Wastewater Treatment Plant Upgrade/Expansion Project

Facility Historical Timeline

1. 1935: Initial WWTP was constructed
    a. 0.5 MGD Trickling Filter Plant consisting of an Imhoff tank, trickling filter, and final clarifier
2. 1966: Capacity Upgrade to a 1.77 MGD facility
    a. Upgraded raw sewage pumping, trickling filters, final clarifiers, anaerobic digestion, and chlorine disinfection
3. 1979: Capacity Upgrade to a 3.2 MGD Activated Sludge Facility
    a. Consisted of a new raw sewage pumping system, headworks (screening and grit removal), aeration tanks, blower building, aerobic digester, and sand filters
4. 1990: Addition of effluent de-chlorination facilities and re-aeration equipment
5. 1997: Sludge de-watering improvements
6. 2003: Capacity upgrade to a 4.0 MGD activated sludge facility
    a. Included new raw sewage pumps, headworks equipment (mechanical fine screen and grit removal system), additional primary clarifiers, additional aeration tank capacity (converted aerobic digester to aeration tank #4), final clarifier, and UV disinfection
    b. Improvements in the sludge handling equipment and facilities: included equipment to produce Class A bio-solids through lime stabilization.
    c. Wet weather flow handling capability was added through the incorporation of the Acti-Flow System, a high rate clarification process designed to remove biochemical oxygen demand and suspended solids
7. Current Conditions
    a. Routinely at, or near, average design flow of the facility; for 2019, annual average flow was 89% of then facility design

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b. Difficulty meeting current limits for ammonia due to current loadings coming into the system
c. UV Disinfection system failed in June of 2019; currently using chemicals for disinfection on a temporary basis until the plant upgrade/expansion is complete
d. Numerous equipment failures over the past 10 to 12 months
    i. Have had to either replace or rebuild our return sludge pumps
    ii. Recently had to replace one of our sludge feed pumps for the solids handling system
    iii. Acti-Flow System controls are now obsolete and would need a complete replacement if they were to fail (estimated at $250k to replace all components)
    iv. Various other controls are now obsolete and replacement/repair parts are hard to find

8. 2019/2020: Compliance Maintenance Project
    a. Consists of new turbo blower, new air header, aeration tank diffusers, and additional return sludge and wasting controls
    b. The project is being completed in order to meet current permit limits. With the facility being overloaded biologically and hydraulically, it has become more difficult to consistently meet our effluent limits set by our NPDES permit.

Project Timeline and Why It Is Necessary

1. Currently unable to meet permit requirements on a consistent basis
    a. Had an inspection on 4/1/2020 and received a letter of Noncompliance from IDEM for repeated ammonia violations; staff is constantly working to get in compliance, but it is proving difficult with the current state of the facility
    b. This has been an on-going issue that has been noted in our last few inspections and the major reason for our current Compliance Maintenance Project.

2. Future Permit Requirements
    a. Total phosphorus limit has to be met by 10/1/2022
    b. Total nitrogen monitoring (no current discharge limit) was included in our recent permit renewal and will likely become a requirement (with a discharge limit) in the next couple permit cycles (renews every 5 years)
    c. Need to commence with the design of the facility soon in order to stay on schedule to have the new facility online by the deadline for phosphorus removal
3. Aging Infrastructure
    a. Much of the facility is at or near the end of its useful life; repair and replacement costs are continuing to increase and becoming more difficult (some parts are no longer available)
4. Overall Capacity of the Facility
    a. Current pumping capacity is below what we need; leads to flood outs and raw/untreated sewage entering the receiving stream (Brandywine Creek)
    b. Have been at, or near, average design flow of the plant (80% or higher) very frequently: could result in a sewer ban being issued by the IDEM, which would prevent any new connections to the system, both residential and commercial/industrial
    c. Need to be able to provide for population growth
    d. As a Utility, we have a responsibility to the citizens (ratepayers) to provide facilities that are proper and adequate to provide treatment now and in the future.

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Engineers Recommended Project Schedule

1.	Review planning document	January 2020
2.	Incorporate Additions/Modifications and submit final report	February 2020
3.	Commence Design	March/April 2020
4.	Complete Design and Obtain Permits	December 2020
5.	Bid and Award Project	March 2021
6.	Start Construction	April 2021
7.	Substantially Complete (operational)	September 2022
8.	Deadline for Phosphorus Compliance (IDEM)	October 1, 2022
9.	Final Completion	November 2022
10.	11 Month Warranty Inspection	October 2023

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