

# MEMO



ST. TAMMANY PARISH

Michael B. Cooper  
Parish President

Date: March 30, 2022

To: Ms. Gina Hayes, Chief Administrative Officer

From: Department of Utilities (DU) Staff

Re: Corrected Rev. 4 (30MAR22): DU Response to Owen & White Cross Gates Water Study Recommendations - (30MAR22 Corrections are to clarify work being performed through Water Sector Project is not currently complete, but will be completed through the Water Sector Project)

The previously provided responses have been updated to reflect the current status of addressing the O&W recommendations. Please see updated responses below noted with (30MAR22) preceding the response.

X	Consultant RECOMMENDATION	Consultant COST	DU RESPONSE/RECOMMENDATION
1	<p>Install sample taps at each hydropneumatic tank inlet for chemical adjustment. Currently there are no sample taps following chemical addition and BEFORE the hydropneumatic tanks. Samples must be taken after the tanks to record the POE chlorine levels for regulatory reporting. But, as in the case of the Steele Road well, the water in the tank at the POE could be stagnant and aged. Sample taps before the tanks will allow for fresh samples to be collected and allow the operators to make chemical feed adjustments immediately.</p>	\$15,000	<p>DU will install sample taps before the hydropneumatics tanks as recommended.</p> <p>(04JAN22): Sample taps have been installed at Willow Wood well and sample tap location at Steele Rd. has been marked. Sample tap at Steele Rd. to be installed soon.</p> <p>(24JAN22): Sample taps have been installed.</p> <p>Work Complete.</p>
2	<p>Adjust sodium hypochlorite feed rates to achieve target levels for optimum monochloramine level. Bill Travis with TMB developed theoretical dosages to achieve optimum monochloramines. Feed rates in the field will vary depending on bulk sodium hypochlorite concentrations. Testing revealed that these concentration levels varied greatly. Consequently, feed rates will vary until a consistent concentration of bulk sodium hypochlorite is maintained. Mr. Travis has performed extensive testing of the water for both Cross Gates and Meadow Lake and should consult with the operators concerning testing of the water before it</p>	\$0	<p>DU will adjust feed rates accordingly.</p> <p>(04JAN22): Sodium hypochlorite feed rates have been adjusted as specified. Mr. Bill Travis continues to adjust the system as needed to optimize the total chlorine residuals.</p> <p>Work Complete.</p>

	<p>enters the hydropneumatic tanks to ensure that optimum monochloramine levels are achieved. Optimum levels will help to control nitrification in the distribution system and will produce the best water quality while using chloramination. Theoretical calculations show that the Steele Road water was being under dosed for optimum chloramine formation. Optimum target total chlorine residuals as determined by TMD and as presented by Tammany Utilities to LDH are 2.7 mg/l for the Steele Road and Meadow Lake wells and 3.0 mg/l for the Willow Wood Well.</p>		
3	<p>Purchase new sodium hypochlorite feed pumps with greater capacity (337 ml/min). New pumps should be variable speed via a 4-20 Ma input from the flow meter. The current feed pumps cannot achieve a free chlorine residual in the event that a "burn out" of the system is needed. This report includes pumps sized that can be used for normal feed rates to obtain optimum chloramines but that also have the capacity to feed enough sodium hypochlorite to achieve a good free chlorine residual even with 6% bulk sodium hypochlorite. All sites should have duplicate chemical feed pumps and all chemical feed pumps should be flow paced. "Step" chemical feed pumps may be required if the JESCO pumps are found to provide inconsistent feed rates at the discharge pressures of 55 to 70 psi.</p>	\$15,000	<p>New / Larger pumps, Magdos Model # LP20 have been installed.</p> <p>Work complete.</p>
4	<p>Conduct a free chlorine burn as soon as adequate chemical feed equipment has been installed and as soon as approval from LDH has been obtained. Once the system is purged and returned to chloramines and evaluated, an annual burn out of the system can be considered. Proper notification must be given to all customers and LDH whenever a change in disinfectant is done. The decision to change to free chlorine for a burn out should be based on system stability, demand of chlorine at the POE versus monochloramine residual concentrations at all sampling points and the MRT, and all other system parameters. It is possible that once all issues are resolved and a very stable monochloramine system is achieved, that no additional burn outs are deemed necessary. It is premature at this time to speculate whether an annual burn out will be necessary. (No Capital cost)</p>	*need cost estimate	<p>We disagree that a chlorine burn out of the system should be done annually without regard to the results of our nitrification monitoring plan. We do agree with the report that "the decision to change to free chlorine for a burn out should be based on system stability, demand of chlorine at the POE versus monochloramine residual concentrations at all sampling points and the MRT, and all other system parameters". Based on the results of our nitrification monitoring plan and at the advice of Bill Travis (Thornton, Musso, &amp; Bellemin), a free chlorine burn is not needed or recommended</p>

at this time. The negative effects of a chlorine burn on the quality of the water provided including increases in chlorine odor, taste, and discoloration from oxidation of iron and manganese (brown water) is an unnecessary and unwarranted inconvenience to our customers. In addition to the aesthetic impacts, there will also be an exponential increase in carcinogens in the form of disinfection by-products produced in the disinfection process.

However, if a chlorine burn is desired, we strongly recommend a third party be contracted to provide the procedure and supervision/monitoring of the performance of the chlorine burn, and all in accordance with LDH rules, regulations, and approvals. Cost of this additional work shall be determined later upon approval.

(04JAN22): DU is in process of coordinating supplies, equipment, and personnel to perform the temporary conversion from Total Chlorine (Chloramine) system to Free Chlorine system (aka. Chlorine burn). Immediately following verification of needed supplies, equipment, & personnel application will be made to Louisiana Department of Health (LDH) for the temporary conversion. A minimum of 2 weeks (14 days) public notice will be provided prior to initiating conversion.

(24JAN22): DU has lined up Chlorine supply and is working on remaining supplies. The remaining field work modifications should be completed

next week weather permitting. Contract has been received from Curtis Environmental and has been submitted to Civil Division for review prior to signature. Immediately following verification of needed supplies, equipment, and execution of contract with Curtis Environmental application will be made to Louisiana Department of Health (LDH) for the temporary conversion. A minimum of 2 weeks (14 days) public notice will be provided prior to initiating conversion.

(23MAR22): Contract with Curtis Environmental is being finalized. Immediately following execution of contract with Curtis Environmental, the application will be made to Louisiana Department of Health (LDH) for the temporary conversion of the Cross Gates water distribution system from Total Chlorine (Chloramine) disinfection to Free Chlorine disinfection. A minimum of 2 weeks (14 days) public notice will be provided prior to initiating conversion. Chlorine, supplies, and equipment have been secured.

Work in progress.

5	Dual bulk sodium hypochlorite tanks are recommended at each site with a minimum of ten days storage maintained. Sodium hypochlorite in each bulk tank must be used completely before a tank is refilled. Tanks must be washed out thoroughly before refilling with new sodium hypochlorite. It may be possible to construct a bulk sodium hypochlorite storage facility for Tammany Utilities so that the minimum of ten days storage is not required at each site. Approval from LDH will be required to implement this plan. If approved, the size of bulk storage tanks at each site could be greatly reduced along with the time that the chemical is held at each site before it is fed into the raw water. (\$10,000 / site = \$30,000 Total)	\$30,000	*See # 6 response below
6	Tammany Utilities should consider switching to 6% bulk sodium hypochlorite. While the use of 6% sodium hypochlorite will require larger feed pumps and larger bulk storage tanks, degradation of the chemical will be greatly reduced with a more consistent feed achieved. 12% sodium hypochlorite will need to be utilized during a burn out or larger chemical feed pumps purchased. (Increased Chemical cost)	*increased cost of chlorine	DU is considering the switch to the 6% bulk sodium hypochlorite. Several factors will be impacted by this (operations, storage tanks, larger sheds, pumps) and DU will need time and funding to make the transition.
7	Insulate the wooden chlorine and chemical feed buildings. Temperatures recorded in the building were extremely high which is very detrimental to the sodium hypochlorite. A constant and low temperature is needed to properly store sodium hypochlorite. (\$15,000/site = \$45,000 Total).	\$45,000	DU has investigated a contract to have new insulated building designed & built with proper air conditioning. Preliminary cost estimated to be \$60,000 per building and funding is required.
8	Ensure proper operation of the air conditioning units in each building – Room temperature of 70°F max. should be maintained but would prefer 62°F for stabilized sodium hypochlorite. Window units may not be ideal given the corrosive nature of the atmosphere. (\$10,000/site = \$30,000 Total).	\$30,000	*see # 7 response above
9	Larger calibration chambers are needed to check the calibration of each chemical feed pump, especially if 6% sodium hypochlorite is considered. (\$250/site = \$750)	\$750	DU will purchase this larger calibration chamber as suggested.  (04JAN22): DU has purchased the larger calibration chambers. Chambers will be installed upon receipt.  (24JAN22): DU has installed larger calibration chambers at Steele Rd. well site and Willow Wood well site.

		<p>Meadow Lake well site is scheduled to be installed January 28, 2022.</p> <p>(23MAR22): DU has installed larger calibration chamber at Meadow Lake well site.</p> <p>Work complete.</p>
10	<p>Alternate Steele Road and Willow Wood operation every other day. This will take modifications to the recently installed SCADA system such that control can be added, or the addition of PLC's at each site programmed to alternate wells each day. Currently the Willow Wood site overpowers the Steele Road site such that the Steele Road site remains idle for extended periods of time. Water quality at the Steele Road site will be adversely affected until the wells are alternated. (Cost in Item 11)</p>	<p>DU agrees with this recommendation, however, will need the necessary equipment and upgrades to existing SCADA to perform the alternating operation between wells.</p> <p>(04JAN22): Steele Rd. and Willow Wood operation is manually alternated daily. SCADA/PLC requirements and modifications are being evaluated and investigated.</p> <p>(24JAN22): Steele Rd. and Willow Wood operation is manually alternated daily. SCADA/PLC requirements and modifications are being evaluated and investigated.</p> <p>(23MAR22): Steele Rd. and Willow Wood operation is manually alternated daily to optimize water quality. Improved remote control or addition of PLC's at each site to alternate wells each day will be evaluated as part of system modeling portion of Water Sector project.</p> <p>(30MAR22): Wells are currently being alternated as recommended. Evaluation of remote control or addition of PLC's at each site to be included as part of Water Sector project that has been awarded funding.</p>

11	SCADA – Manual control of the well pressure settings is needed in order to make one well the primary well and the other well the secondary well. The SCADA system should be modified or PLC's added at each well site to allow control of each well by the operators with set points to achieve primary and secondary operation of the wells.	\$20,000	See Item #10 above.
12	It is recommended that all call out alarms from the well sites are directed to the sheriff's office first. The sheriff's office is manned 24/7. The sheriff's office can locate an operator to address the issue, rather than calls going to voice recordings. This recommendation was suggested by members of the Council. We request that the council resolve this issue of notification with Tammany Utilities. (No cost)	\$0	<p>DU does not feel it would be proper to burden the 911 system with non-emergency calls. We currently have the means with our after-hours call system 24/7/365. When calls are received, on call key personnel are alerted and respond accordingly.</p> <p>(23MAR22): Doctor's Exchange is continued to be used which is a live afterhours answering service utilized by DU and medical offices. Calls received by the Doctor's Exchange are logged and sent to multiple DU employees immediately following customer call.</p> <p><b>Work Complete.</b></p>
13	No SCADA has been added to the Meadow Lake well site. Adding SCADA to this site is extremely critical since this is a single well site. Immediate notification of problems to an operator may allow the operator to rush to the site to resolve a problem before the site loses all stored water and pressure. Chemical feed problems, such as the loss of sodium hypochlorite, might be addressed before the system loses all chlorine residual.	\$10,000	DU would prefer to have SCADA at ALL well sites – need funding to make this happen.

14	<p>Hydro Tank modifications to the inlet piping at both the Willow Wood and Meadow Lake tanks must be corrected to eliminate short circuiting of the treated water. Each tank must be removed from service, inspected, and the internal piping corrected to ensure that the water entering each tank is directed to the opposite end of the tank to allow full contact time and to change out the water in the tanks each time the tank is used.</p>	\$20,000	<p>DU agrees with this recommendation. Work will need to be funded and performed by contractor.</p> <p>(04JAN22): DU is scheduling modifications to the Willow Wood tank for January. Meadow Lake tank modifications will be evaluated and scheduled in the future.</p> <p>(24JAN22): DU has scheduled modifications to the Willow Wood tank for next week. Meadow Lake tank modifications will be evaluated and scheduled in the future.</p> <p>(22MAR22): Willow Wood tank modifications are 90% complete. Waiting on LDH approval to complete modifications which includes putting modifications online. Meadow Lake tank modifications will be evaluated and scheduled in the future.</p> <p>Work in progress.</p>
15	<p>Flow meters at the well sites were not working or were not connected to the SCADA. New flow meters were being installed during the course of this study. Each flow meter should be verified for accuracy and each flow meter should be connected to the SCADA. Signals from the flow meters to the chemical feed pumps for flow pacing will help to ensure that a consistent dosage of chlorine is being made as the flow varies.</p>	\$15,000	<p>New ultrasonic meters have been installed, and modifications for flow pacing is in progress.</p> <p>(04JAN22): DU is scheduling contractor to set up flow meters and pumps for flow pacing.</p> <p>(24JAN22): DU has contractor scheduled to visit site next week to provide quote to set up.</p> <p>(23MAR22): Contractor visited Willow Wood and Steele Rd. well sites to evaluate flow pacing. Evaluation determined that flow pacing of the current pump setup could result in less accurate dosing</p>

			<p>compared to current chemical feed setup due to cycling of pumps run times. The flow pacing could potentially under dose since much of the dosing would occur during pump start up and shut down due to do frequency and duration of pump runs. Flow pacing, pump run times, and associated equipment will be evaluated as part of system modeling portion of Water Sector project.</p> <p>(30MAR22): Flow pacing will be further evaluated as part of water system modeling for Water Sector project that has been awarded funding.</p>
16	<p>Connect Meadow Lake system to a backup supply, Cross Gates or Slidell. The existing Meadow Lake system is supplied from a single well with no backup supply whatsoever. The loss of the well, pumping equipment, chemical feed, or any other component could cause a loss of water for an extended time frame. Investigations during this study found that the emergency generator at the Meadow Lake well site is inadequate to provide power to run the site. Hence, a loss of utility power will cause the system fail. (No estimate available due to incomplete piping data for each system)</p>		<p>DU has evaluated this recommendation &amp; it is included in Phase 1-1 of the Water Sector project application (East St Tammany Water Consolidation). Total Estimated construction cost including design is \$1,330,008.</p> <p>*see attached</p> <p>(23MAR22): This water sector project was awarded funding. The Meadow Lake interconnect will be Phase 1-1 of the Water Sector project.</p> <p>(30MAR22): Work to be completed as Phase 1-1 of Water Sector project that has been awarded funding.</p>
17	<p>Target levels on the daily data sheets at each site do not match the levels listed in the Nitrification Plan. These sheets should be corrected so that the operators have the correct target levels and efforts are made to maintain the target levels at all times.</p>	\$0	<p>Daily log sheets have been updated.</p> <p>Work complete.</p>

18	<p>During this investigation it was determined by an independent professional electrical engineer that the existing generators were undersized for each site. Recommendations were made for new correctly sized generators. However, the Tammany Utilities instructed the electrical engineer to assume that soft starts would be installed at each site to lower the inrush current. This allowed the generators to be downsized somewhat. Consequently, each site will need to have the electrical starters replaced and new correctly sized generators installed. Until this is done, no site has a generator that will run the site under an emergency condition. Damage to a well motor, a control panel, or a generator could occur if one of the existing generators is used to power a site. (Please consult with an Electrical Engineer)</p>	*need cost estimate	<p>Need funding to replace Meadow Lake &amp; Willow Wood generators, and to add a generator at Steel Rd. DU is recommending to have <i>permanent</i> generators at every water well site throughout the parish.</p> <p>(23MAR22): Generators that comply with the sizing recommendations from Nesbit &amp; Associates have been ordered.</p> <p>Work in progress.</p>
19	<p>Install SCADA at the MRT so that chlorine residual readings from the MRT site are “real time”. Readings from the MRT must be collected daily, even during weekends. Adding the MRT to the SCADA will help to eliminate manpower of having to go to the site each day of the week to record a reading. (\$15,000/site)</p>	\$30,000	<p>Great recommendation, need funding to execute.</p>
20	<p>We strongly recommend implementing a unidirectional flushing program to flush all pipelines in a logical and effective manner. Unidirectional flushing means that valves must be closed so that flushing is from one direction and not from two directions. We recommend obtaining a velocity of at least 6 feet per second when flushing. This level of scouring velocity cannot be achieved if all valves are left open and the flushing hydrant is fed from several directions. Flushing an 8” line requires 938 gpm. This rate of water cannot be provided unless both wells are running for the Cross Gates system. Hence, coordination of well operation will be critical when flushing is conducted. Unfortunately, there is not enough supply from the Meadow Lake well to flush properly. A backup supply will help to resolve this deficiency. Currently No routine system flushing is conducted on either system and unidirectional flushing is never undertaken. (\$15,000 modeling)</p>	\$15,000	<p>DU will perform flushing. A routine flushing is scheduled to begin in the month of December 2021. DU believes the modeling cost will be in excess of \$15,000 based on previous experiences with acquiring modeling estimates for water systems.</p> <p>(04JAN22): Routine water age flushing was pushed to January due to staff shortage over holidays and recent COVID surge.</p> <p>(24JAN22): Routine water age flushing will not be performed on Cross Gates system at this time as temporary Free Chlorine conversion is imminent will involve significant flushing of the entire Cross Gates system.</p>

			<p>(23MAR22): Temporary Free Chlorine conversion is imminent and will involve significant flushing of the entire Cross Gates system. Meadow Lake interconnect was awarded funding and will be Phase 1-1 of the Water Sector project. This should provide sufficient capacity to flush Meadow Lake system.</p> <p>(30MAR22): Flushing will be completed during disinfection conversion and Meadow Lake water supply will be increased through Phase 1-1 of the Water Sector project which has been awarded funding.</p>
21	Install a bypass around the Steel Road tank so that the well can still be utilized whenever the hydropneumatic tank is taken out of service. (\$15,000)	\$15,000	DU will utilize a temporary pneumatic tank as a bypass when servicing so well can still be active. This allows for staying within required detention time for proper disinfection; all as per LDH standards and guidelines.
22	Map information provided for each system was not complete. Details for portions of the water systems should be found so that the maps can be completed. (N/A)	N/A	<p>DU is evaluating to purchase proper equipment to identify all assets on lines &amp; complete maps (GPS locator). * quote attached</p> <p>(23MAR22): DU submitted budget amendment request to Council to be introduced at April 7 Council Meeting for funds needed to purchase GIS mapping equipment.</p> <p>Work in progress.</p>
23	Valves that were shown on the maps provided have been shown on a new overall map. Valve details should be developed in the field so that every valve can be identified from known monuments. In addition, each valve should be GPS'd so that coordinates can be used to locate each valve when necessary. (N/A)		*see # 22 response above

24	Repair broken/inoperable valves immediately. Valves that are inoperable can make isolation of small sections very difficult. Valves that are closed can result in stagnant water in parts of the distribution system.	TBD	DU agrees with this recommendation. Any discovered broken and/or inoperable valve is fixed when found or brought to our attention.
25	Distribution – Identify and label any valves that open clockwise. Valves normally open counterclockwise, but some valves are manufactured to open in the opposite direction. Either label valves that open clockwise in the field or replace the valves with new valves so that all valves in the distribution system open identically.	TBD	DU agrees with this recommendation.
26	Dead Ends – Evaluate the installation of additional automated flushing units. Test portions of the distribution system to see if any additional flushing units are required. Testing may also prove that some of the recommended flushing units can be turned off during certain seasons of the year, such as during heavy demands when customer demand keeps the water age low. The number of additional flushing units may be lower than the original seventeen units once water quality is optimized and once water age is calculated using a computer model of the distribution system. Initial estimate is four units at \$4,000 each = \$16,000.	\$16,000	DU will contact O&W to identify the locations of the 4 units and investigate.  (04JAN22): O&W provided the 4 locations. DU is evaluating necessary equipment to install flushing hydrants at provided locations.  (24JAN22): Flushing hydrants have been installed at all 4 locations recommended by O &W.  Work complete.
27	Exercise each distribution valve annually. Record any valves that are broken or inoperable. In many cases the valve box may not have been installed properly such that the placement of a valve wrench on the valve is very difficult. Valve boxes that are off center and make operation of a valve difficult should be excavated and placed correctly. Valve boxes should not bear on the distribution pipe but should be supported independently such that they bear on separate supports. (N/A)		DU agrees with this recommendation. Currently our priority is to identify all valves in the system. Once identified, DU will implement a valve exercise program.
28	Consider building a computer model of each distribution system to verify system capacity and to review water age. Computer models are also extremely helpful when looking for closed valves and to investigate other water issues. Any computer model should be field verified and calibrated.	\$20,000	DU agrees with modeling the entire water distribution systems throughout the St. Tammany Parish area. However, we feel the cost for this will be in excess of \$20,000.  (23MAR22): Modeling of the Cross Gates distribution system will be included in the Water Sector project that recently was awarded funding.

			(30MAR22): Computer model of distribution system will be completed as part of the Water Sector project that was awarded funding.
29	The Parish should purchase the latest AWWA M20 manual on chlorination. Each operator should be required to study the manual so that they can learn more about the chemistry and details of running a chloramine water system.	\$150	DU has ordered the recommended manual.  (04JAN22): DU has received the manual and is reviewing procedures with staff operators.  Work complete.
30	The Parish should engage customers in education about the water system. The Parish should make customers aware of improvements to the water system that stem from this report. Customer should also be educated on items such as home filters. Manufactures recommendations should be followed for water pitches such as those manufactured by Britta. For example, literature from Britta shows that the pitcher filters should be changed every 40 gallons or every 2 months, whichever comes first. Customers should also be educated on stagnant water in their homes caused by low to no usage in portions of their home such as a guest bathroom. Frequent flushing within a home should be stressed to ensure the best water quality at all times. One often overlooked item is pet water bowls. Water bowls for pet should be cleaned each time the bowl is refilled. Customers should be informed of the danger of simply refilling partially full water bowls that should instead be cleaned out frequently. (N/A)		DU believes that education of customers on all aspects of the water system is important. DU staff will coordinate with the Public Information Department staff to discuss and coordinate our efforts.  Work in progress.

31	<p>The Parish should inform customers whenever pressure in the distribution system is lost for even a slight period of time. Any time pressure in the distribution system drops below the LDH requirement of 20 psi there is a chance that contamination could occur. With the new SCADA systems alarms can now be generated from the Steele Road or Willow Wood well sites should pressures drop in the water distribution system. An automated notice to all customers could be generated should a low pressure alarm occur from either of these well sites. Unfortunately, until SCADA is installed at the Meadow Lake well site no automated notice of a loss of pressure will be available for that system. (N/A)</p>	<p>DU follows all LDH regulations relative to a loss of pressure event including the issuance of boil advisories when the pressure in a system drops below 20 PSI. Depending on the scale of the event, notifications are sent out via direct notification (flyers), signs placed in the area, reverse 911 calls, and posting on social media and the Parish website, and news outlets.</p>
32	<p>A loss of chlorine residual (less than 0.5 mg/l) is a significant problem that must be addressed immediately. If the loss is system wide, then a boil water advisory should be issued to all customers until the residual is reinstated and bacteriological samples are taken to ensure that no bacteriological contamination is present. If the loss of chlorine residual is only in a local area, then the extent of low chlorine residual should be established by taking samples that can identify the boundary of the area impacted. Customers should be notified within the boundary of the area of the low chlorine residual of a boil water advisory. Flushing should begin immediately to raise the residual chlorine to acceptable levels. The boil water advisory should not be lifted until bacteriological samples taken within the area per LDH requirements are cleared. Fortunately, water systems where the internal water pressure is maintained but see a loss of chlorine residual can be less susceptible to contamination. But, in our opinion this does not negate the responsibility of the water system to immediately notify customers nor to take appropriate bacteriological water samples to ensure that the water is safe to drink. (N/A)</p>	<p>DU follows all regulations pertaining to the issuance of boil advisories as promulgated in Title 51 (Sanitary Code) and follows the procedures and guidelines as set forth by LDH in ASAP 12.24 (Issuing Boil Advisories-Engineering Services SOP Manual).</p>

33	Ensure that each well site has duplication in chemical feed. During the course of this study only one chemical feed pump was operational at each site. Each site should have complete duplication in chemical feed pumps with either pump fully capable of running at any time. Pumps that are out of service should be given top priority for repairs so that they are returned to service immediately. A common pump for all sites will allow spare pumps to be kept such that a spare pump could be used for any site when needed. (See Item 3)	\$10,000	DU agrees with the recommendation to have secondary chemical pumps at each well site for back up with appropriate funding. Also see items #6 & #7 responses above.
34	Strong consideration should be given to the erection of an elevated tank for the Cross Gates system. An extension of waterlines to the Meadow Lake system would allow this same elevated tank to service that area. An elevated tank will provide a large volume of water for fire protection as well as a significant volume of water to sustain the systems during events where the wells are out of service. Well operation will be optimized and improved with an elevated tank.	\$2,000,000	<p>This recommendation is included in Phase 1-3 of the Water Sector project application (East St Tammany Water Consolidation). Note that the total estimated construction cost including engineering is \$6,202,102.</p> <p>*see attached</p> <p>(23MAR22): The water sector project was awarded funding. Elevated storage towers will be included in Phases 1-3 and 1-8 of the Water Sector Project.</p> <p>(30MAR22): Elevated water storage tanks will be constructed in Phases 1-3 and 1-8 of the Water Sector project that was awarded funding.</p>
35	Consider switching disinfectant from liquid sodium hypochlorite to gas chlorine. The implementation of secondary containment is strongly recommended if chlorine gas is utilized.	\$600,000	Due to safety concerns and the locations of these sites in heavily populated areas of St. Tammany Parish, DU prefers sodium hypochlorite.

CC: Chris Tissue, Todd Torregano, Cindy Samuel, Sean Riecke