CHAPTER 7: PROJECT FEASIBLITY EVALUATION

7.1 Introduction

This chapter presents a summary of the feasibility evaluation for the conceptual projects in each service area recommended for further study, based on the screening-level analysis discussed in Chapter 6. The feasibility evaluation includes an assessment of probable construction and operation and maintenance costs for each project and the system as a whole, an evaluation of potential benefits of the reclaimed water system, a review of potential financing strategies and funding opportunities, and development of a recommended initial rate structure for the City of Fort Worth reclaimed water system. In addition, this chapter includes a discussion of administrative, regulatory and public relations issues that may impact project feasibility.

7.2 Opinion of Probable Costs

The opinion of probable costs for each of the service area alternatives was presented in Chapter 6. A summary of costs for the recommended alternatives is provided in Table 7-1. Detailed cost breakdowns for each alternative are provided in Appendix E. .A memorandum defining the assumptions used to develop these costs is provided in Appendix F. The values shown in Table 7-1 reflect the estimated cost to construct and operate each project to serve the projected demands defined in Chapter 6. Credit for benefits is applied to these costs in Section 7.4. It should be noted that, for those systems that receive treated effluent from the VCWWTP, no operational cost for treatment of the wastewater was included. This cost was attributed to the wastewater system since this treatment would have to occur regardless of whether a reclaimed water system is developed. Based on initial discussions with the Trinity River Authority (TRA), it was assumed that treated effluent from DCRWS could be purchased from TRA at a cost of $0.25/1000 gallons. In addition, treatment costs for the Mary's Creek WRC were also attributed to the wastewater system since treatment at this facility would reduce the amount of water treated at VCWWTP. However, due to anticipated higher energy costs for MBR treatment, some additional operational costs were attributed to the reclaimed water system for the Mary's Creek WRC.

Table 7-1: Summary of Costs, Recommended Alternatives- Without Benefits and Without Cost of Western System WRC

Alt.	Service Area	Annual Avg. Demand	Peak System Demand	Capital Cost[1]	Debt Service[2]	O&M	Energy	Purchase Cost[3]	Overall Unit Cost[4]
		MGD	MGD	$MM	$/yr	$/yr	$/yr	$/1000G	$/1000G
E1	Eastern	2.77	14.69	$15.52	$1,298,000	$215,000	$95,000	$0.00	$0.82
N2	Northern	4.19	11.07	$17.09	$1,430,000	$188,000	$103,000	$0.25	$0.81
W1	Western	3.79	18.12	$39.95	$3,343,000	$455,000	$772,000	$0.00	$1.85
CS2	Central/ Southern	2.18	14.47	$40.75	$3,410,000	$412,000	$135,000	$0.00	$2.40
Total, All Projects		12.93	58.35	$113.30	$9,481,000	$1,270,000	$1,105,000	$0.08	$1.39

[1] Net Present Value of capital cost after accounting for interest during construction.
[2] Assumes a capital recovery period of 20 years and an annual interest rate of 5.5%
[3] Purchase cost applies to water purchased from TRA's DCRWS for the Northern System
[4] Assumes 50-year project life

7.3 Benefits of Reclaimed Water Projects

As new water resources become more costly and difficult to obtain, the benefits of using reclaimed water are becoming widely recognized by cities and utilities around the world. Although negative public perception of reclaimed water use can sometimes hinder or delay efforts to implement reclaimed water programs, these perceptions are often alleviated with public education and information programs that emphasize safety and the benefits of reclaimed water use to the community. The following sections describe some of these benefits in terms both general and specific to the City of Fort Worth and its current and future water supply requirements.

7.3.1 Reduction of Potable Water Demand

One leading driver for the implementation of reuse projects is the impact reuse has on potable water demand. Replacing potable water with reuse water for irrigation of crops, parks, golf courses, and other green spaces results in a savings of potable water for more critical uses. This is particularly relevant in states such as Texas, when summer usage can be significantly greater than that of winter consumption due to irrigation demands. Water reuse has also been identified as a Best Management Practice for water conservation by the Water Conservation Implementation Task Force established by the 78th Texas Legislature. Demonstrated efforts to implement these best management practices are critical to the development of other water supplies. Therefore, in addition to other water conservation efforts, development of a water reuse program will provide for efficient use of the City's water resources and will assist TRWD in securing necessary future water supplies to meet anticipated growth within the City of Fort Worth and surrounding areas. Figure 7-1 shows estimates of the per capita reduction in potable demand that could result from development of the reclaimed water program.

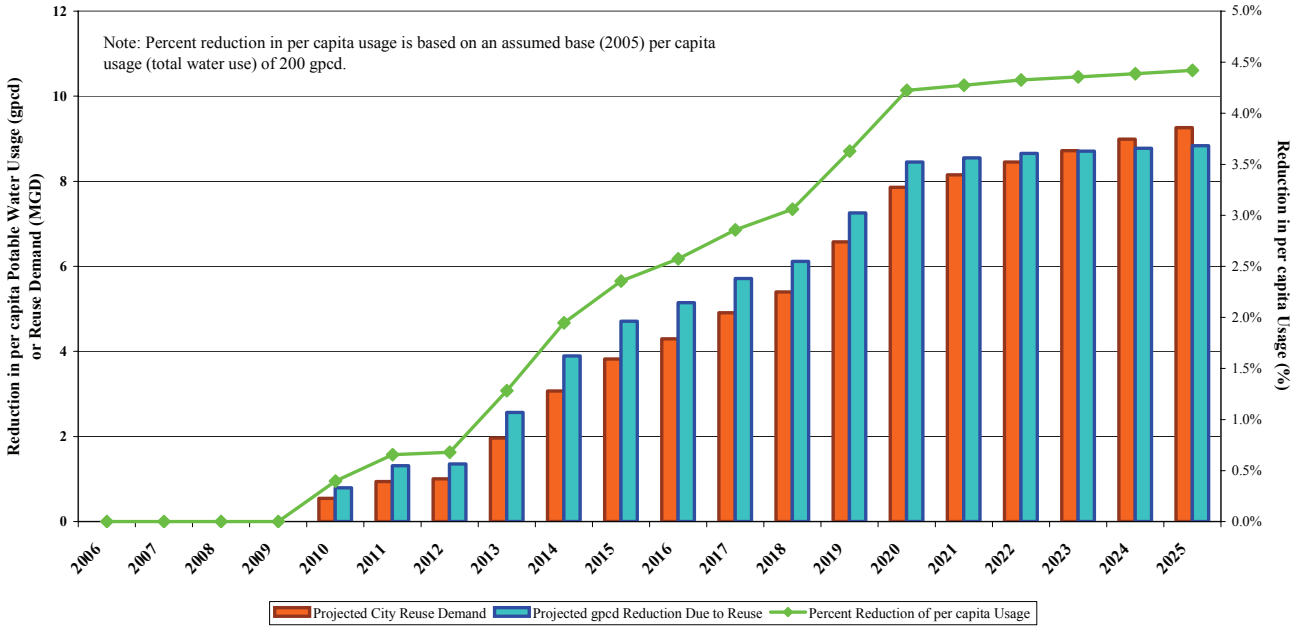


Figure 7-1: Projected Reduction in Per Capita Potable Water Usage Due to Reuse

By year 2025, the projected reclaimed water demand is anticipated to contribute to a reduction of about 8.8 gpcd in potable water usage, which is approximately 4.4% of the current assumed per capita usage of 200 gpcd.

7.3.2 Reclaimed Water as a Water Supply Source

It is often overlooked when introducing reuse programs to the public, that reuse water provides a new water supply source that should be compared on an equal basis to other potential surface and groundwater sources, including new reservoirs. As a water supply source, reclaimed water is particularly attractive because the supply is relatively consistent, even during periods of drought, and actually increases as population increases.

7.3.3 Reduction in Load to Receiving Streams

By diverting wastewater effluent prior to discharge and supplying nonpotable demands, nutrient and BOD loads to receiving streams are reduced. This reduction in loading can have permitting implications for dischargers, who may be able to defer future permit requirements that are more stringent. This impact is particularly important in light of the EPA's current effort to begin incorporating nutrient criteria into surface water quality standards. Although the TCEQ is still exploring different strategies for the development of nutrient criteria, it is likely that these criteria will be established within the next several years. For irrigation uses, elevated nutrient levels are typically desirable and can decrease the amount of required fertilization. Therefore, even with more stringent requirements for receiving streams, it is likely that nutrient reduction would not be necessary for reclaimed water primarily used for irrigation, potentially resulting in reduced treatment costs in the future.

7.3.4 Deferral of Water and Wastewater Treatment Plant Expansions

The reduction in potable water demand has implications for the potential improvements needed at Fort Worth water treatment plants. The North Holly Water Treatment Plant (WTP) has no space for further expansion and space at the South Holly WTP is limited. A 35 MGD expansion for the Eagle Mountain WTP is planned to meet the growing demands of the northern Tarrant County region, but the 2005 Water Master Plan predicts that several more expansion projects or new facilities will be needed in the next 10 years. Figure 7-2 demonstrates the difference that reuse water projects can make by comparing treatment plant capacities with and without reclaimed water use.

Figure 7-2 shows the potable water demand by pressure plane through the planning year 2025. The required treatment capacity of Fort Worth WTPs, as determined by the 2005 Water Master Plan (MP) is denoted by the red line; the capacity needed with reuse projects is shown in green. As can be seen, there is a marked difference between the capacity required with and without the reclaimed water system. By the year 2025, this difference is close to 70 MGD. Any deferral of WTP improvements also results in the deferral of costs that would otherwise be incurred by the City of Fort Worth. Additionally, improvements needed for storage and pumping facilities, piping and other water distribution system facilities benefit from a reduced potable demand, particularly when this demand is reduced during peak usage periods. The quantitative benefit to the City of deferring the WTP improvements identified above was determined to be approximately $9.7 million in 2006 dollars and is accounted for when computing the net cost of reclaimed water in Section 7.4. Details of this benefit deferral calculation are provided in Appendix G. Due to the difficulty of identifying specific

facility deferrals within the water distribution system, and their anticipated relatively low value, no quantitative evaluation of deferring these facilities was performed.

Wastewater plants can also benefit from water reuse projects if the latter involves the construction of a satellite water recycling plant. Typically, recycling plants intercept a portion of the wastewater flow but return the solids to the collection system. In this case, no solids handling facilities or conveyance is necessary on-site, thereby reducing the initial capital expenditure for the water recycling center. Downstream, the wastewater flow to the primary WWTP (e.g. Village Creek WWTP) is reduced and the expansion of treatment units can be deferred. No quantitative evaluation of these deferrals was performed. However, as discussed earlier, wastewater treatment costs were not attributed to the reclaimed water system.

7.3.5 Deferral of Collection System Improvements

If the reuse project involves a satellite recycling center that diverts a portion of flow out of the collection system, system expansion may not be immediately necessary. As discussed in Section 2.3, in the Wastewater Collection System Master Plan, one of the preferred alternatives was the construction of a satellite plant (the Fossil Creek WWTP) for precisely this reason. The plant proposed in the Master Plan would be large enough to eliminate the need to expand the collection system and the treatment units at the VCWWTP. The proposed Mary's Creek Water Recycling Center for the Western System alternative will provide a similar benefit, although significant deferral of collection system improvements will not be realized immediately due to relatively low initial flows. No quantitative evaluation of this benefit was performed.

7.3.6 Reduction in Raw Water Requirements and Deferral of Reservoir Construction

One of the primary benefits of direct, nonpotable reuse projects is the reduction of overall raw water supply that is necessary to meet future demands. TRWD currently pumps water from East Texas out of the Richland Chambers and Cedar Creek Reservoirs. However, as discussed above, reclaimed water provides a "new" water supply or source to meet the growing demands of Fort Worth customers. By meeting the needs of water users, reuse water defers the need for the acquisition of supplies elsewhere. While the Regional Water Plan referenced several options that may become necessary to augment raw water supply for TRWD, such as construction of the Marvin Nichols Reservoir or a pipeline from Toledo Bend Reservoir, reuse projects would reduce the volume of water that would need to be imported or acquired in the future. In addition, the operational costs of pumping raw water from East Texas or from other future water sources further away can be significant and are passed on to TRWD customers, including the City of Fort Worth. The deferral of future reservoir construction or other strategies will reduce costs for TRWD as a whole and also benefit the City indirectly. Consequently, reuse results in the deferral of both capital expenditures and operational costs for raw water conveyance.

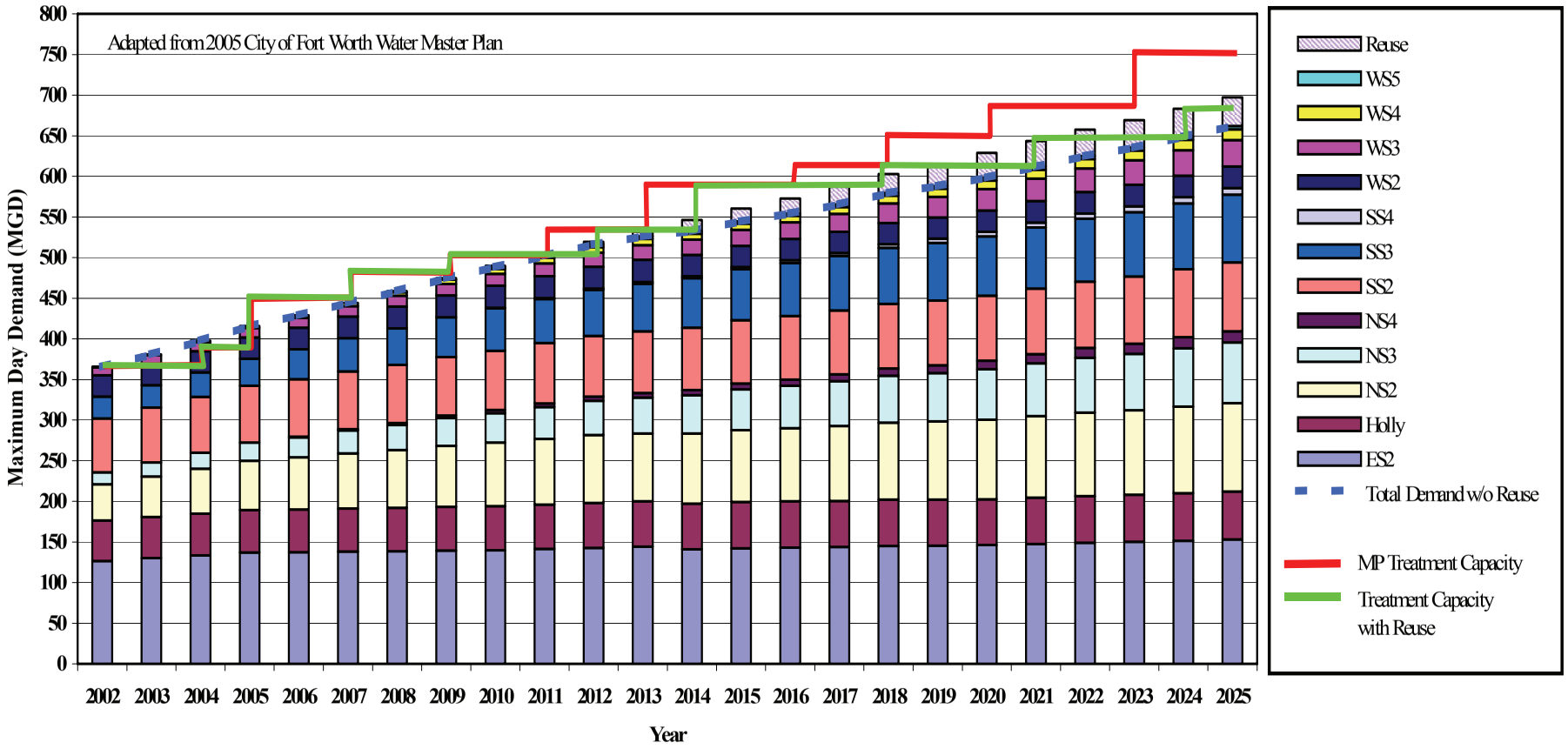


Figure 7-2: City of Fort Worth Projected Water Treatment Needs With and Without Reuse Projects

THIS PAGE INTENTIONALLY LEFT BLANK

A direct benefit to the City resulting from reduced raw water usage is the cost of the raw water. Currently the City pays TRWD $0.65/1000 gallons for raw water. Any raw water usage that is offset by reclaimed water usage by the City or its wholesale water customers can be attributed as a direct benefit of the reclaimed water system and is accounted for in computing the net cost of reclaimed water in the following section.

7.4 Net Cost of Reclaimed Water

As discussed in the previous section, a number of benefits can be attributed to the development of reclaimed water systems. Many of these benefits do not have a direct monetary value and are difficult to quantify in terms of a cost savings to the City. However, as referenced above, deferral of WTP facility expansions and avoidance of raw water costs were two benefits that were directly quantifiable and can be credited to the cost of the reclaimed water system. Table 7-2 provides a summary of the net opinion of probable cost with these benefits credited. With benefits, the system-wide cost of the reclaimed water is estimated to be approximately $0.73/1000 gallons based on full utilization of the projected demands.

Table 7-2: Summary of Costs, Recommended Alternatives, Including Benefits

Alt.	Service Area	Annual Avg. Demand	Peak System Demand	Identified Capital Benefits[1]	Capital Cost[2]
		MGD	MGD	$MM	$MM
E1	Eastern	2.77	14.69	$2.08	$13.44
N2	Northern	4.19	11.07	$3.14	$13.94
W1	Western	3.79	18.12	$2.84	$37.10
CS2	Central/ Southern	2.179	14.47	$1.63	$39.12
Total, All Projects		12.93	58.35	$9.70	$103.61

Alt.	Service Area	Debt Service[3]	O&M	Energy	Purchase Cost[4]	Operational Benefits[5]	Overall Unit Cost[6]
		$/yr	$/yr	$/yr	$/1000G	$/1000G	$/1000G
E1	Eastern	$1,125,000	$215,000	$95,000	N/A	$0.37	$0.39
N2	Northern	$1,167,000	$188,000	$103,000	$0.25	$0.65	$0.10
W1	Western	$3,105,000	$455,000	$772,000	N/A	$0.65	$1.13
CS2	Central/ Southern	$3,273,000	$412,000	$135,000	N/A	$0.65	$1.68
Total, All Projects		$8,670,000	$1,270,000	$1,105,000	$0.08	$0.59	$0.73

[1]Includes credit for deferral of WTP expansions (see Section 7.3.4)- benefit distributed based on annual average demand of each project.
[2] Net Present Value of capital cost after accounting for interest during construction.
[3]Assumes a capital recovery period of 20 years and an annual interest rate of 5.5%.
[4]Purchase cost applies to water purchased from TRA's DCRWS for the Northern System.
[5]Includes credit for purchase of raw water. On Eastern system, only water used by wholesale customers is credited.
[6]Assumes 50-year project life.

7.4.1 Potential Impact of Capital Contributions

A sensitivity analysis was performed to evaluate the impact that capital contributions (from developers or other entities) could have on the net cost of reclaimed water. The net cost of reclaimed water for each project and for all projects as a whole was computed assuming capital contributions ranging from 5% to 30% of the total capital cost of the projects. The impact on the overall unit water cost (50-year) and the pre-amortized unit cost (prior to retirement of the debt) was evaluated and is summarized in Figure 7-3.

7.5 Financing Strategies and Funding Opportunities

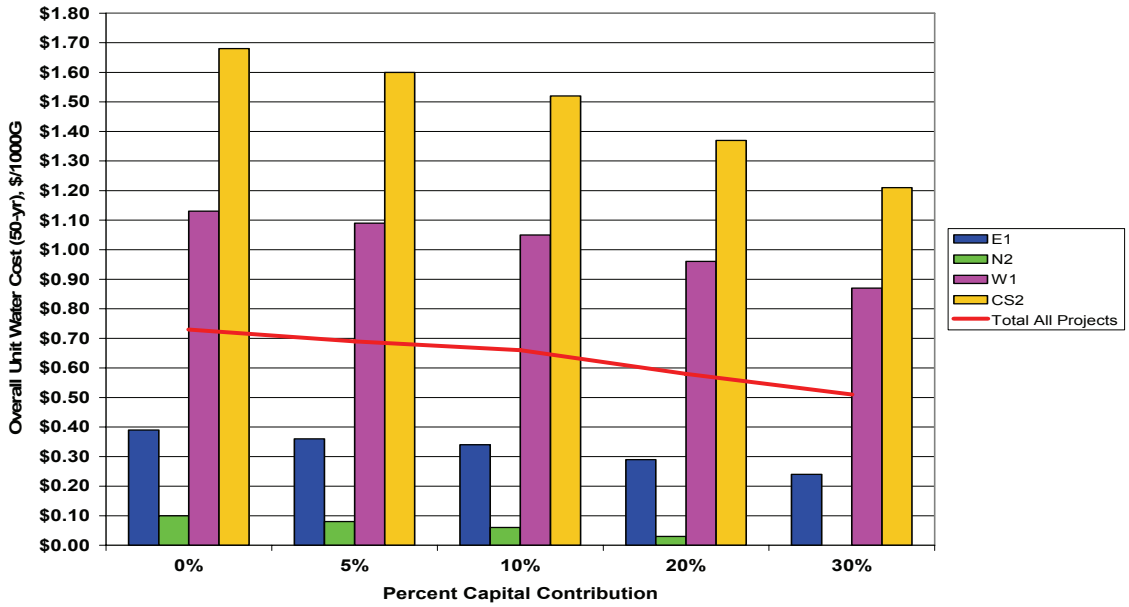
As a consequence of the increased appreciation of the benefits of reclaimed water, there are several funding opportunities being made available to cities and utilities who seek to implement reuse programs. A number of existing water reuse programs that have been implemented around the country were researched with particular attention paid to how the programs were financed. Generally, three methods of financing these sorts of projects, which are often employed in combination, emerged from this investigation: federal or state grants, federal or state loans, and rate/fee restructuring. A general discussion of financing strategies is presented below, followed by a summary of potential grant and loan programs that may be available to the City.

7.5.1 Capital Cost Financing

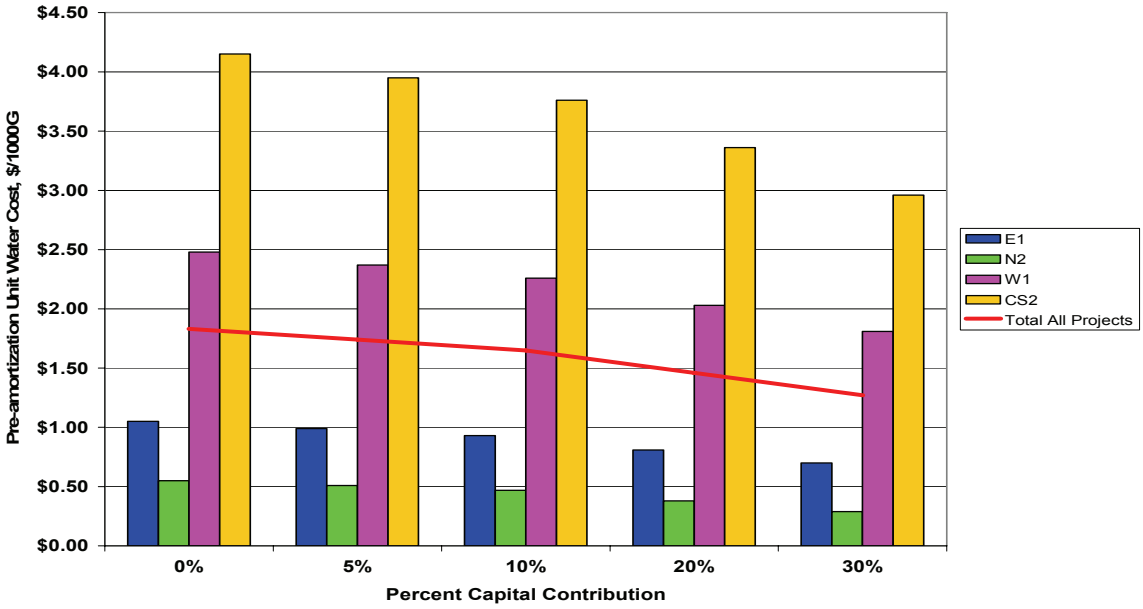
In most of the case studies evaluated, a combination of federal and state grants and loans funded the up-front capital expenditures. With these sorts of sources, eligibility requirements have to be met, and most of these programs explicitly state that funds cannot be employed for any O&M needs. Some loan programs, such as the Drinking Water State Revolving Fund, allow resources to be used for dual distribution pipeline installation, but not explicitly for satellite plants that may be treating reuse water. Agreements between developers, industries, and cities may be struck whereby part of the initial cost of construction is absorbed by impact fees or other asset contributions; this is chiefly possible when the industry or developer is the primary beneficiary of the reuse water. In one instance, the developer fully funded the capital costs, including distribution lines, to facilitate the construction of one of its planned golf course communities. Water and wastewater revenue bonds can also serve to spread the capital costs over a considerable amount of time. The following sections examine some of the more common federal and state programs used to finance capital costs and research of reuse projects.

7.5.1.1 Federal Funding Programs

The US Department of Agriculture (USDA) has loan and grant programs for rural development projects, under which reuse programs may obtain funding. The Water and Waste Loan and Grant Program offers assistance for the development of water and wastewater infrastructure. Interest rates on these loans are determined by the population income of the service area, and grants are employed to bring user rates low enough for the population in question. This particular source of funding, however, is not appropriate for Fort Worth's reuse projects, as the financial assistance is specifically reserved for rural and unincorporated areas. Other federal agencies, such as Housing and Urban Development, have worked in conjunction with the USDA to provide assistance for water reuse projects but those types of grants are not specifically set aside for reuse and are therefore more difficult to obtain.



(a) Overall Unit Cost



(b) Pre-amortized Unit Cost

Figure 7-3: Impact of Capital Contributions on Unit Cost of Reclaimed Water

The Bureau of Reclamation may also provide funding through Title XVI water reuse grants, which finance project construction in the 17 western states after congressional review and approval. The award to construct reclaimed water treatment facilities etc. is often preceded by funding for appropriate studies and research regarding the best reuse program for the area. These monies are given to economically and environmentally sound projects that are not eligible for other types of federal funding.

7.5.1.2 State Funding Programs

Texas has developed several programs to facilitate the implementation of reuse projects, many of which are sponsored by the Texas Water Development Board (TWDB). There are Agricultural Water Conservation Grants and Loans, which promote spending on various water conservation initiatives; interest rates on the Agricultural Loans are competitive, lower than those obtainable through commercial markets, and related to the TWDB's cost of funds. The Water Research Grant Program provides grants to the pragmatic investigation of topics published by the TWDB; these examinations seek to solve existing problems rather than explore new arenas of science. There are also financing opportunities for smaller, rural utilities through the Rural Water Assistance Fund, which offers loans at competitive interest rates for the support of water-related projects and construction of water-related infrastructure.

Another program available through the TWDB is the State Participation Program, which enables the TWDB to assumed a temporary ownership interest in regional projects when the local sponsors are unable to assume debt for the optimally sized facility. While this program has typically been used for water system construction, the TWDB has indicated that it can also be applied to reuse projects if excess capacity is provided in the reuse facilities to meet anticipated future demands. The goal of this program is to allow for the "right sizing" of projects in consideration of future growth. For new water supply projects, the TWDB will fund up to 80% of the costs and for other projects up to 50% of the costs. Only excess capacity can be funded through this program. A sample breakdown of annual payments with and without a state participation loan is provided in Appendix H for a fictitious $10 million project.

Aside from TWDB's initiatives, the EPA guides the management of another state-managed source of financing, the State Revolving Fund (SRF). Under this program, low-interest loans, 80% of which are federally funded, are offered to entities for use in upgrading existing facilities, installing water-efficient devices, and supporting tax incentives for water conservation programs. Under the broader umbrella of the SRF are the Clean Water SRF and the Drinking Water SRF; the former focuses more on improvements for wastewater or reuse projects, while the latter funds are intended for water improvements that address health and compliance issues for existing water utilities. SRF funds can also be used for development of water conservation plans or the development of water conservation regulations.

7.5.2 Debt Repayment and Operations and Maintenance Financing

Debt recovery and operations and maintenance costs can be recovered through monthly water or sewer rates and/or through direct charges for the reclaimed water. Many utilities have struggled with how to set volume rates for reclaimed water. Often, in order to insure that the water is marketable, the reclaimed water rate is set as a percentage of the potable water rate. In other instances,

elimination of effluent discharges to receiving streams was the goal of the program and reclaimed water was provided to customers at a very minimal cost. However, as experience with reclaimed water rate systems develops, it is becoming recognized that the best method of allocating costs is through a cost-of-service evaluation that is consistent and defensible. Often sharing costs among the wastewater, water and reclaimed water users is justified and can minimize the burden on any one group of users.

7.5.3 Preliminary Reclaimed Water Rates for the City of Fort Worth

Several meetings were held with City staff to discuss approaches to establishing a rate for users of reclaimed water. During these meetings, the following guidelines were established:

- The reclaimed water rate should be low enough to be marketable and to attract new customers to the system;
- The reclaimed water rate should not be lower than the going cost of raw water (currently $0.65/1000 gallons) and should not be higher than the going rate for potable water (currently $2.37 - $4.01 per 1000 gallons depending on class and tier);
- The reclaimed water rate should be based on a cost-of-service evaluation of the entire reclaimed water system as a whole;
- City of Fort Worth retail and wholesale water customers (hereafter referred to as "in-system" customers) should pay a lower rate for reclaimed water than other "out-of-system" customers.
- Sales contracts with reclaimed water users should be formulated in a way that allows for modification of the rates annually, based on updates to the cost-of-service evaluation.

In order to determine the basis and range of rates being used in Texas and nationally, a review of reclaimed water rates was carried out and is summarized in Table 7-3. As can be seen, there is a wide range of rates nationally as well as a variety of methods for establishing a given rate. In Texas, reclaimed water rates for those cities that have relatively large established reclaimed water programs range between $0.86 - $1.20 per thousand gallons.

A water reuse rate study completed by the American Water Works Association in 2000 determined that, on average, reuse rates around the country were 69% of potable rates. These charges do not necessarily reflect the practice of purposely setting reuse rates relative to potable rates, however. In many instances, cost of production, capital expenditures, etc. that were a consequence of reclaimed water programs were taken into consideration. El Paso does set its rates as a percentage of potable water, but the utility also varies the percentage based on the level of reclaimed water treatment, so as to commensurately recover the cost (see "Comments" in Table 7-3).

Table 7-3: Summary of Reclaimed Water Rates for Selected Utilities

Utility	$/1000 gal unless otherwise noted	Comments
Austin Water Utility	$0.95	Higher than 1st tier potable water; lower than all other tiers
San Antonio Water System	$0.86 - $1.00	Rate is higher during summer; also function of Edwards Aquifer "Exchange"; monthly fee based on meter size.
City of El Paso	$0.93 or $1.20	Lower rate applies to secondary treatment; higher rate to tertiary treatment; based on 60%/80% of potable rates
City of Odessa	$0.59-$1.00	Metered; lower rates apply to earlier users
Tuscon Water	$1.87	Also includes monthly service charge based on meter size
Cary, NC	$3.28	
Hillsborough County, FL	$0.25 - $0.55	Rates apply to single-family residential meters greater than 1-inch
City of DeLand, FL	$0.30 or $0.60	Based on block usage and meter size
Orlando Utlities Commission	$0.69 or $0.81	Lower rate applies to "bulk" rate (meters 2 in. and greater); higher rate applies to residential meters (< 2 in.)
Toho Water Authority	$0.44 or $0.72	Lower rate for up to 9,000 gallons; higher rate for 10,000 gallons and above
Denver Water	$0.44 - $0.83	Tiered rates
Burbank Water and Power	$1.80	
Irvine Ranch, CA	$0.87 - $8.45	Tiered rates
City of San Diego, CA	$1.07	57% of potable rate
San Jose, CA	$0.65 - $1.63	Based on type of usage- see attached table
South Coast Water District (CA)	$2.61	80% of potable rate
Raleigh, NC	Free	Customers must be able to bulk pick up minimum of 250 gallons.
Brevard County, FL	$9.62/month	Independent of volume used

Based on the guidelines presented above, and the review of water rates presented in Table 7-3, the City staff recommended a preliminary initial reclaimed water rate of $0.75/1000 gallons for in-system customers. Based on a similar structure for water rates, staff also recommended that out-of-system rates be increased by 25% to a rate of 1.25 x $0.75 = $0.94/1000 gallons. This rate has not yet been approved by the City and, as discussed above, would be subject to modification based on future cost-of-service evaluations.

7.5.4 Projected Payback Periods for Reclaimed Water Projects

As a part of the feasibility evaluation, projected payback periods for each of the reclaimed water projects were evaluated, based on the project phasing defined in Chapter 6. The payback period was defined as the time elapsed between the initial capital investment in the project and the break-even point, i.e. when the total cumulative revenue from the project is equal to the total cumulative expenditures (including debt service and operation and maintenance costs). It should be noted that the estimated payback period is very sensitive to financing assumptions, such as interest rate and inflation. For this evaluation, the following assumptions were made:

- Capital Recovery Period = 20 years for City financing and 34 years for state participation financing
- Project Life = 50 years
- Annual interest rate = 5.5%

- Annual inflation rate = 4.0%
- Investment return rate = 5.0%
- Initial (2006) commodity charge for raw water = $0.65 per 1000 gallons
- Initial (2006) commodity charges for reclaimed water = $0.75 per 1000 gallons (in-system) and $0.94 per 1000 gallons (out-of-system)

In addition, it was assumed that the commodity charges for both raw water and reclaimed water increased at the annual inflation rate. For simplicity, all operation and maintenance costs (including energy) were also inflated at this rate.

Two financing options were evaluated. The first used a loan with equal annual debt service payments, based on the assumptions outlined above. The second assumed that the City would obtain state participation funding for 50% of each project from the TWDB (see Section 7.5.1.2). These two options were developed to illustrate the differences between each of these financing approaches. Note that the actual percentage of each project that could be financed through state participation depends on availability of funds and on how the TWDB defines existing and future capacity for reclaimed water projects. In addition, it should be emphasized that these examples are provided for comparative purposes only and are based on conceptual level costs and the simplified assumptions defined above. Actual financing conditions may vary significantly from those presented here.

Figure 7-4 summarizes the payback period for each service area, based on the evaluation of the two financing options. The payback period is defined as the number of years from the beginning of the project required to accumulate benefits and revenue to offset cumulative project costs. Following the payback period, the project has paid off accumulated debt and generates sufficient benefits and revenue to offset annual debt service payments and operations and maintenance costs. As mentioned above, this evaluation is very sensitive to the financial assumptions defined above. For example, if the commodity charges for reclaimed water and raw water increase at a slower rate than the rate of inflation, the payback period can increase significantly and may not ever be reached. Conversely, if the rates increase more rapidly than inflation, the payback period is reduced. For example, if the commodity charges increase at a rate of 5%, the payback period for all projects as a whole is reduced by approximately 5 years.

Figure 7-4 indicates that the projects for the Northern System Service Area and Eastern System Service Area have relatively short payback periods as compared to the projects in the Western and Central/Southern Service Areas. A graphical representation of the costs, benefits and payback period for all the projects as a whole, is provided in Figure 7-5. Figure 7-5 shows that, although the payback point does not vary greatly between the two financing options, the accumulated debt is significantly less with state participation (as indicated by the red line). Similar graphs for each individual alternative are provided in Appendix I.

As can be seen from Figure 7-5, the primary benefit of the state participation financing is to defer debt service payments early in the project when the customer base is not yet developed. This reduces the amount of cumulative debt incurred, but does not have a significant impact on the overall cost of the projects.

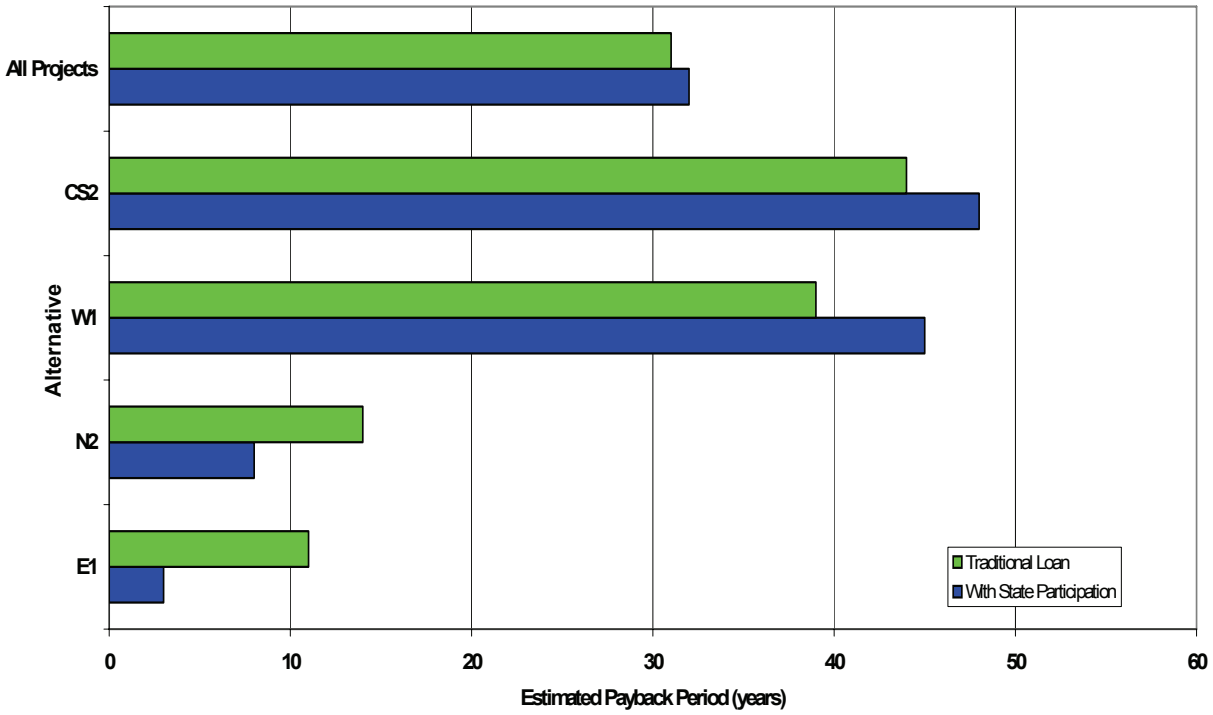


Figure 7-4: Summary of Payback Period for Reclaimed Water Projects

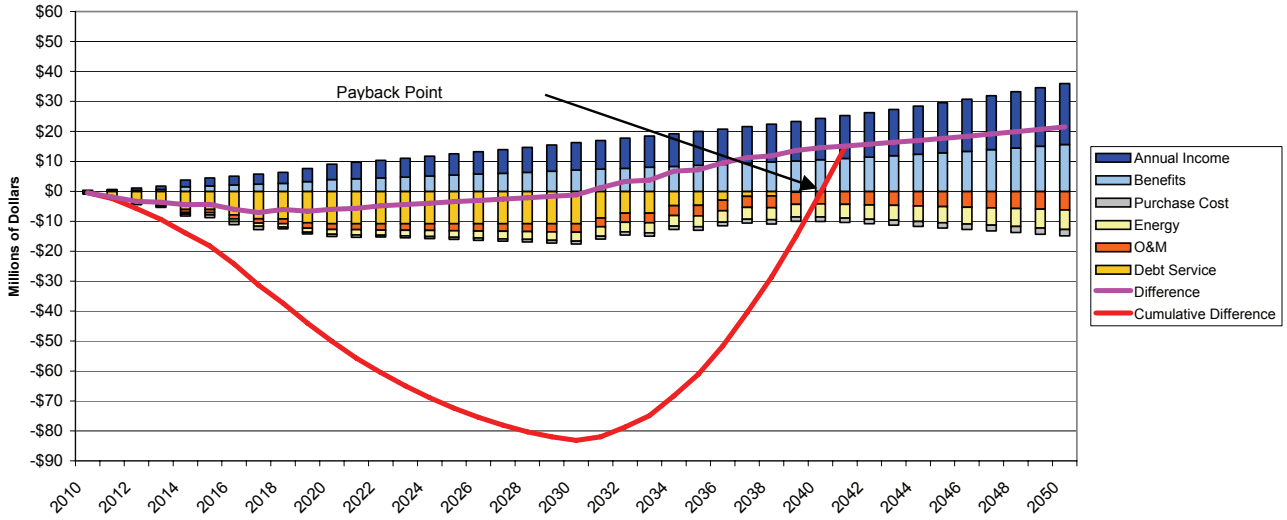
7.6 Feasibility Evaluation Summary

As presented in this chapter, reclaimed water projects provide a number of benefits, many of which are difficult to quantify in terms of a direct financial benefit. Based on the financial evaluation of the individual projects and the reclaimed water system as a whole (including all 4 recommended projects), the following conclusions can be made:

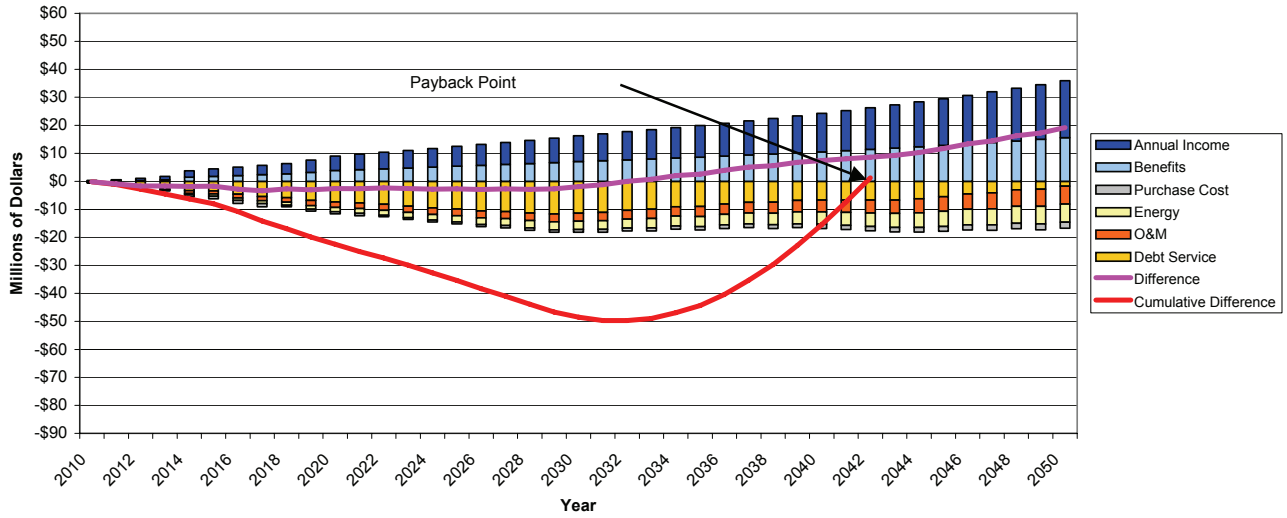
- The Northern and Eastern System projects are the most cost-effective and provide the greatest near-term benefits. These projects will serve customers that have expressed a serious interest in receiving reclaimed water as soon as facilities can be constructed.

- The Central/Southern and Western System projects require more initial cost support than the Northern and Eastern System projects.

- The Central/Southern System project is the most expensive on a unit cost basis. However, there is some potential to supply additional demands in this service area, for example within the proposed Central City Project, and to additional smaller irrigation customers along the route. The proposed facilities provide some additional capacity, particularly if users can be encouraged to provide on-site storage.



(a) Traditional Loan



(b) State Participation Financing

Figure 7-5: Traditional vs. State Participation Financing, System-wide

When evaluated as a system, the reclaimed water projects provide significant benefit to the City in terms of reduction in per capita potable water usage, achieving water conservation goals, and deferral of water and wastewater system facility expansions. Implementation of the reclaimed water system will demonstrate the City's commitment to efficient use of its water resources. This commitment is critical to the success of acquiring new water supply sources necessary to support future growth within the City of Fort Worth and in other communities within TRWD's service area.

Based on this evaluation, it is recommended that the City proceed with implementation of the reclaimed water system, including all four projects. The City should continue to explore alternative financing approaches, including federal or state grant or loan programs, and participation from customers and/or developers. It should be noted that the cost analysis performed here was based on the projected demands presented in Chapter 6. Experience with other established reclaimed water systems suggests that once facilities are in place, demand for reclaimed water often exceeds projected values. Although the "if we build it, they will come" strategy does not come without risk, most reclaimed water systems must, to some extent, rely on uncommitted future demands to justify initial implementation.