

City of Alexandria and Alexandria Renew Enterprises

Combined Sewer System Permit and Long Term Control Plan Update

April 14, 2018



Presentation Outline

- 2017 CSO Law
- Stakeholder Process
- Technical Options and Performance
- Evaluation and Recommendation
- Stakeholder Feedback
- Rate Forecast and Outfall Transfer Initiative
- Next Steps

2017 CSO Law



2017 CSO Law

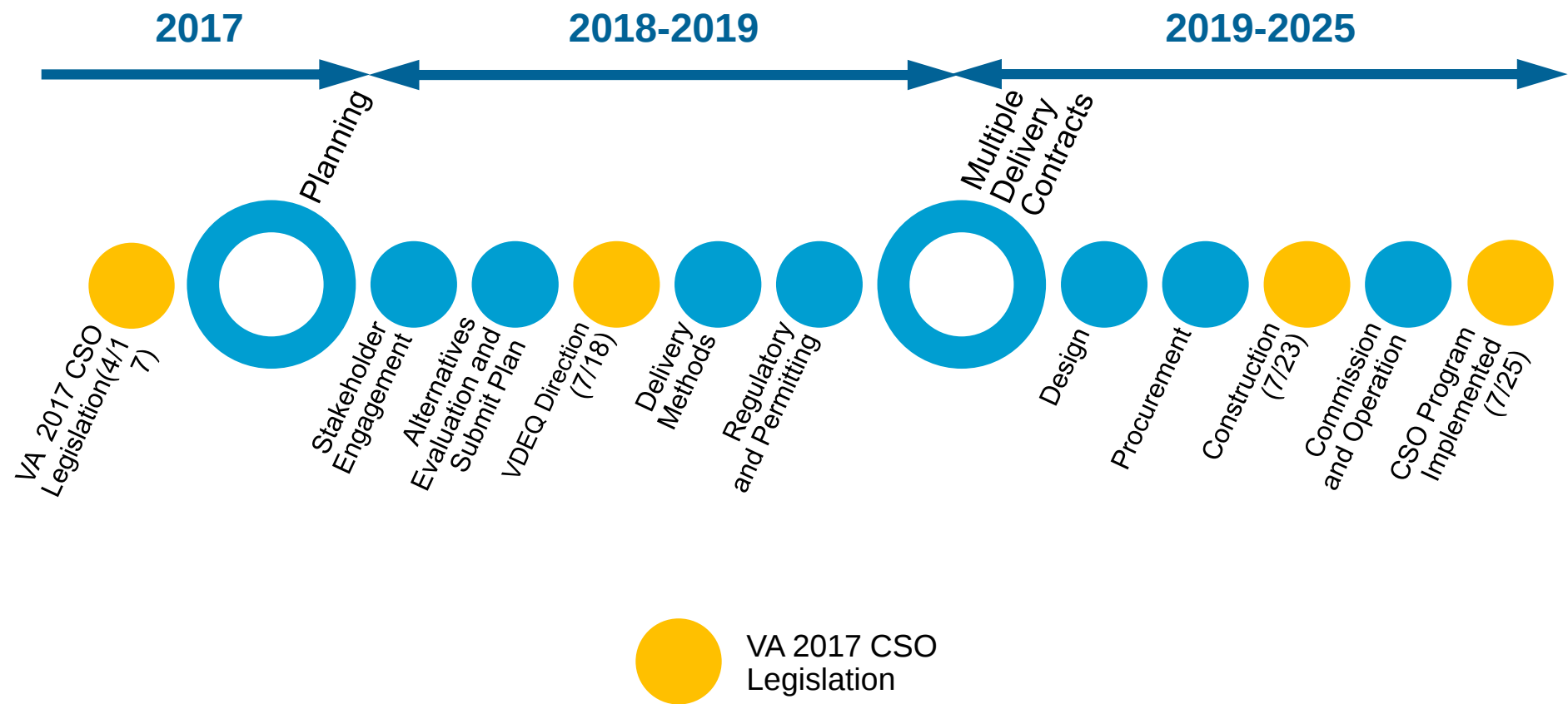
Presumption Approach Requirements per EPA CSO Policy

- Must meet any of the following criteria:
 1. 4-6 overflows per year
 2. 85% capture or elimination by volume
 3. Elimination or removal of no less than the mass of pollutants...for the volumes that would be eliminated or captured for treatment under Paragraph 2

Hunting Creek TMDL Compliance Requirements

- Hunting Creek TMDL assigns Waste Load Allocations to CSO's 002/3/4
- Requires significant reduction in Bacteria
 - CSO 002: 80%
 - CSO 003: 99%
 - CSO 004: 99%

2017 CSO Legislation requires addressing all CSO outfalls by 2025, with interim milestones established



Performance Requirements

CSO 001

Presumption Approach per
CSO Policy (<4-6 overflows)

CSO's 003 and 004

99% Reduction in Bacteria
Load (TMDL)

CSO 002

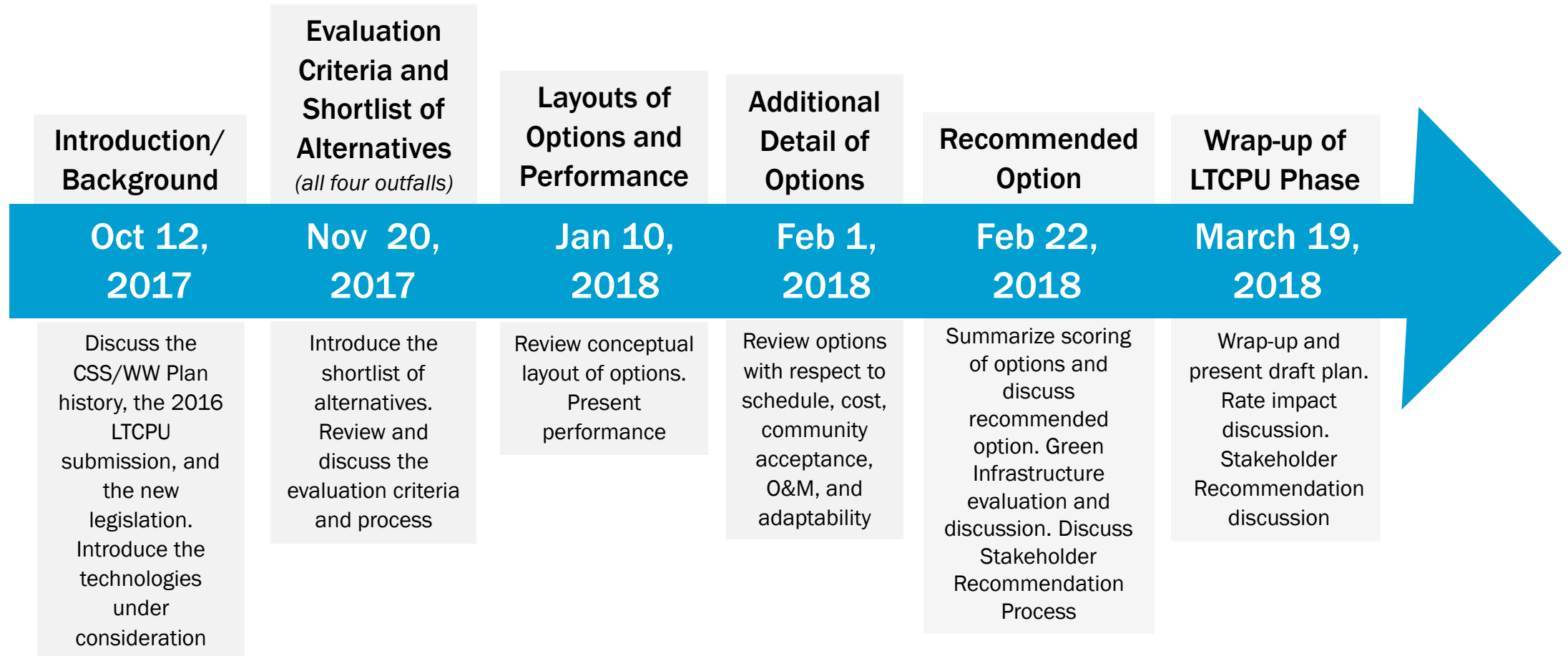
80% Reduction in Bacteria
Load (TMDL)



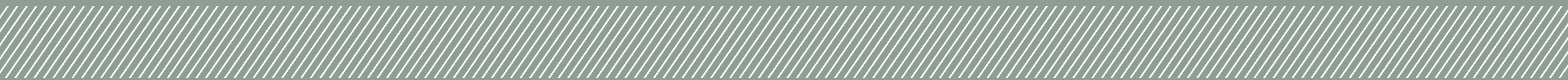
Stakeholder Process



Current CSS Stakeholder Process Timeline



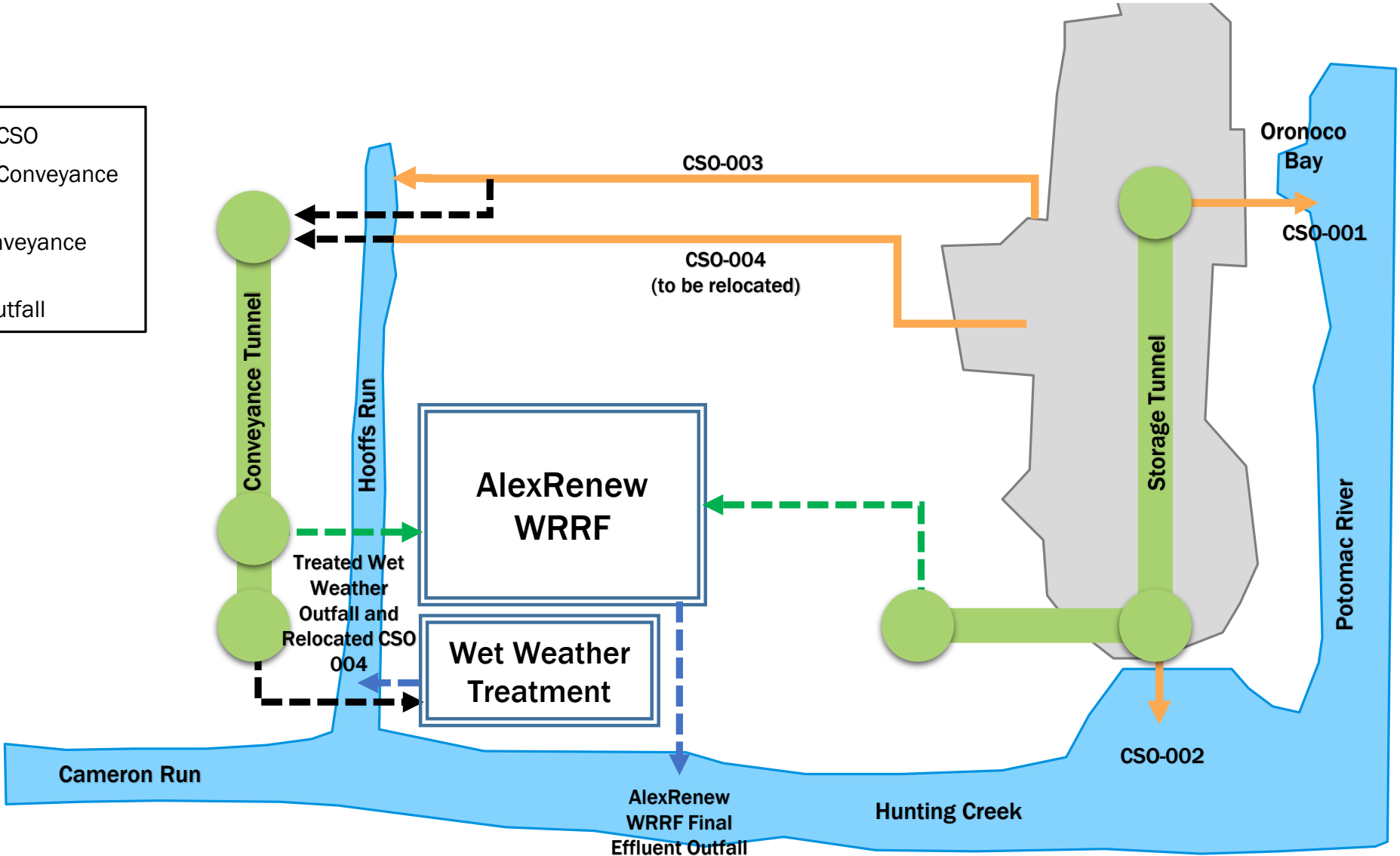
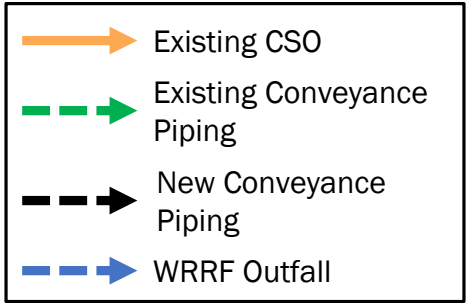
Technical Options - Performance and Recommendation



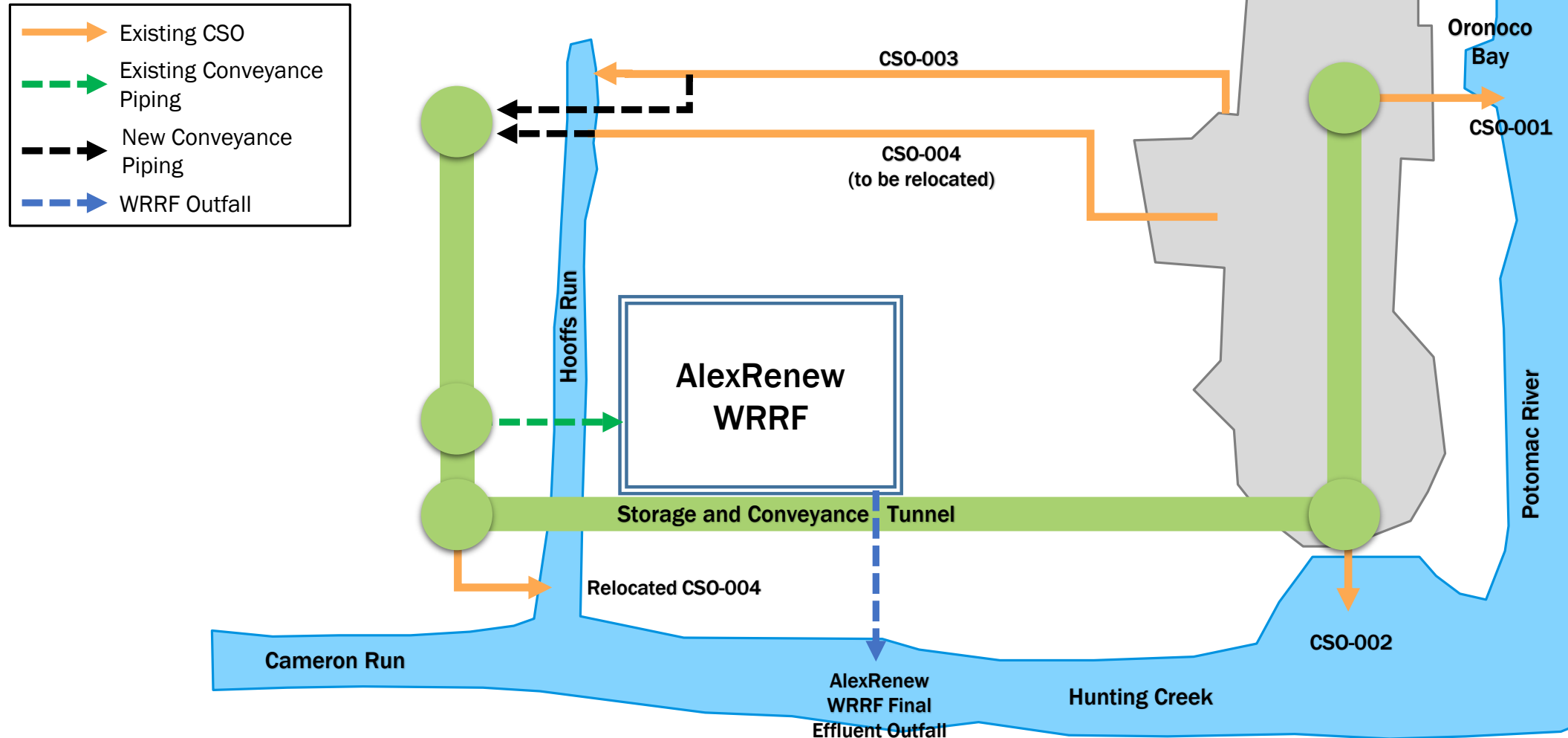
CSO Control Options (short list)

Option	CSO Control Strategy
A	Separate Tunnels for CSOs 003/004 and CSOs 001/002 with new Wet Weather Treatment Facility at AlexRenew for CSOs 003/004 Only
B	Unified Tunnel Connected by Pumping from CSO 003/004 Tunnel to CSO 001/002 Tunnel
B+ (Developed in response to stakeholder requests)	Unified Tunnel Connected by Pumping from CSO 003/004 Tunnel to CSO 001/002 Tunnel plus wet weather treatment through dual facilities
C	Separate Tunnel with new Wet Weather Treatment Facility for CSOs 003/004 and Separate Storage Tanks for CSOs 001 and 002

Option A: Separate Tunnels with Wet Weather Treatment

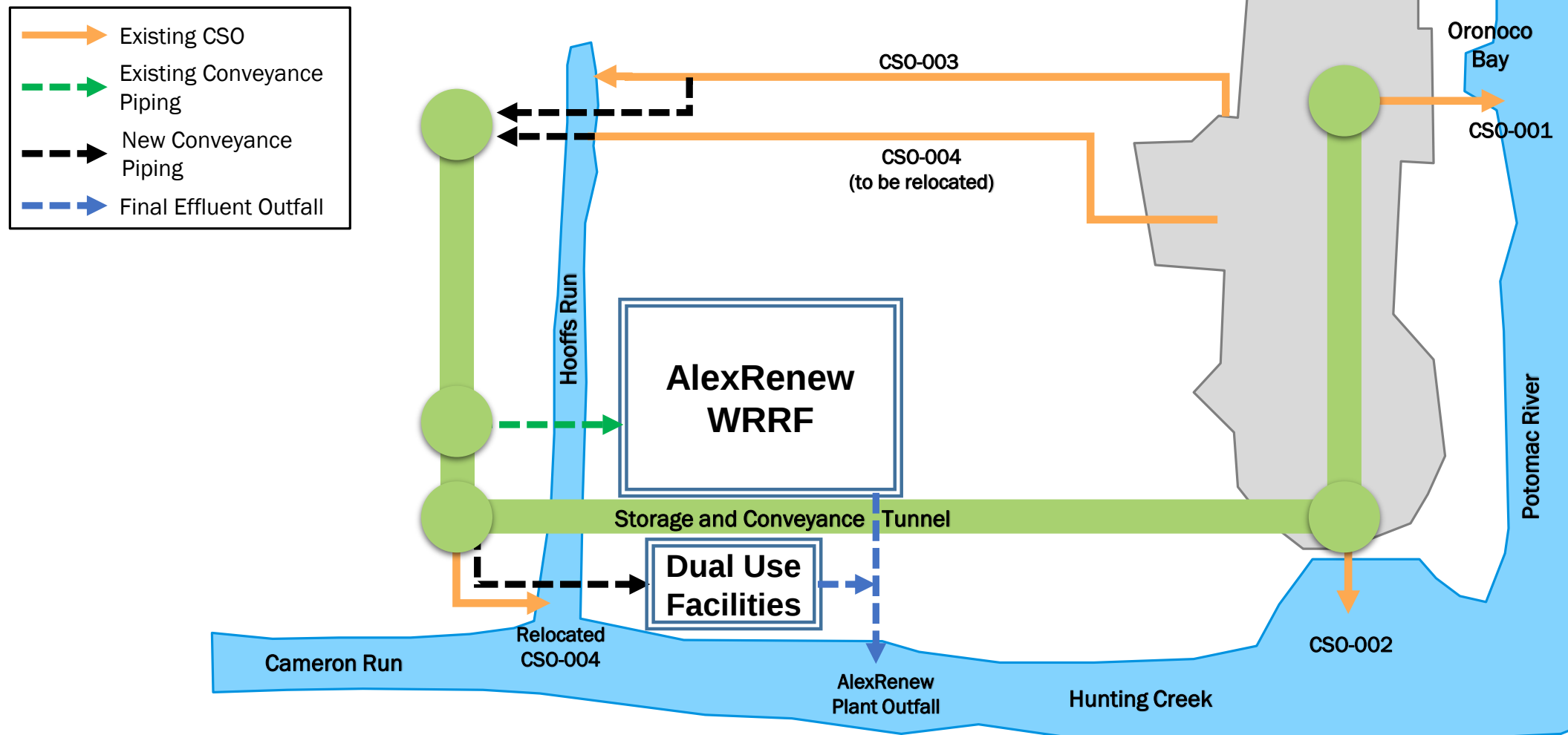


Option B: Unified Tunnel

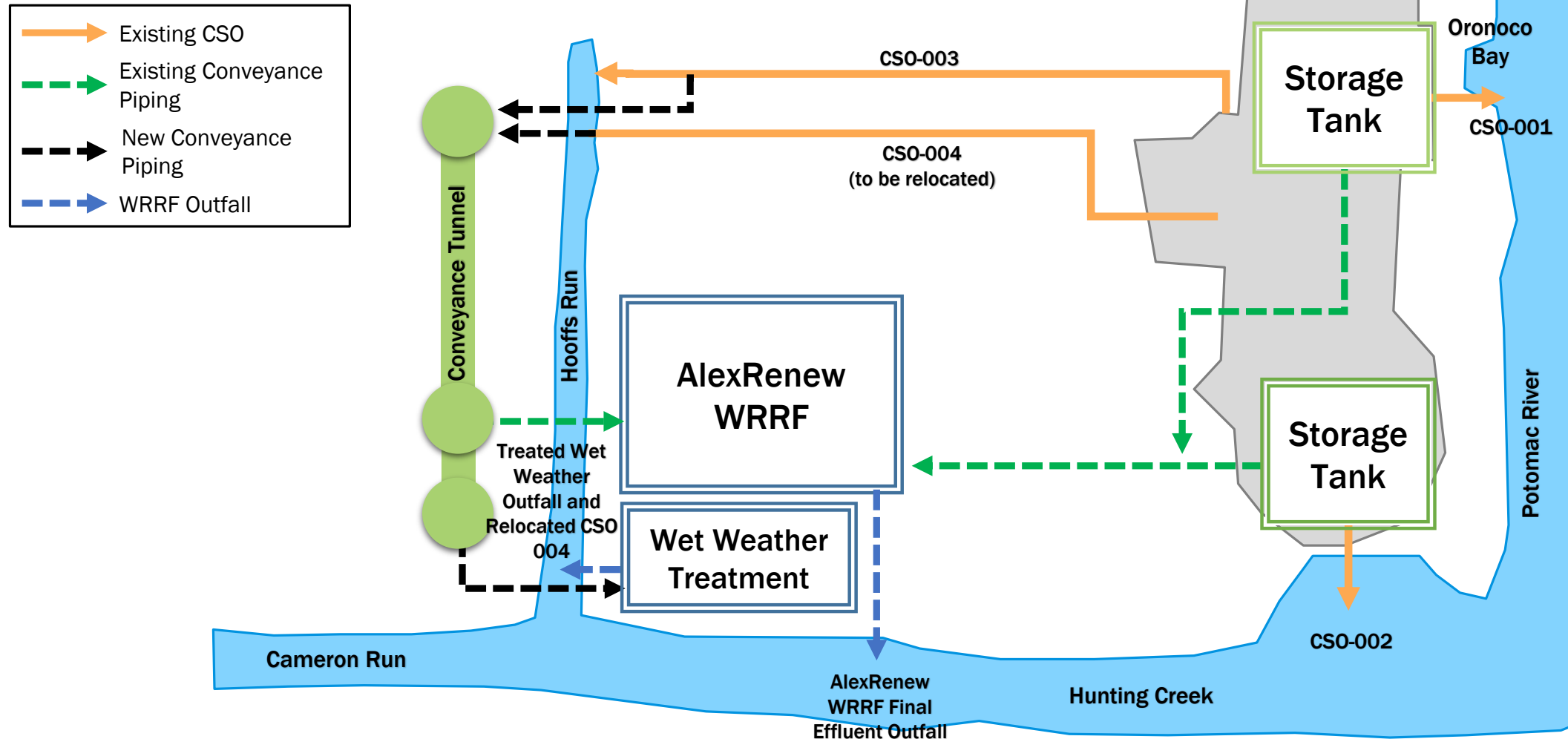


Option B+

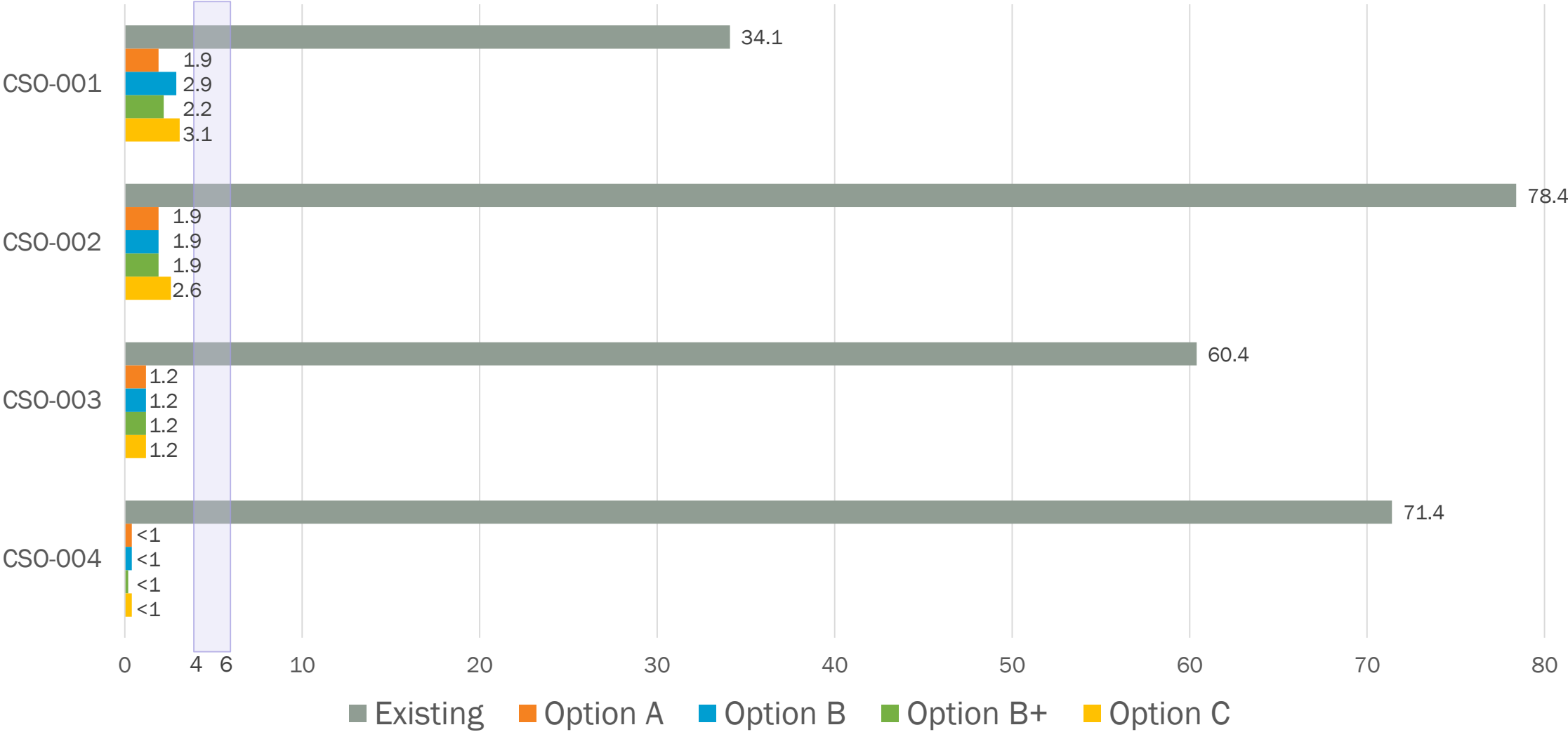
Unified Storage Tunnel with Dual Use Facilities



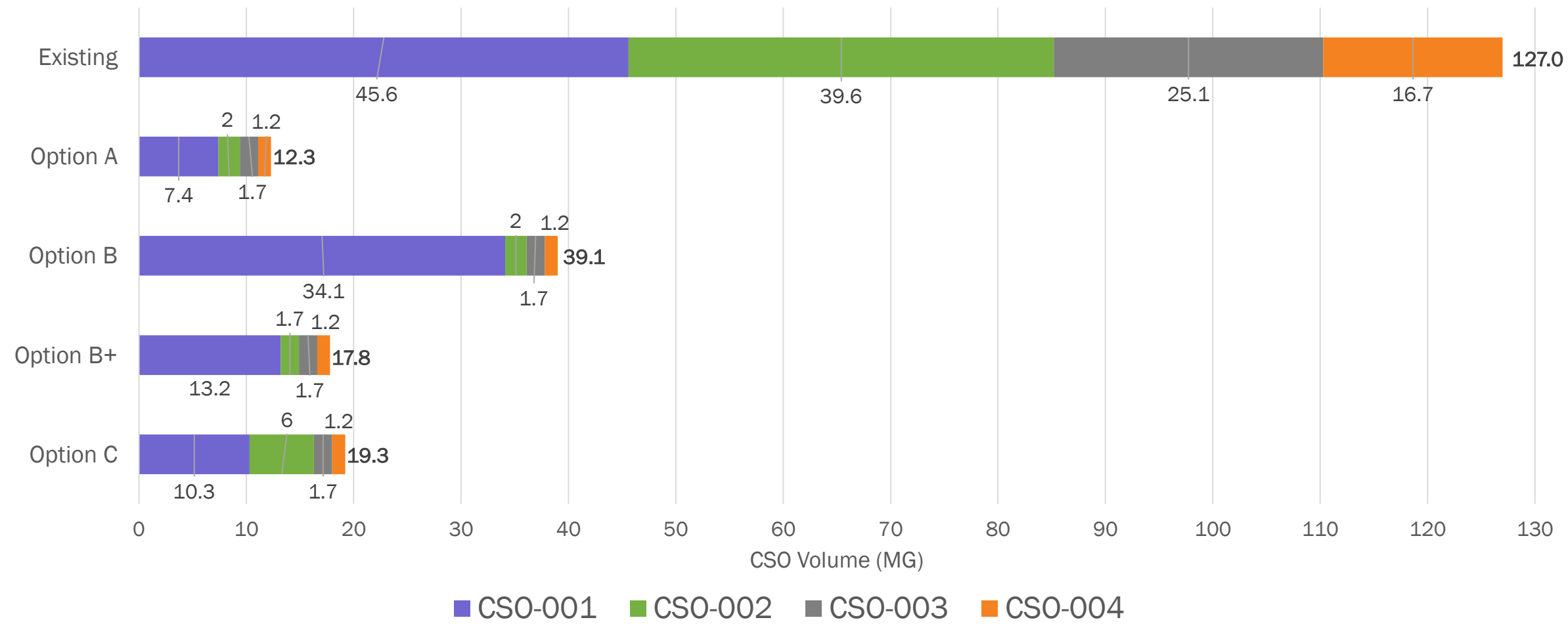
Option C: Tunnel and Tanks with Wet Weather Treatment



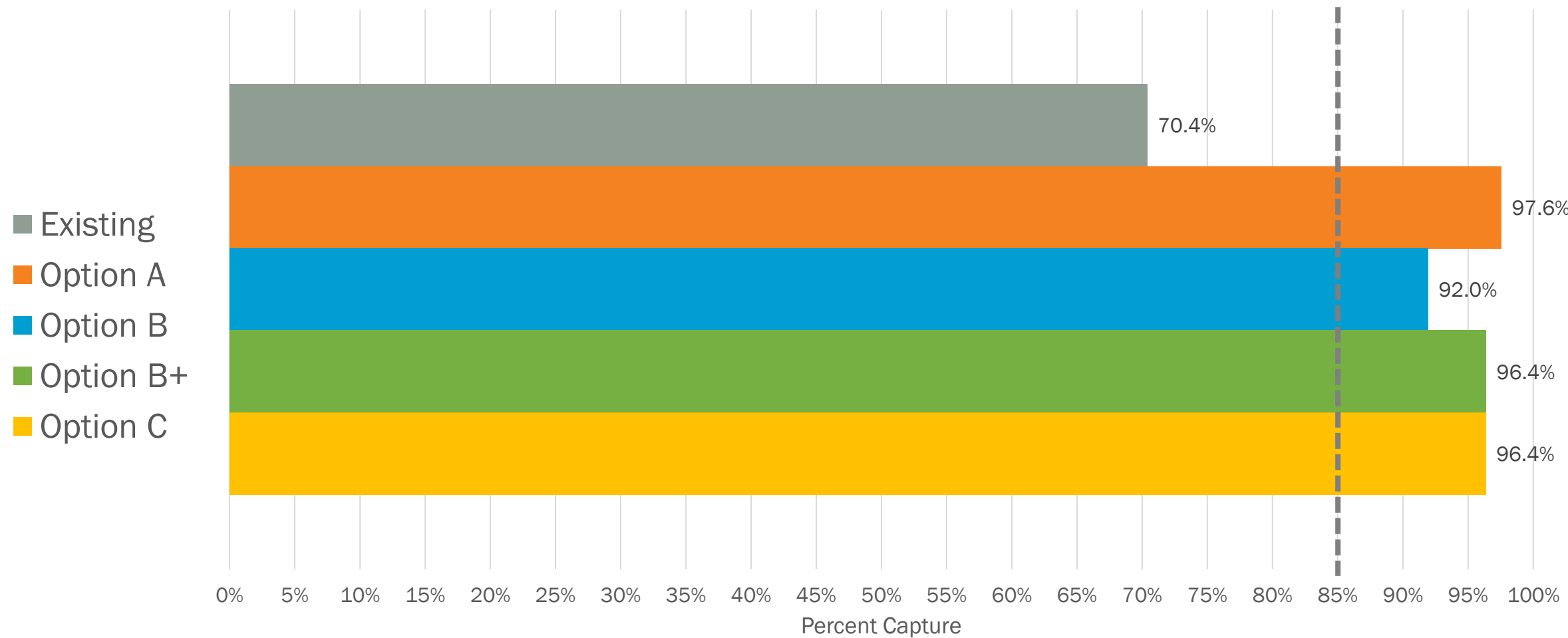
Performance: Average Number of Overflows 2000-2016



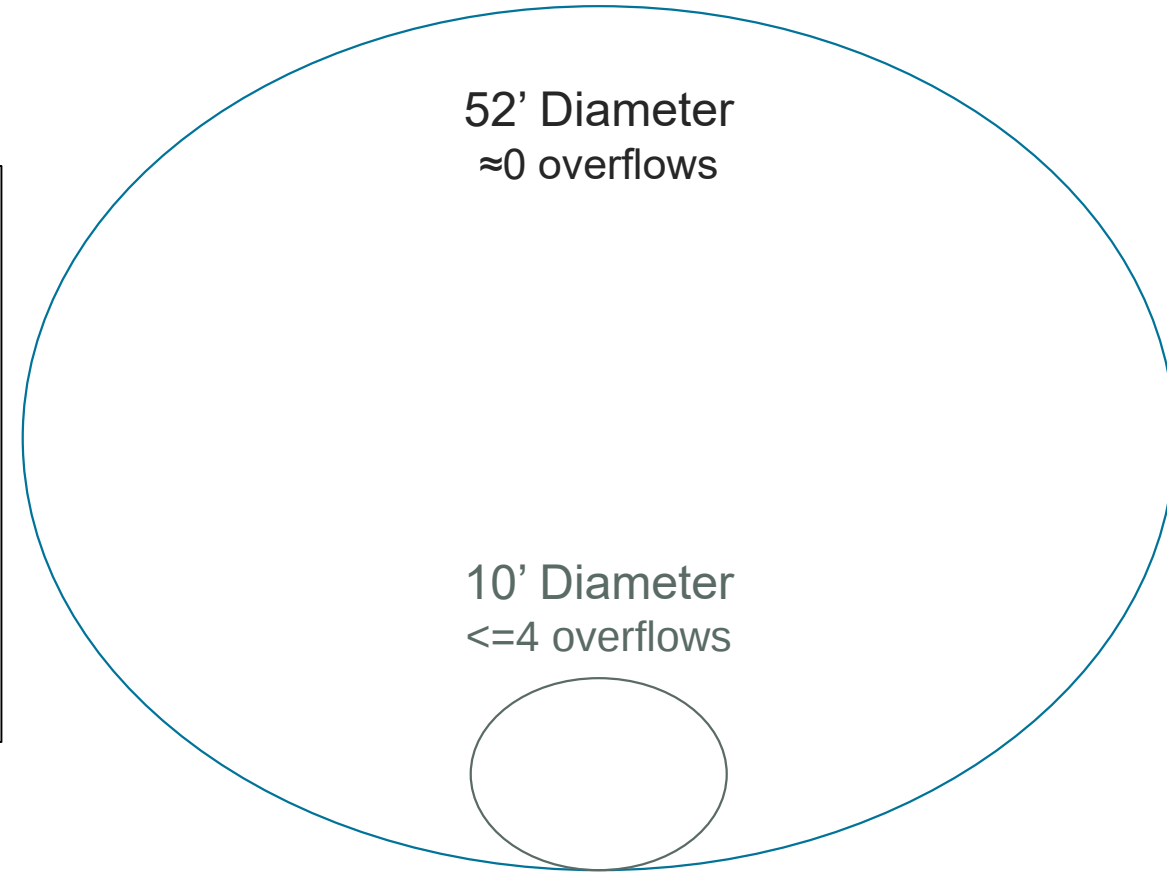
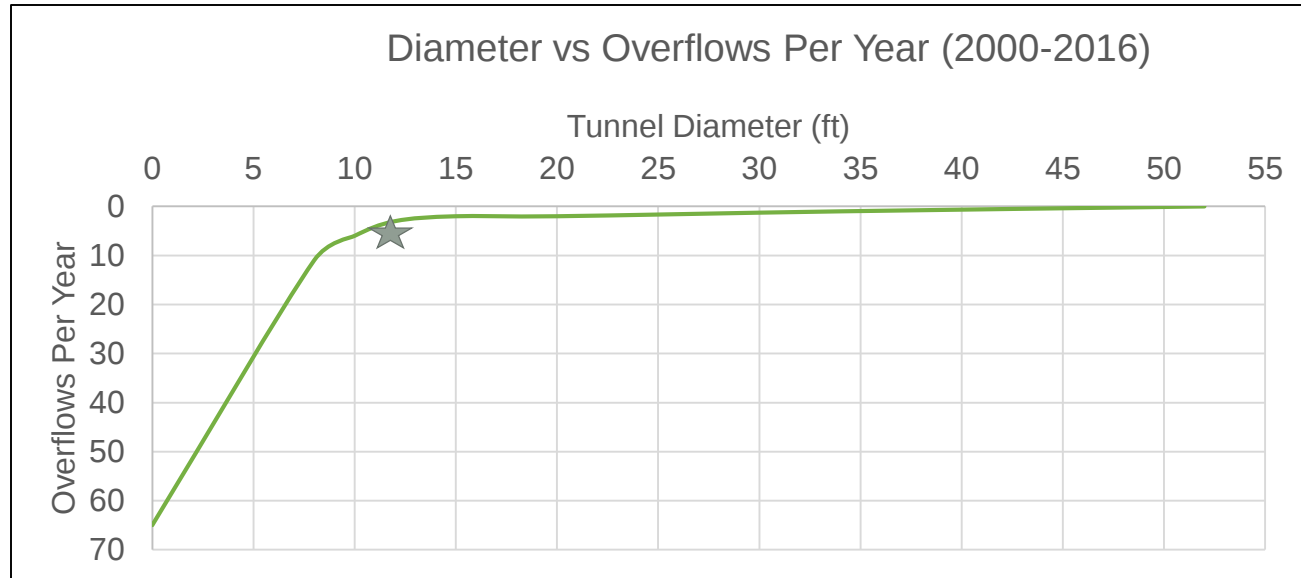
Performance: Average Volume of Overflows 2000-2016



Performance: Average Percent Capture 2000-2016



Why Not Zero?



- Section II.C.5 of the EPA CSO Control Policy recommends performing this type of knee of the curve analysis to help determine CSO controls.

Capital Cost Estimates

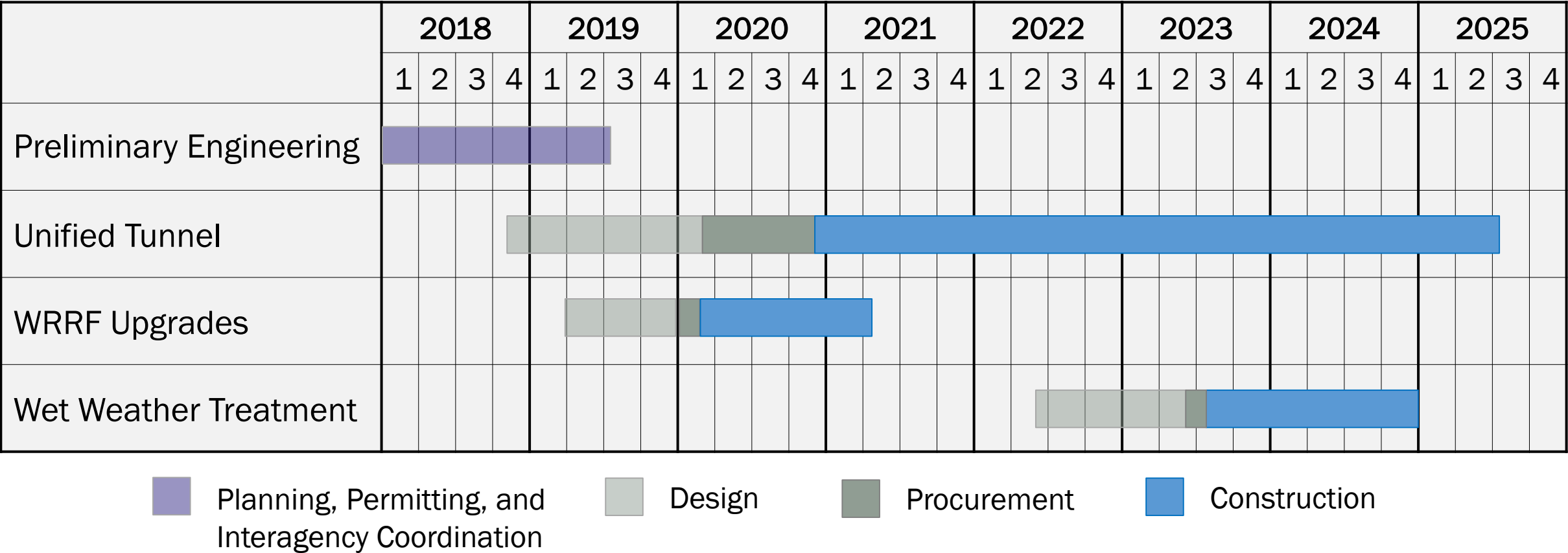
Cost \$ Millions

(escalated to the midpoint of construction)

	Option A Separate Tunnels	Option B Unified Tunnels	Option B+ Unified Tunnels	Option C Tunnel and Tanks
WRRF Upgrades	2.7	2.7	2.7	2.7
CSO 003/4 Tunnel + Pumps	130	130	130	130
Wet Weather Facility	92	–	10	92
CSO 001/2 Tunnel	200	213	213	–
CSO 001/2 Tanks	–	–	–	147
TOTAL ESTIMATES	424	346	356	371
+50% TOTAL ESTIMATES	635	520	535	560

Long Term Control Plan Implementation Schedule

- AlexRenew will lead the implementation of the LTPCU, with support from the City



Option B+ is the recommended option for Long Term Control Plan implementation

Life Cycle Costs	• Has the second lowest estimated capital and life cycle costs
O&M Complexity	• Is the simplest to maintain due to centralized location of facilities and no wet weather treatment
Adaptability	• Provides the most adaptability due to connectivity with WRRF and unified system
Schedule Risk	• Meets the legislative milestone based on current planning
Community Impact • During Construction • Post Construction	• Has fewer short and long-term impacts • Minimal short-term impact over larger area • Low long-term impact: Most mechanical equipment located at WRRF

Stakeholder Feedback



Stakeholder Recommendation

The Stakeholder Group recommends, Option B+ – Unified Tunnel with dual use facility (wet weather treatment), as the combined sewer system control strategy to accomplish the City's goals and permit requirements

- Meets the regulatory requirements
- Lowest cost option
- Minimizes impact to the community
- Most adaptable solution
- Preserves space at AlexRenew

The overall schedule and costs presented are a reasonable balance of cost and complying with the legislative mandate

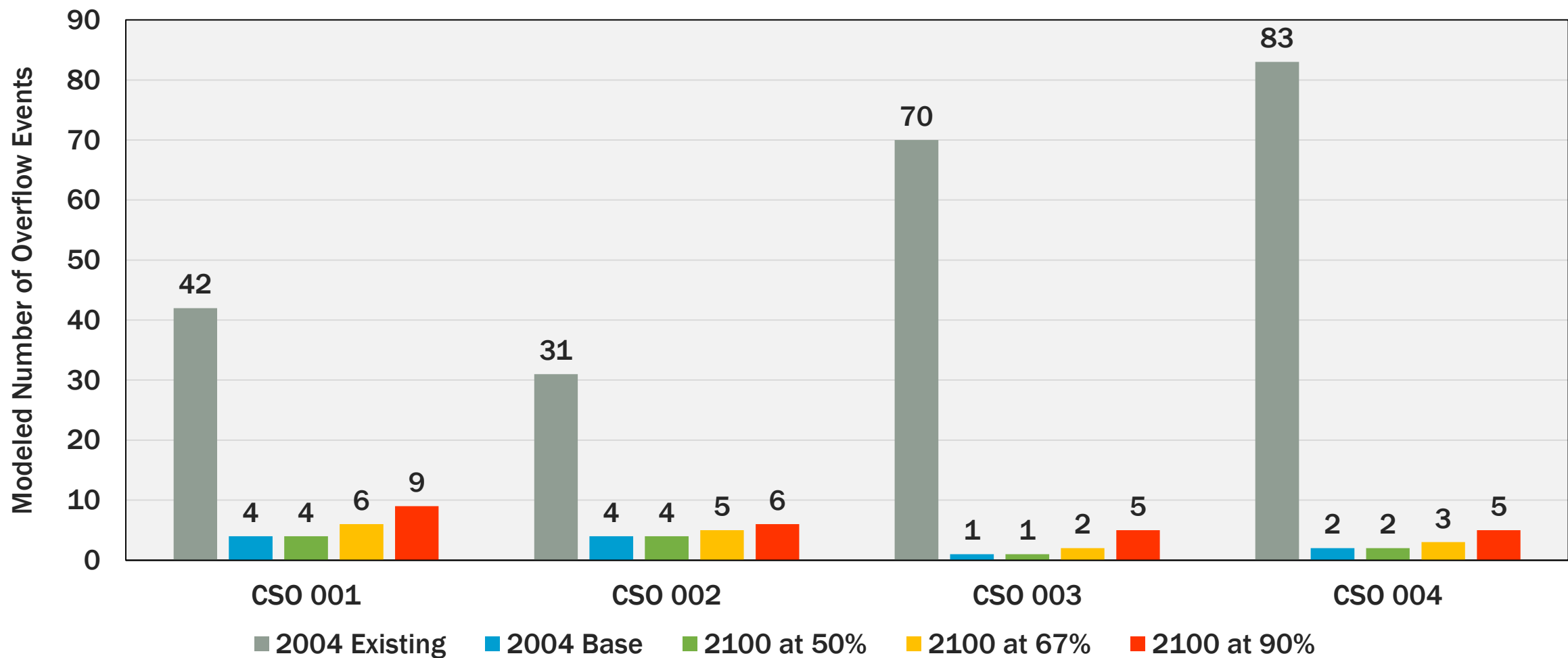
Stakeholder Group Feedback

Stakeholder Group:

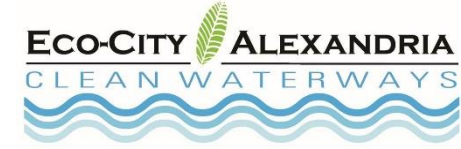
- Unanimously supports Option B+ as recommended option for LTCPU implementation
- Supports the implementation of green infrastructure
- Challenged team to review impacts of future climate change
- Asked team to review extension of CSO 001 out of Oronoco Bay
- Suggested to consider rate impacts on low-and fixed-income residents
- Suggested to consider impact on historic structures/areas

Option B performs well under future predicted climate conditions

Note: Analysis performed for Option B only. It is anticipated that Option B+ would perform as well or better than Option B under future climate conditions



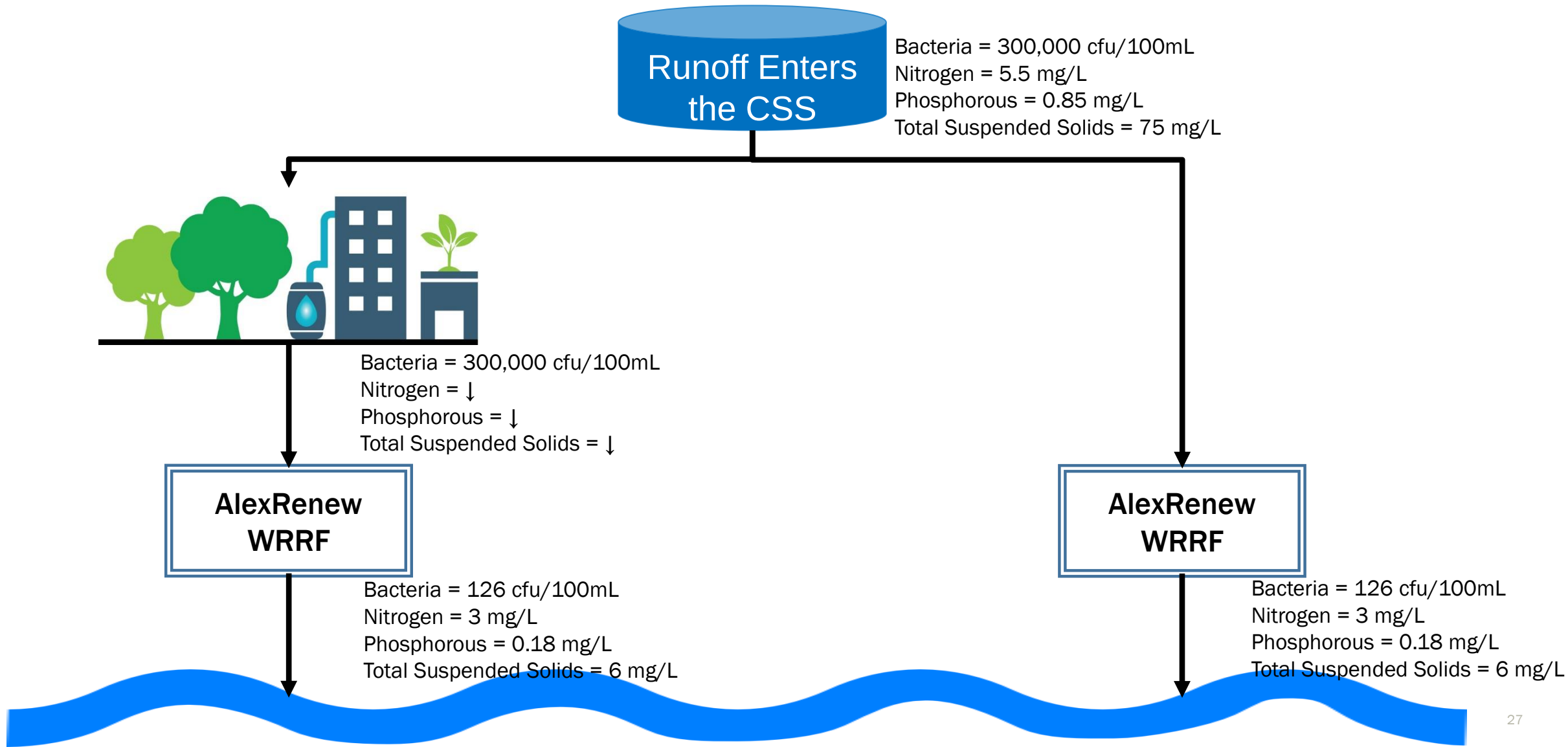
Implementing green infrastructure will not reduce the sizing of traditional infrastructure required



- Analyzed green infrastructure at various implementation rates per other national programs
- Assumed implementation cost of \$0.8M per acre
- Calculated potential volume managed by green infrastructure
- Estimated reduction of CSO 001/2 storage volume and associated tunnel diameter
- Developed overall program cost including green infrastructure

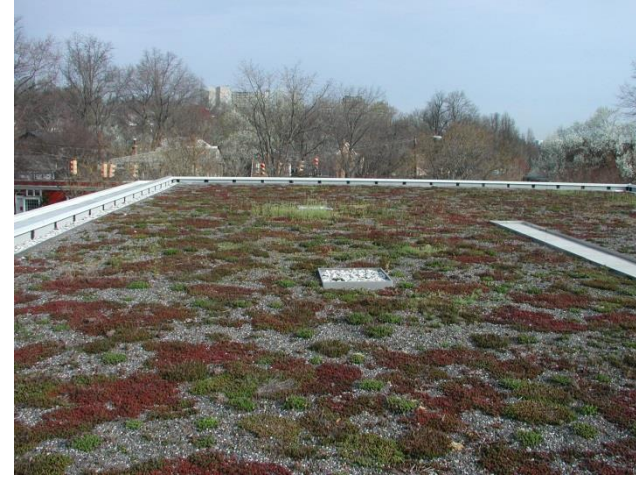
	% Implementation of GI in CSS			
	0%	3%	8%	34%
Volume managed by gray (MG)	7.5	7.4	7.1	5.8
Estimated cost for green (Millions)	\$0	\$8	\$25	\$106
Estimated cost for gray (Millions)	\$200	\$200	\$200	\$197
Total Estimated Program Cost (Millions)	\$200	\$208	\$225	\$303

Green Infrastructure in the Combined Sewer System



The City of Alexandria is committed to green infrastructure implementation city-wide

- City 10-year CIP commits ~\$50M for stormwater treatment
- GI identified as major stormwater treatment strategy
- Continue to encourage and promote GI in development and redevelopment
- Implement GI in a city-wide approach
- Co-benefits of GI with a city-wide approach

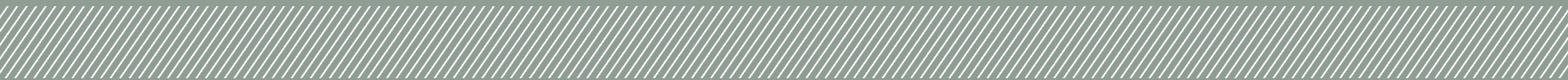


Green Roof, Duncan Library

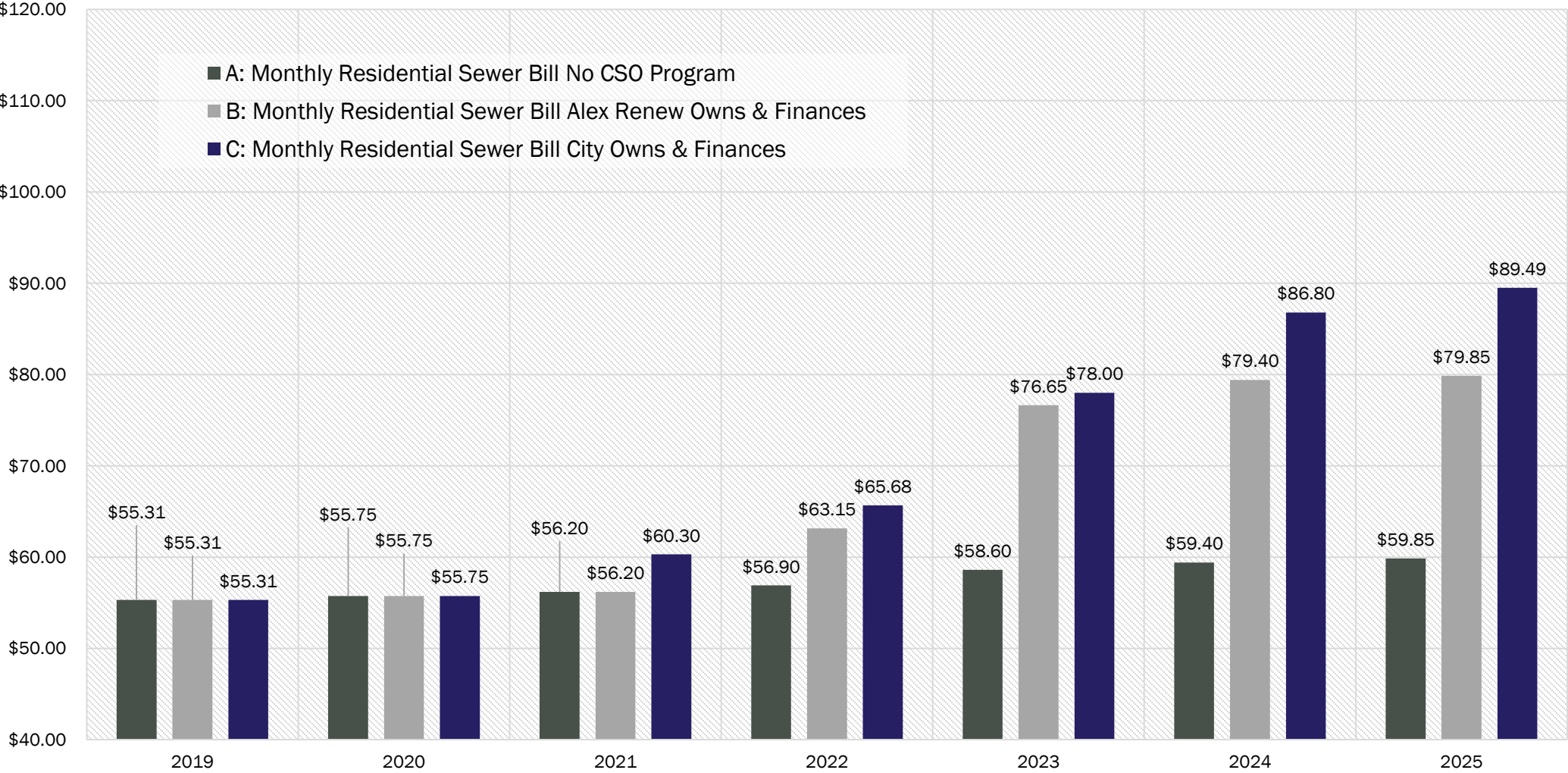


Permeable Pavers and Bioretention Cell, 4MR Park

Rate Forecast and Outfall Transfer Initiative



Option B + Inflation Monthly Residential Bill at 5kgal



Outfall Transfer Initiative

Partnering means leveraging our mutual experience and abilities

Implementation Advantages

- Efficiencies of single entity owning the Program
- AlexRenew has significant experience in implementing large-scale Programs
- Can leverage planned WRRF projects assist in meeting deadline
- Tunnels connect to WRRF
- Simplified permitting

Operational Advantages

- Integration of operations and maintenance under single entity
- AlexRenew has expertise in treatment technology and innovation



Next Steps



Long Term Control Plan Update Timeline

- **Tuesday, April 17** AlexRenew Board Meeting
- **Monday, April 23** LTCPU Public Comment Period Ends
- **Tuesday, April 24** City Council Legislative Meeting

What happens next?

- LTCPU Submission to DEQ
- Transfer of assets – City/AlexRenew partnership
- Continued Community Engagement going forward
 - Preliminary engineering
 - Permitting and land use approvals
 - Design
 - Construction

Questions/Comments

