

APPENDIX H
COST ESTIMATES

Appendix H:

Panhandle Regional Water Planning Area Cost Estimates

As part of the 2006 PWPA Regional Water Plan, cost estimates were developed for each of the recommended water management strategies Region. As appropriate, these cost estimates have been updated for the 2011 regional water 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 for construction 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. For strategies that do not rely heavily on construction costs were updated based on an annual inflation rate of 3 percent.

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 generally 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 72 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.**

New Groundwater Wells

Cost estimates required for water management strategies that include additional wells or well fields can be roughly estimated from the relationships in Table 5. These cost relationships are “rule-of-thumb” in nature and are only appropriate in the broad context of the cost evaluations for the RWP process.

The cost relationships assume construction methods required for public water supply wells, including carbon steel surface casing and pipe-based, stainless steel, and wire-wrap screen.

The cost estimates assume that wells would be gravel-packed in the screen sections and the surface casing cemented to their total depth. Estimates include the cost of drilling, completion, well development, well testing, pump, motor, motor controls, column pipe, installation and mobilization. The cost relationships do not include engineering, contingency, financial and legal services, land costs, or permits. A more detailed cost analysis should be completed prior to developing a project.

The costs associated with conveyance systems for multi-well systems can vary widely based on the distance between wells, terrain characteristics, well production, and distance to the treatment facility. These costs should be estimated using standard engineering approaches and site-specific information. For planning purposes, these costs are estimated at \$50,000 to \$125,000 per well depending on the amount of additional water required and the size and complexity of the infrastructure already in place.

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 \$1,200 per acre of rural ROW. Urban ROW will be higher. If no data is available, assume \$10,000 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 6.

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. For planning purposes, treated water costs are \$2.50 per 1,000 gallons and raw water is \$0.50 per 1,000 gallons. Actual costs are negotiated between the buyer and seller.
- 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. 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).
- 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).
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

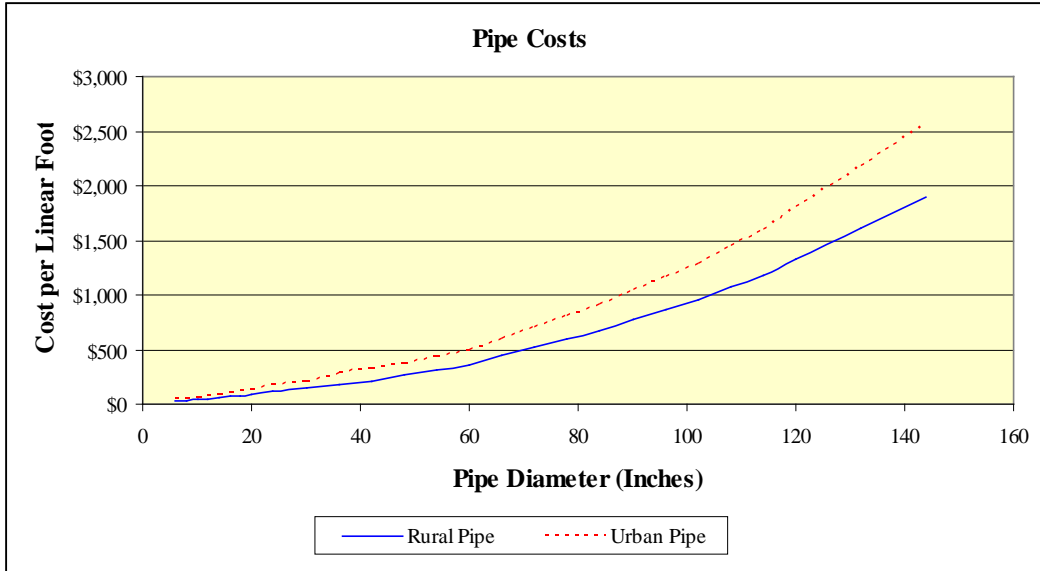
Table 5
Cost Elements for Water Wells

Well Use	Assumed Depth (ft)	Cost (\$) per foot
Municipal	500-800	\$325-\$525
Manufacturing	500	\$350
Livestock	500	\$200
Mining	500	\$200

Table 6
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



Cost Methodologies for Irrigation Water Management Strategies

NPET: The cost of implementing this water conservation strategy is evaluated in terms of the purchase and maintenance of weather stations used throughout the NPET Network. It is assumed that the stations within the network incur maintenance expenses of \$125,000 annually. Each weather station is estimated to have a 10-year life expectancy with a total of \$133,000 being required each decade for replacements. Cost estimates were assumed to be the same as identified in the 2006 plan and were inflated to 2008 dollars utilizing the Farm Machinery Price index. The total estimated cost incurred by the NPET Network over the planning horizon is approximately \$9.0 million.

Change in crop variety: The cost of water savings is calculated by comparing the regional economic impact with the water savings produced. When evaluated, the cost to the region of saving an acre-foot of water is calculated by dividing the total regional impact by the total water savings from 2020 to 2060. The regional economic impact of this strategy is measured by the change in gross receipts as acreages are shifted from long season to short season. Gross receipts are calculated by using five-year (2004-2008) average regional crop prices obtained from the Master Marketer website and five-year average high and average yields obtained from the Texas Agricultural Statistics Service (TASS). When determining the regional impact of shifting acreage from long season to short season, the high yield was used for long season varieties and the average yield was used for short season crops. These yields were then multiplied by the average prices and the change in acreages for each crop.

Irrigation equipment changes: The estimated cost of implementation for converting irrigation systems is composed of two factors, the initial investment and the replacement costs. The reinvestment costs consist of the 25-year useful life of each system and an eight-year useful life for sprinkler heads. The per-acre investment cost of each system and the replacement costs are derived from "Economics of Irrigation Systems", (Amosson et al. 2001). Cost estimates were assumed to be the same as identified in the 2006 plan and were inflated to 2008 dollars utilizing the Farm Machinery Price index. The calculated 50-year total implementation cost is \$233,592,372.

Change in crop type: The cost of implementing this water conservation strategy is evaluated in terms of reduced land values. It is assumed the reason land is being shifted away from corn production is to generate water savings. Texas Rural Land prices are determined through the Real Estate Center at Texas A&M University. This resource provides estimates of irrigated land with fair water for various Regions for 2008. These values are then compared to dryland values in the same regions to determine the loss in value. Land that has sufficient water available for irrigation is worth a premium compared to land with limited irrigation resources. The cost of water savings is evaluated by calculating the cost incurred by producers to generate an acre-foot of water savings. This measure is generated by dividing the total change in land values by the amount of water conserved.

Conservation tillage: An acre of conservation tillage incurs different levels of cost than an acre of conventional tillage does. It is assumed that the average conventionally tilled field will be disked once, chiseled once and cultivated three times during the year with tillage costs totaling \$46/acre. There is one estimated herbicide application, which is estimated to cost \$7.59/acre. Plowing and herbicide costs for conventional tillage total \$53.36/acre. It is

assumed that conservation tillage will incur two field cultivations and one chiseling which will total \$27.13/acre. Also, there are expected to be four herbicide applications totaling \$30.36. Total plowing and herbicide expenses are estimated at \$57.49. This estimates additional costs for conservation tillage at \$4.13 when compared to conventional tillage costs. The additional 1.75 inches of water applied per acre to conventional tillage is estimated to cost \$16.10/acre. After this is taken into account, the total implementation costs per acre are \$69.46 for conventional tillage and \$57.49 for conservation tillage. The final implementation cost is determined by subtracting the total implementation cost of conventional tillage from conservation tillage. This produces an additional \$11.97 in implementation costs for conservation tillage. This \$11.97 is then multiplied by the affected acreage for the corresponding decade. The rates for various filed operations were obtained from Texas Custom Rates Statistics (2008).

Precipitation Enhancement: The implementation costs of the strategy include yearly operating costs and aircraft replacement cost every 20 years. Cost estimates were assumed to be the same as identified in the 2006 plan and were inflated to 2008 dollars utilizing the Farm Machinery Price index. The annual operating expenses incurred are 5.32 million approximately and the aircraft replacement cost incurred once in two decades is 0.80 million.

Converting irrigated crops to dryland: The cost of implementing this water conservation strategy is evaluated in terms of reduced land values. Texas Rural Land prices are determined through the Real Estate Center at Texas A&M University. This resource provides estimates of irrigated land with fair water for various regions for the year 2008. These values are then compared to dryland values in the same regions to determine the loss in value. Land that has sufficient water available for irrigation is worth a premium compared to land with limited irrigation resources. The cost of water savings is evaluated by calculating the cost incurred by producers to generate an acre-foot of water savings. This measure is generated by dividing the total change in land values by the amount of water conserved.

Biotechnology: The implementation cost of this strategy was assumed an additional cost of drought resistant seed which was estimated at a dollar for every one percent reduction in water use. Therefore it was assumed a 15 percent reduction in water use is assumed to cost \$15/acre and a 30 percent reduction will cost \$30/ acre. Cost estimates were made after consultation with Industry and researches working in the area. These costs are then multiplied with the annual total acreage for corn, cotton and soybeans, affected by incorporation of this strategy.

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Table H-1
City of Amarillo
Develop Potter County Well Field (Ogallala Aquifer)

Owner: City of Amarillo
Quantity: 11,182 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	800 gpm	21	Ea.	\$600,000	\$12,600,000
Connection to Pump Station (includes utility corridor)		1	Ea.		\$22,100,000
Engineering and Contingencies (provided by Amarillo)					\$10,125,200
Subtotal for Wellfield and Treatment					\$44,825,200
Transmission System					
Pipeline - Transmission Main	48 inch	1	LS		\$24,529,400
Pump Station and Storage Tank		1	LS		\$9,000,000
Engineering and Contingencies (provided by Amarillo)					\$10,058,800
Subtotal for Transmission					\$43,588,200
Amarillo Delivery Pipeline					
South Delivery Pipeline - Urban	36 inch	42,240	LF	\$276	\$11,658,200
Alt. North Delivery Pipeline - urban	36 inch	34,000	LF	\$276	\$9,384,000
Alt North Route Crossings		1	LS	\$4,000,000	\$4,000,000
Storage tank	2.5 MG	1	EA	\$1,086,000	\$1,086,000
Pump Station Improvements					\$1,000,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$7,042,800
Subtotal for Amarillo Delivery Pipeline					\$34,171,000
TOTAL CONSTRUCTION COST					\$122,584,400
Interest During Construction			(12 months)		\$5,108,100
Permitting and Mitigation					\$818,800
Groundwater Rights/ Purchase					\$0
TOTAL CAPITAL COST					\$128,511,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$11,204,200
Electricity					\$472,800
Water Treatment (\$0.30 per 1,000 gal)					\$1,093,100
Operation and Maintenance					\$1,605,400
Total Annual Cost					\$14,375,500
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,286
Water Cost (\$ per 1,000 gallons)					\$3.95
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$284
Water Cost (\$ per 1,000 gallons)					\$0.87

Table H-2
City of Amarillo
Develop Roberts County Well Field (Ogallala Aquifer)

Owner: City of Amarillo
Quantity: 11,210 AF/Y Each Phase

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	800 gpm	15	Ea.	\$600,000	\$9,000,000
Connection to Pump Station		15	Ea.	\$500,000	\$7,500,000
Engineering and Contingencies (35% for well field)					\$5,775,000
Subtotal for Wellfield and Treatment					\$22,275,000
Transmission System					
Pipeline - Transmission Main	36 inch	401,280	LF	\$184	\$73,835,500
Pump Station	3,500 HP	2	LS	\$5,557,500	\$11,115,000
Storage Tank	3 MG	2	Ea.	\$1,215,000	\$2,430,000
Easement - Rural	20 Feet	184	AC	\$1,219	\$225,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$26,891,400
Subtotal for Transmission					\$114,496,900
TOTAL CONSTRUCTION COST					\$136,771,900
Interest During Construction			(12 months)		\$5,699,300
Permitting and Mitigation					\$1,217,400
Groundwater Rights/ Purchase					\$0
TOTAL CAPITAL COST					\$143,688,600
Annual Costs					
Debt Service (6 percent for 20 years)					\$12,527,400
Electricity					\$949,500
Water Treatment (\$0.30 per 1,000 gal)					\$1,095,800
Operation and Maintenance					\$1,652,400
Total Annual Cost					\$16,225,100
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,447
Water Cost (\$ per 1,000 gallons)					\$4.44
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$330
Water Cost (\$ per 1,000 gallons)					\$1.01

Table H-3
Canadian River Municipal Water Authority
Replace Capacity of Roberts County Well Field (Ogallala Aquifer) in 2030

Owner: Canadian River Municipal Water Authority
Quantity: 15,000 AF/Y

Capital Costs	Cost
Collection Pipeline(s)	\$1,300,000
Well Field(s) and Wells	\$13,161,000
Total Capital Cost	\$14,461,000
Engineering, Legal Costs and Contingencies (30% for pipelines & 35% for all other)	\$4,996,000
Interest During Construction (3 years @ 4 percent)	\$2,367,000
Total Project Cost	\$21,824,000
 Annual Costs	
Debt Service (6 percent for 20 years)	\$1,903,000
Pipeline and Well Operation and Maintenance	\$342,000
Pumping Energy Costs (\$0.09/kWh)	\$1,341,000
Total Annual Cost	\$3,586,000
 Unit Cost	
Annual Cost of Water (\$ per acft)	\$239
Annual Cost of Water (\$ per 1,000 gallons)	\$0.73

**Table H-4
City of Borger
New Well Field**

Owner: City of Borger
Quantity: 2,000 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	600 gpm	4	Ea.	\$162,500	\$650,000
Connection to Pump Station		4	Ea.	\$125,000	\$500,000
Storage Tank (Closed)	400,000 Gal	1	Ea.	\$288,750	\$288,800
Engineering and Contingencies (35% for well field)					\$503,600
Subtotal for Wellfield and Treatment					\$1,942,400
Transmission System					
Pipeline - Rural	20 inch	52,800	LF	\$90	\$4,752,000
Pump Station	80 HP	1	LS	\$703,200	\$703,200
Easement - Rural	20 Feet	24	AC	\$1,219	\$30,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$1,671,700
Subtotal for Transmission					\$7,156,900
TOTAL CONSTRUCTION COST					\$9,099,300
Interest During Construction					(6 months)
					\$197,200
Permitting and Mitigation					\$82,700
Groundwater Rights/ Purchase					
TOTAL CAPITAL COST					\$9,379,200
Annual Costs					
Debt Service (6 percent for 20 years)					\$817,700
Electricity					\$122,400
Water Treatment (\$0.30 per 1,000 gal)					\$195,500
Operation and Maintenance					\$121,300
Total Annual Cost					\$1,256,900
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$628
Water Cost (\$ per 1,000 gallons)					\$1.93
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$220
Water Cost (\$ per 1,000 gallons)					\$0.67

**Table H-5
City of Cactus
New Well Field**

Owner: City of Cactus
Quantity: 1,500 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	600 gpm	3	Ea.	\$552,752	\$1,658,300
Connection to Pump Station		3	Ea.	\$125,000	\$375,000
Storage Tank (Closed)	300,000 Gal	1	Ea.	\$244,500	\$244,500
Engineering and Contingencies (35% for well field)					\$797,200
Subtotal for Wellfield and Treatment					\$3,075,000
Transmission System					
Pipeline - Transmission Main	20 inch	7,920	LF	\$90	\$712,800
Pump Station	40 HP	1	LS	\$623,400	\$623,400
Easement - Rural	20 Feet	4	AC	\$1,219	\$5,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$432,000
Subtotal for Transmission					\$1,773,200
TOTAL CONSTRUCTION COST					\$4,848,200
Interest During Construction					\$105,100
(6 months)					
Permitting and Mitigation					\$43,400
Groundwater Rights/ Purchase					\$450,000
TOTAL CAPITAL COST					\$5,446,700
Annual Costs					
Debt Service (6 percent for 20 years)					\$474,900
Electricity					\$88,500
Water Treatment (\$0.30 per 1,000 gal)					\$146,600
Operation and Maintenance					\$95,600
Total Annual Cost					\$805,600
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$537
Water Cost (\$ per 1,000 gallons)					\$1.65
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$220
Water Cost (\$ per 1,000 gallons)					\$0.68

**Table H-6
City of Canyon
Drill Eight Wells**

Owner: City of Canyon
Quantity: 3,800 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Mobilization		1	LS	\$300,000	\$300,000
Wells	500	8	Ea.	\$400,000	\$3,200,000
Subtotal for Wellfield and Treatment					\$3,500,000
 Transmission System					
PVC C905 Pipe	24 inch	15,000	LF	\$100	\$1,500,000
PVC C900 Pipe	12 inch	21,300	LF	\$50	\$1,065,000
GV & B	24 inch	4	EA	\$20,000	\$80,000
GV & B	12 inch	10	EA	\$5,000	\$50,000
Bore Under Railroad	36 inch	340	LF	\$350	\$119,000
Casing thru Bore	36 inch	340	LF	\$200	\$68,000
Ground Storage Tank	1 MG	1	EA	\$1,000,000	\$1,000,000
Controls		1	EA	\$50,000	\$50,000
Fittings		20,000	LBS	\$5	\$100,000
Electrical Service		1	LS	\$100,000	\$100,000
Subtotal for Transmission					\$4,132,000
 TOTAL CONSTRUCTION COST					 \$7,632,000
Contingencies (10%)					\$763,200
Engineering					\$839,600
Engineering Survey					\$84,000
Testing					\$42,000
Project Representation					\$168,000
TOTAL CAPITAL COST					\$9,528,800
 Annual Costs					
Debt Service (6 percent for 20 years)					\$830,800
Electricity					\$178,200
Water Treatment (\$0.30 per 1,000 gal)					\$371,500
Operation and Maintenance					\$166,000
Total Annual Cost					\$1,546,500
 UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$407
Water Cost (\$ per 1,000 gallons)					\$1.25
 UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$188
Water Cost (\$ per 1,000 gallons)					\$0.58

Table H-7
City of Dumas
Develop Ogallala Aquifer with New Wells

Owner: City of Dumas
Quantity: 2,500 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	800 gpm	4	Ea.	\$368,501	\$1,474,000
Connection to Pump Station		4	Ea.	\$75,000	\$300,000
Storage Tank	500,000 Gal	1	Ea.	\$333,000	\$333,000
Engineering and Contingencies (35% for well field)					\$737,500
Subtotal for Wellfield and Treatment					\$2,844,500
Transmission System					
Pipeline - Rural	20 inch	26,400	LF	\$90	\$2,376,000
Pump Station	80 HP	1	LS	\$703,200	\$703,200
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$958,900
Subtotal for Transmission					\$4,053,100
TOTAL CONSTRUCTION COST					\$6,897,600
Interest During Construction			(12 months)		\$287,400
Permitting and Mitigation					\$62,200
Groundwater Rights/ Purchase					\$750,000
TOTAL CAPITAL COST					\$7,997,200
Annual Costs					
Debt Service (6 percent for 20 years)					\$697,200
Electricity					\$142,100
Water Treatment (\$0.30 per 1,000 gal)					\$244,400
Operation and Maintenance					\$112,800
Total Annual Cost					\$1,196,500
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$479
Water Cost (\$ per 1,000 gallons)					\$1.47
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$200
Water Cost (\$ per 1,000 gallons)					\$0.61

Table H-8
City of Fritch
System Purchase and Rehabilitate Existing Well in Carson County

Owner: City of Fritch
Quantity: 200 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield					
Rehabilitate Existing Wells		1	Ea.	\$58,000	\$58,000
Engineering and Contingencies (35% for well field)					\$20,300
Subtotal for Wellfield and Treatment					\$78,300
TOTAL CONSTRUCTION COST					\$78,300
Interest During Construction			(6 months)		\$1,700
Permitting and Mitigation					\$32,800
Water Rights Purchase					\$60,000
Infrastructure Purchase		1	LS	\$2,677,500	\$2,677,500
TOTAL CAPITAL COST					\$2,850,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$248,500
Electricity (estimated)					\$9,700
Water Treatment (\$0.30 per 1,000 gal)					\$19,600
Operation and Maintenance					\$33,800
Total Annual Cost					\$311,600
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,558
Water Cost (\$ per 1,000 gallons)					\$4.78
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$316
Water Cost (\$ per 1,000 gallons)					\$0.97

Table H-9
City of Fritch
New Well in Hutchinson County

Owner: City of Fritch
Quantity: 200 AF/Y

Assume new well is in Hutchinson County. May be located in Carson.

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
New Well	500 gpm	1	Ea.	\$563,000	\$563,000
Engineering and Contingencies (35% for well field)					\$197,100
Subtotal for Wellfield and Treatment					\$760,100
Transmission System					
Pipeline - Rural	8 inch	5,280	LF	\$34	\$179,500
Pump Station	5 HP	1	LS	\$50,000	\$50,000
Easement - Rural	20 Feet	2	AC	\$1,219	\$3,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$71,400
Subtotal for Transmission					\$303,900
TOTAL CONSTRUCTION COST					\$1,064,000
Interest During Construction			(6 months)		\$23,100
Permitting and Mitigation					\$9,500
Groundwater Rights/ Purchase					\$60,000
TOTAL CAPITAL COST					\$1,156,600
Annual Costs					
Debt Service (6 percent for 20 years)					\$100,800
Electricity					\$9,200
Water Treatment (\$0.30 per 1,000 gal)					\$19,600
Operation and Maintenance					\$20,600
Total Annual Cost					\$150,200
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$751
Water Cost (\$ per 1,000 gallons)					\$2.30
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$247
Water Cost (\$ per 1,000 gallons)					\$0.76

**Table H-10
City of Gruver
New Wellfield**

Owner: City of Gruver
Quantity: 350 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	400 gpm	1	Ea.	\$162,500	\$162,500
Connection to Pump Station		1	Ea.	\$50,000	\$50,000
Storage Tank (Closed)	70,000 Gal	1	Ea.	\$126,000	\$126,000
Engineering and Contingencies (35% for well field)					\$118,500
Subtotal for Wellfield and Treatment					\$457,000
Transmission System					
Pipeline - Rural	8 inch	15,840	LF	\$34	\$538,600
Pump Station	15 HP	1	LS	\$551,000	\$551,000
Easement - Rural	20 Feet	7	AC	\$1,219	\$9,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$354,400
Subtotal for Transmission					\$1,453,000
TOTAL CONSTRUCTION COST					\$1,910,000
Interest During Construction			(6 months)		\$41,400
Permitting and Mitigation					\$17,100
Groundwater Rights/ Purchase					\$0
TOTAL CAPITAL COST					\$1,968,500
Annual Costs					
Debt Service (6 percent for 20 years)					\$171,600
Electricity					\$17,000
Water Treatment (\$0.30 per 1,000 gal)					\$34,200
Operation and Maintenance					\$33,200
Total Annual Cost					\$256,000
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$731
Water Cost (\$ per 1,000 gallons)					\$2.24
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$241
Water Cost (\$ per 1,000 gallons)					\$0.74

**Table H-11
City of Lefors
New Wellfield**

Owner: City of Lefors
Quantity: 100 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	200 gpm	1	Ea.	\$162,500	\$162,500
Connection to Pump Station		1	Ea.	\$50,000	\$50,000
Storage Tank (Closed)	20,000 Gal	1	Ea.	\$53,000	\$53,000
Engineering and Contingencies (35% for well field)					\$92,900
Subtotal for Wellfield and Treatment					\$358,400
Transmission System					
Pipeline - Rural	6 inch	10,560	LF	\$26	\$274,600
Pump Station	2 HP	1	LS	\$258,000	\$258,000
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$172,700
Subtotal for Transmission					\$711,300
TOTAL CONSTRUCTION COST					\$1,069,700
Interest During Construction					\$23,200
					(6 months)
Permitting and Mitigation					\$9,600
Groundwater Rights/ Purchase					\$30,000
TOTAL CAPITAL COST					\$1,132,500
Annual Costs					
Debt Service (6 percent for 20 years)					\$98,700
Electricity					\$5,300
Water Treatment (\$0.30 per 1,000 gal)					\$9,800
Operation and Maintenance					\$19,000
Total Annual Cost					\$132,800
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,328
Water Cost (\$ per 1,000 gallons)					\$4.08
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$341
Water Cost (\$ per 1,000 gallons)					\$1.05

**Table H-12
City of Memphis
New Wellfield**

Owner: City of Memphis
Quantity: 100 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	150 gpm	1	Ea.	\$97,500	\$97,500
Connection to Pump Station		1	Ea.	\$50,000	\$50,000
Storage Tank (Closed)	20,000 Gal	1	Ea.	\$53,000	\$53,000
Engineering and Contingencies (35% for well field)					\$70,200
Subtotal for Wellfield and Treatment					\$270,700
Transmission System					
Pipeline - Rural	6 inch	10,560	LF	\$26	\$274,600
Pump Station	2 HP	1	LS	\$258,000	\$258,000
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$172,700
Subtotal for Transmission					\$711,300
TOTAL CONSTRUCTION COST					\$982,000
Interest During Construction					\$21,300
(6 months)					
Permitting and Mitigation					\$8,800
Groundwater Rights/ Purchase					\$30,000
TOTAL CAPITAL COST					\$1,042,100
Annual Costs					
Debt Service (6 percent for 20 years)					\$90,900
Electricity					\$3,400
Water Treatment (\$0.30 per 1,000 gal)					\$9,800
Operation and Maintenance					\$17,100
Total Annual Cost					\$121,200
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,212
Water Cost (\$ per 1,000 gallons)					\$3.72
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$303
Water Cost (\$ per 1,000 gallons)					\$0.93

Table H-13
City of Pampa
Rehabilitate Existing Wells and New Well

Owner: City of Pampa

Quantity: 2,581 AF/Y

Assume 1500 af with new well and remainder from rehabbed wells

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Rehabilitate Existing Wells		5	Ea.	\$25,000	\$125,000
New Well	750 gpm	1	Ea.	\$162,500	\$162,500
Engineering and Contingencies (35% for well field)					\$100,600
Subtotal for Wellfield and Treatment					\$388,100
Transmission System					
Pipeline - Rural	18 inch	5,280	LF	\$77	\$406,600
Pump Station	22 HP	1	LS	\$564,000	\$564,000
Easement - Rural	20 Feet	2	AC	\$1,219	\$3,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$319,400
Subtotal for Transmission					\$1,293,000
TOTAL CONSTRUCTION COST					\$1,681,100
Interest During Construction			(6 months)		\$36,400
Permitting and Mitigation					\$13,600
Groundwater Rights/ Purchase	(Assume well located on City property)				\$0
TOTAL CAPITAL COST					\$1,731,100
Annual Costs					
Debt Service (6 percent for 20 years)					\$150,900
Electricity					\$69,400
Water Treatment (\$0.30 per 1,000 gal)					\$252,300
Operation and Maintenance					\$30,400
Total Annual Cost					\$503,000
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$195
Water Cost (\$ per 1,000 gallons)					\$0.60
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$136
Water Cost (\$ per 1,000 gallons)					\$0.42

Table H-14
City of Panhandle
New Groundwater Wells in Ogallala Aquifer

Owner: City of Panhandle
Quantity: 600 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	350 gpm	2	Ea.	\$213,862	\$427,700
Connection to Pump Station		1	Ea.	\$50,000	\$50,000
Storage Tank (Closed)	100,000 Gal	1	Ea.	\$183,000	\$183,000
Engineering and Contingencies (35% for well field)					\$231,200
Subtotal for Wellfield and Treatment					\$891,900
Transmission System					
Pipeline - Rural	8 inch	26,400	LF	\$34	\$897,600
Pump Station	85 HP	1	LS	\$712,900	\$712,900
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$518,800
Subtotal for Transmission					\$2,144,300
TOTAL CONSTRUCTION COST					\$3,036,200
Interest During Construction					\$65,800
(6 months)					
Permitting and Mitigation					\$27,300
Groundwater Rights/ Purchase					\$180,000
TOTAL CAPITAL COST					\$3,309,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$288,500
Electricity					\$42,200
Water Treatment (\$0.30 per 1,000 gal)					\$58,700
Operation and Maintenance					\$52,000
Total Annual Cost					\$441,400
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$736
Water Cost (\$ per 1,000 gallons)					\$2.26
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$255
Water Cost (\$ per 1,000 gallons)					\$0.78

Table H-15
City of Perryton
New Groundwater Wells in Ogallala Aquifer

Owner: City of Perryton
Quantity: 1,200 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	400 gpm	4	Ea.	\$213,862	\$855,400
Connection to Pump Station		4	Ea.	\$50,000	\$200,000
Storage Tank (Closed)	200,000 Gal	1	Ea.	\$250,000	\$250,000
Engineering and Contingencies (35% for well field)					\$456,900
Subtotal for Wellfield and Treatment					\$1,762,300
Transmission System					
Pipeline - Rural	14 inch	52,800	LF	\$60	\$3,168,000
Pump Station	86 HP	1	LS	\$714,840	\$714,800
Easement - Rural	20 Feet	24	AC	\$1,219	\$30,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$1,200,600
Subtotal for Transmission					\$5,113,400
TOTAL CONSTRUCTION COST					\$6,875,700
Interest During Construction			(6 months)		\$149,000
Permitting and Mitigation					\$62,300
Groundwater Rights/ Purchase					\$0
TOTAL CAPITAL COST					\$7,087,000
Annual Costs					
Debt Service (6 percent for 20 years)					\$617,900
Electricity					\$77,000
Water Treatment (\$0.30 per 1,000 gal)					\$117,300
Operation and Maintenance					\$98,600
Total Annual Cost					\$910,800
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$759
Water Cost (\$ per 1,000 gallons)					\$2.33
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$244
Water Cost (\$ per 1,000 gallons)					\$0.75

**Table H-16
City of Spearman
New Wellfield**

Owner: City of Spearman
Quantity: 900 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	500 gpm	2	Ea.	\$162,500	\$325,000
Connection to Pump Station		1	Ea.	\$100,000	\$100,000
Storage Tank (Closed)	175,000 Gal	1	Ea.	\$189,188	\$189,200
Engineering and Contingencies (35% for well field)					\$215,000
Subtotal for Wellfield and Treatment					\$829,200
Transmission System					
Pipeline - Rural	12 inch	26,400	LF	\$52	\$1,372,800
Pump Station	45 HP	1	LS	\$634,200	\$634,200
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$633,800
Subtotal for Transmission					\$2,655,800
TOTAL CONSTRUCTION COST					\$3,485,000
Interest During Construction					\$75,500
					(6 months)
Permitting and Mitigation					\$31,500
Groundwater Rights/ Purchase					\$270,000
TOTAL CAPITAL COST					\$3,862,000
Annual Costs					
Debt Service (6 percent for 20 years)					\$336,700
Electricity					\$55,900
Water Treatment (\$0.30 per 1,000 gal)					\$88,000
Operation and Maintenance					\$54,000
Total Annual Cost					\$534,600
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$594
Water Cost (\$ per 1,000 gallons)					\$1.82
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$220
Water Cost (\$ per 1,000 gallons)					\$0.67

Table H-17
City of Sunray
New Groundwater Wells in Ogallala Aquifer

Owner: City of Sunray
Quantity: 800 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	350 gpm	3	Ea.	\$213,862	\$641,600
Connection to Pump Station		3	Ea.	\$50,000	\$150,000
Storage Tank (Closed)	150,000 Gal	1	Ea.	\$225,000	\$225,000
Engineering and Contingencies (35% for well field)					\$355,800
Subtotal for Wellfield and Treatment					\$1,372,400
Transmission System					
Pipeline - Rural	10 inch	10,560	LF	\$43	\$454,100
Pump Station	35 HP	1	LS	\$612,600	\$612,600
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$350,600
Subtotal for Transmission					\$1,423,300
TOTAL CONSTRUCTION COST					\$2,795,700
Interest During Construction			(6 months)		\$60,600
Permitting and Mitigation					\$25,000
Groundwater Rights/ Purchase					\$240,000
TOTAL CAPITAL COST					\$3,121,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$272,100
Electricity					\$49,100
Water Treatment (\$0.30 per 1,000 gal)					\$78,200
Operation and Maintenance					\$54,300
Total Annual Cost					\$453,700
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$567
Water Cost (\$ per 1,000 gallons)					\$1.74
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$227
Water Cost (\$ per 1,000 gallons)					\$0.70

Table H-17
City of Texline
New Groundwater Wells in Ogallala Aquifer

Owner: City of Texline
Quantity: 250 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	350 gpm	1	Ea.	\$213,862	\$213,900
Connection to Pump Station		1	Ea.	\$25,000	\$25,000
Storage Tank (Closed)	50,000 Gal	1	Ea.	\$100,000	\$100,000
Engineering and Contingencies (35% for well field)					\$118,600
Subtotal for Wellfield and Treatment					\$457,500
Transmission System					
Pipeline - Rural	6 inch	26,400	LF	\$26	\$686,400
Pump Station	25 HP	1	LS	\$591,000	\$591,000
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$412,800
Subtotal for Transmission					\$1,705,200
TOTAL CONSTRUCTION COST					\$2,162,700
Interest During Construction			(6 months)		\$46,900
Permitting and Mitigation					\$19,400
Groundwater Rights/ Purchase					\$75,000
TOTAL CAPITAL COST					\$2,304,000
Annual Costs					
Debt Service (6 percent for 20 years)					\$200,900
Electricity					\$16,900
Water Treatment (\$0.30 per 1,000 gal)					\$24,400
Operation and Maintenance					\$36,100
Total Annual Cost					\$278,300
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,113
Water Cost (\$ per 1,000 gallons)					\$3.42
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$310
Water Cost (\$ per 1,000 gallons)					\$0.95

Table H-19
City of Wheeler
New Groundwater Wells in Ogallala Aquifer

Owner: City of Wheeler
Quantity: 200 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	350 gpm	1	Ea.	\$213,862	\$213,900
Connection to Pump Station		1	Ea.	\$25,000	\$25,000
Storage Tank (Closed)	50,000 Gal	1	Ea.	\$100,000	\$100,000
Engineering and Contingencies (35% for well field)					\$118,600
Subtotal for Wellfield and Treatment					\$457,500
Transmission System					
Pipeline - Rural	6 inch	26,400	LF	\$26	\$686,400
Pump Station	15 HP	1	LS	\$551,000	\$551,000
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$398,800
Subtotal for Transmission					\$1,651,200
TOTAL CONSTRUCTION COST					\$2,108,700
Interest During Construction			(6 months)		\$45,700
Permitting and Mitigation					\$18,900
Groundwater Rights/ Purchase					\$60,000
TOTAL CAPITAL COST					\$2,233,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$194,700
Electricity					\$13,000
Water Treatment (\$0.30 per 1,000 gal)					\$19,600
Operation and Maintenance					\$34,900
Total Annual Cost					\$262,200
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,311
Water Cost (\$ per 1,000 gallons)					\$4.02
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$338
Water Cost (\$ per 1,000 gallons)					\$1.04

Table H-20
Randall County-Other
Purchase Water from Amarillo

Owner: County-Other, Randall County
Quantity: 1,000 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Transmission System					
Pipeline - Rural	14 inch	26,400	LF	\$60	\$1,584,000
Pump Station	80 HP	1	LS	\$703,200	\$703,200
Easement - Rural	20 Feet	12	AC	\$1,219	\$15,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$721,300
Subtotal for Transmission					\$3,023,500
TOTAL CONSTRUCTION COST					\$3,023,500
Interest During Construction			(6 months)		\$65,500
Permitting and Mitigation					\$27,400
TOTAL CAPITAL COST					\$3,116,400
Annual Costs					
Debt Service (6 percent for 20 years)					\$271,700
Electricity (Transmission)					\$16,000
Water Purchase (\$2.50 per 1,000 gal.)					\$814,600
Operation and Maintenance					\$40,096
Total Annual Cost					\$1,142,396
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,142
Water Cost (\$ per 1,000 gallons)					\$3.51
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$871
Water Cost (\$ per 1,000 gallons)					\$2.67

Table H-21
County-Other WUGs with Needs less than 200 ac-ft/yr
Install New Groundwater Well

Owner: County-Other
Quantity: 200 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	200 gpm	2	Ea.	\$180,960	\$361,900
Connection to Pump Station		2	Ea.	\$50,000	\$100,000
Storage Tank (Closed)	25,000 Gal	2	Ea.	\$50,000	\$100,000
Engineering and Contingencies (35% for well field)					\$196,700
Subtotal for Wellfield and Treatment					\$758,600
Transmission System					
Pipeline - Rural	6 inch	26,400	LF	\$26	\$686,400
Pump Station	10 HP	1	LS	\$538,000	\$538,000
Easement - Rural	15 Feet	9	AC	\$1,219	\$12,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$394,200
Subtotal for Transmission					\$1,630,600
TOTAL CONSTRUCTION COST					\$2,389,200
Interest During Construction			(6 months)		\$51,800
Permitting and Mitigation					\$21,400
Groundwater Rights/ Purchase					\$60,000
TOTAL CAPITAL COST					\$2,522,400
Annual Costs					
Debt Service (6 percent for 20 years)					\$219,900
Electricity					\$10,400
Water Treatment (\$0.30 per 1,000 gal)					\$19,600
Operation and Maintenance					\$41,200
Total Annual Cost					\$291,100
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,456
Water Cost (\$ per 1,000 gallons)					\$4.47
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$356
Water Cost (\$ per 1,000 gallons)					\$1.09

Table H-22
County-Other WUGs with Needs around 600 ac-ft/yr
Install New Groundwater Wells

Owner: County-Other
Quantity: 600 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	400 gpm	2	Ea.	\$197,411	\$394,800
Connection to Pump Station		2	Ea.	\$100,000	\$200,000
Storage Tank (Closed)	120,000 Gal	1	Ea.	\$164,850	\$164,900
Engineering and Contingencies (35% for well field)					\$265,900
Subtotal for Wellfield and Treatment					\$1,025,600
Transmission System					
Pipeline - Rural	10 inch	10,560	LF	\$43	\$454,100
Pump Station	25 HP	1	LS	\$591,000	\$591,000
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$343,100
Subtotal for Transmission					\$1,394,200
TOTAL CONSTRUCTION COST					\$2,419,800
Interest During Construction					\$100,800
				(12 months)	
Permitting and Mitigation					\$21,700
Groundwater Rights/ Purchase					\$180,000
TOTAL CAPITAL COST					\$2,722,300
Annual Costs					
Debt Service (6 percent for 20 years)					\$237,300
Electricity					\$32,300
Water Treatment (\$0.30 per 1,000 gal)					\$58,700
Operation and Maintenance					\$45,900
Total Annual Cost					\$374,200
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$624
Water Cost (\$ per 1,000 gallons)					\$1.91
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$228
Water Cost (\$ per 1,000 gallons)					\$0.70

Table H-23
County-Other WUGs with Needs around 1,000 ac-ft/yr
Install New Groundwater Wells

Owner: County-Other
Quantity: 1,000 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	600 gpm	2	Ea.	\$213,862	\$427,700
Connection to Pump Station		2	Ea.	\$100,000	\$200,000
Storage Tank (Closed)	200,000 Gal	1	Ea.	\$200,250	\$200,300
Engineering and Contingencies (35% for well field)					\$289,800
Subtotal for Wellfield and Treatment					\$1,117,800
Transmission System					
Pipeline - Rural	12 inch	10,560	LF	\$52	\$549,100
Pump Station	40 HP	1	LS	\$623,400	\$623,400
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$382,900
Subtotal for Transmission					\$1,561,400
TOTAL CONSTRUCTION COST					\$2,679,200
Interest During Construction			(12 months)		\$111,600
Permitting and Mitigation					\$24,000
Groundwater Rights/ Purchase					\$300,000
TOTAL CAPITAL COST					\$3,114,800
Annual Costs					
Debt Service (6 percent for 20 years)					\$271,600
Electricity					\$54,000
Water Treatment (\$0.30 per 1,000 gal)					\$97,800
Operation and Maintenance					\$50,100
Total Annual Cost					\$473,500
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$474
Water Cost (\$ per 1,000 gallons)					\$1.45
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$202
Water Cost (\$ per 1,000 gallons)					\$0.62

Table H-24
County-Other WUGs with Needs around 2,000 ac-ft/yr
Install New Groundwater Wells

Owner: County-Other
Quantity: 2,000 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	800 gpm	3	Ea.	\$263,215	\$789,600
Connection to Pump Station		3	Ea.	\$100,000	\$300,000
Storage Tank (Closed)	400,000 Gal	1	Ea.	\$288,750	\$288,800
Engineering and Contingencies (35% for well field)					\$482,400
Subtotal for Wellfield and Treatment					\$1,860,800
Transmission System					
Pipeline - Rural	16 inch	10,560	LF	\$69	\$728,600
Pump Station	80 HP	1	LS	\$703,200	\$703,200
Easement - Rural	20 Feet	5	AC	\$1,219	\$6,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$464,700
Subtotal for Transmission					\$1,902,500
TOTAL CONSTRUCTION COST					\$3,763,300
Interest During Construction			(12 months)		\$156,800
Permitting and Mitigation					\$33,700
Groundwater Rights/ Purchase					\$600,000
TOTAL CAPITAL COST					\$4,553,800
Annual Costs					
Debt Service (6 percent for 20 years)					\$397,000
Electricity					\$107,600
Water Treatment (\$0.30 per 1,000 gal)					\$195,500
Operation and Maintenance					\$71,100
Total Annual Cost					\$771,200
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$386
Water Cost (\$ per 1,000 gallons)					\$1.18
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$187
Water Cost (\$ per 1,000 gallons)					\$0.57

Table H-25
Steam Electric Power WUGs with Needs less than 200 ac-ft/yr
Install New Groundwater Well

Owner: Steam Electric Power
Quantity: 200 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield and Treatment					
Wells	300 gpm	1	Ea.	\$180,960	\$181,000
Connection to Pump Station		1	Ea.	\$131,608	\$131,600
Storage Tank (Closed)	50,000 Gal	1	Ea.	\$106,000	\$106,000
Engineering and Contingencies (35% for well field)					\$146,500
Subtotal for Wellfield and Treatment					\$565,100
Transmission System					
Pipeline - Rural	8 inch	10,560	LF	\$34	\$359,000
Pump Station	6 HP	1	LS	\$520,400	\$520,400
Easement - Rural	15 Feet	4	AC	\$1,219	\$5,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$289,800
Subtotal for Transmission					\$1,174,200
TOTAL CONSTRUCTION COST					\$1,739,300
Interest During Construction					\$37,700
(6 months)					
Permitting and Mitigation					\$15,600
Groundwater Rights/ Purchase					\$60,000
TOTAL CAPITAL COST					\$1,852,600
Annual Costs					
Debt Service (6 percent for 20 years)					\$161,500
Electricity (Transmission)					\$9,300
Operation and Maintenance					\$32,500
Total Annual Cost					\$203,300
UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$1,017
Water Cost (\$ per 1,000 gallons)					\$3.12
UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$209
Water Cost (\$ per 1,000 gallons)					\$0.64

**Table H-26
Connecting to Palo Duro Reservoir**

Owner:	Palo Duro River Authority		Percentage
Quantity:	Cactus	1,744	45.0%
	Dumas	1,356	35.0%
	Sunray	271	7.0%
	Gruver	116	3.0%
	Spearman	271	7.0%
	<u>Stinnet</u>	116	3.0%
	Total	3,875	

	Quantity	Units	Unit Price	Cost
Water Treatment Plant				
9 MGD Conventional Treatment Plant	1	LS	\$20,766,667	\$20,766,700
Engineering and Contingencies (35%)				\$7,268,300
Subtotal for Water Treatment Plant				\$28,035,000

	Construction	Capital
Cactus	\$9,345,000	\$12,615,800
Dumas	\$7,268,300	\$9,812,300
Sunray	\$1,453,700	\$1,962,500
Gruver	\$623,000	\$841,100
Spearman	\$1,453,700	\$1,962,500
Stinnet	\$623,000	\$841,100
check total	\$20,766,700	\$28,035,300

	Quantity	Units	Unit Price	Cost
Pipeline System Components				
24" line from Res. to WTP	9,000	LF	\$116	\$1,044,000
24" line from WTP to Spearman	51,000	LF	\$116	\$5,916,000
Crossings	1	LS		\$116,200
Connection to Spearman	1	LS		\$15,500
ROW	20	23 AC	\$1,219	\$28,000
Engineering and Contingencies (30%)				\$2,127,500
Pipeline Subtotal at Spearman				\$9,247,200

	Construction	Capital	Electricity (\$)
Cactus	\$3,132,000	\$4,161,200	\$9,100
Dumas	\$2,436,000	\$3,236,500	\$7,100
Sunray	\$487,200	\$647,300	\$1,400
Gruver	\$208,800	\$277,400	\$600
Spearman	\$487,200	\$647,300	\$1,400
Stinnet	\$208,800	\$277,400	\$600
check total	\$6,960,000	\$9,247,100	\$20,200

Table H-26, Continued

	Quantity	Units	Unit Price	Cost
8" line from Spearman to Gruver	71,300	LF	\$34	\$2,424,200
Crossings	1	LS		\$100,700
Connection to Gruver	1	LS		\$15,500
ROW	15	25 AC	\$1,219	\$30,500
Engineering and Contingencies (30%)				\$762,100
Pipeline Subtotal at Gruver				\$3,333,000

	Construction	Capital	Electricity (\$)
Cactus	\$0	\$0	\$0
Dumas	\$0	\$0	\$0
Sunray	\$0	\$0	\$0
Gruver	\$2,424,200	\$3,333,000	\$300
Spearman	\$0	\$0	\$0
Stinnet	\$0	\$0	\$0
check total	\$2,424,200	\$3,333,000	\$300

	Quantity	Units	Unit Price	Cost
24" line from Spearman to Stinnet	133,500	LF	\$116	\$15,486,000
Crossings	1	LS		\$193,600
ROW	20	61 AC	\$1,219	\$74,300
Engineering and Contingencies (30%)				\$4,703,900
Pipeline Subtotal at Stinnet				\$20,457,800

	Construction	Capital	Electricity (\$)
Cactus	\$7,743,000	\$10,228,900	\$14,700
Dumas	\$6,022,300	\$7,955,800	\$11,400
Sunray	\$1,204,500	\$1,591,200	\$2,300
Gruver	\$0	\$0	\$0
Spearman	\$0	\$0	\$0
Stinnet	\$516,200	\$681,900	\$1,000
check total	\$15,486,000	\$20,457,800	\$29,400

	Quantity	Units	Unit Price	Cost
8" line Stinnet Spur	83,350	LF	\$34	\$2,833,900
Crossings	1	LS		\$309,800
Connection to Stinnet	1	LS		\$15,500
ROW	20	38 AC	\$1,219	\$46,300
Engineering and Contingencies (30%)				\$947,800
Pipeline Subtotal at Stinnet				\$4,153,300

	Construction	Capital	Electricity (\$)
Cactus	\$0	\$0	\$0
Dumas	\$0	\$0	\$0
Sunray	\$0	\$0	\$0
Gruver	\$0	\$0	\$0
Spearman	\$0	\$0	\$0
Stinnet	\$2,833,900	\$4,153,300	\$400
check total	\$2,833,900	\$4,153,300	\$400

Table H-26, Continued

	Quantity	Units	Unit Price	Cost
24" line from Stinnet Spur to Dumas	122,800	LF	\$116	\$14,244,800
Crossings	1	LS		\$178,100
Connection to Dumas	1	LS		\$15,500
ROW	20	56 AC	\$1,219	\$68,300
Engineering and Contingencies (30%)				\$4,331,500
Pipeline Subtotal at Dumas				\$18,838,200

	Construction	Capital	Electricity (\$)
Cactus	\$7,368,000	\$9,743,900	\$12,900
Dumas	\$5,730,700	\$7,578,600	\$10,000
Sunray	\$1,146,100	\$1,515,700	\$2,000
Gruver	\$0	\$0	\$0
Spearman	\$0	\$0	\$0
Stinnet	\$0	\$0	\$0
check total	\$14,244,800	\$18,838,200	\$24,900

	Quantity	Units	Unit Price	Cost
8" line Sunray Spur	28,000	LF	\$34	\$952,000
Crossings	1	LS		\$99,700
Pressure Reducing Valve	1	EA		\$23,500
Connection to Sunray	1	LS		\$11,700
ROW	15	10 AC	\$1,219	\$12,200
Engineering and Contingencies (30%)				\$326,100
Pipeline Subtotal at Sunray				\$473,200

	Construction	Capital	Electricity (\$)
Cactus	0	\$0	\$0
Dumas	0	\$0	\$0
Sunray	\$952,000	\$473,200	\$1,100
Gruver	0	\$0	\$0
Spearman	0	\$0	\$0
Stinnet	0	\$0	\$0
check total	\$952,000	\$473,200	\$1,100

	Quantity	Units	Unit Price	Cost
18" line from Dumas to Cactus	67,150	LF	\$77	\$5,170,600
Crossings	1	LS		\$193,600
Connection to Cactus	1	LS		\$11,700
ROW	20	31 AC	\$1,219	\$37,800
Engineering and Contingencies (30%)				\$1,612,800
Pipeline Subtotal at Sunray				\$7,026,500

Table H-26, Continued

	Construction	Capital	Electricity (\$)
Cactus	\$5,170,600	\$7,026,500	\$9,400
Dumas	0	\$0	\$0
Sunray	0	\$0	\$0
Gruver	0	\$0	\$0
Spearman	0	\$0	\$0
Stinnet	0	\$0	\$0
check total	\$5,170,600	\$7,026,500	\$9,400

Pump Station Components	Quantity	Units	Unit Price	Cost
9 MGD PS at intake	250	HP		\$1,279,500
9 MGD PS at WTP	250	HP		\$1,279,500
9 MGD PS at Spearman	400	HP		\$1,795,000
8.12 MGD at Stinnet Spur	400	HP		\$1,795,000
4.04 MGD at Dumas	100	HP		\$742,000
Engineering and Contingencies (35%)				\$2,411,900
Pump Station Subtotal				\$9,302,900

Construction Costs	9 MGD PS at intake	9 MGD PS at WTP	9 MGD PS at Spearman	8.12 MGD at Stinnet Spur	4.04 MGD at Dumas
Cactus	\$575,800	\$575,800	\$807,800	\$897,500	\$417,400
Dumas	\$447,800	\$447,800	\$628,300	\$698,100	\$324,600
Sunray	\$89,600	\$89,600	\$125,700	\$139,600	\$0
Gruver	\$38,400	\$38,400	\$53,900	\$0	\$0
Spearman	\$89,600	\$89,600	\$125,700	\$0	\$0
Stinnet	\$38,400	\$38,400	\$53,900	\$59,800	\$0
check total	\$1,279,600	\$1,279,600	\$1,795,300	\$1,795,000	\$742,000

Capital Costs	9 MGD PS at intake	9 MGD PS at WTP	9 MGD PS at Spearman	8.12 MGD at Stinnet Spur	4.04 MGD at Dumas
Cactus	\$777,300	\$777,300	\$1,090,500	\$1,211,600	\$563,500
Dumas	\$604,600	\$604,600	\$848,100	\$942,400	\$438,200
Sunray	\$120,900	\$120,900	\$169,600	\$188,500	\$0
Gruver	\$51,800	\$51,800	\$72,700	\$0	\$0
Spearman	\$120,900	\$120,900	\$169,600	\$0	\$0
Stinnet	\$51,800	\$51,800	\$72,700	\$80,800	\$0
check total	\$1,727,300	\$1,727,300	\$2,423,200	\$2,423,300	\$1,001,700

Ground Storage Tanks	Quantity	Units	Unit Price	Cost
3 MG at WTP	1	LS	\$928,000	\$928,000
3 MG at Spearman	1	LS	\$928,000	\$928,000
2.5 MG at Stinnet Spur	1	LS	\$821,000	\$821,000
1.5 MG at Dumas	1	LS	\$591,000	\$591,000
Engineering and Contingencies (35%)				\$1,143,800
Pump Station Subtotal				\$4,411,800

Table H-26, Continued

Construction Costs	3 MG at WTP	3 MG at Spearman	2.5 MG at Stinnet Spur	1.5 MG at Dumas	
Cactus	\$417,600	\$417,600	\$410,500	\$332,400	
Dumas	\$324,800	\$324,800	\$319,300	\$258,600	
Sunray	\$65,000	\$65,000	\$63,900	\$0	
Gruver	\$27,800	\$27,800	\$0	\$0	
Spearman	\$65,000	\$65,000	\$0	\$0	
Stinnet	\$27,800	\$27,800	\$27,400	\$0	
check total	\$928,000	\$928,000	\$821,100	\$591,000	\$3,268,100

Capital Costs	3 MG at WTP	3 MG at Spearman	2.5 MG at Stinnet Spur	1.5 MG at Dumas	
Cactus	\$563,800	\$563,800	\$554,200	\$448,800	
Dumas	\$438,500	\$438,500	\$431,000	\$349,100	
Sunray	\$87,700	\$87,700	\$86,200	\$0	
Gruver	\$37,600	\$37,600	\$0	\$0	
Spearman	\$87,700	\$87,700	\$0	\$0	
Stinnet	\$37,600	\$37,600	\$36,900	\$0	
check total	\$1,252,900	\$1,252,900	\$1,108,300	\$797,900	\$4,412,000

TOTAL CONSTRUCTION COST

Cactus	\$50,327,100
Dumas	\$33,678,200
Sunray	\$7,051,400
Gruver	\$4,703,000
Spearman	\$3,196,600
Stinnet	\$6,322,900
check total	\$105,279,200

Interest During Construction

(24 month)

Cactus	\$4,110,200
Dumas	\$2,750,500
Sunray	\$575,900
Gruver	\$384,100
Spearman	\$261,100
Stinnet	\$516,400
check total	\$8,598,200

Permitting and Mitigation

Cactus	\$405,000
Dumas	\$266,800
Sunray	\$64,800
Gruver	\$39,900
Spearman	\$25,100
Stinnet	\$51,000
check total	\$852,600

Table H-26, Continued

TOTAL CAPITAL COST

Cactus	\$54,842,300
Dumas	\$36,695,500
Sunray	\$7,692,100
Gruver	\$5,127,000
Spearman	\$3,482,800
Stinnet	\$6,890,300
check total	\$114,730,000

Annual Costs - Cactus

	Cost
Debt Service (6 percent for 20 years)	\$4,781,400
Electricity	\$46,100
Price to Purchase Water (\$0.15 per 1,000 gal)	\$85,200
Operation and Maintenance	\$589,100
Total Annual Cost	\$5,501,800

UNIT COSTS (Until Amortized)

Water Cost (\$ per ac-ft)	\$3,155
Water Cost (\$ per 1,000 gallons)	\$9.68

UNIT COSTS (After Amortization)

Water Cost (\$ per ac-ft)	\$413
Water Cost (\$ per 1,000 gallons)	\$1.27

Annual Costs - Dumas

	Cost
Debt Service (6 percent for 20 years)	\$3,199,300
Electricity	\$28,500
Price to Purchase Water (\$0.15 per 1,000 gal)	\$66,300
Operation and Maintenance	\$418,000
Total Annual Cost	\$3,712,100

UNIT COSTS (Until Amortized)

Water Cost (\$ per ac-ft)	\$2,737
Water Cost (\$ per 1,000 gallons)	\$8.40

UNIT COSTS (After Amortization)

Water Cost (\$ per ac-ft)	\$378
Water Cost (\$ per 1,000 gallons)	\$1.16

Table H-26, Continued

Annual Costs - Sunray	Cost
Debt Service (6 percent for 20 years)	\$670,600
Electricity	\$6,800
Price to Purchase Water (\$0.15 per 1,000 gal)	\$13,300
Operation and Maintenance	\$90,200
Total Annual Cost	\$780,900
UNIT COSTS (Until Amortized)	
Water Cost (\$ per ac-ft)	\$2,879
Water Cost (\$ per 1,000 gallons)	\$8.84
UNIT COSTS (After Amortization)	
Water Cost (\$ per ac-ft)	\$407
Water Cost (\$ per 1,000 gallons)	\$1.25
Annual Costs - Gruver	Cost
Debt Service (6 percent for 20 years)	\$447,000
Electricity	\$900
Price to Purchase Water (\$0.15 per 1,000 gal)	\$5,700
Operation and Maintenance	\$46,600
Total Annual Cost	\$500,200
UNIT COSTS (Until Amortized)	
Water Cost (\$ per ac-ft)	\$4,303
Water Cost (\$ per 1,000 gallons)	\$13.20
UNIT COSTS (After Amortization)	
Water Cost (\$ per ac-ft)	\$458
Water Cost (\$ per 1,000 gallons)	\$1.40
Annual Costs - Spearman	Cost
Debt Service (6 percent for 20 years)	\$303,600
Electricity	\$1,400
Price to Purchase Water (\$0.15 per 1,000 gal)	\$13,300
Operation and Maintenance	\$52,100
Total Annual Cost	\$370,400
UNIT COSTS (Until Amortized)	
Water Cost (\$ per ac-ft)	\$1,366
Water Cost (\$ per 1,000 gallons)	\$4.19
UNIT COSTS (After Amortization)	
Water Cost (\$ per ac-ft)	\$246
Water Cost (\$ per 1,000 gallons)	\$0.76

Table H-26, Continued

Annual Costs - Stinnet	Cost
Debt Service (6 percent for 20 years)	\$600,700
Electricity	\$2,000
Price to Purchase Water (\$0.15 per 1,000 gal)	\$5,700
Operation and Maintenance	\$58,000
Total Annual Cost	\$666,400
UNIT COSTS (Until Amortized)	
Water Cost (\$ per ac-ft)	\$5,732
Water Cost (\$ per 1,000 gallons)	\$17.59
UNIT COSTS (After Amortization)	
Water Cost (\$ per ac-ft)	\$565
Water Cost (\$ per 1,000 gallons)	\$1.73

Table H-27
Greenbelt M&IWA
Install New Groundwater Well to Supplement Greenbelt Reservoir

Owner: Greenbelt M&IWA
Quantity: 800 AF/Y

Capital Costs	Size	Quantity	Unit	Unit Price	Cost
Wellfield					
Wells	1500 gpm	1	Ea.	\$175,000	\$175,000
Connection to Pump Station		1	Ea.	\$50,000	\$50,000
Engineering and Contingencies (35% for well field)					\$78,800
Subtotal for Wellfield and Treatment					\$303,800
 Transmission System					
Pipeline - Rural	10 inch	7,920	LF	\$43	\$340,600
Pump Station	35 HP	1	LS	\$612,600	\$612,600
Easement - Rural	15 Feet	3	AC	\$1,219	\$4,000
Engineering and Contingencies (30% for pipelines, 35% for other items)					\$316,600
Subtotal for Transmission					\$1,273,800
 TOTAL CONSTRUCTION COST					 \$1,577,600
 Interest During Construction					 \$34,200
(6 months)					
 Permitting and Mitigation					 \$14,100
 Groundwater Rights/ Purchase					 \$240,000
 TOTAL CAPITAL COST					 \$1,865,900
 Annual Costs					
Debt Service (6 percent for 20 years)					\$162,700
Electricity					\$38,300
Water Treatment (\$0.30 per 1,000 gal)					\$0
Operation and Maintenance					\$29,200
Total Annual Cost					\$230,200
 UNIT COSTS (Until Amortized)					
Water Cost (\$ per ac-ft)					\$288
Water Cost (\$ per 1,000 gallons)					\$0.88
 UNIT COSTS (After Amortization)					
Water Cost (\$ per ac-ft)					\$84
Water Cost (\$ per 1,000 gallons)					\$0.26

**Table H-28
Irrigation Strategy Costs**

Armstrong

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 1,556	\$ 1,556	\$ 1,556	\$ 1,556	\$ 1,556
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (1,418)	\$ (1,702)	\$ (1,986)	\$ (2,269)	\$ (2,553)
Convert to Dry		\$ 13,083	\$ 13,083	\$ 13,083	\$ 13,083	\$ 13,083
Irrigation Equipment		\$ 33,297	\$ 34,516	\$ 36,954	\$ 38,174	\$ 39,393
PET Network		\$ 1,483	\$ 1,483	\$ 1,483	\$ 1,483	\$ 1,483
Precipitation Enhancement		\$ 4,718	\$ 4,718	\$ 4,718	\$ 4,718	\$ 4,718
Biotechnology		\$ 3,013	\$ 10,848	\$ 12,053	\$ 12,053	\$ 12,053
Total		\$ 55,732	\$ 64,502	\$ 67,862	\$ 68,798	\$ 69,733

Total - Precip. Enhance. \$51,013.20 \$59,783.41 \$63,143.55 \$64,079.11 \$65,014.66

Carson

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 33,937	\$ 33,937	\$ 33,937	\$ 33,937	\$ 33,937
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (11,243)	\$ (13,492)	\$ (15,741)	\$ (17,989)	\$ (20,238)
Convert to Dry		\$ 84,208	\$ 84,208	\$ 84,208	\$ 84,208	\$ 84,208
Irrigation Equipment		\$ 263,843	\$ 273,504	\$ 292,827	\$ 302,488	\$ 312,150
PET Network		\$ 11,748	\$ 11,748	\$ 11,748	\$ 11,748	\$ 11,748
Precipitation Enhancement		\$ 37,389	\$ 37,389	\$ 37,389	\$ 37,389	\$ 37,389
Biotechnology		\$ 23,994	\$ 86,379	\$ 95,977	\$ 95,977	\$ 95,977
Total		\$ 443,876	\$ 513,674	\$ 540,345	\$ 547,758	\$ 555,171

Total - Precip. Enhance. \$ 406,487 \$ 476,285 \$ 502,956 \$ 510,369 \$ 517,782

Childress

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ -	\$ -	\$ -	\$ -	\$ -
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (1,118)	\$ (1,341)	\$ (1,565)	\$ (1,788)	\$ (2,012)
Convert to Dry		\$ 10,270	\$ 10,270	\$ 10,270	\$ 10,270	\$ 10,270
Irrigation Equipment		\$ 26,292	\$ 27,255	\$ 29,180	\$ 30,143	\$ 31,106
PET Network		\$ 1,171	\$ 1,171	\$ 1,171	\$ 1,171	\$ 1,171
Precipitation Enhancement		\$ 3,726	\$ 3,726	\$ 3,726	\$ 3,726	\$ 3,726
Biotechnology		\$ 2,309	\$ 8,314	\$ 9,237	\$ 9,237	\$ 9,237
Total		\$ 42,650	\$ 49,394	\$ 52,019	\$ 52,759	\$ 53,498

Total - Precip. Enhance. \$ 38,924 \$ 45,668 \$ 48,293 \$ 49,033 \$ 49,772

Table H-28 Continued

Collingsworth

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 65	\$ 65	\$ 65	\$ 65	\$ 65
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (2,488)	\$ (2,986)	\$ (3,483)	\$ (3,981)	\$ (4,479)
Convert to Dry		\$ 8,639	\$ 8,639	\$ 8,639	\$ 8,639	\$ 8,639
Irrigation Equipment		\$ 59,238	\$ 61,407	\$ 65,746	\$ 67,915	\$ 70,084
PET Network		\$ 2,638	\$ 2,638	\$ 2,638	\$ 2,638	\$ 2,638
Precipitation Enhancement		\$ 8,395	\$ 8,395	\$ 8,395	\$ 8,395	\$ 8,395
Biotechnology		\$ 4,419	\$ 15,909	\$ 17,677	\$ 17,677	\$ 17,677
Total		\$ 80,905	\$ 94,067	\$ 99,675	\$ 101,346	\$ 103,018
Total - Precip. Enhance.		\$ 72,511	\$ 85,672	\$ 91,280	\$ 92,952	\$ 94,623

Dallam

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 595,529	\$ 595,529	\$ 595,529	\$ 595,529	\$ 595,529
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (26,865)	\$ (26,865)	\$ (26,865)	\$ (26,865)	\$ (26,865)
Convert to Dry		\$ 126,592	\$ 253,183	\$ 253,183	\$ 253,183	\$ 253,183
Irrigation Equipment		\$ 322,154	\$ 644,358	\$ 966,536	\$ 966,536	\$ 966,536
PET Network		\$ 12,418	\$ 24,837	\$ 37,255	\$ 49,674	\$ 49,674
Precipitation Enhancement		\$ 111,938	\$ 111,938	\$ 111,938	\$ 111,938	\$ 111,938
Biotechnology		\$ 103,328	\$ 371,980	\$ 413,311	\$ 413,311	\$ 413,311
Total		\$ 1,245,094	\$ 1,974,960	\$ 2,350,888	\$ 2,363,306	\$ 2,363,306
Total - Precip. Enhance.		\$1,133,156	\$1,863,021	\$2,238,950	\$2,251,368	\$2,251,368

Donley

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 2,599	\$ 2,599	\$ 2,599	\$ 2,599	\$ 2,599
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (2,118)	\$ (2,542)	\$ (2,965)	\$ (3,389)	\$ (3,813)
Convert to Dry		\$ 13,254	\$ 13,254	\$ 13,254	\$ 13,254	\$ 13,254
Irrigation Equipment		\$ 49,987	\$ 51,818	\$ 55,478	\$ 57,309	\$ 59,139
PET Network		\$ 2,226	\$ 2,226	\$ 2,226	\$ 2,226	\$ 2,226
Precipitation Enhancement		\$ 7,084	\$ 7,084	\$ 7,084	\$ 7,084	\$ 7,084
Biotechnology		\$ 4,191	\$ 15,088	\$ 16,764	\$ 16,764	\$ 16,764
Total		\$ 77,223	\$ 89,526	\$ 94,440	\$ 95,847	\$ 97,253
Total - Precip. Enhance.		\$ 70,139	\$ 82,443	\$ 87,356	\$ 88,763	\$ 90,170

Table H-28 Continued

Gray

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 13,320	\$ 13,320	\$ 13,320	\$ 13,320	\$ 13,320
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (3,410)	\$ (4,092)	\$ (4,774)	\$ (5,456)	\$ (6,138)
Convert to Dry		\$ 23,023	\$ 23,023	\$ 23,023	\$ 23,023	\$ 23,023
Irrigation Equipment		\$ 80,001	\$ 82,930	\$ 88,789	\$ 91,719	\$ 94,648
PET Network		\$ 3,562	\$ 3,562	\$ 3,562	\$ 3,562	\$ 3,562
Precipitation Enhancement		\$ 11,337	\$ 11,337	\$ 11,337	\$ 11,337	\$ 11,337
Biotechnology		\$ 7,304	\$ 26,293	\$ 29,214	\$ 29,214	\$ 29,214
Total		\$ 135,136	\$ 156,373	\$ 164,471	\$ 166,718	\$ 168,966
Total - Precip. Enhance.		\$ 123,799	\$ 145,036	\$ 153,134	\$ 155,381	\$ 157,629

Hall

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ -	\$ -	\$ -	\$ -	\$ -
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (2,344)	\$ (2,812)	\$ (3,281)	\$ (3,750)	\$ (4,218)
Convert to Dry		\$ 17,537	\$ 17,537	\$ 17,537	\$ 17,537	\$ 17,537
Irrigation Equipment		\$ 55,307	\$ 57,332	\$ 61,382	\$ 63,408	\$ 65,433
PET Network		\$ 2,463	\$ 2,463	\$ 2,463	\$ 2,463	\$ 2,463
Precipitation Enhancement		\$ 7,838	\$ 7,838	\$ 7,838	\$ 7,838	\$ 7,838
Biotechnology		\$ 4,637	\$ 16,693	\$ 18,548	\$ 18,548	\$ 18,548
Total		\$ 85,437	\$ 99,049	\$ 104,486	\$ 106,042	\$ 107,599
Total - Precip. Enhance.		\$ 77,599	\$ 91,212	\$ 96,648	\$ 98,205	\$ 99,761

Hansford

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 205,567	\$ 205,567	\$ 205,567	\$ 205,567	\$ 205,567
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (14,152)	\$ (14,152)	\$ (14,152)	\$ (14,152)	\$ (14,152)
Convert to Dry		\$ 97,383	\$ 194,766	\$ 194,766	\$ 194,766	\$ 194,766
Irrigation Equipment		\$ 169,698	\$ 339,406	\$ 509,109	\$ 509,109	\$ 509,109
PET Network		\$ 6,542	\$ 13,083	\$ 19,625	\$ 26,166	\$ 26,166
Precipitation Enhancement		\$ 58,965	\$ 58,965	\$ 58,965	\$ 58,965	\$ 58,965
Biotechnology		\$ 37,659	\$ 135,573	\$ 150,637	\$ 150,637	\$ 150,637
Total		\$ 561,662	\$ 933,209	\$ 1,124,517	\$ 1,131,059	\$ 1,131,059
Total - Precip. Enhance.		\$502,697	\$874,244	\$1,065,552	\$1,072,094	\$1,072,094

Table H-28 Continued

Hartley

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 545,156	\$ 545,156	\$ 545,156	\$ 545,156	\$ 545,156
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (23,446)	\$ (23,446)	\$ (23,446)	\$ (23,446)	\$ (23,446)
Convert to Dry		\$ 105,430	\$ 210,859	\$ 210,859	\$ 210,859	\$ 210,859
Irrigation Equipment		\$ 281,155	\$ 562,323	\$ 843,484	\$ 843,484	\$ 843,484
PET Network		\$ 10,838	\$ 21,676	\$ 32,514	\$ 43,352	\$ 43,352
Precipitation Enhancement		\$ 97,692	\$ 97,692	\$ 97,692	\$ 97,692	\$ 97,692
Biotechnology		\$ 96,380	\$ 346,968	\$ 385,521	\$ 385,521	\$ 385,521
Total		\$ 1,113,205	\$ 1,761,229	\$ 2,091,780	\$ 2,102,618	\$ 2,102,618
Total - Precip. Enhance.		\$1,015,512	\$1,663,536	\$1,994,087	\$2,004,925	\$2,004,925

Hemphill

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ -	\$ -	\$ -	\$ -	\$ -
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (148)	\$ (177)	\$ (207)	\$ (236)	\$ (266)
Convert to Dry		\$ 1,570	\$ 1,570	\$ 1,570	\$ 1,570	\$ 1,570
Irrigation Equipment		\$ 3,463	\$ 3,590	\$ 3,843	\$ 3,970	\$ 4,097
PET Network		\$ 154	\$ 154	\$ 154	\$ 154	\$ 154
Precipitation Enhancement		\$ 491	\$ 491	\$ 491	\$ 491	\$ 491
Biotechnology		\$ 316	\$ 1,137	\$ 1,264	\$ 1,264	\$ 1,264
Total		\$ 5,846	\$ 6,765	\$ 7,115	\$ 7,212	\$ 7,310
Total - Precip. Enhance.		\$ 5,355	\$ 6,274	\$ 6,624	\$ 6,722	\$ 6,819

Hutchinson

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 64,595	\$ 64,595	\$ 64,595	\$ 64,595	\$ 64,595
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (4,277)	\$ (4,277)	\$ (4,277)	\$ (4,277)	\$ (4,277)
Convert to Dry		\$ 24,388	\$ 48,776	\$ 48,776	\$ 48,776	\$ 48,776
Irrigation Equipment		\$ 51,289	\$ 102,598	\$ 153,898	\$ 153,898	\$ 153,898
PET Network		\$ 1,977	\$ 3,954	\$ 5,931	\$ 7,908	\$ 7,908
Precipitation Enhancement		\$ 17,821	\$ 17,821	\$ 17,821	\$ 17,821	\$ 17,821
Biotechnology		\$ 12,490	\$ 44,965	\$ 49,961	\$ 49,961	\$ 49,961
Total		\$ 168,282	\$ 278,431	\$ 336,704	\$ 338,681	\$ 338,681
Total - Precip. Enhance.		\$150,461	\$260,610	\$318,882	\$320,860	\$320,860

Table H-28 Continued

Lipscomb

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 10,513	\$ 10,513	\$ 10,513	\$ 10,513	\$ 10,513
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (1,419)	\$ (1,703)	\$ (1,987)	\$ (2,271)	\$ (2,555)
Convert to Dry		\$ 6,101	\$ 6,101	\$ 6,101	\$ 6,101	\$ 6,101
Irrigation Equipment		\$ 33,240	\$ 34,458	\$ 36,892	\$ 38,109	\$ 39,326
PET Network		\$ 1,480	\$ 1,480	\$ 1,480	\$ 1,480	\$ 1,480
Precipitation Enhancement		\$ 4,710	\$ 4,710	\$ 4,710	\$ 4,710	\$ 4,710
Biotechnology		\$ 3,117	\$ 11,221	\$ 12,468	\$ 12,468	\$ 12,468
Total		\$ 57,743	\$ 66,780	\$ 70,178	\$ 71,111	\$ 72,044
Total - Precip. Enhance.		\$ 53,033	\$ 62,070	\$ 65,467	\$ 66,400	\$ 67,334

Moore

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 272,297	\$ 272,297	\$ 272,297	\$ 272,297	\$ 272,297
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (16,369)	\$ (16,369)	\$ (16,369)	\$ (16,369)	\$ (16,369)
Convert to Dry		\$ 104,300	\$ 208,600	\$ 208,600	\$ 208,600	\$ 208,600
Irrigation Equipment		\$ 196,283	\$ 392,565	\$ 588,847	\$ 588,847	\$ 588,847
PET Network		\$ 7,566	\$ 15,133	\$ 22,699	\$ 30,265	\$ 30,265
Precipitation Enhancement		\$ 68,202	\$ 68,202	\$ 68,202	\$ 68,202	\$ 68,202
Biotechnology		\$ 54,721	\$ 196,996	\$ 218,885	\$ 218,885	\$ 218,885
Total		\$ 687,001	\$ 1,137,425	\$ 1,363,162	\$ 1,370,728	\$ 1,370,728
Total - Precip. Enhance.		\$618,799	\$1,069,223	\$1,294,960	\$1,302,526	\$1,302,526

Ochiltree

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 33,219	\$ 33,219	\$ 33,219	\$ 33,219	\$ 33,219
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (11,239)	\$ (13,487)	\$ (15,735)	\$ (17,982)	\$ (20,230)
Convert to Dry		\$ 83,938	\$ 83,938	\$ 83,938	\$ 83,938	\$ 83,938
Irrigation Equipment		\$ 263,781	\$ 273,440	\$ 292,758	\$ 302,417	\$ 312,076
PET Network		\$ 11,746	\$ 11,746	\$ 11,746	\$ 11,746	\$ 11,746
Precipitation Enhancement		\$ 37,380	\$ 37,380	\$ 37,380	\$ 37,380	\$ 37,380
Biotechnology		\$ 23,936	\$ 86,171	\$ 95,745	\$ 95,745	\$ 95,745
Total		\$ 442,761	\$ 512,407	\$ 539,051	\$ 546,463	\$ 553,874
Total - Precip. Enhance.		\$ 405,381	\$ 475,026	\$ 501,671	\$ 509,082	\$ 516,494

Table H-28 Continued

Oldham

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ -	\$ -	\$ -	\$ -	\$ -
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (534)	\$ (641)	\$ (748)	\$ (855)	\$ (962)
Convert to Dry		\$ 5,453	\$ 5,453	\$ 5,453	\$ 5,453	\$ 5,453
Irrigation Equipment		\$ 12,542	\$ 13,001	\$ 13,920	\$ 14,379	\$ 14,838
PET Network		\$ 558	\$ 558	\$ 558	\$ 558	\$ 558
Precipitation Enhancement		\$ 1,777	\$ 1,777	\$ 1,777	\$ 1,777	\$ 1,777
Biotechnology		\$ 1,132	\$ 4,074	\$ 4,527	\$ 4,527	\$ 4,527
Total		\$ 20,929	\$ 24,224	\$ 25,488	\$ 25,841	\$ 26,193
Total - Precip. Enhance.		\$ 19,151	\$ 22,446	\$ 23,711	\$ 24,063	\$ 24,416

Potter

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 740	\$ 740	\$ 740	\$ 740	\$ 740
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (651)	\$ (781)	\$ (912)	\$ (1,042)	\$ (1,172)
Convert to Dry		\$ 4,885	\$ 4,885	\$ 4,885	\$ 4,885	\$ 4,885
Irrigation Equipment		\$ 15,333	\$ 15,894	\$ 17,017	\$ 17,579	\$ 18,140
PET Network		\$ 683	\$ 683	\$ 683	\$ 683	\$ 683
Precipitation Enhancement		\$ 2,173	\$ 2,173	\$ 2,173	\$ 2,173	\$ 2,173
Biotechnology		\$ 1,327	\$ 4,777	\$ 5,308	\$ 5,308	\$ 5,308
Total		\$ 24,490	\$ 28,371	\$ 29,894	\$ 30,326	\$ 30,757
Total - Precip. Enhance.		\$ 22,317	\$ 26,198	\$ 27,722	\$ 28,153	\$ 28,584

Randall

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 9,768	\$ 9,768	\$ 9,768	\$ 9,768	\$ 9,768
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (11,316)	\$ (13,580)	\$ (15,843)	\$ (18,106)	\$ (20,369)
Convert to Dry		\$ 120,020	\$ 120,020	\$ 120,020	\$ 120,020	\$ 120,020
Irrigation Equipment		\$ 265,122	\$ 274,831	\$ 294,247	\$ 303,955	\$ 313,663
PET Network		\$ 11,805	\$ 11,805	\$ 11,805	\$ 11,805	\$ 11,805
Precipitation Enhancement		\$ 37,570	\$ 37,570	\$ 37,570	\$ 37,570	\$ 37,570
Biotechnology		\$ 24,712	\$ 88,964	\$ 98,849	\$ 98,849	\$ 98,849
Total		\$ 457,682	\$ 529,378	\$ 556,416	\$ 563,861	\$ 571,306
Total - Precip. Enhance.		\$ 420,111	\$ 491,808	\$ 518,846	\$ 526,291	\$ 533,736

Table H-28 Continued

Roberts

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 4,226	\$ 4,226	\$ 4,226	\$ 4,226	\$ 4,226
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (2,138)	\$ (2,566)	\$ (2,994)	\$ (3,421)	\$ (3,849)
Convert to Dry		\$ 8,723	\$ 8,723	\$ 8,723	\$ 8,723	\$ 8,723
Irrigation Equipment		\$ 50,613	\$ 52,466	\$ 56,173	\$ 58,026	\$ 59,879
PET Network		\$ 2,254	\$ 2,254	\$ 2,254	\$ 2,254	\$ 2,254
Precipitation Enhancement		\$ 7,172	\$ 7,172	\$ 7,172	\$ 7,172	\$ 7,172
Biotechnology		\$ 4,075	\$ 14,670	\$ 16,300	\$ 16,300	\$ 16,300
Total		\$ 74,924	\$ 86,945	\$ 91,854	\$ 93,279	\$ 94,705
Total - Precip. Enhance.		\$ 67,752	\$ 79,772	\$ 84,681	\$ 86,107	\$ 87,533

Sherman

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 366,909	\$ 366,909	\$ 366,909	\$ 366,909	\$ 366,909
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (21,010)	\$ (21,010)	\$ (21,010)	\$ (21,010)	\$ (21,010)
Convert to Dry		\$ 127,390	\$ 254,781	\$ 254,781	\$ 254,781	\$ 254,781
Irrigation Equipment		\$ 251,939	\$ 503,914	\$ 755,870	\$ 755,870	\$ 755,870
PET Network		\$ 9,712	\$ 19,424	\$ 29,135	\$ 38,847	\$ 38,847
Precipitation Enhancement		\$ 87,541	\$ 87,541	\$ 87,541	\$ 87,541	\$ 87,541
Biotechnology		\$ 71,339	\$ 256,822	\$ 285,357	\$ 285,357	\$ 285,357
Total		\$ 893,820	\$ 1,468,380	\$ 1,758,584	\$ 1,768,296	\$ 1,768,296
Total - Precip. Enhance.		\$806,279	\$1,380,839	\$1,671,043	\$1,680,755	\$1,680,755

Wheeler

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 798	\$ 798	\$ 798	\$ 798	\$ 798
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (1,110)	\$ (1,332)	\$ (1,554)	\$ (1,776)	\$ (1,998)
Convert to Dry		\$ 10,272	\$ 10,272	\$ 10,272	\$ 10,272	\$ 10,272
Irrigation Equipment		\$ 26,070	\$ 27,024	\$ 28,933	\$ 29,888	\$ 30,843
PET Network		\$ 1,161	\$ 1,161	\$ 1,161	\$ 1,161	\$ 1,161
Precipitation Enhancement		\$ 3,694	\$ 3,694	\$ 3,694	\$ 3,694	\$ 3,694
Biotechnology		\$ 2,338	\$ 8,417	\$ 9,352	\$ 9,352	\$ 9,352
Total		\$ 43,223	\$ 50,034	\$ 52,657	\$ 53,389	\$ 54,122
Total - Precip. Enhance.		\$ 39,528	\$ 46,340	\$ 48,962	\$ 49,695	\$ 50,428

Regional Totals

Strategy	Annual Costs					
	2010	2020	2030	2040	2050	2060
Change Crop Type		\$ 2,160,793	\$ 2,160,793	\$ 2,160,793	\$ 2,160,793	\$ 2,160,793
Change Crop Variety		-	-	-	-	-
Conservation Tillage		\$ (158,814)	\$ (169,354)	\$ (179,893)	\$ (190,432)	\$ (200,971)
Convert to Dry		\$ 996,457	\$ 1,581,940	\$ 1,581,940	\$ 1,581,940	\$ 1,581,940
Irrigation Equipment		\$ 2,510,646	\$ 3,828,630	\$ 5,191,886	\$ 5,237,223	\$ 5,282,561
PET Network		\$ 104,185	\$ 153,238	\$ 202,291	\$ 251,344	\$ 251,344
Precipitation Enhancement		\$ 617,614	\$ 617,614	\$ 617,614	\$ 617,614	\$ 617,614
Biotechnology		\$ 486,739	\$ 1,752,259	\$ 1,946,954	\$ 1,946,954	\$ 1,946,954
Total		\$ 6,717,619	\$ 9,925,120	\$ 11,521,586	\$ 11,605,438	\$ 11,640,236
Total - Precip. Enhance.		\$ 6,100,005	\$ 9,307,506	\$ 10,903,972	\$ 10,987,823	\$ 11,022,622