

Section 4C

Water Supply Plans

The following sections present water supply plans to meet needs (shortages) for Water User Groups and Wholesale Water Providers in the Brazos G Regional Water Planning Area. Detailed explanations of major water management strategies are presented in Volume II, Section 4B. In the following sections:

- Capital costs represent second quarter 2002 prices.
- Unit and annual costs requiring new infrastructure (wells, reservoirs, etc.) are generally shown at full build-out and use of the facilities in the first year of implementation. This will often understate the unit costs (\$/acft) in the early years of a project. However, detailed cost estimates for phasing of projects from decade to decade are beyond the scope of this regional planning study.
- Unit costs for projects utilizing existing infrastructure (purchase of additional water, etc.) are generally held constant, with annual costs adjusted according to level of projected use.
- Unit costs for raw or treated water for interconnections between systems are assumed, with actual costs expected to be negotiated between entities.
- As explained in Volume II, Section 4B.2 Water Conservation, municipal conservation assumes a reduction in per capita water use of 21 gpcd beginning in year 2020 for municipal WUGs with needs and per capita water use exceeding a target of 140 gpcd. Municipalities are encouraged to utilize any BMPs to achieve the conservation goals, not just those used to develop costs. Non-municipal WUGs with needs are recommended by the Brazos G RWPG to reduce total water demand 3 percent by 2010, 5 percent by 2020, and 7 percent from 2030 to 2060 by using Best Management Practices (BMPs). Average costs for irrigation conservation BMPs were derived from the information in Volume II, Section 4B.2.2, but costs for other non-municipal conservation BMPs were not developed due to lack of available data and guidance. Several counties project large irrigation shortages which cannot be met through the recommended conservation targets. These irrigation shortages are typically too large to be met economically through new water supplies and remain as unmet needs in the plan.

- Each municipal water user group is identified with the county in which it is primarily located and the needs (shortages) are reported for all of the counties in which the WUG is located.

4C.1 Bell County Water Supply Plan

Table 4C.1-1 lists each water user group in Bell County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.1-1.
Bell County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
439 WSC	1,149	1,014	Projected surplus
Bell-Milam-Falls WSC	(261)	(514)	Projected shortage – see plan below
City of Belton	3,883	3,464	Projected surplus
Dog Ridge WSC	(205)	(311)	Projected shortage – see plan below
East Bell County WSC	133	92	Projected surplus
Elm Creek WSC	(479)	(631)	Projected shortage – see plan below
Fort Hood (CDP)	3,653	3,842	Projected surplus
City of Harker Heights	2,907	1,904	Projected surplus
City of Holland	141	147	Projected surplus
City of Killeen	3,961	(2,157)	Projected shortage – see plan below
City of Little River-Academy	(20)	(29)	Projected shortage – see plan below
Moffat WSC	145	145	Projected surplus
City of Morgan's Point Resort	(202)	(255)	Projected shortage – see plan below
City of Nolanville	410	398	Projected surplus
Pendleton WSC	0	0	No projected needs
City of Rogers	180	187	Projected surplus
Salado WSC	1,330	1,146	Projected surplus
City of Temple	12,221	6,624	Projected surplus
City of Troy	45	53	Projected surplus
West Bell County WSC	298	322	Projected surplus
County-Other	406	407	Projected surplus
Manufacturing	(1,163)	(1,446)	Projected shortage – see plan below
Steam-Electric	4,466	1,660	Projected surplus
Mining	2	2	Projected surplus
Irrigation	4,363	4,457	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-1 and C-2, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.1.1 439 WSC

439 WSC has a contract to purchase water from the Brazos River Authority from Lake Belton. 439 WSC contracts with Bell County WCID No. 1 to divert, treat, and deliver water from Lake Belton to the WSC. No shortages are projected for 439 WSC and no changes in water supply are recommended.

4C.1.2 Bell-Milam-Falls WSC

4C.1.2.1 Description of Supply

- Source: Surface Water – Contract with Central Texas WSC from Stillhouse Hollow Reservoir. Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 817 acft/yr
- System Description: Bell-Milam-Falls WSC purchases treated water from Central Texas WSC. The WSC also has wells that are used to supplement the purchased water.

4C.1.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Bell-Milam-Falls WSC:

- Increase contract with Central Texas WSC by 100 acft/yr by 2010, increasing by 600 acft/yr by 2060.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.2.3 Costs

Costs of the Recommended Plan for Bell-Milam-Falls WSC.

- a. Increase contract with Central Texas WSC:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$410,400 in 2060

The annual cost was calculated by multiplying the Bell-Milam-Falls WSC projected supply from this strategy by an estimated wholesale water rate of \$684/acft.

**Table 4C.1-2.
Recommended Plan Costs by Decade for Bell-Milam-Falls WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1)	(137)	(261)	(360)	(431)	(514)
Increase Contract with CTWSC						
Supply From Plan Element (acft/yr)	100	200	300	400	500	600
Annual Cost (\$/yr)	\$68,400	\$136,800	\$205,200	\$273,600	\$342,000	\$410,400
Unit Cost (\$/acft)	\$684	\$684	\$684	\$684	\$684	\$684

4C.1.3 City of Belton

The City of Belton has a contract to purchase water from the Brazos River Authority from Lake Belton. Belton contracts with Bell County WCID No. 1 to divert, treat, and deliver water from Lake Belton to the City. No shortages are projected for the City of Belton and no changes in water supply are recommended.

4C.1.4 Dog Ridge WSC

4C.1.4.1 Description of Supply

- Source: Surface Water – Contract with Central Texas WSC from Stillhouse Hollow Reservoir.
- Estimated Reliable Supply: 671 acft/yr
- System Description: Dog Ridge WSC purchases treated water from Central Texas WSC.

4C.1.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Dog Ridge WSC:

- Increase contract with Central Texas WSC by 100 acft/yr by 2010, increasing by 400 acft/yr by 2060.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.4.3 Costs

Costs of the Recommended Plan for Dog Ridge WSC:

- a. Increase contract with Central Texas WSC:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$273,600 in 2060

The annual cost was calculated by multiplying the Dog Ridge WSC projected supply from this strategy by an estimated wholesale water rate of \$684/acft.

**Table 4C.1-3.
Recommended Plan Costs by Decade for Dog Ridge WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(44)	(128)	(205)	(255)	(284)	(311)
Increase Contract with CTWSC						
Supply From Plan Element (acft/yr)	100	200	300	300	300	400
Annual Cost (\$/yr)	\$68,400	\$136,800	\$205,200	\$205,200	\$205,200	\$273,600
Unit Cost (\$/acft)	\$684	\$684	\$684	\$684	\$684	\$684

4C.1.5 East Bell County WSC

East Bell County WSC has a contract to purchase water from the Central Texas WSC from Stillhouse Hollow Reservoir. East Bell County WSC also has wells in the Trinity Aquifer. No shortages are projected for East Bell County WSC and no changes in water supply are recommended.

4C.1.6 Elm Creek WSC

4C.1.6.1 Description of Supply

- Source: Surface Water – Contract with Bluebonnet WSC from Lake Belton.
- Estimated Reliable Supply: 92 acft/yr
- System Description: Elm Creek WSC purchases treated water from Bluebonnet WSC and has wells located in the Trinity Aquifer.

4C.1.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Elm Creek WSC:

- Increase contract with Bluebonnet WSC by 400 acft/yr by 2010, increasing to 700 acft/yr by 2060.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.6.3 Costs

Costs of the Recommended Plan for Elm Creek WSC.

- Increase contract with Bluebonnet WSC:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$513,100 in 2060

The annual cost was calculated by multiplying the Dog Ridge WSC projected supply from this strategy by an estimated wholesale water rate of \$733/acft.

**Table 4C.1-4.
Recommended Plan Costs by Decade for Elm Creek WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(328)	(410)	(479)	(540)	(579)	(631)
Increase Contract with CTWSC						
Supply From Plan Element (acft/yr)	400	500	500	600	600	700
Annual Cost (\$/yr)	\$293,200	\$366,500	\$366,500	\$439,800	\$439,800	\$513,100
Unit Cost (\$/acft)	\$733	\$733	\$733	\$733	\$733	\$733

4C.1.7 Fort Hood (CDP)

The U.S. Department of the Army (Fort Hood) has a water right to store and divert 12,000 acft in Lake Belton. No shortages are projected for Fort Hood and no changes in water supply are recommended.

4C.1.8 City of Harker Heights

The City of Harker Heights has a contract to purchase water from the Brazos River Authority from Lake Stillhouse Hollow. Harker Heights contracts with Bell County WCID No. 1

to divert, treat, and deliver water from Lake Belton to the City. No shortages are projected for the City of Harker Heights and no changes in water supply are recommended.

4C.1.9 City of Holland

The City of Holland has a contract to purchase water from the Central Texas WSC from Stillhouse Hollow Reservoir. No shortages are projected for the City of Holland and no changes in water supply are recommended.

4C.1.10 City of Killeen

4C.1.10.1 Description of Supply

- Surface Water purchased from Bell County WCID No 1.
- Estimated Reliable Supply: 29,632 acft/yr in 2060
- System Description: The City purchases water from Bell County WCID #1.

4C.1.10.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Killeen:

- Conservation.
- Increase contract with Bell County WCID No. 1. Killeen would meet the projected shortage by buying an additional 2,500 acft/yr from Bell County WCID No. 1 by 2060.

4C.1.10.3 Costs

Costs of the recommended plan for the City of Killeen to meet the projected shortages are:

- a. Conservation
 - Date to be Implemented: before 2010 – use rate exceeds 140 gpcd in 2010
 - Annual Cost: maximum of \$698,820 in 2020
- b. Increase contract with Bell County WCID #1:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2060
 - Annual Cost: \$356,783 in 2060

The annual cost was calculated by multiplying the City of Killeen projected supply from this strategy by an estimated wholesale water rate of \$143/acft.

**Table 4C.1-5.
Recommended Plan Costs by Decade for the City of Killeen**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	11,878	6,347	3,961	1,916	(48)	(2,157)
Conservation						
Supply From Plan Element (acft/yr)	820	1,839	1,752	1,439	875	381
Annual Cost (\$/yr)	\$311,600	\$698,820	\$665,760	\$546,820	\$332,500	\$144,780
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Increase Contract with Bell County WCID #1						
Supply From Plan Element (acft/yr)	—	—	—	—	—	2,500
Annual Cost (\$/yr)						\$357,500
Unit Cost (\$/acft)						\$143

4C.1.11 City of Little River-Academy

4C.1.11.1 Description of Supply

- Source: Groundwater – Trinity Aquifer. Surface Water purchased from the City of Temple
- Estimated Reliable Supply: 272 acft/yr
- System Description: Surface water supply supplements groundwater supply. The City of Temple supplies treated surface water to Little River-Academy by transmission pipeline.

4C.1.11.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Little River-Academy:

- Voluntary Redistribution from City of Temple. Little River-Academy would meet the projected shortage by buying an additional 50 acft/yr from the City of Temple. The existing facilities have adequate capacity to deliver the additional water.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.11.3 Costs

Costs of the recommended plan for the City of Little River-Academy to meet the projected shortages are:

- a. Voluntary Redistribution from City of Temple:
- Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$43,850 in 2060

The annual cost was calculated by multiplying the City of Little River Academy projected supply from this strategy by an estimated wholesale water rate of \$877/acft.

**Table 4C.1-6.
Recommended Plan Costs by Decade for the City of Little River-Academy**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(3)	(13)	(20)	(22)	(25)	(29)
Voluntary Redistribution (City of Temple)						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$43,850	\$43,850	\$43,850	\$43,850	\$43,850	\$43,850
Unit Cost (\$/acft)	\$877	\$877	\$877	\$877	\$877	\$877

4C.1.12 Moffat WSC

Moffat WSC has a contract to purchase water from Bluebonnet WSC from Lake Belton, as well as supplemental wells in the Trinity Aquifer. No shortages are projected for Moffat WSC and no changes in water supply are recommended.

4C.1.13 City of Morgan's Point Resort

4C.1.13.1 Description of Supply

- Source: Surface Water from City of Temple
- Estimated Reliable Supply: 291 acft/yr
- System Description: The City of Morgan's Point Resort has a contract with the City of Temple to purchase treated surface water. The City of Temple serves Morgan's Point Resort through a transmission pipeline.

4C.1.13.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Morgan's Point Resort:

- Voluntary Redistribution from City of Temple. Morgan's Point Resort would meet its shortage through purchase of an additional 300 acft/yr from the City of Temple.

- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.13.3 Costs

Costs of the recommended plan for the City of Morgan's Point Resort to meet the projected shortages are:

- Voluntary Redistribution from City of Temple:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$263,100 in 2060

The annual cost was calculated by multiplying the City of Morgan's Point Resort projected supply from this strategy by an estimated wholesale water rate of \$877/acft.

**Table 4C.1-7.
Recommended Plan Costs by Decade for the City of Morgan's Point Resort**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(123)	(164)	(202)	(227)	(241)	(255)
Voluntary Redistribution (City of Temple)						
Supply From Plan Element (acft/yr)	300	300	300	300	300	300
Annual Cost (\$/yr)	\$263,100	\$263,100	\$263,100	\$263,100	\$263,100	\$263,100
Unit Cost (\$/acft)	\$877	\$877	\$877	\$877	\$877	\$877

4C.1.14 City of Nolanville

The City of Nolanville contracts with Bell County WCID No. 1 to divert, treat, and deliver water from Lake Belton to the City. No shortages are projected for Nolanville and no changes in water supply are recommended.

4C.1.15 Pendleton WSC

Pendleton WSC contracts with Bluebonnet WSC to divert, treat, and deliver water from Lake Belton to the WSC. No shortages are projected for Pendleton WSC and no changes in water supply are recommended.

4C.1.16 City of Rogers

The City of Rogers purchases treated surface water from Central Texas WSC. No shortages are projected for the City of Rogers and no changes in water supply are recommended.

4C.1.17 Salado WSC

Salado WSC currently obtains water from the Edwards Aquifer and from a contract with the BRA. There are no projected shortages for Salado WSC; however, Salado WSC is currently pursuing a contract with Central Texas WSC to further augment their existing water supply.

4C.1.18 City of Temple

The City of Temple obtains raw water primarily from the Leon River, to which it holds a run-of-river permit. This permit from the TCEQ gives the City the right to divert water from the river but not to store it. The City also has contracted for stored water from BRA in Lake Belton. No shortages are projected for the City of Temple and no changes in water supply are recommended.

4C.1.19 City of Troy

The City of Troy obtains its water from a contract with the City of Temple and wells located in the Trinity Aquifer. No shortages are projected for the City of Troy and no changes in water supply are recommended.

4C.1.20 West Bell County WSC

West Bell County WSC obtains its water through a contract with the Central Texas WSC. No shortages are projected for West Bell County WSC and no changes in water supply are recommended.

4C.1.21 County-Other

No shortages are projected for County-Other entities and no changes in water supply are recommended. The Oenaville & Belfalls WSC is included in the County-Other category and has informed the Brazos G RWPG that due to recent growth, it expects to be large enough to be included as a Water User Group in the next planning cycle. The WSC obtains supply through a contract with the Central Texas WSC (57 acft/yr) and has applied to the Clearwater Underground Water Conservation District for a Historical and Existing Use Permit for 16.2 acft/yr from the Trinity Aquifer.

4C.1.22 Manufacturing

4C.1.22.1 Description of Supply

- Source: Groundwater from the Trinity Aquifer
- Estimated Reliable Supply: 17 acft/yr

4C.1.22.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage for Manufacturing in Bell County:

- Conservation; and
- Voluntary Redistribution from City of Temple. Manufacturing would meet its shortage through purchase of an additional 1,500 acft/yr from the City of Temple.

4C.1.22.3 Costs

Costs of the recommended plan for Bell County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: By year 2010
 - Annual Cost: Not determined
- b. Voluntary Redistribution from City of Temple:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$1,315,500 in 2060

The annual cost was calculated by multiplying the Manufacturing projected supply from this strategy by an estimated wholesale water rate of \$877/acft.

**Table 4C.1-8.
Recommended Plan Costs by Decade for Bell County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(963)	(1,068)	(1,163)	(1,256)	(1,338)	(1,446)
Conservation						
Supply From Plan Element (acft/yr)	29	54	83	89	95	102
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Voluntary Redistribution (City of Temple)						
Supply From Plan Element (acft/yr)	1,500	1,500	1,500	1,500	1,500	1,500
Annual Cost (\$/yr)	\$1,315,500	\$1,315,500	\$1,315,500	\$1,315,500	\$1,315,500	\$1,315,500
Unit Cost (\$/acft)	\$877	\$877	\$877	\$877	\$877	\$877

4C.1.23 Steam-Electric

No shortages are projected for Bell County Steam-Electric and no changes in water supply are recommended.

4C.1.24 Mining

No shortages are projected for Bell County Mining and no changes in water supply are recommended.

4C.1.25 Irrigation

No shortages are projected for Bell County Irrigation and no changes in water supply are recommended.

4C.1.26 Livestock

No shortages are projected for Bell County Livestock and no changes in water supply are recommended.

4C.2 Bosque County Water Supply Plan

Table 4C.2-1 lists each water user group in Bosque County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.2-1.
Bosque County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Childress Creek WSC	(193)	(206)	Projected shortage – see plan below
City of Clifton	588	570	Projected surplus; possible regional provider, see text below
City of Meridian	(68)	(69)	Projected shortage – see plan below
City of Valley Mills	(103)	(102)	Projected shortage – see plan below
City of Walnut Springs	(60)	(59)	Projected shortage – see plan below
County-Other	(842)	(919)	Projected shortage – see plan below
Manufacturing	(921)	(1,300)	Projected shortage – see plan below
Steam-Electric	(3,497)	(8,223)	Projected shortage – see plan below
Mining	0	0	No projected need
Irrigation	4,986	5,076	Projected surplus
Livestock	0	0	No projected need

¹ From Tables C-3 and C-4, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.2.1 Childress Creek WSC

4C.2.1.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 196 acft/yr
- System Description: The WSC has wells located in the Trinity Aquifer.

4C.2.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Childress Creek WSC:

- Purchase water from the City of Clifton through the Bosque County Regional Project (Section 4B.14.1).

- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.2.1.3 Costs

Costs of the Recommended Plan for Childress Creek WSC.

- Purchase water from the City of Clifton through the Bosque County Regional Project:
 - Cost Source: Cost estimate from strategy evaluation (Section 4B.14.1)
 - Date to be Implemented: By year 2010
 - Total Project Cost: \$2,299,000
 - Annual Cost: \$235,000

**Table 4C.2-2.
Recommended Plan Costs by Decade for Childress Creek WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(126)	(165)	(193)	(199)	(200)	(206)
Purchase water from City of Clifton						
Supply From Plan Element (acft/yr)	213	213	213	213	213	213
Annual Cost (\$/yr)	\$235,000	\$235,000	\$235,000	\$235,000	\$235,000	\$235,000
Unit Cost (\$/acft)	\$1,103	\$1,103	\$1,103	\$1,103	\$1,103	\$1,103

4C.2.2 City of Clifton

4C.2.2.1 Description of Supply

The City of Clifton obtains its water supply from groundwater from the Trinity Aquifer and from surface water from the North Bosque River. The City of Clifton owns water rights on the North Bosque River and has recently completed the construction of the first phase of a new surface water supply project. This new project diverts water from the North Bosque River and impounds it for storage in an off-channel reservoir. The project was planned to provide for additional phases to enlarge the project as demand increases. Based on the estimated availability of groundwater to the City and the firm yield of the new surface water supply project, the City of Clifton has a surplus of 588 acft/yr in the year 2030 and 570 acft/yr in the year 2060. The ability to expand the project results in the City being a potential regional provider of water to other Bosque County entities.

4C.2.3 City of Meridian

4C.2.3.1 Description of Supply

The City of Meridian obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City is projected to have a shortage of 68 acft/yr in the year 2030 and 69 acft/yr in the year 2060.

4C.2.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Meridian:

- Purchase water from the City of Clifton through the Bosque County Regional Project (Section 4B.14.1).
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.2.3.3 Costs

Costs of the recommended plan for the City of Meridian to meet the projected shortages are:

- a. Purchase water from the City of Clifton through the Bosque County Regional Project:
 - Cost Source: Cost estimate from strategy evaluation (Section 4B.14.1)
 - Date to be Implemented: before 2010
 - Total Project Cost: \$2,261,000
 - Annual Cost: \$212,000

**Table 4C.2-3.
Recommended Plan Costs by Decade for the City of Meridian**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(48)	(61)	(68)	(66)	(66)	(69)
Purchase water from the City of Clifton						
Quantity Available (acft/yr)	80	80	80	80	80	80
Annual Cost (\$/yr)	\$212,000	\$212,000	\$212,000	\$212,000	\$212,000	\$212,000
Unit Cost (\$/acft)	\$2,650	\$2,650	\$2,650	\$2,650	\$2,650	\$2,650

4C.2.4 City of Valley Mills

4C.2.4.1 Description of Supply

The City of Valley Mills obtains its water supply from groundwater from the Trinity Aquifer. Based on the groundwater supply available, the City of Valley Mills is projected to have a shortage of 103 acft/yr in the year 2030 and 102 acft/yr in the year 2060.

4C.2.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Valley Mills:

- Conservation; and
- Purchase water from the City of Clifton through the Bosque County Regional Project.

4C.2.4.3 Costs

Costs of the Recommended Plan for the City of Valley Mills to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$7,220 in 2020
- b. Purchase water from the City of Clifton through the Bosque County Regional Project:
 - Cost Source: Cost estimate from strategy evaluation (Section 4B.14.1)
 - Date to be Implemented: before 2010
 - Total Project Cost: \$3,916,000
 - Annual Cost: \$357,295

**Table 4C.2-4.
Recommended Plan Costs by Decade for the City of Valley Mills**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(96)	(101)	(103)	(101)	(101)	(102)
Conservation						
Quantity Available (acft/yr)	9	19	15	11	10	10
Annual Cost (\$/yr)	\$3,420	\$7,220	\$5,700	\$4,180	\$3,800	\$3,800
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase Water from the City of Clifton						
Quantity Available (acft/yr)	190	190	190	190	190	190
Annual Cost (\$/yr)	\$357,295	\$357,295	\$357,295	\$357,295	\$357,295	\$357,295
Unit Cost (\$/acft)	\$1,881	\$1,881	\$1,881	\$1,881	\$1,881	\$1,881

4C.2.5 City of Walnut Springs

4C.2.5.1 Description of Supply

The City of Walnut Springs obtains its water supply from groundwater from the Trinity Aquifer. Based on the groundwater availability in the Trinity Aquifer, the City of Walnut Springs is projected to have a shortage of 60 acft/yr in the year 2030 and 59 acft/yr in the year 2060.

4C.2.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Walnut Springs:

- Purchase water from the City of Clifton through the Bosque County Regional Project.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.2.5.3 Costs

Costs of the Recommended Plan for the City of Walnut Springs to meet the projected shortages are:

- a. Purchase water from the City of Clifton through the Bosque County Regional Project:
 - Cost Source: Cost estimate from strategy evaluation (Section 4B.14.1)
 - Date to be Implemented: before 2010
 - Total Project Cost: \$3,991,000
 - Annual Cost: \$346,000

**Table 4C.2-5.
Recommended Plan Costs by Decade for the City of Walnut Springs**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(56)	(59)	(60)	(59)	(58)	(59)
Clifton System to Walnut Springs						
Quantity Available (acft/yr)	67	67	67	67	67	67
Annual Cost (\$/yr)	\$346,000	\$346,000	\$346,000	\$346,000	\$346,000	\$346,000
Unit Cost (\$/acft)	\$5,164	\$5,164	\$5,164	\$5,164	\$5,164	\$5,164

4C.2.6 County-Other

4C.2.6.1 Description of Supply

Municipal entities included in Bosque County-Other obtain water supply from groundwater from the Trinity Aquifer. None of the County-Other entities utilize surface water as a water supply. Based on the available groundwater supply in the Trinity Aquifer, County-Other is projected to have a shortage of 842 acft/yr in the year 2030 and 919 acft/yr in the year 2060.

4C.2.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages of the County-Other:

- Purchase water from the City of Clifton through the Bosque County Regional Project; and
- BRA System Operations Supply to Bosque County – Volume II, Section 4B.4.
- Conservation was also considered; however, the entity's current per capita use rate is below the selected target rate of 140 gpcd.

4C.2.6.3 Costs

Costs of the Recommended Plan for County-Other to meet the projected shortages are:

- a. Purchase water from the City of Clifton through the Bosque County Regional Project:
 - Cost Source: Unit costs based on strategy evaluation for Walnut Springs. Most system connections would be small, and therefore economies of scale would not reduce unit costs.
 - Date to be Implemented: before 2010
 - Total Project Cost: Not determined.
 - Annual Cost: \$2,582,000 at full implementation
- b. BRA System Operation:
 - Cost Source: BRA System Operations Supply to Bosque County – WUG4 (Section 4B.4), which do not include treatment costs. Additional treatment costs (desalination) and transmission costs to County-Other are estimated on a unit basis of \$3.00/1000 gallons (\$978/acft).
 - Date to be Implemented: before 2010
 - Total Project Cost: Not Determined
 - Annual Cost: \$646,000 at full implementation

**Table 4C.2-6.
Recommended Plan Costs by Decade for Bosque County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(543)	(722)	(842)	(884)	(894)	(919)
Clifton System Supply						
Quantity Available (acft/yr)	400	400	500	500	500	500
Annual Cost (\$/yr)	\$2,065,600	\$2,065,600	\$2,582,000	\$2,582,000	\$2,582,000	\$2,582,000
Unit Cost (\$/acft)	\$5,164	\$5,164	\$5,164	\$5,164	\$5,164	\$5,164
BRA System Operation						
Quantity Available (acft/yr)	200	400	475	475	475	475
Annual Cost (\$/yr)	\$272,000	\$544,000	\$646,000	\$646,000	\$646,000	\$646,000
Unit Cost (\$/acft)	\$1,360	\$1,360	\$1,360	\$1,360	\$1,360	\$1,360

4C.2.7 Manufacturing

4C.2.7.1 Description of Supply

Water supply for manufacturing in Bosque County is obtained by purchase from a city or water supply corporation, from private wells operated by the manufacturing entity, or by limited surface water supplies. Based on the available supplies, Manufacturing is projected to have a shortage of 921 acft/yr in the year 2030 and 1,300 acft/yr in the year 2060.

4C.2.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages for manufacturing:

- Conservation, and
- BRA System Operations Supply to Bosque County – WUG4 (Section 4B.4).

4C.2.7.3 Costs

Costs of the Recommended Plan for Manufacturing to meet the projected shortages are:

- a. Conservation
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined

b. BRA System Operation

- Cost Source: BRA System Operations Supply to Bosque County – WUG4 (Section 4B.4)
- Date to be Implemented: before 2010
- Total Project Cost: \$25,492,000 (total cost for WUG-4 analysis)
- Annual Cost: \$496,600 at full implementation

Table 4C.2-7.
Recommended Plan Costs by Decade for Bosque County Manufacturing

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(641)	(787)	(921)	(1,053)	(1,167)	(1,300)
Conservation						
Quantity Available (acft/yr)	30	58	90	99	107	116
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
BRA System Operation						
Quantity Available (acft/yr)	700	800	1,000	1,100	1,200	1,300
Annual Cost (\$/yr)	\$267,400	\$305,600	\$382,000	\$420,200	\$458,400	\$496,600
Unit Cost (\$/acft)	\$382	\$382	\$382	\$382	\$382	\$382

4C.2.8 Steam-Electric**4C.2.8.1 Description of Supply**

The water supply for Steam-Electric use in Bosque County consists of surface water contracts with the Brazos River Authority and a limited amount of groundwater from the Trinity Aquifer. Steam-Electric is projected to have a shortage of 3,497 acft/yr in the year 2030 and a shortage of 8,223 acft/yr in the year 2060.

4C.2.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage for Steam-Electric:

- Conservation.
- BRA System Operations Supply to Bosque County – WUG4 (Section 4B.4).

4C.2.8.3 Costs

Costs of the Recommended Plan for Steam-Electric to meet the projected shortages are:

- a. Conservation
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. BRA System Operation
 - Cost Source: BRA System Operations Supply to Bosque County – WUG4 (Section 4B.4)
 - Date to be Implemented: before 2010
 - Total Project Cost: \$25,492,000 (total cost for WUG-4 analysis)
 - Annual Cost: \$3,141,186 at full implementation

**Table 4C.2-8.
Recommended Plan Costs by Decade for Bosque County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(585)	(2,450)	(3,497)	(4,772)	(6,327)	(8,223)
Conservation						
Quantity Available (acft/yr)	130	309	506	596	705	837
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
BRA System Operation						
Quantity Available (acft/yr)	585	2,450	3,497	4,772	6,327	8,223
Annual Cost (\$/yr)	\$223,470	\$935,900	\$1,335,854	\$1,822,904	\$2,416,914	\$3,141,186
Unit Cost (\$/acft)	\$382	\$382	\$382	\$382	\$382	\$382

4C.2.9 Mining

Mining is not projected to need additional water supplies through the year 2060 and no changes in water supply are recommended.

4C.2.10 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.2.11 Livestock

No shortages are projected for Livestock and no changes in water supply are recommended.

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4C.3 Brazos County Water Supply Plan

Table 4C.3-1 lists each water user group in Brazos County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.3-1.
Brazos County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Bryan	927	(1,341)	Projected shortage – see plan below
City of College Station	(5,603)	(11,166)	Projected shortage – see plan below
Wellborn SUD	3,692	3,288	Projected surplus
Wickson Creek SUD	(1,160)	(2,116)	Projected shortage – see plan below
County-Other	390	588	Projected surplus
Manufacturing	(96)	(232)	Projected shortage – see plan below
Steam-Electric	276	0	Projected surplus
Mining	0	0	No projected needs
Irrigation	47,653	48,216	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-5 and C-6, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.3.1 City of Bryan

4C.3.1.1 Description of Supply

- Source: Sparta and Carrizo-Wilcox Aquifers
- Estimated Reliable Supply: 15,152 acft/yr
- System Description: Wells located in the Sparta and Carrizo-Wilcox Aquifers

4C.3.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Bryan:

- Wastewater Reuse; and
- Additional Carrizo-Wilcox Aquifer Development.

- In addition to these recommended plan elements, BRA System Operation, Millican Reservoir and the Little River Off-Channel reservoir are considered to be alternative water management strategies.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.3.1.3 Costs

Costs of the Recommended Plan for the City of Bryan.

- Wastewater Reuse for the City of Bryan (4B.3.1):
 - Cost Source: Strategy Evaluation (4B.3.1)
 - Date to be Implemented: By year 2050
 - Total Project Cost: \$6,485,000
 - Annual Cost: \$576,000
- Additional Carrizo-Wilcox Aquifer Development (4B.15.2):
 - Cost Source: Strategy Evaluation (4B.15.2)
 - Date to be Implemented: By year 2050
 - Total Project Cost: \$33,380,000 for full Brazos County evaluation
 - Annual Cost: \$309,600 (based on unit cost for Brazos County evaluation)

**Table 4C.3-2.
Recommended Plan Costs by Decade for the City of Bryan**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	3,191	1,969	927	126	(948)	(1,345)
Wastewater Reuse						
Quantity Available (acft/yr)	—	—	—	—	605	605
Annual Cost (\$/yr)					\$576,000	\$576,000
Unit Cost (\$/acft)					\$952	\$952
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	—	—	—	—	400	800
Annual Cost (\$/yr)					\$154,800	\$309,600
Unit Cost (\$/acft)					\$387	\$387

4C.3.2 City of College Station

4C.3.2.1 Description of Supply

- Source: Groundwater from Carrizo-Wilcox Aquifer
- Estimated Reliable Supply: 20,176 acft/yr

4C.3.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of College Station:

- Conservation,
- Wastewater Reuse; and
- Additional Carrizo-Wilcox Aquifer Development.
- In addition to these recommended plan elements, BRA System Operation, Millican Reservoir and the Little River Off-Channel reservoir are considered to be alternative water management strategies.

4C.3.2.3 Costs

Costs of the recommended plan for the City of College Station to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Strategy Evaluation (4B.2.1)
 - Date to be Implemented: By year 2010
 - Annual Cost: maximum of \$523,640 in 2020
- b. Wastewater Reuse for the City of College Station (4B.3.1):
 - Cost Source: Volume II, Section 4B.3.1
 - Date to be Implemented: By year 2040
 - Total Project Cost: \$2,358,000
 - Annual Cost: \$200,000
- c. Additional Carrizo-Wilcox Aquifer Development (4B.15.2):
 - Cost Source: Strategy Evaluation (4B.15.2)
 - Date to be Implemented: By year 2050
 - Total Project Cost: \$33,380,000 for full Brazos County evaluation
 - Annual Cost: \$4,644,000 (based on unit cost for Brazos County evaluation)

**Table 4C.3-3.
Recommended Plan Costs by Decade for the City of College Station**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	144	(2,801)	(5,603)	(7,668)	(10,256)	(11,166)
Conservation						
Quantity Available (acft/yr)	545	1,378	1,320	1,177	1,149	1,184
Annual Cost (\$/yr)	\$207,100	\$523,640	\$501,600	\$447,260	\$436,620	\$449,920
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Wastewater Reuse						
Quantity Available (acft/yr)	—	—	—	137	137	137
Annual Cost (\$/yr)				\$200,000	\$200,000	\$200,000
Unit Cost (\$/acft)				\$1,462	\$1,462	\$1,462
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	—	3,000	6,000	8,000	11,000	12,000
Annual Cost (\$/yr)		\$1,161,000	\$2,322,000	\$3,096,000	\$4,257,000	\$4,644,000
Unit Cost (\$/acft)		\$387	\$387	\$387	\$387	\$387

4C.3.3 Wellborn SUD

Wellborn SUD currently obtains water from the Carrizo-Wilcox Aquifer and through a contract with the BRA. Wellborn SUD does not have any projected shortages and no changes in water supply are recommended.

4C.3.4 Wickson Creek SUD

4C.3.4.1 Description of Supply

- Source: Sparta and Carrizo-Wilcox Aquifers
- Estimated Reliable Supply: 1,620 acft/yr

4C.3.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Wickson Creek SUD:

- Additional Carrizo-Wilcox Aquifer Development.
- In addition to the recommended plan element, BRA System Operation, Millican Reservoir and the Little River Off-Channel reservoir are considered to be alternative water management strategies.
- Conservation was also considered; however, the SUD's current per capita use rate is below the selected target rate of 140 gpcd.

4C.3.4.3 Costs

Costs of the Recommended Plan for Wickson Creek SUD.

- a. Additional Carrizo-Wilcox Aquifer Development:
- Cost Source: Strategy Evaluation (4B.15.2)
 - Date to be Implemented: By year 2020
 - Total Project Cost: \$33,380,000 for full Brazos County evaluation
 - Annual Cost: \$851,400 at full implementation

**Table 4C.3-4.
Recommended Plan Costs by Decade for Wickson Creek SUD**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(151)	(739)	(1,160)	(1,518)	(1,911)	(2,116)
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	200	800	1,200	1,600	2,000	2,200
Annual Cost (\$/yr)	\$77,400	\$309,600	\$464,400	\$619,200	\$774,000	\$851,400
Unit Cost (\$/acft)	\$387	\$387	\$387	\$387	\$387	\$387

4C.3.5 County-Other

No shortages are projected for Brazos County-Other entities and no changes in water supply are recommended.

4C.3.5 Manufacturing

4C.3.5.1 Description of Supply

- Source: Groundwater from Carrizo-Wilcox Aquifer
- Estimated Reliable Supply: 27,899 acft/yr

4C.3.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Brazos County Manufacturing:

- Conservation, and
- Additional Carrizo-Wilcox Aquifer Development.
- In addition to these recommended plan elements, BRA System Operation, Millican Reservoir and the Little River Off-Channel reservoir are considered to be alternative water management strategies.

4C.3.5.3 Costs

Costs of the recommended plan for Brazos County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: By year 2010
 - Annual Cost: Not determined
- b. Additional Carrizo-Wilcox Aquifer Development:
 - Cost Source: Strategy Evaluation (4B.15.2)
 - Date to be Implemented: By year 2020
 - Total Project Cost: \$33,380,000 for full Brazos County evaluation
 - Annual Cost: \$116,100 at full implementation

**Table 4C.3-5.
Recommended Plan Costs by Decade for Brazos County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	1	(48)	(96)	(145)	(189)	(232)
Conservation						
Quantity Available (acft/yr)	9	18	29	32	35	38
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	—	300	300	300	300	300
Annual Cost (\$/yr)		\$116,100	\$116,100	\$116,100	\$116,100	\$116,100
Unit Cost (\$/acft)		\$387	\$387	\$387	\$387	\$387

4C.4 Burleson County Water Supply Plan

Table 4C.4-1 lists each water user group in Burleson County and their corresponding surplus or shortage in years 2030 and 2060.

**Table 4C.4-1.
Burleson County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Caldwell	1,622	1,582	Projected Surplus
City of Snook	16	0	Projected Surplus – see plan below
City of Somerville	50	31	Projected Surplus
County-Other	155	0	Projected Surplus
Manufacturing	2	(98)	Projected Shortage – see plan below
Steam-Electric	0	0	No Demand/No Shortage
Mining	0	0	No Projected Need
Irrigation	(3,993)	(2,991)	Projected Shortage – see plan below
Livestock	0	0	No Projected Need

¹ From Tables C-7 and C-8, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.4.1 City of Caldwell

The City of Caldwell obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. This supply is projected to be sufficient through the planning period and no change in water supply is recommended.

4C.4.2 City of Snook

The City of Snook obtains its water supply from groundwater from the Sparta Aquifer. This supply is projected to be sufficient through the planning period and no change in water supply is recommended. However, the Brazos G Planning Group decided to develop a plan for each entity for which total supplies were less than 105 percent of the projected demands. The plan developed for the City of Snook follows.

4C.4.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Snook:

- Conservation

4C.4.2.3 Costs

Costs of the Recommended Plan for the City of Snook.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: By year 2010
- Annual Cost: maximum of \$4,180 in 2060

**Table 4C.4-2.
Recommended Plan Costs by Decade for the City of Snook**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	36	23	16	10	5	0
Conservation						
Quantity Available (acft/yr)	3	11	8	7	6	7
Annual Cost (\$/yr)	\$1,140	\$4,180	\$3,040	\$2,660	\$2,280	\$2,660
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380

4C.4.3 City of Somerville

The City of Somerville obtains its water supply from groundwater from the Sparta Aquifer. This supply is projected to be sufficient through the planning period and no change in water supply is recommended.

4C.4.4 County-Other Category

The water supply entities for County-Other show a projected surplus and no changes in water supply are recommended.

4C.4.5 Manufacturing

4C.4.5.1 Description of Supply

- Source: Groundwater from Sparta Aquifer and run-of-river rights.
- Estimated Reliable Supply: 272 acft/yr

4C.4.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Burlleson County Manufacturing:

- Conservation, and
- Additional Carrizo-Wilcox Aquifer Development.

4C.4.5.3 Costs

Costs of the recommended plan for Burlleson County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: By year 2010
 - Annual Cost: Not determined
- b. Additional Carrizo-Wilcox Aquifer Development:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2030
 - Annual Cost: \$124,624 in 2060

The annual costs were calculated by multiplying the Manufacturing projected supply from this strategy by an estimated wholesale water rate of \$831/acft.

**Table 4C.4-3.
Recommended Plan Costs by Decade for Burlleson County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	76	39	2	(35)	(68)	(98)
Conservation						
Quantity Available (acft/yr)	6	12	19	21	24	26
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	—	—	50	50	100	150
Annual Cost (\$/yr)			\$41,537	\$41,537	\$83,080	\$124,624
Unit Cost (\$/acft)			\$831	\$831	\$831	\$831

4C.4.6 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.4.7 Mining

Mining water use category shows a projected surplus and no changes in water supply are recommended.

4C.4.8 Irrigation

4C.4.8.1 Description of Supply

- Source: Groundwater from Brazos River Alluvium Aquifer and run-of-river rights.
- Estimated Reliable Supply: 11,091 acft/yr in 2060

4C.4.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Burlison County Irrigation:

- Conservation, and
- Additional Carrizo-Wilcox Aquifer Development.

4C.4.8.3 Costs

Costs of the recommended plan for Burlison County Irrigation to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Unit Cost: \$160/acft of water saved
 - Annual Cost: \$179,840 in 2030
- b. Additional Carrizo-Wilcox Aquifer Development:
 - Date to be Implemented: By year 2010
 - Total Project Cost: \$8,718,000
 - Annual Cost: \$825,000

The project cost includes seven 1,000 gpm wells drilled to a depth of 2,500 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.4-4.
Recommended Plan Costs by Decade for Burleson County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(4,720)	(4,348)	(3,993)	(3,677)	(3,326)	(2,991)
Conservation						
Quantity Available (acft/yr)	524	837	1,124	1,080	1,032	986
Annual Cost (\$/yr)	\$83,840	\$133,920	\$179,840	\$172,800	\$165,120	\$157,760
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160
Additional Carrizo-Wilcox Aquifer Development						
Quantity Available (acft/yr)	5,000	5,000	5,000	5,000	5,000	5,000
Annual Cost (\$/yr)	\$825,000	\$825,000	\$825,000	\$825,000	\$825,000	\$825,000
Unit Cost (\$/acft)	\$165	\$165	\$165	\$165	\$165	\$165

4C.4.9 Livestock

Livestock water use category shows no projected need and no changes in water supply are recommended.

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4C.5 Callahan County Water Supply Plan

Table 4C.5-1 lists each water user group in Callahan County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.5-1.
Callahan County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Baird	145	154	Projected surplus
City of Clyde	339	375	Projected surplus
Coleman County WSC	(64)	(44)	Projected shortage – see plan below
City of Cross Plains	272	278	Projected surplus
County-Other	204	261	Projected surplus
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	0	0	No demand or supply
Irrigation	25	25	Projected surplus
Livestock	0	0	No demand or supply

¹ From Tables C-9 and C-10, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.5.1 City of Baird

The City of Baird obtains its water supply from surface water supplied from Lake Baird and from the City of Abilene. From 2000 through 2060, the City's contractual purchase from the City of Abilene is 138 acft/yr and the total amount of surface water availability from Lake Baird is 385 acft/yr. Baird also receives reuse water from the City of Clyde in trade for potable water. No shortages are projected for the City of Baird and no changes in water supply are recommended.

4C.5.2 City of Clyde

The City of Clyde uses surface water from local sources which is projected to supply 500 acft/yr from 2000 through 2060. Clyde also has a contractual purchase plan of 307 acft/yr from the City of Abilene that can cover the city's projected demands. Clyde also has an arrangement with City of Baird to receive potable water in trade for reuse water. No current or future shortages are projected. Clyde also has contractual sales to Eula WSC of 221 acft/yr through 2060. No change in water supply uses are projected or recommended.

4C.5.3 Coleman County WSC

4C.5.3.1 Description of Supply

Coleman County WSC obtains its water supply from the City of Coleman via Lake Coleman. Coleman County WSC is projected to have a maximum shortage of 71 acft/yr in 2020.

4C.5.3.2 Water Supply Plan

After implementation of a subordination strategy developed jointly by Region F and the Lower Colorado Region (see Region F and Region K Regional plans for a description of this strategy), the available supply from Lake Coleman increases by approximately 8,000 acft/yr and the previously existing shortages disappear. Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.5.3.3 Costs

Since the available supply from Lake Coleman increases, there are no costs involved.

**Table 4C.5-2.
Recommended Plan Costs by Decade for Coleman County WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(68)	(71)	(64)	(57)	(50)	(44)
Water Supply from City of Coleman						
Supply From Plan Element (acft/yr)	68	71	64	57	50	44
Annual Cost (\$/yr)	0	0	0	0	0	0
Unit Cost (\$/acft)	0	0	0	0	0	0

4C.5.4 City of Cross Plains

The City of Cross Plains uses locally available groundwater for all of its water supply and no future shortage is projected. No changes in water supply are recommended.

4C.5.5 County-Other Category

The water supply entities for County-Other show a projected surplus and no changes in water supply are recommended. Currently there is a contractual purchase of 61 acft/yr through 2060 from the City of Abilene.

4C.5.6 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.5.7 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.5.8 Mining

No Mining demand exists or is projected for the county.

4C.5.9 Irrigation

Irrigation water use shows a projected surplus and no changes in water supply are recommended.

4C.5.10 Livestock

No Livestock demand exists or is projected for the county.

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4C.6 Comanche County Water Supply Plan

Table 4C.6-1 lists each water user group in Comanche County and their corresponding surplus or shortage in years 2030 and 2050. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.6-1.
Comanche County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Comanche	0	0	No projected needs
City of De Leon	0	0	No projected needs
County-Other	393	481	Projected surplus
Manufacturing	7	0	Projected surplus
Steam-Electric	0	0	No projected needs
Mining	0	0	No projected needs
Irrigation	4,892	5,373	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-11 and C-12, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.6.1 City of Comanche

The City of Comanche receives its water from the Upper Leon MWD (Lake Proctor surface water), which has an agreement to meet Comanche's water needs. Therefore, no shortage is projected for the City of Comanche and no changes in water supply are recommended.

4C.6.2 City of DeLeon

The City of DeLeon receives its water from the Upper Leon MWD (Lake Proctor surface water), which has an agreement to meet DeLeon's water needs. Therefore, no shortage is projected for the City of DeLeon and no changes in water supply are recommended.

4C.6.3 County-Other

No shortage is projected for Comanche County-Other entities and no changes in water supply are recommended.

4C.6.4 Manufacturing

No shortage is projected for Comanche County Manufacturing and no changes in water supply are recommended.

4C.6.5 Steam-Electric

No shortage is projected for Comanche County Steam-Electric and no changes in water supply are recommended.

4C.6.6 Mining

No shortage is projected for Comanche County Mining and no changes in water supply are recommended.

4C.6.7 Irrigation

No shortage is projected for Comanche County Irrigation and no changes in water supply are recommended.

4C.6.8 Livestock

No shortages are projected for Comanche County Livestock and no changes in water supply are recommended.

4C.7 Coryell County Water Supply Plan

Table 4C.7-1 lists each water user group in Coryell County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.7-1.
Coryell County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Copperas Cove	3,179	2,260	Projected surplus
Fort Gates	0	0	No projected needs
City of Gatesville	176	(1,232)	Projected shortage – see plan below
Kempner WSC	3,153	1,974	Projected surplus
County-Other	(2,103)	(2,776)	Projected shortage – see plan below
Manufacturing	3	0	Projected surplus
Steam-Electric	0	0	No projected needs
Mining	0	0	No projected needs
Irrigation	1,739	1,739	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-13 and C-14, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.7.1 City of Copperas Cove

No shortages are projected for the City of Copperas Cove and no changes in water supply are recommended.

4C.7.2 Fort Gates WSC

No shortages are projected for Fort Gates WSC and no changes in water supply are recommended.

4C.7.4 City of Gatesville

4C.7.4.1 Description of Supply

- Source: Surface Water – From Lake Belton
- Estimated Reliable Supply: 4,931 acft/yr in 2060

- **System Description:** The City of Gatesville owns and operates a regional treatment plant. Raw water is transferred from a raw water intake site at Lake Belton through approximately 8 miles of transmission line to the regional treatment plant from which the water enters the distribution system.

4C.7.4.3 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Gatesville:

- Conservation
- Purchase additional supply from the Brazos River Authority (Lake Belton)

4C.7.4.4 Costs

Costs of the recommended plan for the City of Gatesville to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: By Year 2010
 - Annual Cost: maximum of \$158,080 in 2060
- b. Purchase additional water from BRA (Lake Belton):
 - Cost Source: estimated wholesale rate of \$45.75/acft
 - Date to be Implemented: By Year 2040
 - Annual Cost: \$59,475 in 2060

The annual cost was calculated assuming the current BRA System rate of \$45.75/acft.

**Table 4C.7-2.
Recommended Plan Costs by Decade for the City of Gatesville**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1,707	931	176	(363)	(826)	(1,232)
Conservation						
Supply From Plan Element (acft/yr)	131	381	388	395	390	416
Annual Cost (\$/yr)	\$49,780	\$144,780	\$147,440	\$150,100	\$148,200	\$158,080
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase Additional Supply from BRA						
Supply From Plan Element (acft/yr)	—	—	—	250	1,000	1,300
Annual Cost (\$/yr)				\$11,438	\$45,750	\$59,475
Unit Cost (\$/acft)				\$45.75	\$45.75	\$45.75

4C.7.4 Kempner WSC

No shortages are projected for Kempner WSC and no changes in water supply are recommended.

4C.7.4 County-Other

4C.7.4.1 Description of Supply

- Source: Surface Water – various contracts with the Brazos River Authority (Lake Belton); Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 1,104 acft/yr in 2060

4C.7.4.3 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Coryell County-Other:

- Conservation
- Additional Trinity Aquifer Development
- Increase Contract with Central Texas WSC

4C.7.4.4 Costs

Costs of the recommended plan for Coryell County-Other to meet the projected shortages are:

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: By Year 2010
- Annual Cost: maximum of \$58,520 in 2020

b. Additional Trinity Aquifer Development:

- Date to be Implemented: By year 2010
- Total Project Cost: \$4,821,000
- Annual Cost: \$438,000

The project cost includes 15 100 gpm wells drilled to a depth of 700 feet in the Trinity Aquifer.

c. Increase Contract with Central Texas WSC:

- Cost Source: estimated wholesale treated water rate
- Date to be Implemented: By year 2010
- Annual Cost: \$1,094,400 in 2060

The annual cost was calculated by multiplying the County-Other projected supply from this strategy by an estimated wholesale water rate of \$684/acft.

**Table 4C.7-3.
Recommended Plan Costs by Decade for Coryell County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,374)	(1,744)	(2,103)	(2,353)	(2,581)	(2,776)
Conservation						
Supply From Plan Element (acft/yr)	61	154	135	117	109	116
Annual Cost (\$/yr)	\$23,180	\$58,520	\$51,300	\$44,460	\$41,420	\$44,080
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Trinity Aquifer Development						
Supply From Plan Element (acft/yr)	1,200	1,200	1,200	1,200	1,200	1,200
Annual Cost (\$/yr)	\$438,000	\$438,000	\$438,000	\$438,000	\$438,000	\$438,000
Unit Cost (\$/acft)	\$365	\$365	\$365	\$365	\$365	\$365
Increase Contract with Central Texas WSC						
Supply From Plan Element (acft/yr)	200	600	1,000	1,200	1,400	1,600
Annual Cost (\$/yr)	\$136,800	\$410,400	\$684,000	\$820,800	\$957,600	\$1,094,400
Unit Cost (\$/acft)	\$684	\$684	\$684	\$684	\$684	\$684

4C.7.6 Manufacturing

No shortages are projected for Coryell County Manufacturing and no changes in water supply are recommended.

4C.7.7 Steam-Electric

Coryell County has no current or projected future demand for Steam-Electric; therefore, no recommendations have been made.

4C.7.8 Mining

No shortages are projected for Coryell County Mining and no changes in water supply are recommended.

4C.7.9 Irrigation

No shortages are projected for Coryell County Irrigation and no changes in water supply are recommended.

4C.7.10 Livestock

No shortages are projected for Coryell County Livestock and no changes in water supply are recommended.

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4C.8 Eastland County Water Supply Plan

Table 4C.8-1 lists each water user group in Eastland County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.8-1.
Eastland County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Cisco	499	589	Projected surplus
City of Eastland	846	949	Projected surplus
City of Gorman	0	0	Supply matches demand
City of Ranger	416	458	Projected surplus
City of Rising Star	(10)	(1)	Projected shortage – see plan below
County-Other	(205)	(99)	Projected shortage – see plan below
Manufacturing	410	401	Projected surplus
Steam-Electric	0	0	No demand or supply
Mining	675	669	Projected surplus
Irrigation	(9,224)	(9,257)	Projected shortage – see plan below
Livestock	0	0	No demand or supply

¹ From Tables C-15 and C-16, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.8.1 The City of Cisco

The City of Cisco uses surface water from Lake Cisco which yields 1,340 acft/yr through 2060. Cisco also has a contract sale to supply water to Westbound WSC of 147 acft/yr through 2060. No shortages are projected for the City of Cisco and no changes in water supply are recommended.

4C.8.2 The City of Eastland

The City of Eastland receives its surface water from a contract with Eastland County WSD. This contract supplies 1,671 acft/yr through 2060. No shortages are projected for the City of Eastland and no changes in water supply are recommended.

4C.8.3 The City of Gorman

The City of Gorman purchases treated water from Upper Leon River MWD and no current or future shortage is projected. Therefore, no changes in water supply are recommended.

4C.8.4 The City of Ranger

The City of Ranger is supplied with surface water from a contract with Eastland Co. WSD. This contract is scheduled to supply 710 acft/yr through 2060. No shortages are projected for the City of Ranger and no changes in water supply are recommended.

4C.8.5 City of Rising Star

4C.8.5.1 Description of Supply

The City of Rising Star uses locally available groundwater for its water supply; however, 2010 through 2060 show projected shortages.

4C.8.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Rising Star:

- Connect to Westbound WSC
- Conservation was also considered; however, the City's current per capita use rate is below the selected target of 140 gpcd.

4C.8.5.3 Costs

Costs of the Recommended Plan for the City of Rising Star.

- b. Water Supply from Westbound WSC
 - Cost Source: Trinity Aquifer well cost
 - Date to be Implemented: before 2010
 - Total Project Cost: \$744,098

- Annual Cost: \$89,400
- Unit Cost: \$596/acft

**Table 4C.8-2.
Recommended Plan Costs by Decade for City of Rising Star**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(17)	(14)	(10)	(6)	(2)	1
Water Supply from Connection to Westbound WSC						
Supply From Plan Element (acft/yr)	150	150	150	150	150	150
Annual Cost (\$/yr)	\$89,400	\$89,400	\$89,400	\$89,400	\$89,400	\$89,400
Unit Cost (\$/acft)	\$596	\$596	\$596	\$596	\$596	\$596

4C.8.6 County-Other Category

4C.8.6.1 Description of Supply

The water supply entities for County-Other show a projected shortage from 2010 through 2060. Currently contract purchases through 2060 exist with the City of Cisco (147 acft/yr), the City of Clyde (221 acft/yr), and Eastland County WSC (120 acft/yr).

4C.8.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of County-Other:

- Purchase additional water from Eastland County WSD
- Conservation was also considered; however, the County-Other's current per capita use rate is below the selected target of 140 gpcd.

4C.8.6.3 Costs

Costs of the Recommended Plan for the County-Other.

a. Water Supply from Eastland County WSD:

- Cost Source: assumed wholesale water rate
- Date to be Implemented: before 2010
- Total Project Cost: \$1,834,540
- Annual Cost: \$317,700

**Table 4C.8-3.
Recommended Plan Costs by Decade for Eastland County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(257)	(239)	(205)	(166)	(129)	(99)
Water Supply from Eastland County WSD (Lake Leon)						
Supply From Plan Element (acft/yr)	300	300	300	300	300	300
Annual Cost (\$/yr)	\$317,700	\$317,700	\$317,700	\$317,700	\$317,700	\$317,700
Unit Cost (\$/acft)	\$1,059	\$1,059	\$1,059	\$1,059	\$1,059	\$1,059

4C.8.7 Manufacturing

Eastland County Manufacturing shows a projected surplus and no changes in water supply are recommended.

4C.8.8 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.8.9 Mining

Eastland County Mining shows a projected surplus and no changes in water supply are recommended.

4C.8.10 Irrigation

4C.8.10.1 Description of Supply

Surface water supplies for Eastland County Irrigation are obtained from Lake Leon, the Leon River, and its tributaries. As demonstrated in Table 4C.8-1, a current and long-term shortage in Irrigation water supplies exists through the year 2060.

4C.8.10.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to partially mitigate projected shortages for Irrigation:

- Conservation
- Brush Control and Weather Mod – these supplies are unquantifiable, see sections 4B.9 and 4B.10 for more detailed information.

4C.8.10.3 Costs

Cost of the Recommended Plan for Eastland County Irrigation.

a. Water Supply from Conservation:

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: By 2010.
- Annual Cost: maximum of \$183,520 in 2060

**Table 4C.8-4.
Recommended Plan Costs by Decade for Eastland County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(9,172)	(9,198)	(9,224)	(9,242)	(9,249)	(9,257)
Conservation						
Supply From Plan Element (acft/yr)	489	816	1,145	1,146	1,146	1,147
Annual Cost (\$/yr)	\$78,240	\$130,560	\$183,200	\$183,360	\$183,360	\$183,520
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160

4C.8.11 Livestock

No Livestock demand exists or is projected for the county.

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4C.9 Erath County Water Supply Plan

Table 4C.9-1 lists each water user group in Erath County and their corresponding surplus or shortage in years 2030 and 2060.

**Table 4C.9-1.
Erath County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Dublin	0	0	No projected needs
City of Stephenville	3,043	2,268	Projected surplus
County-Other	1,009	0	Projected surplus
Manufacturing	(16)	(40)	Projected shortage – see plan below
Steam-Electric	0	0	No projected needs
Mining	0	0	No projected needs
Irrigation	2,322	2,453	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-17 and C-18, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.9.1 City of Dublin

The City of Dublin obtains its water supply from the Upper Leon Municipal Water District (Upper Leon MWD). The Upper Leon MWD has contracted for surface water from Lake Proctor and treats and delivers it to the City of Dublin. The City of Dublin and Upper Leon MWD have contracted for adequate quantities of water to provide a firm supply and meet their needs through the year 2060.

4C.9.2 City of Stephenville

The City of Stephenville obtains its water supply from groundwater from the Trinity Aquifer. The City has also recently completed the construction of a pipeline to Lake Proctor to receive water supplied through a contract with the Upper Leon MWD. With the completion of this project, the City has adequate water supplies to meet their needs through the year 2060.

4C.9.3 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.9.4 Manufacturing

4C.9.4.1 Description of Supply

Manufacturing entities in Erath County currently obtain their water supply from the Trinity Aquifer.

4C.9.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Erath County Manufacturing:

- Conservation
- Additional Trinity Aquifer Development

4C.9.4.3 Costs

Costs of the recommended plan for Erath County Manufacturing to meet the shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Additional Trinity Aquifer Development:
 - Date to be Implemented: By year 2020
 - Total Project Cost: \$198,000
 - Annual Cost: \$18,000

The project cost includes one 150 gpm well drilled to a depth of 400 feet in the Trinity Aquifer.

**Table 4C.9-2.
Recommended Plan Costs by Decade for Erath County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1	(8)	(16)	(24)	(31)	(40)
Conservation						
Supply From Plan Element (acft/yr)	2	4	6	7	7	8
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Trinity Aquifer Development						
Supply From Plan Element (acft/yr)	—	50	50	50	50	50
Annual Cost (\$/yr)		\$18,000	\$18,000	\$18,000	\$18,000	\$18,000
Unit Cost (\$/acft)		\$360	\$360	\$360	\$360	\$360

4C.9.5 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.9.6 Mining

No Mining demand exists or is projected for the county.

4C.9.7 Irrigation

Irrigation is projected to have a surplus of water from available groundwater and surface water supplies and no changes in water supply are recommended.

4C.9.8 Livestock

No shortages are projected for Livestock use and no changes in water supply are recommended.

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4C.10 Falls County Water Supply Plan

Table 4C.10-1 lists each water user group in Falls County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.10-1.
Falls County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Lott	92	96	Projected surplus
City of Marlin	2,606	2,324	Projected surplus
City of Rosebud	663	672	Projected surplus
Tri-County SUD	145	56	Projected surplus
West Brazos WSC	(430)	(580)	Projected shortage – see plan below
County-Other	(111)	55	Projected shortage – see plan below
Manufacturing	1,465	1,427	Projected surplus
Steam-Electric	0	0	No projected demand
Mining	0	0	No projected needs
Irrigation	4,393	4,475	Projected surplus
Livestock	0	0	No Projected Needs
¹ From Tables C-19 and C-20, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.			

4C.10.1 City of Lott

The City of Lott obtains its water supply from the Central Texas WSC, which treats and delivers water from Lake Stillhouse Hollow. The City of Lott has contracted with Central Texas WSC for 184 acft/yr of supply, which exceeds its 2060 water demand of 88 acft/yr. No change in water supply is recommended.

4C.10.2 City of Marlin

The City of Marlin obtains its water supply from surface water from local reservoirs and the Brazos River. The City owns and operates two existing reservoirs—Marlin City Lake and New Marlin Reservoir—that impound runoff from Big Sandy Creek. The City also owns water rights that authorize diversion of 4,000 acft/yr from the Brazos River and have contracted with

the Brazos River Authority for 1,200 acft/yr from the BRA System. Currently, the City utilizes surface water from the two existing reservoirs as its primary supply and diverts water from Brazos River only in an emergency, to supplement the supply in the two existing reservoirs.

4C.10.2.1 Water Supply Plan

While the supplies are projected to be adequate to meet the City's water demand through 2060, the City is developing additional surface water supply to decrease the need for water from the Brazos River. In conjunction with Falls County and the U.S. Dept. of Agriculture, Natural Resources Conservation Service (NRCS), the City of Marlin has been actively pursuing the implementation of the new Brushy Creek Reservoir, which is part of the Big Creek Watershed Project. Brushy Creek Reservoir is proposed as a multi-purpose reservoir for water supply, flood control and recreation. Water rights have been granted and implementation of the project is continuing.

In order to support the efforts of the City of Marlin and others, the following plan is recommended by the Brazos G RWPG for the City of Marlin:

- Conservation.
- Brushy Creek Reservoir

4C.10.2.2 Costs

a. Conservation

- Date to be Implemented: before 2010 – use rate exceeds 140 gpcd
- Annual Cost: maximum of \$42,560 in 2020

b. Brushy Creek Reservoir

- Cost Source: 2001 Brazos G Regional Water Plan, updated to Second Quarter 2002 dollars
- Date to be Implemented: 2010
- Total Project Cost: \$6,301,610 (Brushy Creek Reservoir only)
- Annual Cost: \$513,339

**Table 4C.10-2.
Recommended Plan Costs by Decade for the City of Marlin**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2,815	2,711	2,606	2,517	2,432	2,324
Conservation						
Supply From Plan Element (acft/yr)	46	112	91	68	61	63
Annual Cost (\$/yr)	\$17,480	\$42,560	\$34,580	\$25,840	\$23,180	\$23,940
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Brushy Creek Reservoir						
Supply From Plan Element (acft/yr)	2,000	2,000	2,000	2,000	2,000	2,000
Annual Cost (\$/yr)	\$513,339	\$513,339	\$513,339	\$513,339	\$513,339	\$513,339
Unit Cost (\$/acft)	\$257	\$257	\$257	\$257	\$257	\$257

4C.10.3 City of Rosebud

The City of Rosebud obtains its water supply from the Central Texas WSC, which treats and delivers water from Lake Belton. The City of Rosebud has contracted with Central Texas WSC for 500 acft/yr of supply, which exceeds its 2060 projected water demand of 152 acft/yr. No change in water supply is recommended.

4C.10.4 Tri-County SUD

Tri-County SUD obtains its water supply from the Trinity and Carrizo-Wilcox Aquifers. Tri-County SUD has adequate water supplies to meet its projected water demands. No change in water supply is recommended.

4C.1.5 West Brazos WSC

4C.1.5.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 32 acft/yr

4C.1.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of West Brazos WSC:

- Purchase water from the City of Waco.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.5.3 Costs

Costs of the Recommended Plan for West Brazos WSC.

- Purchase water from City of Waco:
 - Cost Source: Assumed \$850/acft for wholesale water costs and necessary transmission line improvements
 - Date to be Implemented: By year 2010
 - Annual Cost: \$510,000 at full implementation

**Table 4C.10-3.
Recommended Plan Costs by Decade for West Brazos WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(319)	(379)	(430)	(486)	(523)	(580)
Purchase water from City of Waco						
Supply From Plan Element (acft/yr)	400	400	450	500	550	600
Annual Cost (\$/yr)	\$340,000	\$340,000	\$382,500	\$425,000	\$467,500	\$510,000
Unit Cost (\$/acft)	\$850	\$850	\$850	\$850	\$850	\$850

4C.1.6 County-Other

4C.1.6.1 Description of Supply

- Source: Groundwater – Trinity Aquifer; Surface Water – contracts with Central Texas WSC
- Estimated Reliable Supply: 102 acft/yr

4C.1.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Falls County-Other:

- Additional Carrizo-Wilcox Aquifer Development.
- Conservation was also considered; however, this entity's current per capita use rate is below the selected target rate of 140 gpcd.

4C.1.6.3 Costs

Costs of the Recommended Plan for Falls County-Other.

a. Additional Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2010
- Total Project Cost: \$1,376,000
- Annual Cost: \$176,000

The project cost includes four 100 gpm wells drilled to a depth of 250 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.10-4.
Recommended Plan Costs by Decade for Falls County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(258)	(184)	(111)	(44)	5	55
Additional Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	300	300	300	300	300	300
Annual Cost (\$/yr)	\$176,000	\$176,000	\$176,000	\$176,000	\$176,000	\$176,000
Unit Cost (\$/acft)	\$587	\$587	\$587	\$587	\$587	\$587

4C.10.7 Manufacturing

Manufacturing is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.10.8 Steam-Electric

No Steam-Electric demand exists nor is projected for the county.

4C.10.9 Mining

Mining is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.10.10 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.10.11 Livestock

Livestock is projected to have a no additional need for water through the year 2060 and no changes in water supply are recommended.

4C.11 Fisher County Water Supply Plan

Table 4C.11-1 lists each water user group in Fisher County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.11-1.
Fisher County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Roby	117	113	Projected surplus
City of Rotan	0	0	Supply based on projected demand
County-Other	94	152	Projected surplus
Manufacturing	(155)	(236)	Projected shortage – see plan below
Steam-Electric	0	0	No demand or supply
Mining	0	0	No demand or supply
Irrigation	556	572	Projected surplus
Livestock	0	0	No demand or supply

¹ From Tables C-21 and C-22, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.11.1 City of Roby

4C.11.1.1 Description of Supply

Surface water supplies are obtained from the City of Sweetwater through contract purchase from the Oak Creek Reservoir. No shortages are projected for the City of Roby and no changes in water supply are recommended.

4C.11.2 City of Rotan

The City of Rotan is currently purchasing water under contract from the City of Snyder; however, supply is allocated based on projected demands.

4C.11.3 County-Other

The water supply entities for Fisher County-Other show a projected surplus and no changes in water supply are recommended.

4C.11.4 Manufacturing

4C.11.4.1 Description of Supply

Fisher County Manufacturing shows a projected shortage from 2010 through 2060.

4C.11.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of Manufacturing:

- Conservation.
- Purchase water from Sweetwater; however, Sweetwater must complete projects in order to have a surplus.

4C.11.4.3 Costs

Cost of the Recommended Plan for Manufacturing

a. Conservation:

- Date to be Implemented: before 2010
- Annual Cost: not determined

b. Water Supply from Sweetwater:

- Cost Source: assumed wholesale water rate
- Date to be Implemented: before 2010
- Total Project Cost: none (Current infrastructure is assumed to be adequate)
- Annual Cost: \$73,140 in 2060

**Table 4C.11-2.
Recommended Plan Costs by Decade for Fisher County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(92)	(125)	(155)	(184)	(210)	(236)
Conservation						
Supply from Plan Element (acft/yr)	6	11	18	20	22	24
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from Sweetwater						
Supply From Plan Element (acft/yr)	86	114	137	164	188	212
Annual Cost (\$/yr)	\$29,670	\$39,330	\$47,265	\$56,580	\$64,860	\$73,140
Unit Cost (\$/acft)	\$345	\$345	\$345	\$345	\$345	\$345

4C.11.5 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.11.6 Mining

No Mining demand exists or is projected for the county.

4C.11.7 Irrigation

No shortages are projected for Fisher County Irrigation and no changes in water supply are recommended.

4C.11.8 Livestock

No shortages are projected for Fisher County Livestock and no changes in water supply are recommended.

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4C.12 Grimes County Water Supply Plan

Table 4C.12-1 lists each water user group in Grimes County and their corresponding surplus or shortage in years 2030 and 2060.

**Table 4C.12-1.
Grimes County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Navasota	1,257	1,196	Projected surplus
County-Other	229	195	Projected surplus
Manufacturing	(80)	(189)	Projected shortage – see plan below
Steam-Electric	(727)	(9,715)	Projected shortage – see plan below
Mining	16	16	Projected surplus
Irrigation	953	953	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-23 and C-24, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.12.2 City of Navasota

The City of Navasota obtains its water supply from groundwater from the Gulf Coast Aquifer. The existing production capacity of the wells and groundwater availability is adequate to supply the needs of the City of Navasota through the year 2060. No change in water supply is recommended.

4C.12.3 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.12.4 Manufacturing

4C.12.4.1 Description of Supply

- Source: Groundwater – Gulf Coast Aquifer
- Estimated Reliable Supply: 256 acft/yr

4C.12.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Grimes County Manufacturing:

- Conservation, and
- Additional Gulf Coast Aquifer Development.

4C.12.4.3 Costs

Costs of the Recommended Plan for Grimes County Manufacturing.

a. Conservation:

- Date to be Implemented: By year 2010
- Annual Cost: Not determined

b. Additional Gulf Coast Aquifer Development:

- Date to be Implemented: By year 2010
- Total Project Cost: \$312,000
- Annual Cost: \$26,000

The project cost includes two 100 gpm wells drilled to a depth of 300 feet in the Gulf Coast Aquifer.

**Table 4C.12-2.
Recommended Plan Costs by Decade for Grimes County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1)	(41)	(80)	(119)	(154)	(189)
Conservation						
Supply From Plan Element (acft/yr)	8	15	24	26	29	31
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Gulf Coast Aquifer Development						
Supply From Plan Element (acft/yr)	250	250	250	250	250	250
Annual Cost (\$/yr)	\$26,000	\$26,000	\$26,000	\$26,000	\$26,000	\$26,000
Unit Cost (\$/acft)	\$104	\$104	\$104	\$104	\$104	\$104

4C.12.5 Steam-Electric Power

4C.12.5.1 Description of Supply

- Source: Surface Water – Gibbons Creek Reservoir (Texas Municipal Power Agency (TMPA)), BRA contract for water from Lake Limestone, and a contract with the City of Huntsville (Trinity River Authority - Lake Livingston)
- Estimated Reliable Supply: 13,031 acft/yr

4C.12.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Grimes County Steam-Electric:

- Conservation,
- Purchase water from the Brazos River Authority, and
- Raise the level of Gibbons Creek Reservoir. The TMPA operates the Gibbons Creek Power Station, which uses Gibbons Creek Reservoir to provide cooling water supply. The TMPA is considering alternatives for increasing supply from Gibbons Creek Reservoir. Raising the conservation pool from 247 feet to 251 feet would provide up to 3,870 acre-feet of additional supply.

4C.12.5.3 Costs

Costs of the Recommended Plan for Grimes County Steam-Electric.

- a. Conservation:
 - Date to be Implemented: By year 2010
 - Annual Cost: Not determined
- b. Raise level of Gibbons Creek Reservoir:
 - Cost Source: Cost estimate provided by TMPA
 - Date to be Implemented: By year 2010
 - Total Project Cost: \$8,003,000
 - Annual Cost: \$618,000
- c. Purchase water from the Brazos River Authority:
 - Cost Source: Cost estimate provided by TMPA
 - Date to be Implemented: By year 2040
 - Unit Cost: \$203/acft (includes intake and conveyance, and purchase of water from BRA at \$45.75/acft)

**Table 4C.12-3.
Recommended Plan Costs by Decade for Grimes County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	3,729	1,263	(727)	(3,153)	(6,110)	(9,715)
Conservation						
Supply From Plan Element (acft/yr)	279	588	963	1,133	1,340	1,592
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Raise Level of Gibbons Creek Reservoir						
Supply From Plan Element (acft/yr)	3,870	3,870	3,870	3,870	3,870	3,870
Annual Cost (\$/yr)	\$618,000	\$618,000	\$618,000	\$618,000	\$618,000	\$86,000
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$22
Purchase water from the Brazos River Authority						
Supply From Plan Element (acft/yr)	—	—	—	1,000	1,000	4,500
Annual Cost (\$/yr)				\$203,000	\$203,000	\$913,500
Unit Cost (\$/acft)				\$203	\$203	\$203

4C.12.6 Mining

Mining is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.12.7 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.12.8 Livestock

Livestock is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.13 Hamilton County Water Supply Plan

Table 4C.13-1 lists each water user group in Hamilton County and their corresponding surplus or shortage in years 2030 and 2060.

**Table 4C.13-1.
Hamilton County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Hamilton	515	533	Projected surplus
City of Hico	47	54	Projected surplus
County-Other	232	261	Projected surplus
Manufacturing	3	0	Projected surplus
Steam-Electric	0	0	No projected demands
Mining	0	0	No projected demands
Irrigation	3,150	3,175	Projected surplus
Livestock	0	0	No projected needs
¹ From Tables C-25 and C-26, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.			

4C.13.1 City of Hamilton

The City of Hamilton obtains its water supply from Lake Proctor through the Upper Leon Municipal Water District with a contract for 2,000 acft/yr of supply. The City of Hamilton sells a portion of its supply to Multi-County WSC. The City's available supply exceeds the 2060 demands. No change in water supply is recommended.

4C.13.2 City of Hico

The City of Hico obtains its water supply from groundwater from the Trinity Aquifer. The existing production capacity of the wells and groundwater availability is adequate to supply the needs of the City of Hico through the year 2060. No change in water supply is recommended.

4C.13.3 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.13.4 Manufacturing

Manufacturing is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.13.5 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.13.6 Mining

No Mining demand exists or is projected for the county.

4C.13.7 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.13.8 Livestock

Livestock water supply is projected to meet demands through the year 2060 and no changes in water supply are recommended.

4C.14 Haskell County Water Supply Plan

Table 4C.14-1 lists each water user group in Haskell County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.14-1.
Haskell County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Haskell	(383)	(472)	Projected shortage –see plan below
City of Rule	4	13	Projected shortage –see plan below
County-Other	54	77	Projected surplus
Manufacturing	0	0	No demand or supply
Steam-Electric	1,807	1,550	Projected surplus
Mining	(52)	(47)	Projected shortage –see plan below
Irrigation	(25,936)	(21,950)	Projected shortage –see plan below
Livestock	0	0	No demand or supply

¹ From Tables C-27 and C-28, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.14.1 City of Haskell

4C.14.1.1 Description of Supply

Surface water supplies are obtained from a contract with North Central Texas MWD (NCTMWD). The current contract is not sufficient to meet demands through 2060.

4C.14.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the city of Haskell:

- Conservation.
- Purchase additional supply from NCTMWD (additional supply would require implementation of the Millers Creek Reservoir Augmentation strategy by NCTMWD (Section 4B.7))

4C.14.1.3 Costs

Cost of the recommended plan for the City of Haskell.

a. Conservation

- Date to be Implemented: before 2010
- Annual Cost: \$6,840 in 2060

b. Water Supply from NCTMWD:

- Date to be Implemented: before 2010
- Total Project Cost: none (Current infrastructure assumed to be adequate)
- Annual Cost: \$211,500 (based on a unit cost of treated wholesale water of \$423/acft)

**Table 4C.14-2.
Recommended Plan Costs by Decade for the City of Haskell**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(334)	(358)	(383)	(413)	(442)	(472)
Conservation						
Supply From Plan Element (acft/yr)	23	47	36	26	19	18
Annual Cost (\$/yr)	\$8,740	\$17,860	\$13,680	\$9,880	\$7,220	\$6,840
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from NCTMWD						
Supply From Plan Element (acft/yr)	500	500	500	500	500	500
Annual Cost (\$/yr)	\$211,500	\$211,500	\$211,500	\$211,500	\$211,500	\$211,500
Unit Cost (\$/acft)	\$423	\$423	\$423	\$423	\$423	\$423

4C.14.2 City of Rule**4C.14.2.1 Description of Supply**

Water supplies are obtained from a contract with NCTMWD and local groundwater. The current supplies are not sufficient to meet demands through 2020.

4C.14.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Rule:

- Purchase additional supply from NCTMWD (additional supply would require implementation of the Millers Creek Reservoir Augmentation strategy by NCTMWD (Section 4B.7)).
- Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.14.2.3 Costs

Cost of the Recommended Plan for the City of Rule.

a. Water Supply from NCTMWD:

- Date to be Implemented: before 2010
- Total Project Cost: none (Current infrastructure assumed to be adequate)
- Annual Cost: \$19,550 (based on a unit cost of treated wholesale water of \$423/acft)

**Table 4C.14-3.
Recommended Plan Costs by Decade for the City of Rule**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(3)	(0)	4	7	10	13
Water Supply from NCTMWD						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$21,150	\$21,150	\$21,150	\$21,150	\$21,150	\$21,150
Unit Cost (\$/acft)	\$423	\$423	\$423	\$423	\$423	\$423

4C.14.3 The City of Stamford

The City of Stamford is primarily in Jones County and its proposed plan is described in Section 4C.18.

4C.14.4 County-Other Category

The water supplies for Haskell County-Other are from contract purchases from the City of Stamford and from NCTMWD. Haskell County-Other shows a projected surplus and no changes in water supply are recommended.

4C.14.5 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.14.6 Steam-Electric

Haskell County Steam-Electric shows a projected surplus and no changes in water supply are recommended.

4C.14.7 Mining

4C.14.7.1 Description of Supply

The current supply comes from the Seymour Aquifer. With current supplies Mining shows a projected shortage through 2060.

4C.14.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected Mining shortage:

- Conservation, and
- Overdraft aquifer.

4C.14.7.3 Costs

Cost of the Recommended Plan for the Haskell County Mining.

a. Conservation

- Date to be Implemented: before 2010
- Annual Cost: not determined

b. Water Supply from Overdraft Aquifer:

- Cost Source: Seymour Aquifer (max quantity of 53 acft/yr)
- Date to be Implemented: before 2010
- Total Project Cost: none (current infrastructure assumed to be adequate)
- Annual Cost: none (costs would be the same current operational costs.)

**Table 4C.14-4.
Recommended Plan Costs by Decade for Haskell County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(56)	(53)	(52)	(50)	(48)	(47)
Conservation						
Supply From Plan Element (acft/yr)	3	5	6	6	6	6
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Overdraft Aquifer						
Supply From Plan Element (acft/yr)	53	48	46	44	42	41
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—

4C.14.8 Irrigation

4C.14.8.1 Description of Supply

Current surface water supplies Irrigation are not sufficient to meet demands through 2060.

4C.14.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to mitigate a portion of the shortages for Haskell County Irrigation:

- Conservation.
- Implement brush control and weather modification programs. These supplies are unquantifiable; see sections 4B.9 and 4B.10 for more detailed information.

Neither option is sufficient to meet all of the projected needs for Irrigation in Haskell County.

4C.14.8.3 Costs

Costs of the Recommended Plan for Haskell County Irrigation.

a. Conservation:

- Cost Source: Strategy Evaluation (Section 4B.2.2)
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$520,000 in 2030

**Table 4C.14-5.
Recommended Plan Costs by Decade for Haskell County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(28,805)	(27,349)	(25,936)	(24,564)	(23,236)	(21,950)
Conservation						
Supply From Plan Element (acft/yr)	1,479	2,392	3,250	3,153	3,059	2,968
Annual Cost (\$/yr)	\$236,640	\$382,720	\$520,000	\$504,480	\$489,440	\$474,880
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160

4C.14.9 Livestock

No shortages are projected for Haskell County Livestock and no changes in water supply are recommended.

4C.15 Hill County Water Supply Plan

Table 4C.15-1 lists each water user group in Hill County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections. Water supply plans are also presented for some entities that need pumping/conveyance facilities to utilize their existing water resources, or to become a regional provider.

**Table 4C.15-1.
Hill County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Brandon-Irene WSC	51	(92)	Projected shortage – see plan below
Files Valley WSC	323	32	Projected surplus
City of Hillsboro	1,283	(20)	Projected shortage – see plan below
City of Hubbard	0	0	No projected needs
City of Itasca	34	44	Projected surplus
Lake Whitney Water Co.	33	29	Projected surplus
White Bluff Community WS	(341)	(663)	Projected shortage – see plan below
City of Whitney	39	10	Projected surplus – see plan below
Woodrow-Osceola WSC	(119)	(154)	Projected shortage – see plan below
County-Other	624	399	Projected surplus
Manufacturing	(21)	(53)	Projected shortage – see plan below
Steam-Electric	0	0	No projected demands
Mining	0	0	No projected needs
Irrigation	1,004	1,005	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-29 and C-30, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.15.1 Brandon-Irene WSC

4C.15.1.1 Description of Supply

- Source: Groundwater – Trinity Aquifer; Surface water – purchase from Aquilla WSD
- Estimated Reliable Supply: 181 acft/yr in 2060

4C.15.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Brandon-Irene WSC:

- BRA System Operation.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.15.1.3 Costs

Costs of the Recommended Plan for Brandon-Irene WSC.

- a. BRA System Operation:
- Cost Source: Strategy Evaluation (Section 4B.4)
 - Date to be Implemented: By year 2050
 - Annual Cost: \$235,500

**Table 4C.15-2.
Recommended Plan Costs by Decade for Brandon-Irene WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	104	77	51	25	(6)	(92)
BRA System Operation						
Supply From Plan Element (acft/yr)	—	—	—	—	100	100
Annual Cost (\$/yr)					\$235,500	\$235,500
Unit Cost (\$/acft)					\$2,355	\$2,355

4C.15.2 Files Valley WSC

Files Valley WSC obtains its water supply from the Aquilla Water Supply District (WSD). Aquilla WSD has contracted with the Brazos River Authority for surface water from Lake Aquilla and diverts, treats, and delivers water to Files Valley WSC. The existing facilities are adequate to supply the needs of Files Valley WSC through the year 2060. No change in water supply is recommended.

4C.15.3 City of Hillsboro

4C.15.3.1 Description of Supply

- Source: Surface water – purchase from Aquilla WSD
- Estimated Reliable Supply: 1,997 acft/yr in 2060

4C.15.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Hillsboro:

- Conservation, and
- BRA System Operation.

4C.15.3.3 Costs

Costs of the Recommended Plan for the City of Hillsboro.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: By year 2010
- Annual Cost: maximum of \$56,240 in 2020

b. BRA System Operation:

- Cost Source: Strategy Evaluation (Section 4B.4)
- Date to be Implemented: By year 2060
- Annual Cost: \$235,500

**Table 4C.15-3.
Recommended Plan Costs by Decade for the City of Hillsboro**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2,105	1,698	1,283	872	436	(20)
Conservation						
Supply From Plan Element (acft/yr)	66	148	123	96	89	94
Annual Cost (\$/yr)	\$25,080	\$56,240	\$46,740	\$36,480	\$33,820	\$35,720
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
BRA System Operation						
Supply From Plan Element (acft/yr)	—	—	—	—	—	100
Annual Cost (\$/yr)						\$235,500

Unit Cost (\$/acft)							\$2,355
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4C.15.4 City of Hubbard

The City of Hubbard obtains its water supply from surface water from Lake Navarro Mills through the Post Oak Special Utility District (SUD). The Post Oak SUD purchases treated water from the City of Corsicana and delivers it to the City of Hubbard. The existing contractual arrangements and conveyance capacity of the system are adequate to meet the needs of the City of Hubbard through the year 2060. No change in water supply is recommended.

4C.15.5 City of Itasca

The City of Itasca obtains its water supply from groundwater from the Trinity Aquifer. The existing production capacity of the wells and groundwater availability are adequate to supply the needs of the City of Itasca through the year 2060. No change in water supply is recommended.

4C.15.6 Lake Whitney Water Co.

The Lake Whitney Water Co. obtains its water supply from groundwater from the Trinity Aquifer and run-of-river rights. The existing production capacity of the wells and the run-of-river rights are adequate to supply the needs of the entity through the year 2060. No change in water supply is recommended.

4C.15.7 White Bluff Community WS

4C.15.7.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 212 acft/yr

4C.15.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the White Bluff Community WS:

- Conservation, and
- BRA System Operation.

4C.15.7.3 Costs

Costs of the Recommended Plan for the White Bluff Community WS.

- a. Conservation:
 - Date to be Implemented: By year 2010
 - Annual Cost: maximum of \$17,100 in 2060

- a. BRA System Operation:
 - Cost Source: Volume II, Section 4B.4
 - Date to be Implemented: By year 2010
 - Annual Cost: \$1,648,500

**Table 4C.15-4.
Recommended Plan Costs by Decade for the White Bluff Community WS**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(157)	(244)	(341)	(438)	(545)	(663)
Conservation						
Supply From Plan Element (acft/yr)	11	29	31	33	40	45
Annual Cost (\$/yr)	\$4,180	\$11,020	\$11,780	\$12,540	\$15,200	\$17,100
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
BRA System Operation						
Supply From Plan Element (acft/yr)	200	300	400	500	600	700
Annual Cost (\$/yr)	\$471,000	\$706,500	\$942,000	\$1,177,500	\$1,413,000	\$1,648,500
Unit Cost (\$/acft)	\$2,355	\$2,355	\$2,355	\$2,355	\$2,355	\$2,355

4C.15.8 City of Whitney

The City of Whitney obtains its water supply from groundwater from the Trinity Aquifer. The City of Whitney has also contracted with the Brazos River Authority for 750 acft of surface water supply from Lake Whitney; however, the City has not implemented the required infrastructure to utilize this supply. The production capacity of the City's existing wells and groundwater availability are adequate to supply the needs of the City of Whitney through the year 2060; however, the available supply is not greater than 105 percent of the City's projected water demand.

4C.15.8.1 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Whitney:

- Conservation.

4C.15.8.2 Costs

Costs of the Recommended Plan for the City of Whitney.

a. Conservation:

- Date to be Implemented: By year 2010
- Annual Cost: maximum of \$13,680 in 2020

**Table 4C.15-5.
Recommended Plan Costs by Decade for the City of Whitney**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	48	44	39	34	24	10
Conservation						
Supply From Plan Element (acft/yr)	16	36	29	23	21	22
Annual Cost (\$/yr)	\$6,080	\$13,680	\$11,020	\$8,740	\$7,980	\$8,360
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380

4C.15.9 Woodrow-Osceola WSC**4C.15.9.1 Description of Supply**

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 165 acft/yr

4C.15.9.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Woodrow-Osceola WSC:

- BRA System Operation.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.15.9.3 Costs

Costs of the Recommended Plan for Woodrow-Osceola WSC.

- a. BRA System Operation:
- Cost Source: Strategy Evaluation (Section 4B.4)
 - Date to be Implemented: By year 2010
 - Annual Cost: \$471,000

**Table 4C.15-6.
Recommended Plan Costs by Decade for Woodrow-Osceola WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(121)	(120)	(119)	(122)	(133)	(154)
BRA System Operation						
Supply From Plan Element (acft/yr)	200	200	200	200	200	200
Annual Cost (\$/yr)	\$471,000	\$471,000	\$471,000	\$471,000	\$471,000	\$471,000
Unit Cost (\$/acft)	\$2,355	\$2,355	\$2,355	\$2,355	\$2,355	\$2,355

4C.15.10 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.15.11 Manufacturing**4C.15.11.1 Description of Supply**

- Source: Groundwater – Woodbine Aquifer
- Estimated Reliable Supply: 87 acft/yr

4C.15.11.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Hill County Manufacturing:

- Conservation, and
- BRA System Operation.

4C.15.11.3 Costs

Costs of the Recommended Plan for Hill County Manufacturing.

a. Conservation:

- Date to be Implemented: By year 2010
- Annual Cost: Not determined

b. BRA System Operation:

- Cost Source: Strategy Evaluation (Section 4B.4)
- Date to be Implemented: By year 2020
- Annual Cost: \$235,500 (at full implementation)

Table 4C.15-7.
Recommended Plan Costs by Decade for Hill County Manufacturing

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2	(10)	(21)	(32)	(42)	(53)
Conservation						
Supply From Plan Element (acft/yr)	3	5	8	8	9	10
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
BRA System Operation						
Supply From Plan Element (acft/yr)	—	50	50	50	50	100
Annual Cost (\$/yr)		\$117,750	\$117,750	\$117,750	\$117,750	\$235,500
Unit Cost (\$/acft)		\$2,355	\$2,355	\$2,355	\$2,355	\$2,355

4C.15.12 Steam-Electric

No Steam-Electric demand exists nor is projected for the county.

4C.15.13 Mining

Mining is projected to have adequate water supplies to meet the projected demands through the year 2060 and no changes in water supply are recommended.

4C.15.14 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.15.15 *Livestock*

Livestock water supply is projected to meet demands through the year 2060 and no changes in water supply are recommended.

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4C.16 Hood County Water Supply Plan

Table 4C.16-1 lists each water user group in Hood County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.16-1.
Hood County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Acton MUD	2,347	484	Projected surplus
City of Granbury	4,888	3,252	Projected surplus
Oak Trail Shores Subdivision	(114)	(101)	Projected shortage – see plan below
City of Tolar	58	62	Projected surplus
County-Other	(1,195)	(3,543)	Projected shortage – see plan below
Manufacturing	(8)	(15)	Projected shortage – see plan below
Steam-Electric	33,980	27,794	Projected surplus
Mining	(25)	(24)	Projected shortage – see plan below
Irrigation	10,346	10,628	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-31 and C-32, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.16.1 Acton MUD

Acton MUD obtains its water supply from groundwater from the Trinity Aquifer and a contract with the Brazos River Authority for water from Lake Granbury. No shortages are projected for Acton MUD and no changes in water supply are recommended.

4C.16.2 City of Granbury

The City of Granbury obtains its water supply from groundwater from the Trinity Aquifer and from surface water from Lake Granbury. No shortages are projected for the City of Granbury and no changes in water supply are recommended.

4C.16.3 Oak Trail Shores Subdivision

4C.16.3.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 379 acft/yr

4C.16.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Oak Trail Shores Subdivision:

- Purchase water from the City of Granbury.
- Conservation was also considered; however, the entity's current per capita use rate is below the selected target rate of 140 gpcd.

4C.16.3.3 Costs

Costs of the Recommended Plan for Oak Trail Shores Subdivision.

- Purchase Water from the City of Granbury:
 - Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
 - Date to be Implemented: before 2010
 - Annual Cost: \$122,250

**Table 4C.16-2.
Recommended Plan Costs by Decade for Oak Trail Shores Subdivision**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(133)	(126)	(114)	(105)	(101)	(101)
Purchase water from City of Granbury						
Supply From Plan Element (acft/yr)	150	150	150	150	150	150
Annual Cost (\$/yr)	\$122,250	\$122,250	\$122,250	\$122,250	\$122,250	\$122,250
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.16.4 City of Tolar

The City of Tolar obtains its water supply from groundwater from the Trinity Aquifer. The city owns and operates five wells that are projected to supply the needs of the City of Tolar through the year 2060. No shortages are projected for the City of Tolar and no changes in water supply are recommended.

4C.16.5 County-Other

4C.16.5.1 Description of Supply

- Source: Groundwater – Trinity Aquifer; Surface water – Brazos River Authority contracts (Lake Granbury)
- Estimated Reliable Supply: 3,729 acft/yr in 2060

4C.16.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Hood County-Other:

- Purchase water from the City of Granbury.
- Conservation was also considered; however, the entity's current per capita use rate is below the selected target rate of 140 gpcd.

4C.16.5.3 Costs

Costs of the Recommended Plan for Hood County-Other.

a. Purchase Water from the City of Granbury:

- Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
- Date to be Implemented: before 2010
- Annual Cost: \$3,015,500 (at full implementation)

**Table 4C.16-3.
Recommended Plan Costs by Decade for Hood County-Other**

<i>Plan Element</i>	2010	2020	2030	2040	2050	2060
Projected Surplus/(Shortage) (acft/yr)	(19)	(627)	(1,195)	(1,816)	(2,596)	(3,543)
Purchase water from City of Granbury						
Supply From Plan Element (acft/yr)	20	700	1,300	2,000	2,700	3,700
Annual Cost (\$/yr)	\$16,300	\$570,500	\$1,059,500	\$1,630,000	\$2,200,500	\$3,015,500
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.16.6 Manufacturing

4C.16.6.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 22 acft/yr

4C.16.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Hood County Manufacturing:

- Conservation, and
- Purchase water from the City of Granbury.

4C.16.6.3 Costs

Costs of the Recommended Plan for Hood County Manufacturing.

- Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- Purchase Water from the City of Granbury:
 - Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
 - Date to be Implemented: before 2010
 - Annual Cost: 16,300 in 2060

**Table 4C.16-4.
Recommended Plan Costs by Decade for Hood County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(3)	(6)	(8)	(10)	(12)	(15)
Conservation						
Supply From Plan Element (acft/yr)	1	1	2	2	2	3
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from City of Granbury						
Supply From Plan Element (acft/yr)	5	10	10	15	15	20
Annual Cost (\$/yr)	\$4,075	\$8,150	\$8,150	\$12,225	\$12,225	\$16,300
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.16.7 Steam-Electric

Steam-Electric water demand in Hood County is associated with the DeCordova Power Plant owned and operated by Texas Utilities Company (TXU). The DeCordova Power Plant is supplied by water from Lake Granbury. TXU has contracted with the Brazos River Authority for water from the BRA system in sufficient quantity to exceed its needs through the year 2060. No changes in water supply are recommended.

4C.16.8 Mining

4C.1.4.1 Description of Supply

- Source: Groundwater – Trinity Aquifer
- Estimated Reliable Supply: 133 acft/yr in 2060

4C.16.1.3 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Hood County Mining:

- Conservation, and
- Purchase water from the City of Granbury.

4C.16.1.4 Costs

Costs of the Recommended Plan for Hood County Mining.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase Water from the City of Granbury:
 - Cost Source: Assumed raw water unit cost of \$75/acft
 - Date to be Implemented: before 2010
 - Annual Cost: \$2,250

**Table 4C.16-5.
Recommended Plan Costs by Decade for Hood County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(25)	(25)	(25)	(25)	(24)	(24)
Conservation						
Supply From Plan Element (acft/yr)	5	8	11	11	11	11
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from City of Granbury						
Supply From Plan Element (acft/yr)	30	30	30	30	30	30
Annual Cost (\$/yr)	\$2,250	\$2,250	\$2,250	\$2,250	\$2,250	\$2,250
Unit Cost (\$/acft)	\$75	\$75	\$75	\$75	\$75	\$75

4C.16.9 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.16.10 Livestock

No shortages are projected for Livestock use and no changes in water supply are recommended.

4C.17 Johnson County Water Supply Plan

Table 4C.17-1 lists each water user group in Johnson County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.17-1.
Johnson County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Alvarado	(473)	(647)	Projected shortage – see plan below
Bethany WSC	(344)	(515)	Projected shortage – see plan below
Bethesda WSC	(3,722)	(6,703)	Projected shortage – see plan below
City of Burleson	(1,910)	(3,996)	Projected shortage – see plan below
City of Cleburne	1,791	(2,853)	Projected shortage – see plan below
City of Godley	(224)	(403)	Projected shortage – see plan below
City of Grandview	55	(1)	Projected shortage – see plan below
Johnson County FWSD #1	64	(609)	Projected shortage – see plan below
Johnson County SUD	(2,456)	(13,252)	Projected shortage – see plan below
City of Joshua	(782)	(1,163)	Projected shortage – see plan below
City of Keene	1,338	934	Projected surplus
City of Mansfield	0	0	No projected surplus/shortage
Mountain Peak WSC	(421)	(888)	Projected shortage – see plan below
Parker WSC	(400)	(675)	Projected shortage – see plan below
City of Rio Vista	(69)	(106)	Projected shortage – see plan below
City of Venus	1,015	1,021	Projected surplus
County-Other	(2,516)	(2,977)	Projected shortage – see plan below
Manufacturing	(2,546)	(3,639)	Projected shortage – see plan below
Steam-Electric	(1,200)	(1,200)	Projected shortage – see plan below
Mining	(285)	(315)	Projected shortage – see plan below
Irrigation	571	571	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-33 and C-34, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.17.1 City of Alvarado

4C.17.1.1 Description of Supply

- Source: Groundwater – Trinity Aquifer; Surface water from Johnson County SUD
- Estimated Reliable Supply: 86 acft/yr

4C.17.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Alvarado:

- Overdraft the Trinity Aquifer, and
- Purchase water from the City of Venus.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.1.3 Costs

Costs of the Recommended Plan for the City of Alvarado.

- a. Overdraft Trinity Aquifer:
 - Cost Source: None
 - Date to be Implemented: before 2010
 - Total Project Cost: No project cost – assumes current infrastructure is sufficient
 - Annual Cost: No annual cost – assumes current operating costs are sufficient
- b. Purchase Water from the City of Venus:
 - Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
 - Date to be Implemented: before 2030
 - Annual Cost: \$536,270 (at full implementation)

**Table 4C.17-2.
Recommended Plan Costs by Decade for the City of Alvarado**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(401)	(433)	(473)	(510)	(569)	(647)
Overdraft Trinity Aquifer						
Supply From Plan Element (acft/yr)	401	444	—	—	—	—
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from City of Venus						
Supply From Plan Element (acft/yr)	—	—	484	521	580	658
Annual Cost (\$/yr)			\$394,460	\$424,615	\$472,700	\$536,270
Unit Cost (\$/acft)			\$815	\$815	\$815	\$815

4C.17.2 Bethany WSC

4C.17.2.1 Description of Supply

- Source: Groundwater – Trinity Aquifer;
- Estimated Reliable Supply: 87 acft/yr

4C.17.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Bethany WSC:

- Purchase water from Johnson County SUD. This will require Johnson County SUD to implement recommended water management strategies to meet demand.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.2.3 Costs

Costs of the Recommended Plan for Bethany WSC.

a. Purchase water from Johnson County SUD:

- Cost Source: Based on unit costs from Section 4B.11.1 (Reuse through Joe Pool Reservoir)
- Date to be Implemented: before 2010
- Unit Cost: \$617/acft
- Annual Cost: \$1,721,43

**Table 4C.17-3.
Recommended Plan Costs by Decade for Bethany WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(276)	(310)	(344)	(384)	(440)	(515)
Purchase water from Johnson County SUD						
Supply From Plan Element (acft/yr)	276	310	344	384	440	515
Annual Cost (\$/yr)	\$170,292	\$191,270	\$212,248	\$236,928	\$271,480	\$317,755
Unit Cost (\$/acft)	\$617	\$617	\$617	\$617	\$617	\$617

4C.17.3 Bethesda WSC

4C.17.3.1 Description of Supply

- Source: Groundwater – Trinity Aquifer;
- Estimated Reliable Supply: 393 acft/yr

4C.17.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Bethesda WSC:

- Purchase water from the City of Fort Worth.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.3.3 Costs

Costs of the Recommended Plan for Bethesda WSC.

- Purchase Water from the City of Fort Worth:
 - Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
 - Date to be Implemented: before 2010
 - Annual Cost: \$5,462,945 in 2060

**Table 4C.17-4.
Recommended Plan Costs by Decade for Bethesda WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(2,358)	(3,022)	(3,722)	(4,505)	(5,470)	(6,703)
Purchase water from City of Fort Worth (TRWD)						
Supply From Plan Element (acft/yr)	2,358	3,022	3,722	4,505	5,470	6,703
Annual Cost (\$/yr)	\$1,921,770	\$2,462,930	\$3,033,430	\$3,671,575	\$4,458,050	\$5,462,945
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.17.4 City of Burleson

4C.17.4.1 Description of Supply

The City of Burleson obtains its water supply from Tarrant Regional Water District (TRWD). The city purchases water through the City of Fort Worth supply system. Based on the amount of supply currently available from TRWD, the City of Burleson is projected to have a shortage of 1,910 acft/yr in the year 2030 and 3,996 acft/yr in the year 2060.

4C.17.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Burleson:

- Purchase water from the City of Fort Worth.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.4.3 Costs

Costs of the Recommended Plan for the City of Burleson.

- a. Purchase Water from the City of Fort Worth:
 - Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
 - Date to be Implemented: before 2010
 - Annual Cost: \$3,256,740 in 2060

**Table 4C.17-5.
Recommended Plan Costs by Decade for the City of Burleson**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(990)	(1,422)	(1,910)	(2,432)	(3,116)	(3,996)
Purchase water from City of Fort Worth (TRWD)						
Supply From Plan Element (acft/yr)	990	1,422	1,910	2,432	3,116	3,996
Annual Cost (\$/yr)	\$806,850	\$1,158,930	\$1,556,650	\$1,982,080	\$2,539,540	\$3,256,740
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.17.5 City of Cleburne

4C.17.5.1 Description of Supply

The City of Cleburne obtains its water supply from Lake Pat Cleburne, Lake Aquilla, and groundwater from the Trinity Aquifer. The City of Cleburne is projected to have a surplus of 1,791 acft/yr in the year 2030 and a shortage of 2,853 acft/yr in the year 2060.

4C.17.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Cleburne:

- Conservation
- Reuse (The City has implemented a reuse program, which it has committed to expanding.)

4C.17.5.3 Costs

Costs of the Recommended Plan for the City of Cleburne.

- a. Conservation
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: \$195,700 (maximum annual cost in 2020)
- b. Reuse:
 - Cost Source: Strategy Evaluation (Section 4B.3)
 - Date to be Implemented: before 2010
 - Annual Cost: \$1,512,090 (Based on unit costs from Section 4B.3)

**Table 4C.17-6.
Recommended Plan Costs by Decade for the City of Cleburne**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	4,225	3,013	1,791	483	(1,051)	(2,853)
Conservation						
Supply From Plan Element (acft/yr)	229	515	454	413	416	473
Annual Cost (\$/yr)	\$87,020	\$195,700	\$172,520	\$156,940	\$158,080	\$179,740
Unit Cost (\$/acft)	\$530	\$530	\$530	\$530	\$530	\$530
Reuse						
Supply From Plan Element (acft/yr)	351	351	351	351	1,051	2,853
Annual Cost (\$/yr)	\$186,030	\$186,030	\$186,030	\$186,030	\$557,030	\$1,512,090
Unit Cost (\$/acft)	\$530	\$530	\$530	\$530	\$530	\$530

4C.17.6 City of Godley

4C.17.6.1 Description of Supply

The City of Godley obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Godley is projected to have a shortage of 224 acft/yr in the year 2030 and 403 acft/yr in the year 2060.

4C.17.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages of the City of Godley:

- Purchase water from the BRA SWATS plant.
- Reuse is considered an alternative to the SWATS supply.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.6.3 Costs

Costs of the Recommended Plan for the City of Godley.

a. Purchase from BRA SWATS:

- Cost Source: Based on treatment costs of \$3.50/1000 gal plus purchase and transmission costs

- Date to be Implemented: before 2010
- Unit Cost: \$1,512/acft (\$4.64/1,000 gal)
- Annual Cost: \$609,336

**Table 4C.17-7.
Recommended Plan Costs by Decade for the City of Godley**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(141)	(180)	(224)	(269)	(329)	(403)
Purchase from BRA SWATS						
Supply From Plan Element (acft/yr)	141	180	224	269	329	403
Annual Cost (\$/yr)	\$213,192	\$272,160	\$338,688	\$406,728	\$497,448	\$609,336
Unit Cost (\$/acft)	\$1,512	\$1,512	\$1,512	\$1,512	\$1,512	\$1,512

4C.17.7 City of Grandview

4C.17.7.1 Description of Supply

The City of Grandview obtains its water supply from groundwater from the Woodbine Aquifer. The City of Grandview is projected to have a shortage of 1 acft/yr in the year 2060.

4C.17.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Grandview:

- Conservation.

4C.17.7.3 Costs

Costs of the Recommended Plan for the City of Grandview.

- Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2060
 - Annual Cost: \$360 in 2060

**Table 4C.17-8.
Recommended Plan Costs by Decade for the City of Grandview**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	76	65	55	43	25	(1)
Conservation						
Supply From Plan Element (acft/yr)	—	—	—	—	—	1
Annual Cost (\$/yr)						\$380
Unit Cost (\$/acft)						\$380

4C.17.8 Johnson County FWSD No. 1

4C.17.8.1 Description of Supply

The Johnson County FWSD No. 1 obtains its water supply from groundwater from the Trinity Aquifer and surface water supplies from the Brazos River Authority. Johnson County FWSD No. 1 is projected to have a shortage of 609 acft/yr in the year 2060.

4C.17.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the Johnson County FWSD No. 1:

- Additional supply from BRA SWATS.
- Conservation was also considered; however, the utility's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.8.3 Costs

Costs of the Recommended Plan for the Johnson County FWSD No. 1.

- Cost Source: Based on treatment costs of \$3.50/1000 gal plus purchase and transmission costs
- Date to be Implemented: before 2010
- Unit Cost: \$1,512/acft (\$4.64/1,000 gal)
- Annual Cost: \$982,800

**Table 4C.17-9.
Recommended Plan Costs by Decade for the Johnson County FWSD No. 1**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	355	209	64	(112)	(329)	(609)
Additional Supply from BRA SWATS						
Supply From Plan Element (acft/yr)	—	—	—	150	350	650
Annual Cost (\$/yr)				\$226,800	\$529,200	\$982,800
Unit Cost (\$/acft)				\$1,512	\$1,512	\$1,512

4C.17.9 Johnson County SUD (Formerly Johnson County Rural WSC)

4C.17.9.1 Description of Supply

Johnson County SUD (which remains Johnson County Rural WSC in the TWDB database) obtains its water supply from groundwater from the Trinity Aquifer, and a contract with the Brazos River Authority for water from Lake Granbury through the SWATS system. Johnson County SUD is projected to have a shortage of 2,456 acft/yr in the year 2030, and a shortage of 13,252 acft/yr in the year 2060.

4C.17.9.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Johnson County SUD:

- Conservation, and
- Purchase water from the Trinity River Authority Joe Pool Reservoir Reuse Project.
- Alternatives to this strategy are additional use of Lake Granbury supply (Volume II, Section 4B.6.1) and Aquifer Storage and Recover (ASR) in the Trinity Aquifer (Volume II, Section 4B.8.2).

4C.17.9.3 Costs

Costs of the Recommended Plan for Johnson County SUD.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$1,820,960 in 2060

- b. Reuse from Trinity River Authority (Joe Pool Reservoir):
- Cost Source: Volume II, Section 4B.11.1
 - Date to be Implemented: before 2030
 - Total Project Cost: \$79,257,000
 - Annual Cost: \$12,003,200

Table 4C.17-10.
Recommended Plan Costs by Decade for Johnson County SUD

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2,284	39	(2,456)	(5,431)	(9,212)	(13,252)
Conservation						
Supply From Plan Element (acft/yr)	423	1,307	1,883	2,761	3,941	4,792
Annual Cost (\$/yr)	\$160,740	\$496,660	\$715,540	\$1,049,180	\$1,497,580	\$1,820,960
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Reuse from Trinity River Authority (Joe Pool Reservoir)						
Supply From Plan Element (acft/yr)	—	—	20,000	20,000	20,000	20,000
Annual Cost (\$/yr)			\$12,003,200	\$12,003,200	\$12,003,200	\$12,003,200
Unit Cost (\$/acft)			\$600	\$600	\$600	\$600

4C.17.10 City of Joshua

4C.17.10.1 Description of Supply

The City of Joshua obtains its water supply from Johnson County Fresh Water Supply District No. 1 (Johnson Co. FWSD No. 1). Johnson Co. FWSD No. 1 utilizes groundwater from the Trinity Aquifer and surface water from Lake Granbury through the BRA SWATS plant. Based on the existing supply available from groundwater and SWATS, a shortage of 782 acft/yr is projected in the year 2030 and 1,163 acft/yr in the year 2060.

4C.17.10.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Joshua:

- Purchase additional water from BRA SWATS through Johnson County FWSD No. 1.

- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.10.3 Costs

Costs of the Recommended Plan for the City of Joshua.

- Purchase additional water from BRA SWATS through Johnson County FWSD No. 1:
 - Cost Source: Based on treatment costs of \$3.50/1000 gal plus purchase and transmission costs
 - Date to be Implemented: before 2010
 - Unit Cost: \$1,512/acft (\$4.64/1,000 gal)
 - Annual Cost: \$982,800

**Table 4C.17-11.
Recommended Plan Costs by Decade for the City of Joshua**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(626)	(702)	(782)	(875)	(1,000)	(1,163)
Purchase Additional Water from SWATS through Johnson County FWSD No. 1						
Supply From Plan Element (acft/yr)	626	702	782	875	1,000	1,163
Annual Cost (\$/yr)	\$946,512	\$1,061,424	\$1,182,384	\$1,323,000	\$1,512,000	\$1,758,456
Unit Cost (\$/acft)	\$1,512	\$1,512	\$1,512	\$1,512	\$1,512	\$1,512

4C.17.11 City of Keene

The City of Keene obtains its water supply from groundwater from the Trinity Aquifer and a contract with the Brazos River Authority. No shortages are projected for the City of Keene and no changes in water supply are recommended.

4C.17.12 City of Mansfield

The City of Mansfield obtains its water supply from surface water from the Tarrant Regional Municipal Water District (TRMWD), principally located in Region C. The city has contracted for sufficient quantity of water supply to meet its projected needs through the year 2060. No shortage is projected for the City of Mansfield and no changes in water supply are recommended.

4C.17.13 Mountain Peak WSC**4C.17.13.1 Description of Supply**

Mountain Peak WSC obtains its water supply from groundwater from the Trinity Aquifer. Based on the existing supply available from groundwater, a shortage of 421 acft/yr is projected in the year 2030 and 888 acft/yr in the year 2060.

4C.17.13.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Mountain Peak WSC:

- Conservation, and
- Purchase water from the City of Midlothian.

4C.17.13.3 Costs

Costs of the Recommended Plan for Mountain Peak WSC.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$26,980 in 2060

b. Purchase water from the City of Midlothian:

- Cost Source: Assumed unit cost of \$815/acft treated water (\$2.50/1,000 gal)
- Date to be Implemented: before 2010
- Annual Cost: \$723,270 in 2060

**Table 4C.17-12.
Recommended Plan Costs by Decade for Mountain Peak WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(200)	(307)	(421)	(540)	(696)	(888)
Conservation						
Supply From Plan Element (acft/yr)	10	37	44	46	57	71
Annual Cost (\$/yr)	\$3,800	\$14,060	\$16,720	\$17,480	\$21,660	\$26,980
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase Water from the City of Midlothian						
Supply From Plan Element (acft/yr)	200	307	421	540	696	888
Annual Cost (\$/yr)	\$163,000	\$250,205	\$343,115	\$440,100	\$567,240	\$723,720
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.17.14 Parker WSC**4C.17.14.1 Description of Supply**

Parker WSC obtains its water supply from groundwater from the Trinity Aquifer. Based on the existing supply available from groundwater, a shortage of 400 acft/yr is projected in the year 2030 and 675 acft/yr in the year 2060.

4C.17.14.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Parker WSC:

- Purchase water from Johnson County SUD. This will require Johnson County SUD to implement recommended water management strategies to meet demand.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.14.3 Costs

Costs of the Recommended Plan for Parker WSC.

a. Purchase Water from Johnson County SUD:

- Cost Source: Based on unit costs from Section 4B.11.1 (Reuse through Joe Pool Reservoir)
- Date to be Implemented: before 2010
- Unit Cost: \$617/acft
- Annual Cost: \$416,475 (at full implementation)

**Table 4C.17-13.
Recommended Plan Costs by Decade for Parker WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(280)	(339)	(400)	(471)	(562)	(675)
Purchase water from Johnson County SUD						
Supply From Plan Element (acft/yr)	280	339	400	471	562	675
Annual Cost (\$/yr)	\$172,760	\$209,163	\$246,800	\$290,607	\$346,754	\$416,475
Unit Cost (\$/acft)	\$617	\$617	\$617	\$617	\$617	\$617

4C.17.15 City of Rio Vista**4C.17.15.1 Description of Supply**

The City of Rio Vista obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Rio Vista is projected to have a shortage of 69 acft/yr in the year 2030 and 106 acft/yr in the year 2060.

4C.17.15.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Rio Vista:

- Purchase water from Johnson County SUD. This will require Johnson County SUD to implement recommended water management strategies to meet demand.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.17.15.3 Costs

Costs of the recommended plan for the City of Rio Vista to meet the projected shortages are:

- Purchase water from Johnson County SUD:
 - Cost Source: Based on unit costs from Section 4B.11.1 (Reuse through Joe Pool Reservoir)
 - Date to be Implemented: before 2010
 - Unit Cost: \$617/acft
 - Annual Cost: \$65,402 (at full implementation)

**Table 4C.17-14.
Recommended Plan Costs by Decade for the City of Rio Vista**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(54)	(61)	(69)	(77)	(89)	(106)
Purchase water from Johnson County SUD						
Supply From Plan Element (acft/yr)	54	61	69	77	89	106
Annual Cost (\$/yr)	\$33,318	\$37,637	\$42,573	\$47,509	\$54,913	\$65,402
Unit Cost (\$/acft)	\$617	\$617	\$617	\$617	\$617	\$617

4C.17.16 City of Venus

The City of Venus obtains its water supply from groundwater from the Woodbine Aquifer and surface water from the City of Midlothian. The city has a sufficient quantity of water supply to meet its projected needs through the year 2060. No shortage is projected for the City of Venus and no changes in water supply are recommended.

4C.17.17 County-Other**4C.17.17.1 Description of Supply**

Johnson County-Other obtains its water supply primarily from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Johnson County-Other is projected to have a shortage of 2,516 acft/yr in the year 2030 and 2,977 acft/yr in the year 2060.

4C.17.17.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Johnson County-Other:

- Conservation, and
- Purchase water from Johnson County SUD. This will require Johnson County SUD to implement recommended water management strategies to meet demand.

4C.17.17.3 Costs

Costs of the recommended plan for Johnson County-Other to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$79,040 in 2020
- b. Purchase water from Johnson County SUD:
 - Cost Source: Based on unit costs from Section 4B.11.1 (Reuse through Joe Pool Reservoir)
 - Date to be Implemented: before 2010
 - Unit Cost: \$617/acft
 - Annual Cost: \$1,680,091

**Table 4C.17-15.
Recommended Plan Costs by Decade for Johnson County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(2,323)	(2,418)	(2,516)	(2,623)	(2,775)	(2,977)
Conservation						
Supply From Plan Element (acft/yr)	87	208	190	171	166	175
Annual Cost (\$/yr)	\$33,060	\$79,040	\$72,200	\$64,980	\$63,080	\$66,500
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase water from Johnson County SUD						
Supply From Plan Element (acft/yr)	2,236	2,210	2,326	2,452	2,609	2,723
Annual Cost (\$/yr)	\$1,379,512	\$1,363,570	\$1,435,142	\$1,512,884	\$1,609,753	\$1,680,091
Unit Cost (\$/acft)	\$617	\$617	\$617	\$617	\$617	\$617

4C.17.18 Manufacturing

4C.17.18.1 Description of Supply

Johnson County Manufacturing obtains its water supply primarily from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Johnson County Manufacturing is projected to have a shortage of 2,546 acft/yr in the year 2030 and 3,639 acft/yr in the year 2060.

4C.17.18.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Johnson County Manufacturing:

- Conservation, and
- Purchase reuse water from the City of Cleburne.
- Alternative strategy considered was purchase of water from BRA System.

4C.17.18.3 Costs

Costs of the recommended plan for Johnson County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase reuse water from the City of Cleburne:
 - Cost Source: Volume II (Section 4B.3)
 - Date to be Implemented: before 2010
 - Annual Cost: \$1,780,270

**Table 4C.17-16.
Recommended Plan Costs by Decade for Johnson County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,762)	(2,159)	(2,546)	(2,939)	(3,291)	(3,639)
Conservation						
Supply From Plan Element (acft/yr)	64	126	203	231	255	280
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase reuse water from the City of Cleburne						
Supply From Plan Element (acft/yr)	1,698	2,033	2,343	2,708	3,036	3,359
Annual Cost (\$/yr)	\$899,940	\$1,077,490	\$1,241,790	\$1,435,240	\$1,609,080	\$1,780,270
Unit Cost (\$/acft)	\$530	\$530	\$530	\$530	\$530	\$530

4C.17.19 Steam-Electric

4C.17.19.1 Description of Supply

Johnson County Steam-Electric currently does not a supply value assigned. Johnson County Steam-Electric is projected to have a shortage of 1,200 acft/yr in the year 2030 and 2060.

4C.17.19.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Johnson County Steam-Electric:

- Conservation, and
- Purchase reuse water from the City of Cleburne.

4C.17.19.3 Costs

Costs of the recommended plan for Johnson County Steam-Electric to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase reuse water from the City of Cleburne:
 - Cost Source: Strategy Evaluation (Section 4B.3)
 - Date to be Implemented: before 2010
 - Annual Cost: \$591,480 (Based on unit costs from Section 4B.3)

**Table 4C.17-17.
Recommended Plan Costs by Decade for Johnson County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,200)	(1,200)	(1,200)	(1,200)	(1,200)	(1,200)
Conservation						
Supply From Plan Element (acft/yr)	36	60	84	84	84	84
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase Reuse Water from the City of Cleburne						
Supply From Plan Element (acft/yr)	1,164	1,140	1,116	1,116	1,116	1,116
Annual Cost (\$/yr)	\$616,920	\$604,200	\$591,480	\$591,480	\$591,480	\$591,480
Unit Cost (\$/acft)	\$530	\$530	\$530	\$530	\$530	\$530

4C.17.20 Mining**4C.17.20.1 Description of Supply**

Johnson County Mining obtains its water supply from groundwater from the Trinity Aquifer and various run-of-river rights. Based on the available groundwater and surface water supply, Johnson County Mining is projected to have a shortage of 285 acft/yr in the year 2030 and 315 acft/yr in the year 2060.

4C.17.20.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Johnson County Mining:

- Conservation, and
- Purchase water from the BRA System.

4C.17.20.3 Costs

Costs of the recommended plan for Johnson County Mining to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase water from the BRA System:
 - Cost Source: Strategy Evaluation (Section 4B.4), less treatment costs
 - Date to be Implemented: before 2010
 - Unit Cost: \$434/acft
 - Annual Cost: \$123,256

**Table 4C.17-18.
Recommended Plan Costs by Decade for Johnson County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(257)	(274)	(285)	(296)	(307)	(315)
Conservation						
Supply From Plan Element (acft/yr)	11	20	28	29	30	31
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from the BRA System						
Supply From Plan Element (acft/yr)	246	254	257	267	277	284
Annual Cost (\$/yr)	\$106,764	\$110,236	\$111,538	\$115,878	\$120,218	\$123,256
Unit Cost (\$/acft)	\$434	\$434	\$434	\$434	\$434	\$434

4C.17.21 *Irrigation*

No shortage is projected for Johnson County Irrigation and no changes in water supply are recommended.

4C.17.22 *Livestock*

No shortage is projected for Johnson County Livestock and no changes in water supply are recommended.

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4C.18 Jones County Water Supply Plan

Table 4C.18-1 lists each water user group in Jones County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.18-1.
Jones County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Anson	1,740	1,857	Projected surplus
City of Hamlin	1,372	1,413	Projected surplus
City of Hawley	0	0	Supply equals demand
Hawley WSC	25	25	Projected surplus
City of Stamford	1,854	1,695	Projected surplus
County-Other	7	24	Projected surplus
Manufacturing	0	0	Supply equals demand
Steam-Electric	1,330	565	Projected surplus
Mining	0	0	Supply equals demand
Irrigation	2,046	2,074	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-35 and C-36, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.18.1 City of Anson

The City of Anson obtains water from Hubbard Creek Reservoir through the WCTMWD. It has a projected surplus for the study period and no changes in water supply are recommended.

4C.18.2 City of Hamlin

The City of Hamlin obtains water from the Lake Stamford through the City of Stamford. The City has a projected surplus and no changes in water supply are recommended.

4C.18.3 City of Hawley

The City of Hawley is supplied with water from Hawley WSC. No shortages are projected and no changes in water supply are recommended.

4C.18.4 Hawley WSC

Hawley WSC is supplied with water from the City of Abilene. No shortages are projected and no changes in water supply are recommended. However as an alternate strategy

Hawley WSC could receive water from the City of Anson's connection to the Abilene-Hamlin line.

4C.18.5 City of Stamford

The City of Stamford is supplied with water from Lake Stamford. No shortages are projected and no changes in water supply are recommended

4C.18.6 County-Other

No shortages are projected for County-Other and no changes in water supply are recommended.

4C.18.7 Manufacturing

No shortages are projected for Jones County Manufacturing and no changes in water supply are recommended.

4C.18.8 Steam-Electric

No shortages are projected for Steam-Electric and no changes in water supply are recommended.

4C.18.9 Mining

No shortages are projected for Mining and no changes in water supply are recommended.

4C.18.10 Irrigation

No shortages are projected for Irrigation and no changes in water supply are recommended.

4C.18.11 Livestock

No shortages are projected for Livestock and no changes in water supply are recommended.

4C.19 Kent County Water Supply Plan

Table 4C.19-1 lists each water user group in Kent County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.19-1.
Kent County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage)¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Jayton	167	205	Projected surplus
County-Other	(16)	(3)	Projected shortage- see plan below
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	0	0	Supply equals demand
Irrigation	310	307	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-37 and C-38, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.19.1 City of Jayton

Water supply for the City of Jayton is groundwater from the Seymour and Dockum Aquifers. No shortages are projected and no changes in water supply are recommended.

4C.19.2 County-Other

4C.19.2.1 Description of Supply

Supplies are currently obtained from local groundwater, and the Seymour and Dockum Aquifers. Due to water quality limitations, current supplies are not sufficient to meet demands through 2060. Surface water supplies are projected to become available from the Lake Alan Henry Water Supply District.

4C.19.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages for entities included in Kent County-Other:

- Purchase supply from Lake Alan Henry Water District.
- Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.19.2.3 Costs

Cost of the Recommended Plan for the County-Other.

c. Water Supply from Lake Alan Henry Water Supply District:

- Cost Source: Cost estimate prepared in coordination with the Lake Alan Henry Water Supply District and the City of Lubbock
- Date to be Implemented: before 2010
- Total Project Cost: \$5,613,000
- Annual Cost: \$757,000 (total project); \$140,200 (County-Other portion)

**Table 4C.19-2.
Recommended Plan Costs by Decade for the Kent County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(22)	(20)	(16)	(9)	(5)	(3)
Water Supply from Lake Alan Henry Water Supply District						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$140,200	\$140,200	\$140,200	\$140,200	\$140,200	\$140,200
Unit Cost (\$/acft)	\$2,804	\$2,804	\$2,804	\$2,804	\$2,804	\$2,804

4C.19.3 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.19.4 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.19.5 Mining

No shortages are projected for Mining and no changes in water supply are recommended.

4C.19.6 Irrigation

No shortages are projected for Irrigation and no changes in water supply are recommended.

4C.19.7 Livestock

No shortages are projected for Livestock and no changes in water supply are recommended.

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4C.20 Knox County Water Supply Plan

Table 4C.20-1 lists each water user group in Knox County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.20-1.
Knox County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Knox City	(153)	(216)	Projected shortage – see plan below
City of Munday	(185)	(250)	Projected shortage – see plan below
County-Other	(26)	(22)	Projected shortage – see plan below
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	(3)	(3)	Projected shortage – see plan below
Irrigation	(13,317)	(10,460)	Projected shortage – see plan below
Livestock	0	0	No demand or supply

¹ From Tables C-39 and C-40, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.20.1 Knox City

4C.20.1.1 Description of Supply

Knox City obtains surface water via a contract with North Central Texas MWD (NCTMWD) and current supplies are insufficient to meet projected demands in years 2010 through 2060.

4C.20.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of Knox City:

- Conservation
- Purchase additional water from NCTMWD; however, NCTMWD must complete the recommended Wholesale Provider Strategy described in Section 4B.7 to ensure sufficient supplies.

4C.20.1.3 Costs

Costs of the Recommended Plan for Knox City

a. Conservation

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: 2010
- Annual Cost: \$4,180 in 2060

c. Additional water supply from NCTMWD:

- Date to be Implemented: 2010
- Total Project Cost:none (current infrastructure assumed sufficient)
- Unit Cost: \$423/acft (wholesale treated water cost)
- Annual Cost: \$ 105,750

**Table 4C.20-2.
Recommended Plan Costs by Decade for Knox City**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(106)	(134)	(153)	(174)	(195)	(216)
Conservation						
Supply From Plan Element (acft/yr)	9	21	17	13	11	11
Annual Cost (\$/yr)	\$3,420	\$7,980	\$6,460	\$4,940	\$4,180	\$4,180
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Water from NCTMWD						
Supply From Plan Element (acft/yr)	250	250	250	250	250	250
Annual Cost (\$/yr)	\$105,750	\$105,750	\$105,750	\$105,750	\$105,750	\$105,750
Unit Cost (\$/acft)	\$423	\$423	\$423	\$423	\$423	\$423

4C.20.2 City of Munday

4C.20.2.1 Description of Supply

The City of Munday obtains surface water via a contract with North Central Texas MWD (NCTMWD) and current supplies are insufficient to meet projected demands in years 2010 through 2060.

4C.20.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the shortages projected for the City of Munday:

- Conservation
- Purchase additional water from NCTMWD; however, NCTMWD must complete the recommended Wholesale Provider Strategy described in Section 4B.7 to ensure sufficient supplies.

4C.20.2.3 Costs

Costs of the Recommended Plan for the City of Munday:

a. Conservation

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: 2010
- Annual Cost: maximum of \$9,500 in 2020

b. Additional water supply from NCTMWD:

- Date to be Implemented: 2010
- Total Project Cost: none (current infrastructure assumed to be adequate)
- Annual Cost: \$ 105,750

**Table 4C.20-3.
Recommended Plan Costs by Decade for the City of Munday**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(142)	(165)	(185)	(205)	(226)	(250)
Conservation						
Supply From Plan Element (acft/yr)	10	25	20	15	11	10
Annual Cost (\$/yr)	\$3,800	\$9,500	\$7,600	\$5,700	\$4,180	\$3,800
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Water from NCTMWD						
Supply From Plan Element (acft/yr)	250	250	250	250	250	250
Annual Cost (\$/yr)	\$105,750	\$105,750	\$105,750	\$105,750	\$105,750	\$105,750
Unit Cost (\$/acft)	\$423	\$423	\$423	\$423	\$423	\$423

4C.20.3 County-Other Category

4C.20.3.1 Description of Supply

Supplies for County-Other are insufficient to meet demands and shortages are projected from 2010 through 2060.

4C.20.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages of the County-Other entities.

- Purchase additional water from NCTMWD; however, NCTMWD must complete the recommended Wholesale Provider Strategy described in Section 4B.7 to ensure sufficient supplies.
- Conservation was also considered; however, the County-Other's current per capita use rate is below the selected target of 140 gpcd.

4C.20.3.3 Costs

Costs of the Recommended Plan for the City of Munday

a. Additional water supply from NCTMWD:

- Date to be Implemented: 2010
- Total Project Cost: none (current infrastructure is assumed to be adequate)
- Annual Cost: \$ 21,150

**Table 4C.20-4.
Recommended Plan Costs by Decade for Knox County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(21)	(27)	(26)	(24)	(24)	(22)
Water Supply from NCTMWD						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$21,150	\$21,150	\$21,150	\$21,150	\$21,150	\$21,150
Unit Cost (\$/acft)	\$423	\$423	\$423	\$423	\$423	\$423

4C.20.4 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.20.5 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.20.6 Mining

4C.20.6.1 Description of Supply

Shortages are projected for Mining in years 2010 to 2060.

4C.20.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages for Mining:

- Conservation
- Overdraft Seymour Aquifer using existing infrastructure

4C.20.6.3 Costs

Costs of the Recommended Plan for Knox County Mining

a. Overdraft Seymour Aquifer:

- Cost Source: Seymour Aquifer
- Date to be Implemented: 2010
- Total Project Cost: none (current infrastructure assumed to be adequate)
- Annual Cost: N/A (unit cost would be the same current operational costs.)

b. Conservation

- Date to be Implemented: 2010
- Annual Cost: not determined

**Table 4C.20-5.
Recommended Plan Costs by Decade for Knox County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(3)	(3)	(3)	(3)	(3)	(3)
Conservation						
Supply From Plan Element (acft/yr)	1	1	2	2	2	2
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Overdraft Seymour Aquifer						
Supply From Plan Element (acft/yr)	2	2	1	1	1	1
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—

4C.20.7 Irrigation**4C.20.7.1 Description of Supply**

Surface water supplies for Irrigation in Knox County are obtained from Wild Horse Creek, Lake Catherine, and Lake Davis. Irrigation shortages are projected through 2060.

4C.20.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected Irrigation shortages in the county, however the recommended strategies cannot meet the entire projected shortages:

- Conservation
- Brush Control (unquantifiable costs and savings)
- Weather Modification (unquantifiable costs and savings)

4C.20.7.3 Costs

Costs of the Recommended Plan for Irrigation.

a. Additional water supply from Conservation

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: 2010
- Unit Cost: \$160/acft of water saved
- Annual Cost: \$448,320

**Table 4C.20-6.
Recommended Plan Costs by Decade for Knox County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(15,343)	(14,318)	(13,317)	(12,340)	(11,388)	(10,460)
Conservation						
Supply From Plan Element (acft/yr)	1,262	2,052	2,802	2,733	2,666	2,600
Annual Cost (\$/yr)	\$201,920	\$328,320	\$448,320	\$437,280	\$426,560	\$416,000
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160

4C.20.8 Livestock

No future shortages are projected for Livestock uses and no changes in water supply are recommended.

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4C.21 Lampasas County Water Supply Plan

Table 4C.21-1 lists each water user group in Lampasas County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.21-1.
Lampasas County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Kempner	0	0	No projected need
City of Lampasas	274	293	Projected surplus
City of Lometa	0	0	No projected surplus/shortage
County-Other	(703)	(845)	Projected shortage – see plan below
Manufacturing	(135)	(169)	Projected shortage – see plan below
Steam-Electric	0	0	No projected demand
Mining	(24)	(23)	Projected shortage – see plan below
Irrigation	1,222	1,223	Projected surplus
Livestock	0	0	No projected need

¹ From Tables C-41 and C-42, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.21.1 City of Kempner

The City of Kempner obtains its water supply from surface water from Kempner WSC. The city has a sufficient quantity of water supply to meet its projected needs through the year 2060. No shortage is projected for the City of Kempner and no changes in water supply are recommended.

4C.21.2 City of Lampasas

The City of Lampasas obtains its water supply from surface water from the Central Texas WSC via Kempner WSC (Lake Stillhouse Hollow). The city has a sufficient quantity of water supply to meet its projected needs through the year 2060. No shortage is projected for the City of Lampasas and no changes in water supply are recommended.

4C.21.3 City of Lometa

4C.21.3.1 Description of Supply

City of Lometa water system is owned by the Lower Colorado River Authority, and is supplied water from the LCRA Highland Lakes System. The city has a sufficient quantity of water supply to meet its projected needs through the year 2060. No shortage is projected for the City of Lometa and no changes in water supply are recommended.

4C.21.4 County-Other

4C.21.4.1 Description of Supply

Lampasas County-Other obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Lampasas County-Other is projected to have a shortage of 703 acft/yr in the year 2030 and 845 acft/yr in the year 2060.

4C.21.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Lampasas County-Other:

- Conservation, and
- Additional Trinity Aquifer Development.

4C.21.4.3 Costs

Costs of the recommended plan for Lampasas County-Other to meet the projected shortages are:

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$50,920 in 2020
- b. Additional Trinity Aquifer Development:
 - Date to be Implemented: By year 2010
 - Total Project Cost: \$2,576,000
 - Annual Cost: \$245,000

The project cost includes eleven 100 gpm wells drilled to a depth of 200 feet in the Trinity Aquifer.

**Table 4C.21-2.
Recommended Plan Costs by Decade for Lampasas County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(473)	(608)	(703)	(767)	(810)	(845)
Conservation						
Supply From Plan Element (acft/yr)	55	134	126	114	107	110
Annual Cost (\$/yr)	\$20,900	\$50,920	\$47,880	\$43,320	\$40,660	\$41,800
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Trinity Aquifer Development						
Supply From Plan Element (acft/yr)	850	850	850	850	850	850
Annual Cost (\$/yr)	\$245,000	\$245,000	\$245,000	\$245,000	\$245,000	\$245,000
Unit Cost (\$/acft)	\$288	\$288	\$288	\$288	\$288	\$288

4C.21.5 Manufacturing

4C.21.5.1 Description of Supply

Lampasas County Manufacturing obtains its water supply from run-of-river rights. Based on the available surface water supply, Lampasas County Manufacturing is projected to have a shortage of 135 acft/yr in the year 2030 and 169 acft/yr in the year 2060.

4C.21.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Lampasas County Manufacturing:

- Conservation, and
- Purchase water from the City of Lampasas.

4C.21.5.3 Costs

Costs of the recommended plan for Lampasas County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined

b. Purchase water from the City of Lampasas:

- Cost Source: estimated wholesale treated water rate
- Date to be Implemented: By year 2010
- Annual Cost: \$155,040 in 2060

The annual cost was calculated by multiplying the Manufacturing projected supply from this strategy by an estimated wholesale water rate of \$912/acft.

**Table 4C.21-3.
Recommended Plan Costs by Decade for Lampasas County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(111)	(124)	(135)	(146)	(156)	(169)
Conservation						
Supply From Plan Element (acft/yr)	4	7	11	11	12	13
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from the City of Lampasas						
Supply From Plan Element (acft/yr)	150	150	150	150	160	170
Annual Cost (\$/yr)	\$136,800	\$136,800	\$136,800	\$136,800	\$145,920	\$155,040
Unit Cost (\$/acft)	\$912	\$912	\$912	\$912	\$912	\$912

4C.21.6 Steam-Electric

No Steam-Electric demand is projected for Lampasas County.

4C.21.7 Mining**4C.21.7.1 Description of Supply**

Lampasas County Mining obtains its water supply from groundwater from the Trinity and Marble Falls Aquifers. Based on the available groundwater supply, Lampasas County Mining is projected to have a shortage of 24 acft/yr in the year 2030 and 23 acft/yr in the year 2060.

4C.21.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Lampasas County Mining:

- Conservation, and
- Purchase water from the City of Lampasas.

4C.21.7.3 Costs

Costs of the recommended plan for Lampasas County Mining to meet the projected shortages are:

- Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- Purchase water from the City of Lampasas:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$27,360 in 2060

The annual cost was calculated by multiplying the Mining projected supply from this strategy by an estimated wholesale water rate of \$912/acft.

**Table 4C.21-4.
Recommended Plan Costs by Decade for Lampasas County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(26)	(25)	(24)	(24)	(22)	(23)
Conservation						
Supply From Plan Element (acft/yr)	5	7	10	9	9	9
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from the City of Lampasas						
Supply From Plan Element (acft/yr)	30	30	30	30	30	30
Annual Cost (\$/yr)	\$27,360	\$27,360	\$27,360	\$27,360	\$27,360	\$27,360
Unit Cost (\$/acft)	\$912	\$912	\$912	\$912	\$912	\$912

4C.21.8 Irrigation

No shortages are projected for Irrigation and no changes in water supply are recommended.

4C.21.9 Livestock

No shortages are projected for Livestock and no changes in water supply are recommended.

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4C.22 Lee County Water Supply Plan

Table 4C.22-1 lists each water user group in Lee County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.22-1.
Lee County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Aqua WSC	(113)	(264)	Projected shortage – see plan below
City of Giddings	(91)	(354)	Projected shortage – see plan below
Lee County WSC	(515)	(726)	Projected shortage – see plan below
City of Lexington	432	369	Projected surplus
County-Other	119	139	Projected surplus
Manufacturing	3	0	Projected surplus
Steam-Electric	0	0	No projected demand
Mining	0	0	No projected need
Irrigation	104	106	Projected surplus
Livestock	0	0	No projected need

¹ From Tables C-43 and C-44, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.22.1 Aqua WSC

4C.22.1.1 Description of Supply

Aqua WSC obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. Based on the existing supply available from groundwater, a shortage of 113 acft/yr is projected in the year 2030 and 264 acft/yr in the year 2060.

4C.22.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Aqua WSC:

- Additional Carrizo-Wilcox Aquifer Development.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.22.1.3 Costs

Costs of the Recommended Plan for Aqua WSC.

a. Additional Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2020
- Total Project Cost: \$1,047,000
- Annual Cost: \$158,000

The project cost includes one 500 gpm well drilled to a depth of 500 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.22-2.
Recommended Plan Costs by Decade for Aqua WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	3	(30)	(113)	(166)	(214)	(264)
Additional Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)		300	300	300	300	300
Annual Cost (\$/yr)		\$158,000	\$158,000	\$158,000	\$158,000	\$158,000
Unit Cost (\$/acft)		\$527	\$527	\$527	\$527	\$527

4C.22.2 City of Giddings**4C.22.2.1 Description of Supply**

The City of Giddings obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. Based on the existing supply available from groundwater, a shortage of 91 acft/yr is projected in the year 2030 and 354 acft/yr in the year 2060.

4C.22.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Giddings:

- Conservation, and
- Additional Carrizo-Wilcox Aquifer Development.

4C.22.2.3 Costs

Costs of the Recommended Plan for the City of Giddings.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$40,660 in 2020

b. Additional Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2030
- Total Project Cost: \$2,099,000
- Annual Cost: \$270,000

The project cost includes one 1,000 gpm well drilled to a depth of 2,000 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.22-3.
Recommended Plan Costs by Decade for the City of Giddings**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	185	33	(91)	(185)	(273)	(354)
Conservation						
Supply From Plan Element (acft/yr)	39	107	101	91	87	91
Annual Cost (\$/yr)	\$14,820	\$40,660	\$38,380	\$34,580	\$33,060	\$34,580
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	—	—	400	400	400	400
Annual Cost (\$/yr)			\$270,000	\$270,000	\$270,000	\$270,000
Unit Cost (\$/acft)			\$675	\$675	\$675	\$675

4C.22.3 Lee County WSC**4C.22.3.1 Description of Supply**

Lee County WSC obtains its water supply from groundwater from the Queen City Aquifer. Based on the existing supply available from groundwater, a shortage of 515 acft/yr is projected in the year 2030 and 726 acft/yr in the year 2060.

4C.22.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Lee County WSC:

- Carrizo-Wilcox Aquifer Development.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.22.3.3 Costs

Costs of the Recommended Plan for Lee County WSC.

- a. Carrizo-Wilcox Aquifer Development:
 - Date to be Implemented: By year 2010
 - Total Project Cost: \$1,762,000
 - Annual Cost: \$312,000

The project cost includes two 1,000 gpm wells drilled to a depth of 800 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.22-4.
Recommended Plan Costs by Decade for Lee County WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(305)	(418)	(515)	(595)	(663)	(726)
Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	750	750	750	750	750	750
Annual Cost (\$/yr)	\$312,000	\$312,000	\$312,000	\$312,000	\$312,000	\$312,000
Unit Cost (\$/acft)	\$416	\$416	\$416	\$416	\$416	\$416

4C.22.4 City of Lexington

The City of Lexington obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Lexington and no changes in water supply are recommended.

4C.22.5 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.22.6 Manufacturing

Manufacturing is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.22.7 Steam-Electric

No Steam-Electric demand exists nor is projected for the county.

4C.22.8 Mining

Mining is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

Projected Mining demand in Lee County is primarily associated with Alcoa's Sandow Mine, which is located in Lee and Milam Counties. The operation includes depressurization of the groundwater in the layer below the underground lignite formation in order to extract the lignite resource. The water supply available is essentially the amount of water that is produced in the depressurization operation. This operation is largely non-consumptive and the water produced is available for other uses. Mining demands in Lee County are expected to decrease from a present 20,000 acft/yr to 5,450 acft/yr in 2010 through 2040 with the expected closing of the Sandow Mine. Mining demands are projected to decrease further to 13 acft/yr after 2040. Continued mining demand in Lee County is expected from mine reclamation activities and the portion of the new Three Oaks Mine that is located in Lee County.

4C.22.9 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.22.10 Livestock

Livestock is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

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4C.23 Limestone County Water Supply Plan

Table 4C.23-1 lists each water user group in Limestone County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.23-1.
Limestone County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Bistone MWSD	511	7	Projected surplus
City of Coolidge	117	105	Projected surplus
City of Groesbeck	136	(87)	Projected shortage – see plan below
City of Mexia	692	541	Projected surplus
City of Thornton	208	210	Projected surplus
County-Other	353	507	Projected surplus
Manufacturing	(44)	(69)	Projected shortage – see plan below
Steam-Electric	1,447	(15,814)	Projected shortage – see plan below
Mining	0	0	No projected surplus/shortage
Irrigation	19	19	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-45 and C-46, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.23.1 Bistone MWSD

Bistone MWSD obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer and surface water from Lake Mexia. Bistone MWSD has adequate water supplies to meet its projected needs and no changes in water supply are recommended. However, Bistone MWSD is recommended to participate with the City of Groesbeck on development of additional Carrizo-Wilcox Aquifer supplies.

4C.23.2 City of Coolidge

The City of Coolidge obtains its water supply from Lake Mexia through service from Bistone MWSD. The City of Coolidge has contracted for sufficient water supply to meet its needs through the year 2060.

4C.23.3 City of Groesbeck

4C.23.3.1 Description of Supply

The City of Groesbeck obtains its water supply from the Navasota River. The City owns senior water rights (priority date of 1921) on the Navasota River and has limited storage available from Springfield Lake. Based on the available surface water supply, the City of Groesbeck is projected to have a shortage of 87 acft/yr in the year 2060.

4C.23.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Groesbeck:

- Development of Carrizo-Wilcox Aquifer.¹
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.23.3.3 Costs

Costs of the recommended plan for the City of Groesbeck to meet the projected shortages are:

- a. Development of the Carrizo-Wilcox Aquifer:
 - Date to be Implemented: By year 2060
 - Total Project Cost: \$566,000
 - Annual Cost: \$75,000

The project cost includes one 150 gpm well drilled to a depth of 400 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.23-2.
Recommended Plan Costs by Decade for the City of Groesbeck**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	382	219	136	71	7	(87)
Development of the Carrizo-Wilcox Aquifer						
Supply From Plan Element (acft/yr)	—	—	—	—	—	100
Annual Cost (\$/yr)						\$75,000
Unit Cost (\$/acft)						\$750

¹ Possibly in cooperation with Bistone MWSD.

4C.23.4 City of Mexia

The City of Mexia obtains its water supply from its own groundwater sources and purchased groundwater from the Bistone Water Supply District. The City of Mexia has sufficient water supply to meet its needs through the year 2060.

4C.23.5 City of Thornton

The City of Thornton obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Thornton and no changes in water supply are recommended.

4C.23.6 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.23.7 Manufacturing

4C.23.7.1 Description of Supply

Limestone County Manufacturing obtains its water supply from various run-of-river rights. Based on the available surface water supply, Limestone County Manufacturing is projected to have a shortage of 44 acft/yr in the year 2030 and 69 acft/yr in the year 2060.

4C.23.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Limestone County Manufacturing:

- Conservation, and
- Development of the Carrizo-Wilcox Aquifer.

4C.23.7.3 Costs

Costs of the recommended plan for Limestone County Manufacturing to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined

b. Development of the Carrizo-Wilcox Aquifer:

- Date to be Implemented: By year 2010
- Total Project Cost: \$566,000
- Annual Cost: \$75,000

The project cost includes one 150 gpm well drilled to a depth of 400 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.23-3.
Recommended Plan Costs by Decade for Limestone County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(26)	(35)	(44)	(52)	(60)	(69)
Conservation						
Supply From Plan Element (acft/yr)	1	3	4	4	5	5
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Development of the Carrizo-Wilcox Aquifer						
Supply From Plan Element (acft/yr)	100	100	100	100	100	100
Annual Cost (\$/yr)	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Unit Cost (\$/acft)	\$750	\$750	\$750	\$750	\$750	\$750

4C.23.8 Steam-Electric

4C.23.8.1 Description of Supply

Steam-Electric water demand in Limestone County is associated with the Texas Genco (formerly Reliant Energy) power plant located at Lake Limestone. Texas Genco has contracted with the Brazos River Authority for water supply from Lake Limestone. Based on the available surface water supply, Limestone County Steam-Electric is projected to have a surplus of 1,447 acft/yr in the year 2030 and a shortage of 15,814 acft/yr in the year 2060.

4C.23.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Limestone County Steam-Electric:

- Conservation, and
- BRA System Operation.

4C.23.8.3 Costs

Costs of the recommended plan for Limestone County Steam-Electric to meet the projected shortages are:

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. BRA System Operation:
 - Cost Source: Unit costs associated with BRA System Operation strategy analysis for WUG #8 - Robertson County Steam Electric (Volume II, Section 4B.4)
 - Date to be Implemented: before 2040
 - Unit Cost: \$286/acft
 - Annual Cost: \$4,576,000

**Table 4C.23-4.
Recommended Plan Costs by Decade for Limestone County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	5,535	5,269	1,447	(3,212)	(8,891)	(15,814)
Conservation						
Supply From Plan Element (acft/yr)	670	1,130	1,849	2,176	2,573	3,058
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
BRA System Operation						
Supply From Plan Element (acft/yr)	—	—	—	16,000	16,000	16,000
Annual Cost (\$/yr)				\$4,576,000	\$4,576,000	\$4,576,000
Unit Cost (\$/acft)				\$286	\$286	\$286

4C.23.9 Mining

Mining is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.23.10 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.23.11 Livestock

Livestock is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.24 McLennan County Water Supply Plan

Table 4C.24-1 lists each water user group in McLennan County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.24-1.
McLennan County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Bellmead	113	113	Projected surplus
City of Beverly Hills	0	0	No projected need
City of Bruceville-Eddy	35	35	Projected surplus
Chalk Bluff WSC	(550)	(749)	Projected shortage – see plan below
City of Crawford	(60)	(65)	Projected shortage – see plan below
Cross Country WSC	(521)	(644)	Projected shortage – see plan below
City of Gholson	(175)	(222)	Projected shortage – see plan below
City of Hallsburg	(148)	(172)	Projected shortage – see plan below
City of Hewitt	123	123	Projected surplus
City of Lacy-Lakeview	0	0	Projected surplus
City of Lorena	591	498	Projected surplus
City of Mart	(342)	(390)	Projected shortage – see plan below
City of McGregor	841	836	Projected surplus
City of Moody	14	14	Projected surplus
North Bosque WSC	(479)	(679)	Projected shortage – see plan below
City of Riesel	(112)	(129)	Projected shortage – see plan below
City of Robinson	1,407	1,298	Projected surplus
City of Waco	7,729	(11,941)	Projected shortage – see section 4C.38.17
City of West	(411)	(442)	Projected shortage – see plan below
Western Hills WS	(489)	(663)	Projected shortage – see plan below
City of Woodway	214	214	Projected surplus
County-Other	(6,067)	(6,786)	Projected shortage – see plan below
Manufacturing	(1,089)	(1,508)	Projected shortage – see plan below
Steam-Electric	(21,628)	(34,016)	Projected shortage – see plan below
Mining	0	0	No projected needs
Irrigation	7,516	7,521	Projected surplus
Livestock	0	0	No projected needs

¹ From Tables C-47 and C-48, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.24.1 City of Bellmead

4C.24.1.1 Description of Supply

The City of Bellmead obtains its water supply from groundwater from the Trinity Aquifer. The City of Bellmead also has contracted with the City of Waco for supplemental surface water supply from Lake Waco. No shortages are projected for the City of Bellmead; however, the City of Waco and the City of Bellmead are currently negotiating a contract for water supply in order to reduce Bellmead's dependence on Trinity Aquifer groundwater.

4C.24.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended for the City of Bellmead:

- Purchase water from the City of Waco. In order to reduce demands on the Trinity Aquifer, provide for future growth, and coordinate with the City of Waco's plans, water purchased from the City of Waco is in excess of projected future demands for this WUG.

4C.24.1.3 Costs

Costs of the Recommended Plan for the City of Bellmead.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$2,609,630

**Table 4C.24-2.
Recommended Plan Costs by Decade for the City of Bellmead**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	113	113	113	113	113	113
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	2,622	2,751	2,873	2,984	3,065	3,202
Annual Cost (\$/yr)	\$2,136,930	\$2,242,065	\$2,341,495	\$2,431,960	\$2,497,975	\$2,609,630
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.2 City of Beverly Hills

The City of Beverly Hills obtains its water supply from surface water from the City of Waco. No shortages are projected for the City of Beverly Hills and no changes in water supply are recommended.

4C.24.3 City of Bruceville-Eddy

The City of Bruceville-Eddy obtains its water supply from groundwater from the Trinity Aquifer. The City of Bruceville-Eddy also has contracted for surface water from Lake Belton from Bluebonnet WSC. No shortages are projected for the City of Bruceville-Eddy and no changes in water supply are recommended.

4C.24.4 Chalk Bluff WSC

4C.24.4.1 Description of Supply

Chalk Bluff WSC obtains its water supply from groundwater from the Trinity Aquifer. Chalk Bluff WSC is projected to have a shortage of 550 acft/yr in the year 2030, and a shortage of 749 acft/yr in the year 2060.

4C.24.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Chalk Bluff WSC:

- Purchase water from the City of Waco. In order to reduce demands on the Trinity Aquifer, provide for future growth, and coordinate with the City of Waco's plans, water purchased from the City of Waco is in excess of projected future demands for this WUG.
- An alternative water management strategy is to develop supplies from the Carrizo-Wilcox Aquifer in Burleson County in conjunction with the FHLM Water Supply Corporation, an entity comprised of 15 water supply corporations and cities in Falls, Hill, Limestone, and McLennan Counties, including Chalk Bluff WSC. Other alternatives include purchasing supply from BRA System Operation and/or reuse water from WMARSS.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.4.3 Costs

Costs of the Recommended Plan for Chalk Bluff WSC.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$2,408,325

**Table 4C.24-3.
Recommended Plan Costs by Decade for Chalk Bluff WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(392)	(478)	(550)	(627)	(673)	(749)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	1,160	1,766	2,846	2,881	2,918	2,955
Annual Cost (\$/yr)	\$945,400	\$1,439,290	\$2,319,490	\$2,348,015	\$2,378,170	\$2,408,325
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.5 City of Crawford**4C.24.5.1 Description of Supply**

The City of Crawford obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Crawford is projected to have a shortage of 60 acft/yr in the year 2030 and 65 acft/yr in the year 2060.

4C.24.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Crawford:

- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase water from BRA System Operation.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.5.3 Costs

Costs of the Recommended Plan for the City of Crawford.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$57,050

**Table 4C.24-4.
Recommended Plan Costs by Decade for the City of Crawford**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(57)	(59)	(60)	(61)	(62)	(65)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	65	65	65	65	65	70
Annual Cost (\$/yr)	\$52,975	\$52,975	\$52,975	\$52,975	\$52,975	\$57,050
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.6 Cross Country WSC**4C.24.6.1 Description of Supply**

Cross Country WSC obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Cross Country WSC is projected to have a shortage of 521 acft/yr in the year 2030 and 644 acft/yr in the year 2060.

4C.24.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Cross Country WSC:

- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase water from BRA System Operation.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.6.3 Costs

Costs of the Recommended Plan for Cross Country WSC.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$570,500

**Table 4C.24-5.
Recommended Plan Costs by Decade for Cross Country WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(412)	(472)	(521)	(566)	(596)	(644)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	450	500	550	600	650	700
Annual Cost (\$/yr)	\$366,750	\$407,500	\$448,250	\$489,000	\$529,750	\$570,500
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.7 City of Gholson**4C.24.7.1 Description of Supply**

The City of Gholson obtains its water supply from groundwater from the Trinity Aquifer through Gholson WSC. Based on the available groundwater supply, the City of Gholson is projected to have a shortage of 175 acft/yr in the year 2030 and 222 acft/yr in the year 2060.

4C.24.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Gholson:

- Purchase water from the City of Waco. In order to reduce demands on the Trinity Aquifer, provide for future growth, and coordinate with the City of Waco's plans, water purchased from the City of Waco is in excess of projected future demands for this WUG.
- An alternative water management strategy is to develop supplies from the Carrizo-Wilcox Aquifer in Burleson County in conjunction with the FFLM Water Supply

Corporation, an entity comprised of 15 water supply corporations and cities in Falls, Hill, Limestone, and McLennan Counties, including Gholson WSC. Other alternatives include purchasing supply from BRA System Operation and/or reuse water from WMARSS.

- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.7.3 Costs

Costs of the Recommended Plan for the City of Gholson.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$2,157,305

Table 4C.24.6.
Recommended Plan Costs by Decade for the City of Gholson

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(141)	(160)	(175)	(193)	(204)	(222)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	956	1,462	2,539	2,574	2,611	2,647
Annual Cost (\$/yr)	\$779,140	\$1,191,530	\$2,069,285	\$2,097,810	\$2,127,965	\$2,157,305
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.8 City of Hallsburg

4C.24.8.1 Description of Supply

The City of Hallsburg obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Hallsburg is projected to have a shortage of 148 acft/yr in the year 2030 and 172 acft/yr in the year 2060.

4C.24.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Hallsburg:

- Conservation, and
- Purchase water from the City of Waco.
- Alternatives to these strategies are purchasing from BRA System Operation and/or reuse water from WMARSS.

4C.24.8.3 Costs

Costs of the Recommended Plan for the City of Hallsburg.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$3,800 in 2020

b. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$146,700

**Table 4C.24-7.
Recommended Plan Costs by Decade for the City of Hallsburg**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(129)	(140)	(148)	(156)	(162)	(172)
Conservation						
Supply From Plan Element (acft/yr)	4	10	8	6	6	6
Annual Cost (\$/yr)	\$1,520	\$3,800	\$3,040	\$2,280	\$2,280	\$2,280
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	150	150	150	160	170	180
Annual Cost (\$/yr)	\$122,250	\$122,250	\$122,250	\$130,400	\$138,550	\$146,700
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.9 City of Hewitt

The City of Hewitt obtains its water supply from groundwater from the Trinity Aquifer. The City also has contracted with the City of Waco for supplemental surface water supply from Lake Waco. No shortages are projected for the City of Hewitt and no changes in water supply are recommended.

4C.24.10 City of Lacy-Lakeview

The City of Lacy-Lakeview obtains its water supply from the City of Waco. No shortages are projected for the City of Lacy-Lakeview and no changes in water supply are recommended.

4C.24.11 City of Lorena

The City of Lorena obtains its water supply from groundwater from the Trinity Aquifer and run-of-river rights. No shortages are projected for the City of Lorena and no changes in water supply are recommended.

4C.24.12 City of Mart**4C.24.12.1 Description of Supply**

The City of Mart obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Mart is projected to have a shortage of 342 acft/yr in the year 2030 and 390 acft/yr in the year 2060.

4C.24.12.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Mart:

- Purchase water from the City of Waco.
- An alternative water management strategy is to develop supplies from the Carrizo-Wilcox Aquifer in Burleson County in conjunction with the FHLM Water Supply Corporation, an entity comprised of 15 water supply corporations and cities in Falls, Hill, Limestone, and McLennan Counties, including the City of Mart. Other alternatives include purchasing supply from BRA System Operation and/or reuse water from WMARSS.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.12.3 Costs

Costs of the Recommended Plan for the City of Mart.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$326,000

**Table 4C.24-8.
Recommended Plan Costs by Decade for the City of Mart**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(310)	(329)	(342)	(358)	(369)	(390)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	350	350	350	400	400	400
Annual Cost (\$/yr)	\$285,250	\$285,250	\$285,250	\$326,000	\$326,000	\$326,000
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.13 City of McGregor

The City of McGregor obtains its water supply from the Trinity Aquifer, and from surface water from Lake Belton and run-of-river rights. No shortages are projected for the City of McGregor and no changes in water supply are recommended.

4C.24.14 City of Moody

The City of Moody obtains its water supply from groundwater from the Trinity Aquifer and from surface water from Lake Belton via Bluebonnet WSC. No shortages are projected for the City of Moody and no changes in water supply are recommended.

4C.24.15 North Bosque WSC**4C.24.15.1 Description of Supply**

North Bosque WSC obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, North Bosque WSC is projected to have a shortage of 479 acft/yr in the year 2030 and 679 acft/yr in the year 2060.

4C.24.15.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of North Bosque WSC:

- Conservation, and
- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase water from BRA System Operation.

4C.24.15.3 Costs

Costs of the Recommended Plan for North Bosque WSC.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$15,960 in 2060
- b. Water Supply from City of Waco:
 - Date to be Implemented: before 2010
 - Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
 - Annual Cost: \$570,500

**Table 4C.24-9.
Recommended Plan Costs by Decade for North Bosque WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(316)	(403)	(479)	(557)	(604)	(679)
Conservation						
Supply From Plan Element (acft/yr)	10	33	36	38	37	42
Annual Cost (\$/yr)	\$3,800	\$12,540	\$13,680	\$14,440	\$14,060	\$15,960
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	350	450	500	600	650	700
Annual Cost (\$/yr)	\$285,250	\$366,750	\$407,500	\$489,000	\$529,750	\$570,500
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.16 City of Riesel**4C.24.16.1 Description of Supply**

The City of Riesel obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Riesel is projected to have a shortage of 112 acft/yr in the year 2030 and 129 acft/yr in the year 2060.

4C.24.16.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Riesel:

- Purchase water from the City of Waco.
- An alternative water management strategy is to develop supplies from the Carrizo-Wilcox Aquifer in Burleson County in conjunction with the FHLM Water Supply Corporation, an entity comprised of 15 water supply corporations and cities in Falls, Hill, Limestone, and McLennan Counties, including the City of Riesel. Other alternatives include purchasing supply from BRA System Operation and/or reuse water from WMARSS.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.16.3 Costs

Costs of the Recommended Plan for the City of Riesel.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$122,250

**Table 4C.24-10.
Recommended Plan Costs by Decade for the City of Riesel**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(101)	(108)	(112)	(118)	(121)	(129)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	150	150	150	150	150	150
Annual Cost (\$/yr)	\$122,250	\$122,250	\$122,250	\$122,250	\$122,250	\$122,250
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.17 City of Robinson

The City of Robinson obtains its water supply from groundwater from the Trinity Aquifer and from surface water from the Brazos River. No shortages are projected for the City of Robinson and no changes in water supply are recommended.

4C.24.18 City of Waco

The City of Waco obtains its water supply from surface water from Lake Waco, for which it owns water rights. The City supplies several neighboring communities and projected wholesale water sales are projected to cause a shortage before 2050. Refer to Section 4B.38.17 for the City's plan as a Wholesale Water Provider.

4C.24.19 City of West

4C.24.19.1 Description of Supply

The City of West obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of West is projected to have a shortage of 411 acft/yr in the year 2030 and 442 acft/yr in the year 2060.

4C.24.19.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage for the City of West:

- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase supply from BRA System Operation.

- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.19.3 Costs

Costs of the Recommended Plan for the City of West.

a. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$326,000

**Table 4C.24-11.
Recommended Plan Costs by Decade for the City of West**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(395)	(403)	(411)	(418)	(426)	(442)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	450	450	450	450	450	450
Annual Cost (\$/yr)	\$366,750	\$366,750	\$366,750	\$366,750	\$366,750	\$366,750
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.20 Western Hills WS

4C.24.20.1 Description of Supply

Western Hills WS obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Western Hills WS is projected to have a shortage of 489 acft/yr in the year 2030 and 663 acft/yr in the year 2060.

4C.24.20.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Western Hills WS:

- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase water from BRA System Operation.
- Conservation was also considered; however, the entity's current per capita use rate is below the selected target rate of 140 gpcd.

4C.24.20.3 Costs

Costs of the Recommended Plan for Western Hills WS.

- a. Water Supply from City of Waco:
- Date to be Implemented: before 2010
 - Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
 - Annual Cost: \$570,500

Table 4C.24-12.
Recommended Plan Costs by Decade for Western Hills WS

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(353)	(427)	(489)	(557)	(596)	(663)
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	400	500	550	600	650	700
Annual Cost (\$/yr)	\$326,000	\$407,500	\$448,250	\$489,000	\$529,750	\$570,500
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.21 City of Woodway

The City of Woodway obtains its water supply from groundwater from the Trinity Aquifer and from surface water from Lake Waco from the City of Waco. No shortage is projected for the City of Woodway and no changes in water supply are recommended.

4C.24.22 County-Other

4C.24.22.1 Description of Supply

McLennan County-Other obtains its water supply from groundwater from the Trinity Aquifer and surface water from Lake Belton and Lake Waco. Based on the available groundwater and surface water supply, McLennan County-Other is projected to have a shortage of 6,067 acft/yr in the year 2030 and 6,786 acft/yr in the year 2060.

4C.24.22.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of McLennan County-Other:

- Conservation, and
- Purchase water from the City of Waco.

- Alternatives to this strategy are purchasing from BRA System Operation and/or reuse water from WMARSS.

4C.24.22.3 Costs

Costs of the Recommended Plan for McLennan County-Other.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$159,980 in 2020

b. Water Supply from City of Waco:

- Date to be Implemented: before 2010
- Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
- Annual Cost: \$5,705,000

**Table 4C.24-13.
Recommended Plan Costs by Decade for McLennan County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(5,596)	(5,828)	(6,067)	(6,297)	(6,478)	(6,786)
Conservation						
Supply From Plan Element (acft/yr)	184	421	374	284	256	266
Annual Cost (\$/yr)	\$69,920	\$159,980	\$142,120	\$107,920	\$97,280	\$101,080
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	6,000	6,000	6,500	6,500	6,500	7,000
Annual Cost (\$/yr)	\$4,890,000	\$4,890,000	\$5,297,500	\$5,297,500	\$5,297,500	\$5,705,000
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.23 Manufacturing

4C.24.23.1 Description of Supply

McLennan County Manufacturing obtains its water supply from groundwater from the Trinity Aquifer and surface water from run-of-river rights and Lake Waco. Based on the available groundwater and surface water supply, McLennan County Manufacturing is projected to have a shortage of 1,089 acft/yr in the year 2030 and 1,508 acft/yr in the year 2060.

4C.24.23.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of McLennan County Manufacturing:

- Conservation, and
- Purchase water from the City of Waco.
- An alternative to this strategy is to purchase water from BRA System Operation.

4C.24.23.3 Costs

Costs of the Recommended Plan for McLennan County Manufacturing.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Water Supply from City of Waco:
 - Date to be Implemented: before 2010
 - Unit Cost: assumed unit cost of \$815/acft (\$2.50/1,000 gallons) for wholesale treated water, including transmission costs
 - Annual Cost: \$122,250

**Table 4C.24-14.
Recommended Plan Costs by Decade for McLennan County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(784)	(941)	(1,089)	(1,239)	(1,374)	(1,508)
Conservation						
Supply From Plan Element (acft/yr)	106	203	320	357	389	422
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	1,000	1,000	1,500	1,500	1,500	1,700
Annual Cost (\$/yr)	\$815,000	\$815,000	\$1,222,500	\$1,222,500	\$1,222,500	\$1,385,500
Unit Cost (\$/acft)	\$815	\$815	\$815	\$815	\$815	\$815

4C.24.24 Steam-Electric**4C.24.24.1 Description of Supply**

McLennan County Steam-Electric obtains its water supply from Tradinghouse Reservoir. Based on the available surface water supply, McLennan County Steam-Electric is projected to have a shortage of 21,628 acft/yr in the year 2030 and 34,016 acft/yr in the year 2060.

4C.24.24.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of McLennan County Steam-Electric:

- Conservation,
- Reuse from WMARSS, and
- Purchase water from the City of Waco.
- An alternative to this strategy is BRA System Operation.

4C.24.24.3 Costs

Costs of the Recommended Plan for McLennan County Steam-Electric.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Reuse from WMARSS:
 - Cost Source: Volume II, Section 4B.3
 - Date to be Implemented: before 2010
 - Total Project Cost: \$2,995,000
 - Annual Cost: \$1,776,000
- c. Water Supply from City of Waco:
 - Cost Source: assumed unit cost for raw water delivered
 - Date to be Implemented: before 2010
 - Unit Cost: \$286/acft
 - Annual Cost: \$15,485,000

**Table 4C.24-15.
Recommended Plan Costs by Decade for McLennan County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(22,987)	(18,881)	(21,628)	(24,973)	(29,049)	(34,016)
Conservation						
Supply From Plan Element (acft/yr)	1,113	1,649	2,500	2,734	3,019	3,366
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Reuse from WMARSS						
Supply From Plan Element (acft/yr)	16,000	16,000	16,000	16,000	16,000	16,000
Annual Cost (\$/yr)	\$1,776,000	\$1,776,000	\$1,776,000	\$1,776,000	\$1,776,000	\$1,776,000
Unit Cost (\$/acft)	\$111	\$111	\$111	\$111	\$111	\$111
Water Supply from City of Waco						
Supply From Plan Element (acft/yr)	7,000	3,000	6,000	9,000	14,000	19,000
Annual Cost (\$/yr)	\$5,705,000	\$2,445,000	\$4,890,000	\$7,335,000	\$11,410,000	\$15,485,000
Unit Cost (\$/acft)	\$286	\$286	\$286	\$286	\$286	\$286

4C.24.25 Mining

No shortage is projected for McLennan County Mining and no changes in water supply are recommended.

4C.24.26 Irrigation

No shortage is projected for McLennan County Irrigation and no changes in water supply are recommended.

4C.24.27 Livestock

No shortage is projected for McLennan County Livestock and no changes in water supply are recommended.

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4C.25 Milam County Water Supply Plan

Table 4C.25-1 lists each water user group in Milam County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.25-1.
Milam County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Cameron	1,215	1,247	Projected surplus
Milano WSC	105	70	Projected surplus
City of Rockdale	1,267	1,240	Projected surplus
Southwest Milam WSC	(147)	(552)	Projected shortage – see plan below
City of Thorndale	17	11	Projected surplus
County-Other	615	744	Projected surplus
Manufacturing	2,071	494	Projected surplus
Steam-Electric	(4,700)	(8,200)	Projected shortage – see plan below
Mining	0	0	No projected needs
Irrigation	8,961	9,016	Projected surplus
Livestock	0	0	No projected need

¹ From Tables C-49 and C-50, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.25.1 City of Cameron

The City of Cameron obtains its water supply from run-of-the-river rights. No shortages are projected for the City of Cameron and no changes in water supply are recommended.

4C.25.2 Milano WSC

Milano WSC obtains its water supply from the Carrizo-Wilcox Aquifer. No shortages are projected for Milano WSC and no changes in water supply are recommended.

4C.25.3 City of Rockdale

The City of Rockdale obtains its water supply from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Rockdale and no changes in water supply are recommended.

4C.25.4 Southwest Milam WSC

4C.25.4.1 Description of Supply

Southwest Milam WSC obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. Southwest Milam WSC is projected to have a shortage of 147 acft/yr in the year 2030, and a shortage of 552 acft/yr in the year 2060.

4C.25.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Southwest Milam WSC:

- Additional Carrizo-Wilcox Aquifer Development.
- Conservation was also considered; however, the WSC's current per capita use rate is below the selected target rate of 140 gpcd.

4C.25.4.3 Costs

Costs of the Recommended Plan for Southwest Milam WSC.

a. Additional Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2030
- Total Project Cost: \$2,079,000
- Annual Cost: \$294,000

The project cost includes two 400 gpm wells drilled to a depth of 800 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.25-2.
Recommended Plan Costs by Decade for Southwest Milam WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	273	32	(147)	(309)	(426)	(552)
Additional Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	—	—	600	600	600	600
Annual Cost (\$/yr)			\$294,000	\$294,000	\$294,000	\$294,000
Unit Cost (\$/acft)			\$490	\$490	\$490	\$490

4C.25.5 City of Thorndale

The City of Thorndale obtains its water supply from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Thorndale and no changes in water supply are recommended.

4C.25.6 County-Other

The water supply entities for County-Other show a projected surplus and no changes in water supply are recommended.

4C.25.7 Manufacturing

The water supply entities for Milam County Manufacturing show a projected surplus and no changes in water supply are recommended.

4C.25.8 Steam-Electric

4C.25.8.1 Description of Supply

Milam County Steam-Electric obtains its water supply from Lake Alcoa. Based on the available surface water supply, Milam County Steam-Electric is projected to have a shortage of 4,700 acft/yr in the year 2030 and a shortage of 8,200 acft/yr in the year 2060.

4C.25.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Milam County Steam-Electric:

- Conservation, and
- Carrizo-Wilcox Aquifer Development.

4C.25.8.3 Costs

Costs of the Recommended Plan for Milam County Steam-Electric.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined

b. Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2010
- Total Project Cost: \$3,923,000
- Annual Cost: \$611,000

The project cost includes six 1,000 gpm wells drilled to a depth of 500 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.25-3.
Recommended Plan Costs by Decade for Milam County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(880)	(4,700)	(4,700)	(4,700)	(8,200)	(8,200)
Conservation						
Supply From Plan Element (acft/yr)	260	625	875	875	1,120	1,120
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	8,200	8,200	8,200	8,200	8,200	8,200
Annual Cost (\$/yr)	\$611,000	\$611,000	\$611,000	\$611,000	\$611,000	\$611,000
Unit Cost (\$/acft)	\$75	\$75	\$75	\$75	\$75	\$75

4C.25.9 Mining

No shortage is projected for the Milam County Mining and no changes in water supply are recommended.

Mining demand in Milam County has been primarily associated with Alcoa's Sandow Mine, which is located in Lee and Milam Counties in Region G. The operation includes depressurization of the groundwater in the layer below the underground lignite formation in order to extract the lignite resource. The water supply available is essentially the amount of water that is produced in the depressurization operation. This operation is largely non-consumptive and the water produced is available for other uses. Mining demands in Milam County are expected to decrease with the expected closing of the Sandow Mine from a present 30,000 acft/yr to 4,000 acft/yr in 2010, to 1,500 acft/yr in 2050. Continued mining demands in Milam County are associated with mine reclamation activities and operation of the new Three Oaks Mine.

4C.25.10 *Irrigation*

No shortage is projected for the Milam County's Irrigation and no changes in water supply are recommended.

4C.25.11 *Livestock*

No shortage is projected for the Milam County's Livestock and no changes in water supply are recommended.

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4C.26 Nolan County Water Supply Plan

Table 4C.26-1 lists each water user group in Nolan County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.26-1.
Nolan County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Bitter Creek WSC	19	31	Projected surplus
City of Roscoe	(42)	(17)	Projected shortage –see plan below
City of Sweetwater	(2,026)	(1,693)	Projected shortage –see plan below
County-Other	(27)	(4)	Projected shortage –see plan below
Manufacturing	100	(239)	Projected shortage –see plan below
Steam-Electric	(1,377)	(2,817)	Projected shortage –see plan below
Mining	(199)	(197)	Projected shortage –see plan below
Irrigation	(2,914)	(2,566)	Projected shortage –see plan below
Livestock	0	0	Supply equals demand

¹ From Tables C-51 and C-52, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.26.1 Bitter Creek WSC

The Bitter Creek WSC obtains its water from groundwater and treated water from the City of Sweetwater. No current or future shortages are projected and no changes in water supply uses are projected or recommended

4C.26.2 City of Roscoe

4C.26.2.1 Description of Supply

The City of Roscoe obtains surface water from local sources and groundwater from the Dockum and Edwards-Trinity (Plateau) aquifers. Based on available supplies, the City of Roscoe is projected to have shortages starting in 2010.

4C.26.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Roscoe:

- Reallocation of existing groundwater supply from the City of Sweetwater. Sweetwater would replace this amount within their recommended strategy.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.26.2.3 Costs

Costs of the Recommended Plan for the City of Roscoe

a. Reallocation of existing groundwater from the City of Sweetwater:

- Date to be Implemented: 2010
- Total Project Cost: none (current infrastructure assumed to be adequate)
- Annual Cost: \$17,250 (assumed to be equal to Sweetwater's cost for developing a new groundwater source).

**Table 4C.26-2.
Recommended Plan Costs by Decade for the City of Roscoe**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(45)	(45)	(42)	(36)	(26)	(17)
Reallocation of existing groundwater						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$17,250	\$17,250	\$17,250	\$17,250	\$17,250	\$17,250
Unit Cost (\$/acft)	\$345	\$345	\$345	\$345	\$345	\$345

4C.26.3 City of Sweetwater

4C.26.3.1 Description of Supply

Surface water supplies are obtained from Oak Creek Reservoir, Lake Tramell, Lake Sweetwater and the Dockum Aquifer. The City of Sweetwater is projected to have a maximum shortage of 2,026 acft occurring in 2030.

4C.26.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the city of Sweetwater:

- Conservation
- Champion Well Field Phase 1
- Champion Well Field Phase 2
- Oak Creek Reservoir Subordination (see Region F and Region K regional plans for a description of this strategy). The available supply from Oak Creek Reservoir increases by approximately 2,100 and 1,700 ac-ft/yr in 2010 and 2060, respectively.
- Alternate Strategy: Wastewater Reuse (Volume II, Section 4B.3)
- Alternate Strategy: Double Mountain Fort Reservoir (Volume II, Section 4B.12.4)
- Alternate Strategy: Connect with the City of Abilene for treated water supply (Volume II, Section 4B.14.3)

4C.26.3.3 Costs

Cost of the Recommended Plan for the City of Sweetwater.

- a. Conservation
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Annual Cost: maximum of \$74,100 in 2020
- b. Water Supply from Champion Well Field Phase 1 (max quantity of 2,400 acft/yr):
 - Cost Source: *Champion Well Field Collection and Transmission Study*, Freese and Nichols, 1988. Costs updated to 2002 dollars.
 - Date to be Implemented: 2010
 - Total Project Cost: \$12,833,426
 - Annual Cost: \$1,602,230
- c. Water Supply from Champion Well Field Phase 2 (max quantity of 1,090 acft/yr):
 - Cost Source: *Champion Well Field Collection and Transmission Study*, Freese and Nichols, 1988. Costs updated to 2002 dollars.
 - Date to be Implemented: 2040

- Total Project Cost: \$4,227,045
 - Annual Cost: \$702,370
- d. Oak Creek Reservoir Subordination Agreement
- Date to be Implemented: 2010
 - Total Project Cost: none
 - Annual Cost: none

**Table 4C.26-3.
Recommended Plan Costs by Decade for the City of Sweetwater**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,969)	(2,022)	(2,026)	(1,969)	(1,835)	(1,693)
Conservation						
Supply From Plan Element (acft/yr)	94	195	156	113	95	91
Annual Cost (\$/yr)	\$35,720	\$74,100	\$59,280	\$42,940	\$36,100	\$34,580
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from Champion Well Field Phases 1 & 2						
Supply From Plan Element (acft/yr)	1,264	831	550	1,260	796	736
Phase 1 Annual Cost (\$/yr)	\$1,602,230	\$1,602,230	\$1,602,230	\$1,602,230	\$1,602,230	\$1,602,230
Phase 1 Unit Cost (\$/acft)	\$517	\$517	\$517	\$517	\$517	\$517
Phase 2 Annual Cost (\$/yr)	—	—	—	\$702,370	\$702,370	\$702,370
Phase 2 Unit Cost (\$/acft)	—	—	—	\$351	\$351	\$351
Oak Creek Reservoir Subordination Agreement						
Supply From Plan Element (acft/yr)	1,679	1,671	1,557	1,435	1,301	1,154
Annual Cost (\$/yr)	0	0	0	0	0	0
Unit Cost (\$/acft)	0	0	0	0	0	0

4C.26.3 County-Other Category

4C.26.3.1 Description of Supply

The Nolan County-Other entities obtain their water from the City of Sweetwater. Projected shortages begin in 2010.

4C.26.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages for the County-Other entities:

- Purchase additional water supply from Sweetwater
- Conservation was also considered; however, the County-Other's current per capita use rate is below the selected target rate of 140 gpcd.

4C.26.3.3 Costs

Cost of the Recommended Plan for Manufacturing:

a. Water Supply from Sweetwater:

- Cost Source: Assumed wholesale rate for treated water
- Date to be Implemented: 2010
- Total Project Cost: none (existing infrastructure assumed adequate)
- Annual Cost: \$23,000

**Table 4C.26-4.
Recommended Plan Costs by Decade for Nolan County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(31)	(30)	(27)	(21)	(13)	(4)
Water Supply from Sweetwater						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$23,000	\$23,000	\$23,000	\$23,000	\$23,000	\$23,000
Unit Cost (\$/acft)	\$461	\$461	\$461	\$461	\$461	\$461

4C.26.4 Manufacturing

4C.26.4.1 Description of Supply

The current water supply is supplied from the Edwards-Trinity (Plateau) Aquifer and the City of Sweetwater. The projected demands will exceed the current supplies by 2050.

4C.26.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage for Nolan County Manufacturing:

- Conservation
- Purchase water from Sweetwater

4C.26.4.3 Costs

Cost of the Recommended Plan for the Manufacturing.

a. Conservation

- Date to be Implemented: 2010
- Annual Cost: not determined

b. Water Supply from Sweetwater:

- Cost Source: Assumed wholesale rate for treated water
- Date to be Implemented: 2050
- Total Project Cost: none (Current infrastructure assumed to be adequate)
- Annual Cost: \$51,750

**Table 4C.26-5.
Recommended Plan Costs by Decade for Nolan County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	362	224	100	(23)	(132)	(239)
Conservation						
Supply From Plan Element (acft/yr)	23	46	73	81	89	96
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from Sweetwater						
Supply From Plan Element (acft/yr)	0	0	0	0	150	150
Annual Cost (\$/yr)	0	0	0	0	\$51,750	\$51,750
Unit Cost (\$/acft)	0	0	0	0	\$345	\$345

4C.26.5 Steam-Electric

4C.26.5.1 Description of Supply

The current supply comes from the Edwards-Trinity Aquifer and the City of Sweetwater. Projected demands exceed current supplies.

4C.26.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages for Steam-Electric:

- Conservation
- Water supply from City of Sweetwater
- Wastewater Reuse

4C.26.5.3 Costs

Cost of the recommended plan for Steam-Electric:

a. Conservation

- Date to be Implemented: 2010
- Annual Cost: not determined

b. Water Supply from City of Sweetwater:

- Cost Source: Assumed unit costs
- Date to be Implemented: 2020
- Total Project Cost: none (Current infrastructure assumed to be adequate)
- Annual Cost: \$690,000 at full implementation

c. Wastewater Reuse

- Cost Source: Volume II, Section 4B.3
- Date to be Implemented: 2010
- Total Project Cost: \$2,115,000
- Annual Cost: \$187,000

**Table 4C.26-6.
Recommended Plan Costs by Decade for Nolan County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(492)	(1,059)	(1,377)	(1,767)	(2,240)	(2,817)
Conservation						
Supply From Plan Element (acft/yr)	39	94	154	181	214	255
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from City of Sweetwater						
Supply From Plan Element (acft/yr)	0	700	700	1100	1,500	2,000
Annual Cost (\$/yr)	0	\$241,500	\$241,500	\$379,500	\$517,500	\$690,000
Unit Cost (\$/acft)	0	\$345	\$345	\$345	\$345	\$345
Water Supply from Wastewater Reuse						
Supply From Plan Element (acft/yr)	560	560	560	560	560	560
Annual Cost (\$/yr)	\$187,000	\$187,000	\$187,000	\$187,000	\$187,000	\$187,000
Unit Cost (\$/acft)	\$334	\$334	\$334	\$334	\$334	\$334

4C.26.6 Mining

4C.26.6.1 Description of Supply

Mining uses are supplied from the Dockum aquifer. Projected demands exceed available supply.

4C.26.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage for Nolan County Mining:

- Conservation
- Develop Brackish Groundwater

4C.26.6.3 Costs

Cost of the Recommended Plan for Nolan County Mining.

a. Conservation

- Date to be Implemented: 2010
- Annual Cost: not determined

b. Water Supply from Brackish Groundwater:

- Cost Source: Assumed unit cost
- Date to be Implemented: 2010
- Total Project Cost: \$268,188
- Annual Cost: \$25,200

**Table 4C.26-7.
Recommended Plan Costs by Decade for the Nolan County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(200)	(199)	(199)	(197)	(197)	(197)
Conservation						
Supply From Plan Element (acft/yr)	8	14	19	19	19	19
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from Brackish Groundwater						
Supply From Plan Element (acft/yr)	200	200	200	200	200	200
Annual Cost (\$/yr)	\$25,200	\$25,200	\$25,200	\$25,200	\$25,200	\$25,200
Unit Cost (\$/acft)	\$126	\$126	\$126	\$126	\$126	\$126

4C.26.7 Irrigation

4C.26.7.1 Description of Supply

The current supply includes the Dockum aquifer and run-of-river diversions from the Brazos River. The water supply for Nolan County Irrigation shows a projected shortage.

4C.26.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to mitigate some of the projected shortage Nolan County Irrigation:

- Conservation
- Brush Control and Weather Mod – these supplies are unquantifiable, see sections 4B.9 and 4B.10 for more detailed information.

4C.26.7.3 Costs

Cost of the Recommended Plan for Nolan County Irrigation.

a. Conservation

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: 2010
- Annual Cost: \$50,400 in 2060

**Table 4C.26-8.
Recommended Plan Costs by Decade for the Nolan County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(3,164)	(3,038)	(2,914)	(2,794)	(2,679)	(2,566)
Conservation						
Supply From Plan Element (acft/yr)	154	250	341	332	323	315
Annual Cost (\$/yr)	\$24,640	\$40,000	\$54,560	\$53,120	\$51,680	\$50,400
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160

4C.26.8 Livestock

No shortages are projected for Livestock uses and no changes in water supply are recommended.

4C.27 Palo Pinto County Water Supply Plan

Table 4C.27-1 lists each water user group in Palo Pinto County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.27-1.
Palo Pinto County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Graford	76	73	Projected surplus
City of Mineral Wells	3,219	3,156	Projected surplus
City of Strawn	(7)	(23)	Projected shortage—see plan below
County-Other	(203)	(637)	Projected shortage—see plan below
Manufacturing	114	104	Projected surplus
Steam-Electric	563	(1,658)	Projected shortage—see plan below
Mining	410	410	Projected surplus
Irrigation	6,053	6,100	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-53 and C-54, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.27.1 City of Graford

The City of Graford obtains surface water from Keechi Creek and purchases water from Palo Pinto County MWD No. 1. No shortages are projected and no changes in water supply are recommended.

4C.27.2 City of Mineral Wells

The City of Mineral Wells obtains surface water from Lake Palo Pinto from a contract with the Palo Pinto County Municipal Water District No. 1. No shortages are projected and no changes in water supply are recommended.

4C.27.3 City of Strawn

4C.27.3.1 Description of Supply

Surface water supplies are obtained from Lake Tucker. Supplies will not be sufficient to meet demands through 2060.

4C.27.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Strawn:

- Conservation
- Water supply from Eastland County WSD.

4C.27.3.3 Costs

Cost of the Recommended Plan for the City of Strawn.

- a. Conservation
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Annual Cost: maximum of \$5,320 in 2020
- b. Water Supply from Eastland County WSD:
 - Cost Source: Cost estimate to provide service
 - Date to be Implemented: by 2020
 - Total Project Cost: \$1,488,262
 - Annual Cost: \$218,400

**Table 4C.27-2.
Recommended Plan Costs by Decade for the City of Strawn**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	0	(4)	(7)	(10)	(16)	(23)
Conservation						
Supply From Plan Element (acft/yr)	7	14	11	9	9	9
Annual Cost (\$/yr)	\$2,660	\$5,320	\$4,180	\$3,420	\$3,420	\$3,420
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from Eastland County WSD						
Supply From Plan Element (acft/yr)	0	200	200	200	200	200
Annual Cost (\$/yr)	0	\$218,400	\$218,400	\$218,400	\$218,400	\$218,400
Unit Cost (\$/acft)	0	\$1,092	\$1,092	\$1,092	\$1,092	\$1,092

4C.27.4 County-Other

4C.27.4.1 Description of Supply

The current supply includes water purchased from Lake Palo Pinto through the Palo Pinto County MWD No. 1 and run-of-the-river diversions. The water supply entities for County-Other show a projected shortage beginning in 2010.

4C.27.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the County-Other entities:

- Purchase water from Mineral Wells
- Conservation was also considered; however, current per capita use rate is below the selected target rate of 140 gpcd.

4C.27.4.3 Costs

Cost of the Recommended Plan for the Palo Pinto County-Other.

a. Purchase water from Mineral Wells.

- Cost Source: assumed wholesale treated water rate of \$489/acft (\$1.50/1,000 gallons)
- Date to be Implemented: 2010
- Annual Cost: \$24,450

**Table 4C.27-3.
Recommended Plan Costs by Decade for Palo Pinto County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(26)	(121)	(203)	(302)	(446)	(637)
Water Supply from Mineral Wells						
Supply From Plan Element (acft/yr)	100	200	250	350	450	650
Annual Cost (\$/yr)	\$48,900	\$97,800	\$122,250	\$171,150	\$220,050	\$317,850
Unit Cost (\$/acft)	\$489	\$489	\$489	\$489	\$489	\$489

4C.27.5 Manufacturing

Manufacturing supplies are obtained from local surface water sources and groundwater from the Trinity Aquifer. Palo Pinto County Manufacturing shows a projected surplus and no changes in water supply are recommended.

4C.27.6 Steam-Electric

4C.27.6.1 Description of Supply

Surface water supplies are obtained from a contract with Palo Pinto County MWD No. 1. The current contract is not sufficient to meet demands through 2060.

4C.27.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage for Palo Pinto County Steam-Electric:

- Conservation
- Additional Supply from Palo Pinto County MWD No. 1

4C.27.6.3 Costs

Cost of the Recommended Plan for Palo Pinto County Steam-Electric.

- a. Conservation
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Annual Cost: not determined

- b. Additional Supply from Lake Palo Pinto (requires Palo Pinto County MWD No. 1 to implement strategies to increase supply):
- Cost Source: Volume II, Section 4B.13.6 (Lake Palo Pinto Off-Channel Reservoir)
 - Date to be Implemented: 2040
 - Total Project Cost: \$19,314,000
 - Annual Cost: \$1,621,000

**Table 4C.27-4.
Recommended Plan Costs by Decade for Palo Pinto County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	659	774	563	(19)	(782)	(1,658)
Conservation						
Supply From Plan Element (acft/yr)	41	63	102	120	142	169
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Supply from Palo Pinto County MWD No. 1						
Supply From Plan Element (acft/yr)	—	—	—	3,110	3,110	3,110
Annual Cost (\$/yr)				\$1,621,000	\$1,621,000	\$1,621,000
Unit Cost (\$/acft)				\$521	\$521	\$521

4C.27.8 Mining

No future shortages are projected and no changes in water supply are recommended.

4C.27.9 Irrigation

No future shortages are projected and no changes in water supply are recommended.

4C.27.10 Livestock

No future shortages are projected and no changes in water supply are recommended.

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4C.28 Robertson County Water Supply Plan

Table 4C.28-1 lists each water user group in Robertson County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.28-1.
Robertson County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Bremond	385	390	Projected surplus
City of Calvert	239	247	Projected surplus
City of Franklin	305	299	Projected surplus
City of Hearne	1,831	1,858	Projected surplus
Robertson County WSC	177	160	Projected surplus
County-Other	76	74	Projected surplus
Manufacturing	(31)	(77)	Projected shortage – see plan below
Steam-Electric	1,791	(8,284)	Projected shortage – see plan below
Mining	9	9	Projected surplus
Irrigation	779	1,104	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-55 and C-56, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.28.1 City of Bremond

The City of Bremond obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Bremond and no changes in water supply are recommended.

4C.28.2 City of Calvert

The City of Calvert obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Calvert and no changes in water supply are recommended.

4C.28.3 City of Franklin

The City of Franklin obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Franklin and no changes in water supply are recommended.

4C.28.4 City of Hearne

The City of Hearne obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for the City of Hearne and no changes in water supply are recommended.

4C.28.4 Robertson County WSC

Robertson County WSC obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. No shortages are projected for Robertson County WSC and no changes in water supply are recommended.

4C.28.5 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.28.6 Manufacturing

4C.28.6.1 Description of Supply

Robertson County Manufacturing obtains its water supply from groundwater from the Carrizo-Wilcox Aquifer. Based on the available groundwater supply, Robertson County Manufacturing is projected to have a shortage of 31 acft/yr in the year 2030 and 77 acft/yr in the year 2060.

4C.28.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Robertson County Manufacturing:

- Conservation, and
- Additional Carrizo-Wilcox Aquifer Development.

4C.28.6.3 Costs

Costs of the Recommended Plan for Robertson County Manufacturing.

a. Conservation:

- Date to be Implemented: before 2010
- Annual Cost: Not determined

b. Additional Carrizo-Wilcox Aquifer Development:

- Date to be Implemented: By year 2010
- Total Project Cost: \$707,000
- Annual Cost: \$77,000

The project cost includes one 500 gpm well drilled to a depth of 1,300 feet in the Carrizo-Wilcox Aquifer.

**Table 4C.28-2.
Recommended Plan Costs by Decade for Robertson County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1	(15)	(31)	(48)	(64)	(77)
Conservation						
Supply From Plan Element (acft/yr)	3	5	8	9	11	11
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Additional Carrizo-Wilcox Aquifer Development						
Supply From Plan Element (acft/yr)	85	85	85	85	85	85
Annual Cost (\$/yr)	\$77,000	\$77,000	\$77,000	\$77,000	\$77,000	\$77,000
Unit Cost (\$/acft)	\$906	\$906	\$906	\$906	\$906	\$906

4C.28.7 Steam-Electric**4C.28.7.1 Description of Supply**

Robertson County Steam-Electric entities obtain water supply from the Carrizo-Wilcox Aquifer, a contract with the Brazos River Authority for water from Lake Limestone, and various run-of-river rights. Based on the available groundwater and surface water supply, Robertson County Steam-Electric is projected to have a surplus of 1,791 acft/yr in the year 2030 and a shortage of 8,284 acft/yr in the year 2060.

4C.28.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Robertson County Steam-Electric:

- Conservation, and
- Purchase depressurization water from Walnut Creek Mine.
- An alternative to this strategy is BRA System Operation.

4C.28.7.3 Costs

Costs of the Recommended Plan for Robertson County Steam-Electric.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase depressurization water from Walnut Creek Mine:
 - Cost Source: assumed unit cost for raw water supply delivered
 - Date to be Implemented: before 2040
 - Unit Cost: \$275/acft
 - Annual Cost: \$2,475,000

**Table 4C.28-3.
Recommended Plan Costs by Decade for Robertson County Steam-Electric**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	3,840	1,816	1,791	(3,234)	(8,259)	(8,284)
Conservation						
Supply From Plan Element (acft/yr)	840	1,500	2,100	2,450	2,800	2,800
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase reuse water from Walnut Creek Mine						
Supply From Plan Element (acft/yr)	—	—	—	4,000	9,000	9,000
Annual Cost (\$/yr)				\$1,100,000	\$2,475,000	\$2,475,000
Unit Cost (\$/acft)				\$275	\$275	\$275

4C.28.8 Mining

Mining is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.28.9 Irrigation

Irrigation is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.28.10 Livestock

No shortage is projected for Livestock and no changes in water supply are recommended.

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4C.29 Shackelford County Water Supply Plan

Table 4C.29-1 lists each water user group in Shackelford County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.29-1.
Shackelford County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Albany	1,329	1,631	Projected surplus
County-Other	0	0	Supply equals demand
Manufacturing	50	50	Projected surplus
Steam-Electric	0	0	No demand or supply
Mining	0	0	Supply equals demand
Irrigation	(99)	(81)	Projected shortage –see plan below
Livestock	0	0	Supply equals demand

¹ From Tables C-57 and C-58, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.29.1 City of Albany

Water supply for the City of Albany is from Hubbard Creek Reservoir, owned by the West Central Texas MWD and from Lake McCarty. No future shortages are projected and no changes in water supply are recommended.

4C.29.2 County-Other Category

4C.29.2.1 Description of Supply

Supply equals demands for County-Other users, which include Shackelford Co. WSC. The WSC obtains its supply from Possum Kingdom Lake and the City of Albany.

4C.29.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to increase supplies for Shackelford County-Other:

- Purchase additional supply from the West Central Brazos Distribution System (WCBDS), formerly known as the Kerr-McGee Pipeline.

4C.29.2.3 Costs

Cost of the Recommended Plan for Shackelford County-Other.

a. Water Supply from WCBDS (with regional WTP):

- Cost Source: *West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan*, Freese and Nichols, 2004.
- Date to be Implemented: 2010
- Total Project Cost: \$15,877,792
- Annual Cost: \$1,800,000 (total project)
\$321,500 (Shackelford Co Rural WSC portion)

Table 4C.29-2.
Recommended Plan Costs by Decade for the Shackelford County-Other

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	0	0	0	0	0	0
Water Supply from WCBDS						
Supply From Plan Element (acft/yr)	250	250	250	250	250	250
Annual Cost (\$/yr)	\$321,500	\$321,500	\$321,500	\$321,500	\$321,500	\$321,500
Unit Cost (\$/acft)	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286

4C.29.3 Manufacturing

Projections indicate a surplus of water for Manufacturing supply and no changes in water supply are recommended.

4C.29.4 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.29.5 Mining

Projections indicate Mining supply equals demand and no changes in water supply are recommended.

4C.29.6 Irrigation

4C.29.6.1 Description of Supply

Surface water for Irrigation in Shackelford County is obtained from the Clear Fork of the Brazos River. Estimated reliable supply of surface water for irrigated agriculture is 31 acft/yr. There are no significant groundwater supplies available in the county.

4C.29.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to mitigate the unmet Irrigation needs:

- Conservation, and
- Brush Control and Weather Modification – these supplies are unquantifiable, see sections 4B.9 and 4B.10 for more detailed information.

4C.29.6.3 Costs

Cost of the Recommended Plan for Irrigation in Shackelford Co.

a. Conservation:

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: 2010
- Unit: \$160/acft of water saved
- Annual Cost: maximum of \$1,920 in 2030

**Table 4C.29-3.
Recommended Plan Costs by Decade for Shackelford County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(111)	(104)	(99)	(93)	(87)	(81)
Conservation						
Supply From Plan Element (acft/yr)	6	9	12	12	12	11
Annual Cost (\$/yr)	\$960	\$1,140	\$1,920	\$1,920	\$1,920	\$1,760
Unit Cost (\$/acft)	\$160	\$160	\$160	\$160	\$160	\$160

4C.29.7 Livestock

No future shortages are projected in the Livestock category and no changes in water supply are recommended.

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4C.30 Somervell County Water Supply Plan

Table 4C.30-1 lists each water user group in Somervell County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.30-1.
Somervell County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Glen Rose	38	37	Projected surplus
County-Other	(231)	(260)	Projected shortage – see plan below
Manufacturing	(4)	(7)	Projected shortage – see plan below
Steam-Electric	25,570	25,510	Projected surplus
Mining	(94)	(85)	Projected shortage – see plan below
Irrigation	945	953	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-59 and C-60, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.30.1 The City of Glen Rose

The City of Glen Rose obtains groundwater from the Trinity Aquifer. No shortage is projected for the City of Glen Rose and no changes in water supply are recommended.

4C.30.2 County-Other

4C.30.2.1 Description of Supply

Somervell County-Other obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Somervell County-Other is projected to have a shortage of 231 acft/yr in the year 2030 and 260 acft/yr in the year 2060.

4C.30.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Somervell County-Other:

- Wheeler Branch Off-Channel Reservoir – the project has obtained a water rights permit from the TCEQ and is projected to be completed by 2010
- Conservation was also considered; however, the County-Other's per capita use rate is below the selected target rate of 140 gpcd.

4C.30.2.3 Costs

Costs of the Recommended Plan for Somervell County-Other.

- Wheeler Branch Off-Channel Reservoir:
 - Cost Source: Volume II, Section 4B.13.3
 - Date to be Implemented: before 2010
 - Total Project Cost: \$27,195,000
 - Annual Cost: \$2,117,000

**Table 4C.30-2.
Recommended Plan Costs by Decade for Somervell County-Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(133)	(189)	(231)	(251)	(257)	(260)
Wheeler Branch Off-Channel Reservoir						
Supply From Plan Element (acft/yr)	1,800	1,800	1,800	1,800	1,800	1,800
Annual Cost (\$/yr)	\$2,117,000	\$2,117,000	\$2,117,000	\$2,117,000	\$2,117,000	\$2,117,000
Unit Cost (\$/acft)	\$1,176	\$1,176	\$1,176	\$1,176	\$1,176	\$1,176

4C.30.3 Manufacturing

4C.30.3.1 Description of Supply

Somervell County Manufacturing obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Somervell County Manufacturing is projected to have a shortage of 4 acft/yr in the year 2030 and 7 acft/yr in the year 2060.

4C.30.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Somervell County Manufacturing:

- Conservation, and
- Purchase water from the City of Glen Rose.

4C.30.3.3 Costs

Costs of the Recommended Plan for Somervell County Manufacturing.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Water Supply from City of Glen Rose:
 - Cost Source: estimated wholesale treated water rate
 - Date to be Implemented: By year 2010
 - Annual Cost: \$16,161 in 2060

The annual cost was calculated by multiplying the Manufacturing projected supply from this strategy by an estimated wholesale water rate of \$162/acft.

**Table 4C.30-3.
Recommended Plan Costs by Decade for Somervell County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(2)	(3)	(4)	(5)	(6)	(7)
Conservation						
Supply From Plan Element (acft/yr)	0	0	1	1	1	1
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from City of Glen Rose						
Supply From Plan Element (acft/yr)	10	10	10	10	10	10
Annual Cost (\$/yr)	\$16,161	\$16,161	\$16,161	\$16,161	\$16,161	\$16,161
Unit Cost (\$/acft)	\$162	\$162	\$162	\$162	\$162	\$162

4C.30.4 Steam-Electric

Somervell County Steam-Electric is projected to have a surplus of water through 2060 and no changes in water supply are recommended.

4C.30.5 Mining

4C.30.5.1 Description of Supply

Somervell County Mining obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, Somervell County Mining is projected to have a shortage of 94 acft/yr in the year 2030 and 85 acft/yr in the year 2060.

4C.30.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Somervell County Mining:

- Conservation, and
- Voluntary Redistribution from Steam-Electric.

4C.30.5.3 Costs

Costs of the Recommended Plan for Somervell County Mining.

a. Conservation:

- Date to be Implemented: before 2010
- Annual Cost: Not determined

b. Voluntary Redistribution from Steam-Electric:

- Cost Source: assumed unit cost for raw water transfer between entities
- Date to be Implemented: before 2010
- Unit Cost: \$75/acft
- Annual Cost: \$11,250

**Table 4C.30-4.
Recommended Plan Costs by Decade for Somervell County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(106)	(98)	(94)	(91)	(88)	(85)
Conservation						
Supply From Plan Element (acft/yr)	9	14	19	19	18	18
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Voluntary Redistribution from Steam-Electric						
Supply From Plan Element (acft/yr)	150	150	150	150	150	150
Annual Cost (\$/yr)	\$11,250	\$11,250	\$11,250	\$11,250	\$11,250	\$11,250
Unit Cost (\$/acft)	\$75	\$75	\$75	\$75	\$75	\$75

4C.30.6 Irrigation

Somervell County Irrigation is projected to have a surplus of water through 2060 and no changes in water supply are recommended.

4C.30.7 Livestock

No shortages are projected for Somervell County Livestock and no changes in water supply are recommended.

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4C.31 Stephens County Water Supply Plan

Table 4C.31-1 lists each water user group in Stephens County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.31-1.
Stephens County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Breckenridge	1,389	1,487	Projected surplus
Stephens County Rural WSC	917	960	Projected surplus
County-Other	(216)	(193)	Projected shortage –see plan below
Manufacturing	53	50	Projected surplus
Steam-Electric	0	0	No demand or supply
Mining	(5,884)	(6,662)	Projected shortage –see plan below
Irrigation	51	56	Projected surplus
Livestock	0	0	Supply equals demand
Livestock	0	0	Supply equals demand

¹ From Tables C-61 and C-62, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.31.1 The City of Breckenridge

The City of Breckenridge obtains water from Hubbard Creek Reservoir through the West Central Texas Municipal Water District and from Lake Daniel. No future shortages are projected; however an alternative strategy consisting of purchasing water from the WCBDS would supplement current contracted supplies.

4C.31.2 Stephens County Rural WSC

4C.31.2.1 Description of Supply

The current supply comes from the Lake Daniel and Hubbard Creek Reservoir through the City of Breckenridge.

4C.31.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected needs of Stephens Co Rural WSC:

- Purchase additional supply from WCBDS.
- Conservation was also considered; however, current per capita use rate is below the selected target rate of 140 gpcd.

4C.31.2.3 Costs

Cost of the Recommended Plan for Stephens Co Rural WSC.

a. Water Supply from WCBDS (with regional WTP):

- Cost Source: *West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan*, Freese and Nichols, 2004.
- Date to be Implemented: 2010
- Total Project Cost: \$15,877,792
- Annual Cost: \$1,800,000 (total project)
\$514,400 (Stephens Co Rural WSC portion)

Table 4C.31-2.
Recommended Plan Costs by Decade for the Stephens County Rural WSC

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	906	911	917	934	952	960
Water Supply from WCBDS						
Supply From Plan Element (acft/yr)	400	400	400	400	400	400
Annual Cost (\$/yr)	\$514,400	\$514,400	\$514,400	\$514,400	\$514,400	\$514,400
Unit Cost (\$/acft)	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286

4C.31.3 County-Other

4C.31.3.1 Description of Supply

The current supply comes from groundwater. The projected demands will exceed current supplies.

4C.31.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of Stephens County-Other:

- Conservation, and
- Purchase additional supply from WCBDS through local suppliers (City of Breckenridge and Stephens Co. Rural WSC).

4C.31.3.3 Costs

Cost of the Recommended Plan for Stephens County-Other:

- a. Conservation
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Unit Cost: maximum of \$8,360 in 2020
- b. Water Supply from WCBDS (with regional WTP):
 - Cost Source: West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan, Freese and Nichols, 2004.
 - Date to be Implemented: 2010
 - Total Project Cost: \$15,877,792
 - Annual Cost: \$1,800,000 (total project)
\$514,400 (Stephens County-Other portion)

**Table 4C.31-3.
Recommended Plan Costs by Decade for the Stephens County Other**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(218)	(219)	(216)	(210)	(199)	(193)
Conservation						
Supply From Plan Element (acft/yr)	11	22	18	13	10	10
Annual Cost (\$/yr)	\$4,180	\$8,360	\$6,840	\$4,940	\$3,800	\$3,800
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from WCBDS						
Supply From Plan Element (acft/yr)	400	400	400	400	400	400
Annual Cost (\$/yr)	\$514,400	\$514,400	\$514,400	\$514,400	\$514,400	\$514,400
Unit Cost (\$/acft)	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286

4C.31.4 Manufacturing

No shortages are projected for Manufacturing and no changes in water supply are recommended.

4C.31.5 Steam-Electric

No Steam-Electric demand or supply exists for the county.

4C.31.6 Mining

4C.31.6.1 Description of Supply

The current supply comes from groundwater and Possum Kingdom Reservoir; the supplies will not be sufficient through 2060.

4C.31.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage for Stephens County Mining:

- Conservation
- Purchase water from BRA through new pipeline from Possum Kingdom Reservoir.

4C.31.6.3 Costs

Cost of the Recommended Plan for Stephens County Mining.

- a. Conservation
 - Date to be Implemented: 2010
 - Annual Cost: Not determined
- b. Water Supply from BRA:
 - Cost Source: Freese and Nichols cost estimate
 - Date to be Implemented: 2010
 - Total Project Cost: \$ 10,586,000
 - Annual Cost: \$1,470,000

**Table 4C.31-4.
Recommended Plan Costs by Decade for the Stephens County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(5,034)	(5,646)	(5,884)	(6,115)	(6,340)	(6,662)
Conservation						
Supply From Plan Element (acft/yr)	261	466	670	686	702	724
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from BRA (Possum Kingdom Reservoir)						
Supply From Plan Element (acft/yr)	6,000	6,000	6,000	6,000	6,000	6,000
Annual Cost (\$/yr)	\$1,470,000	\$1,470,000	\$1,470,000	\$1,470,000	\$1,470,000	\$1,470,000
Unit Cost (\$/acft)	\$245	\$245	\$245	\$245	\$245	\$245

4C.31.7 Irrigation

No future shortages are projected in the Irrigation category and no changes in water supply are recommended.

4C.31.8 Livestock

No future shortages are projected in the Livestock category and no changes in water supply are recommended.

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4C.32 Stonewall County Water Supply Plan

Table 4C.32-1 lists each water user group in Stonewall County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.32-1.
Stonewall County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Aspermont	9	35	Short term Projected shortage –see plan below
County-Other	37	54	Projected surplus
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	0	0	Supply equals demand
Irrigation	8	9	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-63 and C-64, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.32.1 The City of Aspermont

4C.32.1.1 Description of Supply

The City of Aspermont is supplied from NCTMWA and from local groundwater sources, primarily from the Seymour Aquifer. The short-term shortages are projected that do not exist past the year 2030.

4C.32.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Aspermont:

- Conservation.

4C.32.1.3 Costs

Cost of the Recommended Plan for the City of Aspermont.

- a. Water Supply from Conservation:
- Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Total Project Cost: N/A
 - Annual Cost: maximum of \$6,080 in 2020

**Table 4C.32-2.
Recommended Plan Costs by Decade for the City of Aspermont**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(7)	(1)	9	20	28	35
Conservation						
Supply From Plan Element (acft/yr)	8	16	12	9	6	6
Annual Cost (\$/yr)	\$3,040	\$6,080	\$4,560	\$3,420	\$2,280	\$2,280
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380

4C.32.2 County-Other

The water supply entities for Stonewall County-Other show a projected surplus and no changes in water supply are recommended.

4C.32.3 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.32.4 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.32.5 Mining

Stonewall County Mining shows no projected shortages and no changes in water supply are recommended.

4C.32.6 Irrigation

Stonewall County Irrigation shows a projected surplus and no changes in water supply are recommended.

4C.32.7 Livestock

No Livestock shortage is projected.

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4C.33 Taylor County Water Supply Plan

Table 4C.33-1 lists each water user group in Taylor County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.33-1.
Taylor County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Abilene	(14,071)	(12,973)	Projected shortage –see plan below
City of Merkel	(85)	(52)	Projected shortage –see plan below
Potosi WSC	(120)	(84)	Projected shortage –see plan below
Steamboat Mountain WSC	119	149	Projected surplus
City of Tuscola	0	0	Supply equals demand
City of Tye	(43)	(29)	Projected shortage –see plan below
County-Other	1,051	1,086	Projected surplus
Manufacturing	0	0	Supply equals demand
Steam-Electric	16	1	Projected surplus
Mining	(5)	(4)	Projected shortage –see plan below
Irrigation	162	164	Projected surplus
Livestock	0	0	Supply equals demand

¹ From Tables C-65 and C-66, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.33.1 City of Abilene

4C.33.1.1 Description of Supply

Surface water supplies are obtained from Fort Phantom Hill, Hubbard Creek and O.H. Ivie Reservoirs. Abilene also has a wastewater reuse system for non-potable use, with water stored in Lake Kirby. The City is projected to have supply shortages totaling 14,071 acft in 2030 and 12,973 acft in 2060.

4C.33.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortages for the City of Abilene:

- Conservation
- West Central Brazos System Optimization Plan (WCBSOP)
- Alternate Strategy: BRA System purchase (Possum Kingdom Reservoir)
- Alternate Strategy: purchase from Lake Alan Henry
- Alternate Strategy: Double Mountain Fork Reservoir

The WCBSOP is a combination of the following components, which would operate jointly as a system:

- City of Abilene Reuse (Volume II, Section 4B.3.2)
- Breckenridge Reservoir (Cedar Ridge site) (Volume II, Section 4B.12.1)
 - Double Mountain Fork Reservoir (Volume II, Section 4B.12.4) is an alternative component to Breckenridge Reservoir
- Clear Fork Scalping into Hubbard Creek Reservoir (*West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan*, Freese and Nichols, 2004)
- Priority Calls Agreement: Possum Kingdom/Hubbard
- Priority Calls Agreement: Possum Kingdom/Fort Phantom Clear Fork Scalping

Under this system, the City would utilize return flows to augment storage in Breckenridge Reservoir. Flood flows and releases from Breckenridge Reservoir (which would include City of Abilene return flows) would be pumped into Hubbard Creek Reservoir through the Clear Fork Scalping Operation. Agreements with the Brazos River Authority regarding priority calls on inflows would augment supplies available to Hubbard Creek Reservoir and Fort Phantom's Clear Fork Scalping Operation, as well as to augment supplies from Breckenridge Reservoir and the Clear Fork Scalping into Hubbard Creek Reservoir. In time, a pipeline could be built to deliver water supply from Breckenridge Reservoir directly to the City of Abilene through Fort Phantom Hill Reservoir. Depending upon final permitting, configuration and sizing of system components, the WCBSOP could provide staged increases of supply in excess of 59,150 acft/yr.

The City and the West Central Texas Municipal Water District (WCTMWD) have begun pursuing each of the components of the overall WCBSOP. Permit applications are pending at the TCEQ for City of Abilene reuse and the Clear Fork Scalping into Hubbard Creek Reservoir. The City and District are evaluating alternative configurations of Breckenridge Reservoir and pursuing initial discussions with affected landowners.

At the request of the City and the District, the Brazos G RWPG considers the WCBSOP to be a single strategy to develop and optimize water supplies in the west central Brazos Basin. This strategy is also recommended in identical form for the WCTMWD as a Wholesale Water Provider.

4C.33.1.3 Costs

Cost of the Recommended Plan for the City of Abilene.

- a. Conservation
 - Cost Source: Volume II, Section 4B.2
 - Date to be Implemented: 2010
 - Total Project Cost: N/A
 - Annual Cost: \$378,100 in 2060
- b. Water Supply from West Central Brazos System Optimization Plan (WCBSOP):
 - Cost Source: Evaluations of various components (Table 4C.33-2)
 - Date to be Implemented: phased implementation, beginning in 2010
 - Total Project Cost: \$198,055,000
 - Annual Cost: \$16,795,500
 - Unit Cost: \$284/acft

**Table 4C.33-2,
Component Costs for West Central Brazos System Optimization Plan**

System Component	Total Cost	Annual Cost	Initial Supply Contributed (acft/yr)
Breckenridge Reservoir with reuse and priority calls agreement with BRA	\$82,755,000	\$6,257,000	34,520 ¹
Clear Fork Scalping into Hubbard Creek Reservoir with priority calls agreement with BRA	\$115,300,000	\$10,081,000	7,000
Priority Calls Agreements with BRA for Hubbard Creek Reservoir and Fort Phantom Him Reservoir Scalping (costs for Possum Kingdom Reservoir Impacts – 10,000 acft at \$45.75/acft)	\$0	\$457,500	17,630
Total	\$198,055,000	\$16,795,500	59,150

¹ Includes 5,600 acft/yr of additional yield provided by Abilene's existing return flows.

**Table 4C.33-3.
Recommended Plan Costs by Decade for the City of Abilene**

Plan Element	2010	2020	2030	2040	2050	2060
Projected Surplus/(Shortage) (acft/yr)	(13,087)	(13,871)	(14,071)	(13,920)	(13,487)	(12,973)
Conservation						
Supply From Plan Element (acft/yr)	977	2,042	1,636	1,196	1,026	994
Annual Cost (\$/yr)	\$371,260	\$775,960	\$621,680	\$454,480	\$389,880	\$377,720
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from WCBSOP¹						
Supply From Plan Element (acft/yr)	25,575	25,575	25,575	25,575	25,575	25,575
Annual Cost (\$/yr)	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300
Unit Cost (\$/acft)	\$284	\$284	\$284	\$284	\$284	\$284

¹Costs and supply from WCBSOP are assumed to be split equally between Abilene and the WCTMWD (see Table 4C.38-10).

4C.33.2 City of Merkel

4C.33.2.1 Description of Supply

The City of Merkel obtains surface water from local sources and from the City of Abilene.

4C.33.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Merkel:

- Purchase additional supply from City of Abilene.
- Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.33.2.3 Costs

Cost of the Recommended Plan for the City of Merkel.

a. Water Supply from City of Abilene:

- Cost Source: Assumed treated wholesale rate
- Date to be Implemented: 2010
- Total Project Cost: \$0 (Current infrastructure assumed to be adequate)
- Annual Cost: \$521/acft (\$1.60/1,000 gallons)

**Table 4C.33-4.
Recommended Plan Costs by Decade for the City of Merkel**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(74)	(85)	(85)	(78)	(66)	(52)
Water Supply from Abilene						
Supply From Plan Element (acft/yr)	100	100	100	100	100	100
Annual Cost (\$/yr)	\$52,100	\$52,100	\$52,100	\$52,100	\$52,100	\$52,100
Unit Cost (\$/acft)	\$521	\$521	\$521	\$521	\$521	\$521

4C.33.3 Potosi WSC

4C.33.3.1 Description of Supply

The Potosi WSC purchases water from the City of Abilene, and shows a projected shortage.

4C.33.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the Potosi WSC:

- Purchase additional supply from City of Abilene.
- Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.33.3.3 Costs

Cost of the Recommended Plan for the Potosi WSC.

a. Water Supply from City of Abilene:

- Cost Source: Assumed treated wholesale rate
- Date to be Implemented: 2010
- Total Project Cost: \$0 (Current infrastructure assumed to be adequate)
- Annual Cost: \$521/acft (\$1.60/1,000 gallons)

**Table 4C.33-5
Recommended Plan Costs by Decade for Potosi WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(115)	(121)	(120)	(108)	(96)	(84)
Water Supply from Abilene						
Supply From Plan Element (acft/yr)	150	150	150	150	150	150
Annual Cost (\$/yr)	\$78,150	\$78,150	\$78,150	\$78,150	\$78,150	\$78,150
Unit Cost (\$/acft)	\$521	\$521	\$521	\$521	\$521	\$521

4C.33.3 Steamboat Mountain WSC

The Steamboat Mountain purchases water from the City of Abilene and shows a projected surplus. No changes in water supply are recommended.

4C.33.4 City of Tuscola

The City of Tuscola purchases water from Taylor Co FWSD #1 and shows a supply equal to demand. No changes in water supply are recommended.

4C.33.5 City of Tye

4C.33.5.1 Description of Supply

The City of Tye purchases water from the City of Abilene, and shows a projected shortage.

4C.33.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Tye:

- Purchase additional supply from City of Abilene.
- Conservation was also considered; however, the current per capita use rate is below the selected target rate of 140 gpcd.

4C.33.5.3 Costs

Cost of the Recommended Plan for the City of Tye.

a. Water Supply from City of Abilene:

- Cost Source: Assumed treated wholesale rate
- Date to be Implemented: 2010
- Total Project Cost: \$0 (Current infrastructure assumed to be adequate)
- Annual Cost: \$521/acft (\$1.60/1,000 gallons)

**Table 4C.33-6.
Recommended Plan Costs by Decade for the City of Tye**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(40)	(43)	(43)	(39)	(34)	(29)
Water Supply from Abilene						
Supply From Plan Element (acft/yr)	50	50	50	50	50	50
Annual Cost (\$/yr)	\$26,050	\$26,050	\$26,050	\$26,050	\$26,050	\$26,050
Unit Cost (\$/acft)	\$521	\$521	\$521	\$521	\$521	\$521

4C.33.6 County-Other Category

The water supply entities for Taylor County-Other show a projected surplus and no changes in water supply are recommended.

4C.33.7 Manufacturing

The water supply for Manufacturing equals demand and no changes in water supply are recommended.

4C.33.8 Steam-Electric

The water supply entities for Taylor County Steam-Electric show a projected surplus and no changes in water supply are recommended.

4C.33.9 Mining

4C.33.9.1 Description of Supply

The current supply comes from the Trinity aquifer; Taylor County Mining shows a projected shortage.

4C.33.9.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage Taylor County Mining:

- Conservation

4C.33.9.3 Costs

Cost of the Recommended Plan for Taylor County Mining.

a. Conservation:

- Date to be Implemented: 2010
- Annual Cost: not determined

**Table 4C.33-7.
Recommended Plan Costs by Decade for Taylor County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(5)	(4)	(5)	(4)	(4)	(4)
Conservation						
Supply From Plan Element (acft/yr)	9	15	22	23	23	24
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—

4C.33.10 Irrigation

Taylor County Irrigation shows a projected surplus and no changes in water supply are recommended.

4C.33.11 Livestock

Supplies for Livestock water use equal demand and no changes in water supply are recommended.

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4C.34 Throckmorton County Water Supply Plan

Table 4C.34-1 lists each water user group in Throckmorton County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.34-1.
Throckmorton County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Throckmorton	116	157	Projected surplus
County-Other	16	34	Projected surplus
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	0	0	Supply equals demand
Irrigation	(3,988)	(3,988)	Projected shortage
Livestock	0	0	Supply equals demand

¹ From Tables C-67 and C-68, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.34.1 City of Throckmorton

4C.34.1.1 Description of Supply

The City of Throckmorton obtains water from Lake Throckmorton and Ft. Belknap WSC which shows a projected surplus. Since the city's supply is solely Lake Throckmorton, an alternate source is desired in case of severe drought.

4C.34.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended for the City of Throckmorton:

- Conservation, and
- Purchase additional supply from WCBDS.

- An alternate strategy is to construct a pipeline to purchase water from the City of Graham.

4C.34.1.3 Costs

Cost of the recommended Plan for the City of Throckmorton.

a. Conservation

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: by 2010
- Annual Cost: \$8,360
- Unit Cost: \$380/acft of water saved

b. Water Supply from WCBDS (with regional WTP):

- Cost Source: *West Central Brazos Basin Regional Water Treatment and Distribution Facility Plan*, Freese and Nichols, 2004.
- Date to be Implemented: 2010
- Total Project Cost: \$15,877,792
- Annual Cost: \$1,800,000 (total project)
\$248,198 (City of Throckmorton portion)

**Table 4C.34-2.
Recommended Plan Costs by Decade for the City of Throckmorton**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	93	103	116	134	148	157
Conservation						
Supply From Plan Element (acft/yr)	22	22	18	14	11	11
Annual Cost (\$/yr)	\$8,360	\$8,360	\$6,840	\$5,320	\$4,180	\$4,180
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Water Supply from WCBDS						
Supply From Plan Element (acft/yr)	193	193	193	193	193	193
Annual Cost (\$/yr)	\$248,198	\$248,198	\$248,198	\$248,198	\$248,198	\$248,198
Unit Cost (\$/acft)	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286	\$1,286

4C.34.2 County-Other

The Throckmorton County-Other shows a projected surplus and no changes in water supply are recommended.

4C.34.3 Manufacturing

No Manufacturing demand exists or is projected for the county.

4C.34.4 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

4C.34.5 Mining

No Mining shortages are projected and no changes in water supply system are recommended.

4C.34.6 Irrigation

4C.34.6.1 Description of Supply

- Source: Clear Fork of the Brazos River.
- Estimated Reliable Supply: 12 acft/yr in 2060

4C.34.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Throckmorton County Irrigation:

- Long-term supplies from the West Central Brazos System Optimization Plan (WCBSOP). Unappropriated flows of the Clear Fork of the Brazos River and/or City of Abilene return flows would be used temporarily in conjunction with off-channel storage until the Breckenridge Reservoir (Cedar Ridge site) portion of the WCBSOP is constructed. Water rights obtained by local irrigators through this strategy would become part of the WCBSOP when the WCBSOP is implemented. See Section 4C.33.1.2 for a complete description of the WCBSOP.
- Conservation was also considered; however, this is would be an entirely new irrigation system and would utilize the most water-efficient irrigation technologies that are economically feasible.

4C.34.6.3 Costs

Costs of the recommended plan for Throckmorton County Irrigation to meet the projected shortages are:

- a. West Central Brazos System Operation Plan (with temporary unappropriated flows):
 - Cost Source: Evaluations of various components (Table 4C.33-2)
 - Date to be Implemented: By year 2010
 - Annual Cost: \$1,136,000 (based on unit cost of \$284/acft). Actual costs would be negotiated between the City of Abilene, West Central Texas Municipal Water District, and local irrigators.

**Table 4C.34-3.
Recommended Plan Costs by Decade for Throckmorton County Irrigation**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Shortage (acft/yr)	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)
Water Supply from WCBSOP (temporary unappropriated flows until development of WCBSOP)						
Quantity Available (acft/yr)	4,000	4,000	4,000	4,000	4,000	4,000
Annual Cost (\$/yr)	\$1,136,000	\$1,136,000	\$1,136,000	\$1,136,000	\$1,136,000	\$1,136,000
Unit Cost (\$/acft)	\$284	\$284	\$284	\$284	\$284	\$284

4C.34.7 Livestock

No projected shortage exists and no change in water supply is recommended.

4C.35 Washington County Water Supply Plan

Table 4C.35-1 lists each water user group in Washington County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.35-1.
Washington County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Brenham	232	120	Projected surplus
County-Other	234	135	Projected surplus
Manufacturing	(70)	(199)	Projected shortage – see plan below
Steam-Electric	0	0	No projected demand
Mining	0	0	No projected surplus/shortage
Irrigation	4,696	4,696	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-69 and C-70, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.35.1 City of Brenham

The City of Brenham obtains its water supply through a contract with the Brazos River Authority for 3,535 acft/yr of water supply from Lake Somerville. This contract exceeds its year 2060 projected demand of 3,415 acft/yr. No changes in water supply are recommended.

4C.35.2 County-Other

County-Other is projected to have a surplus of water through the year 2060 and no changes in water supply are recommended.

4C.35.3 Manufacturing

4C.35.3.1 Description of Supply

Washington County Manufacturing obtains its water supply from groundwater from the Gulf Coast Aquifer. Based on the available groundwater supply, Washington County Manufacturing is projected to have a shortage of 70 acft/yr in the year 2030 and 199 acft/yr in the year 2060.

4C.35.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Washington County Manufacturing:

- Conservation, and
- Purchase water from the Brazos River Authority.

4C.35.3.3 Costs

Costs of the Recommended Plan for Washington County Manufacturing.

a. Conservation:

- Date to be Implemented: before 2010
- Annual Cost: Not determined

b. Water Supply from Brazos Rive Authority:

- Cost Source: estimated wholesale treated water rate
- Date to be Implemented: By year 2020
- Annual Cost: \$208,154 in 2060

The annual cost was calculated by multiplying the Manufacturing projected supply from this strategy by an estimated wholesale water rate of \$1,046/acft.

**Table 4C.35-2.
Recommended Plan Costs by Decade for Washington County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	20	(27)	(70)	(113)	(151)	(199)
Conservation						
Supply From Plan Element (acft/yr)	12	23	35	38	41	44
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Water Supply from Brazos River Authority						
Supply From Plan Element (acft/yr)	—	27	70	113	151	199
Annual Cost (\$/yr)		\$28,242	\$73,220	\$118,198	\$157,946	\$208,154
Unit Cost (\$/acft)		\$1,046	\$1,046	\$1,046	\$1,046	\$1,046

4C.35.4 Steam-Electric

No Steam-Electric demand exists nor is projected for the county.

4C.35.5 Mining

No shortages are projected for Mining use and no changes in water supply are recommended.

4C.35.6 Irrigation

Irrigation is projected to have a surplus of water from available groundwater and surface water supplies and no changes in water supply are recommended.

4C.35.7 Livestock

No shortages are projected for Livestock use and no changes in water supply are recommended.

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4C.36 Williamson County Water Supply Plan

Table 4C.36-1 lists each water user group in Williamson County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.36-1.
Williamson County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
City of Bartlett	(146)	(189)	Projected shortage – see plan below
Blockhouse MUD	0	0	No projected surplus/shortage
Brushy Creek MUD	109	87	Projected surplus – see plan below
City of Cedar Park	(6,650)	(26,819)	Projected shortage – see plan below
Chisholm Trail SUD	(941)	(7,883)	Projected shortage – see plan below
Fern Bluff MUD	0	0	No projected surplus/shortage
City of Florence	(63)	(232)	Projected shortage – see plan below
City of Georgetown	9,500	(3,429)	Projected shortage – see plan below
City of Granger	130	77	Projected surplus
City of Hutto	(407)	(780)	Projected shortage – see plan below
Jarrell-Schwertner WSC	(329)	(1,416)	Projected shortage – see plan below
Jonah Water SUD	543	(1,531)	Projected shortage – see plan below
City of Leander	2,977	(232)	Projected shortage – see plan below
Liberty Hill	(788)	(1,722)	Projected shortage – see plan below
Manville WSC	2,369	623	Projected surplus
City of Round Rock	(10,566)	(42,548)	Projected shortage – see plan below
City of Taylor	5,258	3,794	Projected surplus
City of Thrall	(144)	(239)	Projected shortage – see plan below
City of Weir	(277)	(557)	Projected shortage – see plan below
Wells Branch MUD	0	0	No projected surplus/shortage
Williamson-Travis County MUD #1	0	0	No projected surplus/shortage
County-Other	1,165	(3,125)	Projected shortage – see plan below
Manufacturing	(1,583)	(2,328)	Projected shortage – see plan below
Steam-Electric	0	0	No demand or supply
Mining	(1,576)	(1,882)	Projected shortage – see plan below
Irrigation	947	947	Projected surplus
Livestock	0	0	No projected surplus/shortage

¹ From Tables C-71 and C-72, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

4C.36.1 City of Bartlett

4C.36.1.1 Description of Supply

The City of Bartlett obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater supply, the City of Bartlett is projected to have a shortage of 146 acft/yr in the year 2030 and 189 acft/yr in the year 2060.

4C.36.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Bartlett:

- Conservation, and
- New contract with Central Texas WSC.

4C.36.1.3 Costs

Costs of the Recommended Plan for the City of Bartlett.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum \$11,400 in 2020
- b. New contract with Central Texas WSC:
 - Cost Source: Assumed wholesale treated water cost of \$684/acft (\$2.10/1,000 gallons)
 - Date to be Implemented: before 2010
 - Annual Cost: \$123,120

**Table 4C.36-2.
Recommended Plan Costs by Decade for the City of Bartlett**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(112)	(129)	(146)	(158)	(173)	(189)
Conservation						
Supply From Plan Element (acft/yr)	12	30	25	19	18	18
Annual Cost (\$/yr)	\$4,560	\$11,400	\$9,500	\$7,220	\$6,840	\$6,840
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
New Contract with Central Texas WSC						
Supply From Plan Element (acft/yr)	180	180	180	180	180	180
Annual Cost (\$/yr)	\$123,120	\$123,120	\$123,120	\$123,120	\$123,120	\$123,120
Unit Cost (\$/acft)	\$684	\$684	\$684	\$684	\$684	\$684

4C.36.2 Blockhouse MUD

Blockhouse MUD obtains its water supply from the City of Cedar Park. No shortages are projected for Blockhouse MUD and no changes in water supply are recommended.

4C.36.3 Brushy Creek MUD

4C.36.3.1 Description of Supply

Brushy Creek MUD obtains its water supply from a contract with the Brazos River Authority for water from Stillhouse Hollow Reservoir. Although Brushy Creek MUD does not have a projected shortage, their projected supplies are less than 105 percent of their projected demands, and additional conservation is recommended.

4C.36.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Brushy Creek MUD:

- Conservation.

4C.36.3.3 Costs

Costs of the Recommended Plan for Brushy Creek MUD.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$162,260 in 2030

**Table 4C.36-3.
Recommended Plan Costs by Decade for Brushy Creek MUD**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1,350	389	109	102	94	87
Conservation						
Supply From Plan Element (acft/yr)	92	398	427	427	427	427
Annual Cost (\$/yr)	\$34,960	\$151,240	\$162,260	\$162,260	\$162,260	\$162,260
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380

4C.36.4 City of Cedar Park

4C.36.4.1 Description of Supply

The City of Cedar Park obtains its water supply from a contract with the Lower Colorado River Authority (LCRA) in Region K. Based on the available surface water supply, the City of Cedar Park is projected to have a shortage of 6,650 acft/yr in the year 2030 and 26,819 acft/yr in the year 2060.

4C.36.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Cedar Park:

- Conservation, and
- Purchase additional water from LCRA.

4C.36.4.3 Costs

Costs of the Recommended Plan for the City of Cedar Park.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$1,279,840 in 2060

b. Purchase water from LCRA:

- Cost Source: Volume II, Section 4B.11.2
- Date to be Implemented: before 2030
- Total Project Cost: \$81,748,000
- Annual Cost: \$14,906,000

**Table 4C.36-4.
Recommended Plan Costs by Decade for the City of Cedar Park**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	4,852	10	(6,650)	(12,721)	(18,915)	(26,819)
Conservation						
Supply From Plan Element (acft/yr)	413	1,398	1,840	2,300	2,761	3,368
Annual Cost (\$/yr)	\$156,940	\$531,240	\$699,200	\$874,000	\$1,049,180	\$1,279,840
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase water from LCRA						
Supply From Plan Element (acft/yr)	—	—	25,000	25,000	25,000	25,000
Annual Cost (\$/yr)			\$14,906,000	\$14,906,000	\$14,906,000	\$14,906,000
Unit Cost (\$/acft)			\$596	\$596	\$596	\$596

4C.36.5 Chisholm Trail SUD**4C.36.5.1 Description of Supply**

Chisholm Trail SUD obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and a contract with the Brazos River Authority for water from Lake Georgetown. Based on the available groundwater and surface water supply, Chisholm Trail SUD is projected to have a shortage of 941 acft/yr in the year 2030 and 7,883 acft/yr in the year 2060.

4C.36.5.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Chisholm Trail SUD:

- Conservation
- Obtain supply through the LCRA/BRA Alliance, and
- BRA System Operations.

4C.36.5.3 Costs

Costs of the Recommended Plan for Chisholm Trail SUD.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$710,220 in 2060
- b. BRA/LCRA Alliance:
 - Cost Source: Volume II, Section 4B.11.2
 - Date to be Implemented: before 2030
 - Total Project Cost: \$18,518,000
 - Annual Cost: \$2,653,000
- c. BRA System Operations (Lake Granger Conjunctive Use Project):
 - Cost Source: Volume II, Section 4B.5
 - Date to be Implemented: before 2040
 - Total Project Cost: \$303,288,000
 - Annual Cost: \$3,370,500 (based on unit cost for overall strategy of \$749/acft)

**Table 4C.36-5.
Recommended Plan Costs by Decade for Chisholm Trail SUD**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2,588	976	(941)	(3,120)	(5,480)	(7,883)
Conservation						
Supply From Plan Element (acft/yr)	154	456	721	1,114	1,538	1,869
Annual Cost (\$/yr)	\$58,520	\$173,280	\$273,980	\$423,320	\$584,440	\$710,220
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
BRA/LCRA Alliance						
Supply From Plan Element (acft/yr)	—	—	3,472	3,472	3,472	3,472
Annual Cost (\$/yr)			\$2,653,000	\$2,653,000	\$2,653,000	\$2,653,000
Unit Cost (\$/acft)			\$764	\$764	\$764	\$764
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	4,500	4,500
Annual Cost (\$/yr)					\$3,370,500	\$3,370,500
Unit Cost (\$/acft)					\$749	\$749

4C.36.6 Fern Bluff MUD

Fern Bluff MUD obtains its water supply from the City of Round Rock. No shortages are projected for Fern Bluff MUD and no changes in water supply are recommended.

4C.36.7 City of Florence

4C.36.7.1 Description of Supply

The City of Florence obtains its water supply from groundwater from the Trinity Aquifer. Based on the City's available groundwater supply, the City of Florence is projected to have a shortage of 63 acft/yr in the year 2030 and 232 acft/yr in the year 2060.

4C.36.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Florence:

- Conservation, and

- Additional groundwater development.

4C.36.7.3 Costs

Costs of the Recommended Plan for the City of Florence.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$9,120 in 2060
- b. Additional groundwater development:
 - Date to be Implemented: before 2030
 - Total Project Cost: \$803,500
 - Annual Cost: \$73,000

Costs based on drilling three 100 gpm wells into the Trinity Aquifer.

**Table 4C.36-6.
Recommended Plan Costs by Decade for the City of Florence**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	20	(18)	(63)	(113)	(169)	(232)
Conservation						
Supply From Plan Element (acft/yr)	8	22	20	20	20	24
Annual Cost (\$/yr)	\$3,040	\$8,360	\$7,600	\$7,600	\$7,600	\$9,120
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Groundwater Development						
Supply From Plan Element (acft/yr)	—	—	250	250	250	250
Annual Cost (\$/yr)			\$73,000	\$73,000	\$73,000	\$73,000
Unit Cost (\$/acft)			\$292	\$292	\$292	\$292

4C.36.8 City of Georgetown

4C.36.8.1 Description of Supply

The City of Georgetown obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and contracts with the Brazos River Authority for water from Lake Georgetown and Stillhouse Hollow Reservoir. Based on the available groundwater and

surface water supply, the City of Georgetown is projected to have a surplus of 9,500 acft/yr in the year 2030 and a shortage 3,429 acft/yr in the year 2060.

4C.36.8.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Georgetown:

- Conservation, and
- BRA System Operation.

4C.36.8.3 Costs

Costs of the Recommended Plan for the City of Georgetown.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$636,500 in 2060

b. BRA System Operation (Lake Granger Conjunctive Use Project):

- Cost Source: Volume II, Section 4B.5
- Date to be Implemented: before 2040
- Total Project Cost: \$303,288,000
- Annual Cost: \$2,996,000 (based on unit cost for overall strategy of \$749/acft)

**Table 4C.36-7.
Recommended Plan Costs by Decade for the City of Georgetown**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	16,162	13,083	9,500	5,578	1,228	(3,429)
Conservation						
Supply From Plan Element (acft/yr)	228	873	986	1,141	1,398	1,675
Annual Cost (\$/yr)	\$86,640	\$331,740	\$374,680	\$433,580	\$531,240	\$636,500
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	4,000	4,000
Annual Cost (\$/yr)					\$2,996,000	\$2,996,000
Unit Cost (\$/acft)					\$749	\$749

4C.36.9 City of Granger

The City of Granger obtains its water supply from groundwater from the Trinity Aquifer. No shortages are projected for the City of Granger and no changes in water supply are recommended.

4C.36.10 City of Hutto

4C.36.10.1 Description of Supply

The City of Hutto obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer. Based on the available groundwater water supply, the City of Hutto is projected to have a shortage of 407 acft/yr in the year 2030 and 780 acft/yr in the year 2060. The City has an agreement to obtain 0.5 MGD (560 acft/yr) from Manville WSC, but this interconnect will be used primarily for emergency supplies.

4C.36.10.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Hutto:

- Purchase water from the City of Taylor. The City has recently entered into an agreement with the City of Taylor to purchase 2,016 acft/yr through 2010, increasing to 3,136 acft/yr in years 2020 through 2060. The City of Taylor is supplied by the BRA through Lake Granger.
- Purchase from private groundwater supplier. The City has recently entered into a contract with a private groundwater supplier for 3 MGD of supply. Plans call for the water to be produced from the Hooper Formation in eastern Williamson County near the Lee and Milam County lines. The Hooper Formation is part of the overall Carrizo-Wilcox Aquifer system; however, the BGRWPG has not identified any groundwater available from the Carrizo-Wilcox Aquifer in Williamson County. Due to the proximity of the proposed well field to Lee and Milam Counties, it is assumed that the water supplied through this strategy will be drawn equally from both Lee and Milam Counties.
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.36.10.3 Costs

Costs of the Recommended Plan for the City of Hutto.

a. Purchase from City of Taylor:

- Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)

- Date to be Implemented: before 2010
 - Annual Cost: \$3,067,008 (2020 through 2060)
- b. Purchase from private water supplier:
- Cost Source: Assumed wholesale treated water rate of \$1,147/acft (\$3.52/1,000 gallons)
 - Date to be Implemented: before 2010
 - Annual Cost: \$3,854,000

**Table 4C.36-8.
Recommended Plan Costs by Decade for the City of Hutto**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(214)	(303)	(407)	(519)	(645)	(780)
Purchase from City of Taylor (BRA supply from Lake Granger)						
Supply From Plan Element (acft/yr)	2,016	3,136	3,136	3,136	3,136	3,136
Annual Cost (\$/yr)	\$1,971,648	\$3,067,008	\$3,067,008	\$3,067,008	\$3,067,008	\$3,067,008
Unit Cost (\$/acft)	\$978	\$978	\$978	\$978	\$978	\$978
Purchase from Private Groundwater Supplier						
Supply From Plan Element (acft/yr)	3,360	3,360	3,360	3,360	3,360	3,360
Annual Cost (\$/yr)	\$3,854,000	\$3,854,000	\$3,854,000	\$3,854,000	\$3,854,000	\$3,854,000
Unit Cost (\$/acft)	\$1,147	\$1,147	\$1,147	\$1,147	\$1,147	\$1,147

4C.36.11 Jarrell-Schwertner WSC

4C.36.11.1 Description of Supply

Jarrell-Schwertner WSC obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer. Based on the available groundwater water supply, Jarrell-Schwertner WSC is projected to have a shortage of 329 acft/yr in the year 2030 and 1,416 acft/yr in the year 2060.

4C.36.11.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Jarrell-Schwertner WSC:

- Conservation,
- Contract with Central Texas WSC, and
- BRA System Operations.

4C.36.11.3 Costs

Costs of the Recommended Plan for Jarrell-Schwertner WSC.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$60,040 in 2060
- b. Contract with Central Texas WSC:
 - Cost Source: assumed wholesale treated water rate of \$684/acft (\$2.10/1,000 gallons)
 - Date to be Implemented: before 2020
 - Annual Cost: \$1,026,000
- c. BRA System Operations (Lake Granger Conjunctive Use Project):
 - Cost Source: Volume II, Section 4B.5
 - Date to be Implemented: before 2050
 - Total Project Cost: \$303,288,000
 - Annual Cost: \$1,123,500 (based on unit cost for overall strategy of \$749/acft)

**Table 4C.36-9.
Recommended Plan Costs by Decade for Jarrell-Schwertner WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	283	(5)	(329)	(659)	(1,026)	(1,416)
Conservation						
Supply From Plan Element (acft/yr)	30	107	115	116	136	158
Annual Cost (\$/yr)	\$11,400	\$40,660	\$43,700	\$44,080	\$51,680	\$60,040
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Contract with CTWSC						
Supply From Plan Element (acft/yr)	—	1,500	1,500	1,500	—	—
Annual Cost (\$/yr)		\$1,026,000	\$1,026,000	\$1,026,000		
Unit Cost (\$/acft)		\$684	\$684	\$684		
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	1,500	1,500
Annual Cost (\$/yr)					\$1,123,500	\$1,123,500
Unit Cost (\$/acft)					\$749	\$749

4C.36.12 Jonah Water SUD**4C.36.12.1 Description of Supply**

Jonah Water SUD obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and a contract with the Brazos River Authority for water from Stillhouse Hollow Reservoir. Based on the available groundwater and surface water supply, Jonah Water SUD is projected to have a surplus of 543 acft/yr in the year 2030 and a shortage 1,531 acft/yr in the year 2060.

4C.36.12.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Jonah Water SUD:

- Purchase from BRA (EWCWTS).
- Conservation was also considered; however, the SUD's current per capita use rate is below the selected target rate of 140 gpcd.

4C.36.12.3 Costs

Costs of the Recommended Plan for Jonah Water SUD.

- Purchase from BRA (EWCWTS):
 - Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)
 - Date to be Implemented: before 2040
 - Annual Cost: \$1,564,800

**Table 4C.36-10.
Recommended Plan Costs by Decade for Jonah Water SUD**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1,697	1,129	543	(80)	(769)	(1,531)
Purchase from BRA (EWCWTS)						
Supply From Plan Element (acft/yr)	—	—	—	100	1,600	1,600
Annual Cost (\$/yr)				\$97,800	\$1,564,800	\$1,564,800
Unit Cost (\$/acft)				\$978	\$978	\$978

4C.36.13 City of Leander**4C.36.13.1 Description of Supply**

The City of Leander obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and contracts with the Lower Colorado River Authority for water from Lake Travis. Based on the available groundwater and surface water supply, the City of Leander is projected to have a surplus of 2,977 acft/yr in the year 2030 and a shortage 232 acft/yr in the year 2060.

4C.36.13.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Leander:

- Conservation
- Increase supply from the LCRA

4C.36.13.3 Costs

Costs of the Recommended Plan for the City of Leander.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$193,420 in 2060

b. Additional supply from LCRA:

- Cost Source: LCRA wholesale water price of \$115/acft
- Date to be Implemented: before 2040
- Total Project Cost: 0\$ (assumes existing facilities adequate to handle additional supply)
- Annual Cost: \$28,750

**Table 4C.36-11.
Recommended Plan Costs by Decade for the City of Leander**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	4,619	3,860	2,977	2,007	927	(232)
Conservation						
Supply From Plan Element (acft/yr)	65	254	292	342	422	509
Annual Cost (\$/yr)	\$24,700	\$96,520	\$110,960	\$129,960	\$160,360	\$193,420
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Additional Supply from LCRA						
Supply From Plan Element (acft/yr)	—	—	—	—	250	250
Annual Cost (\$/yr)					\$28,750	\$28,750
Unit Cost (\$/acft)					\$115	\$115

4C.36.14 City of Liberty Hill

4C.36.14.1 Description of Supply

The City of Liberty Hill obtains its water supply from groundwater from the Trinity Aquifer. Based on the available groundwater, the City of Liberty Hill is projected to have a shortage of 788 acft/yr in the year 2030 and 1,722 acft/yr in the year 2060.

4C.36.14.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Liberty Hill:

- Conservation, and
- Purchase water from the Brazos River Authority.
- An alternative is to obtain a short term supply from the City of Leander until larger needs develop.

4C.36.14.3 Costs

Costs of the Recommended Plan for the City of Liberty Hill.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1

- Date to be Implemented: before 2010
 - Annual Cost: maximum of \$61,940 in 2060
- b. Purchase water from the Brazos River Authority:
- Cost Source: Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)
 - Date to be Implemented: before 2010
 - Annual Cost: \$1,760,400

Table 4C.36-12.
Recommended Plan Costs by Decade for the City of Liberty Hill

<i>Plan Element</i>	2010	2020	2030	2040	2050	2060
Projected Surplus/(Shortage) (acft/yr)	(302)	(521)	(788)	(1,071)	(1,385)	(1,722)
Conservation						
Supply From Plan Element (acft/yr)	17	62	87	107	134	163
Annual Cost (\$/yr)	\$6,460	\$23,560	\$33,060	\$40,660	\$50,920	\$61,940
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase from BRA						
Supply From Plan Element (acft/yr)	1,800	1,800	1,800	1,800	1,800	1,800
Annual Cost (\$/yr)	\$1,760,400	\$1,760,400	\$1,760,400	\$1,760,400	\$1,760,400	\$1,760,400
Unit Cost (\$/acft)	\$978	\$978	\$978	\$978	\$978	\$978

4C.36.15 Manville WSC

Manville WSC obtains its water supply from groundwater from the Edwards and Trinity Aquifers as well as other minor aquifers. No shortages are projected for Manville WSC and no changes in water supply are recommended.

4C.36.16 City of Round Rock

4C.36.16.1 Description of Supply

The City of Round Rock obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and contracts with the Brazos River Authority for water from Lake Georgetown and Stillhouse Hollow Reservoir. Based on the available groundwater and surface water supply, the City of Round Rock is projected to have a shortage of 10,566 acft/yr in the year 2030 and 42,548 acft/yr in the year 2060.

4C.36.16.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Round Rock:

- Conservation,
- Reuse,
- LCRA/BRA Alliance water, and
- BRA System Operation.

4C.36.16.3 Costs

Costs of the Recommended Plan for the City of Round Rock.

- a. Conservation:
 - Cost Source: Volume II, Section 4B.2.1
 - Date to be Implemented: before 2010
 - Annual Cost: maximum of \$1,372,560 in 2060
- b. Reuse:
 - Cost Source: Volume II, Section 4B.3.1
 - Date to be Implemented: before 2010
 - Total Project Cost: \$6,369,000 (prior to 2040)
 - Annual Cost: \$772,000 (prior to 2040); \$3,751,270 (after 2040 at full reuse potential)
- c. LCRA/BRA Alliance Water:
 - Cost Source: Volume II, Section 4B.11.2
 - Date to be Implemented: before 2020
 - Total Project Cost: \$101,336,000
 - Annual Cost: \$15,084,000
- d. BRA System Operation (Lake Granger Conjunctive Use Project):
 - Cost Source: Volume II, Section 4B.5
 - Date to be Implemented: before 2050
 - Total Project Cost: \$303,288,000
 - Annual Cost: \$11,235,000 (based on unit cost for overall strategy of \$749/acft)

**Table 4C.36-13.
Recommended Plan Costs by Decade for the City of Round Rock**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	5,799	(1,703)	(10,566)	(20,278)	(31,027)	(42,548)
Conservation						
Supply From Plan Element (acft/yr)	586	1,872	2,120	2,455	3,014	3,612
Annual Cost (\$/yr)	\$222,680	\$711,360	\$805,600	\$932,900	\$1,145,320	\$1,372,560
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Reuse						
Supply From Plan Element (acft/yr)	1,532	1,532	1,532	7,443	7,443	7,443
Annual Cost (\$/yr)	\$772,000	\$772,000	\$772,000	\$3,751,270	\$3,751,270	\$3,751,270
Unit Cost (\$/acft)	\$504	\$504	\$504	\$504	\$504	\$504
LCRA/BRA Alliance						
Supply From Plan Element (acft/yr)	—	20,928	20,928	20,928	20,928	20,928
Annual Cost (\$/yr)		\$15,084,000	\$15,084,000	\$15,084,000	\$15,084,000	\$15,084,000
Unit Cost (\$/acft)		\$721	\$721	\$721	\$721	\$721
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	15,000	15,000
Annual Cost (\$/yr)					\$11,235,000	\$11,235,000
Unit Cost (\$/acft)					\$749	\$749

4C.36.17 City of Taylor

The City of Taylor obtains its water supply from a contract with the Brazos River Authority for water from Lake Granger. No shortages are projected for the City of Taylor and no changes in water supply are recommended.

4C.36.18 City of Thrall

4C.36.18.1 Description of Supply

The City of Thrall obtains its water supply from groundwater from a minor aquifer. Based on the available groundwater, the City of Thrall is projected to have a shortage of 144 acft/yr in the year 2030 and 239 acft/yr in the year 2060.

4C.36.18.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Thrall:

- Purchase from BRA (EWCRWTS).
- Conservation was also considered; however, the City's current per capita use rate is below the selected target rate of 140 gpcd.

4C.36.18.3 Costs

Costs of the Recommended Plan for the City of Thrall.

a. Purchase from BRA (EWCRWTS):

- Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)
- Date to be Implemented: before 2010
- Annual Cost: \$254,280

**Table 4C.36-14.
Recommended Plan Costs by Decade for the City of Thrall**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(95)	(117)	(144)	(172)	(203)	(239)
Purchase from BRA (EWCRWTS)						
Supply From Plan Element (acft/yr)	260	260	260	260	260	260
Annual Cost (\$/yr)	\$254,280	\$254,280	\$254,280	\$254,280	\$254,280	\$254,280
Unit Cost (\$/acft)	\$978	\$978	\$978	\$978	\$978	\$978

4C.36.19 City of Weir**4C.36.19.1 Description of Supply**

The City of Weir obtains its water supply from groundwater from the Edwards-BZF (Northern Segment) Aquifer. Based on the available groundwater, the City of Weir is projected to have a shortage of 277 acft/yr in the year 2030 and 557 acft/yr in the year 2060.

4C.36.19.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the City of Weir:

- Conservation, and

- Purchase from BRA (EWCRWTS).
- Voluntary redistribution from the City of Georgetown and BRA System Operation were considered as alternative strategies.

4C.36.19.3 Costs

Costs of the Recommended Plan for the City of Weir.

a. Conservation:

- Cost Source: Volume II, Section 4B.2.1
- Date to be Implemented: before 2010
- Annual Cost: maximum of \$22,040 in 2060

b. Purchase from BRA (EWCRWTS):

- Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)
- Date to be Implemented: before 2010
- Annual Cost: \$586,800

Table 4C.36-15.
Recommended Plan Costs by Decade for the City of Weir

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(132)	(199)	(277)	(362)	(456)	(557)
Conservation						
Supply From Plan Element (acft/yr)	7	25	31	38	47	58
Annual Cost (\$/yr)	\$2,660	\$9,500	\$11,780	\$14,440	\$17,860	\$22,040
Unit Cost (\$/acft)	\$380	\$380	\$380	\$380	\$380	\$380
Purchase from BRA (EWCRWTS)						
Supply From Plan Element (acft/yr)	600	600	600	600	600	600
Annual Cost (\$/yr)	\$586,800	\$586,800	\$586,800	\$586,800	\$586,800	\$586,800
Unit Cost (\$/acft)	\$978	\$978	\$978	\$978	\$978	\$978

4C.36.20 Wells Branch MUD

Wells Branch MUD obtains its water supply from the City of Austin (Region K). No shortages are projected for Wells Branch MUD and no changes in water supply are recommended.

4C.36.21 Williamson-Travis County MUD #1

Williamson-Travis County MUD #1 obtains its water supply from the City of Cedar Park. No shortages are projected for Williamson-Travis County MUD #1 and no changes in water supply are recommended.

4C.36.22 County-Other**4C.36.22.1 Description of Supply**

Williamson County-Other obtains its water supply from groundwater from the Trinity and Edwards Aquifers as well as other minor aquifers. Williamson County-Other also obtains a portion of its water supply from the City of Round Rock, the City of Taylor, and run-of-river rights. Based on the available groundwater and surface water supply, Williamson County-Other is projected to have a surplus of 1,165 acft/yr in the year 2030 and a shortage of 3,125 acft/yr in the year 2060.

4C.36.22.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Williamson County-Other:

- Additional groundwater development, and
- BRA System Operation.
- Conservation was also considered; however, the WUG's current per capita use rate is below the selected target rate of 140 gpcd.

4C.36.22.3 Costs

Costs of the Recommended Plan for Williamson County-Other.

- a. Additional Groundwater Development:
 - Date to be Implemented: before 2030
 - Total Project Cost: 0\$ (primarily single-family residences)
 - Annual Cost: 0\$
- b. BRA System Operation (Lake Granger Conjunctive Use Project):
 - Cost Source: Volume II, Section 4B.5
 - Date to be Implemented: before 2040
 - Total Project Cost: \$303,288,000

- Annual Cost: \$2,621,500 (based on unit cost for overall strategy of \$749/acft)

Table 4C.36-16.
Recommended Plan Costs by Decade for Williamson County-Other

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1,153	1,273	1,165	(188)	(2,001)	(3,125)
Additional Groundwater Development						
Supply From Plan Element (acft/yr)	—	—	280	280	280	280
Annual Cost (\$/yr)			\$0	\$0	\$0	\$0
Unit Cost (\$/acft)			\$0	\$0	\$0	\$0
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	3,500	3,500
Annual Cost (\$/yr)					\$2,621,500	\$2,621,500
Unit Cost (\$/acft)					\$749	\$749

4C.36.23 Manufacturing

4C.36.23.1 Description of Supply

Williamson County Manufacturing obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer as well as other minor aquifers. Williamson County Manufacturing also obtains a portion of its water supply from run-of-river rights. Based on the available groundwater and surface water supply, Williamson County Manufacturing is projected to have a shortage of 1,583 acft/yr in the year 2030 and 2,328 acft/yr in the year 2060.

4C.36.23.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Williamson County Manufacturing:

- Conservation,
- Purchase from the City of Georgetown, and
- BRA System Operation.

4C.36.23.3 Costs

Costs of the Recommended Plan for Williamson County Manufacturing.

- a. Conservation:
 - Date to be Implemented: before 2010
 - Annual Cost: Not determined
- b. Purchase water from the City of Georgetown:
 - Cost Source: Assumed wholesale treated water rate of \$978/acft (\$3.00/1,000 gallons)
 - Date to be Implemented: before 2010 through 2040
 - Annual Cost: \$1,858,200
- c. BRA System Operation (Lake Granger Conjunctive Use Project):
 - Cost Source: Volume II, Section 4B.5
 - Date to be Implemented: before 2040
 - Total Project Cost: \$303,288,000
 - Annual Cost: \$1,872,500 (based on unit cost for overall strategy of \$749/acft)

**Table 4C.36-17.
Recommended Plan Costs by Decade for Williamson County Manufacturing**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,042)	(1,314)	(1,583)	(1,855)	(2,100)	(2,328)
Conservation						
Supply From Plan Element (acft/yr)	48	93	148	167	184	200
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—
Purchase water from the City of Georgetown						
Supply From Plan Element (acft/yr)	1,000	1,300	1,600	1,900	—	—
Annual Cost (\$/yr)	\$978,000	\$1,271,400	\$1,564,800	\$1,858,200		
Unit Cost (\$/acft)	\$978	\$978	\$978	\$978		
BRA System Operation – Lake Granger Augmentation (conjunctive use)						
Supply From Plan Element (acft/yr)	—	—	—	—	2,500	2,500
Annual Cost (\$/yr)					\$1,872,500	\$1,872,500
Unit Cost (\$/acft)					\$749	\$749

4C.36.24 Steam-Electric

There is no Steam-Electric demand or supply in Williamson County.

4C.36.25 Mining**4C.36.25.1 Description of Supply**

Williamson County Mining obtains its water supply from groundwater from the Edwards-BFZ (Northern Segment) Aquifer and run-of-river rights. Based on the available groundwater and surface water supply, Williamson County Mining is projected to have a shortage of 1,583 acft/yr in the year 2030 and 2,328 acft/yr in the year 2060.

4C.36.25.2 Water Supply Plan

The majority of the mining demand in Williamson County is likely dewatering at quarry operations, and a lack of groundwater supply is not detrimental. Therefore, the following plan only includes conservation recommendations as proffered by the Brazos G RWPG. Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of Williamson County Mining:

- Conservation.

4C.36.25.3 Costs

Costs of the Recommended Plan for Williamson County Mining.

a. Conservation:

- Date to be Implemented: before 2010
- Annual Cost: Not determined

**Table 4C.36-18.
Recommended Plan Costs by Decade for Williamson County Mining**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(1,305)	(1,465)	(1,576)	(1,687)	(1,798)	(1,882)
Conservation						
Supply From Plan Element (acft/yr)	71	131	196	208	220	230
Annual Cost (\$/yr)	—	—	—	—	—	—
Unit Cost (\$/acft)	—	—	—	—	—	—

4C.36.26 *Irrigation*

No shortages are projected for Williamson County Irrigation and no changes in water supply are recommended.

4C.36.27 *Livestock*

No shortages are projected for Williamson County Livestock and no changes in water supply are recommended.

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4C.37 Young County Water Supply Plan

Table 4C.37-1 lists each water user group in Young County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

**Table 4C.37-1.
Young County Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Fort Belknap WSC	8	9	Projected surplus
City of Graham	1,874	1,852	Projected surplus
City of Newcastle	0	0	Supply equals demand
County-Other	57	73	Projected surplus
Manufacturing	291	7	Projected surplus
Steam-Electric	11,977	10,656	Projected surplus
Mining	0	0	Supply equals demand
Irrigation	818	830	Projected surplus
Livestock	0	0	Supply equals demand
¹ From Tables C-73 and C-74, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.			

4C.37.1 Fort Belknap WSC

Fort Belknap WSC obtains water from the City of Graham and shows no projected shortages. No changes in water supply are recommended.

4C.37.2 City of Graham

The City of Graham obtains surface water from Lakes Graham and Eddleman. No future shortages are projected and no changes in water supply are recommended.

4C.37.3 City of Newcastle

No future shortages are projected for the City of Newcastle and no changes in water supply are recommended.

4C.37.4 County-Other Category

No future shortages are projected and no changes in water supply are recommended.

4C.37.5 Manufacturing

No future shortages are projected and no changes in water supply are recommended.

4C.37.6 Steam-Electric

No future shortages are projected and no changes in water supply are recommended.

4C.37.7 Mining

No future shortages are projected and no changes in water supply are recommended.

4C.37.8 Irrigation

Irrigation use shows a projected surplus and no changes in water supply are recommended.

4C.37.9 Livestock

Livestock water use category shows no projected shortage and no changes in water supply are recommended.

4C.38 Wholesale Water Providers

Table 4C.38-1 lists each wholesale water provider in the Brazos G Area and their corresponding surplus or shortage in years 2030 and 2060. For each wholesale water provider with a projected shortage, a water supply plan has been developed and is presented in the following subsections, or has previously been presented in a respective county section.

**Table 4C.38-1.
Wholesale Water Provider Surplus/(Shortage)**

Water User Group	Surplus/(Shortage) ¹		Comment
	2030 (acft/yr)	2060 (acft/yr)	
Brazos River Authority (Lake Aquilla System)	(1,884)	(6,261)	Projected shortage – see plan below
Brazos River Authority (Little River System)	(5,329)	(43,690)	Projected shortage – see plan below
Brazos River Authority (Main Stem System) ²	(207,433)	(258,073)	Projected shortage – see plan below
Aquilla Water Supply District	(1,561)	(3,123)	Projected shortage – see plan below
Bell County WCID No. 1	(275)	(3,051)	Projected shortage – see plan below
Bluebonnet WSC	4,417	3,823	Projected surplus
Central Texas WSC	954	(266)	Projected shortage – see plan below
Upper Leon MWD	975	829	Projected surplus
Eastland County WSD	2,980	2,980	Projected surplus
Palo Pinto County MWD No. 1	63	(1,266)	Projected shortage – see plan below
West Central Texas MWD	(10,753)	(11,098)	Projected shortage – see plan below
North Central Texas MWD	(969)	(1,319)	Projected shortage – see plan below
City of Abilene	(14,071)	(12,973)	Projected shortage – see plan below
City of Cedar Park	(6,650)	(26,819)	Projected shortage – see plan below
City of Round Rock	(10,565)	(42,548)	Projected shortage – see plan below
City of Sweetwater	(3,927)	(3,718)	Projected shortage – see plan below
City of Waco	25,638	5,258	Projected surplus – see plan below
¹ From Section 4A.3 – Water Needs for Wholesale Water Providers.			
² Does not include Region H portion.			

4C.38.1 Brazos River Authority (Lake Aquilla System)

4C.38.1.1 Description of Supply

The Brazos River Authority (Lake Aquilla System) obtains water supply from Lake Aquilla. Based on the available surface water supply, the Lake Aquilla System is projected to

have a shortage of 1,884 acft/yr in the year 2030 and 6,261 acft/yr in the year 2060. The projected shortages for the Lake Aquilla System may be overstated. The projected shortages for the Lake Aquilla System are based on a comparison of supplies and contracts, as opposed to a comparison of supplies and projected demands. Projected demands are less than the contracted amounts for supply from the Lake Aquilla System. In addition, the yield from Lake Aquilla was computed using estimated sedimentation rates based on a 1995 hydrographic survey. The BRA has noted that recent watershed modeling and hydrographic survey information indicates that sedimentation rates are considerably less, which would increase available supply from the reservoir. The BRA is actively monitoring sedimentation in the reservoir and has participated in programs aimed at reducing sediment load to the reservoir.

4C.38.1.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the Brazos River Authority (Lake Aquilla System):

- **BRA System Operation (Volume II, Section 4B.4)**

Surplus water supply from the Main Stem/Lower Basin portion of the overall BRA System can be used to augment supply at Lake Aquilla, either through direct diversion to and commingling of water, or through meeting Lake Aquilla water supply obligations from Main Stem/Lower Basin sources (Lake Granbury and/or Lake Whitney).

- **Alternative: Storage Reallocation of Federal Reservoirs (not studied for 2006 Brazos G Plan)**

The BRA has initiated a study with the U.S. Army Corps of Engineers to study the potential for reallocating flood control storage in Federal reservoirs to water supply. The purpose would be to increase water supply yield to meet the growing water needs in the Brazos River Basin. During Phase I, up to four alternative reallocation scenarios will be analyzed in each of nine reservoirs, taking into account hydrology and hydraulics, geotechnical data, engineering and design information, socioeconomic, environmental and cultural issues, and recreational considerations. Up to three reservoirs may be selected for the more detailed Phase II analyses required for implementation. Lake Aquilla is a candidate Federal reservoir and reallocation of storage in Lake Aquilla could increase supplies from the reservoir and mitigate much of the projected shortage.

- **Alternative: Sediment Reduction Program (not studied for 2006 Brazos G Plan)**

The BRA is monitoring the sediment accumulation rates in the agency's reservoirs, and is cognizant that a sediment reduction program at specific reservoirs may be required to maintain yield.

4C.38.1.3 Costs

Costs have not been determined for either strategy for the Brazos River Authority (Lake Aquilla System.)

**Table 4C.38-2.
Recommended Plan Costs by Decade for the BRA Lake Aquilla System**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	1,034	(425)	(1,884)	(3,343)	(4,802)	(6,261)
BRA System Operation (Volume II, Section 4B.4)						
Supply From Plan Element (acft/yr)	0	1,000	2,000	4,000	5,000	7,000
Annual Cost (\$/yr)	ND	ND	ND	ND	ND	ND
Unit Cost (\$/acft)	ND	ND	ND	ND	ND	ND
Storage Reallocation of Federal Reservoirs (Alternative)						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
Alternative: Sediment Reduction Program						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
ND – Costs for supply not determined						

4C.38.2 Brazos River Authority (Little River System)**4C.38.2.1 Description of Supply**

The Brazos River Authority Little River System obtains its water supply from Lake Proctor, Lake Belton, Stillhouse Hollow Reservoir, Lake Georgetown, and Lake Granger. Based on the available surface water supply, the Brazos River Authority Little River System is projected to have a shortage of 5,329 acft/yr in the year 2030 and 43,690 acft/yr in the year 2060. Shortages for the BRA Little River System are based on a comparison of supplies and current contractual commitments, not projected demands for those entities holding contracts with the BRA. In addition, the shortages projected include other demands over and above current contractual commitments totaling approximately 31,000 acft/yr by year 2040.

4C.38.2.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages for the BRA Little River System:

- **BRA Systems Operation and Lake Granger Augmentation (Volume II, Sections 4B.4 and 4B.5)**

The BRA has applied to the TCEQ for an additional appropriation of water that can be developed by utilizing its system of reservoirs to firm up uncontrolled runoff and return flows entering the basin below its reservoir system. Several of the water management strategies recommended to meet Water User Group needs would utilize this large potential supply of water. In addition to the firm supply, the BRA has requested appropriation of a large interruptible supply. The Lake Granger Augmentation project would utilize interruptible water in conjunction with groundwater development to dramatically increase firm supply from the reservoir. Modest needs in early decades would be supplied on an interim basis from existing BRA supplies made available by BRA Systems Operation.

- **Alternative: Groundwater Development (Volume II, Section 4B.15.1)**

The BRA is exploring areas where groundwater resources could be used to better serve Little River System needs by providing additional supply.

- **Alternative: Millican-Bundic Reservoir (Volume II, Section 4B.12.7)**

The BRA would develop the Millican-Bundic Reservoir in coordination with local sponsors/customers to meet future water demands in Region G. Supplies not utilized in Region G could be made available by the BRA to lower basin customers in Region H.

- **Alternative: Little River Off-Channel Reservoir (Volume II, Section 4B.13.5)**

The BRA would develop the Little River Off-Channel Reservoir in coordination with local sponsors/customers to meet future water demands in Region G. Supplies not utilized in Region G could be made available by the BRA to lower basin customers in Region H.

- **Alternative: Storage Reallocation of Federal Reservoirs (not studied for 2006 Brazos G Plan)**

The BRA has initiated a study with the U.S. Army Corps of Engineers to study the potential for reallocating flood control storage in Federal reservoirs to water supply. The purpose would be to increase water supply yield to meet the growing water needs in the Brazos River Basin. During Phase I, up to four alternative reallocation scenarios will be analyzed in each of nine reservoirs, taking into account hydrology and hydraulics, geotechnical data, engineering and design information, socioeconomic, environmental and cultural issues, and recreational considerations. Up to three reservoirs may be selected for the more detailed Phase II analyses required for implementation. Little River System Reservoirs that are candidates for storage reallocation are Lake Proctor, Lake Stillhouse Hollow, Lake Belton, Lake Georgetown and Lake Granger.

- **Alternative: Sediment Reduction Program (not studied for 2006 Brazos G Plan)**

The BRA is monitoring the sediment accumulation rates in the agency's reservoirs, and is cognizant that a sediment reduction program at specific reservoirs may be required to maintain yield.

4C.38.2.3 Costs

Costs of the Recommended Plan for the BRA Little River System are shown in Table 4C.38-3.

**Table 4C.38-3.
Recommended Plan Costs by Decade for the BRA Little River System**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(467)	(2,898)	(5,329)	(8,012)	(37,793)	(43,690)
BRA Systems Operation & Lake Granger Augmentation Project (Volume II, Sections 4B.4 and 4B.5)						
<i>Groundwater Supply (acft/yr)</i>	—	—	—	28,263	28,263	28,263
<i>Surface Water Supply (acft/yr)</i>	500	3,000	5,500	26,127	26,127	26,127
Total Supply From Plan Element (acft/yr)	500	3,000	5,500	54,390	54,390	54,390
Annual Cost (\$/yr)	Costs for interim supplies from BRA System Operations not determined.			\$40,711,000	\$40,711,000	\$40,711,000
Unit Cost (\$/acft)				\$749	\$749	\$749
Alternative: Groundwater Development (Volume II, Section 4B.15.1)						
Supply From Plan Element (acft/yr)	—	35,000	35,000	35,000	35,000	35,000
Annual Cost (\$/yr)		\$27,466,000	\$27,466,000	\$27,466,000	\$27,466,000	\$27,466,000
Unit Cost (\$/acft)		\$785	\$785	\$785	\$785	\$785
Alternative: Millican-Bundic Reservoir (Volume II, Section 4B.12.7)						
Supply From Plan Element (acft/yr)	—	—	—	38,080	38,080	38,080
Annual Cost (\$/yr)				\$34,756,000	\$34,756,000	\$34,756,000
Unit Cost (\$/acft)				\$913	\$913	\$913
Alternative: Little River Off-Channel Reservoir (Volume II, Section 4B.13.5)						
Supply From Plan Element (acft/yr)	—	—	—	32,110	32,110	32,110
Annual Cost (\$/yr)				\$8,028,000	\$8,028,000	\$8,028,000
Unit Cost (\$/acft)				\$250	\$250	\$250
Alternative: Storage Reallocation of Federal Reservoirs						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
Alternative: Sediment Reduction Program						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						

4C.38.3 Brazos River Authority (Main Stem/Lower Basin System)

4C.38.3.1 Description of Supply

The Brazos River Authority (Main Stem/Lower Basin System) obtains water supply from Possum Kingdom Reservoir, Lake Granbury, Lake Whitney, Lake Somerville, and Lake Limestone. Based on the available surface water supply, the Brazos River Authority Main Stem/Lower Basin System is projected to have a shortage of 395,001 acft/yr in the year 2030 and 494,566 acft/yr in the year 2060, including the projected demands on the BRA Main Stem/Lower Basin System from Region H and supplies to Regions C and O. The projected shortages for the BRA Main Stem/Lower Basin System may be overstated. The projected shortages are based on a comparison of supplies and contracts, as opposed to a comparison of supplies and projected demands. Projected demands are less than the contracted amounts for several of the entities supplied by the BRA.

4C.38.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages for the BRA Main Stem/Lower Basin System:

- **BRA Systems Operation (Volume II, Section 4B.4)**

The BRA has applied to the TCEQ for an additional appropriation of water that can be developed by utilizing its system of reservoirs to firm up uncontrolled runoff entering the basin below its reservoir system. Several of the water management strategies recommended to meet Water User Group needs would utilize this large potential supply of water. In addition to the firm supply, the BRA has requested appropriation of a large interruptible supply. Conjunctive use of groundwater or other supplies along the main stem and lower basin similar to the Lake Granger Augmentation strategy could be developed with the interruptible appropriation requested by the BRA. Interruptible supplies at Lake Somerville that are in excess of the firm yield of the reservoir could be firmed up through conjunctive use of nearby Carrizo-Wilcox groundwater.

- **Stonewall, Kent, and Garza County Chloride Control Project (This strategy was studied in 2001 Brazos G Plan and recommended for the Brazos River Authority.)**

The BRA, in coordination with representatives from Stonewall, Kent and Garza Counties is studying the feasibility of installing shallow recovery wells that would intercept chloride-laden groundwater before it discharges to major salt water-producing seeps and springs, and would lower the artesian pressure of the underlying saline aquifer so that the seeps and springs cease to flow. It is estimated that brine

control at the site proposed in Stonewall County would reduce chloride concentration in the Brazos River above Possum Kingdom Reservoir by 45 percent. Similar recovery wells installed in Kent County would reduce chloride concentrations in the Brazos River by an additional 10 – 15 percent. The brine would then be transferred to a solar salt evaporation facility near Post, Texas where the salt would be produced for commercial use. This strategy is an expansion of Chloride Control Option 3, which was studied for the 2001 Brazos G Regional Water Plan and was a water management strategy recommended for the Brazos River Authority.

- **Alternative: Storage Reallocation of Federal Reservoirs (not studied for 2006 Brazos G Plan)**

The BRA has initiated a study with the U.S. Army Corps of Engineers to study the potential for reallocating storage in Federal reservoirs from flood control to water supply. The purpose would be to increase water supply yield to meet the growing water needs in the Brazos River Basin. During Phase I, up to four alternative reallocation scenarios will be analyzed in each of nine reservoirs, taking into account hydrology and hydraulics, geotechnical data, engineering and design information, socioeconomic, environmental and cultural issues, and recreational considerations. Up to three reservoirs may be selected for the more detailed Phase II analyses required for implementation. Main Stem/Lower Basin reservoirs that are candidates for storage reallocation are Lake Whitney and Lake Somerville. Reallocation of Lake Whitney was studied for the 2001 Brazos G Plan, but was not a recommended water management strategy.

- **Alternative: Sediment Reduction Program (not studied for 2006 Brazos G Plan)**

The BRA is monitoring the sediment accumulation rates in the agency's reservoirs, and is cognizant that a sediment reduction program at specific reservoirs may be required to maintain yield.

In addition to the above strategies, the Region H RWPG has recommended several additional strategies for the BRA to supply needs in Region H (see Table 4A-21). While the Brazos G RWPG acknowledges those Region H strategies, the Brazos G RWPG makes no recommendations regarding those strategies.

4C.38.3.3 Costs

Costs of the Recommended Plan for the BRA Main Stem/Lower Basin System.

**Table 4C.38-4.
Recommended Plan Costs by Decade for the BRA Main Stem/Lower Basin System**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(356,825)	(366,240)	(395,001)	(432,751)	(480,265)	(494,566)
Needs Supplied from Region H Strategies ¹	162,345	162,345	187,568	187,568	230,893	236,493
Brazos G Surplus/(Shortage) (acft/yr)	(194,480)	(203,895)	(207,433)	(245,183)	(249,372)	(258,073)
BRA Systems Operation (Volume II, Section 4B.4)						
Supply From Plan Element (acft/yr) ²	194,480	203,895	207,433	245,183	249,372	258,073
Annual Cost (\$/yr)	ND	ND	ND	ND	ND	ND
Unit Cost (\$/acft)	ND	ND	ND	ND	ND	ND
Stonewall, Kent, and Garza County Chloride Control Project (studied in 2001 Brazos G Plan)						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
Alternative: Storage Reallocation of Federal Reservoirs (not studied for 2006 Brazos G Plan)						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
Alternative: Sediment Reduction Program (not studied for 2006 Brazos G Plan)						
Supply From Plan Element (acft/yr)	Supplies and Costs not Determined					
Annual Cost (\$/yr)						
Unit Cost (\$/acft)						
ND – Costs for supply not determined						
¹ Supplies from strategies assigned to BRA to meet shortages in Region H. Actual supplies from these strategies may be greater.						
² Includes 63,510 acft/yr of firm supply from BRA System Operations allocated to Brazos G (Region H allocation is 120,000 acft/yr). Addition supply from BRA System Operations would originate from interruptible supplies firmed up with available groundwater, off-channel storage, or operated conjunctively with other existing water supplies.						

4C.38.4 Bell County WCID No. 1**4C.38.4.1 Description of Supply**

Bell County WCID No. 1 obtains its water supply from a BRA contract for water from Lake Belton. Based on the available surface water supply, Bell County WCID No. 1 is projected to have a shortage of 275 acft/yr in the year 2030 and 3,051 acft/yr in the year 2060.

4C.38.4.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the Bell County WCID No. 1:

- **BRA System Operation.**

4C.38.4.3 Costs

Costs of the Recommended Plan for the Bell County WCID No. 1.

a. Purchase Additional BRA Supply:

- Cost Source: BRA System Wholesale Rate of \$45.75/acft
- Date to be Implemented: before 2010
- Total Project Cost: \$0 (assumes existing infrastructure is adequate)
- Annual Cost: \$160,125

**Table 4C.38-5.
Recommended Plan Costs by Decade for the Bell County WICD No. 1**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(92)	(184)	(275)	(367)	(559)	(3,051)
BRA System Operation						
Supply From Plan Element (acft/yr)	500	500	500	500	600	3,500
Annual Cost (\$/yr)	\$22,875	\$22,875	\$22,875	\$22,875	\$27,450	\$160,125
Unit Cost (\$/acft)	\$45.75	\$45.75	\$45.75	\$45.75	\$45.75	\$45.75

4C.38.5 Bluebonnet WSC

Bluebonnet WSC obtains its water supply through a contract with the Brazos River Authority. No shortages are projected for Bluebonnet WSC and no changes in water supply are recommended.

4C.38.6 Central Texas WSC

4C.38.6.1 Description of Supply

Central Texas WSC obtains its water supply from a BRA contract for water from Lake Stillhouse Hollow. Based on the available surface water supply, Central Texas WSC is projected to have a surplus of 954 acft/yr in the year 2030 and a shortage of 266 acft/yr in the year 2060.

4C.38.6.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the Central Texas WSC:

- **Increase BRA Contract.**

4C.38.6.3 Costs

Costs of the Recommended Plan for the Central Texas WSC.

a. Increase BRA Contract:

- Cost Source: BRA System Wholesale Rate
- Date to be Implemented: before 2060
- Total Project Cost: none (assumes existing infrastructure is adequate)
- Annual Cost: \$12,110.

**Table 4C.38-6.
Recommended Plan Costs by Decade for the Central Texas WSC**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	2,451	1,727	954	581	207	(266)
Increase BRA Contract						
Supply From Plan Element (acft/yr)	—	—	—	—	—	266
Annual Cost (\$/yr)						\$12,170
Unit Cost (\$/acft)						\$45.75

4C.38.7 Aquilla Water Supply District

4C.38.7.1 Description of Supply

Aquilla WSD obtains its water supply from Lake Aquilla through a contract with the Brazos River Authority. The district is projected to have shortages of 520 acft/yr starting in 2010, increasing to 3,123 acft/yr in 2060. The projected shortages for the Lake Aquilla WSD may be overstated. The projected shortages for the BRA Lake Aquilla System are based on a comparison of supplies and contracts, as opposed to a comparison of supplies and projected demands. Projected demands are less than the contracted amounts for supply from the Lake Aquilla System. In addition, the yield from Lake Aquilla was computed using estimated sedimentation rates based on a 1995 hydrographic survey. The BRA has noted that recent watershed modeling and hydrographic survey information indicates that sedimentation rates are considerably less, which would increase available supply from the reservoir. The BRA is actively monitoring sedimentation in the reservoir and has participated in programs aimed at reducing sediment load to the reservoir.

4C.38.7.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortages of the Aquilla WSD:

- **Increase BRA Contract.**

4C.38.7.3 Costs

Costs of the Recommended Plan for the Aquilla WSD.

- a. Increase BRA Contract:
 - Cost Source: BRA System Wholesale Rate (will require BRA to increase supplies at Lake Aquilla through BRA System Operations)
 - Date to be Implemented: before 2060
 - Total Project Cost: none (assumes existing infrastructure is adequate)
 - Annual Cost: \$160,125. in 2060

**Table 4C.38-7.
Recommended Plan Costs by Decade for Aquilla Water Supply District**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(520)	(1,041)	(1,561)	(2,082)	(2,602)	(3,123)
Increase BRA Contract						
Supply From Plan Element (acft/yr)	1,000	2,000	2,000	3,000	3,000	3,500
Annual Cost (\$/yr)	\$45,750	\$91,500	\$91,500	\$137,250	\$137,250	\$160,125
Unit Cost (\$/acft)	\$45.75	\$45.75	\$45.75	\$45.75	\$45.75	\$45.75

4C.38.8 Upper Leon Municipal Water District

Upper Leon MWD obtains its water supply through a contract with the Brazos River Authority for water from Lake Proctor. No shortages are projected for Upper Leon MWD and no changes in water supply are recommended.

4C.38.9 Eastland County Water Supply District

Eastland County WSD obtains its water supply from Lake Leon and a run-of-the-river right. No shortages are projected for Eastland County WSD and no changes in water supply are recommended.

4C.38.10 Palo Pinto County Municipal Water District No. 1

4C.38.10.1 Description of Supply

Palo Pinto County MWD No. 1 obtains its water supply from Lake Palo Pinto. Based on the available surface water supply, Palo Pinto County MWD No. 1 is projected to have a surplus of 63 acft/yr in the year 2030 and a shortage of 1,266 acft/yr in the year 2060.

4C.38.10.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the Palo Pinto County MWD No. 1:

- **Lake Palo Pinto Off-Channel Reservoir (Volume II, Section 4B.13.6)**

This project would restore permitted storage in the Lake Palo Pinto System, thus restoring existing permitted yield.

- **Alternative: Turkey Peak Reservoir (Volume II, Section 4B.12.5)**

4C.38.10.3 Costs

Costs of the Recommended Plan for the Palo Pinto County MWD No. 1.

a. Lake Palo Pinto Off-Channel Reservoir:

- Cost Source: Volume II, Section 4B.13.6
- Date to be Implemented: before 2040
- Total Project Cost: \$19,314,000
- Annual Cost: \$1,621,000

**Table 4C.38-8.
Recommended Plan Costs by Decade for the Palo Pinto County MWD No. 1**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	951	496	63	(324)	(773)	(1,266)
Lake Palo Pinto Off-Channel Reservoir						
Supply From Plan Element (acft/yr)	—	—	—	3,110	3,110	3,110
Annual Cost (\$/yr)				\$1,621,000	\$1,621,000	\$1,621,000
Unit Cost (\$/acft)				\$521	\$521	\$521

4C.38.11 West Central Texas Municipal Water District**4C.38.11.1 Description of Supply**

West Central Texas MWD obtains its water supply from Hubbard Creek Reservoir. Based on the available surface water supply, West Central Texas MWD is projected to have a shortage of 10,753 acft/yr in the year 2030 and a shortage of 11,098 acft/yr in the year 2060.

4C.38.11.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the West Central Texas MWD:

- **West Central Brazos System Optimization Plan (WCBSOP)**
- **Alternative: BRA System Purchase (Possum Kingdom Reservoir)**

The WCBSOP is a combination of the following components, which would operate jointly as a system:

- City of Abilene Reuse (Volume II, Section 4B.3.2)
- Breckenridge Reservoir (Cedar Ridge site) (Volume II, Section 4B.12.1)
 - Double Mountain Fork Reservoir (Volume II, Section 4B.12.4) is an alternative component to Breckenridge Reservoir
- Clear Fork Scalping into Hubbard Creek Reservoir (*West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan*, Freese and Nichols, 2004)
- Priority Calls Agreement: Possum Kingdom/Hubbard
- Priority Calls Agreement: Possum Kingdom/Fort Phantom Clear Fork Scalping

The WCBSOP is a joint strategy between the WCTMWD and the City of Abilene. Refer to the plan for the City of Abilene in Taylor County (Volume I, Section 4C.33.1) for a detailed description.

4C.38.11.3 Costs

Costs of the Recommended Plan for the West Central Texas MWD.

- a. Water Supply from West Central Brazos System Optimization Plan (WCBSOP):
 - Cost Source: Various individual strategy evaluations (Table 4C.38-9)
 - Date to be Implemented: phased implementation, beginning in 2010
 - Total Project Cost: \$198,055,000
 - Annual Cost: \$16,795,500
 - Unit Cost: \$284/acft

**Table 4C.38-9
Component Costs for West Central Brazos System Optimization Plan**

System Component	Total Cost	Annual Cost	Initial Supply Contributed (acft/yr)
Breckenridge Reservoir with reuse and priority calls agreement with BRA	\$82,755,000	\$6,257,000	34,520 ¹
Clear Fork Scalping into Hubbard Creek Reservoir with priority calls agreement with BRA	\$115,300,000	\$10,081,000	7,000
Priority Calls Agreements with BRA for Hubbard Creek Reservoir and Fort Phantom Him Reservoir Scalping (costs for Possum Kingdom Reservoir Impacts – 10,000 acft at \$45.75/acft)	\$0	\$457,500	17,630
Total	\$198,055,000	\$16,795,500	59,150

¹Includes 5,600 acft/yr of additional yield provided by Abilene's existing return flows.

**Table 4C.38-10.
Recommended Plan Costs by Decade for the West Central Texas MWD**

Plan Element	2010	2020	2030	2040	2050	2060
Projected Surplus/(Shortage) (acft/yr)	(10,523)	(10,638)	(10,753)	(10,868)	(10,983)	(11,098)
Water Supply from West Central Brazos System Optimization Plan¹						
Supply From Plan Element (acft/yr)	25,575	25,575	25,575	25,575	25,575	25,575
Annual Cost (\$/yr)	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300	\$7,263,300
Unit Cost (\$/acft)	\$284	\$284	\$284	\$284	\$284	\$284

¹Costs and supply from WCBSOP are split equally between WCTMWD and City of Abilene (see Table 4C.33-3).

4C.38.12 North Central Texas Municipal Water District

4C.38.12.1 Description of Supply

North Central Texas MWD obtains its water supply from Millers Creek Reservoir. Based on the available surface water supply, North Central Texas MWD is projected to have a shortage of 969 acft/yr in the year 2030 and a shortage of 1,319 acft/yr in the year 2060.

4C.38.12.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected shortage of the North Central Texas MWD:

- **Millers Creek Reservoir Augmentation (Lake Creek Diversion – Canal Option) with a Priority Calls Agreement with the BRA**

4C.38.12.3 Costs

Costs of the Recommended Plan for the North Central Texas MWD.

- Millers Creek Reservoir Augmentation with a Priority Calls Agreement with the BRA:
 - Cost Source: Volume II, Section 4B.7
 - Date to be Implemented: before 2010
 - Total Project Cost: \$18,222,000
 - Annual Cost: \$1,350,000

**Table 4C.38-11.
Recommended Plan Costs by Decade for the North Central Texas MWD**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	(739)	(852)	(969)	(1,086)	(1,202)	(1,319)
Lake Creek Diversion with a Priority Calls Agreement with the BRA						
Supply From Plan Element (acft/yr)	4,870	4,870	4,870	4,870	4,870	4,870
Annual Cost (\$/yr)	\$1,350,000	\$1,350,000	\$1,350,000	\$1,350,000	\$1,350,000	\$1,350,000
Unit Cost (\$/acft)	\$277	\$277	\$277	\$277	\$277	\$277

4C.38.13 City of Abilene (Wholesale Water Provider)

The recommended water supply plan for the City of Abilene is included in Section 4C.33 with the Taylor County water user groups.

4C.38.14 City of Cedar Park (Wholesale Water Provider)

The recommended water supply plan for the City of Cedar Park is included in Section 4C.36 with the Williamson County water user groups.

4C.38.15 City of Round Rock (Wholesale Water Provider)

The recommended water supply plan for the City of Round Rock is included in Section 4C.36 with the Williamson County water user groups.

4C.38.16 City of Sweetwater (Wholesale Water Provider)

The recommended water supply plan for the City of Sweetwater is included in Section 4C.26 with the Nolan County water user groups.

4C.38.17 City of Waco (Wholesale Water Provider)**4C.38.17.1 Description of Supply**

The City of Waco obtains its water supply from surface water from Lake Waco, in which it owns water rights, and from Lake Brazos on the Brazos River. The City supplies several neighboring communities and has sufficient water supply to meet its municipal and regional needs through the year 2030, but is projected to experience shortages prior to year 2050. The City has demonstrated a commitment to provide regional water supply in McLennan County, and could extend regional water supplies beyond the 2060 planning horizon by actively pursuing a reuse program. The City has recently entered into a contract to supply up to 16,000 acft of reuse water per year to LS Power to provide cooling water for steam electric power generation, and is exploring other potential reuse water sales.

4C.38.17.2 Water Supply Plan

The Brazos G RWPG recommends that the City of Waco continue to pursue direct and indirect reuse as a water management strategy in order to diversify and extend regional water supplies in the McLennan County area. Accordingly, the following water supply plan is recommended for the City of Waco:

- **Develop Reuse Supplies to Extend Lake Waco and Trinity Aquifer Supplies.**

4C.38.17.3 Costs

Costs of the Recommended Plan for the City of Waco.

- a. Reuse Supplies for the City of Waco:
- Cost Source: Volume II, Section 4B.3
 - Date to be Implemented: ongoing
 - Unit Cost: Unit costs range widely, depending upon quantity used and type of use:
 - \$1,025/acft (average) for small-quantity municipal irrigation use
 - \$111/acft for industrial use (steam-electric)
 - Annual Cost: \$6,355,800 (Annual costs would depend upon application, but is based here on a projected average of \$200/acft for large-quantity uses.)

**Table 4C.38-12.
Recommended Plan Costs by Decade for the City of Waco**

<i>Plan Element</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>	<i>2060</i>
Projected Surplus/(Shortage) (acft/yr)	28,072	23,619	7,729	2,235	(4,612)	(11,941)
Reuse Supply for the City of Waco						
Supply From Plan Element (acft/yr) ¹	31,779	31,779	31,779	31,779	31,779	31,779
Annual Cost (\$/yr)	\$6,355,800	\$6,355,800	\$6,355,800	\$6,355,800	\$6,355,800	\$6,355,800
Unit Cost (\$/acft)	\$200	\$200	\$200	\$200	\$200	\$200

¹ Based on estimated year 2060 WMARSS effluent (Section 4B.3).

4C.39 Summary of Recommended Water Management Strategies

For convenient reference, the Table 4C.39-1 summarizes the water management strategies recommended by the Brazos G Regional Water Planning Group. The strategies listed below include only those related to developing new sources of supply in the Brazos G Region. Strategies involving system interconnections and purchasing water from existing supplies in Region G are not included.

The 2006 Brazos G Regional Water Plan includes recommendations for 21,393 acft/yr of municipal conservation savings; these savings are on top of those savings already included in the TWDB water demand projections. Total new supplies of water into the Brazos G Region, whether conservation newly developed groundwater, supply imported in from other regions, newly developed surface water supplies, or augmentation of existing facilities, total 590,231 acft/yr. These totals do not reflect water trades between users of existing supplies in Region G, but are entirely new supplies to the Brazos G Region.

Implementation of the 2006 Brazos G Regional Water Plan will result in the development of new water supplies that will be reliable in the event of a repeat of the most severe drought on record. It is evident that implementation of all recommended water management strategies is not likely to be necessary in order to meet projected needs within the planning period. The BGRWPG explicitly recognizes the difference between additional supplies and projected needs as System Management Supplies and has recommended the associated water management strategies in the Regional Water Plan for the following reasons:

- So that water management strategies are identified to replace any planned strategies that may fail to develop, through legal, economic or other reasons;
- To serve as additional supplies in the event that rules, regulations, or other restrictions limit use of any planned strategies;
- To facilitate development of specific projects being pursued by local entities for reasons that may not be captured in the supply and demand projections used to identify future supply shortages; and/or
- To ensure adequate supplies in the event of a drought more severe than that which occurred historically.

Table 4C.39-1.
Summary of Recommended Water Management Strategies Involving
New Sources of Supply in the 2006 Brazos G Regional Water Plan

Strategy	WUG or WWP	New Supply by 2060 (acft/yr)	Total Project Cost (2nd Quarter 2002 Prices)
Conservation Strategies			
Municipal	38 WUGs	21,393	N/D ¹
Manufacturing	18 Counties	1,430	N/D
Steam-Electric	9 Counties	13,281	N/D
Mining	10 Counties	1,074	N/D
Irrigation	6 Counties	8,027	N/D
Total Conservation		45,205	N/D
Reuse Strategies			
Reuse	Steam-Electric – Nolan County	560	\$2,115,000
	City of Round Rock	7,443	\$6,369,000
	City of Bryan	605	\$6,485,000
	City of College Station	137	\$2,358,000
	City of Cleburne	2,853	\$1,048,000
	Steam-Electric – McLennan County (City of Waco)	16,000	\$2,995,000
	City of Waco	15,779	N/D
Total Reuse		43,377	\$27,855,000
Water Supply from other Regions			
LCRA/BRA Alliance	Chisholm Trail SUD	3,472	\$18,518,000
	City of Round Rock	20,928	\$101,336,000
LCRA Highland Lakes	Cedar Park	25,000	\$81,748,000
TRA Reuse through Joe Pool Reservoir	Johnson County SUD	20,000	\$79,257,000
Total from Other Regions		69,400	\$280,859,000
Augmentation of Existing Surface Water Supplies			
Lake Palo Pinto Off-Channel Reservoir	Palo Pinto County MWD No. 1	3,110	\$19,314,000
Millers Creek Reservoir Augmentation	North Central Texas Municipal Water District	4,870	\$18,222,000
Raise Level of Gibbons Creek Reservoir	Steam-Electric – Grimes County	3,870	\$8,003,000
BRA System Operation (Lake Granger Augmentation)	Chisholm Trail SUD	26,127 ²	\$303,288,000
	City of Georgetown		
	Jarrell-Schwertner WSC		
	City of Round Rock		
	Williamson County – Other		
Manufacturing – Williamson County			
Total Augmentation of Existing Surface Water Supplies		37,977	\$348,827,000

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Table 4C.39-1.
Summary of Recommended Water Management Strategies Involving
New Sources of Supply in the 2006 Brazos G Regional Water Plan (continued)

Strategy	WUG or WWP	New Supply by 2060 (acft/yr)	Total Project Cost (2nd Quarter 2002 Prices)
New Reservoirs			
Wheeler Branch Off-Channel Reservoir	Somervell County - Other	1,800	\$27,195,000
Brushy Creek Reservoir	City of Marlin	2,000	\$6,301,610
Total New Reservoirs		3,800	\$33,496,610
Systems Approaches			
West Central Brazos System Optimization Plan	City of Abilene	59,150	\$198,055,000
	West Central Texas Municipal Water District		
	Irrigation – Throckmorton County		
BRA System Operation (Excluding Lake Granger Augmentation)	Bell County WCID #1	3,500	\$0
	Bosque County – Other	475	
	Manufacturing – Bosque County	1,300	\$25,492,000
	Steam-Electric – Bosque County	8,225	
	Brandon-Irene WSC	100	
	City of Hillsboro	100	
	White Bluff Community WS	700	\$36,151,000
	Woodrow-Osceola WSC	200	
	Manufacturing – Hill County	100	
	Steam-Electric – Limestone County	16,000	ND
Other Needs to be Met from BRA System Operation ³	234,373	ND	
Total from Systems Approaches		324,223	> \$259,698,000
Groundwater Development			
Brackish Groundwater	Mining - Nolan County	200	\$268,188
Champion Well Field Phases 1 & 2	City of Sweetwater	736	\$17,060,471
Carrizo-Wilcox Aquifer – Lee and Milam Counties [BRA System Operation (Lake Granger Augmentation)]	Williamson County entities, see BRA System Operation (Lake Granger Augmentation) (above)	28,263 ²	–
Carrizo-Wilcox Aquifer – Brazos County	City of Bryan	15,300	\$33,380,000
	City of College Station		
	Wickson Creek SUD		
	Brazos County – Manufacturing		
Carrizo-Wilcox Aquifer – Burleson County	Manufacturing – Burleson County	150	\$124,624 (Annual)
	Irrigation – Burleson County	5,000	\$8,718,000

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Table 4C.39-1.
Summary of Recommended Water Management Strategies Involving
New Sources of Supply in the 2006 Brazos G Regional Water Plan (concluded)

Strategy	WUG or WWP	New Supply by 2060 (acft/yr)	Total Project Cost (2nd Quarter 2002 Prices)
Carrizo Wilcox Aquifer – Falls County	Falls County – Other	300	\$1,376,000
Carrizo-Wilcox Aquifer – Lee County	Aqua WSC	300	\$1,047,000
	City of Giddings	400	\$2,099,000
	Lee County WSC	750	\$1,762,000
	City of Hutto	1,680	\$1,927,000 (Annual)
Carrizo-Wilcox Aquifer – Limestone County	City of Groesbeck	100	\$566,000
	Manufacturing – Limestone County	100	\$566,000
Carrizo-Wilcox Aquifer – Milam County	Southwest Milam WSC	600	\$2,079,000
	Steam-Electric – Milam County	8,200	\$3,923,000
	City of Hutto	1,680	\$1,927,000 (Annual)
Carrizo-Wilcox Aquifer – Robertson County	Robertson County (Manufacturing)	85	\$707,000
Trinity Aquifer – Coryell County	Coryell County – Other	1,200	\$4,821,000
Trinity Aquifer – Erath County	Manufacturing – Erath County	50	\$198,000
Trinity Aquifer – Falls County	Falls County – Other	300	\$1,376,000
Trinity Aquifer – Lampasas County	Lampasas County – Other	850	\$2,576,000
Trinity Aquifer – Williamson County	City of Florence	250	\$803,500
Gulf Coast Aquifer – Grimes County	Manufacturing – Grimes County	250	\$312,000
Total Groundwater Development		66,444	> \$86,116,159
Total New Supplies		590,426	> \$1,030,366,769
<ol style="list-style-type: none"> Not Determined. The Lake Granger Augmentation includes development of an average annual supply of groundwater from the Carrizo-Wilcox Aquifer of 28,263 acft/yr to develop the total new supply of 54,390 acft/yr (Volume II, Section 4B.5). Includes additional BRA contractual commitments not specifically identified in Section 4B.4. Does not include Region H supplies, but does include minor increases to Region C. 			

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