APPENDIX A

COST INFORMATION

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 2
0.084 MGD to UBWPAD WWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 2. Table 4-3 in Section 4.0 of this report summarizes these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, Water Environment Federation (WEF), 1999); cost updated according to ENR index.
Midpoint flow = 61,500 gpd

Current treatment cost to UBWPAD = $1.93/1,000 gallons.
Current quarterly fixed charge to Auburn = $6590.00
Current flow cost to Auburn = $0.25/1,000 gallons.
Assume the above costs increase proportionately over the 20-year period.
Assume treatment cost based on midpoint flow of 61,500 gpd

Auburn and UBWPAD O&M Cost:

Annual O&M Cost to UBWPAD:	$1.93/1000 gallons*61,500 gpd*365 = $43,000
Annual fixed charge to Auburn:	$6590*4 = $26,000
Annual flow charge to Auburn:	$0.25/1,000 gallons*61,500 gpd*365 = $6,000
Total Annual O&M Cost:	**$75,000**
Present Worth of Annual O&M Cost:	17.4*$75,000 = **$1,305,000**

Collection System O&M Cost:

Annual O&M Cost:	9 miles * $4,177/mile = **$38,000**
Present Worth of Annual O&M Cost:	17.4*$38,000 **= $661,000**
Total Annual O&M Cost – Auburn, UBWPAD & Collection System:	$75,000 + $38,000 = **$113,000**
Total Present Worth Cost – Auburn, UBWPAD & Collection System:	$1,305,000 + $661,000 = **$1,966,000**

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 3
0.120 MGD to ORSD WWTP

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 3. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4

Current collection and treatment cost to ORSD = $400/year/single-family housing (sfh) unit
Assume that 1 sfh unit = 2.58 persons
Assume usage = 65 gpcd
Current flow cost to ORSD = ($400/[2.58 persons*65 gpcd*365])*1000 = $6.53/1000 gallons
The above costs increase proportionately over the 20-year period.
Collection and treatment cost based on midpoint flow of 88,200 gpd

O&M Cost:

Annual O&M Cost to ORSD: $6.53/1000 gallons*88,200 gpd*365 = **$210,000**

Present Worth of Annual O&M Cost: 17.4 * $210,000 = **$3,654,000**

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 4
0.26 MGD at New Onsite WWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 4. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
Payment for all new construction in Oxford starts in 2010 and ends in 2030.
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost (Groundwater Recharge at Sites 9, 10, 11):

Sewer extension construction cost = **$8,475,000**
(See Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$8,475,000 + $3,814,000 = **$12,289,000**

Oxford Collection System O&M Cost (Sites 9, 10, 11):

Present worth cost of O&M = 7.7 miles * $4,177/mile **= $32,000*** 17.4 = **$557,000**
Note: This is a very conservative estimate, based on year 2030 design flows over 20 years.

Oxford Collection System Capital Cost (Groundwater Recharge at Site 5):

Sewer extension construction cost = **$16,160,000**
(See Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$16,160,000 + $7,272,000 = **$23,432,000**

Oxford Collection System O&M Cost (Site 5):

Present worth cost of O&M = 11.8 miles * $4,177/mile **= $49,000*** 17.4 = **$853,000**
Note: This is a very conservative estimate, based on year 2030 design flows over 20 years.

Present Worth of Collection System Capital + O&M Cost = $24,285,000

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 4
0.26 MGD at New Onsite WWTF
(Continued)

Land Purchase:

Site 9: 12 acres @ 104,000/acre = **$1,248,000**
Sites 10 + 11: 17 acres @ $52,000/acre = **$884,000** (50% of average cost for Ashworth Hill Development)
Site 5: No cost - Town-owned property

Total Land Purchase Cost = $1,248,000 + $884,000 = **$2,132,000**

New 0.26 MGD WWTF w/ Groundwater Recharge:

Present worth of capital cost of WWTF w/ groundwater recharge area:

Equipment Cost = $4,780,000
Equipment Replacement Cost = $3,891,000
Equipment Salvage Value = $2,422,000
Structure Costs = $10,379,000
Structure Salvage Value = $4,734,000
Present worth of capital cost WWTF= $11,894,000 (Table A-2)

Annual O&M Cost New Plant = **$490,000** (Table A-2)
Present worth of annual O&M New Plant= $8,520,000 (Table A-2)

Present worth cost of WWTF = $20,414,000 (Table A-2)

Groundwater Recharge Piping from WWTP to Recharge Site (9, 10, 11):
Construction cost = $140,000 (See Table A-1)
Total capital cost with 45% contingencies for groundwater recharge piping = $140,000 + $63,000 = **$203,000**

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 5
Expanded ORSD WWTP

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 5. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:
20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost:

Sewer extension construction cost = **$8,995,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$8,995,000 + $4,048,000 = **$13,043,000**

Oxford Collection System O&M Cost:

Present worth cost of O&M = 8.6 miles * $4,177/mile **= $36,000*** 17.4 = **$626,000**
Note: This is a very conservative estimate, based on year 2030 design flows over 20 years.

Total Present Worth Cost of Oxford Collection System = $13,669,000

ORSD WWTP Expansion Present Worth of Capital Cost:
Equipment Cost = $116,000
Equipment Replacement Cost = $94,000
Equipment Salvage Value = $59,000
Structure Costs = $2,441,000
Structure Salvage Value = $1,113,000
Present Worth = $1,479,000 (Table A-3)

ORSD WWTP Expansion O&M Cost:
Annual O&M Cost Plant Expansion = **$99,000**
Present Worth = $1,717,000 (Table A-3)

Present worth cost of WWTF Expansion = **$3,196,000** (Table A-3)

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 5
Expanded ORSD WWTP
(Continued)

Groundwater Recharge Piping from WWTP to Recharge Site (9, 10, 11):

Construction cost = $140,000 (See Table A-1)
Total capital cost with 45% contingencies for groundwater recharge piping =
$140,000 + $63,000 = **$203,000**

Groundwater Recharge Piping from WWTP to Recharge Site (5):

Construction cost = $3,645,000 (See Table A-1)
Total capital cost with 45% contingencies for groundwater recharge piping =
$3,645,000 + $1,640,000 = **$5,285,000**

Land Purchase:

Site 9: No cost – expanding existing facility
Sites 10 + 11: 17 acres @ $52,000/acre = **$884,000** (50% of average cost for Ashworth Hill Development)
Site 5: No cost - Town-owned property

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 6
0.26 MGD to Webster/Dudley AWWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 6. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:
20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost:

Sewer extension construction cost = **$19,740,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$19,740,000 + $8,883,000 = **$28,623,000**

Oxford Collection System O&M Cost:

Present worth cost of O&M = 12.8 miles * $4,177/mile = $53,000* 17.4 = **$922,000**
Note: This is a very conservative estimate, which is based on design year flows over 20 years.

Total Present Worth Cost of Oxford Collection System = $29,545,000

New Webster Collection System Capital Cost:

Sewer extension capital cost = 50% of $1,499,100 = **$750,000** (Table A-1 – Assume 50% of total cost is Oxford's responsibility)
Total capital cost with 45% contingencies for sewer system extensions =
$750,000 + $337,000 = **$1,087,000**

New Webster Collection System O&M Cost: 0.8 miles * $4,177/mile = **$3,000**

Existing Webster Treatment and Collection System O&M Cost: 0.26 MGD * $9.36/1000 gal * 365 days/year = **$888,000**

Present Worth Cost of Webster O&M
$3,000 + $888,000 = $891,000 * 17.4 = **$15,503,000**
Note: This is a very conservative estimate, based on year2030 design flows over 20 years.

Present Worth Cost of Upgrades to existing Webster Pumping Stations = $250,000

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 7
0.826 MGD to Webster/Dudley AWWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 7. Table 4-3 in Chapter 4 of this report summarize these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost:

Sewer extension construction cost = **$49,665,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$49,665,000 + $22,349,250= **$72,014,000**

Assume phased construction; 4 projects, 5 years each.
$72,014,000/4 = $18,000,000 per phase
Phase I present worth $18,000,000
Phase II (2015) present worth = $18,000,000*($P/F_5$) = $18,000,000*0.9337 = $16,807,000
Phase III (2020) present worth = $18,000,000*($P/F_{10}$) = $18,000,000*0.8718 = $15,693,000
Phase IV (2025) present worth = $18,000,000*($P/F_{15}$) = $18,000,000*0.8140 = $14,653,000

Total Present Value = **$65,153,000**

Oxford Collection System O&M Cost:

Present worth cost of O&M = 43.3 miles * $4,177/mile **= $181,000*** 17.4 = **$3,149,000**
Note: This is a very conservative estimate, which is based on year 2030 design flows over 20 years.

Total Present Worth Cost of Oxford Collection System = $68,302,000

New Webster Collection System Capital Cost:

Assume Oxford is responsible for 50% of sewer extension capital cost.
Sewer extension capital cost = 50% of $1,499,100 = **$750,000** (Table A-1).
Total capital cost with 45% contingencies for sewer system extensions =
$750,000 + $337,000 = **$1,087,000**

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 7
0.826 MGD to Webster/Dudley AWWTF
(Continued)

New Webster Collection System O&M Cost:

Cost of O&M = 0.8 miles * $4,177/mile = **$3,000**

Existing Webster Treatment and Collection System O&M Cost:

Cost of O&M = 0.826 MGD * $9.36/1000 gal * 365 days/year = **$2,792,000**

Present Worth Cost of Webster O&M

$3,000 + $2,792,000 = **$2,795,000** * 17.4 = **$48,633,000**

Note: This is a very conservative estimate, which is based on year2030 design flows over 20 years.

Total Present Worth Cost of Webster Collection System = $1,174,000

Present Worth Cost of Upgrades to existing Webster Pumping Stations = $250,000

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 8
New 1.1 MGD WWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 8. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost:

Sewer extension construction cost = **$56,635,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$56,635,000 +$25,485,750= **$82,121,000**

Assume phased construction – 4 projects 5 years apart, starting in 2010.
$82,121,000/4 = $20,530,000 per phase
Phase I present worth $20,530,000
Phase II (2015) present worth = $20,530,000*($P/F_5$) = $20,530,000*0.9337 = $19,169,000
Phase III (2020) present worth = $20,530,000*($P/F_{10}$) = $20,530,000*0.8718 = $17,898,000
Phase IV (2025) present worth = $20,530,000*($P/F_{15}$) = $20,530,000*0.8140 = $16,711,000

Total Present Worth = **$74,308,000**

Oxford Collection System O&M Cost:

Present worth cost of O&M = 61.8 miles * $4,177/mile **= $258,000*** 17.4 = **$4,489,000**
Note: This is a very conservative estimate, which is based on year2030 design flows over 20 years.

Total Present Worth Cost of Oxford Collection System = $78,797,000

New 1.1 MGD WWTF w/ Groundwater Recharge:

Present worth of capital cost of WWTF w/ groundwater recharge area:

Equipment Cost = $8,186,000
Equipment Replacement Cost = $6,664,000

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 8
1.1 MGD WWTF
(Continued)

Equipment Salvage Value = $4,148,000
Structure Costs = $19,236,000
Structure Salvage Value = $8,773,000
Present worth of capital cost WWTF= $21,165,000 (Table A-2)

Annual O&M Cost New Plant = $915,000 (Table A-2)
Present worth of annual O&M New Plant= $15,896,000 (Table A-2)

Note: This is a very conservative estimate, which is based on year 2030 design flows over 20 years.

Present worth cost of WWTF = $37,061,000 (Table A-2)

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 9
1.1 MGD to Webster/Dudley AWWTF

The following presents backup information to determine present worth costs for Wastewater Treatment/Disposal Component 9. Table 4-3 in Chapter 4 of this report summarizes these costs.

Assumptions:

20-year planning period (2010 – 2030)
Discount rate = 4.625%
Inflation rate = 3.2%
Effective discount rate = 1.38%
Present worth factor (uniform series) = 17.4
O&M costs = $4,177/mile of sewer (Wastewater Collection Systems Management, Fifth Edition, WEF, 1999); cost updated according to ENR index.

Oxford Collection System Capital Cost:

Sewer extension construction cost = **$59,625,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$59,625,000 +$26,831,000 = **$86,456,000**

Assume phased construction; 4 projects, 5 years each.
$86,456,000/4 = $21,614,000 per phase
Phase I present worth $21,614,000
Phase II (2015) present worth = $21,614,000*($P/F_5$) = $21,614,000*0.9337 = $20,181,000
Phase III (2020) present worth = $21,614,000*($P/F_{10}$) = $21,614,000*0.8718 = $18,843,000
Phase IV (2025) present worth = $21,614,000*($P/F_{15}$) = $21,614,000*0.8140 = $17,594,000

Total Present Value = **$78,232,000**

Oxford Collection System O&M Cost:

Present worth cost of O&M = 51.8 miles * $4,177/mile **=** $216,000* 17.4 = **$3,758,000**
Note: This is a very conservative estimate, which is based on year2030 design flows over 20 years.

New Webster Collection System Capital Cost:

Assume Oxford is responsible for 50% of sewer extension capital cost.
Sewer extension capital cost = 50% of $1,499,100 = **$750,000** (Table A-1)
Total capital cost with 45% contingencies for sewer system extensions =
$750,000 + $337,000 = **$1,087,000**

PRESENT WORTH COSTS FOR WASTEWATER TREATMENT/DISPOSAL COMPONENT 9
1.2 MGD to Webster/Dudley AWWTF
(Continued)

New Webster Collection System O&M Cost:

Cost of O&M = 0.8miles * $4,177/mile = $3,000

Existing Webster Treatment and Collection System O&M Cost:

Cost of O&M = 1.1 MGD * $9.36/1000 gal * 365 Days/year = $3,758,000

Present Worth Cost of Webster O&M

$3,000 + $3,758,000 = $3,761,000 * 17.4 = **$65,442,000**

Note: This is a very conservative estimate, which is based on year2030 design flows over 20 years.

Present Worth Cost of Upgrades to existing Webster Pumping Stations = $250,000

Table A-1
Collection System Capital Costs

Component 4 - Site 9,10,11

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	3	$500,000	$1,500,000
Pump Station (lg)	0	$1,000,000	$0
Force Main in Easements (lf)	1,700	$50	$85,000
Force Main in Town Roads (lf)	4,400	$100	$440,000
Force Main in State Roads (lf)	6,500	$200	$1,300,000
Gravity Sewer (lf)	24,000	$200	$4,800,000
Low Pressure Sewer (lf)	4,000	$50	$200,000
Bridge or River Crossing	3	$50,000	$150,000
Active RR Crossing (lf)	0	$1,500	$0
Total			$8,475,000

Component 4 - Site 5

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	2	$500,000	$1,000,000
Pump Station (lg)	3	$1,000,000	$3,000,000
Force Main in Easements (lf)	0	$50	$0
Force Main in Town Roads (lf)	4,600	$100	$460,000
Force Main in State Roads (lf)	6,500	$200	$1,300,000
Gravity Sewer (lf)	51,000	$200	$10,200,000
Low Pressure Sewer (lf)	0	$50	$0
Bridge or River Crossing	4	$50,000	$200,000
Active RR Crossing (lf)	0	$1,500	$0
Total			$16,160,000

Component 5 - Site 9,10,11

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	3	$500,000	$1,500,000
Pump Station (lg)	0	$1,000,000	$0
Force Main in Easements	1,300	$50	$65,000
Force Main in Town Roads	9,800	$100	$980,000
Force Main in State Roads	6,500	$200	$1,300,000
Gravity Sewer	24,000	$200	$4,800,000
Low Pressure Sewer	4,000	$50	$200,000
Bridge or River Crossing	3	$50,000	$150,000
Active RR Crossing (lf)	0	$1,500	$0
Total			$8,995,000

Table A-1
Collection System Capital Costs
(Continued)

Component 6

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	2	$500,000	$1,000,000
Pump Station (lg)	5	$1,000,000	$5,000,000
Force Main in Easements	0	$50	$0
Force Main in Town Roads	7,300	$100	$730,000
Force Main in State Roads	6,500	$200	$1,300,000
Gravity Sewer	57,000	$200	$11,400,000
Low Pressure Sewer	0	$50	$0
Bridge or River Crossing	5	$50,000	$250,000
Active RR Crossing (lf)	40	$1,500	$60,000
Total			$19,740,000

Component 7

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	10	$500,000	$5,000,000
Pump Station (lg)	4	$1,000,000	$4,000,000
Force Main in Easements	1,800	$50	$90,000
Force Main in Town Roads	14,600	$100	$1,460,000
Force Main in State Roads	1,200	$200	$240,000
Gravity Sewer	185,000	$200	$37,000,000
Low Pressure Sewer	26,100	$50	$1,305,000
Bridge or River Crossing	3	$50,000	$150,000
Active RR Crossing (lf)	280	$1,500	$420,000
Total			$49,665,000

Component 8

	Quantity	Unit Cost	Total Cost
Force Main in Easements	2,800	$50	$140,000
Force Main in Town Roads	40,600	$100	$4,060,000
Force Main in State Roads	8,100	$200	$1,620,000
Gravity Sewer	242,400	$200	$48,480,000
Low Pressure Sewer	32,300	$50	$1,615,000
Bridge or River Crossing	6	$50,000	$300,000
Active RR Crossing (lf)	280	$1,500	$420,000
Total			$56,635,000

Table A-1
Collection System Capital Costs
(Continued)

Component 9

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	12	$500,000	$6,000,000
Pump Station (lg)	5	$1,000,000	$5,000,000
Force Main in Easements	1,800	$50	$90,000
Force Main in Town Roads	15,900	$100	$1,590,000
Force Main in State Roads	8,100	$200	$1,620,000
Gravity Sewer	215,200	$200	$43,040,000
Low Pressure Sewer	32,300	$50	$1,615,000
Bridge or River Crossing	5	$50,000	$250,000
Active RR Crossing (lf)	280	$1,500	$420,000
Total			$59,625,000

New Webster Sewers

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	1	$500,000	$500,000
Pump Station (lg)	0	$1,000,000	$0
Force Main in Easements	0	$50	$0
Force Main in Town Roads	1,729	$100	$172,900
Force Main in State Roads	0	$200	$0
Gravity Sewer	4,131	$200	$826,200
Low Pressure Sewer	0	$50	$0
Bridge or River Crossing	0	$50,000	$0
Active RR Crossing (lf)	0	$1,500	$0
Total			$1,499,100

Piping to Groundwater Recharge Site 9, 10, 11

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	0	$500,000	$0
Pump Station (lg)	0	$1,000,000	$0
Force Main in Easements	2,800	$50	$140,000
Force Main in Town Roads	0	$100	$0
Force Main in State Roads	0	$200	$0
Gravity Sewer	0	$200	$0
Low Pressure Sewer	0	$50	$0
Bridge or River Crossing	0	$50,000	$0
Active RR Crossing (lf)	0	$1,500	$0
Total			$140,000

Table A-1
Collection System Capital Costs
(Continued)

Piping to Groundwater Recharge Site 5

	Quantity	Unit Cost	Total Cost
Pump Station (sm)	0	$500,000	$0
Pump Station (lg)	0	$1,000,000	$0
Force Main in Easements	900	$50	$45,000
Force Main in Town Roads	36,000	$100	$3,600,000
Force Main in State Roads	0	$200	$0
Gravity Sewer	0	$200	$0
Low Pressure Sewer	0	$50	$0
Bridge or River Crossing	0	$50,000	$0
Active RR Crossing (lf)	0	$1,500	$0
Total			$3,645,000

Table A-2
New WWTF
Present Worth Cost Analysis

		Assume:
Discount Rate:	4.625%	20 year planning period
Inflation Rate:	3.20%	50 year life for structures
Effective Rate:	1.381%	15 year life for equipment
		Include replacement costs and salvage values

Number of Years:	20		
Multipliers:			
	P/F	P/A	A/P
@ Discount Rate:	0.4048	12.8682	0.0777
@ Effective Rate:	0.7601	17.3721	0.0576

Number of Years:	15		
Multipliers:			
	P/F	P/A	A/P
@ Discount Rate:	0.5075	10.6478	0.0939
@ Effective Rate:	0.8141	13.4650	0.0743

	Option 1	**Option 2**
Equipment Cost = Ce	$4,780,000	$8,186,000
Structure Costs = Cs	$10,379,000	$19,236,000
Annual O&M Cost = Ca =	$490,436	$915,056

Present Worth = $Ce + Ce*(P/F_{15}) - (10/15)*Ce*(P/F_{20}) + Cs - Cs*0.6*(P/F_{20}) + (P/A_{20})*Ca$

OPTION 1 **New 0.274 MGD Plant**	**Project Costs Using Effective Rate:**
Equipment Cost (Ce) =	$4,780,000
Equipment Replacement Cost = $Ce*(P/F_{15})$ =	$3,891,000
Equipment Salvage Value = $(10/15)*Ce*(P/F_{20})$ =	$2,422,000
Structure Cost (Cs) =	$10,379,000
Structure Salvage Value = $0.6*Cs*(P/F_{20})$ =	$4,734,000
Present Worth of Capital Cost =	$11,894,000
Present Worth of Annual O&M = $(P/A_{20})*Ca$ =	$8,520,000
Present Worth =	$20,414,000

Table A-2
New WWTF
Present Worth Cost Analysis
(Continued)

OPTION 2 **New 1.1 MGD Plant**	**Project Costs Using Discount Rate:**
Equipment Cost (Ce) =	$8,186,000
Replacement Cost = $Ce*(P/F_{15})$ =	$6,664,000
Salvage Value = $(10/15)*Ce*(P/F_{20})$ =	$4,148,000
Structure Cost (Cs) =	$19,236,000
Salvage Value = $0.6*Cs*(P/F_{20})$ =	$8,773,000
Present Worth of Capital Cost =	$21,165,000
Present Worth of Annual O&M = $(P/A_{20})*Ca$ =	$15,896,000
Present Worth =	$37,061,000

Table A-3
Oxford/Rochdale WWTF Expansion
Present Worth Cost Analysis

		Assume:
Discount Rate:	4.625%	20 year planning period
Inflation Rate:	3.20%	50 year life for structures
Effective Rate:	1.381%	15 year life for equipment
		Include replacement costs and salvage values

Number of Years:	20		
Multipliers:			
	P/F	P/A	A/P
@ Discount Rate:	0.4048	12.8682	0.0777
@ Effective Rate:	0.7601	17.3721	0.0576

Number of Years:	15		
Multipliers:			
	P/F	P/A	A/P
@ Discount Rate:	0.5075	10.6478	0.0939
@ Effective Rate:	0.8141	13.4650	0.0743

Equipment Cost = Ce	$116,000
Structure Costs = Cs	$2,441,000
Annual O&M Cost = Ca =	$98,840

Present Worth = $Ce + Ce*(P/F_{15}) - (10/15)*Ce*(P/F_{20}) + Cs - Cs*0.6*(P/F_{20}) + (P/A_{20})*Ca$

Scenario 1(b)	**Project Costs Using Effective Rate:**
Equipment Cost (Ce) =	$116,000
Equipment Replacement Cost = $Ce*(P/F_{15})$ =	$94,000
Equipment Salvage Value = $(10/15)*Ce*(P/F_{20})$ =	$59,000
Structure Cost (Cs) =	$2,441,000
Structure Salvage Value = $0.6*Cs*(P/F_{20})$ =	$1,113,000
Present Worth of Annual O&M = $(P/A_{20})*Ca$ =	$1,717,000
Present Worth =	$3,196,000