

OUCG DR 17-6

DATA REQUEST
City of Evansville

Cause No. 45545

Information Requested:

For Evansville's preferred new water treatment plant Alternate 2B, please provide cost support documentation for each major component lump sum cost listed in Table 9-9 Plant Alternative 2B Total Estimated Construction Cost on pages 126 and 127 of the Advanced Facility Plan (Attachment SMB-1 to Mr. Breese's case-in-chief testimony in this cause). Please provide copies of the Excel worksheets detailing quantities, unit costs, equipment costs, other data used to establish costs, and all assumptions and cost allowances. Please also provide copies of budgetary cost proposals provided by equipment vendors and material suppliers.

Information Provided:

The spreadsheet is attached as OUCG DR 17-6 - Alt 2B.xlsm. Also attached is OUCG DR 17-6 Timberline Output.pdf (developed in Timberline Cost estimating software) which presents further detail for cost estimates performed early in the development of the alternatives report. All equipment proposals are attached as "Budgetary Quotes.pdf".

Attachments:

OUCG DR 17-6 Attachment 1.xlsm
OUCG DR 17-6 Attachment 2.pdf
OUCG DR 17-6 Attachment 3.pdf

OUCG Note: DR 17-6 Attachment 3.pdf (budgetary quotes) is not included here due to its length (449 pages)

Cause No. 45545
OUCG DR 17-6 Attachment 1

Evansville Water and Sewer Utility**WTP Upgrade - Plant Alternative 2B (New Site) - Capital Cost**

Component Description	Cost
Civil Site Work (Roads, Drainage, Fencing etc.)	\$2,853,000
Rehabilitate River Intake	\$6,752,000
Raw Water Piping, Metering Vault	\$1,610,000
New Conventional Pretreatment System	\$17,377,000
New Ozone Facility (Generation, Basin, LOX)	\$19,630,000
New Biologically Active Filters & Building	\$33,912,000
New Chemical Facilities (all)	\$6,612,000
New Clearwell	\$8,804,000
New High Service Pump Station	\$11,130,000
Residual Pump Station Forcemain	\$1,575,000
Filter Washwater Tank	\$950,000
New Administration Building	\$1,810,000
New Maintenance Building	\$1,040,000
Interconnecting Site Utility / Electrical Work	\$3,500,000
New Electric service entrance	\$1,000,000
New Generator (2,000 KW)	\$1,500,000
Subtotal	\$120,055,000
Additional Construction Contingencies (3%)	\$3,602,000
Other Misc. Plant-Wide Improvements (1%)	\$1,201,000
Allowances	\$500,000
Maintenance Building Relocation	\$13,691,000
Startup and Commissioning	\$1,000,000
Total Estimated Construction Cost	\$140,049,000
Construction Administration and Bidding (2.5%)	\$3,501,000
Inspection and Materials Testing (2%)	\$2,801,000
Interest Incurred through Financing (2.25%)	\$3,151,000
Permitting Fees and Legal Expenses (1%)	\$1,400,000
Total Project Cost	\$150,902,000

Notes:

1. New site assumed to be ready for construction through other City projects
2. Provide cost of WTP demolition and relocation of levee building and maintenance garage as separate

Original Costs from Estimator

Description	Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
Demolition Work	\$49,600	\$75,000	1.512
Roof Repair / Replacement	\$7,000	\$10,500	1.500
Doors & Hardware Rehab	\$13,000	\$19,700	1.515
Building Finishes & Specialties	\$34,200	\$50,500	1.477
Structure and Walkway Rehabilitation	\$50,000	\$75,500	1.510
Process Piping and Accessories	\$209,000	\$317,800	1.521
Pump Replacement	\$1,335,500	\$2,020,400	1.513
Screen Replacement	\$666,000	\$1,019,100	1.530
Potassium Permanganate System	\$249,000	\$366,000	1.470
HVAC Replacement	\$115,000	\$172,000	1.496
Electrical Systems	\$200,000	\$302,000	1.510
Instrumentation	\$84,000	\$126,900	1.511
Totals	\$3,012,300	\$4,555,400	

Adjusted for Report

Table B1.1 - River Intake Rehabilitation, Low Service PS

Description		Estimated Cost	Cost Adjust Comments
Demolition Work		\$75,000	
Roof Repair / Replacement (3,000 sf)		\$60,000	X - City noted a whole new roof
Doors & Hardware Rehab		\$13,000	
Building Finishes & Specialties		\$35,000	
Structure and Walkway Rehabilitation		\$50,000	
Process Piping and Accessories		\$209,000	
Pump Replacement (6 units)		\$1,336,000	
Intake Screens (3 units)		\$1,300,000	X - quote of \$750k for 3 screens - estimate seems to be pneumatic screens so updated
Potassium Permanganate System (1 unit)		\$400,000	X - estimate seemed low - need to run piping over, hopper, storage, etc.
HVAC Replacement (3,000 sf)		\$115,000	
Misc. Electrical (MCC Upgrades are Underway)		\$150,000	X - MCC's are getting some upgrades
Instrumentation		\$100,000	
Subtotal		\$3,843,000	
Estimating Contingency	30%	\$1,152,900	
Escalation to Midpoint	3%	\$115,290	
Construction Subtotal		\$5,111,190	
Contractor General Conditions	10%	\$511,119	
Contractor Overhead and Profit	12%	\$613,343	
Construction Contingencies	5%	\$255,560	
Allowance: Dredge River		\$260,000	
Grand Total Cost		\$6,752,000	

Original Costs from Estimator

	Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
Building & Structure	\$2,445,033	\$3,782,475	1.547
Dewatering	\$194,067	\$305,891	1.576
Foundation and Earthwork	\$1,922,075	\$2,955,862	1.538
Baffle Walls	\$529,091	\$809,914	1.531
Process Piping, Valves, Meters, I	\$269,608	\$411,340	1.526
Flocculators & Mixers	\$1,160,771	\$1,769,373	1.524
Settlement Equipment	\$3,389,594	\$5,158,378	1.522
Slide Gate w/ Operator	\$117,632	\$178,380	1.516
Electrical	\$315,783	\$477,528	1.512
Instrumentation & Controls	\$94,735	\$143,258	1.512
Grand Total Capital Constructio	\$10,438,389	\$15,992,399	

Adjusted for Report

Table B2.2 - New Plate Settler Pretreatment

Description		Estimated Cost
Building & Structure		\$2,446,000
Site Dewatering		\$195,000
Foundation and Earthwork		\$1,923,000
Baffle Walls (530 lf)		\$530,000
Process Piping, Valves, Meters, Etc.		\$500,000
Flocculators & Mixers w/VFD (36 units)		\$1,300,000
Plate Settlers & Sludge Collection		\$3,390,000
Slide Gate w/ Operator (4 units)		\$118,000
Electrical (10% Equip Cost)		\$481,000
Instrumentation & Controls (5% Equip Cost)		\$241,000
Subtotal		\$11,124,000
Estimating Contingency	20%	\$2,225,000
Escalation to Midpoint	3%	\$334,000
Construction Subtotal		\$13,683,000
Contractor General Conditions	10%	\$1,368,000
Contractor Overhead and Profit	12%	\$1,642,000
Construction Contingencies	5%	\$684,000
Allowances:		
Grand Total Cost		\$17,377,000

Cost Adjust
Comments

Increased
Increased

X - Use 10% of equipment cost
X - Use 5% of equipment cost

Original Costs from Estimator

Description		Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
	Ozone Facility w/ Contact Basins			
31.01 Dewatering	Dewatering	\$212,734	\$334,118	1.571
	Contact Basins	\$2,523,808	\$3,901,587	1.546
	Foundation and Earthwork	\$1,501,212	\$2,304,234	1.535
	Building Structure	\$496,909	\$762,532	1.535
	Process Piping	\$301,560	\$463,000	1.535
40.02 Valves, Meters, Etc.	Valves, Meters, Etc.	\$12,895	\$19,571	1.518
43.10 Ozone Equipment	Ozone Equipment	\$3,497,647	\$5,295,271	1.514
22.00 Plumbing	Plumbing	\$55,865	\$84,370	1.510
23.00 HVAC	HVAC	\$352,530	\$532,404	1.510
	Electrical	\$257,000	\$388,130	1.510
26.02 Instrumentation & Controls	Instrumentation & Controls	\$33,000	\$49,838	1.510
	LOX Equipment			
	Slab, Pads, Curbs, Fences/Gates	\$23,462	\$36,190	1.542
32.01 Fencing & Gates	Fencing & Gates	\$5,142	\$7,776	1.512
	Process Piping	\$31,588	\$48,964	1.550
40.02 Valves, Meters, Etc.	Valves, Meters, Etc.	\$20,611	\$31,273	1.517
43.17 LOX Equipment	LOX Vaporizer, Tank, Station	\$890,881	\$1,347,884	1.513
26.01 Above Ground Electrical	Electrical	\$43,160	\$65,267	1.512
26.02 Instrumentation & Controls	Instrumentation & Controls	\$12,948	\$19,580	1.512
Grand Total Capital Construction Cost	Grand Total Capital Construction	\$10,272,952	\$15,691,989	

Adjusted for Report

Table B3.4 - Ozonation in New Basins, New BAF

Description		Estimated Cost	Cost Adjust Comments
Ozone Facility w/ Contact Basins			
	Site Dewatering	\$213,000	
	Ozone Contact Basins	\$2,524,000	
	Access Hatches (8 units)	\$120,000	X - Added item
	Foundation and Earthwork	\$1,502,000	
	Building Structure (7,834 sf)	\$497,000	
	Process Piping	\$377,000	X - Low, increase to match rehab option
	Sampling System (pumps, piping, Analyzers)	\$100,000	X - Added this item
	Valves, Meters, etc.	\$133,000	X - assume 35 valves (9 pumps)+10K for small valves
	Ozone System, quench, destruct (2 units)	\$4,498,000	X - Add 30% (1 Mill) for install
	Plumbing (9,309 sf)	\$56,000	
	HVAC (7,834 sf)	\$353,000	
	Electrical (7,834 sf)	\$900,000	X - 150K for Bldg and 750K for Ozone
	Instrumentation & Controls (1 % Equip Cost)	\$225,000	X - Ozone I&C would be higher; use higher
LOX Equipment			
	Building Structure (1,462 sf)	\$35,000	X - Make 35K based on 12" slab and \$600/cy
	Fencing & Gates	\$9,000	X - Use \$60/ft
	Process Piping	\$32,000	
	Valves, Meters, Etc.	\$42,000	X - Double estimator number
	LOX Vaporizer, Tank, Station (2 units)	\$891,000	
	Electrical (5% Equip Cost)	\$45,000	
	Instrumentation & Controls (1.5% Equip Cost)	\$14,000	
Subtotal		\$12,566,000	
	Estimating Contingency	20%	\$2,513,200
	Escalation to Midpoint	3%	\$376,980
Construction Subtotal		\$15,456,180	
	Contractor General Conditions	10%	\$1,545,618
	Contractor Overhead and Profit	12%	\$1,854,742
	Construction Contingencies	5%	\$772,809
Allowances:			
Grand Total Cost		\$19,630,000	



Original Costs from Estimator

Description		Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
31.01 Dewatering	Building Structure	\$5,154,603	\$7,954,116	1.543
	Dewatering	\$212,734	\$334,535	1.573
	Foundation and Earthwork	\$2,080,983	\$3,201,747	1.539
	Process Piping	\$2,449,864	\$3,744,641	1.529
	40.02 Valves, Meters, Etc. Valves, Meters, Etc.	\$1,665,261	\$2,522,303	1.515
41.22 Hoists & Cranes	Hoists & Cranes	\$146,529	\$221,680	1.513
43.05 Filtration Equipment	Filtration Equipment	\$4,318,188	\$6,667,928	1.544
22.00 Plumbing	Plumbing	\$101,220	\$153,065	1.512
23.00 HVAC	HVAC	\$1,138,500	\$1,721,642	1.512
Electrical		\$571,901	\$864,830	1.512
26.02 Instrumentation & C	Instrumentation & Controls	\$21,944	\$33,184	1.512
Grand Total Capital Constr		\$17,861,727	\$27,419,671	

Deeper filters for BAF

Total Filter Area = 8,681 sq.ft.
 Number of filters = 10
 Area each filter = 965 sq.ft.
 Length each Filter = 50.0 ft
 Width each Filter = 20.0 ft
 Perimeter each Filter = 140 ft
 Additional Conc (3-ft taller) = 233 cu.ft.
 Concrete Adder = \$233,333
 Media Adder = \$500,000

Adjusted for Report

Table X.X - New GAC Biologically Active Filters

Description		Estimated Cost
Filter Building and Structure (25,300 sf)		\$5,405,000
Site Dewatering		\$213,000
Foundation and Earthwork		\$2,081,000
Process Piping		\$2,800,000
Valves, Meters, Etc.		\$1,666,000
Hoists & Cranes		\$147,000
Filtration Equipment		\$5,320,000
Plumbing (25,300 sf)		\$911,000
HVAC (25,300 sf)		\$911,000
Air Scour Blowers		\$850,000
Electrical		\$925,000
Instrumentation & Controls		\$480,000
Subtotal		\$21,709,000
Estimating Contingency	20%	\$4,341,800
Escalation to Midpoint	3%	\$651,270
Construction Subtotal		\$26,702,070
Contractor General Conditions	10%	\$2,670,207
Contractor Overhead and Profit	12%	\$3,204,248
Construction Contingencies	5%	\$1,335,104
Allowances:		
Grand Total Cost		\$33,912,000

Cost Adjust
Comments

X - added additional 3-ft tall walls concrete and media J.Krinks email 7/16/20

X - Additional Media cost is added to conv. Filters

X - Electrical would probably be higher; use 1.5X estimator number

X - Filter I&C would be much higher

is filter system cost that Leopold quoted \$8.2 million for \$8,316,000 this equip

Original Costs from Estimator - for a 6 MG clearwell (using smaller so use 75% quantities)

	Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
Structural Components	\$3,507,453	\$5,415,382	1.544
Dewatering	\$109,646	\$167,526	1.528
Piles	\$1,133,796	\$1,727,195	1.523
Excavation	\$1,734,001	\$2,658,794	1.533
Soil and Backfill	\$523,109	\$828,067	1.583
Grand Total Capital Construction Cost	\$7,008,005	\$10,796,964	

Adjusted for Report

Table B5.1a - Large Clearwell (4 MG) Option

Description		Estimated Cost
Structure		\$2,631,000
Dewatering (2 pumps, 4 mo)		\$110,000
Piles (26,975 vf)		\$851,000
Excavation, Shoring		\$1,301,000
Soil and Backfill		\$393,000
Misc. Clearwell accessories and instruments		\$300,000
Misc Site Restoration		\$50,000
Subtotal		\$5,636,000
Estimating Contingency	20%	\$1,127,200
Escalation to Midpoint	3%	\$169,080
Construction Subtotal		\$6,932,280
Contractor General Conditions	10%	\$693,228
Contractor Overhead and Profit	12%	\$831,874
Construction Contingencies	5%	\$346,614
Allowances:		
Grand Total Cost		\$8,804,000

Keeping this the same (quantity is same for either)

Original Costs from Estimator

	Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
Building Structure	\$855,407	\$1,318,619	1.542
Dewatering	\$70,384	\$107,754	1.531
Foundation and Earthwork	\$317,103	\$486,388	1.534
Process Piping	\$157,812	\$242,437	1.536
Valves, Meters, Etc.	\$166,356	\$252,319	1.517
Pumps	\$682,455	\$1,033,923	1.515
Swift Water Chemical Injectic	\$52,570	\$79,566	1.514
Air Compressor	\$36,696	\$55,602	1.515
Plumbing	\$30,606	\$46,283	1.512
HVAC	\$127,525	\$192,844	1.512
Electrical	\$234,647	\$354,833	1.512
Instrumentation & Controls	\$264,180	\$399,494	1.512
Grand Total Capital Construc	\$2,995,741	\$4,570,062	

Adjusted for Report

Table B6.2 - New High Service Pumps Option

Description		Estimated Cost	Cost Adjust Comments
Pump Building (5,100 sf)		\$513,600	Reduce to 3,000 SF
Dewatering			No dewatering - build on top of clearwell
Foundation and Earthwork		\$159,000	Reduced - built on top of clearwell
Process Piping		\$158,000	
Valves, Meters, etc.		\$167,000	
Vertical Turbine Pumps (4 units at 800ea)		\$3,200,000	
			X - Not to be included
			X - Not to be included
Plumbing (5,100 sf)		\$18,600	
HVAC (5,100 sf)		\$76,800	Reduce to 3000 SF
Electrical (15% equipment)		\$480,000	
Instrumentation & Controls		\$265,000	
Subtotal		\$5,038,000	
Estimating Contingency	20%	\$1,007,600	
Escalation to Midpoint	3%	\$151,140	
Construction Subtotal		\$6,196,740	
Contractor General Conditions	10%	\$619,674	
Contractor Overhead and Profit	12%	\$743,609	
Construction Contingencies	5%	\$309,837	
Allowances:			
Grand Total Cost		\$7,870,000	

Cost to use for alt 2B

\$11,130,000.00 Original Estiamte was for effectivelly replacing high service #2

Chemicals include 1) sodium hypochlorite, 2) sodium hydroxide, 3) sodium bisulfite, 4) fluoride, 5) coagulant, 6) PAC, 7) ammonia

	UNIT	Quantity	Unit Cost	Total Cost	Notes
Building Area	SF	6,400	\$180	\$1,152,000	
HVAC	SF	6,400	\$60	\$384,000	
Plumbing	SF	6,400	\$10	\$64,000	
Fire Protection - Wet pipe	SF	6,400	\$13	\$83,200	
Gratings and handrail	SF	40,000	\$15	\$600,000	Use 40' long x 5' wide (200 SF per room in 5 room (not PAC or ammonia)
Bulk tanks & level transmitter	EA	10	\$20,000	\$200,000	
PAC supersac feeder	LS	1	\$300,000	\$300,000	Unit is about \$200 k
Ammonia system	LS	1	\$250,000	\$250,000	Located outside
Day tanks, scale, equip	EA	5	\$6,500	\$32,500	
Chemical Pump Skids	EA	10	\$20,000	\$200,000	2 for hypo, 1 for NaOH, 2 for bisulfite, 1 for fluoirde, 4 for coag,
Motive Water Pump Systems	EA	4	\$20,000	\$80,000	1 set for hypo, 1 for bisulfite, 1 for PAC, 1 for ammonia
Water Softeners	EA	1	\$15,000	\$15,000	1 set for hypo
Vent piping	LF	200	\$150	\$30,000	Assume 40' for each system besides ammonia and PAC
Fill Piping	LF	300	\$150	\$45,000	Assume 60' for each system besides ammonia and PAC
Vent and fill piping accessories	LS	1	\$10,000	\$10,000	
Transfer Pumps	EA	10	\$7,500	\$75,000	2 for each system besides ammonia and PAC
Feed Piping	LS	1	\$300,000	\$300,000	
Misc. Chem & Building Accessories	LS	1	\$100,000	\$100,000	
Electrical & Instrumentation	% proc	30%	\$345,750	\$345,750	% of process equip
Subtotal				\$4,266,450	
Estimating Contingency	25%			\$1,066,613	
Escalation	1%			\$42,665	
Construction Subtotal				\$5,375,727	
Contractor General Conditions	10%			\$537,572.70	
Contractor Overhead and Profit	12%			\$645,087.24	
Construction Contingencies	1%			\$53,757.27	
Total Cost				\$6,612,144	

Note: The individual components (pretreat, ozone, filters, clearwell, etc.) all include dewatering and CIVIL

	UNIT	Quantity	Unit Cost	Total Cost	Notes
Pavement	SY	9,800	\$40	\$392,000	
Fencing	LF	1,500	\$65	\$97,500	
Gate / Card Access	EA	3	\$30,000	\$90,000	
8-inch storm piping	LF	1,500	\$100	\$150,000	
Larger Storm Piping & MHs/CBs	LS	1	\$150,000	\$150,000	
Additional Excavation / Hauling	CY	5,600	\$60	\$336,000	
Additional Dewatering	LS	1	\$300,000	\$300,000	
Site Grading & Seeding	LS	1	\$120,000	\$120,000	
Landscaping Allowance	LS	1	\$250,000	\$250,000	
Subtotal				\$1,885,500	
Estimating Contingency	20%			\$377,100	
Escalation	3%			\$56,565	
Construction Subtotal				\$2,319,165	
Contractor General Conditions	10%			\$231,916.50	
Contractor Overhead and Profit	12%			\$278,299.80	
Construction Contingencies	1%			\$23,191.65	
Total Cost				\$2,853,000	

Raw water piping

	UNIT	Quantity	Unit Cost	Total Cost
Raw water piping	LF	1,205	\$580	\$698,900
Road crossing	LS	1	\$45,000	\$45,000
Utility Re-routing	LS	1	\$190,000	\$190,000
Misc. Site Grading/restoration	LS	1	\$50,000	\$50,000
Misc. Fittings & Pipe Accessories	LS	1	\$80,000	\$80,000
Subtotal				\$1,063,900
Estimating Contingency	20%			\$212,780
Escalation	3%			\$31,917
Construction Subtotal				\$1,308,597
Contractor General Conditions	10%			\$130,859.70
Contractor Overhead and Profit	12%			\$157,031.64
Construction Contingencies	1%			\$13,085.97
Total Cost				\$1,610,000

Cost Component	Unit	Quantity	Unit Cost	Project Cost
Cast in place concrete	CY	225	\$800	\$180,000
Residuals Pump Station - Pumps	EA	3	\$55,000	\$165,000
Valves	EA	8	\$4,000	\$32,000
Elec & Controls	LS	1	\$340,000	\$340,000
Forcemain & Discharge Piping	LF	1370	\$200	\$274,000
Extension into Ohio River	LF	50	\$500	\$25,000
Misc. Restoration / Grading	LS	1	\$25,000	\$25,000
Subtotal				\$1,041,000
Estimating Contingency	20%			\$208,200
Escalation	3%			\$31,230
Construction Subtotal				\$1,280,430
Contractor General Conditions	10%			\$128,043.00
Contractor Overhead and Profit	12%			\$153,651.60
Construction Contingencies	1%			\$12,804.30
Total Cost				\$1,575,000

Original Costs from Estimator

	Estimated Base Cost (from estimate)	Estimated Loaded Cost (from estimate)	Multiplier from Estimate
Building and Structure	\$5,213,525	\$8,046,664	1.543
Dewatering	\$212,734	\$334,535	1.573
Foundation and Earthwork	\$2,080,983	\$3,201,747	1.539
Process Piping	\$2,449,864	\$3,744,641	1.529
Valves, Meters, Etc.	\$1,665,261	\$2,522,303	1.515
Hoists & Cranes	\$146,529	\$221,680	1.513
Filtration Equipment	\$4,318,188	\$6,667,928	1.544
Plumbing	\$101,220	\$153,065	1.512
HVAC	\$1,138,500	\$1,721,642	1.512
Electrical	\$615,800	\$931,214	1.512
Instrumentation & Controls	\$34,830	\$52,670	1.512
Grand Total Capital Construct	\$17,977,434	\$27,598,089	

Adjusted for Report

Table B3.2 - New Dual Media Gravity Filters

Description		Estimated Cost	Cost Adjust Comments
Filter Building and Structure (25,300 sf)		\$5,214,000	
Site Dewatering		\$213,000	
Foundation and Earthwork		\$2,081,000	
Process Piping		\$2,800,000	X adding 350k for air scour piping
Valves, Meters, Etc.		\$1,666,000	
Hoists & Cranes		\$147,000	
Filtration Equipment (12 units)		\$4,820,000	Leopold quote of 8.2 million for everything (inc. blowers, I&C, valves, troughs, media, 30 days of install oversight) - those are included in cost as separate line items - adding 10% for install after those - taking out \$500k for not having GAC
Plumbing		\$102,000	
HVAC		\$911,000	X - seems high, use 80%
Air Scour Blowers		\$850,000	
Electrical		\$925,000	X - Electrical would probably be higher; use 1.5X estimator number
Instrumentation & Controls		\$480,000	X - Filter I&C would be higher
Subtotal		\$20,209,000	
Estimating Contingency	20%	\$4,041,800	
Escalation to Midpoint	3%	\$606,270	
Construction Subtotal		\$24,857,070	
Contractor General Conditions	10%	\$2,485,707	
Contractor Overhead and Profit	12%	\$2,982,848	
Construction Contingencies	5%	\$1,242,854	
Grand Total Cost		\$31,569,000	

Washwater Tank

Item	Unit	Quantity	Unit Cost	Total Cost	
Fluted column tank	GAL	400,000	\$2	\$800,000	Estimate per discussion w/ caldwell for low
Tank Bollards	EA	10	\$2,000	\$20,000	height tank, do not add contingecies
Piping Extension to Filters	LF	150	\$500	\$75,000	
Misc Site Resoration, Grading	LS	1	\$20,000	\$20,000	
Electrical Service	LS	1	\$35,000	\$35,000	
Total				\$950,000	

Adminstration Building

	Unit	Quantity	Unit Cost	Total
Building Size	SF	7500	\$180	\$1,350,000
Laboratory Equipment	LS	1	\$300,000	\$300,000
Workstations / Printers	LS	1	\$50,000	\$60,000
Networks/Security	LS	1	\$100,000	\$100,000
Total				\$1,810,000

Maintenance Building

Building Size	SF	5000	\$110	\$550,000
Specialized HVAC Adder	LS	1	\$90,000	\$90,000
Compressed air system	LS	1	\$50,000	\$50,000
Tools / Hardware	LS	1	\$350,000	\$350,000
				\$1,040,000

Misc Electrical (Note electrical is included in most of the other individual estiamtes)

Service	LF	200	\$5,000	\$1,000,000
Generator	LS	1	\$1,500,000	\$1,500,000

CONSTANTS - INPUTS

Estimating Contingency (Rehab)	30%
Estimating Contingency (New)	20%
Escalation to Midpoint	3%
Contractor General Conditions	10%
Contractor Overhead and Profit	12%
Permitting	0.0%
Construction Contingencies	5%
Effective Multiplier Used (Rehab)	1.69
Effective Multiplier Used (New)	1.56

**EWSU Water Treatment Plant- Advanced Facility Plan
Evansville Water and Sewer Utility Department, Indiana
20-018 Engineer's ROM Estimate Level 4, 6/12/20**

Project name	EWSU Water Treatment Plant- Advanced Facility Plan Evansville IN USA
Client	EWSU Evansville IN
Engineer	AECOM
Estimator	Bruce Pietkiewicz
Labor rate table	1 AECOM RATES 20
Equipment rate table	Equip - ACM 20ld wrk
Duration	6 mo
Project Division Office	Water Line Water Columbus, Ohio
Principal Party	John Krinks
Estimating Office	Greenville
Contact 1	Bruce Pietkiewicz
Contact 2	Martin Hammer
Estimate Class Lvl	4
Purpose of Estimat	EE
FY Estimate	2020
Estimate Number	20-018
Notes	<p><i>This project involves developing an Advanced Facility Plan to provide alternatives to consider for improvements at the EWSU water treatment plant. The proposed finished water capacity for all alternatives is 50 MGD, and the evaluated alternatives consider rehabilitation of the existing facility, construction of new infrastructure, and a combination of the two. Plant-wide improvements are considered within these alternatives, including options for water supply, pre-treatment, filtration, disinfection, and pumping.</i></p> <p><i>This Engineer's Estimate is only an estimate of possible construction costs for budgeting purposes. This estimate is limited to the conditions existing at issuance and is not a warranty of actual price or cost. Uncertain market conditions such as, but not limited to, local labor or contractor availability, wages, other work, material market fluctuations, price escalations, force majeure events, and developing bidding conditions etc. may affect the accuracy of this estimate. AECOM is not responsible for any variance from this estimate or actual prices and conditions obtained.</i></p>
Report format	Sorted by 'WBS Lvl 1/WBS Lvl 2/WBS Lvl 3/WBS Lvl 4' 'Detail' summary Paginate
Cost index	SC, Greenville (Labor only)
Alternates	01A, 01B, 02A, 02B, 02C, 03A, 03B, 03C, 03D, 03E, 03F, 04A, 04B, 04C, 05A, 05B, 05C, 06A, 06B, 07A, 08A, 09A, 10A, 2A, 2B, 2C, 3A, 3B, 3C, 3D, 3E, 3F, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7A, 8A, 9A

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount	
01				River Intake & Low Service Pump Station																
	1A			River Intake & LSPS Rehab																
		02		Modify Existing Structure & Services																
		02.01		Demolition Work																
				Non-Hazardous Waste Transport and Disposal.	1	ls		-	-				500.00					500	759	
				Demo Entrance Sidewalk & Handrail	6	cy	0.300	/ch	160				-		12.69			76	374	
				Demo Single Door & Frame	3	ea	1.000	/ch	353				-		-			85	693	
				Demo Double Door & Frame	2	ea	1.333	/ch	313				-		37.68			75	616	
				Demo HVAC System (Includes Exhaust Fans, Heaters, Louvers & Ductwork)	3,000	sf		-	-				10.00					30,000	45,531	
				Demo Electrical System (Includes I&C System & Lights)	3,000	sf		/sf	-				6.00					18,000	27,319	
				02.01 Demolition Work	1	ls			826				48,500.00		236.28			236	49,562	75,292
		02.10		Intake Pipe Rehab																
				Temporary support ex. 42" pipe discharge	3	ea	3.000	/ch	1,751				-		839.05			2,517	4,268	6,778
				Demo Conc Ftg/Pier	3	ea	1.000	/cd	2,039				-		2,149.16			6,447	8,486	13,488
				Neoprene Pad	3	ea	2.500	/mh	342	60.00	180		-		-			522	815	
				CIP Footing - 5'w x 2'w x 2'd	3	cy		-	-				1,500.00					4,500	6,830	
				CIP Pier - 5'w x 2'w x 4'd	5	cy		-	-				1,500.00					7,500	11,383	
				Gasket/Nuts/Bolt Kit 42"	9	ea	1.000	/mh	411	425.00	3,825		-		-			4,236	6,455	
				Carbon Steel Flange Thrust Assemblies - 42" interior	9	ea	6.000	/mh	2,464	500.00	4,500		-		-			6,964	10,729	
				02.10 Intake Pipe Rehab	3	ea			7,006	2,835.00	8,505		4,000.00		12,000		2,988.21	8,965	36,476	56,477
		07.01		Roofing																
				Inspect & Patch Roof System (Patchwork Voids Warranty)	3,300	sf		/sf	-				1.50					4,950	7,513	
				Patch Aluminum Downspouts	40	lf		/lf	-				18.00					720	1,093	
				Patch Aluminum Coping @ Roof Parapet 12" wide	257	lf		/lf	-				5.00					1,285	1,950	
				07.01 Roofing	3,300	sf			-				2.11		6,955			6,955	10,556	
		08.00		Doors, Frames & Hardware																
				HM Single Frames- 16 ga 3x7"	5	ea	1.000	/mh	196	180.04	900		-		-			1,096	1,676	
				HM Door Leafs- 3'x7' 20 ga. half glass	7	ea	1.500	/mh	183	450.09	3,151		-		-			3,333	5,071	
				Finish Hardware by Leaf- Allowance	7	ea	8.002	/mh	2,194	900.18	6,301		-		-			8,496	13,036	
				08.00 Doors, Frames & Hardware	7	ea			2,573	1,478.87	10,352		-		-			12,925	19,784	
		09.00		Finishes																
				Paint HM Door Frames - primer (2) coats	5	ea		/ea	-				100.02		500			500	759	
				Paint HM Doors - primer (2) coats	7	ea		/ea	-				140.03		980			980	1,488	
				Paint CMU Block - block filler & (2) coat	6,300	sf		-	-				1.35		8,505			8,505	12,908	
				Upgrade Architectural Finishes	1	ls			-				4,000.00		4,000			4,000	6,071	
				Paint 6" Pipe	505	lf	0.140	/mh	1,947	0.69	350		-		4.24		2,141	4,437	7,018	
				Paint 18" Pipe	85	lf	0.200	/mh	468	2.08	177		-		6.06		515	1,159	1,828	
				Paint 24" Pipe	7	lf	0.350	/mh	67	2.77	19		-		7.07		49	136	215	
				Paint 30" Pipe	54	lf	0.438	/mh	650	3.46	187		-		4.12		223	1,060	1,667	
				Paint 36" Pipe	34	lf	0.525	/mh	491	4.15	141		-		4.95		168	801	1,260	
				Paint 42" Pipe	223	lf	0.525	/mh	1,177	2.75	610		-		4.95		1,103	5,407	8,497	
				09.00 Finishes	3,300	ls	249		6,848	0.59	1,955		4.24		13,985		1.27	4,198	26,986	41,711
		10.00		Specialty Items																
				Signs - Building ID	1	ea		/ea	-				3,000.60		3,001			3,001	4,554	
				Signs - Doors	5	ea		/ea	-				30.01		150			150	228	
				Fire Extinguisher CO2 10 lbs	4	ea		/ea	-				225.05		900			900	1,366	
				10.00 Specialty Items	3,300	ls			-				1.23		4,051			4,051	6,148	
		23.00		HVAC																
				Replace HVAC System (Includes Exhaust Fans, Heaters, Louvers & Ductwork)	3,000	sf		/sf	-				25.01		75,015			75,015	113,851	
				Replace Ancillary Building Systems	3,000	sf		/sf	-				13.00		39,000			39,000	59,191	
				23.00 HVAC	3,300	sf			-				34.55		114,015			114,015	173,042	
		31.00		Dredging																
				Hydraulic Dredging- Allowance	1	ls		-	-				250,000.00		250,000			250,000	379,429	
				31.00 Dredging	1	ls			-				250,000.00		250,000			250,000	379,429	
		32.00		Site Improvements																
				Replace Entrance Sidewalks & Handrail	1	ls		/ls	-				1,200.00		1,200			1,200	1,821	
				32.00 Site Improvements	1	ls			-				1,200.00		1,200			1,200	1,821	
				02 Modify Existing Structure & Services	1	ls	499		17,253	20,811.62	20,812		450,706.22		450,706		13,399.15	13,399	502,170	764,261
		26		Electrical & Instrumentation																
		26.01		Above Ground Electrical																
				Electrical Work For New Pumps & Lights	1	ls		/ls	-				200,000.00		200,000			200,000	303,543	
				26.01 Above Ground Electrical	1	ls			-				200,000.00		200,000			200,000	303,543	
		26.02		Instrumentation & Controls																
				Controls & Instrumentation Work For New Pumps	1	ls		/ls	-				84,000.00		84,000			84,000	127,488	
				26.02 Instrumentation & Controls	1	ls			-				84,000.00		84,000			84,000	127,488	
				26 Electrical & Instrumentation	3,300	ls			-				86.06		284,000			284,000	431,031	
		40		Process Piping																
		40.01		Above Ground Process Piping																
				Replace Water Supply, PCC, Chlorine Solution and Potassium Permanganate Piping	600	lf	0.900	/mh	24,636	47.39	28,432		-		-			53,068	82,143	
				40.01 Above Ground Process Piping	600	lf			24,636	47.39	28,432		-		-			53,068	82,143	
		40.02		Valves, Meters, Etc.																
				Backflow Preventer Flg 6"	1	ea	12.170	/mh	555	5,000.00	5,000		-		-			5,555	8,467	
				Magnetic Flow Meter, Inline - 30" w/ transmitter	2	ea	38.000	/mh	76	43.67	3,319		-		-			41,319	62,926	
				Resurface All Large Discharge Valves & Replace Actuators 24"	6	ea	10.000	/mh	60	30.57	1,834		-		-			48,634	73,932	
				Resurface All Large Discharge Valves & Replace Actuators 36"	1	ea	14.000	/mh	428	30.57	11,700		-		-			12,128	18,435	
				Resurface All Large Discharge Valves & Replace Actuators 42"	3	ea	17.000	/mh	51	30.57	1,559		-		-			46,409	70,537	
				40.02 Valves, Meters, Etc.			213		7,695		146,350		-		-			154,045	234,297	
				40 Process Piping	600	lf	753		32,331	291.30	174,782		-		-			207,113	316,440	
		43		Process Equipment																
		43.00		Pumps																
				Pump Inspection	6	ea	24.000	/mh	144	42.40	6,105		-		-			19,305	29,696	
				Freight On Pumps To Jobsite	6	ea		/ea	-				2,200.00		13,200			9,000	13,659	
				Verified Performance Test	6	day	8.000	/ch	48	29.43	1,413		-		-			1,500.00	10,413	15,896
				Vendor Verified Performance Test	6	ea		/ea	-				-		-			1,500.00	9,000	13,659
				Vendor Witnessed, Verified Performance Test	6	ea		/ea	-				-		-			1,500.00	9,000	13,659
				System Disinfection	1	day	8.000	/ch	8	29.43	235		-		-			750.00	985	1,511
				Equipment Unloading	6	ea	4.000	/ch	132	182.62	4,383		-		-			381.61	2,290	15,134

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			43.00	Pumps															
				Equipment Rigging / Rough Set - Pumps	6 ea	4.000 ch / ea	144	195.85 /ch	4,700	500.00	3,000	-	-	401.59	2,410	-	-	10,110	15,827
				Equipment - Final Setting Grout Base - Pumps	6 ea	4.000 ch / ea	72	103.33 /ch	2,480	50.00	300	-	-	346.16	2,077	-	-	4,857	7,686
				Variable Frequency Drives 150 HP	6 ea	40.000 mh / ea	240	28.14 /mh	6,753	31,995.00	191,970	-	-	-	-	-	-	198,723	302,044
				Replace Vertical Turbine Can Low Service Pumps 150 HP	6 ea	/ea										165,000.00	990,000	990,000	1,502,538
				Demo Existing Low Service Pumps 150 hp	6 ea	30.000 mh / ea	180	34.45 /mh	6,200	-	-	-	-	-	-	-	-	6,200	9,813
				Add Large Sump Pump To Lower Level	1 ea	32.000 mh / ea	32	34.45 /mh	1,102	-	-	-	-	-	45,000.00	45,000	45,000	46,102	70,042
				43.00 Pumps	1 ls		1,000		33,372	199,020.00	199,020	13,200.00	13,200	6,776.18	6,776	1,071,000.00	1,071,000	1,323,368	2,011,165
			43.08	Intake Screens															
				3-Man Dive Team - (1) Diver, (1) Tender, (1) Standby Diver	180 ch	-		-	-	-	-	560.00	100,800	555.56	100,000	-	-	200,800	312,137
				Rebuild Intake Screens	3 ea	60.000 mh / ea	180	32.90 /mh	5,923	-	-	-	-	6,657.60	19,973	47,875.00	143,625	169,521	259,143
				43.08 Intake Screens	3 ea		180		5,923			33,600.00	100,800	39,990.93	119,973	47,875.00	143,625	370,321	571,280
			43.09	Potassium Permanganate System															
				<i>Purchase Chemicals: Potassium Permanganate By Owner)</i>	1 ls														
				Automated Potassium Permanganate w/ Mixing Tank (by Carus Corp)	1 ls	50.000 mh / ls	50	45.62 /mh	2,281	-	-	-	-	10,000.00	10,000	-	-	12,281	18,787
				43.09 Potassium Permanganate System			50		2,281									12,281	18,787
				43 Process Equipment	1 ls		1,230		41,576	199,020.00	199,020	114,000.00	114,000	126,748.98	126,749	1,224,625.00	1,224,625	1,705,970	2,601,233
				1A River Intake & LSPS Rehab	1 ls		2,482		91,159	394,613.41	394,613	848,706.22	848,706	140,148.13	140,148	1,224,625.00	1,224,625	2,699,252	4,112,965
				New River Intake & LSPS															
1B		00		Building & Structure Construction															
			03.00	Foundation Mat															
				Keyway 6"	650 lf	0.050 mh / lf	33	39.49 /mh	1,284	0.67	437	-	-	-	-	-	-	1,721	2,695
				Mat Foundation Edge Form 24"	366 sf	0.350 mh / sf	128	39.49 /mh	5,059	1.31	480	-	-	-	-	-	-	5,540	8,737
				Mat Foundation Edge Form 30"	510 sf	0.350 mh / sf	179	39.49 /mh	7,050	1.31	670	-	-	-	-	-	-	7,720	12,174
				Waterstop 6" Flat	650 lf	0.110 mh / lf	72	39.18 /mh	2,802	2.10	1,365	-	-	-	-	-	-	4,167	6,506
				Strip & Oil Mat Found. Form	876 sf	0.005 mh / sf	4	39.17 /mh	172	0.03	26	-	-	-	-	-	-	198	311
				Rebar- Foundation Mat (100 #/cy)	13 tn	28.006 mh / tn	368	43.53 /mh	16,030	997.70	13,120	-	-	-	-	-	-	29,150	45,283
				Rebar Support - bricks (.12/sf)	368 ea	0.002 mh / ea	1	43.53 /mh	32	0.26	97	-	-	-	-	-	-	129	197
				Finish- Hard Trowel	3,070 sf	0.023 mh / sf	71	39.17 /mh	2,766	-	-	-	-	-	-	-	-	2,766	4,378
				Pump Place Mat Foundation 24"	83 cy	0.500 mh / cy	42	41.39 /mh	1,718	-	-	-	-	4.59	381	-	-	2,098	3,325
				Pump Place Mat Foundation 30"	180 cy	0.500 mh / cy	90	41.39 /mh	3,725	-	-	-	-	4.59	826	-	-	4,551	7,210
				4000 psi Concrete	263 cy	/cy				142.00	37,346	-	-	-	-	-	-	37,346	56,681
				Liquid Curing Compounds	3,946 sf	0.003 mh / sf	12	39.17 /mh	464	0.06	232	-	-	-	-	-	-	696	1,086
				6 Mil. Vapor Barrier	4,400 sf	0.002 mh / sf	9	43.53 /mh	383	0.05	231	-	-	-	-	-	-	614	957
				03.00 Foundation Mat			1,007		41,484		54,004				1,207			96,694	149,540
			03.03	Columns															
				Form Rectangle Columns 14' & 25.33' h	1,525 sf	0.165 mh / sf	252	39.49 /mh	9,936	1.60	2,434	-	-	-	-	-	-	12,371	19,421
				Chamfer	1,144 lf	0.015 mh / lf	17	39.49 /mh	678	0.57	649	-	-	-	-	-	-	1,326	2,057
				Strip & Oil Column Form	1,525 sf	0.005 mh / sf	8	39.17 /mh	299	0.03	46	-	-	-	-	-	-	344	542
				Superplasticizers @ Columns	19 cy	/cy				8.40	160	-	-	-	-	-	-	160	242
				Column Rebar (120 #/cy)	1 tn	20.004 mh / tn	23	43.53 /mh	993	997.70	1,137	-	-	-	-	-	-	2,130	3,297
				Finish- Float	69 sf	0.017 mh / sf	1	39.17 /mh	46	-	-	-	-	-	-	-	-	46	73
				Pump Place Columns 18 ea	19 cy	1.600 mh / cy	30	41.39 /mh	1,258	-	-	-	-	7.50	142	-	-	1,401	2,218
				4000 psi Concrete	19 cy	/cy				142.00	2,698	-	-	-	-	-	-	2,698	4,095
				Grind/Patch Columns	1,525 sf	0.013 mh / sf	20	39.17 /mh	777	0.03	46	-	-	-	-	-	-	822	1,299
				Rub Columns	1,525 sf	0.065 mh / sf	99	39.17 /mh	3,882	0.06	92	-	-	-	-	-	-	3,974	6,284
				Liquid Curing Compounds	1,525 sf	0.003 mh / sf	5	39.17 /mh	179	0.06	90	-	-	-	-	-	-	269	420
				03.03 Columns			454		18,048		7,351				142			25,541	39,948
			03.04	Walls															
				Brick Ledge Forms	257 lf	0.300 mh / lf	77	39.49 /mh	3,045	2.21	567	-	-	-	-	-	-	3,612	5,680
				Keyway 6"	1,004 lf	0.050 mh / lf	50	39.49 /mh	1,983	0.67	675	-	-	-	-	-	-	2,657	4,162
				Vertical Wall Keyway 6"	272 lf	0.110 mh / lf	30	39.49 /mh	1,182	0.67	183	-	-	-	-	-	-	1,365	2,148
				Panel Form System 12-16'	2,250 sf	0.170 mh / sf	383	39.49 /mh	15,104	1.84	4,134	-	-	-	-	-	-	19,239	30,180
				Panel Form System > 16' h	12,695 sf	0.190 mh / sf	2,413	39.49 /mh	95,266	1.84	23,332	-	-	-	-	-	-	118,598	186,190
				Waterstop 6" Flat	1,276 lf	0.110 mh / lf	140	39.18 /mh	5,500	2.10	2,680	-	-	-	-	-	-	8,180	12,772
				Strip & Oil Wall Forms	14,495 sf	0.005 mh / sf	72	39.17 /mh	2,839	0.03	435	-	-	-	-	-	-	3,274	5,154
				Superplasticizers @ Walls	553 cy	/cy				8.40	4,646	-	-	-	-	-	-	4,646	7,051
				Rebar- Walls (125 #/cy)	35 tn	15.003 mh / tn	525	43.53 /mh	22,856	997.70	34,920	-	-	-	-	-	-	57,776	89,173
				Finish- Top of Wall	2,008 sf	0.008 mh / sf	16	39.17 /mh	629	-	-	-	-	-	-	-	-	629	996
				Pump Place Walls 24"	553 cy	1.150 mh / cy	636	41.39 /mh	26,327	-	-	-	-	6.65	3,677	-	-	30,004	47,520
				Pump Place Brick Ledge	14 cy	2.001 mh / cy	28	41.39 /mh	1,159	-	-	-	-	14.42	202	-	-	1,361	2,156
				4000 psi Concrete	567 cy	/cy				142.00	80,514	-	-	-	-	-	-	80,514	122,197
				Grind/Patch Walls	14,495 sf	0.013 mh / sf	188	39.17 /mh	7,382	0.03	435	-	-	-	-	-	-	7,817	12,344
				Rub Walls	7,473 sf	0.058 mh / sf	433	39.17 /mh	16,976	0.06	448	-	-	-	-	-	-	17,425	27,549
				Liquid Curing Compounds	15,303 sf	0.002 mh / sf	31	39.17 /mh	1,199	0.06	900	-	-	-	-	-	-	2,099	3,264
				03.04 Walls			5,023		201,447		153,868				3,879			359,195	558,536
			03.05	Slab On Grade															
				Slab Edge Form 28"	249 sf	0.350 mh / sf	87	39.49 /mh	3,442	1.31	327	-	-	-	-	-	-	3,769	5,944
				Rebar- SOG (125 #/cy)	2 tn	14.003 mh / tn	22	43.53 /mh	951	997.70	1,556	-	-	-	-	-	-	2,507	3,867
				Mesh Support - bricks (.12/sf)	75 ea	0.002 mh / ea													

Table with columns: WBS Lvl 1, WBS Lvl 2, WBS Lvl 3, WBS Lvl 4, Description, Takeoff Quantity, Labor Productivity, Man Hours, Labor Price, Labor Amount, Material Cost/Unit, Material Amount, Subcontract Cost/Unit, Subcontract Amount, Const Equip Cost/Unit, Const Equip Amount, Process Equip Cost/Unit, Process Equip Amount, Total Amount, Grand Total Amount. Rows include categories like 03.06 Suspended Flat Slab, 03.07 Suspended Beams, 03.08 Pads & Curbs, 03.20 Precast Planks, 04.00 Masonry, 05.01 Misc Metals, 06.00 Wood, 07.00 Moisture Protection, 07.01 Roofing, 08.00 Doors, Frames & Hardware, 09.00 Finishes, 10.00 Specialty Items, 22.00 Plumbing, and 23.00 HVAC.

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount	
				23.00 HVAC	1 sf								150,029.95		150,030			150,030	227,703	
			31.00	Dredging																
				Hydraulic Dredging- Allowance	1 ls								250,000.00		250,000			250,000	379,429	
				31.00 Dredging	1 ls								250,000.00		250,000			250,000	379,429	
			31.01	Dewatering																
				Dewatering @ Building Excavation	1 ea	240.00 ch / ea	960	159.35 /ch	38,244	7,500.00	7,500				33,592.77			79,336	125,375	
				Dewatering @ Cofferdams For Intake Construction	3 ea	120.00 ch / ea	1,440	159.35 /ch	57,365	7,500.00	22,500				16,796.52			130,255	205,137	
				31.01 Dewatering	1 ls		2,400		95,609	30,000.00	30,000				83,982.33			209,591	330,512	
			31.02	Piles																
				Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 32 ea (1 per 64 sf)	800 vf	0.002 cd / vf	90	2,146.97 /cd	3,436	35.16	28,125				2.58			33,625	51,409	
				31.02 Piles	32 ea		90		3,436	878.91	28,125				64.51			33,625	51,409	
			31.03	Excavation Shoring																
				Shoring System Design Engineer	1 ls								15,003.00		15,003			15,003	22,770	
				Structure Sheeting (246' x 60' deep)	14,760 sf	0.001 cd / sf	728	2,465.38 /cd	28,031	16.00	236,207				0.75			275,336	420,522	
				Tie Backs (1 per 80 sf of Sheeting, 246' x 45'= 11,070 sf)	138 ea								2,377.47		328,091			328,091	497,950	
				31.03 Excavation Shoring	12,300 sf		728		28,031	19.20	236,207		27.89		343,094		0.90	11,098	618,430	941,242
			31.10	Structure Excavation																
				Exc Clay-Backhoe/Truck	6,345 cy	499.900 cy / cd	457	1,410.06 /cd	17,897						6.58			41,776	59,673	
				31.10 Structure Excavation	6,345 cy		457		17,897						6.58			41,776	59,673	
			31.12	Structure Backfill																
				Backfill Earth-Backhoe/Truck	2,722 cy	0.002 cd / cy	176	1,327.72 /cd	7,300						4.69			12,757	20,058	
				31.12 Structure Backfill	2,722 cy		176		7,300						4.69			12,757	20,058	
			31.13	Soil Disposal																
				Spoils to Waste	3,623 cy	0.003 day / cy	326	1,410.06 /day	12,774						8.23			29,819	42,593	
				31.13 Soil Disposal	3,623 cy		326		12,774						8.23			29,819	42,593	
			31.20	Structure Stone Base																
				Structure Subbase Stone-Loaders/Truck - 3.070' sf x 4"	38 cy	0.003 cd / cy	5	1,609.56 /cd	185	28.28	1,075				10.02			381	1,641	
				31.20 Structure Stone Base	38 cy		5		185	28.28	1,075				10.02			381	1,641	
			32.00	Site Improvements																
				Misc Site Improvement ALLOWANCE	1 ls			/ls					10,000.00		10,000			10,000	15,177	
				32.00 Site Improvements	1 ls								10,000.00		10,000			10,000	15,177	
				00 Building & Structure Construction	6,000 gsft		14,106		562,756	117.96	707,785	173.98	1,043,900	33.68	202,077			2,516,518	3,870,851	
26				Electrical & Instrumentation																
			26.00	UG Electrical																
				Ext Fixtures - Elec - ductbank Conduit/Cable/Wire	100 lf	0.250 mh / lf	25	45.53 /mh	1,138	2.72	272				5.00			1,910	3,010	
				Building Electrical System	6,000 sf			/sf					16.00		96,019			96,019	145,730	
				26.00 UG Electrical	1 ls		25		1,138	272.00	272	96,019.16	96,019	500.00	500			97,929	148,740	
			26.01	Above Ground Electrical																
				Building Electrical System	6,000 sf			/sf					8.00		48,010			48,010	72,865	
				Process Electrical System	6,000 sf			/sf					30.01		180,036			180,036	273,243	
				Ext Light Pole (stl), Base and Fixture, high pressure sodium 400w, 30' high	4 ea	44.000 mh / ea	176	45.53 /mh	8,013	2,300.00	9,200							17,213	26,645	
				26.01 Above Ground Electrical	1 ls		176		8,013	9,200.00	9,200	228,045.52	228,046					245,259	372,754	
			26.02	Instrumentation & Controls																
				Controls & Instrumentation	1 ls			/ls					310,800.00		310,800			310,800	471,706	
				26.02 Instrumentation & Controls	1 ls							310,800.00	310,800					310,800	471,706	
				26 Electrical & Instrumentation	6,000 ls		201		9,151	1.58	9,472	105.81	634,865	0.08	500			653,988	993,200	
40				Process Piping																
			40.00	Under Ground Process Piping																
				Trench Excav & Lay Pipe 0- 4'	783 lf	600.000 lf / cd	73	2,539.31 /cd	3,314						1.88			1,475	4,789	
				Stone Pipe Bedding	58 cy	200.000 cy / cd	21	2,896.43 /cd	840	23.29	1,351							2,191	3,380	
				DI Pipe Push - Class 52 6	505 lf	0.220 mh / lf	111	24.05 /mh	2,672									14,052	21,500	
				DI Pipe Push - Class 52 8	0 lf	0.250 mh / lf	0	51.34 /mh	0									0	1	
				DI Pipe Push - Class 52 12	0 lf	0.310 mh / lf	0	51.34 /mh	0									1	1	
				DI Pipe Push - Class 52 30	54 lf	0.440 mh / lf	24	51.34 /mh	1,220	167.28	9,033							10,253	15,640	
				DI Pipe Push - Class 52 36	0 lf	0.500 mh / lf	0	51.34 /mh	0	225.00	2							3	4	
				DI Pipe Push - Class 52 42	224 lf	0.570 mh / lf	128	51.34 /mh	6,555	290.93	65,169							71,724	109,282	
				DI Pipe Push - Class 52 48	0 lf	0.640 mh / lf	0	51.34 /mh	0	365.00	4							4	6	
				Hydrostatic Testing	783 lf	0.021 ch / lf	66	182.49 /ch	3,001	0.16	125							3,126	4,939	
				Chlorination	783 lf			/lf		0.10	78							78	119	
				42" DI Slab Thimble 24" long	3 ea	3.500 ch / ea	42	182.49 /ch	1,916	1,800.00	5,400				842.80		2,528	9,845	15,252	
				DI 90 ell 42"	6 ea	23.120 mh / ea	139	30.57 /mh	4,240	4,949.10	29,695							33,935	51,779	
				40.00 Under Ground Process Piping	783 lf		603		23,759	156.11	122,236				5.11	4,003		149,999	229,495	
			40.01	Above Ground Process Piping																
				Stencil Exposed Piping <20"	85 lf								10.00		850			850	1,290	
				Stencil Exposed Piping >20"	260 lf								25.01		6,501			6,501	9,867	
				Pipe Supports	18 ea	4.001 mh / ea	72	45.62 /mh	3,285	250.05	4,501							7,786	12,031	
				Hydrostatic Testing	345 lf	0.021 ch / lf	29	182.49 /ch	1,322	0.16	55							1,377	2,176	
				Chlorination	345 lf			/lf		0.10	35							35	52	
				Cross Fitting 6"	1 ea	2.400 ch / ea	10	182.49 /ch	438	170.00	170							608	951	
				Dresser Couplings 18"	5 ea	10.352 ch / ea	207	163.14 /ch	8,444	510.00	2,550							10,994	17,235	
				Dresser Couplings 24"	6 ea	13.803 ch / ea	331	182.49 /ch	15,113	684.14	4,105							19,218	30,150	
				Dresser Couplings 42"	2 ea	24.000 mh / ea	48	40.79 /mh	1,958	3,500.00	7,000							8,958	13,723	
				14" DI Slab Thimble 12" long	0 ea	1.501 ch / ea	0	182.49 /ch	3	325.00										

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			40.01	Above Ground Process Piping															
				PAC Piping & Accessories 3 ea- ALLOWANCE	600 LF	0.240 mh / LF	144	45.62 /mh	6,571	55.01	33,007	-	-	-	-	-	-	39,577	60,494
				Chlorine Piping & Accessories 3 ea- ALLOWANCE	300 LF	0.240 mh / LF	72	45.62 /mh	3,285	55.01	16,503	-	-	-	-	-	-	19,789	30,247
				40.01 Above Ground Process Piping	1,026 lf		2,061		79,799	139.27	142,895	7.17	7,351	1.18	1,208			231,253	356,252
			40.02	Valves, Meters, Etc.															
				Backflow Preventer Flg 6"	1 ea	12.170 mh / ea	12	45.62 /mh	555	5,000.00	5,000	-	-	-	-	-	-	5,555	8,467
				Magnetic Flow Meter - Inline - 30" w/ transmitter	2 ea	30.000 mh / ea	60	48.85 /mh	2,931	15,000.00	30,000	-	-	-	-	-	-	32,931	50,170
				Swing Check Valve 6"	3 ea	4.669 mh / ea	14	45.62 /mh	639	1,100.00	3,300	-	-	-	-	-	-	3,939	6,020
				Swing Check Valve 18"	6 ea	13.713 mh / ea	82	30.71 /mh	2,527	10,800.00	64,800	-	-	-	-	-	-	67,327	102,347
				6" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	4 ea	6.200 mh / ea	25	30.57 /mh	758	2,850.00	11,400	-	-	-	-	-	-	12,158	18,502
				24" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	6 ea	19.204 mh / ea	115	45.62 /mh	5,257	12,502.50	75,015	-	-	-	-	-	-	80,272	122,171
				36" Butterfly Valve, 75 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	1 ea	28.800 mh / ea	29	30.57 /mh	880	19,781.00	19,781	-	-	-	-	-	-	20,661	31,415
				42" Butterfly Valve, 75 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	3 ea	33.600 mh / ea	101	30.57 /mh	3,081	23,078.00	69,234	-	-	-	-	-	-	72,315	109,954
				40.02 Valves, Meters, Etc.	1 ls		438		16,628	278,529.97	278,530							295,158	449,047
			40.04	Hydropneumatic Piping System															
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh					15,000.00					15,000	22,766
				40.04 Hydropneumatic Piping System	1 ls								15,000.00					15,000	22,766
				40 Process Piping	1,809 lf		3,102		120,186	300.53	543,662	12.36	22,351	2.88	5,211			691,410	1,057,560
		43		Process Equipment															
			43.00	Pumps															
				Pump Inspection	6 ea	24.000 mh / ea	144	42.40 /mh	6,105	-	-	2,200.00	13,200	-	-	-	-	19,305	29,696
				Freight On Pumps To Jobsite	6 ea			/ea								1,500.00	9,000	9,000	13,659
				Verified Performance Test	6 day	8.000 ch / day	48	29.43 /ch	1,413							1,500.00	9,000	10,413	15,896
				Vendor Verified Performance Test	6 ea			/ea								1,500.00	9,000	9,000	13,659
				Vendor Witnessed, Verified Performance Test	6 ea			/ea								1,500.00	9,000	9,000	13,659
				System Disinfection	1 day	8.000 ch / day	8	29.43 /ch	235	750.00	750							985	1,511
				Equipment Unloading	6 ea	4.000 ch / ea	132	182.62 /ch	4,383	500.00	3,000			381.61	2,290			9,673	15,134
				Equipment Rigging / Rough Set - Pumps	6 ea	4.000 ch / ea	144	195.85 /ch	4,700	500.00	3,000			401.59	2,410			10,110	15,827
				Equipment - Final Setting Grout Base - Pumps	6 ea	4.000 ch / ea	72	103.33 /ch	2,480	50.00	300			346.16	2,077			4,857	7,686
				Variable Frequency Drives 150 HP	6 ea	40.000 mh / ea	240	28.14 /mh	6,753	31,995.00	191,970							198,723	302,044
				Vertical Turbine Can Low Service Pumps 150 HP	6 ea			/ea								165,000.00	990,000	990,000	1,502,538
				Large Sump Pump To Lower Level	1 ea	32.000 mh / ea	32	34.45 /mh	1,102	-	-					45,000.00	45,000	46,102	70,042
				43.00 Pumps	1 ls		820		27,172	199,020.00	199,020	13,200.00	13,200	6,776.18	6,776	1,071,000.00	1,071,000	1,317,168	2,001,352
			43.08	Intake Screens															
				Cofferdam Shoring System Design Engineer	1 ls			-	-	-	-	15,003.00	15,003	-	-	-	-	15,003	22,770
				Structure Sheeting From Barge (246' x 50' deep)	12,300 sf	0.001 cd / sf	1,102	2,465.38 /cd	42,454	16.00	196,839	-	-	1.63	20,038	-	-	259,331	397,830
				Installation Team Working From Barge	90 ch			-	-	-	-	560.00	50,400	1,111.11	100,000	-	-	150,400	235,644
				River Intake Screen 54" OD x 19' long, 35 mgd/ Screen (Pneumatically Cleaned)	3 ea	60.000 mh / ea	180	32.90 /mh	5,923					6,657.60	19,973	70,958.00	212,874	238,770	364,243
				43.08 Intake Screens	1 ea		1,282		48,377	196,839.24	196,839	65,403.00	65,403	140,011.08	140,011	212,874.00	212,874	663,504	1,020,488
			43.19	Hydroburst System															
				Field Service For Startup	1 ls			-	-	-	-				4,500.00		4,500	4,500	6,830
				Johnson Hydroburst System	1 ls			/ls							114,952.00		114,952	114,952	174,464
				Install Package Air Compressor 20 hp	2 ea	40.000 mh / ea	80	30.57 /mh	2,445					900.00	1,800			4,245	6,735
				Install Air Dryer	1 ea	35.000 mh / ea	35	30.57 /mh	1,070					200.00	200			1,270	2,012
				Install Horizontal Air Receiver Tank 19.33' x 5' diameter, 2500 gallon	1 ea	20.000 mh / ea	20	30.57 /mh	611					3,750.00	3,750			4,361	6,936
				Misc Items	1 ea	40.000 mh / ea	40	30.57 /mh	1,223	4,000.00	4,000							5,223	8,006
				43.19 Hydroburst System	1 ls		175		5,349	4,000.00	4,000			5,750.00	5,750	119,452.00	119,452	134,551	204,982
				43 Process Equipment	1 ls		2,277		80,898	399,859.24	399,859	78,603.00	78,603	152,537.26	152,537	1,403,326.00	1,403,326	2,115,223	3,226,823
				1B New River Intake & LSPS	50 mg d		19,686		772,991	33,215.55	1,660,778	35,594.39	1,779,719	7,206.51	360,326	28,066.52	1,403,326	5,977,139	9,148,434
				01 River Intake & Low Service Pump Station	1 ls		22,168		864,150	2,055,390.92	2,055,391	2,628,425.62	2,628,426	500,473.71	500,474	2,627,951.00	2,627,951	8,676,391	13,261,399

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total
02				Pretreatment															
	2A			Pretreatment - Retrofit North w/ Plate Settlers															
		02		Modify Existing Structure & Services															
			02.01	Demolition Work															
				Non-Hazardous Waste Transport and Disposal.	1 ls	-	-	-	-	-	-	6,000.00	6,000	-	-	-	-	6,000	9,106
				Demo Concrete Walls 12"	50 cy	0.100 ch / cy	10	84.95 /ch	425	-	-	-	-	26.87	1,343	-	-	1,768	2,810
				Cut Opg In Existing Conc Wall 12"x20"x12" h @ Basin Wall	24 ea	1.000 ch / ea	48	84.95 /ch	2,039	-	-	-	-	-	645	-	-	2,684	4,253
				Demo All Piping & Equipment From North Plant Basins	1 ls	32.000 ch / ls	128	167.66 /ch	5,365	-	-	-	-	103.03	103	-	-	5,468	8,655
				Demo Electrical System @ Basins	1 ls	-	-	/ls	-	-	-	2,000.00	2,000	-	-	-	-	2,000	3,035
				Pressure Wash Basin Walls	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069	-	-	0.52	16,500	-	-	38,767	60,783
				Pressure Washing Basin Slab	20,059 sf	200.000 sf / ch	201	53.11 /ch	5,327	0.35	7,021	-	-	0.39	7,849	-	-	20,196	31,578
				02.01 Demolition Work	1 ls		808		24,353	18,089.75	18,090	8,000.00	8,000	26,440.44	26,440			76,883	120,221
			03.03	Columns															
				Form Rectangle Columns 19' h	5,472 sf	0.165 mh / sf	903	39.49 /mh	35,653	1.60	8,735	-	-	-	-	-	-	44,388	69,686
				Chamfer	3,650 lf	0.015 mh / lf	55	39.49 /mh	2,162	0.57	2,070	-	-	-	-	-	-	4,232	6,564
				Strip & Oil Column Form	5,472 sf	0.005 mh / sf	27	39.17 /mh	1,072	0.03	164	-	-	-	-	-	-	1,236	1,946
				Superplasticizers @ Columns	76 cy	-	-	/cy	-	-	638	-	-	-	-	-	-	638	969
				Column Rebar (120 #/cy)	5 tn	20.004 mh / tn	92	43.53 /mh	4,005	997.70	4,589	-	-	-	-	-	-	8,595	13,305
				Finish- Float	86 sf	0.017 mh / sf	1	39.17 /mh	57	-	-	-	-	-	-	-	-	57	91
				Pump Place Columns 48 ea	76 cy	1.600 mh / cy	122	41.39 /mh	5,034	-	-	-	-	7.50	570	-	-	5,604	8,874
				4000 psi Concrete	76 cy	-	-	/cy	-	142.00	10,792	-	-	-	-	-	-	10,792	16,379
				Grind/Patch Columns	5,472 sf	0.013 mh / sf	71	39.17 /mh	2,787	0.03	164	-	-	-	-	-	-	2,951	4,660
				Rub Columns	5,472 sf	0.065 mh / sf	356	39.17 /mh	13,931	0.06	328	-	-	-	-	-	-	14,259	22,547
				Liquid Curing Compounds	5,472 sf	0.003 mh / sf	16	39.17 /mh	643	0.06	322	-	-	-	-	-	-	965	1,506
				03.03 Columns	76 cy		1,643		65,344	365.83	27,803			7.50	570			93,717	146,525
			03.04	Walls															
				Keyway 6"	1,718 lf	0.050 mh / lf	86	39.49 /mh	3,393	0.67	1,155	-	-	-	-	-	-	4,547	7,122
				Vertical Wall Keyway 6"	653 lf	0.110 mh / lf	72	39.49 /mh	2,837	0.67	439	-	-	-	-	-	-	3,276	5,156
				Panel Form System 8-12'	13,893 sf	0.150 mh / sf	2,084	39.49 /mh	82,291	1.84	25,528	-	-	-	-	-	-	107,819	168,988
				Panel Form System > 16' h	28,431 sf	0.190 mh / sf	5,403	39.49 /mh	213,352	1.84	52,252	-	-	-	-	-	-	265,605	416,981
				Waterstop 6" Flat	2,371 lf	0.110 mh / lf	261	39.18 /mh	10,219	2.10	4,980	-	-	-	-	-	-	15,199	23,733
				Strip & Oil Wall Forms	42,324 sf	0.005 mh / sf	212	39.17 /mh	8,290	0.03	1,270	-	-	-	-	-	-	9,560	15,048
				Superplasticizers @ Walls	2,097 cy	-	-	/cy	-	-	17,617	-	-	-	-	-	-	17,617	26,737
				Rebar- Walls (125 #/cy)	131 tn	15.003 mh / tn	1,965	43.53 /mh	85,548	997.70	130,699	-	-	-	-	-	-	216,246	333,761
				Finish- Top of Wall	3,805 sf	0.008 mh / sf	30	39.17 /mh	1,193	-	-	-	-	-	-	-	-	1,193	1,887
				Pump Place Walls	2,097 cy	1.150 mh / cy	2,412	41.39 /mh	99,832	-	-	-	-	6.65	13,944	-	-	113,776	180,197
				4000 psi Concrete	2,097 cy	-	-	/cy	-	142.00	297,774	-	-	-	-	-	-	297,774	451,936
				Grind/Patch Walls	42,324 sf	0.013 mh / sf	550	39.17 /mh	21,554	0.03	1,270	-	-	-	-	-	-	22,824	36,042
				Rub Walls	42,324 sf	0.058 mh / sf	2,455	39.17 /mh	96,147	0.06	2,539	-	-	-	-	-	-	98,686	156,027
				Liquid Curing Compounds	46,129 sf	0.002 mh / sf	92	39.17 /mh	3,614	0.06	2,713	-	-	-	-	-	-	6,327	9,838
				03.04 Walls	2,097 cy		15,622		628,270	256.67	538,236			6.65	13,944			1,180,450	1,833,454
			03.05	Slab On Grade															
				S.O.G. Edge Form < 1'	68 sf	0.240 mh / sf	16	39.49 /mh	644	1.22	83	-	-	-	-	-	-	727	1,146
				Rebar- SOG (125 #/cy)	0 tn	16.000 mh / tn	3	43.53 /mh	139	997.70	200	-	-	-	-	-	-	339	523
				Mesh Support - bricks (.12/sf)	15 ea	0.002 mh / ea	0	43.53 /mh	1	0.26	4	-	-	-	-	-	-	5	8
				Finish- Hard Trowel	126 sf	0.025 mh / sf	3	39.17 /mh	123	-	-	-	-	-	-	-	-	123	195
				Pump Place Slab on Grade 8" @ Sludge Control Vault	3 cy	0.500 mh / cy	2	41.39 /mh	62	-	-	-	-	3.67	11	-	-	73	116
				4000 psi Concrete	3 cy	-	-	/cy	-	142.00	426	-	-	-	-	-	-	426	647
				Liquid Curing Compounds	194 sf	0.002 mh / sf	0	39.17 /mh	15	0.06	11	-	-	-	-	-	-	27	41
				Seal Floors	126 sf	0.002 mh / sf	0	39.17 /mh	10	0.09	12	-	-	-	-	-	-	22	33
				6 Mil. Vapor Barrier	126 sf	0.002 mh / sf	0	43.53 /mh	11	0.05	7	-	-	-	-	-	-	18	27
				Gravel Fill Under Slab 4"	2 cy	0.004 cd / cy	0	1,412.15 /cd	11	29.26	59	-	-	3.84	8	-	-	77	118
				03.05 Slab On Grade	3 cy		25		1,017	266.83	800			6.23	19			1,836	2,855
			03.06	Suspended Flat Slab															
				Form Suspended Slab Bottom	2,041 sf	0.220 mh / sf	449	39.49 /mh	17,731	2.18	4,458	-	-	-	-	-	-	22,189	34,830
				Slab Edge Form 8" & 12"	841 sf	0.250 mh / sf	210	39.49 /mh	8,304	5.17	4,349	-	-	-	-	-	-	12,653	19,743
				Strip & Oil Suspended Slab Forms	2,882 sf	0.005 mh / sf	14	39.17 /mh	565	0.04	118	-	-	-	-	-	-	683	1,073
				Superplasticizers	368 cy	-	-	-	-	8.40	3,092	-	-	-	-	-	-	3,092	4,692
				Rebar- Suspended Slab (225 #/cy)	41 tn	20.004 mh / tn	828	43.53 /mh	36,048	997.70	41,305	-	-	-	-	-	-	77,352	119,742
				Finish- Hard Trowel	2,041 sf	0.035 mh / sf	71	39.17 /mh	2,798	-	-	-	-	-	-	-	-	2,798	4,428
				Pump Place Suspended Slab	368 cy	2.160 mh / cy	795	41.39 /mh	32,899	-	-	-	-	6.65	2,449	-	-	35,348	55,967
				4000 psi Concrete	368 cy	-	-	-	-	142.00	52,256	-	-	-	-	-	-	52,256	79,310
				Liquid Curing Compounds	4,923 sf	0.003 mh / sf	15	39.17 /mh	579	0.68	3,361	-	-	-	-	-	-	3,939	6,016
				03.06 Suspended Flat Slab	368 cy		2,383		98,923	296.03	108,938			6.65	2,449			210,310	325,801
			03.11	Topping Slab															
				Mesh Support (.12/sf)	75 ea	0.002 mh / ea	0	43.53 /mh	7	0.26	20	-	-	-	-	-	-	26	40
				WWM 4X4- W 2.9 Flats	20,059 sf	0.014 mh / sf	281	43.53 /mh	12,224	0.50	10,057	-	-	-	-	-	-	22,281	34,610
				Finish- Hard Trowel	20,059 sf	0.015 mh / sf	301	39.17 /mh	11,787	-	-	-	-	-	-	-	-	11,787	18,656
				Pump Place Topping Slab	1,114 cy	0.750 mh / cy	836	28.06 /mh	23,446	-	-	-	-	6.65	7,411	-	-	30,857	48,903
				4000 psi Concrete	1,114 cy	-	-	/cy	-	142.00	158,188	-	-	-	-	-	-	158,188	240,084
				Liquid Curing Compounds	20,059 sf	0.002 mh / sf	40	39.17 /mh	1,572	0.06	1,180	-	-	-	-	-	-	2,751	4,278
				Seal Floors	624 sf	0.002 mh / sf	1	39.17 /mh	49	0.09	58	-	-	-	-	-	-	107	165
				03.11 Topping Slab	1,114 cy		1,459		49,083	152.16	169,502			6.65	7,411			225,997	346,736
			03.30	Patch Cracks and Resurface Concrete															
				Patch Cracks & Resurface Walls	2,120 sf	10.000 sf / ch	424	53.11 /ch	11,259	0.11	231	-	-	-	-	-	-	11,490	18,171
				Patch Cracks & Resurface Slab	848 sf	6.764 sf / ch	251	53.11 /ch	6,659	0.07	63	-	-	-	-	-	-	6,721	10,634
				Pressure Washing Walls	2,120 sf	33.333 sf / ch	127	53.11 /ch	3,378	0.35	742	-	-	2.37	5,028	-	-	9,147	14,474
				Pressure Washing Basin Slab	848 sf	16.667 sf / ch	102	53.11 /ch	2,702	0.35	297	-	-	4.70	3,982	-	-	6,981	11,065
				03.30 Patch Cracks and Resurface Concrete	2,968 sf		904		23,998	0.45	1,332			3.04	9,010			34,340	54,343
			05.01	Misc Metals															
				Aluminum 2 Line Rail @ Basin Walkways	2,908 lf	0.200 mh / lf	582	38.76 /mh	22,541	32.20	93,638	-	-	-	-	-	-	116,179	177,792
				Replace Alum Handrail @ Existing Influent Channel	106 lf	0.200 mh / lf	21	38.76 /mh	822	32.20	3,413	-	-	-	-	-	-	4	

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
				26.01 Above Ground Electrical	1 ls							315,783.00	315,783					315,783	479,269
			26.02	Instrumentation & Controls															
				Controls & Instrumentation Work For New Equipment (1.5% Equipment Cost)	1 ls			/ls				94,735.00	94,735					94,735	143,781
				26.02 Instrumentation & Controls	1 ls							94,735.00	94,735					94,735	143,781
				26 Electrical & Instrumentation	1 ls							410,518.00	410,518					410,518	623,050
			40	Process Piping															
			40.01	Above Ground Process Piping															
				Misc Pipe Work- ALLOWANCE	1 ls	40.000 mh / ls	40	45.62 /mh	1,825	2,000.00	2,000	-	-					3,825	5,924
				40.01 Above Ground Process Piping	1 lf		40		1,825	2,000.00	2,000							3,825	5,924
			40.04	Hydropneumatic Piping System															
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh				15,000.00	15,000					15,000	22,766
				40.04 Hydropneumatic Piping System	1 ls							15,000.00	15,000					15,000	22,766
				40 Process Piping	1 lf		40		1,825	2,000.00	2,000	15,000.00	15,000					18,825	28,689
			43	Process Equipment															
			43.01	Flocculators & Mixers															
				Freight On Mixers & Flocculators To Jobsite	24 ea			/ea						1,500.00			36,000	36,000	54,638
				Equipment Unloading	24 ea	4.000 ch / ea	528	182.62 /ch	17,532	500.00	12,000			381.61	9,159			38,691	60,537
				Equipment Rigging / Rough Set	24 ea	6.000 ch / ea	864	195.85 /ch	28,202	500.00	12,000			401.59	9,638			49,840	78,187
				Variable Frequency Drives (Included)	24 ea			/ea											
				Rapid Mixer w/7.33' Shaft & Dual 2.33' Blades, 2 HP	6 ea	45.000 mh / ea	270	42.40 /mh	11,447	100.02	600					13,700.00	82,200	94,247	143,784
				Flocculator w/19' Shaft & 9' Blades, 3 HP	18 ea	60.000 mh / ea	1,080	42.40 /mh	45,787	100.00	1,800					35,400.00	637,200	684,787	1,042,287
				43.01 Flocculators & Mixers	1 ls		2,742		102,967	26,400.12	26,400			18,796.90	18,797	755,400.00	755,400	903,564	1,379,433
			43.02	Settlement Equipment															
				Freight On Sedimentation System To Jobsite	6 ea			/ea										9,000	9,000
				Verified Performance Test (2 days per System x 6 ea)	12 day	8.000 ch / day	96	29.43 /ch	2,826								18,000	20,826	31,791
				Vendor Verified Performance Test	6 ea			/ea										9,000	13,659
				Vendor Witnessed, Verified Performance Test	6 ea			/ea										9,000	13,659
				Equipment Unloading	6 ea	16.000 ch / ea	528	182.62 /ch	17,532	500.00	3,000			381.61	2,290			22,822	35,945
				Equipment Rigging / Rough Set	6 ea	96.000 ch / ea	3,456	195.85 /ch	112,807	500.00	3,000			401.59	2,410			118,216	186,929
				Equipment - Final Setting	6 ea	360.000 ch / ea	6,480	103.33 /ch	223,202	50.00	300			346.16	2,077			225,579	357,027
				Inclined Plate Settlers w/ Flow Control Deck 55' x 86' x 8.2'	6 ea			/ea								474,375.00	2,846,250	2,846,250	4,319,798
				43.02 Settlement Equipment	1 ls		10,560		356,367	6,300.00	6,300			6,776.18	6,776	2,891,250.00	2,891,250	3,260,693	4,972,469
			43.03	Baffle Walls															
				Flow Control Diffuser Wall SS 304/304L SS 19' h, 12 ea, 6,840 sf	360 lf	6.000 mh / lf	2,160	30.57 /mh	66,024					28.00	10,080	680.56	245,000	321,104	492,380
				43.03 Baffle Walls	6,840 sf		2,160		66,024					1.47	10,080	35.82	245,000	321,104	492,380
			43.13	Chemical System Equipment															
				Totes	6 ea	1.000 mh / ea	6	45.62 /mh	274									274	433
				Chemical Feed Package Units	6 ea	24.000 mh / ea	144	42.40 /mh	6,105							75,000.00	450,000	456,105	692,634
				Activation Units	6 ea	10.002 mh / ea	60	42.40 /mh	2,544							25,004.99	150,030	152,574	231,730
				Batch Tank	2 ea	10.002 mh / ea	20	42.40 /mh	848							15,002.99	30,006	30,854	46,883
				43.13 Chemical System Equipment	1 ls		230		9,771							630,035.93	630,036	639,807	971,680
			43.20	Slide Gate w/ Operator															
				Slide Gates 36" x 36" w/ 16' Operators @ Influent Chamber	6 ea	30.006 mh / ea	180	47.77 /mh	8,601	500.00	3,000					20,000.00	120,000	131,601	200,292
				43.20 Slide Gate w/ Operator	1 ls		180		8,601	3,000.00	3,000					120,000.00	120,000	131,601	200,292
				43 Process Equipment	1 ls		15,872		543,730	35,700.12	35,700			35,653.08	35,653	4,641,685.93	4,641,686	5,256,769	8,016,254
				2A Pretreatment - Retrofit North w/ Plate Settlers	1 ls		39,401		1,461,626	1,015,362.76	1,015,363	433,518.00	433,518	95,495.46	95,495	4,641,685.93	4,641,686	7,647,688	11,709,068
			2B	Pretreatment - Retrofit North w/ Ballasted Flocculation															
			00	Building & Structure Construction															
			03.03	Columns															
				Form Rectangle Columns 12' h	960 sf	0.165 mh / sf	158	39.49 /mh	6,255	1.60	1,532							7,787	12,226
				Chamfer	720 lf	0.015 mh / lf	11	39.49 /mh	427	0.57	408							835	1,295
				Strip & Oil Column Form	960 sf	0.005 mh / sf	5	39.17 /mh	188	0.03	29							217	341
				Superplasticizers @ Columns	12 cy			/cy		8.40	101							101	153
				Column Rebar (120 #/cy)	1 tn	20.004 mh / tn	14	43.53 /mh	627	997.70	718							1,345	2,082
				Finish- Float	27 sf	0.017 mh / sf	0	39.17 /mh	18									18	28
				Pump Place Columns 15 ea	12 cy	1.600 mh / cy	19	41.39 /mh	795					7.50	90			885	1,401
				4000 psi Concrete	12 cy			/cy		142.00	1,704							1,704	2,586
				Grind/Patch Columns	960 sf	0.013 mh / sf	12	39.17 /mh	489	0.03	29							518	817
				Rub Columns	960 sf	0.065 mh / sf	62	39.17 /mh	2,444	0.06	58							2,502	3,956
				Liquid Curing Compounds	960 sf	0.003 mh / sf	3	39.17 /mh	113	0.06	56							169	264
				03.03 Columns			286		11,355		4,636				90			16,080	25,150
			03.07	Suspended Beams															
				Beam Side Forms	1,780 sf	0.210 mh / sf	374	39.49 /mh	14,764	2.21	3,926							18,689	29,325
				Beam Bottom Forms	592 sf	0.210 mh / sf	124	39.49 /mh	4,910	2.21	1,306							6,216	9,753
				Chamfer	890 lf	0.015 mh / lf	13	39.49 /mh	527	0.57	505							1,032	1,601
				Strip & Oil Beam Forms	2,372 sf	0.005 mh / sf	12	39.17 /mh	465	0.03	71							536	843
				Superplasticizers @ Beams	44 cy			/cy		8.40	370							370	561
				Rebar- Beams (250 #/cy)	6 tn	15.003 mh / tn	83	43.53 /mh	3,592	997.70	5,487							9,079	14,013
				Finish- Top of Beam	592 sf	0.008 mh / sf	5	39.17 /mh	186									186	294
				Pump Place Beams @ Roof	44 cy	2.001 mh / cy	88	41.39 /mh	3,644					14.42	635			4,279	6,777
				4000 psi Concrete	44 cy			/cy		142.00	6,248							6,248	9,483
				Grind/Patch Beams	2,372 sf	0.013 mh / sf	31	39.17 /mh	1,208	0.03	71							1,279	2,020
				Rub Beams	2,372 sf	0.085 mh / sf	202	39.17 /mh	7,897	0.06	142							8,039	12,714
				Liquid Curing Compounds	2,372 sf	0.002 mh / sf	5	39.17 /mh	186	0.06	140							325	506

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			05.01	Misc Metals																
				Aluminum Handrail @ Stairs	56 lf	0.234 mh / lf	13	42.08 /mh	552	44.11	2,470	-	-	-	-	-	-	3,022	4,622	
				Alum Grate Cover .75" @ 4'x4' Sump	1 ea	0.600 mh / ea	1	42.08 /mh	25	185.04	185	-	-	-	-	-	-	210	321	
				Aluminum Roof Hatch 6.33' x 6.33'	1 ea	8.002 mh / ea	8	39.18 /mh	313	5,001.00	5,001	-	-	-	-	-	-	5,314	8,086	
				05.01 Misc Metals	1 ls		57		2,373	19,284.90	19,285							21,658	33,025	
			06.00	Wood																
				Misc Nailers & Blocking	3,623 sf	0.010 mh / sf	36	39.67 /mh	1,438	0.40	1,454	-	-	-	-	-	-	2,892	4,482	
				06.00 Wood	1 ls		36		1,438	1,454.02	1,454							2,892	4,482	
			07.01	Roofing																
				Membrane Roofing- 60 mil EPDM Mechanically Attached w/ 3" Insulation	3,623 sf			/sf				3.00	10,871					10,871	16,499	
				Aluminum Downspouts, 6 ea x 20' each	120 vf			/vf				18.00	2,160					2,160	3,279	
				Aluminum Coping @ Roof Parapet 20" wide	272 lf			/lf				25.01	6,801					6,801	10,323	
				Roof Hatch 4'0" x 4'0"	1 ea			/ea				2,500.50	2,501					2,501	3,795	
				Translucent Panel Skylight Frame & Panels 7' x 7', 4 ea	196 sf			/sf				38.01	7,449					7,449	11,306	
				07.01 Roofing	1 sf							29,782.95	29,783					29,783	45,202	
			08.00	Doors, Frames & Hardware																
				HM Single Frames- 16 ga 3'x7'	2 ea	1.000 mh / ea	2	39.18 /mh	78	180.03	360	-	-	-	-	-	-	438	670	
				HM Door Leafs- 3'x7' 20 ga. half glass	2 ea	1.500 ea / mh	1	39.18 /mh	52	450.09	900	-	-	-	-	-	-	952	1,449	
				Overhead Doors- 10'x10' 24 ga steel manual 1" insulation 26 ga back-up panel	1 ea			-	-	-	-	2,255.00	2,255	-	-	-	-	2,255	3,422	
				Finish Hardware by Leaf- Allowance	2 ea	8.002 mh / ea	16	39.18 /mh	627	900.18	1,800	-	-	-	-	-	-	2,427	3,725	
				08.00 Doors, Frames & Hardware	1 ea		19		758	3,060.60	3,061	2,255.00	2,255					6,073	9,267	
			09.00	Finishes																
				Paint HM Door Frames - primer (2) coats	2 ea			/ea				100.02	200					200	304	
				Paint HM Doors - primer (2) coats	2 ea			/ea				140.03	280					280	425	
				Paint CMU Block - block filler & (2) coat	5,316 sf			-	-	-	-	1.35	7,177					7,177	10,892	
				Misc Architectural Finishes	1 ls			-	-	-	-	2,000.00	2,000					2,000	3,035	
				Paint 8" Pipe	214 lf	0.140 mh / lf	30	27.53 /mh	825	0.92	198	-	-	4.24	907			1,930	3,049	
				Paint 10" Pipe	295 lf	0.140 mh / lf	41	27.53 /mh	1,137	1.15	340	-	-	5.65	1,667			3,145	4,970	
				09.00 Finishes	1 ls		71		1,962	537.94	538	9,656.69	9,657	2,574.44	2,574			14,731	22,675	
			10.00	Specialty Items																
				Signs - Building ID	1 ea			/ea				3,000.60	3,001					3,001	4,554	
				Signs - Doors	2 ea			/ea				30.01	60					60	91	
				Fire Extinguisher CO2 10 lbs	2 ea			/ea				225.05	450					450	683	
				10.00 Specialty Items	1 ls							3,510.70	3,511					3,511	5,328	
			22.00	Plumbing																
				Plumbing Subcontract	3,623 sf			/sf				6.00	21,742					21,742	32,999	
				22.00 Plumbing	1 ls							21,742.34	21,742					21,742	32,999	
			23.00	HVAC																
				Ventilation & Unit Heater System	3,623 sf			/sf				25.01	90,593					90,593	137,495	
				23.00 HVAC	1 sf							90,593.08	90,593					90,593	137,495	
			31.20	Structure Stone Base																
				Structure Subbase Stone-Loaders/Truck - 1,310 sf x 4"	20 cy	0.003 cd / cy	2	1,609.56 /cd	98	28.28	566	-	-	10.02	200			863	1,332	
				31.20 Structure Stone Base	2		2		98		566				200			863	1,332	
			32.00	Site Improvements																
				Asphalt Pavement, 10" Subgrade, 9" Base, 1-1/2" Topping @ Access Drive	236 sy			-	-	-	-	21.80	5,145					5,145	7,808	
				Misc Site Improvement ALLOWANCE	1 ls			/ls				10,000.00	10,000					10,000	15,177	
				32.00 Site Improvements	1 ls							15,144.80	15,145					15,145	22,986	
				00 Building & Structure Construction	3,623 gsf		1,474		58,135	21.17	76,700	96.09	348,123	1.29	4,655			487,612	744,179	
			02	Modify Existing Structure & Services																
			02.01	Demolition Work																
				Non-Hazardous Waste Transport and Disposal.	1 ls			-	-	-	-	2,000.00	2,000					2,000	3,035	
				Misc Demolition	1 ls	8.000 ch / ls	16	84.95 /ch	680	-	-	-	-	26.86	27			706	1,118	
				Demo All Piping & Equipment From North Plant Basins	1 ls	16.000 ch / ls	64	167.66 /ch	2,683	-	-	-	-	103.03	103			2,786	4,410	
				Demo Electrical System @ Basins	1 ls			/ls				2,000.00	2,000					2,000	3,035	
				Pressure Wash Basin Walls	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069	-	-	0.52	16,500			38,767	60,783	
				Pressure Washing Basin Slab	10,000 sf	200.000 sf / ch	100	53.11 /ch	2,656	0.35	3,500	-	-	0.39	3,913			10,069	15,743	
				02.01 Demolition Work	1 ls		602		17,215	14,569.10	14,569	4,000.00	4,000	20,543.23	20,543			56,328	88,125	
			03.04	Walls																
				Keyway 6"	2,200 lf	0.050 mh / lf	110	39.49 /mh	4,345	0.67	1,479	-	-	-	-	-	-	5,823	9,120	
				Vertical Wall Keyway 6"	524 lf	0.110 mh / lf	58	39.49 /mh	2,277	0.67	352	-	-	-	-	-	-	2,629	4,138	
				Panel Form System 4-8'	2,427 sf	0.130 mh / sf	316	39.49 /mh	12,459	1.84	4,460	-	-	-	-	-	-	16,918	26,487	
				Panel Form System > 16' h	33,825 sf	0.190 mh / sf	6,428	39.49 /mh	253,830	1.84	62,166	-	-	-	-	-	-	315,996	496,091	
				Waterstop 6" Flat	2,724 lf	0.110 mh / lf	300	39.18 /mh	11,741	2.10	5,722	-	-	-	-	-	-	17,462	27,266	
				Strip & Oil Forms	36,252 sf	0.005 mh / sf	181	39.17 /mh	7,101	0.03	1,088	-	-	-	-	-	-	8,189	12,889	
				Superplasticizers @ Walls	1,675 cy			/cy		8.40	14,072	-	-	-	-	-	-	14,072	21,357	
				Rebar- Walls (125 #/cy)	105 tn	15.003 mh / tn	1,575	43.53 /mh	68,569	997.70	104,759	-	-	-	-	-	-	173,327	267,518	
				Finish- Top of Wall	2,173 sf	0.008 mh / sf	17	39.17 /mh	681	-	-	-	-	-	-	-	-	681	1,078	
				Pump Place Walls 12"	110 cy	1.150 mh / cy	127	41.39 /mh	5,237	-	-	-	-	6.65	731			5,968	9,452	
				Pump Place Walls 24"	766 cy	1.150 mh / cy	881	41.39 /mh	36,467	-	-	-	-	6.65	5,094			41,560	65,823	
				Pump Place Walls 30"	85 cy	1.150 mh / cy	98	41.39 /mh	4,047	-	-	-	-	6.65	565			4,612	7,304	
				Pump Place Walls 36"	714 cy	1.150 mh / cy	821	41.39 /mh	33,991	-	-	-	-	6.65	4,748			38,739	61,355	
				4000 psi Concrete	1,675 cy			/cy		142.00	237,850	-	-	-	-	-	-	237,850	360,989	
				Grind/Patch Walls	36,252 sf	0.013 mh / sf														

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			03.05	Slab On Grade															
				Gravel Fill Under Slab 4"	39 cy	0.004 cd / cy	5	1,412.15 /cd	209	29.26	1,141	-	-	3.84	150	-	-	1,499	2,300
				03.05 Slab On Grade	49 cy		290		11,693	248.07	12,155			8.76	429			24,278	37,639
			03.06	Suspended Flat Slab															
				Form Suspended Slab Bottom	2,016 sf	0.220 mh / sf	444	39.49 /mh	17,514	2.18	4,404	-	-	-	-	-	-	21,918	34,403
				Slab Edge Form 8" x 12"	435 sf	0.250 mh / sf	109	39.49 /mh	4,295	5.17	2,249	-	-	-	-	-	-	6,545	10,212
				Strip & Oil Suspended Slab Forms	2,451 sf	0.005 mh / sf	12	39.17 /mh	480	0.04	101	-	-	-	-	-	-	581	912
				Superplasticizers	67 cy	-	-	-	-	8.40	563	-	-	-	-	-	-	563	854
				Rebar- Suspended Slab (225 #/cy)	8 tn	20.004 mh / tn	151	43.53 /mh	6,556	997.70	7,513	-	-	-	-	-	-	14,069	21,779
				Finish- Hard Trowel	2,016 sf	0.035 mh / sf	71	39.17 /mh	2,764	-	-	-	-	-	-	-	-	2,764	4,374
				Pump Place Suspended Slab	67 cy	2.160 mh / cy	145	41.39 /mh	5,990	-	-	-	-	6.65	446	-	-	6,436	10,190
				4000 psi Concrete	67 cy	-	-	-	-	142.00	9,514	-	-	-	-	-	-	9,514	14,440
				Liquid Curing Compounds	4,467 sf	0.003 mh / sf	13	39.17 /mh	525	0.68	3,049	-	-	-	-	-	-	3,574	5,459
				03.06 Suspended Flat Slab	67 cy		944		38,124	408.85	27,393			6.65	446			65,962	102,623
			03.08	Pads & Curbs															
				Pad Form	68 sf	0.120 mh / sf	8	39.49 /mh	322	1.37	93	-	-	-	-	-	-	415	651
				Chamfer	136 lf	0.015 mh / lf	2	39.49 /mh	81	0.57	77	-	-	-	-	-	-	158	245
				Strip & Oil Equipment Pad Forms	68 sf	0.005 mh / sf	0	39.17 /mh	13	0.03	2	-	-	-	-	-	-	15	24
				Rebar- Pads (100 #/cy)	0 tn	18.003 mh / tn	2	43.53 /mh	78	997.70	100	-	-	-	-	-	-	178	275
				Finish- Float	120 sf	0.017 mh / sf	2	39.17 /mh	80	-	-	-	-	-	-	-	-	80	126
				Pump Place Pads	2 cy	1.601 mh / cy	3	41.39 /mh	132	-	-	-	-	7.49	15	-	-	147	234
				4000 psi Concrete	2 cy	-	-	-	-	142.00	284	-	-	-	-	-	-	284	431
				Liquid Curing Compounds	187 sf	0.003 mh / sf	1	39.17 /mh	22	0.06	11	-	-	-	-	-	-	33	52
				03.08 Pads & Curbs	2 cy		18		729	283.39	567			7.49	15			1,311	2,038
			03.11	Topping Slab															
				Mesh Support (.12/sf)	1,199 ea	0.002 mh / ea	2	43.53 /mh	104	0.26	315	-	-	-	-	-	-	419	643
				WWM 4X4- W 2.9 Flats	9,994 sf	0.014 mh / sf	140	43.53 /mh	6,090	0.50	5,011	-	-	-	-	-	-	11,101	17,244
				Finish- Hard Trowel	9,994 sf	0.015 mh / sf	150	39.17 /mh	5,873	-	-	-	-	-	-	-	-	5,873	9,295
				Pump Place Topping Slab	555 cy	0.750 mh / cy	416	28.06 /mh	11,681	-	-	-	-	6.65	3,692	-	-	15,373	24,364
				4000 psi Concrete	555 cy	-	-	-	-	142.00	78,810	-	-	-	-	-	-	78,810	119,611
				Liquid Curing Compounds	9,994 sf	0.002 mh / sf	20	39.17 /mh	783	0.06	588	-	-	-	-	-	-	1,371	2,131
				Seal Floors	9,994 sf	0.002 mh / sf	20	39.17 /mh	783	0.09	924	-	-	-	-	-	-	1,707	2,641
				03.11 Topping Slab	555 cy		748		25,314	154.32	85,647			6.65	3,692			114,653	175,929
			03.30	Patch Cracks and Resurface Concrete															
				Patch Cracks & Resurface Walls	2,120 sf	10.000 sf / ch	424	53.11 /ch	11,259	0.11	231	-	-	-	-	-	-	11,490	18,171
				Patch Cracks & Resurface Slab	848 sf	6.764 sf / ch	251	53.11 /ch	6,659	0.07	63	-	-	-	-	-	-	6,721	10,634
				Pressure Wash Basin Walls	2,120 sf	33.333 sf / ch	127	53.11 /ch	3,378	0.35	742	-	-	2.37	5,028	-	-	9,147	14,474
				Pressure Washing Basin Slab	848 sf	16.667 sf / ch	102	53.11 /ch	2,702	0.35	297	-	-	4.70	3,982	-	-	6,981	11,065
				03.30 Patch Cracks and Resurface Concrete	2,968 sf		904		23,998	0.45	1,332			3.04	9,010			34,340	54,343
			05.01	Misc Metals															
				Floor Grating Structural Support (4 #/sf)	6 tn	8.002 ch / tn	228	214.54 /ch	9,785	1,200.24	6,841	-	-	829.17	4,726	-	-	21,353	33,392
				Aluminum 2 Line Rail @ Basin Walkways	366 lf	0.200 mh / lf	73	38.76 /mh	2,837	32.20	11,785	-	-	-	-	-	-	14,622	22,377
				Replace Alum Handrail @ Existing Influent Channel	106 lf	0.200 mh / lf	21	38.76 /mh	822	32.20	3,413	-	-	-	-	-	-	4,235	6,481
				Replace Alum Platform Grating 1"	2,837 sf	0.035 mh / sf	99	42.08 /mh	4,179	12.39	35,157	-	-	-	-	-	-	39,337	59,974
				05.01 Misc Metals	1 ls		422		17,623	57,197.21	57,197			4,726.25	4,726			79,547	122,223
			31.12	Structure Backfill															
				Engineered Fill 22.5' @ Coagulation Basins, 2ea	335 cy	0.003 cd / cy	32	1,327.72 /cd	1,334	12.00	4,020	-	-	4.69	1,570	-	-	6,924	10,712
				Engineered Fill 19' @ Flocculation Basins, 2 ea	3,652 cy	0.003 cd / cy	351	1,327.72 /cd	14,547	12.00	43,824	-	-	4.69	17,116	-	-	75,486	116,775
				Engineered Fill 19' @ Sedimentation Basin, 1 ea	6,516 cy	0.003 cd / cy	626	1,327.72 /cd	25,954	12.00	78,192	-	-	4.69	30,539	-	-	134,685	208,354
				31.12 Structure Backfill	10,503 cy		1,008		41,835	12.00	126,036			4.69	49,224			217,096	335,841
				02 Modify Existing Structure & Services	1 ls		18,498		721,101	762,364.84	762,365	4,000.00	4,000	99,224.01	99,224			1,586,689	2,462,337
			26	Electrical & Instrumentation															
			26.01	Above Ground Electrical															
				Electrical Work For Equipment	1 ls	-	-	/ls	-	-	-	200,000.00	200,000	-	-	-	-	200,000	303,543
				26.01 Above Ground Electrical	1 ls							200,000.00	200,000					200,000	303,543
			26.02	Instrumentation & Controls															
				Controls & Instrumentation Work For New Equipment	1 ls	-	-	/ls	-	-	-	84,000.00	84,000	-	-	-	-	84,000	127,488
				26.02 Instrumentation & Controls	1 ls							84,000.00	84,000					84,000	127,488
				26 Electrical & Instrumentation	1 ls							284,000.00	284,000					284,000	431,031
			40	Process Piping															
			40.00	Under Ground Process Piping															
				Trench Excav & Lay Pipe 8-10"	152 lf	405.000 lf / cd	21	2,270.14 /cd	852	-	-	-	-	2.79	424	-	-	1,276	2,024
				Stone Pipe Bedding	23 cy	200.000 cy / cd	8	2,896.43 /cd	333	23.29	536	-	-	-	-	-	-	869	1,340
				DI Pipe Push - Class 52 6	0 lf	0.220 mh / lf	0	24.05 /mh	0	23.00	0	-	-	-	-	-	-	0	0
				DI Pipe Push - Class 52 8	0 lf	0.250 mh / lf	0	51.34 /mh	0	32.00	0	-	-	-	-	-	-	0	1
				DI Pipe Push - Class 52 12	0 lf	0.310 mh / lf	0	51.34 /mh	0	52.00	1	-	-	-	-	-	-	1	1
				DI Pipe Push - Class 52 30	0 lf	0.440 mh / lf	0	51.34 /mh	0	167.00	2	-	-	-	-	-	-	2	3
				DI Pipe Push - Class 52 36	0 lf	0.500 mh / lf	0	51.34 /mh	0	225.00	2	-	-	-	-	-	-	3	4
				DI Pipe Push - Class 52 42	0 lf	0.570 mh / lf	0	51.34 /mh	0	291.00	3	-	-	-	-	-	-	3	5
				DI Pipe Push - Class 52 48	45 lf	0.640 mh / lf	29	51.34 /mh	1,479	365.30	16,439	-	-	-	-	-	-	17,917	27,289
				DI Pipe Push - Class 52 60	82 lf	0.800 mh / lf	66	51											

Table with columns: WBS Lvl 1, WBS Lvl 2, WBS Lvl 3, WBS Lvl 4, Description, Takeoff Quantity, Labor Productivity, Man Hours, Labor Price, Labor Amount, Material Cost/Unit, Material Amount, Subcontract Cost/Unit, Subcontract Amount, Const Equip Cost/Unit, Const Equip Amount, Process Equip Cost/Unit, Process Equip Amount, Total Amount, Grand Total. Rows include categories like Above Ground Process Piping, Valves, Meters, Etc., Hydropneumatic Piping System, Process Equipment, Pumps, Flocculators & Mixers, Settlement Equipment, Chemical System Equipment, Slide Gate w/ Operator, Foundation Mat, and Columns.

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
				03.03 Columns	27 cy		586		23,313	377.42	10,190			7.50	202			33,706	52,686
			03.04	Walls															
				Keyway 6"	3,254 lf	0.050 mh / lf	163	39.49 /mh	6,426	0.67	2,187	-	-	-	-	-	-	8,613	13,490
				Vertical Wall Keyway 6"	795 lf	0.110 mh / lf	87	39.49 /mh	3,454	0.67	534	-	-	-	-	-	-	3,988	6,277
				Panel Form System 8-12'	4,871 sf	0.150 mh / sf	731	39.49 /mh	28,852	1.84	8,950	-	-	-	-	-	-	37,802	59,249
				Panel Form System 12-16'	8,948 sf	0.170 mh / sf	1,521	39.49 /mh	60,068	1.84	16,442	-	-	-	-	-	-	76,510	120,024
				Panel Form System > 16' h	49,674 sf	0.190 mh / sf	9,440	39.49 /mh	372,765	1.84	91,294	-	-	-	-	-	-	464,059	728,539
				Waterstop 6" Flat	4,049 lf	0.110 mh / lf	445	39.18 /mh	17,452	2.10	8,505	-	-	-	-	-	-	25,956	40,529
				Strip & Oil Wall Forms	63,493 sf	0.005 mh / sf	318	39.17 /mh	12,436	0.03	1,905	-	-	-	-	-	-	14,342	22,575
				Superplasticizers @ Walls	1,609 cy			/cy		8.40	13,517	-	-	-	-	-	-	13,517	20,515
				Rebar- Walls (125 #/cy)	101 tn	15.003 mh / tn	1,515	43.53 /mh	65,957	997.70	100,768	-	-	-	-	-	-	166,724	257,327
				Finish- Top of Wall	4,571 sf	0.008 mh / sf	37	39.17 /mh	1,433	-	-	-	-	-	-	-	-	1,433	2,267
				Pump Place Walls 12", 18" & 20"	1,609 cy	1.150 mh / cy	1,851	41.39 /mh	76,599	-	-	-	-	-	6.65	10,699	-	87,298	138,263
				4000 psi Concrete	1,609 cy			/cy		142.00	228,478	-	-	-	-	-	-	228,478	346,765
				Grind/Patch Walls	63,493 sf	0.013 mh / sf	826	39.17 /mh	32,335	0.03	1,905	-	-	-	-	-	-	34,240	54,069
				Rub Walls	53,253 sf	0.058 mh / sf	3,089	39.17 /mh	120,974	0.06	3,195	-	-	-	-	-	-	124,169	196,317
				Liquid Curing Compounds	65,983 sf	0.002 mh / sf	132	39.17 /mh	5,170	0.06	3,881	-	-	-	-	-	-	9,050	14,072
				03.04 Walls	1,609 cy		20,154		803,920	299.29	481,562			6.65	10,699			1,296,181	2,020,278
			03.05	Slab On Grade															
				Slab Edge Form 8"	361 sf	0.240 mh / sf	87	39.49 /mh	3,421	1.22	440	-	-	-	-	-	-	3,861	6,082
				Slab Edge Form 18"	579 sf	0.340 mh / sf	197	39.49 /mh	7,774	1.52	882	-	-	-	-	-	-	8,655	13,641
				Strip & Oil Forms	940 sf	0.005 mh / sf	5	39.17 /mh	184	0.04	39	-	-	-	-	-	-	223	350
				Rebar- SOG (125 #/cy)	8 tn	14.003 mh / tn	107	43.53 /mh	4,650	997.70	7,612	-	-	-	-	-	-	12,263	18,914
				Mesh Support - bricks (.12/sf)	335 ea	0.002 mh / ea	1	43.53 /mh	29	0.26	88	-	-	-	-	-	-	117	180
				Finish- Hard Trowel	2,791 sf	0.025 mh / sf	70	39.17 /mh	2,733	-	-	-	-	-	-	-	-	2,733	4,325
				Pump Place Slab on Grade 8"	27 cy	0.500 mh / cy	14	41.39 /mh	559	-	-	-	-	-	3.67	99	-	658	1,042
				Pump Place Slab on Grade 18"	95 cy	0.500 mh / cy	48	41.39 /mh	1,966	-	-	-	-	-	3.67	349	-	2,315	3,667
				4000 psi Concrete	122 cy			/cy		142.00	17,324	-	-	-	-	-	-	17,324	26,293
				Saw Cut S-O-G (.08/sf)	223 lf	0.030 mh / lf	7	39.17 /mh	262	0.17	38	-	-	-	0.95	212	-	512	810
				Liquid Curing Compounds	3,731 sf	0.002 mh / sf	7	39.17 /mh	292	0.06	219	-	-	-	-	-	-	512	796
				Seal Floors	2,791 sf	0.002 mh / sf	6	39.17 /mh	219	0.09	258	-	-	-	-	-	-	477	738
				6 Mil. Vapor Barrier	7,000 sf	0.002 mh / sf	14	43.53 /mh	610	0.05	368	-	-	-	-	-	-	977	1,523
				Gravel Fill Under Slab 4"	34 cy	0.004 cd / cy	4	1,412.15 /cd	182	29.26	995	-	-	-	3.84	130	-	1,307	2,005
				03.05 Slab On Grade	122 cy		564		22,881	231.65	28,262			6.48	791			51,934	80,366
			03.06	Suspended Flat Slab															
				Form Suspended Slab Bottom	8,903 sf	0.220 mh / sf	1,959	39.49 /mh	77,344	2.18	19,448	-	-	-	-	-	-	96,792	151,929
				Slab Edge Form 8" & 12"	3,060 sf	0.250 mh / sf	765	39.49 /mh	30,214	5.17	15,823	-	-	-	-	-	-	46,038	71,836
				Strip & Oil Suspended Slab Forms	11,963 sf	0.005 mh / sf	60	39.17 /mh	2,343	0.04	491	-	-	-	-	-	-	2,834	4,453
				Superplasticizers	317 cy				-	8.40	2,663	-	-	-	-	-	-	2,663	4,042
				Rebar- Suspended Slab (225 #/cy)	36 tn	20.004 mh / tn	720	43.53 /mh	31,346	997.70	35,917	-	-	-	-	-	-	67,263	104,123
				Finish- Hard Trowel	8,903 sf	0.035 mh / sf	312	39.17 /mh	12,205	-	-	-	-	-	-	-	-	12,205	19,316
				Pump Place Suspended Slab	317 cy	2.160 mh / cy	685	41.39 /mh	28,340	-	-	-	-	-	6.65	2,109	-	30,449	48,211
				4000 psi Concrete	317 cy				-	142.00	45,014	-	-	-	-	-	-	45,014	68,318
				Liquid Curing Compounds	20,866 sf	0.003 mh / sf	63	39.17 /mh	2,452	0.68	14,244	-	-	-	-	-	-	16,696	25,499
				03.06 Suspended Flat Slab	317 cy		4,563		184,244	421.45	133,600			6.65	2,109			319,953	497,729
			05.01	Misc Metals															
				Aluminum 2 Line Rail @ Basin Walkways	3,000 lf	0.200 mh / lf	600	38.76 /mh	23,255	32.20	96,600	-	-	-	-	-	-	119,855	183,417
				Alum Hatch Cover & Frame 2.5'x2.5' @ Sludge Valve Vault	8 ea	2.000 mh / ea	16	39.18 /mh	627	900.00	7,200	-	-	-	-	-	-	7,827	11,920
				05.01 Misc Metals	1 ls		616		23,881	103,800.00	103,800							127,681	195,336
			31.01	Dewatering															
				Dewatering @ Building Excavation	1 ea	960.000 ch / ea	3,840	159.35 /ch	152,974	7,500.00	7,500	-	-	33,592.77	33,593	-	-	194,067	306,961
				31.01 Dewatering	1 ls		3,840		152,974	7,500.00	7,500			33,592.77	33,593			194,067	306,961
			31.02	Piles															
				Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 410 ea (1 per 64 sf)	10,250 vf	0.002 cd / vf	1,148	2,146.97 /cd	44,022	35.16	360,354	-	-	2.58	26,448	-	-	430,824	658,681
				31.02 Piles	410 ea		1,148		44,022	878.91	360,354			64.51	26,448			430,824	658,681
			31.03	Excavation Shoring															
				Shoring System Design Engineer	1 ls				-	-	-	15,003.00	15,003	-	-	-	-	15,003	22,770
				Structure Sheeting (731' x 30' deep)	21,930 sf	0.001 cd / sf	1,081	2,465.38 /cd	41,647	16.00	350,950	-	-	0.75	16,489	-	-	409,086	624,800
				Tie Backs (1 per 80 sf of Sheeting, 731' x 22" = 16,082 sf)	201 ea				-	-	-	2,377.47	477,872	-	-	-	-	477,872	725,274
				31.03 Excavation Shoring	21,930 sf		1,081		41,647	16.00	350,950	22.48	492,875	0.75	16,489			901,962	1,372,845
			31.10	Structure Excavation															
				Exc Clay-Backhoe/Truck	27,471 cy	499.900 cy / cd	1,978	1,410.06 /cd	77,487	-	-	-	-	6.58	180,870	-	-	258,356	410,496
				31.10 Structure Excavation	27,471 cy		1,978		77,487					6.58	180,870			258,356	410,496
			31.12	Structure Backfill															
				Backfill Earth-Backhoe/Truck	3,620 cy	0.002 cd / cy	234	1,327.72 /cd	9,709	-	-	-	-	4.69	16,966	-	-	26,675	42,368
				31.12 Structure Backfill	3,620 cy		234		9,709					4.69	16,966			26,675	42,368
			31.13	Soil Disposal															
				Spoils to Waste	23,851 cy	0.003 day / cy	2,147	1,410.06 /day	84,095	-	-	-	-	8.23	196,304	-	-	280,399	445,519

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			40.00	Under Ground Process Piping															
				DI Pipe Push - Class 52 6	762 lf	0.220 mh / lf	168	24.05 /mh	4,033	22.53	17,170	-	-	-	-	-	-	21,203	32,442
				Hydrostatic Testing	762 lf	0.021 ch / lf	64	182.49 /ch	2,920	0.16	122	-	-	-	-	-	-	3,042	4,807
				Chlorination	762 lf	/lf		/lf		0.10	76	-	-	-	-	-	-	76	116
				DI 90 ell 6"	12 ea	4.830 mh / ea	58	45.62 /mh	2,644	105.30	1,264	-	-	-	-	-	-	3,908	6,103
				DI Tee 6"	8 ea	4.830 mh / ea	39	30.57 /mh	1,181	0.02	0	-	-	-	-	-	-	1,181	1,870
				DI Blind Flange 6"	1 ea	4.680 mh / ea	5	30.57 /mh	143	103.25	103	-	-	-	-	-	-	246	383
				40.00 Under Ground Process Piping	762 lf		417		14,682	25.72	19,597			1.88	1,435			35,714	55,264
			40.01	Above Ground Process Piping															
				Pipe Supports	8 ea	4.001 mh / ea	32	45.62 /mh	1,460	250.05	2,000	-	-	-	-	-	-	3,461	5,347
				Hydrostatic Testing	100 lf	0.021 ch / lf	8	182.49 /ch	383	0.16	16	-	-	-	-	-	-	399	631
				Chlorination	100 lf	/lf		/lf		0.10	10	-	-	-	-	-	-	10	15
				Wall Thimble 36" x 24" long	4 ea	3.500 ch / ea	56	182.49 /ch	2,555	1,800.00	7,200	-	-	842.80	3,371	-	-	13,126	20,336
				Mud Valves 8" w/ 20' Stem	12 ea	11.200 mh / ea	134	30.71 /mh	4,127	4,000.00	48,000	-	-	-	-	-	-	52,127	79,382
				Gasket/Nuts/Bolt Kit 24"	8 ea	1.000 mh / ea	8	32.89 /mh	263	129.45	1,036	-	-	-	-	-	-	1,299	1,988
				Gasket/Nuts/Bolt Kit 36"	12 ea	2.600 mh / ea	31	45.62 /mh	1,423	175.04	2,100	-	-	-	-	-	-	3,524	5,441
				DI Flanged Joint Pipe 24"	100 lf	2.670 mh / lf	267	30.57 /mh	8,161	267.83	26,783	-	-	-	-	-	-	34,945	53,567
				DI Flanged Tee 36"	4 ea	20.520 mh / ea	82	30.57 /mh	2,509	-	-	-	-	-	-	-	-	2,509	3,971
				DI Flanged Con Red 36x24"	8 ea	20.520 mh / ea	164	30.57 /mh	5,018	4,519.20	36,154	-	-	-	-	-	-	41,171	62,813
				Piping & Accessories- ALLOWANCE	100 LF	0.240 mh / LF	24	45.62 /mh	1,095	55.01	5,501	-	-	-	-	-	-	6,596	10,082
				40.01 Above Ground Process Piping	100 lf		807		26,995	1,288.01	128,801			33.71	3,371			159,167	243,573
			40.02	Valves, Meters, Etc.															
				Backflow Preventer Flg 6"	0 ea	12.170 mh / ea	0	45.62 /mh	6	5,000.00	50	-	-	-	-	-	-	56	85
				Magnetic Flow Meter - Inline - 30" w/ transmitter	0 ea	30.000 mh / ea	0	48.85 /mh	15	15,000.00	150	-	-	-	-	-	-	165	251
				Swing Check Valve 6"	0 ea	4.669 mh / ea	0	45.62 /mh	2	1,100.00	11	-	-	-	-	-	-	13	20
				Swing Check Valve 18"	0 ea	13.713 mh / ea	0	30.71 /mh	4	10,800.00	108	-	-	-	-	-	-	112	171
				6" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	0 ea	6.200 mh / ea	0	30.57 /mh	2	2,850.00	29	-	-	-	-	-	-	30	46
				24" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	0 ea	19.204 mh / ea	0	45.62 /mh	9	12,502.00	125	-	-	-	-	-	-	134	204
				36" Butterfly Valve, 75 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	0 ea	28.800 mh / ea	0	30.57 /mh	9	19,781.00	198	-	-	-	-	-	-	207	314
				42" Butterfly Valve, 75 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	0 ea	33.600 mh / ea	0	30.57 /mh	10	23,078.00	231	-	-	-	-	-	-	241	366
				40.02 Valves, Meters, Etc.	0 ls		1		56	90,111.00	901							957	1,457
			40.04	Hydropneumatic Piping System															
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh				65,000.00	65,000	-	-	-	-	65,000	98,652
				40.04 Hydropneumatic Piping System	0 ls							65,000.00	65,000					65,000	98,652
				40 Process Piping	862 lf		1,226		41,733	173.20	149,299	75.41	65,000	5.58	4,807			260,839	398,946
43				Process Equipment															
			43.01	Flocculators & Mixers															
				Freight On Mixers & Flocculators To Jobsite	36 ea	/ea		/ea						1,500.00			54,000	54,000	81,957
				Equipment Unloading	36 ea	4.000 ch / ea	792	182.62 /ch	26,298	500.00	18,000	-	-	381.61	13,738	-	-	58,036	90,805
				Equipment Rigging / Rough Set	36 ea	6.000 ch / ea	1,296	195.85 /ch	42,303	500.00	18,000	-	-	401.59	14,457	-	-	74,760	117,281
				Variable Frequency Drives (Included)	36 ea	/ea		/ea											
				Rapid Mixer w/7.33' Shaft & Dual 2.33' Blades, 2 HP	4 ea	45.000 mh / ea	180	42.40 /mh	7,631	100.02	400	-	-	-	13,700.00	-	54,800	62,831	95,856
				Flocculator w/19' Shaft & 9' Blades, 3 HP	24 ea	60.000 mh / ea	1,440	42.40 /mh	61,049	100.00	2,400	-	-	-	30,000.00	-	720,000	783,449	1,193,021
				PAC Mixer w/19' Shaft & Dual 3.5' Blades 5 hp	8 ea	60.000 mh / ea	480	42.40 /mh	20,350	100.00	800	-	-	10,000.00	-	80,000	101,150	154,839	
				43.01 Flocculators & Mixers	1 ls		4,188		157,630	39,600.08	39,600			28,195.34	28,195	908,800.00	908,800	1,134,225	1,733,758
			43.02	Settlement Equipment															
				Freight On Sedimentation System To Jobsite	6 ea	/ea		/ea											
				Verified Performance Test (2 days per System x 6 ea)	12 day	8.000 ch / day	96	29.43 /ch	2,826	-	-	-	-	1,500.00	-	18,000	20,826	31,791	
				Vendor Verified Performance Test	6 ea	/ea		/ea						1,500.00	-	9,000	9,000	13,659	
				Vendor Witnessed, Verified Performance Test	6 ea	/ea		/ea						1,500.00	-	9,000	9,000	13,659	
				Equipment Unloading	6 ea	16.000 ch / ea	528	182.62 /ch	17,532	500.00	3,000	-	-	381.61	2,290	-	-	22,822	35,945
				Equipment Rigging / Rough Set	6 ea	96.000 ch / ea	3,456	195.85 /ch	112,807	500.00	3,000	-	-	401.59	2,410	-	-	118,216	186,929
				Equipment - Final Setting	6 ea	360.000 ch / ea	6,480	103.33 /ch	223,202	50.00	300	-	-	346.16	2,077	-	-	225,579	357,027
				Inclined Plate Settlers w/ Flow Control Deck 55' x 86' x 8.2'	6 ea	/ea		/ea						474,375.00	-	2,846,250	2,846,250	4,319,798	
				43.02 Settlement Equipment	1 ls		10,560		356,367	6,300.00	6,300			6,776.18	6,776	2,882,250.00	2,882,250	3,251,693	4,958,809
			43.03	Baffle Walls															
				Flow Control Diffuser Wall SS 304/304L SS 20' h, 12 ea, 10,560 sf	528 lf	6.000 mh / lf	3,168	30.57 /mh	96,836	-	-	-	-	28.00	14,784	719.70	380,000	491,620	753,524
				43.03 Baffle Walls	1 sf		3,168		96,836					14,784.00	14,784	380,000.00	380,000	491,620	753,524
			43.20	Slide Gate w/ Operator															
				Sluice Gates 60" x 60"	4 ea	44.800 mh / ea	179	30.71 /mh	5,503	27,500.00	110,000	-	-	-	-	-	-	115,503	175,658
				43.20 Slide Gate w/ Operator	1 ls		179		5,503	110,000.00	110,000							115,503	175,658
				43 Process Equipment	1 ls		18,095		616,335	155,900.08	155,900			49,755.52	49,756	4,171,050.00	4,171,050	4,993,041	7,621,750
				2C Pretreatment - Construct New Facility	1 ls		61,595		2,350,886	2,172,079.51	2,172,080	978,393.35	978,393	551,167.39	551,167	4,171,050.00	4,171,050	10,223,576	15,709,965
				02 Pretreatment	1 ls		136,318		5,123,300	4,526,502.63	4,526,503	2,102,725.48	2,102,725	773,916.45	773,916	15,132,807.79	15,132,808	27,659,252	42,369,907

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
03				Filtration															
	3A			Filtration - Rehab Existing															
		47.1		Water Plant Process Rehab @ Filters 21 thru 28															
			02.01	Demolition Work															
				Non-Hazardous Waste Transport and Disposal.	520 ton	-	-	-	-	-	-	50.00	26,000	-	-	-	-	26,000	39,461
				Pressure Washing Basin Walls @ Basins 22, 25 & 26	5,573 sf	150.000 sf / ch	74	53.11 /ch	1,973	0.35	1,951	-	-	0.52	2,908	-	-	6,831	10,711
				Pressure Washing Basin Slab @ Basins 22, 25 & 26	3,108 sf	200.000 sf / ch	31	53.11 /ch	825	0.35	1,088	-	-	0.39	1,216	-	-	3,129	4,893
				Remove Air Header	3 ea	8.000 ch / ea	120	231.62 /ch	5,559	250.00	750	-	-	1,957.34	5,872	-	-	12,181	19,282
				Bag, Transport and Dispose Of Media	9,342 cf	65.867 cf / ch	567	163.29 /ch	23,159	0.22	2,076	-	-	4.08	38,137	-	-	63,372	100,500
				Remove Sand (3,108 sf x 24" deep), 230 cy	6,210 cf	0.033 mh / cf	202	46.32 /mh	9,349	-	-	-	-	6.12	37,985	-	-	47,334	75,250
				Remove Anthracite Media (3,108 sf x 6" deep), 58 cy	1,566 cf	0.033 mh / cf	51	46.32 /mh	2,358	-	-	-	-	6.12	9,579	-	-	11,936	18,976
				Remove Gravel Media (3,108 sf x 6" deep), 58 cy	1,566 cf	0.033 mh / cf	51	46.32 /mh	2,358	-	-	-	-	6.12	9,579	-	-	11,936	18,976
				Remove Underdrain System - Grouted Blocks @ Filters 22, 25 & 26	3,108 sf	0.180 mh / sf	559	46.32 /mh	25,915	1.09	3,396	-	-	6.12	19,011	-	-	48,321	76,426
				02.01 Demolition Work	1 ls		1,656		71,496	9,260.15	9,260	26,000.00	26,000	124,285.12	124,285			231,041	364,474
			03.30	Patch Cracks and Resurface Concrete															
				Patch Cracks & Resurface Walls @ Basins 22, 25 & 26	2,120 sf	10.000 sf / ch	424	53.11 /ch	11,259	0.11	231	-	-	-	-	-	-	11,490	18,171
				Patch Cracks & Resurface Walls @ Lower Gallery	6,831 sf	10.000 sf / ch	1,366	53.11 /ch	36,280	0.11	744	-	-	-	-	-	-	37,024	58,549
				Patch Cracks & Resurface Slab @ Basins 22, 25 % 26	848 sf	6.764 sf / ch	251	53.11 /ch	6,659	0.07	63	-	-	-	-	-	-	6,721	10,634
				03.30 Patch Cracks and Resurface Concrete	9,799 sf		2,041		54,198	0.11	1,037							55,235	87,354
			09.00	Finishes															
				Pressure Wash Basins 22, 25 & 26	6 flit	90.000 mh / flit	540	40.56 /mh	21,905	-	-	-	-	701.91	4,211	-	-	26,116	41,371
				Clean Basins 22, 25 & 26	6 flit	30.000 ch / flit	540	143.32 /ch	25,798	500.00	3,000	-	-	3,597.12	21,583	-	-	50,381	79,733
				Clean Lower Gallery Walls For Painting	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069	-	-	0.52	16,500	-	-	38,767	60,783
				Clean & Prep Pipe For Painting	1,740 lf	-	-	-	-	-	-	6.00	10,440	-	-	-	-	10,440	15,845
				Paint Lower Gallery Concrete Surfaces	6,831 sf	-	-	-	-	-	-	1.10	7,514	-	-	-	-	7,514	11,404
				Paint 4" Pipe	0 lf	0.035 mh / lf	0	27.53 /mh	0	1.00	0	-	-	4.00	0	-	-	0	0
				Paint 6" Pipe	818 lf	0.070 mh / lf	57	27.53 /mh	1,577	0.69	566	-	-	4.24	3,467	-	-	5,610	8,873
				Paint 12" Pipe	0 lf	0.120 mh / lf	0	27.53 /mh	0	1.00	0	-	-	6.00	0	-	-	0	0
				Paint 16" Pipe	227 lf	0.140 mh / lf	32	27.53 /mh	875	1.85	419	-	-	6.06	1,375	-	-	2,669	4,209
				Paint 18" Pipe	96 lf	0.200 mh / lf	19	27.53 /mh	529	2.08	199	-	-	6.06	581	-	-	1,309	2,064
				Paint 20" Pipe	0 lf	0.300 mh / lf	0	27.53 /mh	0	2.00	0	-	-	7.00	0	-	-	0	0
				Paint 24" Pipe	0 lf	0.350 mh / lf	0	27.53 /mh	0	3.00	0	-	-	7.00	0	-	-	0	0
				Paint 30" Pipe	0 lf	0.438 mh / lf	0	27.53 /mh	0	4.00	0	-	-	4.00	0	-	-	0	0
				Paint 36" Pipe	541 lf	0.525 mh / lf	284	27.53 /mh	7,820	4.15	2,247	-	-	4.95	2,676	-	-	12,743	20,046
				Paint 42" Pipe	58 lf	0.525 mh / lf	30	27.53 /mh	838	4.85	281	-	-	4.95	287	-	-	1,406	2,210
				09.00 Finishes	1 ls		1,924		70,539	17,782.62	17,783	17,954.10	17,954	50,680.35	50,680			156,956	246,540
			43.05	Filtration Equipment															
				Filter Equipment Start-Up	3 ea	150.000 ch / ea	3,150	350.77 /ch	157,845	2,500.00	7,500	-	-	-	-	-	-	165,345	261,206
				Gravity Filters - Underdrain Blocks, Sand & Anthracite - Purchase	3,108 sf	/sf	-	-	-	-	-	-	-	-	-	172.84	537,185	537,185	815,294
				Install Anthracite Media 6"	1,566 cf	0.033 mh / cf	51	46.32 /mh	2,358	-	-	-	-	6.36	9,962	-	-	12,319	19,586
				Install Gravel Media 6"	1,566 cf	0.033 mh / cf	51	46.32 /mh	2,358	-	-	-	-	6.36	9,962	-	-	12,319	19,586
				New Air Header @ Each Basin	6 ea	16.000 ch / ea	480	231.62 /ch	22,235	-	-	-	-	3,914.67	23,488	-	-	45,723	72,573
				Install Sand Media .45 - .55 mm	6,210 cf	0.033 mh / cf	202	46.32 /mh	9,349	-	-	-	-	6.36	39,504	-	-	48,853	77,668
				Install Gravity Filter Bottoms/Blocks	3,108 sf	0.180 mh / sf	559	46.32 /mh	25,915	1.09	3,396	-	-	15.66	48,667	-	-	77,978	123,624
				43.05 Filtration Equipment	1 ls		4,493		220,059	10,895.80	10,896	43,954.10	43,954	131,582.88	131,583	537,185.18	537,185	899,723	1,389,538
				47.1 Water Plant Process Rehab @ Filters 21 thru 28	1 ls		10,114		416,292	38,975.94	38,976	43,954.10	43,954	306,548.35	306,548	537,185.18	537,185	1,342,955	2,087,906
			47.2	Water Plant Process Rehab @ Filters 29 thru 32															
			02.01	Demolition Work															
				Non-Hazardous Waste Transport and Disposal.	524 ton	-	-	-	-	-	-	50.00	26,200	-	-	-	-	26,200	39,764
				Pressure Washing Basin Walls @ Basins 30, 31 & 32	5,595 sf	150.000 sf / ch	75	53.11 /ch	1,981	0.35	1,958	-	-	0.52	2,919	-	-	6,858	10,753
				Pressure Washing Basin Slab @ Basins 30, 31 & 32	3,174 sf	200.000 sf / ch	32	53.11 /ch	843	0.35	1,111	-	-	0.39	1,242	-	-	3,196	4,997
				Remove Air Header	3 ea	8.000 ch / ea	120	231.62 /ch	5,559	250.00	750	-	-	1,957.34	5,872	-	-	12,181	19,282
				Bag, Transport and Dispose Of Media	9,531 cf	65.867 cf / ch	579	163.29 /ch	23,627	0.22	2,118	-	-	4.08	38,908	-	-	64,654	102,533
				Remove Sand (3,174 sf x 24" deep), 235 cy	6,345 cf	0.033 mh / cf	206	46.32 /mh	9,552	-	-	-	-	6.12	38,810	-	-	48,363	76,886
				Remove Anthracite Media (3,174 sf x 6" deep), 59 cy	1,593 cf	0.033 mh / cf	52	46.32 /mh	2,398	-	-	-	-	6.12	9,744	-	-	12,142	19,303
				Remove Gravel Media (3,174 sf x 6" deep), 59 cy	1,593 cf	0.033 mh / cf	52	46.32 /mh	2,398	-	-	-	-	6.12	9,744	-	-	12,142	19,303
				Remove Underdrain System - Grouted Blocks @ Filters 30, 31 & 32	3,174 sf	0.180 mh / sf	571	46.32 /mh	26,465	1.09	3,468	-	-	6.12	19,414	-	-	49,348	78,048
				02.01 Demolition Work	1 ls		1,686		72,824	9,405.06	9,405	26,200.00	26,200	126,653.73	126,654			235,083	370,870
			03.30	Patch Cracks and Resurface Concrete															
				Patch Cracks & Resurface Walls @ Basins 30, 31 & 32	2,120 sf	10.000 sf / ch	424	53.11 /ch	11,259	0.11	231	-	-	-	-	-	-	11,490	18,171
				Patch Cracks & Resurface Walls @ Lower Gallery	6,831 sf	10.000 sf / ch	1,366	53.11 /ch	36,280	0.11	744	-	-	-	-	-	-	37,024	58,549
				Patch Cracks & Resurface Slab @ Basins 30, 31 & 32	848 sf	6.764 sf / ch	251	53.11 /ch	6,659	0.07	63	-	-	-	-	-	-	6,721	10,634
				03.30 Patch Cracks and Resurface Concrete	9,799 sf		2,041		54,198	0.11	1,037							55,235	87,354
			09.00	Finishes															
				Pressure Wash Basins 30, 31 & 32	6 flit	90.000 mh / flit	540	40.56 /mh	21,905	-	-	-	-	701.91	4,211	-	-	26,116	41,371
				Clean Tank	8 flit	30.000 ch / flit	720	143.32 /ch	34,397	500.00	4,000	-	-	3,597.12	28,777	-	-	67,174	106,311

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			43.05	Filtration Equipment															
				Install Sand Media .45 - .55 mm	6,345 cf	0.033 mh / cf	206	46.32 /mh	9,552					6.36	40,363			49,915	79,357
				Install Gravity Filter Bottoms/Blocks	3,174 sf	0.180 mh / sf	571	46.32 /mh	26,465	1.09	3,468			15.66	49,701			79,634	126,250
				43.05 Filtration Equipment	1 ls		4,511		220,894	10,967.91	10,968			133,818.66	133,819	548,592.59	548,593	914,273	1,411,840
				47.2 Water Plant Process Rehab @ Filters 29 thru 32	1 ls		12,015		488,047	122,999.44	122,999	44,154.10	44,154	336,673.02	336,673	548,592.59	548,593	1,540,466	2,394,559
	47.3			Water Plant Building @ Filters 21 thru 36															
			02.01	Demolition Work															
				Demo HVAC System @ Upper & Lower Levels	44,000 sf							3.00	132,000					132,000	200,338
				Demo Lighting System @ Upper & Lower Levels	44,000 sf			/sf				3.00	132,000					132,000	200,338
				02.01 Demolition Work	1 ls							264,000.00	264,000					264,000	400,677
			08.00	Doors, Frames & Hardware															
				Aluminum Frame Storefronts 10' h @ Filters 21 thru 28	8,400 sf							60.00	504,000					504,000	764,929
				Aluminum Doors & Frames Single 3'x7' full 1/2" glass panel	6 ea	8.000 mh / ea	48	25.39 /mh	1,219	1,150.00	6,900							8,119	12,401
				Finish Hardware by Leaf- Allowance	6 ea	8.002 mh / ea	48	39.18 /mh	1,881	900.18	5,401							7,282	11,174
				08.00 Doors, Frames & Hardware	6 ea		96		3,099	2,050.18	12,301	84,000.00	504,000					519,400	788,504
			09.00	Finishes															
				Paint HM Door Frames - primer (2) coats	32 ea			/ea				100.02	3,201					3,201	4,858
				Paint HM Doors - primer (2) coats	32 ea			/ea				140.03	4,481					4,481	6,801
				Paint CMU Block - block filler & (2) coat	16,800 sf							1.35	22,680					22,680	34,422
				Paint Ceilings	44,000 sf							1.00	44,000					44,000	66,779
				Minor Architectural Improvements	1 ls							10,000.00	10,000					10,000	15,177
				Paint 12" Pipe	400 lf	0.120 mh / lf	48	27.53 /mh	1,322	1.39	554				5.65	2,261		4,136	6,530
				Paint 16" Pipe	77 lf	0.140 mh / lf	11	27.53 /mh	297	1.85	142				6.06	466		905	1,428
				Paint 18" Pipe	12 lf	0.200 mh / lf	2	27.53 /mh	66	2.08	25				6.06	73		164	258
				Paint 20" Pipe	17 lf	0.300 mh / lf	5	27.53 /mh	140	2.31	39				7.07	120		300	473
				Paint 24" Pipe	960 lf	0.350 mh / lf	336	27.53 /mh	9,251	2.77	2,659				7.07	6,782		18,692	29,471
				Paint 36" Pipe	666 lf	0.525 mh / lf	350	27.53 /mh	9,627	4.15	2,767				4.95	3,294		15,678	24,678
				Paint 48" Pipe	303 lf	0.525 mh / lf	159	27.53 /mh	4,380	5.54	1,678				4.95	1,498		7,557	11,864
				09.00 Finishes	1 ls		911		25,083	7,863.94	7,864	84,361.50	84,362	14,494.42	14,494			131,803	202,739
			23.00	HVAC															
				New HVAC System	44,000 sf			/sf				20.00	880,000					880,000	1,335,590
				23.00 HVAC	44,000 sf							20.00	880,000					880,000	1,335,590
			26.01	Above Ground Electrical															
				New Lighting System	44,000 sf			/sf				12.00	528,000					528,000	801,354
				New Support For Conduit & Wiring System	44,000 sf			/sf				6.00	264,000					264,000	400,677
				26.01 Above Ground Electrical	1 ls							792,000.00	792,000					792,000	1,202,031
				47.3 Water Plant Building @ Filters 21 thru 36	1 ls		1,007		28,182	20,165.02	20,165	2,524,361.50	2,524,362	14,494.42	14,494			2,587,203	3,929,540
				3A Filtration - Rehab Existing	1 ls		23,137		932,521	182,140.40	182,140	2,612,469.70	2,612,470	657,715.79	657,716	1,085,777.77	1,085,778	5,470,625	8,412,006
3B				Filtration - Rehab Existing & Add Ozone Facility															
	47.4			Rehab North Basins #1, 2, 3, 4 & 5															
			02.01	Demolition Work															
				Non-Hazardous Waste Transport and Disposal.	2,464 ton							50.00	123,200					123,200	186,983
				Demo Top 2' Of Conc Basin Walls @ Basins 2, 3, 4 & 5 (1512 LF)	149 cy	0.500 ch / cy	149	84.95 /ch	6,329						26.86	4,003		10,332	16,387
				Demo Top 2' Of Conc Basin Columns @ Basins 2, 3, 4 & 5 (32 EA)	16 cy	1.000 ch / cy	32	84.95 /ch	1,359						26.86	430		1,789	2,835
				Demo Baffle Walls @ Basins 1,2,3, 4 & 5	505 cy	0.100 ch / cy	101	84.95 /ch	4,290						26.86	13,567		17,857	28,381
				Demo 7" Reinforced Slabs Over Basins, 547 cy	25,454 sf	0.018 ch / sf	1,375	117.52 /ch	53,842						2.00	50,908		104,750	166,238
				Demo All Piping & Equipment From Basins 1-5	5 ea	32.000 ch / ea	640	167.66 /ch	26,825						103.03	515		27,340	43,277
				Demo Electrical System @ Basins	1 ls							2,000.00	2,000					2,000	3,035
				Pressure Washing Basin Walls @ Basin #1	12,647 sf	150.000 sf / ch	169	53.11 /ch	4,478	0.35	4,426				0.52	6,598		15,503	24,307
				Pressure Washing Basin Slab @ Basin #1	5,518 sf	200.000 sf / ch	55	53.11 /ch	1,465	0.35	1,931				0.39	2,159		5,556	6,687
				02.01 Demolition Work	1 ls		2,520		98,589	6,357.75	6,358	125,200.00	125,200	78,179.91	78,180			308,326	480,130
			03.03	Columns															
				Form Rectangle Column Surrounds 28.5' h, 8 ea	2,892 sf	0.165 mh / sf	477	39.49 /mh	18,843	1.60	4,617							23,459	36,830
				Chamfer	928 lf	0.015 mh / lf	14	39.49 /mh	550	0.57	526							1,076	1,669
				Strip & Oil Column Form	2,892 sf	0.005 mh / sf	14	39.17 /mh	566	0.03	87							653	1,028
				Superplasticizers @ Columns	107 cy			/cy		8.40	899							899	1,364
				Column Rebar (120 #/cy)	6 tn	20.004 mh / tn	128	43.53 /mh	5,590	997.70	6,405							11,995	18,569
				Finish- Float	101 sf	0.017 mh / sf	2	39.17 /mh	67									67	106
				Pump Place Columns 8 ea	107 cy	1.600 mh / cy	171	41.39 /mh	7,087					7.50	802			7,889	12,493
				4000 psi Concrete	107 cy			/cy		142.00	15,194							15,194	23,060
				Grind/Patch Columns	2,892 sf	0.013 mh / sf	38	39.17 /mh	1,473	0.03	87							1,560	2,463
				Rub Columns	2,892 sf	0.065 mh / sf	188	39.17 /mh	7,363	0.06	174							7,536	11,916
				Liquid Curing Compounds	2,892 sf	0.003 mh / sf	9	39.17 /mh	340	0.06	170							510	796
				03.03 Columns	19 cy		1,041		41,879	1,482.01	28,158			42.21	802			70,839	110,294
			03.04	Walls															
				Keyway 6"	1,170 lf	0.050 mh / lf	59	39.49 /mh	2,311	0.67	786							3,097	4,850
				Vertical Wall Keyway 6"	504 lf	0.110 mh / lf	55	39.49 /mh	2,190	0.67	339							2,528	3,980
				Panel Form System 12'-16'	4,973 sf	0.170 mh / sf	845	39.49 /mh	33,384	1.84	9,138							42,521	66,705
				Panel Form System > 16' h	22,686 sf	0.190 mh / sf	4,311	39.49 /mh	170,241	1.84	41,694							211,935	332,722
				Waterstop 6" Flat	1,674 lf	0.110 mh / lf													

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount	
			03.05	Slab On Grade																
				Gravel Fill Under Slab 4"	2 cy	0.004 cd / cy	0	1,412.15 /cd	11	29.26	59			3.84	8			77	118	
				03.05 Slab On Grade	187 cy		25		1,017	4.28	800			0.10	19			1,836	2,855	
			03.06	Suspended Flat Slab																
				Form Suspended Slab Bottom	5,697 sf	0.220 mh / sf	1,253	39.49 /mh	49,492	2.18	12,445							61,937	97,219	
				Slab Edge Form 12"	307 sf	0.250 mh / sf	77	39.49 /mh	3,031	5.17	1,588							4,619	7,207	
				Strip & Oil Suspended Slab Forms	6,004 sf	0.005 mh / sf	30	39.17 /mh	1,176	0.04	246							1,422	2,235	
				Superplasticizers	211 cy					8.40	1,773							1,773	2,690	
				Rebar- Suspended Slab (225 #/cy)	24 tn	20.004 mh / tn	480	43.53 /mh	20,897	997.70	23,945							44,842	69,416	
				Finish- Hard Trowel	5,697 sf	0.035 mh / sf	199	39.17 /mh	7,810									7,810	12,361	
				Pump Place Suspended Slab	211 cy	2.160 mh / cy	456	41.39 /mh	18,863					6.65	1,404			20,267	32,090	
				4000 psi Concrete	211 cy					142.00	29,962							29,962	45,474	
				Liquid Curing Compounds	11,701 sf	0.003 mh / sf	35	39.17 /mh	1,375	0.68	7,988							9,363	14,299	
				03.06 Suspended Flat Slab	211 cy		2,530		102,645	369.41	77,945			6.65	1,404			181,994	282,991	
			05.01	Misc Metals																
				Aluminum 2 Line Rail @ Basin Walkways	209 lf	0.200 mh / lf	42	38.76 /mh	1,620	32.20	6,730							8,350	12,778	
				05.01 Misc Metals	1 ls		42		1,620	6,729.80	6,730							8,350	12,778	
			31.12	Structure Backfill																
				Engineered Fill @ Basins # 2 thru 5 w/ Engineered Fill 29' deep	20,741 cy	300.000 cy / cd	2,212	1,327.72 /cd	91,794	14.00	290,374			7.73	160,391			542,559	841,254	
				31.12 Structure Backfill	20,741 cy		2,212		91,794	14.00	290,374			7.73	160,391			542,559	841,254	
			40.01	Above Ground Process Piping																
				Misc Pipe Work- ALLOWANCE	1 ls	40.000 mh / ls	40	45.62 /mh	1,825	2,000.00	2,000							3,825	5,924	
				40.01 Above Ground Process Piping	1 lf		40		1,825	2,000.00	2,000							3,825	5,924	
			40.04	Hydropneumatic Piping System																
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh				13,000.00						13,000	19,730	
				40.04 Hydropneumatic Piping System	1 ls							13,000.00						13,000	19,730	
				47.4 Rehab North Basins #1, 2, 3, 4 & 5	1 ls		17,610		707,597	671,322.08	671,322	138,200.00	138,200	247,006.48	247,006			1,764,126	2,741,664	
			47.5	Ozone Facility																
				03.03 Columns																
				Form Rectangle Columns 12" h	1,536 sf	0.165 mh / sf	253	39.49 /mh	10,008	1.60	2,452							12,460	19,561	
				Chamfer	1,152 lf	0.015 mh / lf	17	39.49 /mh	682	0.57	653							1,336	2,072	
				Strip & Oil Column Form	1,536 sf	0.005 mh / sf	8	39.17 /mh	301	0.03	46							347	546	
				Superplasticizers @ Columns	19 cy					8.40	160							160	242	
				Column Rebar (120 #/cy)	1 tn	20.004 mh / tn	23	43.53 /mh	993	997.70	1,137							2,130	3,297	
				Finish- Float	42 sf	0.017 mh / sf	1	39.17 /mh	28									28	44	
				Pump Place Columns 24 ea	19 cy	1.600 mh / cy	30	41.39 /mh	1,258					7.49	142			1,401	2,218	
				4000 psi Concrete	19 cy					142.00	2,698							2,698	4,095	
				Grind/Patch Columns	1,536 sf	0.013 mh / sf	20	39.17 /mh	782	0.03	46							828	1,308	
				Rub Columns	1,536 sf	0.065 mh / sf	100	39.17 /mh	3,910	0.06	92							4,003	6,329	
				Liquid Curing Compounds	1,536 sf	0.003 mh / sf	5	39.17 /mh	181	0.06	90							271	423	
				03.03 Columns	19 cy		457		18,143	388.16	7,375			7.49	142			25,661	40,135	
			03.05	Slab On Grade																
				Slab Edge Form 28"	715 sf	0.350 mh / sf	250	39.49 /mh	9,884	1.31	939							10,822	17,068	
				Strip & Oil Form	715 sf	0.005 mh / sf	4	39.17 /mh	140	0.03	21							162	254	
				Rebar- SOG (125 #/cy)	12 tn	14.003 mh / tn	168	43.53 /mh	7,314	997.70	11,972							19,286	29,747	
				Mesh Support - bricks (.12/sf)	689 ea	0.002 mh / ea	1	43.53 /mh	60	0.26	181							241	370	
				Finish- Hard Trowel	5,740 sf	0.015 mh / sf	86	39.17 /mh	3,373									3,373	5,338	
				Pump Place Slab on Grade 8"	142 cy	0.500 mh / cy	71	41.39 /mh	2,939					3.67	521			3,460	5,481	
				Pump Place Thickened Slab 28" x 20"	45 cy	0.500 mh / cy	23	41.39 /mh	931					3.67	165			1,097	1,737	
				4000 psi Concrete	187 cy					142.00	26,554							26,554	40,301	
				Saw Cut S-O-G (.08/sf)	459 lf	0.030 mh / lf	14	39.17 /mh	539	0.17	78			0.95	437			1,054	1,668	
				Liquid Curing Compounds	6,455 sf	0.002 mh / sf	13	39.17 /mh	506	0.06	380							885	1,377	
				Seal Floors	5,740 sf	0.002 mh / sf	11	39.17 /mh	450	0.09	530							980	1,517	
				6 Mil. Vapor Barrier	16,300 sf	0.002 mh / sf	33	43.53 /mh	1,419	0.05	856							2,275	3,545	
				Gravel Fill Under Slab 4"	70 cy	0.004 cd / cy	8	1,412.15 /cd	375	29.26	2,048			3.84	269			2,691	4,129	
				03.05 Slab On Grade	187 cy		682		27,930	232.94	43,559			7.44	1,392			72,882	112,532	
			03.07	Suspended Beams																
				Beam Side Forms	2,932 sf	0.210 mh / sf	616	39.49 /mh	24,318	2.21	6,466							30,785	48,303	
				Beam Bottom Forms	975 sf	0.210 mh / sf	205	39.49 /mh	8,087	2.21	2,150							10,237	16,063	
				Chamfer	1,466 lf	0.015 mh / lf	22	39.49 /mh	869	0.57	831							1,700	2,636	
				Strip & Oil Beam Forms	3,907 sf	0.005 mh / sf	20	39.17 /mh	765	0.03	117							883	1,389	
				Superplasticizers @ Beams	72 cy					8.40	605							605	918	
				Rebar- Beams (250 #/cy)	9 tn	15.003 mh / tn	135	43.53 /mh	5,877	997.70	8,979							14,857	22,930	
				Finish- Top of Beam	975 sf	0.008 mh / sf	8	39.17 /mh	306									306	484	
				Pump Place Beams @ Roof	72 cy	2.001 mh / cy	144	41.39 /mh	5,963					14.42	1,038			7,001	11,090	
				4000 psi Concrete	72 cy					142.00	10,224							10,224	15,517	
				Grind/Patch Beams	3,907 sf	0.013 mh / sf	51	39.17 /mh	1,990	0.03	117							2,107	3,327	
				Rub Beams	3,907 sf	0.085 mh / sf	332	39.17 /mh	13,007	0.06	234							13,242	20,942	
				Liquid Curing Compounds	3,907 sf	0.002 mh / sf	8	39.17 /mh	306	0.06	230							536	833	
				03.07 Suspended Beams	72 cy		1,540		61,488	416.04	29,955			14.42	1,038			92,481	144,433	
			03.08	Pads & Curbs																
				Pad Forms 8" h	264 sf	0.200 mh / sf	53	39.49 /mh	2,085	1.52	402							2,487	3,911	
				Chamfer	394 lf	0.015 mh / lf	6	3												

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				07.00 Moisture Protection	1 ls							4,440.88	4,441					4,441	6,740
				07.01 Roofing															
				Membrane Roofing- 60 mil EPDM Mechanically Attached w/ 3" Insulation	6,168 sf			/sf				3.00	18,508					18,508	28,089
				Aluminum Downspouts, 2 ea x 32" each	64 vf			/vf				18.00	1,152					1,152	1,749
				Scuppers	2 ea			/ea				50.01	100					100	152
				Aluminum Coping @ Roof Parapet 12" wide	313 lf			/lf				15.00	4,696					4,696	7,127
				Translucent Panel Skylight Frame & Panels	1,398 sf			/sf				38.01	53,135					53,135	80,643
				07.01 Roofing	6,168 sf							12.58	77,590					77,590	117,760
				08.00 Doors, Frames & Hardware															
				HM Single Frames- 16 ga 3'x7'	4 ea	1.000 mh / ea	4	39.18 /mh	157	180.04	720	-	-	-	-	-	-	877	1,341
				HM Door Leafs- 3'x7' 20 ga. half glass	4 ea	1.500 ea / mh	3	39.18 /mh	104	450.09	1,800	-	-	-	-	-	-	1,905	2,898
				Overhead Doors- 10'x10' 24 ga steel manual 1" insulation 26 ga back-up panel	1 ea			-	-	-	-	2,255.00	2,255	-	-	-	-	2,255	3,422
				Finish Hardware by Leaf- Allowance	4 ea	8.002 mh / ea	32	39.18 /mh	1,254	900.18	3,601	-	-	-	-	-	-	4,855	7,449
				08.00 Doors, Frames & Hardware	4 ea		39		1,515	1,530.31	6,121		563.75		2,255			9,891	15,111
				09.00 Finishes															
				Paint HM Door Frames - primer (2) coats	4 ea			/ea				100.02	400					400	607
				Paint HM Doors - primer (2) coats	4 ea			/ea				140.03	560					560	850
				Paint CMU Block - block filler & (2) coat	6,168 sf			-	-	-	-	1.35	8,327					8,327	12,638
				09.00 Finishes	1 ls							9,286.99	9,287					9,287	14,095
				10.00 Specialty Items															
				Signs - Building ID	1 ea			/ea				3,000.60	3,001					3,001	4,554
				Signs - Doors	4 ea			/ea				30.01	120					120	182
				Fire Extinguisher CO2 10 lbs	4 ea			/ea				225.05	900					900	1,366
				10.00 Specialty Items	1 ls							4,020.81	4,021					4,021	6,102
				22.00 Plumbing															
				Plumbing Subcontract	5,740 sf			/sf				6.00	34,447					34,447	52,281
				22.00 Plumbing	1 ls							34,446.88	34,447					34,447	52,281
				23.00 HVAC															
				Ventilation & Unit Heater System	5,740 sf			/sf				45.00	258,300					258,300	392,026
				23.00 HVAC	1 sf							258,300.00	258,300					258,300	392,026
				26.00 UG Electrical															
				Building Electrical System	5,956 sf			/sf				16.00	95,315					95,315	144,661
				26.00 UG Electrical	1 ls							95,315.03	95,315					95,315	144,661
				26.01 Above Ground Electrical															
				Building Electrical System	5,956 sf			/sf				8.00	47,658					47,658	72,331
				Electrical Work For Equipment (5% Equipment Cost)	1 ls			/ls				66,000.00	66,000					66,000	100,169
				26.01 Above Ground Electrical	1 ls							113,657.51	113,658					113,658	172,500
				26.02 Instrumentation & Controls															
				Controls & Instrumentation Work For New Equipment (1.5% Equipment Cost)	1 ls			/ls				49,500.00	49,500					49,500	75,127
				26.02 Instrumentation & Controls	1 ls							49,500.00	49,500					49,500	75,127
				40.00 Under Ground Process Piping															
				Trench Excav & Lay Pipe 0- 4'	350 lf	600.000 lf / cd	33	2,539.31 /cd	1,481			-	-	1.88	659			2,141	3,394
				Stone Pipe Bedding	52 cy	200.000 cy / cd	19	2,896.43 /cd	753	23.29	1,211	-	-	-	-	-	-	1,964	3,030
				DI Pipe Push - Class 52 8	200 lf	0.250 mh / lf	50	51.34 /mh	2,567	31.86	6,371	-	-	-	-	-	-	8,938	13,733
				DI Pipe Push - Class 52 14	150 lf	0.340 mh / lf	51	51.34 /mh	2,618	65.16	9,774	-	-	-	-	-	-	12,392	18,977
				Hydrostatic Testing	350 lf	0.021 ch / lf	29	182.49 /ch	1,341	0.16	56	-	-	-	-	-	-	1,397	2,208
				DI 90 ell 14"	2 ea	12.060 mh / ea	24	30.57 /mh	737	469.80	940	-	-	-	-	-	-	1,677	2,593
				40.00 Under Ground Process Piping	350 lf		206		9,498	52.43	18,352			1.88	659			28,509	43,935
				40.01 Above Ground Process Piping															
				Paint & Stencil Exposed Piping <20"	1,192 lf			-	-	-	-	10.00	11,922					11,922	18,095
				Pipe Supports	40 ea	4.001 mh / ea	160	45.62 /mh	7,301	250.05	10,002	-	-	-	-	-	-	11,922	18,095
				Hydrostatic Testing	1,192 lf	0.021 ch / lf	100	182.49 /ch	4,569	0.16	191	-	-	-	-	-	-	4,760	7,521
				8" DI Wall Thimble 24" long	4 ea	5.001 ch / ea	80	182.49 /ch	3,650	1,286.25	5,145	-	-	1,200.15	4,801	-	-	13,596	21,227
				Gasket/Nuts/Bolt Kit 4"	16 ea	1.000 mh / ea	16	32.89 /mh	526	7.87	126	-	-	-	-	-	-	652	1,024
				Gasket/Nuts/Bolt Kit 6"	12 ea	1.000 mh / ea	12	32.89 /mh	395	15.87	190	-	-	-	-	-	-	585	914
				Gasket/Nuts/Bolt Kit 8"	24 ea	1.000 mh / ea	24	32.89 /mh	789	22.00	528	-	-	-	-	-	-	1,317	2,051
				Gasket/Nuts/Bolt Kit 12"	30 ea	1.000 mh / ea	30	32.89 /mh	987	45.00	1,350	-	-	-	-	-	-	2,337	3,611
				Gasket/Nuts/Bolt Kit 14"	20 ea	1.000 mh / ea	20	32.89 /mh	658	46.58	932	-	-	-	-	-	-	1,589	2,455
				DI Flanged Joint Pipe 4"	188 lf	0.820 mh / lf	154	30.57 /mh	4,712	30.99	5,825	-	-	-	-	-	-	10,537	16,299
				DI Flanged Joint Pipe 6"	144 lf	0.900 mh / lf	130	30.57 /mh	3,961	47.39	6,824	-	-	-	-	-	-	10,785	16,626
				DI Flanged Joint Pipe 8"	285 lf	0.980 mh / lf	279	30.57 /mh	8,537	67.30	19,180	-	-	-	-	-	-	27,718	42,622
				DI Flanged Joint Pipe 12"	350 lf	1.890 mh / lf	662	30.57 /mh	20,220	112.92	39,521	-	-	-	-	-	-	59,741	91,984
				DI Flanged Joint Pipe 14"	226 lf	2.050 mh / lf	463	30.57 /mh	14,162	138.18	31,228	-	-	-	-	-	-	45,389	69,808
				DI Flanged 90 ell 6"	2 ea	4.830 mh / ea	10	30.57 /mh	295	105.30	211	-	-	-	-	-	-	506	787
				DI Flanged 90 ell 14"	4 ea	12.060 mh / ea	48	30.57 /mh	1,475	469.80	1,879	-	-	-	-	-	-	3,354	5,186
				DI Flanged Tee 6"	2 ea	4.830 mh / ea	10	30.57 /mh	295	0.02	0	-	-	-	-	-	-	295	467
				DI Flanged Tee 8"	4 ea	5.050 mh / ea	20	30.57 /mh	617	313.10	1,252	-	-	-	-	-	-	1,870	2,878
				DI Flanged Con Red 12x8"	4 ea	11.010 mh / ea	44	30.57 /mh	1,346	487.20	1,949	-	-	-	-	-	-	3,295	5,088
				DI Flanged Con Red 14x8"	2 ea	12.060 mh / ea	24	30.57 /mh	737	588.00	1,176	-	-	-	-	-	-	1,913	2,952
				Misc Piping & Accessories- ALLOWANCE	200 LF	0.240 mh / LF	48	45.62 /mh	2,190	55.01	11,002	-	-	-	-	-	-	13,192	20,165
				40.01 Above Ground Process Piping	1,192 lf		2,334		77,424	116.20	138,511	10.00	11,922	4.03	4,801			232,658	358,496
				40.02 Valves, Meters, Etc.															
				6" Butterfly Valve, 125 lb class, CI Body, Flg, w/ EIM elec actuator NEMA 4	4 ea	6.200 mh / ea	25	30.57 /mh	758	2,850.00	11,400	-	-	-	-	-	-	12,158	18,502
				Pressure Regulator 8"	2 ea	5.229 mh / ea	10	30.57 /mh											

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount				
			43.10	Ozone Equipment																			
				Blower Silencer	2 ea			/ea															
				Catalytic Chamber	2 ea			/ea															
				Cooling Water Pump	2 ea			/ea															
				Cooling Water Skid / Heat X-Changer 10' x 5.67'	2 ea			/ea															
				Cooling Water Supply Pumps	3 ea			/ea															
				Demister	2 ea			/ea															
				Eductor	2 ea			/ea															
				Filter	2 ea			/ea															
				Heater	3 ea			/ea															
				Ozone Diffuser	2 ea			/ea															
				Ozone Generator Skid 17' x 6.5'	2 ea			/ea															
				Ozone Injection Manifold 8" x 10.75' long	1 ea			/ea															
				Ozone Injection Water Supply Pumps	4 ea			/ea															
				Ozone Quench Manifold 30" x 11' long	2 ea			/ea															
				Particulate Filter	1 ea			/ea															
				43.10 Ozone Equipment	1 ls		3,575		118,706	500.00	500				31,005.98		31,006	3,301,500.00	3,301,500	3,451,712	5,248,722		
				47.5 Ozone Facility	6,168 gsf		9,127		326,505	50.37	310,707	109.39	674,736		6.68		41,216	535.26	3,301,500	4,654,664	7,088,721		
		47.6		LOX Equipment																			
			03.05	Slab On Grade																			
				S.O.G. Edge Form 8"	118 sf	0.240 mh / sf	28	39.49 /mh	1,118	1.22	144									1,262	1,988		
				Strip & Oil Form	118 sf	0.005 mh / sf	1	39.17 /mh	23	0.03	4									27	42		
				Rebar- SOG (125 #/cy)	2 tn	14.003 mh / tn	32	43.53 /mh	1,371	997.70	2,245									3,616	5,578		
				Mesh Support - bricks (.12/sf)	175 ea	0.002 mh / ea	0	43.53 /mh	15	0.26	46									61	94		
				Finish- Broom	1,462 sf	0.022 mh / sf	32	39.17 /mh	1,260												1,260	1,994	
				Pump Place Slab on Grade 8"	36 cy	0.500 mh / cy	18	41.39 /mh	745						3.67		132				877	1,390	
				4000 psi Concrete	36 cy			/cy		142.00	5,112										5,112	7,759	
				Saw Cut S-O-G (.08/sf)	117 lf	0.030 mh / lf	4	39.17 /mh	138	0.17	20				0.95		111				269	425	
				Liquid Curing Compounds	1,580 sf	0.002 mh / sf	3	39.17 /mh	124	0.06	93										217	337	
				Seal Floors	1,462 sf	0.002 mh / sf	3	39.17 /mh	115	0.09	135										250	386	
				6 Mil. Vapor Barrier	1,600 sf	0.002 mh / sf	3	43.53 /mh	139	0.05	84										223	348	
				Gravel Fill Under Slab 4"	18 cy	0.004 cd / cy	2	1,412.15 /cd	96	29.26	527				3.84		69				692	1,062	
				03.05 Slab On Grade	36 cy		126		5,144	233.57	8,409				8.68		313				13,866	21,402	
			03.08	Pads & Curbs																			
				LOX Tank Pad Form 24"	350 sf	0.180 mh / sf	63	39.49 /mh	2,488	1.37	478										2,966	4,663	
				LOX Vaporizer Pad Form 12"	78 sf	0.160 mh / sf	12	39.49 /mh	493	1.37	106										599	942	
				Chamfer	191 lf	0.015 mh / lf	3	39.49 /mh	113	0.57	108										221	343	
				Strip & Oil Equipment Pad Forms	428 sf	0.005 mh / sf	2	39.17 /mh	84	0.03	13										97	152	
				Rebar- Pads (100 #/cy)	1 tn	18.004 mh / tn	18	43.53 /mh	784	997.70	998										1,781	2,754	
				Finish- Float	223 sf	0.017 mh / sf	4	39.17 /mh	149												149	235	
				Pump Place Pads 12" & 24"	17 cy	1.600 mh / cy	27	41.39 /mh	1,126						7.49		127				1,253	1,985	
				4000 psi Concrete	17 cy			/cy		142.00	2,414										2,414	3,664	
				Liquid Curing Compounds	651 sf	0.003 mh / sf	2	39.17 /mh	77	0.06	38										115	179	
				03.08 Pads & Curbs	17 cy		131		5,313	244.44	4,155				7.49		127				9,596	14,918	
			26.01	Above Ground Electrical																			
				Electrical Work For Equipment (5% Equipment Cost)	1 ls			/ls					42,977.00								42,977	65,227	
				26.01 Above Ground Electrical	1 ls								42,977.00								42,977	65,227	
			26.02	Instrumentation & Controls																			
				Controls & Instrumentation Work For New Equipment (1.5% Equipment Cost)	1 ls			/ls					12,893.00								12,893	19,568	
				26.02 Instrumentation & Controls	1 ls								12,893.00								12,893	19,568	
			32.01	Fencing & Gates																			
				8' Chain Link Fence @ LOX Tanks	111 lf									31.01								3,442	5,224
				8' Fence Vehicle Gate 12' @ LOX Tanks	1 ea								1,700.34									1,700	2,581
				32.01 Fencing & Gates	1 ls								5,142.02								5,142	7,804	
			40.00	Under Ground Process Piping																			
				Trench Excav & Lay Pipe 0-4'	100 lf	600.000 lf / cd	9	2,539.31 /cd	423						1.88		188				612	970	
				Stone Pipe Bedding	15 cy	200.000 cy / cd	5	2,896.43 /cd	217	23.29	349										567	874	
				DI Pipe Push - Class 52 4	100 lf	0.190 mh / lf	19			14.54	1,454											1,454	2,207
				Hydrostatic Testing	100 lf	0.021 ch / lf	8	182.49 /ch	383	0.16	16											399	631
				DI 90 ell 4"	2 ea	4.530 mh / ea	9	30.57 /mh	277	72.90	146											423	660
				40.00 Under Ground Process Piping	100 lf		51		1,301	19.65	1,965				1.88		188				3,454	5,341	
			40.01	Above Ground Process Piping																			
				Paint & Stencil Exposed Piping <20"	113 lf								10.00									1,130	1,715
				Pipe Supports	5 ea	4.001 mh / ea	20	45.62 /mh	913	250.05	1,250											2,163	3,342
				Hydrostatic Testing	113 lf	0.021 ch / lf	9	182.49 /ch	433	0.16	18											451	713
				Gasket/Nuts/Bolt Kit 3"	10 ea	1.000 mh / ea	10	32.89 /mh	329	4.90	49											378	595
				Gasket/Nuts/Bolt Kit 4"	15 ea	1.000 mh / ea	15	32.89 /mh	493	7.87	118											611	960
				DI Flanged Joint Pipe 3"	50 lf	0.820 mh / lf	41	30.57 /mh	1,253	30.99	1,549											2,803	4,335
				DI Flanged Joint Pipe 4"	63 lf	0.820 mh / lf	52	30.57 /mh	1,579	30.99	1,952											3,531	5,462
				DI Flanged 90 ell 3"	20 ea	1.940 mh / ea	39	30.57 /mh	1,186	55.08	1,102											2,288	3,549
				DI Flanged 90 ell 4"	30 ea	4.530 mh / ea	136	30.57 /mh	4,154	72.90	2,187											6,341	9,894
				DI Flanged Tee 3"	3 ea	1.940 mh / ea	6	30.57 /mh	178	0.04	0											178	282
				DI Flanged Con Red 4x3"	4 ea	4.530 mh / ea	18	30.57 /mh	554	107.52	430											984	1,529
				40.01 Above Ground Process Piping	1 lf		346		11,072	8,655.55	8,656		1,130.23		1,130							20,858	32,376
			40																				

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount	
				3B Filtration - Rehab Existing & Add Ozone Facility	1 ls		27,591		1,065,272	1,041,664.11	1,041,664	875,078.20	875,078	291,903.83	291,904	4,164,700.00	4,164,700	7,438,618	11,380,492	
				Filtration - Install Membranes In Existing Filters																
				Water Plant Process Rehab @ Filters 21 thru 28																
	3C			47.1																
			02.01	Demolition Work																
				Non-Hazardous Waste Transport and Disposal.	2,058 ton								50.00		102,900					
				Pressure Washing Basin Walls @ Basins 21 thru 28	14,860 sf	150.00 sf / ch	198	53.11 /ch	5,261	0.35	5,201				0.52	7,753				
				Pressure Washing Basin Slab @ Basins 21 thru 28	8,288 sf	200.00 sf / ch	83	53.11 /ch	2,201	0.35	2,901				0.39	3,243				
				Remove Air Header	8 ea	8.000 ch / ea	320	231.62 /ch	14,823	250.00	2,000				1,957.34	15,659				
				Bag, Transport and Dispose Of Media	24,948 cf	65.867 cf / ch	1,515	163.29 /ch	61,846	0.22	5,544				4.08	101,845				
				Remove Sand (8,288 sf x 24" deep), 614 cy	16,578 cf	0.033 mh / cf	539	46.32 /mh	24,958						6.12	101,402				
				Remove Anthracite Media (8,288 sf x 6" deep), 155 cy	4,185 cf	0.033 mh / cf	136	46.32 /mh	6,301						6.12	25,598				
				Remove Gravel Media (8,288 sf x 6" deep), 155 cy	4,185 cf	0.033 mh / cf	136	46.32 /mh	6,301						6.12	25,598				
				Remove Underdrain System - Grouted Blocks	8,288 sf	0.180 mh / sf	1,492	46.32 /mh	69,107	1.09	9,055				6.12	50,695				
				02.01 Demolition Work	1 ls		4,419		190,798	24,701.27	24,701	102,900.00	102,900	331,793.44	331,793			650,192	1,023,696	
				03.30 Patch Cracks and Resurface Concrete																
				Patch Cracks & Resurface Walls @ Basins 21-28	14,860 sf	10.000 sf / ch	2,972	53.11 /ch	78,922	0.11	1,618									
				Patch Cracks & Resurface Walls @ Lower Gallery	6,831 sf	10.000 sf / ch	1,366	53.11 /ch	36,280	0.11	744									
				Patch Cracks & Resurface Slab @ Basins 21-28	8,288 sf	6.764 sf / ch	2,451	53.11 /ch	65,078	0.07	613									
				03.30 Patch Cracks and Resurface Concrete	29,979 sf		6,789		180,280	0.10	2,975								183,255	289,847
				09.00 Finishes																
				Pressure Wash Basins 21-28	16 ea	90.000 mh / ea	1,440	40.56 /mh	58,412	-	-				701.91	11,231				
				Clean Basins 21-28	16 ea	30.000 ch / ea	1,440	143.32 /ch	68,794	500.00	8,000				3,597.12	57,554				
				Clean Lower Gallery Walls For Painting	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069				0.52	16,500				
				Clean & Prep Pipe For Painting	1,740 lf								6.00		10,440					
				Paint Lower Gallery Concrete Surfaces	6,831 sf								1.10		7,514					
				Paint 4" Pipe	0 lf	0.035 mh / lf	0	27.53 /mh	0	1.00	0				4.00	0				
				Paint 6" Pipe	818 lf	0.070 mh / lf	57	27.53 /mh	1,577	0.69	566				4.24	3,467				
				Paint 12" Pipe	0 lf	0.120 mh / lf	0	27.53 /mh	0	1.00	0				6.00	0				
				Paint 16" Pipe	227 lf	0.140 mh / lf	32	27.53 /mh	875	1.85	419				6.06	1,375				
				Paint 18" Pipe	96 lf	0.200 mh / lf	19	27.53 /mh	529	2.08	199				6.06	581				
				Paint 20" Pipe	0 lf	0.300 mh / lf	0	27.53 /mh	0	2.00	0				7.00	0				
				Paint 24" Pipe	0 lf	0.350 mh / lf	0	27.53 /mh	0	3.00	0				7.00	0				
				Paint 30" Pipe	0 lf	0.438 mh / lf	0	27.53 /mh	0	4.00	0				4.00	0				
				Paint 36" Pipe	541 lf	0.525 mh / lf	284	27.53 /mh	7,820	4.15	2,247				4.95	2,676				
				Paint 42" Pipe	58 lf	0.525 mh / lf	30	27.53 /mh	838	4.85	281				4.95	287				
				09.00 Finishes	1 ls		3,724		150,043	22,782.62	22,783	17,954.10	17,954	93,670.65	93,671			284,451	448,381	
				47.1 Water Plant Process Rehab @ Filters 21 thru 28	1 ls		14,932		521,121	50,458.56	50,459	120,854.10	120,854	425,464.09	425,464			1,117,898	1,761,923	
				47.2																
				Water Plant Process Rehab @ Filters 29 thru 32																
			02.01	Demolition Work																
				Non-Hazardous Waste Transport and Disposal.	2,154 ton								50.00		107,700					
				Pressure Washing Basin Walls @ Basins 29 thru 36	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069				0.52	16,500				
				Pressure Washing Basin Slab @ Basins 29 thru 36	20,059 sf	200.000 sf / ch	201	53.11 /ch	5,327	0.35	7,021				0.39	7,849				
				Remove Air Header	8 ea	8.000 ch / ea	320	231.62 /ch	14,823	250.00	2,000				1,957.34	15,659				
				Bag, Transport and Dispose Of Media	7,938 cf	65.867 cf / ch	482	163.29 /ch	19,678	0.22	1,764				4.08	32,405				
				Remove Sand (8704 sf x 24" deep), 645 cy	17,408 cf	0.033 mh / cf	566	46.32 /mh	26,208						6.12	106,479				
				Remove Anthracite Media (8704 sf x 6" deep), 161 cy	4,352 cf	0.033 mh / cf	141	46.32 /mh	6,552						6.12	26,620				
				Remove Gravel Media (8704 sf x 6" deep), 161 cy	4,352 cf	0.033 mh / cf	141	46.32 /mh	6,552						6.12	26,620				
				Remove Underdrain System - Grouted Blocks	8,704 sf	0.180 mh / sf	1,567	46.32 /mh	72,575	1.09	9,510				6.12	53,240				
				02.01 Demolition Work	1 ls		3,840		162,913	31,363.74	31,364	107,700.00	107,700	285,371.47	285,371			587,348	923,077	
				03.30 Patch Cracks and Resurface Concrete																
				Patch Cracks & Resurface Walls @ Only Basins 33 thru 36	7,460 sf	10.000 sf / ch	1,492	53.11 /ch	39,620	0.11	812									
				Patch Cracks & Resurface Walls @ Lower Gallery Basins 29 thru 36	6,831 sf	10.000 sf / ch	1,366	53.11 /ch	36,280	0.11	744									
				Patch Cracks & Resurface Slab @ Only Basins 33 thru 36	4,352 sf	6.764 sf / ch	1,287	53.11 /ch	34,172	0.07	322									
				03.30 Patch Cracks and Resurface Concrete	18,643 sf		4,145		110,073	0.10	1,878								111,950	177,064
				09.00 Finishes																
				Pressure Wash Basins 29 thru 36	16 flit	90.000 mh / flit	1,440	40.56 /mh	58,412	-	-				701.91	11,231				
				Clean Tank	16 flit	30.000 ch / flit	1,440	143.32 /ch	68,794	500.00	8,000				3,597.12	57,554				
				Clean Basins 29 thru 36	16 flit	30.000 ch / flit	1,440	143.32 /ch	68,794	500.00	8,000				3,597.12	57,554				
				Clean Lower Gallery Walls For Painting	31,626 sf	150.000 sf / ch	422	53.11 /ch	11,198	0.35	11,069				0.52	16,500				
				Clean & Prep Pipe For Painting	1,740 lf								6.00		10,440					
				Paint Lower Gallery Concrete Surfaces	6,831 sf								1.10		7,514					
				Paint 4" Pipe	52 lf	0.035 mh / lf	2	27.53 /mh	50	0.46	24				4.24	220				
				Paint 6" Pipe	94 lf	0.070 mh / lf	7	27.53 /mh	181	0.69	65				4.24	398				
				Paint 12" Pipe	54 lf	0.120 mh / lf	6	27.53 /mh	178	1.39	75				5.65	305				
				Paint 16" Pipe	38 lf	0.140 mh / lf	5	27.53 /mh	146	1.85	70				6.06	230				
				Paint 18" Pipe	0 lf	0.200 mh / lf	0	27.53 /mh	0	2.00	0				6.00	0				
				Paint 20" Pipe	276 lf	0.300 mh / lf	83	27.53 /mh	2,280	2.31	637				7.07	1,950				
				Paint 24" Pipe	206 lf	0.350 mh / lf	72	27.53 /mh	1,985	2.77	571				7.07	1,455				</

Table with columns: WBS Lvl 1, WBS Lvl 2, WBS Lvl 3, WBS Lvl 4, Description, Takeoff Quantity, Labor Productivity, Man Hours, Labor Price, Labor Amount, Material Cost/Unit, Material Amount, Subcontract Cost/Unit, Subcontract Amount, Const Equip Cost/Unit, Const Equip Amount, Process Equip Cost/Unit, Process Equip Amount, Total Amount, Grand Total. Rows include HVAC, Above Ground Electrical, Instrumentation & Controls, Above Ground Process Piping, Membrane Filtration Equipment, Air Scour Blowers, and various foundation and wall construction items.

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			03.07	Suspended Beams															
				Beam Side Forms	10,878 sf	0.210 mh / sf	2,285	39.49 /mh	90,224	2.21	23,991	-	-	-	-	-	-	114,214	179,209
				Beam Bottom Forms	3,146 sf	0.210 mh / sf	661	39.49 /mh	26,093	2.21	6,938	-	-	-	-	-	-	33,032	51,829
				Chamfer	4,194 lf	0.015 mh / lf	63	39.49 /mh	2,485	0.57	2,378	-	-	-	-	-	-	4,863	7,542
				Strip & Oil Beam Forms	14,024 sf	0.005 mh / sf	70	39.17 /mh	2,747	0.03	421	-	-	-	-	-	-	3,168	4,986
				Superplasticizers @ Beams	302 cy					8.40	2,537	-	-	-	-	-	-	2,537	3,851
				Rebar- Beams (250 #/cy)	38 tn	15.003 mh / tn	570	43.53 /mh	24,815	997.70	37,913	-	-	-	-	-	-	62,728	96,816
				Finish- Top of Beam	3,145 sf	0.008 mh / sf	25	39.17 /mh	986	-	-	-	-	-	-	-	-	986	1,560
				Pump Place Beams @ Roof	302 cy	2.001 mh / cy	604	41.39 /mh	25,011	-	-	-	-	14.42	4,355	-	-	29,367	46,517
				4000 psi Concrete	302 cy					142.00	42,884	-	-	-	-	-	-	42,884	65,086
				Grind/Patch Beams	14,024 sf	0.013 mh / sf	182	39.17 /mh	7,142	0.03	421	-	-	-	-	-	-	7,563	11,942
				Rub Beams	14,024 sf	0.085 mh / sf	1,192	39.17 /mh	46,689	0.06	841	-	-	-	-	-	-	47,530	75,172
				Liquid Curing Compounds	14,024 sf	0.002 mh / sf	28	39.17 /mh	1,099	0.06	825	-	-	-	-	-	-	1,924	2,991
				03.07 Suspended Beams	302 cy		5,681		227,290	394.53	119,149			14.42	4,355			350,795	547,502
			03.09	Pan Stair Fill															
				Finish Stairs	415 sf	0.055 mh / sf	23	39.17 /mh	894	-	-	-	-	-	-	-	-	894	1,415
				Pump Place Pan Stair Concrete	6 cy	3.001 mh / cy	18	41.39 /mh	745	-	-	-	-	9.17	55	-	-	800	1,267
				3000 psi Concrete	6 cy					138.00	828	-	-	-	-	-	-	828	1,257
				03.09 Pan Stair Fill	6 cy		41		1,639	138.00	828			9.17	55			2,522	3,939
			03.20	Precast Planks															
				Precast Hollow Core Roof Planks 4' wide x 10"	25,298 sf	0.020 mh / sf	506	42.24 /mh	21,376	8.80	222,667	-	-	0.35	8,902	-	-	252,945	385,945
				03.20 Precast Planks	25,298 sf		506		21,376	8.80	222,667			0.35	8,902			252,945	385,945
			04.00	Masonry															
				8" CMU + Rigid Insulation Backup To Brick, 20' h	12,093 sf			/sf		-	-	18.00	217,717	-	-	-	-	217,717	330,433
				8" CMU + Rigid Insulation Backup To Brick @ Parapet 3.67' h	2,576 sf			/sf		-	-	18.00	46,368	-	-	-	-	46,368	70,373
				Precast Cap 16" x 4"	644 lf			/lf		-	-	20.00	12,883	-	-	-	-	12,883	19,552
				Brick Veneer @ Block Wall Backup & Concrete Beam	16,601 sf					-	-	9.00	149,439	-	-	-	-	149,439	226,806
				04.00 Masonry	16,601 sf							25.69	426,407					426,407	647,164
			05.01	Misc Metals															
				Metal Stairs Concrete Pans	132 rs	0.067 mh / rs	9	42.08 /mh	370	80.02	10,562	-	-	-	-	-	-	10,933	16,617
				Metal Stair Landing Concrete Pans	8 ea	4.000 mh / ea	32	42.08 /mh	1,347	800.00	6,400	-	-	-	-	-	-	7,747	11,845
				Alum Stair Wall Handrail	112 lf	0.150 mh / lf	17	42.08 /mh	707	16.80	1,882	-	-	-	-	-	-	2,589	3,975
				Aluminum 3 Line Rail @ Basins	1,512 lf	0.234 mh / lf	354	42.08 /mh	14,892	44.11	66,693	-	-	-	-	-	-	81,585	124,790
				Aluminum Handrail @ Pan Stairs	112 lf	0.234 mh / lf	26	42.08 /mh	1,103	44.11	4,940	-	-	-	-	-	-	6,043	9,244
				Alum Grate Cover .75" @ 4'x4' Sump	12 ea	0.600 mh / ea	7	42.08 /mh	303	185.04	2,220	-	-	-	-	-	-	2,523	3,850
				Aluminum Hatch & Frame Over Pipe Gallery 6.33' x 6.33'	12 ea	8.002 mh / ea	96	39.18 /mh	3,762	5,001.00	60,012	-	-	-	-	-	-	63,774	97,035
				05.01 Misc Metals	1 ls		541		22,484	152,709.28	152,709							175,193	267,355
			06.00	Wood															
				Misc Nailers & Blocking	26,076 sf	0.010 mh / sf	261	39.67 /mh	10,347	0.40	10,465	-	-	-	-	-	-	20,812	32,259
				06.00 Wood	1 ls		261		10,347	10,465.09	10,465							20,812	32,259
			07.00	Moisture Protection															
				Caulking @ Masonry Wall Joints- Exterior (.09 lf/sf)	1,494 lf			/lf				4.00	5,977	-	-	-	-	5,977	9,072
				Caulking @ Masonry Wall Joints- Interior	1,494 lf			/lf				4.00	5,977	-	-	-	-	5,977	9,072
				07.00 Moisture Protection	1 ls							11,954.41	11,954					11,954	18,143
			07.01	Roofing															
				Membrane Roofing- 60 mil EPDM Mechanically Attached w/ 3" Insulation	26,076 sf			/sf				3.00	78,244	-	-	-	-	78,244	118,752
				Aluminum Downspouts, 14 ea	280 lf			/lf				18.00	5,041	-	-	-	-	5,041	7,651
				Scuppers	14 ea			/ea				50.01	700	-	-	-	-	700	1,063
				Aluminum Coping @ Roof Parapet 12" wide	650 lf			/lf				15.00	9,752	-	-	-	-	9,752	14,801
				Roof Hatch 4'0" x 4'0"	1 ea			/ea				2,200.44	2,200	-	-	-	-	2,200	3,340
				07.01 Roofing	26,076 sf							3.68	95,937					95,937	145,605
			08.00	Doors, Frames & Hardware															
				HM Single Frames- 16 ga 3'x7'	8 ea	1.000 mh / ea	8	39.18 /mh	313	180.04	1,440	-	-	-	-	-	-	1,754	2,682
				HM Door Leafs- 3'x7' 20 ga. half glass	8 ea	1.500 ea / mh	5	39.18 /mh	209	450.09	3,601	-	-	-	-	-	-	3,810	5,796
				Finish Hardware by Leaf- Allowance	8 ea	8.002 mh / ea	64	39.18 /mh	2,508	900.18	7,201	-	-	-	-	-	-	9,709	14,899
				08.00 Doors, Frames & Hardware	8 ea		77		3,030	1,530.31	12,242							15,273	23,376
			09.00	Finishes															
				Paint HM Door Frames - primer (2) coats	8 ea			/ea				100.02	800	-	-	-	-	800	1,214
				Paint HM Doors - primer (2) coats	8 ea			/ea				140.03	1,120	-	-	-	-	1,120	1,700
				Paint CMU Block - block filler & (2) coat	12,093 sf							1.35	16,326	-	-	-	-	16,326	24,778
				Paint 12" Pipe	400 lf	0.120 mh / lf	48	27.53 /mh	1,322	1.39	554	-	-	5.65	2,261	-	-	4,136	6,530
				Paint 16" Pipe	77 lf	0.140 mh / lf	11	27.53 /mh	297	1.85	142	-	-	6.06	466	-	-	905	1,428
				Paint 18" Pipe	12 lf	0.200 mh / lf	2	27.53 /mh	66	2.08	25	-	-	6.06	73	-	-	164	258
				Paint 20" Pipe	17 lf	0.300 mh / lf	5	27.53 /mh	140	2.31	39	-	-	7.07	120	-	-	300	473
				Paint 24" Pipe	960 lf	0.350 mh / lf	336	27.53 /mh	9,251	2.77	2,659	-	-	7.07	6,782	-	-	18,692	29,471
				Paint 36" Pipe	666 lf	0.525 mh / lf	350	27.53 /mh	9,627	4.15	2,767	-	-	4.95	3,294	-	-	15,687	24,678
				Paint 48" Pipe	303 lf	0.525 mh / lf	159	27.53 /mh	4,380	5.54	1,678	-	-	4.95	1,498	-	-	7,557	11,864
				09.00 Finishes	1 ls		911		25,083	7,863.94	7,864	18,245.93	18,246	14,494.42	14,494			65,687	102,395
			10.00	Specialty Items															
				Signs - Building ID	1 ea			/ea				3,000.60	3,001	-	-	-	-	3,001	4,554
				Signs - Doors	8 ea			/ea				30.01	240	-	-	-	-	240	364
				Fire Extinguisher CO2 10 lbs	8 ea			/ea				225.05	1,800						

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WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount	
			26.00	UG Electrical																
				UG Electrical System	25,300 sf	/sf						16.00	404,881					404,881	614,494	
				26.00 UG Electrical									404,881					404,881	614,494	
			26.01	Above Ground Electrical																
				Building Electrical Systems	25,300 sf	/sf						4.00	101,200					101,200	153,593	
				Electrical Work For Equipment (3% Equipment Cost)	1 ls	/ls						65,820.00	65,820					65,820	99,896	
				26.01 Above Ground Electrical									167,020					167,020	253,489	
			26.02	Instrumentation & Controls																
				Controls & Instrumentation Work For New Equipment (1 % Equipment Cost)	1 ls	/ls						21,944.00	21,944					21,944	33,305	
				26.02 Instrumentation & Controls									21,944					21,944	33,305	
				26 Electrical & Instrumentation	1 ls							593,844.81	593,845					593,845	901,288	
			40	Process Piping																
			40.00	Under Ground Process Piping																
				Trench Excav & Lay Pipe 0- 4'	920 lf	600.000 lf / cd	86	2,539.31 /cd	3,894						1.88		1,733	5,627	8,921	
				Stone Pipe Bedding	136 cy	199.900 cy / cd	49	2,896.43 /cd	1,971	23.29	3,168							5,138	7,927	
				DI Pipe Push - Class 52 30	794 lf	0.440 mh / lf	349	51.34 /mh	17,936	167.28	132,818							150,754	229,967	
				DI Pipe Push - Class 52 48	126 lf	0.640 mh / lf	81	/mh		365.30	46,028							46,028	69,857	
				Hydrostatic Testing	920 lf	0.021 ch / lf	77	182.49 /ch	3,527	0.16	147							3,674	5,805	
				40.00 Under Ground Process Piping	920 lf		642		27,326	198.00	182,161				1.88		1,733	211,220	322,476	
			40.01	Above Ground Process Piping																
				Paint & Stencil Exposed Piping <20"	489 lf							10.00	4,891					4,891	7,423	
				Paint & Stencil Exposed Piping >20"	1,946 lf							25.01	48,660					48,660	73,852	
				Pipe Supports	60 ea	4.001 mh / ea	240	45.62 /mh	10,951	250.05	15,003							25,954	40,103	
				Hydrostatic Testing	2,435 lf	0.021 ch / lf	205	182.49 /ch	9,333	0.16	390							9,723	15,363	
				Dresser Couplings 48"	12 ea	27.200 mh / ea	326	40.79 /mh	13,313	2,400.00	28,800							42,113	64,780	
				12" DI Wall Thimble 24" long	12 ea	1.250 ch / ea	60	182.49 /ch	2,737	430.09	5,161			301.00		3,612	11,510	17,914		
				24" DI Wall Thimble 24" long	24 ea	2.501 ch / ea	240	182.49 /ch	10,951	860.17	20,644			602.12		14,451	46,046	71,664		
				30" DI Wall Thimble 24" long	7 ea	3.751 ch / ea	105	182.49 /ch	4,792	1,100.21	7,701			900.35		6,302	18,796	29,303		
				36" DI Wall Thimble 24" long	4 ea	5.001 ch / ea	80	182.49 /ch	3,650	1,286.26	5,145			1,200.24		4,801	13,596	21,227		
				48" DI Wall Thimble 24" long	2 ea	6.700 ch / ea	54	182.49 /ch	2,445	1,715.00	3,430			1,600.00		3,200	9,075	14,169		
				Gasket/Nuts/Bolt Kit 12"	40 ea	1.000 mh / ea	40	45.62 /mh	1,825	45.01	1,800							3,626	5,621	
				Gasket/Nuts/Bolt Kit 16"	8 ea	1.000 mh / ea	8	32.89 /mh	263	46.64	373							636	983	
				Gasket/Nuts/Bolt Kit 18"	1 ea	1.000 mh / ea	1	32.89 /mh	33	63.09	63							96	148	
				Gasket/Nuts/Bolt Kit 20"	2 ea	1.000 mh / ea	2	32.89 /mh	66	94.52	189							255	391	
				Gasket/Nuts/Bolt Kit 24"	80 ea	2.000 mh / ea	160	45.62 /mh	7,301	129.48	10,358							17,659	27,276	
				Gasket/Nuts/Bolt Kit 36"	56 ea	3.001 mh / ea	168	45.62 /mh	7,666	225.05	12,603							20,269	31,260	
				Gasket/Nuts/Bolt Kit 48"	26 ea	1.000 mh / ea	26	32.89 /mh	855	425.00	11,050							11,905	18,124	
				DI Flanged Joint Pipe 12"	400 lf	1.890 mh / lf	756	45.62 /mh	34,497	112.94	45,176							79,673	123,163	
				DI Flanged Joint Pipe 16"	77 lf	2.170 mh / lf	167	30.57 /mh	5,107	162.43	12,507							17,614	27,066	
				DI Flanged Joint Pipe 18"	12 lf	2.270 mh / lf	27	30.57 /mh	833	183.93	2,207							3,040	4,668	
				DI Flanged Joint Pipe 20"	17 lf	2.490 mh / lf	42	30.57 /mh	1,294	211.50	3,595							4,889	7,505	
				DI Flanged Joint Pipe 24"	960 lf	2.671 mh / lf	2,564	45.62 /mh	116,962	267.89	257,171							374,133	575,430	
				DI Flanged Joint Pipe 36"	666 lf	3.471 mh / lf	2,311	45.62 /mh	105,454	426.62	284,130							389,585	598,133	
				DI Flanged Joint Pipe 48"	303 lf	4.370 mh / lf	1,324	30.57 /mh	40,474	711.54	215,597							256,071	391,274	
				DI Flanged 90 ell 12"	12 ea	11.012 mh / ea	132	45.62 /mh	6,029	380.78	4,569							10,598	16,477	
				DI Flanged 90 ell 16"	24 ea	12.680 mh / ea	304	30.57 /mh	9,302	599.40	14,386							23,688	36,556	
				DI Flanged 90 ell 24"	28 ea	15.733 mh / ea	441	45.62 /mh	20,098	1,458.29	40,832							60,930	93,781	
				DI Flanged 90 ell 30"	27 ea	17.870 mh / ea	482	30.57 /mh	14,748	2,316.60	62,548							77,296	118,273	
				DI Flanged 90 ell 48"	1 ea	25.710 mh / ea	26	30.57 /mh	786	6,633.90	6,634							7,420	11,312	
				DI Flanged Tee 12"	6 ea	11.012 mh / ea	66	45.62 /mh	3,014	777.86	4,667							7,682	11,854	
				DI Flanged Tee 16"	6 ea	12.680 mh / ea	76	30.57 /mh	2,326	0.00	0							2,326	3,681	
				DI Flanged Tee 24"	26 ea	15.733 mh / ea	409	45.62 /mh	18,662	2,687.14	69,866							88,528	135,573	
				DI Flanged Tee 30"	7 ea	17.874 mh / ea	125	45.62 /mh	5,708	0.00	0							5,708	9,034	
				DI Flanged Tee 36"	9 ea	20.524 mh / ea	185	45.62 /mh	8,427	0.00	0							8,427	13,338	
				DI Flanged Tee 48"	3 ea	25.710 mh / ea	77	30.57 /mh	2,358	24,816.96	74,451							76,809	116,727	
				DI Flanged Cross 48"	6 ea	53.500 mh / ea	321	30.57 /mh	9,812	26,896.80	161,381							171,193	260,460	
				DI Flanged Con Red 24x16"	12 ea	15.730 mh / ea	189	30.57 /mh	5,770	1,764.00	21,168							26,938	41,259	
				DI Flanged Con Red 48x36"	4 ea	25.710 mh / ea	103	30.57 /mh	3,143	9,912.00	39,648							42,791	65,150	
				DI Blind Flange 48"	2 ea	23.590 mh / ea	47	30.57 /mh	1,442	7,186.20	14,372							15,815	24,096	
				Chemical Piping & Accessories- ALLOWANCE	1,500 LF	0.240 mh / LF	360	45.62 /mh	16,427	55.01	82,516							98,944	151,236	
				40.01 Above Ground Process Piping	2,435 lf		12,250		508,856	632.50	1,540,133	21.99	53,551	13.29	32,366			2,134,906	3,275,645	
			40.02	Valves, Meters, Etc.																
				Magnetic Flow Meter - Inline - 24" w/ transmitter	12 ea	26.000 mh / ea	312	43.67 /mh	13,626	12,000.00	144,000							157,626	240,117	
				12" Butterfly Valve, 125 lb class, CI Body, Fig. w/ EIM elec actuator NEMA 4	12 ea	9.600 mh / ea	115	30.57 /mh	3,521	13,040.00	156,480							160,001	243,065	
				16" Butterfly Valve, 125 lb class, CI Body, Fig. w/ EIM elec actuator NEMA 4	24 ea	12.800 mh / ea	307	30.57 /mh	9,390	17,386.00	417,264							426,654	648,150	
				24" Butterfly Valve, 125 lb class, CI Body, Fig. w/ EIM elec actuator NEMA 4	34 ea	19.204 mh / ea	653	45.62 /mh	29,788	26,005.19	884,177							913,965	1,389,075	
				36" Butterfly Valve, 75 lb class, CI Body, Fig. w/ EIM elec actuator NEMA 4	0 ea	28.806 mh / ea	0	45.62 /mh	13	39,008.00	390							403	613	
				40.02 Valves, Meters, Etc.	1 ls		1,388		56,338	1,602,310.64	1,602,311							1,658,649	2,521,019	
			40.04	Hydropneumatic Piping System																
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh				64,000.00	64,000					64,000	97,134	
				40.04 Hydropneumatic Piping System	1 ls</															

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
			03.03	Columns															
				Form Rectangle Columns 12" h	1,536 sf	0.165 mh / sf	253	39.49 /mh	10,008	1.60	2,452	-	-	-	-	-	-	12,460	19,561
				Chamfer	1,152 lf	0.015 mh / lf	17	39.49 /mh	682	0.57	653	-	-	-	-	-	-	1,336	2,072
				Strip & Oil Column Form	1,536 sf	0.005 mh / sf	8	39.17 /mh	301	0.03	46	-	-	-	-	-	-	347	546
				Superplasticizers @ Columns	19 cy					8.40	160	-	-	-	-	-	-	160	242
				Column Rebar (120 #/cy)	1 tn	20.004 mh / tn	23	43.53 /mh	993	997.70	1,137	-	-	-	-	-	-	2,130	3,297
				Finish- Float	42 sf	0.017 mh / sf	1	39.17 /mh	28	-	-	-	-	-	-	-	-	28	44
				Pump Place Columns 24 ea	19 cy	1.600 mh / cy	30	41.39 /mh	1,258	-	-	-	-	7.49	142	-	-	1,401	2,218
				4000 psi Concrete	19 cy					142.00	2,698	-	-	-	-	-	-	2,698	4,095
				Grind/Patch Columns	1,536 sf	0.013 mh / sf	20	39.17 /mh	782	0.03	46	-	-	-	-	-	-	828	1,308
				Rub Columns	1,536 sf	0.065 mh / sf	100	39.17 /mh	3,910	0.06	92	-	-	-	-	-	-	4,003	6,329
				Liquid Curing Compounds	1,536 sf	0.003 mh / sf	5	39.17 /mh	181	0.06	90	-	-	-	-	-	-	271	423
				03.03 Columns	19 cy		457		18,143	388.16	7,375			7.49	142			25,661	40,135
			03.05	Slab On Grade															
				Slab Edge Form 28"	715 sf	0.350 mh / sf	250	39.49 /mh	9,884	1.31	939	-	-	-	-	-	-	10,822	17,068
				Strip & Oil Form	715 sf	0.005 mh / sf	4	39.17 /mh	140	0.03	21	-	-	-	-	-	-	162	254
				Rebar- SOG (125 #/cy)	12 tn	14.003 mh / tn	168	43.53 /mh	7,314	997.70	11,972	-	-	-	-	-	-	19,286	29,747
				Mesh Support - bricks (.12/sf)	689 ea	0.002 mh / ea	1	43.53 /mh	60	0.26	181	-	-	-	-	-	-	241	369
				Finish- Hard Trowel	5,740 sf	0.015 mh / sf	86	39.17 /mh	3,373	-	-	-	-	-	-	-	-	3,373	5,338
				Pump Place Slab on Grade 8"	142 cy	0.500 mh / cy	71	41.39 /mh	2,939	-	-	-	-	3.67	521	-	-	3,460	5,481
				Pump Place Thickened Slab 28" x 20"	45 cy	0.500 mh / cy	23	41.39 /mh	931	-	-	-	-	3.67	165	-	-	1,097	1,737
				4000 psi Concrete	187 cy					142.00	26,554	-	-	-	-	-	-	26,554	40,301
				Saw Cut S-O-G (.08/sf)	459 lf	0.030 mh / lf	14	39.17 /mh	539	0.17	78	-	-	0.95	437	-	-	1,054	1,668
				Liquid Curing Compounds	6,455 sf	0.002 mh / sf	13	39.17 /mh	506	0.06	380	-	-	-	-	-	-	885	1,377
				Seal Floors	5,740 sf	0.002 mh / sf	11	39.17 /mh	450	0.09	530	-	-	-	-	-	-	980	1,517
				6 Mil. Vapor Barrier	16,300 sf	0.002 mh / sf	33	43.53 /mh	1,419	0.05	856	-	-	-	-	-	-	2,275	3,545
				Gravel Fill Under Slab 4"	70 cy	0.004 cd / cy	8	1,412.15 /cd	375	29.26	2,048	-	-	3.84	269	-	-	2,691	4,129
				03.05 Slab On Grade	187 cy		682		27,930	232.94	43,559			7.44	1,392			72,882	112,532
			03.07	Suspended Beams															
				Beam Side Forms	2,932 sf	0.210 mh / sf	616	39.49 /mh	24,318	2.21	6,466	-	-	-	-	-	-	30,785	48,303
				Beam Bottom Forms	975 sf	0.210 mh / sf	205	39.49 /mh	8,087	2.21	2,150	-	-	-	-	-	-	10,237	16,063
				Chamfer	1,466 lf	0.015 mh / lf	22	39.49 /mh	869	0.57	831	-	-	-	-	-	-	1,700	2,636
				Strip & Oil Beam Forms	3,907 sf	0.005 mh / sf	20	39.17 /mh	765	0.03	117	-	-	-	-	-	-	883	1,389
				Superplasticizers @ Beams	72 cy					8.40	605	-	-	-	-	-	-	605	918
				Rebar- Beams (250 #/cy)	9 tn	15.003 mh / tn	135	43.53 /mh	5,877	997.70	8,979	-	-	-	-	-	-	14,857	22,930
				Finish- Top of Beam	975 sf	0.008 mh / sf	8	39.17 /mh	306	-	-	-	-	-	-	-	-	306	484
				Pump Place Beams @ Roof	72 cy	2.001 mh / cy	144	41.39 /mh	5,963	-	-	-	-	14.42	1,038	-	-	7,001	11,090
				4000 psi Concrete	72 cy					142.00	10,224	-	-	-	-	-	-	10,224	15,517
				Grind/Patch Beams	3,907 sf	0.013 mh / sf	51	39.17 /mh	1,990	0.03	117	-	-	-	-	-	-	2,107	3,327
				Rub Beams	3,907 sf	0.085 mh / sf	332	39.17 /mh	13,007	0.06	234	-	-	-	-	-	-	13,242	20,942
				Liquid Curing Compounds	3,907 sf	0.002 mh / sf	8	39.17 /mh	306	0.06	230	-	-	-	-	-	-	536	833
				03.07 Suspended Beams	72 cy		1,540		61,488	416.04	29,955			14.42	1,038			92,481	144,433
			03.08	Pads & Curbs															
				Pad Forms 8" h	264 sf	0.200 mh / sf	53	39.49 /mh	2,085	1.52	402	-	-	-	-	-	-	2,487	3,911
				Chamfer	394 lf	0.015 mh / lf	6	39.49 /mh	233	0.57	223	-	-	-	-	-	-	457	709
				Strip & Oil Equipment Curb Forms	264 sf	0.005 mh / sf	1	39.17 /mh	52	0.03	8	-	-	-	-	-	-	60	94
				Rebar- Pads (100 #/cy)	1 tn	18.004 mh / tn	18	43.53 /mh	784	997.70	998	-	-	-	-	-	-	1,781	2,755
				Finish- Float	669 sf	0.017 mh / sf	11	39.17 /mh	446	-	-	-	-	-	-	-	-	446	705
				Pump Place Pads 8"	17 cy	2.501 mh / cy	43	41.39 /mh	1,759	-	-	-	-	9.86	168	-	-	1,927	3,051
				4000 psi Concrete	17 cy					142.00	2,414	-	-	-	-	-	-	2,414	3,664
				Liquid Curing Compounds	933 sf	0.003 mh / sf	3	39.17 /mh	110	0.06	55	-	-	-	-	-	-	165	257
				03.08 Pads & Curbs	17 cy		135		5,469	241.17	4,100			9.86	168			9,736	15,145
			03.20	Precast Planks															
				Precast Hollow Core Roof Planks 4" wide x 10"	5,712 sf	0.020 mh / sf	114	42.24 /mh	4,826	8.80	50,276	-	-	0.35	2,010	-	-	57,112	87,142
				03.20 Precast Planks	5,712 sf		114		4,826	8.80	50,276			0.35	2,010			57,112	87,142
			06.00	Wood															
				PT Roof Blocking @ Top Of Masonry Wall	307 lf	0.035 mh / lf	11	39.67 /mh	426	1.82	559	-	-	-	-	-	-	985	1,522
				06.00 Wood	1 ls		11		426	558.54	559							985	1,522
			07.00	Moisture Protection															
				Caulking @ Masonry Wall Joints- Exterior (.09 lf/sf)	555 lf			/lf				4.00	2,220	-	-	-	-	2,220	3,370
				Caulking @ Masonry Wall Joints- Interior	555 lf			/lf				4.00	2,220	-	-	-	-	2,220	3,370
				07.00 Moisture Protection	1 ls							4,440.88	4,441					4,441	6,740
			07.01	Roofing															
				Membrane Roofing- 60 mil EPDM Mechanically Attached w/ 3" Insulation	6,168 sf			/sf				3.00	18,508	-	-	-	-	18,508	28,089
				Aluminum Downspouts, 2 ea x 32" each	64 vf			/vf				18.00	1,152	-	-	-	-	1,152	1,749
				Scuppers	2 ea			/ea				50.01	100	-	-	-	-	100	152
				Aluminum Coping @ Roof Parapet 12" wide	313 lf			/lf				15.00	4,696	-	-	-	-	4,696	7,127
				Translucent Panel Skylight Frame & Panels	1,398 sf			/sf				38.01	53,135	-	-	-	-	53,135	80,643
				07.01 Roofing	6,168 sf							12.58	77,590					77,590	117,760
			08.00	Doors, Frames & Hardware															
				HM Single Frames- 16 ga 3'x7'	4 ea	1.000 mh / ea	4	39.18 /mh	157	180.04	720	-	-	-	-	-	-	877	1,341
				HM Door Leafs- 3'x7' 20 ga. half glass	4 ea	1.500 ea / mh	3	39.18 /mh	104	450.09	1,800	-	-	-	-	-	-	1,905	2,898

WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	WBS Lvl 4	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Amount	Grand Total Amount
				23.00 HVAC	5,740 sf							45.00	258,300					258,300	392,026
		26.00		UG Electrical															
				Building Electrical System	5,956 sf	/sf						16.00	95,315					95,315	144,661
				26.00 UG Electrical	1 ls							95,315.03	95,315					95,315	144,661
		26.01		Above Ground Electrical															
				Building Electrical System	5,956 sf	/sf						8.00	47,658					47,658	72,331
				Electrical Work For Equipment (3% Equipment Cost)	1 ls	/ls						99,000.00	99,000					99,000	150,254
				26.01 Above Ground Electrical	1 ls							146,657.51	146,658					146,658	222,584
		26.02		Instrumentation & Controls															
				Controls & Instrumentation Work For New Equipment (1% Equipment Cost)	1 ls	/ls						33,000.00	33,000					33,000	50,085
				26.02 Instrumentation & Controls	1 ls							33,000.00	33,000					33,000	50,085
		40.00		Under Ground Process Piping															
				Trench Excav & Lay Pipe 0-4'	350 lf	600.00 lf / cd	33	2,539.31 /cd	1,481			-	-	1.88	659			2,141	3,394
				Stone Pipe Bedding	52 cy	200.00 cy / cd	19	2,896.43 /cd	753	23.29	1,211	-	-	-	-			1,964	3,030
				DI Pipe Push - Class 52 8	200 lf	0.250 mh / lf	50	51.34 /mh	2,567	31.86	6,371	-	-	-	-			8,938	13,733
				DI Pipe Push - Class 52 14	150 lf	0.340 mh / lf	51	51.34 /mh	2,618	65.16	9,774	-	-	-	-			12,392	18,978
				Hydrostatic Testing	350 lf	0.021 ch / lf	29	182.49 /ch	1,341	0.16	56	-	-	-	-			1,397	2,208
				DI 90 ell 14"	2 ea	12.060 mh / ea	24	30.57 /mh	737	469.80	940	-	-	-	-			1,677	2,593
				40.00 Under Ground Process Piping	350 lf		206		9,498	52.43	18,352			1.88	659			28,509	43,935
		40.01		Above Ground Process Piping															
				Paint & Stencil Exposed Piping <20"	1,192 lf							10.00	11,922					11,922	18,095
				Pipe Supports	40 ea	4.001 mh / ea	160	45.62 /mh	7,301	250.05	10,002	-	-	-	-			17,303	26,736
				Hydrostatic Testing	1,192 lf	0.021 ch / lf	100	182.49 /ch	4,569	0.16	191	-	-	-	-			4,760	7,521
				8" DI Wall Thimble 24" long	4 ea	5.001 ch / ea	80	182.49 /ch	3,650	1,286.25	5,145	-	-	1,200.15	4,801			13,596	21,227
				Gasket/Nuts/Bolt Kit 4"	16 ea	1.000 mh / ea	16	32.89 /mh	526	7.87	126	-	-	-	-			652	1,024
				Gasket/Nuts/Bolt Kit 6"	12 ea	1.000 mh / ea	12	32.89 /mh	395	15.87	190	-	-	-	-			585	914
				Gasket/Nuts/Bolt Kit 8"	24 ea	1.000 mh / ea	24	32.89 /mh	789	22.00	528	-	-	-	-			1,317	2,051
				Gasket/Nuts/Bolt Kit 12"	30 ea	1.000 mh / ea	30	32.89 /mh	987	45.00	1,350	-	-	-	-			2,337	3,611
				Gasket/Nuts/Bolt Kit 14"	20 ea	1.000 mh / ea	20	32.89 /mh	658	46.58	932	-	-	-	-			1,589	2,455
				DI Flanged Joint Pipe 4"	188 lf	0.820 mh / lf	154	30.57 /mh	4,712	30.99	5,825	-	-	-	-			10,537	16,299
				DI Flanged Joint Pipe 6"	144 lf	0.900 mh / lf	130	30.57 /mh	3,961	47.39	6,824	-	-	-	-			10,785	16,626
				DI Flanged Joint Pipe 8"	285 lf	0.980 mh / lf	279	30.57 /mh	8,537	67.30	19,180	-	-	-	-			27,718	42,622
				DI Flanged Joint Pipe 12"	350 lf	1.890 mh / lf	662	30.57 /mh	20,220	112.92	39,521	-	-	-	-			59,741	91,984
				DI Flanged Joint Pipe 14"	226 lf	2.050 mh / lf	463	30.57 /mh	14,162	138.18	31,228	-	-	-	-			45,389	69,808
				DI Flanged 90 ell 6"	2 ea	4.830 mh / ea	10	30.57 /mh	295	105.30	211	-	-	-	-			506	787
				DI Flanged 90 ell 14"	4 ea	12.060 mh / ea	48	30.57 /mh	1,475	469.80	1,879	-	-	-	-			3,354	5,186
				DI Flanged Tee 6"	2 ea	4.830 mh / ea	10	30.57 /mh	295	0.02	0	-	-	-	-			295	467
				DI Flanged Tee 8"	4 ea	5.050 mh / ea	20	30.57 /mh	617	313.10	1,252	-	-	-	-			1,870	2,878
				DI Flanged Con Red 12x8"	4 ea	11.010 mh / ea	44	30.57 /mh	1,346	487.20	1,949	-	-	-	-			3,295	5,088
				DI Flanged Con Red 14x8"	2 ea	12.060 mh / ea	24	30.57 /mh	737	588.00	1,176	-	-	-	-			1,913	2,952
				Misc Piping & Accessories- ALLOWANCE	200 LF	0.240 mh / LF	48	45.62 /mh	2,190	55.01	11,002	-	-	-	-			13,192	20,165
				40.01 Above Ground Process Piping	1,192 lf		2,334		77,424	116.20	138,511	10.00	11,922	4.03	4,801			232,658	358,496
		40.02		Valves, Meters, Etc.															
				6" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	4 ea	6.200 mh / ea	25	30.57 /mh	758	2,850.00	11,400	-	-	-	-			12,158	18,502
				Pressure Regulator 8"	2 ea	5.229 mh / ea	10	30.57 /mh	320			-	-	-	-			320	506
				40.02 Valves, Meters, Etc.	1 ls		35		1,078	11,400.00	11,400							12,478	19,008
		40.04		Hydropneumatic Piping System															
				Hydropneumatic Piping, Fitting & Valve Allowance	1 ls	mh / ls		45.62 /mh				17,000.00	17,000					17,000	25,801
				40.04 Hydropneumatic Piping System	1 ls							17,000.00	17,000					17,000	25,801
		43.10		Ozone Equipment															
				Freight On Equipment To Jobsite	1 ls			/ls											
				Verified Performance Test	1 ls			/ls											
				Vendor Verified Performance Test	1 ls			/ls						1,500.00	1,500			1,500	2,277
				Vendor Witnessed, Verified Performance Test	1 ls			/ls											
				Equipment Unloading, Setting, Startup & Testing	1 ls	650.000 ch / ls	3,575	182.62 /ch	118,706	500.00	500	-	-	31,005.98	31,006			150,212	237,984
				Ozone System Equipment	1 ls			/ls						3,300,000.00	3,300,000			3,300,000	5,008,461
				Air Compressor & Receiver	1 ea			/ea											
				Destruct Units (Blower, Analyzer, Preheater, Destruct Vessel)	2 ea			/ea											
				Blower Silencer	2 ea			/ea											
				Catalytic Chamber	2 ea			/ea											
				Cooling Water Pump	2 ea			/ea											
				Cooling Water Skid / Heat X-Changer 10' x 5.67'	2 ea			/ea											
				Cooling Water Supply Pumps	3 ea			/ea											
				Demister	2 ea			/ea											
				Eductor	2 ea			/ea											
				Filter	2 ea			/ea											
				Heater	3 ea			/ea											
				Ozone Diffuser	2 ea			/ea											
				Ozone Generator Skid 17' x 6.5'	2 ea			/ea											
				Ozone Injection Manifold 8" x 10.75' long	1 ea			/ea											
				Ozone Injection Water Supply Pumps	4 ea			/ea											
				Ozone Quench Manifold 30" x 11' long	2 ea			/ea											
				Particulate Filter	1 ea			/ea											
				43.10 Ozone Equipment	1 ls		3,575		118,706	500.00	500			31,005.98	31,006	3,301,500.00	3,301,500	3,451,712	5,248,722
				47.5 Ozone Facility	1 gsf		9,127		326,505	310,707.09	310,707	694,235.95	694,236						

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			03.05	Slab On Grade																
				Saw Cut S-O-G (.08/sf)	117 lf	0.030 mh / lf	4	39.17 /mh	138	0.17	20	-	-	0.95	111	-	-	269	425	
				Liquid Curing Compounds	1,580 sf	0.002 mh / sf	3	39.17 /mh	124	0.06	93	-	-	-	-	-	-	217	337	
				Seal Floors	1,462 sf	0.002 mh / sf	3	39.17 /mh	115	0.09	135	-	-	-	-	-	-	250	386	
				6 Mil. Vapor Barrier	1,600 sf	0.002 mh / sf	3	43.53 /mh	139	0.05	84	-	-	-	-	-	-	223	348	
				Gravel Fill Under Slab 4"	18 cy	0.004 cd / cy	2	1,412.15 /cd	96	29.26	527	-	-	3.84	69	-	-	692	1,062	
				03.05 Slab On Grade	36 cy		126		5,144	233.57	8,409			8.68	313			13,866	21,401	
			03.08	Pads & Curbs																
				LOX Tank Pad Form 24"	350 sf	0.180 mh / sf	63	39.49 /mh	2,488	1.37	478	-	-	-	-	-	-	2,966	4,663	
				LOX Vaporizer Pad Form 12"	78 sf	0.160 mh / sf	12	39.49 /mh	493	1.37	106	-	-	-	-	-	-	599	942	
				Chamfer	191 lf	0.015 mh / lf	3	39.49 /mh	113	0.57	108	-	-	-	-	-	-	221	343	
				Strip & Oil Equipment Pad Forms	428 sf	0.005 mh / sf	2	39.17 /mh	84	0.03	13	-	-	-	-	-	-	97	152	
				Rebar- Pads (100 #/cy)	1 tn	18.004 mh / tn	18	43.53 /mh	784	997.70	998	-	-	-	-	-	-	1,781	2,755	
				Finish- Float	223 sf	0.017 mh / sf	4	39.17 /mh	149	-	-	-	-	-	-	-	-	149	235	
				Pump Place Pads 12" & 24"	17 cy	1.600 mh / cy	27	41.39 /mh	1,126	-	-	-	-	7.49	127	-	-	1,253	1,985	
				4000 psi Concrete	17 cy	-	-	-	-	142.00	2,414	-	-	-	-	-	-	2,414	3,664	
				Liquid Curing Compounds	651 sf	0.003 mh / sf	2	39.17 /mh	77	0.06	38	-	-	-	-	-	-	115	179	
				03.08 Pads & Curbs	17 cy		131		5,313	244.44	4,155			7.49	127			9,596	14,918	
			26.01	Above Ground Electrical																
				Electrical Work For Equipment (5% Equipment Cost)	1 ls	-	-	/ls	-	-	-	43,160.00	43,160	-	-	-	-	43,160	65,505	
				26.01 Above Ground Electrical	1 ls							43,160.00	43,160					43,160	65,505	
			26.02	Instrumentation & Controls																
				Controls & Instrumentation Work For New Equipment (1.5% Equipment Cost)	1 ls	-	-	/ls	-	-	-	12,948.00	12,948	-	-	-	-	12,948	19,651	
				26.02 Instrumentation & Controls	1 ls							12,948.00	12,948					12,948	19,651	
			32.01	Fencing & Gates																
				8' Chain Link Fence @ LOX Tanks	111 lf	-	-	-	-	-	-	31.01	3,442	-	-	-	-	3,442	5,224	
				8' Fence Vehicle Gate 12' @ LOX Tanks	1 ea	-	-	-	-	-	-	1,700.34	1,700	-	-	-	-	1,700	2,581	
				32.01 Fencing & Gates	1 ls							5,142.02	5,142					5,142	7,804	
			40.00	Under Ground Process Piping																
				Trench Excav & Lay Pipe 0- 4'	100 lf	600.000 lf / cd	9	2,539.31 /cd	423	-	-	-	-	1.88	188	-	-	612	970	
				Stone Pipe Bedding	15 cy	200.000 cy / cd	5	2,896.43 /cd	217	23.29	349	-	-	-	-	-	-	567	874	
				DI Pipe Push - Class 52 4	200 lf	0.190 mh / lf	38	51.34 /mh	1,951	14.54	2,908	-	-	-	-	-	-	4,859	7,502	
				Hydrostatic Testing	100 lf	0.021 ch / lf	8	182.49 /ch	383	0.16	16	-	-	-	-	-	-	399	631	
				DI 90 ell 4"	2 ea	4.530 mh / ea	9	30.57 /mh	277	72.90	146	-	-	-	-	-	-	423	660	
				40.00 Under Ground Process Piping	100 lf		70		3,252	34.19	3,419			1.88	188			6,859	10,636	
			40.01	Above Ground Process Piping																
				Paint & Stencil Exposed Piping <20"	113 lf	-	-	-	-	-	-	10.00	1,130	-	-	-	-	1,130	1,715	
				Pipe Supports	5 ea	4.001 mh / ea	20	45.62 /mh	913	250.05	1,250	-	-	-	-	-	-	2,163	3,342	
				Hydrostatic Testing	113 lf	0.021 ch / lf	9	182.49 /ch	433	0.16	18	-	-	-	-	-	-	451	713	
				Gasket/Nuts/Bolt Kit 3"	10 ea	1.000 mh / ea	10	32.89 /mh	329	4.90	49	-	-	-	-	-	-	378	595	
				Gasket/Nuts/Bolt Kit 4"	15 ea	1.000 mh / ea	15	32.89 /mh	493	7.87	118	-	-	-	-	-	-	611	960	
				DI Flanged Joint Pipe 3"	50 lf	0.820 mh / lf	41	30.57 /mh	1,253	30.99	1,549	-	-	-	-	-	-	2,803	4,335	
				DI Flanged Joint Pipe 4"	63 lf	0.820 mh / lf	52	30.57 /mh	1,579	30.99	1,952	-	-	-	-	-	-	3,531	5,462	
				DI Flanged 90 ell 3"	20 ea	1.940 mh / ea	39	30.57 /mh	1,186	55.08	1,102	-	-	-	-	-	-	2,288	3,549	
				DI Flanged 90 ell 4"	30 ea	4.530 mh / ea	136	30.57 /mh	4,154	72.90	2,187	-	-	-	-	-	-	6,341	9,894	
				DI Flanged Tee 3"	3 ea	1.940 mh / ea	6	30.57 /mh	178	0.04	0	-	-	-	-	-	-	178	282	
				DI Flanged Con Red 4x3"	4 ea	4.530 mh / ea	18	30.57 /mh	554	107.52	430	-	-	-	-	-	-	984	1,529	
				40.01 Above Ground Process Piping	113 lf		346		11,072	76.60	8,656	10.00	1,130					20,858	32,376	
			40.02	Valves, Meters, Etc.																
				3" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	8 ea	3.000 mh / ea	24	30.57 /mh	734	1,425.00	11,400	-	-	-	-	-	-	12,134	18,463	
				4" Butterfly Valve, 125 lb class, CI Body, Flg. w/ EIM elec actuator NEMA 4	4 ea	3.500 mh / ea	14	30.57 /mh	428	1,900.00	7,600	-	-	-	-	-	-	8,028	12,212	
				40.02 Valves, Meters, Etc.	1 ls		38		1,162	19,000.00	19,000							20,162	30,675	
			43.17	LOX Equipment																
				Vaporizer 5.67'x5.67'x20" h, 6,000 lbs (Charter/Thermax #SG500)	2 ea	1.000 cd / ea	80	1,783.17 /cd	3,566	-	-	-	-	763.23	1,526	209,000.00	418,000	423,093	642,479	
				High Pressure Tank 10,960 gal, 9.5'dia.x34' h, 46,700 lbs (Charter #VS-11000SC)	2 ea	1.000 cd / ea	80	1,783.17 /cd	3,566	2,000.00	4,000	-	-	763.23	1,526	219,000.00	438,000	447,093	678,904	
				LOX Fo.; Station	1 ea	1.000 mh / ea	1	45.65 /mh	46	13,450.00	13,450	-	-	-	-	7,200.00	7,200	20,696	31,413	
				43.17 LOX Equipment	1 ls		161		7,178	17,450.00	17,450			3,052.90	3,053	863,200.00	863,200	890,881	1,352,796	
				47.6 LOX Equipment	1 ls		872		33,121	61,089.04	61,089	62,380.25	62,380	3,681.24	3,681	863,200.00	863,200	1,023,471	1,555,763	
				3E Filtration - Construct New Gravity Filters & Ozone Facility	1 ls		122,902		5,194,504	6,662,166.23	6,662,166	3,862,801.52	3,862,802	1,289,471.44	1,289,471	6,504,070.37	6,504,070	23,513,013	36,118,873	
3F			00	Building & Structure Construction																
			03.00	Foundation Mat																
				Keyway 6"	1,115 lf	0.050 mh / lf	56	39.49 /mh	2,202	0.67	749	-	-	-	-	-	-	2,951	4,622	
				Mat Foundation Edge Form 30"	1,295 sf	0.350 mh / sf	453	39.49 /mh	17,902	1.31	1,700	-	-	-	-	-	-	19,602	30,913	
				Mat Foundation Bulkhead Form	375 sf	0.350 mh / sf	131	39.49 /mh	5,183	1.52	571	-	-	-	-	-	-	5,754	9,069	
				Waterstop 6" Flat	1,265 lf	0.110 mh / lf	139	39.18 /mh	5,452	2.10	2,657	-	-	-	-	-	-	8,109	12,662	
				Strip & Oil Mat Found. Form	1,670 sf	0.005 mh / sf	8	39.17 /mh	327	0.03	50	-	-	-	-	-	-	377	594	
				Rebar- Foundation Mat (100 #/cy)	66 tn	28.006 mh / tn	1,848	43.53 /mh	80,454	997.70	65,848	-	-	-	-	-	-	146,302	227,275	
				Rebar Support - bricks (.12/sf)	1,695 ea	0.002 mh / ea	3	43.53 /mh	148	0.26	445	-	-	-	-	-	-	593	909	
				Finish- Hard Trowel	14,128 sf	0.023 mh / sf	325	39.17 /mh	12,730	-	-	-								