Outreach Assistance Program
Asset Management Plan Report

Tarentum Borough Water Department

Public Water System ID # 5020055

Report Date: May 2023

Bureau of Safe Drinking Water

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

From EPA's *Asset Management: A Best Practices Guide*[i]

Asset management is maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost. Lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing, or replacing an asset. Asset management is implemented through an **asset management program** and typically includes a written **asset management plan**.

The "Five Core Questions Framework" for Asset Management

This framework walks you through the major activities associated with asset management and can be implemented at the level of sophistication reasonable for a given system.
These five core framework questions provide the foundation for many asset management best practices:

1. **What is the current state of my system's assets?**
2. **What is my required "sustainable" level of service?**
3. **Which assets are critical to sustained performance?**
4. **What are my minimum life cycle costs?**
5. **What is my best long-term funding strategy?**

The five core questions framework for asset management is the starting point for asset management. Beyond planning, asset management should be implemented to achieve continual improvements through a series of "plan, do, check, act" steps.

- **Plan**: Five core questions framework (short-term), revise asset management plan (long-term).
- **Do**: Implement asset management program.
- **Check**: Evaluate progress, changing factors and new best practices.
- **Act**: Take action based on review results.

IMPORTANT NOTE

The following section of this report provides comments for consideration by water system operators, managers, and engineers. These comments are based on interpretation of information from your water system and observations / discussions from site visits, meetings, and telephone and email communication. Water system staff should meet to review, discuss, and carefully consider options for addressing any comments in a manner that would result in improved water quality or quantity for Tarentum Borough Water Department (TBWD). In some cases, water system staff may determine that addressing certain comments is not feasible and/or would not result in improved water quality or quantity. The operator(s) in responsible charge for your water system plays a key role in the decision making moving forward since that operator is the individual designated by the owner to make process control decisions that maintain or change the water quality or quantity of a water system in a manner that may affect the public health or environment. Ideally, decisions on how to address comments and modify existing treatment processes is a consensus decision reached after all applicable water system personnel have met and thoroughly discussed the comments below and associated system-specific options.

The DEP Outreach Assistance Provider is not an operator in responsible charge of this public water system, which is why the comments provided below are not specific recommendations but rather point out areas of concern, for additional investigation and consideration by appropriate personnel from TBWD. In most instances, the first step towards improving performance is to consider operational modifications to existing system processes, these are typically low- or no-cost adjustments to historical operating practices. In general, it is advisable to make one operational modification at a time, collect additional data to determine the impact that modification had on water quality, then move forward with the next priority process control modification. In some instances, operational adjustments alone may not be enough to consistently maintain compliance; therefore, the need to make physical modifications to the existing facility may be a necessary step to consider. Prior to implementing physical modifications, installing additional treatment or equipment, it is critical to contact Southwest DEP Technical Services Section at 412-442-4210, to discuss necessary approvals/permits. Additionally, water system personnel should consider potential simultaneous compliance concerns related to any modifications they plan to make; more specifically, staff should consider if there are unintended consequences that may result in any violations of the Safe Drinking Water regulations. An important consideration to always keep in mind is ensuring that water quantity is adequate to meet minimum pressures and fire protection needs throughout the entire distribution system.

Executive Summary

- TBWD has a significant amount of deferred maintenance, rehabilitation, and replacement in its distribution system. TBWD estimates that 90% of distribution piping is over 100 years old, therefore 90% or an estimated 13 miles of the 14.3 miles of buried assets within the distribution system have exceeded their life expectancy.
- The replacement cost for approximately 13 miles of distribution piping will add an estimated $15 million for immediate funding of the asset management plan due to these assets already exceeding their expected lifespan. TBWD can reasonably expect these assets to fail without warning, possibly requiring urgent emergency repairs that otherwise could have been made in accordance with a scheduled workplan when conditions are optimal.
- As TBWD finalizes their lead service line inventory, replacement of service lines may need to be incorporated in the asset management plan.
- The chemical feed system's last major upgrade at the Tarentum Water Treatment Plant was 1996 and many of the assets within the plant are within 5 years of their life expectancy. A critical item is that the majority of chemical feed systems are located within one room, and they are not within the appropriate compatible grouping. Liquid and dry chemicals should not be stored together regardless of compatibility group. Chemicals from different compatibility groups, such as bases (caustic soda) and polymers (Delpac) should not be stored together. Potassium permanganate (oxidizer) and powdered activated carbon (adsorption powders) should have their own separate rooms with appropriate safety equipment installed. Storing carbon and potassium permanganate together raises the risk of spontaneous combustion.
- EPA considers essential water consumption at 50 gallons per person per day and that the combined water and wastewater bills are deemed 'affordable' if they do not exceed 4.5 % of the Median Household Income (MHI). According to the most recent census, the MHI of Tarentum Borough was $37,513. 4.5% of the MHI equates to $141 per month for water and wastewater services. TBWD's average water bill for 2021 was $70 per month, and the average wastewater bill was $46 per month, for a total of $116, or about 82% of 4.5% of the MHI.
- It is recommended that the asset management spreadsheet be reviewed and updated periodically to adjust asset inventory and costs to reflect the most accurate information and to ensure a prudent enduring planning strategy.
- Water system Operators should strive to achieve and maintain all applicable certification classes and continuing education units required for making operational and treatment decisions. Current certification requirements include Class E (distribution), Class B, and subclasses 1, 8, 10 and 11. TBWD currently employs several operators that meet the necessary water system Operator certification requirements for the water plant and distribution system.

1. **Background:** The Borough of Tarentum functions include public safety, maintenance of Borough infrastructure (roads), maintenance of parks and other recreational facilities, water and electric services, sanitation, and general administrative functions. This asset management plan encompasses only the Tarentum Borough Water Department (TBWD), which is a community water system that serves approximately 4,942 consumers through 1,843 metered connections in Tarentum Borough, Allegheny County. TBWD provides water to East Deer Township through three interconnections. TBWD also maintains an emergency interconnection with Brackenridge Municipal Authority to buy or sell water.

2. **PaDEP Bureau of Safe Drinking Water, Capability Enhancement Program**
   - 2.1. Outreach Assistance Program (OAP):
     - 2.1.1. 2018: Water Audit utilizing AWWA free software with TBWD's assistance, completed in 2018 utilizing Chapter 110 calendar year 2017 data.
     - 2.1.2. 2023: Reviewed and updated water audit spreadsheet utilizing AWWA Version 6 free software with TBWD's assistance with 2021 data.
     - 2.1.3. 2023: Develop an Asset Management Plan with TBWD's assistance, completed in 2023 utilizing 2021 revenue and expense data.

3. **General Description**

The water treatment plant (WTP) obtains raw water from the Allegheny River. Treatment at the WTP includes powder active carbon (taste and odor control), potassium permanganate (oxidant), gaseous chlorine (oxidant and disinfectant), polyaluminum chloride (Delpac 2020) (coagulant), caustic soda (25% sodium hydroxide) (pH adjustment) and sodium fluorosilicic acid (fluoridation). System storage consists of three standpipes, located at one site, total system storage 1.25 MG, tanks operate with common inlet and outlet piping. System maintains an estimated 14.3 miles of distribution piping.

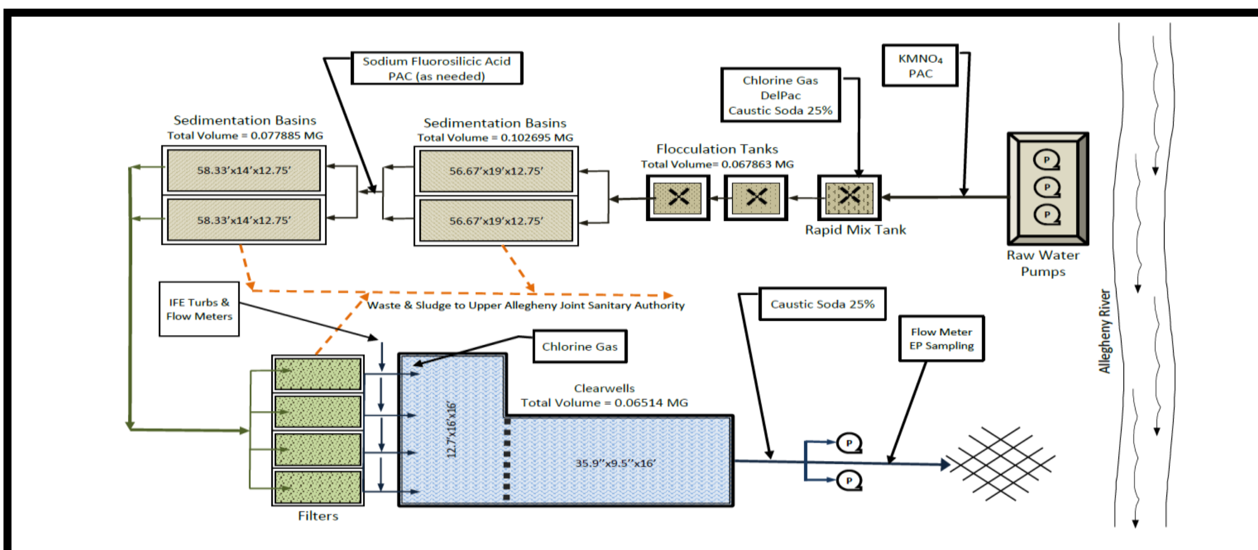


Figure 1. Tarentum Borough water treatment plant schematic.

4. **Asset Inventory/evaluation**

4.1. Asset Management Plan Spreadsheet

4.1.1. **Tab 1** – **Asset Management Team**

4.1.2. **Tab 2 - Level of service (LOS)** establishes what you want your assets to provide. It outlines the major goals of the utility in order to provide the customers what they want. The LOS will become a fundamental part of how the utility is operated. LOS is an ongoing process and LOS goals are set by each utility.

4.1.3. **Tab 3 – Asset Inventory -** including age of asset, estimated replacement cost, average life expectancy, and condition of asset

4.1.3.1. The life expectancy of the assets is an estimate and is based on industry standards and may vary based on the site-specific conditions (e.g., poor water quality, high humidity, soil conditions), maintenance history (e.g., regularly maintained vs not maintained).

4.1.3.2. The estimated replacement cost of the asset does not include engineering, permitting, materials and time that will be necessary to facilitate the replacement.

4.1.3.3. The condition of each asset was based on visual appearance and/or age of assets, and it should be reassessed regularly by staff of the water system.

4.1.3.4. The probability of failure and consequence of failure which are used to calculate the criticality factor should be reviewed and updated by TBWD staff of the water system.

4.1.4. **Tab 4** – **Asset Rating** - Used to identify ratings for conditions, probability of failure and consequences of failure of the asset.

4.1.5. **Tab 5** – **Criticality Factor -** Determining the probability of failure along with the consequence of failure of asset will aid in the identification of critical assets which may help make decisions about resource allocation and about maintaining or improving TBWD's sustainable level of service.

4.1.5.1. Each system needs to determine which assets are most critical to the reliable operation of the utility on a sustainable basis. In addition to evaluating asset criticality, an assessment of asset vulnerability is also essential.

4.1.5.2. TBWD may need to determine the criticality and vulnerability of each asset based on age of asset, redundancy of asset and maintenance of asset.

4.1.6. **Tab 6 – Capital Improvement Plan –** input distribution line replacement and chemical feed upgrades as an example. It is recommended that TBWD develop a Capital Improvement Plan and input assets.

4.1.7. **Tab 7 – Ten Year Budget –** input 2021 Revenue and Expenses from TBWD Financial Audit.

4.1.8. **Tab 8 - Financial Indicators**- Check Up Program for Small Systems (CUPSS) Asset Management Tool - Financial Indictors that can be used to assess how well a water or wastewater system is doing financially

4.1.8.1. Utilized TBWD Expenses and Revenues - TBWD may want to input CIP values and Debt values to evaluate their system

4.1.9. **Tab 9 - Budget vs Revenue** cost vs revenue per thousand gallons

4.1.10. **Tab 10 - Rates and Revenue Requirement** – TBWD may want to utilize to calculate proposed rate increases needed to cover potential deficit.

4.1.11. **Tab 11**- Industry distribution pipe replacement cost estimates for 2022.

4.2. **General Comments**

4.2.1. TBWD may consider taking digital pictures of the assets. It helps in the data collection process, and it creates a permanent record of the assets. Pictures taken over time can also help to determine when the asset may need to be replaced based on its condition.

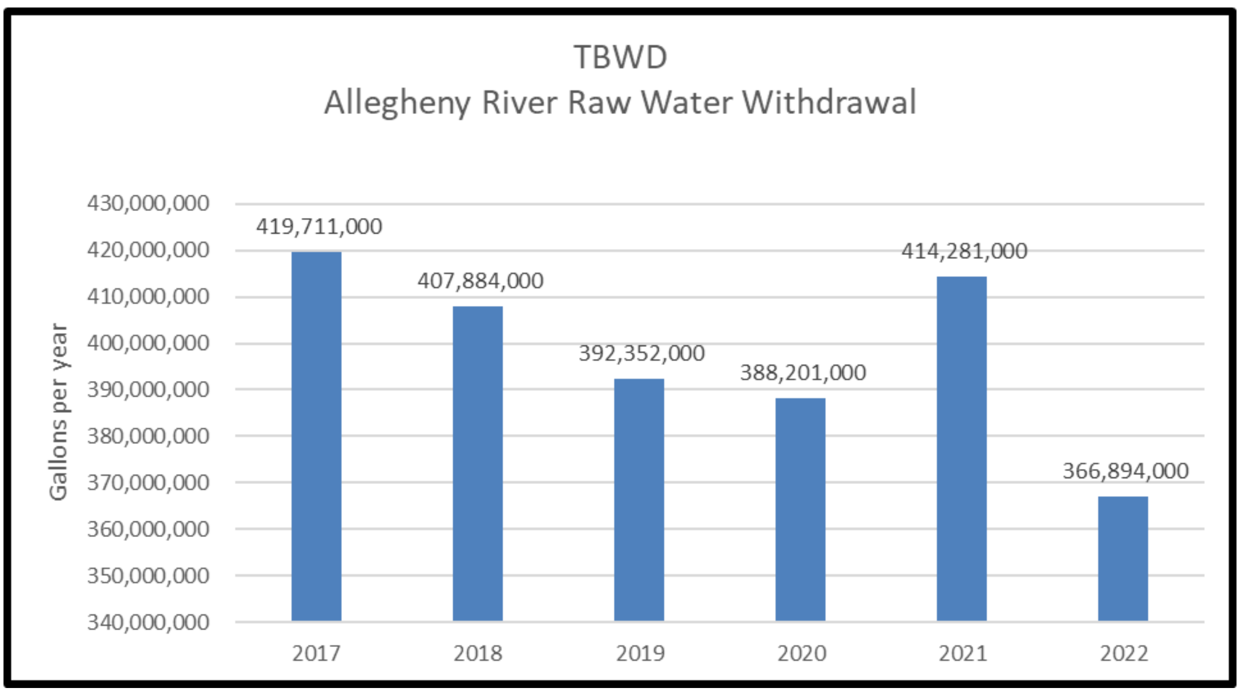
4.2.2. TBWD may consider adding model number and serial number for assets listed on asset management spreadsheet.

4.2.3. An important part of asset management is maintaining the equipment (assets). TBWD may want to consider investing in a Computerized Maintenance Management System. A computerized system can help with routinely scheduling reminders to do recommended preventative maintenance on equipment and other assets.

4.2.4. TBWD may consider reviewing the age of assets, size of assets, condition of assets, and cost to replace assets to determine if the asset management spreadsheet needs to be updated to reflect the true condition and a more accurate replacement cost of assets.

4.3. **Sources and Treatment**

4.3.1. **Source ID 001 – Allegheny River –** Order of Confirmation issued in 1939, 2.0 MGD permitted withdrawal of 2.0 MGD or 1,389 gpm – Allegheny River 2021 Chapter 110 Water Withdrawal = 441.281 MG/year = 1.21 MGD (840 gpm) – utilized 365 days in 2021



4.3.1.1. TBWD maintains one intake on the Allegheny River, the intake is dredged every 3 to 5 years and intake screen is inspected at that time.

4.3.1.2. In-service transmission Line -3,800' of 12" cast iron; installed in 1955; life expectancy is 80 years; replacement cost per foot is based on industry estimate shown on tab 11 of asset management spreadsheet. Utilized replacement cost for ductile iron pipe.

4.3.1.3. Out-of-service transmission Line -2,000' of 14" cast iron; installed in 1934; asset was not included in asset management plan.

4.3.1.4. Raw water flow meter, 12" Fischer Porter Mag meter installed in 1996, life expectancy of 20 years has been exceeded.

4.3.1.4.1. Flow meter is calibrated annually.

4.3.1.4.2. It is recommended to have the flow meter verified and calibrated at least annually to ensure accuracy.

4.3.1.5. 1st Avenue Pumping Station (PS) – Brick building which houses raw water pumps; construction date of 1926, building was refurbished in 2017, life expectancy of 70 years.

4.3.1.6. Raw water pumps – 3 horizontal turbine pumps each capable of pumping 2.0 MGD or 1400 gpm installed in 1996, life expectancy is 30 years. Pumps are rebuilt as needed.

4.3.1.7. 1st Avenue PS Variable Frequency Drives, replaced in 2017; life expectancy is 12 years.

4.3.1.8. 1st Avenue PS, Generac 125 KW generator, installed in 2007, life expectancy is 30 years.

4.3.1.9. 1st Avenue PS electrical equipment, miscellaneous equipment was updated in 2017, life expectancy is 20 years.

4.3.2. **TBWD Water Treatment Plant (WTP) –** Plant was built in 1934 and has a permitted capacity of 2.0 million gallons day (MGD) and a design capacity of 2.0 MGD. Building is a block and brick building; life expectancy is 70 years

4.3.2.1. TBWD WTP electrical equipment; miscellaneous equipment was installed in 1996; life expectancy of 20 years has been exceeded.

4.3.2.2. Vacuum priming system, Quincy QT-5, 5 HP, priming system was installed in 1996, life expectancy of 20 years has been exceeded.

4.3.2.3. Rapid Mix chamber – concrete, 2,932 gallons, installed in 1934, life expectancy of 60 years has been exceeded.

4.3.2.3.1. Unknown if chamber has been refurbished or coated since installation.

4.3.2.3.2. Mixer, one 5 HP mixer, installed in 1996, rebuilt in 2023.

4.3.2.4. Pole building structure covering the basins, installed in 2000, life expectancy is 40 years.

4.3.2.5. Two concrete flocculator chambers, dimensions, 18'x18'x14'each, 33,929 gallons each installed in 1934, life expectancy of 60 years has been exceeded.

4.3.2.5.1. Unknown if chamber has been refurbished or coated since installation.

4.3.2.5.2. Flocculator mixers, each flocculation chamber has mixing paddles with variable speed motors updated in 2015, life expectancy is 20 years.

4.3.2.5.3. Sludge removal equipment, Leopold Clari-Trac II, mechanical scrapers installed in 2015 in each flocculator chamber, life expectancy is 20 years.

4.3.2.6. Two concrete clarification basins, dimensions 56.67'x19'x12.75' each, 102,695 gallons each installed in 1934, life expectancy of 60 years have been exceeded.

4.3.2.6.1. Unknown if chamber has been refurbished or coated since installation.

4.3.2.7. Two concrete clarification basins, dimensions 58.33'x14'x12.75' each, 77,887 gallons each installed in 1934, life expectancy of 60 years have been exceeded.

4.3.2.7.1. Unknown if chamber has been refurbished or coated since installation.

4.3.2.8. Dual media gravity filters concrete chambers, 4 filters, dimensions 12'x15', filtering capacity of 180 ft^2 per filter, installed in 1934, life expectancy of 60 years has been exceeded.

4.3.2.8.1. Filtration system controls, installed in 2014, life expectancy is 20 years.

4.3.2.8.2. Filter media, 4 dual media filters with 18" of anthracite, 6" of silica sand and support gravel, design rate of 1.9 gpm/ft^2 per filter or 0.5 MGD per filter, filter media was replaced in 2014, life expectancy is 20 years.

4.3.2.8.3. Air scour equipment, installed in 2014, life expectancy is 20 years.

4.3.2.9. Backwash flow meter, 12" Fisher flow meter, estimated installation date of 1996, life expectancy of 20 years has been exceeded.

4.3.2.10. Two backwash pumps, 2,600 gpm each, installed in 1996, life expectancy is 30 years, unknown if pumps have been rebuilt since installation.

4.3.2.11. Individual filter flow meters, 4 units, 6" meters, 1 flow meter was replaced in 2020, remaining 3 flow meters were installed in 1996 and life expectancy of 20 years has been exceeded.

4.3.2.12. Plant effluent water flow meter, 12" Bristol Venturi meter installed in 1996, life expectancy of 20 years has been exceeded.

4.3.2.12.1. Flow meter is calibrated annually.

4.3.2.12.2. It is recommended to have the flow meter verified and calibrated at least annually to ensure accuracy.

4.3.2.13. High service pumps, 2 centrifugal pumps each capable of pumping 2.0 MGD or 1400 gpm installed in 1996, life expectancy is 30 years. Pumps are rebuilt as needed.

4.3.2.13.1. High service pumps VFD's, 2 units, one installed in 1996 and one unit installed in 2015, life expectancy of 12 years has been exceeded for one unit.

4.3.2.14. Concrete clearwell, 67,500-gallon capacity, installed in 1934, life expectancy of 60 years has been exceeded.

4.3.2.14.1. Unknown if chamber has been refurbished or coated since installation.

4.3.2.14.2. AWWA Standard M42 recommends inspection and cleaning of tanks and clearwells every 3 years.

4.3.2.15. Gas chlorine feed equipment, rotometer, alarm, scales, and miscellaneous equipment, replaced feed system in 2012, life expectancy is 15 years.

4.3.2.15.1. Recommended to rebuild chlorine system annually.

4.3.2.16. Powdered activated carbon (PAC): volumetric feeder, installed in 1996, life expectancy of feeder is 30 years.

4.3.2.16.1. Carbon feed equipment is located with incompatible chemicals, specifically a strong oxidizer, permanganate; spontaneous combustion could result.

4.3.2.16.2. Powdered activated carbon should be located in separate room with appropriate safety equipment installed.

4.3.2.17. Potassium permanganate: volumetric feeder, installed in 1996, life expectancy of feeder is 30 years.

4.3.2.17.1. Permanganate feed equipment is located with incompatible chemicals, specifically carbon; spontaneous combustion could result.

4.3.2.17.2. Potassium permanganate should be located in separate room with appropriate safety equipment installed.

4.3.2.18. Sodium fluoride: volumetric feeder, installed in 1996, life expectancy of feeder is 30 years.

4.3.2.18.1. Feed equipment is located with incompatible chemicals.

4.3.2.19. Delpac 2020

4.3.2.19.1. LMI diaphragm pump, replaced 2020, life expectancy is 15 years.

4.3.2.19.2. Feed equipment is located with incompatible chemicals.

4.3.2.19.3. Day tank, 40 gallons, installed in 1996, life expectancy of 20 years has been exceeded.

4.3.2.19.4. Bulk tank, 4,000 gallons, installed in 1996, life expectancy of 20 years has been exceeded.

4.3.2.20. Caustic Soda 25%

4.3.2.20.1. LMI diaphragm pump, replaced 2020, life expectancy is 15 years.

4.3.2.20.2. Feed equipment is located with incompatible chemicals.

4.3.2.20.3. Day tank, 250 gallons, installed in 2012, life expectancy is 20 years.

4.3.2.20.4. Bulk tank, 2,000 gallons, installed in 2015, life expectancy is 20 years.

4.3.2.21. With the exception of gaseous chlorine, all treatment chemicals feed equipment is located in one room which is a safety concern.

4.3.2.21.1. Liquid and dry chemicals should not be stored together regardless of compatibility group.

4.3.2.21.2. Chemicals from different compatibility groups, such as bases (caustic soda) and polymers (Delpac) should not be stored together.

4.3.2.21.3. Potassium permanganate (oxidizer) and powdered activated carbon (adsorption powders) should have their own separate rooms with appropriate safety equipment installed.

4.3.2.21.4. Ideally, carbon and permanganate should not be feed concurrently since permanganate will oxidize on the carbon surface which will reduce the adsorption efficiency of the carbon.

4.3.2.21.5. If TBWD updates the chemical feed systems, a potential application point for carbon is prior to any other treatment chemicals with adequate detention time. TBWD may consider relocation of the powder activated carbon to the raw water pump station, which would allow for 32 minutes of detention time at average flow rates of 700 gpm or 1.0 MGD within the transmission line.

4.3.2.22. Raw water turbidimeter, HACH Surface Scatter 7, installed in 2012 , life expectancy is 15 years.

4.3.2.23. Individual filter effluent turbidimeters, 4 units, HACH TU5300, installed in 2019, life expectancy is 15 years.

4.3.2.24. On-line chlorine analyzer, entry point, HACH CL17, installed in 2012, life expectancy is 15 years.

4.3.2.25. On-line pH meter, entry point.

4.3.2.26. Benchtop turbidimeter, HACH 2100N, purchased in 2010, life expectancy of 10 years has been exceeded.

4.3.2.27. Spectrophotometer, HACH DR 2800, purchased in 2012, life expectancy of 10 years has been exceeded.

4.3.2.28. Distribution handheld chlorine analyzer, HACH Pocket II, purchased in 2012, life expectancy of 10 years has been exceeded.

4.3.2.29. Benchtop pH analyzer, HACH Sension, purchased in 2020, life expectancy is 10 years.

4.3.2.30. SCADA system including RTU's, Cambria System, system was installed in 2014, the system software is updated routinely, life expectancy of system which includes the RTU units is 20 years.

4.3.2.31. Generator, 250 KW Generac generator**,** installed in 2007, life expectancy is 30 years. Generator is exercised weekly and is serviced annually.

4.4. Water Storage

4.4.1. General Storage Tank Comments

4.4.1.1. The life expectancy of a glass lined, or steel tank is estimated at 75 years.

4.4.1.2. A tank typical life cycle should include periodic inspections, cleaning, general maintenance, and repairs. If properly maintained a glass lined or steel tank may last more than 100 years. AWWA standard M42 recommends cleaning and inspecting every 3 years.

4.4.1.3. All 3 tanks are located at the intersection of Reservoir Drive and Emerson Drive. Tanks are interconnected and operate with one common inflow/outflow. TBWD distribution system operates as one pressure zone.

4.4.2. **Tank #1,** 0.5 MG steel standpipe, installed in 1934, life expectancy is 100 years.

4.4.3. **Tank #2,** 0.5 MG steel standpipe, installed in 1934, life expectancy is 100 years.

4.4.4. **Tank #3,** 0.25 MG steel standpipe, installed in 1934, life expectancy is 100 years.

4.4.5. All three tanks were repainted in 2017; life expectancy of paint is 25 years.

4.4.6. Valve vaults for tanks, 2 concrete vaults, installed in 1934, life expectancy of 40 years has been exceeded for the vaults.

4.5. East Deer Township Interconnection Vaults and meters

4.5.1. East Deer Township West 7th and Florence interconnection vault; replaced in 2022, life expectancy is 40 years.

4.5.2. East Deer Township West 7th and Florence interconnection meter, 8" and 2" combined Sensus W5500 Turbo meter, installed in 2021, life expectancy is 20 years.

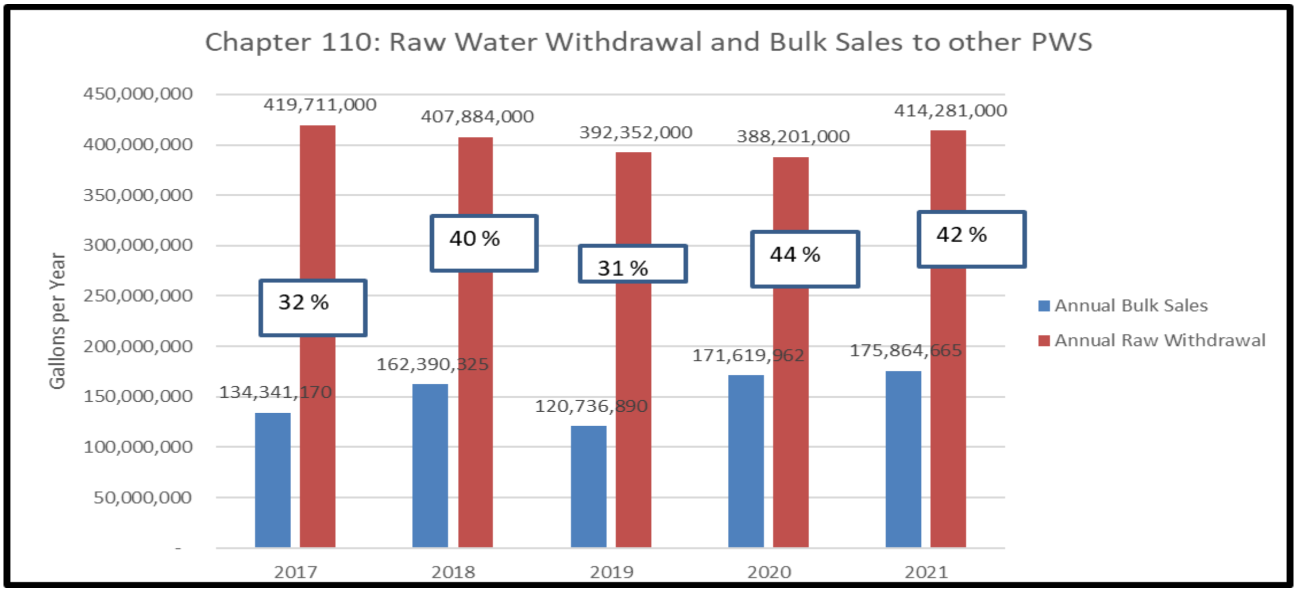
4.5.3. East Deer Township Treadway Lane interconnection vault: replaced in 2022, life expectancy is 40 years.

4.5.4. East Deer Township Treadway Lane interconnection meter, 8" and 2" combined Sensus W5500 Turbo meter, installed in 2021, life expectancy is 20 years.

4.5.5. Deer Township West 9th and Florence interconnection vault; replaced in 2022, life expectancy is 40 years.

4.5.6. Deer Township West 9th and Florence interconnection meter, 8" and 2" combined Sensus W5500 Turbo meter, installed in 2021, life expectancy is 20 years.

4.5.7. It is recommended to have the flow meter verified and calibrated at least annually to ensure accuracy.



4.6. Distribution System – mains, valves, and hydrants

4.6.1. **Water Mains**

4.6.1.1. The condition of pipe, valves and other buried assets can vary greatly depending on the quality of the materials and quality of installation, soil conditions, corrosion, and system pressures.

4.6.1.2. Tab 11 of the Asset Management spreadsheet includes an updated industry standard pipe replacement cost estimation for the 2022 calendar year, which includes the distribution main, the cost of service line replacement installation from water main to property line (long and short services), also includes valves, and hydrants placed every 700 feet.

4.6.1.3. Any repairs or replacement should be completed utilizing industry standard, ANSI/AWWA C-651.

4.6.1.4. TBWD has a GIS mapping system for the distribution system. Specifics such as age of assets, dimension of assets have not been put into the GIS map and the map is not updated. TBWD may want to confirm age, length, and condition of distribution lines and input data into GIS system.

4.6.1.5. The system mapping indicates an estimated 14.3 miles of piping of a variety of ages, composition, and size. TBWD system consists of a variety of pipe with the majority of the piping identified as cast and ductile iron; life expectancy is estimated 80 years for ductile iron and cast. Replacement cost estimates are based on replacing existing iron piping with ductile iron piping.

4.6.1.6. TBWD estimates that 90% of distribution piping is over 100 years old, therefore an estimated 13 miles of the buried pipe and distribution components have exceeded their life expectancy.

4.6.1.7. TBWD length of individual sized piping is unknown, therefore a rough estimate was utilized to determine an estimated replacement cost distribution piping summary:

4.6.1.7.1. 15,100 feet of 4” iron pipe

4.6.1.7.2. 15,100 feet of 6” iron pipe

4.6.1.7.3. 15,100 feet of 8” iron pipe

4.6.1.7.4. 15,100 feet of 10” iron pipe

4.6.1.7.5. 15,100 feet of 12” iron pipe

4.6.1.8. **The estimated replacement cost of the buried assets that have exceeded their life expectancy has significantly impacted the asset management plan, adding approximately $15 million for immediate replacement.**

4.6.2. Distribution valves: The life expectancy of distribution system valves is 40 years.

4.6.2.1. It is recommended to replace valves as distribution lines are replaced, and the cost to replace valves is built into the industry estimates for pipe replacement.

4.6.3. Hydrants: 134 hydrants, life expectancy is 60 years. Cost to replace hydrants is built into the industry estimates for pipe replacement.

4.7. **Meters: Includes radio reading equipment and billing software**

4.7.1. According to the 2021 Chapter 110 report, there are 1,843 customer meters and they range in size from 5/8” to 4”.

4.7.1.1. 1773 - 5/8” meters

4.7.1.2. 29 – ¾” meters

4.7.1.3. 13- 1” meters

4.7.1.4. 15 – 1 ½ “ meters

4.7.1.5. 11 – 2” meters

4.7.1.6. 1 – 3” meter

4.7.1.7. 1 – 4” meter

4.7.1.8. Life expectancy is 15 years, asset management plan utilized 2008 as the age of meters when the universal customer meter replacement program occurred.

4.7.2. Sensus AMI – FlexNet Advanced Metering system was installed in 2020, life expectancy is 20 years, a $25,000 annual fee is required.
4.7.3. Billing system, Incode 10 Tyler System, installed in 2021, life expectancy is 10 years.

4.8. **Vehicles:** In general, life expectancy of vehicles and heavy equipment is based on use of equipment, maintenance of equipment and how the equipment is stored or housed.
4.8.1. Vehicles: TBWD maintains two vehicles designated for the water system. When main breaks occur, they will utilize street department equipment and vehicles.
4.8.1.1. Life expectancy of 20 years has been exceeded for both vehicles.
4.8.2. TBWD may consider adding an estimated 25% to 30% replacement cost for the vehicles and equipment utilized for the street department to the TBWD's asset management plan.
4.8.2.1. Life expectancy of heavy equipment vehicles is 25 years.
4.8.3. Life expectancy utilized for TBWD's asset management plan was based on moderate use, routine maintenance, and stored indoors, when possible, when not in use.

4.9. **Certified Operator(s)**
4.9.1. Water system Operators should strive to achieve and maintain all applicable certification classes and continuing education units required for making operational and treatment decisions.
4.9.2. Current Water Operator certification requirements include Class E (distribution system), WTP: Class B, and Subclasses 1, 8,10 and 11.
4.9.3. TBWD currently employs several operating personnel that meet the necessary water system Operator certification requirements.
4.9.4. Succession planning for replacing the certified water plant and distribution operators should be in progress in order to ensure continual operational system oversight, as it may take months or years for personnel to become appropriately certified and experienced to operate a water treatment plant and distribution system properly and independently.

5. **Budgeting and Cost to Produce Water**
5.1. Much of the water and wastewater conveyance infrastructure that was installed during the first half of the 20th century is coming to the end of its useful life. Being out of sight, less awareness and significance has been placed on these underground lifeline systems which support societies, quality of life, public health, economic development and living standard. Often, these systems only get attention when there is a failure. There is a growing awareness that a reactive management approach is not sustainable.
5.2. Asset Management planning relies on the concept of full cost pricing. The goal of full cost pricing is to have the charges for water cover the entire cost of running the water system today and into the future. The water system should bring in enough revenue to cover the full cost of running the water system, including Operation and Maintenance costs, capital needs, and debt service.[ii]
5.3. Using the 2021 water expenses along with the volume of water produced for 2021, TBWD's true cost to produce water is estimated to be $4.10 per 1,000 gallons.

5.4. The 2021 operating expenses for the water system were $1,696,877, or approximately $77 per household per month.
5.5. The 2021 water revenue was $1,362,952, which equates to a perceived deficit of $333,925.
5.6. Employing the concept of full cost pricing, the Asset Management Plan for TBWD shows that TBWD is not fully financing the true cost of the water system with annual revenues. Instead, a budget deficit exists, which may necessitate a significant rate increase. Utilizing the spreadsheet to project operating expenses and revenue for the water system in 2022, expenses were projected to be $1,832,627 which is an 8% increase from the previous fiscal year expenses due to inflation; however, to budget for savings to conduct capital improvement projects, $2,332,627 in revenue would have been needed for 2022 and continuing thereafter, adjusting for asset condition and as a result of deferring maintenance or replacement of assets that are nearing or have exceeded their expected lifespans.

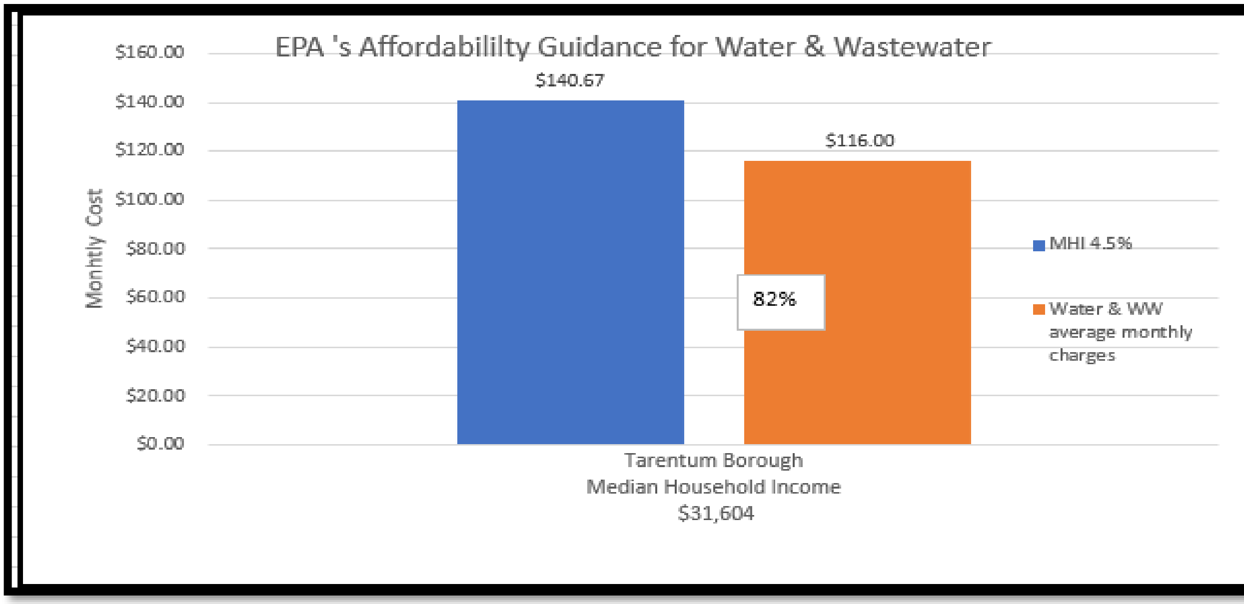
	2021 Expenses	Projected - 2022 Expenses + Capital Improvement
Water System	$1,696,877	$1,832,627
Capital Improvement Plan – Asset Management Plan	$0	$500,000
Total Expenses	$1,696,877	$2,332,627
Cost to produce	$4.10	$5.63
Monthly Water Rates	$77	$106

6. TBWD Current Rates

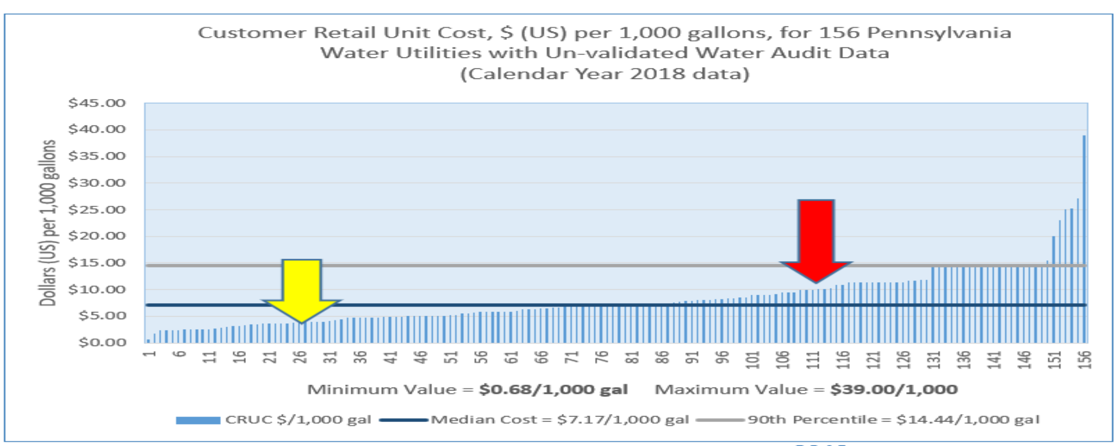
6.1. TBWD reads meters and bills monthly and 96% of accounts are 5/8” residential meters.
6.2. According to the Chapter 110 reporting for 2021, TBWD average residential usage is 8,178 gallons per connection per month.

Meter Size	**Base Rate**	**Per 1,000 gallons**
5/8”	$23.00/2,000 gallons	$11.50
3/4”	$27.08/3,000 gallons	$9.03
1”	$42.11/5,000 gallons	$8.42
1.25”	$69.02/9,000 gallons	$7.67
2”	$166.30/23,000 gallons	$7.23
Non-weighted average used for CRUC		$11.50

6.3. EPA considers essential water consumption at 50 gallons per person per day and that the combined water and wastewater bills are deemed ‘affordable’ if they do not exceed 4.5% of the Median Household Income (MHI). According to the most recent census, the MHI for Tarentum Borough was $37,513. 4.5% of the MHI equates to $141 per month for water and wastewater services. TBWD’s average water bill for 2021 was $70 per month, and the average Upper Allegheny Joint Sanitary Authority wastewater bill was $46 per month, for a total of $116, or about 82% of 4.5% of the MHI.



6.4. Customer Retail Unit Cost (CRUC) represents the charge a customer pays for water service. Utilizing the non-weighted average of all rates of $11.50/1,000 gallons, TBWD has a CRUC above the median cost of $7.17/1,000 gallons from 156 Pennsylvania water utilities, as shown in figure below. The consecutive system, East Deer Township rates are $4.68/1,000 gallons.



Customer Retail Unit Cost (CRUC) for Pennsylvania water utilities **2018** Data.
Red arrow = TBWD rates $11.50/1,000 gallons
Yellow arrow = East Deer Township rates $4.68/1,000 gallons

7. **Capital Improvement Plan**
   7.1. TBWD will need to identify assets for rehabilitation, repair, or replacement, the items list below are **potential priorities** identified by CIP for rehabilitation, repair, or replacement:
      7.1.1. **1-year priorities**
         7.1.1.1. Replacement of 2” distribution lines at an estimated cost of $1,812,000
         7.1.1.2. Replacement of 4” distribution lines at an estimated cost of $2,038,500
         7.1.1.3. Replacement of 6” distribution lines at an estimated cost of $2,431,100
         7.1.1.4. Replacement of 8” distribution lines at an estimated cost of $3,035,100
         7.1.1.5. Replacement of 10” distribution lines at an estimated cost of $3,337,100
      7.1.2. **5-year priorities**
         7.1.2.1. Chemical feed equipment upgrades at an estimated cost of $250,000.
         7.1.2.2. Customer meter replacement at an estimated cost of $967,400
         7.1.2.3. Upgrade Water Treatment Plant’s electrical system at an estimated cost of $100,000
         7.1.2.4. Replacement of WTP Truck and Distribution Truck at an estimated cost of $120,000
         7.1.2.5. Replacement of raw and plant effluent flow meters at an estimated cost of $20,000
         7.1.2.6. Replacement of IFE flow meters at an estimated cost of $22,500
         7.1.2.7. High service pumps and VFDs at an estimated cost of $48,000
         7.1.2.8. Replacement of raw water turbidimeter and entry point chlorine analyzer at an estimated cost of $11,500
      7.1.3. **10-year priorities**
         7.1.3.1. Replacement of raw water pumps at an estimated cost of $60,000
         7.1.3.2. Replacement of IFE filter turbidimeters at an estimated cost of $12,000
         7.1.3.3. Replacement of the 4” interconnection meters at an estimated cost of $8,000
      7.1.4. **15-year projection**
         7.1.4.1. Replacement filter media, filter controls and air scour equipment
         7.1.4.2. Rehabilitation/Replacement of sludge removal equipment in flocculation chambers at an estimated cost of $100,000
      7.1.5. **20-year projection**
         7.1.5.1. Replacement of raw pump house generator and plant generators at an estimated cost of $175,000
         7.1.5.2. Replacement of 12” transmission line at an estimated cost of $915,800
         7.1.5.3. Painting of storage tanks at an estimated cost of $300,000
         7.1.5.4. Replacement of raw water pumps VFDs at an estimated cost of $24,000
         7.1.5.5. Replacement of raw water pump station electrical equipment at an estimated cost of $25,000
         7.1.5.6. Replacement of 8” and 2” combined flow meter at interconnection at an estimated cost of $10,000
      7.1.6. **30-year projection**
         7.1.6.1. Rehabilitation /Replacement of exterior shell of water treatment plant at an estimated cost of $1,000,000

7.1.6.2. Rehabilitation /Replacement of concrete structures within water treatment plant at an estimated cost of $100,000

7.1.6.3. Replacement of interconnection vaults at an estimated cost of $135,000

7.1.7. **50-year projection**

7.1.7.1. Replacement of three storage tanks at an estimated cost of $2,750,000.

7.1.8. **75-year projection**

7.1.8.1. Rehabilitation/Replacement of raw water pump station at an estimated cost of $300,000

8. **Asset Management Resources**

8.1. **Southwest Environmental Finance Center** has partnered with EPA to create a repository of tools related to Asset Management, and resources are available through their Asset Management Switchboard which can be found at the following link: https://swefcamswitchboard.unm.edu/am/

8.2. **US EPA -***Reference Guide for Asset Management Tools*
Web Page: https://www.epa.gov/sustainable-water-infrastructure/asset-management-water-and-wastewater-utilities

WHAT TO DO WITH THIS PLAN

The **next steps** for TBWD to consider may be:

- Form an Asset Management Team, typically including the manager, operator in responsible charge, finance director (if applicable), and key volunteers from the Board and community. Appoint a Team Leader to facilitate the process. Utilize EPA and EFCN resources as a guide.
- As a Team, follow the **PLAN, DO, CHECK, ACT** process, beginning with the Five Core Questions concept for the PLAN step.

PLAN:

- **ASSET EVALUATION**: Report back on the asset inventory and observations noted in this report and update as assets are renewed.
- **LEVEL OF SERVICE**: The Team should engage with stakeholders and customers as to the desired level of service. Best practices may include:
  - Analyzing current and anticipated customer demand and satisfaction with the system
  - Understanding current and anticipated regulatory requirements
  - Writing and communicating to the public a level of service “agreement” that describes your system’s performance targets
  - Using level of service standards to track system performance over time.
- **CRITICAL ASSETS**: Evaluate the most critical assets. Best practices may include:
  - Listing assets according to how critical they are to system operations
  - Conducting a failure analysis when assets fail
  - Determining the probability of failure and listing assets by failure type
  - Analyzing failure risk and consequences
  - Using asset decay curves,

    - Reviewing and updating your system's vulnerability assessment (if your system has one)
- **MINIMUM LIFE CYCLE COST**: Review the 2023 projected costs to account for asset management. Best practices may include:
    - Moving from reactive maintenance to predictive maintenance
    - Knowing the costs and benefits of rehabilitation versus replacement
    - Looking at lifecycle costs, especially for critical assets
    - Deploying resources based on asset conditions
    - Analyzing the causes of asset failure to develop specific response plans
- **LONG-TERM FUNDING PLAN**: Determine a funding strategy based on customer revenues, grants, and loans that account for the cost of asset management. Some strategies to consider:
    - Revising the rate structure
    - Funding a dedicated reserve from current revenues (i.e., creating an asset annuity)
    - Financing asset rehabilitation, repair, and replacement through borrowing or other financial assistance.

DO: Implement the revised plan that results from the PLAN step. This might include another review of rates, including any applicable funding sources such as USDA, CDBG, PENNVEST, etc.

CHECK: Monitor progress regarding the asset management plan periodically. Perhaps quarterly, the Team Leader would gather the Team and the Team would update the Plan and report back to the full Board and stakeholders.

ACT: Carry out the plan.

Repeat the Process. The PLAN step should be **repeated annually** in coordination with the budget process.

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[i] U.S. Environmental Protection Agency, Office of Water. April 2008. "Asset Management: A Best Practices Guide." EPA 816-F-08-014

[ii] Barnes, Glenn. 2017. "Pricing Water to Achieve Full Cost Recovery." Environmental Finance Center, The University of North Carolina at Chapel Hill.
https://efcnetwork.org/wp-content/uploads/2017/12/Webinar_PricingWaterForFullCostRecovery.pdf