

4.6.2 COA Water Management Strategies

The COA provides water for municipal, manufacturing, and steam electric water uses. COA's existing service area covers portions of Travis, Williamson, and Hays Counties.

The COA water management strategies include water conservation, direct reuse, and purchasing water from LCRA. The total amounts for each strategy are summarized below in *Table 4.36*.

Table 4.36 COA Water Management Strategies (ac-ft/yr)

COA Strategies	2010	2020	2030	2040	2050	2060
Conservation	11,030	18,795	24,036	25,385	30,401	36,370
Direct Reuse (Municipal and Manufacturing)	5,143	13,620	22,077	30,268	36,218	40,468
Direct Reuse (Steam Electric) Travis	2,315	3,315	7,315	8,315	12,315	13,315
Purchase Water from LCRA (Steam Electric)	0	0	0	20,975	20,975	26,895
TOTAL	18,487	35,730	53,428	84,943	99,909	117,047

4.6.2.1 Water Conservation

The COA began an aggressive water conservation campaign in the mid 1980s in response to rapid growth and a series of particularly dry years. COA has achieved significant reductions in both per capita consumption and peak day to average day demand ratio. For the per capita use calculations, the COA used year 1998 as their base year instead of year 2000, since the COA had mandatory water conservation measures in place during year 2000.

The adopted LCRWPG projections for municipal, manufacturing, and wholesale water commitments for the COA and its wholesale customers are projected to increase from approximately 198,290 ac-ft/yr in the year 2010 to approximately 384,103 ac-ft/yr in 2060. Projections for water demands in succeeding decades assume the continuation and expansion of the City's conservation programs. These programs represent a roughly 9 percent savings in 2060 over the demands with no per capita reduction. With conservation and reuse an overall per capita reduction of roughly 11 percent is projected.

In 1990, the City's conservation program evolved from primarily reacting to high summertime demands to a comprehensive program with the goals of reducing both per capita consumption and peak day demand. To achieve these broader goals, the City has implemented and anticipates continuing water conservation programs in a number of areas including:

- Public education and outreach including school programs
- Rebate and incentive programs
- Local ordinances that increase water efficiency by customers
- Support of legislation that increases water efficiency in plumbing products and appliances at both the State and Federal level,

- Increased water efficiency in utility operations
- Conservation-oriented rate structures

In 2006, Austin City Council set a water conservation goal of reducing peak day water use by 1% per year for 10-years. The Council created a Water Conservation Task Force with a goal drafting a policy document for Council consideration consisting of strategies and implementation plans for new water conservation initiatives to meet this goal. In 2007, the Austin City Council approved the final policy recommendations aimed at meeting this goal, including enhanced water use management (2-day per week water limits). Through its various water conservation programs, the COA has made significant advances toward reducing the per capita consumption of water in its service area. The COA states that it is committed to continuing to seek ways to reduce its per capita demands as a Best Management Practice for its utility and to reduce overall capital costs for new construction to meet increasing demands. Through on-going efforts including continued conservation planning and comprehensive Water Resources Planning Study effort, COA is in the process of analyzing its current water conservation programs, goals, and per capita demands. For example, the Austin City Council recently adopted a resolution endorsing a goal of reducing total per capita per day water production to an average of 140 gpcd by 2020 and to increase Austin's customers' understanding of their water use and educate them on ways to use water more efficiently. The city council directed city staff to develop a 10-year water conservation action plan to achieve this goal. Plan development is currently underway. Austin Water Utility is expected to present the plan for adoption to the Austin city council in December of 2010. Future plan updates will reflect changes as additional COA water conservation program information becomes available. The range of conservation program costs is from \$60 to \$830 per acre foot, depending on the program.

Environmental and Other Impacts

Water conservation holds several advantages over alternative strategies in the fact that implementation of conservation practices does not require any additional water system infrastructure and does not require the movement of water between locations. In the event that, over time, water conservation causes changes to wastewater concentrations, treatment processes may need to be adjusted to maintain permitted discharge parameters. In addition, water conservation generally does not result in adverse impacts to environmental flows or other environmental considerations.

Impacts to Agriculture

No adverse impacts to agriculture are anticipated as a result of this strategy.

4.6.2.2 Water Reclamation Initiative (Direct Reuse)

This COA reclaimed water program includes the continued development of water distribution systems to provide reclaimed water to meet non-potable water demands within the City's service area. The City has established its Central Reclaimed Water System from the Walnut Creek Wastewater Treatment Plant (WWTP) and its South system from the South Austin Regional WWTP. These systems are expected to have a planning horizon capacity of approximately 40,000 ac-ft/yr. Austin has also evaluated the feasibility of developing reclaimed water facilities in other areas of the City. The City projects that it will need to develop the use of reclaimed water to the maximum extent possible, up to, if necessary, 100 percent reuse of its effluent to meet future needs. As the level of authorized reclaimed water use in the COA increases, the amount of flow it returns to the Colorado River may decrease accordingly.

Development of reclaimed water facilities necessary to provide for the projected 2060 direct municipal reuse (non-potable) demands of approximately 40,400 ac-ft/yr is anticipated to require a capital expenditure of \$227 million. The unit cost of reclaimed water is expected to be \$851 per ac-ft.

In addition to the water conservation measures the COA has implemented to reduce water demands, the COA is pursuing the development of reclaimed water as an additional supply of water to meet non-potable demands in the area. The COA has indicated that it will develop and use reclaimed water as the primary strategy to meet the projected needs in 2060, and likely beyond. To meet the total projected water demands, the Water Reclamation Initiative would need to supply up to 40,400 ac-ft/yr for direct municipal non-potable purposes by the year 2060 plus approximately 13,300 ac-ft/yr of COA direct non-potable use for steam electric needs in Travis County. The approximate total amount of this direct reuse supply in Travis County is 53,700 ac-ft/yr.

The City is currently using reclaimed water from its existing reclaimed system to irrigate several golf courses and meet other non-potable needs. The City estimates this use to be approximately 6,100 ac-ft/yr. In order to expand the availability and use of reclaimed water, the COA has completed a series of planning activities, including the publication of the 1998 Water Reclamation Initiative (WRI) Planning Document, and completion of the north and south system master plans. In addition, COA completed a Title XVI federal cost-share program feasibility study in conjunction with the Federal Bureau of Reclamation (FBR).

The City anticipates that the use of reclaimed water will increase steadily from the current level of 6,100 ac-ft/yr. The COA will continue to pursue implementation of its WRI and anticipates that additional capacity will be available in the future as the needs increase over the planning horizon. *Table 4.37* shows the projected capacity increases for the three main categories of reuse for each decade of the planning period. Note: WRI system master plans have been developed to a system capacity level of approximately 30,000 ac-ft/yr. Additional non-potable water demand and system infrastructure will be required to increase the direct reuse system capacity to achieve the increased volumes included in this plan.

Table 4.37 Anticipated Reclaimed Water Capacity (Direct Reuse)

Decade	Direct Reuse - Municipal and Manufacturing (ac-ft/yr)	Direct Reuse – Steam-Electric Travis County (ac-ft/yr)
2010	5,143	2,315
2020	13,620	3,315
2030	22,077	7,315
2040	30,268	8,315
2050	36,218	12,315
2060	40,468	13,315

Note: Anticipated capacity information provided by COA.

Through its current comprehensive Water Resources Planning Study, COA is in the process of evaluating its water reuse program and options. Future plan updates will reflect changes as additional Austin water reclamation program information becomes available.

Projected Reduction of Return Flows

The COA recognizes that the water demand projections contained in the Lower Colorado Regional Water Plan are only projections. Actual water demands may increase faster or slower than projected. The City will monitor the growth of its water demands and adjust its reclaimed water program, as well as its other water conservation programs, accordingly. As a result, the City has indicated that it may increase the use of reclaimed water at a faster rate than projected in this plan. The City believes that the increased use of reclaimed water will provide, in addition to the benefit of conserving sources of raw water, a monetary benefit to the COA through decreased raw water costs and delayed capital expenditures. As return flows discharged by Austin diminish in the future due to increasing reclamation of water, other sources may need to be dedicated or developed to meet needs that may currently be met by return flows discharged by Austin.

Any decrease in municipal return flows will likely be gradual. However, the City projects that it will increase its use of reclaimed water to the maximum extent feasible to meet demands above 325,000 ac-ft/yr, whether those demands occur before or after 2060.

Opinion of Probable Costs

In addition to water conservation, the use of reclaimed water has been identified as a significant source of water to meet the COA's projected demand deficits in 2060. The City has completed planning studies for a Reclaimed Water System to serve potential customers in the City. The system will provide a portion of the water supply required to meet the COA's identified needs. Planning efforts for additional water reclamation options are in progress, including a comprehensive Water Resources Planning Study.

Table 4.38 presents the probable cost for the central and south systems. As previously indicated, the direct reuse non-potable system for municipal purposes will need to have a capacity of approximately 40,500 ac-ft/yr. Direct reuse for steam-electric purposes in Travis County is projected to be approximately 13,300 ac-ft/yr. In September 2008 numbers, the probable cost for Austin to meet all of its planning horizon identified direct reuse needs through the use of reclaimed water (53,700 ac-ft/yr) is approximately \$429,195,000. This would result in a total annual cost (including operations and maintenance [O&M]) of approximately \$46 million per yr. The opinion of probable unit cost of reclaimed water is \$851 per ac-ft, or approximately \$2.61 per 1,000 gallons.

Table 4.38 COA Reclaimed Water (Direct Reuse for Municipal, Manufacturing, and Steam-Electric) Opinion of Probable Unit Costs

Phase	Cost Opinion
Capital Costs	
Plant Pump Station, Storage, and Misc. Improvements ¹	\$38,141,473
Transmission System ¹	\$217,175,767
System Pumping and Storage ¹	\$46,933,270
Total Capital Costs	\$302,250,510
Engineering, Contingencies and Legal Services (35%)	\$105,787,679
Land Acquisition and Survey (5%)	\$15,112,526
Environmental and Architectural Studies, Mitigation, and Permitting (2%)	\$6,045,010
Total Project Costs	\$429,195,724
Annual Costs	
Debt Service (6 percent for 20 years)	\$37,419,239
Operation and Maintenance ²	\$8,347,255
Total Annual Costs	\$45,766,494
Available Project Yield (ac-ft/yr)	53,783
Unit Cost of Water (\$/ac-ft)	\$851
Unit Cost of Water (\$/1000 gallons)	\$ 2.61

¹ Cost taken from draft U.S. FBR Feasibility Study of COA's Reclaimed Water System (July 2005). Values were increased proportionally to the amount of yield as compared to the amount in the study and converted to September 2008 using the ENR Construction Cost Index.

² O&M Cost taken from draft U.S. FBR Feasibility Study of COA's Reclaimed Water System (July 2005). O&M costs were adjusted to September 2008 dollars using the U.S. Department of Labor's Consumer Price Index

Capital costs for this strategy were updated to September 2008 dollars using the *Engineering News-Record* (ENR) Construction Cost Index (CCI). Land acquisition, environmental study, and O&M costs were adjusted to September 2008 dollars using the U.S. Department of Labor's Consumer Price Index.

Environmental and Other Impacts

The water quality impacts from direct reuse of reclaimed water is regulated by the TCEQ through 30 TAC Chapter 210. Reclaimed water projects authorized under these regulations are presumed to be protective of human health and the environment. The potential impacts generated through the construction of the proposed pipelines and pump stations will need to be addressed in the preliminary engineering studies to be conducted for these projects.

The use of reclaimed water presents an alternative for providing water for non-potable uses without the development of new water supplies for the City of Austin for the planning period. The costs and environmental impacts of expanding the City's current reuse system will have to be determined as more specific information, such as the locations of customers to be served, is identified. The extent of pipeline and other transmission facilities will have to be determined before specific environmental impacts can be estimated. However, the majority of the facilities needed will most likely be placed in existing easements and, therefore, minimize the impact upon natural resources.

Table 4.39 shows the expected return flows from the COA, less the expected amount of reuse. Over the planning period, return flow amounts are projected to increase. The environmental impact analysis for this strategy compared the impact of return flows less the amount of reuse to the impact of no return flows for 2010 and 2060 scenarios. As would be expected, the impacts to instream flows and freshwater inflows to Matagorda Bay showed mainly flow increases. Discussion of the general methodology of the impact analysis is in Section 4.17. Tabular results of the impact analysis are presented in Appendix 4G.

Impacts to Agriculture

Impact to agriculture is low based on the projected return flow amounts over the planning period.

Table 4.39 Projected COA Effluent Minus Reuse by Decade*

COA Return Flows	2010	2020	2030	2040	2050	2060
Projected COA Effluent minus reuse	98,638	99,792	105,750	116,775	124,632	132,660

*Based on data provided by COA.

As allowed by state law and as contemplated by the City of Austin and LCRA 2007 Settlement Agreement, the City intends to use reclaimed water to the maximum extent feasible to meet demands above 325,000 ac-ft/yr, whether those demands occur before or after 2060. As a result, although current projections do not indicate that the City will need to reuse all of its effluent during this planning cycle, this strategy could result in the City potentially reusing all of its effluent to meet growing demands and, ultimately, the City could have zero return flow to the Colorado River from its wastewater treatment plants (WWTP).

4.7 REGIONAL WATER MANAGEMENT STRATEGIES

There are several water management strategies that apply to multiple WUG categories. These strategies are discussed in the regional water management section of the report. For strategies specific to a category of water use, (Municipal, Irrigation, Livestock, Manufacturing, Mining, and Steam Electric Power) refer to later sections of the report.

For municipal WUGs with shortages water conservation was considered before these regional strategies, please refer to Section 4.8.1.

4.7.1 Expansion of Current Groundwater Supplies

This group of strategies includes WUGs with existing groundwater sources that will be seeking to expand the amount of groundwater they produce from that source or sources to meet their increasing needs.

4.7.1.1 Carrizo-Wilcox Aquifer

This alternative would involve pumping additional groundwater from the Carrizo-Wilcox aquifer, either using the WUG’s existing wells or drilling additional wells. This additional water, referred to as