

# 2016 INITIALLY PREPARED REGION C WATER PLAN

MAY 2015

## Executive Summary

This report presents the *2016 Initially Prepared Region C Water Plan* developed in the fourth round of the Senate Bill One regional water planning process. Region C covers all or part of 16 North Central Texas counties, as shown in Figure ES.1. The Region C water plan was developed under the direction of the 22-member Region C Water Planning Group. This initially prepared regional water plan was adopted by the Region C Water Planning Group on April 20, 2015.

The *2016 Initially Prepared Region C Water Plan* includes the following chapters:

1. Description of Region C
2. Population and Water Demand Projections
3. Analysis of Water Supply Currently Available to Region C
4. Identification of Water Needs
5. Identification, Evaluation and Selection of Water Management Strategies
  - 5A. Methodology for Evaluation and Selection of Water Management Strategies
  - 5B. Evaluation of Major Water Management Strategies
  - 5C. Recommended Water Management Strategies for Wholesale Water Providers
  - 5D. Recommended Water Management Strategies for Water User Groups by County
  - 5E. Water Conservation and Reuse
  - 5F. Texas Water Development Board Required Tables
6. Impacts of Regional Water Plan and Consistency with Long-Term Protection of the Water Resources, Agricultural Resources, and Natural Resources
7. Drought Response
8. Unique Stream Segments, Unique Reservoir Sites, and Legislative Recommendations
9. Infrastructure Funding Recommendations
10. Plan Approval Process and Public Participation
11. Implementation and Comparison to Previous Regional Water Plan

This Executive Summary focuses on current water needs and supplies in Region C, the projected need for water, the identification and selection of recommended water management strategies, the costs and impacts of the selected strategies, and county summaries for each county in the region. Other elements of the plan are covered in the main text and the appendices.

### **ES.1 Current Water Needs and Supplies in Region C**

As of the 2010 census, the population of Region C was 6,477,835, which represented 25 percent of Texas' total population. The estimated population as of July 2012 was 6,716,014, an increase of 3.7 percent in two years. The two most populous counties in Region C, Dallas and Tarrant, have 65 percent of the region's population. Region C is heavily urbanized, with 83 percent of the population located in cities with populations in excess of 20,000 people.

#### **Physical Setting**

Most of Region C is in the upper portion of the Trinity River Basin, with smaller parts in the Red, Brazos, Sulphur, and Sabine River Basins. Figure ES.1 shows the major streams in Region C. Precipitation increases from west to east in the region. The average runoff in the region also increases from the west to the east, while evaporation is higher to the west. These patterns of rainfall, runoff, and evaporation result in more abundant water supplies in the eastern part of Region C than in the west.

There are thirty-four major reservoirs in Region C with conservation storages in excess of 5,000 acre-feet. These reservoirs and others outside of Region C provide most of the region's water supply. Aquifers in the region include the Trinity, Woodbine, Carrizo-Wilcox, Nacatoch, and Queen City.

#### **Water Use**

Water use in Region C has increased significantly in recent years, primarily in response to increasing population. The regional water use in the year 2011 was 1,508,886 acre-feet. It is interesting to note that Region C, with over 25 percent of Texas' population, had only 8.3 percent of the state's water use in 2011. About 90 percent of the current water use in Region C is for municipal supply.

#### **Current Sources of Water Supply**

About 90 percent of the water use in Region C is supplied by surface water, but groundwater can be an important source of supply, especially in rural areas. Most of the surface water supply in Region C comes from major reservoirs, including reservoirs in the region and reservoirs outside of Region C that supply water for the region. The Trinity aquifer is the largest source of groundwater in Region C, with

some use in the Woodbine, Carrizo-Wilcox and other minor aquifers. The current use of groundwater is close to or greater than the long-term reliable supply available in some parts of Region C.

About half of the water used for municipal supply in Region C is discharged as treated effluent from wastewater treatment plants, making wastewater reclamation and reuse a potentially significant source of water supply for the region. Reuse supplies are increasing rapidly in Region C, with several major projects recently completed or under development. It is clear that the reuse of treated wastewater will be a significant source of future water supplies for the region.

### **Water Providers in Region C**

Water providers in Region C include 40 wholesale water providers and 360 water user groups. In 2011, the three largest wholesale water providers in Region C (Dallas Water Utilities, Tarrant Regional Water District, and North Texas Municipal Water District) provided the majority of the water used in the region. Cities and towns provide most of the retail water service in Region C.

## **ES.2 Projected Need for Water**

### **Population Projections**

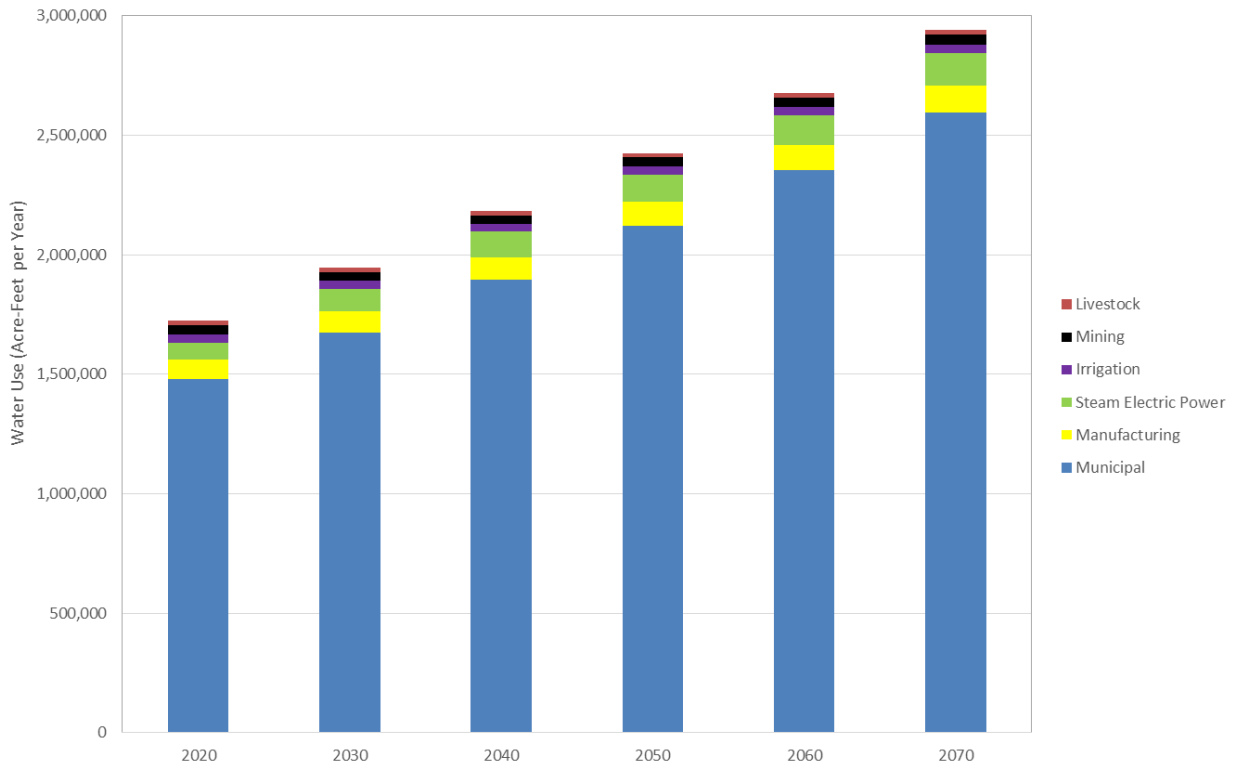
The population of Region C is projected to grow from 6,477,835 in the year 2010 to 9,908,572 in 2040 and 14,347,915 in 2070. These projections have been approved by the Texas Water Development Board, as required by TWDB planning guidelines. This projection reflects a substantial slowing in the rate of growth that has been experienced in Region C over the last 50 years. The distribution of the projected population by county and city is discussed in Chapter 2.

### **Demand Projections**

Figure ES.2 shows the projected dry-year demands for water in Region C, which total 2.2 million acre-feet per year in 2040 and 2.9 million acre-feet per year in 2070. As has been the case historically, municipal demands are projected to make up the majority of the water use in Region C. The 2060 projected demand is almost 600,000 acre-feet per year lower than the projections in the *2011 Region C Water Plan*. The total municipal 2060 gallons per capita per day (gpcd) in the 2011 Plan was 200 as opposed to the total municipal gpcd of 165 in the 2016 Plan. (It should be noted that these gpcd's reflect demands before any conservation water management strategies have been applied). Dry-year demands are significantly higher than normal year demands, especially for municipal use (because of increased

lawn irrigation use). Normal-year demands in Region C might be 10 to 15 percent lower than dry-year demands.

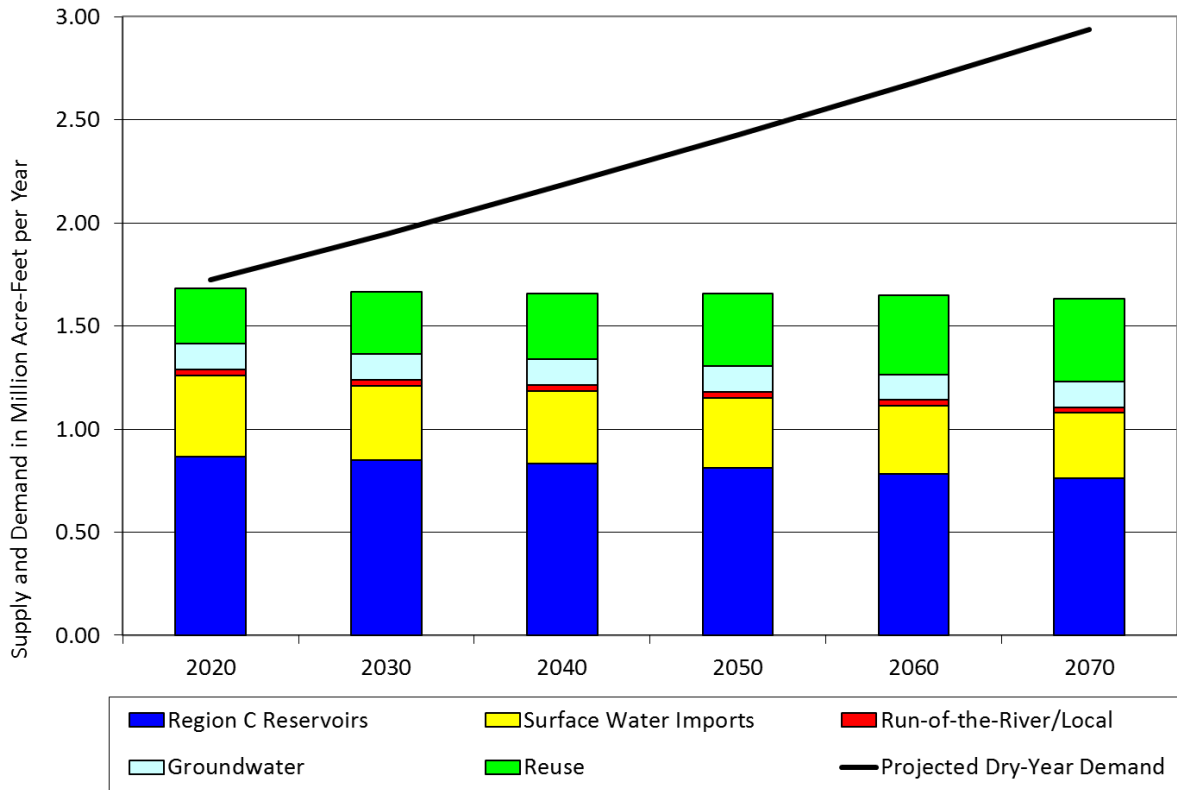
**Figure ES.2**  
**Adopted Projections for Dry-Year Water Use by Category in Region C**



### Comparison of Supply and Demand

Figure ES.3 shows a comparison of supplies currently available to Region C and projected demands. Currently available supplies are almost constant over time at 1.7 million acre-feet per year, as sedimentation in reservoirs is offset by increases in reuse supplies due to increased return flows. With the projected 2070 demand of 2.9 million acre-feet per year, the region has a shortage of 1.2 million acre-feet per year by 2070. Meeting the projected shortage and leaving a reasonable reserve of planned supplies beyond projected needs will require the development of significant new water supplies for Region C over the next 50 years.

**Figure ES.3  
Comparison of Currently Available Supplies and Projected Demands**



**Socio-Economic Impacts of Not Meeting Projected Water Needs**

The Texas Water Development Board will conduct an analysis of the socio-economic impacts of not meeting the projected demands in Region C. This information will be included in the final 2016 Region C Water Plan.

**ES.3 Identification and Selection of Water Management Strategies**

The Region C Water Planning Group identified and evaluated a wide variety of potentially feasible water management strategies in developing this plan. Water supply availability, costs and environmental impacts were determined for conservation and reuse efforts, the connection of existing supplies, and the development of new supplies.

As required by TWDB regulations, the evaluation of water management strategies was an equitable comparison of all feasible strategies and considered the following factors:

- Evaluation of quantity, reliability, and cost of water delivered and treated
- Environmental factors

- Impacts on other water resources and on threats to agricultural and natural resources
- Other factors deemed relevant by the planning group (including consistency with the plans of water providers in the region)
- Consideration of interbasin transfer requirements and third party impacts of voluntary redistributions of water.

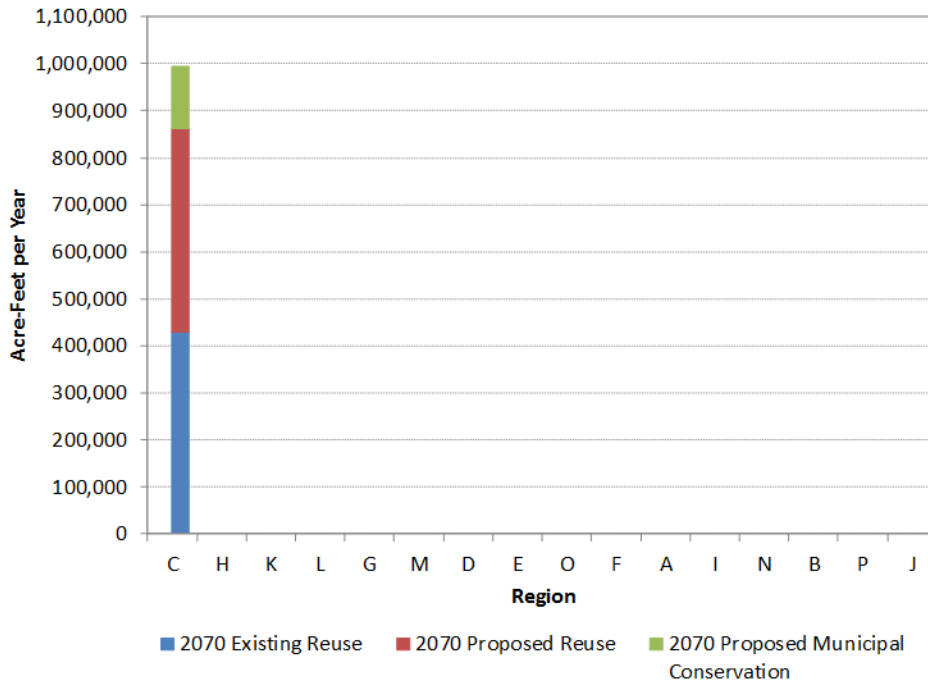
### **Water Conservation and Reuse**

The Region C Water Planning Group considered the municipal water conservation strategies suggested as best management practices by the Conservation Implementation Task Force and recommended a water conservation program for Region C that accomplishes the following:

- Including the 247,409 acre-feet per year of conservation built into the demand projections (for low flow plumbing fixtures, efficient residential clothes washer standards, and efficient residential dishwasher standards), a total conservation and reuse supply of almost 1.19 million acre-feet per year by 2070, 42 percent of the region's demand without conservation.
- A dry-year per capita municipal use for the region (after crediting for conservation and reuse) ranging from 108 gpcd in 2020 to 103 gpcd by 2070.

The Region C Water Plan includes notable conservation and reuse efforts. Figure ES.4 shows the planned supplies from reuse and municipal conservation for Region C based on this *2016 Initially Prepared Region C Water Plan* and for other planning regions based on the Texas Water Development Board Regional Planning Database (DB17). With about 25 percent of the state's population, Region C has \_\_\_ percent of the planned supplies from reuse and municipal conservation. Chapter 5E includes a more detailed discussion of conservation and reuse for the region. *(This figure to be completed for the Final 2016 Region C Water Plan.)*

**Figure ES.4  
Planned 2070 Reuse and Municipal Conservation Supplies by Region**



**Recommended Water Management Strategies**

Table ES.1 lists the major recommended water management strategies for Region C. (Major water management strategies are those supplying over 60,000 acre-feet per year or involving the construction of a reservoir.) Table ES.3 at the end of this chapter lists all the recommended water management strategies. Figure ES.5 shows the location of the recommended major water management strategies. In total, the Region C plan includes water management strategies to develop 1.68 million acre-feet per year of new supplies, for a total available supply of 3.31 million acre-feet per year in 2070. The supply is about 13 percent greater than the projected demand, leaving a reasonable reserve to provide for difficulties in developing strategies in a timely manner, droughts worse than the drought of record, greater than expected growth, and supply for needs beyond this planning horizon.

Figure ES.6 shows the makeup of the 3.31 million acre-feet per year of supplies proposed to be available to the region by 2070. About 37 percent of the supply is already available to the region from surface water and groundwater; a little over a quarter (27 percent) is developed from conservation and reuse efforts, 16 percent is from the connection of existing supplies, and 20 percent is from the development of new supply including reservoirs and run-of-river projects.

The plan includes only five major new reservoirs (compared to more than 25 developed to supply water for Region C over the last 60 years.)

### Cost of the Proposed Plan

Most of the new supplies for Region C will be developed by the major wholesale water providers in the region. Table ES.2 shows the amount of new supply proposed for the five largest wholesale water providers in Region C and the cost to develop that supply. The total cost of implementing all of the water management strategies in the plan is \$21.7 billion. The specific recommended water management strategies recommended for wholesale water providers and water user groups are discussed in sections 5C and 5D of the report.

### County Summaries

There are summaries of the plan for each county at the end of this executive summary.

**Table ES.1  
Recommended Major Water Management Strategies for Region C**

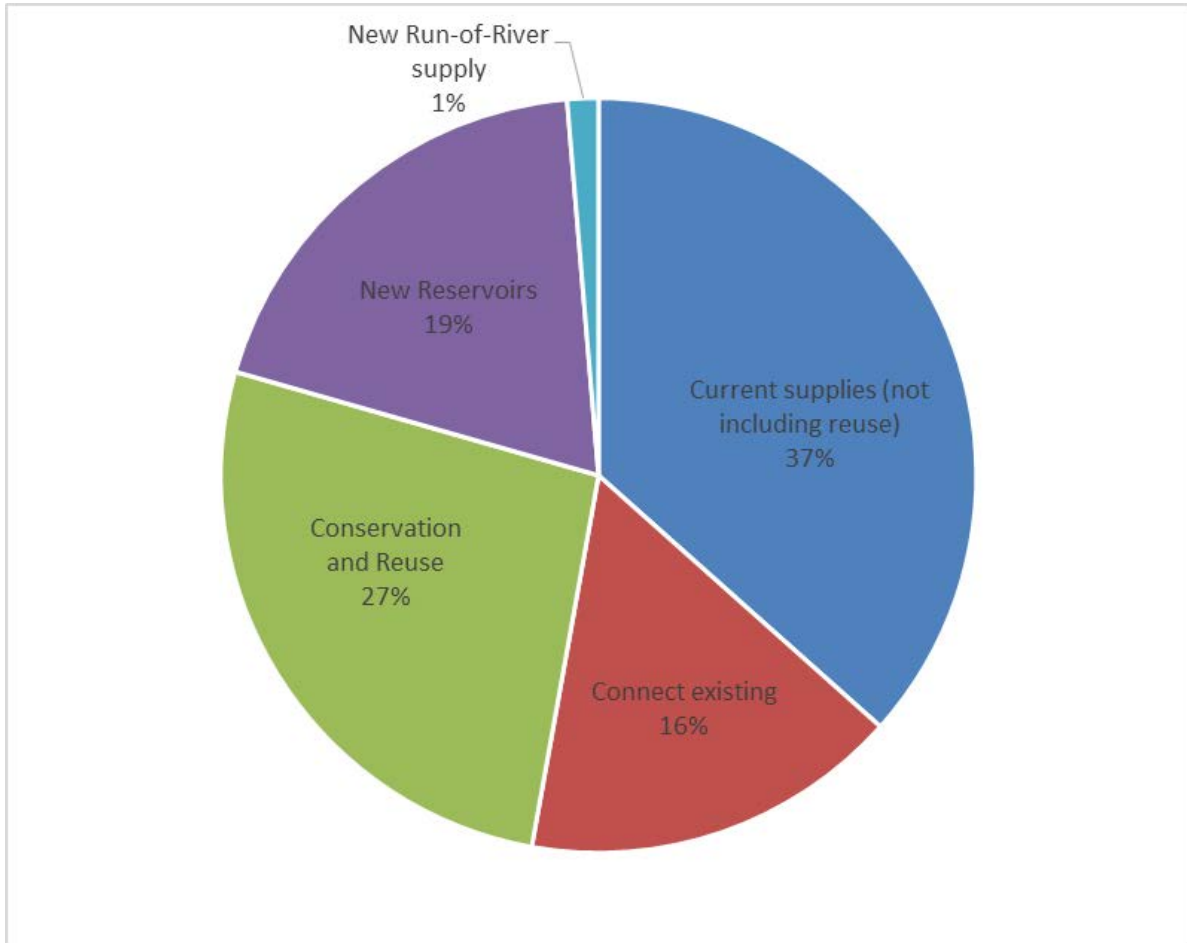
Strategy	Supplier	Supply in 2070 (Ac-Ft/Yr)	Supplier Capital Cost
Conservation	Multiple	135,991	\$262,889,616
Reuse Implementation (Main Stem Trinity River)	Dallas	149,093	\$718,944,000
Connect Lake Palestine	Dallas	110,670	\$887,955,000
Sulphur Basin Supplies	TRWD	280,000	\$2,830,288,000
	NTWMD	87,400	\$1,097,994,000
	UTRWD	35,000	\$284,157,000
Lower Bois d'Arc Creek Reservoir	NTWMD	120,200	\$625,610,000
Toledo Bend	NTWMD	100,000	\$915,266,000
Cedar Creek Wetlands (Reuse)	TRWD	88,059	\$202,623,000
Lake Texoma blending	NTWMD	67,000	\$375,697,000
Lake Columbia	Dallas	56,050	\$351,756,000
Lake Ralph Hall and Associated Reuse	UTRWD	50,121	\$311,388,000
Oklahoma	NTWMD	50,000	\$167,541,000
Neches Run-of-River	Dallas	47,250	\$226,790,000
Lake Tehuacana	TRWD	41,600	\$742,730,000
Lake Texoma Desalination	GTUA	41,076	\$142,222,000







**Figure ES.6**  
**Sources of Water Available to Region C as of 2070**



**Table ES.2  
2070 Supplies for the Largest Wholesale Providers and for Region C**

<b>Wholesale Water Provider</b>	<b>Supplies Available in 2070 from Current Sources<sup>(a)</sup></b>	<b>Supplies Available in 2070 from New Strategies<sup>(a)</sup></b>	<b>Total Supplies Available in 2070<sup>(a)</sup></b>	<b>% of Total Supply from Conservation and Reuse</b>	<b>Cost of Strategies (Millions)</b>
Dallas Water Utilities	506,363	414,274	920,637	31.9%	\$4,256
Tarrant Regional Water District	489,024	483,761	972,785	23.4%	\$4,478
North Texas Municipal Water District	385,153	463,587	848,740	23.6%	\$7,629
City of Fort Worth	282,992	257,766	540,757	26.1%	\$1,035
Trinity River Authority	114,996	142,426	257,422	42.8%	\$81
Upper Trinity Regional Water District	41,002	130,806	171,808	27.0%	\$1,315
Greater Texoma Utility Authority	23,333	69,837	93,170	11.0%	\$240
<b>Total for Region C<sup>(b)</sup></b>	<b>1,631,784</b>	<b>1,678,236</b>	<b>3,310,020</b>		<b>\$21,747</b>
<b>2070 Demand in Region C</b>			<b>2,939,880</b>		
<b>Management Supply Factor for Region C</b>			<b>1.126</b>		

Notes:

(a) Current sources include only those that are connected. Some supplies are used by more than one supplier. For example, TRWD supplies water to TRA and Fort Worth, DWU supplies water to UTRWD, etc.

(b) Total for Region C is not a sum of the numbers above. It includes other providers as well. Some supplies serve multiple suppliers.

**Table ES.3**  
**Summary of Recommended Strategies - Region C WWP and WUGs\***

*\*volumes shown in gray italics are infrastructure projects to utilize the supply volumes from other strategies*

Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Multiple	Conservation - Municipal	\$262,889,616	2020	48,021	\$976,320	131,108	\$171,520	48,021	78,768	87,673	102,646	116,598	131,108
Multiple	Conservation - Non-Municipal	\$0	2020	34	\$310	4,883	\$310	34	731	2,936	4,053	4,488	4,883
Dallas	Main Stem Pump Station	\$44,481,000	2020	34,751	\$153	34,751	\$46	34,751	34,751	34,751	34,751	34,751	34,751
Dallas	Main Stem Balancing Reservoir (Reuse)	\$674,463,000	2050	84,075	\$607	114,342	\$175	0	0	0	84,075	102,011	114,342
Dallas	Connect Lake Palestine (Palestine to IPL to Bachman)	\$887,955,000	2030	110,670	\$773	106,239	\$196	0	110,670	109,563	108,455	107,347	106,239
Dallas	Neches Run-of-River	\$226,790,000	2060	47,250	\$697	47,250	\$296	0	0	0	0	47,250	47,250
Dallas	Lake Columbia	\$351,756,000	2070	56,050	\$951	56,050	\$483	0	0	0	0	0	56,050
Dallas	Infrastructure to Treat & Deliver to Customers	\$1,179,358,000	2020	<i>34,751</i>	\$469	<i>358,632</i>	\$228	34,751	145,421	144,314	227,281	291,359	358,632
Dallas	IPL Infrastructure Improvements	\$887,954,000	2030	<i>110,670</i>	\$771	<i>106,239</i>	\$195	0	110,670	109,563	108,455	107,347	106,239
Tarrant Regional WD	Integrated Pipeline (IPL)	\$702,008,000	2020	<i>71,270</i>	\$442	<i>123,091</i>	\$157	71,270	153,376	147,208	140,602	132,461	123,091
Tarrant Regional WD	Additional Cedar Creek Lake	\$0	2020	32,636	\$0	15,898	\$0	32,636	30,583	28,315	25,609	21,368	15,898
Tarrant Regional WD	Add'l Richland-Chambers Reuse	\$0	2020	38,634	\$0	19,134	\$0	38,634	34,734	30,834	26,934	23,034	19,134
Tarrant Regional WD	Cedar Creek Reuse	\$202,623,000	2030	88,059	\$269	88,059	\$76	0	88,059	88,059	88,059	88,059	88,059
Tarrant Regional WD	Tehuacana	\$742,730,000	2040	41,600	\$1,382	41,600	\$150	0	0	41,600	41,600	41,600	41,600
Tarrant Regional WD	Sulphur Basin Supply	\$2,830,288,000	2050	140,000	\$1,062	280,000	\$264	0	0	0	140,000	280,000	280,000
North Texas MWD	Removal of Chapman Silt Barrier	\$1,793,000	2020	3,620	\$20	3,135	N/A	3,620	3,523	3,426	3,329	3,232	3,135
North Texas MWD	Dredge Lake Lavon	\$1,967,000	2020	7,959	\$20	6,390	N/A	7,959	7,735	7,399	7,062	6,726	6,390
North Texas MWD	Add'l measure to access full Lavon yield	\$20,823,000	2020	14,461	\$205	10,130	\$84	14,461	13,505	12,661	11,818	10,974	10,130
North Texas MWD	Main Stem PS (additional East Fork wetlands - TRA)	\$71,743,000	2020	53,135	\$153	0	\$46	53,135	37,890	25,335	13,004	673	0
North Texas MWD	Lower Bois d'Arc Creek Res.	\$625,610,000	2020	16,815	\$506	113,600	\$71	16,815	120,200	120,200	118,000	115,800	113,600
North Texas MWD	Lake Chapman Pump Station Expansion	\$34,184,000	2020										
North Texas MWD	Additional Lake Texoma - Blend with Lower Bois d'Arc water	\$174,179,000	2040	39,571	\$518	37,867	\$150	0	0	39,571	39,333	38,600	37,867
North Texas MWD	Sulphur Basin Strategy	\$1,097,994,000	2060	87,400	\$642	87,400	\$163	0	0	0	0	87,400	87,400
North Texas MWD	Additional Lake Texoma - Blend with Sulphur Basin water	\$201,518,000	2060	29,133	\$798	29,133	\$218	0	0	0	0	29,133	29,133
North Texas MWD	Toledo Bend Phase 1	\$915,266,000	2070	100,000	\$954	100,000	\$188	0	0	0	0	0	100,000
North Texas MWD	Oklahoma	\$167,541,000	2070	50,000	\$508	50,000	\$228	0	0	0	0	0	50,000
North Texas MWD	Infrastructure to Treat & Deliver to Customers							0	0	0	0	0	0
North Texas MWD	Fannin County Water Supply System	\$45,753,900	2020	<i>56</i>	\$914	<i>12,760</i>	\$614	56	912	2,436	4,666	8,466	12,760
North Texas MWD	Treatment and Distribution (CIP)	\$4,270,998,000	2020	<i>95,990</i>	\$1,062	<i>437,655</i>	\$245	95,990	182,853	208,592	192,546	292,538	437,655
Fort Worth	Alliance Direct Reuse	\$16,083,000	2020	2,800	\$161	7,841	\$20	2,800	2,800	7,841	7,841	7,841	7,841
Fort Worth	Future Direct Reuse	\$129,976,000	2020	2,688	\$1,363	8,166	\$268	2,688	6,934	8,166	8,166	8,166	8,166
Fort Worth	Eagle Mountain 35 mgd expansion	\$68,472,000	2030	<i>19,618</i>	\$417	<i>19,618</i>	\$124	0	19,618	19,618	19,618	19,618	19,618
Fort Worth	West Plant 23 mgd expansion	\$48,082,000	2030	<i>12,892</i>	\$446	<i>12,892</i>	\$134	0	12,892	12,892	12,892	12,892	12,892
Fort Worth	Rolling Hills 50 mgd expansion	\$93,960,000	2030	<i>402</i>	\$401	<i>28,025</i>	\$121	0	402	28,025	28,025	28,025	28,025
Fort Worth	West Plant 35 mgd expansion	\$68,472,000	2040	<i>19,618</i>	\$417	<i>19,618</i>	\$124	0	0	19,618	19,618	19,618	19,618
Fort Worth	Eagle Mountain 30 mgd expansion	\$59,977,000	2040	<i>15,705</i>	\$427	<i>16,815</i>	\$127	0	0	15,705	16,815	16,815	16,815
Fort Worth	50 mgd expansion-1	\$93,960,000	2050	<i>28,025</i>	\$401	<i>28,025</i>	\$121	0	0	0	28,025	28,025	28,025
Fort Worth	50 mgd expansion-2	\$93,960,000	2050	<i>13,092</i>	\$401	<i>28,025</i>	\$121	0	0	0	13,092	28,025	28,025
Fort Worth	50 mgd expansion-3	\$93,960,000	2060	<i>23,915</i>	\$401	<i>28,025</i>	\$121	0	0	0	0	23,915	28,025
Fort Worth	50 mgd expansion-4	\$93,960,000	2070	<i>28,025</i>	\$401	<i>28,025</i>	\$121	0	0	0	0	0	28,025
Fort Worth	50 mgd expansion-5	\$93,960,000	2070	<i>7,903</i>	\$401	<i>7,903</i>	\$121	0	0	0	0	0	7,903

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*\*volumes shown in gray italics are infrastructure projects to utilize the supply volumes from other strategies*

Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Trinity River Authority	TRWD Water:												
Trinity River Authority	Tarrant Co. WSP	\$0	2030	<i>1,629</i>	\$316	<i>17,205</i>	\$316	0	1,629	6,922	11,204	14,388	17,205
Trinity River Authority	Ellis Co. WSP	\$0	2020	<i>3,664</i>	\$316	<i>49,337</i>	\$316	3,664	6,645	10,883	16,734	26,567	49,337
Trinity River Authority	Freestone County SEP	\$0	2030	<i>604</i>	\$0	<i>2,920</i>	\$0	0	604	1,315	1,945	2,462	2,920
Trinity River Authority	Ennis Indirect Reuse	Included in Ennis costs in Table 5C.41	2040	<i>518</i>	\$0	<i>3,696</i>	\$0	0	0	518	1,392	3,696	3,696
Trinity River Authority	Joe Pool Lake Reuse**	N/A	2020	<i>1,914</i>	N/A	<i>4,368</i>	N/A	1,914	2,835	4,041	4,368	4,368	4,368
Trinity River Authority	Additional Los Colinas Reuse	\$15,017,000	2020	<i>7,000</i>	\$392	<i>7,000</i>	\$212	7,000	7,000	7,000	7,000	7,000	7,000
Trinity River Authority	Dallas County Reuse (SEP)	\$8,661,000	2030	<i>2,000</i>	\$590	<i>2,000</i>	\$228	0	2,000	2,000	2,000	2,000	2,000
Trinity River Authority	Ellis County Reuse (SEP)	\$17,958,000	2060	<i>2,200</i>	\$557	<i>4,700</i>	\$235	0	0	0	0	2,200	4,700
Trinity River Authority	Freestone Co. Reuse (SEP)	\$30,593,000	2050	<i>6,760</i>	\$613	<i>6,760</i>	\$235	0	0	0	6,760	6,760	6,760
Trinity River Authority	Kaufman Co. Reuse (SEP)	\$8,763,000	2020	<i>1,000</i>	\$935	<i>1,000</i>	\$283	1,000	1,000	1,000	1,000	1,000	1,000
Trinity River Authority	Tarrant and Denton Co. Reuse	Included in Fort Worth costs in Table 5C.10	2020	<i>3,921</i>	\$0	<i>11,537</i>	\$0	3,921	3,921	11,537	11,537	11,537	11,537
Trinity River Authority	Central Reuse to Irving	Included in Irving costs in Section 5D.	2020	<i>28,025</i>	\$0	<i>28,025</i>	\$0	28,025	28,025	28,025	28,025	28,025	28,025
Trinity River Authority	Central Reuse to NTMWD (via Main Stem Pump Station)	Included in NTMWD costs in Table 5C.8	2020	<i>53,135</i>	\$0	<i>0</i>	\$0	53,135	37,890	25,335	13,004	673	0
Upper Trinity RWD	Chapman Silt Barrier	Included under NTMWD in Table 5C.8	2020	<i>998</i>	\$0	<i>864</i>	\$0	998	972	945	918	891	864
Upper Trinity RWD	Additional Supplies from DWU (Up to Current Contracts)*	\$0	2020	<i>1,819</i>	\$482	<i>18,017</i>	\$482	1,819	6,205	11,048	14,115	16,458	18,017
Upper Trinity RWD	Lake Ralph Hall	\$311,388,000	2030	<i>34,050</i>	\$577	<i>34,050</i>	\$80	0	34,050	34,050	34,050	34,050	34,050
Upper Trinity RWD	Lake Ralph Hall Indirect Reuse	\$0	2030	<i>9,733</i>	\$0	<i>16,071</i>	\$0	0	9,733	14,967	15,335	15,703	16,071
Upper Trinity RWD	Additional Direct Reuse	\$13,213,000	2030	<i>560</i>	\$590	<i>2,240</i>	\$94	0	560	1,121	2,240	2,240	2,240
Upper Trinity RWD	Contract Renewal with Commerce for Lake Chapman supply	\$0	2040	<i>2,813</i>	\$3	<i>5,547</i>	\$3	0	0	2,813	2,799	2,786	5,547
Upper Trinity RWD	Contract Renewal with Commerce for Lake Chapman - Reuse	\$0	2040	<i>1,428</i>	\$0	<i>3,069</i>	\$0	0	0	1,428	1,464	1,500	3,069
Upper Trinity RWD	Additional DWU (Contract Increase)	\$0	2050	<i>5,605</i>	\$482	<i>11,210</i>	\$482	0	0	0	5,605	11,210	11,210
Upper Trinity RWD	Sulphur Basin Supplies	\$284,157,000	2060	<i>17,500</i>	\$837	<i>35,000</i>	\$205	0	0	0	0	17,500	35,000
Upper Trinity RWD	Treatment and Distribution System Improvements	\$706,654,000	2020	<i>2,817</i>		<i>126,068</i>		2,817	51,520	66,372	76,526	102,338	126,068
Greater Texoma UA	Texoma Raw water to Grayson Co SEP	\$24,356,000	2030	<i>6,548</i>	\$388	<i>6,548</i>	\$78	0	6,548	6,548	6,548	6,548	6,548
Greater Texoma UA	Texoma Raw water to Fannin Co SEP	\$25,026,000	2030	<i>9,000</i>	\$287	<i>9,000</i>	\$52	0	9,000	9,000	9,000	9,000	9,000
Greater Texoma UA	Grayson County Water Supply Project (Treatment of Lake Texoma)	\$92,840,000	2020	<i>187</i>	\$841	<i>25,528</i>	\$534	187	1,990	4,333	7,214	13,903	25,528
Greater Texoma UA	Add'l NTMWD (Current CGMA Facilities)	\$0	2020	<i>142</i>	\$570	<i>0</i>	\$570	142	659	1,708	0	0	0
Greater Texoma UA	CGMA-East West Pipeline (NTMWD)	\$3,672,000	2050	<i>4,698</i>	\$877	<i>11,400</i>	\$847	0	0	0	4,698	11,400	11,400
Greater Texoma UA	Parallel CGMA Pipeline (NTMWD)	\$59,492,000	2060	<i>3,533</i>	\$1,232	<i>14,541</i>	\$890	0	0	0	0	3,533	14,541
Dallas County PCMUD	None												
Corsicana	New 8 MGD Halbert/Richland Chambers WTP (4 mgd increase from current plant)	\$37,370,000	2020	<i>2,242</i>	\$1,991	<i>2,242</i>	\$596	2,242	2,242	2,242	2,242	2,242	2,242
Corsicana	Raw Water for Power Plant (Pipeline and PS)	\$16,331,000	2030	<i>5,440</i>	\$323	<i>5,440</i>	\$72	0	5,440	5,440	5,440	5,440	5,440
Corsicana	8 MGD Expansion of Halbert/Richland Chambers WTP and expansion of pump station	\$21,689,000	2050	<i>4,484</i>	\$577	<i>4,484</i>	\$173	0	0	0	4,484	4,484	4,484

**Table ES.3**  
**Summary of Recommended Strategies - Region C WWP and WUGs\***

*\*volumes shown in gray italics are infrastructure projects to utilize the supply volumes from other strategies*

Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Argyle WSC	Additional UTRWD	\$0	2020	69	\$976	1,859	\$976	69	403	1,049	1,482	1,694	1,859
Arlington	Additional Water from TRWD	\$0	2030	4,780	\$316	31,464	\$316	0	4,780	12,711	19,936	26,082	31,464
Athens MWA	Fish Hatchery Reuse	\$0	2020	2,872	\$33	2,872	\$33	2,872	2,872	2,872	2,872	2,872	2,872
Athens MWA	Infrastructure Improvements at WTP	\$2,900,000	2020	1,682	\$59	1,682	\$37	1,682	1,682	1,682	1,682	1,682	1,682
Cross Timbers WSC	Additional UTRWD	\$0	2030	221	\$976	925	\$976	0	221	460	677	816	925
Cross Timbers WSC	Infrastructure to take delivery from UTRWD and to deliver water to customers	\$5,858,000	2020	221	\$639	925	\$111	0	221	460	677	816	925
Denison	4 MGD WTP Expansion	\$13,168,000	2030	2,242	\$701	2,242	\$209	0	2,242	2,242	2,242	2,242	2,242
Denison	4 MGD New WTP	\$19,888,000	2060	2,242	\$1,059	2,242	\$316	0	0	0	0	2,242	2,242
Denison	4 MGD WTP Expansion	\$13,168,000	2070	2,242	\$701	2,242	\$209	0	0	0	0	0	2,242
Denison	Expand Raw Water delivery from Lake Texoma	\$21,629,700	2030	2,242	\$785	6,726	\$94	0	2,242	2,242	2,242	4,484	6,726
Denton	Existing supplies made available by treatment below:		2020	6,590		11,144		6,590	8,273	10,195	11,956	11,550	11,144
Denton	30 mgd Ray Roberts Plant Expansion	\$59,881,000	2020	2,674	\$424	16,815	\$127	2,674	10,926	16,815	16,815	16,815	16,815
Denton	20 mgd Ray Roberts Plant Expansion	\$42,922,000	2040	3,368	\$456	11,210	\$137	0	0	3,368	11,210	11,210	11,210
Denton	30 mgd Ray Roberts Plant Expansion	\$59,881,000	2050	16,815	\$424	16,815	\$127	0	0	0	4,147	16,815	16,815
Denton	25 mgd Treatment Plant Expansion-1	\$51,402,000	2060	8,396	\$437	14,013	\$130	0	0	0	0	8,396	14,013
Denton	25 mgd Treatment Plant Expansion-2	\$51,402,000	2070	11,318	\$541	11,318	\$163	0	0	0	0	0	11,318
East Cedar Creek FWSD	Additional TRWD	\$0	2030	147	\$316	1,779	\$316	0	147	391	655	1,079	1,779
East Cedar Creek FWSD	2 mgd Treatment Plant Expansion	\$8,904,000	2070	962	\$948	962	\$163	0	0	0	0	0	962
Ennis	Indirect Reuse	\$39,456,900	2040	518	\$1,374	3,696	\$481	0	0	518	1,392	3,696	3,696
Ennis	Additional TRWD	\$0	2030	93	\$316	13,143	\$316	0	93	285	1,084	3,807	13,143
Ennis	6 MGD WTP expansion	\$17,433,000	2040	56	\$619	3,363	\$186	0	0	56	2,479	3,363	3,363
Ennis	8 MGD WTP expansion	\$21,697,000	2060	4,142	\$577	4,484	\$173	0	0	0	0	4,142	4,484
Ennis	16 MGD WTP expansion	\$36,138,000	2070	8,992	\$479	8,992	\$143	0	0	0	0	0	8,992
Forney	Additional NTMWD	\$0	2020	504	\$554	9,339	\$554	504	1,789	2,712	3,760	5,695	9,339
Forney	Increase delivery infrastructure from NTWMD (pump station)	\$11,162,800	2050	0	\$94	9,339	\$39	504	1,789	2,712	3,760	5,695	9,339
Gainesville	2.5 MGD WTP Expansion	\$9,970,000	2060	560	\$850	1,401	\$254	0	0	0	0	560	1,401
Gainesville	6 MGD WTP Expansion	\$17,431,000	2070	3,298	\$632	3,298	\$189	0	0	0	0	0	3,298
Gainesville	Infrastructure to deliver to customers	\$26,296,000	2030	204	\$2,243	1,825	\$1,037	0	204	293	393	937	1,825
Gainesville	Expand Direct Reuse	\$1,669,000	2020	70	\$2,330	70	\$342	70	70	70	70	70	70
Garland	Additional NTMWD	\$0	2020	2,610	\$554	16,896	\$554	2,610	8,870	11,946	13,393	15,074	16,896
Grand Prairie	DWU Pipeline and Additional DWU	\$34,306,000	2020	781	\$313	11,331	\$59	781	3,327	7,301	9,154	10,393	11,331
Grand Prairie	Additional Fort Worth (TRWD)	\$0	2020	85	\$639	1,286	\$639	85	495	831	1,016	1,159	1,286
Grand Prairie	Mansfield (TRWD)	\$0	2020	3,240	\$815	4,018	\$815	3,240	3,188	3,296	3,490	3,773	4,018
Grand Prairie	Arlington (TRWD)	\$4,950,500	2020	1,100	\$1,039	2,197	\$850	1,100	1,092	1,665	1,660	2,205	2,197
Lake Cities MUA	Additional UTRWD	\$0	2030	437	\$976	1,615	\$976	0	437	923	1,336	1,483	1,615
Mansfield	Add'l TRWD Supply	\$0	2020	11,730	\$316	38,705	\$316	11,730	14,385	19,068	27,424	32,870	38,705
Mansfield	15 MGD WTP Expansion	\$34,489,000	2021	8,408	\$489	8,408	\$147	8,408	8,408	8,408	8,408	8,408	8,408
Mansfield	20 MGD WTP Expansion-1	\$42,984,000	2025	3,322	\$456	11,210	\$137	3,322	5,977	10,660	11,210	11,210	11,210
Mansfield	20 MGD WTP Expansion-2	\$42,984,000	2050	7,806	\$456	11,210	\$137	0	0	0	7,806	11,210	11,210
Mansfield	16 MGD WTP Expansion	\$36,188,000	2060	2,042	\$482	7,877	\$143	0	0	0	0	2,042	7,877
Midlothian	Add'l TRWD	\$0	2020	1,359	\$316	11,129	\$316	1,359	2,978	5,248	7,353	9,237	11,129
Midlothian	6 MGD WTP Expansion-1	\$17,433,000	2020	1,184	\$619	3,363	\$186	1,184	2,978	3,363	3,363	3,363	3,363

**Table ES.3**  
**Summary of Recommended Strategies - Region C WWP and WUGs\***

*\*volumes shown in gray italics are infrastructure projects to utilize the supply volumes from other strategies*

Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Midlothian	6 MGD WTP Expansion-2	\$17,433,000	2040	<i>1,885</i>	\$619	<i>3,363</i>	\$186	0	0	1,885	3,363	3,363	3,363
Midlothian	6 MGD WTP Expansion-3	\$17,433,000	2060	<i>2,511</i>	\$619	<i>3,363</i>	\$186	0	0	0	0	2,511	3,363
Mustang SUD	Additional UTRWD Supplies	\$0	2030	<i>2,351</i>	\$976	<i>12,042</i>	\$976	0	2,351	5,159	8,031	10,117	12,042
Mustang SUD	Infrastructure to deliver to customers	\$0	2030	<i>2,351</i>	\$0	<i>12,042</i>	\$0	0	2,351	5,159	8,031	10,117	12,042
North Richland Hills	Additional TRA (from TRWD)	\$0	2030	<i>283</i>	\$945	<i>1,712</i>	\$945	0	283	727	1,114	1,431	1,712
North Richland Hills	Additional Fort Worth (from TRWD)	\$0	2020	<i>5,077</i>	\$639	<i>5,067</i>	\$639	5,077	5,389	5,145	4,987	4,924	5,067
North Richland Hills	New Pipeline from Fort Worth (Cost share with Watagua)	\$8,091,722	2020	<i>5,077</i>	\$297	<i>5,067</i>	\$40	5,077	5,389	5,145	4,987	4,924	5,067
Princeton	Additional NTMWD	\$0	2020	<i>91</i>	\$554	<i>3,594</i>	\$554	91	358	616	1,418	2,374	3,594
Rockett SUD	Additional Midlothian with Increase in Infrastructure (20" line)	\$11,874,000	2020	<i>124</i>	\$854	<i>1,394</i>	\$140	124	504	860	1,101	1,273	1,394
Rockett SUD	Additional TRWD/TRA	\$0	2020	<i>4,934</i>	\$316	<i>24,899</i>	\$316	4,934	7,303	10,124	12,610	16,996	24,899
Rockett SUD	Sokoll 10 MGD Expansion-1	\$25,961,000	2020	<i>4,934</i>	\$554	<i>5,605</i>	\$166	4,934	5,605	5,605	5,605	5,605	5,605
Rockett SUD	Sokoll 10 MGD Expansion-2	\$25,961,000	2030	<i>1,698</i>	\$554	<i>5,605</i>	\$166	0	1,698	4,519	5,605	5,605	5,605
Rockett SUD	Sokoll 10 MGD Expansion-3	\$25,961,000	2050	<i>1,400</i>	\$554	<i>5,605</i>	\$166	0	0	0	1,400	5,605	5,605
Rockett SUD	Sokoll 10 MGD Expansion-4	\$25,961,000	2070	<i>5,605</i>	\$554	<i>5,605</i>	\$166	0	0	0	0	0	5,605
Rockwall	Additional NTMWD	\$0	2020	<i>749</i>	\$554	<i>12,990</i>	\$554	749	4,175	5,995	7,659	10,080	12,990
Rockwall	Increase delivery infrastructure from NTWMD	\$22,551,000	2020	<i>0</i>	\$182	<i>12,990</i>	\$39	0	1,457	3,901	6,426	10,080	12,990
Seagoville	Additional DWU beyond Current Contract	\$0	2020	<i>1,107</i>	\$482	<i>5,756</i>	\$482	1,107	1,511	2,047	2,688	4,094	5,756
Seagoville	Infrastructure to take delivery from Dallas	\$0	2020	<i>0</i>	\$0	<i>0</i>	\$0	0	0	0	0	0	0
Seagoville	Infrastructure to deliver to customers	\$0	2020	<i>0</i>	\$0	<i>0</i>	\$0	0	0	0	0	0	0
Sherman	Grayson County Water Supply Project:												
Sherman	<i>10 MGD WTP Expansion (desal)</i>	\$17,328,500	2020	<i>5,605</i>	\$919	<i>5,605</i>	\$401	5,605	5,605	5,605	5,605	5,605	5,605
Sherman	<i>10 MGD New WTP (desal)</i>	\$34,657,000	2050	<i>5,605</i>	\$919	<i>5,605</i>	\$401	0	0	0	5,605	5,605	5,605
Sherman	<i>20 MGD WTP Expansion (desal)</i>	\$29,478,000	2070	<i>11,210</i>	\$782	<i>11,210</i>	\$342	0	0	0	0	0	11,210
Terrell	Additional NTMWD	\$0	2020	<i>340</i>	\$570	<i>13,616</i>	\$570	340	1,854	3,776	6,587	9,936	13,616
Terrell	Infrastructure Upgrades to Deliver water to Wholesale Customers	\$3,714,000	2020	<i>340</i>	\$616	<i>11,210</i>	\$587	340	1,854	3,776	6,587	9,936	13,616
Terrell		\$1,569,100	2030	<i>2,803</i>	\$632	<i>2,803</i>	\$587						
Terrell		\$1,514,500	2040	<i>4,484</i>	\$613	<i>4,484</i>	\$583						
Terrell		\$4,418,700	2040	<i>4,484</i>	\$671	<i>4,484</i>	\$590						
Terrell		\$1,395,100	2020	<i>6,726</i>	\$600	<i>6,726</i>	\$583						
Terrell		\$5,688,500	2030	<i>4,484</i>	\$704	<i>4,484</i>	\$600						
Terrell	Additional Connection to NTMWD	\$25,559,100	2040	<i>340</i>	\$776	<i>13,452</i>	\$616	340	1,854	3,776	6,587	9,936	13,616
Walnut Creek SUD	Additional TRWD	\$0	2030	<i>218</i>	\$316	<i>5,662</i>	\$316	0	218	686	1,476	3,291	5,662
Walnut Creek SUD	6 MGD WTP New	\$9,245,000	2030	<i>218</i>	\$534	<i>3,363</i>	\$303	0	218	686	1,476	3,291	3,363
Walnut Creek SUD	0 MGD WTP Expansion-2	\$0	2050	<i>0</i>	\$0	<i>0</i>	\$0	0	0	0	0	0	0
Walnut Creek SUD	0 MGD WTP Expansion-3	\$0	2060	<i>0</i>	\$0	<i>0</i>	\$0	0	0	0	0	0	0
Walnut Creek SUD	New 12 MGD Eagle Mountain WTP	\$53,337,000	2070	<i>2,299</i>	\$948	<i>2,299</i>	\$283	0	0	0	0	0	2,299
Waxahachie	Dredge Lake Waxahachie	\$31,973,500	2030	<i>705</i>	\$3,796	<i>705</i>	NA	0	705	705	705	705	705
Waxahachie	Add'l TRA/TRWD	\$0	2040	<i>2,659</i>	\$355	<i>12,389</i>	\$355	0	0	2,659	4,809	7,900	12,389
Waxahachie	Ellis County Steam Electric Supply Project	\$15,009,000	2040	<i>2,116</i>	\$342	<i>4,484</i>	\$62	0	0	2,116	4,129	4,484	4,484
Waxahachie	Existing Reuse made usable through additional treatment below:			<i>510</i>		<i>884</i>		510	671	1,104	1,319	1,020	884
Waxahachie	8 MGD Expansion of Howard Rd WTP	\$21,697,000	2030	<i>4,484</i>	\$577	<i>4,484</i>	\$173	0	4,484	4,484	4,484	4,484	4,484



**Table ES.3**  
**Summary of Recommended Strategies - Region C WWP and WUGs\***

*\*volumes shown in gray italics are infrastructure projects to utilize the supply volumes from other strategies*

Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Waxahachie	10 MGD Expansion of Howard Rd WTP	\$25,961,000	2050	5,605	\$554	5,605	\$166	0	0	0	5,605	5,605	5,605
Waxahachie	12 MGD Expansion of Howard Rd WTP	\$29,353,000	2070	6,726	\$521	6,726	\$156	0	0	0	0	0	6,726
Waxahachie	36" Raw water line from IPL to Lake Waxahachie	\$1,073,400	2030	16,815	\$325	16,815	\$317	0	4,484	4,484	10,089	10,089	16,815
Waxahachie	27" Raw water line from IPL to Howard Road Water Treatment Plant	\$3,176,400	2030	16,815	\$372	16,815	\$321	0	4,484	4,484	10,089	10,089	16,815
Waxahachie	36" Raw water line from Lake Waxahachie to Howard Rd WTP	\$5,465,000	2030	16,815	\$48	16,815	\$6	0	4,484	4,484	10,089	10,089	16,815
Waxahachie	Phase I Delivery Infrastructure to Customers in South Ellis County	\$15,220,700	2030	1,121	\$558	1,121	\$78	0	281	1,121	1,121	1,121	1,121
Waxahachie	Phase II Delivery Infrastructure to Customers in South Ellis County	\$23,452,433	2050	5,875	\$572	5,875	\$64	0	0	1,638	4,105	5,165	5,875
Waxahachie	48" TRWD Parallel Supply Line to Sokoll WTP	\$3,510,500	2030	16,815	\$330	16,815	\$317	0	4,484	4,484	10,089	10,089	16,815
Waxahachie	Increase delivery infrastructure to Rockett SUD (30" Raw water Line)	\$11,894,900	2030	16,815	\$163	16,815	\$15	0	4,484	4,484	10,089	10,089	16,815
Waxahachie	Raw Water Intake Improvements at Lake Bardwell	\$5,168,200	2030	16,815	\$53	16,815	\$27	0	4,484	4,484	10,089	10,089	16,815
Weatherford	Indirect Reuse - Lake Weatherford/Sunshine	\$13,089,000	2020	2,240	\$580	2,240	\$91	2,240	2,240	2,240	2,240	2,240	2,240
Weatherford	Add'l Water from TRWD	\$0	2030	55	\$316	22,486	\$316	0	55	628	4,589	12,490	22,486
Weatherford	8 MGD WTP Expansion*	\$36,408,000	2020	1,000	\$1,026	4,484	\$345	1,000	1,000	1,000	4,484	4,484	4,484
Weatherford	14 MGD New WTP	\$60,521,000	2050	2,345	\$922	7,847	\$277	0	0	0	2,345	7,847	7,847
Weatherford	24 MGD WTP Expansion	\$49,781,000	2070	12,395	\$479	12,395	\$143	0	0	0	0	0	12,395
Weatherford	Expand Lake Benbrook PS	\$2,301,800	2030	0	\$756	0	\$326	0	0	0	0	0	0
West Cedar Creek MUD	Additional TRWD	\$0	2020	283	\$316	4,170	\$316	283	566	902	1,346	2,537	4,170
West Cedar Creek MUD	6 MGD WTP Expansion	\$17,429,000	2050	427	\$639	3,251	\$192	0	0	0	427	1,618	3,251
Wise County WSD	Additional TRWD	\$0	2020	1,657	\$316	10,397	\$316	1,657	2,383	3,205	5,859	8,136	10,397
Wise County WSD	10 MGD WTP Expansion-1	\$25,992,000	2020	1,657	\$554	5,605	\$166	1,657	2,383	3,205	5,605	5,605	5,605
Wise County WSD	10 MGD WTP Expansion-2	\$25,992,000	2050	254	\$648	4,792	\$192	0	0	0	254	2,531	4,792
<b>WUGs by County</b>													
<b>Collin County</b>													
Blue Ridge	Connection to NTMWD	\$2,403,656	2020	109	\$678	2,242	\$590	0	109	308	1,363	2,242	2,242
Blue Ridge	Upsize connection to NTMWD	\$1,036,000	2020	895	\$603	3,080	\$573	0	0	0	0	895	3,080
Celina*	Connect to NTMWD	\$16,314,000	2020	1,500	\$345	5,000	\$72	0	1,500	3,000	5,000	5,000	5,000
East Fork SUD*	Increase delivery infrastructure from NTMWD	\$3,500,000	2020	74	\$795	1,624	\$616	74	308	483	758	1,108	1,624
Frisco*	Direct reuse	\$34,882,048	2020	2,240	\$740	5,650	\$222	2,240	3,360	5,650	5,650	5,650	5,650
Melissa	Treated water supply line from NTMWD	\$2,124,324	2020	44	\$877	237	\$127	44	131	165	188	211	237
Parker	Increase delivery infrastructure from NTMWD	\$1,651,000	2030	0	\$44	5,309	\$18	0	3,810	5,398	5,366	5,337	5,309
Prosper*	Increase delivery infrastructure from NTMWD	\$3,786,109	2020	0	\$72	10,874	\$13	0	2,385	5,243	8,098	10,934	10,874
Weston	Connect to NTMWD and supplies	\$27,130,000	2020	0	\$173	18,237	\$49	0	829	4,600	11,501	18,301	18,237
Wylie Northeast SUD	Increase delivery infrastructure from NTMWD	\$4,250,000	2020	37	\$437	979	\$75	37	163	243	360	594	979
Collin County Manufacturing	Additional Groundwater (new wells)	\$402,800	2030	78	\$635	78	\$199	0	78	78	78	78	78
<b>Cooke County</b>													
Muenster	Develop Muenster Lake supply	\$8,504,000	2020	280	\$4,392	280	\$1,851	280	280	280	280	280	280

**Table ES.3  
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Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-foot/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-foot/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-foot/year)	Year 2030 Water Supply Volume (acre-foot/year)	Year 2040 Water Supply Volume (acre-foot/year)	Year 2050 Water Supply Volume (acre-foot/year)	Year 2060 Water Supply Volume (acre-foot/year)	Year 2070 Water Supply Volume (acre-foot/year)
<b>Dallas County</b>													
Glenn Heights*	Increase delivery infrastructure from DWU	\$2,374,000	2060	0	\$137	1,925	\$36	0	0	0	0	289	1,925
Irving	Lake Chapman Silt Barrier Removal	Included under NTMWD in Table 5C.8	2020	3,418	\$0	2,960	NA	3,418	3,326	3,235	3,143	3,052	2,960
Irving	TRA Central Reuse Project	\$39,960,000	2020	28,025	\$497	28,025	\$377	28,025	28,025	28,025	28,025	28,025	28,025
Irving	Lake Chapman Booster Pump Station	\$8,546,000	2020	0	NA	0	NA	0	0	0	0	0	0
Dallas County Irrigation	Los Colinas Expansion	See TRA in Section 5C.	2030	0	See TRA	7,000	See TRA	0	7,000	7,000	7,000	7,000	7,000
Dallas County Steam Electric	Reuse (TRA)	See TRA in Section 5C.	2030	0	See TRA	2,000	See TRA	0	2,000	2,000	2,000	2,000	2,000
Sunnyvale	Additional pipeline from DWU	\$22,408,000	2020	142	\$1,414	2,279	\$593	142	695	1,138	1,495	2,023	2,279
Wilmer	New Connection to Dallas (via Lancaster)	\$4,504,300	2020	207	\$564	800	\$91	207	242	300	400	600	800
Wilmer	Direct Connection to Dallas 36" Transmission Line	\$15,999,500	2040	382	\$528	2,859	\$59	0	0	382	876	1,409	2,859
<b>Denton County</b>													
Corinth	Upsize existing well	\$2,372,900	2020	286	\$1,029	286	\$333	286	286	286	286	286	286
Corinth	New wells in Trinity Aquifer-2020	\$1,634,600	2020	847	\$457	847	\$212	847	847	847	847	847	847
Corinth	New wells in Trinity Aquifer-2030	\$1,634,600	2030	561	\$457	561	\$212	0	561	561	561	561	561
Denton County Other	New wells in Trinity Aquifer	\$2,772,023	2020	334	\$1,005	334	\$310	334	334	334	334	334	334
Denton County Other	New wells in Woodbine Aquifer	\$11,691,860	2020	1,000	\$1,361	1,000	\$383	1,000	1,000	1,000	1,000	1,000	1,000
Hackberry	Increase delivery infrastructure from NTWMD	\$1,731,000	2050	0	\$502	348	\$85	0	0	0	70	200	348
Justin	New wells in Trinity Aquifer	\$2,115,500	2020	244	\$0	244	\$302	244	244	244	244	244	244
Krum	New wells in Trinity Aquifer	\$1,533,200	2020	577	\$299	1,025	\$175	577	707	866	1,025	1,025	1,025
Lewisville*	6 MGD WTP Expansion-2030	\$17,433,000	2030	1,386	\$619	3,363	\$186	0	1,386	3,363	3,363	3,363	3,363
Lewisville*	6 MGD WTP Expansion-2040	\$17,433,000	2040	1,081	\$0	3,363	\$0	0	0	1,081	3,363	3,363	3,363
Lewisville*	7 MGD WTP Expansion-2050	\$19,565,000	2050	845	\$0	3,743	\$0	0	0	0	845	3,879	3,743
Pilot Point	Additional groundwater	\$865,605	2020	269	\$497	269	\$229	269	269	269	269	269	269
Trophy Club	Phase I-Increase delivery infrastructure from Ft Worth; joint project with Ft Worth, Westlake, Trophy Club	\$2,273,000	2020	33	\$162	2,560	\$13	33	896	1,621	2,009	2,305	2,560
Trophy Club	Phase II-Increase delivery infrastructure from Ft Worth; 24" line	\$7,292,600	2020	33	\$260	2,560	\$22	33	896	1,621	2,009	2,305	2,560
Denton County Manufacturing	Additional groundwater	\$777,700	2020	184	\$604	184	\$251	184	184	184	184	184	184
<b>Ellis County</b>													
Ferris	Increase delivery infrastructure from Rockett SUD in future	\$2,578,000	2060	0	\$202	1,395	\$46	0	0	0	0	394	1,395
Files Valley WSC	Connect to Waxahachie (TRWD through TRA)	See Waxahachie in Section 5C.2	2030	55	\$0	72	\$0	0	55	59	63	68	72
Mountain Peak SUD*	Additional wells (Woodbine)	\$1,812,605	2020	7	\$727	7	\$145	7	7	7	7	7	7
Ovilla*	Increase delivery infrastructure from DWU	\$8,136,000	2070	0	\$573	1,494	\$117	0	0	0	0	0	1,494
Palmer	Increase delivery infrastructure from Rockett SUD	\$6,628,000	2020	10	\$694	940	\$104	10	72	151	245	387	940

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Entity	Recommended Strategy	Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost (\$/acre-foot/year)	Year 2020 Water Supply Volume (acre-feet/year)	Year 2030 Water Supply Volume (acre-feet/year)	Year 2040 Water Supply Volume (acre-feet/year)	Year 2050 Water Supply Volume (acre-feet/year)	Year 2060 Water Supply Volume (acre-feet/year)	Year 2070 Water Supply Volume (acre-feet/year)
Rice WSC*	Increase delivery infrastructure from Corsicana	\$6,983,000	2040	0	\$675	1,038	\$114	0	0	156	402	698	1,038
Sardis-Lone Elm WSC	Increase delivery Infrastructure from Rockett SUD	\$1,992,000	2020	0	\$138	1,318	\$13	0	0	548	1,026	1,342	1,318
Sardis-Lone Elm WSC	Connect to Midlothian	\$255,200	2020	1,121	\$21	1,121	\$2	1,121	1,121	1,121	1,121	1,121	1,121
Ellis County Steam Electric	Waxahachie	\$15,009,000	2040	2,116	\$342	4,484	\$62	0	0	2,116	4,129	4,484	4,484
Ellis County Steam Electric	TRA direct reuse	See TRA in Section 5C.1	2060	2,200	See TRA	4,700	See TRA	0	0	0	0	2,200	4,700
<b>Fannin County</b>													
Ladonia	Lake Ralph Hall supply	\$12,134,600	2030	34	\$14,204	133	\$6,629	0	34	57	89	134	133
Leonard	Water System Improvements	\$2,567,600	2020	0	\$1,153	273	\$366	0	148	194	211	240	273
Southwest Fannin Co SUD*	Additional Groundwater (with transmission facilities)	\$2,348,823	2030	100	\$2,559	100	\$589	0	100	100	100	100	100
Trenton	New Wells in Woodbine Aquifer	\$971,785	2030	25	\$4,148	25	\$908	0	25	25	25	25	25
Fannin County Steam Electric	Lake Texoma (GTUA)	See GTUA in Section 5C.1.	2030	9,000	\$0	9,000	\$0	0	9,000	9,000	9,000	9,000	9,000
<b>Freestone County</b>													
Fairfield	New Water Treatment Plant and transmission	\$7,283,000	2050	191	\$880	897	\$202	0	0	0	191	426	897
Freestone County Other	Increase delivery infrastructure from Corsicana	\$5,550,000	2020	40	\$2,053	266	\$306	0	40	44	64	119	266
Freestone County Other	New delivery and treatment facilities from TRWD	\$39,845,900	2030	189	\$1,388	3,207	\$349	189	145	115	368	1,175	3,207
Teague	New Wells in Trinity Aquifer	\$1,145,600	2050	0	\$765	200	\$285	0	0	0	200	200	200
Freestone County Steam Electric	Additional TRWD supplies through TRA	\$0	2020	0	\$0	8,587	\$0	0	604	1,315	1,945	2,462	8,587
Freestone County Steam Electric	TRA direct reuse	See TRA in Section 5C	2050	0	See TRA	6,760	See TRA	0	0	0	6,760	6,760	6,760
<b>Grayson County</b>													
Bells	New well in Woodbine Aquifer	\$1,200,000	2030	145	\$1,102	145	\$412	0	145	145	145	145	145
Gunter	New wells	\$2,080,600	2020	100	\$4,660	100	\$1,180	50	100	100	100	100	100
Southmayd	New Well in Woodbine	\$1,068,000	2070	77	\$1,530	77	\$374	0	0	0	0	0	77
Van Alstyne	Water System Improvements	\$2,180,800	2020	0	\$766	1,370	\$632	0	14	47	87	646	1,370
Grayson County Mining	New well in Trinity Aquifer	\$161,000	2050	0	\$439	41	\$122	0	0	0	41	41	41
Grayson County Steam Electric	Additional Lake Texoma (GTUA)	See GTUA in Section 5C.1.	2030	0	\$0	6,548	\$0	0	6,548	6,548	6,548	6,548	6,548
<b>Henderson County</b>													
Eustace	New well in Carrizo-Wilcox	\$912,400	2020	103	\$992	103	\$254	103	103	103	103	103	103
Payne Springs	Additional Wells (Carrizo-Wilcox)	\$892,000	2020	145	\$749	145	\$232	145	145	145	145	145	145
Henderson County Steam Electric (Region C only)	TRWD (Cedar Creek Lake)	\$19,951,000	2030	4,500	\$274	7,950	\$65	4,500	4,500	4,950	5,950	6,950	7,950
<b>Jack County</b>													

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Jack County Other	Jacksboro (Lost Creek/Lake Jacksboro)	\$1,893,000	2020	7	\$75	7	\$6	7	7	7	7	7	7
Jack County Other	Walnut Creek SUD	\$2,713,000	2020	48	\$15	51	\$2	48	49	49	50	50	51
Jack County Mining	Indirect reuse (Jacksboro)	\$0	2020	330	\$3	359	\$3	330	342	348	351	356	359
<b>Kaufman County</b>													
College Mound WSC	Increase delivery from Terrell	\$5,348,000	2020	55	\$525	1,028	\$88	55	220	346	475	725	1,028
Gastonia-Scurry SUD	Connect to Seagoville (DWU)	\$4,577,500	2020	39	\$238	1,799	\$26	39	39	39	39	569	1,799
Kaufman County Other	0.8 MGD Water Treatment Plant for TRWD water	\$11,922,000	2020	86	\$3,418	457	\$1,235	86	91	127	194	331	457
Mabank*	2 MGD WTP Expansion	\$8,905,000	2030	67	\$948	1,121	\$283		67	249	717	1,121	1,121
Mabank*	3 MGD WTP Expansion	\$11,037,000	2060	326	\$1,004	1,313	\$300					326	1,313
Mabank*	Increase delivery infrastructure from Cedar Creek Lake	\$262,000	2060	1,447	\$11	2,434	\$2	0	67	249	717	1,447	2,434
Kaufman County Mining	Connect to NTWMD	\$4,098,000	2060	3	\$2,317	171	\$310	0	0	0	0	3	171
Kaufman County Steam Electric	TRA direct reuse	See TRA in Section 5C	2020	1,000	See TRA	1,000	See TRA	1,000	1,000	1,000	1,000	1,000	1,000
<b>Navarro County</b>													
Blooming Grove	Groundwater	\$1,669,300	2020	160	\$216,000	160	\$475	160	160	160	160	160	160
Chatfield WSC	New Well	\$1,000,000	2020	150	\$936	150	\$376	150	150	150	150	150	150
MEN WSC	Increase delivery infrastructure from Corsicana (Upsize Lake Halbert Connection)	\$2,521,800	2030	173	\$632	408	\$114	0	173	214	268	334	408
Navarro Mills WSC	New wells (Woodbine)	\$1,339,500	2050	79	\$993	79	\$370	0	0	0	79	79	79
<b>Parker County</b>													
Aledo	Parallel pipeline and pump station from Fort Worth	\$7,710,500	2040	67	\$2,665	269	\$336	0	0	67	164	277	269
Annetta	Connect to Weatherford (TRWD)	\$2,077,600	2030	25	\$2,216	196	\$1,326	0	25	28	35	90	196
Annetta North	Connect to Weatherford (TRWD)	\$59,400	2040	7	\$1,395	38	\$1,264	0	0	7	16	25	38
Annetta South	Connect to Weatherford (TRWD)	\$1,183,300	2040	5	\$6,136	22	\$1,636	0	0	5	10	16	22
Cresson*	New wells in Trinity Aquifer	\$917,300	2020	113	\$941	113	\$259	113	113	113	113	113	113
Parker County Other	Water Treatment Plant and Transmission Facilities	\$116,775,000	2060	0	\$1,668	9,618	\$655	0	0	0	0	3,635	9,618
Parker County Other	New wells in Trinity Aquifer	\$1,448,000	2020	200	\$849	200	\$244	200	200	200	200	200	200
Parker County SUD*	Additional BRA with 1 MGD Treatment Plant Expansion	\$6,776,000	2020	540	\$1,499	540	\$450	540	540	540	540	540	540
Parker County SUD*	Additional Groundwater (new wells in Trinity aquifer)	\$3,860,000	2020	0	\$881	513	\$251	0	0	0	0	513	513
Springtown	Infrastructure improvements at Lake intake	\$280,200	2020	67	\$119	236	\$25	67	244	237	230	227	236
Springtown	New wells in Trinity Aquifer	\$998,400	2020	70	\$1,566	70	\$366	70	70	70	70	70	70
Willow Park	Connect to Weatherford (TRWD)	\$588,100	2030	137	\$1,444	1,562	\$1,284	0	137	306	706	1,135	1,562
<b>Rockwall County</b>													
Blackland WSC*	Direct Connection to NTMWD	\$3,295,550	2020	48	\$407	356	\$65	48	153	204	246	296	356
Cash SUD	Increase delivery infrastructure from NTWMD	\$6,654,700	2020	1,165	\$531	1,042	\$53	1,165	1,075	782	824	927	1,042
Fate	Increase delivery infrastructure from NTMWD	\$15,075,000	2060	0	\$528	2,982	\$104	0	0	0	0	390	2,982

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<b>Tarrant County</b>													
Azle*	Water treatment plant expansion	\$11,046,000	2020	162	\$805	1,641	\$241	162	255	383	607	925	1,641
Benbrook	Water treatment plant expansions	\$13,715,000	2060	0	\$0	2,307	\$0	0	0	0	0	2,342	2,307
Bethesda WSC*	Connection to Arlington	\$18,698,000	2020	1,416	\$704	2,614	\$104	1,416	1,619	1,833	2,072	2,336	2,614
Blue Mound	Purchase Existing Water System from Monarch Utilities	\$5,000,000	2020	0	NA	0	NA	0	0	0	0	0	0
Burleson*	Increase delivery infrastructure from Fort Worth	\$21,780,000	2040	967	\$401	5,541	\$72	0	0	967	2,386	3,922	5,541
Crowley	Increase delivery infrastructure from Fort Worth	\$11,558,000	2030	184	\$394	3,028	\$75	0	184	678	1,297	2,347	3,028
Johnson County SUD*	Connect to Grand Prairie	\$86,140,000	2020	6,726	\$1,248	6,726	\$176	6,726	6,726	6,726	6,726	6,726	6,726
Keller	Increase delivery infrastructure from Fort Worth	\$17,535,000	2020	364	\$0	5,679	\$0	364	2,170	3,697	4,516	5,139	5,679
Kennedale	Increase delivery infrastructure from Ft Worth	\$3,685,000	2040	188	\$1,284	277	\$192	0	0	188	239	283	277
Kennedale	Connect to Arlington	\$1,720,000	2020	280	\$619	280	\$104	280	280	280	280	280	280
Pantego	Connect to Arlington	\$778,000	2030	27	\$2,776	24	\$345	0	27	27	26	25	24
Pantego	Connect to Fort Worth	\$831,000	2030	27	\$3,001	24	\$385	0	27	27	26	25	24
Pelican Bay	Azle (TRWD)	\$956,000	2030	11	\$7,332	12	\$714	0	11	11	11	11	12
Southlake*	Increase delivery infrastructure from Ft Worth	\$43,035,000	2020	141	\$479	8,349	\$46	0	141	2,157	4,198	6,264	8,349
Watauga	Increase delivery infrastructure North Richland Hills/Fort Worth	\$1,839,352	2020	116	\$68	1,225	\$9	116	508	830	987	1,113	1,225
Westlake*	Increase delivery infrastructure from Ft Worth; joint project with Ft Worth, Westlake, Trophy Club	\$2,961,000	2020	42	\$162	3,335	\$13	42	705	1,596	2,181	2,765	3,335
Tarrant County Steam Electric	Direct reuse	\$13,080,000	2030	1,528	\$560	2,360	\$94	0	1,528	2,360	2,360	2,360	2,360
<b>Wise County</b>													
Bridgeport	2 MGD WTP Expansion	\$8,911,000	2050	40	\$948	1,121	\$283				40	827	1,121
Bridgeport	1.5 MGD WTP Expansion	\$7,844,000	2070	489	\$1,916	489	\$573						489
Bridgeport	Expand Capacity of Lake intake and Pump Station	\$766,100	2050	40	\$50	1,610	\$11	0	0	0	40	827	1,610
Chico	Increase delivery capacity from West Wise SUD	\$3,610,000	2050	140	\$942	369	\$124	0	0	0	140	246	369
New Fairview	Connect to Rhome (TRWD through Walnut Creek SUD)	\$3,662,000	\$2,030	34	\$5	221	\$1	0	34	71	119	165	221
Newark	Connect to Rhome (TRWD through Walnut Creek SUD)	\$2,548,000	\$2,030	51	\$1	646	\$0	0	51	147	261	437	646
Runaway Bay	0.5 MGD Water Treatment Plant Expansion	\$4,078,000	2070	0	\$4,855	100	\$1,453	0	0	0	0	0	100
Runaway Bay	Increase capacity of lake intake	\$52,500	2070	100	\$51	100	\$11	0	0	0	0	0	100
West Wise SUD	0.8 MGD Water Treatment Plant Expansion	\$5,697,000	2050	54	\$2,209	308	\$661	0	0	0	54	172	308
Wise County Manufacturing	New wells	\$1,636,600	2020	250	\$757	250	\$209	250	250	250	250	250	250