



Water and Sewer Project Updates

Council Budget Retreat February 28, 2015



Water and Sewer Project Updates

The Update Topics to Cover

- Mega Park Force Main Project
- Sewer Odor Control Measurements
- Rehab of the Mebane Bridge Digester System
- Chloramines are coming in September 1, 2015



Water and Sewer Project Updates





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Mega Park Force
Main Project



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Mega Park Force Main Project

If recruiting efforts are successful and a client goes into the industrial park that uses large quantities of water, many of our water issues such as controlling Trihalomethanes, controlling water pumping and distribution pressure issues, and water fund revenues would be better.





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Sewer Odor Control

Location: Stadium Drive at Edgewood Road near Freedom Park and Edgewood Road South of Bermuda Drive

- What is the odor?
 - Mostly hydrogen sulfide gas
 - Other gases from the decay of sewage
- Where is it coming from?
 - Air relief valves (ARVs) for the force mains coming from Railroad and Covenant Branch Pump Stations designed to relieve excessive pressure on the piping. Located in front of 702 E. Stadium Drive and across from 704 Rosewood Lane.



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Sewer Odor Control

- What causes the odor?
 - The sewage is spending excessive time in the force main causing bacteria to use up available oxygen. In conditions without oxygen in the sewer line; the bacteria then uses sulfates (SO_4) that are present in the wastewater as a source of oxygen in the decay process.
 - The above reaction releases Hydrogen Sulfide which produces a foul rotten egg smell that we smell at various times.



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Sewer Odor Control

- Odor is not the only problem being created!
 - The hydrogen sulfide (H_2S) is combining with the moisture in the top of the pipe (H_2O) to become Sulfuric Acid (H_2SO_4). These conditions are acidic and can be corrosive to the pipe itself. The corrosion affects the top of the pipe where this reaction takes place. Then the debris that falls into the wastewater then scours and erodes the bottom of the pipe as the flow carries it downstream.



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Sewer Odor Control

- What can be done about it?

- Deodorizers to mask the odors- doesn't address corrosion
- Filter the odor out of the air
- Treat the source of the odor with Chemical and Physical treatment
- Add water in order to increase flow through the force main and decrease retention time.
- Introduce extra atmospheric oxygen by aeration or chemically releasing O₂



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Sewer Odor Control

- The problem with covering up the odor with deodorizers or filtering the odor is that these methods do not address the corrosion issue.
- These methods are not effective for concentrations of hydrogen sulfide* over 50 ppm.

** Hydrogen sulfide concentrations being emitted from the air relief valve (ARV) across from Freedom Park are in excess of 1,000 ppm and 200 ppm from the ARV on the south end of Edgewood Road.*



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Sewer Odor Control

- Chemical treatments that kill bacteria may only be effective in short runs of pipe, a half mile or less chemicals that raise or lower the pH could itself cause pipe corrosion or sedimentation issues inside the force mains.
- Aeration or oxygenation would involve a series stations located along the force mains in order to be effective. These measures would be impractical and costs would be prohibitive.



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Sewer Odor Control

- What have we tried?

Adding water to increase flow

D-limonene

Activated Carbon Filter

Ammonium Nitrate

Calcium Nitrate Solution

Hypochlorite

- What has worked?

- We had success with ammonium nitrate. It was not as effective as it could be due to hand feeding the chemical. Because of this it has not been fed at a constant rate so the effectiveness has been intermittent.



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Sewer Odor Control

- What has worked?
 - Last Spring we began feeding calcium nitrate solution which worked much better because it was being fed to match the flow rate coming from the pump station. It all but eliminated the hydrogen sulfate problem. It was expensive, costing an estimated \$80,000.00 a year for Railroad Pump Station.



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Sewer Odor Control

- What has worked?
 - In November of 2014 we began flowing extra water into the sewer lines leading to Railroad Pump Station and without adding calcium nitrate. This reduced the hydrogen sulfide levels from over 1,000 ppm to between 400 and 600 ppm. This reduction can allow less Calcium nitrate to be use and achieve good result at lower cost.



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Sewer Odor Control

- What do we think needs to happen next?
 - It is our belief that once we feed the calcium nitrate solution at a constant rate, along with the water being fed, will bring the cost of controlling the corrosion issues inside the force main and the odor at Freedom Park down to around \$ 50,000.00 per year. An additional \$ 10,000.00 will be needed for Covenant Branch Pump Station and force main.
 - *It is important that we control the corrosion issues inside of our force mains before they cause failures in the pipe integrity.



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Digester Project

New and Rehab of Old Unit

- In 2003, the Wastewater Master Plan showed that our current digester was not large enough to handle the current and projected solids produced in the plant.
- Our current digester is original to the plant and is in poor condition. The walls are thin in many spots and are expected of having many voids underneath. It has already experienced a wall failure and all signs point to another potential failure in the future.
- This project has been in the 5 year plan for many years, but has been shifted based on our economic downturn and the EPA Administrative Order on our sewer system.



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Digester Project

New and Rehab of Old Unit

- Our plan is to build a new digester to temporarily replace the old unit until it can be redone and then use them both for redundancy. If our flows increase from the Mega Park, the extra capacity would allow us to better handle new solids loadings.
- The first phase in the upcoming budget year (\$241,000 +/-) will be engineered drawings and plans for the new digester and pump house.
- The second phase for the next budget year (\$2,365,000 +/-) will be building the new digester and pump house.
- The final phase (\$730,000 +/-) will be installing equipment and rebuilding the old digester.



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Digester Project ---New and Rehab of Old Unit

Pictures of the current condition





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Chloramines

The Chloramine Project is needed to control Trihalomethanes that are formed when chlorine is added to water for disinfection. This project is to maintain compliance with the Disinfection/Disinfection Byproducts Rule that became effective October 1, 2013.



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Chloramines
Feeding Vault
Under Construction
near Clearwells at
The Water Plant





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Chloramines

We anticipate start up of the Chloramine operation to begin in late August or September 1st. Our State mandated deadline to have it operational is October 1, 2015.



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Chloramines

- We will have a major education media program running to alert the water customers how chloramines will affect them, this program will begin in the Spring.
- In most cases customers will see little or no difference in their water.



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Chloramines

- As part of our community partnership with Duke Energy they will support this project with funding of \$1,992,800.



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QUESTIONS?