Appendix M
Cost Estimates Update

Cost Estimates for Water Supply Alternatives

PREPARED FOR: Waukesha Water Utility

PREPARED BY: CH2M HILL

DATE: April 2, 2010

Background

To plan for the City of Waukesha's long-term water supply needs, the Waukesha Water Utility conducted water supply studies and contributed to regional water supply planning efforts. During the past several years, alternative water supply strategies were investigated at the conceptual level, including cost estimates. The cost estimates were developed to meet the intent of Act 227, Wisconsin's Compact implementation statute, and water supply planning law (2007) as part of an application for Great Lakes water.

Cost Estimate Basis

The cost estimates are based on conceptual information (proposed asset type, location, and capacity) and no design has been completed. They support strategic planning efforts that assess the feasibility of different alternatives and screen project options. The estimates are prepared for the purpose of long-range capital planning. They were prepared for guidance in comparing alternatives based on information available at the time of the estimate. Detailed engineering design has not been done. The final cost estimate of any project will depend on market conditions, site conditions, final project scope, schedule, and other variable factors. As a result, final project costs may vary from the estimates presented here.

Examples of estimating methods include cost/capacity curves, scale-up factors, historical cost information and parametric modeling techniques. The cost estimates include:

- Preliminary pipeline alignments and facility siting plans to meet Wisconsin Department of Natural Resources environmental reporting and cost-effectiveness reporting requirements. This also provided more information on high cost items such as pipeline highway and water crossings.
- Treatment strategies for the groundwater supply alternatives considered water quality data on both the deep and shallow aquifers. For example, arsenic removal treatment was used for shallow groundwater because of the recent discovery of arsenic in the future shallow wellfield. Disinfection was used because shallow groundwater modeling indicated a significant surface water influence could be present. The trend of increasing TDS in the deep aquifers resulted in desalination treatment being added in 2020.

CH2M HILL's proprietary Parametric Cost Estimating System (CPES) was used to generate water treatment plant construction, operation, and maintenance cost estimates by inputting fundamental water treatment process design criteria. The tool generates facility footprints to support site layout development and facility planning for quick assessment of cost and

space impacts of alternatives. CPES uses updated industry databases and actual costs from other projects.

- Development costs for new shallow wells reflect recent shallow well costs and Lathers property wellfield planning.
- Electrical power costs reflect 2009 Water Utility rates.
- Backup power generation systems were included in the estimates for pump stations, wells, and treatment plants.
- Wastewater disposal costs were included for the water treatment plant residuals.
- Greenhouse gas estimates were prepared for all the alternatives to quantify this environmental impact.

Construction cost estimates include the following:

- Contractor bonds and insurance: 3 percent
- Contractor mobilization and demobilization: 5 percent
- Contractor overhead: 8 percent
- Contractor profit: 4 percent
- Project contingency: 25 percent

Further, the estimated total construction costs include:

- Engineering, planning, and design: 8 percent
- Permitting, legal, and administration: 12 percent
- Engineering services during construction: 8 percent

Capital and Life-Cycle Costs

Table 1 summarizes the capital, operation/maintenance and present worth costs of the water supply alternatives. Appendix M contains the detailed backup for the estimates.

TABLE 1
Water Supply Alternative Cost Estimates

Water Supply Alternative	Capital Cost[a] ($ million)	Annual Operation/Maintenance Cost ($ million)	20 yr Present Worth Cost ($ million, 6%)	50 yr Present Worth Cost ($ million, 6%)
Deep and shallow aquifers	189	7.2	272	302
Shallow aquifer and Fox River alluvium	184	7.4	269	301
Lake Michigan with return flow to Underwood creek	164	6.2	235	262
Lake Michigan and Shallow Aquifer	238	7.5	324	356

[a]Includes direct construction cost, contractor administrative costs (insurance, bonds, supervision etc), 25% contingency, and costs for permitting, legal, engineering, administrative.

Major changes from the last cost estimate include:

- Wellfield costs for Alternatives 1 and 2 increased because of a larger distance between shallow wells and additional wells. Changes were made based on recent shallow aquifer groundwater modeling results and attempting to reduce impacts on water resources.
- A new alternative was added. Alternative 4 includes the Lake Michigan supply and return system and the shallow aquifer. The Lake Michigan supply and return system has a smaller capacity (24-inch-diameter pipelines vs. 36-inch-diameter pipelines in Alternative 3). The shallow aquifer supply and treatment system is the same as in Alternative 1.

Waukesha Water Utility
Construction Cost Summary of Water Supply Alternatives

	Alternative 1 - Deep and Shallow Wells	Alternative 2 - Shallow Wells and Fox River Alluvium	Alternative 3 - Lake Michigan	Alternative 4 - Lake Michigan and Shallow Wells
Deep Well Treatment Plant				
3 RO plants for Wells 6,8,10	$ 17,467,000			
Shallow Aquifer Water Treatment Plant				
One @ 10.9 mgd	$ 29,864,000			$ 29,864,000
One @18.5 mgd		$ 37,355,000		$ -
Shallow Aquifer Wellfield				
14 new wells @ 0.75 mgd ea.	$ 12,800,000			$ 12,800,000
18 new wells@ 0.75 to 1.5 mgd ea.		$ 17,815,000		
Shallow Aquifer Supply Pipeline to Waukesha				
10 miles of 24" for 10.9 mgd	$ 18,573,000			$ 18,573,000
10 miles of 36" for 18.5 mgd		$ 27,855,000		
Lake Michigan Pipeline to Waukesha				
14 miles of 36" for 18.5 mgd			$ 38,522,000	
14 miles of 24" for 7.6 mgd				$ 25,682,000
Lake Michigan Pump Station to Waukesha				
one @18.5 mgd			$ 8,573,000	
one @ 7.6 mgd				$ 5,282,822
Waukesha Pipeline to Lake Michigan				
11 miles of 36" for 18.5 mgd			$ 25,515,000	
11 miles of 24" for 7.6 mgd				$ 17,011,000
Waukesha Pump Station to Lake Michigan				
one @18.5 mgd			$ 3,508,000	
one @ 7.6 mgd				$ 2,161,686
Distribution System Improvements				
3 miles of 20", 2 miles of 16"		$ 8,465,000	$ 8,465,000	$ 8,465,000
2.5 miles of 20", 7 miles of 16"	$ 15,855,993			
Wastewater Force Main				
5 miles of 6"	$ 3,332,000	$3,332,000		$ 3,332,000
Subtotal	**$ 97,891,993**	**$ 94,822,000**	**$ 84,583,000**	**$ 123,171,508**
3% markup for Bonds & Insurance	$ 2,937,000	$ 2,845,000	$ 2,538,000	$ 3,696,000
5% markup for Mob/Demob	$ 4,895,000	$ 4,742,000	$ 4,230,000	$ 6,159,000
8% markup for Contractors Overhead	$ 8,458,000	$ 8,193,000	$ 7,309,000	$ 10,643,000
4% markup for Contractors profit	$ 4,229,000	$ 4,097,000	$ 3,655,000	$ 5,322,000
25% Contingency	$ 29,603,000	$ 28,675,000	$ 25,579,000	$ 37,248,000
Subtotal Markups and Contingency	**$ 50,122,000**	**$ 48,552,000**	**$ 43,311,000**	**$ 63,068,000**
Total Project Construction Costs	**$ 148,013,993**	**$ 143,374,000**	**$ 127,894,000**	**$ 186,239,508**
8% allowance for engineering and design	$ 11,842,000	$ 11,470,000	$ 10,232,000	$ 14,900,000
12% allowance for permitting, legal and admin.	$ 17,762,000	$ 17,205,000	$ 15,348,000	$ 22,349,000
8% allowance for engr services during construction	$ 11,842,000	$ 11,470,000	$ 10,232,000	$ 14,900,000
Subtotal Other Project Costs	**$ 41,446,000**	**$ 40,145,000**	**$ 35,812,000**	**$ 52,149,000**
TOTAL PROJECT CAPITAL COST	**$ 189,000,000**	**$ 184,000,000**	**$ 164,000,000**	**$ 238,000,000**

Alternative 1:
Deep and Shallow Aquifers

Alternative 1 - Deep and Shallow Aquifers		
Deep Well Treatment Plant (present worth of future cost)		**$17,467,000**
Shallow Aquifer Water Treatment Plant		**$29,864,000**
Shallow Aquifer Wellfield		**$12,800,000**
Supply Pipeline to Waukesha		**$ 18,573,000**
Distribution System Improvements		**$ 15,855,993**
Wastewater Force Main		**$3,332,000**
Subtotal Construction Cost		**$97,891,993**
3% markup for Bonds & Insurance	$2,937,000	
5% markup for Mob/Demob	$4,895,000	
8% markup for Contractors Overhead	$8,458,000	
4% markup for Contractors profit	$4,229,000	
25% Contingency	$29,603,000	
Subtotal Markups and Contingency		**$50,122,000**
Total Project Construction Costs		**$148,013,993**
8% allowance for engineering and design	11,842,000	
12% allowance for permitting, legal and admin.	17,762,000	
8% allowance for engr services during construction	11,842,000	
Subtotal Other Project Costs		**$41,446,000**
TOTAL PROJECT CAPITAL COST		**$189,000,000**

Alternative 1 - Deep and Shallow Aquifer				
		Planning Period	Deep Well Capital Costs	
	2009	Declining		R/O Treatment
Deep Well	Capacity, mgd	Capacity, mgd	Land Cost	
2	1.15	0.81		
3	1.4	0.98		
5	1.44	1.01		
6	2.59	1.63	$500,000	$6,579,000
7	1.08	0.76		
8	2.16	1.36	$500,000	$5,329,000
9	1.94	1.36		
10	3.74	2.36	$500,000	$9,868,000
	total	10.26		
	Firm	7.90	$1,500,000	$21,776,000
		2010 total	$23,276,000	
		2020 @3%/yr inflation	$ 31,280,998	
		2010, P/F=0.5584	**17,467,309**	

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 1/7/2010

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Waukesha Nanofiltration Groundwater WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	3.0 mgd Nanofiltration WTP
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months):	24
Mid-Point of Construction:	Jan/2012

Roundup to the nearest: $1

This Report is for INTERNAL Distributio

This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	BWRO: NanoFilt	$5,219,952
	Yes	Air Stripper: Degas	$837,013
	Yes	In-Plant PS: FWPS	$1,095,437
	Yes	Liquid Chemical: NaOH	$306,023

SUBTOTAL - PROJECT COST			$7,458,425
ADDITIONAL PROJECT COSTS:			
Demolition	0%		$0
Overall Sitework	10%		$745,843
Plant Computer System	5%		$372,922
Yard Electrical	7%		$544,466
Yard Piping	10%		$745,843
UD #1 Default Description	0%		$0
UD #2 Default Description	0%		$0
UD #3 Default Description	0%		$0
SUBTOTAL with Additional Project Costs			$9,867,499

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	B	C	D	E	F
1347	[redacted]				
1348	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
1349					
1350	SITEWORK				
1351	Membrane Area:				
1352	Excavation	233.34	CY	*$5.35*	$1,249
1353	Imported Structural Backfill	185.08	CY	*$40.56*	$7,506
1354	Native Backfill	23.26	CY	*$6.58*	$153
1355	Haul Excess	210.08	CY	*$6.58*	$1,382
1356	Pipe Trench Area:				
1357	Excavation	650.82	CY	*$5.35*	$3,483
1358	Imported Structural Backfill	93.86	CY	*$40.56*	$3,807
1359	Native Backfill	276.03	CY	*$6.58*	$1,816
1360	Haul Excess	374.79	CY	*$6.58*	$2,466
1361	CIP / Cartridge Filter Area:				
1362	Excavation	199.09	CY	*$5.35*	$1,066
1363	Imported Structural Backfill	156.90	CY	*$40.56*	$6,363
1364	Native Backfill	20.86	CY	*$6.58*	$137
1365	Haul Excess	178.23	CY	*$6.58*	$1,173
1366	Electrical Room:				
1367	Excavation	91.60	CY	*$5.35*	$490
1368	Imported Structural Backfill	66.30	CY	*$40.56*	$2,689
1369	Native Backfill	15.48	CY	*$6.58*	$102
1370	Haul Excess	76.12	CY	*$6.58*	$501
1371	Pretreatment Liquid Chemicals Area:				
1372	Excavation	102.79	CY	*$5.35*	$550
1373	Imported Structural Backfill	77.33	CY	*$40.56*	$3,136
1374	Native Backfill	14.44	CY	*$6.58*	$95
1375	Haul Excess	88.35	CY	*$6.58*	$581
1376	CIP Liquid Chemicals Area:				
1377	Excavation	89.85	CY	*$5.35*	$481
1378	Imported Structural Backfill	66.67	CY	*$40.56*	$2,704
1379	Native Backfill	13.56	CY	*$6.58*	$89
1380	Haul Excess	76.29	CY	*$6.58*	$502
1381	CIP Dry Chemicals Area:				
1382	Excavation	48.12	CY	*$5.35*	$258
1383	Imported Structural Backfill	33.19	CY	*$40.56*	$1,346
1384	Native Backfill	9.78	CY	*$6.58*	$64
1385	Haul Excess	38.34	CY	*$6.58*	$252
1386	Chemical Neutralization System Area:				
1387	Excavation	131.60	CY	*$5.35*	$704
1388	Imported Structural Backfill	100.76	CY	*$40.56*	$4,086
1389	Native Backfill	16.74	CY	*$6.58*	$110
1390	Haul Excess	114.86	CY	*$6.58*	$756
1391	Flushing System and Permeate Transfer Area:				
1392	Excavation	0.00	CY	*$5.35*	$0
1393	Imported Structural Backfill	0.00	CY	*$40.56*	$0
1394	Native Backfill	0.00	CY	*$6.58*	$0
1395	Haul Excess	0.00	CY	*$6.58*	$0
1396	Pilot Skid Area:				
1397	Excavation	0.00	CY	*$5.35*	$0
1398	Imported Structural Backfill	0.00	CY	*$40.56*	$0
1399	Native Backfill	0.00	CY	*$6.58*	$0
1400	Haul Excess	0.00	CY	*$6.58*	$0
1401	Other Areas:				
1402	Excavation	0.00	CY	*$5.35*	$0
1403	Imported Structural Backfill	0.00	CY	*$40.56*	$0
1404	Native Backfill	0.00	CY	*$6.58*	$0
1405	Haul Excess	0.00	CY	*$6.58*	$0
1406	Allowance for Misc Items	5%		$50,098.07	$2,505
1407	Subtotal				$52,603
1408	CONCRETE				
1409	Slab on Grade:				
1410	Process Building	382.22	CY	*$345.93*	$132,222
1411	Trench Walls:				
1412	Membrane Pipe Trench	35.20	CY	*$683.50*	$24,059
1413	Equipment Pads:				
1414	Pumps:				
1415	High Pressure Membrane Feed Pumps (Active)	0.20	CY	*$345.93*	$69
1416	High Pressure Membrane Feed Pumps (Standby)	0.40	CY	*$345.93*	$139
1417	Interstage Booster Pumps (Active)	0.00	CY	*$345.93*	$0
1418	Interstage Booster Pumps (Standby)	0.00	CY	*$345.93*	$0
1419	Flushing Pumps (Active)	0.00	CY	*$345.93*	$0
1420	Flushing Pumps (Standby)	0.00	CY	*$345.93*	$0
1421	Permeate Transfer Pumps (Active)	0.00	CY	*$345.93*	$0
1422	Permeate Transfer Pumps (Standby)	0.00	CY	*$345.93*	$0
1423	Cleaning Solution Recirculation Pump (Active)	0.67	CY	*$345.93*	$232
1424	Cleaning Solution Recirculation Pump (Standby)	0.00	CY	*$345.93*	$0
1425	Dry Chemicals Transfer Pump (Active)	0.00	CY	*$345.93*	$0
1426	Spent Chemicals Neutralization Pumps (Active)	1.12	CY	*$345.93*	$386
1427	Spent Chemicals Neutralization Pumps (Standby)	1.12	CY	*$345.93*	$386

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	B	C	D	E	F
1428	Pretreatment Chemical Metering Pumps:				
1429	Sulfuric Acid Active Metering Pump	1.00	CY	*$345.93*	$346
1430	Sulfuric Acid Standby Metering Pump	1.00	CY	*$345.93*	$346
1431	Hydrochloric Acid Active Metering Pump	0.00	CY	*$345.93*	$0
1432	Hydrochloric Acid Standby Metering Pump	0.00	CY	*$345.93*	$0
1433	Scale Inhibitor Active Metering Pump	1.00	CY	*$345.93*	$346
1434	Scale Inhibitor Standby Metering Pump	1.00	CY	*$345.93*	$346
1435	Other Chemical 1 Active Metering Pump	0.00	CY	*$345.93*	$0
1436	Other Chemical 1 Standby Metering Pump	0.00	CY	*$345.93*	$0
1437	Other Chemical 2 Active Metering Pump	0.00	CY	*$345.93*	$0
1438	Other Chemical 2 Standby Metering Pump	0.00	CY	*$345.93*	$0
1439	Liquid CIP Chemical Transfer Pumps:				
1440	Sodium Hydroxide Active Transfer Pump	0.50	CY	*$345.93*	$173
1441	Sodium Hydroxide Standby Transfer Pump	0.00	CY	*$345.93*	$0
1442	Hydrochloric Acid Active Transfer Pump	0.00	CY	*$345.93*	$0
1443	Hydrochloric Acid Standby Transfer Pump	0.00	CY	*$345.93*	$0
1444	Sodium EDTA Active Transfer Pump	0.50	CY	*$345.93*	$173
1445	Sodium EDTA Standby Transfer Pump	0.00	CY	*$345.93*	$0
1446	Other Chemical 3 Active Transfer Pump	0.00	CY	*$345.93*	$0
1447	Other Chemical 3 Standby Transfer Pump	0.00	CY	*$345.93*	$0
1448	Other Chemical 4 Active Transfer Pump	0.00	CY	*$345.93*	$0
1449	Other Chemical 4 Standby Transfer Pump	0.00	CY	*$345.93*	$0
1450	Tanks:				
1451	Flushing Tanks	0.00	CY	*$345.93*	$0
1452	Cleaning Solution Tanks	7.07	CY	*$345.93*	$2,445
1453	Dry Chemicals Solution Preparation Tanks	0.00	CY	*$345.93*	$0
1454	Neutralization Tanks	9.42	CY	*$345.93*	$3,260
1455	Pretreatment Chemicals Bulk Storage Tanks:				
1456	Sulfuric Acid	0.00	CY	*$345.93*	$0
1457	Hydrochloric Acid	0.00	CY	*$345.93*	$0
1458	Scale Inhibitor	0.00	CY	*$345.93*	$0
1459	Other Chemical 1	0.00	CY	*$345.93*	$0
1460	Other Chemical 2	0.00	CY	*$345.93*	$0
1461	Liquid CIP Chemicals Bulk Storage Tanks:				
1462	Sodium Hydroxide	0.00	CY	*$345.93*	$0
1463	Hydrochloric Acid	0.00	CY	*$345.93*	$0
1464	Sodium EDTA	0.00	CY	*$345.93*	$0
1465	Other Chemical 3	0.00	CY	*$345.93*	$0
1466	Other Chemical 4	0.00	CY	*$345.93*	$0
1467	Pretreatment Chemicals Containment Area Walls:				
1468	Sulfuric Acid	2.34	CY	*$557.50*	$1,304
1469	Hydrochloric Acid	0.00	CY	*$557.50*	$0
1470	Scale Inhibitor	2.14	CY	*$557.50*	$1,193
1471	Other Chemical 1	0.00	CY	*$557.50*	$0
1472	Other Chemical 2	0.00	CY	*$557.50*	$0
1473	Liquid CIP Chemicals Containment Area Walls:				
1474	Sodium Hydroxide	1.59	CY	*$557.50*	$887
1475	Hydrochloric Acid	0.00	CY	*$557.50*	$0
1476	Sodium EDTA	2.24	CY	*$557.50*	$1,248
1477	Other Chemical 3	0.00	CY	*$557.50*	$0
1478	Other Chemical 4	0.00	CY	*$557.50*	$0
1479	Allowance for Misc Items	5%		$169,558.46	$8,478
1480	Subtotal				$178,036
1481	MASONRY	High			
1482	CMU Building Over Membrane and Other Covered Areas	7223.06	SF	*$157.92*	$1,140,678
1483	Subtotal	7223.06	SF		$1,140,678
1484	METALS				
1485	Grating Over Pipe Trenches:				
1486	Membrane Pipe Trench:	1055.98	SF	*$72.38*	$76,432
1487	Metal Stairways				
1488	Pretreatment and Liquid CIP Chemicals	8.00	EA	*$1,579.22*	$12,634
1489	Allowance for Misc Items	10%		$89,066.04	$8,907
1490	Subtotal				$97,973
1491	DOORS & WINDOWS				
1492	Roll-Up Doors (14' wide)	4.00	EA	*$2,939.34*	$11,757
1493	Single Entry Doors (4' wide)	4.00	EA	*$828.95*	$3,316
1494	Double Entry Doors (6' wide)	1.00	EA	*$1,243.43*	$1,243
1495	Allowance for Misc Items	10%		$16,316.61	$1,632
1496	Subtotal				$17,948
1497	EQUIPMENT				
1498	***Equipment Purchase Prices (Installation Cost is NOT Included):***				
1499	Reverse Osmosis Train:				
1500	Skids & Manifold Piping	2.00	LS	*$458,744.93*	$917,490
1501	Pressure Vessels (for 8 inch membranes)	108.00	EA	*$1,316.88*	$142,223
1502	Membrane Elements (8 inches in diameter)	756.00	EA	*$455.84*	$344,618
1503	Cartridge Filters (919 gpm)	2.00	EA	*$43,662.10*	$87,324
1504	Bypass Blend Cartridge Filters (0 gpm)	0.00	EA	*$35,517.01*	$0
1505	CIP Cartridge Filters (1200 gpm)	1.00	EA	*$50,356.43*	$50,356
1506	Pumps:				
1507	High Pressure Membrane Feed Pumps (Active) (157 hp each)	1.00	EA	*$38,828.05*	$38,828
1508	High Pressure Membrane Feed Pumps (Standby) (157 hp each)	2.00	EA	*$38,828.05*	$77,656
1509	Insterstage Booster Pumps (Active) (0 hp each)	0.00	EA	*$22,610.32*	$0

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	B	C	D	E	F
1510	Interstage Booster Pumps (Standby) (0 hp each)	0.00	EA	$22,610.32	$0
1511	Flushing Pumps (Active) (90 hp each)	0.00	EA	$0.00	$0
1512	Flushing Pumps (Standby) (90 hp each)	0.00	EA	$0.00	$0
1513	Permeate Transfer Pumps (Active) (0 hp each)	0.00	EA	$0.00	$0
1514	Permeate Transfer Pumps (Standby) (0 hp each)	0.00	EA	$0.00	$0
1515	Cleaning Solution Recirculation Pump (Active) (70 hp each)	1.00	EA	$29,379.74	$29,380
1516	Cleaning Solution Recirculation Pump (Standby) (70 hp each)	0.00	EA	$0.00	$0
1517	Dry Chemicals Transfer Pump (Active) (0 hp each)	0.00	EA	$22,569.63	$0
1518	Spent Chemicals Neutralization Pumps (Active) (70 hp each)	1.00	EA	$10,419.76	$10,420
1519	Spent Chemicals Neutralization Pumps (Standby) (70 hp each)	1.00	EA	$10,419.76	$10,420
1520	Pretreatment Chemical Metering Pumps:				
1521	Sulfuric Acid Active Metering Pump (1 hp each)	1.00	EA	$5,614.98	$5,615
1522	Sulfuric Acid Standby Metering Pump (1 hp each)	1.00	EA	$5,614.98	$5,615
1523	Hydrochloric Acid Active Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1524	Hydrochloric Acid Standby Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1525	Scale Inhibitor Active Metering Pump (1 hp each)	1.00	EA	$5,614.98	$5,615
1526	Scale Inhibitor Standby Metering Pump (1 hp each)	1.00	EA	$5,614.98	$5,615
1527	Other Chemical 1 Active Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1528	Other Chemical 1 Standby Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1529	Other Chemical 2 Active Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1530	Other Chemical 2 Standby Metering Pump (0 hp each)	0.00	EA	$5,614.98	$0
1531	Liquid CIP Chemical Transfer Pumps:				
1532	Sodium Hydroxide Active Transfer Pump (0 hp each)	1.00	EA	$22,569.63	$22,570
1533	Sodium Hydroxide Standby Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1534	Hydrochloric Acid Active Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1535	Hydrochloric Acid Standby Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1536	Sodium EDTA Active Transfer Pump (0 hp each)	1.00	EA	$22,569.63	$22,570
1537	Sodium EDTA Standby Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1538	Other Chemical 3 Active Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1539	Other Chemical 3 Standby Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1540	Other Chemical 4 Active Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1541	Other Chemical 4 Standby Transfer Pump (0 hp each)	0.00	EA	$22,569.63	$0
1542	Energy Recovery Devices (Turbocharger):				
1543	Turbocharger for Interstage Pressure Boost (Active) (0 hp each)	0.00	EA	$35,587.35	$0
1544	Turbocharger for Interstage Pressure Boost (Standby) (0 hp each)	0.00	EA	$35,587.35	$0
1545	Tanks:				
1546	Flushing Tanks (6580 gallons each)	0.00	EA	$20,300.26	$0
1547	Cleaning Solution Tanks (5141 gallons each)	1.00	EA	$18,575.31	$18,575
1548	Dry Chemicals Solution Preparation Tanks (0 gallons each)	0.00	EA	$12,412.12	$0
1549	Neutralization Tanks (41952 gallons each)	1.00	EA	$62,702.27	$62,702
1550	Pretreatment Chemicals Bulk Storage Tanks				
1551	Sulfuric Acid (0 gallons each)	0.00	EA	$0.00	$0
1552	Hydrochloric Acid (8225 gallons each)	0.00	EA	$41,660.38	$0
1553	Scale Inhibitor (0 gallons each)	0.00	EA	$0.00	$0
1554	Other Chemical 1 (9400 gallons each)	0.00	EA	$25,853.48	$0
1555	Other Chemical 2 (9400 gallons each)	0.00	EA	$25,853.48	$0
1556	Liquid CIP Chemicals Bulk Storage Tanks				
1557	Sodium Hydroxide (0 gallons each)	0.00	EA	$0.00	$0
1558	Hydrochloric Acid (8225 gallons each)	0.00	EA	$41,660.38	$0
1559	Sodium EDTA (0 gallons each)	0.00	EA	$0.00	$0
1560	Other Chemical 3 (9306 gallons each)	0.00	EA	$25,594.94	$0
1561	Other Chemical 4 (9306 gallons each)	0.00	EA	$25,594.94	$0
1562	Dry CIP Chemicals Bulk Storage Silos				
1563	Citric Acid (0 cf each)	0.00	EA	$0.00	$0
1564	Trisodium Phosphate (1350 cf each)	0.00	EA	$0.00	$0
1565	Sodium Tripolyphosphate (1125 cf each)	0.00	EA	$0.00	$0
1566	Other Chemical 5 (1227 cf each)	0.00	EA	$0.00	$0
1567	Mixers:				
1568	Static Mixer	1.00	EA	$3,187.26	$3,187
1569	CIP Tank Mixers (6 hp each)	1.00	EA	$16,485.80	$16,486
1570	Dry Chemicals Mixers (0 hp each)	0.00	EA	$0.00	$0
1571	Heaters & Chillers:				
1572	CIP Heaters (212 kw per each)	2.00	EA	$43,962.14	$87,924
1573	Dry Chemicals Heater (0 kw per each)	0.00	EA	$0.00	$0
1574	CIP Chillers (87122 BTU/hr each)	0.00	BTU/hr	$0.00	$0
1575					
1576	Equipment Installation Factor:				
1577	Equipment Installation Factor (Default = 20% * Equipment Purchase Price)	20%		$905,476.06	$181,095
1578	Allowance for Misc Items	5%		$905,476.06	$45,274
1579	Subtotal				$2,191,558
1580	I&C				
1581	Instruments				
1582	Flow Elements	8.00	EA	$7,238.07	$57,905
1583	Isolation Valve Actuators (Electric)	42.00	EA	$5,064.93	$212,727
1584	Isolation Valve Actuators (Pneumatic)	0.00	EA	$5,064.93	$0
1585	Conductivity Meters	6.00	EA		$0
1586	Turbiditymeters	2.00	EA		$0
1587	Temperature Elements	2.00	EA		$0
1588	pH Meters	4.00	EA		$0
1589	ORP Meters	4.00	EA		$0
1590	Pressure Indicators Transmitters	6.00	EA	$7,120.57	$42,723
1591	Pressure Elements	16.00	EA	$593.38	$9,494
1592	Level Indicator Transmitters	2.00	EA	$6,764.54	$13,529
1593	Chemical Tank Radar Level Transmitters	0.00	EA	$824.29	$0

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	B	C	D	E	F
1594	Chemical Tank Beacon	0.00	EA	$824.29	$0
1595	Drum or Tote Weigh Scale	4.00	EA	$1,099.05	$4,396
1596	Metering Pump Discharge Pressure Switch	2.00	EA	$549.53	$1,099
1597	Chemical Magmeters	2.00	EA	$549.53	$1,099
1598	Sump Pump Float Switch	5.00	EA	$274.76	$1,374
1599	Eyewash Station	7.00	EA	$824.29	$5,770
1600	Number of Analog I/O Counts	75.00	EA	$208.82	$15,662
1601	Number of Digital I/O Counts	252.00	EA	$49.46	$12,463
1602	Number of Local Panels	2.00	EA		$0
1603	Number of PLC's	1.00	EA	$10,990.54	$10,991
1604	I&C Conduit Wire	11946.67	LF	$9.53	$113,837
1605	Allowance for Misc Items	5%		$503,069.07	$25,153
1606	Subtotal				$528,223
1607	CONVEYING SYSTEMS				
1608	Bridge Crane	1.00	EA	$55,749.49	$55,749
1609	Bridge Crane Rail	63.83	LF	$28.96	$1,848
1610	Allowance for Misc Items	5%		$57,597.87	$2,880
1611	Subtotal				$60,478
1612	MECHANICAL				
1613	Pipe:				
1614	Cartridge Filtration Influent Header (CFIH, 14 inch, FRP)	11.50	LF	$145.90	$1,678
1615	Cartridge Filtration Influent Lateral (CFIL, 8 inch, FRP)	41.34	LF	$81.04	$3,351
1616	Cartridge Filtraition Effluent Lateral (CFEL, 8 inch, FRP)	22.01	LF	$81.04	$1,784
1617	Cartridge Filtration Effluent Header (CFEH, 14 inch, FRP)	15.50	LF	$145.90	$2,261
1618	Reverse Osmosis Influent Dump Header (ROIDH, 14 inch, FRP)	10.00	LF	$145.90	$1,459
1619	Reverse Osmosis Influent Header (ROIH, 14 inch, FRP)	63.83	LF	$145.90	$9,313
1620	High Pressure Pump Suction (HPPS, 12 inch, FRP)	23.33	LF	$124.28	$2,900
1621	High Pressure Pump Discharge (HPPD, 12 inch, Duplex SST)	0.00	LF	$730.79	$0
1622	Low Pressure Brine Outlet (ERD Discharge) (LPBRO, 6 inch, Duplex SST)	18.33	LF	$340.35	$6,240
1623	Reverse Osmosis Influent Lateral (1st Stage) (ROIL1, 14 inch, Duplex SST)	24.89	LF	$860.93	$21,428
1624	Reverse Osmosis Influent Lateral (2nd Stage) (ROIL2, 8 inch, Duplex SST)	8.33	LF	$470.50	$3,921
1625	Reverse Osmosis Influent Lateral (3rd Stage) (ROIL3, 0 inch, Duplex SST)	0.00	LF	($50.08)	$0
1626	Reverse Osmosis Influent Skid Sub Lateral (1st Stage) (ROISL1, 10 inch, Duplex SST)	42.50	LF	$0.00	$0
1627	Reverse Osmosis Influent Skid Sub Lateral (2nd Stage) (ROISL2, 8 inch, Duplex SST)	21.25	LF	$0.00	$0
1628	Reverse Osmosis Influent Skid Sub Lateral (3rd Stage) (ROISL3, 0 inch, Duplex SST)	0.00	LF	$0.00	$0
1629	Brine Skid Sub Lateral (1st Stage) (BSL1, 6 inch, Duplex SST)	42.50	LF	$0.00	$0
1630	Brine Skid Sub Lateral (2nd Stage) (BSL2, 8 inch, Duplex SST)	21.25	LF	$0.00	$0
1631	Brine Skid Sub Lateral (3rd Stage) (BSL3, 0 inch, Duplex SST)	0.00	LF	$0.00	$0
1632	Brine Lateral (1st Stage) (BL1, 10 inch, Duplex SST)	33.33	LF	$600.64	$20,021
1633	Brine Lateral (2nd Stage) (BL2, 8 inch, Duplex SST)	86.25	LF	$470.50	$40,580
1634	Brine Lateral (3rd Stage) (BL3, 0 inch, Duplex SST)	0.00	LF	($50.08)	$0
1635	Brine Header (BH, 6 inch, Duplex SST)	59.83	LF	$340.35	$20,364
1636	Permeate Lateral (1st Stage) (PL1, 10 inch, FRP)	84.08	LF	$102.66	$8,632
1637	Permeate Lateral (2nd Stage) (PL2, 8 inch, FRP)	14.97	LF	$81.04	$1,213
1638	Permeate Lateral (3rd Stage) (PL3, 0 inch, FRP)	0.00	LF	($5.42)	$0
1639	Permeate Header to Flush Tank (PHFT, 12 inch, FRP)	44.79	LF	$124.28	$5,567
1640	Cleaning Solution Pump Suction Header (CSPSH, 10 inch, FRP)	4.00	LF	$102.66	$411
1641	Cleaning Solution Pump Suction Lateral (CSPSL, 10 inch, FRP)	4.00	LF	$102.66	$411
1642	Cleaning Solution Pump Discharge Lateral (CSPDL, 10 inch, FRP)	5.72	LF	$102.66	$587
1643	Cleaning Solution Pump Discharge Header (CSPDH, 10 inch, FRP)	13.01	LF	$102.66	$1,336
1644	Cleaning Solution Pump Recycle (CSPR, 10 inch, FRP)	16.80	LF	$102.66	$1,725
1645	Cleaning Solution Cartridge Filtration Influent Lateral (CSCFIL, 10 inch, FRP)	4.00	LF	$102.66	$411
1646	Cleaning Solution Cartridge Filtration Effluent Lateral (CSCFEL, 10 inch, FRP)	4.00	LF	$102.66	$411
1647	Cleaning Solution Supply Header (CSSH, 10 inch, FRP)	59.59	LF	$102.66	$6,117
1648	Cleaning Solution Supply Lateral (CSSL, 10 inch, FRP)	4.50	LF	$102.66	$462
1649	Brine Cleaning Solution Return Header (BCSRH, 10 inch, FRP)	79.10	LF	$102.66	$8,120
1650	Brine Cleaning Solution Return Lateral (BCSRL, 10 inch, FRP)	22.30	LF	$102.66	$2,290
1651	Permeate Cleaning Solution Return Header (PCSRH, 3 inch, FRP)	79.10	LF	$27.00	$2,136
1652	Permeate Cleaning Solution Return Lateral (PCSRL, 3 inch, FRP)	53.64	LF	$27.00	$1,448
1653	Permeate Flushing Line (PFL, 10 inch, FRP)	59.83	LF	$102.66	$6,143
1654	Bypass Blend Cartridge Filter Influent (BBCFIL, 6 inch, FRP)	0.00	LF	$59.43	$0
1655	Bypass Blend Cartridge Filter Effluent (BBCFEL, 6 inch, FRP)	0.00	LF	$59.43	$0
1656	Bypass Blend Line (BBL, 6 inch, FRP)	32.00	LF	$59.43	$1,902
1657	Common Spare High Pressure Pump Suction (CSHPPS, 12 inch, FRP)	14.67	LF	$124.28	$1,823
1658	Common Spare High Pressure Pump Discharge (CSHPPD, 12 inch, Duplex SST)	85.50	LF	$730.79	$62,482
1659	Fittings:				
1660	Cartridge Filtration Influent Header (CFIH, 14 inch, FRP)	1.00	EA	$583.58	$584
1661	Cartridge Filtration Influent Lateral (CFIL, 8 inch, FRP)	4.00	EA	$324.18	$1,297
1662	Cartridge Filtraition Effluent Lateral (CFEL, 8 inch, FRP)	2.00	EA	$324.18	$648
1663	Cartridge Filtration Effluent Header (CFEH, 14 inch, FRP)	1.00	EA	$583.58	$584
1664	Reverse Osmosis Influent Dump Header (ROIDH, 14 inch, FRP)	3.00	EA	$583.58	$1,751
1665	Reverse Osmosis Influent Header (ROIH, 14 inch, FRP)	2.00	EA	$583.58	$1,167
1666	High Pressure Pump Suction (HPPS, 12 inch, FRP)	0.00	EA	$497.11	$0
1667	High Pressure Pump Discharge (HPPD, 12 inch, Duplex SST)	2.00	EA	$3,025.68	$6,051

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	B	C	D	E	F
1668	Low Pressure Brine Outlet (ERD Discharge) (LPBRO, 6 inch, Duplex SST)	6.00	EA	$1,374.61	$8,248
1669	Reverse Osmosis Influent Lateral (1st Stage) (ROIL1, 14 inch, Duplex SST)	0.00	EA	$3,576.04	$0
1670	Reverse Osmosis Influent Lateral (2nd Stage) (ROIL2, 8 inch, Duplex SST)	8.00	EA	$1,924.96	$15,400
1671	Reverse Osmosis Influent Lateral (3rd Stage) (ROIL3, 0 inch, Duplex SST)	0.00	EA	($276.47)	$0
1672	Reverse Osmosis Influent Skid Sub Lateral (1st Stage) (ROISL1, 10 inch, Duplex SST)	0.00	EA	$0.00	$0
1673	Reverse Osmosis Influent Skid Sub Lateral (2nd Stage) (ROISL2, 8 inch, Duplex SST)	0.00	EA	$0.00	$0
1674	Reverse Osmosis Influent Skid Sub Lateral (3rd Stage) (ROISL3, 0 inch, Duplex SST)	0.00	EA	$0.00	$0
1675	Brine Skid Sub Lateral (1st Stage) (BSL1, 6 inch, Duplex SST)	0.00	EA	$0.00	$0
1676	Brine Skid Sub Lateral (2nd Stage) (BSL2, 8 inch, Duplex SST)	0.00	EA	$0.00	$0
1677	Brine Skid Sub Lateral (3rd Stage) (BSL3, 0 inch, Duplex SST)	0.00	EA	$0.00	$0
1678	Brine Lateral (1st Stage) (BL1, 10 inch, Duplex SST)	2.00	EA	$2,475.32	$4,951
1679	Brine Lateral (2nd Stage) (BL2, 8 inch, Duplex SST)	4.00	EA	$1,924.96	$7,700
1680	Brine Lateral (3rd Stage) (BL3, 0 inch, Duplex SST)	0.00	EA	($276.47)	$0
1681	Brine Header (BH, 6 inch, Duplex SST)	0.00	EA	$1,374.61	$0
1682	Permeate Lateral (1st Stage) (PL1, 10 inch, FRP)	6.00	EA	$410.65	$2,464
1683	Permeate Lateral (2nd Stage) (PL2, 8 inch, FRP)	2.00	EA	$324.18	$648
1684	Permeate Lateral (3rd Stage) (PL3, 0 inch, FRP)	0.00	EA	($21.69)	$0
1685	Permeate Header to Flush Tank (PHFT, 12 inch, FRP)	5.00	EA	$497.11	$2,486
1686	Cleaning Solution Pump Suction Header (CSPSH, 10 inch, FRP)	1.00	EA	$410.65	$411
1687	Cleaning Solution Pump Suction Lateral (CSPSL, 10 inch, FRP)	0.00	EA	$410.65	$0
1688	Cleaning Solution Pump Discharge Lateral (CSPDL, 10 inch, FRP)	2.00	EA	$410.65	$821
1689	Cleaning Solution Pump Discharge Header (CSPDH, 10 inch, FRP)	0.00	EA	$410.65	$0
1690	Cleaning Solution Pump Recycle (CSPR, 10 inch, FRP)	4.00	EA	$410.65	$1,643
1691	Cleaning Solution Cartridge Filtration Influent Lateral (CSCFIL, 10 inch, FRP)	1.00	EA	$410.65	$411
1692	Cleaning Solution Cartridge Filtration Effluent Lateral (CSCFEL, 10 inch, FRP)	1.00	EA	$410.65	$411
1693	Cleaning Solution Supply Header (CSSH, 10 inch, FRP)	5.00	EA	$410.65	$2,053
1694	Cleaning Solution Supply Lateral (CSSL, 10 inch, FRP)	0.00	EA	$410.65	$0
1695	Brine Cleaning Solution Return Header (BCSRH, 10 inch, FRP)	5.00	EA	$410.65	$2,053
1696	Brine Cleaning Solution Return Lateral (BCSRL, 10 inch, FRP)	4.00	EA	$410.65	$1,643
1697	Permeate Cleaning Solution Return Header (PCSRH, 3 inch, FRP)	5.00	EA	$108.01	$540
1698	Permeate Cleaning Solution Return Lateral (PCSRL, 3 inch, FRP)	4.00	EA	$108.01	$432
1699	Permeate Flushing Line (PFL, 10 inch, FRP)	1.00	EA	$410.65	$411
1700	Bypass Blend Cartridge Filter Influent (BBCFIL, 6 inch, FRP)	0.00	EA	$237.71	$0
1701	Bypass Blend Cartridge Filter Effluent (BBCFEL, 6 inch, FRP)	0.00	EA	$237.71	$0
1702	Bypass Blend Line (BBL, 6 inch, FRP)	1.00	EA	$237.71	$238
1703	Common Spare High Pressure Pump Suction (CSHPPS, 12 inch, FRP)	0.00	EA	$497.11	$0
1704	Common Spare High Pressure Pump Discharge (CSHPPD, 12 inch, Duplex SST)	2.00	EA	$3,025.68	$6,051
1705	Valves:				
1706	Cartridge Filtration Influent Header (CFIH, 14 inch,)	0.00	EA	$8,676.59	$0
1707	Cartridge Filtration Influent Lateral (CFIL, 8 inch,)	2.00	EA	$4,798.76	$9,598
1708	Cartridge Filtraition Effluent Lateral (CFEL, 8 inch,)	2.00	EA	$4,798.76	$9,598
1709	Cartridge Filtration Effluent Header (CFEH, 14 inch,)	0.00	EA	$8,676.59	$0
1710	Reverse Osmosis Influent Dump Header (ROIDH, 14 inch,)	1.00	EA	$8,676.59	$8,677
1711	Reverse Osmosis Influent Header (ROIH, 14 inch,)	0.00	EA	$8,676.59	$0
1712	High Pressure Pump Suction (HPPS, 12 inch,)	2.00	EA	$7,383.98	$14,768
1713	High Pressure Pump Discharge (HPPD, 12 inch, SST Teflon Lined)	0.00	EA	$7,383.98	$0
1714	Low Pressure Brine Outlet (ERD Discharge) (LPBRO, 6 inch, SST Teflon Lined)	2.00	EA	$3,506.15	$7,012
1715	Reverse Osmosis Influent Lateral (1st Stage) (ROIL1, 14 inch, SST Teflon Lined)	2.00	EA	$8,676.59	$17,353
1716	Reverse Osmosis Influent Lateral (2nd Stage) (ROIL2, 8 inch, SST Teflon Lined)	2.00	EA	$4,798.76	$9,598
1717	Reverse Osmosis Influent Lateral (3rd Stage) (ROIL3, 0 inch, SST Teflon Lined)	0.00	EA	($371.68)	$0
1718	Reverse Osmosis Influent Skid Sub Lateral (1st Stage) (ROISL1, 10 inch, SST Teflon Lined)	0.00	EA	$0.00	$0
1719	Reverse Osmosis Influent Skid Sub Lateral (2nd Stage) (ROISL2, 8 inch, SST Teflon Lined)	0.00	EA	$0.00	$0
1720	Reverse Osmosis Influent Skid Sub Lateral (3rd Stage) (ROISL3, 0 inch, SST Teflon Lined)	0.00	EA	$0.00	$0
1721	Brine Skid Sub Lateral (1st Stage) (BSL1, 6 inch, SST Teflon Lined)	0.00	EA	$0.00	$0
1722	Brine Skid Sub Lateral (2nd Stage) (BSL2, 8 inch, SST Teflon Lined)	2.00	EA	$0.00	$0
1723	Brine Skid Sub Lateral (3rd Stage) (BSL3, 0 inch, SST Teflon Lined)	0.00	EA	$0.00	$0
1724	Brine Lateral (1st Stage) (BL1, 10 inch, SST Teflon Lined)	2.00	EA	$6,091.37	$12,183
1725	Brine Lateral (2nd Stage) (BL2, 8 inch, SST Teflon Lined)	2.00	EA	$4,798.76	$9,598
1726	Brine Lateral (3rd Stage) (BL3, 0 inch, SST Teflon Lined)	0.00	EA	($371.68)	$0
1727	Brine Header (BH, 6 inch, SST Teflon Lined)	0.00	EA	$3,506.15	$0
1728	Permeate Lateral (1st Stage) (PL1, 10 inch,)	4.00	EA	$6,091.37	$24,365
1729	Permeate Lateral (2nd Stage) (PL2, 8 inch,)	2.00	EA	$4,798.76	$9,598
1730	Permeate Lateral (3rd Stage) (PL3, 0 inch,)	0.00	EA	($371.68)	$0
1731	Permeate Header to Flush Tank (PHFT, 12 inch,)	1.00	EA	$7,383.98	$7,384
1732	Cleaning Solution Pump Suction Header (CSPSH, 10 inch,)	1.00	EA	$6,091.37	$6,091
1733	Cleaning Solution Pump Suction Lateral (CSPSL, 10 inch,)	1.00	EA	$6,091.37	$6,091
1734	Cleaning Solution Pump Discharge Lateral (CSPDL, 10 inch,)	2.00	EA	$6,091.37	$12,183

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	B	C	D	E	F
1735	Cleaning Solution Pump Discharge Header (CSPDH, 10 inch,)	0.00	EA	$6,091.37	$0
1736	Cleaning Solution Pump Recycle (CSPR, 10 inch,)	2.00	EA	$6,091.37	$12,183
1737	Cleaning Solution Cartridge Filtration Influent Lateral (CSCFIL, 10 inch,)	1.00	EA	$6,091.37	$6,091
1738	Cleaning Solution Cartridge Filtration Effluent Lateral (CSCFEL, 10 inch,)	1.00	EA	$6,091.37	$6,091
1739	Cleaning Solution Supply Header (CSSH, 10 inch,)	0.00	EA	$6,091.37	$0
1740	Cleaning Solution Supply Lateral (CSSL, 10 inch,)	2.00	EA	$6,091.37	$12,183
1741	Brine Cleaning Solution Return Header (BCSRH, 10 inch,)	1.00	EA	$6,091.37	$6,091
1742	Brine Cleaning Solution Return Lateral (BCSRL, 10 inch,)	2.00	EA	$6,091.37	$12,183
1743	Permeate Cleaning Solution Return Header (PCSRH, 3 inch,)	0.00	EA	$1,567.23	$0
1744	Permeate Cleaning Solution Return Lateral (PCSRL, 3 inch,)	2.00	EA	$1,567.23	$3,134
1745	Permeate Flushing Line (PFL, 10 inch,)	1.00	EA	$6,091.37	$6,091
1746	Bypass Blend Cartridge Filter Influent (BBCFIL, 6 inch,)	0.00	EA	$3,506.15	$0
1747	Bypass Blend Cartridge Filter Effluent (BBCFEL, 6 inch,)	0.00	EA	$3,506.15	$0
1748	Bypass Blend Line (BBL, 6 inch,)	1.00	EA	$3,506.15	$3,506
1749	Common Spare High Pressure Pump Suction (CSHPPS, 12 inch,)	1.00	EA	$7,383.98	$7,384
1750	Common Spare High Pressure Pump Discharge (CSHPPD, 12 inch, SST Teflon Lined)	2.00	EA	$7,383.98	$14,768
1751	Allowance for Misc Items	5%		$548,162.49	$27,408
1752	Subtotal				$601,229
1753	ELECTRICAL				
1754	MCC's				
1755	Sections	8.00	EA	$6,783.10	$54,265
1756	AFD's				
1757	High Pressure Membrane Feed Pumps (Active) (157 hp each)	1.00	EA	$149.20	$23,465
1758	High Pressure Membrane Feed Pumps (Standby) (157 hp each)	2.00	EA	$149.20	$46,930
1759	Insterstage Booster Pumps (Active) (0 hp each)	0.00	EA	$0.00	$0
1760	Interstage Booster Pumps (Standby) (0 hp each)	0.00	EA	$0.00	$0
1761	Flushing Pumps (Active) (90 hp each)	0.00	EA	$0.00	$0
1762	Flushing Pumps (Standby) (90 hp each)	0.00	EA	$0.00	$0
1763	Permeate Transfer Pumps (Active) (0 hp each)	0.00	EA	$0.00	$0
1764	Permeate Transfer Pumps (Standby) (0 hp each)	0.00	EA	$0.00	$0
1765	Cleaning Solution Recirculation Pump (Active) (70 hp each)	1.00	EA	$181.91	$12,734
1766	Cleaning Solution Recirculation Pump (Standby) (70 hp each)	0.00	EA	$0.00	$0
1767	Dry Chemicals Transfer Pump (Active) (0 hp each)	0.00	EA	$0.00	$0
1768	Spent Chemicals Neutralization Pumps (Active) (70 hp each)	0.00	EA	$0.00	$0
1769	Spent Chemicals Neutralization Pumps (Standby) (70 hp each)	0.00	EA	$0.00	$0
1770	Sulfuric Acid Active Metering Pump (1 hp each)	0.00	EA	$0.00	$0
1771	Sulfuric Acid Standby Metering Pump (1 hp each)	0.00	EA	$0.00	$0
1772	Hydrochloric Acid Active Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1773	Hydrochloric Acid Standby Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1774	Scale Inhibitor Active Metering Pump (1 hp each)	0.00	EA	$0.00	$0
1775	Scale Inhibitor Standby Metering Pump (1 hp each)	0.00	EA	$0.00	$0
1776	Other Chemical 1 Active Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1777	Other Chemical 1 Standby Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1778	Other Chemical 2 Active Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1779	Other Chemical 2 Standby Metering Pump (0 hp each)	0.00	EA	$0.00	$0
1780	Sodium Hydroxide Active Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1781	Sodium Hydroxide Standby Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1782	Hydrochloric Acid Active Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1783	Hydrochloric Acid Standby Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1784	Sodium EDTA Active Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1785	Sodium EDTA Standby Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1786	Other Chemical 3 Active Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1787	Other Chemical 3 Standby Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1788	Other Chemical 4 Active Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1789	Other Chemical 4 Standby Transfer Pump (0 hp each)	0.00	EA	$0.00	$0
1790	Switchgear				
1791	Units	0.00	EA	$0.00	$0
1792	Electrical Conduit & Wire	1825.60	LF	$9.53	$17,396
1793	Allowance for Misc Items	10%		$137,393.22	$13,739
1794	Subtotal				$168,528
1795					
1796	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
1797	Item 1 Description	0.00		0.00	$0
1798	Item 2 Description	0.00		0.00	$0
1799	Item 3 Description	0.00		0.00	$0
1800	Item 4 Description	0.00		0.00	$0
1801	Item 5 Description	0.00		0.00	$0
1802	Item 6 Description	0.00		0.00	$0
1803	Item 7 Description	0.00		0.00	$0
1804	Item 8 Description	0.00		0.00	$0
1805	Item 9 Description	0.00		0.00	$0
1806	Item 10 Description	0.00		0.00	$0
1807	Item 11 Description	0.00		0.00	$0
1808	Item 12 Description	0.00		0.00	$0
1809	Item 13 Description	0.00		0.00	$0
1810	Item 14 Description	0.00		0.00	$0
1811	Item 15 Description	0.00		0.00	$0
1812	Subtotal				$0
1813					
1814	Subtotal				$5,037,253
1815					

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	B	C	D	E	F
1816	ALLOWANCES		User Over-write		
1817	Finishes Allowance	1.0%		$5,219,952	$52,200
1818	I & C Allowance	0.5%		$5,219,952	$26,100
1819	Mechanical Allowance	1.0%		$5,219,952	$52,200
1820	Electrical Allowance	1.0%		$5,219,952	$52,200
1821					
1822	**Facility Cost**	**2,250,000**	**GPD**	**$2.32**	**$5,219,952**

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DESCRIPTION	QUANT	UNIT	$/UNIT	TOTAL COST
SITEWORK:				
Sitework Prep for Air Stripper / Air Scrubber Pad	203.63	CY	$13.16	$2,680
Wetwell:				
Excavation	59.21	CY	$5.35	$0
Structural Backfill	22.75	CY	$40.56	$0
Backfill	7.36	CY	$6.58	$0
Haul Excess	51.85	CY	$6.58	$341
Allowance for Misc Items	5%		$3,020.90	$151
Subtotal				$3,172
CONCRETE:				
Air Stripper / Air Scrubber Slab on Grade	12.72	CY	$345.93	$4,400
Air Stripper Pads	7.44	CY	$345.93	$2,575
Air Supply Fan Pads	8.86	CY	$345.93	$3,064
Recirculation Pump Pads	0.00	CY	$345.93	$0
Wetwell:				
Slab on Grade	15.98	CY	$382.16	$0
Walls	25.27	CY	$683.50	$0
Elevated Slab	4.87	CY	$1,088.69	$0
Effluent Transfer Pump Pads	0.53	CY	$345.93	$0
Allowance for Misc Items	5%		$10,038.59	$502
Subtotal				$10,541
MASONRY:	High			
Electrical Room	189	SF	$157.92	$29,865
CMU Building Over Degasifiers	515	SF	$157.92	$81,354
CMU Building Over Pump Station	0	SF	$157.92	$0
Subtotal				$111,219
EQUIPMENT:				
Air Stripping Tower (including Inlet Distributor, Tower, Packing, Sump & Fan)	2.00	EA	$186,286.49	$372,573
Air Fans	2.00	EA		
Air Scrubbers (Biological)	0.00	EA	($930,830.02)	$0
Recirculation Pumps	0.00	EA	$6,189.03	$0
Effluent Transfer Pumps:				
Active Pump # 1	29.87	HP	$2,623.49	$0
Active Pump # 2	0.00	HP	$0.00	$0
Active Pump # 3	0.00	HP	$0.00	$0
Active Pump # 4	0.00	HP	$0.00	$0
Active Pump # 5	0.00	HP	$0.00	$0
Active Pump # 6	0.00	HP	$0.00	$0
Active Pump # 7	0.00	HP	$0.00	$0
Active Pump # 8	0.00	HP	$0.00	$0
Active Pump # 9	0.00	HP	$0.00	$0
Active Pump # 10	0.00	HP	$0.00	$0
Standby Pump	29.87	HP	$2,623.49	$0
Permeate Makeup Supply Pumps (Active)	1.00	EA	$5,696.45	$5,696
Permeate Makeup Supply Pumps (Standby)	0.00	EA	$0.00	$0
Effluent Static Mixer	1.00	EA	$4,980.12	$4,980
Allowance for Misc Items	10%		$372,572.98	$37,257
Subtotal				$420,507
MECHANICAL:				
Pipe				
Feed Water Inlet Header-FWIH (12-inch , Exposed , Ductile Iron , Cement Mortar , Paint)	19	LF	$82.21	$1,582
Feed Water Inlet Lateral-FWIL (8-inch , Exposed , Welded Steel , Cement Mortar , Paint)	40	LF	$146.11	$5,844
Degasifier Air Influent Header-DAIH (24-inch , Exposed , FRP , None , None)	18	LF	$126.39	$2,306
Degasifier Air Influent Lateral-DAIL (16-inch , Exposed , FRP , None , None)	6	LF	$86.59	$520
Water Effluent Lateral-WEL (8-inch , Exposed , FRP , None , None)	16	LF	$46.80	$749
Scrubber Air Influent Header-SAIH (24-inch , Exposed , FRP , None , None)	0	LF	$126.39	$0

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Scrubber Air Influent Lateral-SAIL (24-inch , Exposed , FRP , None , None)	0	LF	$126.39	$0
Scrubber Air Discharge-SAD (24-inch , Exposed , FRP , None , None)	0	LF	$126.39	$0
Scrubber Recirculation Pipe-SRP (2-inch , Exposed , Ductile Iron , None , Paint)	0	LF	$11.98	$0
Pump Discharge Lateral-PDL (12-inch , Exposed , Welded Steel , Cement Mortar , Paint)	10	LF	$219.17	$2,192
Pump Discharge Header-PDH (10-inch , Exposed , Welded Steel , Cement Mortar , Paint)	37	LF	$182.64	$6,819
Permeate Makeup Supply Lateral-PML (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	10	LF	$73.06	$755
Permeate Makeup Supply Header-PMH (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	19	LF	$73.06	$1,364
Elbows				
Feed Water Inlet Header-FWIH (12-inch , Exposed , Ductile Iron , Cement Mortar , Paint)	1	EA	$1,725.47	$1,725
Feed Water Inlet Lateral-FWIL (8-inch , Exposed , Welded Steel , Cement Mortar , Paint)	4	EA	$879.95	$3,520
Degasifier Air Influent Header-DAIH (24-inch , Exposed , FRP , None , None)	2	EA	$1,664.01	$3,328
Degasifier Air Influent Lateral-DAIL (16-inch , Exposed , FRP , None , None)	0	EA	$1,107.19	$0
Water Effluent Lateral-WEL (8-inch , Exposed , FRP , None , None)	2	EA	$550.38	$1,101
Scrubber Air Influent Header-SAIH (24-inch , Exposed , FRP , None , None)	0	EA	$1,664.01	$0
Scrubber Air Influent Lateral-SAIL (24-inch , Exposed , FRP , None , None)	0	EA	$1,664.01	$0
Scrubber Air Discharge-SAD (24-inch , Exposed , FRP , None , None)	0	EA	$1,664.01	$0
Scrubber Recirculation Pipe-SRP (2-inch , Exposed , Ductile Iron , None , Paint)	0	EA	$287.58	$0
Pump Discharge Lateral-PDL (12-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$1,319.92	$0
Pump Discharge Header-PDH (10-inch , Exposed , Welded Steel , Cement Mortar , Paint)	3	EA	$1,099.93	$3,300
Permeate Makeup Supply Lateral-PML (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$439.97	$0
Permeate Makeup Supply Header-PMH (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	1	EA	$439.97	$440
Tees				
Feed Water Inlet Header-FWIH (12-inch , Exposed , Ductile Iron , Cement Mortar , Paint)	1	EA	$2,865.10	$2,865
Feed Water Inlet Lateral-FWIL (8-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$2,004.85	$0
Degasifier Air Influent Header-DAIH (24-inch , Exposed , FRP , None , None)	2	EA	$2,177.82	$4,356
Degasifier Air Influent Lateral-DAIL (16-inch , Exposed , FRP , None , None)	0	EA	$1,458.34	$0
Water Effluent Lateral-WEL (8-inch , Exposed , FRP , None , None)	0	EA	$738.87	$0
Scrubber Air Influent Header-SAIH (24-inch , Exposed , FRP , None , None)	0	EA	$2,177.82	$0
Scrubber Air Influent Lateral-SAIL (24-inch , Exposed , FRP , None , None)	0	EA	$2,177.82	$0
Scrubber Air Discharge-SAD (24-inch , Exposed , FRP , None , None)	0	EA	$2,177.82	$0
Scrubber Recirculation Pipe-SRP (2-inch , Exposed , Ductile Iron , None , Paint)	0	EA	$477.52	$0
Pump Discharge Lateral-PDL (12-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$3,007.27	$0
Pump Discharge Header-PDH (10-inch , Exposed , Welded Steel , Cement Mortar , Paint)	1	EA	$2,506.06	$2,506
Permeate Makeup Supply Lateral-PML (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$1,002.42	$0
Permeate Makeup Supply Header-PMH (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	$1,002.42	$0
Valves				
Feed Water Inlet Header-FWIH (12-inch , Exposed , Ductile Iron , Cement Mortar , Paint)	0	EA	$8,401.82	$0
Feed Water Inlet Lateral-FWIL (8-inch , Exposed , Welded Steel , Cement Mortar , Paint)	2	EA	$6,435.71	$12,871
Degasifier Air Influent Header-DAIH (24-inch , Exposed , FRP , None , None)	0	EA	$16,803.65	$0
Degasifier Air Influent Lateral-DAIL (16-inch , Exposed , FRP , None , None)	2	EA	$11,202.43	$22,405
Water Effluent Lateral-WEL (8-inch , Exposed , FRP , None , None)	2	EA	$5,601.22	$11,202
Scrubber Air Influent Header-SAIH (24-inch , Exposed , FRP , None , None)	0	EA	$16,803.65	$0
Scrubber Air Influent Lateral-SAIL (24-inch , Exposed , FRP , None , None)	0	EA	$16,803.65	$0
Scrubber Air Discharge-SAD (24-inch , Exposed , FRP , None , None)	0	EA	$16,803.65	$0
Scrubber Recirculation Pipe-SRP (2-inch , Exposed , Ductile Iron , None , Paint)	0	EA	$1,400.30	$0
Pump Discharge Lateral-PDL (12-inch , Exposed , Welded Steel , Cement Mortar , Paint)	2	EA	$9,653.56	$19,307

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Pump Discharge Header-PDH (10-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	*$8,044.63*	$0
Permeate Makeup Supply Lateral-PML (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	1	EA	*$3,217.85*	$3,218
Permeate Makeup Supply Header-PMH (4-inch , Exposed , Welded Steel , Cement Mortar , Paint)	0	EA	*$3,217.85*	$0
Allowance for Misc Items	5%		$91,749.43	$4,587
Subtotal				$118,862
ELECTRICAL:				
MCC's				
Sections	7	EA	*$6,783.10*	$47,482
AFD's				
Air Stripper Fan (Active) (4 hp each)	2	EA	*$4,617.76*	$9,236
Air Stripper Fan (Standby) (4 hp each)	0	EA	*$4,617.76*	$0
Recirculation Pump (Active) (0 hp each)	0	EA	*$4,125.89*	$0
Recirculation Pump (Standby) (0 hp each)	0	EA	*$4,125.89*	$0
Effluent Transfer Pump (Active) (30 hp each)	1	EA	*$7,798.45*	$0
Effluent Transfer Pump (Standby) (30 hp each)	1	EA	*$7,798.45*	$0
Permeate Makeup Supply Pumps (Active)	0	EA	*$4,371.83*	$0
Permeate Makeup Supply Pumps (Standby)	0	EA	*$4,371.83*	$0
Switchgear				
Units	0	EA	*$31,202.24*	$0
Electrical Conduit & Wire	98	lf	*$9.53*	$935
Allowance for Misc Items	5%		$57,652.30	$2,883
Subtotal				$60,535
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$724,835
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$862,899	$17,258
I & C Allowance	4%		$862,899	$34,516
Mechanical Allowance	5%		$862,899	$43,145
Electrical Allowance	5%	2%	$862,899	$17,258
Facility Cost	**2,250,000**	**GPD**	**$0.37**	**$837,012**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	1088.34	CY	***$5.35***	$5,825
Imported Structural Backfill	57.32	CY	***$40.56***	$2,325
Native Backfill	608.68	CY	***$6.58***	$4,005
Haul Excess	479.66	CY	***$6.58***	$3,156
Allowance for Misc Items	5%		$15,311.28	$766
Subtotal				$16,077
CONCRETE:				
Wet Well:				
Foundation	19.11	CY	***$382.16***	$7,302
Perimeter Walls	60.44	CY	***$683.50***	$41,313
Operating Floor:				
Elevated Slab (Including floor over Discharge Header Vault)	24.26	CY	***$1,088.69***	$26,414
Pump Pads	0.48	CY	***$345.93***	$167
Other Equipment Pads	1.00	CY	***$345.93***	$346
Discharge Pipe Vault:				
Slab on Grade	10.03	CY	***$345.93***	$3,469
Walls	12.36	CY	***$683.50***	$8,451
Allowance for Misc Items	5%		$87,462.34	$4,373
Subtotal				$91,835
MASONRY:	High			
CMU Building	655.07	SF	***$157.92***	$103,450
Subtotal				$103,450
METALS:				
Checker Plate Over Intake Pipe Gate = (Diameter of Influent Pipe +2') * (2 Feet Wide) (sf)	6.33	SF	***$72.38***	$458
Checker Plate Over Discharge Pipe Header = ((Discharge Pipe Diameter * 2) * ("S" * Total Number of Pumps)	19.83	SF	***$72.38***	$1,436
Ladder	17.92	VLF	***$99.36***	$1,781
Allowance for Misc Items	10%		$3,674.86	$367
Subtotal				$4,042
THERMAL & MOISTURE PROTECTION:				
Wet Well Liner	0.00	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Size of Sluice Gate (per side in inches)	14.00	in		
Sluice Gate	1.00	EA	***$3,467.45***	$3,467
Pumps:				
Active Pump # 1	70.24	HP	***$1,236.99***	$86,887
Active Pump # 2	70.24	HP	***$1,236.99***	$86,887
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0
Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	70.24	HP	***$1,236.99***	$86,887
AFD's				

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Active Pump # 1	70.24	HP	***$181.71***	$12,763
Active Pump # 2	70.24	HP	***$181.71***	$12,763
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0
Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	70.24	HP	***$181.71***	$12,763
Allowance for Misc Items	10%		$298,950.93	$29,895
Subtotal				$332,313
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$547,718
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$1,095,437	$21,909
I & C Allowance	8.0%		$1,095,437	$87,635
Mechanical Allowance	25.0%		$1,095,437	$273,859
Electrical Allowance	15.0%		$1,095,437	$164,316
Facility Cost	**211**	**Total Pump HP**	**$5,198.49**	**$1,095,437**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	71.29	CY	$5.35	$382
Imported Structural Backfill	36.37	CY	$40.56	$1,475
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	71.29	CY	$6.58	$469
Allowance for Misc Items	5%		$2,325.61	$116
Subtotal				$2,442
CONCRETE:				
Slab on Grade	26.14	CY	$345.93	$9,043
Containment Walls	7.75	CY	$683.50	$5,299
Bulk Tank Pads	17.10	CY	$345.93	$5,917
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	1.33	CY	$345.93	$461
Corridor				
Slab on Grade	5.56	CY	$345.93	$1,922
Electrical Room				
Slab on Grade	3.04	CY	$345.93	$1,051
Allowance for Misc Items	5%		$23,692.53	$1,185
Subtotal				$24,877
MASONRY:	High			
CMU Building	822.00	SF	$157.92	$129,812
Subtotal				$129,812
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	1.00	EA	$20,154.94	$20,155
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	2.00	EA	$6,737.98	$13,476
Allowance for Misc Items	10%		$33,630.90	$3,363
Subtotal				$36,994
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	1.00	each	$824.29	$824
Chemical Tank Beacons	1.00	each	$824.29	$824
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	0.00	each	$1,099.05	$0
Metering Pump Discharge Pressure Switch	2.00	each	$549.53	$1,099
Magmeter	1.00	each	$549.53	$550
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	5.00	each	$208.82	$1,044
Number of Digital I/O Counts	17.00	each	$49.46	$841
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	140.00	lf	$9.53	$1,334
Allowance for Misc Items	10%		$28,936.76	$2,894
Subtotal				$31,830
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	57.00	lf	*$10.36*	$591
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	57.00	lf	*$11.98*	$683
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,512.50	$251
Subtotal				$2,764
ELECTRICAL:				
# MCC Sections	5.00	#	*$6,783.10*	$33,915
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	40.00	lf	*$9.53*	$381
Allowance for Misc Items	10%		$34,296.63	$3,430
Subtotal				$37,726
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$275,420
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$306,023	$6,120
I & C Allowance	2%		$306,023	$6,120
Mechanical Allowance	4%		$306,023	$12,241
Electrical Allowance	2%		$306,023	$6,120
Facility Cost	982	**Building SF**	**$311.63**	**$306,023**

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C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 1/5/2010

Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Waukesha WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	Fox River Alluvium and Shallow Groundwater
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months):	24
Mid-Point of Construction:	Jan/2012

Roundup to the nearest: $1,000

This Report is for INTERNAL Distributio

This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Inline Rapid Mix: RMX	$623,000
	Yes	Flocculation: FLOC	$1,527,000
	Yes	Lamella Clarifier: LAM	$2,367,000
	Yes	Filters: FILT	$5,024,000
	Yes	Surge Basin-Decanter: BWW	$1,535,000
	No	UV Disinfection: UVD	$0
	Yes	Concrete Clearwell: FWT	$1,313,000
	No	Steel Clearwell: FWT	$0
	No	In-Plant PS: FWPS	$0
	Yes	Vertical Turbine PS: FWPS	$3,042,000
	Yes	Filter BW PS: BWSPS	$1,101,000
	Yes	U.D. Facility: GEN	$0
	Yes	Liquid Chemical: FeCl3	$393,000
	Yes	Liquid Chemical: NaOCl	$296,000
	Yes	Liquid Chemical: FLUOR	$186,000
	Yes	Liquid Chemical: POLYPHOS	$185,000
	Yes	O&M Building: OMB	$2,849,000
SUBTOTAL - PROJECT COST			$20,441,000
ADDITIONAL PROJECT COSTS:			
Demolition		0%	$0
Overall Sitework		10%	$2,045,000
Plant Computer System		5%	$1,023,000
Yard Electrical		7%	$1,493,000
Yard Piping		14%	$2,862,000
UD #1 Default Description		0%	$0
UD #2 Default Description		0%	$0
UD #3 Default Description		0%	$0
SUBTOTAL with Additional Project Costs			$27,864,000

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	B	C	D	E	F
132					
133	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
134					
135	SITEWORK:				
136	Excavation	140.81	CY	$ 5.35	$754
137	Imported Structural Backfill	83.82	CY	$ 40.56	$3,399
138	Native Backfill	0.00	CY	$ 6.58	$0
139	Haul Excess	140.81	CY	$ 6.58	$927
140	Allowance for Misc Items	5%		$ 5,079.48	$254
141	Subtotal				$5,333
142					
143	CONCRETE:				
144	Wall Footing	9.31	CY	$ 345.93	$3,220
145	Stem Walls	0.00	CY	$ 683.50	$0
146	Slab on Grade	27.50	CY	$ 345.93	$9,513
147	Pipe Supports	14.00	EA	$ 438.67	$6,141
148	Electrical Room Slab on Grade	2.13	CY	$ 345.93	$737
149	Allowance for Misc Items	5%		$19,613	$981
150	Subtotal				$20,593
151					
152	MASONRY:	Moderate			
153	CMU Building	864.20	SF	$ 131.60	$113,730
154	Electrical Room	57.56	SF	$ 131.60	$7,574
155	Subtotal	921.76			$121,304
156					
157	EQUIPMENT:				
158	Inline Mixer (20-inch)	2.00	EA	$ 27,983.82	$55,968
159	Allowance for Misc Items	10%		$ 55,967.63	$5,597
160	Subtotal				$61,564.39
161					
162	INSTRUMENTS & CONTROLS:				
163	Instruments				
164	Mag Meter (12-inch)	2.00	EA	$ 10,574.21	$21,148
165	pH / Temperature	1.00	EA	$ 2,093.45	$2,093
166	Turbidity	1.00	EA	$ 3,133.05	$3,133
167	Streaming Current Detector	0.00	EA	$ 10,680.85	$0
168	UV Absorbance	1.00	EA	$ 21,794.63	$21,795
169	Conductivity	0.00	EA	$ 2,057.84	$0
170	Sample Panels	2.00	EA	$ 3,948.04	$7,896
171	Isolation Valve Actuators	4.00	each	$5,064.93	$20,260
172	Flow Control Valve Actuators	2.00	each	$5,064.93	$10,130
173	Number of Analog I/O Counts	12.00	each	$208.82	$2,506
174	Number of Digital I/O Counts	33.60	each	$49.46	$1,662
175	Number of PLC's	1.00	each	$10,331.10	$10,331
176	I&C Conduit & Wire	552.52	lf	$9.53	$5,265
177	Allowance for Misc Items	10%		$ 106,218.79	$10,622
178	Subtotal				$116,841
179					
180	CONVEYING SYSTEMS:				
181	Monorail Hoist (3 Ton)	1.00	EA	$ 55,749.49	$55,749
182	Hoist Rail	105.17	LF	$ 28.96	$3,045
183	Allowance for Misc Items	10%		$ 58,794.83	$5,879
184	Subtotal				$64,674
185					
186	MECHANICAL:				
187	Pipe:				
188	Rapid Mix Pipe (20-inch, RW, Exposed ,Steel ,Cement Mortar ,Paint)	33.33	lf	$365.28	$12,176

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	B	C	D	E	F
189	Flow Control Pipe (12-inch, FCP, Exposed ,Steel ,Cement Mortar ,Paint)	16.00	lf	*$219.17*	$3,507
190	Elbows:				
191	Rapid Mix Pipe (20-inch)	4.00	each	*$2,199.87*	$8,799
192	Valves:				
193	Rapid Mix Isolation Valves (20-inch)	4.00	each	*$16,089.26*	$64,357
194	Flow Control Valve (12-inch)	2.00	each	*$9,653.56*	$19,307
195	Allowance for Misc Items	10%		$108,146.20	$10,815
196	Subtotal				$118,961
197					
198	ELECTRICAL:				
199	MCC's				
200	Sections	5.00	each	*$6,783.10*	$33,915
201	AFD's				
202	Mechanical Mixers (3 hp each)	0.00	each	*$4,494.79*	$0
203	Switchgear				
204	Units	0.00	each	*$31,202.24*	$0
205	Electrical Conduit & Wire	85.00	lf	*$9.53*	$810
206	Allowance for Misc Items	10%		$34,725	$3,473
207	Subtotal				$38,198
208					
209	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
210	Item 1 Description	0.00		0.00	$0
211	Item 2 Description	0.00		0.00	$0
212	Item 3 Description	0.00		0.00	$0
213	Item 4 Description	0.00		0.00	$0
214	Item 5 Description	0.00		0.00	$0
215	Item 6 Description	0.00		0.00	$0
216	Item 7 Description	0.00		0.00	$0
217	Item 8 Description	0.00		0.00	$0
218	Item 9 Description	0.00		0.00	$0
219	Item 10 Description	0.00		0.00	$0
220	Item 11 Description	0.00		0.00	$0
221	Item 12 Description	0.00		0.00	$0
222	Item 13 Description	0.00		0.00	$0
223	Item 14 Description	0.00		0.00	$0
224	Item 15 Description	0.00		0.00	$0
225	Subtotal				$0
226					
227	Subtotal				$547,469
228					
229	ALLOWANCES:		**User Over-write**		
230	Finishes Allowance	2.0%		$622,124	$12,442
231	I & C Allowance	5%		$622,124	$31,106
232	Mechanical Allowance	0%		$622,124	$0
233	Electrical Allowance	5%		$622,124	$31,106
234					
235	Facility Cost	**12,000,000**	**GPD**	**$0.05**	**$622,124**

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	B	C	D	E	F
188					
189	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
190					
191	SITEWORK:				
192	Excavation	3,805	CY	***$5.35***	$20,366
193	Imported Structural Backfill	617	CY	***$40.56***	$25,021
194	Native Backfill	1,032	CY	***$6.58***	$6,793
195	Haul Excess	2,773	CY	***$6.58***	$18,244
196	Allowance for Misc Items	5%		$70,423.45	$3,521
197	Subtotal				$73,945
198					
199	CONCRETE:				
200	Influent Channel:				
201	Foundation	42	CY	***$382.16***	$16,188
202	Channel Walls (Only 3 walls are covered here. The 4th wall is covered in the Flocc Basin.)	70	CY	***$683.50***	$47,563
203	Elevated Slab	25	CY	***$1,088.69***	$27,007
204	Flocc Basin				
205	Foundation	218	CY	***$382.16***	$83,323
206	Basin Walls (Only 3 walls are covered here. The Effluent wall is covered in the Influent Channel of the Lamella Clarifier)	119	CY	***$683.50***	$81,280
207	Under Baffle Wall	40	CY	***$683.50***	$27,065
208	Over Baffle Wall	40	CY	***$683.50***	$27,065
209	Elevated Slab	81	CY	***$1,088.69***	$88,341
210	Flocc Bearing Supports	42	EA	$0.00	$0
211	Electrical Room				
212	Slab on Grade	4	CY	***$345.93***	$1,435
213	Allowance for Misc Items	5%		$399,265.97	$19,963
214	Subtotal				$419,229
215					
216	MASONRY:	**Moderate**			
217	CMU Building	4,312	SF	***$131.60***	$567,498
218	Electrical Room	112	SF	***$131.60***	$14,739
219	Subtotal	4,424			$582,238
220					
221	METALS:				
222	Aluminum Handrail	233	LF	***$72.38***	$16,854
223	Additional Handrail with NO Building	0	LF	***$72.38***	$0
224	Stairs (1 per basin)	16	RISERS	***$394.80***	$6,270
225	Allowance for Misc Items	10%		$23,124.34	$2,312
226	Subtotal				$25,437
227					
228	WOODS & PLASTICS:				
229	FRP Weir	6	LF	$32.90	$183
230	FRP Ladder	4	EA	$1,137.15	$4,549
231	Allowance for Misc Items	5%		$4,732.07	$237
232	Subtotal				$4,969
233					
234	THERMAL & MOISTURE PROTECTION:				
235	Concrete Liner	0	SF	**$16.00**	$0
236	Allowance for Misc Items	10%		$0.00	$0
237	Subtotal				$0
238					
239	DOORS & WINDOWS:				
240	O/U Baffling ON/OFF Factor	*0*			
241	Serpentine Baffling ON/OFF Factor	*1*			$0
242	Stainless Steel Door (2' x 2') for O/U Baffling	0	EA	$1,052.81	$0
243	Stainless Steel Door (2' x 2') for Serpentine Baffling	4	EA	$1,052.81	$4,211
244	Stainless Steel Door (7' x 2.5')	0	EA	$4,606.05	$0
245	Allowance for Misc Items	5%		$4,211.24	$211
246	Subtotal				$4,422
247					

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	B	C	D	E	F
248	EQUIPMENT:				
249	Horizontal Paddle Wheel Flocculation Mechanism (Paddles & Drives)	0	LF	***$0.00***	$0
250	Vertical Paddle Wheel Flocculation Mechanism (Paddles & Drives)	18	EA	***$0.00***	$0
251	Vertical Turbine Flocculation Mechanism (Turbines & Drives)	18	HP	***$1,477.12***	$26,588
252	Vertical Turbine Flocculator VFD's	18	HP	***$596.65***	$10,740
253	Fabricated Slide Gate	2	EA	***$6,077.92***	$12,156
254	Allowance for Misc Items	10%		$49,483.61	$4,948
255	Subtotal				$54,432
256					
257	ELECTRICAL:				
258	*MCC's*				
259	Sections	12	each	***$6,783.10***	$81,397
260	*AFD's*				
261	Flocculation Mixers Stage 1 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
262	Flocculation Mixers Stage 2 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
263	Flocculation Mixers Stage 3 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
264	Flocculation Mixers Stage 4 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
265	Flocculation Mixers Stage 5 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
266	Flocculation Mixers Stage 6 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
267	*Switchgear*				
268	Units	0	each	***$31,202.24***	$0
269	Electrical Conduit & Wire	1,752	lf	***$9.53***	$16,694
270	Allowance for Misc Items	10%		$174,571.06	$17,457
271	Subtotal				$192,028
272					
273	INSTRUMENTS & CONTROLS:				
274	Instruments				
275	Level Switch	2	each	***$549.53***	$1,099
276	Number of Analog I/O Counts	43	each	***$208.82***	$9,021
277	Number of Digital I/O Counts	108	each	***$49.46***	$5,341
278	Number of PLC's	1	each	***$10,331.10***	$10,331
279	I&C Conduit & Wire	1,827	lf	***$9.53***	$17,406
280	Allowance for Misc Items	10%		$43,198.52	$4,320
281	Subtotal				$47,518
282					
283	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
284	Item 1 Description	0.00		0.00	$0
285	Item 2 Description	0.00		0.00	$0
286	Item 3 Description	0.00		0.00	$0
287	Item 4 Description	0.00		0.00	$0
288	Item 5 Description	0.00		0.00	$0
289	Item 6 Description	0.00		0.00	$0
290	Item 7 Description	0.00		0.00	$0
291	Item 8 Description	0.00		0.00	$0
292	Item 9 Description	0.00		0.00	$0
293	Item 10 Description	0.00		0.00	$0
294	Item 11 Description	0.00		0.00	$0
295	Item 12 Description	0.00		0.00	$0
296	Item 13 Description	0.00		0.00	$0
297	Item 14 Description	0.00		0.00	$0
298	Item 15 Description	0.00		0.00	$0
299	Subtotal				$0
300					
301	Subtotal				$1,404,217
302					
303	ALLOWANCES:		**User Over-write**		

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	B	C	D	E	F
304	Finishes Allowance	2.0%		$1,526,323	$30,526
305	I & C Allowance	2%		$1,526,323	$30,526
306	Mechanical Allowance	2%		$1,526,323	$30,526
307	Electrical Allowance	2%		$1,526,323	$30,526
308					
309	Facility Cost	**12,000,000**	**GPD**	**$0.13**	**$1,526,323**

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	B	C	D	E	F
180					
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
182					
183	SITEWORK:				
184	Excavation	4,244	CY	$ 5.35	$22,713
185	Imported Structural Backfill	653	CY	$ 40.56	$26,492
186	Native Backfill	1,176	CY	$ 6.58	$7,738
187	Haul Excess	3,068	CY	$ 6.58	$20,185
188	Allowance for Misc Items	5%		$77,128	$3,856
189	Subtotal				$80,985
190					
191	CONCRETE:				
192	Influent Channel:				
193	Foundation	37	CY	$ 382.16	$14,026
194	Channel Walls	77	CY	$ 683.50	$52,960
195	Elevated Slab	22	CY	$ 1,088.69	$24,216
196	Basin				
197	Foundation	138	CY	$ 382.16	$52,925
198	Channel Walls	264	CY	$ 683.50	$180,519
199	Elevated Slab	38	CY	$ 1,088.69	$41,369
200	Concrete Curb (8" X 8")	73	LF	$ 32.90	$2,402
201	Effluent Channel:				
202	Foundation	37	CY	$ 382.16	$14,026
203	Walls	77	CY	$ 683.50	$52,960
204	Elevated Slab	22	CY	$ 1,088.69	$24,216
205	Electrical Room				
206	Slab on Grade	2	CY	$ 345.93	$737
207	Allowance for Misc Items	5%		$460,355	$23,018
208	Subtotal				$483,373
209					
210	MASONRY:	Moderate			
211	CMU Building	4,746	SF	$ 131.60	$624,619
212	Electrical Room	58	SF	$ 131.60	$7,574
213	Subtotal	4,804			$632,193
214					
215	METALS:				
216	Aluminum Handrail	269	LF	$ 72.38	$19,470
217	Allowance for Misc Items	10%		$ 19,470.17	$1,947
218	Subtotal				$21,417
219					
220	WOODS & PLASTICS:				
221	FRP Ladder	4	EA	$ 1,443.20	$5,773
222	Allowance for Misc Items	5%		$ 5,772.82	$289
223	Subtotal				$6,061
224					
225	THERMAL & MOISTURE PROTECTION:				
226	Concrete Liner	0	SF	$16.00	$0
227	Allowance for Misc Items	10%		$0.00	$0
228	Subtotal				$0
229					
230	EQUIPMENT:				
231	Lamella Clarifier [WPL * PW * #P/T *# * COS(PAR)]	25,063	PLATE AREA (SF)	$ 19.45	$487,452
232	Fabricated Slide Gate	2	EA	$ 6,077.92	$12,156
233	Hoseless Sludge Collector	4	EA	$ 66,857.09	$267,428
234	Allowance for Misc Items	10%		$ 767,035.90	$76,704
235	Subtotal				$843,739
236					
237	INSTRUMENTS & CONTROLS:				
238	Instruments				
239	Turbidimeters	4	EA	$ 3,133.05	$12,532
240	Number of Analog I/O Counts	5	each	$208.82	$1,002.34
241	Number of Digital I/O Counts	24	each	$49.46	$1,186.98
242	Number of PLC's	1	each	$10,331.10	$10,331.10
243	I&C Conduit & Wire	321	LF	$9.53	$3,061.92
244	Allowance for Misc Items	10%		$28,115	$2,811.45
245	Subtotal				$30,926
246					

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	B	C	D	E	F
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
247	MECHANICAL:				
248	Solids Collection Pipe (4-inch, USL , Immersed , Steel)	317	LF	*$66.15*	$20,969
249	Solids Collection Pipe Elbows	16	each	*$439.97*	$7,040
250	Mud Valves	4	EA	*$1,974.02*	$7,896
251	Allowance for Misc Items	10%		$35,905	$3,590
252	Subtotal				$39,495
253					
254	ELECTRICAL:				
255	MCC's				
256	Sections	5	each	*$6,783.10*	$33,915
257	AFD's				
258	Sludge Collectors (total facility) (1 hp each)	-	each	*$4,248.86*	$0
259	Switchgear				
260	Units	-	each	*$31,202.24*	$0
261	Electrical Conduit & Wire	161	LF	*$9.53*	$1,530.96
262	Allowance for Misc Items	10%		$35,446	$3,544.64
263	Subtotal				$38,991
264					
265	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
266	Item 1 Description	0.00		0.00	$0
267	Item 2 Description	0.00		0.00	$0
268	Item 3 Description	0.00		0.00	$0
269	Item 4 Description	0.00		0.00	$0
270	Item 5 Description	0.00		0.00	$0
271	Item 6 Description	0.00		0.00	$0
272	Item 7 Description	0.00		0.00	$0
273	Item 8 Description	0.00		0.00	$0
274	Item 9 Description	0.00		0.00	$0
275	Item 10 Description	0.00		0.00	$0
276	Item 11 Description	0.00		0.00	$0
277	Item 12 Description	0.00		0.00	$0
278	Item 13 Description	0.00		0.00	$0
279	Item 14 Description	0.00		0.00	$0
280	Item 15 Description	0.00		0.00	$0
281	Subtotal				$0
282					
283	Subtotal				$2,177,181
284					
285	ALLOWANCES:		**User Over-write**		
286	Finishes Allowance	2.0%		$2,366,502	$47,330
287	I & C Allowance	2%		$2,366,502	$47,330
288	Mechanical Allowance	2%		$2,366,502	$47,330
289	Electrical Allowance	2%		$2,366,502	$47,330
290					
291	Facility Cost	**12,000,000**	**GPD**	**$0.20**	**$2,366,502**

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	B	C	D	E	F
317	[redacted]				
318	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
319	SITEWORK:				
320	Soil Excavation	5429.67	CY	***$5.35***	$29,061
321	Imported Structural Backfill	640.14	CY	***$40.56***	$25,961
322	Backfill	110.89	CY	***$6.58***	$730
323	Haul Excess	5318.78	CY	***$6.58***	$34,998
324	Stair Case:				
325	Soil Excavation	638.48	CY	***$5.35***	$3,417
326	Imported Structural Backfill	87.11	CY	***$40.56***	$3,533
327	Backfill	32.89	CY	***$6.58***	$216
328	Haul Excess	605.59	CY	***$6.58***	$3,985
329	Blower Room:				
330	Soil Excavation	81.35	CY	***$5.35***	$435
331	Imported Structural Backfill	102.89	CY	***$40.56***	$4,173
332	Backfill	4.04	CY	***$6.58***	$27
333	Haul Excess	77.31	CY	***$6.58***	$509
334	Electrical Room:				
335	Soil Excavation	16.29	CY	***$5.35***	$87
336	Imported Structural Backfill	19.63	CY	***$40.56***	$796
337	Backfill	1.46	CY	***$6.58***	$10
338	Haul Excess	14.83	CY	***$6.58***	$98
339	Allowance for Misc Items	5%		$108,034.91	$5,402
340	Subtotal				$113,437
341					
342	CONCRETE:				
343	Filters				
344	Foundation (Includes Filter, Gulllet Channel, Filter Influent/Backwash Wastewater Channel) (FSOGW * FSOGL * FOSGT) / 27 *#TF	314.52	CY	***$382.16***	$120,198
345	Pipe Gallery Wall	214.75	CY	***$683.50***	$146,779
346	Gullet Wall	42.53	CY	***$683.50***	$29,069
347	Filter Influent / Backwash Waste Channel Walls	362.33	CY	***$683.50***	$247,653
348	Filter Influent / Backwash Waste Channel Lower Elevated Slab	20.99	CY	***$1,088.69***	$22,849
349	Filter Influent / Backwash Waste Channel Upper Elevated Slab	28.33	CY	***$1,088.69***	$30,846
350	End Walls	221.13	CY	***$683.50***	$151,141
351	Common Filter Influent				
352	Slab on Grade	55.14	CY	***$345.93***	$19,076
353	Common Influent Channel Wall	179.54	CY	***$683.50***	$122,718
354	Common Influent Channel Elevated Slab	24.54	CY	***$1,088.69***	$26,719
355	Filter Gallery				
356	Slab on Grade	389.93	CY	***$345.93***	$134,890
357	Filter Gallery Elevated Slab	57.77	CY	***$1,088.69***	$62,891
358	Pipe Supports	1.84	CY	***$32.90***	
359	Blower Room				
360	Slab on Grade	55.50	CY	***$345.93***	$19,201
361	Blower Room Walls	29.08	CY	***$683.50***	$19,879
362	Stair Case				
363	Slab on Grade	46.22	CY	***$345.93***	$15,990
364	Stair Case Walls	25.58	CY	***$683.50***	$17,481
365	Electrical Room				
366	Slab on Grade	3.04	CY	***$345.93***	$1,051
367	Electrical Room Walls	9.71	CY	***$683.50***	$6,638
368	Allowance for Misc Items	5%		$1,195,069.53	$59,753
369	Subtotal				$1,254,823
370					
371	MASONRY:	Moderate			
372	CMU Filter Building	7599.82	SF	***$131.60***	$1,000,147
373	Blower Room	691.67	SF	***$131.60***	$91,024
374	Electrical Room	82.00	SF	***$131.60***	$10,791
375	Subtotal				$1,101,963
376					
377	METALS:				

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	B	C	D	E	F
378	Metal Guardrail with Pickets	415.33	LF	*$72.38*	$30,062
379	Filter Access Hatch	13.44	SF	*$109.91*	
380	Stairs (FBD * 12/8)	32.00	Risers	*$394.80*	$12,634
381	Allowance for Misc Items	10%		$42,695.87	$4,270
382	Subtotal				$46,965
383					
384	THERMAL & MOISTURE PROTECTION:				
385	Concrete Liner	0	SF	$16.00	$0
386	Allowance for Misc Items	10%		$0.00	$0
387	Subtotal				$0
388					
389	EQUIPMENT:				
390	Fabricated Slide Gates, 42-inch	2	EA	*$7,111.04*	$14,222
391	Underdrain - Leopold Type S	1,852	SF	*$69.90*	$129,455
392	Wash Troughs				
393	Conventional	0	LF	*$234.61*	$0
394	Media Retaining	223	LF	*$531.99*	$118,633
395	Media				
396	Bottom Media - Sand (ES=0.5 UC=1.4)	1,852	CF	*$17.47*	$32,364
397	Middle Media - Coal (ES=0 UC=0)	0	CF	*$23.30*	$0
398	Top Media - Coal (ES=1 UC=1.4)	7,408	CF	*$23.30*	$172,607
399	Air Scour Blowers (88 hp each)	2	EA	*$71,524.98*	$143,050
400	Allowance for Misc Items	10%		$610,331.42	$61,033
401	Subtotal				$671,365
402					
403	INSTRUMENTS & CONTROLS:				
404	Instruments				
405	Filter Effluent Magmeter (16-inch)	4.00	EA	*$14,438.40*	$57,754
406	Combined Filter Effluent Magmeter (30-inch)	0.00	EA	*$23,932.23*	$0
407	Isolation Valve Actuators	24.00	EA	*$5,064.93*	$121,558
408	Control Valve Actuators	4.00	EA	*$5,064.93*	$20,260
409	Turbidimeters	4	EA	*$3,133.05*	$12,532
410	Particle Counters	4	EA	*$6,764.54*	$27,058
411	Level Transmitters	4	EA	*$7,120.57*	$28,482
412	Differential Pressure Transmitters	4	EA	*$7,120.57*	$28,482
413	Filter Influent Level Transmitter	2	EA	*$7,120.57*	$14,241
414	Air Scour Differential Pressure Transmitter	2	EA	*$7,120.57*	$14,241
415	Air Scour Discharge Pressure Indicator Transmitter	2	EA	*$7,120.57*	$14,241
416	Number of Analog I/O Counts	53	EA	*$208.82*	$11,026
417	Number of Digital I/O Counts	149	EA	*$49.46*	$7,359
418	Number of PLC's	1	EA	*$10,331.10*	$10,331
419	I&C Conduit & Wire	3,438	LF	*$9.53*	$32,760
420	Allowance for Misc Items	10%		$400,325.99	$40,033
421	Subtotal				$440,359
422					
423	CONVEYING SYSTEMS:				
424	Monorail Hoist (3 Ton)	1	EA	*$3,257.13*	$3,257
425	Hoist Rail	162	LF	*$32.90*	$5,324
426	Allowance for Misc Items	5%		$8,581.61	$429
427	Subtotal				$9,011
428					
429	MECHANICAL:				
430	Pipe				
431	Air Scour Pipe-BAW (12-inch , Exposed , Steel , None , None)	216	LF	*$198.45*	$42,899

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	B	C	D	E	F
432	Filter Influent Header Pipe-FIH (30-inch , Buried , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$547.92	$0
433	Filter Influent Pipe-FIH (20-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$365.28	$0
434	Filter Effluent Pipe-FE (16-inch , Exposed , Steel , Cement Mortar , Paint)	50	LF	$292.22	$14,613
435	Filter Effluent Pipe-FE (16-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	50	LF	$292.22	$14,613
436	Filter Control Valve Pipe-FCV (12-inch , Exposed , Steel , None , None)	32	LF	$198.45	$6,350
437	Filter Effluent Header Pipe-FEH (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	64	LF	$547.92	$34,884
438	Filter to Waste-FTW (16-inch , Exposed , Steel , Cement Mortar , Paint)	43	LF	$292.22	$12,612
439	Filter to Waste-FTW (16-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	153	LF	$292.22	$44,807
440	Backwash Supply Pipe-BWS (30-inch , Exposed , Steel , Cement Mortar , Paint)	170	LF	$547.92	$93,186
441	Backwash Supply Pipe-BWS (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	48	LF	$547.92	$26,300
442	Backwash Waste Pipe-BWW (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	10	LF	$547.92	$5,479
443	Elbows				
444	Air Scour Pipe-BAW (12-inch , Steel)	16	EA	$1,319.92	$21,119
445	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$3,299.80	$0
446	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$2,199.87	$0
447	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$1,759.89	$7,040
448	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$1,759.89	$7,040
449	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$1,319.92	$0
450	Filter Effluent Header Pipe-FEH (30-inch , Steel)	0	EA	$3,299.80	$0
451	Filter to Waste-FTW (16-inch , Steel)	6	EA	$1,759.89	$10,559
452	Filter to Waste-FTW (16-inch , Steel)	0	EA	$1,759.89	$0
453	Backwash Supply Pipe-BWS (30-inch , Steel)	2	EA	$3,299.80	$6,600
454	Backwash Supply Pipe-BWS (30-inch , Steel)	2	EA	$3,299.80	$6,600
455	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$3,299.80	$0
456	Tees				
457	Air Scour Pipe-BAW (12-inch , Steel)	4	EA	$3,007.27	$12,029
458	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$7,518.19	$0
459	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$5,012.12	$0
460	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$4,009.70	$16,039
461	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$4,009.70	$0
462	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$3,007.27	$0
463	Filter Effluent Header Pipe-FEH (30-inch , Steel)	0	EA	$7,518.19	$0
464	Filter to Waste-FTW (16-inch , Steel)	0	EA	$4,009.70	$0
465	Filter to Waste-FTW (16-inch , Steel)	2	EA	$4,009.70	$8,019
466	Backwash Supply Pipe-BWS (30-inch , Steel)	6	EA	$7,518.19	$45,109
467	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$7,518.19	$0
468	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$7,518.19	$0
469	Crosses				
470	Air Scour Pipe-BAW (12-inch , Steel)	2	EA	$4,009.70	$8,019
471	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$10,024.25	$0
472	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$6,682.83	$0
473	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$5,346.27	$0
474	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$5,346.27	$0
475	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$4,009.70	$0
476	Filter Effluent Header Pipe-FEH (30-inch , Steel)	2	EA	$10,024.25	$20,048
477	Filter to Waste-FTW (16-inch , Steel)	0	EA	$5,346.27	$0
478	Filter to Waste-FTW (16-inch , Steel)	0	EA	$5,346.27	$0
479	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$10,024.25	$0
480	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$10,024.25	$0
481	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$10,024.25	$0
482	Valves				
483	Air Scour Pipe-BAW (12-inch ,V500 - BFV)	4	EA	$9,653.56	$38,614
484	Filter Influent Header Pipe-FIH (30-inch ,V500 - BFV)	0	EA	$24,133.90	$0

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	B	C	D	E	F
485	Filter Influent Pipe-FIH (20-inch ,V500 - BFV)	4	EA	*$16,089.26*	$64,357
486	Filter Effluent Pipe-FE (16-inch ,V500 - BFV)	4	EA	*$12,871.41*	$51,486
487	Filter Effluent Pipe-FE (16-inch ,V500 - BFV)	0	EA	*$12,871.41*	$0
488	Filter Control Valve Pipe-FCV (12-inch ,V500 - BFV)	4	EA	*$9,653.56*	$38,614
489	Filter Effluent Header Pipe-FEH (30-inch ,V500 - BFV)	0	EA	*$24,133.90*	$0
490	Filter to Waste-FTW (16-inch ,V500 - BFV)	4	EA	*$12,871.41*	$51,486
491	Filter to Waste-FTW (16-inch ,V500 - BFV)	0	EA	*$12,871.41*	$0
492	Backwash Supply Pipe-BWS (30-inch ,V500 - BFV)	4	EA	*$24,133.90*	$96,536
493	Backwash Supply Pipe-BWS (30-inch ,V500 - BFV)	0	EA	*$24,133.90*	$0
494	Backwash Waste Pipe-BWW (30-inch ,V500 - BFV)	4	EA	*$24,133.90*	$96,536
495	Allowance for Misc Items	5%		$901,593.08	$45,080
496	Subtotal				$946,673
497					
498	ELECTRICAL:				
499	MCC's				
500	Sections	5	EA	*$6,783.10*	$33,915
501	AFD's				
502	Air Scour Blowers (88 hp each)	-	EA	*$14,946.94*	$0
503	Switchgear				
504	Units	-	EA	*$31,202.24*	$0
505	Electrical Conduit & Wire	127	LF	*$9.53*	$1,213
506	Allowance for Misc Items	5%		$35,128.81	$1,756
507	Subtotal				$36,885
508					
509	USER DEFINED ESTIMATE ITEMS	QUANT	UNIT	$/UNIT	TOTAL COST
510	Item 1 Description	0.00		0.00	$0
511	Item 2 Description	0.00		0.00	$0
512	Item 3 Description	0.00		0.00	$0
513	Item 4 Description	0.00		0.00	$0
514	Item 5 Description	0.00		0.00	$0
515	Item 6 Description	0.00		0.00	$0
516	Item 7 Description	0.00		0.00	$0
517	Item 8 Description	0.00		0.00	$0
518	Item 9 Description	0.00		0.00	$0
519	Item 10 Description	0.00		0.00	$0
520	Item 11 Description	0.00		0.00	$0
521	Item 12 Description	0.00		0.00	$0
522	Item 13 Description	0.00		0.00	$0
523	Item 14 Description	0.00		0.00	$0
524	Item 15 Description	0.00		0.00	$0
525	Subtotal				$0
526					
527	Subtotal				$4,621,479.61
528					
529	ALLOWANCES:		**User Over-write**		
530	Finishes Allowance	2%		$5,023,347	$100,466.95
531	Mechanical Allowance	2%		$5,023,347.40	$100,466.95
532	I&C Allowance	2%		$5,023,347.40	$100,466.95
533	Electrical Allowance	2%		$5,023,347.40	$100,466.95
534					
535	Facility Cost	**12,000,000**	**GPD**	**$0.42**	**$5,023,347**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation				
Influent Channel, Surge Basin & Decant Pump	5311.63	CY	$5.35	$28,429
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1502.22	CY	$5.35	$8,040
Pipe Vault	351.82	CY	$5.35	$1,883
Imported Structural Backfill				
Influent Channel, Surge Basin & Decant Pump	426.72	CY	$40.56	$17,306
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	80.20	CY	$40.56	$3,252
Pipe Vault	70.17	CY	$40.56	$2,846
Native Backfill				
Influent Channel, Surge Basin & Decant Pump	1115.38	CY	$6.58	$7,339
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	32.00	CY	$6.58	$211
Pipe Vault	103.39	CY	$6.58	$680
Haul Excess				
Influent Channel, Surge Basin & Decant Pump	4196.25	CY	$6.58	$27,612
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1470.22	CY	$6.58	$9,674
Pipe Vault	248.42	CY	$6.58	$1,635
Allowance for Misc Items	5%		$108,907.43	$5,445
Subtotal				$114,353
CONCRETE:				
Surge Basin:				
Foundation	308.85	CY	$382.16	$118,028
Perimeter Walls	382.34	CY	$683.50	$261,329
Influent Channel Wall	62.23	CY	$683.50	$42,536
Concrete Curb (8" X 8")	76.89	LF	$32.90	$2,530
Backwash Recycle Sump:				
Slab on Grade	18.89	CY	$345.93	$6,534
Walls	90.62	CY	$683.50	$61,940
Elevated Slab	9.23	CY	$1,088.69	$10,045
Backwash Sludge Sump:				
Slab on Grade	13.33	CY	$345.93	$4,612
Walls	66.77	CY	$683.50	$45,640
Elevated Slab	6.88	CY	$1,088.69	$7,491
Dry Pit:				
Slab on Grade	5.31	CY	$345.93	$1,836
Walls	32.33	CY	$683.50	$22,096
Elevated Slab	3.49	CY	$1,088.69	$3,802
Pipe Vault:				
Lower Elevated Slab	29.64	CY	$1,088.69	$32,271
Upper Elevated Slab	29.64	CY	$1,088.69	$32,271
Walls	32.67	CY	$683.50	$22,333
Electrical Room Slab on Grade	5.27	CY	$345.93	$1,822
Allowance for Misc Items	5%		$677,117.15	$33,856
Subtotal				$710,973
MASONRY:	Moderate			
Pump Sumps and Pipe Vault	0.00	SF	$131.60	$0
Electrical Room	80.89	SF	$131.60	$10,645
Subtotal	80.89			$10,645
METALS:				
Influent Channel:				
Grating	185.56	SF	$72.38	$13,431
Surge Basin:				
Grating	4.00	SF	$72.38	$290
Backwash Recycle Sump:				
Grating	4.00	SF	$72.38	$290
Backwash Sludge Sump:				
Grating	4.00	SF	$72.38	$290
Dry Pit:				

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Ladder	27.60	VLF	$99.36	$2,742
Pipe Vault:				
Grating	4.00	SF	$72.38	$290
Stairs	16.00	RISERS	$394.80	$6,317
Allowance for Misc Items	10%		$23,647.47	$2,365
Subtotal				$26,012
DOORS & WINDOWS:				
Backwash Recycle Sump:				
Aluminum Access Hatch (10' x 5')	1.00	EA	$4,400.75	$4,401
Backwash Sludge Sump:				
Aluminum Access Hatch (3' x 3')	1.00	EA	$1,098.21	$1,098
Dry Pit:				
Aluminum Access Hatch (3' x 3')	1.00	EA	$1,098.21	$1,098
Pipe Vault:				
Aluminum Access Hatch (3' x 3')	2.00	EA	$1,098.21	$2,196
Allowance for Misc Items	5%		$8,793.60	$440
Subtotal				$9,233
EQUIPMENT:				
Floating Decanter Plate System	0.00	SF	$72.94	$0
Traveling Solids Removal Mechanism	2.00	EA	$66,857.09	$133,714
Washwater Decant Pump (Submersible Pump)	3.00	EA	$18,993.38	$56,980
Sludge Pump (Submersible Pump)	2.00	EA	$12,409.63	$24,819
Mixers	0.00	HP	$1,580.26	$0
Allowance for Misc Items	10%		$215,513.57	$21,551
Subtotal				$237,065
I&C:				
Instruments				
Backwash Waste Recycle Header Magmeter (BWRH, 12 inch)	1.00	EA	$10,573.93	$10,574
Isolation Valve Actuators (Electric)	5.00	EA	$5,064.93	$25,325
Level Transmitters	1.00	EA	$7,120.57	$7,121
Number of Analog I/O Counts	6.00	EA	$208.82	$1,253
Number of Digital I/O Counts	30.00	EA	$49.46	$1,484
Number of Local Panels	1.00	EA	$10,331.10	$10,331
Number of PLC's	1.00	EA	$10,990.54	$10,991
I&C Conduit Wire	259.78	lf	$9.53	$2,475
Allowance for Misc Items	5%		$69,552.80	$3,478
Subtotal				$73,030
MECHANICAL:				
Pipe:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	LF	$657.50	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	LF	$123.32	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	16.22	LF	$219.17	$3,555
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	LF	$219.17	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	81.00	LF	$54.81	$4,439
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	16.22	LF	$109.58	$1,778
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	LF	$109.58	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	54.00	LF	$109.58	$5,917
Elbows:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	$3,959.76	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	$2,588.21	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	1.00	EA	$1,319.92	$1,320
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	$1,319.92	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	6.00	EA	$1,150.31	$6,902
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	$659.96	$660
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	$659.96	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	4.00	EA	$659.96	$2,640
Tee:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	$9,021.82	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	$4,297.65	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	2.00	EA	$3,007.27	$6,015

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Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$3,007.27*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	0.00	EA	*$1,910.07*	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	*$1,503.64*	$1,504
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$1,503.64*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	0.00	EA	*$1,503.64*	$0
Valves:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	*$28,960.68*	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	*$12,602.74*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$9,653.56*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$9,653.56*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	3.00	EA	*$5,601.22*	$16,804
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$4,826.78*	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$4,826.78*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	2.00	EA	*$4,826.78*	$9,654
Allowance for Misc Items	5%		$61,186.86	$3,059
Subtotal				$64,246
ELECTRICAL:				
# MCC Sections	8.00	EA	*$6,783.10*	$54,265
Switchgear	0.00	EA	*$31,202.24*	$0
Adjustable Frequency Drives				
Basin Mixer	0.00	EA	*$4,125.89*	$0
Sludge Pumps (Active)	1.00	EA	*$4,871.14*	$4,871
Sludge Pumps (Standby)	1.00	EA	*$4,871.14*	$4,871
Recycle Pumps (Active)	2.00	EA	*$6,299.20*	$12,598
Recycle Pumps (Standby)	1.00	EA	*$6,299.20*	$6,299
Electrical Conduit & Wire	259.78	lf	*$9.53*	$2,475
Allowance for Misc Items	5%		$85,380.01	$4,269
Subtotal				$89,649
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,335,206.98
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2%		$1,534,721	$30,694.41
I & C Allowance	3%		$1,534,720.67	$46,041.62
Mechanical Allowance	5%		$1,534,720.67	$76,736.03
Electrical Allowance	3%		$1,534,720.67	$46,041.62
Facility Cost	**2,519,600**	**Gallons**	**$0.61**	**$1,534,721**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Circular Clearwell				
Excavation	14,515	CY	***$5.35***	$77,691
Imported Structural Backfill	1,523	CY	***$40.56***	$61,784
Native Backfill	2,973	CY	***$6.58***	$19,563
Haul Excess	11,542	CY	***$6.58***	$75,949
Rectangular Clearwell				
Excavation	0	CY	***$5.35***	$0
Imported Structural Backfill	0	CY	***$40.56***	$0
Native Backfill	0	CY	***$6.58***	$0
Haul Excess	0	CY	***$6.58***	$0
Allowance for Misc Items	5%		$234,986.14	$11,749
Subtotal				$246,735
CONCRETE:				
Circular Clearwell				
Prestressed Concrete Tank (2000000 gallons)	1	EA	***$872,030.58***	$872,031
Rectangular Clearwell				
Foundation	0	CY	***$382.16***	$0
Columns	0	CY	***$683.50***	$0
Walls	0	CY	***$683.50***	$0
Elevated Slab	0	CY	***$1,088.69***	$0
Concrete Baffling	0	CY	***$683.50***	$0
Allowance for Misc Items	5%		$872,030.58	$43,602
Subtotal				$915,632
METALS & PLASTICS:				
Polypropylene Baffling	0	SF	***$10.99***	$0
Stainless Steel Baffling	0	SF	***$45.79***	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
THERMAL & MOISTURE PROTECTION:				
Concrete Liner	0	SF	***$16.00***	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,162,368
ALLOWANCES:		**User Over-write**		
Metals Allowance	1.0%		$1,249,858	$12,499
Finishes Allowance	2.0%		$1,249,858	$24,997

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Equipment Allowance	1.0%		$1,249,858	$12,499
I & C Allowance	2%		$1,249,858	$24,997
Mechanical Allowance	5%		$1,249,858	$62,493
Electrical Allowance	1%		$1,249,858	$12,499
Facility Cost	**2,000,000**	**Gallons**	**$0.66**	**$1,312,350**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	701.75	CY	$5.35	$0
Imported Structural Backfill	358.27	CY	$40.56	$0
Native Backfill	89.16	CY	$6.58	$0
Haul Excess	612.60	CY	$6.58	$0
Forebay:				
Excavation	7114.29	CY	$5.35	$0
Imported Structural Backfill	437.87	CY	$40.56	$0
Native Backfill	1838.49	CY	$6.58	$0
Haul Excess	5275.80	CY	$6.58	$0
Office:				
Excavation	0.00	CY	$5.35	$0
Imported Structural Backfill	0.00	CY	$40.56	$0
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	0.00	CY	$6.58	$0
Surge Protection:				
Excavation	117.15	CY	$5.35	$627
Imported Structural Backfill	86.04	CY	$40.56	$3,489
Native Backfill	18.55	CY	$6.58	$122
Haul Excess	98.59	CY	$6.58	$649
Allowance for Misc Items	5%		$4,887.33	$244
Subtotal				$5,132
CONCRETE:				
Pump Station				
Foundation	256.01	CY	$382.16	$0
Pump Pad Epoxy	0.74	CY	$3,412.56	$2,528
Pump Pad Support	7.78	CY	$345.93	$2,692
Pipe Supports	4.19	CY	$345.93	$1,448
Electrical Room				
Foundation	14.61	CY	$345.93	$5,055
Surge Protection				
Foundation	20.70	CY	$345.93	$7,161
Office				
Foundation	0.00	CY	$345.93	$0
Pump Station Forebay				
Slab on Grade for Rectangular Tank	231.48	CY	$345.93	$0
Support Walls for Rectangular	342.22	CY	$683.50	$0
Support Columns for Rectangular	16.50	CY	$683.50	$0
Elevated Slab for Rectangular	91.36	CY	$1,088.69	$0
Pump Baffling (for all cases)	16.43	CY	$683.50	$0
Sump Walls	86.37	CY	$683.50	$0
Sump Concrete Fill	184.06	CY	$382.16	$0
Prestressed Concrete Tank (422429 gallons)	0.00	EA	$0.00	$0
Allowance for Misc Items	5%		$18,883.83	$944
Subtotal				$19,828
MASONRY:	Moderate			
Pump Station Building	2235.55	SF	$197.40	$441,303
Office Building	0.00	SF	$131.60	$0
Surge Building	558.89	SF	$131.60	$73,551
Electrical Room	394.53	SF	$131.60	$51,921
Subtotal	3188.98			$566,775
METALS:				
Pump Removal Hatches	73.33	SF	$109.91	$8,060
Allowance for Misc Items	10%		$8,059.73	$806
Subtotal				$8,866
THERMAL & MOISTURE PROTECTION:				
Wet Well Liner	0.00	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	1.00	EA	$167,150.63	$167,151
Active Pump # 2	1.00	EA	$167,150.63	$167,151
Active Pump # 3	1.00	EA	$167,150.63	$167,151

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Active Pump # 4	1.00	EA	$167,150.63	$167,151
Active Pump # 5	0.00	EA	$0.00	$0
Active Pump # 6	0.00	EA	$0.00	$0
Active Pump # 7	0.00	EA	$0.00	$0
Active Pump # 8	0.00	EA	$0.00	$0
Active Pump # 9	0.00	EA	$0.00	$0
Active Pump # 10	0.00	EA	$0.00	$0
Standby Pump	1.00	EA	$167,150.63	$167,151
Allowance for Misc Items	10%		$835,753.14	$83,575
Subtotal				$919,328
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	10.00	each	$5,064.93	$50,649
Control Valve Actuators	5.00	each	$5,064.93	$25,325
Level Indicator Transmitters	2.00	each	$6,764.54	$13,529
Level Swithces	2.00	each	$7,120.57	$14,241
Pressure Indicator Transmitters	6.00	each	$7,120.57	$42,723
Pressure Switches	10.00	each	$7,120.57	$71,206
Number of Analog I/O Counts	37.20	each	$208.82	$7,768
Number of Digital I/O Counts	104.40	each	$49.46	$5,163
Number of PLC's	5.00	each	$10,331.10	$51,656
I&C Conduit & Wire	2380.06	lf	$9.53	$22,679
Allowance for Misc Items	10%		$ 304,939.30	$30,494
Subtotal				$335,433
MECHANICAL:				
Pipe:				
Discharge Lateral Pipe (14-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	35.00	LF	$53.41	$1,869
Discharge Header Pipe (30-inch,DIS, Exposed/Buried, Steel, Cement Mortar, Cement Mortar)	42.50	LF	$744.31	$31,633
Pump Discharge Pipe (10-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	4.17	LF	$55.90	$233
Elbows:				
Discharge Header Pipe (30-inch)	2.00	EA	$2,831.95	$5,664
Tees:				
Discharge Header Pipe (30-inch)	5.00	EA	$5,509.28	$27,546
Valves:				
Discharge Lateral Isolation Valve (14-inch, BFV)	5.00	EA	$1,529.44	$7,647
Pump Control Valve (14-inch, Check Valve)	5.00	EA	$1,529.44	$7,647
Discharge Header Isolation Valve (30-inch, BFV)	1.00	EA	$5,934.12	$5,934
Air Release Vacuum Valves	15.00	EA	$3,297.16	$49,457
Allowance for Misc Items	10%		$137,631.79	$13,763
Subtotal				$151,395
ELECTRICAL:				
MCC's				
Sections	7.00	each	$6,783.10	$47,482
AFD's				
Active Pump # 1	450.00	HP	$132.14	$59,461
Active Pump # 2	450.00	HP	$132.14	$59,461
Active Pump # 3	450.00	HP	$132.14	$59,461
Active Pump # 4	450.00	HP	$132.14	$59,461
Active Pump # 5	0.00	HP	$0.00	$0
Active Pump # 6	0.00	HP	$0.00	$0
Active Pump # 7	0.00	HP	$0.00	$0
Active Pump # 8	0.00	HP	$0.00	$0
Active Pump # 9	0.00	HP	$0.00	$0
Active Pump # 10	0.00	HP	$0.00	$0
Standby Pump	450.00	HP	$132.14	$59,461
Switchgear				
Units	0.00	each	$31,202.24	$0
Electrical Conduit & Wire	340.01	lf	$9.53	$3,240
Allowance for Misc Items	5%		$348,025	$17,401
Subtotal				$365,427
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0

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Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,372,183
ALLOWANCES:		**User Over-write**		
Finishes Allowance	5%		$3,041,261	$152,063
I & C Allowance	2%		$3,041,261	$60,825
Surge Allowance	5%		$3,041,261	$152,063
Mechanical Allowance	5%		$3,041,261	$152,063
Electrical Allowance	5%		$3,041,261	$152,063
Facility Cost	**2,250**	**Total Pump HP**	**$1,351.67**	**$3,041,261**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	1575.42	CY	***$5.35***	$0
Imported Structural Backfill	86.68	CY	***$40.56***	$0
Native Backfill	828.79	CY	***$6.58***	$0
Haul Excess	746.63	CY	***$6.58***	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
CONCRETE:				
Wet Well:				
Foundation	28.89	CY	***$382.16***	$0
Perimeter Walls	64.42	CY	***$683.50***	$0
Operating Floor:				
Elevated Slab (Including floor over Discharge Header Vault)	36.61	CY	***$1,088.69***	$0
Pump Pads	1.63	CY	***$345.93***	$565
Other Equipment Pads	1.00	CY	***$345.93***	$346
Discharge Pipe Vault:				
Slab on Grade	13.66	CY	***$345.93***	$4,725
Walls	17.16	CY	***$683.50***	$11,727
Allowance for Misc Items	5%		$17,362.33	$868
Subtotal				$18,230
MASONRY:	Moderate			
CMU Building	988.44	SF	***$131.60***	$130,080
Subtotal				$130,080
METALS:				
Checker Plate Over Intake Pipe Gate = (Diameter of Influent Pipe +2') * (2 Feet Wide) (sf)	10.00	SF	***$72.38***	$724
Checker Plate Over Discharge Pipe Header = ((Discharge Pipe Diameter * 2) * ("S" * Total Number of Pumps)	57.98	SF	***$72.38***	$4,197
Ladder	15.55	VLF	***$99.36***	$1,545
Allowance for Misc Items	10%		$6,464.96	$646
Subtotal				$7,111
EQUIPMENT:				
Size of Sluice Gate (per side in inches)	36.00	Inches		
Sluice Gate	1.00	EA	***$6,330.27***	$6,330
Pumps:				
Active Pump # 1	124.39	HP	***$790.52***	$98,332
Active Pump # 2	124.39	HP	***$790.52***	$98,332
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0
Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	124.39	HP	***$790.52***	$98,332
AFD's				
Active Pump # 1	124.39	HP	***$156.14***	$19,422
Active Pump # 2	124.39	HP	***$156.14***	$19,422
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0

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Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	124.39	HP	***$156.14***	$19,422
Allowance for Misc Items	10%		$353,259.39	$35,326
Subtotal				$394,916
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$550,338
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$1,100,676	$22,014
I & C Allowance	8.0%		$1,100,676	$88,054
Mechanical Allowance	25.0%		$1,100,676	$275,169
Electrical Allowance	15.0%		$1,100,676	$165,101
Facility Cost	**373**	**Total Pump HP**	**$2,949.56**	**$1,100,676**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	89.00	CY	$5.35	$476
Imported Structural Backfill	45.41	CY	$40.56	$1,842
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	89.00	CY	$6.58	$586
Allowance for Misc Items	5%		$2,903.46	$145
Subtotal				$3,049
CONCRETE:				
Slab on Grade	31.46	CY	$345.93	$10,882
Containment Walls	6.37	CY	$683.50	$4,356
Bulk Tank Pads	29.50	CY	$345.93	$10,204
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	2.00	CY	$345.93	$692
Corridor				
Slab on Grade	7.50	CY	$345.93	$2,594
Electrical Room				
Slab on Grade	3.41	CY	$345.93	$1,179
Allowance for Misc Items	5%		$29,906.78	$1,495
Subtotal				$31,402
MASONRY:	Moderate			
CMU Building	1226.00	SF	$131.60	$161,343
Subtotal				$161,343
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	$16,973.34	$33,947
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	3.00	EA	$6,737.98	$20,214
Allowance for Misc Items	10%		$54,160.63	$5,416
Subtotal				$59,577
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	$824.29	$1,649
Chemical Tank Beacons	2.00	each	$824.29	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	0.00	each	$1,099.05	$0
Metering Pump Discharge Pressure Switch	3.00	each	$549.53	$1,649
Magmeter	2.00	each	$549.53	$1,099
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	9.00	each	$208.82	$1,879
Number of Digital I/O Counts	26.00	each	$49.46	$1,286
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	297.00	lf	$9.53	$2,830
Allowance for Misc Items	10%		$34,460.81	$3,446
Subtotal				$37,907
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	61.00	lf	*$10.36*	$632
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	61.00	lf	*$11.98*	$731
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	12.00	each	*$7.95*	$95
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	12.00	each	*$63.16*	$758
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	3.00	each	*$8.27*	$25
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	3.00	each	*$109.33*	$328
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Allowance for Misc Items	10%		$3,184.53	$318
Subtotal				$3,503
ELECTRICAL:				
# MCC Sections	6.00	#	*$6,783.10*	$40,699
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	243.00	lf	*$9.53*	$2,315
Allowance for Misc Items	10%		$43,014.07	$4,301
Subtotal				$47,315
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$353,071
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$392,301	$7,846
I & C Allowance	2%		$392,301	$7,846
Mechanical Allowance	4%		$392,301	$15,692
Electrical Allowance	2%		$392,301	$7,846
Facility Cost	**1,226**	**Building SF**	**$319.98**	**$392,301**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	76.22	CY	$5.35	$408
Imported Structural Backfill	38.89	CY	$40.56	$1,577
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	76.22	CY	$6.58	$502
Allowance for Misc Items	5%		$2,486.65	$124
Subtotal				$2,611
CONCRETE:				
Slab on Grade	28.07	CY	$345.93	$9,711
Containment Walls	4.73	CY	$683.50	$3,232
Bulk Tank Pads	25.13	CY	$345.93	$8,694
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	1.33	CY	$345.93	$461
Corridor				
Slab on Grade	6.94	CY	$345.93	$2,402
Electrical Room				
Slab on Grade	0.00	CY	$345.93	$0
Allowance for Misc Items	5%		$24,500.49	$1,225
Subtotal				$25,726
MASONRY:	Moderate			
CMU Building	1050.00	SF	$131.60	$138,181
Subtotal				$138,181
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	$17,367.52	$34,735
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	2.00	EA	$6,737.98	$13,476
Allowance for Misc Items	10%		$48,211.01	$4,821
Subtotal				$53,032
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	$824.29	$1,649
Chemical Tank Beacons	2.00	each	$824.29	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	0.00	each	$1,099.05	$0
Metering Pump Discharge Pressure Switch	2.00	each	$549.53	$1,099
Magmeter	1.00	each	$549.53	$550
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	6.00	each	$208.82	$1,253
Number of Digital I/O Counts	20.00	each	$49.46	$989
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	225.00	lf	$9.53	$2,144
Allowance for Misc Items	10%		$31,752.48	$3,175
Subtotal				$34,928
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	59.00	lf	*$10.36*	$611
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	59.00	lf	*$11.98*	$707
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,557.19	$256
Subtotal				$2,813
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$266,266
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$295,851	$5,917
I & C Allowance	2%		$295,851	$5,917
Mechanical Allowance	4%		$295,851	$11,834
Electrical Allowance	2%		$295,851	$5,917
Facility Cost	**1,050**	**Building SF**	**$281.76**	**$295,851**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	51.83	CY	$5.35	$277
Imported Structural Backfill	26.44	CY	$40.56	$1,072
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	51.83	CY	$6.58	$341
Allowance for Misc Items	5%		$1,690.92	$85
Subtotal				$1,775
CONCRETE:				
Slab on Grade	20.15	CY	$345.93	$6,969
Containment Walls	3.83	CY	$683.50	$2,617
Bulk Tank Pads	0.00	CY	$345.93	$0
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	1.33	CY	$345.93	$461
Corridor				
Slab on Grade	4.72	CY	$345.93	$1,634
Electrical Room				
Slab on Grade	0.00	CY	$345.93	$0
Allowance for Misc Items	5%		$11,680.12	$584
Subtotal				$12,264
MASONRY:	Moderate			
CMU Building	714.00	SF	$131.60	$93,963
Subtotal				$93,963
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	$0.00	$0
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	2.00	EA	$6,737.98	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	$824.29	$0
Chemical Tank Beacons	0.00	each	$824.29	$0
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	2.20	each	$1,099.05	$2,422
Metering Pump Discharge Pressure Switch	2.00	each	$549.53	$1,099
Magmeter	1.00	each	$549.53	$550
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	7.00	each	$208.82	$1,462
Number of Digital I/O Counts	15.00	each	$49.46	$742
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	122.47	lf	$9.53	$1,167
Allowance for Misc Items	10%		$29,861.98	$2,986
Subtotal				$32,848
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	51.00	lf	*$10.36*	$528
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	51.00	lf	*$11.98*	$611
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,378.44	$238
Subtotal				$2,616
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$167,266
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$185,851	$3,717
I & C Allowance	2%		$185,851	$3,717
Mechanical Allowance	4%		$185,851	$7,434
Electrical Allowance	2%		$185,851	$3,717
Facility Cost	**714**	**Building SF**	**$260.30**	**$185,851**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	51.83	CY	*$5.35*	$277
Imported Structural Backfill	26.44	CY	*$40.56*	$1,072
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	51.83	CY	*$6.58*	$341
Allowance for Misc Items	5%		$1,690.92	$85
Subtotal				$1,775
CONCRETE:				
Slab on Grade	20.15	CY	*$345.93*	$6,969
Containment Walls	3.83	CY	*$683.50*	$2,617
Bulk Tank Pads	0.00	CY	*$345.93*	$0
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	1.33	CY	*$345.93*	$461
Corridor				
Slab on Grade	4.72	CY	*$345.93*	$1,634
Electrical Room				
Slab on Grade	0.00	CY	*$345.93*	$0
Allowance for Misc Items	5%		$11,680.12	$584
Subtotal				$12,264
MASONRY:	Moderate			
CMU Building	714.00	SF	*$131.60*	$93,963
Subtotal				$93,963
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	*$0.00*	$0
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	2.00	EA	*$6,737.98*	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	*$824.29*	$0
Chemical Tank Beacons	0.00	each	*$824.29*	$0
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	1.37	each	*$1,099.05*	$1,501
Metering Pump Discharge Pressure Switch	2.00	each	*$549.53*	$1,099
Magmeter	1.00	each	*$549.53*	$550
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	6.00	each	*$208.82*	$1,253
Number of Digital I/O Counts	15.00	each	*$49.46*	$742
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	108.22	lf	*$9.53*	$1,031
Allowance for Misc Items	10%		$28,596.74	$2,860
Subtotal				$31,456
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	51.00	lf	*$10.36*	$528
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	51.00	lf	*$11.98*	$611
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,378.44	$238
Subtotal				$2,616
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$165,874
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$184,305	$3,686
I & C Allowance	2%		$184,305	$3,686
Mechanical Allowance	4%		$184,305	$7,372
Electrical Allowance	2%		$184,305	$3,686
Facility Cost	714	Building SF	$258.13	$184,305

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Description	Quantity	Unit	$/Unit	Total Cost
O&M BUILDING	6000.00	SF	$474.70	$2,848,226
Subtotal				$2,848,226
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,848,226
ALLOWANCES:				
Finishes Allowance	0.0%		$2,848,226	$0
I & C Allowance	0%		$2,848,226	$0
Mechanical Allowance	0%		$2,848,226	$0
Electrical Allowance	0%		$2,848,226	$0
Facility Cost	**6,000**	**SF**	**$474.70**	**$2,848,226**

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Alternative 1 - Deep and Shallow Aquifer

Shallow Well Capital Costs						
Shallow Well	Shallow Well Capacity, mgd	Land	Wells and Pumphouses	Sitework Electric Utility	Shallow well Treatment Facility	Interconnecting Piping
Vernon 1	0.75	$160,000	$300,000	$750,000		$ 907,200
Vernon 2	0.75	$160,000	$300,000	$644,000		$ 132,000
Vernon 3	0.75	$160,000	$300,000			$ 662,400
Vernon 4	0.75	$160,000	$300,000			$ 1,152,000
Vernon 5	0.75	$160,000	$300,000			$ 2,112,000
Vernon 6	0.75	$160,000	$300,000			
Vernon 7	0.75	$160,000	$300,000			
Lather 1	0.75	$160,000	$300,000			
Lather 2	0.75	$160,000	$300,000			
Lather 3	0.75	$160,000	$300,000			
Lather 4	0.75	$160,000	$300,000			
Lather 5	0	$160,000	$300,000			
Vernon 8	0.75	$160,000	$300,000			
Vernon 9	0.75	$160,000	$300,000			
Wells 11-13 firm	1.2	$2,240,000	$4,200,000	$1,394,000	$29,864,000	$4,965,600
					Includes $2 million for Land	
	10.95					
	Total Wellfield	**$12,799,600**				

Alternative 1 Finished Water pipeline

Pipelines		**$16,884,000**
10% allowance for pipeline valves & appurtenances		**$1,689,000**
Pipeline Construction Cost		**$18,573,000**
Pipeline Construction Cost		**$18,573,000**
3% markup for Bonds & Insurance	$558,000	
5% markup for Mob/Demob	$929,000	
8% markup for Contractors Overhead	$1,561,000	
4% markup for Contractors profit	$843,000	
25% Contingency	$5,616,000	
Subtotal Markups and Contingency		**$9,507,000**
Total Project Construction Costs		**$28,080,000**
8% allowance for pipeline engineering and design	2,247,000	
12% allowance for permitting, legal and administration	3,370,000	
8% allowance for pipeline engr services during construction	2,247,000	
Subtotal Other Project Costs		**$7,864,000**
GRAND TOTAL PROJECT COST		**$35,944,000**

Alternative 1 - Deep and Shallow Aquifer Finished Water Pipeline

Water Forcemain		
Segment	Miles	Diameter
A	6	24
B	5	24

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$1,462,856	Co. Rd I, wetland
2	$1,976,832	In Co HWY H
3	$1,520,640	In Oakdale
4	$1,556,755	In Oakdale, cross Les Paul
5	$1,535,086	In Sunset Drive, cross SW Ave
6	$1,823,247	In NW Ave, cross College
7	$2,682,613	NW Ave to Main, at Fox River
8	$7,234	Main Street, businesses
9	$2,995,129	In Co. Road Y, wetland, cross 164
10	$1,322,957	City streets, Open country to Hillcrest
subtotal	**$16,883,349**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	213	213
Low urban	1.00	288	288
Medium urban	1.19	343	343
High urban	1.37	395	395
Groundwater	**1.30**	**374**	**374**
Forest	1.15	331	331
Gravel roads	0.85	245	245
Creek crossing	2.00	576	576
HWY crossing	4.00	1152	1152

miles	0.13	0.25	0.5
feet	660	1320	2640
	4620	3960	2640

Alternative 1 Distribution System Costs

Distribution Improvements		**$**	**14,414,539**
10% allowance for pipeline valves & appurtenances		**$**	**1,441,454**
Pipeline Construction Cost			**$15,855,993**
3% markup for Bonds & Insurance	$476,000		
5% markup for Mob/Demob	$793,000		
8% markup for Contractors Overhead	$1,332,000		
4% markup for Contractors profit	$720,000		
25% Contingency	$4,795,000		
Subtotal Markups and Contingency			**$8,116,000**
Total Project Construction Costs			**$23,971,993**
5% allowance for pipeline engineering and design	1,439,000		
12% allowance for permitting, legal and administration	1,199,000		
8% allowance for pipeline engr services during construction	1,918,000		
Subtotal Other Project Costs			**$4,556,000**
GRAND TOTAL PROJECT COST			**$28,528,000**

Alternative 1 - Deep and Shallow Distribution System Improvements

Water Forcemain		
Segment	Miles	Diameter
A	2.5	20
B	2.1	16
C	5.1	16
Unit cost	$/dia-in	12

Blending Pipes

Mile	Cost	Comments
1 mi of 20"	$1,736,064	Assume High Urban
1 mi of 16"	$1,388,851	Assume High Urban
	$4,414,811	20" Distribution
	$2,916,588	16" Distribution
	$7,083,141	16" Blending
subtotal	**$14,414,539**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	178	142
Low urban	1.00	240	192
Medium urban	1.19	286	228
High urban	1.37	329	263
Groundwater	**1.30**	**312**	**250**
Forest	1.15	276	221
Gravel roads	0.85	204	163
Creek crossing	2.00	480	384
HWY crossing	4.00	960	768

miles	0.13	0.25	0.5
feet	660	1320	2640

Alternative 1&2 Wastewater Forcemain

Pipelines		**$3,029,000**
10% allowance for pipeline valves & appurtenances		**$303,000**
Pipeline Construction Cost		**$3,332,000**
Pipeline Construction Cost		**$3,332,000**
3% markup for Bonds & Insurance	$100,000	
5% markup for Mob/Demob	$167,000	
8% markup for Contractors Overhead	$280,000	
4% markup for Contractors profit	$152,000	
25% Contingency	$1,008,000	
Subtotal Markups and Contingency		**$1,707,000**
Total Project Construction Costs		**$5,039,000**
5% allowance for pipeline engineering and design	303,000	
12% allowance for permitting, legal and administration	252,000	
08% allowance for pipeline engr services during construction	404,000	
Subtotal Other Project Costs		**$959,000**
GRAND TOTAL PROJECT COST		**$5,998,000**

Alternative 1 & 2 - Wastewater Force Main

Wastewater Forcemain		
Segment	Miles	Diameter
A	2	6
B	3	6

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$416,275	In Sentry Dr., Cross 2 access roads, Chapman Dr, Spring city Dr, W. Sunset Dr
2	$452,390	In Sunset Dr, cross access road, dozens of residential drive ways, Oakdale Dr, Wisteria, School Dr. Burr Oak, HWY 59
3	$452,390	Cross Foxwood Trail, River Plain, Dale, Mary Ann, Red Oak
4	$833,026	In HWY H, cross HWY, Red clover, 0.5 mi wetland
5	$874,368	In Co Rd I, wetland
subtotal	**$3,028,450**	

Alignment Category	Pipeline Construction Difficulty Factors (source: C	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	53	53
Low urban	1.00	72	72
Medium urban	1.19	86	86
High urban	1.37	99	99
Groundwater	1.30	94	94
Forest	1.15	83	83
Gravel roads	0.85	61	61
Creek crossing	2.00	144	144
HWY crossing	4.00	288	288

miles	0.13	0.25	0.5	0.05
feet	660	1320	2640	264

	O&M Cost Alternative 1 - Deep and Shallow wells						
Source of Supply		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	**Total**
	Deep Well pumping/maintenance	$/1000 gal	1,387,000	$ 0.350	$ 485,450	$ 485,450	
	Shallow Well Pumping/Maintenance	$/1000 gal	2,007,500	$ 0.140	$ 281,050	$ 281,050	
	Total Supply						$ 766,500
Treatment/Pumping		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	Deep Wells 6,7,8					$ 646,449	
	Shallow Wells					$ 2,226,000	
	Residuals		144175	$ 4	$ 576,700	$ 576,700	
	Total Treatment/Pumping						$ 3,449,149
Home Softening		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	Salt/Equipment/Replacment	1				$ 2,863,894	
							$ 2,863,894
Transmission		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	O&M	$/lf/yr	137,280	$ 0.52	$ 71,386	$ 71,386	
	Total Transmission						$ 71,386
Alternative Total O&M ($/yr.)							**$ 7,200,000**
PRESENT WORTH (6%, 20 yrs)							**$ 83,000,000**
PRESENT WORTH (6%, 50 yrs)							**$ 113,000,000**

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES LIFE CYCLE COST ANALYSIS

File 1/5/2010
Version:

Click for CPES QA/QC

Import File: C:\Documents and Settings\jcurl\Desktop\WaukeshaWI\Waukesha 3.0 mgd NF GW WTP.xls

Brows

Project Name:	Waukesha Nanofiltration Groundwater WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	3.0 mgd Nanofiltration WTP
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months)	24
Mid-Point of Construction:	Jan/2012

Life Cycle Analysis:

i =	6.00%
n =	25
Annual Inflation %:	4.50%

To Global Life Cycle Data Sheet

To Annual O & M Cost Summary Sheet

This Report is for INTERNAL Distribution

This Report is for EXTERNAL Distribution

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Construction Cost	Annual O&M Cost (Escalated)	Life Cycle Cost (NPV)
	Yes	BWRO: NanoFilt	$9,139,656	$433,740	$14,684,307
	Yes	Air Stripper: Degas	$1,465,532	$42,217	$2,005,200
	Yes	In-Plant PS: FWPS	$1,918,009	$76,024	$2,889,840
	Yes	Liquid Chemical: NaOH	$535,818	$154,723	$2,513,689
		Additional Project Costs:			
		Biosolids Disposal	$0	$0	$0
		Standard Items	$4,218,067	$115,121	$5,689,695
		User Defined Items	$0	$0	$0
		Plant O & M Labor		$173,963	$2,223,822
TOTAL - Life Cycle Analysis			$17,277,082	$995,788	$30,006,553

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Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	271	50%	8,760	$ 0.06	$ 49,567

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	7,223	2.00	8,760	$ 0.06	$ 7,087

Specialty Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Citric Acid	100%	50%	4	$ 2,500.00	$ 4,983
Hydrochloric Acid	100%	50%	-	$ 360.00	$ -
Scale Inhibitor	100%	50%	10	$ 4,400.00	$ 22,159
Sodium Hydroxide	100%	50%	2	$ 825.32	$ 1,027
Sodium Tripolyphosphate	100%	50%	-	$ 3,100.00	$ -
Sodium EDTA	100%	50%	2	$ 1,260.00	$ 1,256
Sulfuric Acid	100%	50%	81	$ 138.09	$ 5,564
Trisodium Phosphate	100%	50%	-	$ 2,700.00	$ -
Other Liquid CIP Chemical 1	100%	50%	-	$ -	$ -
Other Liquid CIP Chemical 2	100%	50%	-	$ -	$ -
Other Dry CIP Chemical 1	100%	50%	-	$ -	$ -
Other Pretreatment Chemical 1	100%	50%	-	$ -	$ -
Other Pretreatment Chemical 2	100%	50%	-	$ -	$ -
Total Specialty Chemicals					$ 34,988

Specialty Items:	Number per Relacement	Cartridge Filter Cost / Each	Cost
Process Cartridge Filter Replacements	1,236	$ 11.00	$ 13,596
CIP Cartridge Filter Replacements	1,408	$ 11.00	$ 15,488
Membrane Elements	378		$ 30,886
Input Membrane Replacement Frequency (yrs)	5	Typically 3 to 5 years	
Input Membrane Module Cost	*Membrane Size = 8 inches*	*Membrane Cost:* $ 513.35	
Total Specialty Items			$ 59,970

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 67,831
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 219,443	10.0%	$ 21,944

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	241,388
Contingency					10%	$	24,139
Total Annual O&M Cost						$	265,526

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Annual O & M Cost:					
Power					
Equipment Power					
Power Cost Total					
Existing Electrical					
Chemicals					
Maintenance and Replacement					
Maintenance & Repair Cost					
Replacement Cost					
Other					
Other Cost					
Additional Annual O&M Items					
Item 1					
Item 2					
Item 3					
Item 4					
Item 5					
Item 6					
Item 7					
Item 8					
Item 9					
Item 10					
Item 11					
Item 12					
Item 13					
Item 14					
Item 15					
Additional Annual O&M Cost					
Contingency					
Total Annual O&M Cost					

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Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	140	50%	8,760	$ 0.06	$ 25,607
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	655	2.00	8,760	$ 0.06	$ 643
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 12,213
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 38,462.57	10.0%	$ 3,846
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 42,309
Contingency				10%	$ 4,231
Total Annual O&M Cost					$ 46,540

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Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	822	2.00	8,760	$ 0.06	$ 806

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	183	$ 825.32	$ 75,371
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 75,371

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 1,736
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 78,279	10.0%	$ 7,828

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

Subtotal Annual O&M Cost		$ 86,107
Contingency	10%	$ 8,611
Total Annual O&M Cost		$ 94,718

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C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES LIFE CYCLE COST ANALYSIS

File Version: 1/5/2010

Click for CPES QA/QC

Import File: \\Gecko\wbg\Curl\WaukeshaWI\Treatment plant Surface water alt 1.xls

Brows

Project Name:	Waukesha WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	Fox River Alluvium and Shallow Groundwater
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months)	24
Mid-Point of Construction:	Jan/2012

Life Cycle Analysis:

i =	6.00%
n =	25
Annual Inflation %:	4.50%

To Global Life Cycle Data Sheet

To Annual O & M Cost Summary Sheet

This Report is for INTERNAL Distribution

This Report is for EXTERNAL Distribution

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Construction Cost	Annual O&M Cost (Escalated)	Life Cycle Cost (NPV)
	Yes	Inline Rapid Mix: RMX	$1,124,218	$10,054	$1,252,729
	Yes	Flocculation: FLOC	$2,758,162	$20,477	$3,019,917
	Yes	Lamella Clarifier: LAM	$4,276,418	$99,959	$5,554,216
	Yes	Filters: FILT	$9,077,505	$74,615	$10,031,332
	Yes	Surge Basin-Decanter: BWW	$2,773,337	$38,555	$3,266,193
	No	UV Disinfection: UVD	$0	$0	$0
	Yes	Concrete Clearwell: FWT	$2,371,500	$1,111	$2,385,692
	No	Steel Clearwell: FWT	$0	$0	$0
	No	In-Plant PS: FWPS	$0	$0	$0
	Yes	Vertical Turbine PS: FWPS	$5,495,750	$738,581	$14,937,283
	Yes	Filter BW PS: BWSPS	$1,988,991	$44,586	$2,558,947
	Yes	U.D. Facility: GEN	$0	$0	$0
	Yes	Liquid Chemical: FeCl3	$708,914	$220,946	$3,533,337
	Yes	Liquid Chemical: NaOCl	$534,622	$98,204	$1,789,986
	Yes	Liquid Chemical: FLUOR	$335,846	$8,675	$446,737
	Yes	Liquid Chemical: POLYPHOS	$333,051	$39,577	$838,978
	Yes	O&M Building: OMB	$5,146,925	$11,636	$5,295,664
		Additional Project Costs:			
		Biosolids Disposal	$0	$0	$0
		Standard Items	$13,413,828	$384,177	$18,324,898
		User Defined Items	$0	$0	$0
		Plant O & M Labor		$434,906	$5,559,555
TOTAL - Life Cycle Analysis			$50,339,067	$2,226,059	$78,795,464
Construction Cost per GPD (based on Maximum Daily Flow Rate)			$4.19 / GPD		
Non-Construction Cost					
Capital Cost per GPD (based on Maximum Daily Flow Rate)			$4.19 / GPD		(Note: "Capital Cost" equals Construction Cost plus Non-Construction Cost)
Annual O & M Cost per 1,000 Gallons (based on Average Annual Daily Flow Rate)				$ 1.016 / Thousand Gallons	

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Rapid Mixing (Inline)

To Summary Sheet

Construction Cost:	$1,124,217

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	6	50%	8,760	$ 0.06	$ 1,097

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	922	2.00	8,760	$ 0.06	$ 905

Chemicals:	$

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 3,084
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 5,086	10.0%	$ 509

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

Subtotal Annual O&M Cost		$ 5,595
Contingency	10%	$ 559
Total Annual O&M Cost		$ 6,154

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Alternative Plan

Flocculation (Homogenous Particle Without Flocculation for Dissolved Sedimentation)					
	To Human Good				
Construction Cost:					$ [illegible]
Annual O & M Cost:					
Item	**Quantity**	**Unit Cost**	**Annual Hours**	**Total**	**% Year**
Equipment Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Labor Electrical	**Quantity**	**Unit Cost**	**Annual Hours**	**Total**	**% Year**
Maintenance Electrical	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chemicals					
Maintenance Materials and Replacement					
Maintenance & Repair Cost					$ [illegible]
Replacement Cost					$ -
Other					
Other Cost			$ [illegible]	[illegible]	$ [illegible]
Other Annual O&M Items					
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ [illegible]
Contingency				[illegible]%	$ [illegible]
Total Annual O&M Cost					$ [illegible]

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Lamella Clarifier

To Summary Sheet

Construction Cost:					$4,276,417
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	4	50%	8,760	$ 0.06	$ 732
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	4,804	2.00	8,760	$ 0.06	$ 4,713
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 45,127
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 50,572	10.0%	$ 5,057
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 55,629
Contingency				10%	$ 5,563
Total Annual O&M Cost					$ 61,192

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Filters

To Summary Sheet

Construction Cost:					$9,077,505
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	5	50%	8,760	$ 0.06	$ 915
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	7,600	2.00	8,760	$ 0.06	$ 7,457
Chemicals:		Annual Usage (tons)	Annual Facility Usage (% of year)	$/ton	Chemical Cost
GAC		-	100%	$ 2,400.00	$ -
Total Chemical Cost					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 29,379
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 37,750	10.0%	$ 3,775
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 41,525
Contingency				10%	$ 4,153
Total Annual O&M Cost					$ 45,678

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Large System Combination Wastewater Surge Basin and Floating Tube Decanter Clarification (>= 5 MGD)

To Summary Sheet

Construction Cost:					$2,773,337
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	43	50%	8,760	$ 0.06	$ 7,865
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	81	2.00	8,760	$ 0.06	$ 79
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 11,562
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 19,506	10.0%	$ 1,951
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 21,457
Contingency				10%	$ 2,146
Total Annual O&M Cost					$ 23,602

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Concrete Tank

To Summary Sheet

Construction Cost:					$2,371,500
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	-	50%	8,760	$ 0.06	$ -
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	-	2.00	8,760	$ 0.06	$ -
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 562
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 562	10.0%	$ 56
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 618
Contingency				10%	$ 62
Total Annual O&M Cost					$ 680

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In-Plant Pump Station

To Summary Sheet

Construction Cost:					**$6,620,228**
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2,666	50%	8,760	$ 0.06	$ 487,626
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,022	2.00	8,760	$ 0.06	$ 1,003
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 74,141
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 562,769.52	10.0%	$ 56,277
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 619,046
Contingency				10%	$ 61,905
Total Annual O&M Cost					$ 680,951

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Vertical Turbine Pump Station

To Summary Sheet

Construction Cost:					$5,495,750
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	1,800	50%	8,760	$ 0.06	$ 329,230
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	3,189	2.00	8,760	$ 0.06	$ 3,129
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 41,314
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 373,672	10.0%	$ 37,367
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 411,039
Contingency				10%	$ 41,104
Total Annual O&M Cost					$ 452,143

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Granular Media Filter Backwash Supply Pump Station

To Summary Sheet

Construction Cost:					$1,988,991
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	21	50%	8,760	$ 0.06	$ 3,841
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	988	2.00	8,760	$ 0.06	$ 969
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 17,747
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 22,557	10.0%	$ 2,256
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 24,813
Contingency				10%	$ 2,481
Total Annual O&M Cost					$ 27,294

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	**$708,913**

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	3	50%	8,760	$ 0.06	$ 549

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,226	2.00	8,760	$ 0.06	$ 1,203

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	274	$ 782.93	$ 107,249
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					**$ 107,249**

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 2,783
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 111,783	10.0%	$ 11,178

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	122,962
Contingency					10%	$	12,296
Total Annual O&M Cost						$	135,258

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$534,621

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,050	2.00	8,760	$ 0.06	$ 1,030

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	55	$ 1,672.13	$ 45,811
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 45,811

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 2,477
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 49,684	10.0%	$ 4,968

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	54,653
Contingency					10%	$	5,465
Total Annual O&M Cost						$	60,118

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$335,845

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	714	2.00	8,760	$ 0.06	$ 701

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	15	$ 360.00	$ 2,630
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 826.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 2,630

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 692
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 4,389	10.0%	$ 439

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	4,828
Contingency					10%	$	483
Total Annual O&M Cost						$	5,310

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	**$333,051**

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	714	2.00	8,760	$ 0.06	$ 701

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	18	$ 2,000.00	$ 18,265
Total Chemical Cost					$ 18,265

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 692
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 20,023	10.0%	$ 2,002

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	22,026
Contingency					10%	$	2,203
Total Annual O&M Cost						$	24,228

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O & M Building

To Summary Sheet

Construction Cost:					**$5,146,924**
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	-	50%	8,760	$ 0.06	$ -
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	6,000	2.00	8,760	$ 0.06	$ 5,887
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ -
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 5,887	10.0%	$ 589
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 6,475
Contingency				10%	$ 648
Total Annual O&M Cost					$ 7,123

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City of Waukesha Home Water Softening Costs

Total number of residential meters (2010)	17,104
Percent of meters that have water softening units	80%
Salt Cost ($/year) [a]	$ 1,551,675
Lbs salt per year	7,388,928
Annual Maintenance & electricity [b]	$ 273,664
Cost for repair/replacement of equipment [c]	$ 1,038,555
Total Softening Cost ($/yr)	**$ 2,863,894**

a Assumes 45 lb of salt per month per customer, $0.21/lb
b Assumes $20 per customer per year
c Asumes 10 year replacement, starting in 2020, $1,000/unit, A/F 0.0759

Alternative 2:
Shallow and Fox River Alluvium

Alternative 2 - Shallow and Fox River Alluvium			
Shallow Aquifer Wells			**$17,815,000**
Shallow Aquifer Water Treatment Plant			**$37,355,000**
Transmission Main to Waukesha			**$27,855,000**
Distribution Improvements			**$ 8,465,000**
Wastewater Force Main			**$3,332,000**
Subtotal Construction Cost			**$94,822,000**
3% markup for Bonds & Insurance		$2,845,000	
5% markup for Mob/Demob		$4,742,000	
8% markup for Contractors Overhead		$8,193,000	
4% markup for Contractors profit		$4,097,000	
25% Contingency		$28,675,000	
Subtotal Markups and Contingency			**$48,552,000**
Total Project Construction Costs			**$143,374,000**
8% allowance for engineering and design		11,470,000	
12% allowance for permiting, legal and admin.		17,205,000	
8% allowance for engr services during construction		11,470,000	
Subtotal Other Project Costs			**$40,145,000**
TOTAL PROJECT CAPTIAL COST			**$184,000,000**

Alternative 2 - Shallow Aquifer and Fox River Alluvium

Fox River Alluvium Well Field Capital Costs					
Well	Capacity, mgd	Land Cost	Well Cost	Shallow Electrical Utility	Interconnecting Piping
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		$1,000,000	$2,800,000	$495,000	$715,200

TOTAL **$5,010,200**

Alternative 2 - Shallow Aquifer and Fox River Alluvium

Vernon Marsh Shallow Well Capital Costs						Shallow Aquifer Surface Water Treatment Plant		
Shallow Well	Shallow Well Capacity (mgd)	Land	Wells and Pumphouses	Sitework Electric Utility	Interconnecting Piping	Facility	Raw Trunk Main	Sludge Forcemain
Vernon 1,2	1.5	$320,000	$600,000	$150,000	$ 912,000			
Vernon 3,4	1.5	$320,000	$600,000	$ [illegible]	$ 132,000			
Vernon 5,6	1.5	$320,000	$600,000		$ 652,400			
Vernon 7,8	2	$320,000	$800,000		$ 1,152,000			
Vernon 9,10	2	$320,000	$800,000		$ 2,112,000			
Vernon 11,12	2	$320,000	$800,000					
Vernon 13,14	2	$320,000	$800,000					
Vernon 15,16	2							
Firm	14							
		$2,240,000	$4,200,000	$1,394,000	$4,970,400	$37,355,000	$27,855,000	$3,332,000

TOTAL **$12,804,400**

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 1/5/2010

Click for CPES QA/ QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Waukesha WTP	
Project Number:		
Project Manager:	Linda Mohr	
Estimator:	Jason Curl	
Project Description:	Fox River Alluvium and Shallow Groundwater	Roundup to the nearest:
Project Location (City):	Milwaukee	$1,000
Project Location (State):	WISCONSIN	
Project Location (Country):	USA	
Construction Start (Month):	Jan	This Report is for INTERNAL Distributio
Construction Start (Year):	2011	
Construction Duration (months):	24	
Mid-Point of Construction:	Jan/2012	This Report is for EXTERNAL Distributio

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Inline Rapid Mix: RMX	$700,000
	Yes	Flocculation: FLOC	$1,814,000
	Yes	Lamella Clarifier: LAM	$2,940,000
	Yes	Filters: FILT	$6,591,000
	Yes	Surge Basin-Decanter: BWW	$1,535,000
	Yes	UV Disinfection: UVD	$1,342,000
	Yes	Concrete Clearwell: FWT	$1,313,000
	No	Steel Clearwell: FWT	$0
	No	In-Plant PS: FWPS	$0
	Yes	Vertical Turbine PS: FWPS	$4,233,000
	Yes	Filter BW PS: BWSPS	$1,101,000
	Yes	U.D. Facility: GEN	$0
	Yes	Liquid Chemical: FeCl3	$396,000
	Yes	Liquid Chemical: NaOCl	$296,000
	Yes	Liquid Chemical: FLUOR	$189,000
	Yes	Liquid Chemical: POLYPHOS	$207,000
	Yes	O&M Building: OMB	$4,748,000

SUBTOTAL - PROJECT COST			$27,405,000
ADDITIONAL PROJECT COSTS:			
Demolition	0%		$0
Overall Sitework	10%		$2,741,000
Plant Computer System	5%		$1,371,000
Yard Electrical	7%		$2,001,000
Yard Piping	14%		$3,837,000
UD #1 Default Description	0%		$0
UD #2 Default Description	0%		$0
UD #3 Default Description	0%		$0
SUBTOTAL with Additional Project Costs			$37,355,000

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Description	Quantity	Unit	$/Unit	Total Cost
O&M BUILDING	10000.00	SF	$474.70	$4,747,044
Subtotal				$4,747,044
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$4,747,044
ALLOWANCES:				
Finishes Allowance	0.0%		$4,747,044	$0
I & C Allowance	0%		$4,747,044	$0
Mechanical Allowance	0%		$4,747,044	$0
Electrical Allowance	0%		$4,747,044	$0
Facility Cost	**10,000**	**SF**	**$474.70**	**$4,747,044**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	60.98	CY	*$5.35*	$326
Imported Structural Backfill	31.11	CY	*$40.56*	$1,262
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	60.98	CY	*$6.58*	$401
Allowance for Misc Items	5%		$1,989.32	$99
Subtotal				$2,089
CONCRETE:				
Slab on Grade	23.12	CY	*$345.93*	$7,997
Containment Walls	4.17	CY	*$683.50*	$2,847
Bulk Tank Pads	0.00	CY	*$345.93*	$0
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	1.33	CY	*$345.93*	$461
Corridor				
Slab on Grade	5.56	CY	*$345.93*	$1,922
Electrical Room				
Slab on Grade	0.00	CY	*$345.93*	$0
Allowance for Misc Items	5%		$13,227.45	$661
Subtotal				$13,889
MASONRY:	Moderate			
CMU Building	840.00	SF	*$131.60*	$110,545
Subtotal				$110,545
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	*$0.00*	$0
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	2.00	EA	*$6,737.98*	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	*$824.29*	$0
Chemical Tank Beacons	0.00	each	*$824.29*	$0
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	2.28	each	*$1,099.05*	$2,502
Metering Pump Discharge Pressure Switch	2.00	each	*$549.53*	$1,099
Magmeter	1.00	each	*$549.53*	$550
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	7.00	each	*$208.82*	$1,462
Number of Digital I/O Counts	15.00	each	*$49.46*	$742
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	145.54	lf	*$9.53*	$1,387
Allowance for Misc Items	10%		$30,162.07	$3,016
Subtotal				$33,178
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	54.00	lf	*$10.36*	$559
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	54.00	lf	*$11.98*	$647
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,445.47	$245
Subtotal				$2,690
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$186,190
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$206,878	$4,138
I & C Allowance	2%		$206,878	$4,138
Mechanical Allowance	4%		$206,878	$8,275
Electrical Allowance	2%		$206,878	$4,138
Facility Cost	**840**	**Building SF**	**$246.28**	**$206,878**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	51.83	CY	$5.35	$277
Imported Structural Backfill	26.44	CY	$40.56	$1,072
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	51.83	CY	$6.58	$341
Allowance for Misc Items	5%		$1,690.92	$85
Subtotal				$1,775
CONCRETE:				
Slab on Grade	20.15	CY	$345.93	$6,969
Containment Walls	3.83	CY	$683.50	$2,617
Bulk Tank Pads	0.00	CY	$345.93	$0
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	1.33	CY	$345.93	$461
Corridor				
Slab on Grade	4.72	CY	$345.93	$1,634
Electrical Room				
Slab on Grade	0.00	CY	$345.93	$0
Allowance for Misc Items	5%		$11,680.12	$584
Subtotal				$12,264
MASONRY:	Moderate			
CMU Building	714.00	SF	$131.60	$93,963
Subtotal				$93,963
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	$0.00	$0
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	2.00	EA	$6,737.98	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	$824.29	$0
Chemical Tank Beacons	0.00	each	$824.29	$0
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	3.67	each	$1,099.05	$4,037
Metering Pump Discharge Pressure Switch	2.00	each	$549.53	$1,099
Magmeter	1.00	each	$549.53	$550
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	9.00	each	$208.82	$1,879
Number of Digital I/O Counts	15.00	each	$49.46	$742
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	147.44	lf	$9.53	$1,405
Allowance for Misc Items	10%		$32,132.39	$3,213
Subtotal				$35,346
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	51.00	lf	*$10.36*	$528
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	51.00	lf	*$11.98*	$611
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,378.44	$238
Subtotal				$2,616
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$169,764
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$188,626	$3,773
I & C Allowance	2%		$188,626	$3,773
Mechanical Allowance	4%		$188,626	$7,545
Electrical Allowance	2%		$188,626	$3,773
Facility Cost	**714**	**Building SF**	**$264.18**	**$188,626**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	76.22	CY	*$5.35*	$408
Imported Structural Backfill	38.89	CY	*$40.56*	$1,577
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	76.22	CY	*$6.58*	$502
Allowance for Misc Items	5%		$2,486.65	$124
Subtotal				$2,611
CONCRETE:				
Slab on Grade	28.07	CY	*$345.93*	$9,711
Containment Walls	4.73	CY	*$683.50*	$3,232
Bulk Tank Pads	25.13	CY	*$345.93*	$8,694
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	1.33	CY	*$345.93*	$461
Corridor				
Slab on Grade	6.94	CY	*$345.93*	$2,402
Electrical Room				
Slab on Grade	0.00	CY	*$345.93*	$0
Allowance for Misc Items	5%		$24,500.49	$1,225
Subtotal				$25,726
MASONRY:	Moderate			
CMU Building	1050.00	SF	*$131.60*	$138,181
Subtotal				$138,181
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	*$17,367.52*	$34,735
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	2.00	EA	*$6,737.98*	$13,476
Allowance for Misc Items	10%		$48,211.01	$4,821
Subtotal				$53,032
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	*$824.29*	$1,649
Chemical Tank Beacons	2.00	each	*$824.29*	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	0.00	each	*$1,099.05*	$0
Metering Pump Discharge Pressure Switch	2.00	each	*$549.53*	$1,099
Magmeter	1.00	each	*$549.53*	$550
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	6.00	each	*$208.82*	$1,253
Number of Digital I/O Counts	20.00	each	*$49.46*	$989
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	225.00	lf	*$9.53*	$2,144
Allowance for Misc Items	10%		$31,752.48	$3,175
Subtotal				$34,928
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	59.00	lf	*$10.36*	$611
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	59.00	lf	*$11.98*	$707
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,557.19	$256
Subtotal				$2,813
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$266,266
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$295,851	$5,917
I & C Allowance	2%		$295,851	$5,917
Mechanical Allowance	4%		$295,851	$11,834
Electrical Allowance	2%		$295,851	$5,917
Facility Cost	**1,050**	**Building SF**	**$281.76**	**$295,851**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	89.00	CY	*$5.35*	$476
Imported Structural Backfill	45.41	CY	*$40.56*	$1,842
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	89.00	CY	*$6.58*	$586
Allowance for Misc Items	5%		$2,903.46	$145
Subtotal				$3,049
CONCRETE:				
Slab on Grade	31.46	CY	*$345.93*	$10,882
Containment Walls	6.87	CY	*$683.50*	$4,699
Bulk Tank Pads	29.50	CY	*$345.93*	$10,204
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	2.00	CY	*$345.93*	$692
Corridor				
Slab on Grade	7.50	CY	*$345.93*	$2,594
Electrical Room				
Slab on Grade	3.41	CY	*$345.93*	$1,179
Allowance for Misc Items	5%		$30,249.22	$1,512
Subtotal				$31,762
MASONRY:	Moderate			
CMU Building	1226.00	SF	*$131.60*	$161,343
Subtotal				$161,343
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	*$18,113.65*	$36,227
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	3.00	EA	*$6,737.98*	$20,214
Allowance for Misc Items	10%		$56,441.24	$5,644
Subtotal				$62,085
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	*$824.29*	$1,649
Chemical Tank Beacons	2.00	each	*$824.29*	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	0.00	each	*$1,099.05*	$0
Metering Pump Discharge Pressure Switch	3.00	each	*$549.53*	$1,649
Magmeter	2.00	each	*$549.53*	$1,099
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	9.00	each	*$208.82*	$1,879
Number of Digital I/O Counts	26.00	each	*$49.46*	$1,286
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	297.00	lf	*$9.53*	$2,830
Allowance for Misc Items	10%		$34,460.81	$3,446
Subtotal				$37,907
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	61.00	lf	*$10.36*	$632
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	61.00	lf	*$11.98*	$731
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	12.00	each	*$7.95*	$95
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	12.00	each	*$63.16*	$758
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	3.00	each	*$8.27*	$25
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	3.00	each	*$109.33*	$328
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Allowance for Misc Items	10%		$3,184.53	$318
Subtotal				$3,503
ELECTRICAL:				
# MCC Sections	6.00	#	*$6,783.10*	$40,699
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	243.00	lf	*$9.53*	$2,315
Allowance for Misc Items	10%		$43,014.07	$4,301
Subtotal				$47,315
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$355,940
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$395,488	$7,910
I & C Allowance	2%		$395,488	$7,910
Mechanical Allowance	4%		$395,488	$15,820
Electrical Allowance	2%		$395,488	$7,910
Facility Cost	1,226	**Building SF**	**$322.58**	**$395,488**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	1575.42	CY	***$5.35***	$0
Imported Structural Backfill	86.68	CY	***$40.56***	$0
Native Backfill	828.79	CY	***$6.58***	$0
Haul Excess	746.63	CY	***$6.58***	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
CONCRETE:				
Wet Well:				
Foundation	28.89	CY	***$382.16***	$0
Perimeter Walls	64.42	CY	***$683.50***	$0
Operating Floor:				
Elevated Slab (Including floor over Discharge Header Vault)	36.61	CY	***$1,088.69***	$0
Pump Pads	1.63	CY	***$345.93***	$565
Other Equipment Pads	1.00	CY	***$345.93***	$346
Discharge Pipe Vault:				
Slab on Grade	13.66	CY	***$345.93***	$4,725
Walls	17.16	CY	***$683.50***	$11,727
Allowance for Misc Items	5%		$17,362.33	$868
Subtotal				$18,230
MASONRY:	Moderate			
CMU Building	988.44	SF	***$131.60***	$130,080
Subtotal				$130,080
METALS:				
Checker Plate Over Intake Pipe Gate = (Diameter of Influent Pipe +2') * (2 Feet Wide) (sf)	10.00	SF	***$72.38***	$724
Checker Plate Over Discharge Pipe Header = ((Discharge Pipe Diameter * 2) * ("S" * Total Number of Pumps)	57.98	SF	***$72.38***	$4,197
Ladder	15.55	VLF	***$99.36***	$1,545
Allowance for Misc Items	10%		$6,464.96	$646
Subtotal				$7,111
EQUIPMENT:				
Size of Sluice Gate (per side in inches)	36.00	Inches		
Sluice Gate	1.00	EA	***$6,330.27***	$6,330
Pumps:				
Active Pump # 1	124.39	HP	***$790.52***	$98,332
Active Pump # 2	124.39	HP	***$790.52***	$98,332
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0
Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	124.39	HP	***$790.52***	$98,332
AFD's				
Active Pump # 1	124.39	HP	***$156.14***	$19,422
Active Pump # 2	124.39	HP	***$156.14***	$19,422
Active Pump # 3	0.00	HP	***$0.00***	$0
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0

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Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	124.39	HP	***$156.14***	$19,422
Allowance for Misc Items	10%		$353,259.39	$35,326
Subtotal				$394,916
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$550,338
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$1,100,676	$22,014
I & C Allowance	8.0%		$1,100,676	$88,054
Mechanical Allowance	25.0%		$1,100,676	$275,169
Electrical Allowance	15.0%		$1,100,676	$165,101
Facility Cost	**373**	**Total Pump HP**	**$2,949.56**	**$1,100,676**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	766.13	CY	$5.35	$0
Imported Structural Backfill	394.33	CY	$40.56	$0
Native Backfill	92.56	CY	$6.58	$0
Haul Excess	673.58	CY	$6.58	$0
Forebay:				
Excavation	9387.95	CY	$5.35	$0
Imported Structural Backfill	667.68	CY	$40.56	$0
Native Backfill	1838.49	CY	$6.58	$0
Haul Excess	7549.46	CY	$6.58	$0
Office:				
Excavation	0.00	CY	$5.35	$0
Imported Structural Backfill	0.00	CY	$40.56	$0
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	0.00	CY	$6.58	$0
Surge Protection:				
Excavation	129.07	CY	$5.35	$691
Imported Structural Backfill	95.68	CY	$40.56	$3,880
Native Backfill	19.56	CY	$6.58	$129
Haul Excess	109.51	CY	$6.58	$721
Allowance for Misc Items	5%		$5,420.31	$271
Subtotal				$5,691
CONCRETE:				
Pump Station				
Foundation	284.38	CY	$382.16	$0
Pump Pad Epoxy	0.74	CY	$3,412.56	$2,528
Pump Pad Support	10.50	CY	$345.93	$3,632
Pipe Supports	5.32	CY	$345.93	$1,842
Electrical Room				
Foundation	50.50	CY	$345.93	$17,471
Surge Protection				
Foundation	23.33	CY	$345.93	$8,069
Office				
Foundation	0.00	CY	$345.93	$0
Pump Station Forebay				
Slab on Grade for Rectangular Tank	231.48	CY	$345.93	$0
Support Walls for Rectangular	342.22	CY	$683.50	$0
Support Columns for Rectangular	16.50	CY	$683.50	$0
Elevated Slab for Rectangular	91.36	CY	$1,088.69	$0
Pump Baffling (for all cases)	16.43	CY	$683.50	$0
Sump Walls	86.37	CY	$683.50	$0
Sump Concrete Fill	184.06	CY	$382.16	$0
Prestressed Concrete Tank (704049 gallons)	0.00	EA	$0.00	$0
Allowance for Misc Items	5%		$33,541.85	$1,677
Subtotal				$35,219
MASONRY:	Moderate			
Pump Station Building	2519.25	SF	$197.40	$497,305
Office Building	0.00	SF	$131.60	$0
Surge Building	629.81	SF	$131.60	$82,884
Electrical Room	1363.60	SF	$131.60	$179,452
Subtotal	4512.66			$759,641
METALS:				
Pump Removal Hatches	73.33	SF	$109.91	$8,060
Allowance for Misc Items	10%		$8,059.73	$806
Subtotal				$8,866
THERMAL & MOISTURE PROTECTION:				
Wet Well Liner	0.00	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	1.00	EA	$219,989.00	$219,989
Active Pump # 2	1.00	EA	$219,989.00	$219,989
Active Pump # 3	1.00	EA	$219,989.00	$219,989

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Active Pump # 4	1.00	EA	$219,989.00	$219,989
Active Pump # 5	0.00	EA	$0.00	$0
Active Pump # 6	0.00	EA	$0.00	$0
Active Pump # 7	0.00	EA	$0.00	$0
Active Pump # 8	0.00	EA	$0.00	$0
Active Pump # 9	0.00	EA	$0.00	$0
Active Pump # 10	0.00	EA	$0.00	$0
Standby Pump	1.00	EA	$219,989.00	$219,989
Allowance for Misc Items	10%		$1,099,945.01	$109,995
Subtotal				$1,209,940
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	10.00	each	$5,064.93	$50,649
Control Valve Actuators	5.00	each	$5,064.93	$25,325
Level Indicator Transmitters	2.00	each	$6,764.54	$13,529
Level Swithces	2.00	each	$7,120.57	$14,241
Pressure Indicator Transmitters	6.00	each	$7,120.57	$42,723
Pressure Switches	10.00	each	$7,120.57	$71,206
Number of Analog I/O Counts	37.20	each	$208.82	$7,768
Number of Digital I/O Counts	104.40	each	$49.46	$5,163
Number of PLC's	5.00	each	$10,331.10	$51,656
I&C Conduit & Wire	2407.48	lf	$9.53	$22,940
Allowance for Misc Items	10%		$ 305,200.54	$30,520
Subtotal				$335,721
MECHANICAL:				
Pipe:				
Discharge Lateral Pipe (18-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	45.00	LF	$68.67	$3,090
Discharge Header Pipe (36-inch,DIS, Exposed/Buried, Steel, Cement Mortar, Cement Mortar)	45.00	LF	$896.07	$40,323
Pump Discharge Pipe (12-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	5.00	LF	$59.36	$297
Elbows:				
Discharge Header Pipe (36-inch)	2.00	EA	$3,449.05	$6,898
Tees:				
Discharge Header Pipe (36-inch)	5.00	EA	$6,723.69	$33,618
Valves:				
Discharge Lateral Isolation Valve (18-inch, BFV)	5.00	EA	$2,759.13	$13,796
Pump Control Valve (18-inch, Check Valve)	5.00	EA	$2,759.13	$13,796
Discharge Header Isolation Valve (36-inch, BFV)	1.00	EA	$7,386.98	$7,387
Air Release Vacuum Valves	15.00	EA	$3,297.16	$49,457
Allowance for Misc Items	10%		$168,662.47	$16,866
Subtotal				$185,529
ELECTRICAL:				
MCC's				
Sections	3.00	each	$6,783.10	$20,349
AFD's				
Active Pump # 1	700.00	HP	$128.86	$90,202
Active Pump # 2	700.00	HP	$128.86	$90,202
Active Pump # 3	700.00	HP	$128.86	$90,202
Active Pump # 4	700.00	HP	$128.86	$90,202
Active Pump # 5	0.00	HP	$0.00	$0
Active Pump # 6	0.00	HP	$0.00	$0
Active Pump # 7	0.00	HP	$0.00	$0
Active Pump # 8	0.00	HP	$0.00	$0
Active Pump # 9	0.00	HP	$0.00	$0
Active Pump # 10	0.00	HP	$0.00	$0
Standby Pump	700.00	HP	$128.86	$90,202
Switchgear				
Units	8.00	each	$31,202.24	$249,618
Electrical Conduit & Wire	343.93	lf	$9.53	$3,277
Allowance for Misc Items	5%		$724,256	$36,213
Subtotal				$760,469
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0

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Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$3,301,075
ALLOWANCES:		**User Over-write**		
Finishes Allowance	5%		$4,232,147	$211,607
I & C Allowance	2%		$4,232,147	$84,643
Surge Allowance	5%		$4,232,147	$211,607
Mechanical Allowance	5%		$4,232,147	$211,607
Electrical Allowance	5%		$4,232,147	$211,607
Facility Cost	3,500	**Total Pump HP**	**$1,209.18**	**$4,232,147**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Circular Clearwell				
Excavation	14,515	CY	*$5.35*	$77,691
Imported Structural Backfill	1,523	CY	*$40.56*	$61,784
Native Backfill	2,973	CY	*$6.58*	$19,563
Haul Excess	11,542	CY	*$6.58*	$75,949
Rectangular Clearwell				
Excavation	0	CY	*$5.35*	$0
Imported Structural Backfill	0	CY	*$40.56*	$0
Native Backfill	0	CY	*$6.58*	$0
Haul Excess	0	CY	*$6.58*	$0
Allowance for Misc Items	5%		$234,986.14	$11,749
Subtotal				$246,735
CONCRETE:				
Circular Clearwell				
Prestressed Concrete Tank (2000000 gallons)	1	EA	*$872,030.58*	$872,031
Rectangular Clearwell				
Foundation	0	CY	*$382.16*	$0
Columns	0	CY	*$683.50*	$0
Walls	0	CY	*$683.50*	$0
Elevated Slab	0	CY	*$1,088.69*	$0
Concrete Baffling	0	CY	*$683.50*	$0
Allowance for Misc Items	5%		$872,030.58	$43,602
Subtotal				$915,632
METALS & PLASTICS:				
Polypropylene Baffling	0	SF	*$10.99*	$0
Stainless Steel Baffling	0	SF	*$45.79*	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
THERMAL & MOISTURE PROTECTION:				
Concrete Liner	0	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,162,368
ALLOWANCES:		**User Over-write**		
Metals Allowance	1.0%		$1,249,858	$12,499
Finishes Allowance	2.0%		$1,249,858	$24,997

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Equipment Allowance	1.0%		$1,249,858	$12,499
I & C Allowance	2%		$1,249,858	$24,997
Mechanical Allowance	5%		$1,249,858	$62,493
Electrical Allowance	1%		$1,249,858	$12,499
Facility Cost	**2,000,000**	**Gallons**	**$0.66**	**$1,312,350**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	1383.87	CY	***$5.35***	$7,407
Imported Structural Backfill	76.18	CY	***$40.56***	$3,090
Native Backfill	308.73	CY	***$6.58***	$2,031
Haul Excess	1075.14	CY	***$6.58***	$7,075
Allowance for Misc Items	5%		$19,602.35	$980
Subtotal				$20,582
CONCRETE:				
Process Building Slab on Grade	73.32	CY	***$345.93***	$25,364
Concrete Walls	57.78	CY	***$683.50***	$39,491
Electrical Room Slab on Grade	0.15	CY	***$345.93***	$51
Allowance for Misc Items	5%		$64,906.76	$3,245
Subtotal				$68,152
MASONRY:	Moderate			
CMU Building	1546.67	SF	***$131.60***	$203,543
Subtotal				$203,543
METALS:				
Stairway from Building Doors to Floor	30.00	Risers	***$394.80***	$11,844
Stairway from Grating to Floor	18.00	Risers	***$394.80***	$7,106
Grating	469.33	SF	***$72.38***	$33,971
Handrail	56.00	LF	***$72.38***	$4,053
Allowance for Misc Items	10%		$56,974.61	$5,697
Subtotal				$62,672
EQUIPMENT:				
UV Reactors	2.00	EA	***$185,134.72***	$370,269
Sump Pump	1.00	EA	***$6,077.92***	$6,078
Allowance for Misc Items	10%		$376,347.36	$37,635
Subtotal				$413,982
INSTRUMENTS & CONTROLS:				
Mag Meters	2.00	EA	***$17,912.55***	$35,825
UV Absorbance Analyzer	1.00	EA	***$21,794.63***	$21,795
Allowance for Misc Items	5%		$57,619.74	$2,881
Subtotal				$60,501
CONVEYING SYSTEMS:				
Bridge Crane	1.00	EA	***$25,289.83***	$25,290
Crane Rail	53.33	LF	***$56.12***	$2,993
Allowance for Misc Items	10%		$28,282.91	$2,828
Subtotal				$31,111
MECHANICAL:				
Inlet and Outlet Pipe Headers (36 inch diameter)	1.00	LS	***$82,262.74***	$82,263
UV Train Pipe Systems (24 inch diameter)	2.00	EA	***$24,962.51***	$49,925
Allowance for Misc Items	10%		$132,187.76	$13,219
Subtotal				$145,407
ELECTRICAL:				
UPS	0.00	KW	***$1,316.01***	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0

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Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,005,951
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$1,341,268	$26,825
I & C Allowance	5%		$1,341,268	$67,063
Mechanical Allowance	8%		$1,341,268	$107,301
Electrical Allowance	10%		$1,341,268	$134,127
Facility Cost	**20,000,000**	**GPD**	**$0.07**	**$1,341,268**

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Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation				
Influent Channel, Surge Basin & Decant Pump	5311.63	CY	***$5.35***	$28,429
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1502.22	CY	***$5.35***	$8,040
Pipe Vault	351.82	CY	***$5.35***	$1,883
Imported Structural Backfill				
Influent Channel, Surge Basin & Decant Pump	426.72	CY	***$40.56***	$17,306
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	80.20	CY	***$40.56***	$3,252
Pipe Vault	70.17	CY	***$40.56***	$2,846
Native Backfill				
Influent Channel, Surge Basin & Decant Pump	1115.38	CY	***$6.58***	$7,339
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	32.00	CY	***$6.58***	$211
Pipe Vault	103.39	CY	***$6.58***	$680
Haul Excess				
Influent Channel, Surge Basin & Decant Pump	4196.25	CY	***$6.58***	$27,612
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1470.22	CY	***$6.58***	$9,674
Pipe Vault	248.42	CY	***$6.58***	$1,635
Allowance for Misc Items	5%		$108,907.43	$5,445
Subtotal				$114,353
CONCRETE:				
Surge Basin:				
Foundation	308.85	CY	***$382.16***	$118,028
Perimeter Walls	382.34	CY	***$683.50***	$261,329
Influent Channel Wall	62.23	CY	***$683.50***	$42,536
Concrete Curb (8" X 8")	76.89	LF	***$32.90***	$2,530
Backwash Recycle Sump:				
Slab on Grade	18.89	CY	***$345.93***	$6,534
Walls	90.62	CY	***$683.50***	$61,940
Elevated Slab	9.23	CY	***$1,088.69***	$10,045
Backwash Sludge Sump:				
Slab on Grade	13.33	CY	***$345.93***	$4,612
Walls	66.77	CY	***$683.50***	$45,640
Elevated Slab	6.88	CY	***$1,088.69***	$7,491
Dry Pit:				
Slab on Grade	5.31	CY	***$345.93***	$1,836
Walls	32.33	CY	***$683.50***	$22,096
Elevated Slab	3.49	CY	***$1,088.69***	$3,802
Pipe Vault:				
Lower Elevated Slab	29.64	CY	***$1,088.69***	$32,271
Upper Elevated Slab	29.64	CY	***$1,088.69***	$32,271
Walls	32.67	CY	***$683.50***	$22,333
Electrical Room Slab on Grade	5.27	CY	***$345.93***	$1,822
Allowance for Misc Items	5%		$677,117.15	$33,856
Subtotal				$710,973
MASONRY:	**Moderate**			
Pump Sumps and Pipe Vault	0.00	SF	***$131.60***	$0
Electrical Room	80.89	SF	***$131.60***	$10,645
Subtotal	80.89			$10,645
METALS:				
Influent Channel:				
Grating	185.56	SF	***$72.38***	$13,431
Surge Basin:				
Grating	4.00	SF	***$72.38***	$290
Backwash Recycle Sump:				
Grating	4.00	SF	***$72.38***	$290
Backwash Sludge Sump:				
Grating	4.00	SF	***$72.38***	$290
Dry Pit:				

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Ladder	27.60	VLF	*$99.36*	$2,742
Pipe Vault:				
Grating	4.00	SF	*$72.38*	$290
Stairs	16.00	RISERS	*$394.80*	$6,317
Allowance for Misc Items	10%		$23,647.47	$2,365
Subtotal				$26,012
DOORS & WINDOWS:				
Backwash Recycle Sump:				
Aluminum Access Hatch (10' x 5')	1.00	EA	*$4,400.75*	$4,401
Backwash Sludge Sump:				
Aluminum Access Hatch (3' x 3')	1.00	EA	*$1,098.21*	$1,098
Dry Pit:				
Aluminum Access Hatch (3' x 3')	1.00	EA	*$1,098.21*	$1,098
Pipe Vault:				
Aluminum Access Hatch (3' x 3')	2.00	EA	*$1,098.21*	$2,196
Allowance for Misc Items	5%		$8,793.60	$440
Subtotal				$9,233
EQUIPMENT:				
Floating Decanter Plate System	0.00	SF	*$72.94*	$0
Traveling Solids Removal Mechanism	2.00	EA	*$66,857.09*	$133,714
Washwater Decant Pump (Submersible Pump)	3.00	EA	*$18,993.38*	$56,980
Sludge Pump (Submersible Pump)	2.00	EA	*$12,409.63*	$24,819
Mixers	0.00	HP	*$1,580.26*	$0
Allowance for Misc Items	10%		$215,513.57	$21,551
Subtotal				$237,065
I&C:				
Instruments				
Backwash Waste Recycle Header Magmeter (BWRH, 12 inch)	1.00	EA	$10,573.93	$10,574
Isolation Valve Actuators (Electric)	5.00	EA	*$5,064.93*	$25,325
Level Transmitters	1.00	EA	*$7,120.57*	$7,121
Number of Analog I/O Counts	6.00	EA	*$208.82*	$1,253
Number of Digital I/O Counts	30.00	EA	*$49.46*	$1,484
Number of Local Panels	1.00	EA	*$10,331.10*	$10,331
Number of PLC's	1.00	EA	*$10,990.54*	$10,991
I&C Conduit Wire	259.78	lf	*$9.53*	$2,475
Allowance for Misc Items	5%		$69,552.80	$3,478
Subtotal				$73,030
MECHANICAL:				
Pipe:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	LF	*$657.50*	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	LF	*$123.32*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	16.22	LF	*$219.17*	$3,555
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	LF	*$219.17*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	81.00	LF	*$54.81*	$4,439
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	16.22	LF	*$109.58*	$1,778
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	LF	*$109.58*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	54.00	LF	*$109.58*	$5,917
Elbows:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	*$3,959.76*	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	*$2,588.21*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	1.00	EA	*$1,319.92*	$1,320
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$1,319.92*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	6.00	EA	*$1,150.31*	$6,902
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	*$659.96*	$660
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$659.96*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	4.00	EA	*$659.96*	$2,640
Tee:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	*$9,021.82*	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	*$4,297.65*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	2.00	EA	*$3,007.27*	$6,015

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Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$3,007.27*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	0.00	EA	*$1,910.07*	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	*$1,503.64*	$1,504
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$1,503.64*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	0.00	EA	*$1,503.64*	$0
Valves:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	*$28,960.68*	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	*$12,602.74*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$9,653.56*	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	*$9,653.56*	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	3.00	EA	*$5,601.22*	$16,804
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$4,826.78*	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	*$4,826.78*	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	2.00	EA	*$4,826.78*	$9,654
Allowance for Misc Items	5%		$61,186.86	$3,059
Subtotal				$64,246
ELECTRICAL:				
# MCC Sections	8.00	EA	*$6,783.10*	$54,265
Switchgear	0.00	EA	*$31,202.24*	$0
Adjustable Frequency Drives				
Basin Mixer	0.00	EA	*$4,125.89*	$0
Sludge Pumps (Active)	1.00	EA	*$4,871.14*	$4,871
Sludge Pumps (Standby)	1.00	EA	*$4,871.14*	$4,871
Recycle Pumps (Active)	2.00	EA	*$6,299.20*	$12,598
Recycle Pumps (Standby)	1.00	EA	*$6,299.20*	$6,299
Electrical Conduit & Wire	259.78	lf	*$9.53*	$2,475
Allowance for Misc Items	5%		$85,380.01	$4,269
Subtotal				$89,649
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,335,206.98
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2%		$1,534,721	$30,694.41
I & C Allowance	3%		$1,534,720.67	$46,041.62
Mechanical Allowance	5%		$1,534,720.67	$76,736.03
Electrical Allowance	3%		$1,534,720.67	$46,041.62
Facility Cost	**2,519,600**	**Gallons**	**$0.61**	**$1,534,721**

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	B	C	D	E	F
317					
318	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
319	SITEWORK:				
320	Soil Excavation	7890.61	CY	***$5.35***	$42,233
321	Imported Structural Backfill	885.62	CY	***$40.56***	$35,916
322	Backfill	137.39	CY	***$6.58***	$904
323	Haul Excess	7753.22	CY	***$6.58***	$51,017
324	Stair Case:				
325	Soil Excavation	673.00	CY	***$5.35***	$3,602
326	Imported Structural Backfill	87.11	CY	***$40.56***	$3,533
327	Backfill	34.67	CY	***$6.58***	$228
328	Haul Excess	638.33	CY	***$6.58***	$4,200
329	Blower Room:				
330	Soil Excavation	91.90	CY	***$5.35***	$492
331	Imported Structural Backfill	116.44	CY	***$40.56***	$4,722
332	Backfill	4.42	CY	***$6.58***	$29
333	Haul Excess	87.48	CY	***$6.58***	$576
334	Electrical Room:				
335	Soil Excavation	16.29	CY	***$5.35***	$87
336	Imported Structural Backfill	19.63	CY	***$40.56***	$796
337	Backfill	1.46	CY	***$6.58***	$10
338	Haul Excess	14.83	CY	***$6.58***	$98
339	Allowance for Misc Items	5%		$148,442.48	$7,422
340	Subtotal				$155,865
341					
342	CONCRETE:				
343	Filters				
344	Foundation (Includes Filter, Gulllet Channel, Filter Influent/Backwash Wastewater Channel) (FSOGW * FSOGL * FOSGT) / 27 *#TF	458.37	CY	***$382.16***	$175,171
345	Pipe Gallery Wall	278.19	CY	***$683.50***	$190,141
346	Gullet Wall	55.97	CY	***$683.50***	$38,257
347	Filter Influent / Backwash Waste Channel Walls	460.37	CY	***$683.50***	$314,665
348	Filter Influent / Backwash Waste Channel Lower Elevated Slab	26.67	CY	***$1,088.69***	$29,032
349	Filter Influent / Backwash Waste Channel Upper Elevated Slab	36.00	CY	***$1,088.69***	$39,193
350	End Walls	253.63	CY	***$683.50***	$173,357
351	Common Filter Influent				
352	Slab on Grade	62.48	CY	***$345.93***	$21,615
353	Common Influent Channel Wall	213.70	CY	***$683.50***	$146,067
354	Common Influent Channel Elevated Slab	27.81	CY	***$1,088.69***	$30,276
355	Filter Gallery				
356	Slab on Grade	567.17	CY	***$345.93***	$196,201
357	Filter Gallery Elevated Slab	75.62	CY	***$1,088.69***	$82,330
358	Pipe Supports	2.24	CY	***$32.90***	
359	Blower Room				
360	Slab on Grade	63.66	CY	***$345.93***	$22,023
361	Blower Room Walls	31.79	CY	***$683.50***	$21,730
362	Stair Case				
363	Slab on Grade	46.22	CY	***$345.93***	$15,990
364	Stair Case Walls	25.58	CY	***$683.50***	$17,481
365	Electrical Room				
366	Slab on Grade	3.04	CY	***$345.93***	$1,051
367	Electrical Room Walls	9.71	CY	***$683.50***	$6,638
368	Allowance for Misc Items	5%		$1,521,216.81	$76,061
369	Subtotal				$1,597,278
370					
371	MASONRY:	**Moderate**			
372	CMU Filter Building	10239.03	SF	***$131.60***	$1,347,470
373	Blower Room	793.33	SF	***$131.60***	$104,404
374	Electrical Room	82.00	SF	***$131.60***	$10,791
375	Subtotal				$1,462,665
376					
377	METALS:				

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	B	C	D	E	F
378	Metal Guardrail with Pickets	517.33	LF	*$72.38*	$37,445
379	Filter Access Hatch	20.25	SF	*$109.91*	
380	Stairs (FBD * 12/8)	32.00	Risers	*$394.80*	$12,634
381	Allowance for Misc Items	10%		$50,078.70	$5,008
382	Subtotal				$55,087
383					
384	THERMAL & MOISTURE PROTECTION:				
385	Concrete Liner	0	SF	$16.00	$0
386	Allowance for Misc Items	10%		$0.00	$0
387	Subtotal				$0
388					
389	EQUIPMENT:				
390	Fabricated Slide Gates, 42-inch	2	EA	*$7,111.04*	$14,222
391	Underdrain - Leopold Type S	3,083	SF	*$69.90*	$215,466
392	Wash Troughs				
393	Conventional	0	LF	*$234.61*	$0
394	Media Retaining	379	LF	*$531.99*	$201,446
395	Media				
396	Bottom Media - Sand (ES=0.5 UC=1.4)	3,083	CF	*$17.47*	$53,867
397	Middle Media - Coal (ES=0 UC=0)	0	CF	*$23.30*	$0
398	Top Media - Coal (ES=1 UC=1.4)	12,331	CF	*$23.30*	$287,288
399	Air Scour Blowers (147 hp each)	2	EA	*$80,692.87*	$161,386
400	Allowance for Misc Items	10%		$933,675.01	$93,368
401	Subtotal				$1,027,043
402					
403	INSTRUMENTS & CONTROLS:				
404	Instruments				
405	Filter Effluent Magmeter (20-inch)	4.00	EA	*$17,150.92*	$68,604
406	Combined Filter Effluent Magmeter (36-inch)	0.00	EA	*$28,001.02*	$0
407	Isolation Valve Actuators	24.00	EA	*$5,064.93*	$121,558
408	Control Valve Actuators	4.00	EA	*$5,064.93*	$20,260
409	Turbidimeters	4	EA	*$3,133.05*	$12,532
410	Particle Counters	4	EA	*$6,764.54*	$27,058
411	Level Transmitters	4	EA	*$7,120.57*	$28,482
412	Differential Pressure Transmitters	4	EA	*$7,120.57*	$28,482
413	Filter Influent Level Transmitter	2	EA	*$7,120.57*	$14,241
414	Air Scour Differential Pressure Transmitter	2	EA	*$7,120.57*	$14,241
415	Air Scour Discharge Pressure Indicator Transmitter	2	EA	*$7,120.57*	$14,241
416	Number of Analog I/O Counts	53	EA	*$208.82*	$11,026
417	Number of Digital I/O Counts	149	EA	*$49.46*	$7,359
418	Number of PLC's	1	EA	*$10,331.10*	$10,331
419	I&C Conduit & Wire	4,266	LF	*$9.53*	$40,650
420	Allowance for Misc Items	10%		$419,065.93	$41,907
421	Subtotal				$460,973
422					
423	CONVEYING SYSTEMS:				
424	Monorail Hoist (3 Ton)	1	EA	*$3,257.13*	$3,257
425	Hoist Rail	190	LF	*$32.90*	$6,259
426	Allowance for Misc Items	5%		$9,515.98	$476
427	Subtotal				$9,992
428					
429	MECHANICAL:				
430	Pipe				
431	Air Scour Pipe-BAW (16-inch , Exposed , Steel , None , None)	268	LF	*$264.60*	$70,861

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	B	C	D	E	F
432	Filter Influent Header Pipe-FIH (36-inch , Buried , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$657.50	$0
433	Filter Influent Pipe-FIH (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$547.92	$0
434	Filter Effluent Pipe-FE (20-inch , Exposed , Steel , Cement Mortar , Paint)	56	LF	$365.28	$20,385
435	Filter Effluent Pipe-FE (20-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	56	LF	$365.28	$20,385
436	Filter Control Valve Pipe-FCV (16-inch , Exposed , Steel , None , None)	43	LF	$264.60	$11,290
437	Filter Effluent Header Pipe-FEH (36-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	79	LF	$657.50	$51,942
438	Filter to Waste-FTW (20-inch , Exposed , Steel , Cement Mortar , Paint)	43	LF	$365.28	$15,765
439	Filter to Waste-FTW (20-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	184	LF	$365.28	$67,211
440	Backwash Supply Pipe-BWS (36-inch , Exposed , Steel , Cement Mortar , Paint)	201	LF	$657.50	$131,986
441	Backwash Supply Pipe-BWS (36-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	48	LF	$657.50	$31,560
442	Backwash Waste Pipe-BWW (36-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	10	LF	$657.50	$6,575
443	Elbows				
444	Air Scour Pipe-BAW (16-inch , Steel)	16	EA	$1,759.89	$28,158
445	Filter Influent Header Pipe-FIH (36-inch , Steel)	0	EA	$3,959.76	$0
446	Filter Influent Pipe-FIH (30-inch , Steel)	0	EA	$3,299.80	$0
447	Filter Effluent Pipe-FE (20-inch , Steel)	4	EA	$2,199.87	$8,799
448	Filter Effluent Pipe-FE (20-inch , Steel)	4	EA	$2,199.87	$8,799
449	Filter Control Valve Pipe-FCV (16-inch , Steel)	0	EA	$1,759.89	$0
450	Filter Effluent Header Pipe-FEH (36-inch , Steel)	0	EA	$3,959.76	$0
451	Filter to Waste-FTW (20-inch , Steel)	6	EA	$2,199.87	$13,199
452	Filter to Waste-FTW (20-inch , Steel)	0	EA	$2,199.87	$0
453	Backwash Supply Pipe-BWS (36-inch , Steel)	2	EA	$3,959.76	$7,920
454	Backwash Supply Pipe-BWS (36-inch , Steel)	2	EA	$3,959.76	$7,920
455	Backwash Waste Pipe-BWW (36-inch , Steel)	0	EA	$3,959.76	$0
456	Tees				
457	Air Scour Pipe-BAW (16-inch , Steel)	4	EA	$4,009.70	$16,039
458	Filter Influent Header Pipe-FIH (36-inch , Steel)	0	EA	$9,021.82	$0
459	Filter Influent Pipe-FIH (30-inch , Steel)	0	EA	$7,518.19	$0
460	Filter Effluent Pipe-FE (20-inch , Steel)	4	EA	$5,012.12	$20,048
461	Filter Effluent Pipe-FE (20-inch , Steel)	0	EA	$5,012.12	$0
462	Filter Control Valve Pipe-FCV (16-inch , Steel)	0	EA	$4,009.70	$0
463	Filter Effluent Header Pipe-FEH (36-inch , Steel)	0	EA	$9,021.82	$0
464	Filter to Waste-FTW (20-inch , Steel)	0	EA	$5,012.12	$0
465	Filter to Waste-FTW (20-inch , Steel)	2	EA	$5,012.12	$10,024
466	Backwash Supply Pipe-BWS (36-inch , Steel)	6	EA	$9,021.82	$54,131
467	Backwash Supply Pipe-BWS (36-inch , Steel)	0	EA	$9,021.82	$0
468	Backwash Waste Pipe-BWW (36-inch , Steel)	0	EA	$9,021.82	$0
469	Crosses				
470	Air Scour Pipe-BAW (16-inch , Steel)	2	EA	$5,346.27	$10,693
471	Filter Influent Header Pipe-FIH (36-inch , Steel)	0	EA	$12,029.10	$0
472	Filter Influent Pipe-FIH (30-inch , Steel)	0	EA	$10,024.25	$0
473	Filter Effluent Pipe-FE (20-inch , Steel)	0	EA	$6,682.83	$0
474	Filter Effluent Pipe-FE (20-inch , Steel)	0	EA	$6,682.83	$0
475	Filter Control Valve Pipe-FCV (16-inch , Steel)	0	EA	$5,346.27	$0
476	Filter Effluent Header Pipe-FEH (36-inch , Steel)	2	EA	$12,029.10	$24,058
477	Filter to Waste-FTW (20-inch , Steel)	0	EA	$6,682.83	$0
478	Filter to Waste-FTW (20-inch , Steel)	0	EA	$6,682.83	$0
479	Backwash Supply Pipe-BWS (36-inch , Steel)	0	EA	$12,029.10	$0
480	Backwash Supply Pipe-BWS (36-inch , Steel)	0	EA	$12,029.10	$0
481	Backwash Waste Pipe-BWW (36-inch , Steel)	0	EA	$12,029.10	$0
482	Valves				
483	Air Scour Pipe-BAW (16-inch ,V500 - BFV)	4	EA	$12,871.41	$51,486
484	Filter Influent Header Pipe-FIH (36-inch ,V500 - BFV)	0	EA	$28,960.68	$0

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	B	C	D	E	F
485	Filter Influent Pipe-FIH (30-inch ,V500 - BFV)	4	EA	*$24,133.90*	$96,536
486	Filter Effluent Pipe-FE (20-inch ,V500 - BFV)	4	EA	*$16,089.26*	$64,357
487	Filter Effluent Pipe-FE (20-inch ,V500 - BFV)	0	EA	*$16,089.26*	$0
488	Filter Control Valve Pipe-FCV (16-inch ,V500 - BFV)	4	EA	*$12,871.41*	$51,486
489	Filter Effluent Header Pipe-FEH (36-inch ,V500 - BFV)	0	EA	*$28,960.68*	$0
490	Filter to Waste-FTW (20-inch ,V500 - BFV)	4	EA	*$16,089.26*	$64,357
491	Filter to Waste-FTW (20-inch ,V500 - BFV)	0	EA	*$16,089.26*	$0
492	Backwash Supply Pipe-BWS (36-inch ,V500 - BFV)	4	EA	*$28,960.68*	$115,843
493	Backwash Supply Pipe-BWS (36-inch ,V500 - BFV)	0	EA	*$28,960.68*	$0
494	Backwash Waste Pipe-BWW (36-inch ,V500 - BFV)	4	EA	*$28,960.68*	$115,843
495	Allowance for Misc Items	5%		$1,197,655.76	$59,883
496	Subtotal				$1,257,539
497					
498	ELECTRICAL:				
499	MCC's				
500	Sections	5	EA	*$6,783.10*	$33,915
501	AFD's				
502	Air Scour Blowers (147 hp each)	-	EA	*$22,201.95*	$0
503	Switchgear				
504	Units	-	EA	*$31,202.24*	$0
505	Electrical Conduit & Wire	158	LF	*$9.53*	$1,506
506	Allowance for Misc Items	5%		$35,421.03	$1,771
507	Subtotal				$37,192
508					
509	USER DEFINED ESTIMATE ITEMS	QUANT	UNIT	$/UNIT	TOTAL COST
510	Item 1 Description	0.00		0.00	$0
511	Item 2 Description	0.00		0.00	$0
512	Item 3 Description	0.00		0.00	$0
513	Item 4 Description	0.00		0.00	$0
514	Item 5 Description	0.00		0.00	$0
515	Item 6 Description	0.00		0.00	$0
516	Item 7 Description	0.00		0.00	$0
517	Item 8 Description	0.00		0.00	$0
518	Item 9 Description	0.00		0.00	$0
519	Item 10 Description	0.00		0.00	$0
520	Item 11 Description	0.00		0.00	$0
521	Item 12 Description	0.00		0.00	$0
522	Item 13 Description	0.00		0.00	$0
523	Item 14 Description	0.00		0.00	$0
524	Item 15 Description	0.00		0.00	$0
525	Subtotal				$0
526					
527	Subtotal				$6,063,631.57
528					
529	ALLOWANCES:		**User Over-write**		
530	Finishes Allowance	2%		$6,590,904	$131,818.08
531	Mechanical Allowance	2%		$6,590,903.88	$131,818.08
532	I&C Allowance	2%		$6,590,903.88	$131,818.08
533	Electrical Allowance	2%		$6,590,903.88	$131,818.08
534					
535	Facility Cost	**20,000,000**	**GPD**	**$0.33**	**$6,590,904**

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	B	C	D	E	F
180					
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
182					
183	SITEWORK:				
184	Excavation	4,742	CY	$ 5.35	$25,383
185	Imported Structural Backfill	747	CY	$ 40.56	$30,305
186	Native Backfill	1,245	CY	$ 6.58	$8,194
187	Haul Excess	3,497	CY	$ 6.58	$23,011
188	Allowance for Misc Items	5%		$86,893	$4,345
189	Subtotal				$91,237
190					
191	CONCRETE:				
192	Influent Channel:				
193	Foundation	42	CY	$ 382.16	$16,188
194	Channel Walls	88	CY	$ 683.50	$60,363
195	Elevated Slab	26	CY	$ 1,088.69	$28,234
196	Basin				
197	Foundation	160	CY	$ 382.16	$61,282
198	Channel Walls	286	CY	$ 683.50	$195,325
199	Elevated Slab	38	CY	$ 1,088.69	$41,369
200	Concrete Curb (8" X 8")	86	LF	$ 32.90	$2,829
201	Effluent Channel:				
202	Foundation	42	CY	$ 382.16	$16,188
203	Walls	88	CY	$ 683.50	$60,363
204	Elevated Slab	26	CY	$ 1,088.69	$28,234
205	Electrical Room				
206	Slab on Grade	2	CY	$ 345.93	$737
207	Allowance for Misc Items	5%		$511,114	$25,556
208	Subtotal				$536,669
209					
210	MASONRY:	Moderate			
211	CMU Building	5,514	SF	$ 131.60	$725,698
212	Electrical Room	58	SF	$ 131.60	$7,574
213	Subtotal	5,572			$733,272
214					
215	METALS:				
216	Aluminum Handrail	295	LF	$ 72.38	$21,352
217	Allowance for Misc Items	10%		$ 21,352.07	$2,135
218	Subtotal				$23,487
219					
220	WOODS & PLASTICS:				
221	FRP Ladder	4	EA	$ 1,443.20	$5,773
222	Allowance for Misc Items	5%		$ 5,772.82	$289
223	Subtotal				$6,061
224					
225	THERMAL & MOISTURE PROTECTION:				
226	Concrete Liner	0	SF	$16.00	$0
227	Allowance for Misc Items	10%		$0.00	$0
228	Subtotal				$0
229					
230	EQUIPMENT:				
231	Lamella Clarifier [WPL * PW * #P/T *# * COS(PAR)]	41,771	PLATE AREA (SF)	$ 19.45	$812,420
232	Fabricated Slide Gate	2	EA	$ 6,077.92	$12,156
233	Hoseless Sludge Collector	4	EA	$ 66,857.09	$267,428
234	Allowance for Misc Items	10%		$ 1,092,003.71	$109,200
235	Subtotal				$1,201,204
236					
237	INSTRUMENTS & CONTROLS:				
238	Instruments				
239	Turbidimeters	4	EA	$ 3,133.05	$12,532
240	Number of Analog I/O Counts	5	each	$208.82	$1,002.34
241	Number of Digital I/O Counts	24	each	$49.46	$1,186.98
242	Number of PLC's	1	each	$10,331.10	$10,331.10
243	I&C Conduit & Wire	373	LF	$9.53	$3,557.42
244	Allowance for Misc Items	10%		$28,610	$2,861.00
245	Subtotal				$31,471
246					

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	B	C	D	E	F
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
247	MECHANICAL:				
248	Solids Collection Pipe (4-inch, USL , Immersed , Steel)	343	LF	*$66.15*	$22,689
249	Solids Collection Pipe Elbows	16	each	*$439.97*	$7,040
250	Mud Valves	4	EA	*$1,974.02*	$7,896
251	Allowance for Misc Items	10%		$37,625	$3,762
252	Subtotal				$41,387
253					
254	ELECTRICAL:				
255	MCC's				
256	Sections	5	each	*$6,783.10*	$33,915
257	AFD's				
258	Sludge Collectors (total facility) (1 hp each)	-	each	*$4,248.86*	$0
259	Switchgear				
260	Units	-	each	*$31,202.24*	$0
261	Electrical Conduit & Wire	187	LF	*$9.53*	$1,778.71
262	Allowance for Misc Items	10%		$35,694	$3,569.42
263	Subtotal				$39,264
264					
265	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
266	Item 1 Description	0.00		0.00	$0
267	Item 2 Description	0.00		0.00	$0
268	Item 3 Description	0.00		0.00	$0
269	Item 4 Description	0.00		0.00	$0
270	Item 5 Description	0.00		0.00	$0
271	Item 6 Description	0.00		0.00	$0
272	Item 7 Description	0.00		0.00	$0
273	Item 8 Description	0.00		0.00	$0
274	Item 9 Description	0.00		0.00	$0
275	Item 10 Description	0.00		0.00	$0
276	Item 11 Description	0.00		0.00	$0
277	Item 12 Description	0.00		0.00	$0
278	Item 13 Description	0.00		0.00	$0
279	Item 14 Description	0.00		0.00	$0
280	Item 15 Description	0.00		0.00	$0
281	Subtotal				$0
282					
283	Subtotal				$2,704,054
284					
285	ALLOWANCES:		**User Over-write**		
286	Finishes Allowance	2.0%		$2,939,189	$58,784
287	I & C Allowance	2%		$2,939,189	$58,784
288	Mechanical Allowance	2%		$2,939,189	$58,784
289	Electrical Allowance	2%		$2,939,189	$58,784
290					
291	Facility Cost	**20,000,000**	**GPD**	**$0.15**	**$2,939,189**

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	B	C	D	E	F
188					
189	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
190					
191	SITEWORK:				
192	Excavation	4,462	CY	***$5.35***	$23,882
193	Imported Structural Backfill	743	CY	***$40.56***	$30,115
194	Native Backfill	1,137	CY	***$6.58***	$7,485
195	Haul Excess	3,325	CY	***$6.58***	$21,876
196	Allowance for Misc Items	5%		$83,357.26	$4,168
197	Subtotal				$87,525
198					
199	CONCRETE:				
200	Influent Channel:				
201	Foundation	42	CY	***$382.16***	$16,188
202	Channel Walls (Only 3 walls are covered here. The 4th wall is covered in the Flocc Basin.)	88	CY	***$683.50***	$60,362
203	Elevated Slab	25	CY	***$1,088.69***	$27,007
204	Flocc Basin				
205	Foundation	275	CY	***$382.16***	$105,198
206	Basin Walls (Only 3 walls are covered here. The Effluent wall is covered in the Influent Channel of the Lamella Clarifier)	178	CY	***$683.50***	$121,487
207	Under Baffle Wall	48	CY	***$683.50***	$32,761
208	Over Baffle Wall	48	CY	***$683.50***	$32,761
209	Elevated Slab	91	CY	***$1,088.69***	$99,593
210	Flocc Bearing Supports	42	EA	$0.00	$0
211	Electrical Room				
212	Slab on Grade	4	CY	***$345.93***	$1,435
213	Allowance for Misc Items	5%		$496,789.26	$24,839
214	Subtotal				$521,629
215					
216	MASONRY:	Moderate			
217	CMU Building	5,292	SF	***$131.60***	$696,495
218	Electrical Room	112	SF	***$131.60***	$14,739
219	Subtotal	5,404			$711,234
220					
221	METALS:				
222	Aluminum Handrail	276	LF	***$72.38***	$19,962
223	Additional Handrail with NO Building	0	LF	***$72.38***	$0
224	Stairs (1 per basin)	27	RISERS	***$394.80***	$10,507
225	Allowance for Misc Items	10%		$30,468.67	$3,047
226	Subtotal				$33,516
227					
228	WOODS & PLASTICS:				
229	FRP Weir	9	LF	$32.90	$306
230	FRP Ladder	4	EA	$1,443.17	$5,773
231	Allowance for Misc Items	5%		$6,078.43	$304
232	Subtotal				$6,382
233					
234	THERMAL & MOISTURE PROTECTION:				
235	Concrete Liner	0	SF	$16.00	$0
236	Allowance for Misc Items	10%		$0.00	$0
237	Subtotal				$0
238					
239	DOORS & WINDOWS:				
240	O/U Baffling ON/OFF Factor	*0*			
241	Serpentine Baffling ON/OFF Factor	*1*			$0
242	Stainless Steel Door (2' x 2') for O/U Baffling	0	EA	$1,052.81	$0
243	Stainless Steel Door (2' x 2') for Serpentine Baffling	4	EA	$1,052.81	$4,211
244	Stainless Steel Door (7' x 2.5')	0	EA	$4,606.05	$0
245	Allowance for Misc Items	5%		$4,211.24	$211
246	Subtotal				$4,422
247					

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	B	C	D	E	F
248	EQUIPMENT:				
249	Horizontal Paddle Wheel Flocculation Mechanism (Paddles & Drives)	0	LF	***$0.00***	$0
250	Vertical Paddle Wheel Flocculation Mechanism (Paddles & Drives)	18	EA	***$0.00***	$0
251	Vertical Turbine Flocculation Mechanism (Turbines & Drives)	24	HP	***$1,345.03***	$32,281
252	Vertical Turbine Flocculator VFD's	24	HP	***$533.15***	$12,796
253	Fabricated Slide Gate	2	EA	***$6,077.92***	$12,156
254	Allowance for Misc Items	10%		$57,232.18	$5,723
255	Subtotal				$62,955
256					
257	ELECTRICAL:				
258	*MCC's*				
259	Sections	12	each	***$6,783.10***	$81,397
260	*AFD's*				
261	Flocculation Mixers Stage 1 (total facility) (2 hp each)	6	each	***$4,371.83***	$26,231
262	Flocculation Mixers Stage 2 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
263	Flocculation Mixers Stage 3 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
264	Flocculation Mixers Stage 4 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
265	Flocculation Mixers Stage 5 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
266	Flocculation Mixers Stage 6 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
267	*Switchgear*				
268	Units	0	each	***$31,202.24***	$0
269	Electrical Conduit & Wire	1,752	lf	***$9.53***	$16,694
270	Allowance for Misc Items	10%		$175,308.86	$17,531
271	Subtotal				$192,840
272					
273	INSTRUMENTS & CONTROLS:				
274	Instruments				
275	Level Switch	2	each	***$549.53***	$1,099
276	Number of Analog I/O Counts	43	each	***$208.82***	$9,021
277	Number of Digital I/O Counts	108	each	***$49.46***	$5,341
278	Number of PLC's	1	each	***$10,331.10***	$10,331
279	I&C Conduit & Wire	1,827	lf	***$9.53***	$17,406
280	Allowance for Misc Items	10%		$43,198.52	$4,320
281	Subtotal				$47,518
282					
283	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
284	Item 1 Description	0.00		0.00	$0
285	Item 2 Description	0.00		0.00	$0
286	Item 3 Description	0.00		0.00	$0
287	Item 4 Description	0.00		0.00	$0
288	Item 5 Description	0.00		0.00	$0
289	Item 6 Description	0.00		0.00	$0
290	Item 7 Description	0.00		0.00	$0
291	Item 8 Description	0.00		0.00	$0
292	Item 9 Description	0.00		0.00	$0
293	Item 10 Description	0.00		0.00	$0
294	Item 11 Description	0.00		0.00	$0
295	Item 12 Description	0.00		0.00	$0
296	Item 13 Description	0.00		0.00	$0
297	Item 14 Description	0.00		0.00	$0
298	Item 15 Description	0.00		0.00	$0
299	Subtotal				$0
300					
301	Subtotal				$1,668,021
302					
303	ALLOWANCES:		**User Over-write**		

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	B	C	D	E	F
304	Finishes Allowance	2.0%		$1,813,066	$36,261
305	I & C Allowance	2%		$1,813,066	$36,261
306	Mechanical Allowance	2%		$1,813,066	$36,261
307	Electrical Allowance	2%		$1,813,066	$36,261
308					
309	Facility Cost	**20,000,000**	**GPD**	**$0.09**	**$1,813,066**

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	B	C	D	E	F
132					
133	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
134					
135	SITEWORK:				
136	Excavation	164.17	CY	$ 5.35	$879
137	Imported Structural Backfill	97.72	CY	$ 40.56	$3,963
138	Native Backfill	0.00	CY	$ 6.58	$0
139	Haul Excess	164.17	CY	$ 6.58	$1,080
140	Allowance for Misc Items	5%		$ 5,921.92	$296
141	Subtotal				$6,218
142					
143	CONCRETE:				
144	Wall Footing	10.34	CY	$ 345.93	$3,576
145	Stem Walls	0.00	CY	$ 683.50	$0
146	Slab on Grade	32.91	CY	$ 345.93	$11,385
147	Pipe Supports	14.00	EA	$ 438.67	$6,141
148	Electrical Room Slab on Grade	2.13	CY	$ 345.93	$737
149	Allowance for Misc Items	5%		$21,839	$1,092
150	Subtotal				$22,931
151					
152	MASONRY:	Moderate			
153	CMU Building	1024.14	SF	$ 131.60	$134,778
154	Electrical Room	57.56	SF	$ 131.60	$7,574
155	Subtotal	1081.69			$142,352
156					
157	EQUIPMENT:				
158	Inline Mixer (24-inch)	2.00	EA	$ 33,734.86	$67,470
159	Allowance for Misc Items	10%		$ 67,469.72	$6,747
160	Subtotal				$74,216.70
161					
162	INSTRUMENTS & CONTROLS:				
163	Instruments				
164	Mag Meter (14-inch)	2.00	EA	$ 11,797.27	$23,595
165	pH / Temperature	1.00	EA	$ 2,093.45	$2,093
166	Turbidity	1.00	EA	$ 3,133.05	$3,133
167	Streaming Current Detector	0.00	EA	$ 10,680.85	$0
168	UV Absorbance	1.00	EA	$ 21,794.63	$21,795
169	Conductivity	0.00	EA	$ 2,057.84	$0
170	Sample Panels	2.00	EA	$ 3,948.04	$7,896
171	Isolation Valve Actuators	4.00	each	$5,064.93	$20,260
172	Flow Control Valve Actuators	2.00	each	$5,064.93	$10,130
173	Number of Analog I/O Counts	12.00	each	$208.82	$2,506
174	Number of Digital I/O Counts	33.60	each	$49.46	$1,662
175	Number of PLC's	1.00	each	$10,331.10	$10,331
176	I&C Conduit & Wire	633.99	lf	$9.53	$6,041
177	Allowance for Misc Items	10%		$ 109,441.19	$10,944
178	Subtotal				$120,385
179					
180	CONVEYING SYSTEMS:				
181	Monorail Hoist (3 Ton)	1.00	EA	$ 55,749.49	$55,749
182	Hoist Rail	118.04	LF	$ 28.96	$3,418
183	Allowance for Misc Items	10%		$ 59,167.41	$5,917
184	Subtotal				$65,084
185					
186	MECHANICAL:				
187	Pipe:				
188	Rapid Mix Pipe (24-inch, RW, Exposed ,Steel ,Cement Mortar ,Paint)	40.00	lf	$438.33	$17,533

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	B	C	D	E	F
189	Flow Control Pipe (14-inch, FCP, Exposed ,Steel ,Cement Mortar ,Paint)	18.67	lf	*$255.69*	$4,773
190	Elbows:				
191	Rapid Mix Pipe (24-inch)	4.00	each	*$2,639.84*	$10,559
192	Valves:				
193	Rapid Mix Isolation Valves (24-inch)	4.00	each	*$19,307.12*	$77,228
194	Flow Control Valve (14-inch)	2.00	each	*$11,262.48*	$22,525
195	Allowance for Misc Items	10%		$132,619.04	$13,262
196	Subtotal				$145,881
197					
198	ELECTRICAL:				
199	MCC's				
200	Sections	5.00	each	*$6,783.10*	$33,915
201	AFD's				
202	Mechanical Mixers (4 hp each)	0.00	each	*$4,617.76*	$0
203	Switchgear				
204	Units	0.00	each	*$31,202.24*	$0
205	Electrical Conduit & Wire	97.54	lf	*$9.53*	$929
206	Allowance for Misc Items	10%		$34,845	$3,484
207	Subtotal				$38,329
208					
209	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
210	Item 1 Description	0.00		0.00	$0
211	Item 2 Description	0.00		0.00	$0
212	Item 3 Description	0.00		0.00	$0
213	Item 4 Description	0.00		0.00	$0
214	Item 5 Description	0.00		0.00	$0
215	Item 6 Description	0.00		0.00	$0
216	Item 7 Description	0.00		0.00	$0
217	Item 8 Description	0.00		0.00	$0
218	Item 9 Description	0.00		0.00	$0
219	Item 10 Description	0.00		0.00	$0
220	Item 11 Description	0.00		0.00	$0
221	Item 12 Description	0.00		0.00	$0
222	Item 13 Description	0.00		0.00	$0
223	Item 14 Description	0.00		0.00	$0
224	Item 15 Description	0.00		0.00	$0
225	Subtotal				$0
226					
227	Subtotal				$615,398
228					
229	ALLOWANCES:		**User Over-write**		
230	Finishes Allowance	2.0%		$699,316	$13,986
231	I & C Allowance	5%		$699,316	$34,966
232	Mechanical Allowance	0%		$699,316	$0
233	Electrical Allowance	5%		$699,316	$34,966
234					
235	Facility Cost	**20,000,000**	**GPD**	**$0.03**	**$699,316**

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Alternative 2 Finished Water pipeline

Pipelines		**$25,322,000**
10% allowance for pipeline valves & appurtenances		**$2,533,000**
Pipeline Construction Cost		**$27,855,000**
Pipeline Construction Cost		**$27,855,000**
3% markup for Bonds & Insurance	$836,000	
5% markup for Mob/Demob	$1,393,000	
8% markup for Contractors Overhead	$2,340,000	
4% markup for Contractors profit	$1,264,000	
25% Contingency	$8,422,000	
Subtotal Markups and Contingency		**$14,255,000**
Total Project Construction Costs		**$42,110,000**
8% allowance for pipeline engineering and design	3,369,000	
12% allowance for permitting, legal and administration	5,054,000	
8% allowance for pipeline engr services during construction	3,369,000	
Subtotal Other Project Costs		**$11,792,000**
GRAND TOTAL PROJECT COST		**$53,902,000**

Alternative 2 - Shallow Aquifer Finished Water Transmission Main

Water Forcemain		
Segment	Miles	Diameter
A	6	36
B	5	36

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$2,194,284	Co. Rd I, wetland
2	$2,965,248	In Co HWY H
3	$2,280,960	In Oakdale
4	$2,335,133	In Oakdale, cross Les Paul
5	$2,302,629	In Sunset Drive, cross SW Ave
6	$2,734,871	In NW Ave, cross College
7	$4,023,920	NW Ave to Main, at Fox River
8	$7,234	Main Street, businesses
9	$4,492,693	In Co. Road Y, wetland, cross 164
10	$1,984,435	City streets, Open country to Hillcrest
subtotal	**$25,321,406**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	320	320
Low urban	1.00	432	432
Medium urban	1.19	514	514
High urban	1.37	592	592
Groundwater	**1.30**	**562**	**562**
Forest	1.15	497	497
Gravel roads	0.85	367	367
Creek crossing	2.00	864	864
HWY crossing	4.00	1728	1728

miles	0.13	0.25	0.5
feet	660	1320	2640
	4620	3960	2640

Alternative 2 - Distribution

Pipelines		**$7,695,000**
10% allowance for pipeline valves & appurtenances		**$770,000**
Pipeline Construction Cost		**$8,465,000**
Pipeline Construction Cost		**$8,465,000**
3% markup for Bonds & Insurance	$254,000	
5% markup for Mob/Demob	$424,000	
8% markup for Contractors Overhead	$712,000	
4% markup for Contractors profit	$385,000	
25% Contingency	$2,560,000	
Subtotal Markups and Contingency		**$4,335,000**
Total Project Construction Costs		**$12,800,000**
5% allowance for pipeline engineering and design	768,000	
12% allowance for permitting, legal and administration	640,000	
08% allowance for pipeline engr services during construction	1,024,000	
Subtotal Other Project Costs		**$2,432,000**
GRAND TOTAL PROJECT COST		**$15,232,000**

O&M Costs Alternative 2 - Shallow and Fox River Alluvium

Source of Supply	Units	Quantity	Unit Cost	Ext. Cost	$/yr	Totals
Well pumping/maintenance	$/1000 gal	3,978,500	$ 0.140	$ 556,990	$ 556,990	
Total Supply						$ 556,990

Treatment/Pumping	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
Treatment Plant/Pump station					$3,558,904	
Residuals	$/1000 gal	79570	$ 4	$ 318,280	$ 318,280	
Total Treatment/Pumping						$ 3,877,184

Transmission	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
O&M	$/lf/yr	108,281	$ 0.52	$ 56,306	$ 56,306	
Total Transmission						$ 56,306

Home Softening	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
Salt/Equipment/Replacment	1				$ 2,863,894	
						$ 2,863,894

Alternative Total O&M ($/yr.)	**$ 7,400,000**
PRESENT WORTH (6%, 20 yrs)	**$ 85,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 117,000,000**

CH2M HILL Parametric Cost Estimating System (CPES)

FACILITIES LIFE CYCLE COST ANALYSIS

File 1/5/2010
Version:

Click for CPES QA/QC

Import File: C:\ Documents and Settings\ tnading\ Desktop\ waukesha\ Waukesha WTP.xls

Brows

Project Name:	Waukesha WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	Fox River Alluvium and Shallow Groundwater
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months)	24
Mid-Point of Construction:	Jan/2012

Life Cycle Analysis:

i =	6.00%
n =	25
Annual Inflation %:	4.50%

To Global Life Cycle Data Sheet

To Annual O & M Cost Summary Sheet

This Report is for INTERNAL Distribution

This Report is for EXTERNAL Distribution

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Construction Cost	Annual O&M Cost (Escalated)	Life Cycle Cost (NPV)
	Yes	Inline Rapid Mix: RMX	$1,224,509	$11,448	$1,370,850
	Yes	Flocculation: FLOC	$3,174,699	$29,495	$3,551,743
	Yes	Lamella Clarifier: LAM	$5,146,551	$85,072	$6,234,044
	Yes	Filters: FILT	$11,540,743	$87,491	$12,659,160
	Yes	Surge Basin-Decanter: BWW	$2,687,313	$33,462	$3,115,069
	Yes	UV Disinfection: UVD	$2,348,574	$82,195	$3,399,292
	Yes	Concrete Clearwell: FWT	$2,297,940	$1,092	$2,311,899
	No	Steel Clearwell: FWT	$0	$0	$0
	No	In-Plant PS: FWPS	$0	$0	$0
	Yes	Vertical Turbine PS: FWPS	$7,410,535	$1,119,793	$21,725,243
	Yes	Filter BW PS: BWSPS	$1,927,296	$37,318	$2,404,344
	Yes	U.D. Facility: GEN	$0	$0	$0
	Yes	Liquid Chemical: FeCl3	$692,505	$361,992	$5,319,976
	Yes	Liquid Chemical: NaOCl	$518,039	$156,934	$2,524,178
	Yes	Liquid Chemical: FLUOR	$330,287	$11,746	$480,429
	Yes	Liquid Chemical: POLYPHOS	$362,245	$63,504	$1,174,039
	Yes	O&M Building: OMB	$8,312,125	$157,639	$10,327,270
		Additional Project Costs:			
		Biosolids Disposal	$0	$0	$0
		Standard Items	$17,422,556	$499,001	$23,801,456
		User Defined Items	$0	$0	$0
		Plant O & M Labor		$782,831	$10,007,198
TOTAL - Life Cycle Analysis			$65,395,917	$3,521,013	$110,406,190

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Rapid Mixing (Inline)

To Summary Sheet

Construction Cost:					$1,224,509
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	8	50%	8,760	$ 0.06	$ 1,463
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,082	2.00	8,760	$ 0.06	$ 1,062
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 3,267
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 5,792	10.0%	$ 579
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 6,371
Contingency				10%	$ 637
Total Annual O&M Cost					$ 7,008

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Flocculation (Horizontal Paddle Wheel Flocculation for Downstream Sedimentation)

Construction Cost:

Annual O & M Cost

Equipment Power

Building Electrical

Other Cost

Maintenance & Spare Parts Cost

Replacement Cost

Other Cost

Item 1

Item 2

Item 3

Item 4

Item 5

Item 6

Item 7

Item 8

Item 9

Item 10

Item 11

Item 12

Item 13

Item 14

Item 15

Potential Annual O&M Cost

Contingency

Total Annual O&M Cost

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Lamella Clarifier

To Summary Sheet

Construction Cost:					$5,146,551
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	4	50%	8,760	$ 0.06	$ 732
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	5,572	2.00	8,760	$ 0.06	$ 5,467
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 36,842
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 43,040	10.0%	$ 4,304
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 47,344
Contingency				10%	$ 4,734
Total Annual O&M Cost					$ 52,079

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Filters

To Summary Sheet

Construction Cost:					$11,540,742
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	8	50%	8,760	$ 0.06	$ 1,463
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	10,239	2.00	8,760	$ 0.06	$ 10,046
Chemicals:		Annual Usage (tons)	Annual Facility Usage (% of year)	$/ton	Chemical Cost
GAC		-	100%	$ 2,400.00	$ -
Total Chemical Cost					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 32,755
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 44,264	10.0%	$ 4,426
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 48,691
Contingency				10%	$ 4,869
Total Annual O&M Cost					$ 53,560

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Large System Combination Wastewater Surge Basin and Floating Tube Decanter Clarification (>= 5 MGD)

To Summary Sheet

Construction Cost:					$2,687,312
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	43	50%	8,760	$ 0.06	$ 7,865
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	81	2.00	8,760	$ 0.06	$ 79
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 8,985
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 16,930	10.0%	$ 1,693
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 18,622
Contingency				10%	$ 1,862
Total Annual O&M Cost					$ 20,485

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UV Disinfection

To Summary Sheet

Construction Cost:					$2,348,574
Annual O & M Cost:					
Power:	Total kw	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	42	50%	8,760	$ 0.06	$ 10,400
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,547	2.00	8,760	$ 0.06	$ 1,517
Specialty Items:				Number per Replacement / Recalibration	Cost
Lamp Replacement				8	$ 6,017
Lamp Replacement Frequency (hrs)	4,000	Fixed			
Input Lamp Cost	$ 350.00	Default = $350			
Ballast Replacement				8	$ 2,178
Input Ballast Replacement Frequency (yrs)	10	Typically 10 years			
Input Ballast Cost	$ 4,000.00	Default = $4,000			
Sleeve Replacement				8	$ 432
Input Sleeve Replacement Frequency (yrs)	3	Typically 3 to 5 years			
Input Sleeve Cost	$ 175.00	Default = $175			
Intensity Sensor Replacement				8	$ 3,502
Input Intensity Sensor Replacement Frequency (yrs)	5	Typically 3 to 5 years			
Input Intensity Sensor Cost	$ 2,750.00	Default = $2,750			
Intensity Sensor Recalibration		Annual Calibration except during Replacement Years			$ 3,363
Input Cost of Single Sensor Recalibration (each)	$ 500.00	Default = $500			
Total Specialty Items					$ 15,492
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 14,175
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			41,585	10.0%	$ 4,158
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -

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Item 6						$	
Item 7						$	
Item 8						$	
Item 9						$	
Item 10						$	
Item 11						$	
Item 12						$	
Item 13						$	
Item 14						$	
Item 15						$	
Subtotal Annual O&M Cost						$	[illegible]
Contingency					[illegible]	$	[illegible]
Total Annual O&M Cost						$	[illegible]

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Concrete Tank

To Summary Sheet

Construction Cost:					$2,297,940
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	-	50%	8,760	$ 0.06	$ -
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	-	2.00	8,760	$ 0.06	$ -
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 552
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 552	10.0%	$ 55
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 608
Contingency				10%	$ 61
Total Annual O&M Cost					$ 668

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Vertical Turbine Pump Station

To Summary Sheet

Construction Cost:					$7,410,535
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2,800	50%	8,760	$ 0.06	$ 512,135
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	4,513	2.00	8,760	$ 0.06	$ 4,428
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 49,977
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 566,540	10.0%	$ 56,654
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 623,194
Contingency				10%	$ 62,319
Total Annual O&M Cost					$ 685,513

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Granular Media Filter Backwash Supply Pump Station

To Summary Sheet

Construction Cost:					$1,927,295
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	21	50%	8,760	$ 0.06	$ 3,841
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	988	2.00	8,760	$ 0.06	$ 969
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 14,070
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 18,880	10.0%	$ 1,888
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 20,768
Contingency				10%	$ 2,077
Total Annual O&M Cost					$ 22,845

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost: $692,504

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	3	50%	8,760	$ 0.06	$ 549

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,226	2.00	8,760	$ 0.06	$ 1,203

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	457	$ 782.93	$ 178,749
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 178,749

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 2,643
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 183,144	10.0%	$ 18,314

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	201,458
Contingency					10%	$	20,146
Total Annual O&M Cost						$	221,604

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$518,038

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,050	2.00	8,760	$ 0.06	$ 1,030

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	91	$ 1,672.13	$ 76,352
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 76,352

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 1,650
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 79,398	10.0%	$ 7,940

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	87,338
Contingency					10%	$	8,734
Total Annual O&M Cost						$	96,071

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$330,287

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	714	2.00	8,760	$ 0.06	$ 701

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	24	$ 360.00	$ 4,384
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 4,384

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 492
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 5,942	10.0%	$ 594

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	6,536
Contingency					10%	$	654
Total Annual O&M Cost						$	7,190

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$362,245

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	840	2.00	8,760	$ 0.06	$ 824

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	30	$ 2,000.00	$ 30,441
Total Chemical Cost					$ 30,441

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 498
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 32,129	10.0%	$ 3,213

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	35,342
Contingency					10%	$	3,534
Total Annual O&M Cost						$	38,876

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O & M Building

To Summary Sheet

Construction Cost:					**$8,312,124**
Annual O & M Cost:					
Power:	**Total HP**	**Average-to-Maximum Flow Factor**	**Annual Usage (Hours / Year)**	**$/kwh**	**Power Cost**
Equipment Power	-	50%	8,760	$ 0.06	$ -
Other Electrical:	**Building Area (SF)**	**Watts / SF**	**Annual Usage (Hours / Year)**	**$/kwh**	**Other Electrical Cost**
Building Electrical	10,000	2.00	8,760	$ 0.06	$ 9,811
Chemicals:					$ -
Repair and Maintenance, and Replacement:				**Replacement Included? (1 = "Yes", 0 = "No")**	**Annual Cost**
Maintenance & Repair Cost					$ 69,943
Replacement Cost				-	$ -
Other:			**Total Annual O&M Cost**	**"Other" Percent**	**Other Cost**
Other Cost			$ 79,754	10.0%	$ 7,975
User Defined Annual O&M Items:					**Annual Cost**
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 87,730
Contingency				10%	$ 8,773
Total Annual O&M Cost					$ 96,503

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To Summary Sheet

Standard Additional Project Costs

Standard Additional Project Costs	Total Construction Cost	Total Construction Cost Escalated to Year 0 Dollars
Mobilization	$ -	
Permit Closure	$ [illegible]	
Plant Compact System	$ [illegible]	$ [illegible]
Yard Piping	$ [illegible]	$ [illegible]
Yard Pumps	$ [illegible]	$ [illegible]
Total	$ [illegible]	$ [illegible]

Annual O & M Cost			
Repair and Maintenance			
Repair and Maintenance Cost	$ [illegible]	[illegible]	$ [illegible]
Replacement Cost		[illegible]	$
Other			
Other Cost	$ [illegible]	[illegible]	$ [illegible]
Other Defined Annual O&M Items			
Item 1			$
Item 2			$ -
Item 3			$ -
Item 4			$
Item 5			$ -
Item 6			$
Item 7			$ -
Item 8			$
Item 9			$ -
Item 10			$ -
Item 11			$ -
Item 12			$ -
Item 13			$
Item 14			$ -
Item 15			$

Subtotal Annual O&M Cost		$	277,707
Contingency	10%	$	27,771
Total Annual O&M Cost		$	305,477

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Alternative 3:
Lake Michigan Water

Alternative 3 - Lake Michigan Water		
Supply Pipeline		**$35,020,000**
10% allowance for pipeline valves & appurtenances		**$3,502,000**
Subtotal Pipeline Construction Cost		**$38,522,000**
Parkway Booster Station		**$8,573,000**
Subtotal Supply System Construction Cost		**$47,095,000**
Return Pipeline/Pump station to Underwood Creek		**$ 29,023,000**
Distribution System Improvements		**$ 8,465,000**
Subtotal Construction Cost		**$ 84,583,000**
3% markup for Bonds & Insurance	$2,538,000	
5% markup for Mob/Demob	$4,230,000	
8% markup for Contractors Overhead	$7,309,000	
4% markup for Contractors profit	$3,655,000	
25% Contingency	$25,579,000	
Subtotal Markups and Contingency		**$43,311,000**
Total Project Construction Costs		**$127,894,000**
8% allowance for pipeline engineering and design	10,232,000	
12% allowance for permitting, legal and administration	15,348,000	
8% allowance for pipeline engr services during constructio	10,232,000	
Subtotal Other Project Costs		**$35,812,000**
TOTAL PROJECT CAPITAL COST		**$164,000,000**

Alternative 3 - Milwaukee Water Supply

Pipeline Segment	Miles	Diameter	
A	9	36	432
B	3	36	432

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$3,991,680	In Howard Ave, cross HWY 894, 60th
2	$2,335,133	In Howard Ave, cross 76th, cross 84th, cross 92nd
3	$3,190,493	In Howard Ave, cross HWY 45, cross 104th
4	$2,720,045	In Howard Ave, cross HWY 100, cross Beliot Rd, in pkwy, cross Morgan Ave
5	$3,736,212	In pkwy, cross Oklahoma, cross National, cross Cleveland
6	$3,024,553	0.5 mi pkwy, 0.5 mi in 124th Street
7	$1,984,435	In 124th, cross 124th street, Utility corridor (Oak Leaf)
8	$2,047,162	Utility corridor, cross Sunnyslope, cross Moorland
9	$1,816,214	Utility corridor, cross Calhoun
10	$2,194,284	Utility corridor
11	$2,194,284	Utility corridor
12	$1,816,214	Utility corridor, cross Springdale
13	$2,280,960	Cotton Crt
14	$1,687,910	Open country
subtotal	**$35,019,579**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	320	320
Low urban	1.00	432	432
Medium urban	1.19	514	514
High urban	1.37	592	592
Groundwater	**1.30**	**562**	**562**
Forest	1.15	497	497
Gravel roads	0.85	367	367
Creek crossing	2.00	864	864
HWY crossing	4.00	1728	1728

miles	0.13	0.25	0.5
feet	660	1320	2640
	4620	3960	2640

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	455.19	CY	***$5.35***	$2,436
Imported Structural Backfill	576.89	CY	***$40.56***	$23,396
Native Backfill	21.83	CY	***$6.58***	$144
Haul Excess	433.36	CY	***$6.58***	$2,852
Forebay:				
Excavation	943.32	CY	***$5.35***	$0
Imported Structural Backfill	575.02	CY	***$40.56***	$0
Native Backfill	75.56	CY	***$6.58***	$0
Haul Excess	867.76	CY	***$6.58***	$0
Office:				
Excavation	0.00	CY	***$5.35***	$0
Imported Structural Backfill	0.00	CY	***$40.56***	$0
Native Backfill	0.00	CY	***$6.58***	$0
Haul Excess	0.00	CY	***$6.58***	$0
Surge Protection:				
Excavation	266.84	CY	***$5.35***	$1,428
Imported Structural Backfill	146.42	CY	***$40.56***	$5,938
Native Backfill	43.02	CY	***$6.58***	$283
Haul Excess	223.81	CY	***$6.58***	$1,473
Allowance for Misc Items	5%		$37,949.28	$1,897
Subtotal				$39,847
CONCRETE:				
Pump Station				
Foundation	342.13	CY	***$382.16***	$130,747
Support Walls	0.00	CY	***$683.50***	$0
Support Columns	0.00	CY	***$683.50***	$0
Pump Pad Epoxy	2.48	CY	$3,412.56	$8,449
Pump Pad Support	50.52	CY	***$345.93***	$17,476
Pipe Supports	2.74	CY	***$345.93***	$950
Mezzanine				
Elevated Slab	0.00	CY	***$1,088.69***	$0
Electrical Room				
Foundation	58.69	CY	***$345.93***	$20,303
Surge Protection				
Foundation	75.51	CY	***$345.93***	$26,120
Office				
Foundation	0.00	CY	***$345.93***	$0
Pump Station Forebay				
Slab on Grade for Steel Tank	346.49	CY	***$345.93***	$0
Prestressed Concrete Tank (654765 gallons)	0.00	EA	***$0.00***	$0
Outlet Box	5.91	CY	***$382.16***	$2,258
Allowance for Misc Items	5%		$206,302.68	$10,315
Subtotal				$216,618
MASONRY:	Moderate			
Pump Station Building	4077.42	SF	***$197.40***	$804,890
Office Building	0.00	SF	***$131.60***	$0
Surge Building	1019.35	SF	***$131.60***	$134,148
Electrical Room	1584.66	SF	***$131.60***	$208,543
Subtotal	6681.43			$1,147,582

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METALS:				
Metal Guardrail with Pickets	0.00	LF	***$72.38***	$0
Stairs = IF Mezzanine = 10 * 12/8	0.00	Risers	***$394.80***	$0
Pump Removal Hatches	191.04	SF	***$109.91***	$20,997
Ladder	0.00	VLF	***$99.36***	$0
Allowance for Misc Items	10%		$20,996.63	$2,100
Subtotal				$23,096
THERMAL & MOISTURE PROTECTION:				
Wet Well Liner	0.00	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	1000.00	HP	***$249.00***	$249,000
Active Pump # 2	1000.00	HP	***$249.00***	$249,000
Active Pump # 3	1000.00	HP	***$249.00***	$249,000
Active Pump # 4	0.00	HP	***$0.00***	$0
Active Pump # 5	0.00	HP	***$0.00***	$0
Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	1000.00	HP	***$249.00***	$249,000
Steel Forebay Tank (654765 gallons)	1.00	EA	***$278,348.80***	$0
Allowance for Misc Items	10%		$996,000.47	$99,600
Subtotal				$1,095,601
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	8.00	each	***$5,064.93***	$40,519
Control Valve Actuators	4.00	each	***$5,064.93***	$20,260
Level Indicator Transmitters	2.00	each	***$6,764.54***	$13,529
Level Swithces	2.00	each	***$7,120.57***	$14,241
Pressure Indicator Transmitters	5.00	each	***$7,120.57***	$35,603
Pressure Switches	8.00	each	***$7,120.57***	$56,965
Number of Analog I/O Counts	31.20	each	***$208.82***	$6,515
Number of Digital I/O Counts	84.00	each	***$49.46***	$4,154
Number of PLC's	4.00	each	***$10,331.10***	$41,324
I&C Conduit & Wire	2347.84	lf	***$9.53***	$22,372
Allowance for Misc Items	10%		$ 255,482.85	$25,548
Subtotal				$281,031
CONVEYING SYSTEMS				
Bridge Crane	0.00	EA	***$55,749.49***	$0
Bridge Crane Rail	0.00	LF	***$28.96***	$0
Allowance for Misc Items	10%		$ -	$0
Subtotal				$ -
MECHANICAL:				
Pipe:				
Suction Header Pipe (30-inch,SUC, Buried, Steel, Cement Mortar, Tape Coating)	66.96	LF	***$744.31***	$49,839
Suction Lateral Pipe (20-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	46.67	LF	***$491.38***	$22,931

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Discharge Lateral Pipe (18-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	36.00	LF	*$440.79*	$15,868
Discharge Header Pipe (30-inch,DIS, Buried, Steel, Cement Mortar, Tape Coating)	66.96	LF	*$744.31*	$49,839
Pump Suction Pipe (12-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	4.00	LF	*$289.03*	$1,156
Pump Discharge Pipe (8-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	2.67	LF	*$187.86*	$501
Elbows:				
Discharge Lateral Pipe (18-inch)	4.00	EA	*$1,597.76*	$6,391
Discharge Header Pipe (30-inch)	2.00	EA	*$2,831.95*	$5,664
Tees:				
Suction Header Pipe (30-inch)	4.00	EA	*$5,509.28*	$22,037
Discharge Header Pipe (30-inch)	4.00	EA	*$5,509.28*	$22,037
Valves:				
Suction Header Isolation Valve (30-inch, BFV)	1.00	EA	*$5,934.12*	$5,934
Suction Lateral Isolation Valve (20-inch, BFV)	4.00	EA	*$3,545.34*	$14,181
Discharge Lateral Isolation Valve (18-inch, BFV)	4.00	EA	*$2,759.13*	$11,037
Pump Control Valve (18-inch, Butterfly Valve)	4.00	EA	*$2,759.13*	$11,037
Discharge Header Isolation Valve (30-inch, BFV)	1.00	EA	*$5,934.12*	$5,934
Air Release Vacuum Valves	12.00	EA	*$3,297.16*	$39,566
Allowance for Misc Items	10%		$283,952.56	$28,395
Subtotal				$312,348
ELECTRICAL:				
MCC's				
Sections	3.00	each	*$6,783.10*	$20,349
AFD's				
Active Pump # 1	1000.00	HP	*$127.09*	$127,092
Active Pump # 2	1000.00	HP	*$127.09*	$127,092
Active Pump # 3	1000.00	HP	*$127.09*	$127,092
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	1000.00	HP	*$127.09*	$127,092
Switchgear				
Units	7.00	each	*$31,202.24*	$218,416
Electrical Conduit & Wire	323.84	lf	*$9.53*	$3,086
Allowance for Misc Items	5%		$750,220	$37,511
Subtotal				$787,731
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
75,000 gallon welded steel tank, foundation	1.00		150000.00	$150,000
Standby Generator	1.00		1000000.00	$1,000,000
Land	1.00		250000.00	$250,000
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$1,400,000
Subtotal				$5,303,853

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ALLOWANCES:		User Over-write		
Finishes Allowance	2%		$8,578,122	$171,562
I & C Allowance	2%	4%	$8,578,122	$349,130
Surge Allowance	5%	10%	$8,578,122	$857,812
Mechanical Allowance	2%	15%	$8,578,122	$1,286,718
Electrical Allowance	5%	7%	$8,578,122	$609,047
Facility Cost	**4,000**	**Total Pump HP**	**$2,144.53**	**$8,578,122**

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	Return Flow Underwood Creek (18.5 mgd, 36" dia)		
	Pipelines		**$23,195,000**
	10% allowance for pipeline valves & appurtenances		**$2,320,000**
	Pipeline Construction Cost		**$25,515,000**
	WWTP Effluent Pump Station		**$3,508,000**
	Conveyance System Construction Cost		**$29,023,000**
	3% markup for Bonds & Insurance	$871,000	
	5% markup for Mob/Demob	$1,452,000	
	8% markup for Contractors Overhead	$2,508,000	
	4% markup for Contractors profit	$1,254,000	
	25% Contingency	$8,777,000	
	Subtotal Markups and Contingency		**$14,862,000**
	Total Project Construction Costs		**$43,885,000**
	8% allowance for pipeline engineering and design	3,511,000	
	12% allowance for permitting, legal and administration	5,267,000	
	8% allowance for pipeline engr services during construction	3,511,000	
	Subtotal Other Project Costs		**$12,289,000**
	GRAND TOTAL PROJECT COST		**$56,174,000**

Alternative 3 - Underwood Creek Return Flow

Pipeline Segment		Diameter
A		36
B		36

Unit cost	$/dia-in	12

Mile	Cost		Comments
1	$2,389,306		0.75 mi follows river, crosses Prairie ave, Marshall and Dunbar, 0.25 under alley to NW ave
2	$2,389,306		Cross Maple, Grand, Barstow, East, Barney, Hartwell, crossing of E Broadway (major street); end at Oakland
3	$3,290,285		follows path (cross Greendale and Frederick), cross East Side bypass HYW 59 (MAJOR)
4	$1,836,971	70%	Follows New Berlin trail/utility corridor, cross Springdale;also a stream crossing, some forest; ends near stream crossing
5	$1,555,159	70%	Follows trail, open country mostly, some forest, wetlands for 0.5 mi; assume groundwater; ends near wetlands/open water pond
6	$1,247,001	70%	Follows trail, open country mostly, some forest (assume 10%)
7	$1,700,456	70%	Begins near Calhoun, one stream crossing; becoming urban again but still follows trail and is mostly open, crosses Calhoun and ends near Moorland, assume 10% forest
8	$1,181,537	70%	Still in trail, no crossings; very open; Ends near Sunnyslope Rd
9	$1,181,537	70%	Still in trail, no crossings; very open; Ends at 124th st
10	$2,623,104		Going north under 124th st, crosses Greenfield (hwy 59), ends near 124th and Zinke Dr
11	$3,800,079		Last section follows Underwood Creek, Crosses I-94
subtotal	**$23,194,740**		

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf
Open country	0.74	320
Low urban	1.00	432
Medium urban	1.19	514
High urban	1.37	592
Groundwater	**1.30**	**562**
Forest	1.15	497
Gravel roads	0.85	367
Creek crossing	2.00	864
HWY crossing	4.00	1728

miles	0.13	0.25
feet	660	1320
	4620	3960

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	639.92	CY	***$5.28***	$3,381
Imported Structural Backfill	532.57	CY	***$40.04***	$21,322
Native Backfill	38.78	CY	***$6.50***	$252
Haul Excess	601.13	CY	***$6.50***	$3,905
Forebay:				
Excavation	0.00	CY	***$5.28***	$0
Imported Structural Backfill	0.00	CY	***$40.04***	$0
Native Backfill	0.00	CY	***$6.50***	$0
Haul Excess	0.00	CY	***$6.50***	$0
Office:				
Excavation	0.00	CY	***$5.28***	$0
Imported Structural Backfill	0.00	CY	***$40.04***	$0
Native Backfill	0.00	CY	***$6.50***	$0
Haul Excess	0.00	CY	***$6.50***	$0
Surge Protection:				
Excavation	385.95	CY	***$5.28***	$2,039
Imported Structural Backfill	201.65	CY	***$40.04***	$8,073
Native Backfill	75.73	CY	***$6.50***	$492
Haul Excess	310.22	CY	***$6.50***	$2,015
Allowance for Misc Items	5%		$41,478.65	$2,074
Subtotal				$43,553
CONCRETE:				
Pump Station				
Foundation	482.04	CY	***$382.16***	$184,218
Support Walls	0.00	CY	***$683.50***	$0
Support Columns	10.37	CY	***$683.50***	$7,088
Pump Pad Epoxy	2.20	CY	$3,368.81	$7,401
Pump Pad Support	24.15	CY	***$345.93***	$8,354
Pipe Supports	29.63	CY	***$345.93***	$10,250
Mezzanine				
Elevated Slab	0.00	CY	***$1,088.69***	$0
Electrical Room				
Foundation	13.23	CY	***$345.93***	$4,577
Surge Protection				
Foundation	108.47	CY	***$345.93***	$37,524
Office				
Foundation	0.00	CY	***$345.93***	$0
Pump Station Forebay				
Slab on Grade for Steel Tank	0.00	CY	***$345.93***	$0
Prestressed Concrete Tank (0 gallons)	0.00	EA	***$0.00***	$0
Outlet Box	9.91	CY	***$382.16***	$3,786
Allowance for Misc Items	5%		$263,196.94	$13,160
Subtotal				$276,357
MASONRY:	Moderate			
Pump Station Building	5857.49	SF	***$194.87***	$1,141,458
Office Building	0.00	SF	***$129.91***	$0
Surge Building	1464.37	SF	***$129.91***	$190,243
Electrical Room	357.23	SF	***$129.91***	$46,409
Subtotal	7679.09			$1,378,109

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METALS:				
Metal Guardrail with Pickets	0.00	LF	*$71.45*	$0
Stairs = IF Mezzanine = 10 * 12/8	0.00	Risers	*$389.74*	$0
Pump Removal Hatches	0.00	SF	*$108.50*	$0
Ladder	0.00	VLF	*$98.09*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	200.00	HP	*$323.10*	$64,619
Active Pump # 2	200.00	HP	*$323.10*	$64,619
Active Pump # 3	200.00	HP	*$323.10*	$64,619
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	200.00	HP	*$323.10*	$64,619
Steel Forebay Tank (0 gallons)	0.00	EA	*$0.00*	$0
Allowance for Misc Items	10%		$258,477.39	$25,848
Subtotal				$284,325
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	8.00	each	*$2,169.93*	$17,359
Control Valve Actuators	4.00	each	*$2,169.93*	$8,680
Level Indicator Transmitters	2.00	each	*$6,677.82*	$13,356
Level Swithces	2.00	each	*$7,029.28*	$14,059
Pressure Indicator Transmitters	5.00	each	*$7,029.28*	$35,146
Pressure Switches	8.00	each	*$7,029.28*	$56,234
Number of Analog I/O Counts	31.20	each	*$206.14*	$6,432
Number of Digital I/O Counts	84.00	each	*$48.82*	$4,101
Number of PLC's	4.00	each	*$10,198.66*	$40,795
I&C Conduit & Wire	2896.62	lf	*$9.41*	$27,247
Allowance for Misc Items	10%		$ 223,408.90	$22,341
Subtotal				$245,750
CONVEYING SYSTEMS				
Bridge Crane	1.00	EA	*$55,034.79*	$55,035
Bridge Crane Rail	207.77	LF	*$28.59*	$5,939
Allowance for Misc Items	10%		$ 60,974	$6,097
Subtotal				$ 67,071
MECHANICAL:				
Pipe:				
Suction Header Pipe (42-inch,SUC, Buried, Steel, Cement Mortar, Tape Coating)	65.88	LF	*$1,034.40*	$68,150
Suction Lateral Pipe (24-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	56.00	LF	*$584.96*	$32,757
Discharge Lateral Pipe (24-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	48.00	LF	*$584.96*	$28,078
Discharge Header Pipe (42-inch,DIS, Buried, Steel, Cement Mortar, Tape Coating)	65.88	LF	*$1,034.40*	$68,150

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Pump Suction Pipe (12-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	4.00	LF	*$285.33*	$1,141
Pump Discharge Pipe (8-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	2.67	LF	*$278.51*	$743
Elbows:				
Discharge Lateral Pipe (24-inch)	4.00	EA	*$2,186.46*	$8,746
Discharge Header Pipe (42-inch)	2.00	EA	*$4,014.02*	$8,028
Tees:				
Suction Header Pipe (42-inch)	4.00	EA	*$7,836.34*	$31,345
Discharge Header Pipe (42-inch)	4.00	EA	*$7,836.34*	$31,345
Valves:				
Suction Header Isolation Valve (42-inch, BFV)	1.00	EA	*$8,726.52*	$8,727
Suction Lateral Isolation Valve (24-inch, BFV)	4.00	EA	*$5,390.47*	$21,562
Discharge Lateral Isolation Valve (24-inch, BFV)	4.00	EA	*$5,390.47*	$21,562
Pump Control Valve (24-inch, Full Port Valve)	4.00	EA	*$5,390.47*	$21,562
Discharge Header Isolation Valve (42-inch, BFV)	1.00	EA	*$8,726.52*	$8,727
Air Release Vacuum Valves	12.00	EA	*$3,254.89*	$39,059
Allowance for Misc Items	10%		$399,680.68	$39,968
Subtotal				$439,649
ELECTRICAL:				
MCC's				
Sections	8.00	each	*$6,696.14*	$53,569
AFD's				
Active Pump # 1	200.00	HP	*$180.66*	$36,132
Active Pump # 2	200.00	HP	*$180.66*	$36,132
Active Pump # 3	200.00	HP	*$180.66*	$36,132
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	200.00	HP	*$180.66*	$36,132
Switchgear				
Units	0.00	each	*$30,802.24*	$0
Electrical Conduit & Wire	399.53	lf	*$9.41*	$3,758
Allowance for Misc Items	5%		$201,856	$10,093
Subtotal				$211,949
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,946,763
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2%		$3,508,051	$70,161
I & C Allowance	2%		$3,508,051	$70,161
Surge Allowance	5%		$3,508,051	$175,403

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Mechanical Allowance	2%		$3,508,051	$70,161
Electrical Allowance	5%		$3,508,051	$175,403
Facility Cost	**800**	**Total Pump HP**	**$4,385.06**	**$3,508,051**

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Alternative 3 - Distribution

Pipelines		**$7,695,000**
10% allowance for pipeline valves & appurtenances		**$770,000**
Pipeline Construction Cost		**$8,465,000**
Pipeline Construction Cost		**$8,465,000**
3% markup for Bonds & Insurance	$254,000	
5% markup for Mob/Demob	$424,000	
8% markup for Contractors Overhead	$712,000	
4% markup for Contractors profit	$385,000	
25% Contingency	$2,560,000	
Subtotal Markups and Contingency		**$4,335,000**
Total Project Construction Costs		**$12,800,000**
5% allowance for pipeline engineering and design	768,000	
12% allowance for permitting, legal and administration	640,000	
08% allowance for pipeline engr services during construction	1,024,000	
Subtotal Other Project Costs		**$2,432,000**
GRAND TOTAL PROJECT COST		**$15,232,000**

Alternative 3 - Lake Michigan Distribution System Improvements

Water Forcemain		
Segment	Miles	Diameter
A	2.8	20
B	2	16

Unit cost	$/dia-in	12

Mile	Cost	Comments
1 mi of 20"	$1,736,064	Assume High Urban
1 mi of 16"	$1,388,851	Assume High Urban
subtotal	**$7,694,380**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	178	142
Low urban	1.00	240	192
Medium urban	1.19	286	228
High urban	1.37	329	263
Groundwater	**1.30**	**312**	**250**
Forest	1.15	276	221
Gravel roads	0.85	204	163
Creek crossing	2.00	480	384
HWY crossing	4.00	960	768

miles	0.13	0.25	0.5
feet	660	1320	2640

Lake Michigan O&M Costs							
Source of Supply		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	**Totals**
	Purchased water	1000 gals	3,978,500	$ 1.40	$ 5,569,900	$ 5,569,900	
	Total Supply						$ 5,569,900
Pumping Supply		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	Energy	mgd	10.9			$ 179,759	
	O&M		2% of Capital cost of pump station	$ 0.0200	$ 8,573,000	$ 171,460	
	Total Pumping Supply						$ 351,219
Return Flow		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	Energy	mgd	10.9			$ 118,712	
	O&M		2% of Capital cost of pump station	$ 0.0200	$ 3,508,000	$ 70,160	
	Total Return Flow						$ 188,872
Transmission		**Units**	**Quantity**	**Unit Cost**	**Ext. Cost**	**$/yr**	
	O&M	$/lf/yr	132,000	$ 0.52	$ 68,640	$ 68,640	
	Total Transmission						$ 68,640
Alternative Total O&M ($/yr.)							**$ 6,200,000**
PRESENT WORTH (6%, 20 yrs)							**$ 71,000,000**
PRESENT WORTH (6%, 50 yrs)							**$ 98,000,000**

Milwaukee Water Supply - 36" the entire alignment

Pipeline					
Segment	Miles	Diameter	60th & Howard Ground Elevation	780	
			Hillcrest WSE	1000	
A	7	36	Segment A Piping K	8.85	(one K=1.0 entr, ten K=0.30 90-elb, 3 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
B	7	36	Segment B Piping K	5.65	(one flow thru tee K=0.6, five K=0.3 90-elb, one bend thru tee K=1.80, three open bfly valve K=0.25, one exit K=0.5)
			Piping Friction Factor	0.015	
			Power cost, $/kw	0.06	
			Power efficiency	0.9	
			GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	B RW Velocity	B Pipeline Frict Loss	Total FW Piping Fric Loss	Total Static Loss	Total Friction Head	Available Suction Head	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost
	mgd	gpm	ft/s	ft	ft	ft/s	ft	ft	ft	ft	ft	ft	psi	hp	kw	kw	$
	8	5552	1.75	8.77	0.33	1.75	8.80	18.16	220	238	81	157	68	276	228	2001032	$120,062
ADD	10.9	7565	2.39	16.28	0.61	2.39	16.33	33.72	220	254	81	173	75	413	342	2995986	$179,759
MDD	18.5	12839	4.05	46.90	1.74	4.05	47.05	97.13	220	317	81	236	102	958	793	6950168	$417,010

Underwood Creek Return Flow - 36" the entire alignment

Pipeline		
Segment	Miles	Diameter
A	11.4	36

Waukesha WWTP	[illegible]	earth elevation at WWTP
elevation at watershed divide	[illegible]	
Discharge at Underwood Creek	[illegible]	
Segment A Piping K	[illegible]	(one K=1.0 entr, ten K=0.30 90-elb, 3 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
Segment B Piping K	[illegible]	(one flow thru tee K=0.6, five K=0.3 90-elb, one bend thru tee K=1.80, three open bfly valve K=0.25, one
Piping Friction Factor	[illegible]	
Power cost, $/kw	[illegible]	
Power efficiency	[illegible]	
GHG, lbs CO2/Mwhr	[illegible]	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	Total Friction Head	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost
	mgd	gpm	ft/s	ft	ft	ft	ft	ft	ft	psi	hp	kw	kw	$
ADD	10	6940	2.19	22.25	0.51	22.76	102	124	124	54	273	226	1978537	$118,712
MDD	14	9716	3.06	43.60	1.00	44.60	102	146	146	63	449	372	3256229	$195,374

Underwood Creek Return Flow

Pipeline		
Segment	Miles	Diameter
A	11.4	36

Waukesha WWTP	794	Google earth elevation at WWTP
elevation at watershed divide	895	
Discharge at Underwood Creek	718	
Segment A Piping K	6.85	(one K=1.0 entr, ten K=0.30 90-elb, 3 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
Segment B Piping K	5.65	(one flow thru tee K=0.6, five K=0.3 90-elb, one bend thru tee K=1.80, three open bfly valve K=0.25, one exit K=0.5)
Piping Friction Factor	0.015	
Power cost, $/kw	0.06	
Power efficiency	0.9	
GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	Total Friction Head	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost	Annual GHG Produced
	mgd	gpm	ft/s	ft	ft	ft	ft	ft	ft	psi	hp	kw	kw	$	tons CO2
ADD	10	6940	2.19	22.25	0.51	22.76	102	124	124	54	273	226	1978537	$118,712	1839
MDD	14	9716	3.06	43.60	1.00	44.60	102	146	146	63	449	372	3256229	$195,374	3027

WWTP Effluent Pump Station

Approx. Topo EL 794

Design TDH	146	ft	must be designed to pump up to the watershed divide;
	63	psi	
No. of pumps	3	3 active, 1 standby	
Capacity, mgd (each)	3.33		
HP (each)	122		nominal 150 hp
Drive	variable frequency		

Underwood Creek Return Flow

Pipeline			
Segment		Diameter	
A		36	432
B		36	432

Unit cost	$/dia-in	12

Mile	Cost		Comments
1	$2,389,306		0.75 mi follows river, crosses Prairie ave, Marshall and Dunbar, 0.25 under alley to NW ave
2	$2,389,306		Cross Maple, Grand, Barstow, East, Barney, Hartwell, crossing of E Broadway (major street); end at Oakland
3	$3,290,285		follows path (cross Greendale and Frederick), cross East Side bypass HYW 59 (MAJOR)
4	$1,836,971	70%	Follows New Berlin trail/utility corridor, cross Springdale;also a stream crossing, some forest (assume 20%); ends near stream crossing
5	$1,555,159	70%	Follows trail, open country mostly, some forest (assume 30%), wetlands for 0.5 mi; assume groundwater; ends near wetlands/open water pond
6	$1,247,001	70%	Follows trail, open country mostly, some forest (assume 10%)
7	$1,700,456	70%	Begins near Calhoun, one stream crossing; becoming urban again but still follows trail and is mostly open, crosses Calhoun and ends near Moorland, assume 10% forest
8	$1,181,537	70%	Still in trail, no crossings; very open; Ends near Sunnyslope Rd
9	$1,181,537	70%	Still in trail, no crossings; very open; Ends at 124th st
10	$2,623,104		Going north under 124th st, crosses Greenfield (hwy 59), ends near 124th and Zinke Dr
11	$3,800,079		Last section follows Underwood Creek, Crosses I-94
subtotal	**$23,194,740**		

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf
Open country	0.74	320
Low urban	1.00	432
Medium urban	1.19	514
High urban	1.37	592
Groundwater	**1.30**	**562**
Forest	1.15	497
Gravel roads	0.85	367
Creek crossing	2.00	864
HWY crossing	4.00	1728

Underwood Creek Return Flow

Pipelines		**$23,195,000**
10% allowance for pipeline valves & appurtenances		**$2,320,000**
Pipeline Construction Cost		**$25,515,000**
WWTP Effluent Pump Station		**$3,508,000**
Conveyance System Construction Cost		**$29,023,000**
3% markup for Bonds & Insurance	$871,000	
5% markup for Mob/Demob	$1,452,000	
8% markup for Contractors Overhead	$2,508,000	
4% markup for Contractors profit	$1,254,000	
25% Contingency	$8,777,000	
Subtotal Markups and Contingency		**$14,862,000**
Total Project Construction Costs		**$43,885,000**
8% allowance for pipeline engineering and design	3,511,000	
12% allowance for permitting, legal and administration	5,267,000	
8% allowance for pipeline engr services during construction	3,511,000	
Subtotal Other Project Costs		**$12,289,000**
GRAND TOTAL PROJECT COST		**$56,174,000**

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	639.92	CY	***$5.28***	$3,381
Imported Structural Backfill	532.57	CY	***$40.04***	$21,322
Native Backfill	38.78	CY	***$6.50***	$252
Haul Excess	601.13	CY	***$6.50***	$3,905
Forebay:				
Excavation	0.00	CY	***$5.28***	$0
Imported Structural Backfill	0.00	CY	***$40.04***	$0
Native Backfill	0.00	CY	***$6.50***	$0
Haul Excess	0.00	CY	***$6.50***	$0
Office:				
Excavation	0.00	CY	***$5.28***	$0
Imported Structural Backfill	0.00	CY	***$40.04***	$0
Native Backfill	0.00	CY	***$6.50***	$0
Haul Excess	0.00	CY	***$6.50***	$0
Surge Protection:				
Excavation	385.95	CY	***$5.28***	$2,039
Imported Structural Backfill	201.65	CY	***$40.04***	$8,073
Native Backfill	75.73	CY	***$6.50***	$492
Haul Excess	310.22	CY	***$6.50***	$2,015
Allowance for Misc Items	5%		$41,478.65	$2,074
Subtotal				$43,553
CONCRETE:				
Pump Station				
Foundation	482.04	CY	***$382.16***	$184,218
Support Walls	0.00	CY	***$683.50***	$0
Support Columns	10.37	CY	***$683.50***	$7,088
Pump Pad Epoxy	2.20	CY	$3,368.81	$7,401
Pump Pad Support	24.15	CY	***$345.93***	$8,354
Pipe Supports	29.63	CY	***$345.93***	$10,250
Mezzanine				
Elevated Slab	0.00	CY	***$1,088.69***	$0
Electrical Room				
Foundation	13.23	CY	***$345.93***	$4,577
Surge Protection				
Foundation	108.47	CY	***$345.93***	$37,524
Office				
Foundation	0.00	CY	***$345.93***	$0
Pump Station Forebay				
Slab on Grade for Steel Tank	0.00	CY	***$345.93***	$0
Prestressed Concrete Tank (0 gallons)	0.00	EA	***$0.00***	$0
Outlet Box	9.91	CY	***$382.16***	$3,786
Allowance for Misc Items	5%		$263,196.94	$13,160
Subtotal				$276,357
MASONRY:	Moderate			
Pump Station Building	5857.49	SF	***$194.87***	$1,141,458
Office Building	0.00	SF	***$129.91***	$0
Surge Building	1464.37	SF	***$129.91***	$190,243
Electrical Room	357.23	SF	***$129.91***	$46,409
Subtotal	7679.09			$1,378,109

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METALS:				
Metal Guardrail with Pickets	0.00	LF	*$71.45*	$0
Stairs = IF Mezzanine = 10 * 12/8	0.00	Risers	*$389.74*	$0
Pump Removal Hatches	0.00	SF	*$108.50*	$0
Ladder	0.00	VLF	*$98.09*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	200.00	HP	*$323.10*	$64,619
Active Pump # 2	200.00	HP	*$323.10*	$64,619
Active Pump # 3	200.00	HP	*$323.10*	$64,619
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	200.00	HP	*$323.10*	$64,619
Steel Forebay Tank (0 gallons)	0.00	EA	*$0.00*	$0
Allowance for Misc Items	10%		$258,477.39	$25,848
Subtotal				$284,325
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	8.00	each	*$2,169.93*	$17,359
Control Valve Actuators	4.00	each	*$2,169.93*	$8,680
Level Indicator Transmitters	2.00	each	*$6,677.82*	$13,356
Level Swithces	2.00	each	*$7,029.28*	$14,059
Pressure Indicator Transmitters	5.00	each	*$7,029.28*	$35,146
Pressure Switches	8.00	each	*$7,029.28*	$56,234
Number of Analog I/O Counts	31.20	each	*$206.14*	$6,432
Number of Digital I/O Counts	84.00	each	*$48.82*	$4,101
Number of PLC's	4.00	each	*$10,198.66*	$40,795
I&C Conduit & Wire	2896.62	lf	*$9.41*	$27,247
Allowance for Misc Items	10%		$ 223,408.90	$22,341
Subtotal				$245,750
CONVEYING SYSTEMS				
Bridge Crane	1.00	EA	*$55,034.79*	$55,035
Bridge Crane Rail	207.77	LF	*$28.59*	$5,939
Allowance for Misc Items	10%		$ 60,974	$6,097
Subtotal				$ 67,071
MECHANICAL:				
Pipe:				
Suction Header Pipe (42-inch,SUC, Buried, Steel, Cement Mortar, Tape Coating)	65.88	LF	*$1,034.40*	$68,150
Suction Lateral Pipe (24-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	56.00	LF	*$584.96*	$32,757
Discharge Lateral Pipe (24-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	48.00	LF	*$584.96*	$28,078
Discharge Header Pipe (42-inch,DIS, Buried, Steel, Cement Mortar, Tape Coating)	65.88	LF	*$1,034.40*	$68,150

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Pump Suction Pipe (12-inch,SUC, Exposed, Steel, Cement Mortar, Paint)	4.00	LF	*$285.33*	$1,141
Pump Discharge Pipe (8-inch,DIS, Exposed, Steel, Cement Mortar, Paint)	2.67	LF	*$278.51*	$743
Elbows:				
Discharge Lateral Pipe (24-inch)	4.00	EA	*$2,186.46*	$8,746
Discharge Header Pipe (42-inch)	2.00	EA	*$4,014.02*	$8,028
Tees:				
Suction Header Pipe (42-inch)	4.00	EA	*$7,836.34*	$31,345
Discharge Header Pipe (42-inch)	4.00	EA	*$7,836.34*	$31,345
Valves:				
Suction Header Isolation Valve (42-inch, BFV)	1.00	EA	*$8,726.52*	$8,727
Suction Lateral Isolation Valve (24-inch, BFV)	4.00	EA	*$5,390.47*	$21,562
Discharge Lateral Isolation Valve (24-inch, BFV)	4.00	EA	*$5,390.47*	$21,562
Pump Control Valve (24-inch, Full Port Valve)	4.00	EA	*$5,390.47*	$21,562
Discharge Header Isolation Valve (42-inch, BFV)	1.00	EA	*$8,726.52*	$8,727
Air Release Vacuum Valves	12.00	EA	*$3,254.89*	$39,059
Allowance for Misc Items	10%		$399,680.68	$39,968
Subtotal				$439,649
ELECTRICAL:				
MCC's				
Sections	8.00	each	*$6,696.14*	$53,569
AFD's				
Active Pump # 1	200.00	HP	*$180.66*	$36,132
Active Pump # 2	200.00	HP	*$180.66*	$36,132
Active Pump # 3	200.00	HP	*$180.66*	$36,132
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	200.00	HP	*$180.66*	$36,132
Switchgear				
Units	0.00	each	*$30,802.24*	$0
Electrical Conduit & Wire	399.53	lf	*$9.41*	$3,758
Allowance for Misc Items	5%		$201,856	$10,093
Subtotal				$211,949
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,946,763
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2%		$3,508,051	$70,161
I & C Allowance	2%		$3,508,051	$70,161
Surge Allowance	5%		$3,508,051	$175,403

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Mechanical Allowance	2%		$3,508,051	$70,161
Electrical Allowance	5%		$3,508,051	$175,403
Facility Cost	**800**	**Total Pump HP**	**$4,385.06**	**$3,508,051**

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Root River Return Flow

Pipeline		
Segment	Miles	Diameter
A	15.5	36

Waukesha WWTP	794	Google earth elevation at WWTP
elevation at watershed divide	895	
Discharge at Root River	705	
Segment A Piping K	10.35	(one K=1.0 entr, twenty K=0.30 90-elb, 5 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
Segment B Piping K	8.15	(one flow thru tee K=0.6, ten K=0.3 90-elb, one bend thru tee K=1.80, five open bfly valve K=0.25, one exit K=0.5)
Piping Friction Factor	0.015	
Power cost, $/kw	0.06	
Power efficiency	0.9	
GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost	Annual GHG Produced
	mgd	gpm	ft/s	ft	ft	ft	ft	ft	psi	hp	kw	kw	$	tons CO2
ADD	10	6940	2.19	30.34	0.77	31	102	133	57	332	275	2413060	$144,784	2243
MDD	14	9716	3.06	59.47	1.51	61	102	163	70	570	472	4138149	$248,289	3846

WWTP Effluent Pump Station

Approx. Topo EL	794		
Design TDH	163	ft	must be designed to pump up to the watershed divide;
	70	psi	
No. of pumps	3	3 active, 1 standby	
Capacity, mgd (each)	3.33		
HP (each)	136		nominal 150 hp
Drive	variable frequency		

Root River Return Flow

Pipeline		
Segment		Diameter
A		36
B		36

Unit cost	$/dia-in	12

Mile	Cost		Comments
1	$2,389,306	0%	0.75 mi follows river, crosses Prairie ave, Marshall and Dunbar, 0.25 under alley to NW ave
2	$2,389,306	0%	Cross Maple, Grand, Barstow, East, Barney, Hartwell, crossing of E Broadway (major street); end at Oakland
3	$3,290,285	0%	follows path (cross Greendale and Frederick), cross East Side bypass HYW 59 (MAJOR)
4	$1,836,971	70%	Follows New Berlin trail/utility corridor, cross Springdale;also a stream crossing, some forest (assume 20%); ends near stream crossing
5	$1,555,159	70%	Follows trail, open country mostly, some forest (assume 30%), wetlands for 0.5 mi; assume groundwater; ends near wetlands/open water pond
6	$1,247,001	70%	Follows trail, open country mostly, some forest (assume 10%)
7	$1,700,456	70%	Begins near Calhoun, one stream crossing; becoming urban again but still follows trail and is mostly open, crosses Calhoun and ends near Moorland, assume 10% forest
8	$1,181,537	70%	Still in trail, no crossings; very open; Ends near Sunnyslope Rd
9	$1,181,537	70%	Still in trail, no crossings; very open; Ends at 124th st
10	$2,584,328		Going south, 0.7 mi under 124th st. 0.3 mi along Root River pkwy; ends near Cleveland Ave.
11	$2,623,104		Follows Root River Parkway, crosses Oklahoma (major crossing), ends near S 116th St
12	$1,806,520		Follows Root River Parkway 0.2 mi, crosses Morgan, follows oak leaf bike trail, crosses Beloit Rd, ends between Beloit Rd and S 108th St
13	$2,431,503		Follows Oak Leaf Bike Trail, crosses Hwy 100, crosses Coldspring, ends at Hwy 45
14	$3,649,536		In Root River pkwy, cross HWY 45, Layton Ave, ends at Forest Home Ave
15	$2,623,104		In Root River pkwy, crosses Forest Home Ave (Hwy 24) and 84th st, discharges to Root River
subtotal	**$32,489,652**		

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES	Seg A cost $/lf
Open country	0.74	320
Low urban	1.00	432
Medium urban	1.19	514
High urban	1.37	592
Groundwater	**1.30**	**562**
Forest	1.15	497
Gravel roads	0.85	367
Creek crossing	2.00	864
HWY crossing	4.00	1728

Root River Return Flow

Pipelines		**$32,490,000**
10% allowance for pipeline valves & appurtenances		**$3,249,000**
Pipeline Construction Cost		**$35,739,000**
WWTP Effluent Pump Station		**$3,508,000**
Conveyance System Construction Cost		**$39,247,000**
3% markup for Bonds & Insurance	$1,178,000	
5% markup for Mob/Demob	$1,963,000	
8% markup for Contractors Overhead	$3,392,000	
4% markup for Contractors profit	$1,696,000	
25% Contingency	$11,869,000	
Subtotal Markups and Contingency		**$20,098,000**
Total Project Construction Costs		**$59,345,000**
8% allowance for pipeline engineering and design	4,748,000	
12% allowance for permitting, legal and administration	7,122,000	
8% allowance for pipeline engr services during construction	4,748,000	
Subtotal Other Project Costs		**$16,618,000**
GRAND TOTAL PROJECT COST		**$75,963,000**

Lake Michigan Direct Return Flow

Pipeline		
Segment	Miles	Diameter
A	22.0	36

Waukesha WWTP	794	
elevation at watershed divide	895	
Discharge at Lake Michigan	580	
Segment A Piping K	10.35	(one K=1.0 entr, twenty K=0.30 90-elb, 5 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
Segment B Piping K	8.15	(one flow thru tee K=0.6, ten K=0.3 90-elb, one bend thru tee K=1.80, five open bfly valve K=0.25, one exit K=0.5)
Piping Friction Factor	0.015	
Power cost, $/kw	0.06	
Power efficiency	0.9	
GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost	Annual GHG Produced
	mgd	gpm	ft/s	ft	ft	ft	ft	ft	psi	hp	kw	kw	$	tons CO2
ADD	10	6940	2.19	43.07	0.77	44	102	146	63	364	302	2644286	$158,657	2458
MDD	14	9716	3.06	84.41	1.51	86	102	188	81	658	545	4772636	$286,358	4436

WWTP Effluent Pump Station

Approx. Topo EL 794

Design TDH	188	ft	must be designed to pump up to the watershed divide;
	81	psi	
No. of pumps	3	3 active, 1 standby	
Capacity, mgd (each)	3.33		
HP (each)	157		nominal 200 hp
Drive	variable frequency		

Lake Michigan Direct Return Flow

Pipeline		
Segment		Diameter
A		36
B		36

Unit cost	$/dia-in	12

Mile	Cost		Comments
1	$2,389,306	0%	0.75 mi follows river, crosses Prairie ave, Marshall and Dunbar, 0.25 under alley to NW ave
2	$2,389,306	0%	Cross Maple, Grand, Barstow, East, Barney, Hartwell, crossing of E Broadway (major street); end at Oakland
3	$3,290,285	0%	follows path (cross Greendale and Frederick), cross East Side bypass HYW 59 (MAJOR)
4	$1,836,971	70%	Follows New Berlin trail/utility corridor, cross Springdale;also a stream crossing, some forest (assume 20%); ends near stream crossing
5	$1,555,159	70%	Follows trail, open country mostly, some forest (assume 30%), wetlands for 0.5 mi; assume groundwater; ends near wetlands/open water pond
6	$1,247,001	70%	Follows trail, open country mostly, some forest (assume 10%)
7	$1,700,456	70%	Begins near Calhoun, one stream crossing; becoming urban again but still follows trail and is mostly open, crosses Calhoun and ends near Moorland, assume 10% forest
8	$1,181,537	70%	Still in trail, no crossings; very open; Ends near Sunnyslope Rd
9	$1,181,537	70%	Still in trail, no crossings; very open; Ends at 124th st
10	$2,059,707		Follows Trail, crosses S 16th St, ends at Hwy 100
11	$2,431,503		Follows Trail, crosses Hwy 45, ends at S 92nd St
12	$2,714,342		Follows train tracks, crosses National, 82nd, 80th, ends at 76th
13	$2,714,342		Follows train tracks, crosses 73rd, 71st, 68th, Becher, ends at Beloit Rd
14	$2,714,342		Follows train tracks, ends at 43rd st
15	$2,714,342		Follows train tracks, ends at 27th st
16	$2,714,342		Follows train tracks, ends at 16th st
17	$2,714,342		Follows train tracks, ends at Hwy 794
18	$2,714,342		Follows train tracks, crosses Hwy 794, Oklahoma, Chase, Howell, Whitman, ends near Clement
19	$2,714,342		Follows train tracks, ends near Lake pkwy
20	$2,714,342		Follows train tracks, crosses Lake pkwy, Howard, ends at KK
21	$2,714,342		Follows KK then turns east on Lunham and discharges to Lake
subtotal	**$48,406,191**		

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES	Seg A cost $/lf
Open country	0.74	320
Low urban	1.00	432
Medium urban	1.19	514
High urban	1.37	592
Groundwater	**1.30**	**562**
Forest	1.15	497
Gravel roads	0.85	367
Creek crossing	2.00	864
HWY crossing	4.00	1728

Lake Michigan Direct Return Flow

Pipelines		**$48,407,000**
10% allowance for pipeline valves & appurtenances		**$4,841,000**
Pipeline Construction Cost		**$53,248,000**
WWTP Effluent Pump Station		**$3,508,000**
Conveyance System Construction Cost		**$56,756,000**
3% markup for Bonds & Insurance	$1,703,000	
5% markup for Mob/Demob	$2,838,000	
8% markup for Contractors Overhead	$4,904,000	
4% markup for Contractors profit	$2,452,000	
25% Contingency	$17,164,000	
Subtotal Markups and Contingency		**$29,061,000**
Total Project Construction Costs		**$85,817,000**
8% allowance for pipeline engineering and design	6,866,000	
12% allowance for permitting, legal and administration	10,299,000	
8% allowance for pipeline engr services during construction	6,866,000	
Subtotal Other Project Costs		**$24,031,000**
GRAND TOTAL PROJECT COST		**$109,848,000**

Alternative 4:
Lake Michigan and Shallow Aquifer

Alternative 4 -Lake Michigan and Shallow Aquifers		
Shallow Aquifer Water Treatment Plant		**$29,864,000**
Shallow Aquifer Wellfield		**$12,800,000**
Shallow Aquifer Supply Pipeline to Waukesha		**$ 18,573,000**
Distribution System Improvements		**$ 8,465,000**
Wastewater Force Main		**$3,332,000**
Subtotal Shallow Aquifer Construction Cost		**$73,034,000**
Lake Michigan Supply Pipeline		**$25,682,000**
Parkway Booster Station		**$5,282,822**
Return Flow Pipeline/Pump Station		**$19,172,686**
Subtotal Lake Michigan Supply		**$50,137,508**
Subtotal Construction Cost		**$123,171,508**
3% markup for Bonds & Insurance	$3,696,000	
5% markup for Mob/Demob	$6,159,000	
8% markup for Contractors Overhead	$10,643,000	
4% markup for Contractors profit	$5,322,000	
25% Contingency	$37,248,000	
Subtotal Markups and Contingency		**$63,068,000**
Total Project Construction Costs		**$186,239,508**
8% allowance for engineering and design	14,900,000	
12% allowance for permitting, legal and admin	22,349,000	
8% allowance for engr services during constru	14,900,000	
Subtotal Other Project Costs		**$52,149,000**
TOTAL PROJECT CAPITAL COST		**$238,000,000**

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES DESIGN & CONSTRUCTION COST MODULE

File Version: 1/5/2010

Click for CPES QA/QC | To Concrete Wall Thickness Help | To Cost Summary Matrix | To Unit Cost Database

Project Name:	Waukesha WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	Fox River Alluvium and Shallow Groundwater
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months):	24
Mid-Point of Construction:	Jan/2012

Roundup to the nearest: $1,000

This Report is for INTERNAL Distributio

This Report is for EXTERNAL Distributic

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Cost
	Yes	Inline Rapid Mix: RMX	$623,000
	Yes	Flocculation: FLOC	$1,527,000
	Yes	Lamella Clarifier: LAM	$2,367,000
	Yes	Filters: FILT	$5,024,000
	Yes	Surge Basin-Decanter: BWW	$1,535,000
	No	UV Disinfection: UVD	$0
	Yes	Concrete Clearwell: FWT	$1,313,000
	No	Steel Clearwell: FWT	$0
	No	In-Plant PS: FWPS	$0
	Yes	Vertical Turbine PS: FWPS	$3,042,000
	Yes	Filter BW PS: BWSPS	$1,101,000
	Yes	U.D. Facility: GEN	$0
	Yes	Liquid Chemical: FeCl3	$393,000
	Yes	Liquid Chemical: NaOCl	$296,000
	Yes	Liquid Chemical: FLUOR	$186,000
	Yes	Liquid Chemical: POLYPHOS	$185,000
	Yes	O&M Building: OMB	$2,849,000

SUBTOTAL - PROJECT COST			$20,441,000
ADDITIONAL PROJECT COSTS:			
Demolition	0%		$0
Overall Sitework	10%		$2,045,000
Plant Computer System	5%		$1,023,000
Yard Electrical	7%		$1,493,000
Yard Piping	14%		$2,862,000
UD #1 Default Description	0%		$0
UD #2 Default Description	0%		$0
UD #3 Default Description	0%		$0
SUBTOTAL with Additional Project Costs			$27,864,000

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	B	C	D	E	F
132					
133	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
134					
135	SITEWORK:				
136	Excavation	140.81	CY	$ 5.35	$754
137	Imported Structural Backfill	83.82	CY	$ 40.56	$3,399
138	Native Backfill	0.00	CY	$ 6.58	$0
139	Haul Excess	140.81	CY	$ 6.58	$927
140	Allowance for Misc Items	5%		$ 5,079.48	$254
141	Subtotal				$5,333
142					
143	CONCRETE:				
144	Wall Footing	9.31	CY	$ 345.93	$3,220
145	Stem Walls	0.00	CY	$ 683.50	$0
146	Slab on Grade	27.50	CY	$ 345.93	$9,513
147	Pipe Supports	14.00	EA	$ 438.67	$6,141
148	Electrical Room Slab on Grade	2.13	CY	$ 345.93	$737
149	Allowance for Misc Items	5%		$19,613	$981
150	Subtotal				$20,593
151					
152	MASONRY:	Moderate			
153	CMU Building	864.20	SF	$ 131.60	$113,730
154	Electrical Room	57.56	SF	$ 131.60	$7,574
155	Subtotal	921.76			$121,304
156					
157	EQUIPMENT:				
158	Inline Mixer (20-inch)	2.00	EA	$ 27,983.82	$55,968
159	Allowance for Misc Items	10%		$ 55,967.63	$5,597
160	Subtotal				$61,564.39
161					
162	INSTRUMENTS & CONTROLS:				
163	Instruments				
164	Mag Meter (12-inch)	2.00	EA	$ 10,574.21	$21,148
165	pH / Temperature	1.00	EA	$ 2,093.45	$2,093
166	Turbidity	1.00	EA	$ 3,133.05	$3,133
167	Streaming Current Detector	0.00	EA	$ 10,680.85	$0
168	UV Absorbance	1.00	EA	$ 21,794.63	$21,795
169	Conductivity	0.00	EA	$ 2,057.84	$0
170	Sample Panels	2.00	EA	$ 3,948.04	$7,896
171	Isolation Valve Actuators	4.00	each	$5,064.93	$20,260
172	Flow Control Valve Actuators	2.00	each	$5,064.93	$10,130
173	Number of Analog I/O Counts	12.00	each	$208.82	$2,506
174	Number of Digital I/O Counts	33.60	each	$49.46	$1,662
175	Number of PLC's	1.00	each	$10,331.10	$10,331
176	I&C Conduit & Wire	552.52	lf	$9.53	$5,265
177	Allowance for Misc Items	10%		$ 106,218.79	$10,622
178	Subtotal				$116,841
179					
180	CONVEYING SYSTEMS:				
181	Monorail Hoist (3 Ton)	1.00	EA	$ 55,749.49	$55,749
182	Hoist Rail	105.17	LF	$ 28.96	$3,045
183	Allowance for Misc Items	10%		$ 58,794.83	$5,879
184	Subtotal				$64,674
185					
186	MECHANICAL:				
187	Pipe:				
188	Rapid Mix Pipe (20-inch, RW, Exposed ,Steel ,Cement Mortar ,Paint)	33.33	lf	$365.28	$12,176

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	B	C	D	E	F
189	Flow Control Pipe (12-inch, FCP, Exposed ,Steel ,Cement Mortar ,Paint)	16.00	lf	*$219.17*	$3,507
190	Elbows:				
191	Rapid Mix Pipe (20-inch)	4.00	each	*$2,199.87*	$8,799
192	Valves:				
193	Rapid Mix Isolation Valves (20-inch)	4.00	each	*$16,089.26*	$64,357
194	Flow Control Valve (12-inch)	2.00	each	*$9,653.56*	$19,307
195	Allowance for Misc Items	10%		$108,146.20	$10,815
196	Subtotal				$118,961
197					
198	ELECTRICAL:				
199	MCC's				
200	Sections	5.00	each	*$6,783.10*	$33,915
201	AFD's				
202	Mechanical Mixers (3 hp each)	0.00	each	*$4,494.79*	$0
203	Switchgear				
204	Units	0.00	each	*$31,202.24*	$0
205	Electrical Conduit & Wire	85.00	lf	*$9.53*	$810
206	Allowance for Misc Items	10%		$34,725	$3,473
207	Subtotal				$38,198
208					
209	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
210	Item 1 Description	0.00		0.00	$0
211	Item 2 Description	0.00		0.00	$0
212	Item 3 Description	0.00		0.00	$0
213	Item 4 Description	0.00		0.00	$0
214	Item 5 Description	0.00		0.00	$0
215	Item 6 Description	0.00		0.00	$0
216	Item 7 Description	0.00		0.00	$0
217	Item 8 Description	0.00		0.00	$0
218	Item 9 Description	0.00		0.00	$0
219	Item 10 Description	0.00		0.00	$0
220	Item 11 Description	0.00		0.00	$0
221	Item 12 Description	0.00		0.00	$0
222	Item 13 Description	0.00		0.00	$0
223	Item 14 Description	0.00		0.00	$0
224	Item 15 Description	0.00		0.00	$0
225	Subtotal				$0
226					
227	Subtotal				$547,469
228					
229	ALLOWANCES:		**User Over-write**		
230	Finishes Allowance	2.0%		$622,124	$12,442
231	I & C Allowance	5%		$622,124	$31,106
232	Mechanical Allowance	0%		$622,124	$0
233	Electrical Allowance	5%		$622,124	$31,106
234					
235	Facility Cost	**12,000,000**	**GPD**	**$0.05**	**$622,124**

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	B	C	D	E	F
188					
189	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
190					
191	SITEWORK:				
192	Excavation	3,805	CY	***$5.35***	$20,366
193	Imported Structural Backfill	617	CY	***$40.56***	$25,021
194	Native Backfill	1,032	CY	***$6.58***	$6,793
195	Haul Excess	2,773	CY	***$6.58***	$18,244
196	Allowance for Misc Items	5%		$70,423.45	$3,521
197	Subtotal				$73,945
198					
199	CONCRETE:				
200	Influent Channel:				
201	Foundation	42	CY	***$382.16***	$16,188
202	Channel Walls (Only 3 walls are covered here. The 4th wall is covered in the Flocc Basin.)	70	CY	***$683.50***	$47,563
203	Elevated Slab	25	CY	***$1,088.69***	$27,007
204	Flocc Basin				
205	Foundation	218	CY	***$382.16***	$83,323
206	Basin Walls (Only 3 walls are covered here. The Effluent wall is covered in the Influent Channel of the Lamella Clarifier)	119	CY	***$683.50***	$81,280
207	Under Baffle Wall	40	CY	***$683.50***	$27,065
208	Over Baffle Wall	40	CY	***$683.50***	$27,065
209	Elevated Slab	81	CY	***$1,088.69***	$88,341
210	Flocc Bearing Supports	42	EA	$0.00	$0
211	Electrical Room				
212	Slab on Grade	4	CY	***$345.93***	$1,435
213	Allowance for Misc Items	5%		$399,265.97	$19,963
214	Subtotal				$419,229
215					
216	MASONRY:	Moderate			
217	CMU Building	4,312	SF	***$131.60***	$567,498
218	Electrical Room	112	SF	***$131.60***	$14,739
219	Subtotal	4,424			$582,238
220					
221	METALS:				
222	Aluminum Handrail	233	LF	***$72.38***	$16,854
223	Additional Handrail with NO Building	0	LF	***$72.38***	$0
224	Stairs (1 per basin)	16	RISERS	***$394.80***	$6,270
225	Allowance for Misc Items	10%		$23,124.34	$2,312
226	Subtotal				$25,437
227					
228	WOODS & PLASTICS:				
229	FRP Weir	6	LF	$32.90	$183
230	FRP Ladder	4	EA	$1,137.15	$4,549
231	Allowance for Misc Items	5%		$4,732.07	$237
232	Subtotal				$4,969
233					
234	THERMAL & MOISTURE PROTECTION:				
235	Concrete Liner	0	SF	$16.00	$0
236	Allowance for Misc Items	10%		$0.00	$0
237	Subtotal				$0
238					
239	DOORS & WINDOWS:				
240	O/U Baffling ON/OFF Factor	*0*			
241	Serpentine Baffling ON/OFF Factor	*1*			$0
242	Stainless Steel Door (2' x 2') for O/U Baffling	0	EA	$1,052.81	$0
243	Stainless Steel Door (2' x 2') for Serpentine Baffling	4	EA	$1,052.81	$4,211
244	Stainless Steel Door (7' x 2.5')	0	EA	$4,606.05	$0
245	Allowance for Misc Items	5%		$4,211.24	$211
246	Subtotal				$4,422
247					

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	B	C	D	E	F
248	EQUIPMENT:				
249	Horizontal Paddle Wheel Flocculation Mechanism (Paddles & Drives)	0	LF	***$0.00***	$0
250	Vertical Paddle Wheel Flocculation Mechanism (Paddles & Drives)	18	EA	***$0.00***	$0
251	Vertical Turbine Flocculation Mechanism (Turbines & Drives)	18	HP	***$1,477.12***	$26,588
252	Vertical Turbine Flocculator VFD's	18	HP	***$596.65***	$10,740
253	Fabricated Slide Gate	2	EA	***$6,077.92***	$12,156
254	Allowance for Misc Items	10%		$49,483.61	$4,948
255	Subtotal				$54,432
256					
257	ELECTRICAL:				
258	*MCC's*				
259	Sections	12	each	***$6,783.10***	$81,397
260	*AFD's*				
261	Flocculation Mixers Stage 1 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
262	Flocculation Mixers Stage 2 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
263	Flocculation Mixers Stage 3 (total facility) (1 hp each)	6	each	***$4,248.86***	$25,493
264	Flocculation Mixers Stage 4 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
265	Flocculation Mixers Stage 5 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
266	Flocculation Mixers Stage 6 (total facility) (0 hp each)	0	each	***$4,125.89***	$0
267	*Switchgear*				
268	Units	0	each	***$31,202.24***	$0
269	Electrical Conduit & Wire	1,752	lf	***$9.53***	$16,694
270	Allowance for Misc Items	10%		$174,571.06	$17,457
271	Subtotal				$192,028
272					
273	INSTRUMENTS & CONTROLS:				
274	Instruments				
275	Level Switch	2	each	***$549.53***	$1,099
276	Number of Analog I/O Counts	43	each	***$208.82***	$9,021
277	Number of Digital I/O Counts	108	each	***$49.46***	$5,341
278	Number of PLC's	1	each	***$10,331.10***	$10,331
279	I&C Conduit & Wire	1,827	lf	***$9.53***	$17,406
280	Allowance for Misc Items	10%		$43,198.52	$4,320
281	Subtotal				$47,518
282					
283	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
284	Item 1 Description	0.00		0.00	$0
285	Item 2 Description	0.00		0.00	$0
286	Item 3 Description	0.00		0.00	$0
287	Item 4 Description	0.00		0.00	$0
288	Item 5 Description	0.00		0.00	$0
289	Item 6 Description	0.00		0.00	$0
290	Item 7 Description	0.00		0.00	$0
291	Item 8 Description	0.00		0.00	$0
292	Item 9 Description	0.00		0.00	$0
293	Item 10 Description	0.00		0.00	$0
294	Item 11 Description	0.00		0.00	$0
295	Item 12 Description	0.00		0.00	$0
296	Item 13 Description	0.00		0.00	$0
297	Item 14 Description	0.00		0.00	$0
298	Item 15 Description	0.00		0.00	$0
299	Subtotal				$0
300					
301	Subtotal				$1,404,217
302					
303	ALLOWANCES:		**User Over-write**		

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	B	C	D	E	F
304	Finishes Allowance	2.0%		$1,526,323	$30,526
305	I & C Allowance	2%		$1,526,323	$30,526
306	Mechanical Allowance	2%		$1,526,323	$30,526
307	Electrical Allowance	2%		$1,526,323	$30,526
308					
309	Facility Cost	12,000,000	GPD	$0.13	$1,526,323

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	B	C	D	E	F
180					
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
182					
183	SITEWORK:				
184	Excavation	4,244	CY	$ 5.35	$22,713
185	Imported Structural Backfill	653	CY	$ 40.56	$26,492
186	Native Backfill	1,176	CY	$ 6.58	$7,738
187	Haul Excess	3,068	CY	$ 6.58	$20,185
188	Allowance for Misc Items	5%		$77,128	$3,856
189	Subtotal				$80,985
190					
191	CONCRETE:				
192	Influent Channel:				
193	Foundation	37	CY	$ 382.16	$14,026
194	Channel Walls	77	CY	$ 683.50	$52,960
195	Elevated Slab	22	CY	$ 1,088.69	$24,216
196	Basin				
197	Foundation	138	CY	$ 382.16	$52,925
198	Channel Walls	264	CY	$ 683.50	$180,519
199	Elevated Slab	38	CY	$ 1,088.69	$41,369
200	Concrete Curb (8" X 8")	73	LF	$ 32.90	$2,402
201	Effluent Channel:				
202	Foundation	37	CY	$ 382.16	$14,026
203	Walls	77	CY	$ 683.50	$52,960
204	Elevated Slab	22	CY	$ 1,088.69	$24,216
205	Electrical Room				
206	Slab on Grade	2	CY	$ 345.93	$737
207	Allowance for Misc Items	5%		$460,355	$23,018
208	Subtotal				$483,373
209					
210	MASONRY:	Moderate			
211	CMU Building	4,746	SF	$ 131.60	$624,619
212	Electrical Room	58	SF	$ 131.60	$7,574
213	Subtotal	4,804			$632,193
214					
215	METALS:				
216	Aluminum Handrail	269	LF	$ 72.38	$19,470
217	Allowance for Misc Items	10%		$ 19,470.17	$1,947
218	Subtotal				$21,417
219					
220	WOODS & PLASTICS:				
221	FRP Ladder	4	EA	$ 1,443.20	$5,773
222	Allowance for Misc Items	5%		$ 5,772.82	$289
223	Subtotal				$6,061
224					
225	THERMAL & MOISTURE PROTECTION:				
226	Concrete Liner	0	SF	$16.00	$0
227	Allowance for Misc Items	10%		$0.00	$0
228	Subtotal				$0
229					
230	EQUIPMENT:				
231	Lamella Clarifier [WPL * PW * #P/T *# * COS(PAR)]	25,063	PLATE AREA (SF)	$ 19.45	$487,452
232	Fabricated Slide Gate	2	EA	$ 6,077.92	$12,156
233	Hoseless Sludge Collector	4	EA	$ 66,857.09	$267,428
234	Allowance for Misc Items	10%		$ 767,035.90	$76,704
235	Subtotal				$843,739
236					
237	INSTRUMENTS & CONTROLS:				
238	Instruments				
239	Turbidimeters	4	EA	$ 3,133.05	$12,532
240	Number of Analog I/O Counts	5	each	$208.82	$1,002.34
241	Number of Digital I/O Counts	24	each	$49.46	$1,186.98
242	Number of PLC's	1	each	$10,331.10	$10,331.10
243	I&C Conduit & Wire	321	LF	$9.53	$3,061.92
244	Allowance for Misc Items	10%		$28,115	$2,811.45
245	Subtotal				$30,926
246					

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	B	C	D	E	F
181	**Description**	**Quantity**	**Unit**	**$/Unit**	**Total Cost**
247	MECHANICAL:				
248	Solids Collection Pipe (4-inch, USL , Immersed , Steel)	317	LF	*$66.15*	$20,969
249	Solids Collection Pipe Elbows	16	each	*$439.97*	$7,040
250	Mud Valves	4	EA	*$1,974.02*	$7,896
251	Allowance for Misc Items	10%		$35,905	$3,590
252	Subtotal				$39,495
253					
254	ELECTRICAL:				
255	MCC's				
256	Sections	5	each	*$6,783.10*	$33,915
257	AFD's				
258	Sludge Collectors (total facility) (1 hp each)	-	each	*$4,248.86*	$0
259	Switchgear				
260	Units	-	each	*$31,202.24*	$0
261	Electrical Conduit & Wire	161	LF	*$9.53*	$1,530.96
262	Allowance for Misc Items	10%		$35,446	$3,544.64
263	Subtotal				$38,991
264					
265	**USER DEFINED ESTIMATE ITEMS:**	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
266	Item 1 Description	0.00		0.00	$0
267	Item 2 Description	0.00		0.00	$0
268	Item 3 Description	0.00		0.00	$0
269	Item 4 Description	0.00		0.00	$0
270	Item 5 Description	0.00		0.00	$0
271	Item 6 Description	0.00		0.00	$0
272	Item 7 Description	0.00		0.00	$0
273	Item 8 Description	0.00		0.00	$0
274	Item 9 Description	0.00		0.00	$0
275	Item 10 Description	0.00		0.00	$0
276	Item 11 Description	0.00		0.00	$0
277	Item 12 Description	0.00		0.00	$0
278	Item 13 Description	0.00		0.00	$0
279	Item 14 Description	0.00		0.00	$0
280	Item 15 Description	0.00		0.00	$0
281	Subtotal				$0
282					
283	Subtotal				$2,177,181
284					
285	ALLOWANCES:		**User Over-write**		
286	Finishes Allowance	2.0%		$2,366,502	$47,330
287	I & C Allowance	2%		$2,366,502	$47,330
288	Mechanical Allowance	2%		$2,366,502	$47,330
289	Electrical Allowance	2%		$2,366,502	$47,330
290					
291	Facility Cost	**12,000,000**	**GPD**	**$0.20**	**$2,366,502**

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	B	C	D	E	F
317	COST ESTIMATE				
318	Description	Quantity	Unit	$/Unit	Total Cost
319	SITEWORK:				
320	Soil Excavation	5429.67	CY	$5.35	$29,061
321	Imported Structural Backfill	640.14	CY	$40.56	$25,961
322	Backfill	110.89	CY	$6.58	$730
323	Haul Excess	5318.78	CY	$6.58	$34,998
324	Stair Case:				
325	Soil Excavation	638.48	CY	$5.35	$3,417
326	Imported Structural Backfill	87.11	CY	$40.56	$3,533
327	Backfill	32.89	CY	$6.58	$216
328	Haul Excess	605.59	CY	$6.58	$3,985
329	Blower Room:				
330	Soil Excavation	81.35	CY	$5.35	$435
331	Imported Structural Backfill	102.89	CY	$40.56	$4,173
332	Backfill	4.04	CY	$6.58	$27
333	Haul Excess	77.31	CY	$6.58	$509
334	Electrical Room:				
335	Soil Excavation	16.29	CY	$5.35	$87
336	Imported Structural Backfill	19.63	CY	$40.56	$796
337	Backfill	1.46	CY	$6.58	$10
338	Haul Excess	14.83	CY	$6.58	$98
339	Allowance for Misc Items	5%		$108,034.91	$5,402
340	Subtotal				$113,437
341					
342	CONCRETE:				
343	Filters				
344	Foundation (Includes Filter, Gullet Channel, Filter Influent/Backwash Wastewater Channel) (FSOGW * FSOGL * FOSGT) / 27 *#TF	314.52	CY	$382.16	$120,198
345	Pipe Gallery Wall	214.75	CY	$683.50	$146,779
346	Gullet Wall	42.53	CY	$683.50	$29,069
347	Filter Influent / Backwash Waste Channel Walls	362.33	CY	$683.50	$247,653
348	Filter Influent / Backwash Waste Channel Lower Elevated Slab	20.99	CY	$1,088.69	$22,849
349	Filter Influent / Backwash Waste Channel Upper Elevated Slab	28.33	CY	$1,088.69	$30,846
350	End Walls	221.13	CY	$683.50	$151,141
351	Common Filter Influent				
352	Slab on Grade	55.14	CY	$345.93	$19,076
353	Common Influent Channel Wall	179.54	CY	$683.50	$122,718
354	Common Influent Channel Elevated Slab	24.54	CY	$1,088.69	$26,719
355	Filter Gallery				
356	Slab on Grade	389.93	CY	$345.93	$134,890
357	Filter Gallery Elevated Slab	57.77	CY	$1,088.69	$62,891
358	Pipe Supports	1.84	CY	$32.90	
359	Blower Room				
360	Slab on Grade	55.50	CY	$345.93	$19,201
361	Blower Room Walls	29.08	CY	$683.50	$19,879
362	Stair Case				
363	Slab on Grade	46.22	CY	$345.93	$15,990
364	Stair Case Walls	25.58	CY	$683.50	$17,481
365	Electrical Room				
366	Slab on Grade	3.04	CY	$345.93	$1,051
367	Electrical Room Walls	9.71	CY	$683.50	$6,638
368	Allowance for Misc Items	5%		$1,195,069.53	$59,753
369	Subtotal				$1,254,823
370					
371	MASONRY:	Moderate			
372	CMU Filter Building	7599.82	SF	$131.60	$1,000,147
373	Blower Room	691.67	SF	$131.60	$91,024
374	Electrical Room	82.00	SF	$131.60	$10,791
375	Subtotal				$1,101,963
376					
377	METALS:				

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	B	C	D	E	F
378	Metal Guardrail with Pickets	415.33	LF	*$72.38*	$30,062
379	Filter Access Hatch	13.44	SF	*$109.91*	
380	Stairs (FBD * 12/8)	32.00	Risers	*$394.80*	$12,634
381	Allowance for Misc Items	10%		$42,695.87	$4,270
382	Subtotal				$46,965
383					
384	THERMAL & MOISTURE PROTECTION:				
385	Concrete Liner	0	SF	$16.00	$0
386	Allowance for Misc Items	10%		$0.00	$0
387	Subtotal				$0
388					
389	EQUIPMENT:				
390	Fabricated Slide Gates, 42-inch	2	EA	*$7,111.04*	$14,222
391	Underdrain - Leopold Type S	1,852	SF	*$69.90*	$129,455
392	Wash Troughs				
393	Conventional	0	LF	*$234.61*	$0
394	Media Retaining	223	LF	*$531.99*	$118,633
395	Media				
396	Bottom Media - Sand (ES=0.5 UC=1.4)	1,852	CF	*$17.47*	$32,364
397	Middle Media - Coal (ES=0 UC=0)	0	CF	*$23.30*	$0
398	Top Media - Coal (ES=1 UC=1.4)	7,408	CF	*$23.30*	$172,607
399	Air Scour Blowers (88 hp each)	2	EA	*$71,524.98*	$143,050
400	Allowance for Misc Items	10%		$610,331.42	$61,033
401	Subtotal				$671,365
402					
403	INSTRUMENTS & CONTROLS:				
404	Instruments				
405	Filter Effluent Magmeter (16-inch)	4.00	EA	*$14,438.40*	$57,754
406	Combined Filter Effluent Magmeter (30-inch)	0.00	EA	*$23,932.23*	$0
407	Isolation Valve Actuators	24.00	EA	*$5,064.93*	$121,558
408	Control Valve Actuators	4.00	EA	*$5,064.93*	$20,260
409	Turbidimeters	4	EA	*$3,133.05*	$12,532
410	Particle Counters	4	EA	*$6,764.54*	$27,058
411	Level Transmitters	4	EA	*$7,120.57*	$28,482
412	Differential Pressure Transmitters	4	EA	*$7,120.57*	$28,482
413	Filter Influent Level Transmitter	2	EA	*$7,120.57*	$14,241
414	Air Scour Differential Pressure Transmitter	2	EA	*$7,120.57*	$14,241
415	Air Scour Discharge Pressure Indicator Transmitter	2	EA	*$7,120.57*	$14,241
416	Number of Analog I/O Counts	53	EA	*$208.82*	$11,026
417	Number of Digital I/O Counts	149	EA	*$49.46*	$7,359
418	Number of PLC's	1	EA	*$10,331.10*	$10,331
419	I&C Conduit & Wire	3,438	LF	*$9.53*	$32,760
420	Allowance for Misc Items	10%		$400,325.99	$40,033
421	Subtotal				$440,359
422					
423	CONVEYING SYSTEMS:				
424	Monorail Hoist (3 Ton)	1	EA	*$3,257.13*	$3,257
425	Hoist Rail	162	LF	*$32.90*	$5,324
426	Allowance for Misc Items	5%		$8,581.61	$429
427	Subtotal				$9,011
428					
429	MECHANICAL:				
430	Pipe				
431	Air Scour Pipe-BAW (12-inch , Exposed , Steel , None , None)	216	LF	*$198.45*	$42,899

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	B	C	D	E	F
432	Filter Influent Header Pipe-FIH (30-inch , Buried , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$547.92	$0
433	Filter Influent Pipe-FIH (20-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	0	LF	$365.28	$0
434	Filter Effluent Pipe-FE (16-inch , Exposed , Steel , Cement Mortar , Paint)	50	LF	$292.22	$14,613
435	Filter Effluent Pipe-FE (16-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	50	LF	$292.22	$14,613
436	Filter Control Valve Pipe-FCV (12-inch , Exposed , Steel , None , None)	32	LF	$198.45	$6,350
437	Filter Effluent Header Pipe-FEH (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	64	LF	$547.92	$34,884
438	Filter to Waste-FTW (16-inch , Exposed , Steel , Cement Mortar , Paint)	43	LF	$292.22	$12,612
439	Filter to Waste-FTW (16-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	153	LF	$292.22	$44,807
440	Backwash Supply Pipe-BWS (30-inch , Exposed , Steel , Cement Mortar , Paint)	170	LF	$547.92	$93,186
441	Backwash Supply Pipe-BWS (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	48	LF	$547.92	$26,300
442	Backwash Waste Pipe-BWW (30-inch , Encased , Steel , Cement Mortar , Fusion Bonded Epoxy)	10	LF	$547.92	$5,479
443	Elbows				
444	Air Scour Pipe-BAW (12-inch , Steel)	16	EA	$1,319.92	$21,119
445	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$3,299.80	$0
446	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$2,199.87	$0
447	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$1,759.89	$7,040
448	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$1,759.89	$7,040
449	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$1,319.92	$0
450	Filter Effluent Header Pipe-FEH (30-inch , Steel)	0	EA	$3,299.80	$0
451	Filter to Waste-FTW (16-inch , Steel)	6	EA	$1,759.89	$10,559
452	Filter to Waste-FTW (16-inch , Steel)	0	EA	$1,759.89	$0
453	Backwash Supply Pipe-BWS (30-inch , Steel)	2	EA	$3,299.80	$6,600
454	Backwash Supply Pipe-BWS (30-inch , Steel)	2	EA	$3,299.80	$6,600
455	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$3,299.80	$0
456	Tees				
457	Air Scour Pipe-BAW (12-inch , Steel)	4	EA	$3,007.27	$12,029
458	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$7,518.19	$0
459	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$5,012.12	$0
460	Filter Effluent Pipe-FE (16-inch , Steel)	4	EA	$4,009.70	$16,039
461	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$4,009.70	$0
462	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$3,007.27	$0
463	Filter Effluent Header Pipe-FEH (30-inch , Steel)	0	EA	$7,518.19	$0
464	Filter to Waste-FTW (16-inch , Steel)	0	EA	$4,009.70	$0
465	Filter to Waste-FTW (16-inch , Steel)	2	EA	$4,009.70	$8,019
466	Backwash Supply Pipe-BWS (30-inch , Steel)	6	EA	$7,518.19	$45,109
467	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$7,518.19	$0
468	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$7,518.19	$0
469	Crosses				
470	Air Scour Pipe-BAW (12-inch , Steel)	2	EA	$4,009.70	$8,019
471	Filter Influent Header Pipe-FIH (30-inch , Steel)	0	EA	$10,024.25	$0
472	Filter Influent Pipe-FIH (20-inch , Steel)	0	EA	$6,682.83	$0
473	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$5,346.27	$0
474	Filter Effluent Pipe-FE (16-inch , Steel)	0	EA	$5,346.27	$0
475	Filter Control Valve Pipe-FCV (12-inch , Steel)	0	EA	$4,009.70	$0
476	Filter Effluent Header Pipe-FEH (30-inch , Steel)	2	EA	$10,024.25	$20,048
477	Filter to Waste-FTW (16-inch , Steel)	0	EA	$5,346.27	$0
478	Filter to Waste-FTW (16-inch , Steel)	0	EA	$5,346.27	$0
479	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$10,024.25	$0
480	Backwash Supply Pipe-BWS (30-inch , Steel)	0	EA	$10,024.25	$0
481	Backwash Waste Pipe-BWW (30-inch , Steel)	0	EA	$10,024.25	$0
482	Valves				
483	Air Scour Pipe-BAW (12-inch ,V500 - BFV)	4	EA	$9,653.56	$38,614
484	Filter Influent Header Pipe-FIH (30-inch ,V500 - BFV)	0	EA	$24,133.90	$0

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	B	C	D	E	F
485	Filter Influent Pipe-FIH (20-inch ,V500 - BFV)	4	EA	*$16,089.26*	$64,357
486	Filter Effluent Pipe-FE (16-inch ,V500 - BFV)	4	EA	*$12,871.41*	$51,486
487	Filter Effluent Pipe-FE (16-inch ,V500 - BFV)	0	EA	*$12,871.41*	$0
488	Filter Control Valve Pipe-FCV (12-inch ,V500 - BFV)	4	EA	*$9,653.56*	$38,614
489	Filter Effluent Header Pipe-FEH (30-inch ,V500 - BFV)	0	EA	*$24,133.90*	$0
490	Filter to Waste-FTW (16-inch ,V500 - BFV)	4	EA	*$12,871.41*	$51,486
491	Filter to Waste-FTW (16-inch ,V500 - BFV)	0	EA	*$12,871.41*	$0
492	Backwash Supply Pipe-BWS (30-inch ,V500 - BFV)	4	EA	*$24,133.90*	$96,536
493	Backwash Supply Pipe-BWS (30-inch ,V500 - BFV)	0	EA	*$24,133.90*	$0
494	Backwash Waste Pipe-BWW (30-inch ,V500 - BFV)	4	EA	*$24,133.90*	$96,536
495	Allowance for Misc Items	5%		$901,593.08	$45,080
496	Subtotal				$946,673
497					
498	ELECTRICAL:				
499	MCC's				
500	Sections	5	EA	*$6,783.10*	$33,915
501	AFD's				
502	Air Scour Blowers (88 hp each)	-	EA	*$14,946.94*	$0
503	Switchgear				
504	Units	-	EA	*$31,202.24*	$0
505	Electrical Conduit & Wire	127	LF	*$9.53*	$1,213
506	Allowance for Misc Items	5%		$35,128.81	$1,756
507	Subtotal				$36,885
508					
509	USER DEFINED ESTIMATE ITEMS	QUANT	UNIT	$/UNIT	TOTAL COST
510	Item 1 Description	0.00		0.00	$0
511	Item 2 Description	0.00		0.00	$0
512	Item 3 Description	0.00		0.00	$0
513	Item 4 Description	0.00		0.00	$0
514	Item 5 Description	0.00		0.00	$0
515	Item 6 Description	0.00		0.00	$0
516	Item 7 Description	0.00		0.00	$0
517	Item 8 Description	0.00		0.00	$0
518	Item 9 Description	0.00		0.00	$0
519	Item 10 Description	0.00		0.00	$0
520	Item 11 Description	0.00		0.00	$0
521	Item 12 Description	0.00		0.00	$0
522	Item 13 Description	0.00		0.00	$0
523	Item 14 Description	0.00		0.00	$0
524	Item 15 Description	0.00		0.00	$0
525	Subtotal				$0
526					
527	Subtotal				$4,621,479.61
528					
529	ALLOWANCES:		**User Over-write**		
530	Finishes Allowance	2%		$5,023,347	$100,466.95
531	Mechanical Allowance	2%		$5,023,347.40	$100,466.95
532	I&C Allowance	2%		$5,023,347.40	$100,466.95
533	Electrical Allowance	2%		$5,023,347.40	$100,466.95
534					
535	Facility Cost	**12,000,000**	**GPD**	**$0.42**	**$5,023,347**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation				
Influent Channel, Surge Basin & Decant Pump	5311.63	CY	$5.35	$28,429
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1502.22	CY	$5.35	$8,040
Pipe Vault	351.82	CY	$5.35	$1,883
Imported Structural Backfill				
Influent Channel, Surge Basin & Decant Pump	426.72	CY	$40.56	$17,306
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	80.20	CY	$40.56	$3,252
Pipe Vault	70.17	CY	$40.56	$2,846
Native Backfill				
Influent Channel, Surge Basin & Decant Pump	1115.38	CY	$6.58	$7,339
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	32.00	CY	$6.58	$211
Pipe Vault	103.39	CY	$6.58	$680
Haul Excess				
Influent Channel, Surge Basin & Decant Pump	4196.25	CY	$6.58	$27,612
Dry Pit, Backwash Waste Sludge Wet Well, & Backwash Waste Recycle Wet Well	1470.22	CY	$6.58	$9,674
Pipe Vault	248.42	CY	$6.58	$1,635
Allowance for Misc Items	5%		$108,907.43	$5,445
Subtotal				$114,353
CONCRETE:				
Surge Basin:				
Foundation	308.85	CY	$382.16	$118,028
Perimeter Walls	382.34	CY	$683.50	$261,329
Influent Channel Wall	62.23	CY	$683.50	$42,536
Concrete Curb (8" X 8")	76.89	LF	$32.90	$2,530
Backwash Recycle Sump:				
Slab on Grade	18.89	CY	$345.93	$6,534
Walls	90.62	CY	$683.50	$61,940
Elevated Slab	9.23	CY	$1,088.69	$10,045
Backwash Sludge Sump:				
Slab on Grade	13.33	CY	$345.93	$4,612
Walls	66.77	CY	$683.50	$45,640
Elevated Slab	6.88	CY	$1,088.69	$7,491
Dry Pit:				
Slab on Grade	5.31	CY	$345.93	$1,836
Walls	32.33	CY	$683.50	$22,096
Elevated Slab	3.49	CY	$1,088.69	$3,802
Pipe Vault:				
Lower Elevated Slab	29.64	CY	$1,088.69	$32,271
Upper Elevated Slab	29.64	CY	$1,088.69	$32,271
Walls	32.67	CY	$683.50	$22,333
Electrical Room Slab on Grade	5.27	CY	$345.93	$1,822
Allowance for Misc Items	5%		$677,117.15	$33,856
Subtotal				$710,973
MASONRY:	Moderate			
Pump Sumps and Pipe Vault	0.00	SF	$131.60	$0
Electrical Room	80.89	SF	$131.60	$10,645
Subtotal	80.89			$10,645
METALS:				
Influent Channel:				
Grating	185.56	SF	$72.38	$13,431
Surge Basin:				
Grating	4.00	SF	$72.38	$290
Backwash Recycle Sump:				
Grating	4.00	SF	$72.38	$290
Backwash Sludge Sump:				
Grating	4.00	SF	$72.38	$290
Dry Pit:				

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Ladder	27.60	VLF	$99.36	$2,742
Pipe Vault:				
Grating	4.00	SF	$72.38	$290
Stairs	16.00	RISERS	$394.80	$6,317
Allowance for Misc Items	10%		$23,647.47	$2,365
Subtotal				$26,012
DOORS & WINDOWS:				
Backwash Recycle Sump:				
Aluminum Access Hatch (10' x 5')	1.00	EA	$4,400.75	$4,401
Backwash Sludge Sump:				
Aluminum Access Hatch (3' x 3')	1.00	EA	$1,098.21	$1,098
Dry Pit:				
Aluminum Access Hatch (3' x 3')	1.00	EA	$1,098.21	$1,098
Pipe Vault:				
Aluminum Access Hatch (3' x 3')	2.00	EA	$1,098.21	$2,196
Allowance for Misc Items	5%		$8,793.60	$440
Subtotal				$9,233
EQUIPMENT:				
Floating Decanter Plate System	0.00	SF	$72.94	$0
Traveling Solids Removal Mechanism	2.00	EA	$66,857.09	$133,714
Washwater Decant Pump (Submersible Pump)	3.00	EA	$18,993.38	$56,980
Sludge Pump (Submersible Pump)	2.00	EA	$12,409.63	$24,819
Mixers	0.00	HP	$1,580.26	$0
Allowance for Misc Items	10%		$215,513.57	$21,551
Subtotal				$237,065
I&C:				
Instruments				
Backwash Waste Recycle Header Magmeter (BWRH, 12 inch)	1.00	EA	$10,573.93	$10,574
Isolation Valve Actuators (Electric)	5.00	EA	$5,064.93	$25,325
Level Transmitters	1.00	EA	$7,120.57	$7,121
Number of Analog I/O Counts	6.00	EA	$208.82	$1,253
Number of Digital I/O Counts	30.00	EA	$49.46	$1,484
Number of Local Panels	1.00	EA	$10,331.10	$10,331
Number of PLC's	1.00	EA	$10,990.54	$10,991
I&C Conduit Wire	259.78	lf	$9.53	$2,475
Allowance for Misc Items	5%		$69,552.80	$3,478
Subtotal				$73,030
MECHANICAL:				
Pipe:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	LF	$657.50	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	LF	$123.32	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	16.22	LF	$219.17	$3,555
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	LF	$219.17	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	81.00	LF	$54.81	$4,439
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	16.22	LF	$109.58	$1,778
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	LF	$109.58	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	54.00	LF	$109.58	$5,917
Elbows:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	$3,959.76	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	$2,588.21	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	1.00	EA	$1,319.92	$1,320
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	$1,319.92	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	6.00	EA	$1,150.31	$6,902
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	$659.96	$660
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	$659.96	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	4.00	EA	$659.96	$2,640
Tee:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	$9,021.82	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	$4,297.65	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	2.00	EA	$3,007.27	$6,015

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Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	$3,007.27	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	0.00	EA	$1,910.07	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	1.00	EA	$1,503.64	$1,504
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	$1,503.64	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	0.00	EA	$1,503.64	$0
Valves:				
Backwash Waste (BWW, 36 inch, Steel)	0.00	EA	$28,960.68	$0
Filter to Waste (FTW, 18 inch, DI)	0.00	EA	$12,602.74	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	$9,653.56	$0
Backwash Waste Recycle Header (BWRH, 12 inch, Steel)	0.00	EA	$9,653.56	$0
Backwash Waste Recycle Lateral (BWRL, 8 inch, DI)	3.00	EA	$5,601.22	$16,804
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	$4,826.78	$0
Backwash Waste Sludge Header (BWSH, 6 inch, Steel)	0.00	EA	$4,826.78	$0
Backwash Waste Sludge Lateral (BWSL, 6 inch, Steel)	2.00	EA	$4,826.78	$9,654
Allowance for Misc Items	5%		$61,186.86	$3,059
Subtotal				$64,246
ELECTRICAL:				
# MCC Sections	8.00	EA	$6,783.10	$54,265
Switchgear	0.00	EA	$31,202.24	$0
Adjustable Frequency Drives				
Basin Mixer	0.00	EA	$4,125.89	$0
Sludge Pumps (Active)	1.00	EA	$4,871.14	$4,871
Sludge Pumps (Standby)	1.00	EA	$4,871.14	$4,871
Recycle Pumps (Active)	2.00	EA	$6,299.20	$12,598
Recycle Pumps (Standby)	1.00	EA	$6,299.20	$6,299
Electrical Conduit & Wire	259.78	lf	$9.53	$2,475
Allowance for Misc Items	5%		$85,380.01	$4,269
Subtotal				$89,649
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,335,206.98
ALLOWANCES:		User Over-write		
Finishes Allowance	2%		$1,534,721	$30,694.41
I & C Allowance	3%		$1,534,720.67	$46,041.62
Mechanical Allowance	5%		$1,534,720.67	$76,736.03
Electrical Allowance	3%		$1,534,720.67	$46,041.62
Facility Cost	**2,519,600**	**Gallons**	**$0.61**	**$1,534,721**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Circular Clearwell				
Excavation	14,515	CY	*$5.35*	$77,691
Imported Structural Backfill	1,523	CY	*$40.56*	$61,784
Native Backfill	2,973	CY	*$6.58*	$19,563
Haul Excess	11,542	CY	*$6.58*	$75,949
Rectangular Clearwell				
Excavation	0	CY	*$5.35*	$0
Imported Structural Backfill	0	CY	*$40.56*	$0
Native Backfill	0	CY	*$6.58*	$0
Haul Excess	0	CY	*$6.58*	$0
Allowance for Misc Items	5%		$234,986.14	$11,749
Subtotal				$246,735
CONCRETE:				
Circular Clearwell				
Prestressed Concrete Tank (2000000 gallons)	1	EA	*$872,030.58*	$872,031
Rectangular Clearwell				
Foundation	0	CY	*$382.16*	$0
Columns	0	CY	*$683.50*	$0
Walls	0	CY	*$683.50*	$0
Elevated Slab	0	CY	*$1,088.69*	$0
Concrete Baffling	0	CY	*$683.50*	$0
Allowance for Misc Items	5%		$872,030.58	$43,602
Subtotal				$915,632
METALS & PLASTICS:				
Polypropylene Baffling	0	SF	*$10.99*	$0
Stainless Steel Baffling	0	SF	*$45.79*	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
THERMAL & MOISTURE PROTECTION:				
Concrete Liner	0	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$1,162,368
ALLOWANCES:		**User Over-write**		
Metals Allowance	1.0%		$1,249,858	$12,499
Finishes Allowance	2.0%		$1,249,858	$24,997

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Equipment Allowance	1.0%		$1,249,858	$12,499
I & C Allowance	2%		$1,249,858	$24,997
Mechanical Allowance	5%		$1,249,858	$62,493
Electrical Allowance	1%		$1,249,858	$12,499
Facility Cost	**2,000,000**	**Gallons**	**$0.66**	**$1,312,350**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Pump Station:				
Excavation	701.75	CY	$5.35	$0
Imported Structural Backfill	358.27	CY	$40.56	$0
Native Backfill	89.16	CY	$6.58	$0
Haul Excess	612.60	CY	$6.58	$0
Forebay:				
Excavation	7114.29	CY	$5.35	$0
Imported Structural Backfill	437.87	CY	$40.56	$0
Native Backfill	1838.49	CY	$6.58	$0
Haul Excess	5275.80	CY	$6.58	$0
Office:				
Excavation	0.00	CY	$5.35	$0
Imported Structural Backfill	0.00	CY	$40.56	$0
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	0.00	CY	$6.58	$0
Surge Protection:				
Excavation	117.15	CY	$5.35	$627
Imported Structural Backfill	86.04	CY	$40.56	$3,489
Native Backfill	18.55	CY	$6.58	$122
Haul Excess	98.59	CY	$6.58	$649
Allowance for Misc Items	5%		$4,887.33	$244
Subtotal				$5,132
CONCRETE:				
Pump Station				
Foundation	256.01	CY	$382.16	$0
Pump Pad Epoxy	0.74	CY	$3,412.56	$2,528
Pump Pad Support	7.78	CY	$345.93	$2,692
Pipe Supports	4.19	CY	$345.93	$1,448
Electrical Room				
Foundation	14.61	CY	$345.93	$5,055
Surge Protection				
Foundation	20.70	CY	$345.93	$7,161
Office				
Foundation	0.00	CY	$345.93	$0
Pump Station Forebay				
Slab on Grade for Rectangular Tank	231.48	CY	$345.93	$0
Support Walls for Rectangular	342.22	CY	$683.50	$0
Support Columns for Rectangular	16.50	CY	$683.50	$0
Elevated Slab for Rectangular	91.36	CY	$1,088.69	$0
Pump Baffling (for all cases)	16.43	CY	$683.50	$0
Sump Walls	86.37	CY	$683.50	$0
Sump Concrete Fill	184.06	CY	$382.16	$0
Prestressed Concrete Tank (422429 gallons)	0.00	EA	$0.00	$0
Allowance for Misc Items	5%		$18,883.83	$944
Subtotal				$19,828
MASONRY:	Moderate			
Pump Station Building	2235.55	SF	$197.40	$441,303
Office Building	0.00	SF	$131.60	$0
Surge Building	558.89	SF	$131.60	$73,551
Electrical Room	394.53	SF	$131.60	$51,921
Subtotal	3188.98			$566,775
METALS:				
Pump Removal Hatches	73.33	SF	$109.91	$8,060
Allowance for Misc Items	10%		$8,059.73	$806
Subtotal				$8,866
THERMAL & MOISTURE PROTECTION:				
Wet Well Liner	0.00	SF	$16.00	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
EQUIPMENT:				
Pumps				
Active Pump # 1	1.00	EA	$167,150.63	$167,151
Active Pump # 2	1.00	EA	$167,150.63	$167,151
Active Pump # 3	1.00	EA	$167,150.63	$167,151

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Active Pump # 4	1.00	EA	$167,150.63	$167,151
Active Pump # 5	0.00	EA	$0.00	$0
Active Pump # 6	0.00	EA	$0.00	$0
Active Pump # 7	0.00	EA	$0.00	$0
Active Pump # 8	0.00	EA	$0.00	$0
Active Pump # 9	0.00	EA	$0.00	$0
Active Pump # 10	0.00	EA	$0.00	$0
Standby Pump	1.00	EA	$167,150.63	$167,151
Allowance for Misc Items	10%		$835,753.14	$83,575
Subtotal				$919,328
INSTRUMENTATION & CONTROLS:				
Instruments				
Isolation Valve Actuators	10.00	each	$5,064.93	$50,649
Control Valve Actuators	5.00	each	$5,064.93	$25,325
Level Indicator Transmitters	2.00	each	$6,764.54	$13,529
Level Swithces	2.00	each	$7,120.57	$14,241
Pressure Indicator Transmitters	6.00	each	$7,120.57	$42,723
Pressure Switches	10.00	each	$7,120.57	$71,206
Number of Analog I/O Counts	37.20	each	$208.82	$7,768
Number of Digital I/O Counts	104.40	each	$49.46	$5,163
Number of PLC's	5.00	each	$10,331.10	$51,656
I&C Conduit & Wire	2380.06	lf	$9.53	$22,679
Allowance for Misc Items	10%		$ 304,939.30	$30,494
Subtotal				$335,433
MECHANICAL:				
Pipe:				
Discharge Lateral Pipe (14-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	35.00	LF	$53.41	$1,869
Discharge Header Pipe (30-inch,DIS, Exposed/Buried, Steel, Cement Mortar, Cement Mortar)	42.50	LF	$744.31	$31,633
Pump Discharge Pipe (10-inch,DIS, Exposed, HDPE, Cement Mortar, Cement Mortar)	4.17	LF	$55.90	$233
Elbows:				
Discharge Header Pipe (30-inch)	2.00	EA	$2,831.95	$5,664
Tees:				
Discharge Header Pipe (30-inch)	5.00	EA	$5,509.28	$27,546
Valves:				
Discharge Lateral Isolation Valve (14-inch, BFV)	5.00	EA	$1,529.44	$7,647
Pump Control Valve (14-inch, Check Valve)	5.00	EA	$1,529.44	$7,647
Discharge Header Isolation Valve (30-inch, BFV)	1.00	EA	$5,934.12	$5,934
Air Release Vacuum Valves	15.00	EA	$3,297.16	$49,457
Allowance for Misc Items	10%		$137,631.79	$13,763
Subtotal				$151,395
ELECTRICAL:				
MCC's				
Sections	7.00	each	$6,783.10	$47,482
AFD's				
Active Pump # 1	450.00	HP	$132.14	$59,461
Active Pump # 2	450.00	HP	$132.14	$59,461
Active Pump # 3	450.00	HP	$132.14	$59,461
Active Pump # 4	450.00	HP	$132.14	$59,461
Active Pump # 5	0.00	HP	$0.00	$0
Active Pump # 6	0.00	HP	$0.00	$0
Active Pump # 7	0.00	HP	$0.00	$0
Active Pump # 8	0.00	HP	$0.00	$0
Active Pump # 9	0.00	HP	$0.00	$0
Active Pump # 10	0.00	HP	$0.00	$0
Standby Pump	450.00	HP	$132.14	$59,461
Switchgear				
Units	0.00	each	$31,202.24	$0
Electrical Conduit & Wire	340.01	lf	$9.53	$3,240
Allowance for Misc Items	5%		$348,025	$17,401
Subtotal				$365,427
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0

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Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,372,183
ALLOWANCES:		**User Over-write**		
Finishes Allowance	5%		$3,041,261	$152,063
I & C Allowance	2%		$3,041,261	$60,825
Surge Allowance	5%		$3,041,261	$152,063
Mechanical Allowance	5%		$3,041,261	$152,063
Electrical Allowance	5%		$3,041,261	$152,063
Facility Cost	**2,250**	**Total Pump HP**	**$1,351.67**	**$3,041,261**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	1575.42	CY	*$5.35*	$0
Imported Structural Backfill	86.68	CY	*$40.56*	$0
Native Backfill	828.79	CY	*$6.58*	$0
Haul Excess	746.63	CY	*$6.58*	$0
Allowance for Misc Items	5%		$0.00	$0
Subtotal				$0
CONCRETE:				
Wet Well:				
Foundation	28.89	CY	*$382.16*	$0
Perimeter Walls	64.42	CY	*$683.50*	$0
Operating Floor:				
Elevated Slab (Including floor over Discharge Header Vault)	36.61	CY	*$1,088.69*	$0
Pump Pads	1.63	CY	*$345.93*	$565
Other Equipment Pads	1.00	CY	*$345.93*	$346
Discharge Pipe Vault:				
Slab on Grade	13.66	CY	*$345.93*	$4,725
Walls	17.16	CY	*$683.50*	$11,727
Allowance for Misc Items	5%		$17,362.33	$868
Subtotal				$18,230
MASONRY:	Moderate			
CMU Building	988.44	SF	*$131.60*	$130,080
Subtotal				$130,080
METALS:				
Checker Plate Over Intake Pipe Gate = (Diameter of Influent Pipe +2') * (2 Feet Wide) (sf)	10.00	SF	*$72.38*	$724
Checker Plate Over Discharge Pipe Header = ((Discharge Pipe Diameter * 2) * ("S" * Total Number of Pumps)	57.98	SF	*$72.38*	$4,197
Ladder	15.55	VLF	*$99.36*	$1,545
Allowance for Misc Items	10%		$6,464.96	$646
Subtotal				$7,111
EQUIPMENT:				
Size of Sluice Gate (per side in inches)	36.00	Inches		
Sluice Gate	1.00	EA	*$6,330.27*	$6,330
Pumps:				
Active Pump # 1	124.39	HP	*$790.52*	$98,332
Active Pump # 2	124.39	HP	*$790.52*	$98,332
Active Pump # 3	0.00	HP	*$0.00*	$0
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0
Active Pump # 6	0.00	HP	*$0.00*	$0
Active Pump # 7	0.00	HP	*$0.00*	$0
Active Pump # 8	0.00	HP	*$0.00*	$0
Active Pump # 9	0.00	HP	*$0.00*	$0
Active Pump # 10	0.00	HP	*$0.00*	$0
Standby Pump	124.39	HP	*$790.52*	$98,332
AFD's				
Active Pump # 1	124.39	HP	*$156.14*	$19,422
Active Pump # 2	124.39	HP	*$156.14*	$19,422
Active Pump # 3	0.00	HP	*$0.00*	$0
Active Pump # 4	0.00	HP	*$0.00*	$0
Active Pump # 5	0.00	HP	*$0.00*	$0

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Active Pump # 6	0.00	HP	***$0.00***	$0
Active Pump # 7	0.00	HP	***$0.00***	$0
Active Pump # 8	0.00	HP	***$0.00***	$0
Active Pump # 9	0.00	HP	***$0.00***	$0
Active Pump # 10	0.00	HP	***$0.00***	$0
Standby Pump	124.39	HP	***$156.14***	$19,422
Allowance for Misc Items	10%		$353,259.39	$35,326
Subtotal				$394,916
USER DEFINED ESTIMATE ITEMS:	**QUANT**	**UNIT**	**$/UNIT**	**TOTAL COST**
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$550,338
ALLOWANCES:		**User Over-write**		
Finishes Allowance	2.0%		$1,100,676	$22,014
I & C Allowance	8.0%		$1,100,676	$88,054
Mechanical Allowance	25.0%		$1,100,676	$275,169
Electrical Allowance	15.0%		$1,100,676	$165,101
Facility Cost	**373**	**Total Pump HP**	**$2,949.56**	**$1,100,676**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	89.00	CY	$5.35	$476
Imported Structural Backfill	45.41	CY	$40.56	$1,842
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	89.00	CY	$6.58	$586
Allowance for Misc Items	5%		$2,903.46	$145
Subtotal				$3,049
CONCRETE:				
Slab on Grade	31.46	CY	$345.93	$10,882
Containment Walls	6.37	CY	$683.50	$4,356
Bulk Tank Pads	29.50	CY	$345.93	$10,204
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	2.00	CY	$345.93	$692
Corridor				
Slab on Grade	7.50	CY	$345.93	$2,594
Electrical Room				
Slab on Grade	3.41	CY	$345.93	$1,179
Allowance for Misc Items	5%		$29,906.78	$1,495
Subtotal				$31,402
MASONRY:	Moderate			
CMU Building	1226.00	SF	$131.60	$161,343
Subtotal				$161,343
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	$16,973.34	$33,947
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	3.00	EA	$6,737.98	$20,214
Allowance for Misc Items	10%		$54,160.63	$5,416
Subtotal				$59,577
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	$824.29	$1,649
Chemical Tank Beacons	2.00	each	$824.29	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	0.00	each	$1,099.05	$0
Metering Pump Discharge Pressure Switch	3.00	each	$549.53	$1,649
Magmeter	2.00	each	$549.53	$1,099
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	9.00	each	$208.82	$1,879
Number of Digital I/O Counts	26.00	each	$49.46	$1,286
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	297.00	lf	$9.53	$2,830
Allowance for Misc Items	10%		$34,460.81	$3,446
Subtotal				$37,907
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	61.00	lf	*$10.36*	$632
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	61.00	lf	*$11.98*	$731
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	12.00	each	*$7.95*	$95
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	12.00	each	*$63.16*	$758
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	3.00	each	*$8.27*	$25
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	3.00	each	*$109.33*	$328
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	6.00	each	*$45.15*	$271
Allowance for Misc Items	10%		$3,184.53	$318
Subtotal				$3,503
ELECTRICAL:				
# MCC Sections	6.00	#	*$6,783.10*	$40,699
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	243.00	lf	*$9.53*	$2,315
Allowance for Misc Items	10%		$43,014.07	$4,301
Subtotal				$47,315
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$353,071
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$392,301	$7,846
I & C Allowance	2%		$392,301	$7,846
Mechanical Allowance	4%		$392,301	$15,692
Electrical Allowance	2%		$392,301	$7,846
Facility Cost	1,226	**Building SF**	**$319.98**	**$392,301**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	76.22	CY	$5.35	$408
Imported Structural Backfill	38.89	CY	$40.56	$1,577
Native Backfill	0.00	CY	$6.58	$0
Haul Excess	76.22	CY	$6.58	$502
Allowance for Misc Items	5%		$2,486.65	$124
Subtotal				$2,611
CONCRETE:				
Slab on Grade	28.07	CY	$345.93	$9,711
Containment Walls	4.73	CY	$683.50	$3,232
Bulk Tank Pads	25.13	CY	$345.93	$8,694
Day Tank Pads	0.00	CY	$345.93	$0
Transfer Pump Pads	0.00	CY	$345.93	$0
Metering Pump Pads	1.33	CY	$345.93	$461
Corridor				
Slab on Grade	6.94	CY	$345.93	$2,402
Electrical Room				
Slab on Grade	0.00	CY	$345.93	$0
Allowance for Misc Items	5%		$24,500.49	$1,225
Subtotal				$25,726
MASONRY:	Moderate			
CMU Building	1050.00	SF	$131.60	$138,181
Subtotal				$138,181
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	2.00	EA	$17,367.52	$34,735
Day Tank	0.00	EA	$0.00	$0
Transfer Pump	0.00	EA	$0.00	$0
Metering Pump	2.00	EA	$6,737.98	$13,476
Allowance for Misc Items	10%		$48,211.01	$4,821
Subtotal				$53,032
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	2.00	each	$824.29	$1,649
Chemical Tank Beacons	2.00	each	$824.29	$1,649
Day Tank Differential Pressure Transmitter	0.00	each	$824.29	$0
Drum or Tote Weigh Scale	0.00	each	$1,099.05	$0
Metering Pump Discharge Pressure Switch	2.00	each	$549.53	$1,099
Magmeter	1.00	each	$549.53	$550
Sump Pump Float Switch	1.00	each	$274.76	$275
Eyewash	1.00	each	$824.29	$824
Number of Analog I/O Counts	6.00	each	$208.82	$1,253
Number of Digital I/O Counts	20.00	each	$49.46	$989
Number of Local Panels	1.00	each	$10,331.10	$10,331
Number of PLC's	1.00	each	$10,990.54	$10,991
I&C Conduit & Wire	225.00	lf	$9.53	$2,144
Allowance for Misc Items	10%		$31,752.48	$3,175
Subtotal				$34,928
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	$10.36	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	$11.98	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	59.00	lf	$10.36	$611
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	59.00	lf	$11.98	$707
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$7.95	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$63.16	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	$7.95	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	$63.16	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$8.27	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$109.33	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	$8.27	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	$109.33	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$4.46	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$32.34	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	$4.46	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	$32.34	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	$45.15	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	$45.15	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	$45.15	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	$45.15	$181
Allowance for Misc Items	10%		$2,557.19	$256
Subtotal				$2,813
ELECTRICAL:				
# MCC Sections	0.00	#	$6,783.10	$0
Switchgear	0.00	each	$31,202.24	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	$4,187.38	$0
User Defined Item #1	0.00	each	$4,125.89	$0
User Defined Item #2	0.00	each	$4,125.89	$0
User Defined Item #3	0.00	each	$4,125.89	$0
Electrical Conduit & Wire	0.00	lf	$9.53	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$266,266
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$295,851	$5,917
I & C Allowance	2%		$295,851	$5,917
Mechanical Allowance	4%		$295,851	$11,834
Electrical Allowance	2%		$295,851	$5,917
Facility Cost	1,050	Building SF	$281.76	$295,851

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	51.83	CY	*$5.35*	$277
Imported Structural Backfill	26.44	CY	*$40.56*	$1,072
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	51.83	CY	*$6.58*	$341
Allowance for Misc Items	5%		$1,690.92	$85
Subtotal				$1,775
CONCRETE:				
Slab on Grade	20.15	CY	*$345.93*	$6,969
Containment Walls	3.83	CY	*$683.50*	$2,617
Bulk Tank Pads	0.00	CY	*$345.93*	$0
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	1.33	CY	*$345.93*	$461
Corridor				
Slab on Grade	4.72	CY	*$345.93*	$1,634
Electrical Room				
Slab on Grade	0.00	CY	*$345.93*	$0
Allowance for Misc Items	5%		$11,680.12	$584
Subtotal				$12,264
MASONRY:	Moderate			
CMU Building	714.00	SF	*$131.60*	$93,963
Subtotal				$93,963
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	*$0.00*	$0
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	2.00	EA	*$6,737.98*	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	*$824.29*	$0
Chemical Tank Beacons	0.00	each	*$824.29*	$0
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	2.20	each	*$1,099.05*	$2,422
Metering Pump Discharge Pressure Switch	2.00	each	*$549.53*	$1,099
Magmeter	1.00	each	*$549.53*	$550
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	7.00	each	*$208.82*	$1,462
Number of Digital I/O Counts	15.00	each	*$49.46*	$742
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	122.47	lf	*$9.53*	$1,167
Allowance for Misc Items	10%		$29,861.98	$2,986
Subtotal				$32,848
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	51.00	lf	*$10.36*	$528
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	51.00	lf	*$11.98*	$611
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$7.95*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$63.16*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	*$7.95*	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	*$63.16*	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$8.27*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$109.33*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$8.27*	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$109.33*	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	*$4.46*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	*$32.34*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	*$4.46*	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	*$32.34*	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	*$45.15*	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	*$45.15*	$181
Allowance for Misc Items	10%		$2,378.44	$238
Subtotal				$2,616
ELECTRICAL:				
# MCC Sections	0.00	#	*$6,783.10*	$0
Switchgear	0.00	each	*$31,202.24*	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	*$4,187.38*	$0
User Defined Item #1	0.00	each	*$4,125.89*	$0
User Defined Item #2	0.00	each	*$4,125.89*	$0
User Defined Item #3	0.00	each	*$4,125.89*	$0
Electrical Conduit & Wire	0.00	lf	*$9.53*	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$167,266
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$185,851	$3,717
I & C Allowance	2%		$185,851	$3,717
Mechanical Allowance	4%		$185,851	$7,434
Electrical Allowance	2%		$185,851	$3,717
Facility Cost	**714**	**Building SF**	**$260.30**	**$185,851**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
SITEWORK:				
Excavation	51.83	CY	*$5.35*	$277
Imported Structural Backfill	26.44	CY	*$40.56*	$1,072
Native Backfill	0.00	CY	*$6.58*	$0
Haul Excess	51.83	CY	*$6.58*	$341
Allowance for Misc Items	5%		$1,690.92	$85
Subtotal				$1,775
CONCRETE:				
Slab on Grade	20.15	CY	*$345.93*	$6,969
Containment Walls	3.83	CY	*$683.50*	$2,617
Bulk Tank Pads	0.00	CY	*$345.93*	$0
Day Tank Pads	0.00	CY	*$345.93*	$0
Transfer Pump Pads	0.00	CY	*$345.93*	$0
Metering Pump Pads	1.33	CY	*$345.93*	$461
Corridor				
Slab on Grade	4.72	CY	*$345.93*	$1,634
Electrical Room				
Slab on Grade	0.00	CY	*$345.93*	$0
Allowance for Misc Items	5%		$11,680.12	$584
Subtotal				$12,264
MASONRY:	Moderate			
CMU Building	714.00	SF	*$131.60*	$93,963
Subtotal				$93,963
METALS:				
Metal Stairway	1.00	EA	$6,580.07	$6,580
Grating	1.00	EA	$1,579.22	$1,579
Allowance for Misc Items	10%		$8,159.28	$816
Subtotal				$8,975
EQUIPMENT:				
Bulk Tank	0.00	EA	*$0.00*	$0
Day Tank	0.00	EA	*$0.00*	$0
Transfer Pump	0.00	EA	*$0.00*	$0
Metering Pump	2.00	EA	*$6,737.98*	$13,476
Allowance for Misc Items	10%		$13,475.96	$1,348
Subtotal				$14,824
INSTRUMENTS & CONTROLS:				
Instruments				
Chemical Tank Radar Level Transmitters	0.00	each	*$824.29*	$0
Chemical Tank Beacons	0.00	each	*$824.29*	$0
Day Tank Differential Pressure Transmitter	0.00	each	*$824.29*	$0
Drum or Tote Weigh Scale	1.37	each	*$1,099.05*	$1,501
Metering Pump Discharge Pressure Switch	2.00	each	*$549.53*	$1,099
Magmeter	1.00	each	*$549.53*	$550
Sump Pump Float Switch	1.00	each	*$274.76*	$275
Eyewash	1.00	each	*$824.29*	$824
Number of Analog I/O Counts	6.00	each	*$208.82*	$1,253
Number of Digital I/O Counts	15.00	each	*$49.46*	$742
Number of Local Panels	1.00	each	*$10,331.10*	$10,331
Number of PLC's	1.00	each	*$10,990.54*	$10,991
I&C Conduit & Wire	108.22	lf	*$9.53*	$1,031
Allowance for Misc Items	10%		$28,596.74	$2,860
Subtotal				$31,456
MECHANICAL:				
Pipe				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	lf	*$10.36*	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	lf	*$11.98*	$0

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Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	51.00	lf	$10.36	$528
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	51.00	lf	$11.98	$611
Elbows				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$7.95	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$63.16	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	8.00	each	$7.95	$64
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	8.00	each	$63.16	$505
Tees				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$8.27	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$109.33	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	$8.27	$17
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	$109.33	$219
End Caps				
Chemical Transfer Pump Suction Header Piping-CTSH (1-inch, Exposed, PVC)	0.00	each	$4.46	$0
Chemical Transfer Pump Discharge Header Piping-CTDH (1-inch, Exposed, FRP)	0.00	each	$32.34	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC)	2.00	each	$4.46	$9
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP)	2.00	each	$32.34	$65
Valves				
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	$45.15	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	0.00	each	$45.15	$0
Chemical Metering Pump Suction Header Piping-LCSH (1-inch, Exposed, PVC, V-902, Diaphragm)	4.00	each	$45.15	$181
Chemical Metering Pump Discharge Header Piping-LCDH (1-inch, Exposed, FRP, V-902, Diaphragm)	4.00	each	$45.15	$181
Allowance for Misc Items	10%		$2,378.44	$238
Subtotal				$2,616
ELECTRICAL:				
# MCC Sections	0.00	#	$6,783.10	$0
Switchgear	0.00	each	$31,202.24	$0
Adjustable Frequency Drives				
Metering Pumps	0.00	each	$4,187.38	$0
User Defined Item #1	0.00	each	$4,125.89	$0
User Defined Item #2	0.00	each	$4,125.89	$0
User Defined Item #3	0.00	each	$4,125.89	$0
Electrical Conduit & Wire	0.00	lf	$9.53	$0
Allowance for Misc Items	10%		$0.00	$0
Subtotal				$0
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0

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Subtotal				$0
Subtotal				$165,874
ALLOWANCES:		User Over-write		
Finishes Allowance	2.0%		$184,305	$3,686
I & C Allowance	2%		$184,305	$3,686
Mechanical Allowance	4%		$184,305	$7,372
Electrical Allowance	2%		$184,305	$3,686
Facility Cost	714	**Building SF**	**$258.13**	**$184,305**

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COST ESTIMATE

Description	Quantity	Unit	$/Unit	Total Cost
O&M BUILDING	6000.00	SF	$474.70	$2,848,226
Subtotal				$2,848,226
USER DEFINED ESTIMATE ITEMS:	QUANT	UNIT	$/UNIT	TOTAL COST
Item 1 Description	0.00		0.00	$0
Item 2 Description	0.00		0.00	$0
Item 3 Description	0.00		0.00	$0
Item 4 Description	0.00		0.00	$0
Item 5 Description	0.00		0.00	$0
Item 6 Description	0.00		0.00	$0
Item 7 Description	0.00		0.00	$0
Item 8 Description	0.00		0.00	$0
Item 9 Description	0.00		0.00	$0
Item 10 Description	0.00		0.00	$0
Item 11 Description	0.00		0.00	$0
Item 12 Description	0.00		0.00	$0
Item 13 Description	0.00		0.00	$0
Item 14 Description	0.00		0.00	$0
Item 15 Description	0.00		0.00	$0
Subtotal				$0
Subtotal				$2,848,226
ALLOWANCES:				
Finishes Allowance	0.0%		$2,848,226	$0
I & C Allowance	0%		$2,848,226	$0
Mechanical Allowance	0%		$2,848,226	$0
Electrical Allowance	0%		$2,848,226	$0
Facility Cost	**6,000**	**SF**	**$474.70**	**$2,848,226**

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Alternative 1 - Deep and Shallow Aquifer

Shallow Well	Shallow Well Capacity, mgd	Land	Wells and Pumphouses	Sitework Electric Utility	Shallow well Treatment Facility	Interconnecting Piping
		Shallow Well Capital Costs				
Vernon 1	0.75	$160,000	$300,000	$750,000		$ 907,200
Vernon 2	0.75	$160,000	$300,000	$644,000		$ 132,000
Vernon 3	0.75	$160,000	$300,000			$ 662,400
Vernon 4	0.75	$160,000	$300,000			$ 1,152,000
Vernon 5	0.75	$160,000	$300,000			$ 2,112,000
Vernon 6	0.75	$160,000	$300,000			
Vernon 7	0.75	$160,000	$300,000			
Lather 1	0.75	$160,000	$300,000			
Lather 2	0.75	$160,000	$300,000			
Lather 3	0.75	$160,000	$300,000			
Lather 4	0.75	$160,000	$300,000			
Lather 5	0	$160,000	$300,000			
Vernon 8	0.75	$160,000	$300,000			
Vernon 9	0.75	$160,000	$300,000			
Wells 11-13 firm	1.2	$2,240,000	$4,200,000	$1,394,000	$29,864,000 Includes $2 million for Land	$4,965,600
	10.95					
	Total Wellfield	**$12,799,600**				

Alternative 1 Finished Water pipeline

Pipelines		**$16,884,000**
10% allowance for pipeline valves & appurtenances		**$1,689,000**
Pipeline Construction Cost		**$18,573,000**
Pipeline Construction Cost		**$18,573,000**
3% markup for Bonds & Insurance	$558,000	
5% markup for Mob/Demob	$929,000	
8% markup for Contractors Overhead	$1,561,000	
4% markup for Contractors profit	$843,000	
25% Contingency	$5,616,000	
Subtotal Markups and Contingency		**$9,507,000**
Total Project Construction Costs		**$28,080,000**
8% allowance for pipeline engineering and design	2,247,000	
12% allowance for permitting, legal and administration	3,370,000	
8% allowance for pipeline engr services during construction	2,247,000	
Subtotal Other Project Costs		**$7,864,000**
GRAND TOTAL PROJECT COST		**$35,944,000**

Alternative 3 - Distribution

Pipelines		**$7,695,000**
10% allowance for pipeline valves & appurtenances		**$770,000**
Pipeline Construction Cost		**$8,465,000**
Pipeline Construction Cost		**$8,465,000**
3% markup for Bonds & Insurance	$254,000	
5% markup for Mob/Demob	$424,000	
8% markup for Contractors Overhead	$712,000	
4% markup for Contractors profit	$385,000	
25% Contingency	$2,560,000	
Subtotal Markups and Contingency		**$4,335,000**
Total Project Construction Costs		**$12,800,000**
5% allowance for pipeline engineering and design	768,000	
12% allowance for permitting, legal and administration	640,000	
08% allowance for pipeline engr services during construction	1,024,000	
Subtotal Other Project Costs		**$2,432,000**
GRAND TOTAL PROJECT COST		**$15,232,000**

Alternative 3 - Lake Michigan Distribution System Improvements

Water Forcemain		
Segment	Miles	Diameter
A	2.8	20
B	2	16

Unit cost	$/dia-in	12

Mile	Cost	Comments
1 mi of 20"	$1,736,064	Assume High Urban
1 mi of 16"	$1,388,851	Assume High Urban
subtotal	**$7,694,380**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	178	142
Low urban	1.00	240	192
Medium urban	1.19	286	228
High urban	1.37	329	263
Groundwater	**1.30**	**312**	**250**
Forest	1.15	276	221
Gravel roads	0.85	204	163
Creek crossing	2.00	480	384
HWY crossing	4.00	960	768

miles	0.13	0.25	0.5
feet	660	1320	2640

Alternative 1&2 Wastewater Forcemain

Pipelines		**$3,029,000**
10% allowance for pipeline valves & appurtenances		**$303,000**
Pipeline Construction Cost		**$3,332,000**
Pipeline Construction Cost		**$3,332,000**
3% markup for Bonds & Insurance	$100,000	
5% markup for Mob/Demob	$167,000	
8% markup for Contractors Overhead	$280,000	
4% markup for Contractors profit	$152,000	
25% Contingency	$1,008,000	
Subtotal Markups and Contingency		**$1,707,000**
Total Project Construction Costs		**$5,039,000**
5% allowance for pipeline engineering and design	303,000	
12% allowance for permitting, legal and administration	252,000	
08% allowance for pipeline engr services during construction	404,000	
Subtotal Other Project Costs		**$959,000**
GRAND TOTAL PROJECT COST		**$5,998,000**

Alternative 1 & 2 - Wastewater Force Main

Wastewater Forcemain		
Segment	Miles	Diameter
A	2	6
B	3	6

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$416,275	In Sentry Dr., Cross 2 access roads, Chapman Dr, Spring city Dr, W. Sunset Dr
2	$452,390	In Sunset Dr, cross access road, dozens of residential drive ways, Oakdale Dr, Wisteria, School Dr. Burr Oak, HWY 59
3	$452,390	Cross Foxwood Trail, River Plain, Dale, Mary Ann, Red Oak
4	$833,026	In HWY H, cross HWY, Red clover, 0.5 mi wetland
5	$874,368	In Co Rd I, wetland
subtotal	**$3,028,450**	

Alignment Category	Pipeline Construction Difficulty Factors (source: C	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	53	53
Low urban	1.00	72	72
Medium urban	1.19	86	86
High urban	1.37	99	99
Groundwater	1.30	94	94
Forest	1.15	83	83
Gravel roads	0.85	61	61
Creek crossing	2.00	144	144
HWY crossing	4.00	288	288

miles	0.13	0.25	0.5	0.05
feet	660	1320	2640	264

Alternative 4 - Lake Michigan and Shallow Aquifer

Pipeline Segment	Miles	Diameter
A	9	24
B	3	24

Unit cost	$/dia-in	12

Mile	Cost	Comments
1	$2,661,120	In Howard Ave, cross HWY 894, 60th
2	$1,556,755	In Howard Ave, cross 76th, cross 84th, cross 92nd
3	$2,126,995	In Howard Ave, cross HWY 45, cross 104th
4	$1,613,363	In Howard Ave, cross HWY 100, cross Beliot Rd, in pkwy, cross Morgan Ave
5	$2,490,808	In pkwy, cross Oklahoma, cross National, cross Cleveland
6	$2,016,369	0.5 mi pkwy, 0.5 mi in 124th Street
7	$1,322,957	In 124th, cross 124th street, Utility corridor (Oak Leaf)
8	$1,364,774	Utility corridor, cross Sunnyslope, cross Moorland
9	$1,210,810	Utility corridor, cross Calhoun
10	$1,462,856	Utility corridor
11	$1,462,856	Utility corridor
12	$1,210,810	Utility corridor, cross Springdale
13	$1,520,640	Cotton Crt
14	$1,125,274	Open country
subtotal	**$23,346,386**	
10% Valves	$2,334,639	
Total	**$25,681,025**	

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES	Seg A cost $/lf	Seg B cost $/lf
Open country	0.74	213	213
Low urban	1.00	288	288
Medium urban	1.19	343	343
High urban	1.37	395	395
Groundwater	1.30	374	374
Forest	1.15	331	331
Gravel roads	0.85	245	245
Creek crossing	2.00	576	576
HWY crossing	4.00	1152	1152
miles	0.13	0.25	0.5
feet	660	1320	2640
	4620	3960	2640

Alternative 4 - Lake Michigan and Shallow Aquifer Return Flow Underwood Creek (7.6 mgd, 24" dia)

Pipelines	$15,463,160
10% allowance for pipeline valves &	$1,547,000
Pipeline Construction Cost	$17,011,000
WWTP Effluent Pump Station	$2,161,686
Conveyance System Construction C	$19,172,686

Alternative 4 - Underwood Creek Return Flow

Pipeline			
Segment		Diameter	
A		24	288
B		24	288

Unit cost	$/dia-in	12

Mile	Cost		Comments
1	$1,592,870		0.75 mi follows river, crosses Prairie ave, Marshall and Dunbar, 0.25 under alley to NW ave
2	$1,592,870		Cross Maple, Grand, Barstow, East, Barney, Hartwell, crossing of E Broadway (major street); end at Oakland
3	$2,193,523		follows path (cross Greendale and Frederick), cross East Side bypass HYW 59 (MAJOR)
4	$1,224,647	70%	Follows New Berlin trail/utility corridor, cross Springdale;also a stream crossing, some forest; ends near stream crossing
5	$1,036,772	70%	Follows trail, open country mostly, some forest, wetlands for 0.5 mi; assume groundwater; ends near wetlands/open water pond
6	$831,334	70%	Follows trail, open country mostly, some forest (assume 10%)
7	$1,133,637	70%	Begins near Calhoun, one stream crossing; becoming urban again but still follows trail and is mostly open, crosses Calhoun and ends near Moorland, assume 10% forest
8	$787,692	70%	Still in trail, no crossings; very open; Ends near Sunnyslope Rd
9	$787,692	70%	Still in trail, no crossings; very open; Ends at 124th st
10	$1,748,736		Going north under 124th st, crosses Greenfield (hwy 59), ends near 124th and Zinke Dr
11	$2,533,386		Last section follows Underwood Creek, Crosses I-94
subtotal	**$15,463,160**		
10% Valves	**$1,547,862**		
Total	**$17,011,022**		

Alignment Category	Pipeline Construction Difficulty Factors (source: CPES)	Seg A cost $/lf
Open country	0.74	213
Low urban	1.00	288
Medium urban	1.19	343
High urban	1.37	395
Groundwater	**1.30**	**374**
Forest	1.15	331
Gravel roads	0.85	245
Creek crossing	2.00	576
HWY crossing	4.00	1152

miles	0.13	0.25
feet	660	1320

	4620	3960

O&M Cost Alternative 4 - Lake Michigan and Shallow wells

Source of Supply	Units	Quantity	Unit Cost	Ext. Cost	$/yr	Total
Shallow Well Pumping/Maintenance	$/1000 gal	2,007,500	$ 0.140	$ 281,050	$ 281,050	
Purchased water	1000 gals	1,591,400	$ 1.40	$ 2,227,960	$ 2,227,960	
Total Supply						$ 2,509,010

Treatment/Pumping	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
Shallow Wells					$ 2,226,000	
Residuals		144175	$ 4	$ 576,700	$ 576,700	
Lake MI Energy	mgd	4.4			$ 75,732	
Lake MI O&M		2% of Capital cost of pump station	$ 0.0200	$ 5,300,000	$ 106,000	
Return Flow Energy	mgd	4.4			$ 56,619	
Return O&M		2% of Capital cos	$ 0.0200	$ 2,200,000	$ 44,000	
Total Treatment/Pumping						$ 3,085,051

Home Softening	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
Salt/Equipment/Replacment	1				$ 1,804,253	
						$ 1,804,253

Transmission	Units	Quantity	Unit Cost	Ext. Cost	$/yr	
Shallow Aquifer	$/lf/yr	137,280	$ 0.52	$ 71,386	$ 71,386	
Total Transmission						$ 71,386

Alternative Total O&M ($/yr.)	**$ 7,500,000**
PRESENT WORTH (6%, 20 yrs)	**$ 86,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 118,000,000**

C H2M HILL P arametric Cost E stimating S ystem (CPES)

FACILITIES LIFE CYCLE COST ANALYSIS

File 1/5/2010
Version:

Click for CPES QA/QC

Import File: \\Gecko\wbg\Curl\WaukeshaWI\Treatment plant Surface water alt 1.xls

Brows

Project Name:	Waukesha WTP
Project Number:	
Project Manager:	Linda Mohr
Estimator:	Jason Curl
Project Description:	Fox River Alluvium and Shallow Groundwater
Project Location (City):	Milwaukee
Project Location (State):	WISCONSIN
Project Location (Country):	USA
Construction Start (Month):	Jan
Construction Start (Year):	2011
Construction Duration (months)	24
Mid-Point of Construction:	Jan/2012

Life Cycle Analysis:

i =	6.00%
n =	25
Annual Inflation %:	4.50%

To Global Life Cycle Data Sheet

To Annual O & M Cost Summary Sheet

☒ This Report is for INTERNAL Distribution

☐ This Report is for EXTERNAL Distribution

Item	Is This Facility Included in Project? (Yes or No)	SCOPE OF PROJECT	Construction Cost	Annual O&M Cost (Escalated)	Life Cycle Cost (NPV)
	Yes	Inline Rapid Mix: RMX	$1,124,218	$10,054	$1,252,729
	Yes	Flocculation: FLOC	$2,758,162	$20,477	$3,019,917
	Yes	Lamella Clarifier: LAM	$4,276,418	$99,959	$5,554,216
	Yes	Filters: FILT	$9,077,505	$74,615	$10,031,332
	Yes	Surge Basin-Decanter: BWW	$2,773,337	$38,555	$3,266,193
	No	UV Disinfection: UVD	$0	$0	$0
	Yes	Concrete Clearwell: FWT	$2,371,500	$1,111	$2,385,692
	No	Steel Clearwell: FWT	$0	$0	$0
	No	In-Plant PS: FWPS	$0	$0	$0
	Yes	Vertical Turbine PS: FWPS	$5,495,750	$738,581	$14,937,283
	Yes	Filter BW PS: BWSPS	$1,988,991	$44,586	$2,558,947
	Yes	U.D. Facility: GEN	$0	$0	$0
	Yes	Liquid Chemical: FeCl3	$708,914	$220,946	$3,533,337
	Yes	Liquid Chemical: NaOCl	$534,622	$98,204	$1,789,986
	Yes	Liquid Chemical: FLUOR	$335,846	$8,675	$446,737
	Yes	Liquid Chemical: POLYPHOS	$333,051	$39,577	$838,978
	Yes	O&M Building: OMB	$5,146,925	$11,636	$5,295,664
		Additional Project Costs:			
		Biosolids Disposal	$0	$0	$0
		Standard Items	$13,413,828	$384,177	$18,324,898
		User Defined Items	$0	$0	$0
		Plant O & M Labor		$434,906	$5,559,555
TOTAL - Life Cycle Analysis			$50,339,067	$2,226,059	$78,795,464
Construction Cost per GPD (based on Maximum Daily Flow Rate)			$4.19 / GPD		
Non-Construction Cost					
Capital Cost per GPD (based on Maximum Daily Flow Rate)			$4.19 / GPD		(Note: "Capital Cost" equals Construction Cost plus Non-Construction Cost)
Annual O & M Cost per 1,000 Gallons (based on Average Annual Daily Flow Rate)				$ 1.016 / Thousand Gallons	

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Rapid Mixing (Inline)

To Summary Sheet

Construction Cost:					$1,124,217
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	6	50%	8,760	$ 0.06	$ 1,097
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	922	2.00	8,760	$ 0.06	$ 905
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 3,084
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 5,086	10.0%	$ 509
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 5,595
Contingency				10%	$ 559
Total Annual O&M Cost					$ 6,154

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Lamella Clarifier

To Summary Sheet

Construction Cost:					$4,276,417
Annual O & M Cost:					
Power:	Total HP	Average to Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	4	50%	8,760	$ 0.06	$ 732
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	4,804	2.00	8,760	$ 0.06	$ 4,713
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 45,127
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	Other: Percent	Other Cost
Other Cost			$ 50,572	10.0%	$ 5,057
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 55,629
Contingency				10%	$ 5,563
Total Annual O&M Cost					$ 61,192

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Filters

To Summary Sheet

Construction Cost:	$9,077,505

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	5	50%	8,760	$ 0.06	$ 915

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	7,600	2.00	8,760	$ 0.06	$ 7,457

Chemicals:		Annual Usage (tons)	Annual Facility Usage (% of year)	$/ton	Chemical Cost
GAC		-	100%	$ 2,400.00	$ -
Total Chemical Cost					$ -

Repair and Maintenance, and Replacement	Replacement Included? (1 = Yes; 0 = No?)	Annual Cost
Maintenance & Repair Cost		$ 29,379
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 37,750	10.0%	$ 3,775

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

Subtotal Annual O&M Cost		$ 41,525
Contingency	10%	$ 4,153
Total Annual O&M Cost		$ 45,678

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Large System Combination Wastewater Surge Basin and Floating Tube Decanter Clarification (>= 5 MGD)

To Summary Sheet

Construction Cost:					$2,773,337
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	43	50%	8,760	$ 0.06	$ 7,865
Other Electrical	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	81	2.00	8,760	$ 0.06	$ 79
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 11,562
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 19,506	10.0%	$ 1,951
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 21,457
Contingency				10%	$ 2,146
Total Annual O&M Cost					$ 23,602

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Concrete Tank

To Summary Sheet

Construction Cost:					$2,371,500
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	-	50%	8,760	$ 0.06	$ -
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	-	2.00	8,760	$ 0.06	$ -
Chemicals:					$ -
Repair and Maintenance and Replacement:				Replacement Included? (1= "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 562
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 562	10.0%	$ 56
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 618
Contingency				10%	$ 62
Total Annual O&M Cost					$ 680

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In-Plant Pump Station

To Summary Sheet

Construction Cost:					$6,620,228
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2,666	50%	8,760	$ 0.06	$ 487,626
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,022	2.00	8,760	$ 0.06	$ 1,003
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 74,141
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 562,769.52	10.0%	$ 56,277
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 619,046
Contingency				10%	$ 61,905
Total Annual O&M Cost					$ 680,951

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Vertical Turbine Pump Station

To Summary Sheet

Construction Cost:					$5,495,750
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	1,800	50%	8,760	$ 0.06	$ 329,230
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	3,189	2.00	8,760	$ 0.06	$ 3,129
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 41,314
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 373,672	10.0%	$ 37,367
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 411,039
Contingency				10%	$ 41,104
Total Annual O&M Cost					$ 452,143

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Granular Media Filter Backwash Supply Pump Station

To Summary Sheet

Construction Cost:					$1,988,991
Annual O & M Cost:					
Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	21	50%	8,760	$ 0.06	$ 3,841
Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	988	2.00	8,760	$ 0.06	$ 969
Chemicals:					$ -
Repair and Maintenance, and Replacement:				Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost					$ 17,747
Replacement Cost				-	$ -
Other:			Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost			$ 22,557	10.0%	$ 2,256
User Defined Annual O&M Items:					Annual Cost
Item 1					$ -
Item 2					$ -
Item 3					$ -
Item 4					$ -
Item 5					$ -
Item 6					$ -
Item 7					$ -
Item 8					$ -
Item 9					$ -
Item 10					$ -
Item 11					$ -
Item 12					$ -
Item 13					$ -
Item 14					$ -
Item 15					$ -
Subtotal Annual O&M Cost					$ 24,813
Contingency				10%	$ 2,481
Total Annual O&M Cost					$ 27,294

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost: $708,913

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	3	50%	8,760	$ 0.06	$ 549

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,226	2.00	8,760	$ 0.06	$ 1,203

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	274	$ 782.93	$ 107,249
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 107,249

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 2,783
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 111,783	10.0%	$ 11,178

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	122,962
Contingency					10%	$	12,296
Total Annual O&M Cost						$	135,258

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost: $534,621

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	1,050	2.00	8,760	$ 0.06	$ 1,030

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	55	$ 1,672.13	$ 45,811
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$ -	$ -
Total Chemical Cost					$ 45,811

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 2,477
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 49,684	10.0%	$ 4,968

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	54,653
Contingency					10%	$	5,465
Total Annual O&M Cost						$	60,118

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost:	$335,845

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	714	2.00	8,760	$ 0.06	$ 701

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	15	$ 360.00	$ 2,630
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	-	$	$ -
Total Chemical Cost					$ 2,630

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ 692
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 4,389	10.0%	$ 439

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost							$	4,828
Contingency						10%	$	483
Total Annual O&M Cost							$	5,310

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Liquid Chemical Storage & Feed

To Summary Sheet

Construction Cost: $333,051

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	2	50%	8,760	$ 0.06	$ 366

Other Electrical:	Building Area (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	714	2.00	8,760	$ 0.06	$ 701

Liquid Chemicals:	Annual Usage (% of year)	Average-to-Maximum Flow Factor	Annual Usage (dry tons / year)	Cost ($/dry ton)	Chemical Cost
Aluminum Sulfate (Alum)	100%	50%	-	$ 644.17	$ -
Aqueous Ammonia	100%	50%	-	$ 404.57	$ -
Ferric Chloride	100%	50%	-	$ 782.93	$ -
Hydrofluorosilicic Acid	100%	50%	-	$ 360.00	$ -
Hyrogen Peroxide (35%)	100%	50%	-	$ 1,734.23	$ -
Liquid Polymer	100%	50%	-	$ 3,140.89	$ -
Sodium Bisulfite	100%	50%	-	$ 920.91	$ -
Sodium Hydroxide (50%)	100%	50%	-	$ 825.32	$ -
Sodium Hypochlorite (12.5%)	100%	50%	-	$ 1,672.13	$ -
Sulfuric Acid	100%	50%	-	$ 138.09	$ -
Other Chemical	100%	50%	18	$ 2,000.00	$ 18,265
Total Chemical Cost					$ 18,265

Repair and Maintenance, and Replacement:	Replacement Included? (1= "Yes", 0= "No")	Annual Cost
Maintenance & Repair Cost		$ 692
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 20,023	10.0%	$ 2,002

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

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Subtotal Annual O&M Cost						$	22,026
Contingency					10%	$	2,203
Total Annual O&M Cost						$	24,228

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O & M Building

To Summary Sheet

Construction Cost:	$5,146,924

Annual O & M Cost:

Power:	Total HP	Average-to-Maximum Flow Factor	Annual Usage (Hours / Year)	$/kwh	Power Cost
Equipment Power	-	50%	8,760	$ 0.06	$ -

Other Electrical:	Building Area, (SF)	Watts / SF	Annual Usage (Hours / Year)	$/kwh	Other Electrical Cost
Building Electrical	6,000	2.00	8,760	$ 0.06	$ 5,887

Chemicals:	$ -

Repair and Maintenance, and Replacement:	Replacement Included? (1 = "Yes", 0 = "No")	Annual Cost
Maintenance & Repair Cost		$ -
Replacement Cost	-	$ -

Other:	Total Annual O&M Cost	"Other" Percent	Other Cost
Other Cost	$ 5,887	10.0%	$ 589

User Defined Annual O&M Items:	Annual Cost
Item 1	$ -
Item 2	$ -
Item 3	$ -
Item 4	$ -
Item 5	$ -
Item 6	$ -
Item 7	$ -
Item 8	$ -
Item 9	$ -
Item 10	$ -
Item 11	$ -
Item 12	$ -
Item 13	$ -
Item 14	$ -
Item 15	$ -

Subtotal Annual O&M Cost		$ 6,475
Contingency	10%	$ 648
Total Annual O&M Cost		$ 7,123

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Milwaukee Water Supply - 24" the entire alignment

Pipeline					
Segment	Miles	Diameter	60th & Howard Ground Elevation	780	
A	7	24	Hillcrest WSE	1000	
B	7	24	Segment A Piping K	6.85	(one K=1.0 entr, ten K=0.30 90-elb, 3 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
			Segment B Piping K	5.65	(one flow thru tee K=0.6, five K=0.3 90-elb, one bend thru tee K=1.80, three open bfly valve K=0.25, one exit K=0.5)
			Piping Friction Factor	0.015	
			Power cost, $/kw	0.06	
			Power efficiency	.019	
			GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	B RW Velocity	B Pipeline Frict Loss	B Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	Total Friction Head	Available Suction Head	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost
	mgd	gpm	ft/s	ft	ft	ft/s	ft	ft	ft	ft	ft	ft	ft	psi	hp	kw	kw	$
	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	220	220	81	139	60	0	0	0	$0
ADD	4.4	3054	2.17	20.15	0.50	2.17	20.21	0.41	41.27	220	261	81	180	78	174	144	1262200	$75,732

Underwood Creek Return Flow - 24" the entire alignment

Pipeline					
Segment	Miles	Diameter	Waukesha WWTP	794	google earth elevation at WWTP
			elevation at watershed divide	895	
A	11.4	24	Discharge at Underwood Creek	718	
			Segment A Piping K	6.85	(one K=1.0 entr, ten K=0.30 90-elb, 3 open bfly valve K=0.25,one bend thru rdcr tee K=1.80+0.3)
			Segment B Piping K	5.65	(one flow thru tee K=0.6, five K=0.3 90-elb, one bend thru tee K=1.80, three open bfly valve K=0.25, one
			Piping Friction Factor	0.015	
			Power cost, $/kw	0.06	
			Power efficiency	0.9	
			GHG, lbs CO2/Mwhr	1859	

	Supply Flow Rate	Supply Flow Rate	A Pipeline Velocity	A Pipeline Frict Loss	A Piping Misc K Loss	Total FW Piping Fric Loss	Total Static Loss	Total Friction Head	TDH	TDH	Power	Power	Annual Power Usage	Annual Power Cost
	mgd	gpm	ft/s	ft	ft	ft	ft	ft	ft	psi	hp	kw	kw	$
ADD	4.4	3054	2.17	32.70	0.50	33.20	102	135	135	58	130	108	943656	$56,619