

May 14, 2021

Board of Directors
Fort Bend County MUD 37
c/o Johnson & Petrov, LLP
2929 Allen Parkway, suite 3150
Houston, Texas 77019

Re: FBCMUD 37 WWTP Evaluation

Dear Board:

We have completed our investigation and evaluation of the Fort Bend County MUD 37 Wastewater Treatment Plant ("WWTP"). After review of the original engineering plans, interviews with the operator, analysis of process calculations, and personal observations, we have found the following:

- The WWTP was designed and permitted for an average daily flow of 0.175 mgd under the previous TCEQ Chapter 317 Design Criteria using a 200 mg/l influent BOD concentration;
- Existing influent flow varies from about 50% to 60% of permitted flow, depending on rainfall and I/I into the collection system;
- Additional development in the District will increase influent flow to the WWTP by about 0.1 mgd;
- The plant has been under TCEQ enforcement for several years for incompliance with its TPDES permit;
- The TPDES permit is currently being amended to provide for a maximum monthly average flow of 0.35 mgd, which would require doubling the plant capacity;
- The volumes and loading of the aeration basin and clarifier meet the new TCEQ Chapter 217 Design Criteria using a 300 mg/l BOD concentration; however, the digester is significantly deficient in volume;
- The original plant was designed using a complete mix activated sludge process which allows short-circuiting of wastewater through the aeration basin and incomplete nitrification of incoming ammonia;
- The existing air blowers and air diffusion systems in the aeration basin and digester are insufficient to provide the oxygen needed to meet the effluent quality requirements of the TPDES discharge permit.
- The design of the octagonally-shaped clarifier results in insufficient collection of settled sludge to the center withdrawal point, and flotation of the sludge that settles in the "corners" occurs, causing effluent total suspended solids (TSS) to be elevated.
- There is evidence of uneven settling of the lift station wetwell, a situation that has been repaired to some degree, but a question about the structural integrity remains.

A study is underway to consider serving the proposed Wellville residential/wellness/healthcare facility located to the east and adjacent to the WWTP which would require as much as 0.1 mgd of wastewater treatment capacity, triggering the necessity to expand the WWTP. There is no assurance that the study will result in the need to expand the WWTP at this time. Therefore, a two-phase approach is recommended. The first phase would include improvements to meet the required TPDES

discharge standards for the current 0.175 mgd average daily flow. The second phase would expand the plant to treat an average daily flow of 0.35 mgd, and would be implemented when the needs arise.

Phase One Improvements

The recommended Phase I WWTP Improvements would include the following:


- Temporarily modifying the WWTP to utilize the existing digester to act as the aeration basin during modifications to the existing Aeration Basin;
- A detailed order of work has been prepared to demonstrate the sequencing and timing of work to achieve the Phase I Improvements and is shown in Table 1;
- Construction of a new influent fine screening facility to remove particles greater than 0.1 inch in size to keep debris from settling and filling the bottom of the Aeration Basin;
- Construction of a dividing wall in the Aeration Basin and rerouting of flows to prevent short-circuiting of influent flow;
- Installation of a new high efficiency fine bubble air diffusion in the Aeration Basin;
- Installation of two self-priming pumps to move sludge from the clarifier either back to the Aeration Basin (RAS) or to the Digester (WAS);
- Installation of new high efficiency fine bubble air diffusers in the Digester to promote greater stabilization of sludge;
- Installation of two new positive displacement blowers to provide air supply to the Digester;
- The proposed WWTP Improvements are shown in Figure 1.
- The Estimated Construction Budget for the Phase I Improvements is \$484,990 as shown in Table 1.

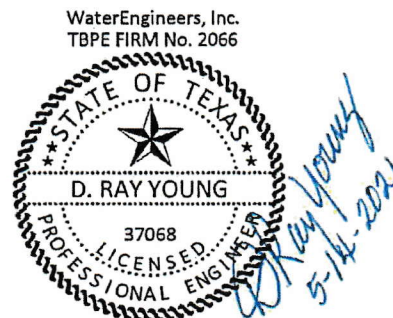
Phase II Expansion

The Phase II Expansion would include the addition of a second aeration basin, a second clarifier, an expansion to the chlorine contact basin, an addition of a gravity sludge thickener, and an expansion of the Aerobic Digester. The expansion will require modifications to the adjacent walking trail and detention pond. Figure 2 shows the outline of the proposed expansion. The recommended Construction Budget for the expansion is \$1,750,000.

Please contact me if you have questions or comments.

Sincerely,
WaterEngineers, Inc.


D. Ray Young, P.E.
Principal Engineer



Attachments: Table 1 - Order of Work and Construction Cost Estimate for WWTP Improvements
Figure 1 – Site Plan for Proposed WWTP Improvements
Figure 2 – Site Plan for Future WWTP Expansion

TABLE 1
COST CONSTRUCTION BUDGET
FORT BEND COUNTY MUD 37 WASTEWATER TREATMENT PLANT IMPROVEMENTS

Task No.	DESCRIPTION OF WORK	Time Req'd, Days	Time Since Begin	Estimated Cost	Markup, %	Item cost, \$
1	Payment & Performance Bonds	0	0	\$14,000	0.00%	\$14,000.00
2	Order new rotating drum screen	30	30	\$75,000	15.00%	\$86,250.00
3	Order two new blowers for digester basin	30	30	\$60,000	15.00%	\$69,000.00
4	Order new blower control panel	30	30	\$10,000	15.00%	\$11,500.00
5	Order two self-priming pumps and install on a fabricated skid	30	30	\$20,000	15.00%	\$23,000.00
6	Order pump VFD control panel and floats	30	30	\$10,000	15.00%	\$11,500.00
7	Order fabricated air headers and air line for digester aeration	30	30	\$10,000	15.00%	\$11,500.00
8	Order new fabricated air header for aeration basin	30	30	\$10,000	15.00%	\$11,500.00
9	Order air diffusion equipment for the digester	30	30	\$10,000	15.00%	\$11,500.00
10	Order air diffusion equipment for the aeration basin	30	30	\$15,000	15.00%	\$17,250.00
11	Order fabricated screen/flow splitter box	30	30	\$10,000	15.00%	\$11,500.00
12	Order piping and valves	30	30	\$17,000	15.00%	\$19,550.00
13	Order screen lined dumpster	30	30	\$10,000	15.00%	\$11,500.00
14	Mobilization	30	60	\$5,000	0.00%	\$5,000.00
15	Excavate for Screen Pad footings	1	61	\$2,500	0.00%	\$2,500.00
16	Form & pour concrete footings & slab under screen	7	68	\$7,500	0.00%	\$7,500.00
17	Form & pour concrete columns	7	75	\$5,000	0.00%	\$5,000.00
18	Form & pour elevated concrete slab	15	90	\$15,000	0.00%	\$15,000.00
19	Install stairs and handrail at screen platform	7	97	\$7,500	0.00%	\$7,500.00
20	Install rotary drum screen	7	104	\$1,000	0.00%	\$1,000.00
21	Install screen control panel and run conduit and wire	2	106	\$3,000	15.00%	\$3,450.00
22	Install bar screen/splitter box	3	109	\$1,000	0.00%	\$1,000.00
23	Install connect lines and valves'	4	113	\$2,000	0.00%	\$2,000.00
24	Extend line from splitter box to Aeration Basin	3	116	\$2,000	0.00%	\$2,000.00
25	Clean out Digester	1	117	\$3,000	15.00%	\$3,450.00
26	Core digester wall for suction line of temporary ML transfer pumps	1	118	\$500	15.00%	\$575.00
27	Core RAS chamber wall for suction line for RAS pumps (temporarily used @ digester)	1	119	\$500	15.00%	\$575.00
28	Install new air diffusion equipment in Digester	5	124	\$2,500	0.00%	\$2,500.00
29	Install new or used bar screen in digester	1	125	\$1,000	0.00%	\$1,000.00
30	Lay temporary influent line from lift station to digester	2	127	\$1,500	0.00%	\$1,500.00
31	Install temporary ML transfer pumps at digester (to be relocated later)	3	130	\$2,000	0.00%	\$2,000.00
32	Install mixed liquor transfer pump VFD control panel and level sensor floats	2	132	\$3,000	15.00%	\$3,450.00
33	Install mixed liquor transfer line from ML pumps to near clarifier inlet	3	135	\$3,000	0.00%	\$3,000.00
34	Install air headers and air line for digester aeration	2	137	\$1,500	0.00%	\$1,500.00
35	Install new digester blowers	2	139	\$1,000	0.00%	\$1,000.00
36	Install air piping to connect new blowers to digester air main	2	141	\$1,000	0.00%	\$1,000.00
37	Extend air lines from existing blowers to air drop points in Aeration Basin	7	148	\$2,000	0.00%	\$2,000.00
38	Re-route RAS pump discharge to Digester using existing WAS line	1	149	\$500	0.00%	\$500.00
39	Drain and clean existing aeration basin	2	151	\$6,000	15.00%	\$6,900.00
40	Make final connection of temporary ML transfer line to clarifier inlet	1	152	\$1,000	0.00%	\$1,000.00
41	Connect temporary force main at lift station	1	153	\$500	0.00%	\$500.00
42	Begin Temporary Operations with Digester serving as the Aeration Basin	0	153	\$0	0.00%	\$0.00
43	Excavate existing force main and reroute and connect to rotary drum screen'	7	160	\$5,000	0.00%	\$5,000.00
44	Form concrete divider wall in Aeration Basin	10	170	\$7,500	0.00%	\$7,500.00
45	Pour concrete wall	2	172	\$7,500	0.00%	\$7,500.00
46	Install new air diffusion equipment in Aeration Basin	7	179	\$5,000	0.00%	\$5,000.00
47	Connect piping to existing blower supply line	3	182	\$1,000	0.00%	\$1,000.00
48	Fill Aeration Basin with clear water and test with 2 feet of water over diffusers	1	183	\$500	0.00%	\$500.00
49	Convert process back to using Aeration Basin	5	188	\$500	0.00%	\$500.00
50	Disconnect temporary force main and remove	1	189	\$500	0.00%	\$500.00
51	Disconnect RAS line to digester and remove piping	1	190	\$500	0.00%	\$500.00
52	Disconnect temporary ML transfer line and remove piping'	1	191	\$500	0.00%	\$500.00
53	Relocate RAS/WAS pump skid under screen slab	7	198	\$1,500	0.00%	\$1,500.00
54	Electrical wiring and control relocation	2	200	\$3,000	15.00%	\$3,450.00
55	Connect RAS/WAS pump suction to RAS/WAS sludge chamber	3	203	\$1,500	0.00%	\$1,500.00
56	Connect RAS/WAS pump discharge line to the head of the Aeration Basin	2	205	\$1,500	0.00%	\$1,500.00
57	Saw cut and remove old concrete, fill & hydromulch	5	210	\$3,000	0.00%	\$3,000.00
58	Add crushed concrete to return access drive to good condition	5	215	\$1,500	0.00%	\$1,500.00
59	Clean up site	5	220	\$1,000	0.00%	\$1,000.00
60	Demobilize	15	235	\$5,000	0.00%	\$5,000.00
61	Subtotal Construction Cost Budget					\$440,900.00
62	Contingency @ 10%					\$44,090.00
63	Total Construction Cost Budget					\$484,990.00