement to sell treated wastewater effluent to Fountain Quail. He mentioned that he has been getting phone calls from concerned residents who say Fountain Quail has contacted them about obtaining pipeline right-of-way, claiming they have eminent domain. There was some general discussion, but no one was able to provide Mr. Holsomback much more information. Wayne Owen said that TRWD will help with communication in this area if necessary. Melvin Webb (Springtown) said the gas industry has also asked Springtown if they can purchase their wastewater effluent. At this time, Springtown does not plan to sell their effluent to the gas industry.

The meeting concluded at 3:30 PM.

**ATTACHMENT A**  
**SAMPLE LETTER INVITING WATER USER GROUPS AND WHOLESALE WATER  
PROVIDERS TO COUTY-WIDE MEETINGS**

# REGION C WATER PLANNING GROUP

Senate Bill One Third Round of Regional Water Planning - Texas Water Development Board

## Board Members

James M. Parks, Chair  
Jody Puckett, Vice-Chair  
Russell Laughlin, Secretary  
Steve Berry  
Jerry W. Chapman  
Frank Crumb  
Jerry Johnson  
Bill Lewis  
G. K. Maenius  
Howard Martin  
Jim McCarter  
Dr. Paul Phillips  
Irvin M. Rice  
Robert O. Scott  
Connie Standridge  
Jack Stevens  
Danny Vance  
Mary E. Vogelson  
Tom Woodward

<Title><First Name><Last Name>

<Job Title>

<Address 1>

<Address 2>

<City><State><Zip>

<Title><First Name><Last Name>

August 12, 2008

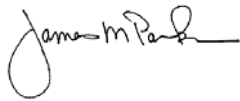
Dear <First Name><Last Name>:

The Region C Water Planning Group has completed its draft report summarizing the Parker-Wise County Study. The consultant team for the Region C Water Planning Group is hosting a meeting to discuss the proposed recommendations in the draft report. This meeting is scheduled for Thursday, August 28, 2008 at 2:00 PM in the conference room of the Springtown Fire Hall located at 215 Goshen Rd., Springtown, TX 76082.

The Region C Water Planning Group appreciates your participation in this meeting. We invite you (or a representative from your staff) to participate in this meeting. The information you provide at this meeting will help the Planning Group finalize this report.

If you have any questions about this meeting or the Region C Water Planning effort, please contact Stephanie Griffin of Freese and Nichols, Inc. at (817)735-7353 or by email at [swg@freese.com](mailto:swg@freese.com). If you cannot attend the meeting but would like to provide input, please contact Stephanie before August 28, 2008. The Region C Water Planning Group appreciates your participation in the planning effort.

Sincerely,



James (Jim) M. Parks  
Chair, Region C Water Planning Group

Cc: Russell Laughlin, Secretary  
Angela Masloff, Texas Water Development Board

c/o NTMWD  
505 E. Brown Street  
P. O. Box 2408  
Wylie, Texas 75098-2408  
972/442-5405  
972/442-5405/Fax  
jparks@ntmwd.com  
www.regioncwater.org

**Contact List for Parker-Wise County Study**

<b>WUG/Name of Political Subdivision</b>	<b>Title</b>	<b>First Name</b>	<b>Last Name</b>		<b>Job Title</b>	<b>County</b>	<b>Address1</b>	<b>Address2</b>	<b>City</b>	<b>State</b>	<b>Postal Code</b>
City of Aledo	Mr.	Ken	Pfeifer		City Administrator	Parker	P.O. Box 1	200 Old Annetta Rd.	Aledo	TX	76008
City of Hudson Oaks	Mr.	Robert	Hanna		Public Works Manager	Parker	150 North Oakridge Drive		Hudson Oaks	TX	76087
City of Mineral Wells	Mr.	Lance	Howerton		City Manager	Palo Pinto, Parker	115 S.W. 1st Street	P.O. Box 460	Mineral Wells	TX	76068
City of Reno		Craig	Bennet			Parker	195 West Reno Road		Azle	TX	76020
City of Springtown	Mr.	Melvin	Webb			Parker	P.O. Box 444	102 E. Second ST.	Springtown	TX	76082
City of Willow Park	Mr.	Claude	Arnold		City Manager	Parker	101 Stagecoach Trail		Willow Park	TX	76087
Town of Annetta	Mayor	Olan	Usher		Mayor	Parker	P.O. Box 1150		Aledo	TX	76008
Town of Annetta South	Mayor	Gerhard	Kleinschmidt			Parker	511 McFarland Ranch Road	PO Box 61	Aledo	TX	76008
Palo Pinto County MWD #1	Mr.	John P.	Ritchie				P.O. Box 98		Mineral Wells	TX	76068
Walnut Creek SUD	Mr.	Jerry	Holsomback			Parker/ Wise	P.O. Box 657	1155 West 199	Springtown	TX	76082
City of Weatherford	Mr.	J. Kraig	Kahler		Director of Utilities	Parker	P.O. Box 255	303 Palo Pinto Street	Weatherford	TX	76086
Parker County UD #1	Mr.	Ron	Moore		Board Member		P.O. Box 1724		Springtown	TX	76082
Azle	Mr.	Rick	White		Utilities	Parker	613 Southwest Parkway		Azle	TX	76020
City of Alvord	Mr.	Ricky	Tow		City Administrator	Wise	113 Wickham	P.O.Box 63	Alvord	TX	76225
City of Aurora	Ms.	Toni	Richardson		City Secretary	Wise	P.O. Box 558	303 Derting Rd.	Aurora	TX	76078
City of Boyd	Mr.	Jim	Hamilton		City Manager	Wise	P.O. Box 216	100 E Rock Island Ave.	Boyd	TX	76023
City of Bridgeport	Mr.	David	Turnbow		Director of Public Works	Wise	901 Cates		Bridgeport	TX	76426
City of Chico	Mr.	Edward L.	Cowley		Director of Public Works	Wise	113 West Decatur Street	P.O. Box 37	Chico	TX	76431
City of Decatur	Mr.	Earl	Smith		Director of Public Works	Wise	P.O. Box 1299	1601 S. State St.	Decatur	TX	76234
City of New Fairview	Mayor	Jim	Miller			Wise	999 Illinois Lane		New Fairview	TX	76078
City of Newark	Mr.	Chris	Cromer		Director of Public Works	Wise	P.O. Box 156		Newark	TX	76071
City of Rhome	Mr.	Preston	Gilliam		Director of Public Works	Wise	105 West First Street	P.O. Box 228	Rhome	TX	76078
City of Runaway Bay		Mike	Jump			Wise	101 Runaway Bay Drive		Runaway Bay	TX	76426
West Wise SUD	Mr.	James	Ward			Wise	P.O. Box 566		Bridgeport	TX	76426-0566
Wise County SUD	Mr.	Brett	Shannon		Board Vice President	Wise	201 E Walnut St.		Decatur	TX	76234
Bolivar WSC	Ms.	Polly	Kruger			Cooke/ Denton/ Wise		P. O. Box 1789	Sanger	TX	76266
Community WSC	Ms.	Doris	Hollyfield			Tarrant/ Wise	12190 Liberty School Rd		Azle	TX	76020



**ATTACHMENT B**  
**MEETING PRESENTATION**



## Parker-Wise County Study

Region C Water Planning Group

August 28, 2008  
Freese and Nichols, Inc.

## Parker-Wise County Study Agenda

- Background Information
- Population and Demand Projections
- Summary by Water User Group
- Summary by Wholesale Water Provider
- Input from Water Providers
- Public Comments

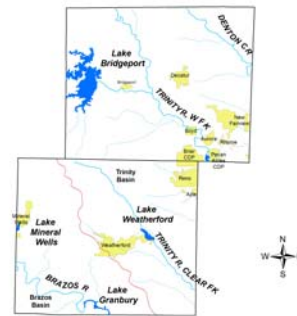


## Parker-Wise County Study Overview

- Study Period – 2010 to 2030
- Study Area – Parker County and Wise County
- Reasons for the Study
  - NCTCOG population projections for Parker and Wise Counties were much higher than projections in the 2006 Region C Water Plan
  - Changes in preferred water management strategies



## Parker-Wise County Study Area



## Parker-Wise County Study Basic Steps Taken for the Study

- Met with or Surveyed Water User Groups (WUGs) in the Study Area
- Reviewed Recent Population and Water Use Data
- Developed Population Projections, Per Capita Water Use, and Demand Values
- Revised Water Management Strategies to Meet Projected Demands
- Updated Cost Estimates for Water Management Strategies



## Parker-Wise County Study Draft Report

- Water User Groups with Increased Population Projections
  - Aledo
  - Alvord
  - Aurora
  - Boyd
  - Decatur
  - Walnut Creek SUD
  - Weatherford
  - West Wise SUD (2020 & 2030 Projections)
  - Willow Park



## Parker-Wise County Study Draft Report

- Water User Groups with Decreased Population Projections
  - Hudson Oaks
  - Rhome
  - Runaway Bay



## Parker-Wise County Study Draft Report

- Water User Groups with No Change to Population Projections
  - Annetta
  - Annetta South
  - Azle
  - Bolivar WSC
  - Bridgeport
  - Chico
  - Community WSC
  - Mineral Wells
  - New Fairview
  - Newark
  - Parker County-Other
  - Reno
  - Springtown
  - Wise County Other

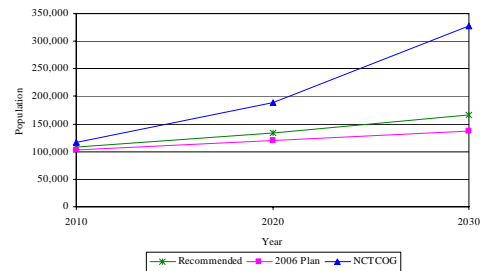


## Parker-Wise County Study Draft Report

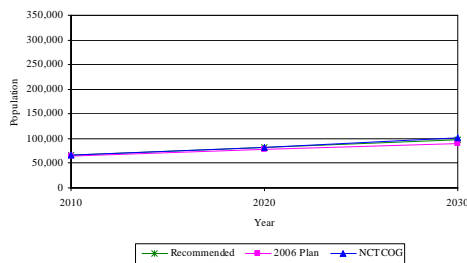
- Population Projections Summary
  - Population and demand growing faster than projected in 2006 Region C Plan
  - County total population growing slower than projected by NCTCOG



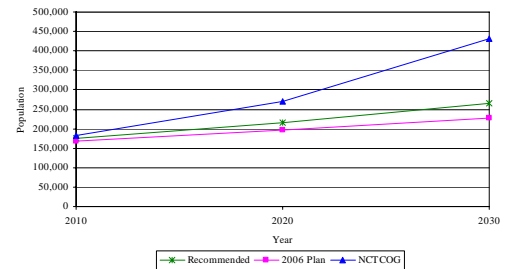
## Parker County Population Projections



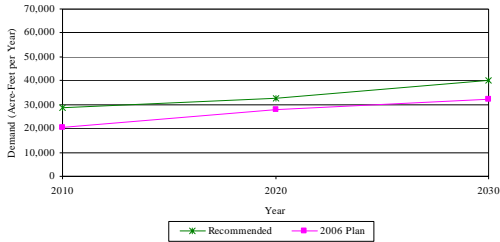
## Wise County Population Projections



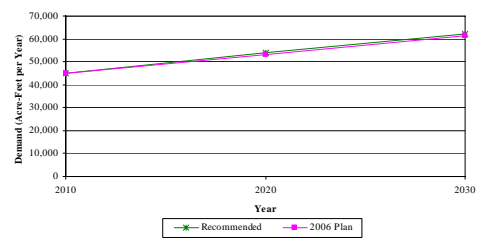
## Population Projections for Study Area



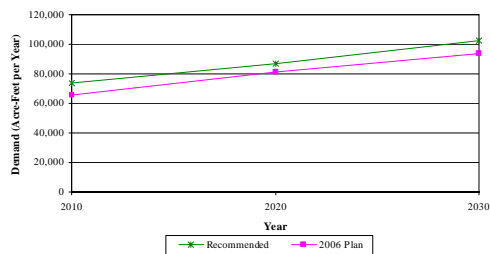
## Parker County Total Demand Projections



## Wise County Total Demand Projections



## Demand Projections for Study Area



## Parker-Wise County Study

Summary by Water User Group

## Summary by Water User Group

- Aledo
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Fort Worth
    - Temporary Overdraft
- Alvord
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from West Wise SUD
    - Temporary Overdraft



## Summary by Water User Group

- Annetta and Annetta South
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Weatherford
    - Temporary Overdraft



## Summary by Water User Group

- Aurora
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources through Rhome
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Rhome (Walnut Creek SUD)
- Azle
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 3 MGD Water Treatment Plant Expansion (2030)



## Summary by Water User Group

- Bolivar WSC
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Temporary Overdraft
    - Cooke County Water Supply Project (Outside Study Area)
    - Purchase Water from UTRWD (Outside Study Area)
    - Additional Groundwater (Outside Study Area)
- Boyd
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources (through Walnut Creek SUD)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Walnut Creek SUD



## Summary by Water User Group

- Bridgeport
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 0.9 MGD Water Treatment Plant Expansion (2010)
    - New 2 MGD Water Treatment Plant (2020)
- Chico
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources (through West Wise SUD)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from West Wise SUD



## Summary by Water User Group

- Community WSC
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 0.5 MGD Water Treatment Plant Expansion (2020)
- Decatur (Wise County SUD)
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 1 MGD Water Treatment Plant Expansion (2010)
    - New 2 MGD Water Treatment Plant (2020)
    - 2 MGD New Water Treatment Plant Expansion (2030)



## Summary by Water User Group

- Hudson Oaks
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources (through Weatherford)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Weatherford
    - Temporary Overdraft



## Summary by Water User Group

- Mineral Wells
  - Current Sources
    - Lake Mineral Wells
    - Lake Palo Pinto
  - Recommended Strategies
    - Water Conservation
- New Fairview
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Rhome (Walnut Creek SUD)



## Summary by Water User Group

- Newark
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Walnut Creek SUD
- Reno
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources (Springtown & Walnut Creek SUD)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Springtown
    - Purchase Water from Walnut Creek SUD



## Summary by Water User Group

- Rhome
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources (Walnut Creek SUD)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Walnut Creek SUD
- Runaway Bay
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 0.5 MGD Water Treatment Plant Expansion (2030)



## Summary by Water User Group

- Springtown
  - Current Sources
    - Trinity Aquifer
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
- Walnut Creek SUD
  - Current Sources
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 6 MGD Water Treatment Plant Expansion (2010)
    - New 12 MGD Water Treatment Plant (2010)



## Summary by Water User Group

- Weatherford
  - Current Sources
    - Lake Weatherford
    - Trinity Aquifer
    - TRWD Sources
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - 4 MGD Water Treatment Plant Expansion (2020)
    - New 8 MGD Water Treatment Plant (2030)



## Summary by Water User Group

- West Wise SUD
  - Current Sources
    - TRWD Sources (Direct & through Walnut Creek SUD)
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from TRWD
    - Purchase Water from Walnut Creek SUD
    - New 0.5 MGD Water Treatment Plant (2030)
- Willow Park
  - Current Sources
    - Trinity Aquifer
  - Recommended Strategies
    - Water Conservation
    - Purchase Water from Weatherford
    - Temporary Overdraft



## Parker-Wise County Study

Summary by Wholesale Water Provider

## TRWD Current Customers

- Azle
- Bridgeport
- Community WSC
- Decatur (Wise County SUD)
- Runaway Bay
- Springtown
  - Reno



## TRWD Current Customers

- Walnut Creek SUD
  - Boyd
  - Reno
  - Rhome
    - Aurora
  - County Other
  - West Wise SUD and Chico



## TRWD Current Customers

- Weatherford
  - Hudson Oaks
- West Wise SUD
  - Chico
- Wise County Other

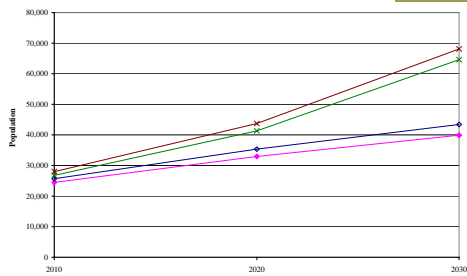


## Potential New TRWD Customers

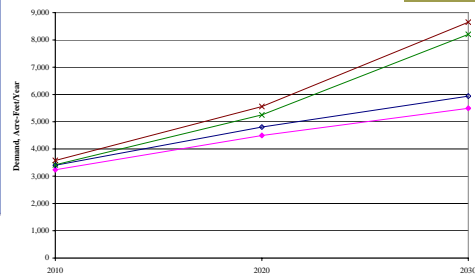
- Aledo (through Fort Worth)
- Alvord (direct or through West Wise SUD)
- Annetta (through Weatherford)
- Annetta South (through Weatherford)
- Newark (through Walnut Creek SUD)
- New Fairview (through Rhome/Walnut Creek SUD)
- Willow Park (through Weatherford)



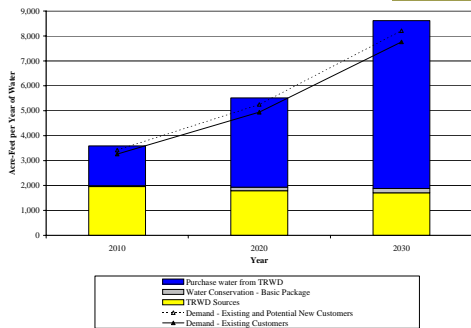
## Population Projections for Walnut Creek SUD



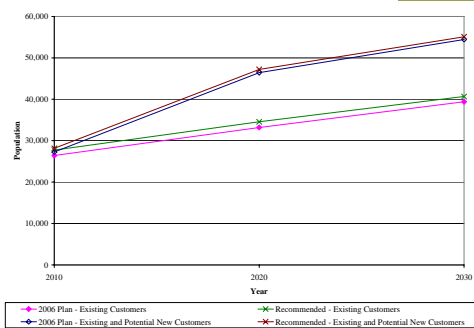
## Demand Projections for Walnut Creek SUD



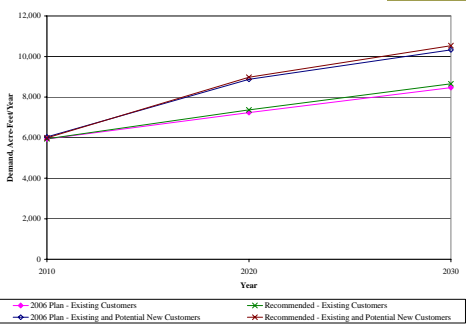
## Demands and Supplies for Walnut Creek SUD



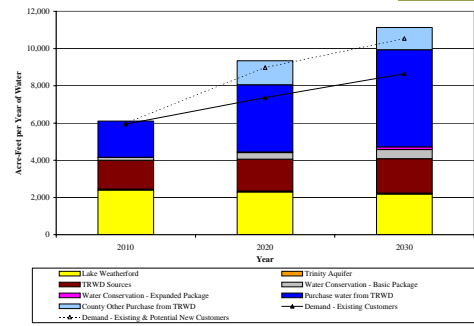
## Population Projections for the City of Weatherford and Customers



## Demand Projections for the City of Weatherford and Customers



## Demands and Supplies for City of Weatherford and Customers



## Parker-Wise County Study Projected Costs

- Supplemental Wells
  - \$35,400,000
- New Water Treatment Plants
  - \$86,900,000
- Water Treatment Plant Expansions
  - \$56,900,000

## Parker-Wise County Study Projected Costs

- Water Transmission Facilities (Capital Costs)
  - Walnut Creek Parallel Pipeline to Boyd and Rhome ■ \$28,400,000
  - East Parker County System - Pipeline from Weatherford to Annetta, Annetta South, and Willow Park ■ \$13,700,000
  - Decatur Parallel Pipeline to Bridgeport ■ \$15,000,000
  - Other Projects ■ \$18,200,000
- Total Capital Costs for Transmission Facilities ■ \$75,300,000



## Parker-Wise County Study Projected Costs

- Total Capital Costs for Study Area
  - \$254,500,000



## Parker-Wise County Study

- Discussion
  - Are the current supplies correct?
  - Do you agree with the proposed Water Management Strategies?



## Public Comments

- Please complete a speaker card before speaking.
- Time allowed is 3 minutes per person.



## Parker-Wise County Study

- Closing Thoughts
  - Please provide comments by noon Thursday, September 4<sup>th</sup>

### Contact Information:

Stephanie Griffin, P.E.  
(817) 735-7353  
swg@freese.com



**APPENDIX G**

**TWDB COMMENTS AND RESPONSE TO COMMENTS**



# TEXAS WATER DEVELOPMENT BOARD



James E. Herring, *Chairman*  
Lewis H. McMahan, *Member*  
Edward G. Vaughan, *Member*

J. Kevin Ward  
*Executive Administrator*

Jack Hunt, *Vice Chairman*  
Thomas Weir Labatt III, *Member*  
Joe M. Crutcher, *Member*

December 10, 2008

Mr. James M. Parks, P.E.  
Executive Director  
North Texas Municipal Water District  
P.O. Box 2406  
Wylie, Texas 75089

Re: Region-Specific Studies Contract for Regional Water Planning between the Texas Water Development Board (TWDB) and North Texas Municipal Water District, TWDB Contract No. 0704830688, Draft Final Study Report Comments for Region-Specific Studies – Study 4: Regional System Implementation Plans for Parker-Wise Counties and Other Counties.

Dear Mr. Parks:

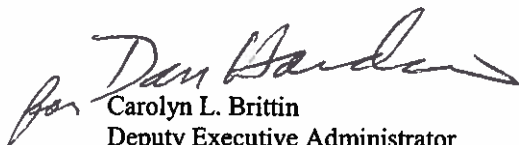
Staff members of TWDB have completed a review of the Draft Final Study Report under TWDB Contract No. 0704830688. As stated in the above-referenced contract, North Texas Municipal Water District will consider incorporating Draft Final Study Report comments, shown in Attachment 1, as well as other comments received, into the Final Study Report. In accordance with paragraph F, Article III, Section II of the contract, a copy of these TWDB Executive Administrator comments as well as a written summary of how the Draft Final Study Report was revised in response must be included in all the Final Study Report documents, for example, as an appendix.

TWDB looks forward to receiving one (1) electronic copy of all files, one electronic copy of each Final Study Report in Portable Document Format (PDF), and nine (9) bound double-sided copies of each Final Study Report sent to the TWDB Executive Administrator no later than the contract Final Study Report Deadline (April 30, 2009 for most reports). Please also transfer copies of all data and reports generated by the planning process and used in developing the Final Study Report to the TWDB Executive Administrator no later than the contract Final Study Report Deadline.

As a reminder, if any portion of the Final Study Report is to be included in a 2011 regional water plan it will be reviewed as part of the Initially Prepared Plan for meeting all statutory and agency rule requirements regarding the preparation of regional water plans.

If you have any questions concerning this contract, please contact Angela Masloff, TWDB's designated Contract Manager for this study at (512) 936-0872.

Sincerely,



Carolyn L. Brittin  
Deputy Executive Administrator  
Water Resources Planning and Information

Enclosures  
Attachment 1

c: Angela Masloff, TWDB

#### *Our Mission*

*To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas.*

P.O. Box 13231 • 1700 N. Congress Avenue • Austin, Texas 78711-3231  
Telephone (512) 463-7847 • Fax (512) 475-2053 • 1-800-RELAYTX (for the hearing impaired)  
www.twdb.state.tx.us • info@twdb.state.tx.us

TNRIS - Texas Natural Resources Information System • www.tnr.is.state.tx.us  
A Member of the Texas Geographic Information Council (TGIC)



## ATTACHMENT 1

TWDB Contract No. 0704830688

### **Regional System Implementation Plans for Parker and Wise Counties Region C, Region-Specific Study Number 4**

#### ***TWDB Comments on Draft Final Study Report***

1. Scope of Work Study 4, Task 2, Section B states that the study will “Analyze alternative approaches to developing a Parker-Wise County Water Supply System, including estimates of capital and operating costs. Develop a recommended system, including phasing”. Although strategies were updated in the study and nearly all updates for municipal water users were to increase purchases from Tarrant Regional Water District, a specific “Parker-Wise County Water Supply System” was not included in the draft report. Additionally, no analysis of alternative approaches was made for a Parker-Wise County Water Supply System. Please include the results of developing a Parker-Wise County Water Supply System and the results of the analysis of the alternative approaches to developing the recommended system. Please also include the phasing of the system.
2. Scope of Work Study 4, Task 2, Section B states that the study will “include an analysis of the alternative of developing a raw pump station and treatment plant for Walnut Creek SUD on Eagle Mountain Lake.” Although the draft report states that Walnut Creek has begun a study on the water treatment plant, the report does not include any analysis of this alternative (developing a raw pump station and water treatment plant on Eagle Mountain Lake).
3. Scope of Work Study 4, Task 2, Section C of the scope of work (Exhibit C, Page 10) states that the study will “Develop a specific implementation plan for the Parker-Wise County Water Supply System.” The draft report does not include a specific implementation plan -- please specify the implementation plan for such a system.
4. Section 3.2, page 3, paragraph 1 – When discussing “municipal per capita water use,” please consider adding a footnote specifying that this is commonly referred to “GPCD”.
5. Section 3.2, page 3, paragraph 1 – “It is estimated that the actual population and demand values could be 15% higher or lower than the recommended values.” Please consider describing the basis for this statement.
6. Section 3.2 – The discussion for most cities with higher population projections often included a very brief discussion of the basis for these higher projections. Specific justification for population revisions to the regional water plan is not required until an actual revision request, however if the region water planning group would like informal feedback from TWDB staff on such projections, the more justification, the better. Please consider adding any additional justification provided by the cities or utilities.

7. Please include a list of the names of the utilities and cities who attended each of the meetings in the appendix of the report or as an alternative, if there was a meeting memo report written for each meeting, please include that in the appendix.

**TWDB Contract No. 0704830688**

**Regional System Implementation Plans for Other Counties  
Region C, Region-Specific Study Number 4**

***TWDB Comments on Draft Final Study Report***

No comments at this time.

# REGION C WATER PLANNING GROUP

Senate Bill One Third Round of Regional Water Planning - Texas Water Development Board

## Board Members

James M. Parks, Chair  
Jody Puckett, Vice-Chair  
Russell Laughlin, Secretary  
Steve Berry  
Bill Ceverha  
Jerry W. Chapman  
S. Frank Crumb  
Bill Lewis  
G. K. Maenius  
Howard Martin  
Jim McCarter  
Dr. Paul Phillips  
Gary Spicer  
Robert O. Scott  
Connie Standridge  
Jack Stevens  
Damy Vance  
Mary E. Vogelson  
Dr. Tom Woodward

April 8, 2009

Carolyn L. Brittin  
Deputy Executive Administrator  
Texas Water Development Board  
P.O. Box 13231  
Austin, TX 78711-3231

Dear Ms. Brittin:

The Region C Water Planning Group (RCWPG) has received the Texas Water Development Board comments on the Draft Water Supply Study for Parker and Wise Counties dated December 10, 2008. The RCWPG's responses to the seven points made in your letter are given in *italics* below:

1. Scope of Work Study 4, Task 2, Section B states that the study will "Analyze alternative approaches to developing a Parker-Wise Water Supply System, including estimates of capital and operating costs. Develop a recommended system, including phasing." Although strategies were updated in the study and nearly all updates for municipal water users were to increase purchases from Tarrant Regional Water District, a specific "Parker-Wise County Water Supply System" was not included in the draft report. Additionally, no analysis of alternative approaches was made for a Parker-Wise County Water Supply System. Please include the results of developing a Parker –Wise County Water Supply System and the results of the analysis of the alternate approaches to developing the recommended system. Please also include the phasing of the system.

*It is noted that a "Parker-Wise County Water Supply System" is not specifically discussed in the draft report. The "Parker-Wise County Water Supply System" consists of two significant subsystems: Walnut Creek Special Utility District and Weatherford. The Walnut Creek SUD system is described in Section 6.2 of the draft report. The Weatherford system is discussed in Section 6.1 of the draft report. Several other smaller, local providers also sell water to other entities within these counties and are described in Section 6 of the draft report. To address TWDB's comment, a paragraph was added to Section 6 of the report to clarify the nature of the water supply system.*

*Most of the water user groups and wholesale water providers in the study area indicated that their future water supply plans are in line with the 2006 Plan. Although few entities requested alternative strategies be included in the report, five potential alternatives were identified. A discussion of the alternative strategies has been added to Section 9 of the report. The Eagle Mountain Water Treatment Plant for Walnut Creek SUD has been added to Section 9 as an alternative to expansion of their current system. The other*

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*four alternative strategies are discussed in Section 9 but were not analyzed in great detail because they are either not recommended by the planning group or because there is not currently enough information to allow a detailed analysis.*

2. Scope of Work Study 4, Task 2, Section B states that the study will “include an analysis of the alternative of developing a raw water pump station and treatment plant for Walnut Creek SUD on Eagle Mountain Lake.” Although the draft report states that Walnut Creek has begun a study on the water treatment plant, the report does not include any analysis of this alternative (developing a raw water pump station and water treatment plant on Eagle Mountain Lake).

*A discussion of the potential Eagle Mountain Lake alternative for Walnut Creek SUD has been added to Section 9 of the report. A cost estimate for the required infrastructure has been added to Appendix E.*

3. Scope of Work Study 4, Task 2, Section C of the scope of work (Exhibit C, page 10) states that the study will “Develop a specific implementation plan for the Parker-Wise County Water Supply System.” The draft report does not include a specific implementation plan – please specify the implementation plan for such a system.

*The timing associated with the recommended strategies is discussed in the draft report. We have added an implementation section (Section 8), which includes a more specific implementation plan and a table with recommended strategies and their approximate in-service dates.*

4. Section 3.2, page 3, paragraph 1 – When discussing “municipal per capita water use,” please consider adding a footnote specifying that this is commonly referred to “GPCD”.

*A footnote has been added indicating that “municipal per capita water use” is commonly referred to as “gpcd”.*

5. Section 3.2, page 3, paragraph 1 – “It is estimated that the actual population and demand values could be 15% higher or lower than the recommended values.” Please consider describing the basis for this statement.

*The statement acknowledging that the projections may be higher or lower by as much 15 percent is based on our experience, which has shown that population projections are seldom exact. No changes were made to the report.*

6. Section 3.2 – The discussion for most cities with higher population projections often included a very brief discussion of the basis for these higher projections. Specific justification for population revisions to the regional water plan is not required until an actual revision request, however if the region water planning group would like informal feedback from TWDB staff on such projections, the more justification, the

better. Please consider adding any additional justification provided by the cities of utilities.

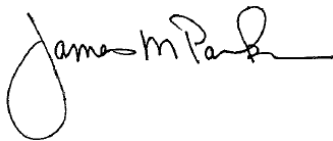
*Most of the population and demand projections that increased in this study are relatively small. In these cases, changes to population and demand projections will not be needed for the 2011 Region C Water Plan to allow the preferred water management strategies to be included in the plan. For those entities that are growing more significantly, additional information may be provided to the TWDB if changes to the projections are needed to include preferred water management strategies. No changes were made to this report based on this comment.*

7. Please include a list of the names of the utilities and cities who attended each of the meetings in the appendix of the report or as an alternative, if there was a meeting memo report written for each meeting, please include that in the appendix.

*Section 3.1 of the draft report mentions a public meeting that was held in a group-setting in Springtown on August 28, 2008. Appendix F has been added to the report with a copy of the meeting notes (including a list of participants), the meeting announcement, the mailing list, and the presentation.*

*Section 3.2 discusses meetings and telephone interviews with the larger water user groups and wholesale water providers in the study area. Table 3.1 has been added indicating the entities and persons with whom the consultants spoke.*

Sincerely,

A handwritten signature in black ink that reads "James M. Parks". The signature is written in a cursive style with a large, looped initial "J".

James M. Parks  
Chair, Region C Water Planning Group

Cc: Russell Laughlin, Region C Water Planning Group Secretary  
Angela Masloff, TWDB