Layout - Price River

Influent Wastewater	Influent Pump Station	Preliminary Treatment	Primary Clarification	IFAS	Secondary Clarifier
-			Chlorination	Post Aeration	Effluent
		Anaerobic Digestion	Sludge Drying Lagoon	Hauling and Land Filling	
					

Summary Equipment Database

Hydromantis	2014,(USA A	۹vg)
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Layout Summary Description CONSTRUCTION COSTS	Value	Units
Unit process construction cost Other direct construction costs Other indirect construction cost	\$13,500,000 \$5,320,000 \$14,800,000	\$ \$ \$
Total construction costs	\$33,600,000	\$
ANNUAL COSTS		
LABOR COSTS		
Administration labor cost	\$53,200 \$156,000	\$/yr
Laboratory labor cost	\$150,000	⊅/yi \$/vr
Unit process maintenance labo	\$268.000	\$/vr
Total labor costs	\$1,050,000	\$/yr
MATERIAL COSTS	\$224 000	\$/vr
	Q224,000	ψ/yi
CHEMICAL COSTS Total chemical cost	\$78,900	\$/yr
ENERGY COSTS Total energy cost	\$476,000	\$/yr
Total operation and maintanen	\$1,830,000	\$/yr
CONSTRUCTION COST AMO		
Amortization cost for total cons	\$2,930,000	\$/yr
Total annual project cost	\$4,770,000	\$/yr
PROJECT SUMMARY		
Present worth	\$57,600,000	\$
Total project cost	\$33,600,000	ቅ ድ/አም
Total maintenance labor cost	\$268.000	o⇒/yi \$/vr
Total material cost	\$224,000	\$/vr
Total chemical cost	\$78,900	\$/yr
Total energy cost	\$476,000	\$/yr
Total amortization cost	\$2,930,000	\$/yr

Process Summary

Process	Construction (\$)	Operation (\$/yr)	Maintenance (\$/yr)	Material (\$/yr)	Chemical (\$/yr)	Energy (\$/yr)	Amortization (\$/yr)
Influent Pump Station	2070000	36300	25000	14500	(0 28000	179000
Preliminary Treatment	671000	52800	23000	16800	(0 3040	56200
Anaerobic Digestion	3440000	73100	38700	27900	(0 11600	325000
Primary Clarification	474000	49400	24600	4630	(0 993	44100

Chlorination	571000	45700	6270	22100	78900	11800	58600
Sludge Drying Lagoon	98000	4390	2310	0	0	0	8210
IFAS	3910000	203000	104000	76300	0	416000	415000
Post Aeration	58000	32900	10200	1440	0	3320	5270
Hauling and Land Filling	325000	8990	0200	53600	õ	0020	64800
Secondary Clarifier	603000	60900	24500	6700	0	1200	62000
	093000	03000	04000	0730	0	1500	00300
	0	0	0	0	0	0	0
Blower System	1210000	0	0	0	0	0	101000
Other Costs	20100000	209000	0	0	0	0	1610000
Summary of Other Costs for Layou	•						
Description Value	L Inite						
Other Costs	onits						
Other Costs							
Quantities							
Required land	43 acre						
Administration labor hours	1030 hr/yr						
Laboratory labor hours	3020 hr/yr						
Costs							
DIRECT COSTS							
Mobilization	478000 \$						
Site preparation	709000 \$						
Site electrical	1330000 \$						
Yard piping	892000 \$						
Instrumentation and control	665000 \$						
Lab and administration building	1250000 \$						
Total direct construction costs	F200000 \$						
Total direct construction costs	5320000 ş						
INDIRECT COSTS							
Cost of land	\$ 000038						
Missellensous cost	1000000 \$						
	1080000 \$						
	433000 \$						
Engineering design fee	3250000 \$						
Inspection cost	433000 \$						
Contingency	2170000 \$						
Technical	433000 \$						
Interest during construction	3300000 \$						
Profit	2820000 \$						
Total indirect construction cost	14800000 \$						
Total of other construction cost	2010000 €						
I otal of other construction cos	20100000 \$						
LABOR COSTS							
Administration labor cost	53200 \$/vr						
Laboratory labor cost	156000 ¢/yr						
Laboratory labor cost	100000 \$/yi						
Summary of Air Supply System							
Description Value	Units						
Blower System for Entire Plant	onito						
Design Information							
Minimum oir flow consoity	16000 cofm						
Salety factor	1.5						
Requested air flow capacity	23900 scfm						
I otal capacity of blowers	23900 scfm						
Number of blowers in use	4						
Total number of blowers	5						
Capacity of individual blowers	5990 scfm						
Estimated cost of an installed I	180000 \$						
Blower building area	1690 sqft						
Costs							
Construction and equipment co	1210000 \$						
Installed Blower Cost	900000 \$						
Building Cost	186000 \$						
Misc Costs	119000 \$						
Operational labor cost	0 \$/yr						
Maintenance labor cost	0 \$/vr						
Material and supply cost	0 \$/vr						
Chemical cost	0 \$\/r						
Energy cost	0 ¢/yi 0 \$//r						
Amortization cost	101000 ¢/m						
Notes	101000 \$/yi						
Energy costs are shown at the individu	ual unit processes that i	require air					
-							
Influent Wastewater							
Influent Pump Station							

Design Output Data		
Description	Value	Units
Pump Station		
Design Information		
Volume of wet well		26600 cuft
Width of wet well		205 ft
Depth of the pumping station		28.3 ft
Length of the pumping station		21.2 ft

Width of the pumping station	236	ft
Minimum depth of water in wet	7.31	ft
Area of pump building	682	sqft
Peak capacity of pumps	13.6	MGD(US)
Firm pumping capacity	13.6	MGD(US)
Total dynamic head - average	44.5	ft
Quantities		
Operation labor required	705	pers-hrs/yr
Maintenance labor required	595	pers-hrs/yr
Electrical energy required	280000	kWh/yr
Volume of earthwork required	626000	cuft
Volume of slab concrete requir	47000	cuft
Volume of wall concrete require	19800	cuft
Capacity per pump	9410	gpm(US)
Number of constant speed pun	2	
Number of variable speed purr	0	
Diameter of discharge header	21.9	in
Total dynamic head	60	ft
Size of selected pump	20	in
Specific speed of pump	4050	
Pump rotating speed	889	rpm
Motor size required	166	HP
Size of selected motor	200	HP
Width of pump system	4.6	ft
Length of pump system	21.6	ft
Length of the dry well	21.2	ft
Width of the dry well	30.6	ft
Costs		
Construction and equipment co	2070000	\$
Earthwork Cost	186000	\$
Wall Concrete Cost	477000	\$
Slab Concrete Cost	609000	\$
Building Cost	75000	\$
Installed Pump Equipment C	410000	\$
Misc Costs	316000	\$
Operational labor cost	36300	\$/yr
Maintenance labor cost	25000	\$/yr
Material and supply cost	14500	\$/yr
Chemical cost	0	\$/yr
Energy cost	28000	\$/yr
Amortization cost	179000	\$/yr

Preliminary Treatment Design Output Data

Description	Value	Units
Preliminary Treatment		
Design Information		
Mechanically Cleaned Bar Scre	een	
Bar size	0.25	in
Bar spacing	0.5	in
Slope of bars from horizontal	30	degrees
Head loss through screen	0.176	ft
Approach velocity	2.5	ft/s
Average flow through velocity (2.5	ft/s
Maximum flow through velocity	3	ft/s
Screen channel width	2.47	ft
Average channel depth	1	ft
Horizontal Flow Grit Chamber		
Maximum flow	15.4	cuft/s
Average flow	6.18	cuft/s
Minimum flow	2.79	cuft/s
Temperature	10	deg C
Maximum flow through velocity	1.5	ft/s
Average flow through velocity (1	ft/s
Size of smallest particle 100%	0.2	mm
Specific gravity of particle	2.65	
Number of units	2	
Maximum flow/unit	7.71	cuft/s
Width of channel	1.28	ft
Depth of channel	4	ft
Length of channel	144	ft
Settling velocity of particle	0.0707	ft/s
Slope of channel bottom	0.00137	
Allowance for currents	1.7	
Manning coefficient	0.035	
Hydraulic retention time	1.6	min
Volume of grit	16.1	cuft/d
Costs		
Construction and equipment co	671000	\$
Operational labor cost	52800	\$/yr
Maintenance labor cost	23000	\$/yr
Material and supply cost	16800	\$/yr

Chemical cost		0	\$/yr
Energy cost		3040	\$/yr
Amortization cost		56200	⊅/yr
Anaerobic Digestion			
Design Output Data			
Description	Value		Units
Design Information			
Percent VSS destroyed		50	%
Solids concentration in digeste		5	%
Detention time		25	d
Digester depth		27.1	ft #
Effective digester volume		198000	cuft
Number of digesters per batter		2	oun
Number of primary digesters p		1	
Number of secondary digester		1	
Number of batteries		1	f t / :
Gas produced Heat required		34.0 710000	CUIT/MIN BTLI/br
Digester gas required		27.7	cuft/min
Total natural gas required		0	cuft/yr
Quantities			
Operation labor required		1420	pers-hrs/yr
Maintenance labor required		920	pers-hrs/yr
Volume of earthwork required		107000	KVVN/yr
Slab thickness		10.8	in
Volume of slab concrete requir		6560	cuft
Wall thickness		21	in
Volume of wall concrete requir		23700	cuft
Sidewater depth		27.1	ft
Surface area/floor of 2-story co		1240	in
Length of total piping system		624	ft
Number of 90 degree elbows		26	
Number of tees		51	
Number of plug valves		37	4 (- l4) / -l
Lotal dry solids treated		4.62	ton(snort)/a
Construction and equipment co		3440000	\$
Earthwork Cost		58400	\$
Wall Concrete Cost		572000	\$
Slab Concrete Cost		85000	\$
Building Cost		381000	\$ ¢
Floating Cover Cost		1220000	\$
Gas Recirculation Units Cost		267000	\$
Heating Units Cost		182000	\$
Gas Safety Equipment Cost		120000	\$
Installed Pumps Cost		74800	\$ ¢./
Operational labor cost		38700	\$/yr \$/yr
Material and supply cost		27900	\$/vr
Chemical cost			
Energy cost		0	\$/yr
Amortization cost		0 11600	\$/yr \$/yr
		0 11600 325000	\$/yr \$/yr \$/yr
Primary Clarification		0 11600 325000	\$/yr \$/yr \$/yr
Primary Clarification Design Output Data		0 11600 325000	\$/yr \$/yr \$/yr
Primary Clarification Design Output Data Description	Value	0 11600 325000	\$/yr \$/yr \$/yr Units
Primary Clarification Design Output Data Description Primary Clarification	Value	0 11600 325000	\$/yr \$/yr \$/yr Units
Primary Clarification Design Output Data Description Primary Clarification Design Information	Value	0 11600 325000	\$/yr \$/yr \$/yr Units
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area	Value	0 11600 325000 5120	\$/yr \$/yr \$/yr Units
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi	Value	0 11600 325000 5120 2560 58	\$/yr \$/yr \$/yr Units sqft sqft
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per batter	Value	0 11600 325000 5120 2560 58 2	\$/yr \$/yr \$/yr Units sqft sqft ft
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per battern Number of batteries	Value	0 11600 325000 5120 2560 58 2 1	\$/yr \$/yr \$/yr Units sqft sqft ft
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per battern Number of batteries Solids loading rate	Value	0 11600 325000 5120 2560 58 2 1 2.95	\$/yr \$/yr \$/yr Units sqft sqft ft Ib/(sqft·d)
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarif Diameter of each circular clarif Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Wrisi Least	Value	0 11600 325000 5120 2560 58 2 1 2.95 2.02	\$/yr \$/yr \$/yr Units sqft sqft ft Ib/(sqft·d) hr
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Weir length	Value	0 11600 325000 5120 2560 58 2 1 1 2.95 2.02 673 2640	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft·d) hr ft grd(/LS)
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per batter Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities	Value	0 11600 325000 5120 2560 58 2 1 2.95 5 2.02 673 26400	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft·d) hr ft gpd(US)
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per batter Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required	Value	0 11600 325000 5120 2560 58 2 1 2.95 2.02 673 26400 684	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft-d) hr ft gpd(US) pers-hrs/yr
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Diameter of clarifiers per battery Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required	Value	0 11600 325000 55120 2560 58 2 2.02 673 26400 684 375	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft·d) hr ft gpd(US) pers-hrs/yr pers-hrs/yr
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Diameter of each circular clarifi Number of clarifiers per battere Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required Electrical energy required	Value	0 11600 325000 5120 2560 58 2 2.02 673 26400 684 375 9040	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft·d) hr ft gpd(US) pers-hrs/yr pers-hrs/yr kWh/yr
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Diameter of each circular clarifi Number of clarifiers per battery Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required Electrical energy required Volume of earthwork required	Value	0 11600 325000 5120 2560 58 2 2.02 673 26400 684 375 9040 6450	\$/yr \$/yr \$/yr Units sqft sqft ft lb/(sqft·d) hr ft gpd(US) pers-hrs/yr kWh/yr cuft in
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per battery Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required Electrical energy required Volume of slab concrete required Slab thickness	Value	0 11600 325000 5120 2560 588 2 1 2.95 2.02 673 26400 684 375 9040 64500 10.2 5360	\$/yr \$/yr \$/yr Units sqft sqft sqft ft lb/(sqft·d) hr ft gpd(US) pers-hrs/yr kWh/yr cuft in cuft
Primary Clarification Design Output Data Description Primary Clarification Design Information Surface area Surface area per circular clarifi Diameter of each circular clarifi Number of clarifiers per battery Number of clarifiers per battery Number of batteries Solids loading rate Hydraulic retention time Weir length Volume of sludge generated Quantities Operation labor required Maintenance labor required Electrical energy required Volume of slab trequired Slab thickness	Value	0 11600 325000 5120 2560 58 2 1 2.95 2.02 673 26400 684 375 9040 684 375 9040 64500 10.2 5360	\$/yr \$/yr \$/yr Units sqft sqft sqft ft lb/(sqft·d) hr ft gpd(US) pers-hrs/yr kWh/yr cuft in cuft in

Costs		
Construction and equipment co	436000	\$
Earthwork Cost	19100	\$
Wall Concrete Cost	93500	\$ ¢
Installed Equipment Cost	187000	¢ ¢
Misc Costs	66500	\$
Operational labor cost	35200	\$/vr
Maintenance labor cost	15800	\$/yr
Material and supply cost	4360	\$/yr
Chemical cost	0	\$/yr
Energy cost	904	\$/yr
Amortization cost	40500	\$/yr
Waste Sludge Pumping		
Design Information	0.0004	
Average daily pumping rate	0.0264	
Design capacity per nump	0.0204	apm(LIS)
Number of numps	3.17	gpin(00)
Number of batteries	1	
Firm pumping capacity	0.0264	MGD(US)
Quantities		
Operation labor required	276	pers-hrs/yr
Maintenance labor required	210	pers-hrs/yr
Electrical energy required	892	kWh/yr
Volume of earthwork required	1600	cuft
Area of pump building	201	sqft
Costs	20200	¢
Earthwork Cost	38300	¢
Pump Building Cost	22100	Ψ ¢
Installed Pump Cost	9890	Ψ \$
Misc Costs	5840	\$
Operational labor cost	14200	\$/yr
Maintenance labor cost	8850	\$/yr
Material and supply cost	268	\$/yr
Chemical cost	0	\$/yr
Energy cost	89	\$/yr
0,		
Amortization cost	3620	\$/yr
Amortization cost	3620	\$/yr
Amortization cost Chlorination Design Output Data	3620	\$/yr
Amortization cost Chlorination Design Output Data Description	3620 Value	\$/yr Units
Amortization cost Chlorination Design Output Data Description Chlorination	3620 Value	\$/yr Units
Amortization cost Chlorination Design Output Data Description Chlorination Design Information	3620 Value	\$/yr Units
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank	3620 Value 208000	\$/yr Units gal(US)
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required	3620 Value 208000 332	\$/yr Units gal(US) lb/d
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required	3620 Value 208000 332 833	\$/yr Units gal(US) Ib/d Ib/d
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent colform count	3620 Value 208000 332 833 1000000	\$/yr Units gal(US) lb/d lb/d /100ml
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Netak Chlorine required Influent coliform count Effluent coliform count	3620 Value 208000 332 833 1000000 29.2	\$/yr Units gal(US) lb/d lb/d /100ml /100ml
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Occessional Labor sequired	3620 Value 208000 332 833 10000000 29.2	\$/yr Units gal(US) Ib/d Ib/d /100ml /100ml
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintagnage labor required	3620 Value 208000 332 833 10000000 29.2 887 140	\$/yr Units gal(US) lb/d /100ml /100ml pers-hrs/yr pers brs/yr
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Electrical energy required	3620 Value 208000 332 833 1000000 29.2 887 149 118000	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Guantities Operational labor required Maintenance labor required Electrical energy required Volume of earthwork required	3620 Value 208000 332 833 1000000 29.2 887 149 118000 118000	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuff
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of slab concrete required	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790	\$ yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Electrical energy required Volume of earthwork required Volume of wall concrete requir	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Influent coliform count Effluent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of slab concrete requir Volume of chlorinators and evi	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790 4980 1	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Maintenance labor required Volume of earthwork required Volume of slab concrete required Volume of slab concrete required Number of chlorinators and evic Chlorination building area	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 1 220	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Operational labor required Maintenance labor required Maintenance labor required Volume of earthwork required Volume of slab concrete requir Number of chlorinators and ev: Chlorination building area Number of chlorine cylinders	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 1 1200 5	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft
Amortization cost Chlorination Design Output Data Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of slab concrete requir Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Number of chlorinators and evic Chlorination building area Number of chlorine cylinders Area of chlorine storage buildir	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 11900 2790 4980 1220 5 700	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft sqft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Volume of earthwork required Volume of slab concrete requir Volume of slab concrete requir Number of chlorinators and ev: Chlorination building area Number of chlorine storage buildir Costs	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790 4980 11 2200 5 700	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft sqft sqft
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Volume of earthwork required Volume of earthwork required Volume of slab concrete requir Number of chlorinators and evi Chlorination building area Number of chlorine storage buildir Costs Construction and equipment co	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790 4980 118000 11900 2790 571000 571000	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr pers-hrs/yr cuft cuft cuft cuft sqft \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Electrical energy required Volume of slab concrete requir Volume of slab concrete require Volume of chlorinators and ev: Chlorination building area Number of chlorine storage buildir Costs Construction and equipment cot Earthwork Cost Wall Concrete Cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 11 220 5 700 571000 3520	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr pers-hrs/yr cuft cuft cuft cuft sqft \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Maintenance labor required Volume of earthwork required Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Volume of chlorinators and ev: Chlorination building area Number of chlorine storage buildir Costs Construction and equipment co Earthwork Cost Wall Concrete Cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 118000 5700 571000 3520 120000 3520	\$/yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of slab concrete required Number of chlorinators and ev: Chlorination building area Number of chlorine cylinders Area of chlorine storage buildir Costs Construction and equipment cost Installed Equinment Cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 1 18000 11900 57000 571000 3520 120000 36100 320000	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft cuft sqft \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Design Output Data Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of salb concrete requir Volume of salb concrete requir Volume of salb concrete requir Volume of salb concrete requir Number of chlorine cylinders Area of chlorine storage buildir Construction and equipment cot Earthwork Cost Wall Concrete Cost Installed Equipment Cost Building Cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 1 2200 5 700 571000 3520 120000 36100 320000 24200	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr pers-hrs/yr cuft cuft cuft sqft \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Design Output Data Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of labor required Volume of slab concrete requir Volume of slab concrete required Volume of slab concrete required Volume of chlorine cylinders Area of chlorine storage buildir Costs Construction and equipment cot Earthwork Cost Wall Concrete Cost Slab Concrete Cost Slab Concrete Cost Building Cost Storage Building Cost	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790 4980 11 2200 57000 571000 3520 120000 36100 320000 24200 38500	\$\sqrtyr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr pers-hrs/yr cuft cuft cuft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of slab concrete required Volume of chlorinators and evic Chlorination building area Number of chlorine storage buildir Costs Construction and equipment cost Slab Concrete Cost Installed Equipment Cost Building Cost Storage Building Cost Misc Costs	3620 Value 208000 332 833 10000000 29.2 887 149 118000 11900 2790 4980 11 2200 57000 557000 5571000 3520 120000 36100 320000 24200 36500 28700	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft sqft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of slab concrete requir Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Volume of chlorinators and ev: Chlorination building area Number of chlorine storage buildir Costs Construction and equipment cot Earthwork Cost Wall Concrete Cost Installed Equipment Cost Building Cost Storage Building Cost Misc Costs Operational labor cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 11900 2790 4980 1 2200 5 700 571000 3520 120000 36100 320000 24200 38500 28700 45700	\$ ^j yr Units gal(US) lb/d lb/d /100ml /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Peak chlorine required Peak chlorine required Peak chlorine required Influent coliform count Quantities Operational labor required Maintenance labor required Volume of earthwork required Volume of slab concrete required Volume of chlorine storage buildir Costs Construction and equipment cot Earthwork Cost Wall Concrete Cost Installed Equipment Cost Building Cost Storage Building Cost Misc Costs Operational labor cost Maintenance labor cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 118000 11900 2790 4980 11200 5700 571000 3520 120000 36100 320000 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 38500 24200 3620 24200 3620 24200 3620 24200 36200 24200 36200 24200 36200 24200 36200 24200 38500 24200 38500 24200 38500 24200 38500 24200 36200 24200 38500 24200 36200 24200 36200 36200 24200 36200 36200 24200 3620 362000 36200 362000 36200 36200 36200	\$/yr Units gal(US) lb/d
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Volume of salb concrete required Volume of salb concrete required Volume of salb concrete required Volume of salb concrete required Volume of solb concrete required Number of chlorinators and ev: Chlorination building area Number of chlorine cylinders Area of chlorine storage buildir Costs Construction and equipment cost Building Cost Storage Building Cost Maintenance labor cost Material and supply cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 118000 11900 2790 4980 11900 571000 3520 120000 36100 320000 024200 38500 24200 38500 24200 38500 22100	\$/yr Units gal(US) lb/d lb/d /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft cuft sqft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Design Output Data Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Volume of earthwork required Volume of slab concrete requir Volume of slab concrete requir Volume of chlorinators and evi Chlorination building area Number of chlorine cylinders Area of chlorine storage buildir Costs Construction and equipment cost Building Cost Storage Building Cost Misc Costs Operational labor cost Material and supply cost Chemical cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 11900 2790 4980 1 12000 3520 120000 36100 320000 24200 38500 28700 45700 6270 22100 78900	\$/yr Units gal(US) Ib/d Ib/d /100ml pers-hrs/yr pers-hrs/yr kWh/yr cuft cuft cuft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Design Output Data Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Volume of slab concrete required Volume of slab concrete required Volume of slab concrete required Volume of chlorinators and evic Chlorination building area Number of chlorine cylinders Area of chlorine storage buildir Costs Construction and equipment cot Building Cost Storage Building Cost Misc Costs Operational labor cost Material and supply cost Chemical cost Entry cost	3620 Value 208000 332 833 1000000 29.2 887 149 118000 2790 4980 11900 2790 4980 11900 2790 571000 3520 120000 36100 320000 24200 36100 320000 24200 36570 6270 22100 78900 11800 22900 78900 11800 22900 78900 11800 22900 78900 11800 22900 78900 11800 79	\$/yr Units gal(US) lb/d lb/d /100ml /100ml pers-hrs/yr kWh/yr cuft cuft cuft cuft sqft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Amortization cost Chlorination Design Output Data Description Chlorination Design Information Volume of tank Average chlorine required Peak chlorine required Influent coliform count Effluent coliform count Quantities Operational labor required Maintenance labor required Electrical energy required Volume of earthwork required Volume of slab concrete requir Volume of slab concrete requir Volume of slab concrete requir Volume of slab concrete requir Volume of chlorinators and eva Chlorination building area Number of chlorine storage buildir Costs Construction and equipment cost Slab Concrete Cost Installed Equipment Cost Building Cost Storage Building Cost Misc Costs Operational labor cost Material and supply cost Chemical cost Energy cost Amortization cost	3620 Value 208000 332 833 1000000 29.2 887 149 11800 11900 2790 4980 11 220 5 700 571000 3520 120000 36100 320000 24200 36100 320000 24200 36100 320000 24200 36100 36100 32000 24200 36500 120000 36100 36500 120000 36500 120000 36500 375000 375000 375000 375000 375000 375000 375000 375000 375000 375000 375000 375000 375000 375000 3750000 3750000 3750000 375000000 375000000000000000000000000000000000000	\$\fyr Units gal(US) lb/d lb/d lb/d /100ml pers-hrs/yr pers-hrs/yr cuft cuft cuft cuft sqft \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$

Sludge Drying Lagoon Design Output Data Description

Sludge Drying Lagoon Design Information

Value

Units

Sludge flow	13500	gpd(US)
Initial solids content in sludge	5	%
Sludge depth in lagoon	1	ft
Dry solids produced	2060000	lb/yr
Lagoon volume	896000	cuft
Total lagoon surface area	896000	sqft
Number of lagoons required	2	
Quantities		
Operation labor required	85.2	pers-hrs/yr
Maintenance labor required	55	pers-hrs/yr
Volume of earthwork required	258000	cuft
Volume of wall concrete require	80	cuft
Surface area per lagoon	448000	sqft
Length of lagoon at top of leve	681	ft
Depth of cut	0.24	ft
Depth of fill	2.76	ft
Costs		
Construction and equipment co	98000	\$
Earthwork Cost	76400	\$
Wall Concrete Cost	1930	\$
Misc Costs	19600	\$
Operational labor cost	4390	\$/yr
Maintenance labor cost	2310	\$/yr
Material and supply cost	0	\$/yr
Chemical cost	0	\$/yr
Energy cost	0	\$/yr
Amortization cost	8210	\$/yr

IFAS

IFAG			
Design Output Data			
Description	Value		Units
IFAS			
Design Information			
Carbon & Nitrification Design			
Max. specific growth of nitrifier		0.2	1/d
Death rate of nitrifiers at winter		0.0301	1/d
Minimum SRT for design at wi		5.89	d
Design SRT for design at winter		8.83	d
Design SS		2500	mg/L
Calculated VSS		1710	mg/L
Calculated VSS:TSS ratio		0.686	mg VSS/mg SS
Total volume of reactors		7060	m3
Length of parallel train		36	m
Width of parallel train		10	m
Sidewater depth		5	m
Number of batteries		1	
Number of parallel trains per b		4	
Number of cells within one train		2	
Total number of dividing walls		4	
Hydraulic retention time		11	hr
F/M ratio		0.127	kg BOD/kg MLSS/d
Volumetric BOD loading		0.362	kg BOD/m3/d
Observed yield (VSS basis)		0.999	g VSS/g BOD
Observed yield (TSS basis)		0.972	g TSS/g BOD
Amount of alkalinity required		268	gCaCO3/m3
Amount of sludge generated		3320	kg/d
Sludge recycle rate		5140	m3/d
Nitrogen requirement for bioma		8.71	mg/L
Phosphorus requirement for bi		1.74	mg/L
Oxygen requirement to meet a		5720	kg/d
Air flow required to meet avera		26600	N m3/hr
Design air flow		62.8	N m3/min/1000 m3
Quantities		0.400	
Operation labor required		3480	pers-nrs/yr
Maintenance labor required		2090	pers-nrs/yr
Volume of earthwork required		4110000	KVVII/yi
Volume of eleb concrete required		57900	cuit
Volume of stab concrete requir		3/800	cuit
Volume of wall concrete requir		30200	cuit #
Number of diffusors per train		1140	n
Number of guing arm boaders		555	
Volume of Modia required		3530	m2
Sieve Area required		3030	m2
Costs		30.1	1112
Construction and equipment or		3780000	¢
Earthwork Cost		40600	¢ ¢
Wall Concrete Cost		727000	¢ ¢
Slab Concrete Cost		749000	¢
Handrail Cost		85400	\$
Installed Aerator Equipment		451000	ŝ
Air Piping Cost		268000	ŝ
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Misc Costs Media Cost Screen Cost	255000 1160000 41900	\$ \$ \$
Operational labor cost	179000	\$/vr
Maintenance labor cost	87700	\$/yr
Material and supply cost	75500	\$/yr
Chemical cost	0	\$/yr
Energy cost	411000	\$/yr
Amortization cost	403000	\$/yr
Sludge Recycle Pumping		
Design Information	1.26	
Average daily pumping rate	2.30	
Design capacity per nump	2.71	apm(US)
Number of pumps	3	gpiii(00)
Number of batteries	1	
Firm pumping capacity	1.36	MGD(US)
Quantities		
Operation labor required	458	pers-hrs/yr
Maintenance labor required	377	pers-hrs/yr
Electrical energy required	45400	kvvn/yr
Area of nump building	2030	saft
Costs	204	Sqit
Construction and equipment co	123000	\$
Earthwork Cost	601	\$
Pump Building Cost	27900	\$
Installed Pump Cost	76100	\$
Misc Costs	18800	\$
Operational labor cost	23600	\$/yr
Maintenance labor cost	15800	\$/yr
Chemical cost	004	⊅/yi ¢/yr
Energy cost	4540	\$/vr
Amortization cost	11700	\$/yr
Post Aeration		
Post Aeration Design Output Data		
Post Aeration Design Output Data Description Value		Units
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Promotion Desig		Units
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved overgen in influent	2	Units
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef	2	Units mg/L mg/L
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure	2 5 1	Units mg/L mg/L
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t	2 5 1 2	Units mg/L mg/L mg/L
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer	2 5 1 2 8.5	Units mg/L mg/L mg/L mg/L
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required	2 5 1 2 8.5 99.7	Units mg/L mg/L mg/L lb/d
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency	2 5 1 2 8.5 99.7 2.95	Units mg/L mg/L mg/L lb/d lbO2/(HP·h)
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto	2 5 1 25 8.5 99.7 2.95 27700	Units mg/L mg/L lb/d lbO2/(HP·h) ga[(US)
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Ownstring	2 5 1 2 8.5 99.7 2.95 27700 133	Units mg/L mg/L mg/L lb/d lb/2/(HP·h) gal(US) scfm
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin denth	2 5 1 2 8.5 99.7 2.95 27700 133	Units mg/L mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer I Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet ϵ Quantities Basin depth Length of basin	2 5 1 2 8.5 99.7 2.95 27700 133 15 8 22	Units mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design Information Dissolved oxygen in influent Design factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer 1 Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30	Units mg/L mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design information Dissolved oxygen in influent Desired dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer 1 Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 0 12	Units mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer i Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Width of solver of diffusers Number of diffusers	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1	Units mg/L mg/L lb/d lb/O2/(HP·h) gal(US) scfm ft ft ft
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in efformation Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Number of diffusers Number of swing arm diffuser I Volume of wall concrete required	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860	Units mg/L mg/L mg/L lb/d lb/2/(HP·h) gal(US) scfm ft ft ft cuft
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Wuth of basin Number of diffusers Number of sung arm diffuser I Volume of sab concrete requin Volume of slab concrete requin	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185	Units mg/L mg/L lb/d lb/2/(HP·h) gal(US) scfm ft ft ft cuft cuft
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers Number of swing arm diffuser I Volume of sab concrete require Volume of sab concrete require	2 5 1 2.85 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200	Units mg/L mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft ft cuft cuft kWh/yr
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer I Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers Number of swing arm diffuser I Volume of sab concrete required Volume of sab concrete required Operation labor required	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 242	Units mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft ft cuft cuft cuft cuft kWh/yr pers-hrs/yr
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design information Dissolved oxygen in influent Design factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer 1 Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers Number of swing arm diffuser I Volume of salb concrete required Operation labor required Operation labor required	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 12 1 860 185 33200 640 243	Units mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft ft cuft kWh/yr pers-hrs/yr pers-hrs/yr
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer in Oxygen required Orgen time Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Number of diffusers Number of sale concrete requir Volume of slab concrete required Operating required Operating labor required Construction labor required Costs Construction and equipment or	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243	Units mg/L mg/L lb/d lb/D2/(HP·h) gal(US) scfm ft ft ft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr s
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Basin depth Length of basin Number of diffusers Number of sabic concrete requir Volume of sabic concrete required Operating labor required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Number of diffusers Number of sub concrete required Operation labor required Operation labor required Operation labor required Operation labor required Maintenance labor required Construction and equipment cc Wall Concrete Cost	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243 58000 20700	Units mg/L mg/L lb/d lb/2/(HP·h) gal(US) scfm ft ft ft cuft cuft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oyegan required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Wumber of diffusers Number of slab concrete required Operation labor required Maintenance labor required Maintenance labor required Costs Construction and equipment cc Wall Concrete Cost	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243 58000 20700 11100	Units mg/L mg/L lb/d lb/2(HP-h) gal(US) scfm ft ft ft cuft cuft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$ \$
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Wumber of diffusers Number of diffusers Number of slab concrete require Volume of slab concrete require Operation labor required Operation labor required Costs Construction and equipment cc Wall Concrete Cost Installed Equipment Cost	2 5 1 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243 58000 20700 11100 20400	Units mg/L mg/L lb/d lb/2/(HP·h) gal(US) scfm ft ft ft cuft cuft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$ \$ \$
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer i Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers Number of swing arm diffuser I Volume of sab concrete required Operation labor required Costs Construction and equipment cc Wall Concrete Cost Slab Concrete Cost Installed Equipment Cost Misc Costs	2 5 1 2.95 27700 133 15 8.22 30 12 1 860 840 243 58000 20700 11100 20400 5740	Units mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft ft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$ \$ \$ \$
Post Aeration Design Output Data Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Design dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer i Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Length of basin Width of basin Number of diffusers Number of swing arm diffuser I Volume of sab concrete required Operation labor required Maintenance labor required Costs Construction and equipment cost Misc Costs Operational labor cost	2 5 1 2,85 99.7 2.95 27700 133 15 8.22 30 12 1 860 640 243 58000 20700 11100 20400 5740 32900	Units mg/L mg/L mg/L lb/d lbO2/(HP·h) gal(US) scfm ft ft ft cuft kWh/yr pers-hrs/yr pers-hrs/yr pers-hrs/yr \$ \$ \$ \$ \$ \$ \$ \$
Post Aeration Description Value Post Aeration by Diffused Aeration Design Information Dissolved oxygen in influent Deside dissolved oxygen in influent Deside dissolved oxygen in ef Correction factor for pressure Minimum dissolved oxygen in t Oxygen saturation at summer Oxygen required Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Basin depth Length of basin Number of diffusers Number of size concrete required Operating required Operation labor required Costs Construction and equipment cc Wall Concrete Cost Slab Concrete Cost Slab Concrete Cost Slab Concrete Cost Slab Concrete Cost Misc Costs Operational labor cost Misc Costs Operational labor cost	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243 58000 20700 11100 20400 11100 20400 5740 32900 10200	Units mg/L mg/L lb/d lb/D2/(HP·h) gal(US) scfm ft ft ft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Post Aeration Description Value Description Value Post Aeration by Diffused Aeration Design Information Design Information Dissolved oxygen in influent Desired dissolved oxygen in influent Desired dissolved oxygen in the Correction factor for pressure Minimum dissolved oxygen in the Correction factor for pressure One control of the Correction factor for pressure Minimum dissolved oxygen in the Correction factor for pressure One control of the Correction factor for pressure Oxygen saturation at summer Oxygen required Operating transfer efficiency Operating transfer efficiency Total volume of aerobic reacto Air flow rate required to meet a Quantities Basin depth Basin depth Basin depth Length of basin Number of diffusers Number of sabic concrete required Operational bor required Volume of sub concrete required Operation labor required Maintenance labor required Maintenance Maintenance Value Concrete Cost Slab Concrete Cost Slab Concrete Cost Misc Costs Operational labor cost Maintenance labor cost Maintenance labor cost Maintenance labor cost Maintenance labor cost	2 5 1 2 8.5 99.7 2.95 27700 133 15 8.22 30 12 1 860 185 33200 640 243 58000 20700 11100 20400 5740 32900 10200 1440	Units mg/L mg/L lb/d lb/d lb/d/(HP·h) gal(US) scfm ft ft ft cuft cuft cuft cuft kWh/yr pers-hrs/yr pers-hrs/yr \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
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Hauling and Land Filling Design Output Data

Description	Value	Units
Sludge Hauling and Land Filling	g	
Design Information		
Volume of sludge hauled	11.2	cuyd/d
Truck capacity	19	cuyd
Round trip time to disposal site	1	hr

Truck loading time	0.75	hr
Operational hours per day	8	hr
Number of trucks required	1	
Distance to disposal site	10	miles
Quantities		
Total sludge volume hauled	11.2	cuyd/d
Maximum anticipated landfill do	30	d
Anticipated sludge storage hei	8	ft
Sludge storage shed area	1130	sqft
Width of sludge storage shed :	23.8	ft
Length of sludge storage shed	47.6	ft
Volume of earthwork required	3290	cuft
Volume of slab concrete requir	1460	cuft
Surface area of canopy roof	1130	sqft
Round trip haul distance	20	miles
Round trips per day per truck	1	
Distance traveled per year per	5000	miles
Sludge hauled	9.88	ton(short)/d
Operation labor required	175	pers-hrs/yr
LandFilling cost	35200	\$/yr
Costs		
Construction and equipment co	325000	\$
Earthwork Cost	975	\$
Slab Concrete Cost	18900	\$
Canopy Roof Cost	22600	\$
Vehicle Cost	283000	\$
Operational labor cost	8990	\$/yr
Maintenance labor cost	0	\$/yr
Material and supply cost	53600	\$/yr
Chemical cost	0	\$/yr
Energy cost	0	\$/yr
Amortization cost	64800	\$/yr

Secondary Clarifier Design Output Data

Description	Value		Units
Secondary Clarification			
Design Information			
Surface area		10200	sqft
Surface area per circular clarif	i	5090	sqft
Diameter of each circular clarit	f	81	ft
Number of clarifiers per batter		2	
Number of batteries		1	
Solids loading rate		11.1	lb/(sqft·d)
Hydraulic retention time		4.04	hr
Designed surface overflow rate		400	gal(US)/(sqft⋅d)
Weir length		671	ft
Volume of wasted sludge		85200	qpd(US)
Quantities			
Operation labor required		1030	pers-hrs/yr
Maintenance labor required		570	pers-hrs/yr
Electrical energy required		10100	kWh/yr
Volume of earthwork required		132000	cuft
Slab thickness		10.2	in
Volume of slab concrete requi	,	10100	cuft
Wall thickness		11.5	in
Volume of wall concrete requir	1	5340	cuft
Costs			
Construction and equipment co		647000	\$
Earthwork Cost		39000	\$
Wall Concrete Cost		128000	\$
Slab Concrete Cost		131000	\$
Installed Equipment Cost		250000	\$
Misc Costs		98700	\$
Operational labor cost		53300	\$/vr
Maintenance labor cost		24000	\$/vr
Material and supply cost		6470	\$/vr
Chemical cost		0	\$/vr
Energy cost		1010	\$/vr
Amortization cost		59500	\$/vr
Waste Sludge Pumping			
Design Information			
Average daily pumping rate		0.0852	MGD(US)
Total pumping capacity		0.0852	MGD(US)
Design capacity per pump		29.6	apm(US)
Number of pumps		3	31()
Number of batteries		1	
Firm pumping capacity		0.0852	MGD(US)
Quantities		0.0002	
Operation labor required		321	pers-hrs/vr
Maintenance labor required		250	pers-hrs/vr
Electrical energy required		2870	kWh/vr
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Volume of earthwork required Area of pump building Costs	1610 cuft 202 sqft
Construction and equipment co	16300 ¢
Earthwork Cost	40300 \$
Pump Building Cost	22200 \$
Installed Pump Cost	16600 \$
Misc Costs	7060 \$
Operational labor cost	16500 \$/yr
Maintenance labor cost	10500 \$/yr
Material and supply cost	324 \$/yr
Chemical cost	0 \$/yr
Energy cost	287 \$/yr
Amortization cost	4380 \$/yr

Effluent Design Output Data		
Description	Value	Units
Costs		
Construction and equipment	DC .	0\$
Operational labor cost		0 \$/yr
Maintenance labor cost		0 \$/yr
Material and supply cost		0 \$/yr
Chemical cost		0 \$/yr
Energy cost		0 \$/yr
Amortization cost		0 \$/yr