KIWWTP – Wet Weather Treatment Projects

LCA BOARD MEETING

June 10, 2024

Project Goal:

- **Increase peak wet-weather flow capacity from 87 million gallons per day (MGD) to 100 MGD to reduce the frequency of Outfall 003 activations during extreme wet-weather events.**

Planned Approach:

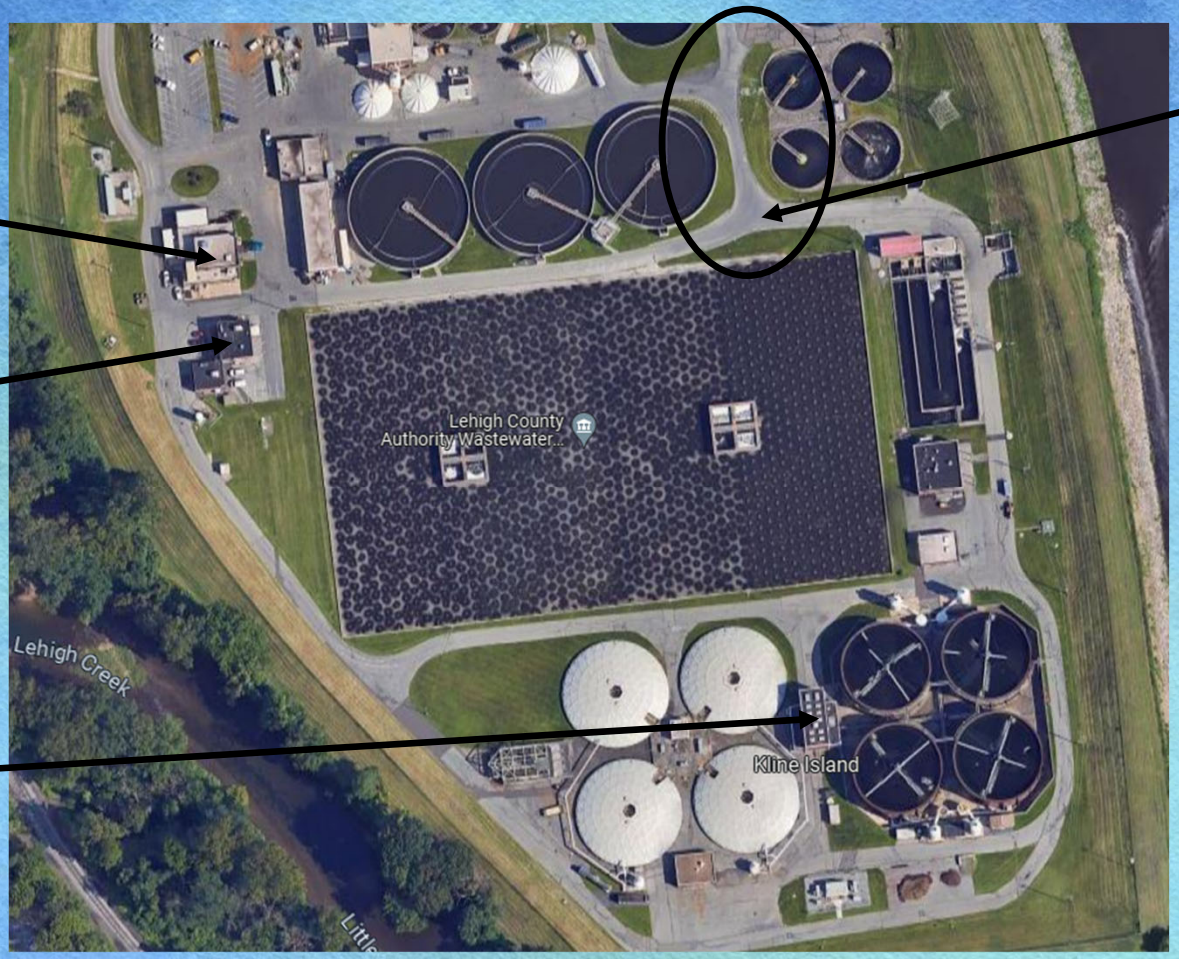
- **Replacement of four (4) existing Main Pump Station (MPS) vacuum primed pumps with four 20 MGD vertical turbine pumps, new motors and VFDs**
- **Replacement of two (2) existing Auxiliary Pump Station (APS) pumps with larger 40 MGD vertical turbine pumps, includes increased motor size and new VFDs**
- **Replacement of five (5) existing Primary effluent pumps at the Intermediate Pump Station (IPS) with increased design capacity including new motors and VFDs.**
- **Installation of a new tertiary bypass line to allow temporary diversion of biologically treated flow around the KIWWTP's tertiary treatment system during severe wet weather events.**
- **Note that the MPS, APS, and IPS Improvements were all identified as near term upgrades in the 2019 KIWWTP Master Plan.**

Work Locations:

Main Pump Station

Auxiliary Pump Station

Intermediate Pump Station



Area of Proposed Tertiary Bypass

City of Allentown Review:

- **Planned approaches were broken out into 3 Preliminary Design Reports for City review as Major Capital Improvements:**
  - **Main and Auxiliary Pump Station Improvements**
  - **Intermediate Pump Station Improvements**
  - **Tertiary Bypass Improvements**

- **All three projects received Conceptual Design Approval from the City of Allentown on 5/9/2024**

- **LCA requested to combine the above three projects into one KIWWTP Wet Weather Improvements project for final design and construction due to the fact they are interrelated as well as to leverage economy of scale. The City agreed to this combining of projects.**

Main Pump Station:

- Replace existing pumps and motors with new vertical turbine pumps with increased pumping capacity.
- Eliminate existing vacuum prime system which is outdated and adds another source of failure
- Electrical upgrades to accommodate larger pumps and VFDs
- New VFDs for 2 of the pumps, 2 to remain constant speed
- Structural improvements including concrete platform for new motors, discharge piping and VFDs.
- New discharge piping and valves
- Wet well hydraulic improvements per physical modeling recommendations

Auxiliary Pump Station:

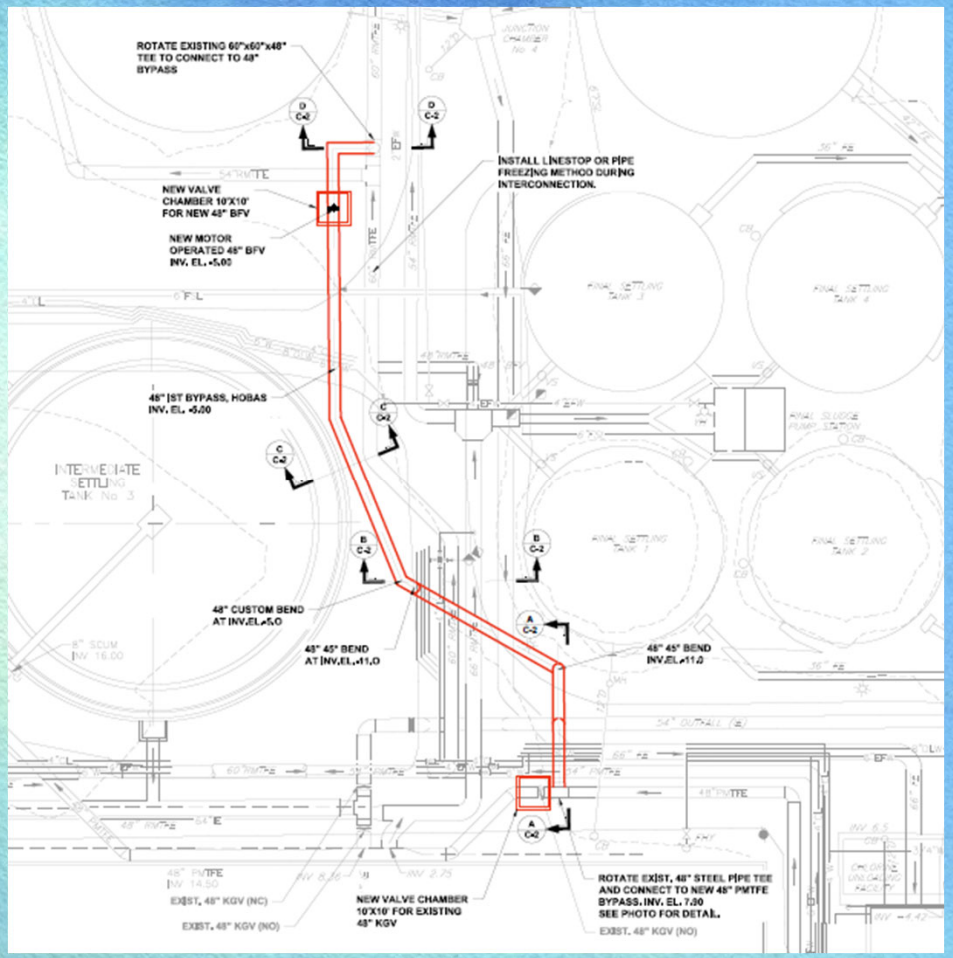
- Replace existing pumps and motors with new pumps with increased pumping capacity.
- Electrical upgrades to accommodate larger pumps and VFDs
- New MCC within a modular power zone building
- New discharge piping and valves
- Hydraulic modeling to evaluate flow from future KISS Relief Interceptor
- Design of any necessary wet well hydraulic improvements identified by the modeling

Intermediate Pump Station:

- Replace existing primary effluent pumps to increase capacity to allow for 100 MGD maximum pumping capacity.
- New VFDs for 3 of the 5 pumps, 2 to remain constant speed
- Upgrades to the MCC and feeders
- Upgrades to the HVAC

Tertiary Bypass:

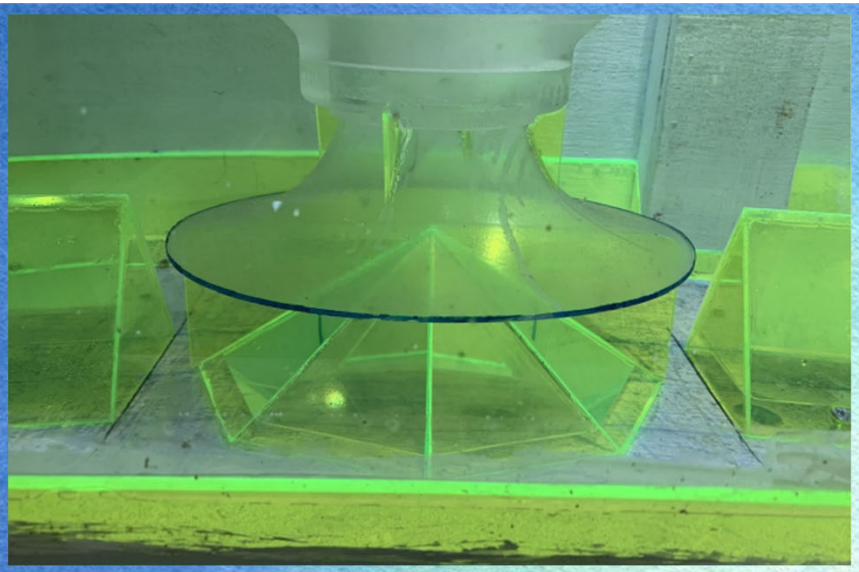
- Install 48” bypass piping to allow a portion of the Plastic Media Trickling Filter (PMTF) effluent to bypass the Intermediate Settling Tanks (IST) and Rock Media Trickling Filters (RMTF) and divert a portion of the flow directly to the Final Settling Tanks (FST).
- Work will include new valve chambers and valving to allow for this temporary diversion.



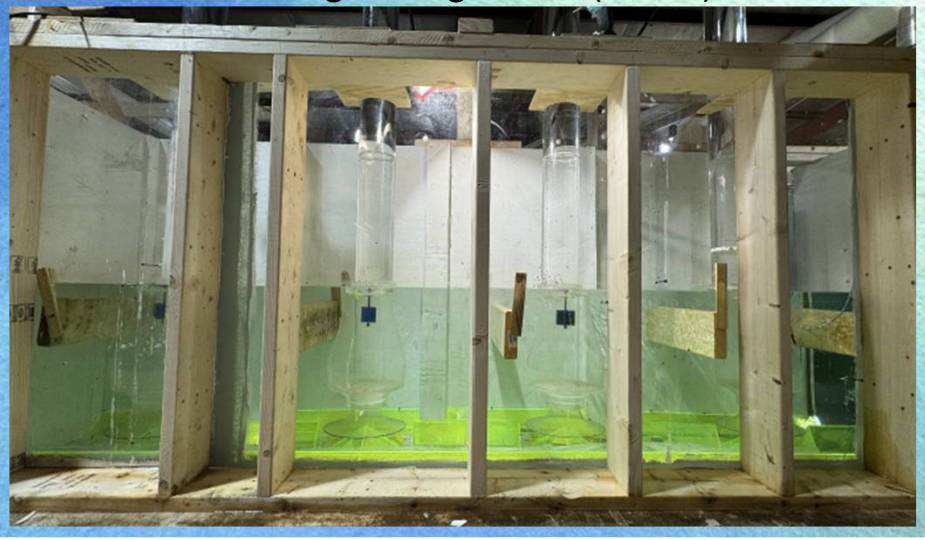
Hydraulic Modeling:

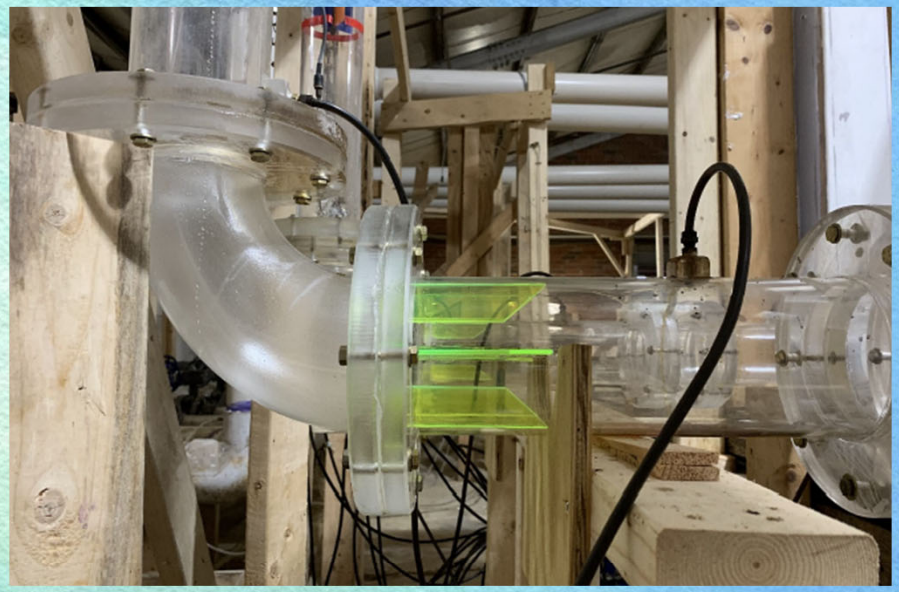
- Hydraulic modeling of the MPS and APS was performed during Preliminary Design
- Hydraulic improvements were identified such as:
  - Revised floor cones under the new MPS pumps
  - Vortex suppression/flow straightening beams within the MPS wet well
  - Anti-rotation vanes in the APS suction piping

Hydraulic model of MPS



Floor cones (above)
Flow Straightening beams (below)





Anti rotation baffles in APS suction piping

Approval Request:

- Capital Project Authorization for Final Design & Bidding Phase = $1,181,575
  - Professional Services Authorization (Kleinfelder, Inc.) for Final Design and Bidding Phase Services = $994,450
  - Professional Services Authorization (Current Solutions, P.C.) for Electrical QA/QC review, Facility Survey and Preliminary Power System Analysis = $97,125