Piney Mountain Subdivision Wastewater System

Asset Management Plan - October 2022

Background

The Piney Mountain Subdivision wastewater system was originally constructed in 1996. The system includes low pressure PVC collector lines from the homes throughout the neighborhood with various valves, a pump station with two pumps and a backup generator and the associated electrical and control appurtenances, and a ductile iron force main that discharges to the City of Durham's wastewater collection system. Currently, 56 homes are connected to the Piney Mountain system.

Asset Inventory

Since its construction in 1996, the Piney Mountain Subdivision wastewater system has been maintained by Orange Water and Sewer Authority (OWASA) through a combination of preventative maintenance and corrective maintenance activities. OWASA completed a comprehensive condition assessment of the pump station in 2004 and completed subsequent improvements and rehabilitations in 2006. In 2013 all assets throughout OWASA's facilities were assessed for condition. A 2016 project replaced the station's electrical system and added a generator.

Overall condition of the equipment continues to be informally assessed during preventative and corrective maintenance work orders and emergency response calls. Condition of equipment and components is used to obtain a snapshot of the current condition of the assets as well as estimate their remaining life. Condition assessments, when performed regularly, allow OWASA to gauge maintenance requirements and ensure reliability and prolong asset useful lifespans.

Additionally, OWASA periodically collects metal force main samples from the ductile iron line in areas with high potential for corrosion to assess the condition of the main that runs from the pump station to the City of Durham manhole. Because of the criticality and high replacement cost of this asset, background information about the force main was provided to the Piney Mountain Homeowners' Association (PMHOA) in August 2021. A condition assessment completed in October 2022 found several high-risk areas along the force main to be in relatively good condition. OWASA also inspects the pump station on a weekly basis in addition to responding to any emergency situations, such as leaks or equipment failures.

Attachment 1 provides the current asset inventory within the Piney Mountain Subdivision System. The table includes the date of asset installation (please note some assets are original whereas others have been replaced), condition of the asset, life expectancy of the asset, remaining life of the asset, and the estimated cost to replace. The life expectancy of the asset is

based on the original lifespan provided by the equipment or component manufacturer. The remaining life of the asset is based on the installation date, original manufacturer lifespan, and condition noted in the field. Asset life can be quite variable compared to the manufacturer lifespan depending on installation, environment, and maintenance activities. OWASA tracks whether or not equipment falls within the low (asset lasting less time than the expected manufacturer lifespan), base (asset aligns well with the manufacturer lifespan), or high (asset is lasting longer than the expected manufacturer lifespan) life cycle values within a renewal and replacement model, however all listed lifespan years and remaining life years are estimates. The estimated cost to replace the asset is shown in 2021 dollars and includes labor (both internal OWASA staff and external contractors as needed), materials and equipment, construction inspection and administration (if necessary, for external contractor work), and a 10% contingency.

The costs shown are planning level best estimates for a direct replacement of existing assets. Please note that when replacements and rehabilitations are needed, it is also the time to look towards improvements of new equipment or more efficient equipment, potentially impacting the costs shown. Also, note that the costs in the table assume that the asset would be replaced in its entirety, whereas in many instances the equipment or asset may be rehabilitated or only partially replaced depending on the type of wear and tear. The table is not meant to be exhaustive for all assets at the pump station, items such as fences, access areas, and other appurtenances for proper running of the station may not be captured in this inventory.

Planned Improvements

The current plan for rehabilitation and improvements within the system can generally be inferred from the “Next Replacement Year” column in Table 1. The notable changes from the October 2021 plan include: 1) a significant increase in the estimated remaining life of the force main as determined by the recent condition assessment (and a corresponding deferral of its planned replacement), and 2) the coating and lining of ARV manholes and pipes within these manholes as recommended by the same study.

Attachments

- Piney Mountain Asset Inventory (Table 1)
- Pump station components

Attachment 1
Piney Mountain Wastewater System Asset Inventory - Oct 24, 2022

Asset	Detail	Date Installed	Condition Score*	Approx. Remaining Life (Years)	Replacement/Rehab Cost in 2021 Dollars**	Next Replacement Year	Next Replacement Future value
Low Pressure PVC Collector Lines - High Risk	Areas near check valves (112 feet)	1995	2	13	$ 12,000	2035	$ 15,742
Low Pressure PVC Collector Lines - Remainder	9816 feet	1995	2	23	$ 1,021,000	2045	$ 1,650,426
4" DIP Force Main - High Risk Sections	A) Taproot/Mt Sinai intersection (2000 feet) B) near Wilkins Rd loop (700 feet)	1995	2	50	$ 486,000	2072	$ 1,380,543
4" DIP Force Main - Remainder	4700 feet	1995	2	50	$ 846,000	2072	$ 2,403,168
Air Relief Valves - Collector Lines	ARV (2)	1995	2	13	$ 8,500	2035	$ 11,151
Air Relief Valves - Force Main	ARV (3)	2022	1	20	$ 10,000	2042	$ 15,183
Valves	Valves Gate (5)	1995	3	13	$ 3,200	2035	$ 4,198
	Ball Valve (3)	1995	3	13	$ 900	2035	$ 1,181
Manholes	4-ft diameter (1)	1995	3	1	$ 12,000	2023	$ 12,253
Wet Well	Wet Well	2006	2	24	$ 34,000	2046	$ 56,120
Pumps	Pump-1	2022	1	15	$ 8,000	2037	$ 10,942
	Pump 2	2022	1	15	$ 8,000	2037	$ 10,942
	Well Pump	2007	3	5	$ 600	2027	$ 666
Controls	Controls -Pump Controller	2006	3	3	$ 2,300	2025	$ 2,449
	Well Pump Controls	2016	2	4	$ 1,700	2026	$ 1,848
Generator	Generator	2016	2	24	$ 42,000	2046	$ 69,325

*Condition Score definitions:

1. Excellent condition - very good or new asset
2. Good condition - minor defects only
3. Fair condition – moderate signs of wear, damage or corrosion and minorly reduced function
4. Poor condition – significant signs of wear, damage or corrosion and reduced function
5. Very poor condition - requires immediate replacement, unserviceable or has a safety concern

Notes and assumptions

Future costs assume inflation at 2.11%/year

Replacement estimates assume in-kind replacement only

Replacement costs assume full replacement; in many instances asset rehabilitation or partial replacement may be acceptable.

Notable changes from October 2021

Increased the estimated remaining life of 4" DIP force main to 50 years per Jacobs TM.

Included the recommended lining/coating of the 3 ARV manholes and pipes as per Jacobs TM. Used the high-end estimate for budgetary purposes.

Reflected the 2022 replacements of force main ARVs and Pumps.


Junction Box
Generator
Controls and Electrical
Wetwell/Pumps


Controls and Electrical Panel
Junction Box
Generator
Wetwell/Pumps