
APPENDIX D.1
IFAS PRELIMINARY COST ESTIMATE

Opinion of Probable Construction Costs

VTSV WWTF
IFAS Treatment Process

Division	Description	Quantity	Units	Cost per Unit (\$)	Installation Multiplier	Cost (Nearest \$100)
1	GENERAL CONDITIONS					0
		1	LS		1.0	0
2	CIVIL / SITEWORK					123,000
	Excavation For New Basins And Clarifiers	1200	BCY	2	1.3	3,000
	Hauling Of Excavation	1500	CY	9	1.3	16,000
	Misc. Excavation For Yard Piping	1	LS	35,000	1.3	45,500
	New Concrete Pad For New Generator On West Side Of Existing Building	1	LS	5,000	1.3	6,500
	Grade Preparation For Extension Of Existing Building To West Side	1	LS	40,000	1.3	52,000
3	CONCRETE					1,176,900
	New Aeration Tanks	150	CY	900.00	1.1	148,500
	Clarifiers	100	CY	900.00	1.1	99,000
	Concrete Floor	150	CY	900.00	1.1	148,500
	Top Slab Of The Holding Tank	110	CY	900.00	1.1	108,900
	Misc. Concrete	10	CY	900.00	1.1	9,900
	Precast Insulated Walls	12036	SF	34.00	1.1	450,200
	Precast Double Tee Roof	12036	SF	16.00	1.1	211,900
4	MASONRY					32,500
	Misc. Masonary Wall Interior Of Building	1	LS	25,000.00	1.3	32,500
5	METALS					17,500
	Hand Rails, Misc Metal Grating	1	LS	13,450.00	1.3	17,500
6	WOOD AND PLASTIC					0
7	THERMAL & MOISTURE PROTECTION					3,900
	Misc. Sealants	1	LS	3,000.00	1.3	3,900
8	DOORS & WINDOWS					32,500
	2- Garage Doors	1	LS	10,000.00	1.3	13,000
	2- Double Doors	1	LS	7,000.00	1.3	9,100
	4- Single Door	1	LS	8,000.00	1.3	10,400
9	FINISHES					24,000
	Paints On Door And Frames, Exposed Piping	1	LS	20,000.00	1.2	24,000
10	SPECIALITIES					9,100
	Fire Extinguishers	1	LS	3,000.00	1.3	3,900
	Bathroom Accessories	1	LS	4,000.00	1.3	5,200
11	EQUIPMENT					1,828,600
	IFAS Vendor quote	1	LS	876,700	1.3	1,139,800
	Teritary Filters For P-Removal And Denite	1	LS	450,000	1.3	585,000
	Chemical Skid For Carbon Addition	1	LS	5,000	1.3	6,500
	UV Disinfection	3	EA	21,120	1.3	82,400
	Chemical Storage Tank- PACI	1	EA	5,940	1.3	7,800
	Chemical Storage Tank- Micro-C	1	EA	5,395	1.3	7,100

IFAS Treatment Process Alternative
Opinion of Probable Construction Cost

12	FURNISHINGS					6,500
	Lab, Operations Room	1	LS	5,000.00	1.3	6,500
13	SPECIAL CONSTRUCTION					0
14	HOISTS AND CRANES					0
15	MECHANICAL / HVAC					178,100
	Process Piping	1	LS	50,000.00	1.3	65,000
	HVAC	1	LS	87,000.00	1.3	113,100
16	ELECTRICAL and INSTRUMENTATION & CONTROLS					682,500
	New Scada System, Mcc, Misc.Electrical Connection, Controls	1	LS	650,000.00	1.0	650,000
	New Generator	1	LS	25,000.00	1.3	32,500
SUBTOTAL 1						4,115,100
	CONSTRUCTION PRORATES(See Note 1)	18.0%	of Subtotal 1	740,718	1.0	740,800
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	617,265	1.0	617,300
SUBTOTAL 2						5,473,200
	CONTINGENCY (See Note 4)	25.0%	of Subtotal 2	1,368,300	1.0	1,368,300
SUBTOTAL 3						6,841,500
	ENGINEERING COSTS	15.0%	of Subtotal 3	1,026,225	1.0	1,026,300
TOTAL						7,867,800

Notes

- | | | |
|-----|--|--------------|
| 1 | <u>Construction Prorates</u> ^{(a) (b)} | <u>18%</u> |
| (a) | General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and special construction practices to maintain continued plant operations. Also includes misc construction materials needed for project not included above. | |
| 2 | <u>Contractor's Overhead & Profit</u> ^(a) | <u>15.0%</u> |
| (a) | Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs and profits. | |
| 4 | <u>Design Contingency</u> ^(a) | <u>25.0%</u> |
| (a) | The design contingency is added to the subtotal based on the conceptual nature of information developed for this evaluation. | |
| 5 | <u>Engineering Costs</u> | <u>15.0%</u> |
| | Costs incurred during Final Design and Construction. | |

IFAS Treatment Process Alternative
Net Present Value Summary

20-Year Present Value Analysis

IFAS treatment Process	
IFAS	
Capital Costs	\$7,867,800
Annual Operating and Maintenance Costs	
Chemicals & Reagents Delivered ³	\$58,500
Energy Cost ²	\$55,300
Personnel (i.e. salary, benefits, payroll tax, insurance, training) ³	\$43,673
Administrative Costs (e.g. office supplies, printing, etc.) ³	\$11,950
Management and Legal Services ³	\$18,960
Insurance ³	\$8,000
Monitoring & Testing ³	\$25,500
Professional Services ³	\$3,000
Residuals Disposal ³	\$13,058
<i>Subtotal</i>	<i>\$238,000</i>
<i>NPV of Annual O&M Costs</i>	<i>\$4,210,000</i>
Total Net Present Cost	\$11,528,800

1 - Equipment Manufacturer Chemical Consumption Estimate
 2 - Developed from Equipment Loads/Usage (reference attached Operations and Maintenance Cost Estimate Sheet)
 3 - Developed from Village Cost Data 2008, 2009 (Reference attached Village Cost Summarized Data Sheet)

Assumptions:

- | | |
|----------------------------|------|
| 1. Life cycle, n (years): | 20 |
| 2. Annual inflation rate | 2.0% |
| 3. Discount Rate | 3.2% |
| 3. Labor cost of \$25/hour | |

$$NPV = Annual_Cost \times \left[\frac{(1+i)^n - 1}{i \times (1+i)^n} \right]$$

IFAS Treatment Process Alternative
Operation and Maintenance Cost Estimate

Description	Quantity Installed	Operating	Motor Size	Total operating	Operating Load ⁽¹⁾	Run Time, hrs			Annual Energy Use	Unit Cost	Annual Electricity Cost
			(HP)	(HP)		(kW)	(hr/day)	(hr/yr)			
Anoxic Mixers	6	6	1.3	7.80	6.24	4.7	24	8760	40,887	\$0.090	\$3,680
IMLR Pumps	2	2	1.5	3.00	2.40	1.8	24	8760	15,726	\$0.090	\$1,415
Aeration Blowers	2	2	50	100.00	1,200.00	897.6	24	8760	327,624	\$0.090	\$29,486
Clarifier Mechanism	2	2	2	4.00	3.20	2.4	24	8760	20,968	\$0.090	\$1,887
Tertiary Filters			---			3.7	24	8760	32,412	\$0.090	\$2,917
Tertiary Filter Feed Pump or UV Feed Pump	2	2	2	4.00	3.20	2.4	24	8760	20,968	\$0.090	\$1,887
RAS Pump	2	2	14.8	29.60	23.68	17.7	24	8760	155,163	\$0.090	\$13,965
Total operating HP				148					Total Annual Electricity Cost		\$55,300

(1) Operating load based on 80% of total operating HP to account for motor inefficiencies and correction for elevation.

Chemical Cost/ year		
Ferric cost		\$ 13,500
Mico-C	From Vendor calcs	\$ 45,000
Chemical Cost per year		\$ 58,500

IFAS Treatment Process Alternative
Net Present Value Calculations

End of Year	O&M Costs	Present Value of O&M Costs	Short Lived Assets	Present Value of Short Lived Assets
1	\$238,000	\$235,178		\$0
2	\$238,000	\$232,389		\$0
3	\$238,000	\$229,634		\$0
4	\$238,000	\$226,911		\$0
5	\$238,000	\$224,220		\$0
6	\$238,000	\$221,561		\$0
7	\$238,000	\$218,934		\$0
8	\$238,000	\$216,338		\$0
9	\$238,000	\$213,773		\$0
10	\$238,000	\$211,238	\$5,000	\$4,438
11	\$238,000	\$208,733		\$0
12	\$238,000	\$206,258		\$0
13	\$238,000	\$203,812		\$0
14	\$238,000	\$201,396		\$0
15	\$238,000	\$199,007	\$144,700	\$120,993
16	\$238,000	\$196,648		\$0
17	\$238,000	\$194,316		\$0
18	\$238,000	\$192,012		\$0
19	\$238,000	\$189,735		\$0
20	\$238,000	\$187,485		\$0
	Capital Costs	\$7,867,800	Discount Rate = 1.2% (Takes into account inflation)	
	O&M Costs	\$4,210,000		
	Short Lived Asset	\$126,000		
	Salvage Value	\$675,000		
	NPV	\$11,528,800		

IFAS Treatment Process Alternative
Net Present Value Calculations

IFAS Alternative	Life Expectancy	Replacement Cost	Salvage Value at 20 yrs
Short Lived Assets			
Existing Bar Screen	15	\$ 86,000	\$ 21,500
Existing Grit Pump	15	\$ 15,000	\$ 3,750
Existing Grit Classifier	15	\$ 35,000	\$ 8,750
Influent EQ tank Mixer 1	15	\$ 13,800	\$ 3,450
Influent EQ tank Mixer 2	15	\$ 13,800	\$ 3,450
Submersible Mixers	15	\$ 55,200	\$ 13,800
Aerobic Diffusers	10	\$ 10,000	\$ 5,000
Blowers (3 duty)	15	\$ 240,000	\$ 60,000
IMLR Pump (2 Duty)	15	\$ 30,000	\$ 7,500
Clarifier Mechanism (2 Duty)	15	\$ 25,000	\$ 6,250
RAS/WAS Pumps (2 Duty)	15	\$ 30,000	\$ 7,500
Tertiary Filter Feed Pump	15	\$ 15,000	\$ 3,750
Tertiary Filter- Polymer Pump	15	\$ 5,000	\$ 1,250
Tertiary Filter- Ferric Pump	15	\$ 5,000	\$ 1,250
Chemical Skid- Alum	15	\$ 5,000	\$ 1,250
Chemical Skid- Carbon	15	\$ 5,000	\$ 1,250
Long Life Assets			
New Concrete Structures	50	\$ 1,176,900	\$ 706,140
Total Salvage Value			\$ 855,840
Present Value of Salvage Costs			\$675,000

Depreciation Calcs

Depreciation Value = (Cost - Salvage Value)/Life

SL = (C-SV)/L

Then adjust to present day

VTSV - Compilation Summary of Cost Data

Expense Category	YEAR								2016
	2008				2009				
	Total	O&M	G&A	Cap	Total	O&M	G&A	Cap	
Salaries	\$77,961				\$91,261				
Overtime	\$1,261				\$2,000				
Emp Ins	\$10,704				\$13,585				
FICA	\$5,973				\$6,982				
Pension	\$2,071				\$2,738				
Subtotal for	\$97,970				\$116,566				\$132,343
Salaries & Benefits: Sp	\$64,660	\$32,330				\$76,934	\$38,467		\$43,673
Workmen's Comp			\$1,487				\$1,740		
Unempl Ins			\$162				\$183		
Educ & Tr	\$614					\$1,000			
Mgt Services			\$18,960				\$18,960		\$18,960
Legal Services									
Audit Services			\$1,720				\$1,800		\$1,800
Other Serv			\$1,922				\$12,000		\$6,961
Trash	\$925								
Mnt Bldg & Plant				\$5,110				\$8,000	\$6,555
Mnt Equip	\$13,143					\$15,000			
Mnt Vehicles	\$2,627					\$3,000			
Repair Lines				\$0				\$5,000	
Ins			\$7,550				\$8,000		\$8,000
Internet	\$376					\$450			\$450
Phone	\$1,107					\$1,000			\$1,000
Publ			\$143				\$1,200		
Dues			\$8,428				\$8,000		\$8,000
Gen Suppl	\$545		\$545			\$2,000	\$2,000		\$2,500
LabSuppl	\$1,476					\$15,000			\$25,500
Postage			\$52				\$1,000		
Gas & Elec	\$14,674								
Gas & Oil	\$3,575					\$4,000			\$4,000
Chem	\$30,265								\$32,300
Sludge Removal & Tes	\$38,066								\$13,058
Lien filings			\$100				\$500		

APPENDIX D.2
MBR PRELIMINARY COST ESTIMATE

Opinion of Probable Construction Costs

VTSV WWTF
MBR Treatment Process

Division	Description	Quantity	Units	Cost per Unit (\$)	Installation Multiplier	Cost (nearest \$100)
1	GENERAL CONDITIONS					0
		1	LS		1.0	0
2	CIVIL / SITEWORK					154,300
	Grade Preparation For Headworks Expansion And Flume Relocation	1	LS	20,000	1.3	25,000
	Excavation Within The Existing Headworks For New Channel	3	CY	10	1.3	100
	Excavation For Concrete Tanks (An, Ax, Ox)	850	CY	11	1.3	12,200
	Yard Piping Excavation, Installation. Material, Bedding, Compacting	1	LS	35,000	1.3	45,500
	Grade Preparation For New Carport On South Side Of Existing Building	1	LS	20,000	1.3	26,000
	New Retaining Wall Next To The Car Port	1	LS	20,000	1.3	26,000
	New Concrete Pad For New Generator On West Side Of Existing Building	1	LS	5,000	1.3	6,500
	Grade Preparation For Extension Of Existing Building To West Side	1	LS	10,000	1.3	13,000
3	CONCRETE					674,800
	New Tanks	200	CY	900.00	1.1	198,000
	Existing Aeration Tank Retrofit With Walls	9	CY	800.00	1.1	7,500
	Misc. Concrete For Headworks Retrofit	10	CY	800.00	1.1	8,800
	Misc. Concrete For Clarifier Base Slab Levelling	5	CY	800.00	1.1	4,400
	Concrete For Basins Top Slab	78	CY	900.00	1.1	77,300
	New Slab On West Side For Building Expansion	21	CY	800.00	1.1	18,500
	Pad For Generator	13	CY	800.00	1.1	11,500
	Misc. Concrete	15	CY	800.00	1.1	13,200
	Precast Insulated Wall	6100	SF	34.00	1.1	228,200
	Precast Double Tee Roof	6100	SF	16.00	1.1	107,400
4	MASONRY					25,800
	Misc. Masonary Wall Interior Of Building	1	LS	19,800.00	1.3	25,800
5	METALS					14,100
	Hand Rails, Misc Metal Grating	1	LS	10,800.00	1.3	14,100
6	WOOD AND PLASTIC					0
7	THERMAL & MOISTURE PROTECTION					0
8	DOORS & WINDOWS					27,500
	2- Garage Doors	1	LS	10,000.00	1.1	11,000
	2- Double Doors	1	LS	7,000.00	1.1	7,700
	4- Single Door	1	LS	8,000.00	1.1	8,800
9	FINISHES					20,000
	Paints On Door And Frames, Exposed Piping, Bollards	1	LS	20,000.00	1.0	20,000
10	SPECIALITIES					6,900
	Fire Extinguishers	1	LS	2,350.00	1.1	2,600
	Bathroom Accessories	1	LS	3,850.00	1.1	4,300
11	EQUIPMENT					1,598,100
	MBR Vendor Quote	1	LS	1,097,000	1.3	1,426,100
	Headworks New Fine Screen	1	EA	86,900	1.3	108,700
	UV Disinfection	2	EA	21,120	1.2	50,700
	Chemical Storage Tank- Pacl	1	EA	5,940	1.1	6,600
	Chemical Storage Tank- Micro-C	1	EA	5,395	1.1	6,000

MBR Treatment Process Alternative
Opinion Of Probable Construction Cost

12	FURNISHINGS					6,500
	Lab, Operations Room	1	LS	5,000.00	1.3	6,500
13	SPECIAL CONSTRUCTION					0
14	HOISTS AND CRANES					19,500
	Mono Rail And Hoist For Moving Of Membrane Cassettes	1	LS	15,000.00	1.3	19,500
15	MECHANICAL / HVAC					174,800
	Process Piping	1	LS	47,400.00	1.3	61,700
	HVAC	1	LS	87,000.00	1.3	113,100
16	ELECTRICAL and INSTRUMENTATION & CONTROLS					682,500
	New Scada System, Mcc, Misc.Electrical Connection, Controls	1	LS	650,000.00	1.0	650,000
	New Generator	1	LS	25,000.00	1.3	32,500
SUBTOTAL 1						3,404,800
	CONSTRUCTION PRORATES(See Note 1)	18.0%	of Subtotal 1	612,864	1.0	612,900
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	510,720	1.0	510,800
SUBTOTAL 2						4,528,500
	CONTINGENCY (See Note 4)	25.0%	of Subtotal 2	1,132,125	1.0	1,132,200
SUBTOTAL 3						5,660,700
	ENGINEERING COSTS	15.0%	of Subtotal 3	849,105	1.0	849,200
TOTAL						6,509,900

Notes

- 1 Construction Prorates^{(a) (b)} 18%
(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and special construction practices to maintain continued plant operations. Also includes misc construction materials needed for project not included above.
- 2 Contractor's Overhead & Profit^(a) 15.0%
(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs and profits.
- 4 Design Contingency^(a) 25.0%
(a) The design contingency is added to the subtotal based on the conceptual nature of information developed for this evaluation.
- 5 Engineering Costs 15.0%
Costs incurred during Final Design and Construction.

MBR Treatment Process Alternative
Net Present Value Summary

20-Year Present Value Analysis

Capital Costs	
MBR Process	
<i>Capital Cost</i>	\$6,509,900
Annual Operating and Maintenance Costs	
Chemicals & Reagents Delivered ¹	\$50,600
Energy Cost ²	\$45,000
Personnel (i.e. salary, benefits, payroll tax, insurance, training) ³	\$43,673
Administrative Costs (e.g. office supplies, printing, etc.) ³	\$11,950
Management and Legal Services ³	\$18,960
Insurance ³	\$8,000
Monitoring & Testing ³	\$25,500
Professional Services ³	\$3,000
Residuals Disposal ³	\$13,058
<i>Subtotal</i>	\$219,742
<i>NPV of Annual O&M Costs</i>	\$3,887,000
Total Net Present Cost	\$10,088,900

1 - Equipment Manufacturer Chemical Consumption Estimate

2 - Developed from Equipment Loads/Usage (reference attached Operations and Maintenance Cost Estimate Sheet)

3 - Developed from Village Cost Data 2008, 2009 (Reference attached Village Cost Summarized Data Sheet)

Assumptions:

- | | |
|----------------------------|------|
| 1. Life cycle, n (years): | 20 |
| 2. Annual inflation rate | 2.0% |
| 3. Discount Rate | 3.2% |
| 3. Labor cost of \$25/hour | |

$$NPV = Annual_Cost \times \left[\frac{(1+i)^n - 1}{i \times (1+i)^n} \right]$$

MBR Treatment Process Alternative
Operations and Maintenance Cost Estimate

Description	Quantity Installed	Operating	Motor Size	Total operating	KWhrs/day (from Vendor)	Annual Energy Use	Unit Cost	Annual Electricity Cost
			(HP)	(HP)		(kWh/yr)	(\$/kWh)	(\$/yr)
New Mechanical Screen	1	1	2.0	2.00	29	10,456	\$0.090	\$941
Pre- Anoxic Mixing	1	1	4.2	4.21	75	27,503	\$0.090	\$2,475
Recycle Pump	1	1	15	14.80	120	43,705	\$0.090	\$3,933
Post Anoxic Mixer	1	1	4	4.21	75	27,503	\$0.090	\$2,475
Permeate Pump	2	2	2	4.00	98	35,814	\$0.090	\$3,223
MBR Blowers	2	2	25	50.00	478	174,532	\$0.090	\$15,708
Aeration Blowers	1	1	40.0	40.00	493	179,941	\$0.090	\$16,195
Total Annual Electricity Cost								\$45,000

Chemical Cost/ year		
Sodium Hypochlorite For 12 Cleaning Events	From Vendor calcs	\$ 146
Oxalic Acid- Membrane CIP- 1/Year		\$ 149
Alum		\$ 5,260
Mico-C		\$ 20,455
Chemical Cost per year		\$ 26,100

Annual Ancillary O&M- and Administrative- Related Costs	
Description	Annual Cost
Personnel (i.e. salary, benefits, payroll tax, insurance, training)	\$43,673
Administrative Costs (e.g. office supplies, printing, etc.)	\$11,950
Management and Legal Services	\$18,960
Insurance	\$8,000
Process Chemicals	\$32,300
Monitoring & Testing	\$25,500
Professional Services	\$3,000
Residuals Disposal	\$13,058
Misc. O&M Costs/Year	\$156,442

MBR Treatment Process Alternative
Net Present Value Calculations

End of Year	O&M Costs	Present Value of O&M Costs	Short Lived Assets	Present Value of Short Lived Assets
1	\$219,742	\$217,136		\$0
2	\$219,742	\$214,561		\$0
3	\$219,742	\$212,017		\$0
4	\$219,742	\$209,503		\$0
5	\$219,742	\$207,019		\$0
6	\$219,742	\$204,564		\$0
7	\$219,742	\$202,138		\$0
8	\$219,742	\$199,741		\$0
9	\$219,742	\$197,373		\$0
10	\$219,742	\$195,033	\$5,000	\$4,438
11	\$219,742	\$192,720	\$13,019	\$11,418
12	\$219,742	\$190,435	\$11,572	\$10,029
13	\$219,742	\$188,177	\$10,126	\$8,671
14	\$219,742	\$185,945	\$8,679	\$7,344
15	\$219,742	\$183,740	\$153,733	\$128,546
16	\$219,742	\$181,562		\$0
17	\$219,742	\$179,409		\$0
18	\$219,742	\$177,281		\$0
19	\$219,742	\$175,179		\$0
20	\$219,742	\$173,102		\$0
Capital Costs		\$6,509,900	Discount Rate = 1.2% (Takes into account inflation)	
O&M Costs		\$3,887,000		
Short Lived Asset		\$171,000		
Salvage Value		\$479,000		
NPV		\$10,088,900		

MBR Treatment Process Alternative
Net Present Value Calculations

MBR Alternative	Life Expectancy	Replacement Cost	Salvage Value at 20 yrs
Short Lived Assets			
Existing Bar Screen	15	\$ 86,000	\$ 21,500
Existing Grit Pump	15	\$ 15,000	\$ 3,750
Existing Grit Classifier	15	\$ 35,000	\$ 8,750
New Bar Screen	15	\$ 86,000	\$ 21,500
EQ Tank Mixer 1	15	\$ 13,800	\$ 3,450
EQ Tank Mixer 2	15	\$ 13,800	\$ 3,450
Anaerobic Mixer	15	\$ 13,800	\$ 3,450
Anoxic Mixer (2 Duty)	15	\$ 27,600	\$ 6,900
Aerobic Diffusers	10	\$ 10,000	\$ 5,000
MBR Membrane Year 11	11	\$ 28,930	\$ 13,019
MBR Membrane Year 12	12	\$ 28,930	\$ 11,572
MBR Membrane Year 13	13	\$ 28,930	\$ 10,126
MBR Membrane Year 14	14	\$ 28,930	\$ 8,679
MBR Membrane Year 15	15	\$ 28,930	\$ 7,233
Blowers (3 Duty)	15	\$ 240,000	\$ 60,000
IMLR/WAS Pump	15	\$ 15,000	\$ 3,750
Permeate Pump (2 Duty)	15	\$ 30,000	\$ 7,500
Chemical Skid- Alum	15	\$ 5,000	\$ 1,250
Chemical Skid- Carbon	15	\$ 5,000	\$ 1,250
Long Life Assets			
New concrete structures	50	\$ 674,800	\$ 404,880
Total Salvage Value			\$ 607,008
Present Value of Salvage Costs			\$479,000

Depreciation Calcs

Depreciation Value = (Cost - Salvage Value)/Life

SL = (C-SV)/L

Then adjust to present day

VTSV - Compilation Summary of Cost Data

Expense Category	YEAR								2016
	2008				2009				
	Total	O&M	G&A	Cap	Total	O&M	G&A	Cap	
Salaries	\$77,961				\$91,261				
Overtime	\$1,261				\$2,000				
Emp Ins	\$10,704				\$13,585				
FICA	\$5,973				\$6,982				
Pension	\$2,071				\$2,738				
Subtotal for	\$97,970				\$116,566				\$132,343
Salaries & Benefits: Sp	\$64,660	\$32,330				\$76,934	\$38,467		\$43,673
Workmen's Comp			\$1,487				\$1,740		
Unempl Ins			\$162				\$183		
Educ & Tr	\$614					\$1,000			
Mgt Services			\$18,960				\$18,960		\$18,960
Legal Services									
Audit Services			\$1,720				\$1,800		\$1,800
Other Serv			\$1,922				\$12,000		\$6,961
Trash	\$925								
Mnt Bldg & Plant				\$5,110				\$8,000	\$6,555
Mnt Equip	\$13,143					\$15,000			
Mnt Vehicles	\$2,627					\$3,000			
Repair Lines				\$0				\$5,000	
Ins			\$7,550				\$8,000		\$8,000
Internet	\$376					\$450			\$450
Phone	\$1,107					\$1,000			\$1,000
Publ			\$143				\$1,200		
Dues			\$8,428				\$8,000		\$8,000
Gen Suppl	\$545	\$545				\$2,000	\$2,000		\$2,500
LabSuppl	\$1,476					\$15,000			\$25,500
Postage			\$52				\$1,000		
Gas & Elec	\$14,674								
Gas & Oil	\$3,575					\$4,000			\$4,000
Chem	\$30,265								\$32,300
Sludge Removal & Tes	\$38,066								\$13,058
Lien filings			\$100				\$500		

APPENDIX D.2A
MBR PRELIMINARY COST ESTIMATE WITH GRT

Opinion of Probable Construction Costs

VTSV WWTF

MBR Treatment Process

Division	Description	Quantity	Units	Cost per Unit (\$)	Installation Multiplier	Installation/Labor Cost	Cost (nearest \$100)
1	GENERAL CONDITIONS						0
		1	LS		1.0		0
2	CIVIL / SITEWORK						154,300
	Grade Preparation For Headworks Expansion And Flume Relocation	1	LS	20,000	1.3	5000	25,000
	Excavation Within The Existing Headworks For New Channel	3	CY	10	1.3	9	100
	Excavation For Concrete Tanks (An, Ax, Ox)	850	CY	11	1.3	2805	12,200
	Yard Piping Excavation, Installation, Material, Bedding, Compacting	1	LS	35,000	1.3	10500	45,500
	Grade Preparation For New Carport On South Side Of Existing Building	1	LS	20,000	1.3	6000	26,000
	New Retaining Wall Next To The Car Port	1	LS	20,000	1.3	6000	26,000
	New Concrete Pad For New Generator On West Side Of Existing Building	1	LS	5,000	1.3	1500	6,500
	Grade Preparation For Extension Of Existing Building To West Side	1	LS	10,000	1.3	3000	13,000
3	CONCRETE						674,800
	New Tanks	200	CY	900.00	1.1	39600	198,000
	Existing Aeration Tank Retrofit With Walls	9	CY	800.00	1.1	1500	7,500
	Misc. Concrete For Headworks Retrofit	10	CY	800.00	1.1	1760	8,800
	Misc. Concrete For Clarifier Base Slab Levelling	5	CY	800.00	1.1	880	4,400
	Concrete For Basins Top Slab	78	CY	900.00	1.1	15460	77,300
	New Slab On West Side For Building Expansion	21	CY	800.00	1.1	3700	18,500
	Pad For Generator	13	CY	800.00	1.1	2300	11,500
	Misc. Concrete	15	CY	800.00	1.1	2640	13,200
	Precast Insulated Wall	6100	SF	34.00	1.1	45640	228,200
	Precast Double Tee Roof	6100	SF	16.00	1.1	21480	107,400
4	MASONRY						25,800
	Misc. Masonary Wall Interior Of Building	1	LS	19,800.00	1.3	5940	25,800
5	METALS						14,100
	Hand Rails, Misc Metal Grating	1	LS	10,800.00	1.3	3240	14,100
6	WOOD AND PLASTIC						0
7	THERMAL & MOISTURE PROTECTION						0
8	DOORS & WINDOWS						27,500
	2- Garage Doors	1	LS	10,000.00	1.1	1000	11,000
	2- Double Doors	1	LS	7,000.00	1.1	700	7,700
	4- Single Door	1	LS	8,000.00	1.1	800	8,800
9	FINISHES						20,000
	Paints On Door And Frames, Exposed Piping, Bollards	1	LS	20,000.00	1.0	4000	20,000
10	SPECIALITIES						6,900
	Fire Extinguishers	1	LS	2,350.00	1.1	235	2,600
	Bathroom Accessories	1	LS	3,850.00	1.1	385	4,300
11	EQUIPMENT						1,598,100
	MBR Vendor Quote	1	LS	1,097,000	1.3	329100	1,426,100
	Headworks New Fine Screen	1	EA	86,900	1.3	21725	108,700
	UV Disinfection	2	EA	21,120	1.2	8448	50,700
	Chemical Storage Tank- Pacl	1	EA	5,940	1.1	594	6,600
	Chemical Storage Tank- Micro-C	1	EA	5,395	1.1	540	6,000

MBR Treatment Process Alternative
Opinion Of Probable Construction Cost

12	FURNISHINGS						6,500
	Lab, Operations Room	1	LS	5,000.00	1.3	1500	6,500
13	SPECIAL CONSTRUCTION						0
14	HOISTS AND CRANES						19,500
	Mono Rail And Hoist For Moving Of Membrane Cassettes	1	LS	15,000.00	1.3	4500	19,500
15	MECHANICAL / HVAC						174,800
	Process Piping	1	LS	47,400.00	1.3	14220	61,700
	HVAC	1	LS	87,000.00	1.3	26100	113,100
16	ELECTRICAL and INSTRUMENTATION & CONTROLS						682,500
	New Scada System, Mcc, Misc.Electrical Connection, Controls	1	LS	500,000.00	1.3	150000	650,000
	New Generator	1	LS	25,000.00	1.3	7500	32,500
	LABOR COST (Division 2- Division16)					750301	
						SUBTOTAL 1	3,404,800
	CONSTRUCTION PRORATES(See Note 1)	18.0%	of Subtotal 1	612,864			612,900
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	510,720			510,800
						SUBTOTAL 2	4,528,500
	CONTINGENCY (See Note 4)	25.0%	of Subtotal 2	1,132,125			1,132,200
						SUBTOTAL 3	5,660,700
	ENGINEERING COSTS	15.0%	of Subtotal 3	849,105			849,200
				Of Engineering Cost		73,800	73,800
	GROSS RECEIPTS TAX	8.69%		Of labor cost		65,200	65,200
						TOTAL	6,648,900

Notes

- | | | |
|-----|---|--------------|
| 1 | <u>Construction Prorates</u> ^{(a) (b)} | <u>18%</u> |
| (a) | General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and special construction practices to maintain continued plant operations. Also includes misc construction materials needed for project not included above | |
| 2 | <u>Contractor's Overhead & Profit</u> ^(a) | <u>15.0%</u> |
| (a) | Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs and profits. | |
| 4 | <u>Design Contingency</u> ^(a) | <u>25.0%</u> |
| (a) | The design contingency is added to the subtotal based on the conceptual nature of information developed for this evaluation. | |
| 5 | <u>Engineering Costs</u> | <u>15.0%</u> |
| | Costs incurred during Final Design and Construction | |

MBR Treatment Process Alternative
Net Present Value Summary

20-Year Present Value Analysis

Capital Costs	
MBR Process	
<i>Capital Cost</i>	\$6,648,900
Annual Operating and Maintenance Costs	
Chemicals & Reagents Delivered ¹	\$50,600
Energy Cost ²	\$45,000
Personnel (i.e. salary, benefits, payroll tax, insurance, training) ³	\$43,673
Administrative Costs (e.g. office supplies, printing, etc.) ³	\$11,950
Management and Legal Services ³	\$18,960
Insurance ³	\$8,000
Monitoring & Testing ³	\$25,500
Professional Services ³	\$3,000
Residuals Disposal ³	\$13,058
<i>Subtotal</i>	\$219,742
<i>NPV of Annual O&M Costs</i>	\$3,887,000
Total Net Present Cost	\$10,227,900

1 - Equipment Manufacturer Chemical Consumption Estimate
2 - Developed from Equipment Loads/Usage (reference attached Operations and Maintenance Cost Estimate Sheet)
3 - Developed from Village Cost Data 2008, 2009 (Reference attached Village Cost Summarized Data Sheet)

Assumptions:

- | | |
|----------------------------|------|
| 1. Life cycle, n (years): | 20 |
| 2. Annual inflation rate | 2.0% |
| 3. Discount Rate | 3.2% |
| 3. Labor cost of \$25/hour | |

$$NPV = Annual_Cost \times \left[\frac{(1+i)^n - 1}{i \times (1+i)^n} \right]$$

$$\left[\frac{1}{i \times (1+i)^n} \right]$$

MBR Treatment Process Alternative
Operations and Maintenance Cost Estimate

Description	Quantity Installed	Operating	Motor Size	Total operating	KWhrs/day (from Vendor)	Annual Energy Use	Unit Cost	Annual Electricity Cost
			(HP)	(HP)		(kWh/yr)	(\$/kWh)	(\$/yr)
New Mechanical Screen	1	1	2.0	2.00	29	10,456	\$0.090	\$941
Pre- Anoxic Mixing	1	1	4.2	4.21	75	27,503	\$0.090	\$2,475
Recycle Pump	1	1	15	14.80	120	43,705	\$0.090	\$3,933
Post Anoxic Mixer	1	1	4	4.21	75	27,503	\$0.090	\$2,475
Permeate Pump	2	2	2	4.00	98	35,814	\$0.090	\$3,223
MBR Blowers	2	2	25	50.00	478	174,532	\$0.090	\$15,708
Aeration Blowers	1	1	40.0	40.00	493	179,941	\$0.090	\$16,195
Total Annual Electricity Cost								\$45,000

Chemical Cost/ year		
Sodium Hypochlorite For 12 Cleaning Events	From Vendor calcs	\$ 146
Oxalic Acid- Membrane CIP- 1/Year		\$ 149
Alum		\$ 5,260
Mico-C		\$ 45,000
Chemical Cost per year		\$ 50,600

MBR Treatment Process Alternative
Net Present Value Calculations

End of Year	O&M Costs	Present Value of O&M Costs	Short Lived Assets	Present Value of Short Lived Assets
1	\$219,742	\$217,136		\$0
2	\$219,742	\$214,561		\$0
3	\$219,742	\$212,017		\$0
4	\$219,742	\$209,503		\$0
5	\$219,742	\$207,019		\$0
6	\$219,742	\$204,564		\$0
7	\$219,742	\$202,138		\$0
8	\$219,742	\$199,741		\$0
9	\$219,742	\$197,373		\$0
10	\$219,742	\$195,033	\$5,000	\$4,438
11	\$219,742	\$192,720	\$13,019	\$11,418
12	\$219,742	\$190,435	\$11,572	\$10,029
13	\$219,742	\$188,177	\$10,126	\$8,671
14	\$219,742	\$185,945	\$8,679	\$7,344
15	\$219,742	\$183,740	\$153,733	\$128,546
16	\$219,742	\$181,562		\$0
17	\$219,742	\$179,409		\$0
18	\$219,742	\$177,281		\$0
19	\$219,742	\$175,179		\$0
20	\$219,742	\$173,102		\$0
	Capital Costs	\$6,648,900	Discount Rate = 1.2% (Takes into account inflation)	
	O&M Costs	\$3,887,000		
	Short Lived Asset	\$171,000		
	Salvage Value	\$479,000		
	NPV	\$10,227,900		

MBR Treatment Process Alternative
Net Present Value Calculations

MBR Alternative	Life Expectancy	Replacement Cost	Salvage Value at 20 yrs
Short Lived Assets			
Existing Bar Screen	15	\$ 86,000	\$ 21,500
Existing Grit Pump	15	\$ 15,000	\$ 3,750
Existing Grit Classifier	15	\$ 35,000	\$ 8,750
New Bar Screen	15	\$ 86,000	\$ 21,500
EQ Tank Mixer 1	15	\$ 13,800	\$ 3,450
EQ Tank Mixer 2	15	\$ 13,800	\$ 3,450
Anaerobic Mixer	15	\$ 13,800	\$ 3,450
Anoxic Mixer (2 Duty)	15	\$ 27,600	\$ 6,900
Aerobic Diffusers	10	\$ 10,000	\$ 5,000
MBR Membrane Year 11	11	\$ 28,930	\$ 13,019
MBR Membrane Year 12	12	\$ 28,930	\$ 11,572
MBR Membrane Year 13	13	\$ 28,930	\$ 10,126
MBR Membrane Year 14	14	\$ 28,930	\$ 8,679
MBR Membrane Year 15	15	\$ 28,930	\$ 7,233
Blowers (3 Duty)	15	\$ 240,000	\$ 60,000
IMLR/WAS Pump	15	\$ 15,000	\$ 3,750
Permeate Pump (2 Duty)	15	\$ 30,000	\$ 7,500
Chemical Skid- Alum	15	\$ 5,000	\$ 1,250
Chemical Skid- Carbon	15	\$ 5,000	\$ 1,250
Long Life Assets			
New concrete structures	50	\$ 674,800	\$ 404,880
Total Salvage Value			\$ 607,008
Present Value of Salvage Costs			\$479,000

Depreciation Calcs

Depreciation Value = (Cost - Salvage Value)/Life

SL = (C-SV)/L

Then adjust to present day

VTSV - Compilation Summary of Cost Data

Expense Category	YEAR								2016
	2008				2009				
	Total	O&M	G&A	Cap	Total	O&M	G&A	Cap	
Salaries	\$77,961				\$91,261				
Overtime	\$1,261				\$2,000				
Emp Ins	\$10,704				\$13,585				
FICA	\$5,973				\$6,982				
Pension	\$2,071				\$2,738				
Subtotal for	\$97,970				\$116,566				\$132,343
Salaries & Benefits: Sp	\$64,660	\$32,330				\$76,934	\$38,467		\$43,673
Workmen's Comp			\$1,487				\$1,740		
Unempl Ins			\$162				\$183		
Educ & Tr	\$614					\$1,000			
Mgt Services			\$18,960				\$18,960		\$18,960
Legal Services									
Audit Services			\$1,720				\$1,800		\$1,800
Other Serv			\$1,922				\$12,000		\$6,961
Trash	\$925								
Mnt Bldg & Plant				\$5,110				\$8,000	\$6,555
Mnt Equip	\$13,143					\$15,000			
Mnt Vehicles	\$2,627					\$3,000			
Repair Lines				\$0				\$5,000	
Ins			\$7,550				\$8,000		\$8,000
Internet	\$376					\$450			\$450
Phone	\$1,107					\$1,000			\$1,000
Publ			\$143				\$1,200		
Dues			\$8,428				\$8,000		\$8,000
Gen Suppl	\$545	\$545				\$2,000	\$2,000		\$2,500
LabSuppl	\$1,476					\$15,000			\$25,500
Postage			\$52				\$1,000		
Gas & Elec	\$14,674								
Gas & Oil	\$3,575					\$4,000			\$4,000
Chem	\$30,265								\$32,300
Sludge Removal & Tes	\$38,066								\$13,058
Lien filings			\$100				\$500		

APPENDIX D.3
SBR PRELIMINARY COST ESTIMATE

Opinion of Probable Construction Costs

VTSV WWTF
SBR Treatment Process

Division	Description	Quantity	Units	Cost per Unit (\$)	Installation Multiplier	Cost (Nearest \$100)
1	GENERAL CONDITIONS					0
		1	LS		1.0	0
2	CIVIL / SITEWORK					172,300
	Excavation For New Basins	3240	BCY	3	1.3	12,200
	Hauling Of Excavation	4050	CY	9	1.3	43,100
	Cost For Misc Yard Piping	1	LS	30,000	1.3	39,000
	Removing Of Existing Steel Eq	1	LS	15,000	1.3	19,500
	Grade Preparation For New Carport On South Side Of Existing Building	1	LS	20,000	1.3	26,000
	New Retaining Wall Next To The Car Port	1	LS	20,000	1.3	26,000
	New Concrete Pad For New Generator On West Side Of Existing Building	1	LS	5,000	1.3	6,500
3	CONCRETE					1,177,800
	Total Cost For Sbr Tank	800	CY	900.00	1.1	792,000
	Misc. Concrete	10	CY	800.00	1.1	8,800
	Retrofit To Existing Aeration Tank	9	CY	800.00	1.1	8,000
	Pad For Generator	13	CY	800.00	1.1	11,500
	Precast Insulated Wall	6500	SF	34.00	1.1	243,100
	Precast Double Tee Roof	6500	SF	16.00	1.1	114,400
4	MASONRY					25,800
	Misc. Masonary Wall Interior Of Building	1	LS	19,800.00	1.3	25,800
5	METALS					14,100
	Hand Rails, Misc Metal Grating	1	LS	10,800.00	1.3	14,100
6	WOOD AND PLASTIC					0
7	THERMAL & MOISTURE PROTECTION					3,200
	Misc. Sealants	1	LS	2,400.00	1.3	3,200
8	DOORS & WINDOWS					32,500
	2- Garage Doors	1	LS	10,000.00	1.3	13,000
	2- Double Doors	1	LS	7,000.00	1.3	9,100
	4- Single Door	1	LS	8,000.00	1.3	10,400
9	FINISHES					26,000
	Paints On Door And Frames, Exposed Piping	1	LS	20,000.00	1.3	26,000
10	SPECIALITIES					8,200
	Fire Extinguishers	1	LS	2,350.00	1.3	3,100
	Bathroom Accessories	1	LS	3,850.00	1.3	5,100
11	EQUIPMENT					1,365,500
	SBR Vendor Quote	1	LS	490,500	1.3	637,700
	Effluent Equilization Tank	2	EA	15,000	1.3	39,000
	Tertiary Filters For P-Removal And Denite	1	LS	450,000	1.3	585,000
	Cost For Carbon Chemical Skid	1	LS	5,000	1.3	6,500
	UV Disinfection	3	EA	21,120	1.3	82,400
	Chemical Storage Tank- PACI	1	EA	5,940	1.3	7,800
	Chemical Storage Tank- Micro-C	1	EA	5,395	1.3	7,100

SBR Treatment Process Alternative
Opinion Of Provavle Construction Cost

12	FURNISHINGS					6,500
	Lab, Operations Room	1	LS	5,000.00	1.3	6,500
13	SPECIAL CONSTRUCTION					0
14	HOISTS AND CRANES					0
15	MECHANICAL / HVAC					174,800
	Process Piping	1	LS	47,400.00	1.3	61,700
	HVAC	1	LS	87,000.00	1.3	113,100
16	ELECTRICAL and INSTRUMENTATION & CONTROLS					682,500
	New Scada System, Mcc, Misc.Electrical Connection, Controls	1	LS	650,000.00	1.0	650,000
	New Generator	1	LS	25,000.00	1.3	32,500
SUBTOTAL 1						3,689,200
	CONSTRUCTION PRORATES(See Note 1)	18.0%	of Subtotal 1	664,056	1.0	664,100
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	553,380	1.0	553,400
SUBTOTAL 2						4,906,700
	CONTINGENCY (See Note 4)	25.0%	of Subtotal 2	1,226,675	1.0	1,226,700
SUBTOTAL 3						6,133,400
	ENGINEERING COSTS	15.0%	of Subtotal 3	920,010	1.0	920,100
TOTAL						7,053,500

Notes

- | | | |
|-----|--|--------------|
| 1 | Construction Prorates ^{(a) (b)} | <u>18%</u> |
| (a) | General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and special construction practices to maintain continued plant operations. Also includes misc construction materials needed for project not included above. | |
| 2 | Contractor's Overhead & Profit ^(a) | <u>15.0%</u> |
| (a) | Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs and profits. | |
| 4 | Design Contingency ^(a) | <u>25.0%</u> |
| (a) | The design contingency is added to the subtotal based on the conceptual nature of information developed for this evaluation. | |
| 5 | Engineering Costs | <u>15.0%</u> |
| | Costs incurred during Final Design and Construction. | |

SBR Treatment Process Alternative
Net Present Value Summary

20-Year Present Value Analysis

Capital Costs	
SBR	
<i>Capital Cost</i>	\$7,053,500
Annual Operating and Maintenance Costs	
Chemicals & Reagents Delivered ³	\$58,500
Energy Cost ²	\$46,900
Personnel (i.e. salary, benefits, payroll tax, insurance, training) ³	\$43,673
Administrative Costs (e.g. office supplies, printing, etc.) ³	\$11,950
Management and Legal Services ³	\$18,960
Insurance ³	\$8,000
Monitoring & Testing ³	\$25,500
Professional Services ³	\$3,000
Residuals Disposal ³	\$13,058
<i>Subtotal</i>	\$229,542
<i>NPV of Annual O&M Costs</i>	\$4,060,000
Total Net Present Cost	\$10,552,500

1 - Equipment Manufacturer Chemical Consumption Estimate
2 - Developed from Equipment Loads/Usage (reference attached Operations and Maintenance Cost Estimate Sheet)
3 - Developed from Village Cost Data 2008, 2009 (Reference attached Village Cost Summarized Data Sheet)

Assumptions:

- | | |
|----------------------------|------|
| 1. Life cycle, n (years): | 20 |
| 2. Annual inflation rate | 2.0% |
| 3. Discount Rate | 3.2% |
| 3. Labor cost of \$25/hour | |

$$NPV = Annual_Cost \times \left[\frac{(1+i)^n - 1}{i \times (1+i)^n} \right]$$

SBR Treatment Process Alternative
Operations and Maintenance Cost Estimate

Description	Quantity Installed	Operating	Motor Size	Total operating	Operating Load ⁽¹⁾	kW	KWhrs/day	Annual Energy Use	Unit Cost	Annual Electricity Cost
			(HP)	(HP)				(kWh/yr)	(\$/kWh)	(\$/yr)
Decanter Drive Unit	2	2	0.25	0.50	0.40	0.1	2	548	\$0.090	\$49
Anoxic Mixers	2	2	11	22.00	17.60	3.3	79	28,762	\$0.090	\$2,589
Waste Sludge Pump	2	2	2.4	4.80	3.84	0.1	3	1,168	\$0.090	\$105
Effluent EQ Pump	2	2	2	4.00	3.20	2.4	7	2,614	\$0.090	\$235
Tertiary Filters			---			3.7	89	32,412	\$0.090	\$2,917
IMLR Wall Pump	2	2	1.5	3.00	2.40	1.8	43	15,684	\$0.090	\$1,412
Aeration Blowers	2	2	75.0	150.00	120.00	50.2	1204.3	439,570	\$0.090	\$39,561
Total Annual Electricity Cost										\$46,900

(1) Operating load based on 80% of total operating HP to account for motor inefficiencies and correction for elevation.

Chemical Cost/ year		
Ferric cost	From Vendor	\$ 13,500
Mico-C	calcs	\$ 45,000
Chemical Cost per year		\$ 58,500

SBR Treatment Process Alternative
Net Present Value Calculations

End of Year	O&M Costs	Present Value of O&M Costs	Short Lived Assets	Present Value of Short Lived Assets
1	\$229,542	\$226,820		\$0
2	\$229,542	\$224,130		\$0
3	\$229,542	\$221,472		\$0
4	\$229,542	\$218,846		\$0
5	\$229,542	\$216,251		\$0
6	\$229,542	\$213,687		\$0
7	\$229,542	\$211,153		\$0
8	\$229,542	\$208,649		\$0
9	\$229,542	\$206,175		\$0
10	\$229,542	\$203,731	\$5,000	\$4,102
11	\$229,542	\$201,315		\$0
12	\$229,542	\$198,928		\$0
13	\$229,542	\$196,569		\$0
14	\$229,542	\$194,238		\$0
15	\$229,542	\$191,935	\$107,800	\$80,097
16	\$229,542	\$189,659		\$0
17	\$229,542	\$187,410		\$0
18	\$229,542	\$185,188		\$0
19	\$229,542	\$182,992		\$0
20	\$229,542	\$180,822		\$0
Capital Costs		\$7,053,500	Discount Rate = 1.2% (Takes into account inflation)	
O&M Costs		\$4,060,000		
Short Lived Asset		\$85,000		
Salvage Value		\$646,000		
NPV		\$10,552,500		

SBR Treatment Process Alternative
Net Present Value Calculations

SBR Alternative	Life Expectancy	Replacement Cost	Salvage Value at 20 yrs
Short Lived Assets			
Existing Bar Screen	15	\$ 86,000	\$ 21,500
Existing Grit Pump	15	\$ 15,000	\$ 3,750
Existing Grit Classifier	15	\$ 35,000	\$ 8,750
EQ tank Mixer 1	15	\$ 13,800	\$ 3,450
EQ tank Mixer 2	15	\$ 13,800	\$ 3,450
Submersible Mixer (2 duty)	15	\$ 27,600	\$ 6,900
Aerobic Diffusers	10	\$ 10,000	\$ 5,000
Blowers (2 duty)	15	\$ 160,000	\$ 40,000
IMLR/WAS Pump (2 duty)	15	\$ 30,000	\$ 7,500
Effluent Equilization Pump (2 duty)	15	\$ 30,000	\$ 7,500
Tertiary Filter- Polymer Pump	15	\$ 5,000	\$ 1,250
Tertiary Filter- Ferric Pump	15	\$ 5,000	\$ 1,250
Chemical Skid- Alum	15	\$ 5,000	\$ 1,250
Chemical Skid- Carbon	15	\$ 5,000	\$ 1,250
Long Life Assets			
New Concrete structures	50	\$ 1,177,800	\$ 706,680
Total Salvage Value			\$ 819,480
Present Value of Salvage Costs			\$ 646,000

Depreciation Calcs

Depreciation Value = (Cost - Salvage Value)/Life

SL = (C-SV)/L

Then adjust to present day

VTSV - Compilation Summary of Cost Data

Expense Category	YEAR								2016
	2008				2009				
	Total	O&M	G&A	Cap	Total	O&M	G&A	Cap	
Salaries	\$77,961				\$91,261				
Overtime	\$1,261				\$2,000				
Emp Ins	\$10,704				\$13,585				
FICA	\$5,973				\$6,982				
Pension	\$2,071				\$2,738				
Subtotal for	\$97,970				\$116,566				\$132,343
Salaries & Benefits: Sp	\$64,660	\$32,330				\$76,934	\$38,467		\$43,673
Workmen's Comp			\$1,487				\$1,740		
Unempl Ins			\$162				\$183		
Educ & Tr	\$614					\$1,000			
Mgt Services			\$18,960				\$18,960		\$18,960
Legal Services									
Audit Services			\$1,720				\$1,800		\$1,800
Other Serv			\$1,922				\$12,000		\$6,961
Trash	\$925								
Mnt Bldg & Plant				\$5,110				\$8,000	\$6,555
Mnt Equip	\$13,143					\$15,000			
Mnt Vehicles	\$2,627					\$3,000			
Repair Lines				\$0				\$5,000	
Ins			\$7,550				\$8,000		\$8,000
Internet	\$376					\$450			\$450
Phone	\$1,107					\$1,000			\$1,000
Publ			\$143				\$1,200		
Dues			\$8,428				\$8,000		\$8,000
Gen Suppl	\$545	\$545				\$2,000	\$2,000		\$2,500
LabSuppl	\$1,476					\$15,000			\$25,500
Postage			\$52				\$1,000		
Gas & Elec	\$14,674								
Gas & Oil	\$3,575					\$4,000			\$4,000
Chem	\$30,265								\$32,300
Sludge Removal & Tes	\$38,066								\$13,058
Lien filings			\$100				\$500		