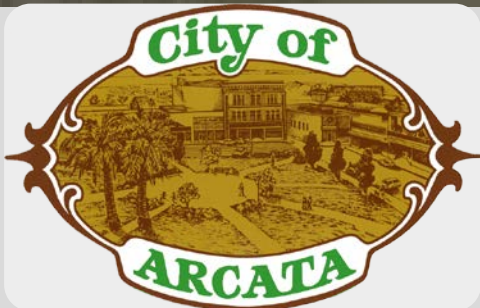




Arcata Wastewater Treatment Facility Feasibility Study



Arcata Wastewater Treatment Facility Feasibility Study

Project Purpose, Goals, and Funding

Purpose

- Investigate and evaluate strategies for protecting, relocating, or otherwise adapting the City's wastewater facilities to maintain safety and regulatory compliance considering long-term climate change effects from flooding and other coastal hazards

Goals

- Inform the City on how to move forward on the levee resilience improvements
- Identify multiple top-ranking alternatives to support future decisions

Funding

- City Feasibility Study funded through a State Water Regional Control Board (SWRCB) Clean Water State Revolving Fund (CWSRF) grant administered through Rural Community Assistance Corporation with cooperation from the Coastal Commission and Regional Water Quality Control Board
- ©2024. "Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation of use."

Arcata Wastewater Treatment Facility Feasibility Study Scope

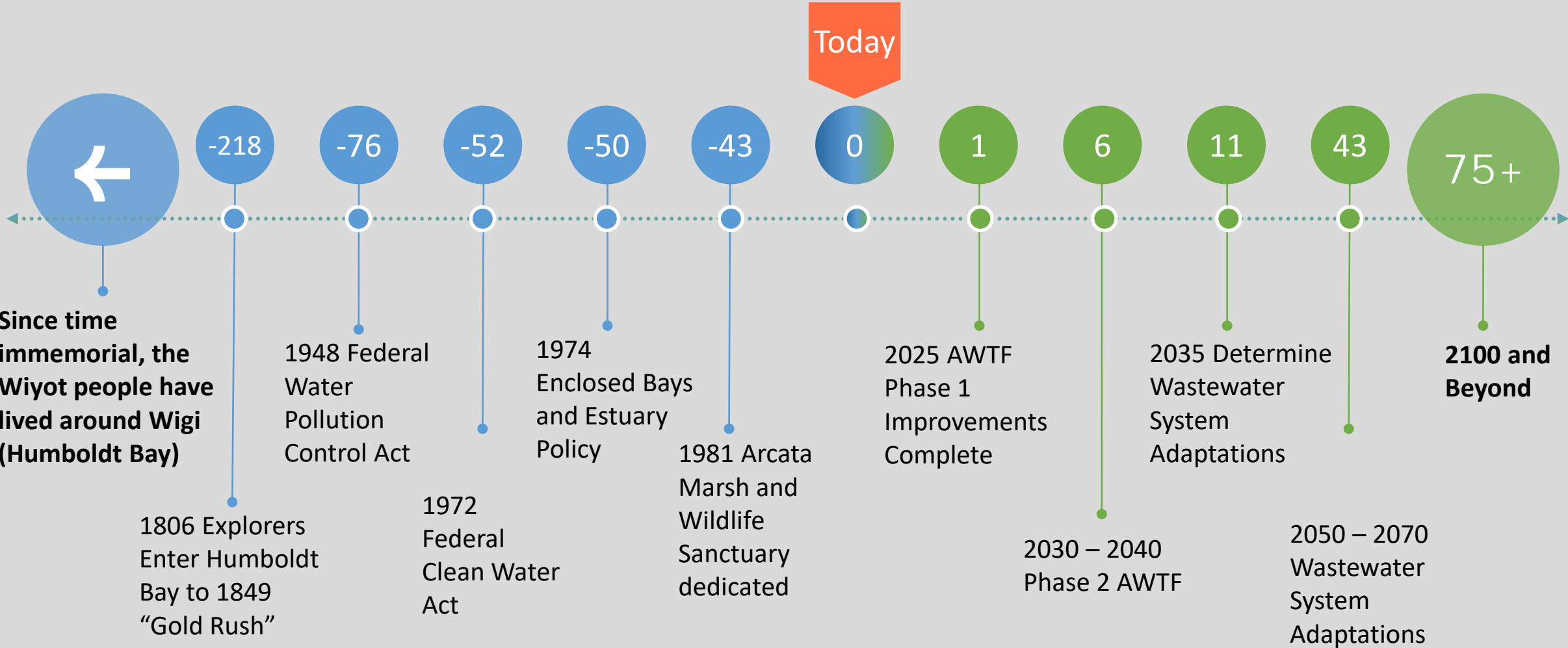
Feasibility Study Report:

- Background Information Review
- Sea Level Rise Risk Vulnerability Assessment
- Adaptation Alternatives Development
- Alternatives Analysis
- Cost Analysis and Funding Plan
- Final Feasibility Study Findings

(Final Alternative Selection not included in the Feasibility Study)

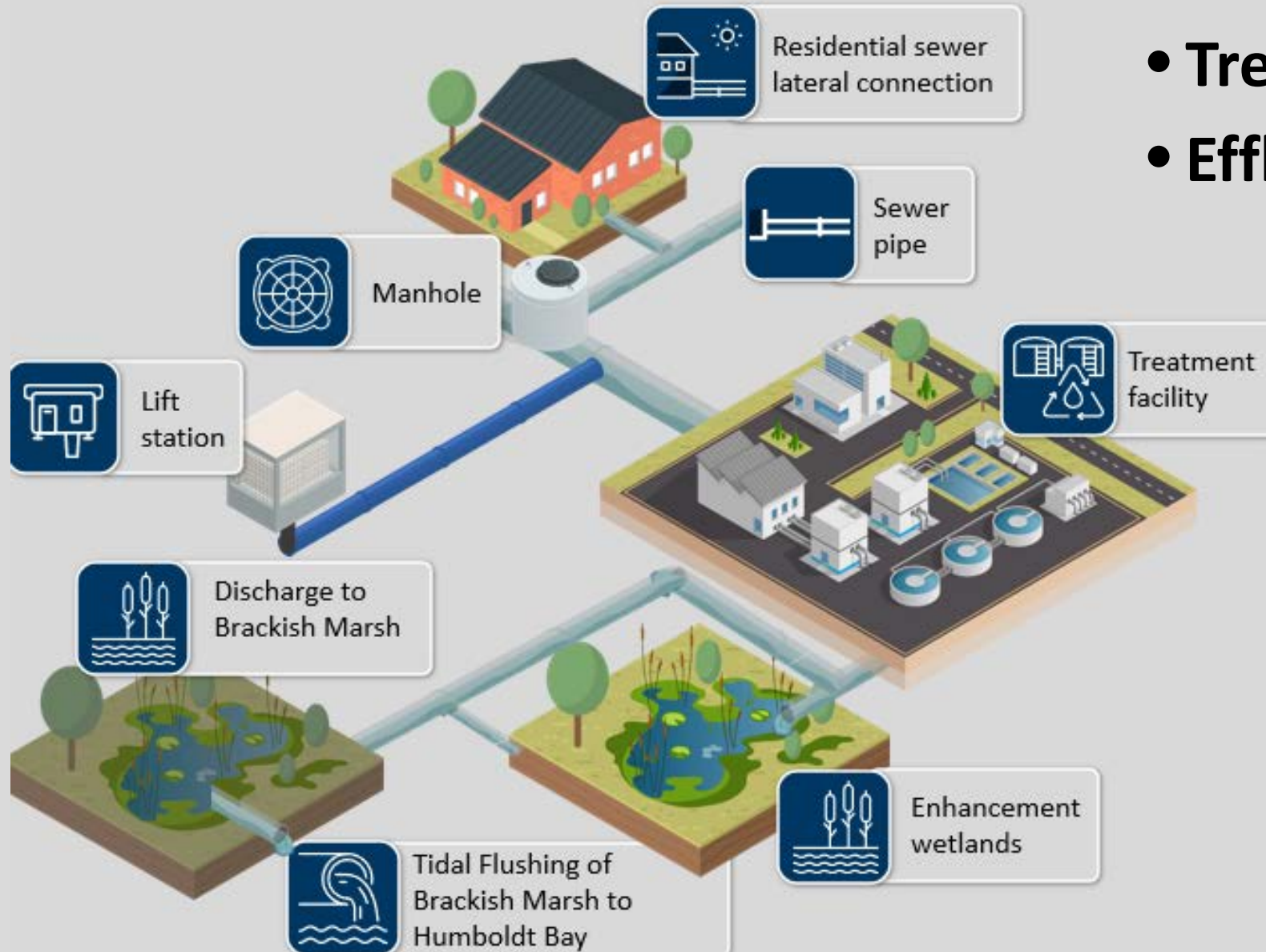
Timeline

Humboldt Bay Region History & Wastewater Regulation and Treatment Timeline

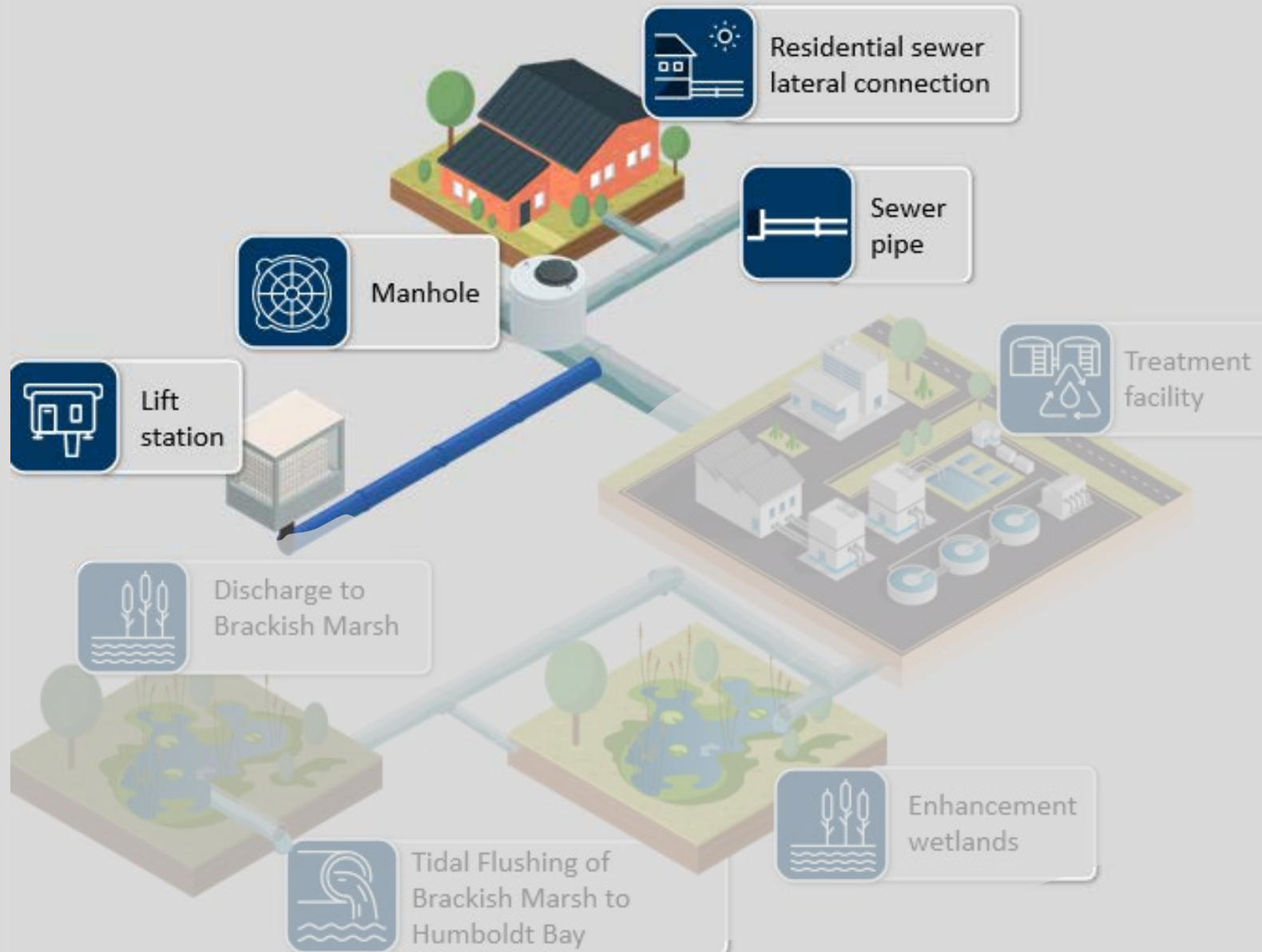


Existing treatment system

- Collection System
- Treatment Facility
- Effluent Disposal System



Collection System

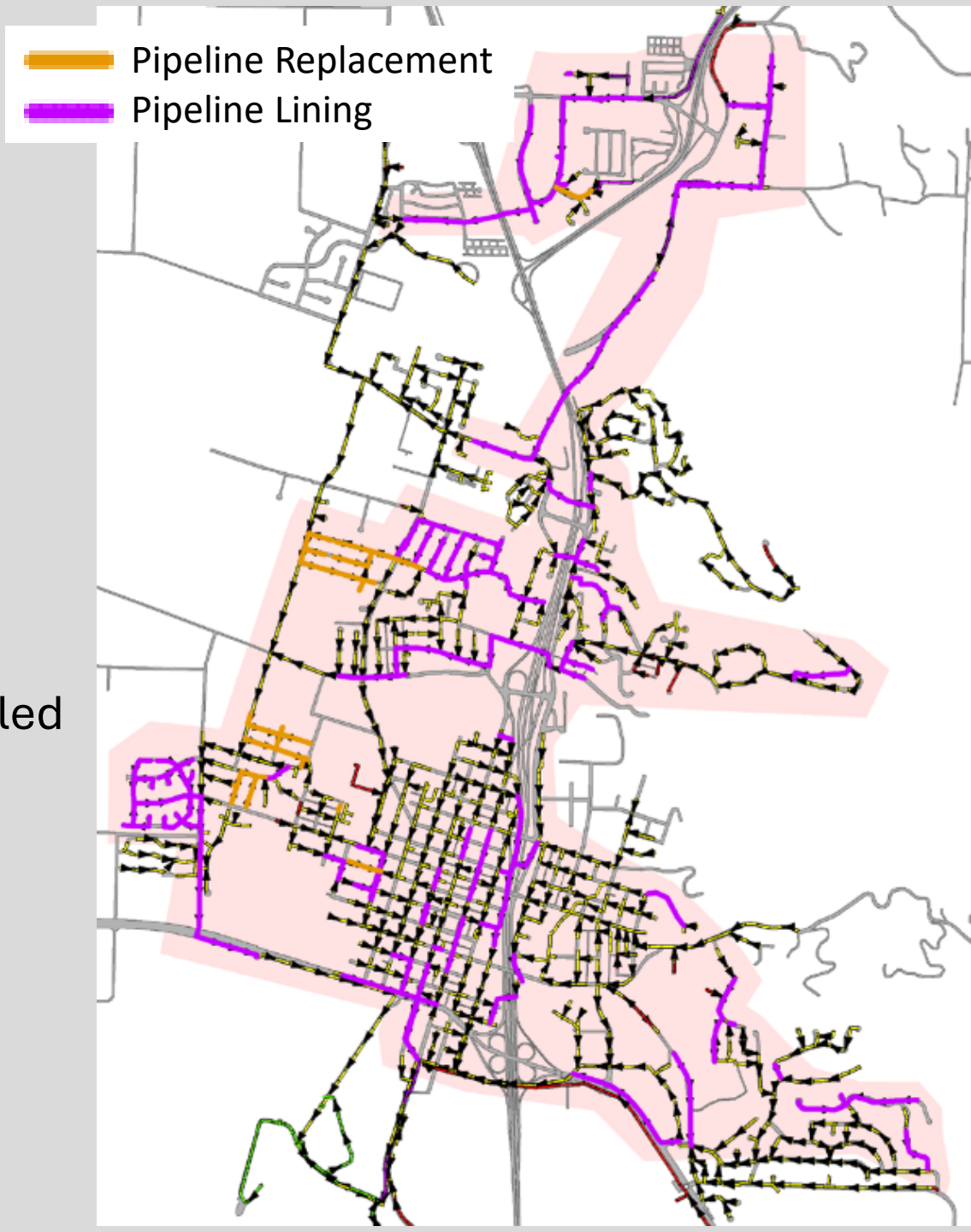


Collection System Improvements

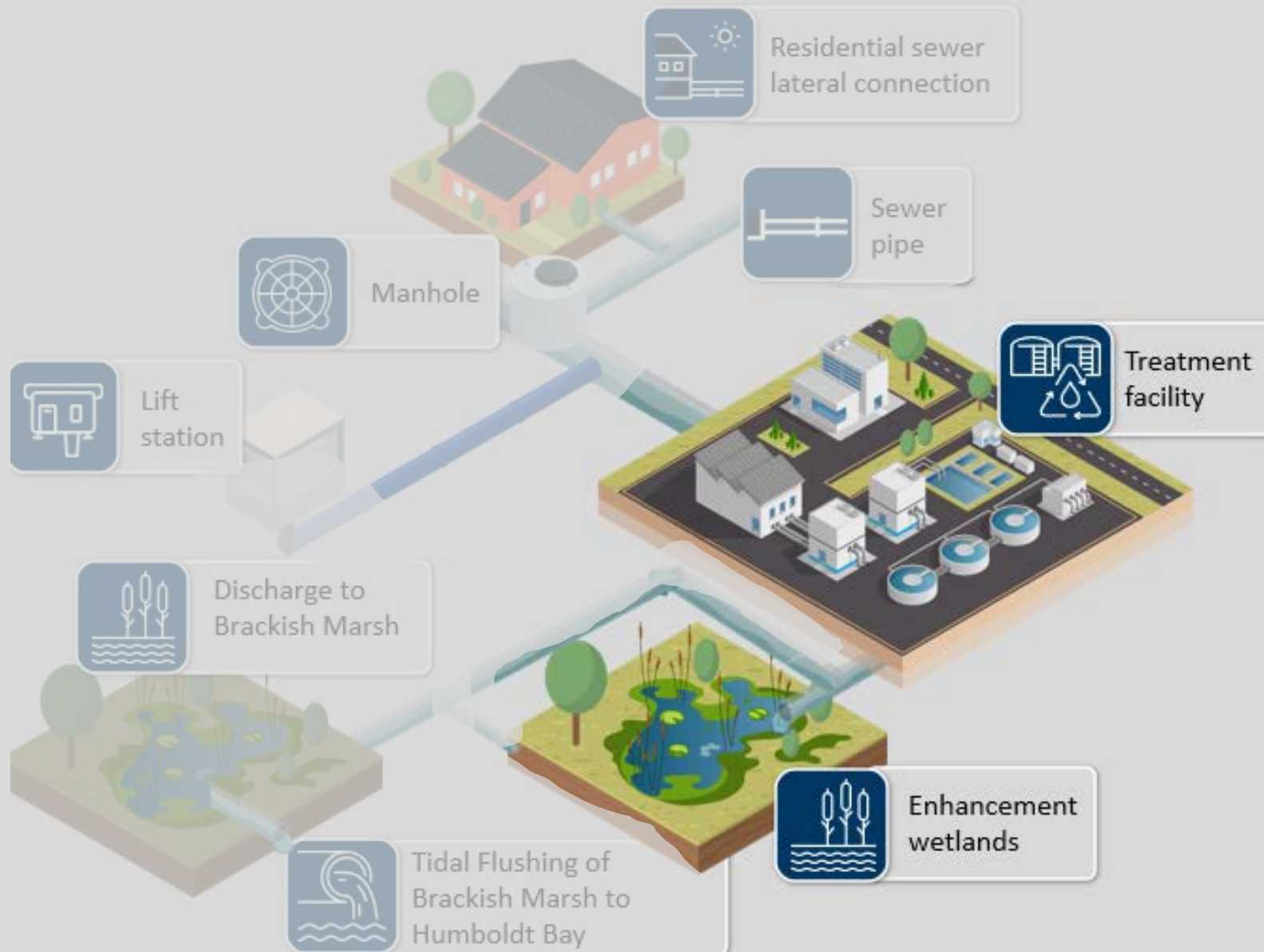
City is implementing projects to reduce Inflow and Infiltration into the collection system and reduce sewer flows going to the Treatment Plant

2018 Inflow and Infiltration Project major components included:

- 41,325 linear feet of cured in place pipelining installed
- 29 manholes replaced, newly installed, or rehabilitated
- 1,200 linear feet of sewer main replaced
- 7,500 linear feet of sewer lateral pipe replaced
- 500 lateral cleanouts installed
- 620 service lateral connections,



Treatment Facility



Wastewater Treatment Facility Planned Improvements

Phase 1 Improvements (in Progress)

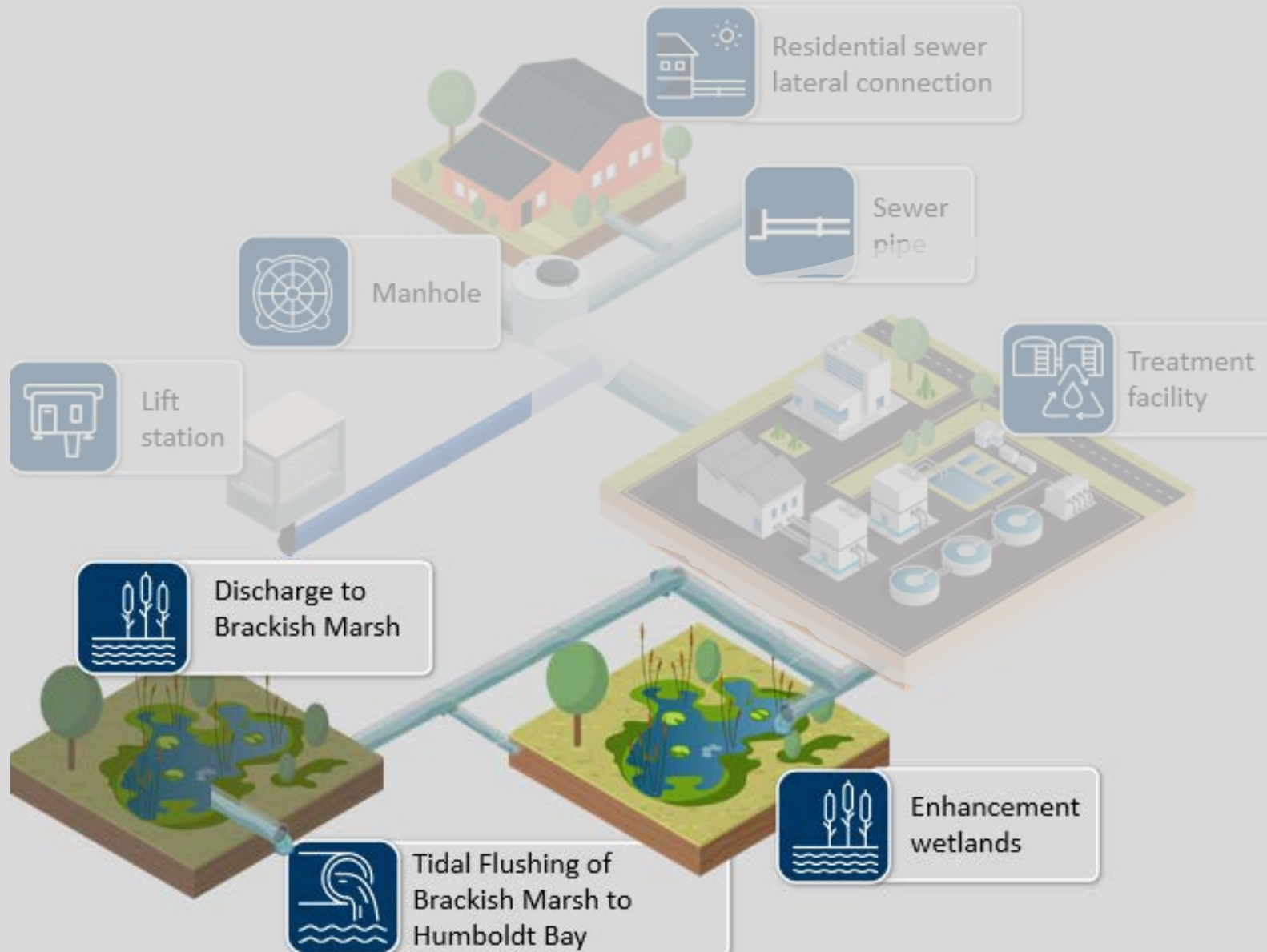
- Flow Reconfiguration
- Plant Rehabilitation
 - Headworks and Primary Clarifier Improvements
 - Pond and Treatment Wetland Improvements
 - UV Disinfection
 - Electrical Upgrades

Phase 2 (to be completed in the near term)

- Treatment Process Upgrades to Improve the Quality of Effluent Discharge to the Bay

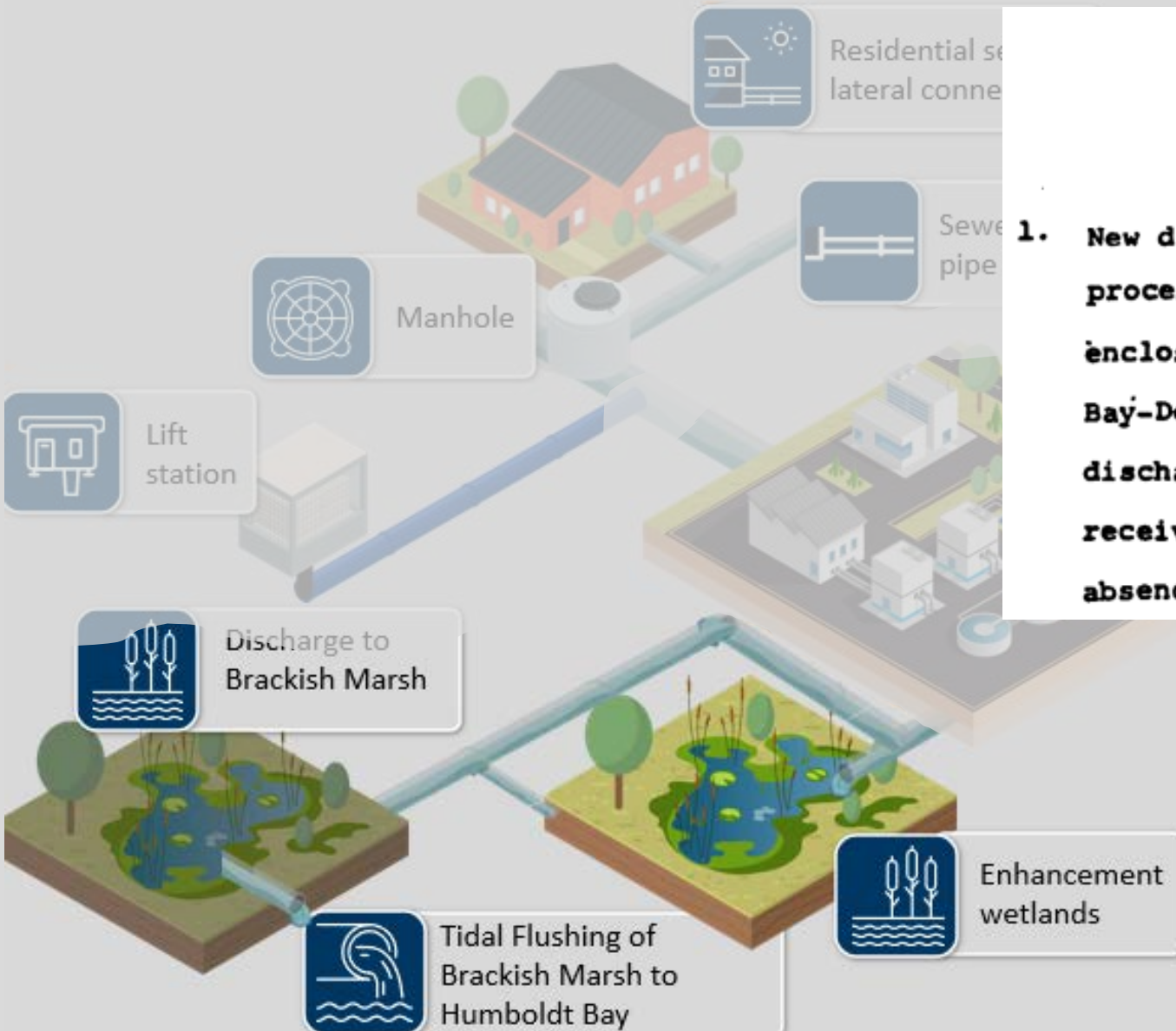


Effluent Disposal System



Effluent Disposal System

1974 Water Quality Control Policy for the
Enclosed Bays and Estuaries of California



CHAPTER III DISCHARGE PROHIBITIONS

1. New discharges^{5/} of municipal wastewaters and industrial process waters^{2/} (exclusive of cooling water discharges) to enclosed bays and estuaries, other than the San Francisco Bay-Delta system, which are not consistently treated and discharged in a manner that would enhance the quality of receiving waters above that which would occur in the absence of the discharge, shall be prohibited.



Wastewater Treatment System Sea Level Rise Risk Summary

- Arcata Sea Level Rise Vulnerability Assessment and Capital Improvement Project Adaptation Plan identified the following for the Wastewater Treatment System:
 - Asset vulnerability
 - Asset adaptive capacity
 - Consequences if asset is flooded
 - Likelihood that asset will be flooded
 - Risk of asset damage/ failure based on a combination of likelihood of flooding and consequences of flooding

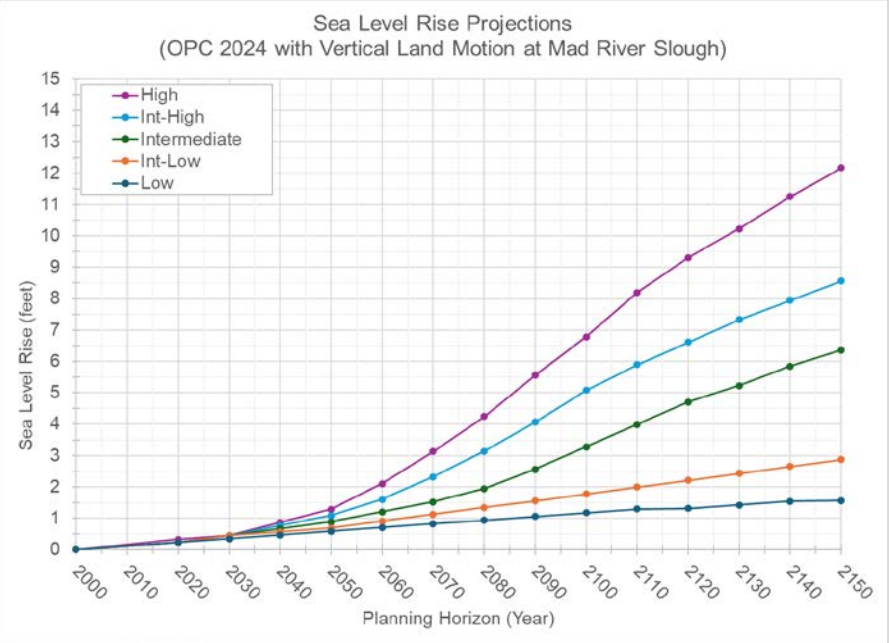
Summary of Risk Matrix

Risk Assessment includes consideration of the likelihood and consequence of a flooding event

Risk Matrix Evaluation							
		Consequence					
		Insignificant	Minor	Moderate	Major	Severe	Catastrophic
Likelihood	Almost Certain						
	Very Likely						
	Likely						
	Unlikely						
	Very Unlikely						
	Almost Unprecedented						

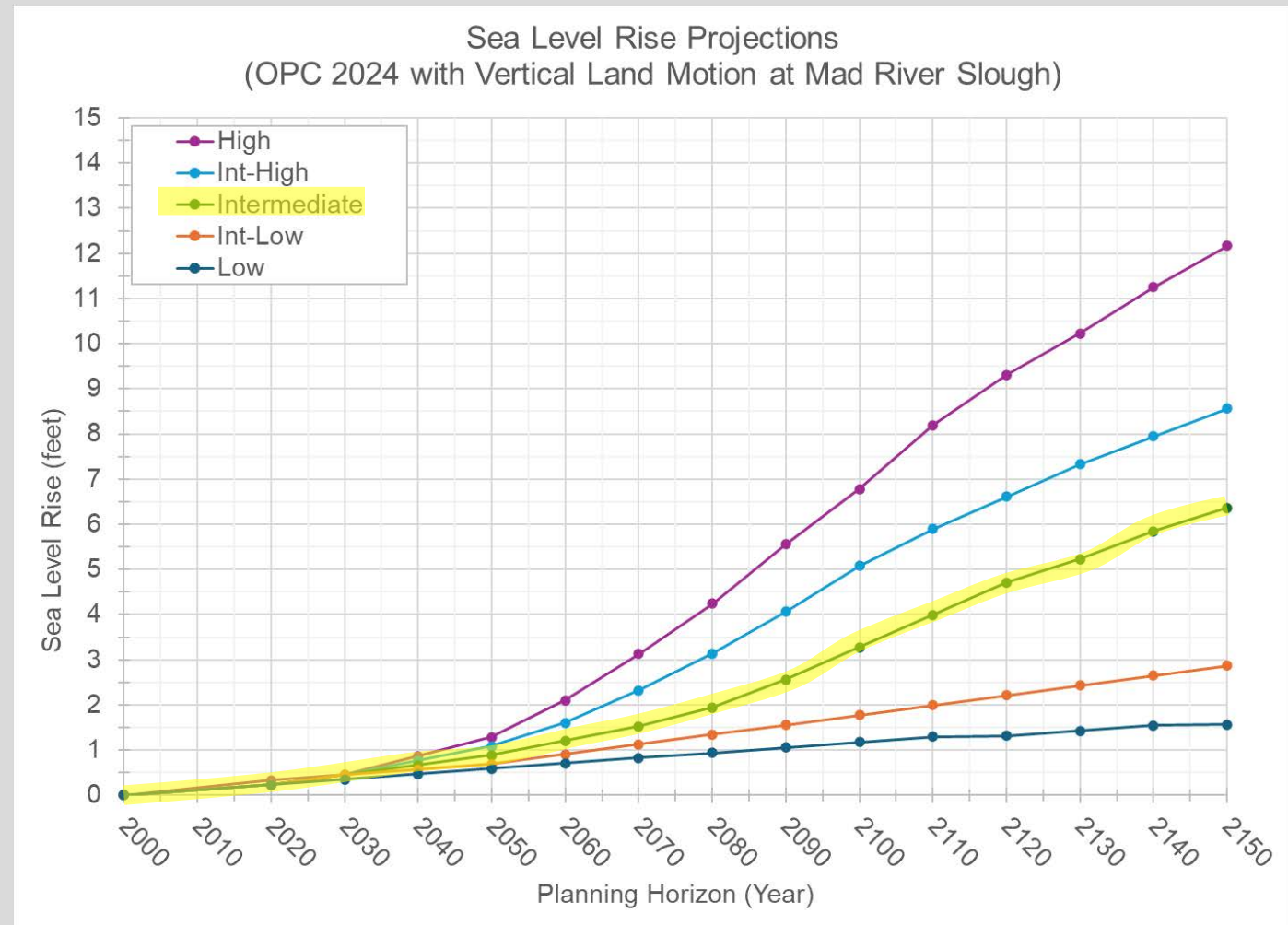
Sea Level Rise Projections
(OPC 2024 with Vertical Land Motion at Mad River Slough)

Year	High	Int-High	Intermediate	Int-Low	Low
2024	4.2	4.0	3.8	3.6	3.4
2030	5.5	5.0	4.5	4.2	4.0
2035	6.8	6.0	5.5	5.2	5.0
2040	8.2	7.0	6.5	6.2	6.0
2045	9.5	8.0	7.5	7.2	7.0
2050	11.0	9.0	8.5	8.2	8.0



Sea Level Rise Planning Scenario

- Sea Level Rise scenarios along the west coast of California are provided in the latest 2024 Draft State of California Sea Level Rise Guidance document developed by the Ocean Protection Council
- For the wastewater system risk analysis, the Intermediate projection was used
- Intermediate: Based on sea level observations and current estimates of future warming, a reasonable estimate of the upper bound of most likely sea level rise in 2100.



Collection System Risk

Risk Rating
Very High
High
Medium
Low
Very Low

	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
First Street Lift Station and Support infrastructure	10.7 ft – 13.3 ft				
Meadowbrook, Wetlands, and Samoa Lift Stations	11.7 ft - 13.3 ft				
Collection System Piping	Below ground surface				

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

Treatment Facility Risk without the Levee Project

Risk Rating
Very High
High
Medium
Low
Very Low

	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
Site and Facility Access	11.2 ft	Low	Medium	Medium	Medium
Essential Treatment Facilities	10.7 ft – 16.7 ft	Low	Medium	High	High
Enhancement Marshes	11.7 ft - 13.3 ft	Low	Medium	High	High

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

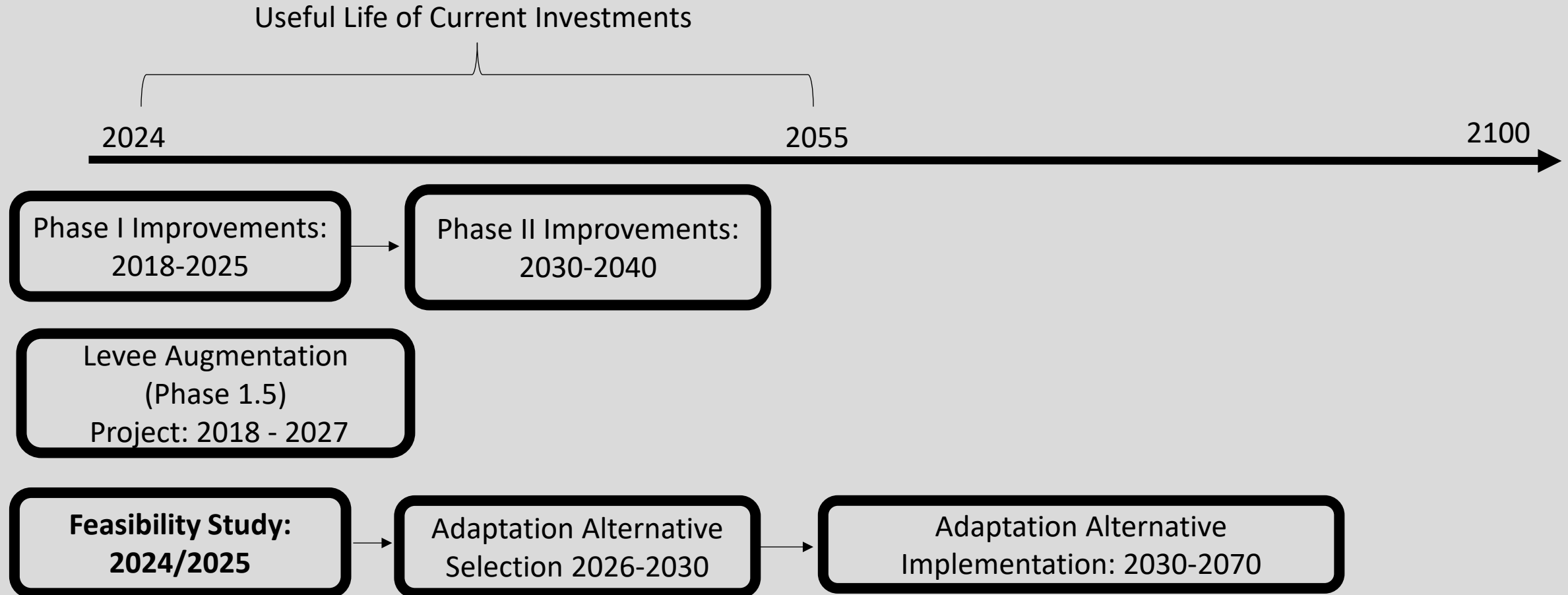
Treatment Facility Risk with the Future Levee Project

Risk Rating
Very High
High
Medium
Low
Very Low

	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
Site and Facility Access	11.2 ft				
Essential Treatment Facilities	Protected to 15 ft				
Enhancement Marshes	11.7 ft - 13.3 ft				

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

Arcata Wastewater Treatment Facility Improvement Timeline

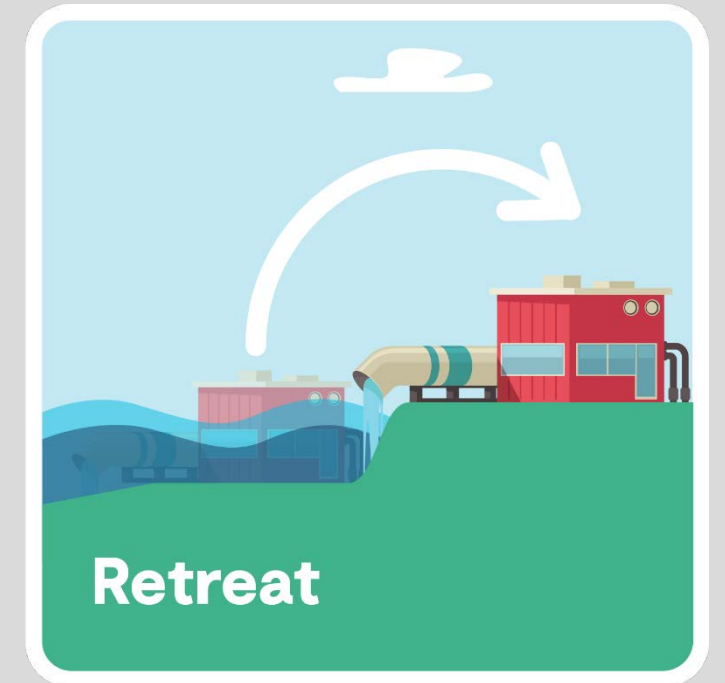


Adaption strategies

**Protect/defend where
significant investment exists**

**Accommodate where infeasible
to defend or relocate**

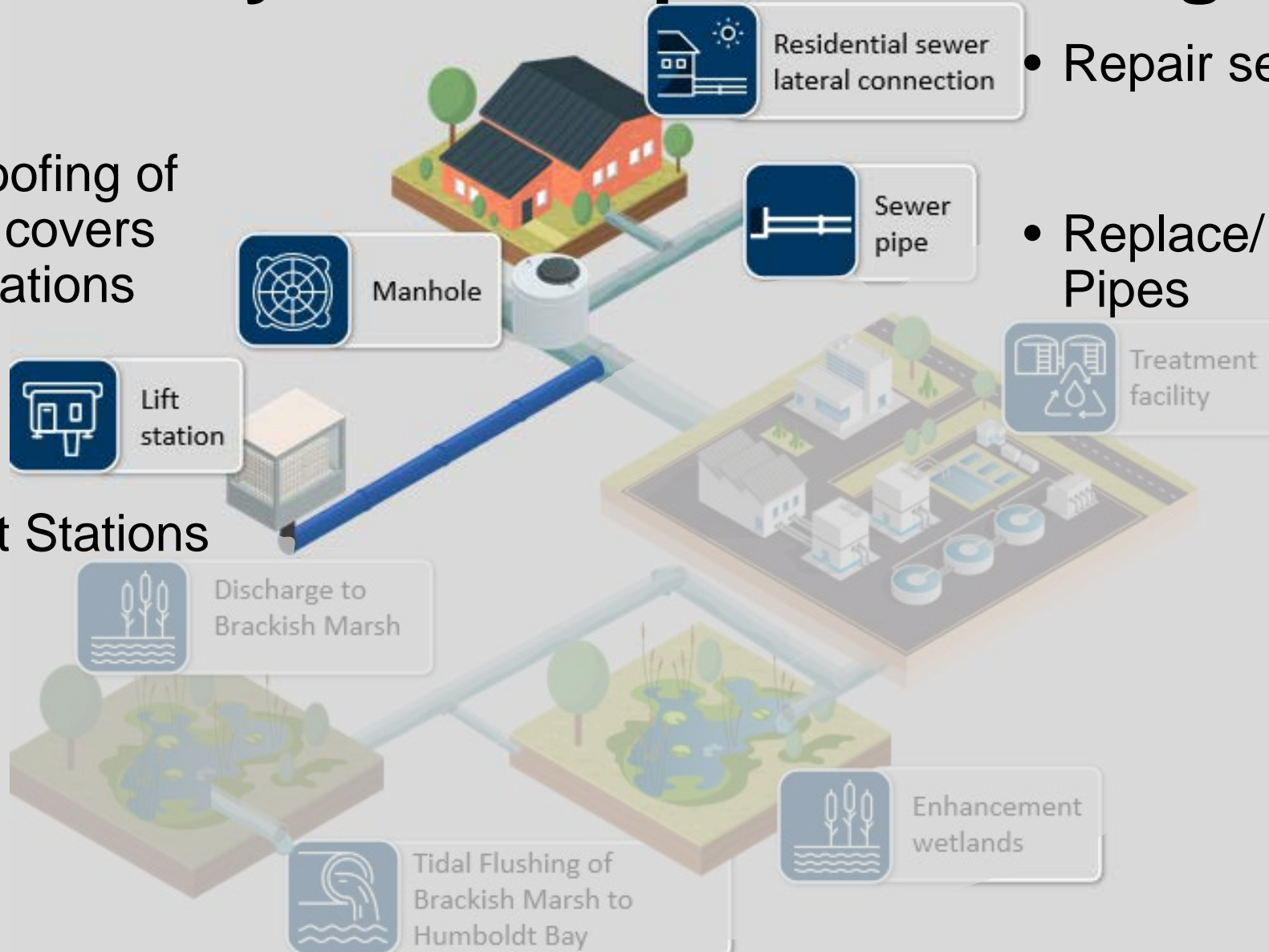
**Retreat where/when no
longer feasible to defend**



Protect/ Accommodate Collection System Adaptation Strategies

- Flood proofing of manhole covers and lift stations

- Elevate Lift Stations

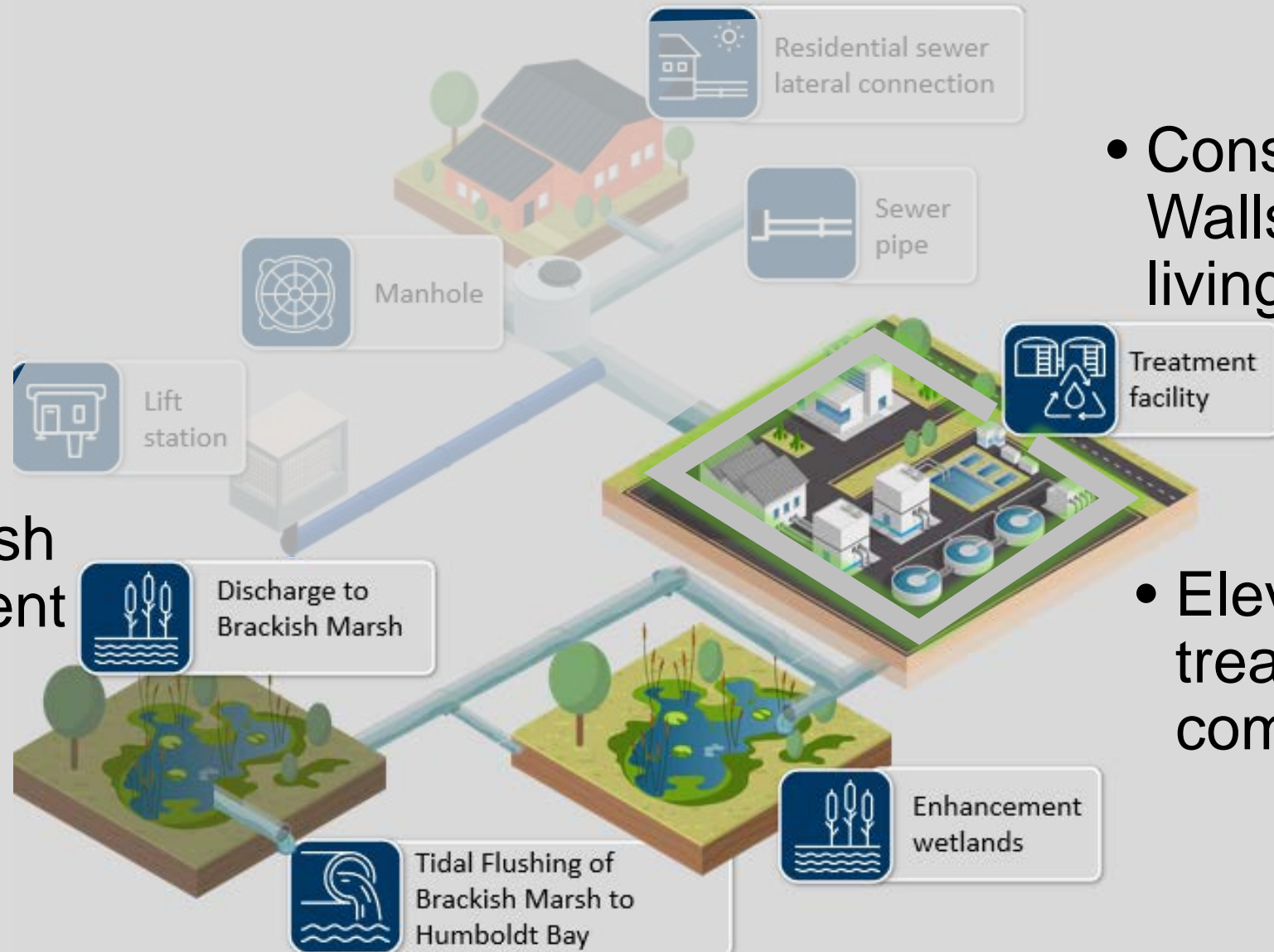


- Repair service laterals

- Replace/ Repair Sewer Pipes

Protect / Accommodate Treatment / Discharge Adaptation Strategies

- Modify Marsh Enhancement Wetlands



- Construction of Sea Walls/ Levees/ living shorelines
- Elevate critical treatment components

Retreat Adaptation Strategies

Collection System

- Reconfigure lift stations to pump to different areas of the City

Treatment

- New Wastewater Plant (Full/ Partial)

Effluent Disposal

- Ocean Discharge
- Land application/ Reuse
- New surface water discharge
- Groundwater injection

Collection/ Treatment/ Disposal

- Decentralized Treatment coupled with land application/ reuse

Retreat

Effluent Disposal: Ocean Outfall (Year Round)

Regional Examples of Ocean Outfalls

- Redwood Marine Terminal serving the Peninsula Community Services District, which includes Samoa and Fairhaven
- Mendocino City Community Services District
- Monterey One Regional Wastewater Treatment Plant



Ocean Discharge

- Examples: Monterey Regional Wastewater Treatment Plant. Serves Castroville, Del Rey Oaks, Marina, Monterey, Pacific Grove, Salinas, Sand City and Seaside
- Mendocino Community Services District



Retreat

Effluent Disposal: Surface Water (Year Round)

- Summertime Discharge
Prohibition: North Coast
Regional Water Quality Control
Board Basin Plan prohibits
discharge of effluent to the
Mad, Eel, and Russian Rivers
during the low flow period of
May 15th – September 30th
- City of Fortuna is pursuing an
Amendment to the Basin Plan
for a Lower Eel River Exception
to Seasonal Discharge
Prohibition



Retreat

Effluent Disposal: Land Application (Year Round)

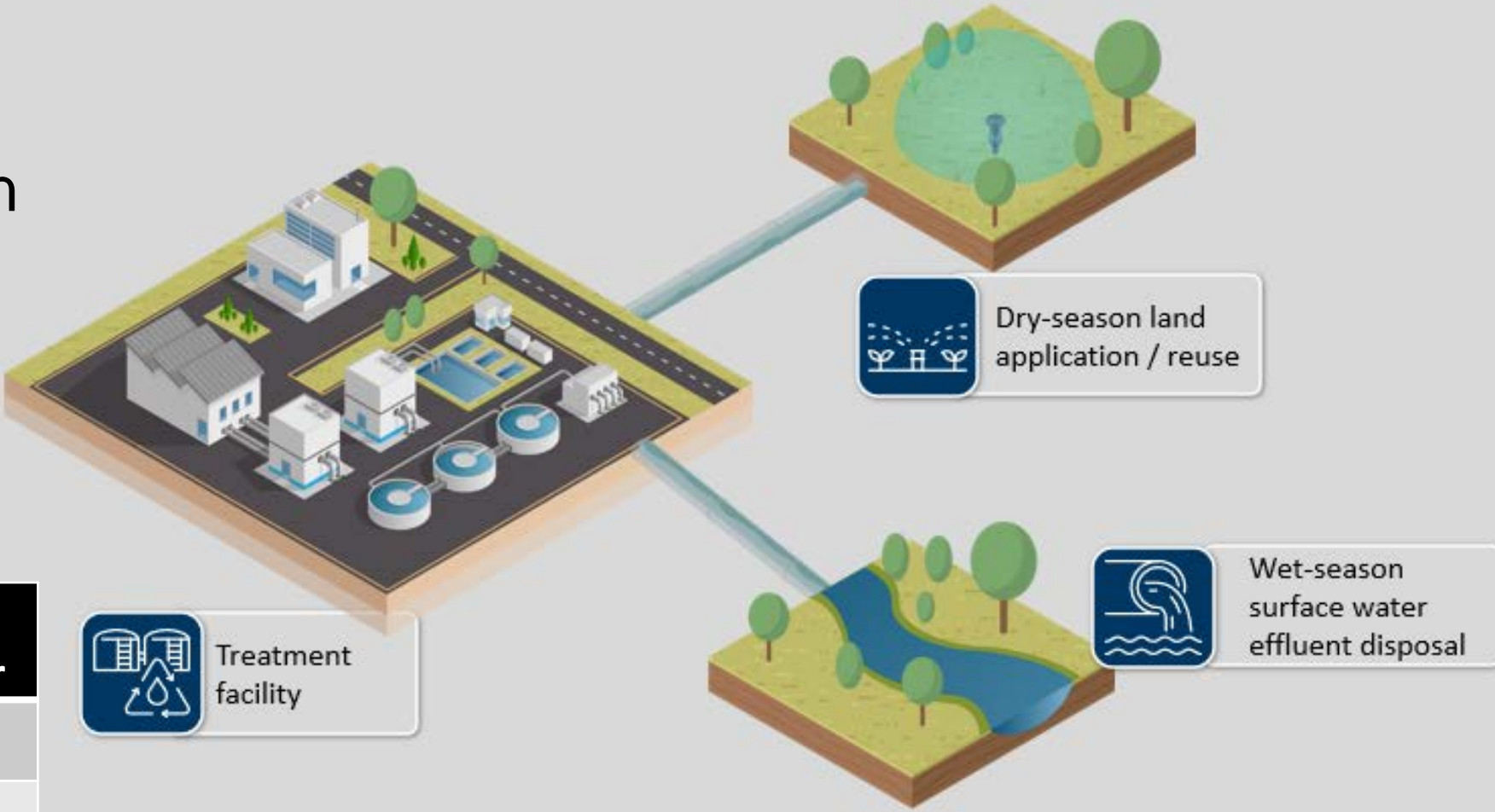


- No local municipalities rely solely on irrigation year-round
- Estimated area needed for full irrigation ~2,000 acres

Retreat

Effluent Disposal: Surface Discharge/ Land Application

- Estimated area needed for dry-season irrigation ~600 acres
- Similar systems used in McKinleyville and Rio Dell



Permitted flows	Dry Weather	Wet Weather
Arcata	2.3 MGD	5 MGD
Rio Dell	0.4 MGD	1.25 MGD
McK	1.37 MGD	3.1 MGD

***MGD = Million Gallons per Day**

Discharge Options: Land Application

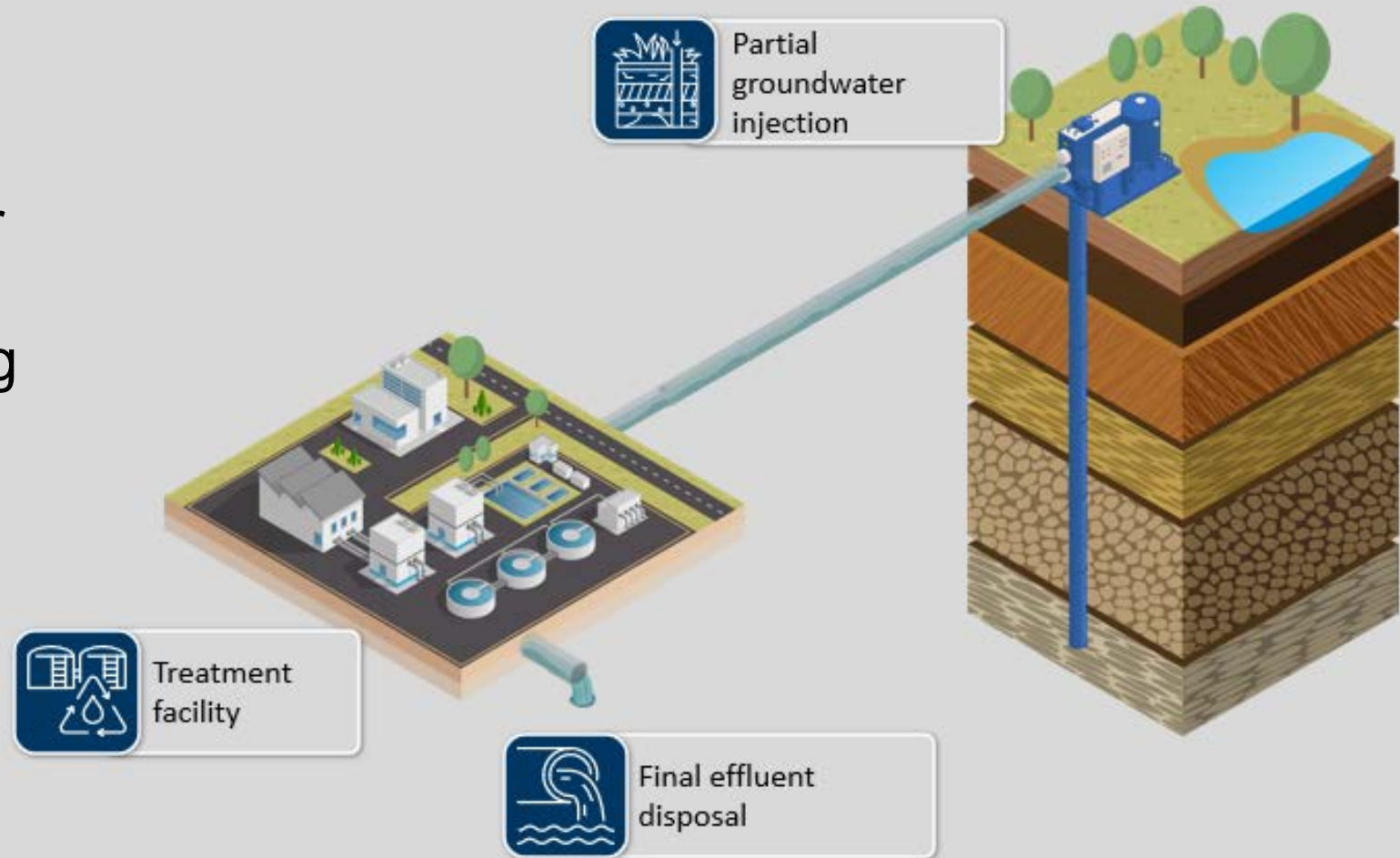
- Local Examples: McKinleyville and Rio Dell



Retreat

Effluent Disposal: Groundwater Injection Discharge

- Groundwater injection is used for:
 - Preventing saltwater intrusion into drinking water aquifers
 - Indirect recharge of drinking water aquifers
- Dept of Toxic Substance Control only allows injection if wastes cannot be disposed of in an alternative way



Indirect Potable Reuse

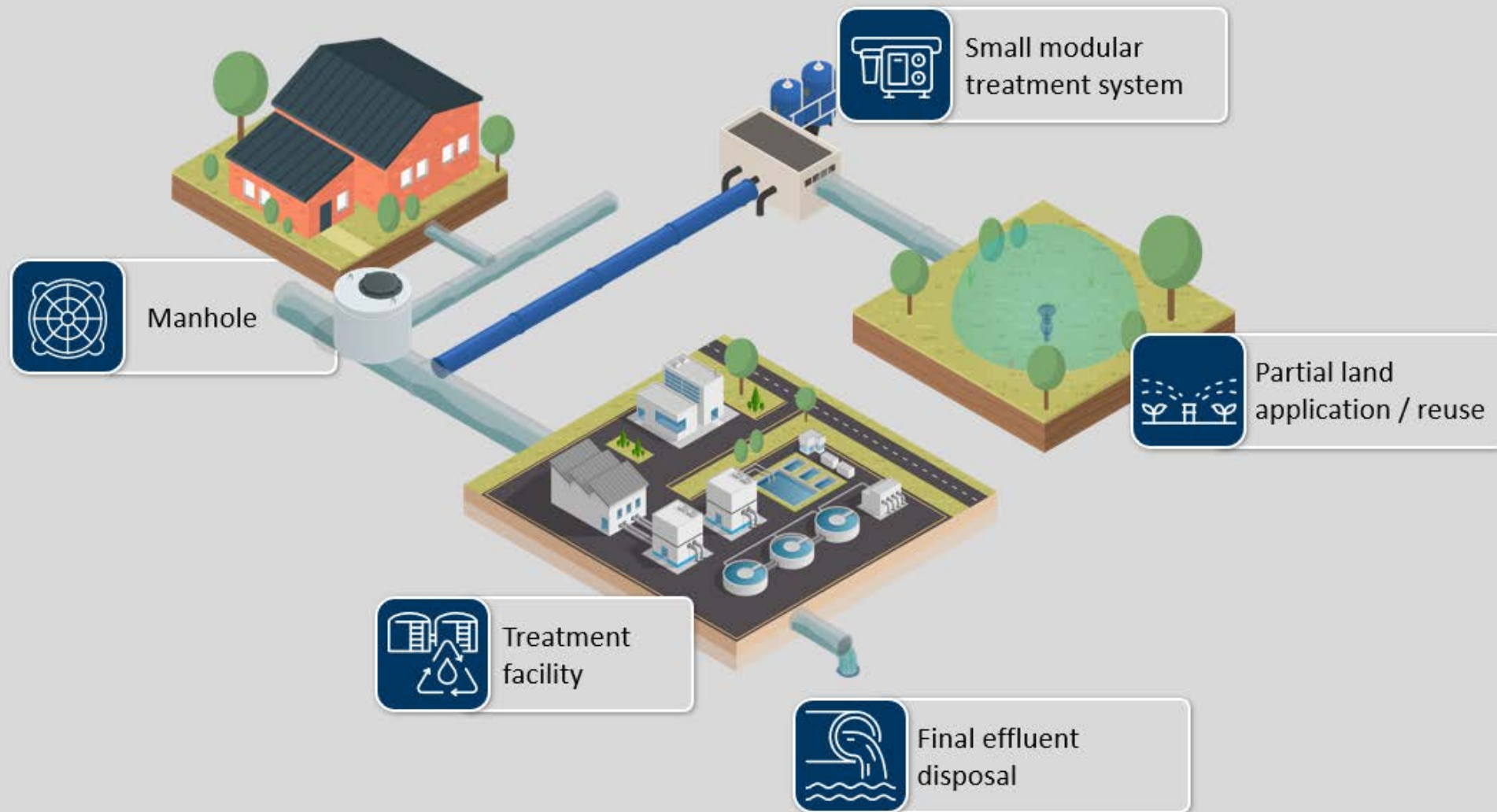


Direct Potable Reuse

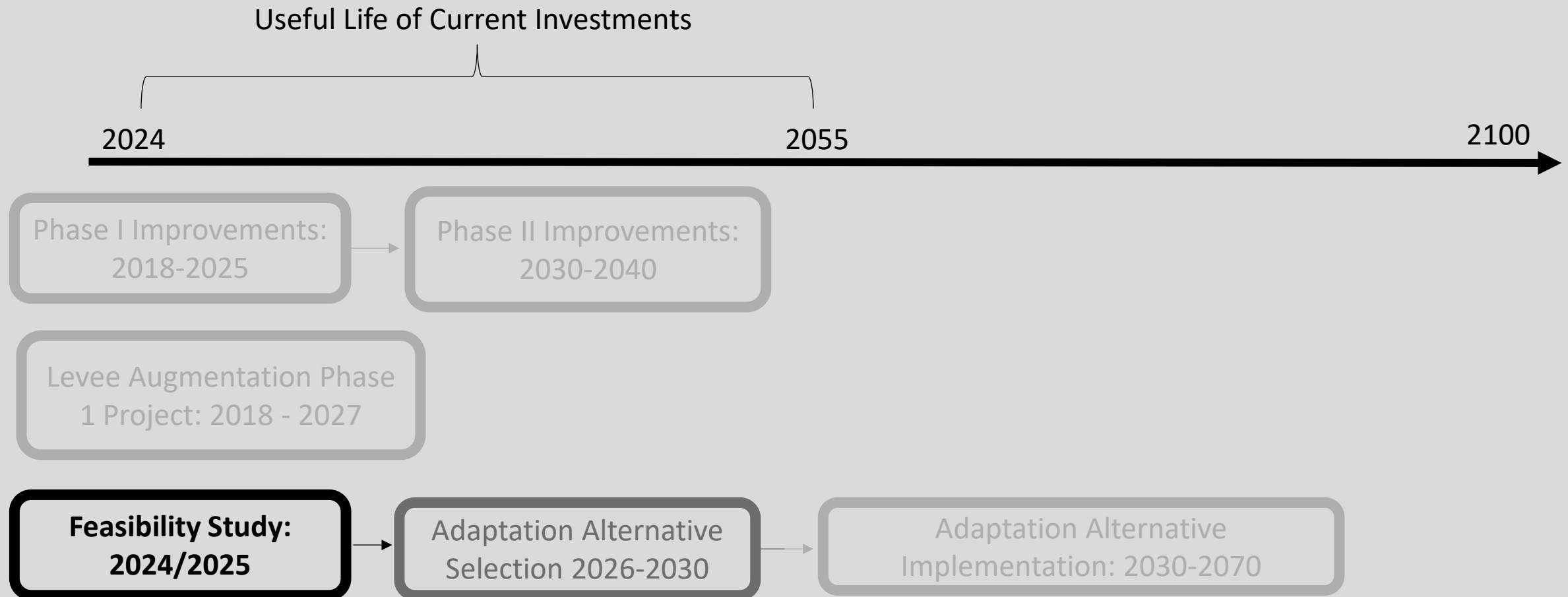


Retreat

Effluent Disposal: Decentralized Treatment



Arcata Wastewater Treatment Facility Improvement Timeline



Next: Community Input

Breakout Groups

- 3 stations (~10 minutes per station), all attendees invited to visit each station
 - Wastewater Discharge Options
 - Decision Making Criteria
 - Beneficial Reuse and Ancillary Benefits
- Goals: review information, ask questions, share your thoughts