Hazen

CITY OF Cooper City
Someplace Special

City of Cooper City
Water and Wastewater Master Plan
Part 2 – Master Plan Findings

March 13, 2025

Introductions

Janeen Wietgrefe, PE, PMP

- Project Director
- 28 years with Hazen

George Brown, PE

- Water System Leader
- 29 years with Hazen

Alonso Griborio, PE, PhD

- Wastewater System Leader
- 20 years with Hazen

Agenda

1. Project goals: What questions does the Master Plan answer?
2. Water System: *Good Condition, Normal R&R Needed*
3. Wastewater System: *End-of-Useful Life, Significant Investment Needed*
4. Plant Electrical: *End-of-Useful Life, Significant Investment Needed*
5. Q&A

Project Goals: What questions does the Master Plan answer?

The Master Plan assessed your key water and wastewater infrastructure to answer these key questions:

Quantity

Is there sufficient treatment capacity and supply to meet demand?

Quality

Are improvements needed to meet regulation?

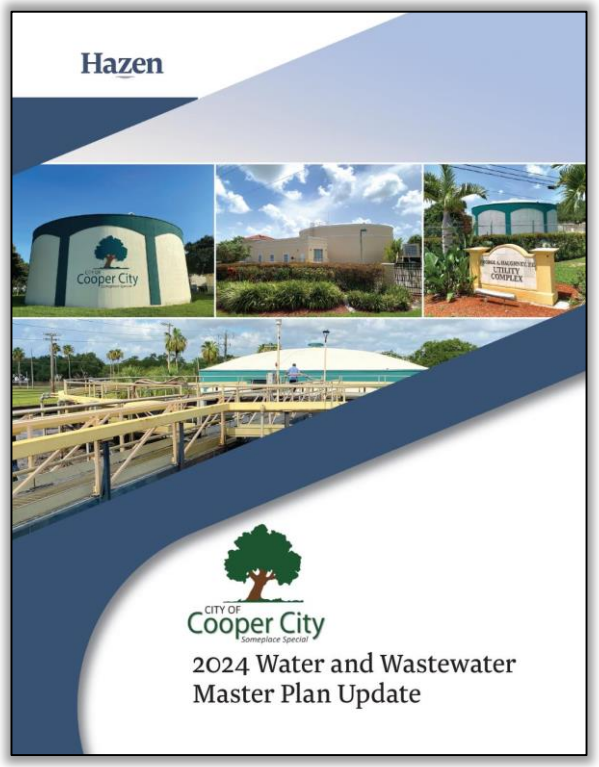
Condition

What is the condition of the assets; what assets need to be replaced?

Cost

What is the cost to ensure reliability over the next 20 years?

Final deliverables:

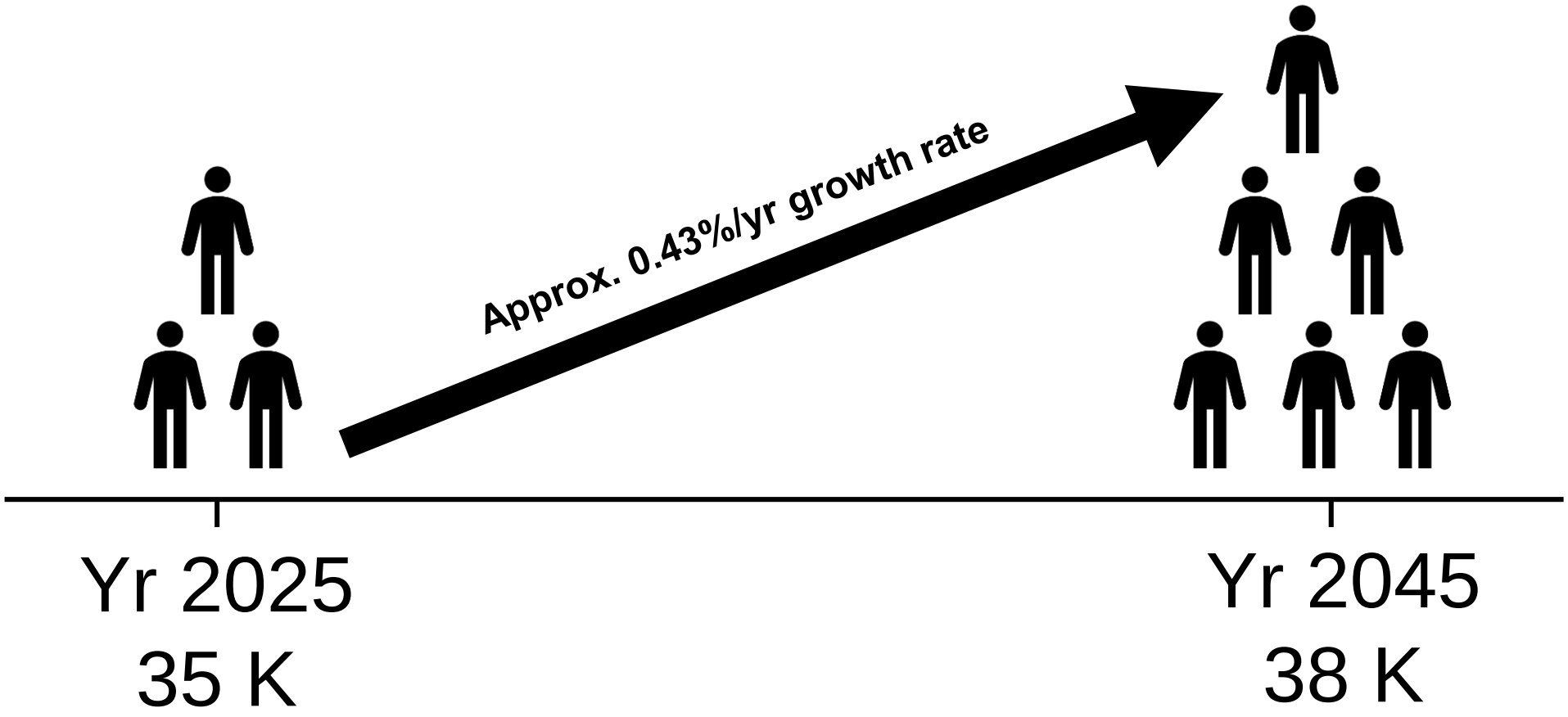


- 500-page report
- Findings documented
- 20-year CIP

- Power BI Dashboard for visualizing the CIP cash flow

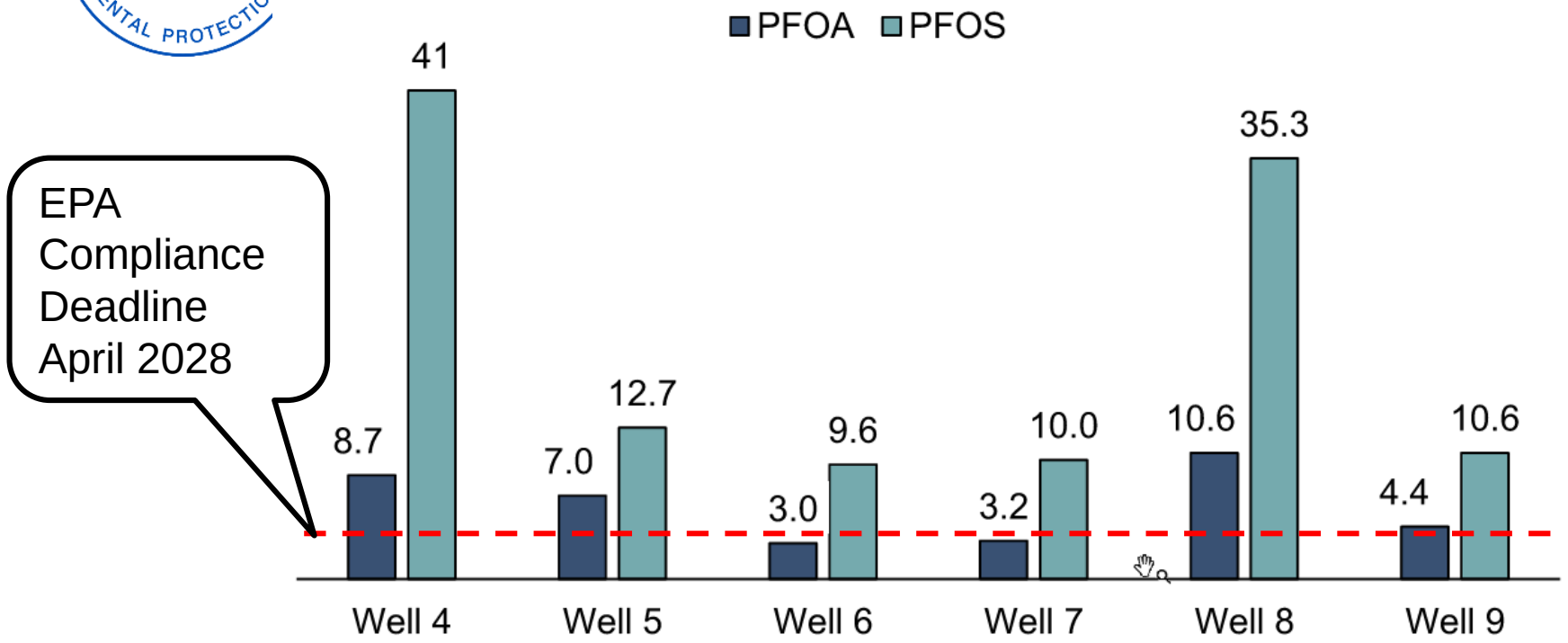
Water System

The City's water service area population is forecasted to grow over the next 20 years to approximately 38,000 people

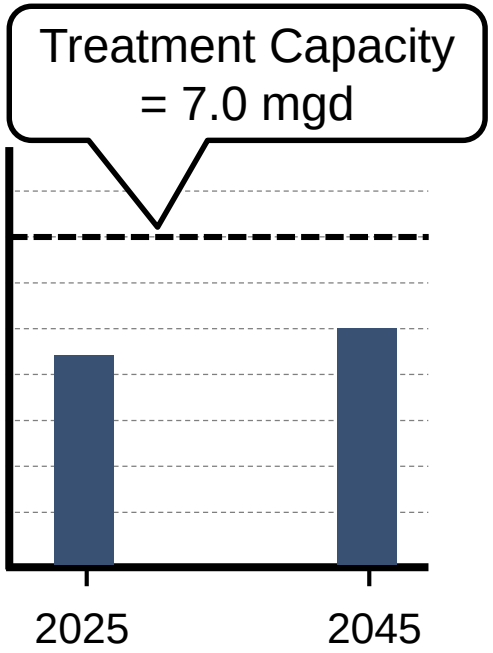


The City's water supply contains PFAS. The City's existing treatment plant reduces PFAS to below detection level.

Perfluoroalkyl substances (PFAS) are probably linked to negative health effects in test animals



The City has sufficient treatment capacity and water supply to meet demand through the year 2045…



Maximum Day
Finished Water Demand

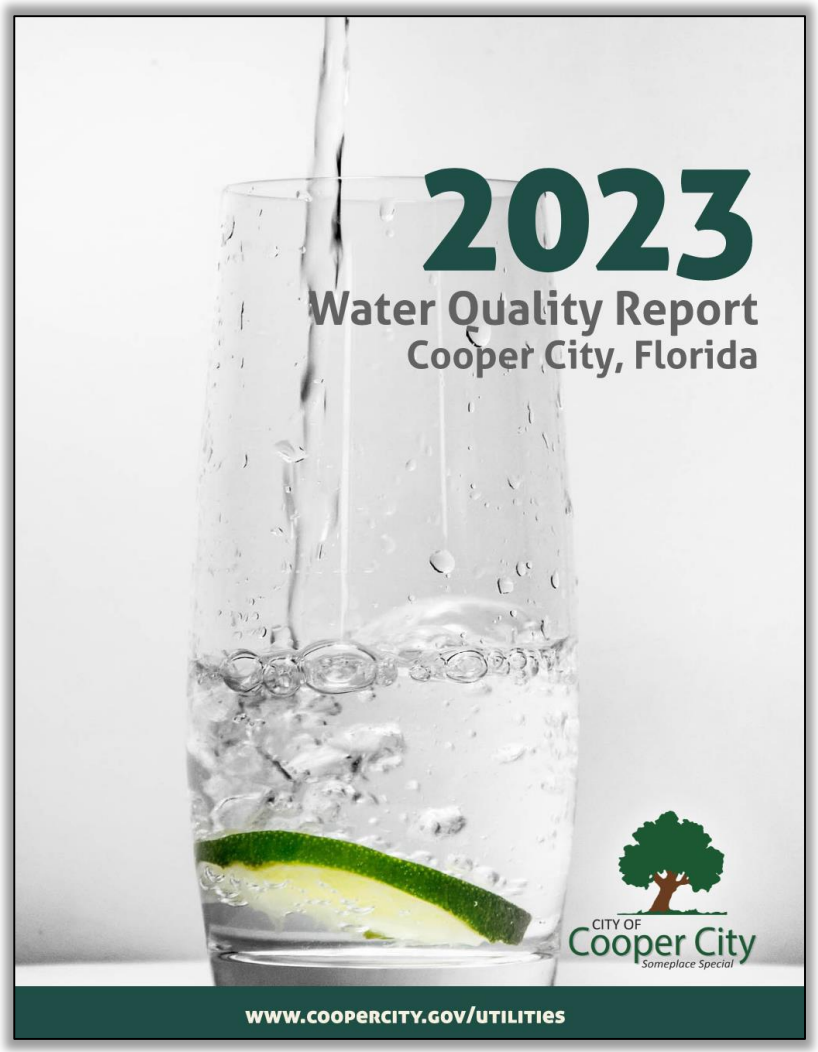
Water Supply

Treatment

Removes
PFAS? Yes

…hence, maintaining the reliability of the City's existing assets through renewal and replacement is the City's key water system investment need.

The City's water quality complies with all current regulations…



The City tests its water tens of thousands of times per year to document compliance

…and will comply with the future PFAS regulation with no new capital investments.

Hazen assessed the condition of the City's supply and treatment assets

Key Findings:

Iron scaling and sediment in raw water

The City's treatment assets are in good condition

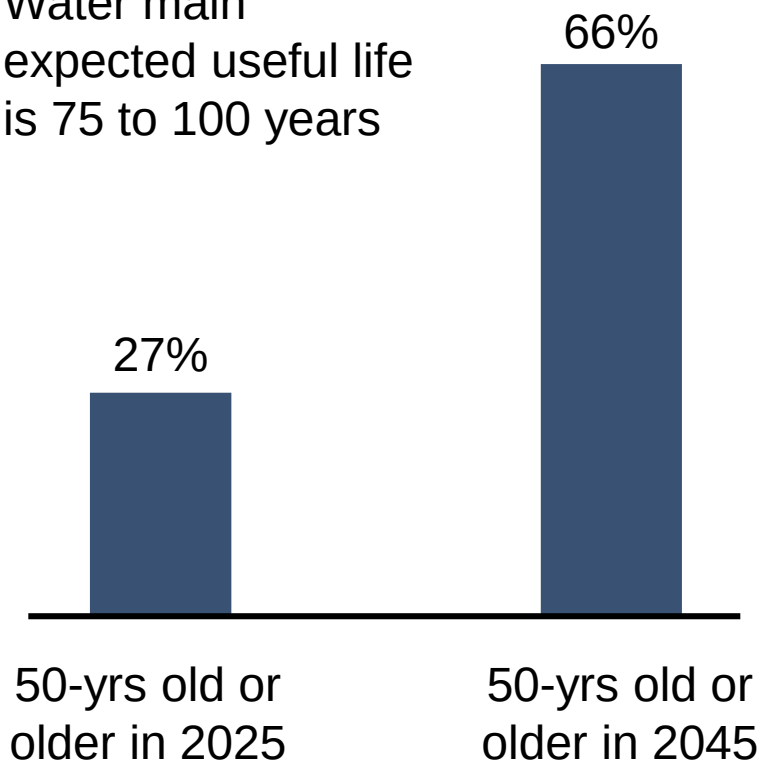
Chemical systems are near the end of their useful life

Near-term well rehab and pump replacement recommended

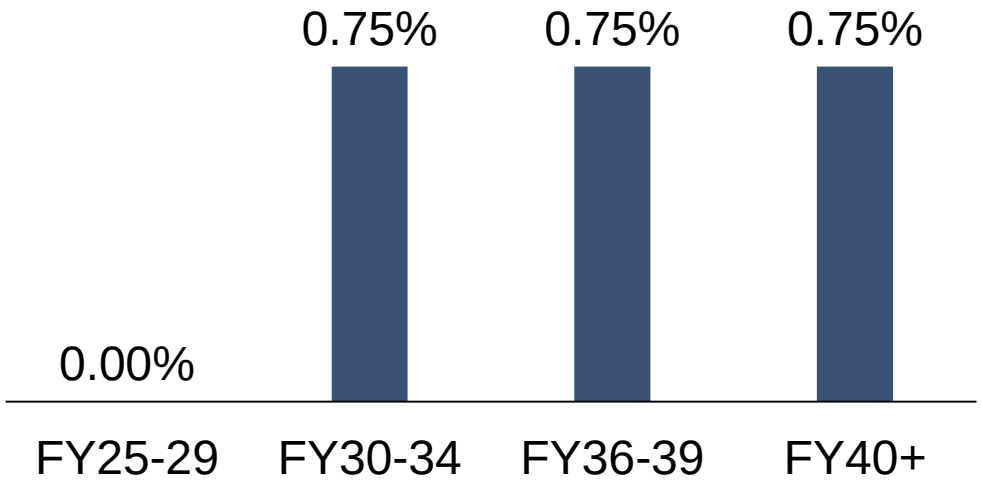
Supply and treatment 20-year CIP = $47 million (2024$)

Distribution system asset replacement needs were assessed based on age…

Water main expected useful life is 75 to 100 years



Typical industry annual pipe replacement rates range from 0.5% to 3%



Water distribution system 20-year CIP = $73.1 million (2024$)

In conclusion, the City's water system is in good condition.

The City's state-of-the art water treatment plant is one of its most important assets.

Normal renewal and replacement (R&R) investment is recommended to ensure the long-term sustainability of the City's water infrastructure.

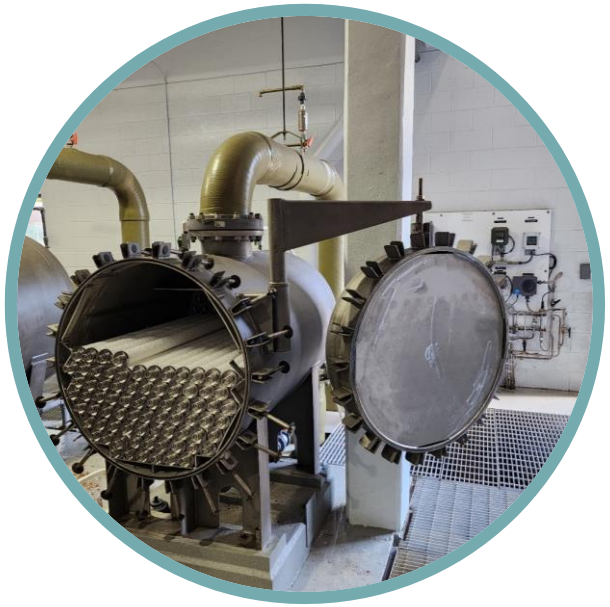
	20-year CIP in 2024$
Supply	$11.6 M
Treatment	$35.4 M
Distribution	$73.1 M
Total	**$120 M**

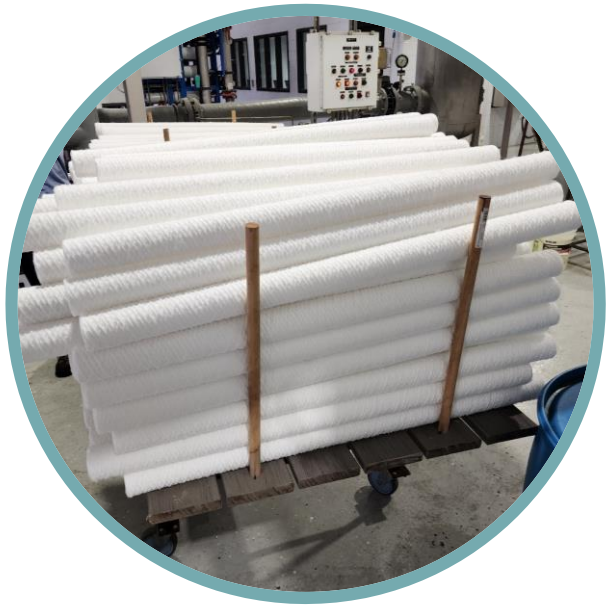
Water System

What would happen if the water system projects are not implemented?

Not investing in the City's water system results in avoidable operating costs, for example:

Clear Cartridge Filters





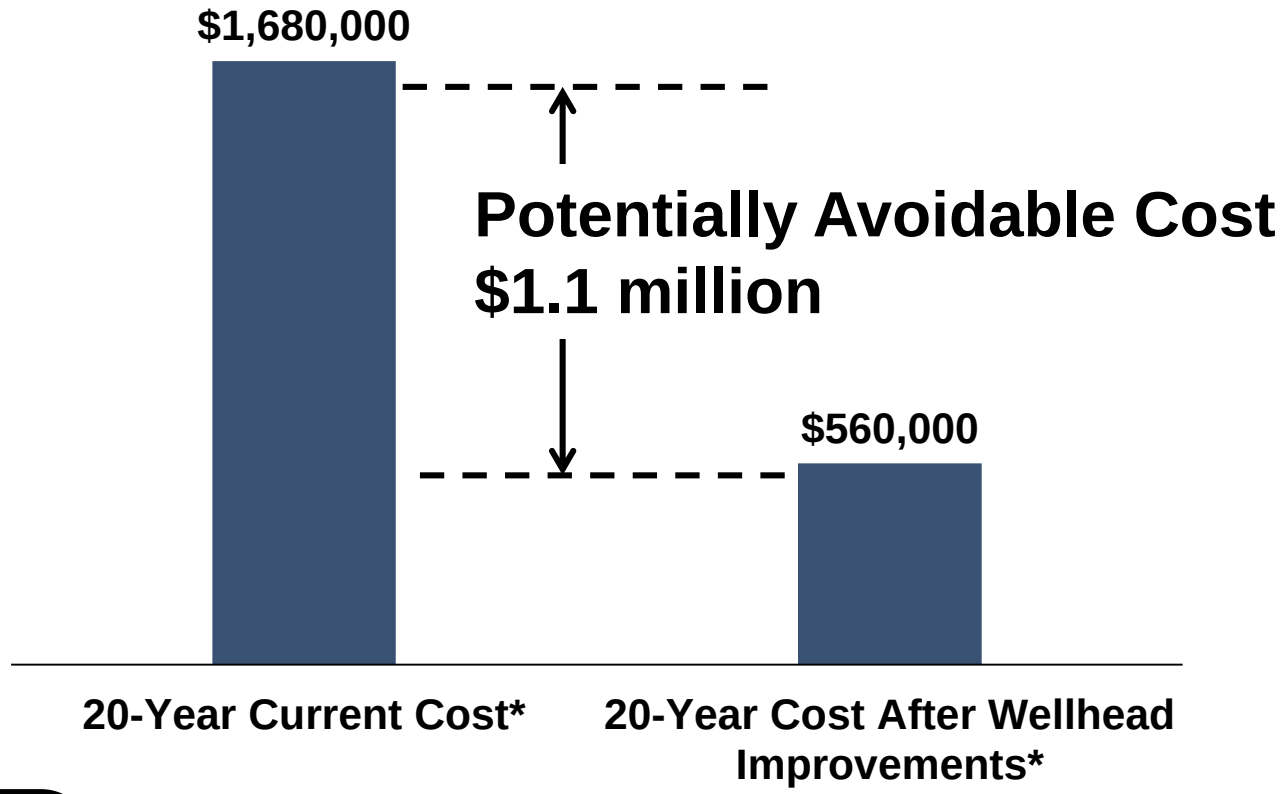
Used Cartridge Filters

Current cartridge filter replacement rate = every nine weeks.

If well improvements are implemented replacement rate = every 6 months.

Not investing in the City's water system results in avoidable operating costs, for example:

Removing air and/or operating automated blowoff valves could result in significantly reduced cartridge filter replacement frequency (potential $1.1 million in savings over 20 years)



* Cost includes labor and materials

Plant Electrical

All power is supplied to the WTP and WWTP through the switchgear…

Water Treatment Plant (WTP)

Wastewater Treatment Plant (WWTP)

…the switchgear and diesel engine generator are at the end of their useful life.

Plant switchgear is at the end of its useful life…

Your WTP/WWTP Switchgear

Key Facts:

- Year Installed: Estimated 1973
- Current age: 52 years
- Typical expected life: 30 years
- Years beyond its expected life: 22 years

…the City staff have done excellent work in maintaining this aging equipment…but its time to replace it.

Some key information…

Your Home Electrical

120 volts

Your WTP/WWTP Switchgear

23,000 volts

…it takes approximately two years to procure this type of equipment.

Replacing the switchgear at the existing location is not feasible…

…enclosing the electrical equipment in a storm resistant bldg is desirable.

Recommended electrical improvements

Legend:

- Electrical distribution equipment (also in need of replacement)
- Proposed Switchgear (S) and Diesel Engine Generator (G)

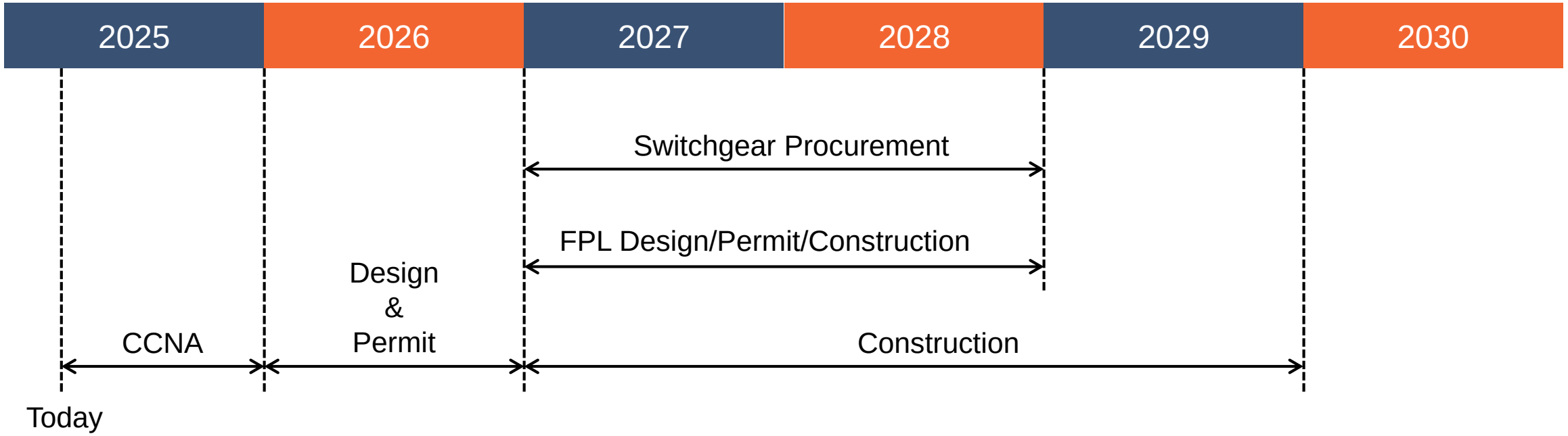
Estimated Cost:

$21 million

(for all ■ & ■ improvements shown)

Class 5 Estimate per AACE, International standard 18R-97

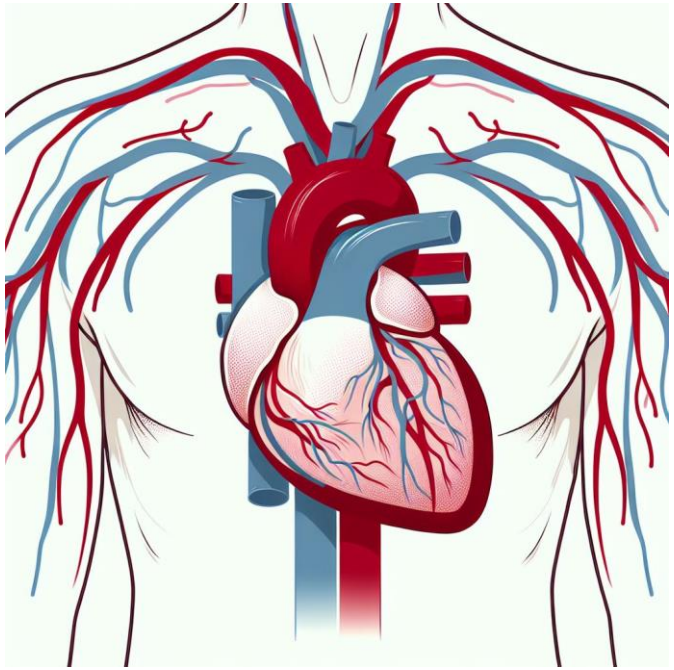
Estimated project duration if approximately five years



Plant Electrical

What would happen if the switchgear replacement project wasn’t implemented?

Just as the heart pumps blood to sustain life, the switchgear distributes power to ensure the continuous operation of the water and wastewater treatment plants.



A failure in the switchgear is akin to a heart attack, which can have severe consequences for the entire system.

Staff Safety Risks:

Aging switchgear is more prone to arc flash.

An arc flash is a sudden release of electrical energy. Temperature of the arc flash is approximately 35,000 degrees F (four times the temperature of the sun's surface).

Source: https://www.osha.gov/sites/default/files/publications/OSHA4475.pdf

Not implementing this project could result in an unplanned outage of the switchgear resulting in:

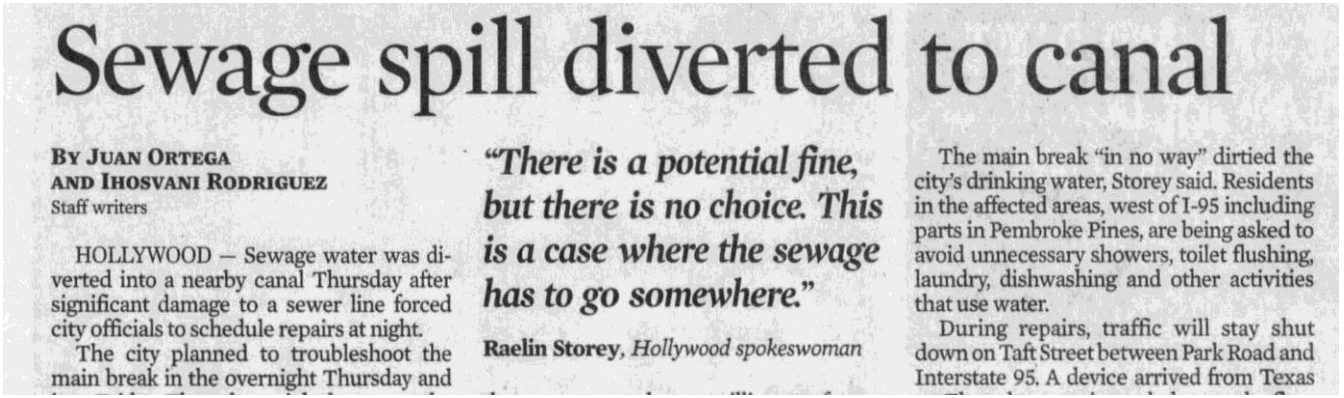
Water Production Risks:

- Water production would stop
- Increased fire hazard
- Boil water notice
- Drinking water limited to what can be supplied via emergency interconnects with Sunrise, Davie, and Pembroke Pines

Not implementing this project could result in an unplanned outage of the switchgear resulting in:

Wastewater Treatment Risks:

- Wastewater treatment would stop
- Effluent disposal would stop
- Raw sewage would overflow resulting in public health and safety concerns



Sewage spill diverted to canal

By Juan Ortega
and Ihosvani Rodriguez
Staff writers

HOLLYWOOD — Sewage water was diverted into a nearby canal Thursday after significant damage to a sewer line forced city officials to schedule repairs at night.

The city planned to troubleshoot the main break in the overnight Thursday and

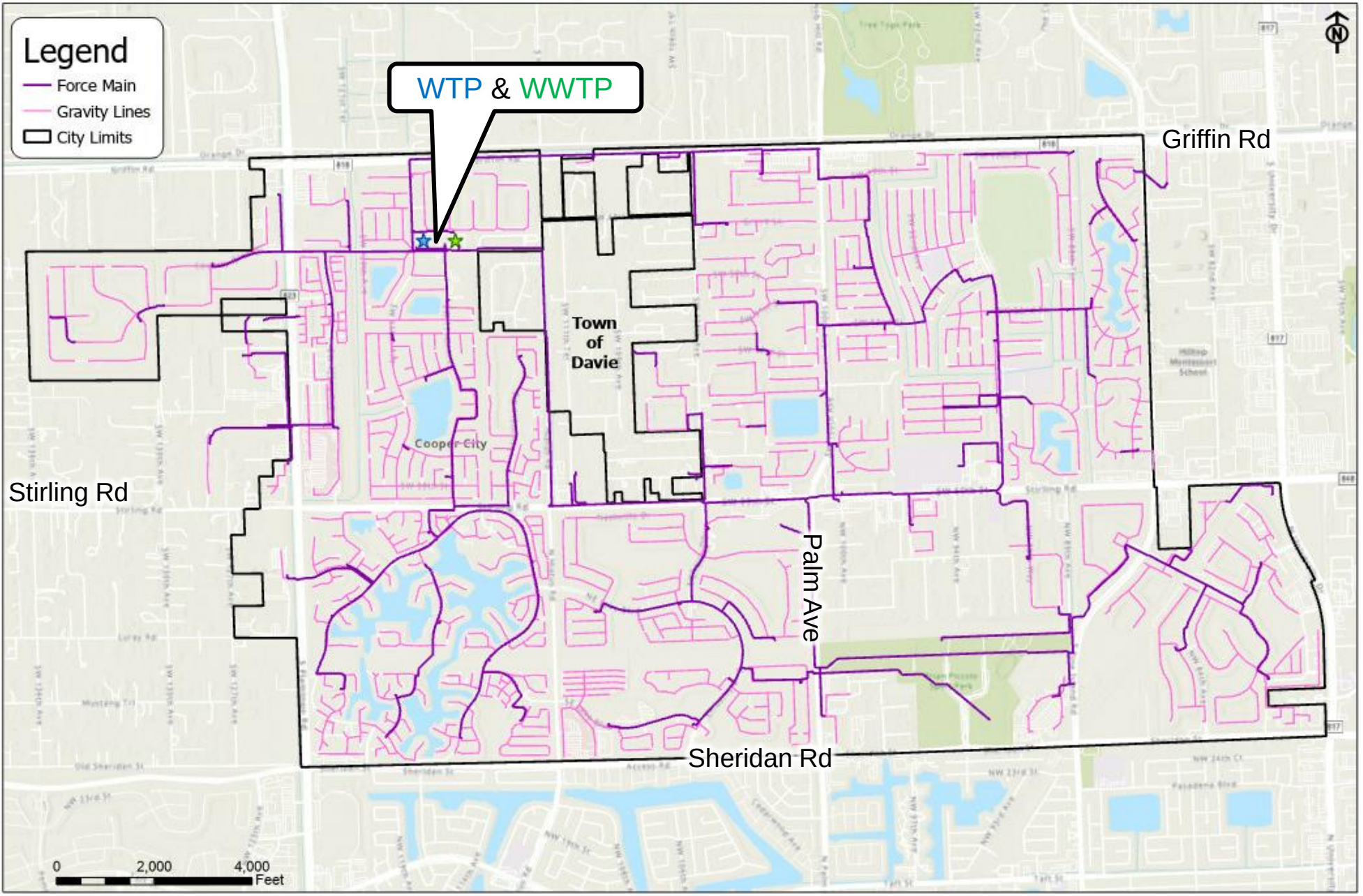
"There is a potential fine, but there is no choice. This is a case where the sewage has to go somewhere."

Raelin Storey, *Hollywood spokeswoman*

The main break "in no way" dirtied the city's drinking water, Storey said. Residents in the affected areas, west of I-95 including parts in Pembroke Pines, are being asked to avoid unnecessary showers, toilet flushing, laundry, dishwashing and other activities that use water.

During repairs, traffic will stay shut down on Taft Street between Park Road and Interstate 95. A device arrived from Texas

Wastewater System

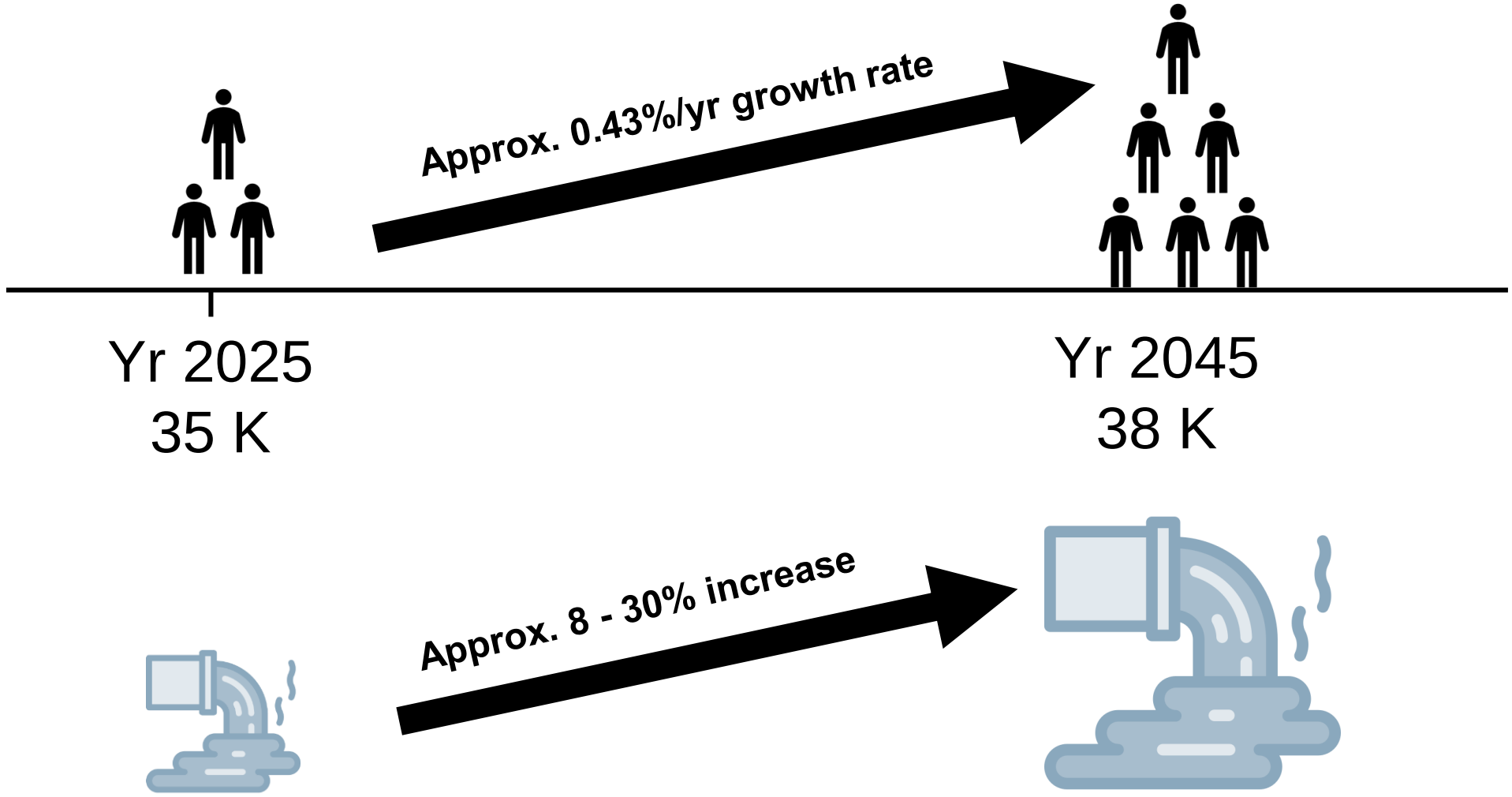


Wastewater Service Area

Key Facts:

Gravity Sewer	91 mi
Force Main	33 mi
Manholes	2,201
City Lift Stations	83
Private LS	10

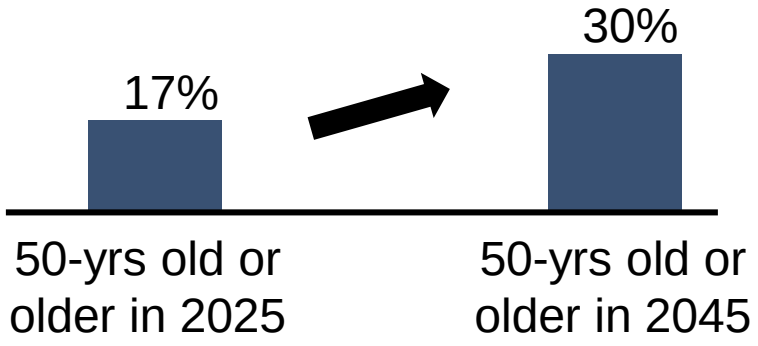
The City's wastewater generation is forecasted to grow by FY 2045



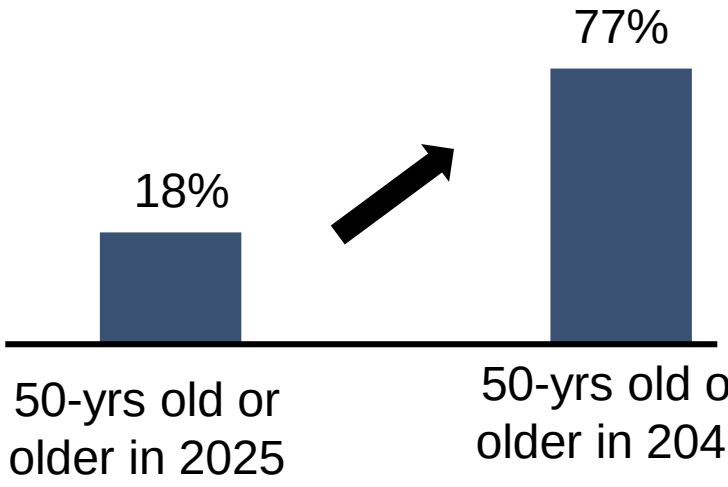
Average Annual Flow – 2.6 mgd

Average Annual Flow: 2.8-3.4 mgd

Collection system asset replacement needs were assessed based on age…



Force Mains (50-75 yr service life)



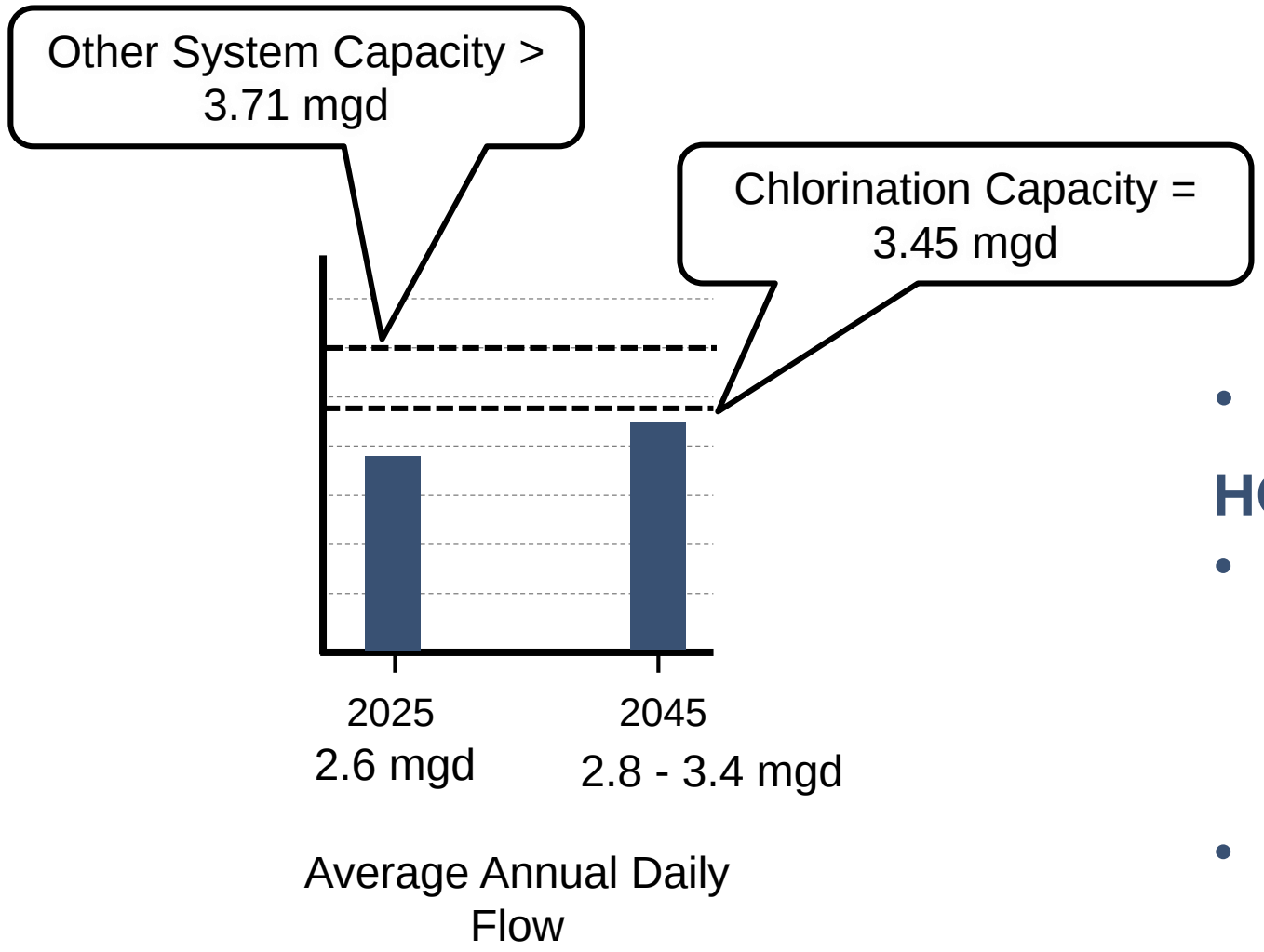
Gravity Sewers (50-75 yr service life)

Recommended CIPs

- 1% Annual force main replacement
- Gravity sewer lining, rehab and maintenance
- Lift Station rehabilitation
- New Lift Station generators
- Collection System Condition Assessment
- Lift Station Control Module Migration/Upgrade

Wastewater collection system 20-year CIP = $54.2 million (2024$)

Sufficient WW treatment capacity through the year 2045 is available…

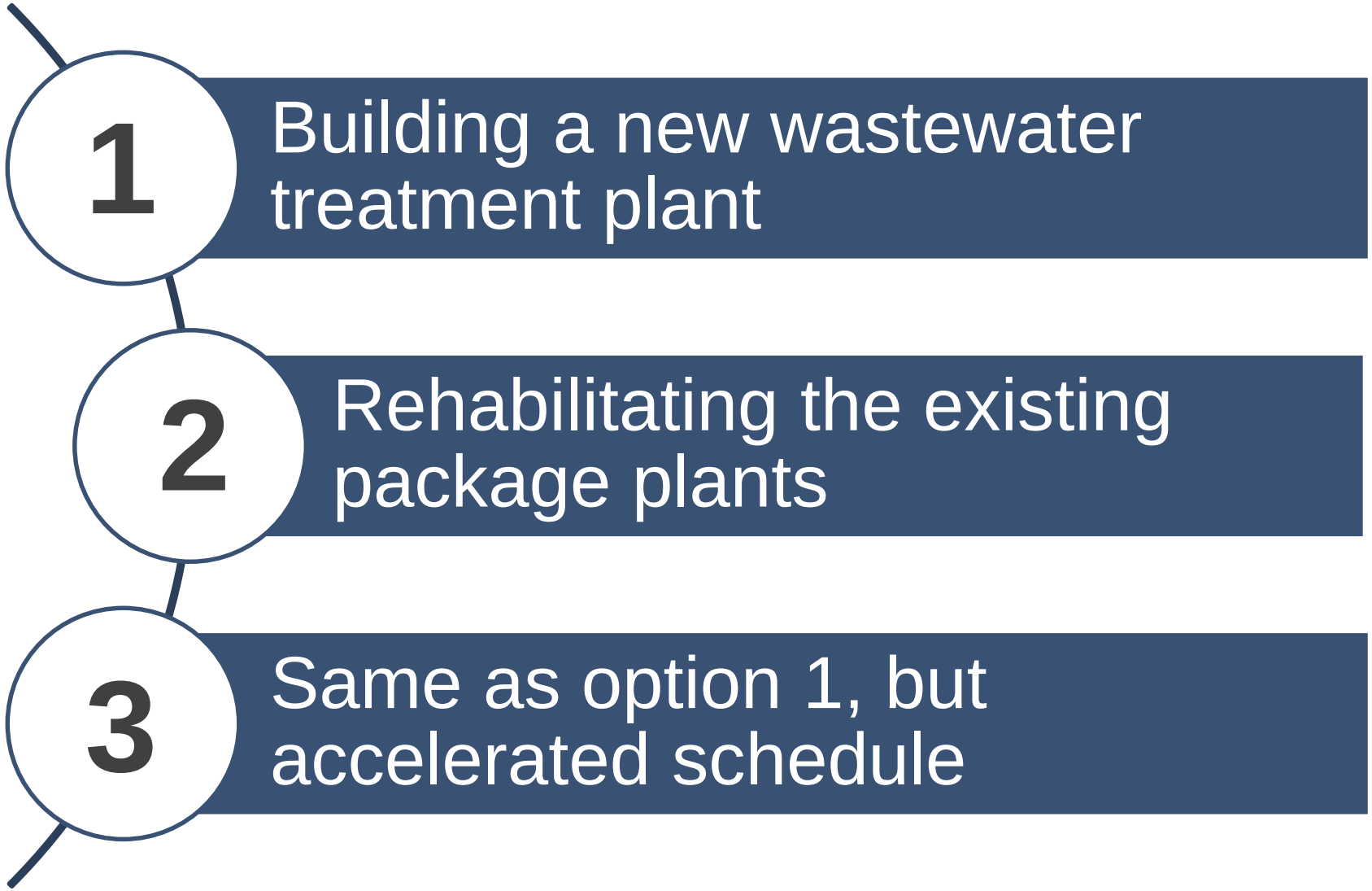


- **WWTP is in compliance**

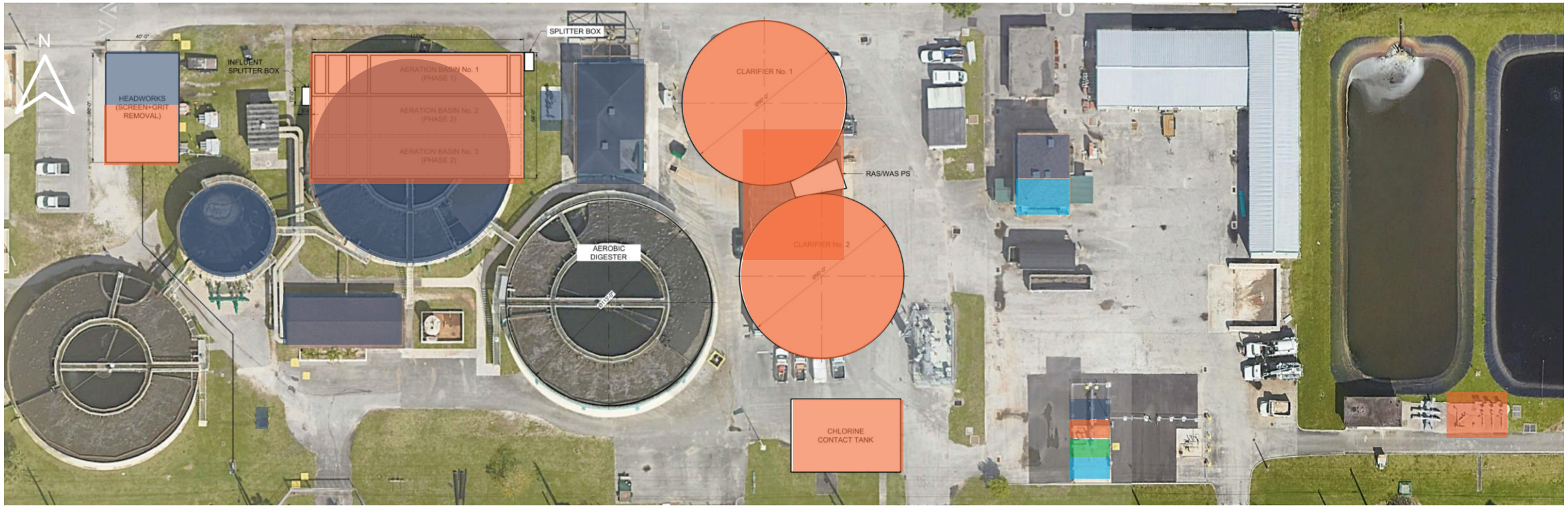
HOWEVER,

- **Many processes including Package Plants 1 and 2 are beyond their expected useful life**
- **Most processes need major rehabilitation or replacement**

Wastewater Treatment Plant CIP Approaches



Option 1 - New Wastewater Treatment Plant (WWTP)



Legend:

- 2024 - 2030
- 2031 - 2035
- 2036 - 2040
- 2041 - 2045

Estimated Cost:

$128.8 million

WWTP and DIW improvements

Notes –

- State-of-the art new facility
- Multiple color highlights on structures indicate projects in multiple time periods as annotated
- Class 5 Estimate per AACE

DIW – Deep Injection Well

Option 2 – Rehab the existing WWTP

Legend:

- 2024 - 2030
- 2031 - 2035
- 2036 - 2040
- 2041 - 2045

Estimated Cost:

$96.8 million

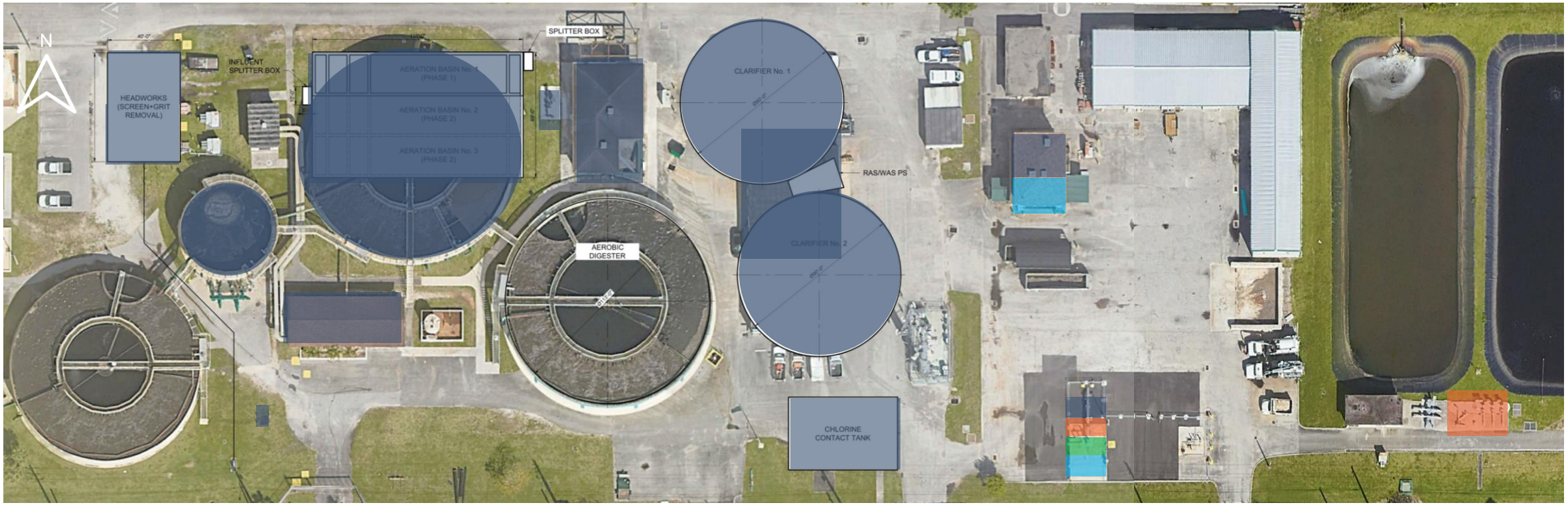
WWTP and DIW improvements

Notes –

- Existing plant is an old technology
- Multiple color highlights on structures indicate projects in multiple time periods as annotated
- Class 5 Estimate per AACE

DIW – Deep Injection Well

Option 3 – Same as option 1, but accelerated schedule



Legend:

- 2024 - 2030
- 2031 - 2035
- 2036 - 2040
- 2041 - 2045

Estimated Cost:

$124.1 million

WWTP and DIW improvements

Notes –

- State-of-the art new facility
- Multiple color highlights on structures indicate projects in multiple time periods as annotated
- Class 5 Estimate per AACE

DIW – Deep Injection Well

In conclusion, the City's wastewater treatment plant has many elements at the end of their useful life, a significant reinvestment is recommended.

	Option 1: New WWTP	Option 2: Rehab WWTP	Option 3: New WWTP Acceleration of Option 1
WWTP and DIW improvements	$129 M	$96.8 M	$124 M
Wastewater Collection Projects	$54.1 M	$54.1 M	$54.1 M
Utility Fleet Projects	$0.65 M	$0.65 M	$0.65 M
Total	**$184 M**	**$152 M**	**$179 M**

Wastewater System

What would happen if the wastewater system projects are not implemented?

Not implementing the wastewater system projects significantly increases the risk of catastrophic failure

- System failure can result in overflow/spills and/or inadequate treatment, which could result in:
  - **Environmental pollution ➡ release of pollutants into waterways, harming ecosystems.**
  - **Public health risks ➡ spread of waterborne diseases and contamination of drinking water sources.**
  - **Long periods of time with non-compliance ➡ fines, penalties, and legal issues.**
  - **Negative impact on local economy ➡ environmental and health issues can harm local businesses, and property values.**

In addition to risk of catastrophic failure, inadequate investment would result in

- Decreased capacity / reduced plant efficiency
  - **Aging infrastructure can reduce plant's capacity and result in inefficient treatment**
- Regulatory non-compliance
  - **Reduce capacity/efficient can result in noncompliance and potential for fines, consent decree orders, etc.**
- Increased maintenance cost
  - **More frequent breakdowns**
  - **Increased energy and chemical consumption**
  - **Increase cost of corrective maintenance**
- Increased odor complaints
  - **Inefficient treatment increases odor and nuisance conditions**

This strategic investment will ensure the continuous successful operation of the Cooper City WWTP, maintaining effluent compliance with regulatory requirements, while providing adequate capacity to support the community's growth and development for the next 20 years

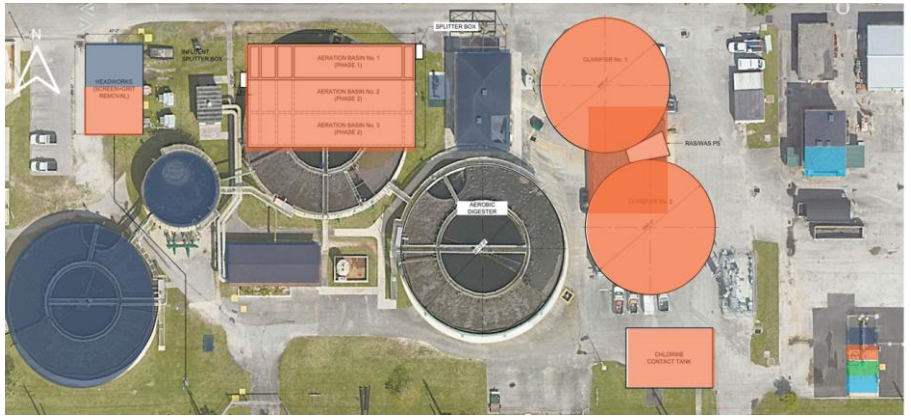
Wastewater System

Why investing in a new WWTP is advisable?

Why invest in Option 1 or Option 3 (new WWTP) if more expensive than Option 2 (rehab existing WWTP)?

A new wastewater treatment plant is an investment for the City's' future beyond the 20 years of the Master Plan

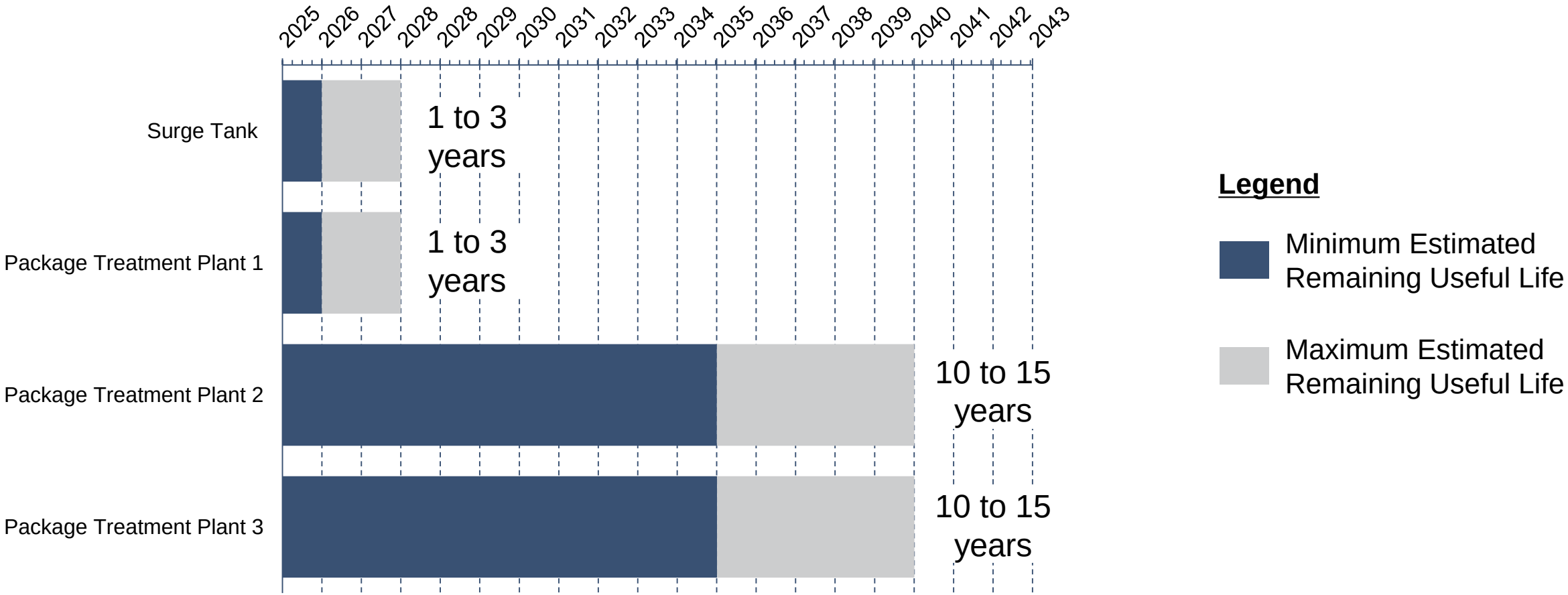
- The existing package plant is an old technology that will require continuous investment beyond the 20-year of the master plan
  - **Investment is expected to continuously increase after 20 years**
- While a significant capital expenditure upfront, a new wastewater treatment plant will result in reduced expenditure after construction, with the following benefits:
  - **Lower overall life cycle cost**
    - *Reduced O&M cost*
    - *Reduced capital expenditure in the long term (investment will significantly reduce after construction)*
  - **State of the art facility**
    - *Can be built as an educational, recreational facility for the community*
  - **Improved efficiency**
    - *Reduce odor*
  - **Increased capacity**
    - *Can be designed with added capacity compared to current treatment*



Wastewater System

What is the estimated remaining life for key components?

Estimated Remaining Service Life for the Surge Tank and Package Treatment Plants 1, 2 & 3

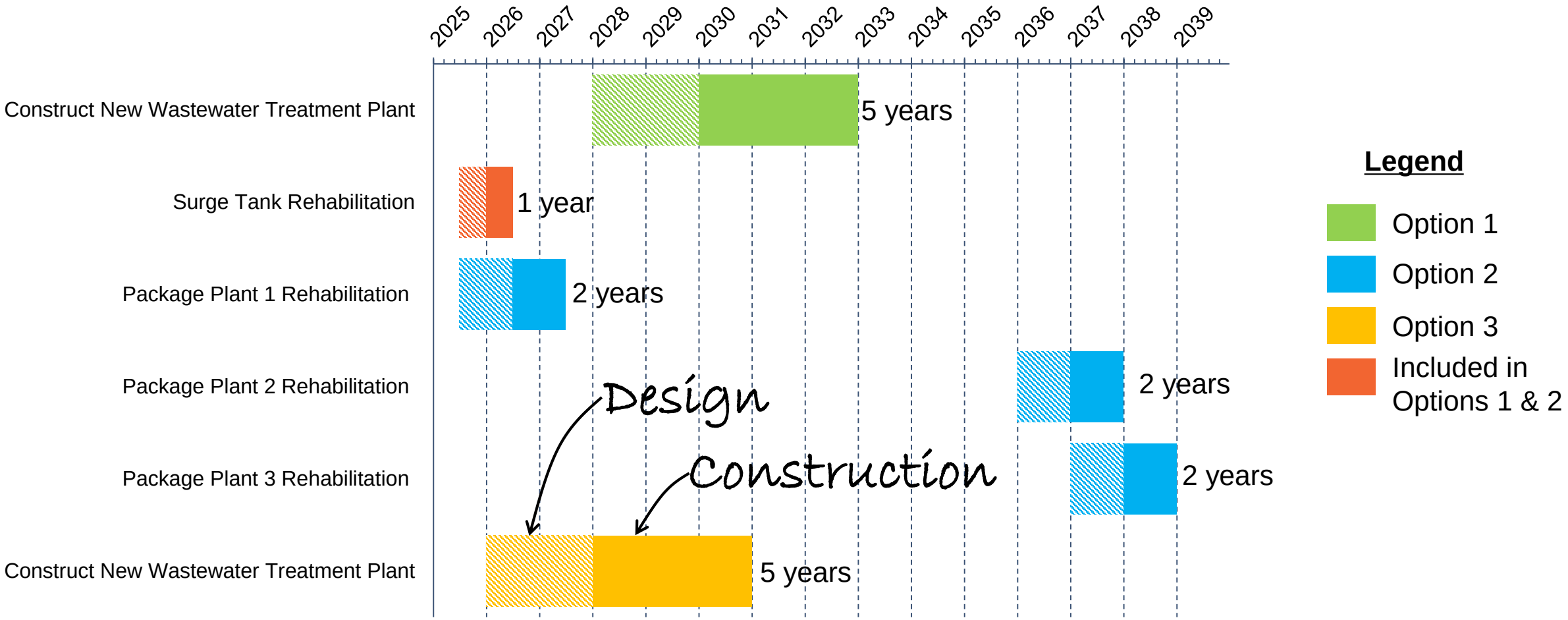


Note: The estimated remaining life can vary significantly. Remaining service life values are estimated based on visual inspection of mechanical, electrical, instrumentation and structural components

Wastewater System

What is the estimated project duration for key projects?

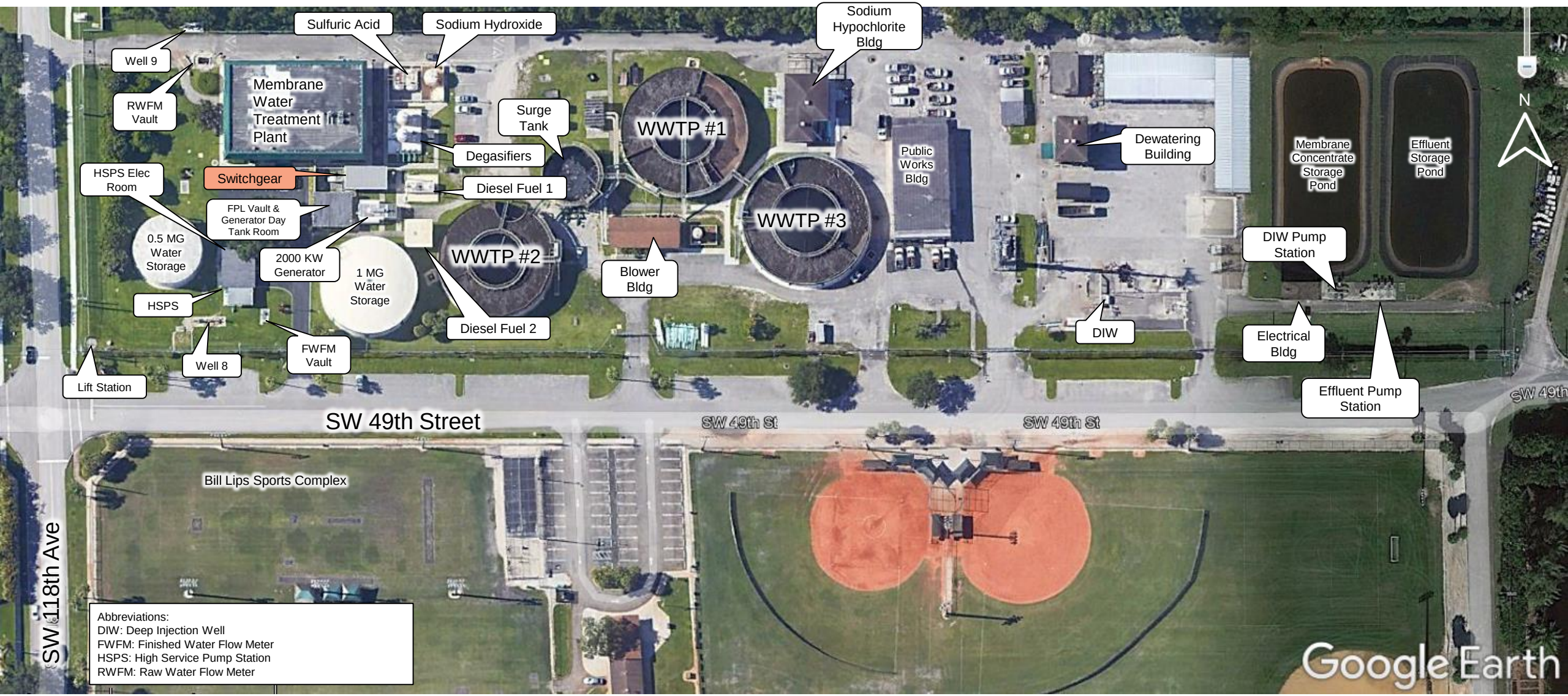
Project Duration for Surge Tank and Package Treatment Plant Replacement/Rehabilitation: Options 1, 2 & 3



Questions?

Backup

Existing Site Plan



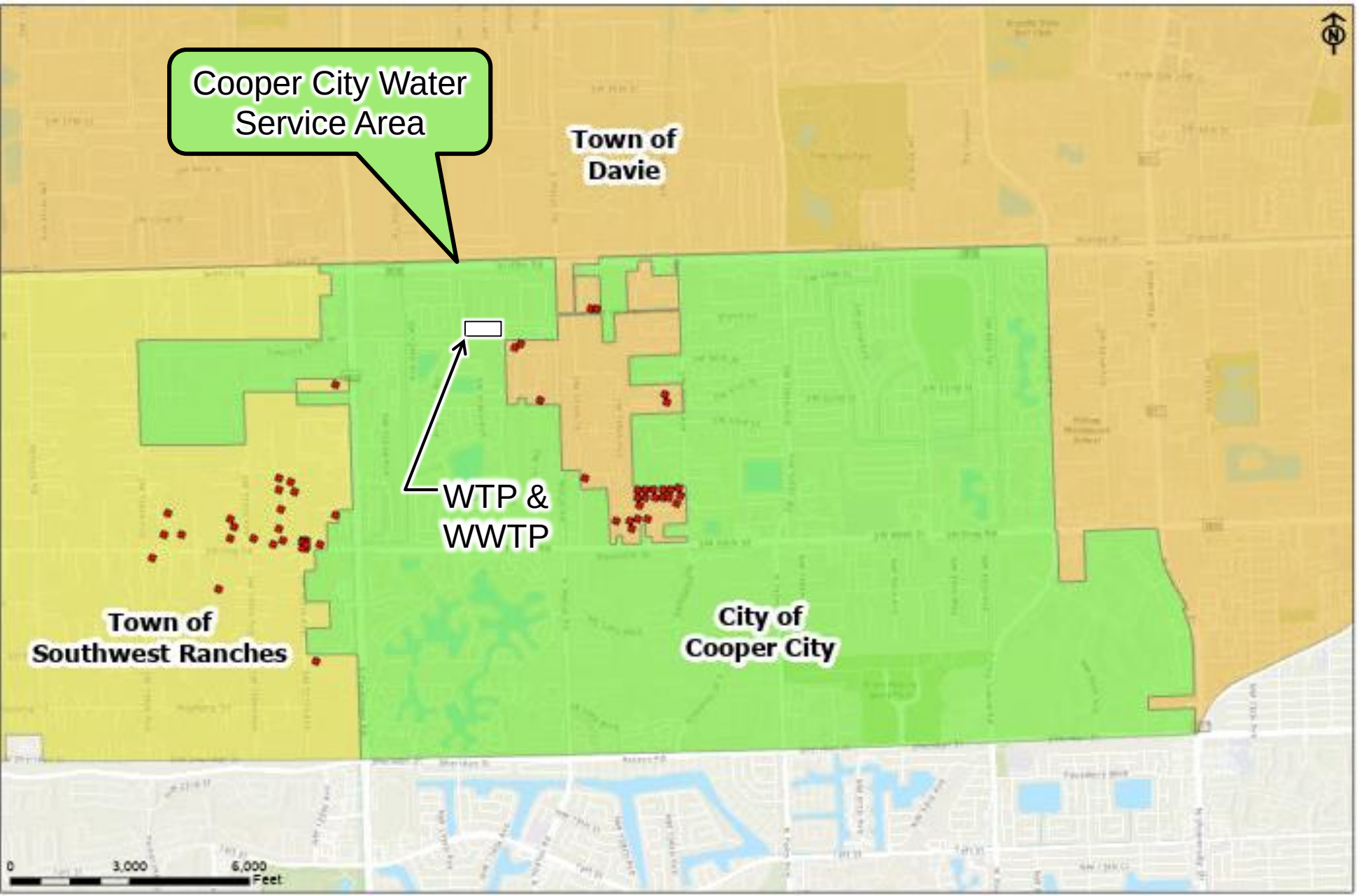
Wastewater Collection Projects

Project/Program	Total Cost (FY 2025-FY 2045) in 2024 $
Lift Station Rehab	$11,076,000
Force Main Rehab	$23,056,000
Gravity Sewer and Manhole Assessment and Rehab	$16,757,000
LS Generators	$2,316,000
Collection System Condition Assessment	$391,000
Lift Station Control Module Migration/Upgrade	$550,000
	$54,154,000

Master Plan CIPs

Project	Total Cost (FY 2025-FY 2045) in 2024 $		
	Option 1	Option 2	Option 3
Raw Water Supply			
Water Treatment Projects	$28,863,000	$28,863,000	$28,863,000
Deep Injection Well Projects	$45,562,000	$45,562,000	$45,562,000
Water Distribution Projects	$73,630,000	73,630,000	73,630,000
Wastewater Collection Projects	$54,146,000	$54,146,000	$54,146,000
Wastewater Treatment Projects	$83,003,000	$51,242,000	$78,530,000
General Projects	$21,647,000	$21,647,000	$21,647,000
Utility Fleet Projects	$650,000	$650,000	$650,000
Total Cost	**$307,501,000**	**$275,740,000**	**$303,028,000**

Option 1: Building a new wastewater treatment plant
Option 2: Rehabbing the existing package plants conforming to the Cooper City George A. Haughney WWTP
Option 3: Prioritizing the New Wastewater Treatment Plant (WWTP) Construction



Water Service Area

Key Facts:

- The City's drinking water complies will all current regulations.
- WTP is "State-of-the-Art".
- The City supplies all the drinking water to its residents.
- City serves approximately 162 persons outside of the City's corporate limits.

Key facts about the City's water system assets…

Water Supply

- Six Biscayne Wells
- Four are 28 years old
- Two are 23 years old

Treatment

- State-of-the-art membrane WTP built in 1998
- Capacity = 7.0 million gallons per day (mgd)
- New membranes this year

Storage

- Three tanks (emergency storage)
- Capacity = 3.5 million gallons (mg)

Distribution

- 145 miles of water distribution piping

WTP: Water Treatment Plant

…City's water complies with all State and Federal standards.

Existing Wastewater Treatment System (Liquid Stream)

Surge Tank

- Built in 1986
- Poor Condition

Aeration System

- Poor Condition

Wastewater Treatment

- Condition:Three Package Plants
  - Plant 1 (1970s) – Poor
  - Plant 2 (1980s) – Moderate
  - Plant 3 (1990s) – Good

Wastewater Storage

- 0.35 Million Capacity
- Good condition

DIW

- Moderate condition
- Need larger pumps for capacity expansion

Transfer Pumps to SRWWTP

- Moderate condition

Existing Wastewater Treatment System (Solids Stream)

Wastewater Treatment

Sludge Transferring System

- System replaced recently
- Good condition
- Only one available. Need another system for reliability

Dewatering

- Poor condition
- HOWEVER, a replacement project is ongoing

Water Use Permit Limits

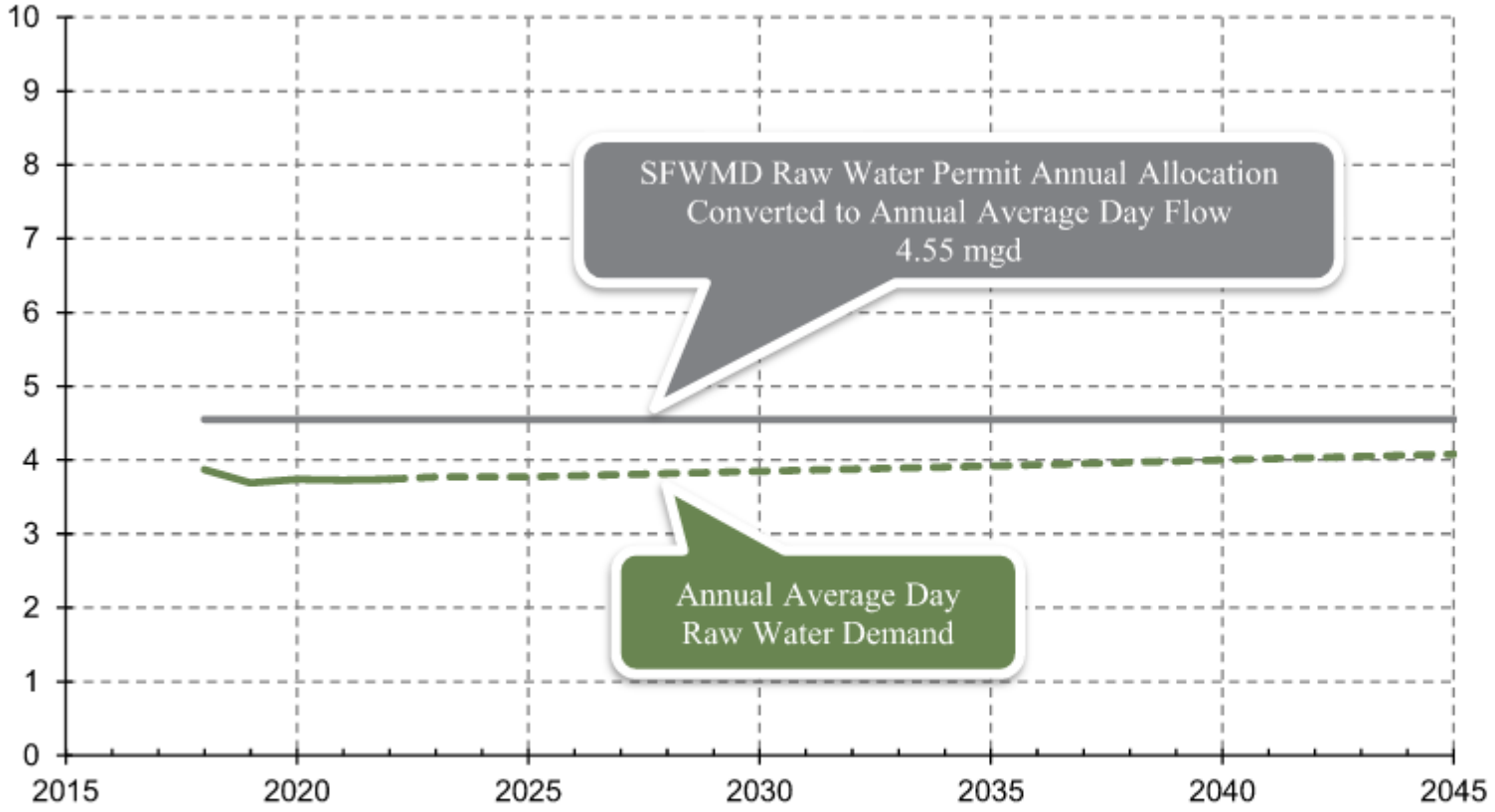


Figure 2-3: Annual Average Day Raw Water Demand Forecast (MGD) in relation to the SFWMD Annual Permitted Biscayne Aquifer Raw Water Allocation (MGD)

Conclusions

The annual permitted raw water allocation from SFWMD is sufficient to meet average day raw water demands for the planning horizon.