

Hitting a 20-Year “Grand Slam” Capital Plan in Gloucester

Gloucester, MA

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Gloucester, MA Basics and Challenges

Utility Master Plan (UMP)

Asset Management Plan (AMP)

Comprehensive Wastewater Management Plan (CWMP)

“Grand Slam” Integrated Plan

Gloucester, MA – The Basics



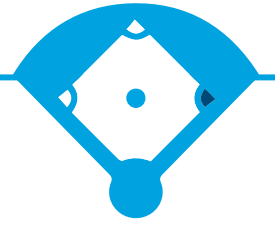
- Essex County, 40 miles north of Boston, 80 miles east of Worcester
 - SR133/RT127
 - Coastal, tidally influenced community
- Serve 12,000 customers
- City's assets include:
 - 60 miles gravity sewer; 29 PS; 1 WWTF
 - 55 miles storm sewer
 - 163 miles of water main; 3 storage tanks; 2 WTP
 - 30 miles force main/low pressure sewer
 - 1,265 septic tank effluent pump (STEPS)
 - 402 grinder pumps

Aerial view of Gloucester, MA

Gloucester, MA – The Challenges

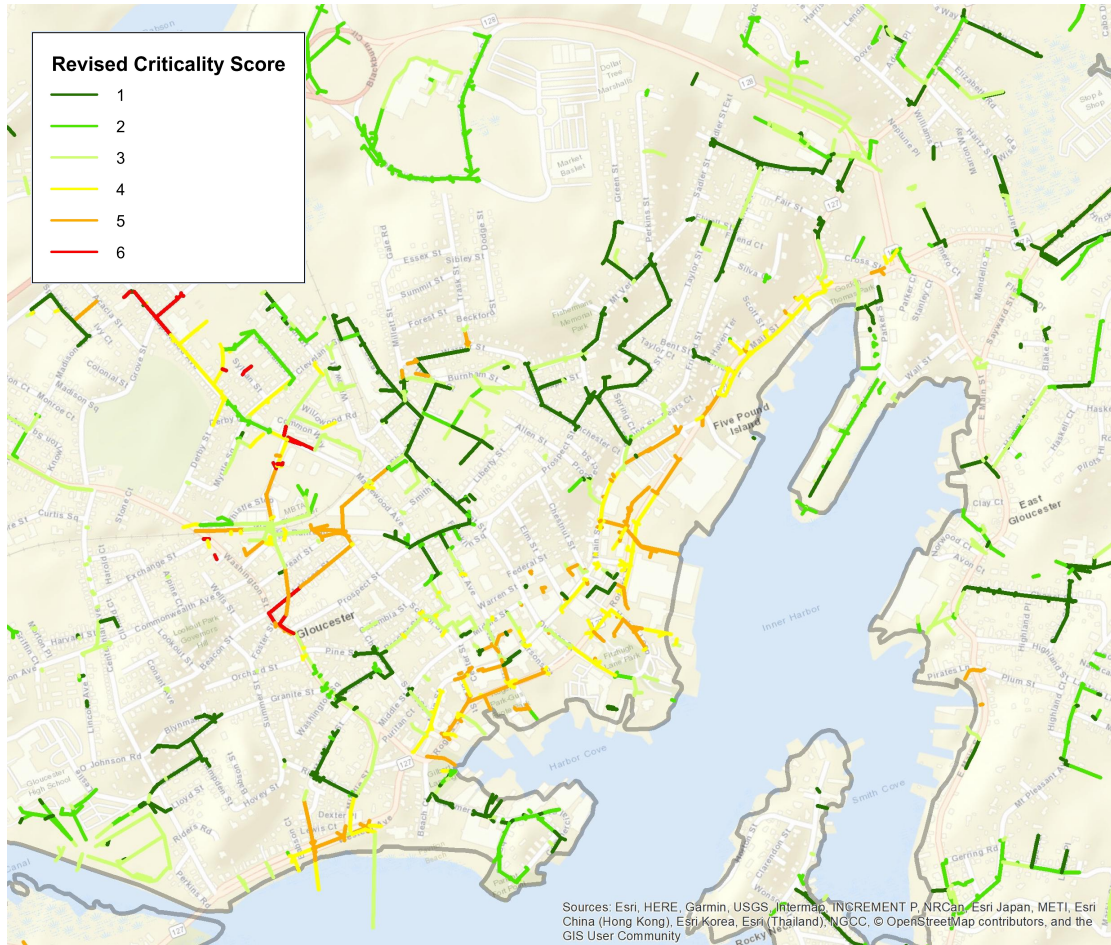
- Flooding, cross-country pipes, maintainability
- Grease, ragging, odors
- Reactive
- Cost/time inefficiencies
- Subject to regulatory requirements through several permits
 - EPA, NPDES - CSO- 9 minimum controls; MS4 compliance
 - MassDEP, I/I control planning
- Approach: *'Grand Slam'* Integrated Capital Planning
 - Aimed to address all infrastructure needs
 - UMP, AMP, CWMP

Utility Master Plan (UMP)



- **Developed to meet current and anticipated NPDES permit compliance**
- **UMP scope of work covered stormwater, wastewater collection, pump stations, and a Water Pollution Control Facility (WPCF) evaluation**
 - Existing conditions analysis
 - Criticality
 - Capital needs planning
- **Outlines and schedules future investigations, inspections and condition assessments for wastewater and stormwater assets.**

Utility Master Plan (UMP)



- **GIS-based criticality analysis**
 - Wastewater and stormwater assets
 - Customized economic, social, and environmental factors to calculate Consequence of Failure (CoF)
 - Assets with high CoF scores, combined with rankings established in the City's 2017 Infiltration and Inflow (I/I) Control Plan, used to prioritize field inspections
 - Roadway conditions considered for stormwater assets
- **Sanitary and storm sewer use ordinances updated**

Utility Master Plan (UMP)



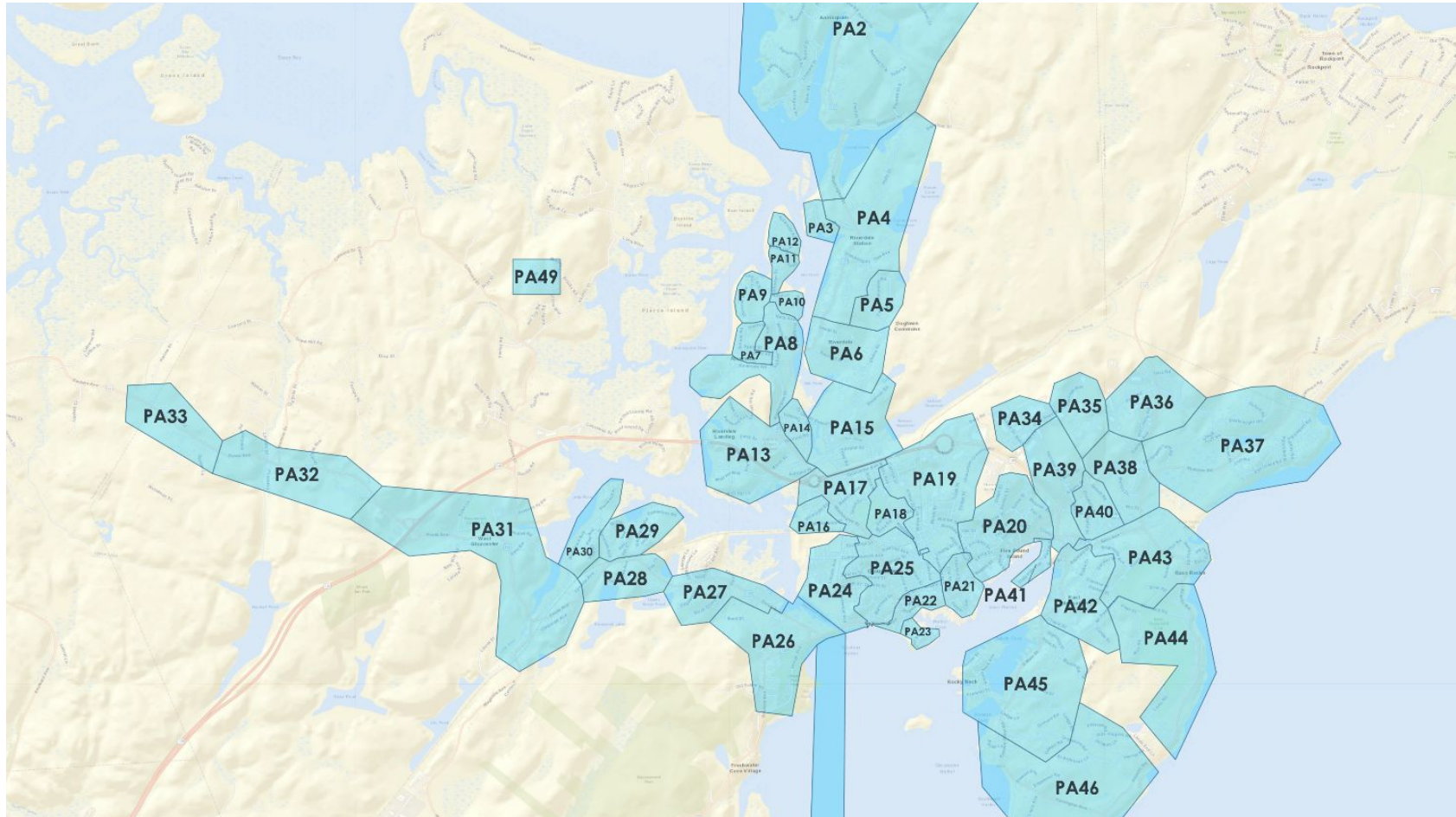
DPW Station

- PS condition assessments based on visual and auditory observations.
 - 29 pump stations and STEP systems evaluated
 - 20-year capital improvement plan (CIP) developed
- Sewer ordinance updated to regulate STEP maintenance and incorporate inspection program



Goose Cove Wet Well

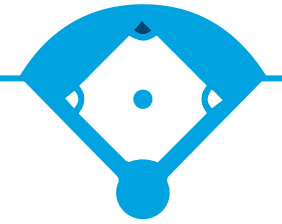
Utility Master Plan (UMP)



Project Areas, Gloucester, MA

- 20-year implementation plan with pre-determined scopes of work within localized project areas.
- Recommendations organized by “Improvement” and “Routine” categories:
 - Rehabilitation/construction
 - Inspection/investigation
- Stormwater and wastewater collection recommendations, \$25M
- Treatment improvements, \$60M

Asset Management Plan (AMP)



		Consequence of Failure					
		1	2	3	4	5	6
Likelihood of Failure	6	C	C	B	B	A	A
	5	C	C	B	B	A	A
	4	D	D	C	C	B	B
	3	D	D	C	C	B	B
	2	E	E	D	D	C	C
	1	E	E	D	D	C	C

- Need for integrated approach identified in 2013; grant funding opportunity
- Level of service (LOS) goals established
- Risk analysis performed
 - Likelihood of Failure (LoF)
 - Combined with CoF from UMP
- Water recommendations, \$40M
- Additional wastewater recommendations, \$35M

Asset Management Plan (AMP)

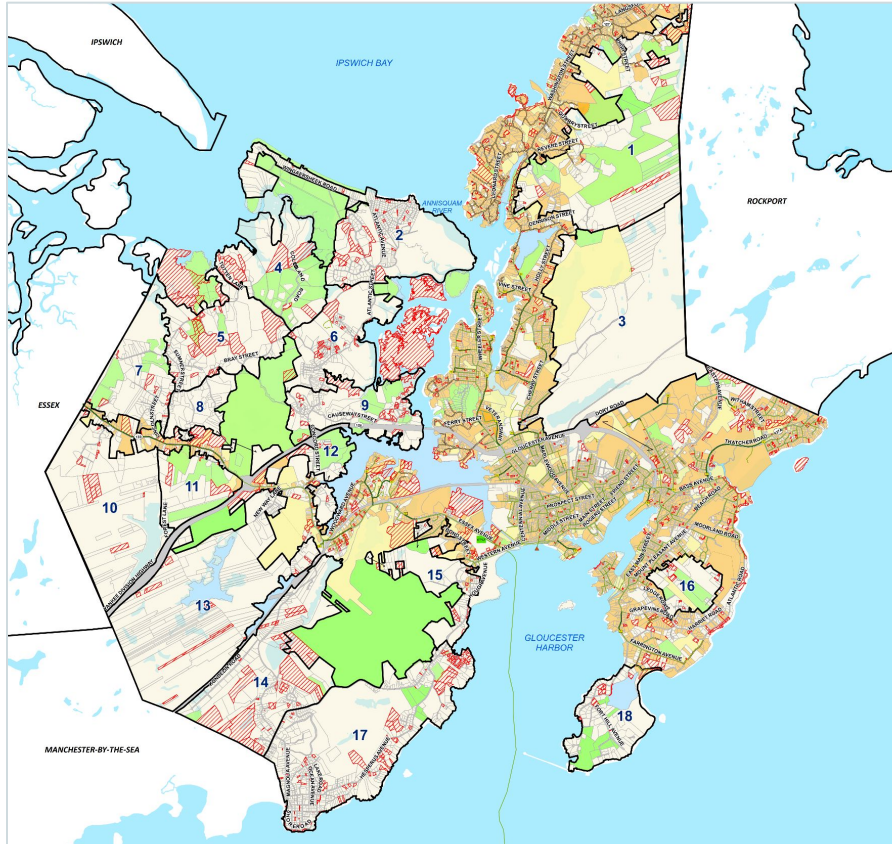
Results

- Assessed strengths/weaknesses of collection/distribution systems
- Prioritized plan to maximize benefits in a cost-effective manner
- Position City to meet needs of the community
- Meet current, pending and future federal and state regulatory requirements.

Additional steps

- Refine financial implementation plan with City's capital planning needs
- Overlay identified needs using GIS based on capital budgets
- Rate analysis to distribute proposed capital expenditures over the next 20-years.

Comprehensive Wastewater Management Plan (CWMP)



- **Remain in compliance with the City's NPDES permit**
 - Draft issued in 2010.
 - Currently, City operates a primary treatment only facility; new NPDES permit will likely require secondary treatment.
- **Provide future growth planning for next 20 years**
- **Remaining NPDES compliance requirement includes evaluation of long-term needs of non-sewered areas.**
- **Phase 1 (Existing Conditions) drafted and sent the City and MassDEP.**

Comprehensive Wastewater Management Plan (CWMP)



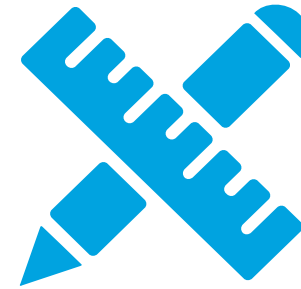
Public Input

Evaluate public input for Phase 2 analysis.



Phase 2

Identify short-listed treatment alternatives for needs areas



Phase 3

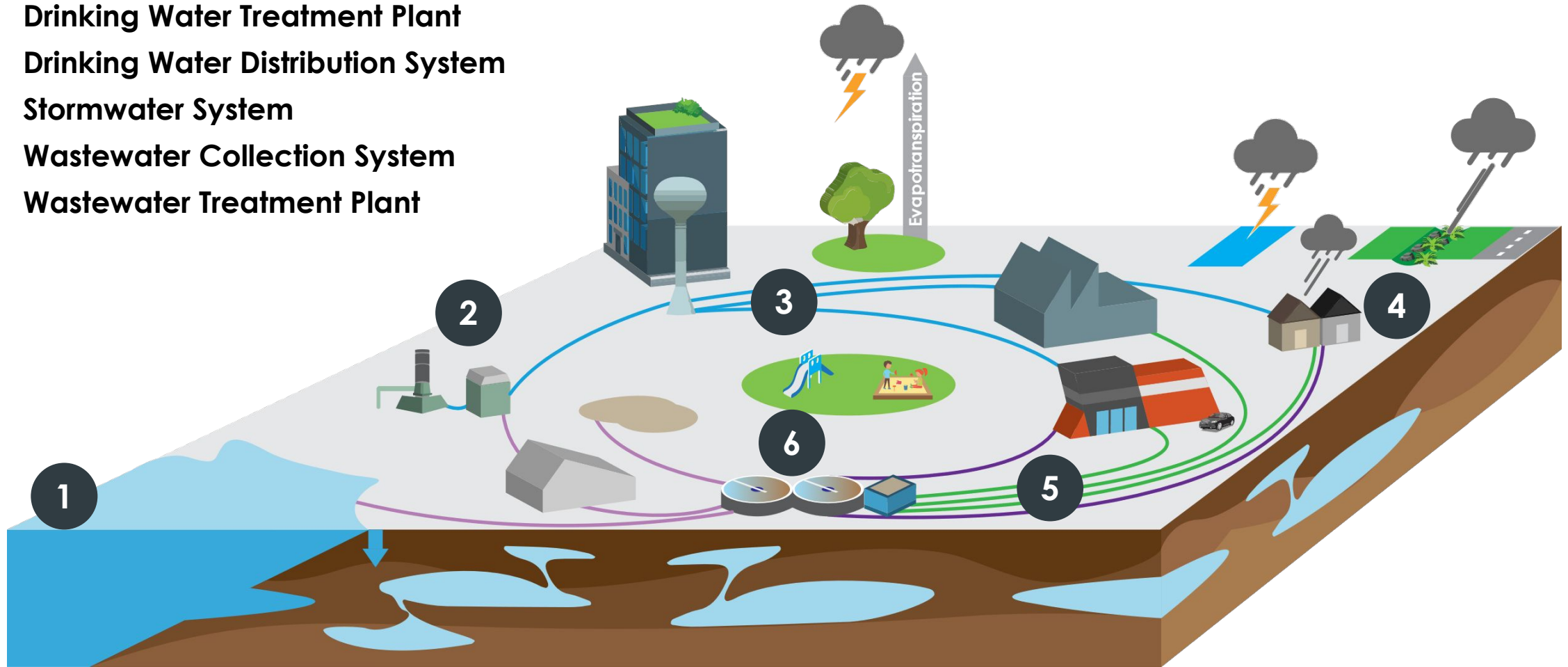
Evaluate alternatives and develop Final CWMP; followed by public hearing.

“Grand Slam” Integrated Plan; Bases Loaded...



Integrated Systems: The Big Picture

1. Water Supply
2. Drinking Water Treatment Plant
3. Drinking Water Distribution System
4. Stormwater System
5. Wastewater Collection System
6. Wastewater Treatment Plant



What is Integrated Planning?

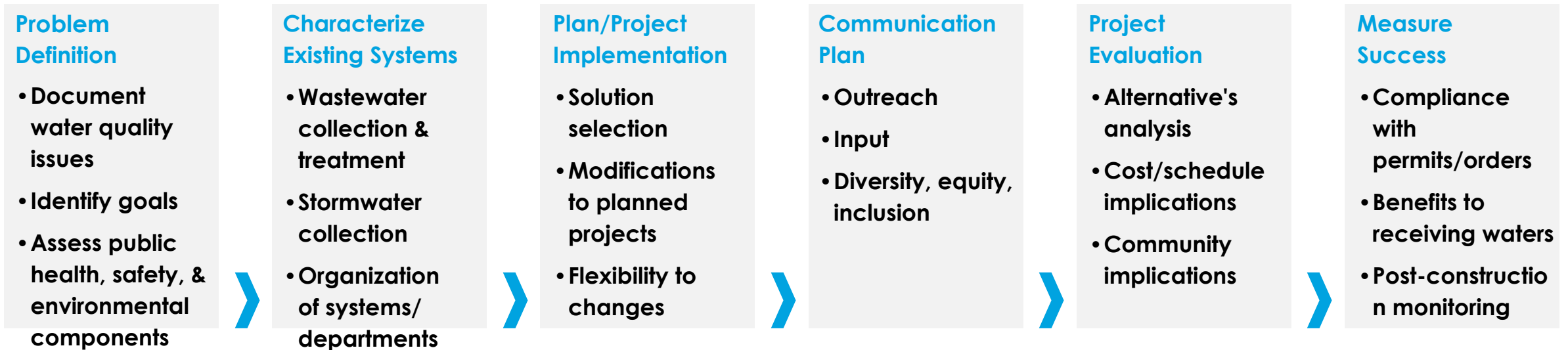


- “Formal” guidance and framework provided by EPA
 - <https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater>
- Process focused on addressing needs for both wastewater and stormwater systems concurrently
- Identifies efficiencies to best prioritize capital expenditures
- Considers sustainability and comprehensive (holistic) solutions
- May include green infrastructure
- Water treatment and distribution components too!

Benefits of Integrated Planning

- **Voluntary approach to meeting Clean Water Act (CWA) requirements**
- **Comprehensive review of alternatives, selection of solutions**
- **Improves communication across stakeholder community**
- **Increase efficiency, reduce capital spending**
- **Better, more-equitable decision making**

Elements of an integrated plan



Public/stakeholder involvement throughout process: Better, more-equitable outcome

The Gloucester Connection: Integrated Planning

Wastewater Collection	Stormwater Collection	Wastewater Treatment	Water Distribution/Treatment
<ul style="list-style-type: none"> • Prioritize I/I work based on asset criticality • Perform field investigative tasks based on IICP • Perform PS inspections • Hydraulic model updates 	<ul style="list-style-type: none"> • Address water quality impairments • Prioritize inspections based on asset criticality • Perform inspections 	<ul style="list-style-type: none"> • Review flows and loads • Document existing processes • Assess equipment and condition 	<ul style="list-style-type: none"> • Review existing conditions • Evaluate storage tanks, distribution, and plants • Update hydraulic model
<ul style="list-style-type: none"> • Strengthen sewer ordinance • Establish private source program • Establish asset management protocols • Implement immediate corrective actions 	<ul style="list-style-type: none"> • New non-wastewater discharge article • Prepare recommendations for rehabilitation • Integrate findings into Utility Cloud 	<ul style="list-style-type: none"> • Identify improvements needed for existing processes • Evaluate secondary treatment alternatives • Prepare revised capital and operating costs 	<ul style="list-style-type: none"> • Implement a hydrant/valve replacement program • Review level of service/business risk exposure • Prepare capital and operating costs
<ul style="list-style-type: none"> • Unified GIS • Prepared long-term CIPs • Discuss/plan for public education approach (meetings, website updates, mailers) • Integrate needed improvements and adjust 20-year CIP across all assets 			

Merging efforts into an integrated plan & engaging the public aims at producing better decisions and equitable projects.

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Status of Things in Gloucester



Ongoing Initiatives

- PS upgrades
- I/I reduction in key basins
- Point repairs and lining
- Hartz Street PS force main replacement
- Localized flow monitoring up and downstream of Hartz St Pump Station
- Public/private source inspections

Next Steps

- **Integrate** needed improvements and adjust 20-year CIP across all assets
- Public education program