APPENDIX G

WWTP ALTERNATIVE COST ESTIMATES

Contact Stabilization

Cost Estimate

($1,000s)

Wastewater Process		
Biofilters		
Aeration Basin	$	1,239
Secondary Clarifier	$	513
Blower Building	$	129
Influent Pump Stn Mods	$	113
Headworks Mods	$	121
UV disinfection	$	315
Site/Civil	$	72
Yard Pipe	$	72
Electrical	$	433
Construction Cost Total	$	3,008

SBR

Cost Estimate
($1,000s)

Wastewater Process		
SBR Basin	$	1,717
Blower Building		
Effluent EQ	$	95
Influent Pump Stn Mods	$	148
Headworks Mods	$	161
UV disinfection	$	315
Site/Civil	$	72
Yard Pipe	$	72
Electrical	$	433
Construction Cost Total	$	3,014

Trickling Filter

Cost Estimate
($1,000s)

Wastewater Process		
Biofilters	$	714
Secondary Clarifier	$	513
Primary Sed	$	586
Package filtration	$	409
Effluent EQ	-	
Influent Pump Stn Mods	$	115
Headworks Mods	$	56
UV disinfection	$	315
Site/Civil	$	72
Yard Pipe	$	72
Electrical	$	503
Construction Cost Total	$	3,356

Complete Mix
Anoxic Select & Filter

Cost Estimate
($1,000s)

Wastewater Process		
Aeration Basin	$	1,742
Secondary Clarifier	$	513
Blower Building	$	129
Package filtration	$	409
Influent Pump Stn Mods	$	113
Headworks Mods	$	121
UV disinfection	$	315
Site/Civil	$	72
Yard Pipe	$	108
Electrical	$	559
Construction Cost Total	$	4,082

SBR & Filter

Cost Estimate
($1,000s)

Wastewater Process		
SBR Basin	$	1,585
Blower Building	$	123
Package filtration	$	409
Effluent EQ	$	95
Influent Pump Stn Mods	$	148
Headworks Mods	$	161
UV disinfection	$	315
Site/Civil	$	72
Yard Pipe	$	108
Electrical	$	475
Construction Cost Total	$	3,491

REDWOOD SANITARY SEWER DISTRICT
Capital Cost Worksheet

Project: Option 3 - Anaerobic Digestion

Estimated By:	DJM	4/3/99	Checked By:	JM	
Item	**Description**	**Estimated Quantity**	**Unit**	**Unit Price**	**Estimated Cost**
1	**Mobilization** (8% of CONSTRUCTION)				
	SUBTOTAL				**$123,000**
2	**Site Work**				
	Clearing/Grading/Surfacing	1	LS	$15,000	$15,000
	Yard Piping	1	LS	$120,000	$120,000
	SUBTOTAL				**$135,000**
3	**Digesters and Control Building**				
	Excavation/Compaction/Backfill	200	CY	$20	$4,000
	Gravel Base	35	CY	$35	$1,225
	Digester Concrete Walls	60	CY	$520	$31,200
	Digester Operations Building Walls	12	CY	$520	$6,200
	Digester Operations Building Roof	520	SF	$30	$15,600
	Concrete - Slab on Grade	40	CY	$300	$12,000
	Concrete Walkway	10	CY	$175	$1,750
	Fixed Covers with Hatches, Pressure Relief	2	EA	$38,500	$77,000
	Fixed Covers Installation	2	EA	$12,000	$24,000
	Side Access Cleaning Ports	2	EA	$5,000	$10,000
	Gas Mixing System (Incl. Compressors)	2	EA	$50,000	$100,000
	Gas Mixing System Installation	2	EA	$20,000	$40,000
	Railing and Stairs	60	LF	$55	$3,300
	Platforms	1	LS	$15,000	$15,000
	7 million BTU/day Boiler w/Expansion Tank	1	EA	$75,000	$75,000
	External Spiral Heat Exchanger	1	EA	$40,000	$40,000
	Heat Exchanger/Boiler Installation	1	LS	$30,000	$30,000
	Cleanable Sight Glasses	2	EA	$3,500	$7,000
	Waste Gas Burner w/ Auto Ignition	1	EA	$15,500	$15,500
	Hot Water Pumps	2	EA	$1,500	$3,000
	Transfer Pumps	2	EA	$5,000	$10,000
	Gas Safety Equip.(Drip & Flame Traps, etc.)	1	LS	$35,000	$35,000
	Motor Controlled Valves	10	EA	$2,500	$25,000
	Gas Meters/Rotameters/Analyzers	1	LS	$32,000	$32,000
	Equipment Pads and Supports	1	LS	$22,000	$22,000
	Testing/Start-Up	1	LS	$30,000	$30,000
	Digester Control Bldg Process Piping	1	LS	$166,500	$80,600
	SUBTOTAL				**$746,400**

REDWOOD SANITARY SEWER DISTRICT
Capital Cost Worksheet

Project: Option 3 - Anaerobic Digestion

Estimated By:	DJM	4/3/99	Checked By:	JM	
Item	**Description**	**Estimated Quantity**	**Unit**	**Unit Price**	**Estimated Cost**
4	**Modify Existing Facilities**				
	Abandon Existing Aeration Basin	1	LS	$10,000	$10,000
	Convert Existing Digester	1	LS	$8,000	$8,000
	SUBTOTAL				**$18,000**
5	**Pump Stations**				
	Equalization Pump Station	1	LS	$30,000	$30,000
	Thickened Sludge Pumps	2	EA	$10,000	$20,000
	Digested Sludge Pumps	2	EA	$10,000	$20,000
	SUBTOTAL				**$70,000**
6	**Conveying/Hauling Equipment**				
	Conveyor	1	LS	$20,000	$20,000
	Trailer	1	LS	$12,000	$12,000
	SUBTOTAL				**$32,000**
7	**Electrical and Instrumentation**				
	Power Systems (12% of CONSTRUCTION)	1	LS	$173,500	$173,500
	Control Systems (9% of CONSTRUCTION)	1	LS	$137,900	$137,900
	SUBTOTAL				**$311,400**
				Construction SubTotal :	$1,446,000
				Overhead and Profit (15%):	$217,000
4/3/99	ENR = 5900			**Construction Cost**	**$1,663,000**

REDWOOD SANITARY SEWER DISTRICT
Capital Cost Worksheet

Project: SOMAT 2PB-9S

Estimated By:	DJM	4/3/99	Checked By:	JM	
Item	**Description**	**Estimated Quantity**	**Unit**	**Unit Price**	**Estimated Cost**
1	**Mobilization** (5% of CONSTRUCTION)				
	SUBTOTAL				**$14,000**
2	**SOMAT**				
	2PB-9S	1	LS	$110,000	$110,000
	Concrete Pad	3	CY	$325	$1,000
	Installation (20% of SUBTOTAL)	1	LS	$31,620	$31,620
	Filtrate Pump	1	EA	$3,500	$3,500
	Pipe/Fittings/Supports	1	LS	$12,000	$12,000
	SUBTOTAL				**$158,100**
3	**Building/Enclosure**				
	Metal Siding Building	360	SF	$115	$41,400
	Mechanical Systems (30% of SUBTOTAL)	1	LS	$17,800	$17,800
	SUBTOTAL				**$59,200**
4	**Electrical and Instrumentation**				
	Power Systems (10% of CONSTRUCTION)	1	LS	$27,200	$27,200
	Control Systems (5% of CONSTRUCTION)	1	LS	$13,600	$13,600
	SUBTOTAL				**$40,800**

Notes: *1 - Equipment Installation includes start-up and testing*

2 - SOMAT includes polymer feed equipment and flocculator

4/3/99 ENR CCI = 5900

Construction SubTotal :	$272,000
Overhead and Profit (15%):	$40,800
Construction Cost	$312,800

REDWOOD SANITARY SEWER DISTRICT
Capital Cost Worksheet

Project: Dissolved Air Floatation Thickener (DAF)

Estimated By:	DJM	4/3/99	Checked By:	JM	
Item	**Description**	**Estimated Quantity**	**Unit**	**Unit Price**	**Estimated Cost**
1	**Mobilization** (5% of CONSTRUCTION)				
	SUBTOTAL				**$27,000**
2	**DAF**				
	Envirex Model 35 DAF - Steel Tank	1	LS	$185,000	$185,000
	Concrete Pad	17	CY	$325	$5,500
	Installation (15% of SUBTOTAL)	1	LS	$38,655	$38,655
	Pipe/Fittings/Supports	1	LS	$10,000	$10,000
	Underflow Pump	1	EA	$3,500	$3,500
	Platform/Stairs/Handrail	1	LS	$15,000	$15,000
	SUBTOTAL				**$257,700**
3	**Building/Enclosure**				
	Metal Siding Building	1100	SF	$115	$126,500
	Mechanical Systems (30% of SUBTOTAL)	1	LS	$54,200	$54,200
	SUBTOTAL				**$180,700**
4	**Electrical and Instrumentation**				
	Power Systems (8% of CONSTRUCTION)	1	LS	$42,800	$42,800
	Control Systems (5% of CONSTRUCTION)	1	LS	$26,800	$26,800
	SUBTOTAL				**$69,600**

Notes:

1 - DAF Equipment includes internal equipment, recycle pump

4/3/99 ENR = 5900

Construction SubTotal :	$535,000
Overhead and Profit (15%):	$80,000
Construction Cost	**$615,000**

Redwood WWTP Alternatives Annual O&M Cost Estimates

Category	Existing Plant	Contact Stabilization	SBR	Biofilter	Comp Mix Eff Filter	SBR w/ Eff. Filter
Salary and Wages	$ 55,500	$ 73,800	$ 73,800	$ 73,800	$ 84,300	$ 84,300
Emp Benefits	$ 18,949	$ 25,250	$ 25,250	$ 25,250	$ 28,850	$ 28,850
Suply and Material	$ 24,808	$ 27,808	$ 26,400	$ 29,800	$ 31,500	$ 31,000
Services	$ 55,835	$ 77,235	$ 76,800	$ 80,500	$ 82,500	$ 81,500
Interfund & Inter Gov.	$ 123,254	$ 136,700	$ 135,500	$ 144,000	$ 146,000	$ 145,000
Capital Replace/Improvements	$ 39,870	$ 49,370	$ 49,370	$ 51,400	$ 55,400	$ 55,400
Subtotal	$ 318,216	$ 390,163	$ 387,120	$ 404,750	$ 428,550	$ 426,050
Anaerobic Digestion	$ 193,760	$ 193,760	$ 193,760	$ 193,760	$ 193,760	$ 193,760
TOTAL O&M COST	$ 511,976	$ 583,923	$ 580,880	$ 598,510	$ 622,310	$ 619,810