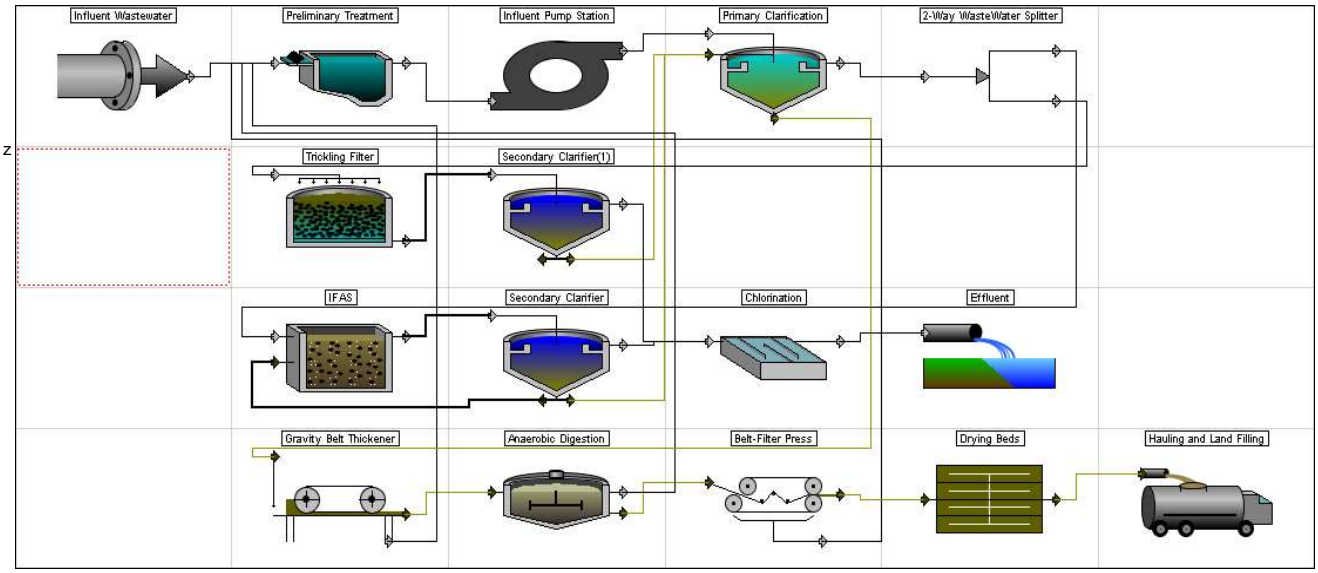
Layout - Spanish Fork City



Summary

Equipment Database

Hydromantis 2014,(USA Avg)

Layout Summary

Description	Value	Units
CONSTRUCTION COSTS		
Unit process construction cost	$17,400,000	$
Other direct construction costs	$7,000,000	$
Other indirect construction cos	$18,300,000	$
Total construction costs	$42,700,000	$
ANNUAL COSTS		
LABOR COSTS		
Administration labor cost	$73,000	$/yr
Laboratory labor cost	$166,000	$/yr
Unit process operation labor c	$878,000	$/yr
Unit process maintenance labc	$420,000	$/yr
Total labor costs	$1,540,000	$/yr
MATERIAL COSTS		
Total material cost	$264,000	$/yr
CHEMICAL COSTS		
Total chemical cost	$177,000	$/yr
ENERGY COSTS		
Total energy cost	$519,000	$/yr
Total operation and maintanen	$2,500,000	$/yr
CONSTRUCTION COST AMC		
Amortization cost for total cons	$3,810,000	$/yr
Total annual project cost	$6,300,000	$/yr
PROJECT SUMMARY		
Present worth	$75,500,000	$
Total project cost	$42,700,000	$
Total operation labor cost	$1,120,000	$/yr
Total maintenance labor cost	$420,000	$/yr
Total material cost	$264,000	$/yr
Total chemical cost	$177,000	$/yr
Total energy cost	$519,000	$/yr
Total amortization cost	$3,810,000	$/yr

Process Summary

Process	Construction ($)	Operation ($/yr)	Maintenance ($/yr)	Material ($/yr)	Chemical ($/yr)	Energy ($/yr)	Amortization ($/yr)
Preliminary Treatment	752000	66300	29400	18800	0	3680	63000
Trickling Filter	1230000	37100	26700	6880	0	14200	108000
IFAS	5660000	204000	108000	109000	0	421000	615000
Gravity Belt Thickener	812000	18000	3800	0	20700	7620	74300

Influent Pump Station	1230000	41100	29300	8610	0	37600	111000
Secondary Clarifier(1)	464000	48500	24900	4530	0	968	43200
Secondary Clarifier	690000	69100	35200	6770	0	1220	63700
Anaerobic Digestion	2150000	78900	43500	18700	0	12900	205000
Primary Clarification	581000	59300	30200	5700	0	1070	53900
Chlorination	687000	56700	9650	24200	119000	11900	70600
Belt-Filter Press	812000	11300	2400	0	37600	6640	74300
2-Way WasteWater Splitter	0	0	0	0	0	0	0
Effluent	0	0	0	0	0	0	0
Drying Beds	805000	181000	76500	7240	0	0	70000
Hauling and Land Filling	313000	6300	0	53600	0	0	63800
Blower System	1210000	0	0	0	0	0	102000
Other Costs	25300000	239000	0	0	0	0	2090000

Summary of Other Costs for Layout

Description	Value	Units
Other Costs		
Quantities		
Required land	17	acre
Administration labor hours	1420	hr/yr
Laboratory labor hours	3210	hr/yr
Costs		
DIRECT COSTS		
Mobilization	632000	$
Site preparation	893000	$
Site electrical	1790000	$
Yard piping	1190000	$
Instrumentation and control	912000	$
Lab and administration building	1580000	$
Total direct construction costs	7000000	$
INDIRECT COSTS		
Cost of land	340000	$
Miscellaneous cost	1400000	$
Legal cost	561000	$
Engineering design fee	4210000	$
Inspection cost	561000	$
Contingency	2810000	$
Technical	561000	$
Interest during construction	4180000	$
Profit	3660000	$
Total indirect construction cost	18300000	$
Total of other construction cos	25300000	$
LABOR COSTS		
Administration labor cost	73000	$/yr
Laboratory labor cost	166000	$/yr

Summary of Air Supply System

Description	Value	Units
Blower System for Entire Plant		
Design Information		
Minimum air flow capacity	16200	scfm
Safety factor	1.5	
Requested air flow capacity	24300	scfm
Total capacity of blowers	24300	scfm
Number of blowers in use	4	
Total number of blowers	5	
Capacity of individual blowers	6060	scfm
Estimated cost of an installed I	181000	$
Blower building area	1700	sqft
Costs		
Construction and equipment cc	1210000	$
Installed Blower Cost	907000	$
Building Cost	187000	$
Misc Costs	120000	$
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	102000	$/yr
Notes		
Energy costs are shown at the individual unit processes that require air		

Influent Wastewater
Preliminary Treatment
Design Output Data

Description	Value	Units
Preliminary Treatment		
Design Information		

Mechanically Cleaned Bar Screen		
Bar size	0.25	in
Bar spacing	1	in
Slope of bars from horizontal	30	degrees
Head loss through screen	0.0407	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	3.71	ft
Average channel depth	1	ft
Horizontal Flow Grit Chamber		
Maximum flow	18.5	cuft/s
Average flow	9.28	cuft/s
Minimum flow	6.2	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	9.26	cuft/s
Width of channel	1.54	ft
Depth of channel	4	ft
Length of channel	144	ft
Settling velocity of particle	0.0707	ft/s
Slope of channel bottom	0.00106	
Allowance for currents	1.7	
Manning coefficient	0.035	
Hydraulic retention time	1.6	min
Volume of grit	24.1	cuft/d
Costs		
Construction and equipment cc	752000	$
Operational labor cost	66300	$/yr
Maintenance labor cost	29400	$/yr
Material and supply cost	18800	$/yr
Chemical cost	0	$/yr
Energy cost	3680	$/yr
Amortization cost	63000	$/yr

Trickling Filter

Design Output Data

Description	Value	Units
Trickling Filtration		
Design Information		
Reaction rate constant	0.00156	
Hydraulic loading rate	0.75	gal(US)/(sqft·min)
Total hydraulic loading rate	0.772	gal(US)/(sqft·min)
Recirculation ratio	0.0293	
Number of towers per stage	1	
Number of stages	2	
Depth of filter tower	21.2	ft
Diameter of filter tower	48.6	ft
Surface area per filter tower	929	sqft
Total surface area	1860	sqft
Volume per filter tower	39300	cuft
Total volume	78600	cuft
Quantities		
Operation labor required	196	pers-hr/yr
Maintenance labor required	170	pers-hr/yr
Volume of earthwork required	45200	cuft
Volume of slab concrete requir	2480	cuft
Volume of wall concrete requir	6460	cuft
Number of posts per tower	136	
Total length of precast beams	1970	ft
Costs		
Construction and equipment cc	1090000	$
Earthwork Cost	13400	$
Wall Concrete Cost	155000	$
Slab Concrete Cost	32100	$
Concrete Beam Cost	79200	$
Media Cost	448000	$
Installed Distributor Arm Cos	140000	$
Misc Costs	217000	$
Operational labor cost	10100	$/yr
Maintenance labor cost	7420	$/yr
Material and supply cost	5880	$/yr
Chemical cost	0	$/yr
Energy cost	857	$/yr
Amortization cost	94100	$/yr
Internal Recycle Pumping		
Design Information		
Average daily pumping rate	3.99	MGD(US)

Total pumping capacity	3.99	MGD(US)
Design capacity per pump	1380	gpm(US)
Number of pumps	3	
Number of batteries	1	
Firm pumping capacity	3.99	MGD(US)
Quantities		
Operation labor required	526	pers-hrs/yr
Maintenance labor required	442	pers-hrs/yr
Electrical energy required	133000	kWh/yr
Volume of earthwork required	2230	cuft
Area of pump building	279	sqft
Costs		
Construction and equipment cc	143000	$
Earthwork Cost	660	$
Pump Building Cost	30600	$
Installed Pump Cost	90100	$
Misc Costs	21900	$
Operational labor cost	27100	$/yr
Maintenance labor cost	19200	$/yr
Material and supply cost	1000	$/yr
Chemical cost	0	$/yr
Energy cost	13300	$/yr
Amortization cost	13500	$/yr

IFAS

Design Output Data

Description	Value	Units
IFAS		
Design Information		
Carbon & Nitrification Design		
Design SRT for design at winte	20	d
Design SS	2500	mg/L
Calculated VSS	1720	mg/L
Calculated VSS:TSS ratio	0.689	mg VSS/mg SS
Total volume of reactors	11700	m3
Length of parallel train	59	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 trai	3	
Total number of dividing walls	8	
Hydraulic retention time	18.1	hr
F/M ratio	0.0728	kg BOD/kg MLSS/d
Volumetric BOD loading	0.208	kg BOD/m3/d
Observed yield (VSS basis)	0.803	g VSS/g BOD
Observed yield (TSS basis)	0.777	g TSS/g BOD
Amount of alkalinity required	256	gCaCO3/m3
Amount of sludge generated	2420	kg/d
Sludge recycle rate	5140	m3/d
Nitrogen requirement for biom	5.58	mg/L
Phosphorus requirement for bi	1.12	mg/L
Oxygen requirement to meet a	5830	kg/d
Air flow required to meet avera	27100	N m3/hr
Design air flow	38.8	N m3/min/1000 m3
Quantities		
Operation labor required	3500	pers-hrs/yr
Maintenance labor required	2100	pers-hrs/yr
Electrical energy required	4170000	kWh/yr
Volume of earthwork required	210000	cuft
Volume of slab concrete requir	76800	cuft
Volume of wall concrete requir	44600	cuft
Handrail length	1740	ft
Number of diffusers per train	337	
Number of swing arm headers	8	
Volume of Media required	5830	m3
Sieve Area required	30.6	m2
Costs		
Construction and equipment cc	5530000	$
Earthwork Cost	62300	$
Wall Concrete Cost	1070000	$
Slab Concrete Cost	996000	$
Handrail Cost	131000	$
Installed Aerator Equipment	690000	$
Air Piping Cost	271000	$
Misc Costs	355000	$
Media Cost	1920000	$
Screen Cost	33700	$
Operational labor cost	180000	$/yr
Maintenance labor cost	91600	$/yr
Material and supply cost	108000	$/yr
Chemical cost	0	$/yr

Energy cost	417000	$/yr
Amortization cost	604000	$/yr
Sludge Recycle Pumping		
Design Information		
Average daily pumping rate	1.36	MGD(US)
Total pumping capacity	2.71	MGD(US)
Design capacity per pump	943	gpm(US)
Number of pumps	3	
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	kWh/yr
Volume of earthwork required	2030	cuft
Area of pump building	254	sqft
Costs		
Construction and equipment cc	123000	$
Earthwork Cost	601	$
Pump Building Cost	27900	$
Installed Pump Cost	76100	$
Misc Costs	18800	$
Operational labor cost	23600	$/yr
Maintenance labor cost	16400	$/yr
Material and supply cost	864	$/yr
Chemical cost	0	$/yr
Energy cost	4540	$/yr
Amortization cost	11700	$/yr

Gravity Belt Thickener

Design Output Data

Description	Value	Units
Gravity Belt Thickener		
Design Information		
Belt filter width	1	m
Number of units	1	
Hydraulic loading per unit per r	125	gpm(US)
Hydraulic loading required per	91.5	gpm(US)
Final solids content	7	%
Solids capture fraction	0.998	
Quantities		
Operation labor required	349	pers-hrs/yr
Maintenance labor required	87.2	pers-hrs/yr
Power	76200	kWh/yr
Polymer required	15900	lb/yr
Dry solids produced	10900	lb/d
Costs		
Construction and equipment cc	812000	$
Building Cost	279000	$
Polymer System Cost	82500	$
Feed Pump Cost	30300	$
Conveyor System Cost	77000	$
Installed Belt Filter System C	344000	$
Operational labor cost	18000	$/yr
Maintenance labor cost	3800	$/yr
Material and supply cost	0	$/yr
Chemical cost	20700	$/yr
Energy cost	7620	$/yr
Amortization cost	74300	$/yr

Influent Pump Station

Design Output Data

Description	Value	Units
Pump Station		
Design Information		
Volume of wet well	1810	cuft
Width of wet well	13.3	ft
Depth of the pumping station	29.4	ft
Length of the pumping station	22.8	ft
Width of the pumping station	45.7	ft
Minimum depth of water in wet	8.39	ft
Area of pump building	777	sqft
Peak capacity of pumps	19.7	MGD(US)
Firm pumping capacity	19.7	MGD(US)
Total dynamic head - average	44.3	ft
Quantities		
Operation labor required	799	pers-hrs/yr
Maintenance labor required	672	pers-hrs/yr
Electrical energy required	376000	kWh/yr
Volume of earthwork required	193000	cuft
Volume of slab concrete requir	8680	cuft
Volume of wall concrete requir	6340	cuft

Capacity per pump	13700	gpm(US)
Number of constant speed pur	0	
Number of variable speed pur	2	
Diameter of discharge header	26.4	in
Total dynamic head	57.3	ft
Size of selected pump	24	in
Specific speed of pump	3370	
Pump rotating speed	712	rpm
Motor size required	206	HP
Size of selected motor	250	HP
Width of pump system	5.4	ft
Length of pump system	23.5	ft
Length of the dry well	22.8	ft
Width of the dry well	32.5	ft
Costs		
Construction and equipment co	1230000	$
Earthwork Cost	57100	$
Wall Concrete Cost	153000	$
Slab Concrete Cost	113000	$
Building Cost	85500	$
Installed Pump Equipment C	590000	$
Installed Control Module Cos	44200	$
Misc Costs	188000	$
Operational labor cost	41100	$/yr
Maintenance labor cost	29300	$/yr
Material and supply cost	8610	$/yr
Chemical cost	0	$/yr
Energy cost	37600	$/yr
Amortization cost	111000	$/yr

Secondary Clarifier(1)

Design Output Data

Description	Value	Units
Secondary Clarification		
Design Information		
Surface area	5010	sqft
Surface area per circular clarifi	2510	sqft
Diameter of each circular clarif	57	ft
Number of clarifiers per battery	2	
Number of batteries	1	
Solids loading rate	0.341	lb/(sqft·d)
Hydraulic retention time	4.04	hr
Designed surface overflow rate	400	gal(US)/(sqft·d)
Weir length	266	ft
Volume of wasted sludge	19900	gpd(US)
Quantities		
Operation labor required	675	pers-hrs/yr
Maintenance labor required	370	pers-hrs/yr
Electrical energy required	9000	kWh/yr
Volume of earthwork required	62300	cuft
Slab thickness	10.2	in
Volume of slab concrete requir	5190	cuft
Wall thickness	11.5	in
Volume of wall concrete requir	3820	cuft
Costs		
Construction and equipment co	427000	$
Earthwork Cost	18500	$
Wall Concrete Cost	92000	$
Slab Concrete Cost	67300	$
Installed Equipment Cost	184000	$
Misc Costs	65200	$
Operational labor cost	34800	$/yr
Maintenance labor cost	16100	$/yr
Material and supply cost	4270	$/yr
Chemical cost	0	$/yr
Energy cost	900	$/yr
Amortization cost	39800	$/yr
Waste Sludge Pumping		
Design Information		
Average daily pumping rate	0.0199	MGD(US)
Total pumping capacity	0.0199	MGD(US)
Design capacity per pump	6.91	gpm(US)
Number of pumps	3	
Number of batteries	1	
Firm pumping capacity	0.0199	MGD(US)
Quantities		
Operation labor required	266	pers-hrs/yr
Maintenance labor required	202	pers-hrs/yr
Electrical energy required	673	kWh/yr
Volume of earthwork required	1600	cuft
Area of pump building	200	sqft
Costs		

Construction and equipment cc	36900	$
Earthwork Cost	475	$
Pump Building Cost	22000	$
Installed Pump Cost	8730	$
Misc Costs	5630	$
Operational labor cost	13700	$/yr
Maintenance labor cost	8790	$/yr
Material and supply cost	258	$/yr
Chemical cost	0	$/yr
Energy cost	67	$/yr
Amortization cost	3490	$/yr

Secondary Clarifier

Design Output Data

Description	Value	Units
Secondary Clarification		
Design Information		
Surface area	10200	sqft
Surface area per circular clarifi	5090	sqft
Diameter of each circular clarif	81	ft
Number of clarifiers per battery	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	1010	ft
Volume of wasted sludge	62100	gpd(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 requir	10100	cuft
Wall thickness	11.5	in
Volume of wall concrete requir	5340	cuft
Costs		
Construction and equipment cc	647000	$
Earthwork Cost	39000	$
Wall Concrete Cost	128000	$
Slab Concrete Cost	131000	$
Installed Equipment Cost	250000	$
Misc Costs	98700	$
Operational labor cost	53300	$/yr
Maintenance labor cost	24800	$/yr
Material and supply cost	6470	$/yr
Chemical cost	0	$/yr
Energy cost	1010	$/yr
Amortization cost	59500	$/yr
Waste Sludge Pumping		
Design Information		
Average daily pumping rate	0.0621	MGD(US)
Total pumping capacity	0.0621	MGD(US)
Design capacity per pump	21.5	gpm(US)
Number of pumps	3	
Number of batteries	1	
Firm pumping capacity	0.0621	MGD(US)
Quantities		
Operation labor required	308	pers-hrs/yr
Maintenance labor required	239	pers-hrs/yr
Electrical energy required	2090	kWh/yr
Volume of earthwork required	1610	cuft
Area of pump building	201	sqft
Costs		
Construction and equipment cc	43700	$
Earthwork Cost	477	$
Pump Building Cost	22100	$
Installed Pump Cost	14400	$
Misc Costs	6660	$
Operational labor cost	15900	$/yr
Maintenance labor cost	10400	$/yr
Material and supply cost	306	$/yr
Chemical cost	0	$/yr
Energy cost	209	$/yr
Amortization cost	4130	$/yr

Anaerobic Digestion

Design Output Data

Description	Value	Units
Anaerobic Digestion		
Design Information		
Percent VSS destroyed	50	%

Solids concentration in digeste	5	%
Detention time	15	d
Digester depth	23.5	ft
Digester diameter	45	ft
Effective digester volume	80800	cuft
Number of digesters per batter	2	
Number of primary digesters p	1	
Number of secondary digester	1	
Number of batteries	1	
Gas produced	42.1	cuft/min
Heat required	399000	BTU/hr
Digester gas required	15.4	cuft/min
Total natural gas required	0	cuft/yr
Quantities		
Operation labor required	1530	pers-hrs/yr
Maintenance labor required	997	pers-hrs/yr
Electrical energy required	129000	kWh/yr
Volume of earthwork required	80500	cuft
Slab thickness	9.93	in
Volume of slab concrete requir	3000	cuft
Wall thickness	19.3	in
Volume of wall concrete requir	13400	cuft
Sidewater depth	23.5	ft
Surface area/floor of 2-story cc	595	sqft
Piping size	6	in
Length of total piping system	486	ft
Number of 90 degree elbows	26	
Number of tees	51	
Number of plug valves	37	
Total dry solids treated	5.49	ton(short)/d
Costs		
Construction and equipment cc	2150000	$
Earthwork Cost	23900	$
Wall Concrete Cost	322000	$
Slab Concrete Cost	38900	$
Building Cost	65500	$
Piping System Cost	244000	$
Floating Cover Cost	680000	$
Gas Recirculation Units Cost	233000	$
Heating Units Cost	152000	$
Gas Safety Equipment Cost	105000	$
Installed Pumps Cost	74800	$
Operational labor cost	78900	$/yr
Maintenance labor cost	43500	$/yr
Material and supply cost	18700	$/yr
Chemical cost	0	$/yr
Energy cost	12900	$/yr
Amortization cost	205000	$/yr

Primary Clarification

Design Output Data

Description	Value	Units
Primary Clarification		
Design Information		
Surface area	7640	sqft
Surface area per circular clarifi	3820	sqft
Diameter of each circular clarif	70	ft
Number of clarifiers per battery	2	
Number of batteries	1	
Solids loading rate	2.35	lb/(sqft·d)
Hydraulic retention time	2.02	hr
Weir length	1210	ft
Volume of sludge generated	31400	gpd(US)
Quantities		
Operation labor required	870	pers-hrs/yr
Maintenance labor required	478	pers-hrs/yr
Electrical energy required	9660	kWh/yr
Volume of earthwork required	95800	cuft
Slab thickness	10.2	in
Volume of slab concrete requir	7640	cuft
Wall thickness	11.5	in
Volume of wall concrete requir	4640	cuft
Costs		
Construction and equipment cc	542000	$
Earthwork Cost	28400	$
Wall Concrete Cost	112000	$
Slab Concrete Cost	99100	$
Installed Equipment Cost	220000	$
Misc Costs	82700	$
Operational labor cost	44800	$/yr
Maintenance labor cost	20800	$/yr
Material and supply cost	5420	$/yr

Chemical cost	0	$/yr
Energy cost	966	$/yr
Amortization cost	50100	$/yr
Waste Sludge Pumping		
Design Information		
Average daily pumping rate	0.0314	MGD(US)
Total pumping capacity	0.0314	MGD(US)
Design capacity per pump	10.9	gpm(US)
Number of pumps	3	
Number of batteries	1	
Firm pumping capacity	0.0314	MGD(US)
Quantities		
Operation labor required	282	pers-hrs/yr
Maintenance labor required	216	pers-hrs/yr
Electrical energy required	1060	kWh/yr
Volume of earthwork required	1600	cuft
Area of pump building	201	sqft
Costs		
Construction and equipment cc	39200	$
Earthwork Cost	476	$
Pump Building Cost	22100	$
Installed Pump Cost	10700	$
Misc Costs	5980	$
Operational labor cost	14500	$/yr
Maintenance labor cost	9400	$/yr
Material and supply cost	274	$/yr
Chemical cost	0	$/yr
Energy cost	106	$/yr
Amortization cost	3710	$/yr

Chlorination

Design Output Data

Description	Value	Units
Chlorination		
Design Information		
Volume of tank	250000	gal(US)
Average chlorine required	500	lb/d
Peak chlorine required	1000	lb/d
Influent coliform count	10000000	/100ml
Effluent coliform count	29.2	/100ml
Quantities		
Operational labor required	1100	pers-hrs/yr
Maintenance labor required	221	pers-hrs/yr
Electrical energy required	119000	kWh/yr
Volume of earthwork required	14300	cuft
Volume of slab concrete requir	3350	cuft
Volume of wall concrete requir	5620	cuft
Number of chlorinators and ev	1	
Chlorination building area	220	sqft
Number of chlorine cylinders	8	
Area of chlorine storage buildir	1120	sqft
Costs		
Construction and equipment cc	687000	$
Earthwork Cost	4220	$
Wall Concrete Cost	135000	$
Slab Concrete Cost	43400	$
Installed Equipment Cost	386000	$
Building Cost	24200	$
Storage Building Cost	61600	$
Misc Costs	32900	$
Operational labor cost	56700	$/yr
Maintenance labor cost	9650	$/yr
Material and supply cost	24200	$/yr
Chemical cost	119000	$/yr
Energy cost	11900	$/yr
Amortization cost	70600	$/yr

Belt-Filter Press

Design Output Data

Description	Value	Units
Belt-Filter Press		
Design Information		
Belt filter width	1	m
Number of units	1	
Hydraulic loading per unit per r	70	gpm(US)
Hydraulic loading required per	46.2	gpm(US)
Final solids content	19	%
Solids capture fraction	0.998	
Quantities		
Operation labor required	220	pers-hrs/yr
Maintenance labor required	55	pers-hrs/yr
Power	66400	kWh/yr

Polymer required	28900	lb/yr
Dry solids produced	7930	lb/d
Belt filter(s)	275000	$
Building	279000	$
Installation	68800	$
Polymer system	82500	$
Feed pumps	30300	$
Conveyor system	77000	$
Costs		
Construction and equipment cc	812000	$
Building Cost	279000	$
Polymer System Cost	82500	$
Feed Pumps Cost	30300	$
Conveyor System Cost	77000	$
Installed Belt Filter	344000	$
Operational labor cost	11300	$/yr
Maintenance labor cost	2400	$/yr
Material and supply cost	0	$/yr
Chemical cost	37600	$/yr
Energy cost	6640	$/yr
Amortization cost	74300	$/yr

2-Way WasteWater Splitter

Design Output Data

Description	Value	Units
2-Way Wastewater Flow Splitter		
Design Information		
Flow to first split (average)	4.07	MGD(US)
Flow to first split (peak)	8.09	MGD(US)
Flow to first split (minimum)	2.73	MGD(US)
Flow to second split (average)	2.01	MGD(US)
Flow to second split (peak)	3.99	MGD(US)
Flow to second split (minimum	1.35	MGD(US)
Costs		
Construction and equipment cc	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

Effluent

Design Output Data

Description	Value	Units
Costs		
Construction and equipment cc	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

Drying Beds

Design Output Data

Description	Value	Units
Sludge Drying Beds		
Design Information		
Total surface area required	57100	sqft
Initial depth of sludge	12	in
Final solids	50	%
Bed holding time	103	d
Quantities		
Total drying bed surface area	57100	sqft
Number beds	20	
Surface area of each individua	2850	sqft
Length of each bed	143	ft
Volume of earthwork required	281000	cuft
Volume concrete for dividing w	19200	cuft
Volume of R.C. in-place for tru	4280	cuft
Volume of sand	42800	cuft
Volume of gravel	57100	cuft
Clay pipe diameter	6	in
Total length clay pipe	5710	in
Sludge solids produced	3.3	ton(short)/d
Operational labor required	3520	pers-hrs/yr
Maintenance labor required	1760	pers-hrs/yr
Costs		
Construction and equipment cc	805000	$
Earthwork Cost	83300	$
Wall Concrete Cost	324000	$

Slab Concrete Cost	33300	$
Drying Bed Media Cost	159000	$
Drain Pipe System Cost	126000	$
Misc Costs	79700	$
Operational labor cost	181000	$/yr
Maintenance labor cost	76500	$/yr
Material and supply cost	7240	$/yr
Chemical cost	0	$/yr
Energy cost	0	$/yr
Amortization cost	70000	$/yr

Hauling and Land Filling

Design Output Data

Description	Value	Units
Sludge Hauling and Land Filling		
Design Information		
Volume of sludge hauled	7.83	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	7.83	cuyd/d
Maximum anticipated landfill d	30	d
Anticipated sludge storage hei	8	ft
Sludge storage shed area	793	sqft
Width of sludge storage shed s	19.9	ft
Length of sludge storage shed	39.8	ft
Volume of earthwork required	2370	cuft
Volume of slab concrete requir	1070	cuft
Surface area of canopy roof	793	sqft
Round trip haul distance	20	miles
Round trips per day per truck	1	
Distance traveled per year per	5000	miles
Sludge hauled	6.92	ton(short)/d
Operation labor required	122	pers-hrs/yr
LandFilling cost	35200	$/yr
Costs		
Construction and equipment co	313000	$
Earthwork Cost	704	$
Slab Concrete Cost	13800	$
Canopy Roof Cost	15900	$
Vehicle Cost	283000	$
Operational labor cost	6300	$/yr
Maintenance labor cost	0	$/yr
Material and supply cost	53600	$/yr
Chemical cost	0	$/yr
Energy cost	0	$/yr
Amortization cost	63800	$/yr