Appendix 4D
Cost Estimates

Appendix 4D: Region F Cost Estimates

As part of the 2006 Region F Plan, cost estimates were developed for each of the recommended water management strategies in Region F. As appropriate, these cost estimates have been updated for the 2011 Region F Plan. In accordance with the Texas Water Development Board guidance the costs for water management strategies are to be updated from second quarter 2002 dollars to September 2008 dollars. The methodology used to develop the 2011 costs is described in the following sections. Where updated unit costs were not available, the Engineering News Record (ENR) Index was used to increase the costs from second quarter 2002 (March) costs to September 2008 costs. An increase of **134%** from March 2002 to September 2008 was determined using the ENR Index method.

Introduction

1. The evaluation of water management strategies requires developing cost estimates. Guidance for cost estimates may be found in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)", Section 4.1.2. Costs are to be reported in September 2008 dollars.
2. Standard unit costs for installed pipe, pump stations and standard treatment facilities were developed from actual bid data from similar projects throughout the State of Texas. These estimates were used for all SB1 projects, unless more detailed costing is available. All unit costs include the contractors' mobilization, overhead and profit. The unit costs **do not** include engineering, contingency, financial and legal services, costs for land and rights-of-way, permits, environmental and archeological studies, or mitigation. The costs for these items are determined separately in the cost tables.
3. The information presented in this section is intended to be 'rule-of-thumb' guidance. Specific situations may call for alteration of the procedures and costs. Note that the costs in this memorandum provide a planning level estimate for comparison purposes.
4. It is important that when comparing alternatives that the cost estimates be similar and include similar items. If an existing reliable cost estimate is available for a project it should be used where appropriate. All cost estimates must meet the requirements set forth in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)".
5. The cost estimates have two components:
    - Initial capital costs, including engineering and construction costs, and
    - Average annual costs, including annual operation and maintenance costs and debt service.

    TWDB does not require the consultant to determine life cycle or present value analysis. For most situations annual costs are sufficient for comparison purposes and a life-cycle analysis is not required.

ASSUMPTIONS FOR CAPITAL COSTS:

Conveyance Systems

Standard pipeline costs used for these cost estimates are shown in Table 1. Pump station costs are based on required Horsepower capacity and are listed in Table 2. The power capacity is to be determined from the hydraulic analyses conducted from a planning level hydraulic grade line evaluation (or detailed analysis if available). Pipelines and pump stations are to be sized for peak pumping capacity.

- Pump efficiency is assumed to be 75 percent.
- Peaking factor of 2 times the average demand is to be used for strategies when the water is pumped directly to a water treatment plant. (or historical peaking factor, if available)
- Peaking factor of 1.2 to 1.5 is to be used if there are additional water sources and/or the water is transported to a terminal storage facility.
- Ground storage is to be provided at each booster pump station along the transmission line unless there is a more detailed design.
- Ground storage tanks should provide sufficient storage for 2.5 to 4 hours of pumping at peak capacity. Costs for ground storage are shown in Table 3. Covered storage tanks are used for all strategies transporting treated water.

Water Treatment Plants

Water treatment plants are to be sized for peak day capacity (assume peaking factor of 2 if no specific data is available). Costs estimated for new conventional surface water treatment facilities and expansions of existing facilities are listed in Table 4. Conventional treatment does not include advanced technologies, such as ozone or UV treatment. **All treatment plants are to be sized for finished water capacity**.

- For reverse osmosis plants for surface water, increase construction costs shown on Table 4 by the amount shown on Table 5 for the appropriate size plant that will be used for RO. If groundwater is the raw water source, use only the costs in Table 5. These costs were based on actual cost estimates of similar facilities.
- The amount of reject water generated by reverse osmosis treatment is dependent upon the incoming quality of the raw water. Final treatment goals should be between 600 and 800 mg/l of TDS. (This provides a safety margin in meeting secondary treatment standards.) For reverse osmosis treatment of brackish water (1,000 – 3,000 mg/l of TDS), assume that 20 percent of the raw water treated with membranes is discharged as reject water, unless project-specific data is available. For brackish water with TDS concentrations between 3,000 and 10,000 mg/l, assume 30% reject water. Desalination of seawater or very high TDS water will

have a higher percent of reject water (50 to 60%). Minimal losses are assumed for conventional treatment facilities.

- Costs for ion exchange facilities are shown on Table 6. For these facilities it is assumed that 2 to 3 percent of the raw water would be discharged as reject water.

New Groundwater Wells

For the Groundwater Study for Region F, LBG-Guyton Associates prepared a project-specific table of well field costs. Where project-specific information is not available, refer to Table 7. The pumping capacity should be for peak pumpage. Well depth will be estimated by county and aquifer.

For expansion of existing well fields for municipal water providers, an additional $150,000 per expansion for connection to the existing distribution system is assumed. Connection costs and conveyance systems for new well fields will be determined on a case-by-case basis.

New Reservoirs

Site-specific cost estimates will be made for reservoir sites. The elements required for reservoir sites are included in Table 8. Lake intake structures for new reservoirs will be determined on a case-by-case basis. Generally, costs for construction of such facilities prior to filling of the reservoir will be less than shown on Table 2.

Other Costs

- Engineering, contingency, construction management, financial and legal costs are to be estimated at 30 percent of construction cost for pipelines and 35 percent of construction costs for pump stations, treatment facilities and reservoir projects. (This is in accordance with TWDB guidance.)
- Permitting and mitigation for transmission and treatment projects are to be estimated at 1 percent of the total construction costs. For reservoirs, mitigation and permitting costs are assumed equal to twice the land purchase cost, unless site specific data is available.
- Right-of-way (ROW) costs for transmission lines are estimated at $2,000 per acre of rural ROW. Urban ROW will be higher. If no data is available, assume $15,000 per acre. If a small pipeline follows existing right-of-ways (such as

highways), no additional right-of-way cost may be assumed. Large pipelines will require ROW costs regardless of routing.

Interest during construction is the total of interest accrued at the end of the construction period using a 6 percent annual interest rate on total borrowed funds, less a 4 percent rate of return on investment of unspent funds. This is calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction. These factors were used in cost estimating and are presented in Table 9.

ASSUMPTIONS FOR ANNUAL COSTS:

Annual costs are to be estimated using the following assumptions:

- Debt service for all transmission and treatment facilities is to be annualized over 20 years, but not longer than the life of the project. [Note: uniform amortization periods should be used when evaluating similar projects for an entity.]
- Annual interest rate for debt service is 6 percent.
- Water purchase costs are to be based on wholesale rates reported by the selling entity when possible. In lieu of known rates, a typical regional cost for treated water and raw water will be developed.
- Operation and Maintenance costs are to be calculated based on the construction cost of the capital improvement. Engineering, permitting, etc. should not be included as a basis for this calculation. However, a 20% allowance for construction contingencies should be included for all O&M calculations. Per the "General Guidelines for Regional Water Plan Development (2007-2012)", O&M should be calculated at:
    - 1 percent of the construction costs for pipelines
    - 1.5 percent for dams
    - 2.5 percent of the construction costs for pump stations, storage tanks, meters and SCADA systems
    - Assume O&M costs for treatment facilities are included in the treatment cost
- Surface water treatment costs are estimated at $0.70 per 1,000 gallons for conventional plants and $1.24 per 1,000 gallons of finished water for surface water plants with reverse osmosis. Assume cost for treatment of groundwater by reverse osmosis is $0.75 per 1,000 gallons. If only a portion of the water will be treated with RO, apply costs proportionately. Treatment for nitrates is estimated at $0.40 per 1,000 gallons. Treatment for groundwater (assuming disinfection and labor only) is estimated at $0.30 per 1,000 gallons. These costs include chemicals, labor and electricity for treatment and should be applied to amount of finished water receiving the treatment. Electricity associated with moving raw

water to the treatment facility is calculated separately (this includes electricity associated with groundwater well fields).

- Reject water disposal for treatment of brackish water is to be estimated on a case-by-case basis depending on disposal method. If no method is defined, assume a cost of $0.35 per 1,000 gallons of reject water. [This value represents a moderate cost estimate. If the water were returned to a brackish surface water source, the costs would be negligible. If evaporation beds or deep well injection were used, the costs could be much higher.]
- Pumping costs are to be estimated using an electricity rate of $0.09 per Kilowatt Hour. If local data is available, this can be used.

Table 1

Pipeline Costs (does not include ROW)

Diameter	Base Installed Cost	Rural Cost with Appurtenances	Urban Cost with Appurtenances	Assumed ROW Width	Assumed Temporary Easement Width
(Inches)	($/Foot)	($/Foot)	($/Foot)	(Feet)	(Feet)
6	24	26	39	15	50
8	31	34	52	15	50
10	39	43	65	20	60
12	47	52	77	20	60
14	55	60	90	20	60
16	62	69	103	20	60
18	70	77	116	20	60
20	82	90	135	20	60
24	105	116	174	20	60
30	132	145	215	20	60
36	167	184	276	20	60
42	196	215	323	30	70
48	244	269	374	30	70
54	288	317	435	30	70
60	332	366	495	30	70
66	401	441	591	30	70
72	469	516	697	30	70
78	538	591	799	40	80
84	616	677	914	40	80
90	704	774	1,045	40	80
96	782	860	1,161	40	80
102	870	957	1,290	40	80
108	977	1,075	1,451	40	80
114	1,075	1,183	1,596	50	100
120	1,212	1,333	1,801	50	100
132	1,466	1,613	2,177	50	100
144	1,730	1,903	2,569	50	100

Notes: a Costs are based on PVC class 150 pipe for the smaller long, rural pipelines.
b Appurtenances assumed to be 10% of installed pipe costs.
c For urban pipelines, costs were increased by 35% for cost with appurtenances. For pipes 42"and smaller, additional costs were added.
d Adjust costs for obstacles (rock, forested areas) and easy conditions (soft soil in flat country).

Table 2
Pump Station Costs for Transmission Systems

	Booster PS	Lake PS with Intake
Horsepower	**Costs**	**Costs**
5	$516,000	
10	$538,000	
20	$564,000	
25	$591,000	
50	$645,000	
100	$742,000	
200	$1,118,000	$1,484,000
300	$1,441,000	$1,914,000
400	$1,795,000	$2,387,000
500	$2,032,000	$2,698,000
600	$2,150,000	$2,860,000
700	$2,268,000	$3,021,000
800	$2,516,000	$3,343,000
900	$2,634,000	$3,505,000
1,000	$2,870,000	$3,817,000
2,000	$4,182,000	$5,562,000
3,000	$5,020,000	$6,677,000
4,000	$6,095,000	$8,107,000
5,000	$6,988,000	$9,293,000
6,000	$8,063,000	$10,723,000
7,000	$8,923,000	$11,867,000
8,000	$9,890,000	$13,154,000
9,000	$10,965,000	$14,583,000
10,000	$12,255,000	$16,299,000
20,000	$20,425,000	$27,165,000
30,000	$26,875,000	$35,744,000
40,000	$33,325,000	$44,322,000
50,000	$38,700,000	$51,471,000
60,000	$44,075,000	$58,620,000
70,000	$49,450,000	$65,769,000

Note:
1. Lake PS with intake costs include intake and pump station.
2. Adjust pump station costs upward if the pump station is designed to move large quantities of water at a low head (i.e. low horsepower). See Rusty Gibson for appropriate factor.
3. Assumed multiple pump setup for all pump stations.

Table 3
Ground Storage Tanks

Size (MG)	With Roof	Without Roof
0.05	$125,000	$106,000
0.1	$183,000	$156,000
0.5	$438,000	$333,000
1	$634,000	$469,000
1.5	$796,000	$591,000
2	$957,000	$714,000
2.5	$1,086,000	$821,000
3	$1,215,000	$928,000
3.5	$1,355,000	$1,023,000
4	$1,505,000	$1,118,000
5	$1,720,000	$1,303,000
6	$2,075,000	$1,505,000
7	$2,446,000	$1,740,000
8	$2,822,000	$2,069,000
10	$3,746,000	$2,752,000
12	$4,671,000	$3,419,000
14	$5,595,000	$4,085,000

Note: Costs assume steel tanks smaller than 1 MG, concrete tanks 1 MG and larger.

Table 4
Conventional Water Treatment Plant Costs

Plant Capacity (MGD)	New Conventional Plants	Conventional Plant Expansions
1	$5,800,000	$2,900,000
3	$10,600,000	$7,400,000
7	$17,500,000	$12,900,000
10	$22,400,000	$16,000,000
15	$29,100,000	$20,900,000
20	$35,400,000	$26,100,000
30	$47,600,000	$35,700,000
40	$60,000,000	$45,500,000
50	$72,600,000	$54,400,000
60	$84,900,000	$63,500,000
70	$96,600,000	$72,200,000
80	$107,900,000	$81,400,000
90	$118,500,000	$90,500,000
100	$130,200,000	$100,200,000

Note: Plant is sized for finished peak day capacity.

Table 5

Additional Cost for Reverse Osmosis Treatment

Plant Capacity (MGD)	Reverse Osmosis Facilities Cost
0.5	$1,300,000
1	$1,600,000
3	$3,200,000
7	$7,200,000
10	$9,800,000
15	$14,200,000
20	$18,300,000
30	$25,500,000
40	$31,400,000
50	$36,600,000
60	$40,700,000

Note: Plant is sized for finished water capacity.

Table 6
Groundwater Nitrate Treatment

Treatment Capacity (MGD)	Ion Exchange Plant Cost
0.25	$800,000
1.0	$1,700,000
3.0	$3,900,000

Note: Plant is sized for finished water capacity.

Table 7
Cost Elements for Water Wells

Cost per municipal well = 1.55*(25,500 + (70*a) + (350*b))

Cost per agricultural well = 10,000 + 70*a + 350*b, where:

a = pump rate (gpm), b = well depth (feet)

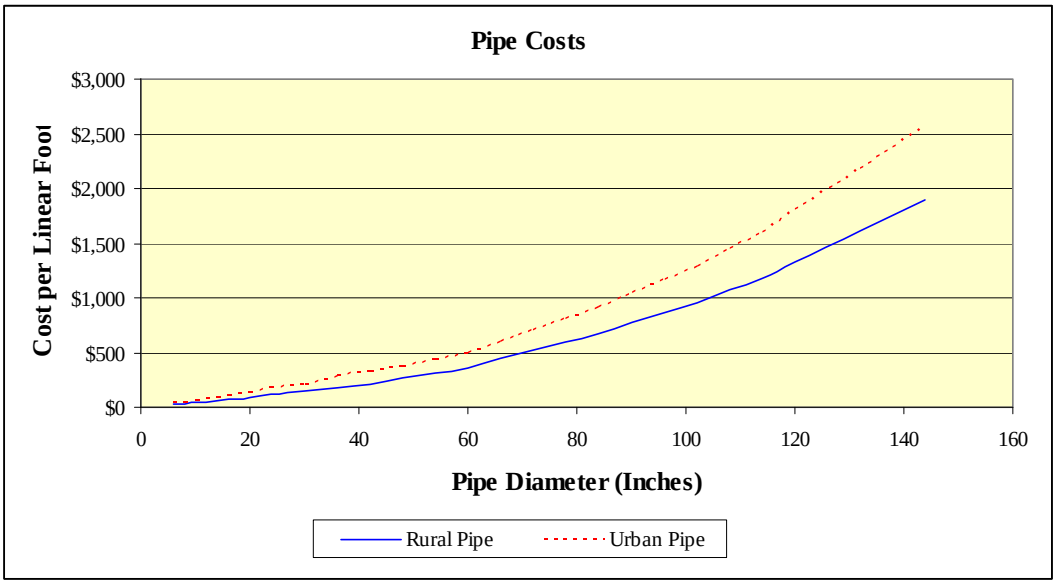
Table 8
Cost Elements for Reservoir Sites

Capital Costs	Studies and Permitting
Embankment	Environmental and archeological studies
Spillway	Permitting
Outlet works	Terrestrial mitigation tracts
Site work	Engineering and contingencies
Land	Construction management
Administrative facilities	
Supplemental pumping facilities	
Flood protection	

Table 9
Factors for Interest During Construction

Construction Period	Factor
6 months	0.02167
12 months	0.04167
18 months	0.06167
24 months	0.08167
36 month construction	0.12167

Figure 1



WUGNAME: Andrews
STRATEGY: Dockum Desalination Facility
STRATEGY NUMBER: F27ADVTR
AMOUNT (ac-ft/yr): 950

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Land acquisition		3	AC	$	2,000	$	6,000
Well pumps	500 gpm	3	EA	$	19,741	$	59,000
Well construction		3	EA	$	197,411	$	592,000
Well field piping	8-inch	15,840	LF	$	34	$	539,000
Ground storage tank	0.25 MG		LS	$	222,375	$	222,000
Engineering and Contingencies (35%)						$	496,000
Subtotal Pump Station and Intake						$	1,914,000

Disposal Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Pipeline	8-inch	26,400	LF	$	34	$	898,000
Right-of-way		12.1	AC	$	2,000	$	24,000
High pressure well disposal pumps	1300 gpm	1	EA	$	26,322	$	26,000
Brine Lagoon		1	LS	$	394,823	$	395,000
Engineering and Contingencies (30%)						$	403,000
Subtotal Transmission to Treatment Plant						$	1,746,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
RO Treatment Facility	1.0 MGD	1	LS	$	1,895,150	$	1,895,000
Ground storage tank	0.25 MG	1	LS	$	222,375	$	222,000
Engineering and Contingencies (35%)						$	741,000
Subtotal of Treatment						$	2,858,000

CONSTRUCTION TOTAL		$	6,518,000
Permitting and Mitigation		$	58,000
Interest During Construction	(6 months)	$	141,000
TOTAL COST		**$**	**6,717,000**

ANNUAL COSTS*

Debt Service (6% for 20 years)*	$	586,000
Electricity ($0.09 kWh)	$	179,000
Operation & Maintenance	$	108,000
Water Treatment	$	232,000
Total Annual Costs	**$**	**1,105,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$	1,163
Per 1,000 Gallons	$	3.57

UNIT COSTS (After Amortization)

Per Acre-Foot	$	546
Per 1,000 Gallons	$	1.68

WUGNAME: Ballinger
STRATEGY: Generic 0.2 MGD Reuse
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 220

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**		**Cost**
Reclaimed Treatment Plant Land Acquisition		3	AC	$ 5,000	$	15,000
Engineering and Contingencies (30%)					$	5,000
Subtotal Land Acquisition					$	20,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline 75gpm	4 in	10,560	LF	$ 24	$	253,000
Right-of-way easements		7	AC	$ 2,000	$	15,000
Engineering and Contingencies (30%)					$	80,000
Subtotal Pipeline					$	348,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	150 gpm	1	EA	$ 31,586	$	32,000
Storage tank	0.05 MG	1	EA	$ 106,000	$	106,000
Engineering and Contingencies (35%)					$	48,000
Subtotal of Pump Station(s)					$	186,000
Treatment Equipment		**Quantity**	**Unit**	**Unit Price**		**Cost**
Microfiltration/Ultrafiltration (MF/UF) and Reverse Osmosis (RO) Equipment and Installation		1	EA	$ 743,583	$	744,000
UV/Oxidation		1	EA	$ 131,608	$	132,000
Engineering and Contingencies (35%)					$	307,000
Subtotal of Treatment Equipment					$	1,183,000
Building		**Quantity**	**Unit**	**Unit Price**		**Cost**
Metal Building		3,500	SF	$ 118	$	415,000
Engineering and Contingencies (35%)					$	145,000
Subtotal of Building					$	560,000
Electrical						**Cost**
20% of Equipment Cost					$	80,000
Engineering and Contingencies (35%)					$	28,000
Subtotal of Electrical					$	108,000
Instrumentation						**Cost**
20% of Equipment Cost					$	80,000
Engineering and Contingencies (35%)					$	28,000
Subtotal of Instrumentation					$	108,000
CONSTRUCTION TOTAL					$	2,513,000
Interest During Construction					$	54,000

WUGNAME:	Ballinger		
STRATEGY:	Generic 0.2 MGD Reuse		
TOTAL COST		**$**	**2,567,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	224,000
Operation & Maintenance		$	100,000
Total Annual Costs		**$**	**324,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	1,473
Per 1,000 Gallons		$	4.52
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	455
Per 1,000 Gallons		$	1.39

WUGNAME: City of Ballinger
STRATEGY: Pipeline to Hords Creek Reservoir
STRATEGY NUMBER: F06AVolRed
AMOUNT (ac-ft/yr): 220

CONSTRUCTION COSTS

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
12" DR-11 HDPE water line	12 in.	16,000	LF	$ 31	$ 504,000
10" DR-13.5 HPDE water line	10 in.	8,000	LF	$ 26	$ 209,000
10" DR-17 HPDE water line	10 in.	86,000	LF	$ 26	$ 2,247,000
Class "C" bedding material		110,000	LF	$ 2	$ 174,000
HPDE heat fusion fittings		1	LS	$ 88,177	$ 88,000
10" gate valve with valve box	10 in.	25	EA	$ 2,632	$ 66,000
12" gate valve with valve box	12 in.	3	EA	$ 3,290	$ 10,000
Tie-in existing raw water line	10 in.	1	EA	$ 2,632	$ 3,000
Master meter and valve vault		1	LS	$ 12,898	$ 13,000
Air relief valve assembly		10	EA	$ 4,500	$ 45,000
Flush valve assembly		5	EA	$ 3,750	$ 19,000
Stream crossing		4	EA	$ 19,741	$ 79,000
18" bore & steel casement		1,500	LF	$ 132	$ 197,000
Gravel roadway repair		3,900	LF	$ 11	$ 41,000
Asphalt roadway repair		1,000	LF	$ 26	$ 26,000
Pipeline markers		200	EA	$ 66	$ 13,000
Right-of-way easements		1	LS	$ 65,673	$ 66,000
Engineering and Contingencies (30%)					$ 1,140,000
Subtotal pipeline					$ 4,940,000

Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	35 HP	1	EA	$ 612,600	$ 613,000
Fencing		500	LF	$ 26	$ 13,000
Pipe insulation		1	LS	$ 6,580	$ 7,000
Site piping		1	LS	$ 32,902	$ 33,000
Electrical service		1	LS	$ 65,804	$ 66,000
Controls and telemetry		1	LS	$ 19,741	$ 20,000
Engineering and Contingencies (35%)					$ 263,000
Subtotal of Pump Station(s)					$ 1,015,000

Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Ground Storage Tank	0.5 MG	1	EA	$ 333,000	$ 333,000
Engineering and Contingencies (35%)					$ 117,000
Subtotal of Ground Storage					$ 450,000

Mobilization, bonding & insurance	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
		1	LS	$ 189,383	$ 189,000

WUGNAME:	City of Ballinger		
STRATEGY:	Pipeline to Hords Creek Reservoir		
CONSTRUCTION TOTAL		$	6,594,000
Permitting and Mitigation		$	58,000
Interest During Construction	(6 months)	$	143,000
TOTAL COST		**$**	**6,795,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	592,000
Electricity ($0.09 kWh)		$	7,500
Operation & Maintenance		$	90,000
Raw Water Purchase		$	50,000
Total Annual Costs		**$**	**739,500**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	3,361
Per 1,000 Gallons		$	10.32
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	670
Per 1,000 Gallons		$	2.06

WUGNAME: Big Spring
STRATEGY: Big Spring Reuse
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 1,855

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**		**Cost**
Reclaimed Treatment Plant Land Acquisition		2	AC	$ 2,000	$	4,000
Engineering and Contingencies (35%)					$	1,000
Subtotal Land Acquisition					$	5,000

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	10 in	5,500	LF	$ 65	$	358,000
Transmission pipeline	6 in	500	LF	$ 39	$	20,000
Right-of-way easements		4	AC	$ 1,000	$	4,000
Engineering and Contingencies (30%)					$	115,000
Subtotal Pipeline					$	497,000

Diversion Structure & Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	1715 gpm	1	EA	$ 65,804	$	66,000
Engineering and Contingencies (35%)					$	23,000
Subtotal of Diversion and Pump Station					$	89,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	1400 gpm	1	EA	$ 65,804	$	66,000
Storage tank	0.50 MG	1	EA	$ 333,000	$	333,000
Engineering and Contingencies (35%)					$	140,000
Subtotal of Pump Station(s)					$	539,000

Treatment Equipment	**Quantity**	**Unit**	**Unit Price**		**Cost**
Microfiltration/Ultrafiltration (MF/UF)	1	EA	$ 2,043,866	$	2,044,000
Reverse Osmosis (RO)	1	EA	$ 1,816,185	$	1,816,000
UV/Oxidation	1	EA	$ 572,493	$	572,000
Engineering and Contingencies (35%)				$	1,551,000
Subtotal of Treatment Equipment				$	5,983,000

Reject Facilities	**Quantity**	**Unit**	**Unit Price**		**Cost**
High Pressure Membrane Reject (Piping to Creek)	1	EA	$ 138,188	$	138,000
Low Pressure Membrane Reject	1	EA	$ 98,706	$	99,000
Engineering and Contingencies (35%)				$	83,000
Subtotal of Reject Facilities				$	320,000

Building	**Quantity**	**Unit**		**Cost**
Metal Building	5,000	SF	$ 118	$ 592,000
Engineering and Contingencies (35%)				$ 207,000
Subtotal of Building				$ 799,000

WUGNAME:	Big Spring		
STRATEGY:	Big Spring Reuse		
Electrical			**Cost**
20% of Equipment Cost		$	445,000
Engineering and Contingencies (35%)		$	156,000
Subtotal of Electrical		$	601,000
Instrumentation			**Cost**
20% of Equipment Cost		$	445,000
Engineering and Contingencies (35%)		$	156,000
Subtotal of Instrumentation		$	601,000
CONSTRUCTION TOTAL		$	9,434,000
Permitting and Mitigation		$	84,000
Interest During Construction	(12 Months)	$	393,000
TOTAL COST		**$**	**9,911,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	864,000
Operation & Maintenance		$	665,000
Total Annual Costs		**$**	**1,529,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	824
Per 1,000 Gallons		$	2.53
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	358
Per 1,000 Gallons		$	1.10

WUGNAME: Bronte
STRATEGY: Rehabilitation of Oak Creek Pipeline
STRATEGY NUMBER: F19REHPIP
AMOUNT (ac-ft/yr): 129

CONSTRUCTION COSTS

Pipeline Rehabilitation	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
New pipe	10"	29,100	LF	$ 39	$ 1,134,900
New pipe	8"	0	LF	$ 31	$ -
Replace storage tank	0.05 MG	1	LS	$ 106,000	$ 106,000
Engineering and Contingencies (10%)					$ 124,000
					$ 1,364,900

CONSTRUCTION TOTAL **$ 1,364,900**

Annual Capital Costs for 5-year Replacement Period $ 272,980

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 23,800

WUGNAME: Bronte
STRATEGY: New Groundwater Southeast of Bronte
STRATEGY NUMBER: F13OthGW
AMOUNT (ac-ft/yr): 350 treated

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Groundwater rights		450	AC	$ 300	$ 135,000
Water wells	250 gpm	3	EA	$ 175,150	$ 525,000
Piping and other appurtenances		1	LS	$ 26,300	$ 26,000
Engineering and contingencies (30%)					$ 551,000
Transmission					
Pipeline	10 in.	26,400	LF	$ 43	$ 1,135,000
Right of Way Easements		12	AC	$ 2,000	$ 24,000
Pump Station	19.0 HP	1	EA	$ 561,400	$ 561,000
Engineering and contingencies					$ 537,000
RO Treatment	.75 mgd	1	EA	$ 1,450,000	$ 1,450,000
Engineering and contingencies					$ 508,000
CONSTRUCTION TOTAL					$ 5,452,000
Permitting and Mitigation					$ 44,000
Interest During Construction	(12 months)				$ 227,000
TOTAL COST					**$ 5,723,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 499,000
Electricity ($0.09 kWh)	$ 13,000
Operation & Maintenance	$ 37,000
Water Treatment	$ 60,000
Total Annual Costs	**$ 609,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,740
Per 1,000 Gallons	$ 5.34

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 314
Per 1,000 Gallons	$ 0.96

WUGNAME: Bronte
STRATEGY: New Groundwater at Oak Creek Reservoir
STRATEGY NUMBER: F13OthGW
AMOUNT (ac-ft/yr): 150 treated

CONSTRUCTION COSTS

Well Field	Size	Quantity	Unit	Unit Price	Cost
Groundwater rights		150	AC	$ 300	$ 45,000
Water wells	100 gpm	3	EA	$ 213,125	$ 639,000
Piping and other appurtenances		1	LS	$ 32,000	$ 32,000
Engineering and contingencies (30%)					$ 671,000
Transmission around lake					
Pipeline	6 in.	15,840	LF	$ 26	$ 412,000
Right of Way Easements		5	AC	$ 2,000	$ 10,000
Pump Station	7.0 HP	1	EA	$ 524,800	$ 525,000
Ground storage	0.10 MG	1	EA	$ 183,000	$ 183,000
Engineering and contingencies					$ 371,000
CONSTRUCTION TOTAL					$ 2,888,000
Permitting and Mitigation					$ 19,000
Interest During Construction	(6 months)				$ 63,000
TOTAL COST					**$ 2,970,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 259,000
Electricity ($0.09 kWh)					$ 6,000
Operation & Maintenance					$ 29,000
Water Treatment					$ 15,000
Total Annual Costs					**$ 309,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,060
Per 1,000 Gallons					$ 6.32
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 333
Per 1,000 Gallons					$ 1.02

WUGNAME: Bronte, Robert Lee, Winters
STRATEGY: Generic 0.1 MGD Reuse
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 110

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**		**Cost**
Reclaimed Treatment Plant Land Acquisition		3	AC	$ 5,000	$	15,000
Engineering and Contingencies (30%)					$	5,000
Subtotal Land Acquisition					$	20,000

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline 75gpm	4 in	10,560	LF	$ 26	$	278,000
Right-of-way easements		7	AC	$ 2,000	$	15,000
Engineering and Contingencies (30%)					$	88,000
Subtotal Pipeline					$	381,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	75 gpm	1	EA	$ 31,586	$	32,000
Storage tank	0.025 MG	1	EA	$ 105,286	$	105,000
Engineering and Contingencies (35%)					$	48,000
Subtotal of Pump Station(s)					$	185,000

Treatment Equipment	**Quantity**	**Unit**	**Unit Price**		**Cost**
Microfiltration/Ultrafiltration (MF/UF) and Reverse Osmosis (RO) Equipment and Installation	1	EA	$ 486,948	$	487,000
UV/Oxidation	1	EA	$ 85,545	$	86,000
Engineering and Contingencies (35%)				$	201,000
Subtotal of Treatment Equipment				$	774,000

Building	**Quantity**	**Unit**	**Unit Price**		**Cost**
Metal Building	3,500	SF	$ 118	$	415,000
Engineering and Contingencies (35%)				$	145,000
Subtotal of Building				$	560,000

Electrical		**Cost**
20% of Equipment Cost	$	71,000
Engineering and Contingencies (35%)	$	25,000
Subtotal of Electrical	$	96,000

Instrumentation		**Cost**
20% of Equipment Cost	$	71,000
Engineering and Contingencies (35%)	$	25,000
Subtotal of Instrumentation	$	96,000

CONSTRUCTION TOTAL	$	2,112,000

WUGNAME:	Bronte, Robert Lee, Winters		
STRATEGY:	Generic 0.1 MGD Reuse		
Interest During Construction		$	46,000
TOTAL COST		**$**	**2,158,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	188,000
Operation & Maintenance		$	70,000
Total Annual Costs		**$**	**258,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	2,345
Per 1,000 Gallons		$	7.20
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	636
Per 1,000 Gallons		$	1.95

WUGNAME: Colorado City
STRATEGY: Dockum Desalination Facility
STRATEGY NUMBER:
AMOUNT (ac-ft/yr): 2,200

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Land acquisition - well sites		6	AC	$	2,000	$	12,000
Land acquisition - pipeline r.o.w.		15	AC	$	2,000	$	30,000
Well pumps	250 gpm	6	EA	$	100,000	$	600,000
Well construction		6	EA	$	250,000	$	1,500,000
Well field piping (based on assumed avg dist of 3 mi/well to Pump Station. 70% 4"))	4-inch	66,528	LF	$	30	$	1,996,000
Well field piping (based on assumed avg dist of 3 mi/well to Pump Station. 30% 6"))	6-inch	28,512	LF	$	38	$	1,083,000
Ground storage tank	0.25 MG		LS	$	320,000	$	320,000
Engineering and Contingencies (35%)						$	1,939,000
Subtotal Pump Station and Intake						$	7,480,000

Disposal Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Pipeline	8-inch	26,400	LF	$	34	$	898,000
Right-of-way		12.1	AC	$	2,000	$	24,000
High pressure well disposal pumps	1300 gpm	1	EA	$	26,322	$	26,000
Brine Lagoon		1	LS	$	394,823	$	395,000
Engineering and Contingencies (30%)						$	403,000
Subtotal Transmission to Treatment Plant						$	1,746,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
RO Treatment Facility	2.0 MGD	1	LS	$	6,000,000	$	6,000,000
Engineering and Contingencies (35%)						$	2,100,000
Subtotal of Treatment						$	8,100,000

CONSTRUCTION TOTAL		$	17,326,000
Permitting and Mitigation		$	154,000
Interest During Construction	(6 months)	$	375,000
TOTAL COST		**$**	**17,855,000**

ANNUAL COSTS*		
Debt Service (6% for 20 years)*	$	1,557,000
Electricity ($0.09 kWh)	$	179,000
Operation & Maintenance	$	262,000
Water Treatment	$	538,000
Total Annual Costs	**$**	**2,536,000**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water	$	1,153
Per 1,000 Gallons	$	3.54
UNIT COSTS (After Amortization)		
Per Acre-Foot	$	445
Per 1,000 Gallons	$	1.37

WUGNAME: CRMWD
STRATEGY: Southwest Pecos County to Odessa
STRATEGY NUMBER: F13OthGW
AMOUNT (ac-ft/yr): 15,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Wells	12-inch	10	EA	$ 365,869	$ 3,659,000
Well field piping		20	MGD	$ 329,019	$ 6,580,000
Other well field appurtanances		1	LS	$ 1,316,076	$ 1,316,000
Engineering and Contingencies (35%)					$ 4,044,000
Subtotal of Well Field					$ 15,599,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	42 in.	554,400	LF	$ 215	$ 119,196,000
Right-of-way easements		255	AC	$ 2,000	$ 510,000
Engineering and Contingencies (30%)					$ 35,912,000
Subtotal Pipeline					$ 155,618,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	250 HP	1	EA	$ 1,279,500	$ 1,280,000
Storage tank	4 MG	1	EA	$ 1,118,000	$ 1,118,000
Engineering and Contingencies (35%)					$ 839,000
Subtotal of Pump Station(s)					$ 3,237,000

CONSTRUCTION TOTAL		$ 174,454,000
Permitting and Mitigation		$ 1,598,000
Interest During Construction	(12 months)	$ 7,269,000
TOTAL COST		**$ 183,321,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 15,983,000
Electricity ($0.09 kWh)	$ 1,611,000
Operation & Maintenance	$ 1,508,000
Water Purchase	$ 1,466,000
Water Treatment	$ 1,711,000
Total Annual Costs	**$ 22,279,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,485
Per 1,000 Gallons	$ 4.56

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 420
Per 1,000 Gallons	$ 1.29

WUGNAME: CRMWD

STRATEGY: Well field development and transmission pipeline from Roberts County to CRMWD

STRATEGY NUMBER: F08Market

AMOUNT (ac-ft/yr): 25,000

GROUNDWATER COSTS		**Quantity**	**Unit**		**Unit Price**		**Cost**
Groundwater Rights		10,000	Acre	$	658	$	6,580,000
Subtotal						$	6,580,000

CONSTRUCTION COSTS	**Size**	**Quantity**	**Unit**			**Cost**
Well Facilities						
Wells (1,000 gpm per well)	1000 gpm	23	LS	$	592,234	$ 13,621,000
Well field pipeline ($329,000 / mgd)	33.5 mgd	33.50	MGD	$	329,000	$ 11,022,000
Engineering and Contingencies (30%)						$ 7,393,000
Subtotal of Well Field						$32,036,000
Pipeline						
Pipeline	48 in.	1,625,000	LF	$	269	$ 437,125,000
Right of Way Easements (ROW)	30 ft.	1,119	Acre	$	4,000	$ 4,477,000
Engineering and Contingencies (30%)						$ 132,481,000
Subtotal of Pipeline						$574,083,000
Pump Station(s)						
Booster Pump Station	4500 HP	1	LS	$	6,541,500	$ 6,542,000
Booster Pump Station	4000 HP	2	LS	$	6,095,000	$ 12,190,000
Booster Pump Station	750 HP	1	LS	$	2,392,000	$ 2,392,000
Ground Storage Tank	4.2 MG	3	LS	$	1,155,000	$ 3,465,000
Engineering and Contingencies (35%)						$ 8,606,000
Subtotal of Pump Station(s)						$33,195,000

CONSTRUCTION TOTAL						$ 639,314,000
Permitting and Mitigation						$ 5,915,000
Interest During Construction (18 months)						$ 39,832,000
TOTAL COST Before Development Costs						**$645,894,000**
Development Costs						
Preliminary Expenses		1	LS	$	32,901,907	$ 32,902,000
Development Fee	15%	1	LS	$	96,605,263	$ 96,605,000
Subtotal						$129,507,000
TOTAL COST						**$775,401,000**

ANNUAL COSTS	
Debt Service (6% for 30 years)	$ 67,603,000
Electricity transmission($0.09 kWh)	$ 4,884,000
Electricity well field (330 HP each well $0.06 kWh)	$ 4,458,000
Operation & Maintenance	$ 6,037,000
Total Annual Costs	**$82,982,000**

UNIT COSTS (Until Amortized)	
Per Acre-Foot	$ 3,319
Per 1,000 Gallons	$ 10.19

UNIT COSTS (After Amortization)	
Per Acre-Foot	$ 615
Per 1,000 Gallons	$ 1.89

WUGNAME: CRMWD
STRATEGY: Winkler County Well Field
STRATEGY NUMBER: F12CenGW
AMOUNT (ac-ft/yr): 6,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		7	EA	$ 419,000	$ 2,933,000
Well field pipeline	10"	2,800	LF	$ 43	$ 120,000
Well field pipeline	12"	6,050	LF	$ 52	$ 315,000
Well field pipeline	14"	600	LF	$ 60	$ 36,000
Well field pipeline	16"	1,000	LF	$ 69	$ 69,000
Well field pipeline	18"	800	LF	$ 77	$ 62,000
Well field pipeline	24"	2,000	LF	$ 116	$ 232,000
Well field pipeline	27"	2,000	LF	$ 131	$ 261,000
Well field pipeline	30"	7,650	LF	$ 145	$ 1,109,000
Other well field appurtenances			LS	$ 1,316,076	$ 1,316,076
Engineering and contingencies (35%)					$ 2,259,000
Subtotal Well field					$ 8,712,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	36 in	228,934	LF	$ 184	$ 42,124,000
Right-of-way easements		105	AC	$ 2,000	$ 210,000
Engineering and Contingencies (30%)					$ 12,700,000
Subtotal Pipeline					$ 55,034,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	1800 HP	1	EA	$ 3,919,600	$ 3,920,000
Storage tank	5 MG	2	EA	$ 1,303,000	$ 2,606,000
Engineering and Contingencies (35%)					$ 2,284,000
Subtotal of Pump Station(s)					$ 8,810,000

CONSTRUCTION TOTAL		$ 72,556,000
Permitting and Mitigation		$ 689,000
Interest During Construction	(12 months)	$ 3,023,000
TOTAL COST		**$ 76,268,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 6,649,000
Electricity ($0.09 kWh)	$ 726,000
Operation & Maintenance	$ 704,000
Water Purchase	$ 587,000
Total Annual Costs	**$ 8,666,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,444
Per 1,000 Gallons	$ 4.43

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 336
Per 1,000 Gallons	$ 1.03

WUGNAME: CRMWD
STRATEGY: Ward County Well Field Replacement Wells
STRATEGY NUMBER:
AMOUNT (ac-ft/yr): 0

CONSTRUCTION COSTS

Well Field	Size	Quantity	Unit	Unit Price	Cost
Water wells		14	EA	$ 338,000	$ 4,732,000
Well field pipeline	12"	2,000	LF	$ 52	$ 104,000
Well field pipeline	14"	2,000	LF	$ 60	$ 120,000
Well field pipeline	18"	2,000	LF	$ 77	$ 154,000
Well field pipeline	24"	2,000	LF	$ 116	$ 232,000
Well field pipeline	27"	2,000	LF	$ 131	$ 261,000
Well field pipeline	30"	4,000	LF	$ 145	$ 580,000
Other well field appurtenances (20%)			LS		$ 290,200
Engineering and contingencies (35%)					$ 2,266,000
Subtotal Well field					$ 8,739,000

CONSTRUCTION TOTAL		$ 8,739,000
Permitting and Mitigation		$ 78,000
Interest During Construction	(6 months)	$ 189,000
TOTAL COST		**$ 9,006,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 785,000
Operation & Maintenance	$ 65,000
Total Annual Costs	**$ 850,000**

WUGNAME: CRMWD
STRATEGY: Capitan Reef Complex Desalination Facility
STRATEGY NUMBER: F16DESAL
AMOUNT (ac-ft/yr): 9,500

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land acquisition		14	AC	$ 2,632	$ 38,000
Well Pumps	500 gpm	20	EA	$ 19,741	$ 395,000
Well Collection Piping	8-inch	20,000	L.F.	$ 53	$ 1,053,000
Well Construction		20	EA	$ 429,041	$ 8,581,000
Ground Storage Tank (6 hrs)	3.3 MG	1	L.S.	$ 985,000	$ 985,000
Engineering and Contingencies (35%)					$ 3,868,000
Subtotal Well Field					$ 14,920,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	30 in.	289,000	L.F.	$ 145	$ 41,905,000
Transmission pipeline - treatment plant to dispc	16 in.	2,000	L.F.	$ 69	$ 138,000
Right-of-way easements		140	AC	$ 2,000	$ 280,000
Engineering and Contingencies (30%)					$ 12,697,000
Subtotal Pipeline					$ 55,020,000

Pumps	**Size**	**Quantity**	**Unit**		**Cost**
Well field to treatment plant	7500 gpm	3	EA	$ 92,125	$ 276,000
Booster Station	1600 HP	1	EA	$ 3,657,200	$ 3,657,000
Ground storage tank	5 MG	1	EA	$ 1,303,000	$ 1,303,000
High service pump station	2000 gpm	1	LS	$ 236,894	$ 237,000
Ground storage tank	2.5 MG	1	LS	$ 821,000	$ 821,000
High pressure well disposal pumps	1300 gpm	3	EA	$ 26,322	$ 79,000
Engineering and Contingencies (35%)					$ 2,231,000
Subtotal of Pumps					$ 8,604,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
RO Unit	10.0 MGD	1	LS	$ 9,800,000	$ 9,800,000
Disinfection facility		1	LS	$ 223,733	$ 224,000
Metal Building		5,000	SF	$ 118	$ 592,000
Engineering and Contingencies (35%)					$ 3,716,000
Subtotal of Treatment					$ 14,332,000

Reject Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Brine lagoon	37.5 MG	1	LS	$ 3,158,583	$ 3,159,000
Disposal wells		10	LS	$ 1,579,292	$ 15,793,000
Engineering and Contingencies (35%)					$ 6,633,000
Subtotal of Reject Facilities					$ 25,585,000

WUGNAME: CRMWD
STRATEGY: Capitan Reef Complex Desalination Facility

Electrical and Instrumentation	**Size**	**Quantity**	**Unit**			**Cost**
Electrical		1	LS	$	2,594,677	$ 2,595,000
Instrumentation		1	LS	$	1,729,785	$ 1,730,000
Power Service		25,000	LF	$	39	$ 987,000
Engineering and Contingencies (35%)						$ 1,859,000
Subtotal of Electrical & Instrumentation						$ 7,171,000
CONSTRUCTION TOTAL						$ 125,632,000
Permitting and Mitigation						$ 736,990
Interest During Construction	(12 months)					$ 5,235,000
TOTAL COST						**$ 131,603,990**
ANNUAL COSTS						
Debt Service (6% for 20 years)						$ 11,474,000
Electricity ($0.09 kWh)						$ 2,171,378
Operation & Maintenance						$ 3,240,000
Water Purchase						$ 929,000
Total Annual Costs						**$ 17,814,378**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water						$ 1,875
Per 1,000 Gallons						$ 5.75
UNIT COSTS (After Amortization)						
Per Acre-Foot						$ 667
Per 1,000 Gallons						$ 2.05

WUGNAME: City of Eden
STRATEGY: 0.7 MGD RO Plant
STRATEGY NUMBER: F27ADVTR
AMOUNT (ac-ft/yr): 392

CONSTRUCTION COSTS

Treatment Facility	Size	Quantity	Unit	Unit Price		Cost
RO Plant	0.7 MGD	1	LS	$ 1,420,000	$	1,420,000
Storage Tank	0.75 MG	1	LS	$ 401,000	$	401,000
Engineering and Contingencies (35%)					$	637,000
CONSTRUCTION TOTAL					$	2,458,000
Permitting and Mitigation					$	22,000
Interest During Construction	(12 months)				$	102,000
TOTAL COST					**$**	**2,582,000**
ANNUAL COSTS						
Debt Service (6% for 20 years)					$	225,000
O&M					$	96,000
Total Annual Cost					**$**	**321,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	819
Per 1,000 gallons					$	2.51
UNIT COSTS (After Amortization)						
Per Acre-Foot of treated water					$	245
Per 1,000 gallons					$	0.75

WUGNAME: City of Eden
STRATEGY: Replacement Well
STRATEGY NUMBER: F30REPWELL
AMOUNT (ac-ft/yr): 323

CAPITAL COSTS

	Quantity	Units	Unit Price		Cost
Water Well Construction	1	EA		$	1,211,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	403,000
Subtotal				**$**	**1,746,000**
Permitting and Mitigation				$	16,000
Interest During Construction				$	38,000
TOTAL CAPITAL COST				**$**	**1,800,000**

ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	157,000
O&M				$	13,000
Chemicals		1000 gal	$ 0.10	$	11,000
Electricity				$	178,000
Total Annual Cost				**$**	**359,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$	1,113
Per 1,000 gallons	$	3.42

UNIT COSTS (After Amortization)

Per Acre-Foot of treated water	$	626
Per 1,000 gallons	$	1.92

WUGNAME: City of Eden
STRATEGY: Eden Bottled Water System
STRATEGY NUMBER: F26BOTTLE
AMOUNT (ac-ft/yr): 1.34

CAPITAL COSTS		2002 **Cost**		2008 **Cost**
Equipment	$	40,000	$	53,000
Installation	$	10,000	$	13,000
Metal Buildings	$	60,000	$	79,000
Engineering and Contingences (20%)	$	22,000	$	29,000
TOTAL CAPITAL COST FOR TWO SYSTEMS	$	132,000	$	174,000
Permitting	$	1,320	$	2,000
TOTAL CAPITAL COST	$	133,320	$	176,000
ANNUAL COSTS				
Debt Service (6% for 10 yrs)	$	18,114	$	24,000
O&M at $2 per 1000 gallon	$	8,760	$	9,000
Total Annual Cost	$	26,874	$	33,000
UNIT COSTS				
Per Acre-Foot of Bottled Water	$	19,994	$	24,552
Per 1,000 gallons	$	61.36	$	75.34

WUGNAME: Kimble County Manufacturing
STRATEGY: New Groundwater from Edwards-Trinity Plateau Aquifer
STRATEGY NUMBER: F10ETRGW
AMOUNT (ac-ft/yr): 1,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	8-in.	5	EA	$ 142,136	$ 711,000
Connection to Existing System		5	LF	$ 65,804	$ 329,000
Engineering and contingencies (35%)					$ 364,000
Subtotal Well field					$ 1,404,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	12 in.	79,200	LF	$ 52	$ 4,118,000
Right-of-way easements		36	AC	$ 2,000	$ 72,000
Engineering and Contingencies (30%)					$ 1,257,000
Subtotal Pipeline					$ 5,447,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	200 HP	1	EA	$ 1,118,000	$ 1,118,000
Storage tank	0.5 MG	1	EA	$ 333,000	$ 333,000
Engineering and Contingencies (35%)					$ 508,000
Subtotal of Pump Station(s)					$ 1,959,000

CONSTRUCTION TOTAL		$ 8,810,000
Permitting and Mitigation		$ 79,000
Interest During Construction	(6 months)	$ 191,000
TOTAL COST		**$ 9,080,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 792,000
Electricity ($0.09kWh)	$ 84,000
Operation & Maintenance	$ 106,000
Water Purchase	$ 98,000
Total Annual Costs	**$ 1,080,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,080
Per 1,000 Gallons	$ 3.31

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 288
Per 1,000 Gallons	$ 0.88

WUGNAME: Menard
STRATEGY: New Hickory Well
STRATEGY NUMBER: F11HICGW
AMOUNT (ac-ft/yr): 160

CONSTRUCTION COSTS

Well Field	Size	Quantity	Unit	Unit Price	Cost
Water wells	10-in	1	EA	$ 1,144,460	$ 1,144,000
Connection to existing system		1	LS	$ 65,804	$ 66,000
Engineering and contingencies (35%)					$ 424,000
Subtotal Well field					$ 1,634,000

CONSTRUCTION TOTAL		$ 1,634,000
Permitting and Mitigation		$ 15,000
Interest During Construction	(6 months)	$ 35,000
TOTAL COST		**$ 1,684,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 147,000
Electricity ($0.09 kWh)	$ 75,000
Operation & Maintenance	$ 11,000
Total Annual Costs	**$ 233,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,456
Per 1,000 Gallons	$ 4.47

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 538
Per 1,000 Gallons	$ 1.65

WUGNAME: Menard
STRATEGY: New Hickory Well with ASR
STRATEGY NUMBER: F17ASR
AMOUNT (ac-ft/yr): 240

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	10-in	1	EA	$ 1,144,460	$ 1,144,000
Connection to existing system		1	LS	$ 65,804	$ 66,000
Injection pump		1	EA	$ 19,741	$ 20,000
Engineering and contingencies (35%)					$ 431,000
Subtotal Well field					$ 1,661,000

CONSTRUCTION TOTAL		$ 1,661,000
Permitting and Mitigation		$ 55,000
Interest During Construction	(6 months)	$ 36,000
TOTAL COST		**$ 1,752,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 153,000
Electricity ($0.09 kWh)	$ 137,000
Operation & Maintenance	$ 15,000
Total Annual Costs	**$ 305,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,271
Per 1,000 Gallons	$ 3.90

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 633
Per 1,000 Gallons	$ 1.94

WUGNAME: Menard
STRATEGY: San Saba Off-Channel Reservoir
STRATEGY NUMBER: F22OCR
AMOUNT (ac-ft/yr): 500

CONSTRUCTION COSTS

Reservoir	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Mobilization		1	LS	$ 278,613	$ 279,000
Care of Water During Construction		1	LS	$ 61,724	$ 62,000
Clearing and Grubbing		5	Ac	$ 2,632	$ 14,000
Foundation Preparation		1	LS	$ 65,804	$ 66,000
Required Excavation		10,000	CY	$ 5	$ 46,000
Borrow Excavation		188,000	CY	$ 5	$ 866,000
Random Compacted Fill		198,000	CY	$ 6	$ 1,173,000
Core Wall		4,000	CY	$ 428	$ 1,711,000
Soil Cement		8,000	CY	$ 105	$ 842,000
Flex Base Roadway		1,000	CY	$ 53	$ 53,000
Spillway Structure Reinforced Concrete		1,800	CY	$ 494	$ 888,000
Rock Riprap		550	CY	$ 132	$ 72,000
Misc. Internal Drainage		1	LS	$ 658,038	$ 658,000
Instrumentation-Piezometers		1	LS	$ 65,804	$ 66,000
Instrumentation-Monuments		1	LS	$ 32,902	$ 33,000
Reservoir site		75	AC	$ 2,300	$ 173,000
Engineering and contingencies (35%)					$ 2,451,000
Subtotal Reservoir					$ 9,453,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Pipeline from River to OCR	24 in	1,500	LF	$ 116	$ 174,000
Pipeline from OCR to WTP	8 in	5,400	LF	$ 34	$ 184,000
Pipeline from WTP to Menard	8 in	2,300	LF	$ 34	$ 78,000
Right-of-way easements		1	AC	$ 2,000	$ 2,000
Engineering and Contingencies (30%)					$ 131,000
Subtotal Pipeline					$ 569,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Channel Weir		1	LS	$ 361,921	$ 362,000
River Pump Station	400 HP	1	LS	$ 1,795,000	$ 1,795,000
Reservoir Pump Station w intake	50 HP	1	LS	$ 645,000	$ 645,000
Pump Station (WTP to Menard)	50 HP	1	EA	$ 645,000	$ 645,000
Engineering and Contingencies (35%)					$ 1,206,000
Subtotal of Pump Station(s)					$ 4,653,000

New Water Treatment Plant	**Size**	**Quantity**	**Unit**		**Cost**
Conventional WTP	1.1 mgd	1	LS	$ 6,040,000	$ 6,040,000
Engineering and Contingencies (35%)					$ 2,114,000
Subtotal WTP					$ 8,154,000

CONSTRUCTION TOTAL $ 22,829,000

WUGNAME:	Menard		
STRATEGY:	San Saba Off-Channel Reservoir		
Permitting and Mitigation		$	580,000
Interest During Construction	(24 months)	$	1,864,000
TOTAL COST		**$**	**25,273,000**
ANNUAL COSTS			
Debt Service (6% for 30 years)		$	1,836,000
Electricity ($0.09 kWh)		$	30,000
Operation & Maintenance		$	235,000
Water Treatment		$	57,000
Water Purchase		$	57,000
Total Annual Costs		**$**	**2,215,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	4,430
Per 1,000 Gallons		$	13.60
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	758
Per 1,000 Gallons		$	2.33

WUGNAME: Midland
STRATEGY: T-Bar Well Field
STRATEGY NUMBER: F12CenGW
AMOUNT (ac-ft/yr): 13,600

Based on draft cost estimate by PSC. Provided by City of Midland on 5/16/05

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Wells		43	EA	$ 430,000	$ 18,490,000
Well field piping		20	MGD	$ 329,019	$ 6,580,000
Well field site improvements		1	LS	$ 4,794,466	$ 4,794,000
Engineering and Contingencies (35%)					$ 10,452,000
					$ 40,316,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Pipe	36 in.	368,860	LF	$ 184	$ 67,870,000
Right-of-way easements		169	AC	$ 2,632	$ 445,000
Engineering and Contingencies (30%)					$ 20,495,000
Subtotal Pipeline					$ 88,810,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station at Well Field	1900 HP	1	LS	$ 4,050,800	$ 4,051,000
Storage Tank at Well Field	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Booster Station	1900 HP	1	LS	$ 4,050,800	$ 4,051,000
Storage Tank at Booster Station	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Storage Tank at High Point	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Chlorination and other improvements		1	LS	$ 10,528,610	$ 10,529,000
Engineering and Contingencies (35%)					$ 8,101,000
Subtotal of Pump Station(s)					$ 31,247,000

CONSTRUCTION TOTAL		$ 160,373,000
Permitting and Mitigation		$ 1,451,000
Interest During Construction	(12 months)	$ 6,683,000
TOTAL COST		**$ 168,507,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 14,691,000
Electricity ($0.09 kWh)	$ 1,885,500
Operation & Maintenance	$ 2,763,000
Total Annual Costs	**$ 19,339,500**

UNIT COSTS (Before Amortization)

Per Acre-Foot of treated water	$ 1,422
Per 1,000 Gallons	$ 4.36

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 342
Per 1,000 Gallons	$ 1.05

WUGNAME: Odessa and Midland
STRATEGY: Odessa and Midland Reuse Project
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 9,799

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**		**Unit Price**		**Cost**
Reclaimed Treatment Plant Land Acquisition		5	AC	$	5,000	$	25,000
Disposal Facilities Land Acquisition		25	AC	$	1,000	$	25,000
Engineering and Contingencies (35%)						$	18,000
Subtotal Land Acquisition						$	68,000
Pipeline	**Size**	**Quantity**	**Unit**				**Cost**
Transmission pipeline	30 in	84,000	LF	$	215	$	18,060,000
Transmission pipeline	24 in	3,000	LF	$	174	$	522,000
Transmission pipeline	12 in	5,280	LF	$	77	$	407,000
Right-of-way easements		122	AC	$	2,000	$	244,000
Engineering and Contingencies (30%)						$	5,770,000
Subtotal Pipeline						$	25,003,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**				**Cost**
Pump Station Reclaimed water to terminal	2-7500 gpm	1	EA	$	160,561	$	161,000
Pump Station Midland Reclaimed Water	2-7640 gpm	1	EA	$	221,101	$	221,000
Storage tank Reclaimed water to terminal	2.7 MG	1	EA	$	863,800	$	864,000
Storage tank Midland Reclaimed Water	3.75 MG	1	EA`	$	1,070,500	$	1,071,000
Engineering and Contingencies (35%)						$	811,000
Subtotal of Pump Station(s)						$	3,128,000
Treatment Equipment	**Size**	**Quantity**	**Unit**				**Cost**
Microfiltration/Ultrafiltration (MF/UF)		1	EA	$	7,959,629	$	7,960,000
Reverse Osmosis (RO)		1	EA	$	7,675,357	$	7,675,000
UV/Oxidation		1	EA	$	2,105,722	$	2,106,000
Secondary Treatment @ Midland's WWTP	3.75 MG	1	EA	$	8,225,477	$	8,225,000
Engineering and Contingencies (35%)						$	9,088,000
Subtotal of Treatment Equipment						$	35,054,000
Reject Facilities		**Quantity**	**Unit**				**Cost**
High Pressure Membrane Reject							
Pumps	1875 gpm	1	EA	$	144,768	$	145,000
RO reject lagoon	2.7 MG	1	EA	$	592,234	$	592,000
Brine Lagoon	40.5 MG	1	EA	$	2,937,482	$	2,937,000
Disposal Well		4	EA	$	1,974,114	$	7,896,000
Pipeline	18 in	85,000	LF	$	116	$	9,860,000
Low Pressure Membrane Reject							
Lagoon	1.5 MG	1	LS	$	723,842	$	724,000
Engineering and Contingencies (35%)						$	7,754,000
Subtotal of Reject Facilities						$	29,908,000

WUGNAME: Odessa and Midland
STRATEGY: Odessa and Midland Reuse Project

Aquifer Storage and Recovery		**Quantity**	**Unit**				**Cost**
Pipeline	14 in	27,000	LF	$	90	$	2,430,000
Pumps	1875 gpm	1	EA	$	44,747	$	45,000
Well Field Modification		1	LS	$	65,804	$	66,000
Engineering and Contingencies (35%)						$	889,000
Subtotal of Aquifer Storage and Recovery						$	3,430,000

Building		**Quantity**	**Unit**				**Cost**
Metal Building		15,000	SF	$	118	$	1,777,000
Engineering and Contingencies (35%)						$	622,000
Subtotal of Building						$	2,399,000

Electrical							**Cost**
10% of Equipment Cost						$	1,831,000
Engineering and Contingencies (35%)						$	641,000
Subtotal of Electrical						$	2,472,000

Instrumentation							**Cost**
10% of Equipment Cost						$	1,831,000
Engineering and Contingencies (35%)						$	641,000
Subtotal of Instrumentation						$	2,472,000

CONSTRUCTION TOTAL						$	103,934,000
Permitting and Mitigation						$	929,000
Interest During Construction	(12 months)					$	4,331,000
TOTAL COST						**$**	**109,194,000**

ANNUAL COSTS							
Debt Service (6% for 20 years)						$	9,520,000
Operation & Maintenance						$	3,752,000
Total Annual Costs						**$**	**13,272,000**

UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,354
Per 1,000 Gallons						$	4.16

UNIT COSTS (After Amortization)							
Per Acre-Foot						$	383
Per 1,000 Gallons						$	1.18

WUGNAME:	Richland SUD & McCulloch County Other (City of Melvin, Live
STRATEGY:	Central Bottled Water Point in Brady
STRATEGY NUMBER:	F26BOTTLE
AMOUNT (ac-ft/yr):	0.5

		Cost
Capital Costs for Set-up	$	3,000
ANNUAL COSTS		
Total Administrative Costs	$	13,000
Water Cost	$	1,200
Total Annual Cost	$	14,200
PRO-RATED ANNUAL COSTS		
Richland SUD	$	10,200
Melvin	$	2,000
Live Oak Hills Subdivision	$	2,000
UNIT COSTS		
Per Acre-Foot Bottled	$	28,780
Per 1,000 Gallons	$	88.32

WUGNAME: Richland SUD
STRATEGY: Richland SUD Specialized Media System
STRATEGY NUMBER: F27ADVTR
AMOUNT (ac-ft/yr): 113

CAPITAL COSTS

		Cost
Building	$	39,000
Connection to System	$	26,000
Engineering and Permitting	$	13,000
TOTAL CAPITAL COST	**$**	**78,000**

ANNUAL COSTS

Debt Service (6% over 10 years)	$	11,000
Payments to WRT	$	46,000
Power Supply	$	11,000
Personnel	$	7,000
Total Annual Cost	**$**	**75,000**

UNIT COSTS

Per Acre-Foot Delivered	$	664
Per 1,000 Gallons	$	2.04

WUGNAME: Richland SUD
STRATEGY: Replacement Well
STRATEGY NUMBER: F30REPWELL
AMOUNT (ac-ft/yr): 113

CAPITAL COSTS

	Quantity	Units	Unit Price		Cost
Water Well Construction	1	EA		$	1,137,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	381,000
Subtotal				**$**	**1,650,000**
Permitting and Mitigation				$	15,228
Interest During Construction				$	35,751
TOTAL CAPITAL COST				**$**	**1,700,979**

ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	148,000
O&M				$	13,000
Chemicals		1000 gal	$ 0.10	$	4,000
Electricity				$	59,000
Total Annual Cost				**$**	**224,000**

UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water	$	1,982
Per 1,000 gallons	$	6.08

UNIT COSTS (After Amortization)		
Per Acre-Foot of treated water	$	673
Per 1,000 gallons	$	2.06

WUGNAME: Richland SUD
STRATEGY: New Groundwater from Ellenberger Aquifer in San Saba County
STRATEGY NUMBER: F14ELLGW
AMOUNT (ac-ft/yr): 200

CONSTRUCTION COSTS

Pipeline	**Size**	**Quantity**	**Unit**				**Cost**
Transmission pipeline	10 in.	52,800	LF	$	43	$	2,270,000
Right-of-way easements		24	AC	$	2,000	$	48,000
Engineering and Contingencies (30%)						$	695,000
Subtotal Pipeline						$	3,013,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**				**Cost**
Pump Station	10.0 HP	1	EA	$	538,000	$	538,000
Ground Storage	1.00 MG	2	EA	$	469,000	$	938,000
Engineering and Contingencies (35%)						$	517,000
Subtotal of Pump Station(s)						$	1,993,000

CONSTRUCTION TOTAL		$	5,006,000
Permitting and Mitigation		$	34,000
Interest During Construction	(6 months)	$	108,000
TOTAL COST		**$**	**5,148,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$	449,000
Electricity ($0.09kWh)	$	2,000
Operation & Maintenance	$	72,000
Total Annual Costs	**$**	**523,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$	2,615
Per 1,000 Gallons	$	8.03

UNIT COSTS (After Amortization)

Per Acre-Foot	$	370
Per 1,000 Gallons	$	1.14

WUGNAME: Robert Lee
STRATEGY: Mountain Creek Intake Structure
STRATEGY NUMBER: F20Intake
AMOUNT (ac-ft/yr): 50

CONSTRUCTION COSTS

Floating Pump with Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Floating Pump	10 HP	1	LS	$ 329,019	$ 329,000
Pipeline	12 in.	1,000	LF	$ 52	$ 52,000
Engineering and Contingencies (35%)					$ 133,000
Subtotal Pump Station and Intake					$ 514,000
CONSTRUCTION TOTAL					$ 514,000
Permitting and Mitigation					$ 3,000
Interest During Construction	(6 months)				$ 11,000
TOTAL COST					**$ 528,000**
ANNUAL COSTS*					
Debt Service (6% for 20 years)*					$ 46,000
Electricity ($0.09 kWh)					$ 600
Operation & Maintenance					$ 10,000
Total Annual Costs					**$ 56,600**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,132
Per 1,000 Gallons					$ 3.47
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 212
Per 1,000 Gallons					$ 0.65

WUGNAME: Robert Lee
STRATEGY: Infrastructure expansion
STRATEGY NUMBER:
AMOUNT (ac-ft/yr): 200

CONSTRUCTION COSTS

Infrastructure Improvemens	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Water Treatment Plant Expansion	.5 mgd	1	LS	$ 1,500,000	$	1,500,000
Additional Storage	0.1 MG	1	LS	$ 156,000	$	156,000
Other Improvements		1	LS	$ 100,000	$	100,000
Engineering and Contingencies (35%)					$	615,000
Subtotal Infrastructure Improvements					$	2,371,000
CONSTRUCTION TOTAL					$	2,371,000
Permitting and Mitigation					$	14,000
Interest During Construction	(6 months)				$	51,000
TOTAL COST					**$**	**2,436,000**
ANNUAL COSTS*						
Debt Service (6% for 20 years)*					$	212,000
Water Treatment					$	45,600
Operation & Maintenance					$	8,000
Total Annual Costs					**$**	**265,600**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,328
Per 1,000 Gallons					$	4.08
UNIT COSTS (After Amortization)						
Per Acre-Foot					$	268
Per 1,000 Gallons					$	0.82

WUGNAME: Robert Lee
STRATEGY: Lake Spence Desalination Facility
STRATEGY NUMBER: F16Desal
AMOUNT (ac-ft/yr): 500

CONSTRUCTION COSTS

Pump Station with Intake	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station with Intake	50 HP	1	LS	$ 857,850	$ 858,000
Engineering and Contingencies (35%)					$ 300,000
Subtotal Pump Station and Intake					$ 1,158,000

Transmission to Treatment Plant	**Size**	**Quantity**	**Unit**		**Cost**
Pipeline	10-inch	15,840	LF	$ 43	$ 681,000
Right-of-way		7.3	AC	$ 2,000	$ 15,000
Engineering and Contingencies (30%)					$ 209,000
Subtotal Transmission to Treatment Plant					$ 905,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
RO Treatment Facility	1.0 MGD	1	LS	$ 4,500,000	$ 4,500,000
Ground storage tank	0.1 MG	1	LS	$ 156,000	$ 156,000
Engineering and Contingencies (35%)					$ 1,630,000
Subtotal of Treatment					$ 6,286,000

CONSTRUCTION TOTAL		$ 8,349,000
Permitting and Mitigation		$ 74,000
Interest During Construction	(12 months)	$ 348,000
TOTAL COST		**$ 8,771,000**

ANNUAL COSTS*

Debt Service (6% for 20 years)*	$ 765,000
Electricity ($0.09 kWh)	$ 13,500
Operation & Maintenance	$ 39,000
Water Treatment	$ 122,000
Total Annual Costs	**$ 939,500**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,879
Per 1,000 Gallons	$ 5.77

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 349
Per 1,000 Gallons	$ 1.07

WUGNAME: Robert Lee
STRATEGY: New Groundwater from Alluvium in Coke County
STRATEGY NUMBER: F10RLGW
AMOUNT (ac-ft/yr): 150

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	6-in.	2	EA	$ 120,900	$ 242,000
Engineering and contingencies (35%)					$ 85,000
Subtotal Well field					$ 327,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	6 in.	7,920	LF	$ 26	$ 206,000
Right-of-way easements		36	AC	$ 2,000	$ 72,000
Engineering and Contingencies (30%)					$ 83,000
Subtotal Pipeline					$ 361,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	10.0 HP	1	EA	$ 538,000	$ 538,000
Engineering and Contingencies (35%)					$ 188,000
Subtotal of Pump Station(s)					$ 726,000

CONSTRUCTION TOTAL		$ 1,414,000
Permitting and Mitigation		$ 12,000
Groundwater Rights		$ 45,000
Interest During Construction	(6 months)	$ 31,000
TOTAL COST		**$ 1,502,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 131,000
Electricity ($0.09kWh)	$ 4,000
Operation & Maintenance	$ 22,000
Total Annual Costs	**$ 157,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,047
Per 1,000 Gallons	$ 3.21

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 173
Per 1,000 Gallons	$ 0.53

WUGNAME: Robert Lee
STRATEGY: Treated water from San Angelo using Spence Pipeline
STRATEGY NUMBER: F06AVOLRED
AMOUNT (ac-ft/yr): 400

CONSTRUCTION COSTS

Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	14.0 HP	1	LS	$ 548,400	$	548,000
Engineering and Contingencies (35%)					$	192,000
Subtotal Pump Station					$	740,000
Rehabilitation of Spence pipeline						
See Cost Table for San Angelo						
CONSTRUCTION TOTAL					$	740,000
Permitting and Mitigation					$	7,000
Interest During Construction	(12 months)				$	31,000
TOTAL COST					**$**	**778,000**
ANNUAL COSTS*						
Debt Service (6% for 20 years)*					$	68,000
Electricity ($0.09 kWh)					$	5,000
Operation & Maintenance					$	3,000
Water Purchase ($3.00/ kgal)					$	391,000
Total Annual Costs					**$**	**467,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,168
Per 1,000 Gallons					$	3.58
UNIT COSTS (After Amortization)						
Per Acre-Foot					$	998
Per 1,000 Gallons					$	3.06

WUGNAME: San Angelo
STRATEGY: Phase I - 5.0 MGD Regional Brackish Water Desalination Facility
STRATEGY NUMBER: F16DESAL
AMOUNT (ac-ft/yr): 5,600

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land acquisition		800	AC	$ 2,632	$ 2,106,000
Well pumps	500 gpm	16	EA	$ 19,741	$ 316,000
Well construction		16	EA	$ 197,411	$ 3,159,000
Well field piping		5	LS	$ 329,019	$ 1,645,000
Ground storage tank	1.5 MG	1	LS	$ 591,000	$ 591,000
Engineering and Contingencies (35%)					$ 2,736,000
Subtotal Well Field					$ 10,553,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline - well field to treatment p	30 in.	158,400	LF	$ 145	$ 22,968,000
Transmission pipeline - treatment plant to dispo	16 in.	2,000	LF	$ 69	$ 138,000
Right-of-way easements		56.47	AC	$ 1,000	$ 56,000
Engineering and Contingencies (30%)					$ 6,949,000
Subtotal Pipeline					$ 30,111,000

Pumps	**Size**	**Quantity**	**Unit**		**Cost**
Well field to treatment plant	4000 gpm	2	EA	$ 92,125	$ 184,000
High pressure well disposal pumps	1300 gpm	2	EA	$ 26,322	$ 53,000
Engineering and Contingencies (35%)					$ 83,000
Subtotal of Pumps					$ 320,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Land acquisition		30	AC	$ 2,632	$ 79,000
RO Unit	5.0 MGD	1	LS	$ 5,200,000	$ 5,200,000
Ground storage tank	2.5 MG	1	LS	$ 821,000	$ 821,000
Disinfection facility		1	LS	$ 157,929	$ 158,000
Metal Building		5,000	SF	$ 118	$ 592,000
Engineering and Contingencies (35%)					$ 2,398,000
Subtotal of Treatment					$ 9,248,000

Reject Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Brine lagoon	19 MG	1	LS	$ 1,776,703	$ 1,777,000
Disposal wells		7	LS	$ 1,579,292	$ 11,055,000
Engineering and Contingencies (35%)					$ 4,491,000
Subtotal of Reject Facilities					$ 17,323,000

WUGNAME: San Angelo
STRATEGY: Phase I - 5.0 MGD Regional Brackish Water Desalination Facility

Electrical and Instrumentation	**Size**	**Quantity**	**Unit**				**Cost**
Electrical		1	LS	$	467,273	$	467,000
Instrumentation		1	LS	$	311,515	$	312,000
Power Service		10,000	LF	$	39	$	395,000
Engineering and Contingencies (35%)						$	411,000
Subtotal of Electrical & Instrumentation						$	1,585,000
CONSTRUCTION TOTAL						$	69,140,000
Permitting and Mitigation						$	653,000
Interest During Construction	(24 months)					$	5,647,000
TOTAL COST						**$**	**75,440,000**
ANNUAL COSTS							
Debt Service (6% for 20 years)						$	6,577,000
Electricity ($0.09 kWh)						$	643,500
Operation & Maintenance						$	1,456,000
Water Purchase						$	547,430
Total Annual Costs						**$**	**9,223,930**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,647
Per 1,000 Gallons						$	5.05
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	473
Per 1,000 Gallons						$	1.45

WUGNAME: San Angelo
STRATEGY: Phase II - Upgrade Desal Facility to 10 MGD
STRATEGY NUMBER: F16DESAL
AMOUNT (ac-ft/yr): 11,200

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land acquisition		800	AC	$ 2,632	$ 2,106,000
Well pumps	500 gpm	16	EA	$ 19,741	$ 316,000
Well construction		16	EA	$ 197,411	$ 3,159,000
Well field piping		5	LS	$ 329,019	$ 1,645,000
Ground storage tank	1.5 MG	1	LS	$ 591,000	$ 591,000
Engineering and Contingencies (35%)					$ 2,736,000
Subtotal Well Field					$ 10,553,000

Pumps	**Size**	**Quantity**	**Unit**		**Cost**
Well field to treatment plant	4000 gpm	3	EA	$ 92,125	$ 276,000
High pressure well disposal pumps	1300 gpm	1	EA	$ 26,322	$ 26,000
Engineering and Contingencies (35%)					$ 106,000
Subtotal of Pumps					$ 408,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
RO Unit	5.0 MGD	1	LS	$ 5,200,000	$ 5,200,000
Disinfection facility		1	LS	$ 65,804	$ 66,000
Engineering and Contingencies (35%)					$ 1,843,000
Subtotal of Treatment					$ 7,109,000

Reject Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Brine lagoon	19 MG	1	LS	$ 1,776,703	$ 1,777,000
Disposal wells		7	LS	$ 1,579,292	$ 11,055,000
Engineering and Contingencies (35%)					$ 4,491,000
Subtotal of Reject Facilities					$ 17,323,000

Electrical and Instrumentation	**Size**	**Quantity**	**Unit**		**Cost**
Electrical		1	LS	$ 467,273	$ 467,000
Instrumentation		1	LS	$ 311,515	$ 312,000
Power Service		10,000	LF	$ 39	$ 395,000
Engineering and Contingencies (35%)					$ 411,000
Subtotal of Electrical & Instrumentation					$ 1,585,000

CONSTRUCTION TOTAL $ 36,978,000

WUGNAME:	San Angelo		
STRATEGY:	Phase II - Upgrade Desal Facility to 10 MGD		
Permitting and Mitigation		$	329,000
Interest During Construction	(24 months)	$	3,020,000
TOTAL COST		**$**	**40,327,000**
ANNUAL COSTS*			
Debt Service (6% for 20 years)*		$	7,055,000
Electricity ($0.09 kWh)		$	1,375,500
Operation & Maintenance		$	2,514,000
Water Purchase		$	1,095,000
Total Annual Costs		**$**	**12,039,500**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	1,075
Per 1,000 Gallons		$	3.30
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	445
Per 1,000 Gallons		$	1.37

* Includes debt service and other annual costs for 5 MGD facility

WUGNAME: San Angelo
STRATEGY: Groundwater from Edwards-Trinity (Plateau) aquifer
STRATEGY NUMBER: F10ETRGW
AMOUNT (ac-ft/yr): 12,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		10	EA	$ 263,215	$ 2,632,000
Well field piping		15	MGD	$ 329,019	$ 4,935,000
Other well field appurtenances		1	LS	$ 658,038	$ 658,000
Engineering and contingencies (30%)					$ 2,468,000
Subtotal Well Field					$ 10,693,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	30 in.	160,000	LF	$ 145	$ 23,200,000
Right-of-way easements		73	AC	$ 2,000	$ 146,000
Engineering and Contingencies (30%)					$ 7,004,000
Subtotal Pipeline					$ 30,350,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	450 HP	1	EA	$ 1,913,500	$ 1,914,000
Storage tank	6 MG	1	EA	$ 1,505,000	$ 1,505,000
Engineering and Contingencies (35%)					$ 1,197,000
Subtotal of Pump Station(s)					$ 4,616,000

CONSTRUCTION TOTAL		$ 45,659,000
Permitting and Mitigation		$ 420,000
Interest During Construction	(12 months)	$ 1,903,000
TOTAL COST		**$ 47,982,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 4,183,000
Electricity ($0.09 kWh)	$ 2,083,500
Operation & Maintenance	$ 480,000
Water Purchase	$ 1,173,000
Total Annual Costs	**$ 7,919,500**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 660
Per 1,000 Gallons	$ 2.03

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 311
Per 1,000 Gallons	$ 0.96

WUGNAME: San Angelo
STRATEGY: Groundwater from Southwest Pecos County
STRATEGY NUMBER: F13OTHGW
AMOUNT (ac-ft/yr): 12,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		20	EA	$ 921,253	$ 18,425,000
Well field piping		15	MGD	$ 329,019	$ 4,935,000
Other well field appurtenances		1	LS	$ 2,632,153	$ 2,632,000
Engineering and contingencies (30%)					$ 7,798,000
Subtotal Well Field					$ 33,790,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	36 in.	401,719	LF	$ 184	$ 73,916,000
Transmission pipeline - high pressure	36 in.	341,582	LF	$ 184	$ 62,851,000
Transmission pipeline	30 in.	189,072	LF	$ 145	$ 27,415,000
Right-of-way easements		428	AC	$ 1,000	$ 428,000
Engineering and Contingencies (30%)					$ 49,383,000
Subtotal Pipeline					$ 213,993,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	500 HP	1	EA	$ 2,032,000	$ 2,032,000
Storage tank	6 MG	2	EA	$ 1,505,000	$ 3,010,000
Engineering and Contingencies (35%)					$ 1,765,000
Subtotal of Pump Station(s)					$ 6,807,000

CONSTRUCTION TOTAL		$ 254,590,000
Permitting and Mitigation		$ 2,348,000
Interest During Construction	(24 months)	$ 20,792,000
TOTAL COST		**$ 277,730,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 24,214,000
Electricity ($0.09 kWh)	$ 3,900,000
Operation & Maintenance	$ 2,433,000
Water Purchase	$ 1,173,000
Total Annual Costs	**$ 31,720,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 2,643
Per 1,000 Gallons	$ 8.11

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 626
Per 1,000 Gallons	$ 1.92

WUGNAME: San Angelo
STRATEGY: McCulloch County Well Field Phase 1
STRATEGY NUMBER: F11HICGW
AMOUNT (ac-ft/yr): 6,700
Implementation Date 2014

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Water wells		8	EA	$ 921,253	$	7,370,000
Well field piping		1	LS	$ 8,618,984	$	8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$	1,382,000
Engineering and contingencies (30%)					$	5,211,000
Subtotal Well Field					$	22,582,000

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	36 in.	304,000	LF	$ 184	$	55,936,000
Right-of-way easements		140	AC	$ 2,000	$	280,000
Engineering and Contingencies (30%)					$	16,865,000
Subtotal Pipeline					$	73,081,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station	2600 HP	1	EA	$ 4,684,800	$	4,685,000
Storage tank	6 MG	2	EA	$ 1,505,000	$	3,010,000
Engineering and Contingencies (35%)					$	2,693,000
Subtotal of Pump Station(s)					$	10,388,000

Treatment	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Single Use Ion Exchange	6 MGD	1	EA	$ 6,800,000	$	6,800,000
Engineering and Contingencies (35%)					$	2,380,000
Subtotal of Treatment					$	9,180,000

CONSTRUCTION TOTAL		$	115,231,000
Permitting and Mitigation		$	1,054,000
Interest During Construction	(24 months)	$	9,411,000
TOTAL COST		**$**	**125,696,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$	10,959,000
Electricity ($0.09 kWh)	$	6,145,500
Operation & Maintenance	$	1,110,534
Water Purchase	$	-
Total Annual Costs	**$**	**18,215,034**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$	2,719
Per 1,000 Gallons	$	8.34

UNIT COSTS (After Amortization)

Per Acre-Foot	$	1,083
Per 1,000 Gallons	$	3.32

WUGNAME: San Angelo
STRATEGY: McCulloch County Well Field Phase 2
STRATEGY NUMBER: F11HICGW
AMOUNT (ac-ft/yr): 3,300
Implementation Date 2026

CONSTRUCTION COSTS

Well Field	Size	Quantity	Unit	Unit Price	Cost
Water wells		8	EA	$ 921,253	$ 7,370,000
Well field piping		1	LS	$ 8,618,984	$ 8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$ 1,382,000
Engineering and contingencies (30%)					$ 5,211,000
Subtotal Well Field					$ 22,582,000

Treatment	Size	Quantity	Unit	Unit Price	Cost
Single Use Ion Exchange	3.5 MGD	1	EA	$ 2,100,000	$ 2,100,000
Engineering and Contingencies (35%)					$ 735,000
Subtotal of Treatment					$ 2,835,000

CONSTRUCTION TOTAL		$ 25,417,000
Permitting and Mitigation		$ 242,000
Interest During Construction	(24 months)	$ 2,076,000
TOTAL COST		**$ 27,735,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 2,418,000
Electricity ($0.09 kWh)	$ 6,145,500
Operation & Maintenance	$ 293,502
Water Purchase	$ -
Total Annual Costs	**$ 8,857,002**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 2,684
Per 1,000 Gallons	$ 8.24

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 1,951
Per 1,000 Gallons	$ 5.99

WUGNAME: San Angelo
STRATEGY: McCulloch County Well Field Phase 3
STRATEGY NUMBER: F11HICGW
AMOUNT (ac-ft/yr): 2,000
Implementation Date 2034

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		3	EA	$ 921,253	$ 2,764,000
Well field piping		1	LS	$ 8,618,984	$ 8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$ 1,382,000
Engineering and contingencies (30%)					$ 3,830,000
Subtotal Well Field					$ 16,595,000

Treatment	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Single Use Ion Exchange	1.75 MGD	1	EA	$ 1,200,000	$ 1,200,000
Engineering and Contingencies (35%)					$ 420,000
Subtotal of Treatment					$ 1,620,000

CONSTRUCTION TOTAL		$ 18,215,000
Permitting and Mitigation		$ 173,000
Interest During Construction	(24 months)	$ 1,488,000
TOTAL COST		**$ 19,876,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 1,733,000
Electricity ($0.09 kWh)	$ 6,145,500
Operation & Maintenance	$ 201,780
Water Purchase	$ -
Total Annual Costs	**$ 8,080,280**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 4,040
Per 1,000 Gallons	$ 12.40

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 3,174
Per 1,000 Gallons	$ 9.74

WUGNAME: San Angelo
STRATEGY: Spence Pipeline Rehabilitation
STRATEGY NUMBER: F19REHPIP
AMOUNT (ac-ft/yr): 2,300

CONSTRUCTION COSTS

Pump Station(s) & Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pumping Unit	450 HP	2	EA	$ 197,411	$395,000
Pump Station Control Valve	16 in	2	EA	$ 26,322	$53,000
Isolation Valve	16 in	2	EA	$ 6,580	$13,000
Bridge Pipe		220	LF	$ 197	$43,000
Piping and Appuranturances		1	LS	$ 26,322	$26,000
2400 Switchgear		1	LS	$ 98,706	$99,000
Electrical		1	LS	$ 72,384	$72,000
SCADA System		1	LS	$ 197,411	$197,000
Engineering and Contingencies (30%)					$269,000
Subtotal of Pump Stations					$1,167,000
Pipeline					
Transmission Pipeline	12 in	36,000	LF	$ 77	$2,772,000
Combination Air Valve	6 in	3	EA	$ 11,845	$36,000
Combination Air Valve	3 in	9	EA	$ 9,213	$83,000
Blowoff Valve	6 in	4	EA	$ 6,580	$26,000
Mainline Valves	24 in	3	EA	$ 13,161	$39,000
Cathodic Protection		36,000	LF	$ 7	$237,000
Roadway Bore	42 in	80	LF	$ 592	$47,000
Road Repair		40	LF	$ 395	$16,000
Erosion Control		300	LF	$ 99	$30,000
Permanent Gates		10	EA	$ 1,974	$20,000
Air Valve Rehabilitation	3 in	20	EA	$ 3,290	$66,000
Engineering and Contingencies (30%)					$1,012,000
Subtotal of Pipelines					$4,384,000
Storage Tank					
Rehabilitation of Mountain Top Tank		1	LS	$ 131,608	$132,000
Demolish Pump Station No 1		1	LS	$ 52,643	$53,000
Demolish Pump Station No 2		1	LS	$ 52,643	$53,000
Engineering and Contingencies (30%)					$71,000
Subtotal of Storage Tanks					$309,000
CONSTRUCTION TOTAL					$5,860,000
Permitting and Mitigation					$ 53,000
Interest During Construction	(12 month)				$ 244,000
TOTAL COST					**$ 6,157,000**

WUGNAME:	San Angelo		
STRATEGY:	Spence Pipeline Rehabilitation		
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	537,000
Electricity ($0.09 kWh)		$	179,000
Total Annual Costs		**$**	**716,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	311
Per 1,000 Gallons		$	0.96
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	78
Per 1,000 Gallons		$	0.24

WUGNAME: Snyder
STRATEGY: Snyder Reuse Project
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 726

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**	**Cost**
Reclaimed Treatment Plant Land Acquisition		2	AC	$ 2,632	$ 5,000
Engineering and Contingencies (35%)					$ 2,000
Subtotal Land Acquisition					$ 7,000
Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline to CRMWD GST	8 in	6,800	LF	$ 52	$ 354,000
Transmission pipeline to Reclaimed WTP	8 in	1,500	LF	$ 52	$ 78,000
Transmission pipeline to Disposal	4 in	1,500	LF	$ 26	$ 39,000
Right-of-way easements		7	AC	$ 1,000	$ 7,000
Engineering and Contingencies (30%)					$ 143,000
Subtotal Pipeline					$ 621,000
Pump Station(s) & Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station finished water to CRMWD GST	500	1	EA	$ 52,643	$ 53,000
Pump Station WWTP efluent to Reclaim WTP	700	1	EA	$ 52,643	$ 53,000
Storage reservoir in snyder	15 MG	1	EA	$ 1,302,916	$ 1,303,000
Storage tank	0.18 MG	1	EA	$ 191,400	$ 191,000
Lagoon (1day storage)	1 MG	1	EA`	$ 230,313	$ 230,000
Engineering and Contingencies (35%)					$ 641,000
Subtotal of Pump Station(s)					$ 2,471,000
Treatment Equipment	**Size**	**Quantity**	**Unit**		**Cost**
Microfiltration/Ultrafiltration (MF/UF)		1	EA	$ 798,858	$ 799,000
Reverse Osmosis (RO)		1	EA	$ 568,545	$ 569,000
UV/Oxidation		1	EA	$ 250,054	$ 250,000
Engineering and Contingencies (35%)					$ 566,000
Subtotal of Treatment Equipment					$ 2,184,000
Reject Facilities		**Quantity**	**Unit**		**Cost**
High Pressure Membrane Reject					
Pumps	125 gpm	1	EA	$ 32,902	$ 33,000
RO reject lagoon (1 day storage)	0.18 MG	1	EA	$ 82,913	$ 83,000
Low Pressure Membrane Reject					
Pumps	70 gpm	1	EA	$ 32,902	$ 33,000
Lagoon (1 day storage)	0.2 MG	1	LS	$ 230,313	$ 230,000
Engineering and Contingencies (35%)					$ 133,000
Subtotal of Reject Facilities					$ 512,000

WUGNAME: Snyder
STRATEGY: Snyder Reuse Project

Aquifer Storage and Recovery		**Quantity**	**Unit**				**Cost**
Pipeline	8 in	27,000	LF	$	52	$	1,404,000
Pumps	2-347	1	EA	$	46,063	$	46,000
ASR Well Facilities		1	LS	$	186,883	$	187,000
Engineering and Contingencies (35%)						$	573,000
Subtotal of Aquifer Storage and Recovery						$	2,210,000

Building		**Quantity**	**Unit**				**Cost**
Metal Building		4,500	SF	$	118	$	533,000
Engineering and Contingencies (35%)						$	187,000
Subtotal of Building						$	720,000

Electrical							**Cost**
10% of Equipment Cost						$	168,000
Engineering and Contingencies (35%)						$	59,000
Subtotal of Electrical						$	227,000

Instrumentation							**Cost**
10% of Equipment Cost						$	168,000
Engineering and Contingencies (35%)						$	59,000
Subtotal of Instrumentation						$	227,000

CONSTRUCTION TOTAL						$	9,179,000
Permitting and Mitigation						$	82,000
Interest During Construction	(12 month)					$	382,000
TOTAL COST						**$**	**9,643,000**
ANNUAL COSTS							
Debt Service (6% for 20 years)						$	841,000
Operation & Maintenance						$	263,000
Total Annual Costs						**$**	**1,104,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,521
Per 1,000 Gallons						$	4.67
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	362
Per 1,000 Gallons						$	1.11

WUGNAME:
STRATEGY: Replacement Well
STRATEGY NUMBER: F30REPWELL
AMOUNT (ac-ft/yr): 0

CAPITAL COSTS

	Quantity	Units	Unit Price		Cost
Water Well Construction	1	EA		$	257,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	117,000
Subtotal				**$**	**506,000**
Permitting and Mitigation				$	5,000
Interest During Construction				$	11,000
TOTAL CAPITAL COST				**$**	**522,000**

ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	46,000
O&M				$	4,000
Total Annual Cost				**$**	**50,000**