



## 5.37 Young County Water Supply Plan

Table 5.2-1 lists each water user group in Young County and their corresponding surplus or shortage in years 2040 and 2070. A brief summary of the water user groups and the plan for the selected water user are presented in the following subsections.

**Table 5.2-1. Young County Surplus/(Shortage)**

| Water User Group | Surplus/(Shortage) <sup>1</sup> |                   | Comment                              |
|------------------|---------------------------------|-------------------|--------------------------------------|
|                  | 2040<br>(acft/yr)               | 2070<br>(acft/yr) |                                      |
| Baylor WSC       | 1                               | 1                 | Projected surplus                    |
| Fort Belknap WSC | (51)                            | (93)              | Projected shortage - see plan below. |
| City of Graham   | (1,769)                         | (2,434)           | Projected shortage - see plan below. |
| County-Other     | 48                              | 9                 | Projected surplus                    |
| Manufacturing    | 50                              | 68                | Projected surplus                    |
| Steam-Electric   | 0                               | 0                 | Demand equals supply                 |
| Mining           | (115)                           | 8                 | Projected shortage - see plan below. |
| Irrigation       | (456)                           | (456)             | Projected shortage - see plan below. |
| Livestock        | (11)                            | (11)              | Projected shortage - see plan below. |

1 – From Tables C-59 and C-60, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

### 5.37.1 Baylor WSC

The service area for Baylor WSC includes areas of Baylor, Archer, Throckmorton, Knox, and Young Counties. Only a portion of the service area within Knox, Throckmorton, and Young Counties is located within the Brazos G region. This section will only deal with the supply, demands and strategies that are within the Brazos G Area. Baylor SUD is not projected to experience supply shortages in Brazos G through the planning period and no change in water supply is recommended. Conservation was considered; however, the entity’s per capita use is less than the target per capita of 140 gpcd.

### 5.37.2 Fort Belknap WSC

#### Description of Supply

Fort Belknap WSC obtains its water supply through purchases of treated surface water under contract from the City of Graham, which is projected to provide 419 acft/yr of available supply. This WUG is located in multiple counties (Young, Palo Pinto, Throckmorton, and Stephens). The quantities shown represent the cumulative totals for Fort Belknap WSC. Water supply shortages are projected for Fort Belknap WSC throughout the planning period.

## Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategy is recommended to meet the projected water shortage for Fort Belknap WSC. Conservation was considered, but the entity's per capita use is less than the target per capita of 140 gpcd.

- a. Purchase Additional Water from City of Graham:
  - Strategy requires implementation of Throckmorton Reservoir (see City of Throckmorton) project and Treated Water Purchase and Conveyance project (see City of Graham)
  - Cost Source: Volume II
  - Date to be Implemented: before 2030
  - Unit Cost: \$880/acft
  - Annual Cost: \$83,600

**Table 5.37-1. Recommended Plan Costs by Decade for Fort Belknap WSC**

| Plan Element   | 2020     | 2030     | 2040     | 2050     | 2060     | 2070     |
|--|----------|----------|----------|----------|----------|----------|
| <i>Projected Surplus/(Shortage) (acft/yr)</i>                    | (37)     | (47)     | (51)     | (62)     | (77)     | (93)     |
| <b>Conservation</b>  |          |          |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | —        | —        | —        | —        | —        | —        |
| Annual Cost (\$/yr)  | —        | —        | —        | —        | —        | —        |
| <i>Projected Surplus/(Shortage) after Conservation (acft/yr)</i> | (37)     | (47)     | (51)     | (62)     | (77)     | (93)     |
| <b>Purchase Additional Water from City of Graham</b>             |          |          |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | 95       | 95       | 95       | 95       | 95       | 95       |
| Annual Cost (\$/yr)  | \$83,600 | \$83,600 | \$83,600 | \$83,600 | \$83,600 | \$83,600 |
| Unit Cost (\$/acft)  | \$880    | \$880    | \$880    | \$880    | \$880    | \$880    |

### 5.37.3 City of Graham

#### Description of Supply

The City of Graham obtains its water supply through diversions of surface water from Lake Graham and Lake Eddleman authorized under water rights held by the City; these diversions are projected to provide 1,275 acft/yr in available supply at the beginning of the planning period and then decreasing to 675 acft/yr at the end. The City also contracts with the Brazos River Authority to purchase raw surface water which is projected to provide 1,000 acft/yr of water supply. The City contracts to sell treated and raw water supply to Fort Belknap WSC, the City of Newcastle and Graham-East WSC which comprise a portion of the Young County-Other WUG, the City of Bryson which comprises a portion of Jack County-Other, and Young County Manufacturing and Steam-Electric entities. Supply shortages are projected during the planning period. .



## Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategy is recommended to meet the projected water shortage for the City of Graham.

a. Conservation

- Cost Source: Volume II
- Date to be Implemented: before 2030
- Annual Cost: \$677,600 in 2070
- Unit Cost: \$560/acft

b. Treated Water Purchase and Conveyance (from Throckmorton)

- Strategy requires implementation of Throckmorton Reservoir
- Cost Source: Volume II
- Date to be Implemented: before 2030
- Project Cost: \$47,390,000
- Unit Cost: maximum \$3,267/acft

**Table 5.377-3. Recommended Plan Costs by Decade for the City of Graham**

| Plan Element   | 2020        | 2030        | 2040        | 2050        | 2060        | 2070        |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| <i>Projected Surplus/(Shortage) (acft/yr)</i>                        | (1,362)     | (1,582)     | (1,769)     | (1,982)     | (2,208)     | (2,434)     |
| <b>Conservation</b>  |             |             |             |             |             |             |
| Supply From Plan Element (acft/yr)                                   | —           | 231         | 463         | 708         | 962         | 1,210       |
| Annual Cost (\$/yr)  | —           | \$129,360   | \$259,280   | \$396,480   | \$538,720   | \$677,600   |
| <i>Projected Surplus/(Shortage) after Conservation (acft/yr)</i>     | (1,362)     | (1,351)     | (1,306)     | (1,274)     | (1,246)     | (1,224)     |
| <b>Additional Needs in Recommended Strategies for Others</b>         |             |             |             |             |             |             |
| Increase Contract to Fort Belknap WSC (acft/yr)                      | (95)        | (95)        | (95)        | (95)        | (95)        | (95)        |
| <i>Projected Surplus/(Shortage) Including Recommended Strategies</i> | (1,457)     | (1,446)     | (1,401)     | (1,369)     | (1,341)     | (1,319)     |
| <b>Treated Water Purchase and Conveyance from Throckmorton</b>       |             |             |             |             |             |             |
| Supply From Plan Element (acft/yr)                                   | 1,500       | 1,500       | 1,500       | 1,500       | 1,500       | 1,500       |
| Annual Cost (\$/yr)  | \$4,900,000 | \$4,900,000 | \$1,566,000 | \$1,566,000 | \$1,566,000 | \$1,566,000 |
| Unit Cost (\$/acft)  | \$3,267     | \$3,267     | \$1,044     | \$1,044     | \$1,044     | \$1,044     |

#### 5.37.4 County-Other

Entities in Young County-Other obtain their water supply through groundwater production from the Cross Timbers Aquifer and through purchases of treated surface water from the City of Graham. Supplies available through local groundwater production are projected at 200 acft/yr, while purchased supply availability ranges from 175 acft/yr at the beginning of the planning period to 214 acft/yr at the end. No future shortages are projected and no changes in water supply are recommended. Conservation was considered, but the entity's per capita use is less than the target per capita of 140 gpcd.

#### 5.37.5 Manufacturing

Young County Manufacturing is supplied through purchases of treated surface water under contract from the City of Graham and the City of Olney and through purchases of groundwater produced by entities in Young County-Other. No shortages are projected and no changes in water supply are recommended.

#### 5.37.6 Steam-Electric

Young County Steam-Electric entities obtain their water supply through purchases of raw surface water under contract from the City of Graham and the Brazos River Authority. No shortages are projected and no changes in water supply are recommended.

#### 5.37.7 Mining

##### Description of Supply

Mining in Young County obtains water supply through local groundwater production from the Seymour and Cross Timbers Aquifers. Supply shortages are projected during the planning the period.

##### Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following plan is recommended for Young County Mining. Associated costs are included for each strategy.

- a. Conservation
  - Cost Source: Volume II
  - Date to be Implemented: before 2030
  - Annual Cost: not determined
- b. Groundwater Development – Cross Timbers Aquifer
  - Cost Source: Volume II
  - Date to be Implemented: before 2030
  - Project Cost: \$1,385,000
  - Unit Cost: maximum of \$877/acft in 2030



**Table 5.37-2. Recommended Plan Costs by Decade for Young County – Mining**

| Plan Element   | 2020     | 2030      | 2040     | 2050     | 2060     | 2070     |
|--|----------|-----------|----------|----------|----------|----------|
| <i>Projected Surplus/(Shortage) (acft/yr)</i>                    | (106)    | (195)     | (115)    | (70)     | (24)     | 8        |
| <b>Conservation</b>  |          |           |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | 6        | 14        | 14       | 11       | 7        | 5        |
| Annual Cost (\$/yr)  | ND       | ND        | ND       | ND       | ND       | ND       |
| <i>Projected Surplus/(Shortage) after Conservation (acft/yr)</i> | (100)    | (181)     | (101)    | (59)     | (17)     | 13       |
| <b>Groundwater Development – Cross Timbers Aquifer</b>           |          |           |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | 100      | 181       | 181      | 181      | 181      | 181      |
| Annual Cost (\$/yr)  | \$59,339 | \$109,622 | \$55,622 | \$11,622 | \$11,622 | \$11,622 |
| Unit Cost (\$/acft)  | \$475    | \$877     | \$445    | \$93     | \$93     | \$93     |

ND – Not determined. Costs to implement industrial conservation technologies will vary based on each location

### 5.37.8 Irrigation

#### Description of Supply

Irrigation in Young County obtains water supply through groundwater production from the Cross Timbers and Seymour Aquifers, and through utilization of Cross Timbers groundwater sourced from Region B. Supply projections show shortages for Irrigation in Young County throughout the planning period.

#### Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following plan is recommended for Young County Irrigation. Associated costs are included for each strategy.

- a. Conservation
  - Cost Source: Volume II
  - Date to be Implemented: before 2030
  - Annual Cost: maximum of \$7,304
  - Unit Cost: \$210/acft
- b. Groundwater Development – Cross Timbers Aquifer
  - Cost Source: Volume II
  - Date to be Implemented: before 2030
  - Project Cost: \$4,374,381
  - Unit Cost: \$1,074/acft

**Table 5.37-3. Recommended Plan Costs by Decade for Young County – Irrigation**

| Plan Element   | 2020      | 2030      | 2040     | 2050     | 2060     | 2070     |
|--|-----------|-----------|----------|----------|----------|----------|
| <i>Projected Surplus/(Shortage) (acft/yr)</i>                    | (459)     | (459)     | (459)    | (459)    | (459)    | (459)    |
| <b>Conservation</b>  |           |           |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | 15        | 25        | 35       | 35       | 35       | 35       |
| Annual Cost (\$/yr)  | \$3,130   | \$5,217   | \$7,304  | \$7,304  | \$7,304  | \$7,304  |
| <i>Projected Surplus/(Shortage) after Conservation (acft/yr)</i> | (444)     | (434)     | (424)    | (424)    | (424)    | (424)    |
| <b>Groundwater Development – Cross Timbers Aquifer</b>           |           |           |          |          |          |          |
| Supply From Plan Element (acft/yr)                               | 450       | 450       | 450      | 450      | 450      | 450      |
| Annual Cost (\$/yr)  | \$483,285 | \$483,285 | \$48,285 | \$48,285 | \$48,285 | \$48,285 |
| Unit Cost (\$/acft)  | \$1,074   | \$1,074   | \$107    | \$107    | \$107    | \$107    |

### 5.37.9 Livestock

#### Description of Supply

Livestock in Young County obtains water supply primarily through local stock surface water impoundments. Projections show supply shortages for Livestock through the planning period.

#### Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following plan is recommended for Young County Livestock. Associated costs are included for each strategy.

- a. Groundwater Development – Cross Timbers Aquifer
  - Cost Source: Volume II, Chapter 14
  - Date to be Implemented: before 2030
  - Project Cost: \$252,000
  - Unit Cost: maximum of \$1,809/acft
- b. Leave needs unmet in 2020
  - Cost Source: Cost of not meeting needs – see Appendix H
  - Date to be Implemented: before 2030



**Table 5.37-6. Recommended Plan Costs by Decade for Young County – Livestock**

| Plan Element   | 2020     | 2030     | 2040    | 2050    | 2060    | 2070    |
|--|----------|----------|---------|---------|---------|---------|
| <i>Projected Surplus/(Shortage) (acft/yr)</i>                    | (122)    | (11)     | (11)    | (11)    | (11)    | (11)    |
| <b>Conservation</b>  |          |          |         |         |         |         |
| Supply From Plan Element (acft/yr)                               | —        | —        | —       | —       | —       | —       |
| Annual Cost (\$/yr)  | —        | —        | —       | —       | —       | —       |
| <i>Projected Surplus/(Shortage) after Conservation (acft/yr)</i> | (122)    | (11)     | (11)    | (11)    | (11)    | (11)    |
| <b>Groundwater Development – Cross Timbers Aquifer</b>           |          |          |         |         |         |         |
| Supply From Plan Element (acft/yr)                               | 11       | 11       | 11      | 11      | 11      | 11      |
| Annual Cost (\$/yr)  | \$19,895 | \$19,895 | \$1,895 | \$1,895 | \$1,895 | \$1,895 |
| Unit Cost (\$/acft)  | \$1,809  | \$1,809  | \$172   | \$172   | \$172   | \$172   |
| <b>Leave Needs Unmet</b>   |          |          |         |         |         |         |
| Supply From Plan Element (acft/yr)                               | 111      | —        | —       | —       | —       | —       |
| Annual Cost (\$/yr)  | —        | —        | —       | —       | —       | —       |
| Unit Cost (\$/acft)  | —        | —        | —       | —       | —       | —       |

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