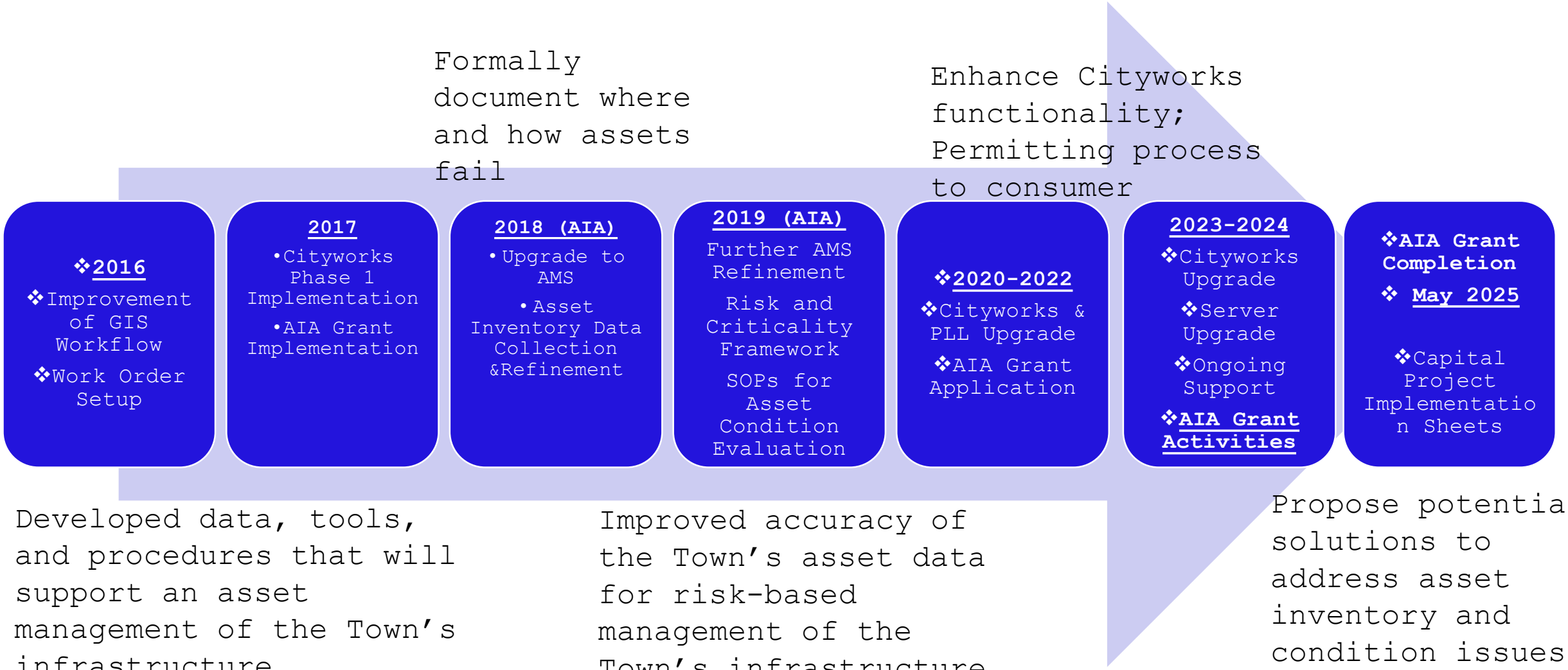
Jacobs Challenging today. Reinventing tomorrow.

Town of Carolina Beach AIA Grant Project

Town Council Regular Meeting

June 10, 2025

The Asset Management Journey



AIA Grant Enabled Accomplishments for Wastewater and Water Projects

Task 1 – Expand Asset Inventory and Condition Data

✓ Additional Data Collection after Gap Analysis
✓ Condition Assessment

Goal: Asset Inventory Assessment & Update

Task 2 – Risk Analysis

✓ Risk Analysis

Goal: Risk Framework for system components

Task 3 – Enhanced Financial Practices

✓ Renewal and Replacement Model

Goal: Determine projects to improve system performance

Task 4 – Develop Project Implementation Guides for Financial Planning

✓ Project Implementation Guides
✓ Planning Level Cost Estimates

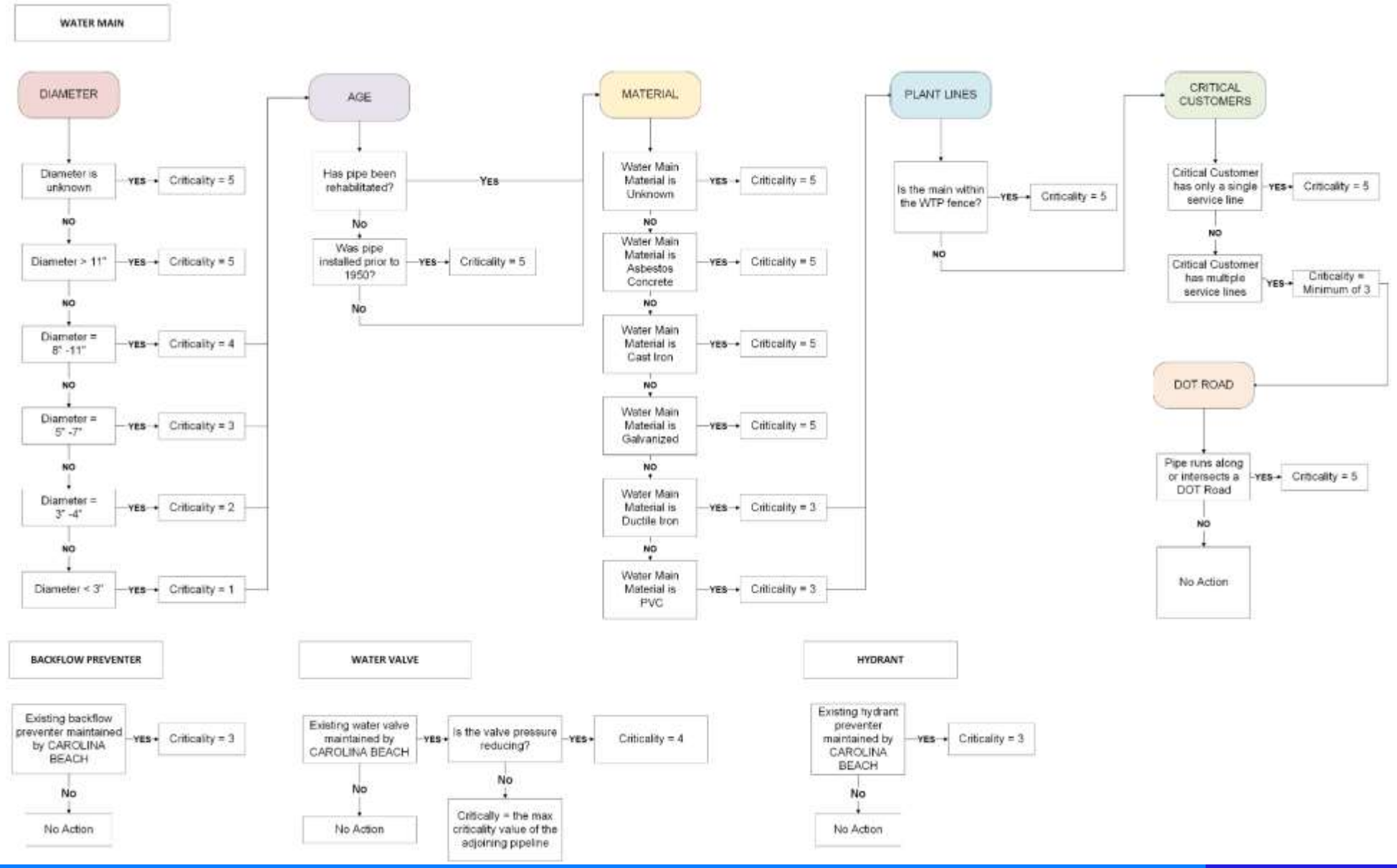
Goal: Cost Analysis and Project Generation

Asset Inventory (Task 1)

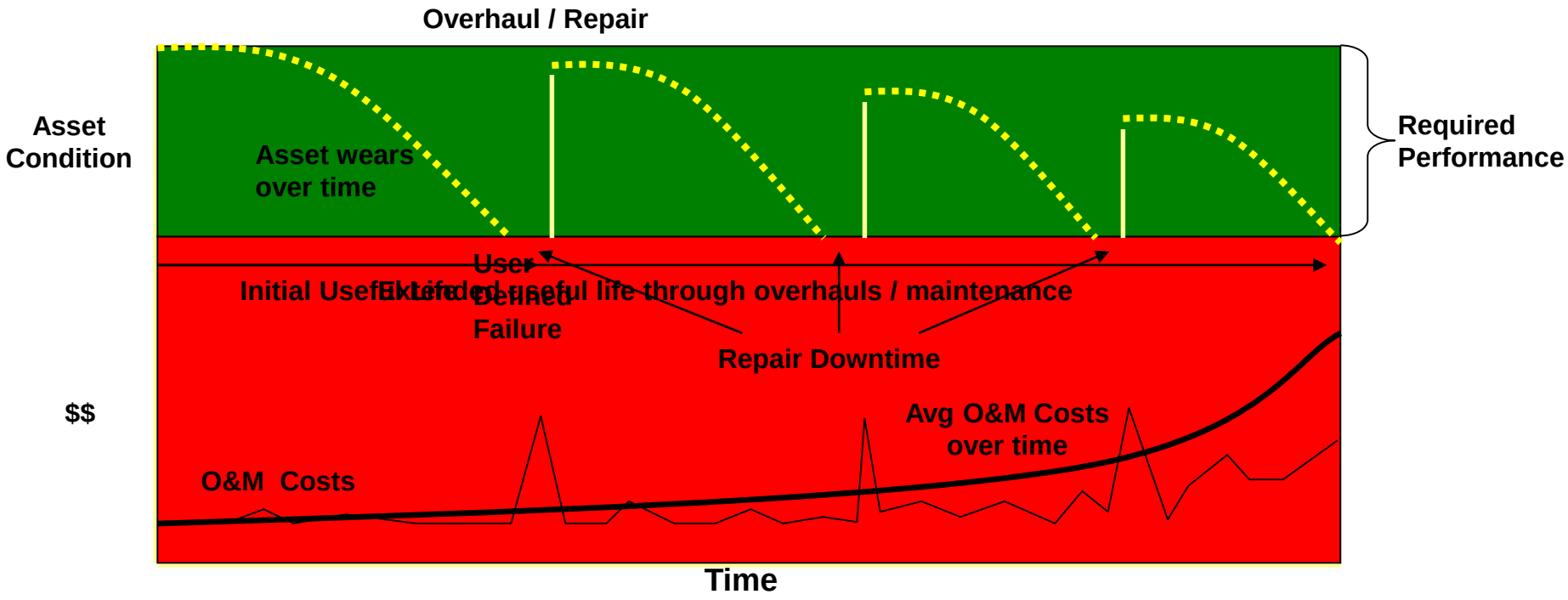
- Gap analysis performed on both horizontal and vertical assets
- Condition assessment
- Purchasing of GPR
- Sustainable process for updating data

Asset Type	Parameter	Before AIA Grant	After AIA Grant
Gravity Sewer (GS)	GS with Diameter	96%	99.9%
	GS with Material	45%	99.9%
	GS with Age	10%	98.5%
Force Main (FM)	FM with Diameter	81%	99.8%
	FM with Material	1%	99.2%
	FM with Age	10%	99.5%
Water Main (WM)	WM with Diameter	100%	100%
	WM with Material	95%	99.5%
	WM with Age	10%	95%

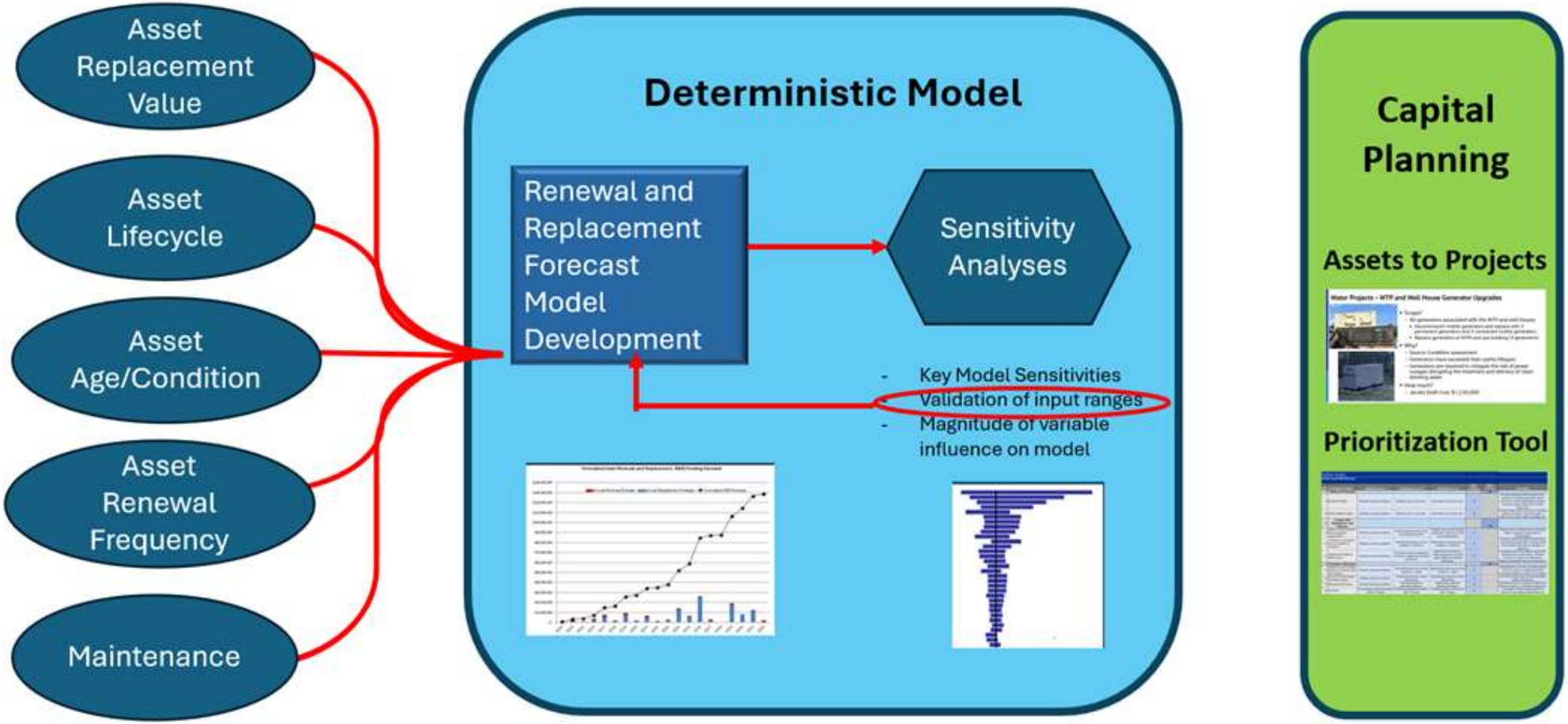
Water Distribution: Horizontal Criticality Modeling (Task 2)



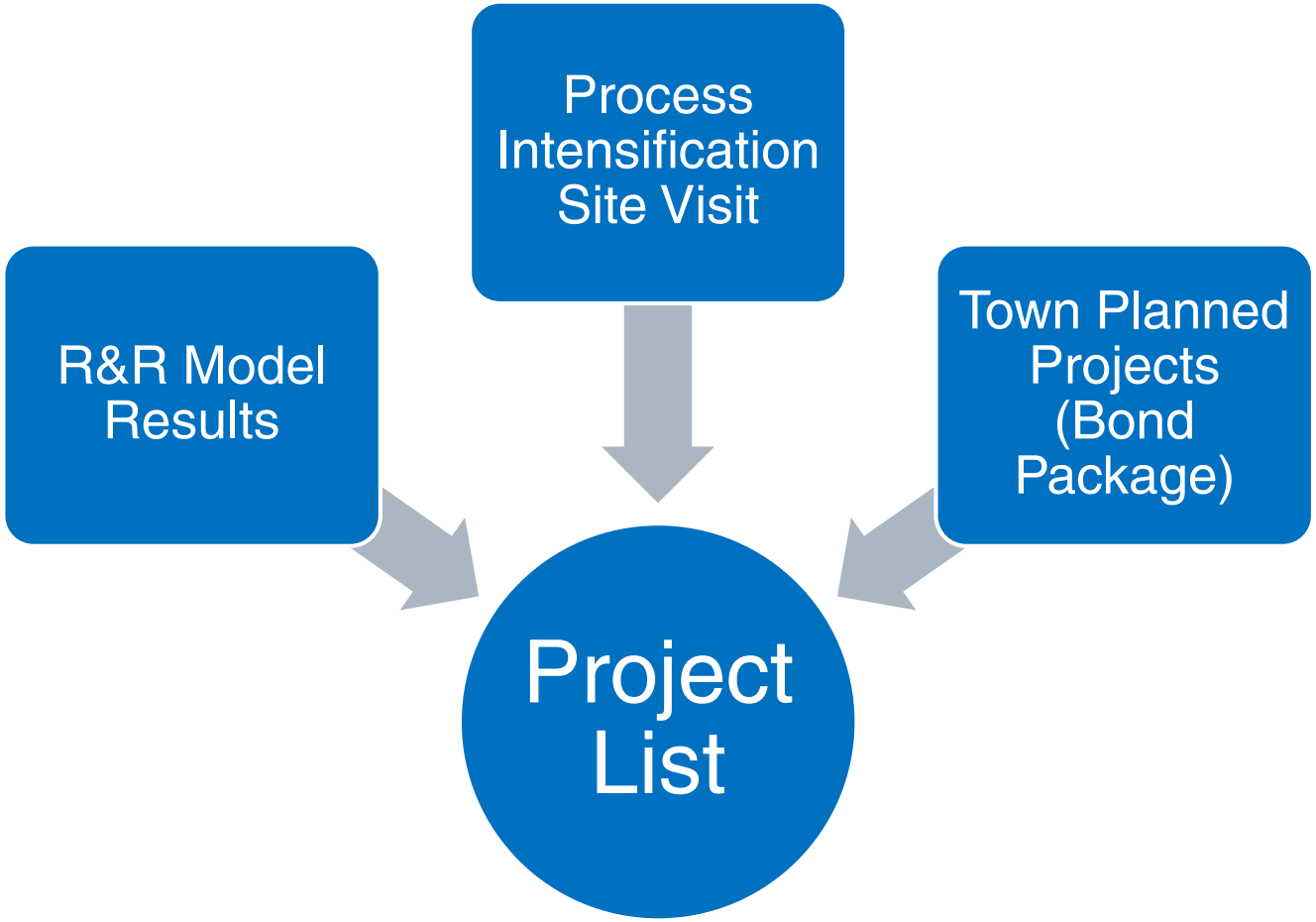
Equipment Life Cycle Maintenance Goals (Task 2)



R&R Forecast Model Development (Task 3)



Prioritized Project List (Task 4)



Prioritized Project List (Task 4)

	Water and Wastewater Prioritized Project List	Score		Water and Wastewater Prioritized Project List	Score
1	Headworks replacement	40	13	Process Safety	30
2	Disinfection and Effluent Improvements Option 2	40	14	Blower Replacement	28
3	Disinfection and Effluent Improvements Option 1	36	15	Tertiary Treatment Improvements Option 1	28
4	Bypass and EQ Basins	32	16	Tertiary Treatment Improvements Option 2	28
5	Secondary Treatment Improvements	32	17	Upgrades to WTP #2 Building and Electrical	28
6	New WTP #3	32	18	Connection to WTP #3	28
7	Lift Station #1 Improvements	32	19	Generator Upgrades	28
8	New WTP #3 Building	30	20	Pump Station Equipment and Power Upgrades	28
9	RAS/WAS Pump Station Replacement and Clarifier Connection	30	21	WWTP Power Improvements	26
10	New 2 MG Tank and High Service Pumps	30	22	Decommission WT #1	24
11	Upgrades to WTP #2 Equipment	30	23	Water Conveyance	24
12	Process Security	30	24	Sewer Conveyance	24

Project Name	Category and Source	Funding and Prioritization
WWTP Secondary Treatment Improvements	Miscellaneous Equipment Replacements within Secondary Treatment	Clean Water State Revolving Fund
Wastewater Treatment Plant	R&R Model	Score: 32/50

Project Need

Secondary wastewater treatment is a biological treatment process that uses microorganisms called activated sludge to reduce the amount of organic and nutrient pollutants in wastewater. The microorganisms are cycled through multiple passes through a secondary treatment basin until the end of their lifespan when they are wasted from the system. Key assets needed to maintain this system are transportation piping and pumping for the return and waste activated sludge (RAS/WAS), motors, check valves, and mixers. Most of the pumps, mixers, motors, etc. in the secondary treatment plant are beyond their typical useful lifespan of 10-20 years. The mixers at plant #1 are inoperable.

Project Scope

For secondary treatment at plant 1, 4 jet mixers will be replaced to allow for the option to have NOx removal or more reliable settling. The scope of this project also includes replacing aging assets like pumps, gearboxes, and sludge telemetry.

Project Cost

Total project cost in 2025 dollars, including non-construction, estimated at $920,000 ($644,000/$1,380,000) (-30/+50%). The estimate includes a 25% contractor markup and 30% contingency.

Next Steps Highlights

- Project implementation and funding - review, prioritize, delegate, and address the issues identified in the project, incorporating into the O&M and CIP programs, when appropriate.
- Financial modeling advancement – perform a probabilistic analysis to produce anticipated funding ranges instead of a deterministic model.
- Business case evaluation – support the evaluation of key decisions on challenging problems and opportunities using a structured framework (e.g., replacement of gravity line vs. renewal using liner)
- Key performance indicators - expand the identification of R&R projects beyond life cycle and condition factors, to the identification of assets that are not meeting their identified LOS and require an R&R activity to bring them back in line with their targeted LOS

Motion

The Town Council adopts 25-2334 resolution for the Town of Carolina Beach Water System Resiliency Assessment Project.