

TREATMENT PLANT

W&O CONSTRUCTION
FINAL PAY REQUEST

Project: Treatment Plant
CONTRACT APPLICATION FOR PAYMENT
Contractor: W & O Construction

APPLICATION NUMBER 9
APPLICATION DATE 6/11/21
PERIOD TO DATE 6/11/21

ITEM #	ITEM DESCRIPTION	UNIT	UNIT PRICE	CONTRACT VALUES		TOTAL FROM PREVIOUS ESTIMATES		THIS PERIOD		TOTAL TO DATE		Complt %
				EST. QTY	ITEM TOTAL	QTY	ITEM TOTAL	QTY	ITEM TOTAL	QTY	ITEM TOTAL	
1	Bonds and Insurance	LS	\$4,000.00	1	\$4,000.00	1	\$4,000.00		\$0.00	1	\$4,000.00	1
2	Mobilization	LS	\$18,000.00	1	\$18,000.00	1	\$18,000.00		\$0.00	1	\$18,000.00	1
3	Testing Allowance	LS	\$20,000.00	1	\$20,000.00		\$0.00	1	\$20,000.00	1	\$20,000.00	1
4	Excavation	LS	\$40,900.00	1	\$40,900.00	0.97	\$39,673.00		\$1,227.00	1	\$40,900.00	1
5	Reinforcing Steel	LS	\$24,100.00	1	\$24,100.00	1	\$24,100.00		\$0.00	1	\$24,100.00	1
6	Stone	LS	\$19,100.00	1	\$19,100.00	1	\$19,100.00		\$0.00	1	\$19,100.00	1
7	Concrete - Basin	LS	\$65,425.00	1	\$65,425.00	1	\$65,425.00		\$0.00	1	\$65,425.00	1
8	Concrete - Building	LS	\$42,700.00	1	\$42,700.00	1	\$42,700.00		\$0.00	1	\$42,700.00	1
9	Concrete - Site	LS	\$18,500.00	1	\$18,500.00	0.9	\$16,650.00		\$1,850.00	1	\$18,500.00	1
10	Site Piping	LS	\$16,800.00	1	\$16,800.00	1	\$16,800.00		\$0.00	1	\$16,800.00	1
11	Precast Concrete/Stormwater Pipe	LS	\$4,000.00	1	\$4,000.00	1	\$4,000.00		\$0.00	1	\$4,000.00	1
12	Metal Building	LS	\$40,500.00	1	\$40,500.00	1	\$40,500.00		\$0.00	1	\$40,500.00	1
13	Metal Building Installation	LS	\$15,000.00	1	\$15,000.00	1	\$15,000.00		\$0.00	1	\$15,000.00	1
14	Building Insulation	LS	\$14,750.00	1	\$14,750.00	1	\$14,750.00		\$0.00	1	\$14,750.00	1
15	Drywall	LS	\$10,000.00	1	\$10,000.00	1	\$10,000.00		\$0.00	1	\$10,000.00	1
16	Casework	LS	\$6,900.00	1	\$6,900.00	1	\$6,900.00		\$0.00	1	\$6,900.00	1
17	Painting	LS	\$4,300.00	1	\$4,300.00	0.95	\$4,085.00		\$215.00	1	\$4,300.00	1
18	Doors, Frames, Hardware	LS	\$3,950.00	1	\$3,950.00	1	\$3,950.00		\$0.00	1	\$3,950.00	1
19	Overhead Door	LS	\$2,525.00	1	\$2,525.00	1	\$2,525.00		\$0.00	1	\$2,525.00	1
20	Toilet Accessories	LS	\$350.00	1	\$350.00	1	\$350.00		\$0.00	1	\$350.00	1
21	Trench Drain	LS	\$6,350.00	1	\$6,350.00	1	\$6,350.00		\$0.00	1	\$6,350.00	1
22	Pumps/Grinder	LS	\$8,400.00	1	\$8,400.00	1	\$8,400.00		\$0.00	1	\$8,400.00	1
23	Flow Meter	LS	\$4,500.00	1	\$4,500.00	1	\$4,500.00		\$0.00	1	\$4,500.00	1
24	Mechanical Piping	LS	\$16,600.00	1	\$16,600.00	1	\$16,600.00		\$0.00	1	\$16,600.00	1
25	Equipment Installation	LS	\$17,500.00	1	\$17,500.00	1	\$17,500.00		\$0.00	1	\$17,500.00	1
26	Plumbing	LS	\$10,950.00	1	\$10,950.00	1	\$10,950.00		\$0.00	1	\$10,950.00	1
27	HVAC	LS	\$11,900.00	1	\$11,900.00	1	\$11,900.00		\$0.00	1	\$11,900.00	1
28	Electric	LS	\$25,000.00	1	\$25,000.00	1	\$25,000.00		\$0.00	1	\$25,000.00	1
29	Change Order No. 1	LS	\$10,194.00	1	\$10,194.00		\$0.00	1	\$10,194.00	1	\$10,194.00	1
TOTALS					\$483,194.00		\$449,708.00		\$33,486.00		\$483,194.00	11
STORED MATERIALS FROM ATTACHED SCHEDULE							\$0.00		\$0.00		\$0.00	
TOTAL WORK & STORED MATERIALS							\$449,708.00		\$33,486.00		\$483,194.00	
RETAINAGE ON WORK COMPLETED									\$0.00		\$0.00	
RETAINAGE ON STORED MATERIALS											\$0.00	
TOTAL WORK & STORED MATERIALS LESS RETAINAGE											\$483,194.00	

Tansi Waste Management, Inc.
Tansi Amenity Wastewater Treatment System
Bid Schedule

Bid Tabulation

Bid Date: Tuesday, August 25, 2009
 Bid Time: 12:00 p.m. local time
 Bid Location: ECE Services, 702 Old Jamestown Hwy., Crossville, TN 38555.

ITEM #	ITEM DESCRIPTION	UNIT	EST. QTY	Engineer's Estimate		W & O Construction		Roy Joe Angel		Baron & Dowdle		Merit Construction		East Tennessee Construction	
				UNIT PRICE	TOTAL EST. ITEM PRICE	UNIT PRICE	TOTAL EST. ITEM PRICE	UNIT PRICE	TOTAL EST. ITEM PRICE	UNIT PRICE	TOTAL EST. ITEM PRICE	UNIT PRICE	TOTAL EST. ITEM PRICE	UNIT PRICE	TOTAL EST. ITEM PRICE
1	CONCRETE BIOLOGICAL TREATMENT BASINS AND BUILDING	LS	1	\$135,000	\$135,000	\$178,000	\$178,000	\$205,000	\$205,000	\$236,849.00	\$236,849	\$255,000	\$255,000	\$213,500	\$213,500
2	TREATMENT PLANT BUILDING AND PROCESS EQUIPMENT	LS	1	\$140,000	\$140,000	\$170,000	\$170,000	\$221,900	\$221,900	\$189,549.00	\$189,549	\$173,095	\$173,095	\$283,500	\$283,500
3	SITE CIVIL FEATURES OWNER'S ELECTRICAL SUBCONTRACTOR ALLOWANCE	LS	1	\$50,000	\$50,000	\$80,000	\$80,000	\$85,400	\$85,400	\$102,293.00	\$102,293	\$165,000	\$165,000	\$139,500	\$139,500
4	(HORIZON ELECTRIC OF TENNESSEE) ENGINEER'S DISCRETIONARY ALLOWANCE	LS	1	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000.00	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
5	ALLOWANCE	LS	1	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000.00	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
SUBMITTED BID AMOUNT															
				\$ 370,000	\$ 370,000	\$ 473,000	\$ 473,000	\$ 557,300	\$ 557,300	\$ 573,691	\$ 573,691	\$ 638,095	\$ 638,095	\$ 681,500	\$ 681,500

I hereby certify that this is an accurate and correct tabulation of the bids received for this project. All bids have been checked for mathematical errors.



Environmental & Civil Engineering Services
 P.O. Box 6 Crossville, Tennessee 38557-0006
 702 Old Jamestown Hwy Crossville, TN 38555
 931.484.9321 Fax 931.484.9322

Chuck F. Burger, Mayor

Hilborn, Jim

From: Manson Clement [MansonC@southernsalesinc.com]
Sent: Thursday, November 01, 2012 2:30 PM
To: Hilborn, Jim
Subject: TANSI GE MBR Value

Jim, please find below the itemization of the Tansi GE MBR amounts for your use.

Here are the correct figures

Original contract	\$393,830.00
BF4 Screen Added	\$41,303.00
Membranes added	<u>\$45,000.00</u>
Total	\$480,133.00

We have also added the UV unit in the amount of ~\$10,000.

490,000

Jim, please confirm that you received this information and let me know if you need anything more!

Regards,

Manson Clement
Southern Sales Company, Inc.
mansonc@southernsalesinc.com
(423) 559-1639 home office
(865) 250-4782 cell
(423) 728-4146 home fax
(800) 843-5523 Nashville office

Hilborn, Jim

From: Manson Clement [MansonC@southernsalesinc.com]
Sent: Tuesday, November 20, 2012 12:36 PM
To: Hilborn, Jim
Subject: RE: TANSI Membrane Replacement Price

Yes! 10 years.

Regards,

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From: Hilborn, Jim [mailto:JHilborn@grwinc.com]
Sent: Tuesday, November 20, 2012 1:17 PM
To: Manson Clement
Subject: RE: TANSI Membrane Replacement Price

Manson,
The way I read this is we need to figure replacing 16 modules (at \$2,910) every 8 to 10 years?
Thanks,

$$16 \times 2,910 = 46,560 \text{ per 10 years}$$
$$= 4,656 \text{ /YR}$$

Jim Hilborn
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Nashville TN, 37217
JHilborn@grwinc.com

615-366-1600 Office
615-366-0406 Fax
615-210-8565 Cell

From: Manson Clement [mailto:MansonC@southernsalesinc.com]
Sent: Monday, November 19, 2012 9:59 AM
To: Hilborn, Jim
Subject: RE: TANSI Membrane Replacement Price

Jim, I have posted below some description from GE regarding what is installed and what they were proposing with regard to expansion and flow ranges. This should help with understanding what we have presently installed. I think that TANSI has 2 trains with 1 cassette per train and 8 modules per cassette, thus a total of 16 modules. However, I have sent a request to GE to confirm and will let you know upon receipt of the information.

Good Morning Duke,

When we met on October 21st, my understanding is that the District would like to have a firm Average Day Flow capacity of 300,000 gpd with the next phase of construction. My understanding is that the State rates treatment plant capacity with the largest unit off line.

If it is correct for me to assume that your two existing trains, now fully populated with modules, each contribute an ADF of 50,000 gpd; you currently have a plant rated capacity of 50,000 gpd. However, if the District is able to expand by adding two new trains with an ADF of 200,000 gpd each, then the firm capacity of Phase 1 and Phase 2 can be revised upward.

Allow me to label the two existing trains as "A" and "B", and allow me to label the two proposed trains as "C" and "D". Trains A and B have ADF capacities of 50,000 gpd respectively. Proposed trains C and D will have capacities of 200,000 gpd respectively. Thus the Phase III expansion will provide the District with a firm capacity of 50K + 50K + 200K = 300,000 gallons per day Average Day Flow, with one 200,000 gpd train off line.

I think you are going to need a ZMOD L-96 System (see attachments) with two ZW-500D cassettes per train. If you desire additional capacity, I suggest that you consider a ZMOD L-192 System with the capacity to go to 400,000 gpd per train.

Regards,

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From: Manson Clement
Sent: Monday, November 19, 2012 10:12 AM
To: 'Hilborn, Jim'
Subject: RE: TANSI Membrane Replacement Price

Jim, I have attached a data sheet for the ZMOD L for your use. This was included in a budget proposal for expansion of the Tansi unit. I will go back into my file to see what size cassettes are presently installed.

This is a 3 page document and on page 2 I have placed a red boarder around the cassette and module. This indicates that there are 48 modules in a fully populated 500D cassette. The cassettes may not be fully populated as I will need to check with GE to see and I will let you know.

Hope this helps!

Regards,

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From: Manson Clement
Sent: Monday, November 19, 2012 10:02 AM
To: 'Hilborn, Jim'
Subject: RE: TANSI Membrane Replacement Price

A module fits in a cassette, so there are several modules in a single cassette. I will check to see how many.

Regards,

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From: Hilborn, Jim [<mailto:JHilborn@grwinc.com>]
Sent: Monday, November 19, 2012 9:36 AM
To: Manson Clement
Subject: RE: TANSI Membrane Replacement Price

Manson
I don't understand this. I think we had just one ZW500 unit? Do we use \$2,910 depreciation a year?

Jim Hilborn
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404 BNA Drive, Suite 201
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JHilborn@grwinc.com

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615-210-8565 Cell

From: Manson Clement [<mailto:MansonC@southernsalesinc.com>]
Sent: Friday, November 16, 2012 1:39 PM
To: Hilborn, Jim
Subject: TANSI Membrane Replacement Price

Jim, per our discussion on Wednesday afternoon regarding Lake Tansi GE Membranes, please find the information below:

Manson:

For their lifecycle cost evaluation, please advise them to use \$2,910 USD per ZW500a module. This price escalates at CPI+1% and is adjusted monthly in our contracts. Please note that this price is for replacement membranes only, i.e., it is not to be used for expansion of the facility. Replacement modules have a two year full warranty for mechanical defects.

Please let me know if you need anything more!

Regards,

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Z-MOD* L Packaged Plant

Pre-engineered Packaged Plants are cost effective, compact solutions for wastewater treatment

Base System

- Zeeweed* 500 reinforced ultrafiltration Membranes and Membrane Tanks
- Preassembled equipment skid with:
 - 1) Permeate Pump
 - 2) Valves & Instrumentation
 - 3) Control Panel with PLC & Interface
- Backpulse Tank and Air Compressor
- Plant start-up and operator training

Application Dependent Options

- Biological equipment includes screening, process blowers, diffusers, RAS pumps, mixers, and enhanced nitrogen removal systems
- Chemical systems for enhanced coagulation, pH control and membrane cleaning
- Effluent systems including turbidity measurement and UV disinfection
- Available shelf and online spares, parts, service contracts and process tracking software
- 24/7 technical support
- Zenotrac proprietary data analysis and tracking system
- SCADA Systems

Equipment Material

- Epoxy coated carbon steel Frame
- 316 Stainless Steel permeate, recirculation and aeration piping on the equipment skid
- Epoxy coated carbon steel membrane tank
- High density polyethylene backpulse tank



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SC-2MODL-DAT-EN 0107 NA/EMEA

DATA SHEET Z-MOD L SYSTEMS

		Z-MOD L88	Z-MOD L96	Z-MOD L192
Design Flow Rates				
Minimum Sustainable Flow Rate (1 train running, 1 in standby)	gpd	50,400	108,000	115,200
Maximum Hydraulic Flow Rate (Both Trains Running)	gpd	316,800	662,400	1,382,400
Permeate Discharge Design				
Minimum Permeate Flow (FCL) (without going into Standby)	gpm	35	75	80
Maximum Permeate Flow (FCH)	gpm	120	230	480
Maximum Discharge Pressure	psig	20	20	20
Cassette Configuration				
Type of Membrane		500D	500D	500D
Number of Trains		2	2	2
Typical Number of Cassettes per Train		1	1- 2	2 - 4
Number of Modules per Cassette		48	48	48
Standard Equipment				
Membrane Aeration Blowers		2	2	2
Total Number of Membrane Tanks		2	2	2
Reversible Permeate/Backpulse Pump		2	2	2
Backpulse Tank		1	1	1
Control Panel		1	1	1
PLC		1	1	1
HMI		1	1	1
Equipment Skid		1	1	1
Tie points Connections				
Permeate Pump Inlet	inch	3"	4"	6"
Common Effluent Discharge Piping	inch	4"	6"	8"
Gravity Recirculation Piping	inch	8"	10"	12"
Utility Water Piping	inch	3"	3"	3"
Equipment Footprint				
Skid Installation Length	ft	11.6	13.2	14.8
Skid Installation Width	ft	5	5	6.6
Skid Installation Height	ft	3.5	4.25	5.11

DATA SHEET Z-MOD L SYSTEMS

Membrane Tank Tie Points

	One Cassette	Two Cassette	Three Cassette	Four Cassette	Five Cassette	Six Cassette
Permeate	4"	4"	6"	6"	10"	10"
Air	2 x 3"	2x6"	2x6"	2x6"	2x10"	2x10"
Feed	8"	10"	14"	20"	24"	24"
Recirculation	8"	10"	10"	14"	20"	20"
Overflow	8"	10"	10"	20"	24"	24"
Drain	4"	4"	4"	4"	4"	4"
Sprayer	2"	2"	2"	2"	2"	2"
Length	9.8ft	16.5ft	23.2ft	29.8ft	36.7ft	43.3ft
Width	11ft	11ft	11ft	11ft	11ft	11ft
Height	11ft	11ft	11ft	11ft	11ft	11ft
Railing Height	43"	43"	43"	43"	43"	43"

		Z-MOD L88	Z-MOD L96	Z-MOD L192
Typical Equipment Footprint Dimensions				
Estimated Building Length	ft	30	30	45
Estimated Building Width	ft	50	50	50
Required Height to Hoist Hook for Membrane Removal	ft	26.5	26.5	26.5

**Building dimensions include equipment skid, membrane tanks, backpulse tank, membrane loading area, UV disinfection, chemicals

Options Available

Process Equipment

Process Aeration Blowers		2	2	2
Acoustical Enclosure for Process Blowers		2	2	2
Aerobic Diffusers		1 Lot	1 Lot	1 Lot
Anoxic Mixing (Mechanical Mixer)		1	1	1
EQ Transfer Pumps		2	2	2
Recirculation Pumps		2	2	2
Enhanced Nitrogen Removal System		1 Lot	1 Lot	1 Lot

Chemical Equipment

pH Adjustment		1 Lot	1 Lot	1 Lot
Enhanced Coagulation		1 Lot	1 Lot	1 Lot
Phosphorous Removal		1 Lot	1 Lot	1 Lot
Co-Nutrient Dosing		1 Lot	1 Lot	1 Lot
NaOCL Cleaning System		1 Lot	1 Lot	1 Lot
Citric Acid Cleaning System		1 Lot	1 Lot	1 Lot

Effluent & Discharge Equipment

Turbidity Measurement		1 Lot	1 Lot	1 Lot
Effluent Mag Meter		1 Lot	1 Lot	1 Lot
UV Disinfection Peak Flow - No Redundancy		1 Lot	1 Lot	1 Lot
UV Disinfection Redundancy at Average Flow		2 Lot	2 Lot	2 Lot

Control Equipment

Allen Bradley PLC upgrade		1	1	1
Auto dialer		1	1	1
ZenoTrac Data Monitoring System		1	1	1

PROJECT COST

**Tansi Sewer System
Summary of Project and Development Costs**

CONSTRUCTION AND EQUIPMENT COSTS

Collection System Projects	\$500,300.00
Treatment Plant Construction	\$483,200.00
Treatment Plant Equipment	\$490,000.00

TOTAL CONSTRUCTION AND EQUIPMENT COST \$1,473,500.00

ESTIMATED DEVELOPMENT COSTS

Engineering (Based on RD recomm. fees)

Preliminary Report	\$10,000.00
Design	\$91,900.00
Construction Representation	\$120,000.00
Legal	\$25,000.00
Interest During Construction	\$25,000.00

TOTAL PROJECT COSTS \$271,900.00

TOTAL PROJECT COSTS \$1,745,400.00

**TANSI SEWER SYSTEM
ENGINEERING FEE CALCULATIONS**

Item	Construction Cost	RD Recc Fee %	Engineering Fee
Collection System	\$411,300.00	5.79%	\$23,814.27
WWTP Construction	\$483,200.00	7.00%	\$33,824.00
WWTP Equipment	\$490,000.00	7.00%	\$34,300.00
Additional Grinders	\$594,000.00		\$0.00
TOTAL COST	\$1,978,500.00		\$91,938.27

PRESENT WORTH ESTIMATE

**Tansi Sewer System
Present Worth Estimate
Straight Line Depreciation**

2008 CONSTRUCTION AND EQUIPMENT COSTS	2009 Value	Life Exp. Years	Annual Depreciation	2012 Value
Collection System Projects*	\$500,300.00	20	\$25,015.00	\$425,255.00
Treatment Plant Construction	\$483,200.00	40	\$12,080.00	\$446,960.00
Treatment Plant Equipment	\$490,000.00	30	\$16,333.33	\$441,000.00
TOTAL CONSTRUCTION AND EQUIPMENT COST	\$1,473,500.00			\$1,313,215.00
TOTAL PROJECT COSTS	\$271,900.00			

*Dollar value break down is approximately 50% Lines and 50% pumps. The pumps have a life expectancy of 10 years and the lines 30 years for an average of 20 years.