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Chapter 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 2011 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 2011 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 will be conducted, and the results of those surveys summarized in *Section 9.3* of this chapter. Completion of the survey and tabulation of the results will follow the completion of the Initially Prepared Plan (IPP). Additional text will be included in *Chapter 9* to discuss each proposed WIF project detailing its location in the regional water plan, the sources and water user groups associated with the project.

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. Updates to this section will be completed after the 2011 water infrastructure financing survey is completed.

9.2 Capital Costs for the 2011 Region H Water Plan

The estimated cost of the 2011 Region H Water Plan is approximately \$12.3 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 GRPs, are estimated at \$2.3 billion (see *Tables 9-1 and 9-2*). Large-scale treatment and transmission system expansions for the Chambers-Liberty County Navigational District, North Harris County Regional Water Authority (NHCRWA), the West Harris County Regional Water Authority (WHCRWA), the North Fort Bend Water Authority (NFBWA), the San Jacinto River Authority (SJRA) and the City of Houston are estimated at \$5.8 billion (see *Table 9-2*).

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 are summarized in *Table 9-1*. 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. Note that the project volume listed in *Table 9-1* is not necessarily indicative of new yield; for example, the transmission line projects do not create new yield but rather convey volumes generated by other projects.

Table 9-1
Recommended Water Supply and Transmission Strategies

#	WMS	Starting Decade	Project Volume (ac-ft/yr)	WWP Capital Cost (2008 \$)
Recommended Water Management Strategies:				
1	INDUSTRIAL CONSERVATION	2010	TBD	TBD
2	IRRIGATION CONSERVATION	2010	77,900	At WUG Level
3	MUNICIPAL CONSERVATION	2010	105,500	At WUG Level
4	EXPAND/INCREASE CURRENT CONTRACTS	2010	142,600	At WUG Level
5	NEW CONTRACTS FROM EXISTING SUPPLIES	2010	83,600	At WUG Level
6	REALLOCATION OF EXISTING SUPPLIES	2010	N/A	At WUG Level
7	TRA TO SJRA CONTRACT	2040	76,500	\$302,781,597
8	TRA TO HOUSTON CONTRACT	2030	123,500	See Luce Bayou
9	WUG-LEVEL CONTRACTS	2010	N/A	At WUG Level
10	WWP CONTRACTS	2010	N/A	Contract Rate
11	EXPANDED USE OF GROUNDWATER	2010	91,400	At WUG Level
12	INTERIM STRATEGIES	2010	45,500	At WUG Level
13	NEW GROUNDWATER WELLS FOR LIVESTOCK	2020	41	At WUG Level
14	CHCRWA GRP	2010	2,400	See CHCRWA Trans.
15	COH GRP	2010	TBD	See COH Treatment
16	CITY OF MISSOURI CITY GRP	2010	21,700	\$92,071,000 + WUG-Level cost
17	FORT BEND MUD 25 GRP	2013	600	At WUG Level
18	FORT BEND WCID 2 GRP	2013	5,800	\$24,828,857
19	NFBWA GRP	2013	106,400	See NFBWA Trans. + WUG-Level cost
20	NHCRWA GRP	2010	117,800	See NHCRWA Trans. + WUG-Level cost
21	PECAN GROVE GRP	2013	1,700	At WUG Level
22	RICHMOND/ROSENBERG GRP	2013	N/A	\$117,220,200
23	SJRA WRAP	2013	129,100	\$900,000,000 + WUG-Level cost
24	SUGAR LAND GRP	2013	9,800	\$161,360,000 + WUG-Level cost
25	WHCRWA GRP	2010	78,800	See WHCRWA Trans + WUG-Level cost
26	CHCRWA TRANSMISSION LINE / DISTRIBUTION	2010	4,800	TBD
27	CLCND WEST CHAMBERS SYSTEM	2013	2,800	\$20,380,000
28	COH DISTRIBUTION EXPANSION	2010	TBD	\$118,060,000
29	COH TREATMENT EXPANSION	2010	Varies by decade	\$2,045,672,161
30	HARRIS COUNTY MUD 50 WTP	2013	630	At WUG Level
31	HUNTSVILLE WTP	2010	11,200	\$61,023,906
32	LUCE BAYOU TRANSFER	2020	450,000	\$253,916,914

#	WMS	Starting Decade	Project Volume (ac-ft/yr)	WWP Capital Cost (2008 \$)
33	NFBWA INTERNAL DISTRIBUTION	2013	106,400	\$225,000,000
34	NFBWA SHARED TRANSMISSION LINE	2013	71,900	\$213,000,000
35	NHCRWA INTERNAL DISTRIBUTION	2010	117,800	\$535,881,416
36	NHCRWA TRANSMISSION LINE	2010	117,800	\$253,249,136
37	PEARLAND SWTP	2010	13,400	At WUG Level
38	WHCRWA INTERNAL DISTRIBUTION	2010	78,800	\$552,472,000
39	WHCRWA TRANSMISSION LINE	2010	78,800	\$290,084,193
40	ALLENS CREEK RESERVOIR	2020	99,650	\$222,752,400
41	GCWA OFF-CHANNEL RESERVOIR	2030	39,500	\$197,448,012
42	MILLICAN RESERVOIR	2040	194,500	\$1,159,907,000
43	FULSHEAR REUSE	2020	430	At WUG Level
44	HOUSTON INDIRECT REUSE	2040	128,800	At WUG Level
45	MONTGOMERY MUD 8/9 INDIRECT REUSE	2016	1,100	At WUG Level
46	NHCRWA INDIRECT REUSE	2040	16,300	At WUG Level
47	WASTEWATER REUSE FOR INDUSTRY	2060	67,200	\$332,051,761
48	WASTEWATER RECLAMATION FOR MUN. IRRIGATION	2030	36,400	At WUG Level
49	BRA SYSTEM OPERATIONS PERMIT	2020	25,400	TBD
50	HOUSTON BAYOUS PERMIT	2020	0	\$20,956,000
51	BRAZORIA CO. INTERRUPTIBLE SUPPLIES FOR IRR.	2010	124,000	At WUG Level
52	BRAZOS SALTWATER BARRIER	2030	N/A	\$44,470,739

Alternative Water Management Strategies				
1	SABINE TO REGION H TRANSFER	2030	N/A	\$760,813,320
2	FREPORT DESALINATION	2040	N/A	\$255,699,000
3	LITTLE RIVER OFF-CHANNEL	2040	N/A	\$137,356,000
4	MONTGOMERY COUNTY MUD 8/9 DESAL	N/A	N/A	TBD

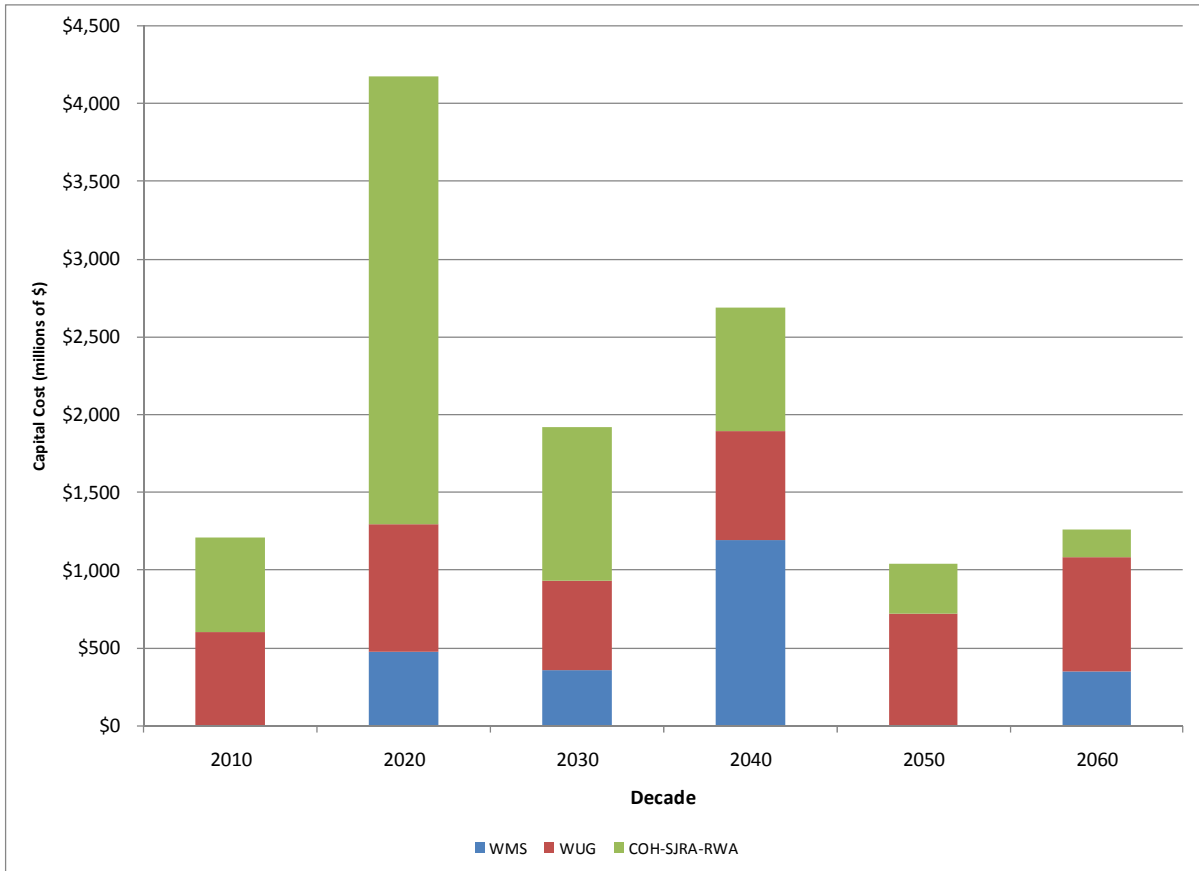
The distribution of capital costs over the planning period is shown in *Figure 9-1*. WUG-level capital costs are represented as starting in the years indicated. If necessitated by increasing strategy volumes, WUG capital costs are also shown in subsequent decades, reflecting phased infrastructure expansion to handle additional project capacity. A significant portion of the overall infrastructure will be built before 2030 due to groundwater reduction regulations, as discussed below. The City of Houston, SJRA and Regional Water Authorities cost projection reflects meeting the surface water conversion milestones in Harris, Fort Bend and Montgomery Counties as a result of local subsidence district regulations.

Table 9-2
Total Supply and Transmission Cost

Water Supply	WUG (Conservation) ¹	\$ 757,400
	WUG (Surface Water)	\$ 2,835,559,500
	WUG (Groundwater)	\$ 471,234,600
	WUG (Reuse)	\$ 850,233,300
	WWP (WMS)	\$ 2,373,066,100
	Total For Water Management Strategies	\$ 6,530,850,900
Transmission / Treatment Infrastructure	City of Houston ²	\$ 2,417,649,100
	City of Huntsville	\$ 61,023,900
	NHCRWA ³	\$ 789,131,000
	CLCND	\$ 20,380,000
	WHCRWA ⁴	\$ 842,556,000
	NFBWA ⁵	\$ 438,000,000
	SJRA ⁶	\$ 1,202,781,600
	Total Transmission Infrastructure Cost	\$ 5,771,521,600
Total Supply and Transmission Infrastructure Cost		\$ 12,302,372,600

- 1 Very little conservation cost is capital for infrastructure, with many costs occurring at the annual or per acre-foot level.
- 2 City of Houston water treatment / transmission infrastructure costs, period 2007 - 2030, are based on information obtained from the City of Houston. Also includes the cost of the Luce Bayou conveyance
- 3 NHCRWA water transmission infrastructure costs are based on information obtained from the NHCRWA Consultant Team
- 4 WHCRWA water transmission infrastructure costs are based on information obtained from the WHCRWA Consultant Team
- 5 NFBWA water transmission infrastructure costs are based on "North Fort Bend Water Authority, Groundwater Reduction Plan", Brown and Gay & TCB/AECOM, March 2008.
- 6 SJRA water transmission infrastructure costs for the SJRA WRAP are based on "Montgomery County Alternative Water Supply Program", Brown and Gay, February 2009. Value also includes costs estimated by Region H Consultant for TRA to SJRA transfer conveyance.

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 face the need to construct long pipelines and treatment facilities. Regulations 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. Groundwater pumpage in Montgomery County is regulated by the Lonestar Groundwater District to 64,000 acre-feet per year, the sustainable yield of the Gulf Coast Aquifer within Montgomery County. The first surface water conversion milestones in Montgomery County are mandated in 2015.

Water conservation is a major component of the Region H Water Plan, accounting for up to 183,000 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, multiple irrigation inlets, and the laser-leveling of rice fields. Both of these methods require capital infrastructure, with lining of irrigation canals totaling \$757,000 and on-farm methods totaling \$7,744,000 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 6.3 percent, at a cost of \$202 to \$311 per acre-foot. 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.

9.3 Summary of Survey Responses

The following sections will describe the results of the Water Infrastructure Financing Survey performed as part of the 2011 Plan. For the 2011 Plan update, the Texas Water Development Board (TWDB) has developed a web based survey tool and methodology. The Region H Water Planning Group will be responsible for notifying districts and municipalities and regional water providers, conducting the survey, and reporting the findings as an update to this section of the Regional Water Plan. The current schedule for completion of this task is after the submission of the Initially Prepared Plan (IPP).

9.3.1 Municipal Water User Groups

Summary will be provided once the 2011 Water Infrastructure Survey is completed.

9.3.2 Non-Municipal Water User Groups

Summary will be provided once the 2011 Water Infrastructure Survey is completed.

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