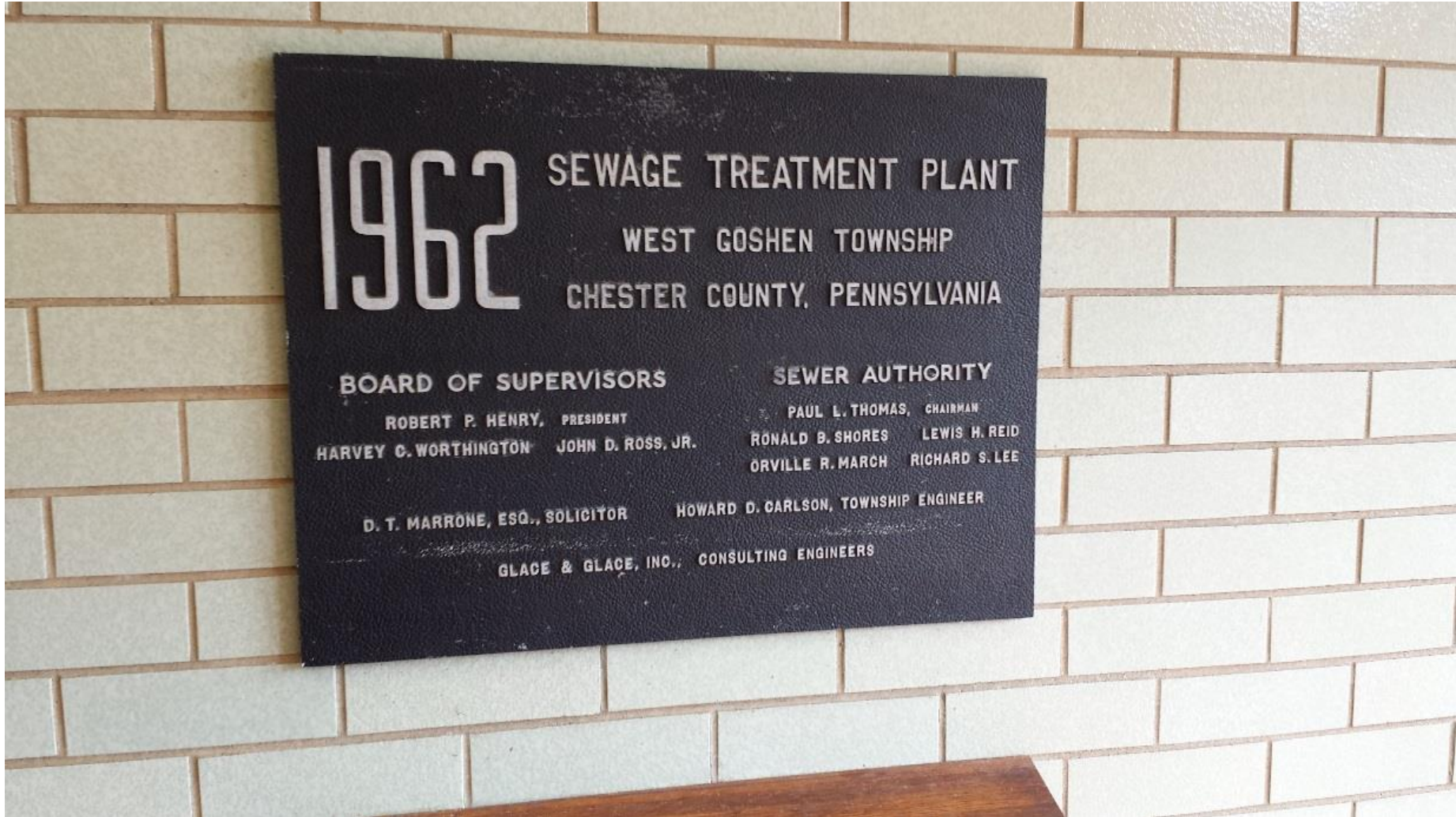


# West Goshen Sewer Authority

System Description, Capital Projects and Rates Forecast.

# Introduction

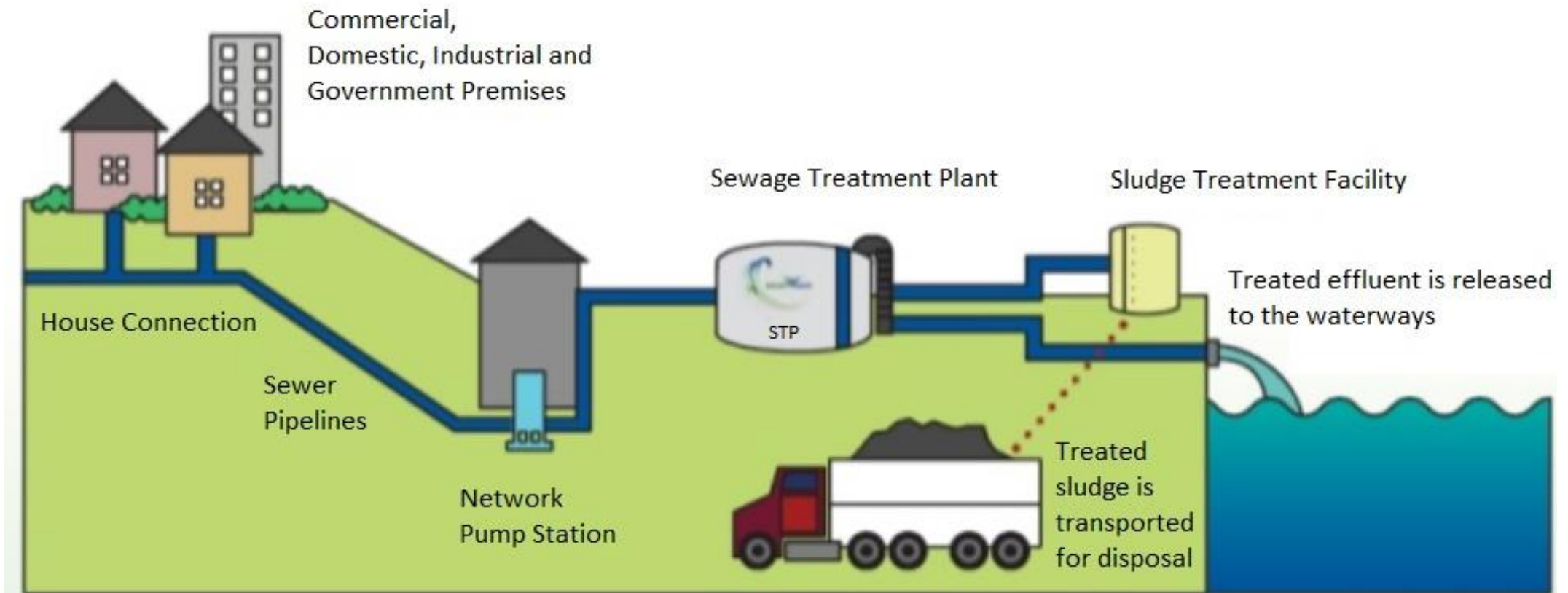


# Purpose of the Projects

- Regulatory Compliance
  - Existing discharge permit limitations must be maintained
  - Existing, new, and future regulations
  - EPA Mandate for Goose Creek TMDL
  - At risk for fines for non-compliance (i.e. Underground Storage Tanks)
- Deteriorating Infrastructure
  - Hydrogen sulfide corrosion
  - Inflow and Infiltration (I/I)
  - Increased Operation, Maintenance , and Emergency Repair costs
- Employee Life, Health, and Safety Concerns
  - Methane Gas Levels above Lower Explosive Levels in Buildings
  - Explosion proof equipment lacking in areas where required by Code
  - Revised Codes and Regulations (Industry Standards)
- Sustain Level of Service as Expected by Customers

# **Accomplishments and Investments To-Date**

# Diagram of Collection, Conveyance and Treatment System



Source: <https://www.slideshare.net/cheeweishan/sewage-treatmentsystem8-55403780>

# Significant Work Completed In 2017

- Projects to Repair/Replace Treatment Plant
  - Structure Repairs to Primary Clarifier No. 3.
  - Emergency Repairs to the Anaerobic Digester.
  - Replacement of Two Emergency Generators.
  - Headworks Improvements.
  - Mechanical Fine Screens.
  - Equalization Basin Pump 1 was replaced.
  - Equalization Blower 3 was rebuilt.
- Projects to Repair/Replace Collection and Conveyance System
  - Perform 8 spot repairs
  - Repaired or Replaced 27 manholes
  - Replaced 14 feet of clay pipe.

# Significant Work Completed or Will Be Completed In 2018

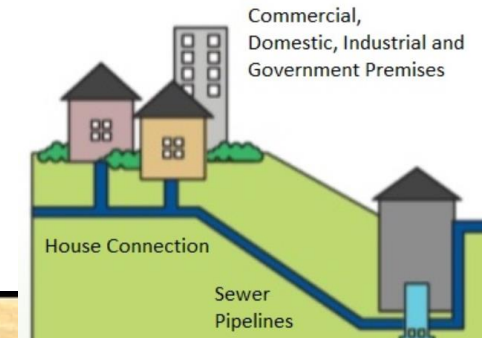
- Projects to Repair/Replace Collection and Conveyance System
  - Approximately 5,800 feet of 8-inch diameter cured-in-place pipe lining.
  - Approximately 8,000 feet of 30-inch diameter cured-in-place pipe lining.
  - Perform 8 spot repairs.
  - Replace 3 manholes.
  - Rehabilitate 54 manholes.
  - Replace 3 air release valves.
  - Bypass Facilities Projects at 7 of the pump stations.
  - Replacement of the Woodcrest (Downing Avenue) pump station.

# Capital Projects Completed or Will Be Completed In 2018

- Projects to Repair/Replace Treatment Plant
  - Enhanced Chemical Addition.
  - Grit Removal System.
  - Influent Screw Pumps.
  - Replace 16-inch diameter buried aeration piping (Pending 2018 grant decision).
  - Install variable frequency drivers on existing blowers to reduce power consumption and improve operations (Pending 2018 grant decision).
  - Install Dissolved Oxygen sensors in Aeration Basins to improve operations (Pending 2018 grant decision).
  - Reinstall handrail at Aeration Tanks where previously damaged (Pending 2018 grant decision).
  - Arc Flash Study to be performed.



# Sanitary Sewer System Rehabilitation

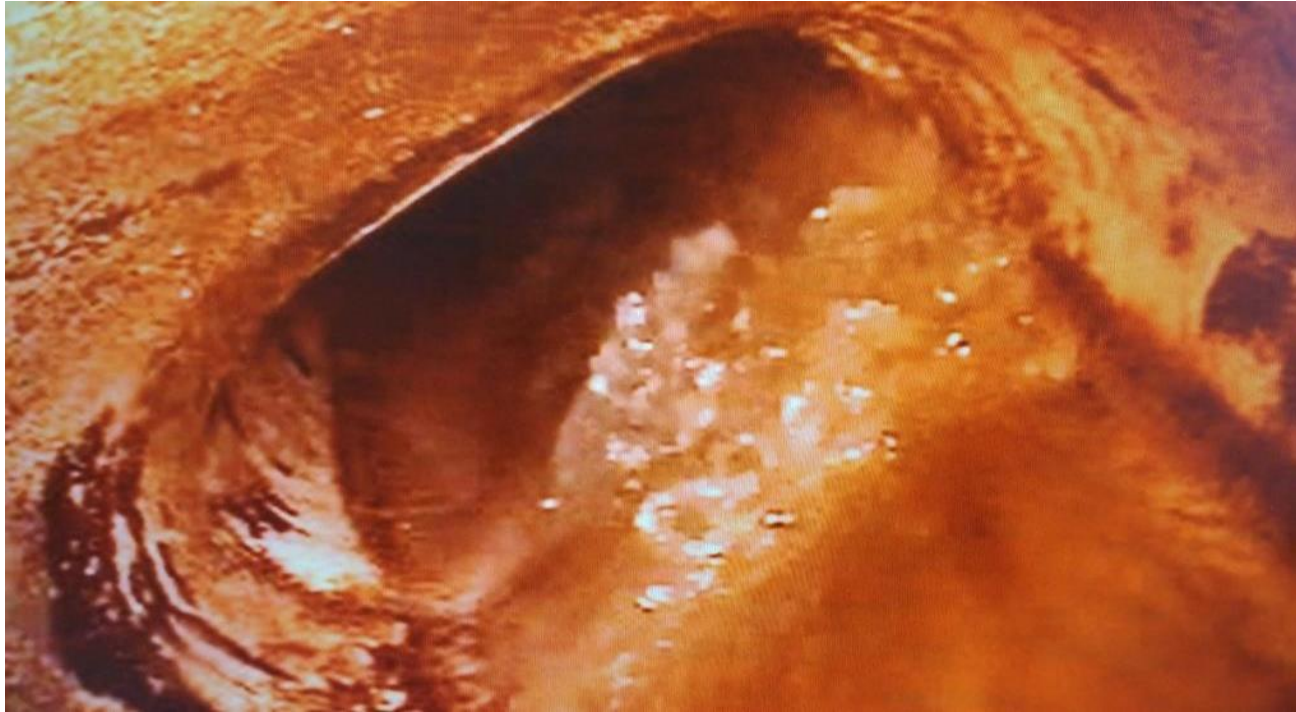


2015: Root Intrusion in Sewer Main

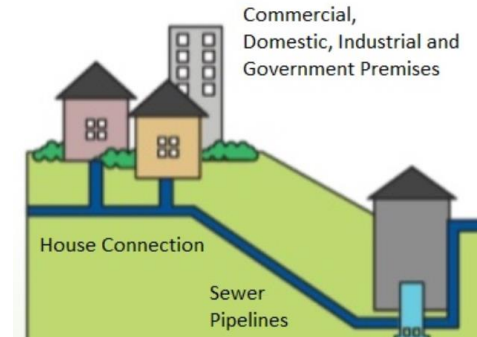


2016: Lined Sewer Main

# Sanitary Sewer System Rehabilitation – Collapsed Sewer

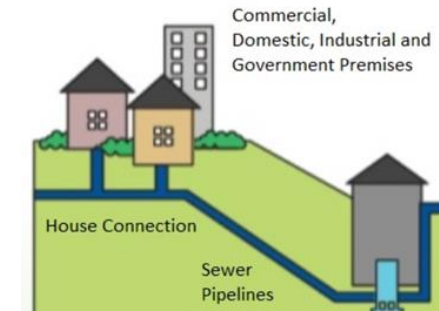


2018: Squashed Pipe at Knollwood Drive





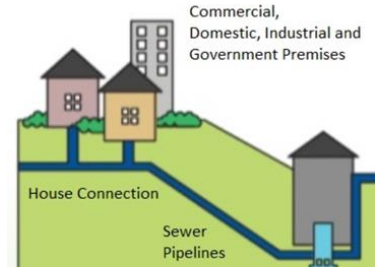
# Sanitary Sewer System Rehabilitation – Gas Corrosion of Concrete



2015: Deteriorating Conditions at Manhole 1553-32 at Greenhill Road



# Sanitary Sewer System Rehabilitation



2016: Rehabilitating Manhole 1553-32 at Greenhill Road



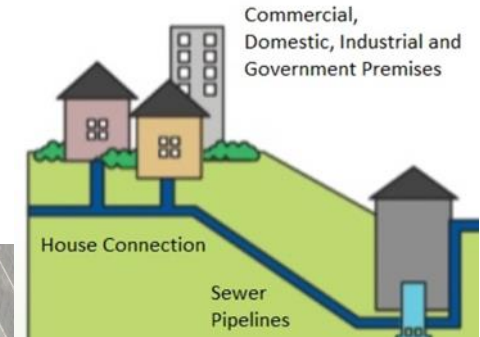
# Sanitary Sewer System Rehabilitation



Before: Broken and Deteriorating Manhole



2018: New Manhole to Replace Broken and Deteriorating Manhole





# Deteriorating Conditions of Pump Stations



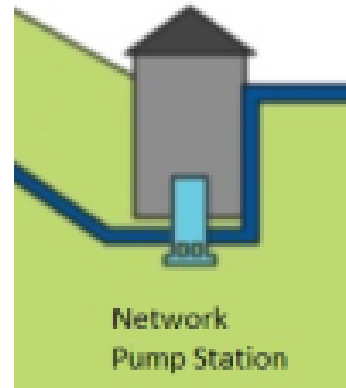
Westtown Way Equipment



Fern Hill Grinder



Woodcrest Deterioration





# Headworks System Improvements



Fine Screen



Aerated Grit Blower

2015



Fine Screens



Vortex Grit System

2018



# Deteriorating Conditions of Wastewater Treatment Plant



Operations Building Exterior Deterioration



Operations Building Interior Deterioration



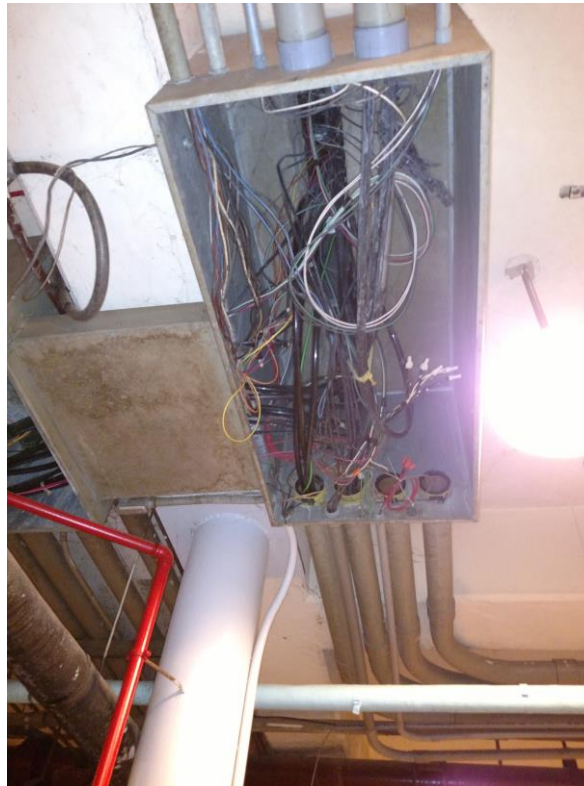


# Deteriorating Conditions of Wastewater Treatment Plant

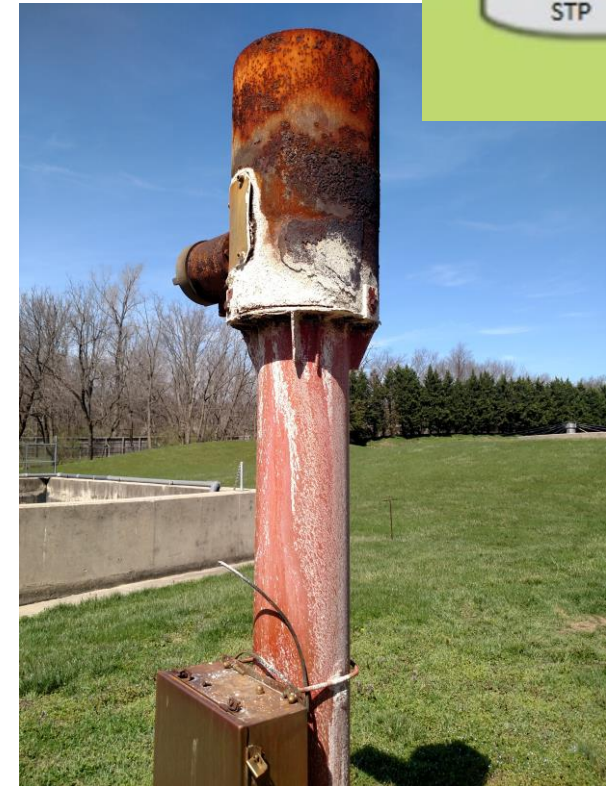
Sewage Treatment Plant



Operations Building Sludge Pipe



Operations Building Electrical Wiring



Waste Gas Flare



# Deteriorating Conditions of Wastewater Treatment Plant

Sewage Treatment Plant



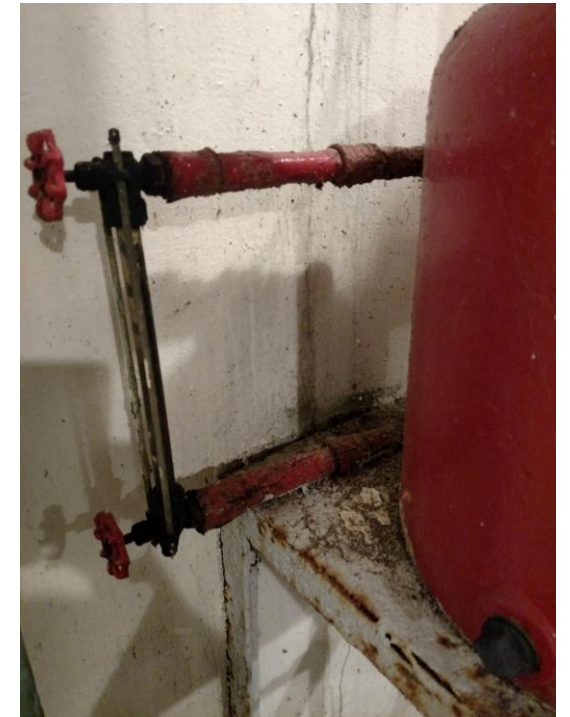
Gas Pipe Interior



Gas Regulator Diaphragm



Digester Roof Gas Leak

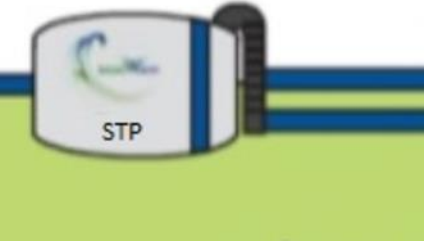


Gas Condensate Tank

Gas Corrosion and Decay - Digester

# Primary Clarifier No. 3 Structural Rehabilitation

Sewage Treatment Plant



2015: Crack Wall in the Clarifier Structure

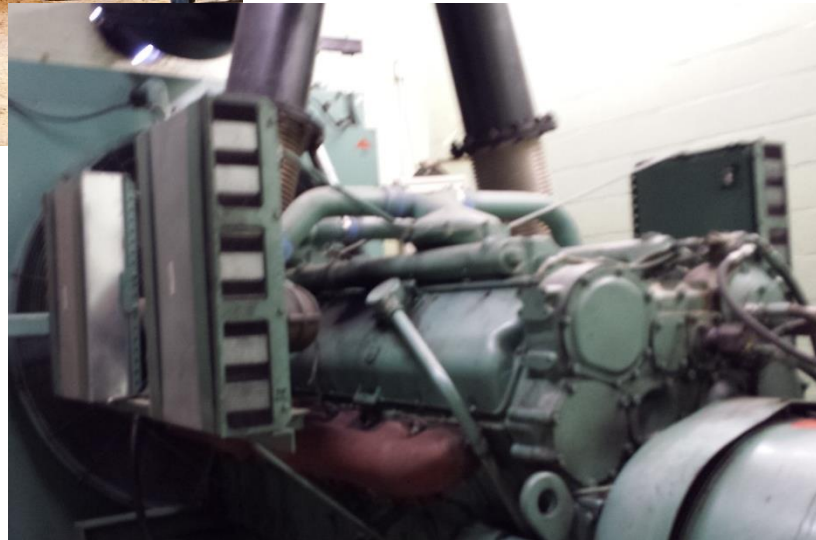


2016: New Wall of the Clarifier Structure



# Emergency Generator Replacement

Sewage Treatment Plant



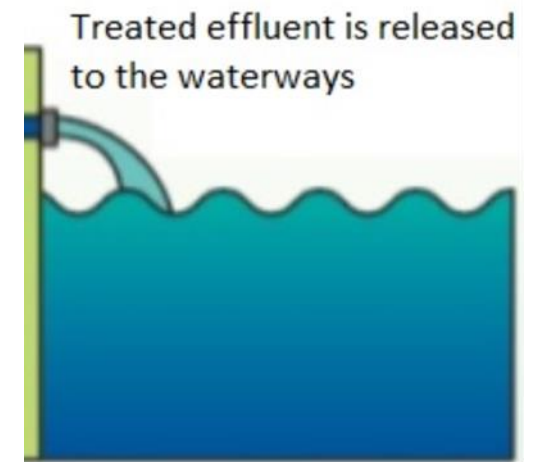
2015: Emergency Generator



2017: New Emergency Generators



# Treated Effluent Discharged to Goose Creek



**What is Left to be Completed?**

# Replace Failed Treatment Systems



New Primary Anaerobic Digester – June 2018



# Reducing Phosphorus – EPA Mandate (95-98% Reduction)



New PAC Feed Pumps



New Hydrated Lime Feed Pumps & Slurry System





# Mandates and Code Compliance

- Complying with EPA Mandate
  - 10 Year Litigation Ended in 2018
  - Tertiary Treatment System and Dewatering Improvements for TMDL Compliance
- Safety and Code Compliance
  - Pump Station Improvements
  - Long-Term Sustainability



# Rehabilitation vs. Replacement

- Saving Money through Extending the Useful Life
  - Collection System Investigation
    - Township Staff Lead work saves \$2 per foot of inspection
  - Collection System Rehabilitations
    - Lining sewer pipe
    - Lining manholes



# Project and Operating Cost Reductions Strategies

- Reduction Programs
  - COSTAR (Purchased Emergency Generators, pump control panels, mechanical screens, conveyors, and grit removal system)
- Staff
  - Problem Solving
  - Operations
  - Maintenance



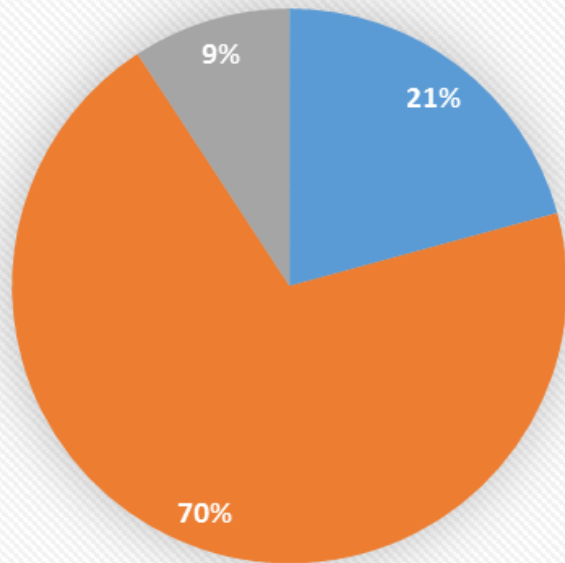
# How Will We Pay For the Capital Program?

# Project Funding

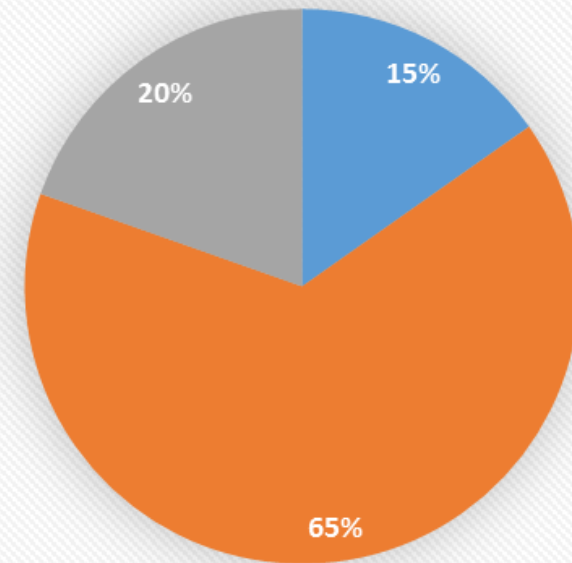
- Capital Program: ~\$27MM over 5 Years
- Funding
  - In 2017, the Authority sold sewer revenue and guaranteed sewer revenue bonds to secure \$17MM in funding
  - Payments from Municipalities (East Goshen, West Whiteland, Westtown, Thornbury)~ \$7MM
  - Sewer Authority Reserves \$3MM
- Grants
  - 2016 – CFA Awarded: \$290,000
  - 2018 – CFA Application: \$276,158
  - Mariner II DEP Grant Application

# Expense Comparison

**2016 Expenses: \$4.78 M**



**Average 2019 - 2023 Expenses: \$6.37 M**



■ Administration   ■ Operation and Maintenance   ■ Debt Service

# At a Minimum, the Rates should be Increase to Cover the Debt

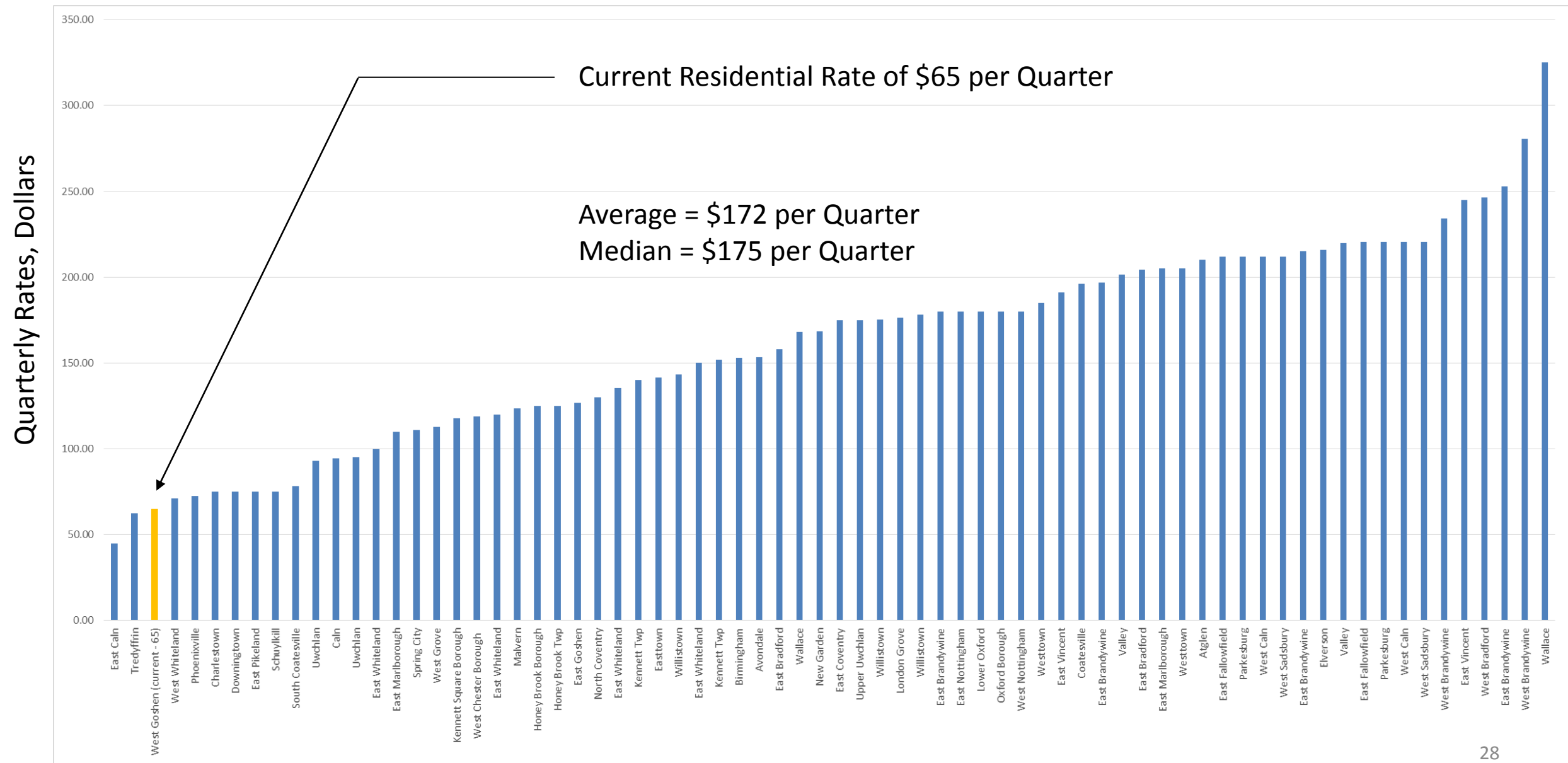
	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>
Revenue	\$ 4,930,632	\$ 5,015,888	\$ 5,068,612	\$ 5,161,871
Revenue from Increase in Rates <sup>(1)</sup>	1,262,355	1,262,355	1,262,355	1,262,355
Total Revenue	6,192,987	6,278,243	6,330,967	6,424,226
Expenses	4,694,098	4,930,919	5,077,374	5,336,428
Bond Debt	1,244,775	1,245,875	1,247,975	1,248,681
Total Expenses	5,938,873	6,176,794	6,325,349	6,585,109
Estimated Surplus / (Deficit)	\$ 254,114	\$ 101,449	\$ 5,618	\$ (160,883)

Notes:

(1) A rate increase of 41.54% for all categories. Residential rates will increase from \$65.00 per quarter to \$92.00 per quarter. The rate increase will cover the debt expense for the next several years. An additional rate increase is projected to be needed in 2022.



# Chester County Quarterly Sewer Rates At 12,000 Gallons

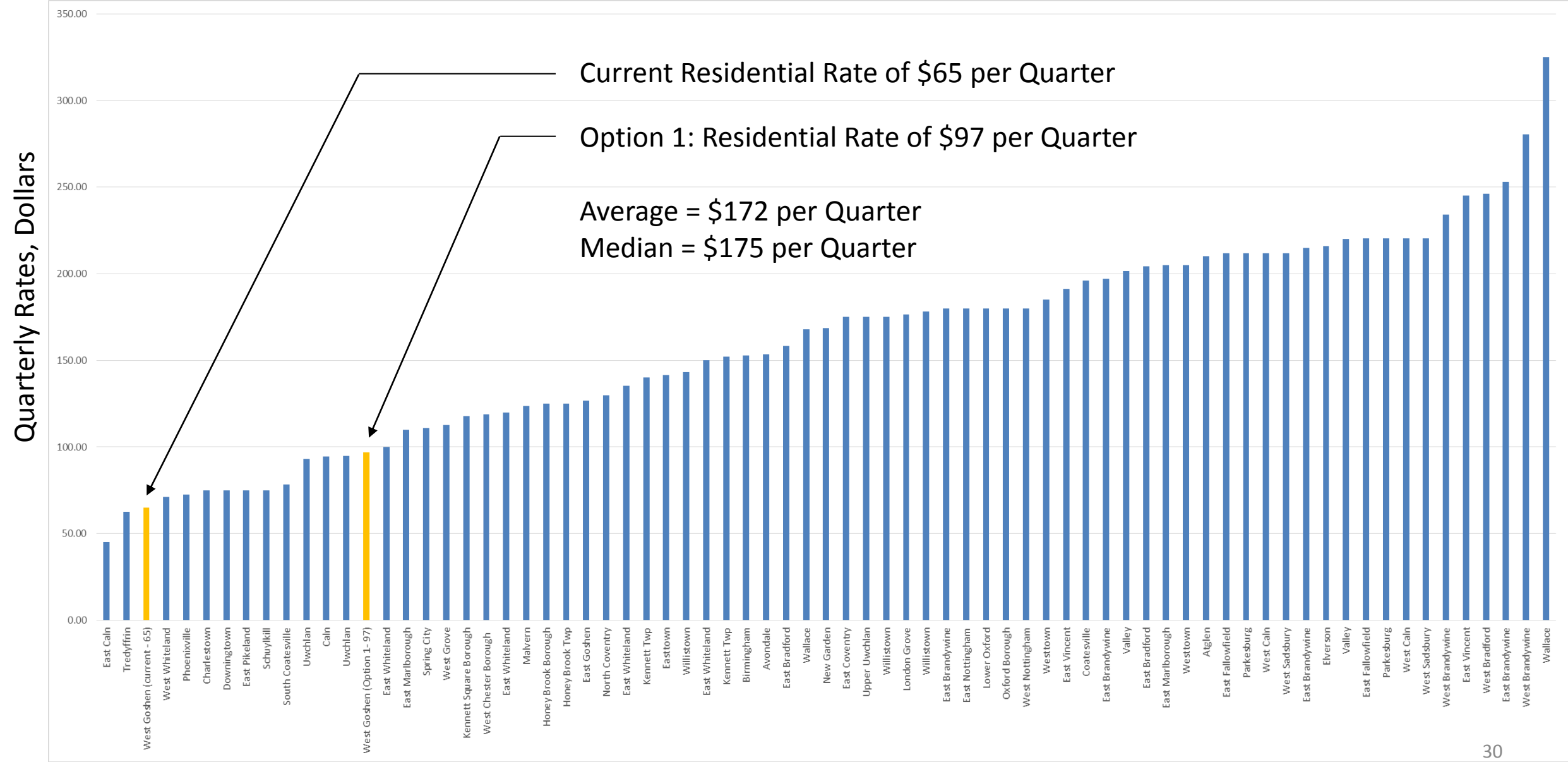




## Option #1: Residential Rates will Increase from \$65 per Quarter to \$97 per Quarter (\$128 per Year Increase)

	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>
Revenue	\$ 4,930,632	\$ 5,015,888	\$ 5,068,612	\$ 5,161,871
Revenue from Increase in Rates	1,496,046	1,496,046	1,496,046	1,496,046
Total Revenue	6,426,678	6,511,934	6,564,658	6,657,917
Expenses	4,694,098	4,930,919	5,077,374	5,336,428
Bond Debt	1,244,775	1,245,875	1,247,975	1,248,681
Total Expenses	5,938,873	6,176,794	6,325,349	6,585,109
Estimated Surplus / (Deficit)	\$ 487,805	\$ 335,140	\$ 239,309	\$ 72,808

# Chester County Quarterly Sewer Rates At 12,000 Gallons



**How do we plan for the future?**

## Remaining Risk

- Capital Improvement Plan addressed highest risk and prioritized items
- We are working on a Plan to prioritize and address/mitigate remaining increased risk items

# Remaining Risk

- Large Sewers (Interceptors)
  - Severely deteriorated sewers identified by Staff have been repaired (on-going and costly)
  - Condition of remaining sections, greatly unknown
  - Inspection cannot be completed by Township Staff
- Pump Stations
  - Remaining Pump Stations Require Improvements over next 10 years
- Regulatory Changes
  - DEP & EPA may require more stringent treatment such as nitrogen removal

# Capital Improvement Fund Development

Needed Annually for Capital Reserve	Increase Residential Quarterly User Rate To: (Average Over 5 Year Period)	Annual Increase in Sewer rates
\$700,000	\$111.20	\$184.80
\$1,000,000	\$118.23	\$212.92
\$1,250,000	\$124.00	\$236.00



# Aerial Picture of the Wastewater Treatment Plant

