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## ***FAR WEST TEXAS WATER PLANNING GROUP***

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November 17, 2010

Ms. Carolyn Brittin  
Deputy Executive Administrator  
Water Resources Planning & Information  
Texas Water Development Board  
P.O. Box 13231, Capitol Station  
Austin, Texas 78711-3231

Dear Ms. Brittin,

Please accept this letter of transmittal with the accompanying two Errata Sheet Addendum attachments to the Final Adopted Region E plan: (1) Far West Texas Water Plan Errata Sheet; (2) Far West Texas Water Plan, Attachment B: Level 1 Comments – Initially Prepared Regional Water Plan Vs. Online Planning Database Review. The two Errata Sheet Addendums are to be officially considered part of the Adopted 2011 Region E Regional Water Plan with a few additional revisions possibly needed to the Errata Sheets after submittal. The Political Subdivision, the Rio Grande Council of Governments, has written the letter on behalf of and with the signature of the Far West Texas Water Planning Group (Region E) Chair.

Sincerely,

Tom Beard

msa

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## Far West Texas Water Plan ERRATA SHEET

*(The following revisions are incorporated in this printed copy of the 2011 Plan)*

### Executive Summary

Unnumbered Table on page ES-6

Replace the projected volumes for Jeff Davis and Presidio Counties as follows:

Jeff Davis*	591	587	584	581	578	574
Presidio*	20,304	19,906	19,515	19,132	18,757	18,390

Add the following footnote:

*\*Jeff Davis and Presidio County Underground Water Conservation Districts project higher demands (see Table 2-3).*

In the Executive Summary, page ES-9, last sentence of last paragraph is replaced with the following text:

*Currently EPWU is operating three reuse projects that provide 6,000 acre-feet per year. If Strategy E-1 (see Chapter 4 page 4-15) is implemented, the supply from reuse will increase to 12,000 acre-feet per year by 2040.*

The total estimated cost on page ES-14 is revised to **\$842,299,633**.

### Chapter 1

The following paragraph is added following the first paragraph of Section 1.6.5:

*The Priority Groundwater Management Area (PGMA) process is initiated by the TCEQ, who designates a PGMA when an area is experiencing critical groundwater problems, or is expected to do so within 25 years. These problems include shortages of surface water or groundwater, land subsidence resulting from groundwater withdrawal, or contamination of groundwater supplies. Once an area is designated a PGMA, landowners have two years to create a Groundwater Conservation District (GCD). Otherwise, the TCEQ is required to create a GCD or to recommend that the area be added to an existing district. The TWDB works with the TCEQ to produce a legislative report every two years on the status of PGMAs in the state. The PGMA process is completely independent of the current Groundwater Management Area (GMA) process and each process has different goals. The goal of the PGMA process is to establish GCDs in these designated areas so that there will be a regulating entity to address the identified groundwater issues. PGMAs are still relevant as long as there remain portions within these designated areas without GCDs. At this time the El Paso County PGMA does not have a GCD established. A statewide map of the declared PGMA areas is available at:*

*[http://www.tceq.state.tx.us/assets/public/permitting/watersupply/groundwater/maps/pgma\\_areas.pdf](http://www.tceq.state.tx.us/assets/public/permitting/watersupply/groundwater/maps/pgma_areas.pdf).*

**Chapter 2**

Unnumbered Table in Section 2.4.4

Replace the projected volumes for Jeff Davis and Presidio Counties as follows:

Jeff Davis*	591	587	584	581	578	574
Presidio*	20,304	19,906	19,515	19,132	18,757	18,390

Replace the two footnotes with the following one footnote:

*\*Jeff Davis and Presidio County Underground Water Conservation Districts project higher demands (see Table 2-3).*

In Section 2.4.5, the following text is added as a second paragraph.

*A TWDB-funded study by the University of Texas Bureau of Economic Geology projects a higher steam electric power generation water demand that is distributed within all the counties in the Region. After consideration of the study results, the Planning Group agreed that the water demand presented in the 2006 Far West Texas Water Plan that assigns the demand to only El Paso County is more accurate.*

**Chapter 3**

Table 3-1. Water Supply Source Availability

Availability for Direct Reuse / El Paso County is revised to 6,000 for all decades.  
 Availability for Other Aquifer (Balmorhea Alluvium) / Jeff Davis County is revised to 500 for all decades.

Table 3-3. Water Supplies Available to Each Wholesale Water Provider:

The entire table is replaced with the following new table that lists the entities that receive water from the wholesaler and the source of the supplies.

**Table 3-3. Water Supplies Available to Each Wholesale Water Provider**

Wholesale Water Provider	Receiving Entity	Supply Source****	Capacity by Source	Total Capacity by WUG	Total Capacity by WWP
El Paso County Water Improvement District #1	EPCWID#1 Member Irrigators	Other Aquifer (RG Alluv.)	80,000	136,154	184,328
		Rio Grande	18,457		
		Indirect Reuse/Return Flows	37,697		
	El Paso Water Utilities*	Rio Grande	48,174	48,174	
El Paso Water Utilities*	City of El Paso	EPWU blended sources	127,567	127,567	153,375
	Fort Bliss** (also self supplied)	EPWU blended sources	435	435	
	Vinton	EPWU blended sources	400	400	
	Lower Valley Water District	EPWU blended sources	6,280	6,280	
	County Other	EPWU blended sources	6,278	6,278	
	Manufacturing	EPWU blended sources	9,181	9,181	

	Mining*** (also self supplied)	EPWU blended sources	103	103	
	Steam Electric	EPWU blended sources	3,131	3,131	
Lower Valley Water District	Clint	EPWU blended sources	276	276	6,280
	San Elizario	EPWU blended sources	1,924	1,924	
	Socorro	EPWU blended sources	2,959	2,959	
	Lower Valley Water District (Other Retail Customers)	EPWU blended sources	1,121	1,121	

\* In addition to supplies received from EPCWID#1, EPWU develops additional supplies (105,201 acre-feet/year) from wells in the Hueco and Mesilla Bolson Aquifers and direct reuse of treated wastewater. These combined supplies are supplemented with new supplies over time, as described in Integrated Water Management Strategies E-1 through E-7 (Table 4-2), to provide sufficient water to meet the needs of all entities supplied by EPWU.

\*\* Fort Bliss develops additional supplies (4,445 acre-feet/year) from wells in the Hueco Bolson Aquifer. This self supply in combination with supplies received from EPWU (Strategy E-9) is sufficient to meet their 50-year supply needs as documented in Tables 2-2 and 4-1.

\*\*\* Mining companies grouped together under the Mining category also develop additional supplies (66 acre-feet/year) from private wells in the Rio Grande Alluvium Aquifer. This self supply in combination with supplies received from EPWU is sufficient to meet their 50-year supply needs as documented in Tables 2-2 and 4-1.

\*\*\*\* EPWU blended sources include existing groundwater, surface water, and reuse supplies developed by EPWU plus new supply strategies as described in Chapter 4 Section 4.4 starting on page 414.

The following footnotes are added at the bottom of the unnumbered table at the end of Section 3.4.13:

\* Average reported export between 2004 and 2008.

Note: See Region F Water Plan for future water use projections for the Reeves County water user entities.

In Section 3.5, last sentence is replaced with the following text:

*Currently EPWU is operating three reuse projects that provide 6,000 acre-feet per year. If Strategy E-1 (see Chapter 4 page 4-15) is implemented, the supply from reuse will increase to 12,000 acre-feet per year by 2040.*

**Chapter 4**

Table 4-2. Summary of Recommended Water Management Strategies:

- In Strategy E-4 the total capital cost is revised to **\$16,875,000**.
- In Strategy E-8 the strategy supply volumes for the decades 2020 through 2060 are revised to **1607, 3304, 4764, 6245, and 7726**.
- In Strategy E-10 the WUG name is changed to **Lower Valley Water District** only, deleting (El Paso County Other). Also change strategy name to "Purchase water from **EPWU**".
- 2010 supply volumes for Strategies E-18 through E-22 are deleted.
- The following full report name and the location of this study in the Plan are included in the first footnote on Table 4-2:  
*"Evaluation of Irrigation Efficiency Strategies for Far West Texas: Feasibility, Water Savings and Cost Considerations" as discussed in Chapter 1 Section 1.2.2 and Appendix 1A of this Plan.*

Table 4-3. Summary of Recommended Water Management Strategy Costs:

- In Strategy E-2 the annual cost in decade 2010 is deleted.
- In Strategy E-4 the total capital cost is revised to **\$16,875,000**.
- In Strategy E-5 a unit cost of **\$1,671** is added for the 2020 decade.
- In Strategy E-8 the cost per acre-foot/year for decades 2020 through 2060 are revised to **\$1114, \$914, \$763, \$712, and \$564**.
- In Strategy E-10 the WUG name is changed to **Lower Valley Water District** only, deleting (El Paso County Other). Also change strategy name to "Purchase water from **EPWU**".
- Cost per Acre-Foot/Year for Strategy E-19 for decades 2020 through 2060 are changed from \$339 to **\$8**.
- Cost per Acre-Foot/Year for Strategy E-21 for decades 2020 through 2060 are changed from \$74 to **\$77**.
- Revisions are made to the Total Annual Cost and Cost per Acre Foot/Year for the following strategies:

Strategy	Total Annual Cost						Cost per Acre-Foot/Year					
	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060
E-10		\$272,855	\$703,566	\$1,305,656	\$2,273,332	\$3,749,970		\$451	\$606	\$814	\$1,094	\$1,470
E-11		\$421,234	\$1,087,164	\$2,019,534	\$3,516,116	\$5,802,090		\$451	\$606	\$814	\$1,094	\$1,470
E-12		\$228,657	\$616,908	\$1,141,228	\$2,008,584	\$3,338,370		\$451	\$606	\$814	\$1,094	\$1,470
E-9	\$941,904	\$3,372,000	\$4,534,992	\$6,091,646	\$8,184,636	\$11,002,888	\$279	\$375	\$504	\$677	\$909	\$1,222
E-14		\$154,294	\$385,264	\$731,162	\$1,269,048	\$2,092,959		\$721	\$968	\$1,301	\$1,748	\$2,349
E-15		\$2,245,194	\$5,445,000	\$9,873,289	\$16,752,832	\$27,896,724		\$721	\$968	\$1,301	\$1,748	\$2,349
E-16		\$586,173	\$1,462,648	\$2,843,986	\$4,824,480	\$8,630,226		\$721	\$968	\$1,301	\$1,748	\$2,349
E-17		\$2,744,126	\$4,820,640	\$8,339,410	\$14,251,444	\$24,145,371		\$721	\$968	\$1,301	\$1,748	\$2,349

Table 4-4. Summary of Recommended Water Management Strategy Environmental Assessments:

In Strategy E-10 the WUG name is changed to **Lower Valley Water District** only, deleting (El Paso County Other). Also change strategy name to "Purchase water from **EPWU**".

In Section 4.4.4, the text included in the paragraph with the heading Recharge of Groundwater with Treated Surface Water (Strategy E-3) is replaced with the following text:

*Water treatment plant capacity and the timing of demand for water currently limit the use of surface water by El Paso Water Utilities. Early in the irrigation season, the*

water available from the Rio Grande exceeds the demand that can be supplied by surface water. Later in the irrigation season, the demand can exceed the treatment plant capacity. In order to make use of the available surface water early in the irrigation season, EPWU is planning to develop recharge basins to allow treated surface water to percolate downward to the underlying Hueco Bolson Aquifer where it will move laterally through the aquifer and eventually be retrieved through municipal production wells. This would make up to 5,000 acre-feet of additional water available per year.

The Hueco Bolson Aquifer is the primary source of water for the City of El Paso, Fort Bliss, Ciudad Juarez and private industries in the area. Since 1903 groundwater levels have declined by as much as 150 feet in some areas of the aquifer, thus developing a cone of depression around a major pumping center serving the City of El Paso. This area is located over an ancient watercourse of the Rio Grande and is well suited for both short- and long-term groundwater storage due to the high porosity and permeability of the de-saturated vertical portion of the aquifer formation. The substantial depression in the water table surface thus affords ample underground storage space and reasonably high assurances of long-term recovery of stored water. The recharge basin area described in this strategy is in the northern portion of the cone of depression and water percolating downward through the basins will naturally gravity drain in the subsurface toward the existing production wells located approximately two miles away.

Previous projects and studies have shown the practicality of aquifer recharge in this area. The Hueco Bolson Aquifer has been successfully recharged with tertiary treated wastewater from the Fred Hervey Water Reclamation Plant that is treated to drinking water quality standards. Injection rates of up to about 10,000 acre-feet per year through deep injection wells and spreading basins have occurred since the mid-1980s. The average horizontal hydraulic conductivity estimated from 85 EPWU production well pumping tests is 10 meter/day (32.8 feet/day or 2.3 miles/year)<sup>1</sup>. While an AWWARF funded study (*Comparison of Alternative Methods for Recharge of a Deep Aquifer*) lists a vertical wetting front velocity of 13.8 feet/day<sup>2</sup>. Aquifer recharge using both treated wastewater effluent and available surface water provide an opportunity to mitigate aquifer overdraft and potentially restore groundwater supplies for continued use.

<sup>1</sup> Heywood, C.E. and Yager, R.M., 2003, *Simulated ground-water flow in the Hueco Bolson, an alluvial-based aquifer system near El Paso, Texas*: U.S. Geological Survey Water-resources Investigation Report 02-4108, 73p.

<sup>2</sup> Hahn, W.F., Thompson, H., Forbes, J. and Ankeny, M., 2003, *Comparison of alternative methods for recharge of a deep aquifer*: AWWA Research Foundation Report 90962F, jointly sponsored by AWWARF, El Paso Water Utilities, and U.S. Dept. of the Interior, Bureau of Reclamation.

In Section 4.4.4, last paragraph titled "Additional Conjunctive Use (Strategy E-5)", the following language is added to the end of the paragraph.

*The 16,400 acre-feet per year could be provided to EPWU through EPCWID#1 from the pool of water supply developed from the irrigation conservation strategies E-18 and E-19. The remaining water supply developed through these strategies (10,340 acre-feet/per year) would be made available to irrigator members of the EPCWID#1.*

In Section 4.4.10, first sentence in the Reuse paragraph, the estimated capital cost is revised to **\$25,257,000**.

Table 4-8. Capital Cost of the Reuse Strategy:

O&M costs for the years 2017 and 2027 are revised to **\$463,300 and \$926,300**.  
 Total Annual Costs for the years 2017, 2027 and 2037 are revised to **\$1,075,300 - \$2,150,300 - \$3,225,000**.

Table 4-9. Capital Cost of the Preferred Integrated Strategy:

The title of the capital investment items in decades 2040, 2050 and 2060 are as follows:

2040	<b>Import from Diablo Farms</b>
2050	<b>Import from Dell Valley</b>
2060	<b>Additional import from Dell Valley</b>

In Section 4.5, the first entity serviced by the Lower Valley Water District is changed from "El Paso County Other" to "**Lower Valley Water District (Other Retail Customers)**".

In Section 4.7, the following sentence is added at the end of the Cost paragraph:

*The City anticipates applying for a grant to fund this project.*

In Section 4.8, the underlined headings are revised to list related strategy identifiers as follows:

- *Irrigation Scheduling (Strategies E-18 and E 21)*
- *Tailwater Recovery and Reuse Systems (Strategies E-20 and E-22)*
- *Improvements to Water District Delivery Systems (Strategy E-19)*

In Section 4.8.1, the first sentence of the third paragraph is revised as follows:

*The **unit** cost for a pipeline is estimated at ~~\$170 \$4 to \$339 \$8~~ per acre foot ---*

In Section 4.8.1, the following sentence is added to the end of the third paragraph:

*The District anticipates using existing revenues to fund this project and therefore no debt service is assumed.*

Table 4-11. Water Savings and Cost Estimates for EPCWID#1:

The Pipeline for District Canals strategy annual cost under both drought and full allotment is revised from \$8,487,434 to **\$202,261**. The unit costs are revised from \$339 to \$170 to **\$8.09 and \$4.05**.

In Section 4.8.2, a portion of the text in the first paragraph is revised as follows:

*Irrigation Scheduling and Tailwater Reuse are found to have potential for future water savings when water is available in the river. However, under drought-of-record conditions when there is no river water available these strategies are not*

***feasible (Table 4-12). The potential water savings for the district under both drought and full supply conditions is shown in Table 4-12.***

Table 4-12. Water Savings and Cost Estimates for HCCRD#1:  
 The annual cost under drought conditions for both Scheduling and Tailwater Reuse strategies is changed from \$38,400 and \$220,800 to **NA and NA**.

In Section 4.8.3, revise the cost range in the third sentence of the first paragraph from \$18 and \$83 to **\$10 and \$86**.

Table 4-13. Water Savings and Cost Estimates for HCUWCD#1:  
 Table revised as follows:

BMP Strategy		Water Savings (af)		Annual Cost (\$)		Unit Cost (\$/af)	
		Drought	Full	Drought	Full	Drought	Full
Scheduling	Pivot/Sprinkler	2,357	7,453	202,920	202,920	86	27
	Surface Irrigation	1,178	3,726	67,650	37,650	57	10
	Total	3,535	11,179	270,570	240,570	77	22
Tailwater Reuse	Surface Irrigation	589	1,863	194,063	194,063	329	104

**Chapter 8**

The second sentence of recommendation #9 on page 8-5 is deleted and replaced with the following sentence:

*Although this did not occur during the current planning period, future planning schedules could be impacted.*

In Section 8.3, second full paragraph following the bulleted sections, the reference to Trans Texas Water Trust is revised to Trans **Pecos** Water Trust.

**Chapter 10**

Additional responses to TWDB IPP review comments as they relate to the Plan's coordination with the TWDB DB12 planning database is provided in the form of the following attached spreadsheet (IPP Comment Letter Attachment B):

APPENDIX 10C. Response to TWDB Comments:

Response to comment #16 – **(ENR Cost Index)** is added to the end of the response sentence that ends with "September 2008 US dollars".

Response to comment #17 should indicate that discussion is provided in Section **4.4.8** instead of 4.4.7.

**FAR WEST TEXAS WATER PLAN**  
**ATTACHMENT B: LEVEL 1 COMMENTS - INITIALLY PREPARED REGIONAL WATER PLAN VS. ONLINE PLANNING DATABASE REVIEW**

*Color-shaded cells indicate the location of the correct values at the time of the IPP review and that now appear in the final Far West Texas Water Plan.*

FAR WEST TEXAS - REGION E	IPP document reference:		Non-matching numbers														Remarks	
	Page number	Table number	IPP document number							Online Planning Database (DB12) number								
Item			non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060		
Total projected year-2010 water consumptive use	ES-3	in text		648,126							629,952							
2010 irrigation water use	ES-3	in text		499,092							487,042							
2010 mining water use	ES-3	in text		2,397							2,273							
Projected Municipal and County Other demands - total 2060	ES-5								213,939							214,139		
Projected Irrigation Water Use Culberson County	ES-6			46,759	45,758	44,779	43,821	42,883	41,965		28,960	28,340	27,733	27,140	26,559	25,991		
Projected Irrigation Water Use Jeff Davis County	ES-6			3,119	3,057	2,995	2,935	2,875	2,816		576	572	569	566	563	559	Correct volumes in Table 2-2 of Final Plan.	
Projected Irrigation Water Use Presidio County	ES-6			25,156	24,646	24,145	23,655	23,175	22,705		20,068	19,670	19,279	18,896	18,521	18,154	Correct volumes in Table 2-2 of Final Plan.	
El Paso Direct reuse program	ES-11	in text		7,387	10,531	13,676	16,820	19,964	23,109		0	2,000	4,000	6,000	6,000	6,000	EPWU existing reuse program currently provides 6,000 ac-ft/yr in all decades.	
Total estimated capital cost to develop all recommended wms	ES-14	in text	688,858,000							691,258,000							\$842,299,633	
Other Aquifers Jeff Davis County	3-4	3-1		274	274	274	274	274	274		500	500	500	500	500	500		
El Paso WID #1 WWP supply	3-9	3-3		173,751	173,751	173,751	173,751	173,751	173,751		49,100	49,100	49,100	49,100	49,100	49,100	184,328 from revised Table 3-3.	
El Paso WU WWP supply	3-9	3-3		131,000	131,000	131,000	131,000	131,000	131,000		147,163	147,164	147,165	147,166	147,167	147,168	153,375 from revised Table 3-3.	
Horizon MUD WWP supply	3-9	3-3		3,920	3,920	3,920	3,920	3,920	3,920		na	na	na	na	na	na	Deleted as a WWP.	
City of El Paso - Import from Diablo Farms	4-9	4-2						0						10,000				
Horizon Regional MUD WMS Supply	4-9	4-2			1,527	3,224	4,684	6,165	7,646			1,607	3,304	4,764	6,245	7,726		
Manufacturing WMS Supply	4-9	4-2						2,760							7,960			
C-O Purchase water from EPWU Capital cost	4-10	4-3	27,323,000							0								
Total Annual Cost	4-26	4-8			1,075,333	2,150,333	3,225,333					1,075,300	2,150,300	3,225,000			From Table 4-8 in Final Plan.	
Total Captial Cost	4-26	last paragraph	631,357,000							631,157,000								
Desalination of Agricultural Drain Water Capital Cost	4-27	4-9	16,875,000							16,675,000								
Total Captial Cost	4-27	4-9	631,357,000							631,157,000								
2060 Additional Dell City GW annual cost	4-27	4-9							10,886,000							26,177,000		
Please verify 2023 & 2033 New Conjuntive Annual Cost	4-27	4-9															Correct	
EPCWID #1 IRRIGATION SCHEDULING Annual Cost	4-33	4-11	96,000		96,000	96,000	96,000	96,000	96,000	0	0	0	0	0	0	0	0	From Table 4-3 in Final Plan.
EPCWID #1 - Pipelines for District Canals Annual Costs	4-33	4-11	8,487,434							0	0	0	0	0	0	0	0	\$202,261 for decades 2020 through 2060 as shown in Table 4-3 of Final Plan.
EPCWID #1 - TAILWATER REUSE Annual Cost	4-33	4-11	910,800		910,800	910,800	910,800	910,800	910,800	0	0	0	0	0	0	0	0	From Tables 4-3 and 4-13 in Final Plan.
HCUWCD #1 IRRIGATION SCHEDULING - Annual Cost	4-35	4-13	270,570		270,570	270,570	270,570	270,570	270,570	0	0	0	0	0	0	0	0	From Tables 4-3 and 4-13 in Final Plan.
HCUWCD #1- TAILWATER REUSE - Annual Cost	4-35	4-13	194,063		194,063	194,063	194,063	194,063	194,063	0	0	0	0	0	0	0	0	From Tables 4-3 and 4-13 in Final Plan.
El Capitan Reef (names misaligned)	4-27	4-9	El Capitan Reef							Import from Diablo Farms								
Culberson County Irrigation Needs	4-4	4-1					2,938	3,876	4,794					(5,602)	(5,708)	(3,206)		
El Paso Count Irrigation Needs	4-5	4-1		(73,360)	(69,047)	(67,097)	(58,629)	(54,828)	(51,089)		(110,957)	(106,644)	(104,694)	(96,226)	(92,425)	(88,686)		
Hudspeth County Irrigation Needs	4-6	4-1					(87,508)	(83,952)	(80,470)					(89,508)	(95,952)	(104,625)		

**TABLE 4-2. SUMMARY OF RECOMMENDED WATER MANAGEMENT STRATEGY EVALUATIONS**

(All strategies are in the Rio Grande Basin)

Water User Group	County Used	Strategy	Strategy ID	Source	Strategy Supply (Acre-Feet/Year)*						Total Capital Cost (Table 4-3)	Quality **	Reliability***	Average Environmental Factors (Table 4-4)	Strategy Impacts****			
					2010	2020	2030	2040	2050	2060					Water Resources	Agricultural Resources	Natural Resources	Ecologically Unique Stream Segments
															(1-5)	(1-5)	(1-5)	(1-5)
City of El Paso (EPWU)	El Paso	IWMS - Direct reuse	E-1	Treated EPWU blended sources		2,000	4,000	6,000	6,000	6,000	\$25,257,000	2	1	1.5	1	2	2	2
City of El Paso (EPWU)	El Paso	IWMS - Conservation	E-2	NA		3,000	7,000	11,000	16,000	22,000	NA	NA	NA	2	NA	NA	NA	2
City of El Paso (EPWU)	El Paso	IWMS - Recharge of groundwater with treated surface water	E-3	Treated EPWU blended sources		5,000	5,000	5,000	5,000	5,000	\$14,625,000	2	2	2	2	2	2	2
City of El Paso (EPWU)	El Paso	IWMS - Desalination of agricultural drain water	E-4	Treated Agricultural Drain Water		2,700	2,700	2,700	2,700	2,700	\$16,875,000	2	1	2.25	3	2	2	2
City of El Paso (EPWU)	El Paso	IWMS - Conjunctive use with additional surface water	E-5	Upper Rio Grande		5,000	15,000	20,000	20,000	20,000	\$140,238,000	2	2	2	2	3	2	2
City of El Paso (EPWU)	El Paso	IWMS - Import from Dell Valley	E-6	Bone Spring-Victorio Peak Aquifer					10,000	20,000	\$214,113,000	2	1	2.25	2	4	2	2
City of El Paso (EPWU)	El Paso	IWMS - Import from Diablo Farms	E-7	Capitan Reef Aquifer				10,000	10,000	10,000	\$245,506,000	1	1	2.25	3	3	2	2
Lower Valley Water District	El Paso	Purchase water from EPWU	E-10	EPWU blended sources		605	1,161	1,604	2,078	2,551	\$0	1	2	2	2	2	2	2
San Elizario	El Paso	Purchase water from LVWD	E-11	EPWU blended sources		934	1,794	2,481	3,214	3,947	\$0	1	2	2	2	2	2	2
Socorro	El Paso	Purchase water from LVWD	E-12	EPWU blended sources		507	1,018	1,402	1,836	2,271	\$0	1	2	2	2	2	2	2
Fort Bliss	El Paso	Purchase water from EPWU	E-9	EPWU blended sources	3,376	8,992	8,998	8,998	9,004	9,004	\$0	1	2	2	2	2	2	2
Vinton	El Paso	Purchase water from EPWU	E-14	EPWU blended sources		214	398	562	726	891	\$0	1	2	2	2	2	2	2
El Paso County Other	El Paso	Purchase Water from EPWU	E-15	EPWU blended sources		3,114	5,625	7,589	9,584	11,876	\$0	1	1	2.25	2	2	2	2
Manufacturing	El Paso	Purchase water from EPWU	E-16	EPWU blended sources		813	1,511	2,186	2,760	3,674	\$0	1	2	2	2	2	2	2
Steam Electric Power	El Paso	Purchase water from EPWU	E-17	EPWU blended sources		3,806	4,980	6,410	8,153	10,279	\$0	1	2	2	2	2	2	2
Horizon Regional MUD	El Paso	Additional wells and desalination plant expansions	E-8	Rio Grande Alluvium		1,607	3,304	4,764	6,245	7,726	\$34,344,000	1	2	2.25	3	2	2	2
El Paso County Tornillo WID	El Paso	Additional wells	E-13	Huaco Bolson Aquifer		175	175	350	350	350	\$1,006,762	1	1	2.25	3	2	2	2
El Paso County Tornillo WID	El Paso	Arsenic treatment facility	E-23	Huaco Bolson Aquifer		276	276	276	276	276	\$1,996,232	1	1	2.25	3	2	2	2
Irrigation (EPCWID#1)	El Paso	Irrigation scheduling (Conservation)	E-18	Upper Rio Grande		1,740	1,740	1,740	1,740	1,740	\$0	3	2	2	1	2	2	2
		Water district delivery systems (Conservation)	E-19	Upper Rio Grande		25,000	25,000	25,000	25,000	25,000	\$147,635,869	3	2	2	1	2	2	2
		Tailwater reuse	E-20	Upper Rio Grande		1,723	1,723	1,723	1,723	1,723	\$0	3	2	2	1	2	2	2
Irrigation (HCUWCD#1)	Hudspeth	Irrigation scheduling (Conservation)	E-21	Bone Spring-Victorio Peak Aquifer		3,535	3,535	3,535	3,535	3,535	\$0	3	2	2	1	2	2	2
		Tailwater reuse	E-22	Bone Spring-Victorio Peak Aquifer		589	589	589	589	589	\$0	3	2	2	1	2	2	2
Irrigation (HCCRD#1)	Hudspeth	No feasible strategy	NA	None		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
City of Marfa	Presidio	Additional 1 well	E-24	Igneous Aquifer		500	500	500	500	500	\$702,770	1	1	2.25	2	2	2	2
<b>Totals</b>					<b>3,376</b>	<b>71,830</b>	<b>96,027</b>	<b>124,409</b>	<b>147,013</b>	<b>171,632</b>	<b>\$842,299,633</b>							

\* Strategy Supply: Supply is the "Needs" volume from Table 4-1 for all entities except Irrigation. Irrigation supply in El Paso and Hudspeth Counties is from Table 26 in the 2009 irrigation strategy evaluation report "Evaluation of Irrigation Efficiency Strategies for Far West Texas: Feasibility, Water Savings and Cost Considerations" as discussed in Chapter 1 Section 1.2.2 and Appendix 1A of this Plan.

\*\* Quality range: 1= Meets safe drinking-water standards; 2=Must be treated or mixed to meet safe drinking-water standards; 3=Usable for irrigation.

\*\*\* Reliability range: 1=Sustainable; 2=Interruptible during droughts; 3=Non-sustainable.

\*\*\*\* Strategy impact range: 1=positive; 2=no new; 3=minimal negative; 4=moderate negative; 5=significant negative.

**Table 4-3. SUMMARY OF RECOMMENDED WATER MANAGEMENT STRATEGY COST**

Water User Group	County Used	Strategy	Strategy ID	Total Capital Cost*	Total Annual Cost						Cost per Acre-Foot/Year					
					2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060
City of El Paso (EPWU)	El Paso	IWMS - Direct reuse	E-1	\$25,257,000		\$1,075,300	\$2,150,300	\$3,225,000	\$2,615,300	\$2,001,300		\$538	\$538	\$538	\$436	\$334
City of El Paso (EPWU)	El Paso	IWMS - Conservation	E-2	NA		\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000		\$333	\$143	\$91	\$63	\$45
City of El Paso (EPWU)	El Paso	IWMS - Recharge of groundwater with treated surface water	E-3	\$14,625,000		\$2,710,000	\$2,710,000	\$2,710,000	\$1,648,000	\$1,648,000		\$542	\$542	\$542	\$330	\$330
City of El Paso (EPWU)	El Paso	IWMS - Desalination of agricultural drain water	E-4	\$16,875,000		\$2,512,000	\$2,512,000	\$2,512,000	\$1,286,000	\$1,286,000		\$930	\$930	\$930	\$476	\$476
City of El Paso (EPWU)	El Paso	IWMS - Conjunctive use with additional surface water	E-5	\$140,238,000		\$8,353,000	\$14,114,000	\$18,210,000	\$12,091,000	\$10,490,000		\$1,671	\$941	\$911	\$605	\$525
City of El Paso (EPWU)	El Paso	IWMS - Import from Dell Valley	E-6	\$214,113,000					\$15,291,000	\$26,177,000					\$1,529	\$1,309
City of El Paso (EPWU)	El Paso	IWMS - Import from Diablo Farms	E-7	\$245,506,000				\$23,530,000	\$23,530,000	\$23,530,000				\$2,353	\$2,353	\$2,353
Lower Valley Water District**	El Paso	Purchase water from EPWU	E-10	\$0		\$272,855	\$703,566	\$1,305,656	\$2,273,332	\$3,749,970		\$451	\$606	\$814	\$1,094	\$1,470
San Elizario**	El Paso	Purchase water from LVWD	E-11	\$0		\$421,234	\$1,087,164	\$2,019,534	\$3,516,116	\$5,802,090		\$451	\$606	\$814	\$1,094	\$1,470
Socorro**	El Paso	Purchase water from LVWD	E-12	\$0		\$228,657	\$616,908	\$1,141,228	\$2,008,584	\$3,338,370		\$451	\$606	\$814	\$1,094	\$1,470
Fort Bliss**	El Paso	Purchase water from EPWU	E-9	\$0	\$941,904	\$3,372,000	\$4,534,992	\$6,091,646	\$8,184,636	\$11,002,888	\$279	\$375	\$504	\$677	\$909	\$1,222
Vinton**	El Paso	Purchase water from EPWU	E-14	\$0		\$154,294	\$385,264	\$731,162	\$1,269,048	\$2,092,959		\$721	\$968	\$1,301	\$1,748	\$2,349
County Other**	El Paso	Purchase water from EPWU	E-15	\$0		\$2,245,194	\$5,445,000	\$9,873,289	\$16,752,832	\$27,896,724		\$721	\$968	\$1,301	\$1,748	\$2,349
Manufacturing**	El Paso	Purchase water from EPWU	E-16	\$0		\$586,173	\$1,462,648	\$2,843,986	\$4,824,480	\$8,630,226		\$721	\$968	\$1,301	\$1,748	\$2,349
Steam Electric Power**	El Paso	Purchase water from EPWU	E-17	\$0		\$2,744,126	\$4,820,640	\$8,339,410	\$14,251,444	\$24,145,371		\$721	\$968	\$1,301	\$1,748	\$2,349
Horizon Regional MUD	El Paso	Additional wells and desalination	E-8	\$34,344,000		\$1,790,000	\$3,020,000	\$3,635,000	\$4,444,000	\$4,359,000		\$1,114	\$914	\$763	\$712	\$564
El Paso County Tornillo WID	El Paso	Additional wells	E-13	\$1,006,762		\$5,000	\$5,000	\$10,000	\$10,000	\$10,000		\$29	\$29	\$29	\$29	\$23
El Paso County Tornillo WID	El Paso	Arsenic treatment facility	E-23	\$1,996,232		\$9,413	\$9,413	\$9,413	\$9,413	\$9,413		\$34	\$34	\$34	\$34	\$34
Irrigation (EPCWID#1)	El Paso	Irrigation scheduling (Conservation)	E-18	\$0		\$96,000	\$96,000	\$96,000	\$96,000	\$96,000		\$55	\$55	\$55	\$55	\$55
		Water district delivery systems (Conservation)	E-19	\$147,635,869		\$202,261	\$202,261	\$202,261	\$202,261	\$202,261		\$8	\$8	\$8	\$8	\$8
		Tailwater reuse	E-20	\$0		\$910,800	\$910,800	\$910,800	\$910,800	\$910,800		\$529	\$529	\$529	\$529	\$529
Irrigation (HCUWCD#1)	Hudspeth	Irrigation scheduling (Conservation)	E-21	\$0		\$270,570	\$270,570	\$270,570	\$270,570	\$270,570		\$77	\$77	\$77	\$77	\$77
		Tailwater reuse	E-22	\$0		\$194,063	\$194,063	\$194,063	\$194,063	\$194,063		\$329	\$329	\$329	\$329	\$329
Irrigation (HCCRD#1)	Hudspeth	No feasible strategy	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
City of Marfa	Presidio	Additional 1 well	E-24	\$702,770		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000		\$10	\$10	\$10	\$10	\$10
<b>Totals</b>				<b>\$842,299,633</b>	<b>\$941,904</b>	<b>\$29,157,940</b>	<b>\$46,255,589</b>	<b>\$88,866,018</b>	<b>\$116,683,879</b>	<b>\$158,848,005</b>	<b>\$279</b>	<b>\$10,812</b>	<b>\$11,273</b>	<b>\$15,522</b>	<b>\$18,757</b>	<b>\$22,029</b>

\* Total Capital Cost are estimated based on September 2008 US dollars.

\*\* EPWU contract sales price per acre-foot  
Price escalates 3% per year  
O&M included in contracted price