



**City of Pataskala Utility Department
Nathan W. Coey, Utility Director**

Utility Department Updates for the October 3, 2016 City Council Meeting

➤ **Director Updates**

• **Legislation**

- **Resolution 2016-053.** *This will be presented at the October 3rd meeting pending review from the Utility Committee.* A Resolution authoring and directing the City Administrator to enter into contract with Chaltron Systems Inc for the purchase of new flow metering equipment at Water Treatment Plant #1 in an amount of \$12,660.

- The Water Treatment Plant #1 has an issue with accurately tracking water demand into the distribution system. The current flow meter is in a position that does not provide the appropriate data regarding metered flow.
- The current meter is installed prior to the 200,000 gallon clear well. Water from the clear well is pumped to the distribution system through the High Service Pumps. Our daily production tracking is not accurate for what is pumped to the system.
- The new metering system will track the actual water pumped into the distribution system via the pumps.
- Funds are available for this purchase under the 2016 Utility Budget.
- Please see the “Flexim Ultrasonic Flow Meter Summary” document attached to this update.

- **Ohio EPA WRF Inspection.** On August 17, 2016, Paul Vandermeer with the Ohio EPA conducted the annual inspection of the WRF facility. Please see the attached report from the OEPA.

- **Inspection Report Summary.** This was a positive inspection for us. No deficiencies were noted regarding treatment operations. Our only (self-reported) violations were two overflow events in 2015. June 2015 was related to pumps tripping out in high flow at

Creek Road Lift Station and July 2015 was related to the lightning strike that destroyed communication and pump operations at Eastside Lift Station. Typical events like this serve as indicators that our system is stressed during wet weather events, of which the OEPA will document for required improvements.

- **Report Findings #2.** The amount of inflow and infiltration (I & I) was discussed during the inspection. By my calculations 40% of our annual flow is directly related to I & I. This is not uncommon given the age of the infrastructure in the Westside Tributary Area. Specifically, historic village due to the amount of aged clay pipe in the ground. There is 36,264 feet of 8, 10, and 15 inch clay pipe in the service area or 22% of our entire inventory. Clay pipe often has joints every 10 to 20 feet, the grout and packing fails allowing in ground water to the sanitary system. We have identified only one area (High and Broadway) where storm sewers are tied into the sanitary via catch basins. At some point this bill will be due in the form of reinvestment. I have called these out in the past 4 years as unfunded CIP projects, specifically pipe replacing or relining. I will suggest a part of the 2018 budget to begin a replacement effort incrementally over several years. The OEPA would like to see movement on this before they make it a requirement due to consistent wet weather overflows.
 - Our highest reported average daily flow over the past year was 2.343 MGD (68% increase from average daily flow), as a result of rain and snow melt the last week of December 2015, thus indicating our influence of I & I. The peak flow is compared to our dry weather flows are in the .6 MGD range with an annual average of .742 MGD.
 - I & I remediation requires a great deal of time and resources to completely eliminate. Short of replacing the entire clay system or relining, our options are limited. The OEPA focus or concern is related to growth potential, more so this being an issue as we grow closer to a WRF design flow of 1.1 MGD.
 - Challenges and lessons to come.
- **Suggested Action 1.** The agency suggested were look at a storm water utility to fund storm repairs or installation of new storm systems. This would provide a mechanism to address

specific areas of known direct surface water influence (High and Broadway).

- **River Forest Lift Station Project.** The survey work is complete and the proper paper work has been sent for legal filing. Final review of the drawings have been completed as we work to OEPA review.

➤ **Water Department**

- The 2016 Valve Exercising Program is complete. Chris Sharrock took the lead on this important program with great results. We did not break any valves in the process so that is a sign that our preventive exercising program is working. During the process we located valves below grade through the assistance of our mapping program. We have generated a minimal repair list to bring valves to grade. This program will commence in June 2017.
- At the time of this report our annual Hydrant Flushing Program is under way. This effort ensures proper operation of the hydrants and purge any sediments as a requirement by the OEPA. Our past experience proves very little sediment in our mains due to our operational process and corrosion control efforts.
 - During the flushing work on 9-26-16 a hydrant watch valve failed. The exterior bolts on the valve failed due to corrosion of the non stainless steel bolts. This resulted in the need to shut down the main in Barrington Ridge that affected 36 homes. Water was restored in the afternoon with customers on a boil advisory until lifted.
 - Stainless steel bolts are a requirement in our specifications for developments. Since 2011 we have required this of any new system work and is included in our specification documents.
 - There is a recall on threads on American Darling hydrants manufactured in 2006 to 2011. During the flushing work the crews are checking the manufacture dates on the American Darling hydrants to provide a list of hydrants and locations for the manufacture to replace at no cost to the department.
- Settlement Phase 3 water main extension is being pressure tested at the time of this update. Once hydrostatic testing has passed, the line will be flushed and tested for the absence of bacteria before placing into service.
- A service line leak at 163 Terrier Court was repaired on 9-27-16.

➤ **Water Reclamation Department**

- A biosolids land application event was conducted on September 21 and 23. A total of 140 tons of product was delivered and applied to a local hay farm. This resulted in an empty storage building. A local farmer is planting wheat after the corn crop is removed and we will do one more application in November to provide us sufficient storage room through the winter.

➤ **Billing Department Update**

- Changes were made on the bill stub stock to encourage customers to submit the stub with payment to assist in processing.
- Staff is working on updating the backflow data base.

Highest Regards, Nathan W. Coey, Utility Director

Please see the attached report regarding the WTP1 effluent flow meters.



City of Pataskala Utility Department
Nathan W. Coey, Utility Director

'Flexim' Ultrasonic Flow Meter Summary

➤ **Issue**

- Water Treatment Plant #1 does not accurately record produced water delivered to the distribution system.
 - The current magnetic flow meter is placed in a vertical position. Due to the position in the flow process the metering point is not “full pipe” due to gravity drop into the production clear well. The drop and aeration in the pipe provides inaccurate readings due to poor application.
 - “Mag” meters work efficiently in full pipe applications mounted in horizontal applications.
 - The current meter monitors only the water pumped to the production clear well prior to delivery to the system via the high service pumps.
 - The transfer pump system pressurizes the ion exchange units with treated water drawn from the iron filters. The treated water pressurized by pumps and treatment vessels result in treated discharge to the clear well.
 - The stored water in the clear well (200,000 gallon capacity) is available for discharge to the system by the high service pumps. Set points are activated for automatic delivery to the system. This water is not currently metered.
 - To further complicate the issue, water may be produced for clear well storage when demand may not require. Current meter reports are not accurate to the actual usage in the system.
 - In order for ion exchange backwash to occur, the transfer pumps will operate. During this automatic operation, the vessel to be backwashed is removed from the treatment train while water will be produced through the active unit. This results in additional treated water to the clear well that is metered for production, often not based on demand needs. The produced water is not always distributed at an equal pace

by the high service pumps based on system demand. This means there is a gap (unaccounted water) between what is pumped to the clear well and what is pumped to the system.

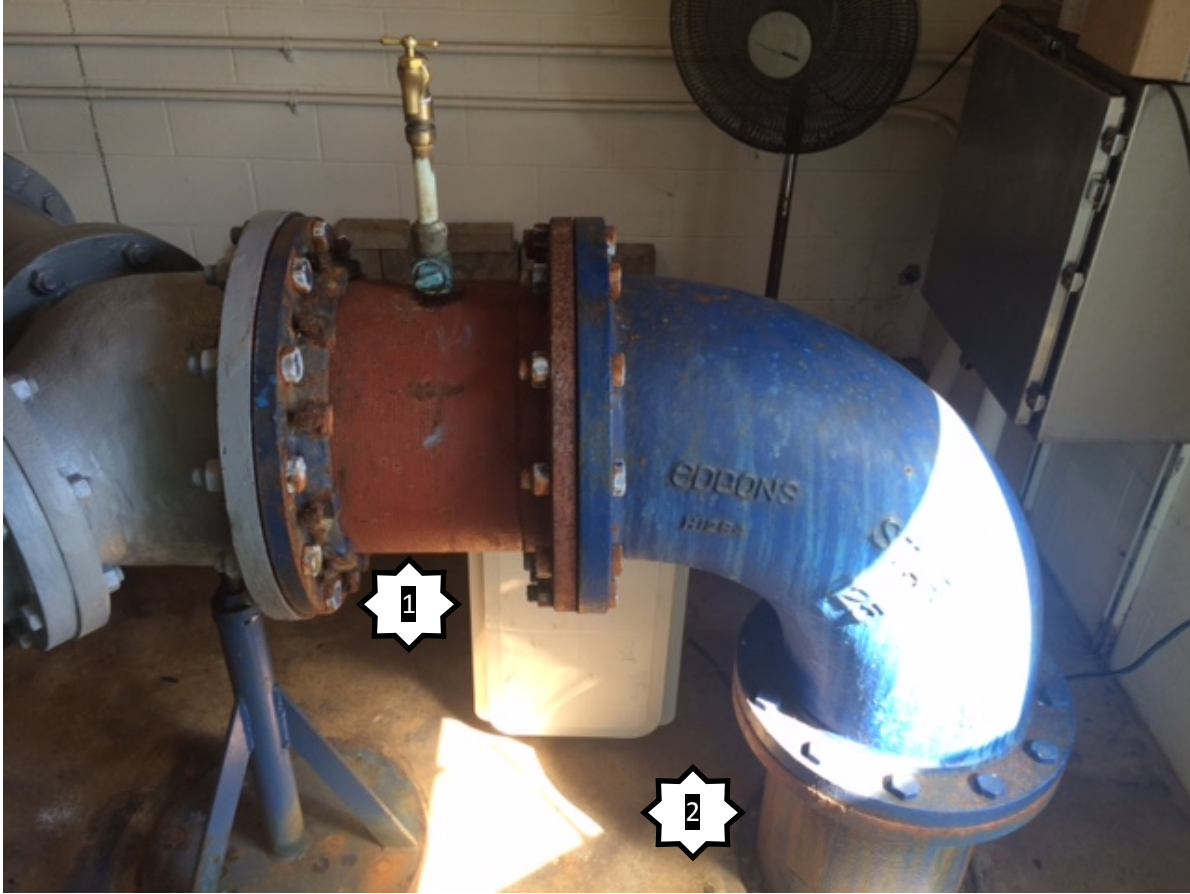
- Based on recent testing 43% of the daily water produced to the clear wells actually leave the facility to meet system demand. However, our current metering indicates 100% of produced water is leaving the plant, which is not accurate.

➤ **Goal**

- We seek to be accurate in our monthly distribution flow reports to the Ohio EPA. For future planning it is imperative to know the actual daily demand of water to the system. Water Treatment Plant #1 may produce 300,000 to 400,000 gallons of water a day to the clear well, this water is not always pumped to the system that day.
- Accurate monitoring of the water distributed from WTP#1 will provide a clear picture on our actual water loss percent (unaccounted water through billing) in the aged system. Accurate flow reporting is key to ensure our diligence in protecting the infrastructure investment.

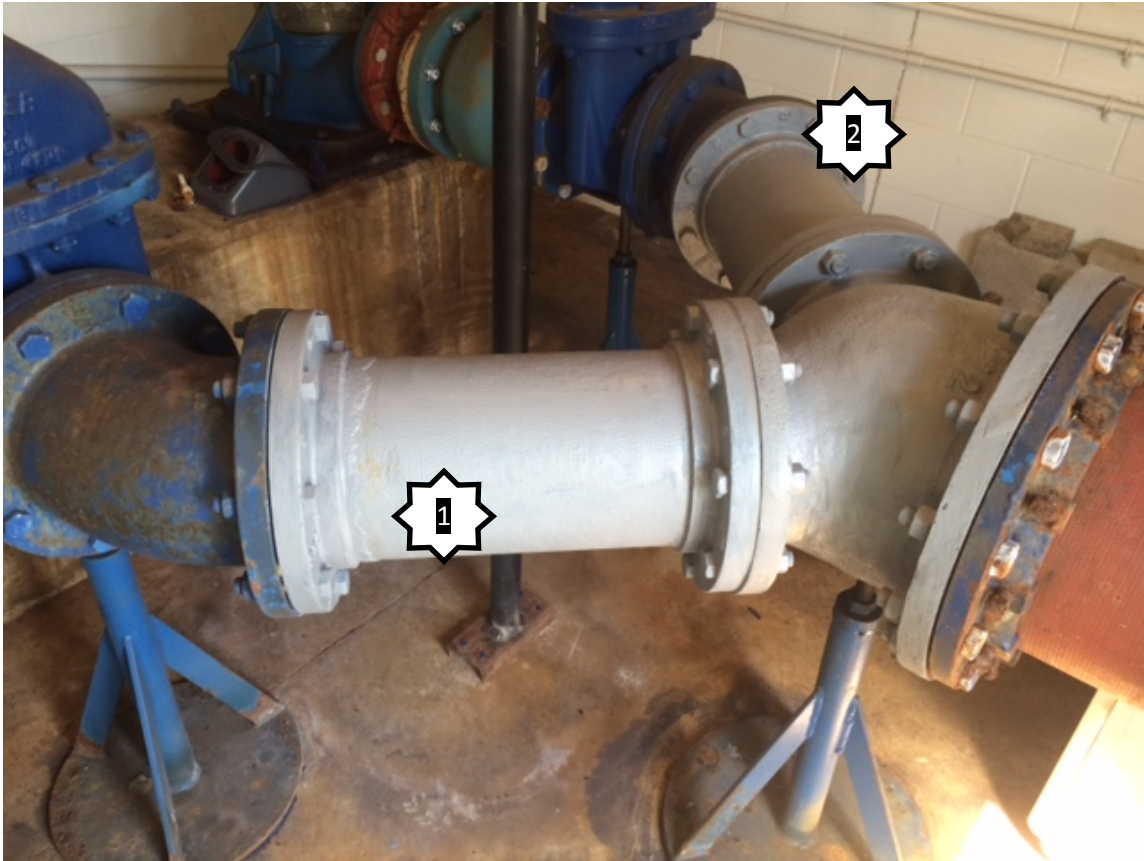
➤ **Solutions**

- **Option 1.** Install a one magnetic flow meter in the high service building downstream from both pumps.
 - Due to restrictions there is not enough lay length for a single mag meter downstream of both pumps. We needed at least 13 inches for the meter and additional fittings put us in the 18 to 24 inch range to make this work. Pipe work modifications provided no room for error and proved to be risky. This option was abandoned.



Spool piece (1) was less than 12 inches. Pipe after the ninety degree fitting (2) was prohibitive due to the penetration into the concrete floor.

- **Option 2.** Install a one magnetic flow meter after each pump (2 total) in the high service building downstream from both pumps.
 - Due to restrictions there is not enough lay length for a mag meter after each pump. We needed at least 13 inches for the meter and additional fittings put us in the 18 to 24 inch range to make this work. There were concerns that harmonics from the pumps would cause inaccurate meter readings. This option was abandoned.



Spool pieces (1 and 2) were less than 14 inches. These areas were not long enough to install a mag meter.

Options 1 and 2 would have been the most economical at a cost of \$8,000 to \$11,000. Pipe configuration limitations proved to be insurmountable.

- **Option 3.** Install a one magnetic flow meter downstream of the high service pump building on the WTP#1 property. This option was planned to be our best plan of correction. Through evaluation and planning process, we found this to be the most expensive, but typical industry standard.
 - This option would have required a capital cost estimated at \$22,000.
 - \$8,000 for flow meter, monitoring equipment, grounding rings, and manufacturer startup/programming costs.
 - \$4,000 for a concrete metering vault (8 feet deep), access hatch, and safety ladder/cage for entry.
 - \$2,000 for pipe work and valves for a meter bypass in the event of failure or replacement.
 - \$2,000 for excavation work, vault set, vault base, and aggregate.
 - \$2,000 to run electric and communication cables to the vault.
 - \$2,000 for integration and programming to the SCADA system.
 - \$2,000 dollars (10%) contingency for any unknowns. This was added in case we had to replace sections of pipe before and after the meter, backfill, thrust blocking, and vault penetration sealing.
 - Total cost estimate of \$22,000.
 - Understanding the budget restrains of the Water fund, I was not enamored with the cost potential of this option. This option would have required WTP#1 to be off line for several days to set the pit and install new pipe work.



Meter vault location (1), High Service Pump Building (2).

- **Option 4.** Install a clamp on ultrasonic flow transducers after each high service pump. While at the OWEA Annual Conference I met the folks from Chaltron Systems and was introduced to their 'Flexim' ultrasonic transducer flow meters. This option proved to be more economical than Option 3. This option is our best alternative for accurate flow metering at WTP#1.
 - Representatives from Chaltron conducted a feasibility study on our application in the High Service Building. Testing indicated that the ultrasonic meters would work on the previously discussed spool pieces from Option 2. Additionally, there were no harmonics issues given the proximity to the pump motors.
 - Chaltron offered a quote of \$12,660.
 - \$9,058 for two ultrasonic transducers, meter control device, cables, and mounting equipment.
 - \$2,402 for a wireless transmitter and receiver package to send the data into the operator station in the building. This would provide easy daily data reporting for the operators.
 - \$1,200 for installation and programming of the meters.
 - Total quote cost of \$12,660.
 - Chaltron provided an extensive list of their installations, mostly in northern Ohio. I called some of the larger clients and focused on water plant applications.
 - Marathon Petroleum has over 250 meters installed.
 - NEORS (Cleveland Wastewater) utilizes in treatment and collection operations.
 - Kent Water Plant uses these meters on well flow recording. They are planning to purchase more for additional wells and their filter to waste monitoring. They have used this for 1.5 years with no reported issues.
 - City of Hudson uses this type of meter on water treatment discharge monitoring. In service for 3 years and working well with no issues.
 - Avon Lake Water uses these meters for their large commercial applications. They are planning to buy a portable unit for water loss testing in specific parts of their system. They have reported no issues with the accuracy and maintenance on the meters. They have been using this product for 5 years.
 - Portage County Water utilizes these meters on their production wells. They also use this in an up flow pipe to a

storage reservoir. They have used this product for a year and have had no reported issues.

- City of Akron and Cleveland (Baldwin and Crown) use these meters in the plants and system. I have yet to receive a return call from the superintendents regarding their option on the meter.
- Village of West Jefferson (local) uses this in applications at their wastewater plant. They have not reported any issues and are satisfied with the purchase.

Highest Regards, Nathan W. Coey, Utility Director