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9. Water Infrastructure Financing Recommendations

9.1 Introduction

In Senate Bill 2 of the 77th Texas Legislature, the preparation of an Infrastructure Financing Report (IFR) was added to the regional planning process. The purpose of the IFR is to identify the funding needed to implement the water management strategies recommended in the 2006 Regional Water Plan. The primary objectives of this chapter/report are:

- Determine the number of Political Subdivisions with identified needs that will be unable to finance their water infrastructure needs;
- Determine the amount of infrastructure costs in the 2006 Regional Water Plan that cannot be financed by the local Political Subdivisions;
- Determine funding options, such as State funding, that are proposed by the Political Subdivisions to finance water infrastructure costs that cannot be financed locally; and
- Determine additional roles the Regional Water Planning Group proposes for the State in financing the recommended water supply projects.

A survey of Water User Groups (WUGs) with identified infrastructure needs was conducted, and the results of those surveys are summarized in Section 9.3 of this chapter.

The Region H Water Planning Group reviewed the current role of the State in financing water supply projects and made recommendations for program increases and new initiatives in Chapter 8 of this plan.

9.2 Capital Costs for the 2006 Region H Water Plan

The estimated cost of the 2006 Region H Water Plan is \$5.5 billion over the 50-year planning period. This cost includes the development of new water sources, estimates for distribution and treatment facilities, and the capital improvements required to achieve agricultural conservation targets. Water management strategies (WMS), such as new water source projects and major conveyance systems, are estimated at \$1.14 billion (see Table 9-1). Local treatment and transmission systems for Water User Groups (WUG), including additional well and storage capacity, are estimated at \$2.1 billion (see Table 9-2). Additionally, costs are included for internal distribution system expansions for the North Harris County Regional Water Authority (\$800 million), the West Harris County Regional Water Authority (\$793 million) and the City of Houston (\$623 million). These three entities supply treated water to member/customer WUGs, and are adding surface water infrastructure to meet their respective Groundwater Reduction Plans (GRPs), as required by local subsidence districts.

As can be seen in Table 9-1, several recommended water management strategies (WMS) reallocate existing water supplies and require no capital infrastructure beyond WUG system expansions. These costs are reflected in the WUG cost estimates in Appendix 4C, and summarized in Table 9-2. Also, several strategies require the Luce Bayou Transfer water management strategy to move existing supplies from the Trinity River Basin to Harris and Montgomery Counties.

Table 9-1: Recommended Water Supply and Transmission Strategies

Water Management Strategy	Starting Decade	Yield (ac-ft/yr)	Capital Cost (2002 \$)
Municipal Conservation	2000	100,987	\$ 16,154,000
Industrial Conservation	2000	TBD	TBD
Irrigation Conservation	2010	77,900	\$ 573,000
Expanded Use of Groundwater	2010	91,497	at WUG level
Expand/Increase Current Contracts	2010	68,300	at WUG level
New Contracts from Existing Supply	2010	215,400	see Luce Bayou
Non-Municipal Contractual Transfers	2010	21,000	at WUG level
Redesignation of Existing Water Rights	2010	N/A	N/A
BRA System Operations Permit	2010	120,000	\$ 4,500,000
Lake Houston Additional Yield	2010	13,500	\$ 0
Freeport Seawater Desalination	2020	33,600	\$ 255,699,000
Luce Bayou IBT Conveyance	2020	N/A	\$ 239,000,000
Wastewater Reuse for Industry	2020	67,200	\$ 234,158,000
Allens Creek Reservoir	2030	99,700	\$ 170,040,000
Brazos Saltwater Barrier	2030	N/A	\$ 30,300,000
TRA to Houston Contract	2030	150,000	see Luce Bayou
TRA to SJRA Contract	2030	50,000	see Luce Bayou
Houston to GCWA Transfer	2050	28,000	\$ 102,382,000
Houston Indirect Wastewater Reuse	2050	98,000	TBD
Little River Off-Channel Reservoir	2050	32,100	\$ 96,512,000
NHCRWA Indirect Wastewater Reuse	2060	31,400	TBD
New San Jacinto River Water Rights	2010	0	\$ 0
New Harris County Bayous Water Rights	2010	0	\$ 9,013,000
Total			\$ 1,137,677,000

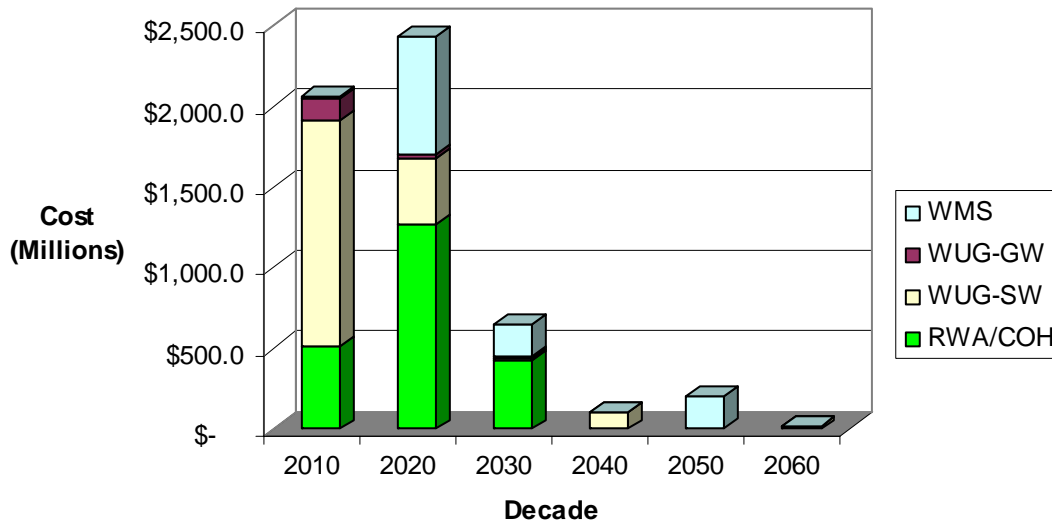
The distribution of costs over the planning period is shown in Figure 9-1. WUG-level costs for surface water treatment and distribution infrastructure are shown as fully occurring in the first decade in which facilities are required. This accounts for the lack of WUG-level infrastructure costs corresponding with the WMS costs in the later decades. Many of these costs will actually be phased in over time, particularly those for water treatment plants. A significant portion of the overall infrastructure will be built before 2030 due to groundwater reduction regulations, as discussed below. The Regional Water Authorities / City of Houston cost projection reflects meeting the surface water conversion milestones in Harris County as a result of Harris-Galveston Subsidence District regulations.

Table 9-2: Total Supply and Transmission Cost

		Cost		
		GW	SW	Total
Water Supply	WUG	\$174,697,700	\$1,942,120,200	\$2,116,817,900
	WWP (WMS)			\$1,137,677,000
	Total Supply Infrastructure Cost for Recommended Strategies			\$3,254,494,900
Water Transmission	City of Houston ¹			\$623,100,000
	NHCRWA ²			\$800,000,000
	WHCRWA ³			\$792,605,000
	Total Transmission Infrastructure Cost			\$2,215,705,000
Total Supply and Transmission Infrastructure Cost				\$5,470,199,900

- 1 City of Houston water transmission infrastructure costs, period 2007 - 2030, are based on *City of Houston Water Production Optimization Study*, CDM, October 2002.
- 2 NHCRWA water transmission infrastructure costs are based on information obtained from the NHCRWA Consultant Team
- 3 WHCRWA water transmission infrastructure costs are based on information obtained from the WHCRWA Consultant Team

Figure 9-1: Costs by Decade and Category



WUG infrastructure costs occur early in the planning period due to the availability and predominant use of groundwater. The ability to easily drill groundwater wells throughout the region has allowed development to occur at significant distances from surface water sources. As projected water demands surpass the sustainable yield of the Gulf Coast Aquifer, communities now face the need to construct long pipelines and treatment facilities.

Regulatory Plans enacted by the Harris-Galveston Subsidence District and the Fort Bend Subsidence District limit groundwater use to a percentage of total demand within those counties. Surface water conversion milestones are mandated in 2020 and 2030 for Harris County, and in 2013 and 2025 in Fort Bend County. Montgomery County is not under a GRP, but is projected to begin utilizing surface water as well by 2010.

Water conservation is a major component of the Region H Water Plan, accounting for 179,100 acre-feet per year of reduced demand. Irrigation conservation is recommended in six counties, with potential reductions ranging from 10 to 28 percent of demand. These savings are to be achieved through the lining of irrigation canals, and the laser-leveling of rice fields. Both of these methods require capital infrastructure, totaling \$573,000 over the six counties.

Municipal conservation does not require capital infrastructure, but incurs a cost per acre-foot to achieve the target savings. Depending upon the size of the WUG, conservation is estimated as reducing demand by 5.5 to 7 percent, at a cost of \$154 to \$161 per acre-foot (or \$0.47 to \$0.49 per thousand gallons). This cost per acre-foot of savings is used in the strategy tables in Chapter 4. However, the cost of conservation measures would be paid as an incremental addition to the rate for water actually sold and consumed. As an incremental increase to the existing unit water rates, conservation costs range from \$8.96 to \$12.12 per acre foot (or \$0.028 to \$0.037 per thousand gallons).

9.3 Summary of Survey Responses

Surveys were sent to 176 districts and municipalities and 3 wholesale water providers with projected water shortages and anticipated capital costs in the 2006 Region H Water Plan. Of these, 36 surveys were completed and returned. Water User Groups that did not correspond to a single Political Subdivision, such as unincorporated areas and non-municipal WUGs, were sent to the county judge. Per the TWDB format, only those strategies that required capital infrastructure were included on the surveys. The responses received are tabulated in Appendix A, and the completed questionnaires are at Appendix B.

9.3.1 Municipal Water User Groups

Survey responses were received from 29 districts and municipalities. Although each response was unique, several trends were apparent.

First, the majority of municipal utility districts responding indicated that they were built-out or nearly built-out, and they did not intend to extend service into adjacent areas. This is to be expected in this portion of the state, where groundwater from the Gulf Coast Aquifer has been readily available. Developers of single subdivisions up to master-planned communities have formed utility districts to provide water and sewer service within these new communities. Adjacent development typically forms an adjacent utility district. Future districts will absorb most of the projected population growth in the Municipal County-Other WUGs. As discussed in Chapter 2, a survey was conducted in 2002 to allow the Region H WUGs to review and comment on the population projections, and revisions were made based upon the responses received. It is apparent that not all districts responded to that earlier survey. For the sake of this survey, a shift from growth within existing districts to the formation of new districts reduces the potential for state loan requests. New districts serving

new development generally issue bonds to finance their initial infrastructure, while existing districts may rely on State Grants or Revolving Fund Loans for system expansions.

Second, many districts in areas with limited or regulated groundwater use indicated they would participate in a collective GRP. Under these plans, some participants would over-convert to surface water while others remained on groundwater. All participants would pay a set water-use fee to fund the requisite surface water infrastructure. Collectively, the group would remain within the limited or regulated groundwater capacity of the Gulf Coast Aquifer. By only converting certain areas to surface water, collective GRPs are less costly than plans for conversion of all WUGs. The distribution of costs through water-use fees reduces the need for infrastructure grants from the state. The GRPs cited in the responses included the North Harris County Regional Water Authority, the West Harris County Regional Water Authority and the City of Houston (which includes some adjacent districts). Within Fort Bend County, several responding districts are within the new North Fort Bend Regional Water Authority, and the Cities of Richmond and Rosenberg cited an on-going study which may result in an additional regional system.

Finally, the regional water authorities and the majority of municipalities expect to finance their capital infrastructure through bonds. The Drinking Water State Revolving Fund was the state program most often identified for potential use. Riverside WSC noted that they would like to utilize Texas Department of Housing and Community Affairs grants, but the program lacks funds to meet all of the identified needs. The Brazos River Authority identified State Participation for use in major projects (specifically Allens Creek Reservoir, Little River Off-Channel Reservoir and Freeport Desalination).

9.3.2 Non-Municipal Water User Groups

Non-municipal WUG demands are aggregated at the County and Basin level. Surveys for these WUGs were sent to County judges, because no single entity represents these collective WUGs. The surveys addressed the capital costs for water supply, but not for distribution because specific destinations were not identified. The County responses were non-committal, pointing out that county government is not responsible for providing water supply. It is expected that within the non-municipal water use categories, local infrastructure will be funded using a combination of the methods outlined below, which come from a review of existing funding programs and information contained in previous water plans.

Manufacturing: Projected water shortages for manufacturing occur due to projected growth exceeding available local supply (usually groundwater) and in some counties, regulatory limits reducing the availability of groundwater. It is anticipated that those companies with projected shortages will coordinate directly with the surface water providers identified for any infrastructure needed to bring water to their sites. The funding of this construction may occur in a number of ways. The typical method is for the water provider to construct the distribution system supplying its customers, and pass through the cost in the water rate. State assistance may be requested through the State Loan Program for some projects, particularly the Freeport Seawater Desalination Plant. A second funding option is for the manufacturer to directly construct the required infrastructure to connect to a provider's supply. This would be a site-specific decision. In areas not currently served by a surface water provider, a private developer may choose to establish a distribution utility, or a public-private partnership may be formed between the water supplier and end user to develop a new system.

Steam Electric Power: Steam Electric Power is projected to increase in direct proportion to population and manufacturing growth, and with it the associated water demand. Shortages in water supply for power are projected to be met through expanded use of groundwater and/or increased use of surface water from current wholesale providers. It is expected that the power plant owners, as a part of any facility upgrades they may make, will include the required water supply intakes and pipelines or contract directly with existing major water providers to obtain the needed additional water.

Mining: Mining is projected to experience water shortages in twelve counties, although the needs in six of those can be met through expanded use of groundwater. Any well costs would be borne by the private mining company. In the remaining six counties, a new or increased contract for surface water from current wholesale providers is recommended. It is anticipated that those companies with projected shortages will coordinate directly with the surface water providers identified for any infrastructure needed to bring water to their sites. The cost of this infrastructure is expected to be paid by the private mining entities.

Irrigation: Anticipated infrastructure costs for irrigation are related to the irrigation conservation management strategy, which includes such measures as canal lining, upgrading to more efficient irrigation systems and laser-leveling fields. Individual irrigators would predominantly fund these measures, with assistance from the State through the Agricultural Water Conservation Loan Program. This program requires the funds to be requested through a soil and water conservation district, underground water conservation district or an authorized supplier of water for irrigation, which would then manage the projects locally. Since small irrigators may be unable to assume full financial liability for these improvements, subsidies or grants from the State and/or the water providers may be needed to ensure these improvements are made. In Waller County, irrigation conservation is used to off-set increased municipal use of groundwater. Therefore, a local government agency must be identified to ensure conservation occurs in that county.