

## Cost Estimation Methodology for the 2010 Region M Water Plan

### Introduction

In accordance with the instructions provided by the Texas Water Development Board in "Exhibit C - Guidelines for Regional Water Plan Development" (Appendix 10) individual, per-unit cost estimates were generated for the following water management strategies (WMSs) available in Region M:

- A. Acquisition of Rio Grande Water Rights Through Purchase
- B. Acquisition of Rio Grande Water Rights Through Urbanization
- C. Acquisition of Rio Grande Water Rights Through Contract
- D. Non-Potable Water Re-Use
- E. Potable Water Re-Use
- F. Advanced Water Conservation
- G. Seawater Desalination
- H. Brackish Groundwater Desalination
- I. Additional Groundwater
- J. Brownsville Weir and Reservoir
- K. Resaca Restoration
- L. Laredo Low Water Weir
- M. Banco Morales Reservoir
- N. Proposed Elevated Storage Tank and Infrastructure Improvements for City of Elsa
- O. On-Farm Conservation
- P. Conveyance System Conservation

This document explains the origin and development of the per-unit cost estimates for Water Management Strategies (WMS)

Water Rights Purchase

Table AWR-1. Reported and inflated construction costs of a 10 MGD surface

Item	Description	US\$2007
1	Raw water intake screens/gates	\$5,928,110
2	Raw water reservoir	\$8,892,171
3	High service pump station	\$13,338,264
4	Raw water pump station	\$8,151,163
5	Flocculation/sedimentation basins	\$32,604,623
6	Membranes filtration equipment	\$31,122,606
7	Filter building	\$5,335,300
8	Chemical storage/feed system	\$6,224,521
9	Administrative/lab/control building	\$4,149,681
10	Chemical building	\$2,519,451
11	Clearwell tank	\$12,597,241
12	Recycle pump station	\$1,778,429
13	Backwash waste/sludge lagoon	\$4,979,614
14	Plant piping & valving	\$19,518,322
15	Plant electrical	\$27,876,958
16	Site grading & seeding	\$1,482,031
17	Site paving	\$2,667,650
18	Fencing	\$1,107,078
<b>Construction cost subtotal</b>		<b>\$190,273,199</b>

Table AWR-2. Other capital outlay costs for a new 10 MGD surface water

Item	Description	US\$2007
1	Delivery infrastructure (\$219,525/mile @ 1 mile)	\$2,964,048
2	Engineering/Other (35%)	\$66,595,615
3	Land and easements (5%)	\$9,513,659
4	Environmental (1%)	\$1,902,729
5	Purchased water cost (Purchase @ \$2,300/acre foot)	\$347,845,100
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$428,821,151</b>

Table AWR-3. Estimated debt service costs of acquisition of Rio Grande surface rights and

Item	Description	Value	Unit
1	Construction costs	\$190,273,199	US\$2007
2	Other Capital Outlay Costs	\$428,821,151	US\$2007
3	Total initial costs (i.e., loan principle)	\$619,094,351	US\$2007
4	Annual Interest Rate	0.06	Number
5	Monthly Interest Rate	0.005	Number
6	Years of Loan/Lifetime	20	Years
7	Number Monthly Payments	240	Number
8	Monthly Payments on Loan	\$4,435,384	US\$2007
9	Annual Payments on Loan	\$53,224,611	US\$2007
10	Interest During Construction	\$24,708,679	US\$2007

Table AWR-4. Acquisition of Rio Grande surface water rights estimated total

Item	Description	Value
Annual Costs		
1	Operations and maintenance (45%)	\$53,224,609
2	Power cost (10%)	\$11,827,689
<b>Total Annual Costs</b>		<b>\$65,052,298</b>
Water Production		
3	Million-Gallons-Per-Day	135.0209803
4	1,000 gallons/year	49,282,658
5	acre-feet/year	151,237
Costs per-unit		
6	\$/1,000 gallons	\$1.32
7	\$/acre-foot	\$430.13

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	619,094,351
Monthly Payment	\$4,435,384.21
Annual Payment	\$53,224,610.51
Lifetime payments	\$1,064,492,210.21

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$1,339,912.46	\$3,095,471.75	\$4,435,384.21	617,754,438.18	\$2,059,181.46
Feb	2	\$1,346,612.02	\$3,088,772.19	\$4,435,384.21	617,747,738.62	\$2,059,159.13
Mar	3	\$1,353,345.08	\$3,082,039.13	\$4,435,384.21	617,741,005.56	\$2,059,136.69
Apr	4	\$1,360,111.80	\$3,075,272.41	\$4,435,384.21	617,734,238.83	\$2,059,114.13
May	5	\$1,366,912.36	\$3,068,471.85	\$4,435,384.21	617,727,438.27	\$2,059,091.46
Jun	6	\$1,373,746.92	\$3,061,637.28	\$4,435,384.21	617,720,603.71	\$2,059,068.68
Jul	7	\$1,380,615.66	\$3,054,768.55	\$4,435,384.21	617,713,734.98	\$2,059,045.78
Aug	8	\$1,387,518.74	\$3,047,865.47	\$4,435,384.21	617,706,831.90	\$2,059,022.77
Sep	9	\$1,394,456.33	\$3,040,927.88	\$4,435,384.21	617,699,894.30	\$2,058,999.65
Oct	10	\$1,401,428.61	\$3,033,955.60	\$4,435,384.21	617,692,922.02	\$2,058,976.41
Nov	11	\$1,408,435.76	\$3,026,948.45	\$4,435,384.21	617,685,914.88	\$2,058,953.05
Dec	12	\$1,415,477.93	\$3,019,906.27	\$4,435,384.21	617,678,872.70	\$2,058,929.58
Total		\$16,528,573.68	\$36,696,036.83	\$53,224,610.51		\$24,708,678.78

Capital Cost

\$631,081,709

Water Rights Urbanization

Table AWR-1. Reported and inflated construction costs of a 10 MGD surface water

Item	Description	Cost
1	Raw water intake screens/gates	\$ 643,074
2	Raw water reservoir	\$ 964,612
3	High service pump station	\$ 1,446,918
4	Raw water pump station	\$ 884,228
5	Flocculation/sedimentation basins	\$ 3,536,909
6	Membraen filtration equipment	\$ 3,376,141
7	Filter building	\$ 578,767
8	Chemical storage/feed system	\$ 675,228
9	Administrative/lab/control building	\$ 450,152
10	Chemical building	\$ 273,307
11	Clearwell tank	\$ 1,366,533
12	Recycle pump station	\$ 192,922
13	Backwash waste/sludge lagoon	\$ 540,182
14	Plant piping & valving	\$ 2,117,323
15	Plant electrical	\$ 3,024,057
16	Site grading & seeding	\$ 160,769
17	Site paving	\$ 289,383
18	Fencing	\$ 120,094
<b>Construction cost subtotal</b>		<b>\$ 20,640,599</b>

Table AWR-2. Other capital outlay costs for a new 10 MGD surface water treatment

Item	Description	US\$2007
1	Delivery infrastructure (\$219,525/mile @ 1 mile)	\$ 321,536
2	Engineering/Other (35%)	\$ 7,224,209
3	Land and easements (5%)	\$ 1,032,030
4	Environmental (1%)	\$ 206,406
5	Contracted water cost (Urbanization @ \$1,565/acre foot)	\$ 25,675,390
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$ 34,459,570</b>

Table AWR-3. Estimated debt service costs of acquisition of Rio Grande surface

Item	Description	Value
1	Construction costs	\$20,640,598
2	Other Capital Outlay Costs	\$34,459,570
3	Total initial costs (i.e., loan principle)	\$55,100,168
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$394,755
9	Annual Payments on Loan	\$4,737,057
10	Interest During Construction	\$2,199,103

Table AWR-4. Acquisition of Rio Grande surface water rights estimated total annual

Item	Description	Value
Annual Costs		
1	Operations and maintenance (45%)	\$5,773,739
2	Power cost (10%)	\$1,283,053
<b>Total Annual Costs</b>		<b>\$7,056,792</b>
Water Production		
3	Million-Gallons-Per-Day	14.64690653
4	1,000 gallons/year	5346120.882
5	acre-feet/year	16406
Costs per-unit		
6	\$/1,000 gallons	1.32
7	\$/acre-foot	430.13

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$55,100,168
Monthly Payment	\$394,754.72
Annual Payment	\$4,737,056.63
Lifetime payments	\$94,741,132.67

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$119,253.88	\$275,500.84	\$394,754.72	\$54,980,914.49	\$183,269.71
Feb	2	\$119,850.15	\$274,904.57	\$394,754.72	\$54,980,914.49	\$183,267.73
Mar	3	\$120,449.40	\$274,305.32	\$394,754.72	\$54,980,914.49	\$183,265.73
Apr	4	\$121,051.64	\$273,703.07	\$394,754.72	\$54,980,914.49	\$183,263.72
May	5	\$121,656.90	\$273,097.82	\$394,754.72	\$54,980,914.49	\$183,261.70
Jun	6	\$122,265.19	\$272,489.53	\$394,754.72	\$54,980,914.49	\$183,259.68
Jul	7	\$122,876.51	\$271,878.21	\$394,754.72	\$54,980,914.49	\$183,257.64
Aug	8	\$123,490.90	\$271,263.82	\$394,754.72	\$54,980,914.49	\$183,255.59
Sep	9	\$124,108.35	\$270,646.37	\$394,754.72	\$54,980,914.49	\$183,253.53
Oct	10	\$124,728.89	\$270,025.83	\$394,754.72	\$54,980,914.49	\$183,251.46
Nov	11	\$125,352.54	\$269,402.18	\$394,754.72	\$54,980,914.49	\$183,249.39
Dec	12	\$125,979.30	\$268,775.42	\$394,754.72	\$54,980,914.49	\$183,247.30
Total			\$3,265,992.99	\$4,737,056.63		\$2,199,103.19

Capital Cost

\$56,167,058

Acquisition of Water Rights through Contract

Table AWR-1. Reported and inflated construction costs of a 10 MGD surface

Item	Description	US\$2007
1	Raw water intake screens/gates	\$183,091
2	Raw water reservoir	\$274,637
3	High service pump station	\$411,956
4	Raw water pump station	\$251,751
5	Flocculation/sedimentation basins	\$1,007,004
6	Membraen filtration equipment	\$961,231
7	Filter building	\$164,782
8	Chemical storage/feed system	\$192,246
9	Administrative/lab/control building	\$128,164
10	Chemical building	\$77,814
11	Clearwell tank	\$389,070
12	Recycle pump station	\$54,927
13	Backwash waste/sludge lagoon	\$153,797
14	Plant piping & valving	\$602,829
15	Plant electrical	\$860,988
16	Site grading & seeding	\$45,773
17	Site paving	\$82,391
18	Fencing	\$34,192
	<b>Construction cost subtotal</b>	<b>\$5,876,645</b>

Table AWR-2. Other capital outlay costs for a new 10 MGD

Item	Description	
1	Delivery infrastructure (\$219,525/mile @ 1 mile)	\$91,546
2	Engineering/Other (35%)	\$6,862,451
3	Land and easements (5%)	\$980,350
4	Environmental (1%)	\$196,070
5	Contracted water cost (Contract @ \$1,000/acre foot)	\$1,947,883
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$10,078,300</b>

Table AWR-3. Estimated debt service costs of acquisition of Rio Grande surface

Item	Description	Unit
1	Construction costs	\$5,876,645
2	Other Capital Outlay Costs	\$10,078,300
3	Total initial costs (i.e., loan principle)	\$15,954,945
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$114,306
9	Annual Payments on Loan	\$1,371,674
10	Interest During Construction	\$636,778

Table AWR-4. Acquisition of Rio Grande surface water rights

Item	Description	
<b>Annual Costs</b>		
1	Operations and maintenance (45%)	\$1,643,858
2	Power cost (10%)	\$365,302
<b>Total Annual Costs</b>		<b>\$2,009,160</b>
<b>Water Production</b>		
3	Million-Gallons-Per-Day	4.17
4	1,000 gallons/year	1,522,110
5	acre-feet/year	4,671
<b>Costs per-unit</b>		
6	\$/1,000 gallons	\$1.32
7	\$/acre-foot	\$430.13

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	15,954,945
Monthly Payment	\$114,306.18
Annual Payment	\$1,371,674.20
Lifetime payments	\$27,433,483.93

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$34,531.46	\$79,774.73	\$114,306.18	15,920,413.78	\$53,068.05
Feb	2	\$34,704.11	\$79,602.07	\$114,306.18	15,920,241.13	\$53,067.47
Mar	3	\$34,877.63	\$79,428.55	\$114,306.18	15,920,067.60	\$53,066.89
Apr	4	\$35,052.02	\$79,254.16	\$114,306.18	15,919,893.22	\$53,066.31
May	5	\$35,227.28	\$79,078.90	\$114,306.18	15,919,717.96	\$53,065.73
Jun	6	\$35,403.42	\$78,902.76	\$114,306.18	15,919,541.82	\$53,065.14
Jul	7	\$35,580.44	\$78,725.75	\$114,306.18	15,919,364.80	\$53,064.55
Aug	8	\$35,758.34	\$78,547.84	\$114,306.18	15,919,186.90	\$53,063.96
Sep	9	\$35,937.13	\$78,369.05	\$114,306.18	15,919,008.11	\$53,063.36
Oct	10	\$36,116.82	\$78,189.37	\$114,306.18	15,918,828.42	\$53,062.76
Nov	11	\$36,297.40	\$78,008.78	\$114,306.18	15,918,647.84	\$53,062.16
Dec	12	\$36,478.89	\$77,827.30	\$114,306.18	15,918,466.35	\$53,061.55
Total			\$945,709.26	\$1,371,674.20		\$636,777.93

Capital Cost

16,263,876.57

## Non-potable water reuse

Table NPWR-1. Non-potable reuse projected initial costs, 2007.

Item	Description	US\$2007
	Construction	
1	Treatment system	\$ 113,651,234
2	Transmission system (assumes 1 mile)	\$ 7,271,972
	<b>Construction Cost Subtotal</b>	<b>\$ 120,923,206</b>
	Other Capital Outlays	
3	Engineering/Other (35%)	\$ 42,323,130
4	Land and easements (5%)	\$ 6,046,152
5	Environmental (1%)	\$ 1,209,224
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$ 49,578,506</b>

Table NPWR-2. Non-potable reuse debt service costs, 2007.

Item	Description	Value
1	Construction costs	\$ 120,923,206
2	Other Capital Outlay Costs	\$ 49,578,506
3	Total initial costs (i.e., loan principle)	\$ 170,501,712
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$ 1,221,527
9	Annual Payments on Loan	\$ 14,658,327
10	Interest During Construction	\$6,804,894.99

Table NPWR-3. Non-Potable reuse total annual project costs, water production, and per unit

Item	Description	Value
	Annual Costs	
2	O&M	\$ 1,669,639
3	Treatment	\$ 5,308,540
	<b>Total Annual Costs</b>	<b>\$ 6,978,179</b>
	Water Production	
4	Million-Gallons-Per-Day	41
5	1,000 gallons/year	15,113,641
6	acre-feet/year	46382
	Costs per-unit	
6	\$/1,000 gallons	\$ 0.46
7	\$/acre-foot	\$ 150.45

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	170,501,712
Monthly Payment	\$1,221,527.22
Annual Payment	\$14,658,326.67
Lifetime payments	\$293,166,533.45

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$369,018.66	\$852,508.56	\$1,221,527.22	170,132,693.72	\$567,108.98
Feb	2	\$370,863.75	\$850,663.47	\$1,221,527.22	170,130,848.62	\$567,102.83
Mar	3	\$372,718.07	\$848,809.15	\$1,221,527.22	170,128,994.30	\$567,096.65
Apr	4	\$374,581.66	\$846,945.56	\$1,221,527.22	170,127,130.71	\$567,090.44
May	5	\$376,454.57	\$845,072.65	\$1,221,527.22	170,125,257.80	\$567,084.19
Jun	6	\$378,336.84	\$843,190.38	\$1,221,527.22	170,123,375.53	\$567,077.92
Jul	7	\$380,228.53	\$841,298.69	\$1,221,527.22	170,121,483.85	\$567,071.61
Aug	8	\$382,129.67	\$839,397.55	\$1,221,527.22	170,119,582.70	\$567,065.28
Sep	9	\$384,040.32	\$837,486.90	\$1,221,527.22	170,117,672.06	\$567,058.91
Oct	10	\$385,960.52	\$835,566.70	\$1,221,527.22	170,115,751.85	\$567,052.51
Nov	11	\$387,890.32	\$833,636.90	\$1,221,527.22	170,113,822.05	\$567,046.07
Dec	12	\$389,829.78	\$831,697.45	\$1,221,527.22	170,111,882.60	\$567,039.61
Total		\$4,552,052.71	\$10,106,273.97	\$14,658,326.67		\$6,804,894.99

Capital Cost

173,803,091.35

## Potable Water Reuse

Table PWR-1. Potable reuse projected initial costs, 2007.

Item	Description	US\$2007
	Construction	
1	Treatment system	\$ 5,056,324
2	Transmission system (assumes 1 mile)	\$ 175,598
	<b>Construction Cost Subtotal</b>	<b>\$ 5,231,923</b>
	Other Capital Outlays	
3	Engineering/Other (35%)	\$ 1,831,173
4	Land and easements (5%)	\$ 261,596
5	Environmental (1%)	\$ 52,319
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$ 2,145,088</b>

Table PWR-2. Potable reuse debt service costs, 2007.

Item	Description	Value	Unit
1	Construction costs	\$5,231,923	
2	Other Capital Outlay Costs	\$2,145,088	
3	Total initial costs (i.e., loan principle)	\$7,377,011	
4	Annual Interest Rate	0.06	
5	Monthly Interest Rate	0.005	
6	Years of Loan/Lifetime	20	
7	Number Monthly Payments	240	
8	Monthly Payments on Loan	\$52,851	
9	Annual Payments on Loan	\$634,214	
10	Interest During Construction	\$294,424	

Table PWR-3. Potable water reuse total annual project costs, water production, and per unit

Item	Description	Value
	Annual Costs	
1	O&M	\$ 40,317
2	Treatment	\$ 128,187
	<b>Total Annual Costs</b>	<b>\$ 168,504</b>
	Water Production	
3	Million-Gallons-Per-Day	1
4	1,000 gallons/year	364,954
5	acre-feet/year	1,120
	Costs per-unit	
6	\$/1,000 gallons	\$0.46
7	\$/acre-foot	\$150.45

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	7,377,011
Monthly Payment	\$52,851.20
Annual Payment	\$634,214.37
Lifetime payments	\$12,684,287.33

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$15,966.14	\$36,885.05	\$52,851.20	7,361,044.75	\$24,536.82
Feb	2	\$16,045.97	\$36,805.22	\$52,851.20	7,360,964.92	\$24,536.55
Mar	3	\$16,126.20	\$36,724.99	\$52,851.20	7,360,884.69	\$24,536.28
Apr	4	\$16,206.83	\$36,644.36	\$52,851.20	7,360,804.06	\$24,536.01
May	5	\$16,287.87	\$36,563.33	\$52,851.20	7,360,723.02	\$24,535.74
Jun	6	\$16,369.31	\$36,481.89	\$52,851.20	7,360,641.58	\$24,535.47
Jul	7	\$16,451.15	\$36,400.04	\$52,851.20	7,360,559.74	\$24,535.20
Aug	8	\$16,533.41	\$36,317.79	\$52,851.20	7,360,477.48	\$24,534.92
Sep	9	\$16,616.08	\$36,235.12	\$52,851.20	7,360,394.81	\$24,534.65
Oct	10	\$16,699.16	\$36,152.04	\$52,851.20	7,360,311.73	\$24,534.37
Nov	11	\$16,782.65	\$36,068.54	\$52,851.20	7,360,228.24	\$24,534.09
Dec	12	\$16,866.57	\$35,984.63	\$52,851.20	7,360,144.32	\$24,533.81
Total		\$196,951.35	\$437,263.02	\$634,214.37		\$294,423.93

Capital Cost

7,519,849.98

## Advanced Water Conservation

Table AC-1. Advanced conservation projected initial costs, 2007.

Item	Description	US\$2007
	Initial Capital Costs	
1	School Education @ \$5/student (2000 population)	\$3,106,511
2	Public Education @ \$5/person (2010 population)	\$12,126,288
	<b>Construction Cost Subtotal</b>	<b>\$15,232,799</b>
	Other Capital Outlays	
3	Delivery infrastructure (\$219,525/mile) @ 1 mile	\$380,290
4	Engineering/Other (35%)	\$5,331,480
5	Land and easements (5%)	\$761,640
6	Environmental (1%)	\$152,327
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$6,625,736</b>

Table AC-2. Advanced conservation debt service costs, 2007.

Item	Description	Value	Unit
1	Construction costs	\$15,232,799	
2	Other capital outlays	\$6,625,736	
3	Total initial costs (i.e., loan principle)	\$21,858,535	
4	Annual Interest Rate	0.06	
5	Monthly Interest Rate	0.005	
6	Years of Loan/Lifetime	20	
7	Number Monthly Payments	240	
8	Monthly Payments on Loan	\$156,601	
9	Annual Payments on Loan	\$1,879,216	
10	Interest During Construction	\$872,396.15	

Table AC-3. Advanced conservation total annual project costs, water production, and per unit

Item	Description	Value
Annual Costs		
<b>Total Annual Costs</b>		
Water Production		
1	Million-Gallons-Per-Day	29.3
2	1,000 gallons/year	10,685,875
3	acre-feet/year	32,793
NO ANNUAL COSTS		
Costs per-unit		
4	\$/1,000 gallons	
5	\$/acre-foot	

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	21,858,535
Monthly Payment	\$156,601.34
Annual Payment	\$1,879,216.03
Lifetime payments	\$37,584,320.67

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$47,308.66	\$109,292.68	\$156,601.34	21,811,226.68	\$72,704.09
Feb	2	\$47,545.20	\$109,056.13	\$156,601.34	21,810,990.14	\$72,703.30
Mar	3	\$47,782.93	\$108,818.41	\$156,601.34	21,810,752.41	\$72,702.51
Apr	4	\$48,021.84	\$108,579.49	\$156,601.34	21,810,513.50	\$72,701.71
May	5	\$48,261.95	\$108,339.38	\$156,601.34	21,810,273.39	\$72,700.91
Jun	6	\$48,503.26	\$108,098.07	\$156,601.34	21,810,032.08	\$72,700.11
Jul	7	\$48,745.78	\$107,855.56	\$156,601.34	21,809,789.56	\$72,699.30
Aug	8	\$48,989.51	\$107,611.83	\$156,601.34	21,809,545.83	\$72,698.49
Sep	9	\$49,234.46	\$107,366.88	\$156,601.34	21,809,300.89	\$72,697.67
Oct	10	\$49,480.63	\$107,120.71	\$156,601.34	21,809,054.71	\$72,696.85
Nov	11	\$49,728.03	\$106,873.31	\$156,601.34	21,808,807.31	\$72,696.02
Dec	12	\$49,976.67	\$106,624.67	\$156,601.34	21,808,558.67	\$72,695.20
Total		\$583,578.92	\$1,597,571.26	\$1,879,216.03		\$872,396.15

Capital Cost

22,583,710.45

## Seawater Desalination

Item	Description	Construction Costs
<b>Desalination</b>		
1	Site Development	\$6,828,393
2	Seawater Intake System	\$10,960,282
3	Pretreatment System	\$20,672,097
4	Primary Treatment System	\$12,513,570
5	Post Treatment System	\$425,752
6	Solids Handling System	\$1,795,255
7	Yard Piping	\$1,277,257
8	Support Facilities	\$9,307,417
9	Electrical and Instrumentation	\$7,095,871
10		<b>Subtotal</b> \$70,875,895
11	Effective Contingency	\$7,087,588
12	<b>Total Desalination Plant</b>	<b>\$77,963,483</b>

## Brine Disposal System

13	Brine Transfer Pump Station	\$2,703,189
14	Brine Disposal Main (Open-cut Land Installation)	\$37,755,440
15	Brine Disposal Main (Ocean Installation)	\$1,365,110
16	Brine Disposal Main (Bench head)	\$4,054,783
17	Diffuser Array	\$1,351,594
18	Easement Acquisition	\$1,567,850
19		<b>Subtotal</b> \$48,797,967
20	Contingency	\$4,879,797
21		<b>Total Brine Disposal</b> \$53,677,763

## Finished Water Transmission System

22	Finished Water Transfer & HS Pumps	\$2,459,902
23	Finished Water Transmission System	\$6,163,271
24	2.0 MG Ground Storage Tank	\$3,481,437
25	Land and Right of Way	\$810,957
26		<b>Subtotal</b> \$12,915,566
27	Effective Contingency	\$1,291,557
28		<b>Total Finished Water</b> \$14,207,123
29		<b>TOTAL Construction Cost</b> \$145,848,370

## Other Capital Outlays

1	Design Determination Studies	\$8,020,362
2	Design and Specifications	\$16,043,426
3	Environmental Review and Permitting	\$2,916,741
4	Construction Support Services	\$7,293,204
5	Startup Support Services	\$2,286,898
6		<b>Total Project Implementation</b> \$36,560,630

Item	Description	Unit
1	Construction costs	\$145,848,370
2	Other Capital Outlay Costs	\$36,560,630
3	Total initial costs (i.e., loan principle)	\$182,409,000
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$1,306,835
9	Annual Payments on Loan	\$15,682,017
10	Interest During Construction	\$7,280,127

Item	Description	Value
Annual Costs		
1	Operations and maintenance	\$19,814,910
2	Power cost	\$9,605,980
<b>Total Annual Costs</b>		<b>\$29,420,890</b>
Water Production		
3	Million-Gallons-Per-Day	25
4	1,000 gallons/year	9,125,000
5	acre-feet/year	28,004
Costs per-unit		
6	\$/1,000 gallons	\$3.22
7	\$/acre-foot	\$1,051

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$182,409,000
Monthly Payment	\$1,306,834.73
Annual Payment	\$15,682,016.75
Lifetime payments	\$313,640,335.07

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment PP <sub>t</sub>	Interest Payment IP <sub>t</sub>	Total Payment TP <sub>t</sub> = IP <sub>t</sub> + PP <sub>t</sub>	Unspent Funds UF <sub>t</sub>	Return on Investment
Jan	1	\$394,789.73	\$912,045.00	1,306,835	182,014,210.27	\$606,714.03
Feb	2	\$396,763.68	\$910,071.05	1,306,835	182,012,236.32	\$606,707.45
Mar	3	\$398,747.50	\$908,087.23	1,306,835	182,010,252.50	\$606,700.84
Apr	4	\$400,741.23	\$906,093.50	1,306,835	182,008,258.77	\$606,694.20
May	5	\$402,744.94	\$904,089.79	1,306,835	182,006,255.06	\$606,687.52
Jun	6	\$404,758.66	\$902,076.06	1,306,835	182,004,241.34	\$606,680.80
Jul	7	\$406,782.46	\$900,052.27	1,306,835	182,002,217.54	\$606,674.06
Aug	8	\$408,816.37	\$898,018.36	1,306,835	182,000,183.63	\$606,667.28
Sep	9	\$410,860.45	\$895,974.28	1,306,835	181,998,139.55	\$606,660.47
Oct	10	\$412,914.75	\$893,919.97	1,306,835	181,996,085.25	\$606,653.62
Nov	11	\$414,979.33	\$891,855.40	1,306,835	181,994,020.67	\$606,646.74
Dec	12	\$417,054.22	\$889,780.50	1,306,835	181,991,945.78	\$606,639.82
Total		\$4,869,953.33	\$10,812,063.42	15,682,017		\$7,280,126.82

Capital Cost

\$185,940,937

## Brackish groundwater desalination

The cost estimate for the brackish groundwater desalination WMS is largely derived from cost data published in the *Guidance Manual for Brackish Groundwater Desalination in Texas* (2008). The Guidance Manual cited the experience and knowledge gained during development of the North Cameron Regional Water Project (North Cameron). This project, a brackish groundwater desalination facility with a capacity of 2.25 million gallons per day, provides the construction cost data used in the development the per unit cost estimation used in the Plan for the WMS, brackish groundwater desalination (Table BWRO-1. The construction period for North Cameron ended in 2007, so no additional manipulation (i.e., inflating or discounting) of the cost data was done.

Table BWRO-1. Brackish groundwater desalination construction cost data from North Cameron

Item	Description	US\$2007
1	Reverse osmosis building, concentrate lines, off-site	\$18,852,690
2	Reverse osmosis system	\$50,749,118
3	Production well	\$11,688,921
4	Ground storage tank (2 MG)	\$28,672,602
5	Site fencing	\$978,221
6	High service pump system and chlorination building	\$8,250,764
7	Secondary containment (pipes, valves, pumps, and installation)	\$9,052,779
8	PVC piping (valves, accessories, pumps and wet well)	\$11,592,496
9	Electrical supervisory control and data acquisition	\$31,524,441
10	Chlorination	\$1,842,861
11	Paving, grading, and flatwork (sidewalks and driveway)	\$2,310,020
12	Ductile iron header	\$227,619
13	Culvert	\$113,810
14	Irrigation line	\$104,961
15	Transformer pad and conduit from service to pad	\$248,389
16	Temporary power hookup	\$52,637
	<b>Construction cost subtotal</b>	<b>\$176,262,329</b>

In addition to construction costs, water projects, such as North Cameron, incur a variety of pre-construction costs and/or planning costs. These costs, which include water delivery infrastructure, engineering, land and easement purchases, are categorized as “Other capital outlays” per Exhibit B (Table BWRO-2). Note the “purchased water cost” for brackish groundwater desalination is not available (N/A). For groundwater, this cost is presumed to be zero.

Table BWRO-2. Brackish groundwater desalination other capital outlay cost data from North Cameron Regional Water

Item	Description	US\$2007
<i>Data from Guidance Manual</i>		
1	Test wells	\$1,138,095
2	Test well evaluation	\$853,571
3	Laboratory testing	\$1,824,737
	Estimations (with assumptions)	\$0
4	Delivery infrastructure (\$219,525/mile) @ 1 mile	\$6,246,037
5	Engineering/Other (35%)	\$61,691,818
6	Land and easements (5%)	\$8,813,125
7	Environmental (1%)	\$1,762,625
8	Purchased water cost	N/A
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$82,330,009</b>

The construction and other capital outlay costs were compiled and a single debt service cost was estimated to cover these initial project costs (Table BWRO-3). The lifetime of the loan and the project are both assumed to be for 20 years. Interest for the loan is assumed to be 6%.

Table BWRO-3. Brackish groundwater desalination estimated debt service costs, 2007.

Item	Description	Value	Unit
1	Construction costs	\$176,262,329	
2	Other Capital Outlay Costs	\$82,330,009	
3	Total initial costs (i.e., loan principle)	\$258,592,338	
4	Annual Interest Rate	0.06	
5	Monthly Interest Rate	0.005	
6	Years of Loan/Lifetime	20	
7	Number Monthly Payments	240	
8	Monthly Payments on Loan	\$1,852,636	
9	Annual Payments on Loan	\$22,231,630	
10	Interest During Construction	\$10,320,681	

Table BWRO-4: Brackish groundwater desalination estimated total annual project costs, water production, and per unit production costs, 2007.

Item	Description	Value
<b>Annual Costs</b>		
2	Operations and maintenance (30%)	\$16,673,721
3	Power cost (30%)	\$16,673,721
<b>Total Annual Costs</b>		<b>\$33,347,442</b>
<b>Water Production</b>		
4	Million-Gallons-Per-Day	64.01785714
5	1,000 gallons/year	23,366,518
6	acre-feet/year	71,700
<b>Costs per-unit</b>		
6	\$/1,000 gallons	\$1.43
7	\$/acre-foot	\$465.10

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$258,592,338
Monthly Payment	\$1,852,635.82
Annual Payment	\$22,231,629.89
Lifetime payments	\$444,632,597.79

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$559,674.13	\$1,292,961.69	\$1,852,635.82	\$258,032,663.84	\$860,108.88
Feb	2	\$562,472.50	\$1,290,163.32	\$1,852,635.82	\$258,029,865.47	\$860,099.55
Mar	3	\$565,284.87	\$1,287,350.96	\$1,852,635.82	\$258,027,053.11	\$860,090.18
Apr	4	\$568,111.29	\$1,284,524.53	\$1,852,635.82	\$258,024,226.68	\$860,080.76
May	5	\$570,951.85	\$1,281,683.98	\$1,852,635.82	\$258,021,386.13	\$860,071.29
Jun	6	\$573,806.61	\$1,278,829.22	\$1,852,635.82	\$258,018,531.37	\$860,061.77
Jul	7	\$576,675.64	\$1,275,960.18	\$1,852,635.82	\$258,015,662.34	\$860,052.21
Aug	8	\$579,559.02	\$1,273,076.81	\$1,852,635.82	\$258,012,778.96	\$860,042.60
Sep	9	\$582,456.81	\$1,270,179.01	\$1,852,635.82	\$258,009,881.16	\$860,032.94
Oct	10	\$585,369.10	\$1,267,266.73	\$1,852,635.82	\$258,006,968.88	\$860,023.23
Nov	11	\$588,295.94	\$1,264,339.88	\$1,852,635.82	\$258,004,042.03	\$860,013.47
Dec	12	\$591,237.42	\$1,261,398.40	\$1,852,635.82	\$258,001,100.55	\$860,003.67
Total		\$6,903,895.19	\$15,327,734.70	\$22,231,629.89		\$10,320,680.54

Capital Cost

\$263,599,392

## Additional Groundwater

Table #GW Additional groundwater projected initial costs, 2007.

Item	Description	US\$2007
	Construction	
1	Wellfield	\$3,265,444
2	Water Treatment Facility (32 MGD)	\$15,849,754
	<b>Construction Cost Subtotal</b>	<b>\$19,115,198</b>
	Other Capital Outlays	
3	Delivery infrastructure (\$219,525/mile) @ 1 mile	\$219,525
4	Engineering/Other (35%)	\$6,690,319
5	Land and easements (5%)	\$955,760
6	Environmental (1%)	\$191,152
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$7,837,231</b>

Table #GW Additional groundwater debt service costs, 2007.

Item	Description	
1	Construction costs	\$44,047,050
2	Other capital outlays	\$18,059,290
3	Total initial costs (i.e., loan principle)	\$62,106,340
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$444,949
9	Annual Payments on Loan	\$5,339,389
10	Interest During Construction	\$2,478,727

Item	Description	
	Annual Costs	
1	O&M Wellfield	\$1,618,672
2	O&M Water Treatment Facility	\$3,652,129
	<b>Total Annual Costs</b>	<b>\$5,270,802</b>
	Water Production	
3	Million-Gallons-Per-Day	21.89007405
4	1,000 gallons/year	7989877.029
5	acre-feet/year	24520
	Costs per-unit	
6	\$/1,000 gallons	\$0.66
7	\$/acre-foot	\$214.96

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	62,106,340
Monthly Payment	\$444,949.11
Annual Payment	\$5,339,389.35
Lifetime payments	\$106,787,786.92

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$134,417.41	\$310,531.70	\$444,949.11	\$61,971,923.03	\$206,573.08
Feb	2	\$135,089.50	\$309,859.62	\$444,949.11	\$61,971,250.94	\$206,570.84
Mar	3	\$135,764.94	\$309,184.17	\$444,949.11	\$61,970,575.49	\$206,568.58
Apr	4	\$136,443.77	\$308,505.34	\$444,949.11	\$61,969,896.67	\$206,566.32
May	5	\$137,125.99	\$307,823.12	\$444,949.11	\$61,969,214.45	\$206,564.05
Jun	6	\$137,811.62	\$307,137.49	\$444,949.11	\$61,968,528.82	\$206,561.76
Jul	7	\$138,500.68	\$306,448.44	\$444,949.11	\$61,967,839.76	\$206,559.47
Aug	8	\$139,193.18	\$305,755.93	\$444,949.11	\$61,967,147.26	\$206,557.16
Sep	9	\$139,889.15	\$305,059.97	\$444,949.11	\$61,966,451.29	\$206,554.84
Oct	10	\$140,588.59	\$304,360.52	\$444,949.11	\$61,965,751.85	\$206,552.51
Nov	11	\$141,291.53	\$303,657.58	\$444,949.11	\$61,965,048.90	\$206,550.16
Dec	12	\$141,997.99	\$302,951.12	\$444,949.11	\$61,964,342.44	\$206,547.81
Total		\$1,658,114.34	\$3,681,275.00	\$5,339,389.35		\$2,478,726.57

Capital Cost

63,308,888.87

Table BWR-1. Brownsville Weir & Reservoir projected initial costs, 2007.

Item	Description	US\$2007
Construction		
1	Weir & Reservoir construction	\$34,026,480
2	Water Treatment Facility (35 MGD)	\$32,654,444
3	Treated Water Storage	\$1,632,722
<b>Construction Cost Subtotal</b>		<b>\$68,313,646</b>
Other Capital Outlays		
4	Delivery infrastructure (\$219,525/mile) @ 1 mile	\$219,525
5	Engineering/Other (35%)	\$23,909,776
6	Land and easements (5%)	\$3,415,682
7	Environmental (1%)	\$683,136
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$28,228,119</b>

Table BWR-2. Brownsville Weir & Reservoir debt service costs, 2007.

Item	Description	Value
1	Construction costs	\$68,313,646
2	Other Capital Outlay Costs	\$28,228,119
3	Total initial costs (i.e., loan principle)	\$96,541,765
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$691,655
9	Annual Payments on Loan	\$8,299,862
10	Interest During Construction	\$3,853,079

Table BWR-3. Brownsville Weir & Reservoir total annual project costs, water production, and per unit production costs, 2007. Water production approximated at 20,643 acre-feet

Item	Description	Value
Annual Costs		
2	O&M Water treatment facility	\$3,265,444
3	O&M Weir and Reservoir	\$510,397
<b>Total Annual Costs</b>		<b>\$3,775,841</b>
Water Production		
4	Million-Gallons-Per-Day	18.43
5	1,000 gallons/year	6,726,950
6	acre-feet/year	20,644
Costs per-unit		
6	\$/1,000 gallons	\$1.78
7	\$/acre-foot	\$182.90

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$96,541,765
Monthly Payment	\$691,655.19
Annual Payment	\$8,299,862.27
Lifetime payments	\$165,997,245.33

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$208,946.36	\$482,708.83	\$691,655.19	96,332,818.64	\$321,109.40
Feb	2	\$209,991.10	\$481,664.09	\$691,655.19	96,331,773.90	\$321,105.91
Mar	3	\$211,041.05	\$480,614.14	\$691,655.19	96,330,723.95	\$321,102.41
Apr	4	\$212,096.26	\$479,558.93	\$691,655.19	96,329,668.74	\$321,098.90
May	5	\$213,156.74	\$478,498.45	\$691,655.19	96,328,608.26	\$321,095.36
Jun	6	\$214,222.52	\$477,432.67	\$691,655.19	96,327,542.48	\$321,091.81
Jul	7	\$215,293.63	\$476,361.55	\$691,655.19	96,326,471.37	\$321,088.24
Aug	8	\$216,370.10	\$475,285.09	\$691,655.19	96,325,394.90	\$321,084.65
Sep	9	\$217,451.95	\$474,203.24	\$691,655.19	96,324,313.05	\$321,081.04
Oct	10	\$218,539.21	\$473,115.98	\$691,655.19	96,323,225.79	\$321,077.42
Nov	11	\$219,631.91	\$472,023.28	\$691,655.19	96,322,133.09	\$321,073.78
Dec	12	\$220,730.07	\$470,925.12	\$691,655.19	96,321,034.93	\$321,070.12
Total		\$2,577,470.90	\$5,722,391.36	\$8,299,862.27		\$3,853,079.03

Capital Cost

\$98,411,077

**Table RR-1. Resaca Restoration**

Item	Description	US\$2007
	Construction	
1	Resaca construction	\$28,056,745
	<b>Construction Cost Subtotal</b>	<b>\$28,056,745</b>
	Other Capital Outlays	
4	Delivery infrastructure @ 1 mile	\$229,555
5	Engineering/Other (35%)	\$19,512,191
6	Land and easements (5%)	\$2,754,662
7	Environmental (1%)	\$459,110
	<b>Other Capital Outlay Costs Subtotal</b>	<b>\$22,955,519</b>

Table RR-2. Resaca Restoration debt service costs, 2007.

Item	Description	Value	Unit
1	Construction costs	\$28,056,745	US\$2007
2	Other Capital Outlay Costs	\$22,955,519	US\$2007
3	Total initial costs (i.e., loan principle)	\$51,012,264	US\$2007
4	Annual Interest Rate	0.06	Number
5	Monthly Interest Rate	0.005	Number
6	Years of Loan/Lifetime	20	Years
7	Number Monthly Payments	240	Number
8	Monthly Payments on Loan	\$365,468	US\$2007
9	Annual Payments on Loan	\$4,385,612	US\$2007
10	Interest During Construction	\$2,035,951	US\$2007

Table RR-3. Resaca Restoration total annual project costs, water production, and per unit production costs,

Item	Description	Value
	Annual Costs	
3	O&M Resacas	\$510,397
	<b>Total Annual Costs</b>	<b>\$510,397</b>
	Water Production	
4	Million-Gallons-Per-Day	0.75
5	1,000 gallons/year	273,750
6	acre-feet/year	877
	Costs per-unit	
6	\$/1,000 gallons	\$24.75
7	\$/acre-foot	\$2,542.00

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$51,012,264
Monthly Payment	\$365,467.70
Annual Payment	\$4,385,612.44
Lifetime payments	\$87,712,248.70

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment PP <sub>t</sub>	Interest Payment IP <sub>t</sub>	Total Payment TP <sub>t</sub> = IP <sub>t</sub> + PP <sub>t</sub>	Unspent Funds UF <sub>t</sub>	Return on Investment
Jan	1	\$110,406.38	\$255,061.32	\$365,467.70	50,901,857.62	\$169,672.86
Feb	2	\$110,958.41	\$254,509.29	\$365,467.70	50,901,305.59	\$169,671.02
Mar	3	\$111,513.21	\$253,954.50	\$365,467.70	50,900,750.79	\$169,669.17
Apr	4	\$112,070.77	\$253,396.93	\$365,467.70	50,900,193.23	\$169,667.31
May	5	\$112,631.13	\$252,836.58	\$365,467.70	50,899,632.87	\$169,665.44
Jun	6	\$113,194.28	\$252,273.42	\$365,467.70	50,899,069.72	\$169,663.57
Jul	7	\$113,760.25	\$251,707.45	\$365,467.70	50,898,503.75	\$169,661.68
Aug	8	\$114,329.06	\$251,138.65	\$365,467.70	50,897,934.94	\$169,659.78
Sep	9	\$114,900.70	\$250,567.00	\$365,467.70	50,897,363.30	\$169,657.88
Oct	10	\$115,475.20	\$249,992.50	\$365,467.70	50,896,788.80	\$169,655.96
Nov	11	\$116,052.58	\$249,415.12	\$365,467.70	50,896,211.42	\$169,654.04
Dec	12	\$116,632.84	\$248,834.86	\$365,467.70	50,895,631.16	\$169,652.10
Total		\$1,361,924.82	\$3,023,687.61	\$4,385,612.44		\$2,035,950.81

Capital Cost

52,000,000.80

Table LLWW-1. Laredo Low Water Weir projected initial costs

Item	Description	US\$2007
Construction		
1	Weir & Reservoir construction	\$122,463,545
2	Water Treatment Facility (35 MGD)	\$31,840,522
3	Treated Water Storage	\$90,623,023
<b>Construction Cost Subtotal</b>		<b>\$244,927,090</b>
Other Capital Outlays		
4	Delivery infrastructure @ 1 mile	\$434,884
5	Engineering/Other (35%)	\$36,965,139
6	Land and easements (5%)	\$5,218,608
7	Environmental (1%)	\$869,768
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$43,488,399</b>

Table LLWW-2. Laredo Low Water Weir debt service costs, 2007.

Item	Description	Value
1	Construction costs	\$244,927,090
2	Other Capital Outlay Costs	\$43,488,399
3	Total initial costs (i.e., loan principle)	\$288,415,489
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$2,066,298
9	Annual Payments on Loan	\$24,795,578
10	Interest During Construction	\$11,510,953

Table LLWW-3. Laredo Low Water Weir total annual project costs, water production, and per

Item	Description	Value
Annual Costs		
1	O&M Weir and Reservoir	\$205,000
<b>Total Annual Costs</b>		<b>\$205,000</b>
Costs per-unit		
2	\$/1,000 gallons	\$13.69
3	\$/acre-foot	\$4,460.00

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$288,415,489
Monthly Payment	\$2,066,298.14
Annual Payment	\$24,795,577.69
Lifetime payments	\$495,911,553.76

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$624,220.70	\$1,442,077.45	\$2,066,298.14	287,791,268.30	\$959,304.23
Feb	2	\$627,341.80	\$1,438,956.34	\$2,066,298.14	287,788,147.20	\$959,293.82
Mar	3	\$630,478.51	\$1,435,819.63	\$2,066,298.14	287,785,010.49	\$959,283.37
Apr	4	\$633,630.90	\$1,432,667.24	\$2,066,298.14	287,781,858.10	\$959,272.86
May	5	\$636,799.06	\$1,429,499.09	\$2,066,298.14	287,778,689.94	\$959,262.30
Jun	6	\$639,983.05	\$1,426,315.09	\$2,066,298.14	287,775,505.95	\$959,251.69
Jul	7	\$643,182.97	\$1,423,115.17	\$2,066,298.14	287,772,306.03	\$959,241.02
Aug	8	\$646,398.88	\$1,419,899.26	\$2,066,298.14	287,769,090.12	\$959,230.30
Sep	9	\$649,630.87	\$1,416,667.27	\$2,066,298.14	287,765,858.13	\$959,219.53
Oct	10	\$652,879.03	\$1,413,419.11	\$2,066,298.14	287,762,609.97	\$959,208.70
Nov	11	\$656,143.42	\$1,410,154.72	\$2,066,298.14	287,759,345.58	\$959,197.82
Dec	12	\$659,424.14	\$1,406,874.00	\$2,066,298.14	287,756,064.86	\$959,186.88
Total		\$7,700,113.33	\$17,095,464.36	\$24,795,577.69		\$11,510,952.52

Capital Cost

\$294,000,001

Table BMR-1. Banco Morales Reservoir projected initial costs

Item	Description	US\$2007
Construction		
1	Weir & Reservoir construction	\$8,981,539
2	Water Treatment Facility (35 MGD)	\$8,442,647
3	Treated Water Storage	\$538,892
<b>Construction Cost Subtotal</b>		<b>\$17,963,079</b>
Other Capital Outlays		
4	Delivery infrastructure (\$219,525/mile) @ 1 mile	\$73,370
5	Engineering/Other (35%)	\$6,236,477
6	Land and easements (5%)	\$880,444
7	Environmental (1%)	\$146,741
<b>Other Capital Outlay Costs Subtotal</b>		<b>\$7,337,032</b>

Table BMR-2. Banco Morales Reservoir debt service costs

Item	Description	Value	Unit
1	Construction costs	\$17,963,079	US\$2007
2	Other Capital Outlay Costs	\$7,337,032	US\$2007
3	Total initial costs (i.e., loan principle)	\$25,300,111	US\$2007
4	Annual Interest Rate	\$0	Number
5	Monthly Interest Rate	\$0	Number
6	Years of Loan/Lifetime	\$20	Years
7	Number Monthly Payments	\$240	Number
8	Monthly Payments on Loan	\$181,258	US\$2007
9	Annual Payments on Loan	\$2,175,094	US\$2007
10	Interest During Construction	\$1,009,753	US\$2007

Table BMR-3. Banco Morales Reservoir total annual project costs, water production, and per unit production costs

Item	Description	Value
Annual Costs		
2	O&M Water treatment facility	\$47,850
3	O&M Weir and Reservoir	\$7,150
<b>Total Annual Costs</b>		<b>\$55,000</b>
Water Production		
4	Million-Gallons-Per-Day	4.7
5	1,000 gallons/year	77,555
6	acre-feet/year	238
Costs per-unit		
6	\$/1,000 gallons	\$1.41
7	\$/acre-foot	\$231.09

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$25,300,111
Monthly Payment	\$181,257.85
Annual Payment	\$2,175,094.24
Lifetime payments	\$43,501,884.73

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$54,757.30	\$126,500.56	\$181,257.85	25,245,353.70	\$84,151.18
Feb	2	\$55,031.08	\$126,226.77	\$181,257.85	25,245,079.92	\$84,150.27
Mar	3	\$55,306.24	\$125,951.61	\$181,257.85	25,244,804.76	\$84,149.35
Apr	4	\$55,582.77	\$125,675.08	\$181,257.85	25,244,528.23	\$84,148.43
May	5	\$55,860.69	\$125,397.17	\$181,257.85	25,244,250.31	\$84,147.50
Jun	6	\$56,139.99	\$125,117.86	\$181,257.85	25,243,971.01	\$84,146.57
Jul	7	\$56,420.69	\$124,837.16	\$181,257.85	25,243,690.31	\$84,145.63
Aug	8	\$56,702.79	\$124,555.06	\$181,257.85	25,243,408.21	\$84,144.69
Sep	9	\$56,986.31	\$124,271.55	\$181,257.85	25,243,124.69	\$84,143.75
Oct	10	\$57,271.24	\$123,986.62	\$181,257.85	25,242,839.76	\$84,142.80
Nov	11	\$57,557.59	\$123,700.26	\$181,257.85	25,242,553.41	\$84,141.84
Dec	12	\$57,845.38	\$123,412.47	\$181,257.85	25,242,265.62	\$84,140.89
Total		\$675,462.07	\$1,499,632.17	\$2,175,094.24		\$1,009,752.90

Capital Cost

\$25,789,990

**Proposed Elevated Storage Tank and Infrastructure  
Improvements for the City of Elsa**

Construction		
Item	Description	US\$2010
1	0.5 MG Elevated Storage	\$ 950,000
2	Substandard Waterline Replacement	\$ 101,500
3	Substandard Wastewater Line Replac	\$ 340,000
4	Rehad/New Lift Service Stations	\$ 4,000,000
5	Substandard Waterline Replacement	\$ 280,000
6	Proposed Water Line	\$ 196,000
7	Proposed Wastewater Line	\$ 153,000
<b>Construction Cost Subtotal</b>		<b>\$ 6,020,500</b>

Item	Description	US\$2010
1	Planning	\$ 196,945
2	Design	\$ 196,945
3	Construction	\$ 56,270
4	Environmental	\$ 67,524
5	Surveying	\$ 39,389
6	Geotechnical	\$ 33,762
7	Testing	\$ 28,135
8	Inspection	\$ 56,270
9	GIS Asset Management Project	\$ 300,000
10	Contingency	\$ 747,906
11	Professional Engineering Fees	\$ 975,240
<b>Other Capital Outlay Subtotal</b>		<b>\$ 2,698,386</b>

Item	Description	Value	Unit
1	Construction costs	\$ 6,020,500	
2	Other Capital Outlay Costs	\$ 2,698,386	
3	Total initial costs (i.e., loan principle)	\$ 8,718,886	
4	Annual Interest Rate	0.06	
5	Monthly Interest Rate	0.005	
6	Years of Loan/Lifetime	20	
7	Number Monthly Payments	240	
8	Monthly Payments on Loan	\$ 62,465	
9	Annual Payments on Loan	\$ 749,578	
10	Interest During Construction	\$347,979.52	

Description	Value
<b>Annual Costs</b>	
Operations and maintenance (45%)	10,705
<b>Annual Costs</b>	<b>\$10,705</b>
<b>Water Production</b>	
Million-Gallons-Per-Day	0.1
1,000 gallons/year	34214
acre-feet/year	105
<b>Costs per-unit</b>	
\$/1,000 gallons	\$0.31
\$/acre-foot	\$101.95

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	8,718,886
Monthly Payment	\$62,464.81
Annual Payment	\$749,577.69
Lifetime payments	\$14,991,553.74

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment PPt	Interest Payment IPt	Total Payment TPt = IPt + PPt	Unspent Funds U Ft	Return on Investment
Jan	1	\$18,870.38	\$43,594.43	\$62,464.81	8,700,015.62	\$29,000.05
Feb	2	\$18,964.73	\$43,500.08	\$62,464.81	8,699,921.27	\$28,999.74
Mar	3	\$19,059.55	\$43,405.25	\$62,464.81	8,699,826.45	\$28,999.42
Apr	4	\$19,154.85	\$43,309.96	\$62,464.81	8,699,731.15	\$28,999.10
May	5	\$19,250.62	\$43,214.18	\$62,464.81	8,699,635.38	\$28,998.78
Jun	6	\$19,346.88	\$43,117.93	\$62,464.81	8,699,539.12	\$28,998.46
Jul	7	\$19,443.61	\$43,021.19	\$62,464.81	8,699,442.39	\$28,998.14
Aug	8	\$19,540.83	\$42,923.98	\$62,464.81	8,699,345.17	\$28,997.82
Sep	9	\$19,638.53	\$42,826.27	\$62,464.81	8,699,247.47	\$28,997.49
Oct	10	\$19,736.73	\$42,728.08	\$62,464.81	8,699,149.27	\$28,997.16
Nov	11	\$19,835.41	\$42,629.40	\$62,464.81	8,699,050.59	\$28,996.84
Dec	12	\$19,934.59	\$42,530.22	\$62,464.81	8,698,951.41	\$28,996.50
Total			\$516,800.97	\$749,577.69		\$347,979.52

Capital Cost

8,887,707.45

Irrigation On Farm Conservation  
 CONSTRUCTION CAPITAL COSTS

Construction Costs	\$241,221,309
Construction Capital Costs Subtotal	\$241,221,309

OTHER CAPITAL OUTLAYS

1 Engineering, Legal Costs, Financing, & Contingencies (35%)	\$84,427,458
2 Land Acquisition & Easements (5%)	\$12,061,065
3 Environmental & Arch. Studies & Mitigation & Permitting (1%)	\$2,412,213
Other Capital Outlays Subtotal	\$98,900,736

Item	Description	
1	Construction costs	\$241,221,309
2	Other capital outlays	\$98,900,736
3	Total initial costs (i.e., loan principle)	\$340,122,045
4	Annual Interest Rate	\$0
5	Monthly Interest Rate	\$0
6	Years of Loan/Lifetime	\$20
7	Number Monthly Payments	\$240
8	Monthly Payments on Loan	\$2,436,740
9	Annual Payments on Loan	\$29,240,880
10	Interest During Construction	\$67,201

Item	Description	Value
	Annual Costs	
	Operation and Maintenance	\$39,776,678
	Total Annual Costs	\$39,776,678
	Water Production	
4	Million-Gallons-Per-Day	195
5	1,000 gallons/year	71290659
6	acre-feet/year	219228
	Costs per-unit	
6	\$/1,000 gallons	\$0.56
7	\$/acre-foot	\$181.44

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	\$340,122,045
Monthly Payment	\$2,436,739.97
Annual Payment	\$29,240,879.61
Lifetime payments	\$584,817,592.11

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$736,129.74	\$1,700,610.23	2,436,740	\$1,700,610.23	\$5,668.70
Feb	2	\$739,810.39	\$1,696,929.58	2,436,740	\$1,696,929.58	\$5,656.43
Mar	3	\$743,509.44	\$1,693,230.52	2,436,740	\$1,693,230.52	\$5,644.10
Apr	4	\$747,226.99	\$1,689,512.98	2,436,740	\$1,689,512.98	\$5,631.71
May	5	\$750,963.12	\$1,685,776.84	2,436,740	\$1,685,776.84	\$5,619.26
Jun	6	\$754,717.94	\$1,682,022.03	2,436,740	\$1,682,022.03	\$5,606.74
Jul	7	\$758,491.53	\$1,678,248.44	2,436,740	\$1,678,248.44	\$5,594.16
Aug	8	\$762,283.99	\$1,674,455.98	2,436,740	\$1,674,455.98	\$5,581.52
Sep	9	\$766,095.41	\$1,670,644.56	2,436,740	\$1,670,644.56	\$5,568.82
Oct	10	\$769,925.88	\$1,666,814.08	2,436,740	\$1,666,814.08	\$5,556.05
Nov	11	\$773,775.51	\$1,662,964.45	2,436,740	\$1,662,964.45	\$5,543.21
Dec	12	\$777,644.39	\$1,659,095.58	2,436,740	\$1,659,095.58	\$5,530.32
Total		\$9,080,574.35	\$20,160,305.26	29,240,880		\$67,201.02

Capital Cost

\$360,215,149

Conveyance Improvements

CONSTRUCTION CAPITAL COSTS

Construction Costs	\$20,020,648
Construction Capital Costs Subtotal	\$20,020,648

OTHER CAPITAL OUTLAYS

1 Engineering, Legal Costs, Financing, & Contingencies (35%)	\$7,007,227
2 Land Acquisition & Easements (5%)	\$1,991,932
3 Environmental & Arch. Studies & Mitigation & Permitting (1%)	\$200,206
Other Capital Outlays Subtotal	\$9,199,365

Item	Description	
1	Construction costs	\$20,020,648
2	Other capital outlays	\$9,199,365
3	Total initial costs (i.e., loan principle)	\$29,220,013
4	Annual Interest Rate	0.06
5	Monthly Interest Rate	0.005
6	Years of Loan/Lifetime	20
7	Number Monthly Payments	240
8	Monthly Payments on Loan	\$209,341
9	Annual Payments on Loan	\$2,512,095
10	Interest During Construction	\$5,773

Item	Description	Value
	Annual Costs	
	Operation and Maintenance	\$211,441
	Total Annual Costs	\$211,441
	Water Production	
4	Million-Gallons-Per-Day	195
5	1,000 gallons/year	71,290,659
6	acre-feet/year	218783
	Costs per-unit	
6	\$/1,000 gallons	\$0.00
7	\$/acre-foot	\$0.97

Interest During Construction (IDC) Calculator

**Loan Information**

Annual Interest Rate	0.06
Monthly Interest Rate	0.01
Years of Loan/Lifetime	20
Number Monthly Payments	240
Principal	29,220,013
Monthly Payment	\$209,341.25
Annual Payment	\$2,512,094.98
Lifetime payments	\$50,241,899.62

Assuming: Construction period equals 1 year

Month	Payment Number	Principle payment $PP_t$	Interest Payment $IP_t$	Total Payment $TP_t = IP_t + PP_t$	Unspent Funds $UF_t$	Return on Investment
Jan	1	\$63,241.18	\$146,100.07	209,341	\$146,100.07	\$487.00
Feb	2	\$63,557.39	\$145,783.86	209,341	\$145,783.86	\$485.95
Mar	3	\$63,875.18	\$145,466.07	209,341	\$145,466.07	\$484.89
Apr	4	\$64,194.55	\$145,146.70	209,341	\$145,146.70	\$483.82
May	5	\$64,515.52	\$144,825.72	209,341	\$144,825.72	\$482.75
Jun	6	\$64,838.10	\$144,503.15	209,341	\$144,503.15	\$481.68
Jul	7	\$65,162.29	\$144,178.96	209,341	\$144,178.96	\$480.60
Aug	8	\$65,488.10	\$143,853.14	209,341	\$143,853.14	\$479.51
Sep	9	\$65,815.55	\$143,525.70	209,341	\$143,525.70	\$478.42
Oct	10	\$66,144.62	\$143,196.63	209,341	\$143,196.63	\$477.32
Nov	11	\$66,475.35	\$142,865.90	209,341	\$142,865.90	\$476.22
Dec	12	\$66,807.72	\$142,533.53	209,341	\$142,533.53	\$475.11
Total		\$780,115.56	\$1,731,979.42	2,512,095		\$5,773.26

Capital Cost

141.45

30,946,219.15