



# Reclaimed Water in Alexandria

Context, Drivers, and Future

March 10, 2023

# Overview

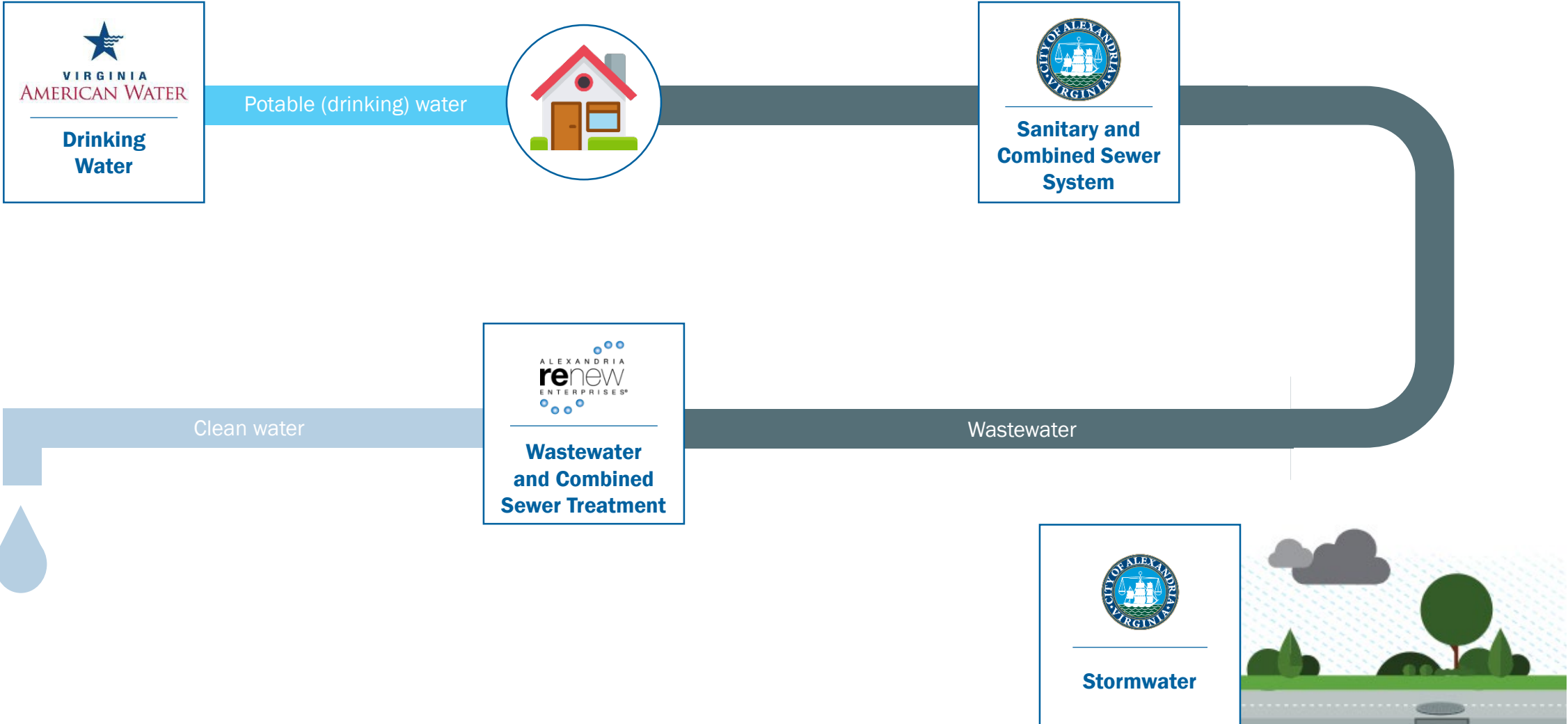
- **Who is AlexRenew?**
- **Drivers for Reclaimed Water in Alexandria**
- **AlexRenew's Reclaimed Water System**
- **Challenges and Future of Reclaimed Water at AlexRenew**



# AlexRenew

- Purifies 13 billion gallons of wastewater at its Water Resource Recovery Facility each year
- Serves over 300,000 customers in Alexandria and Fairfax County
- Independent political subdivision
- Invests over \$50M annually to protect waterways and the Chesapeake Bay
- Governed by a 5-member citizen Board

# How Water Works in Alexandria



# Reclaimed Water Drivers

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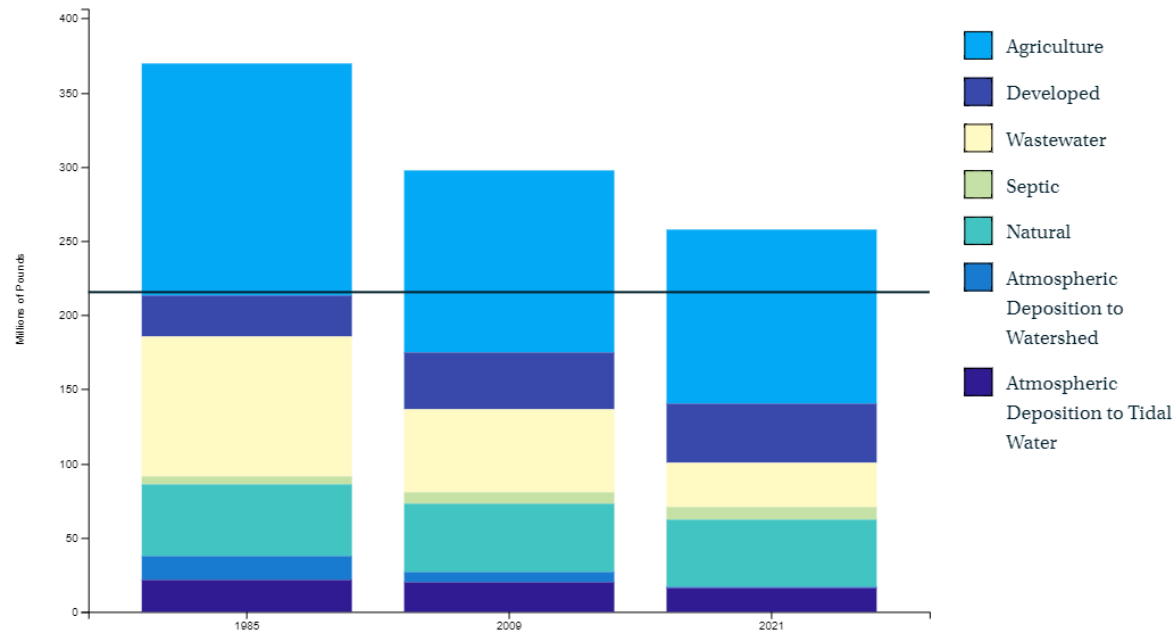
# Wastewater Treatment Plants Have Made the Greatest Progress Meeting Nutrient Reduction Goals

## Modeled Nitrogen Loads to the Chesapeake Bay (1985-2021)

Loads simulated using CAST19 and jurisdiction-reported data on wastewater discharges. \*The natural sector includes, in part, forests and wetlands which are preferable land use types with the lowest loading rates among sources.

[VIEW CHART](#) [VIEW TABLE](#)

**Loads by Source** **Loads by Jurisdiction**



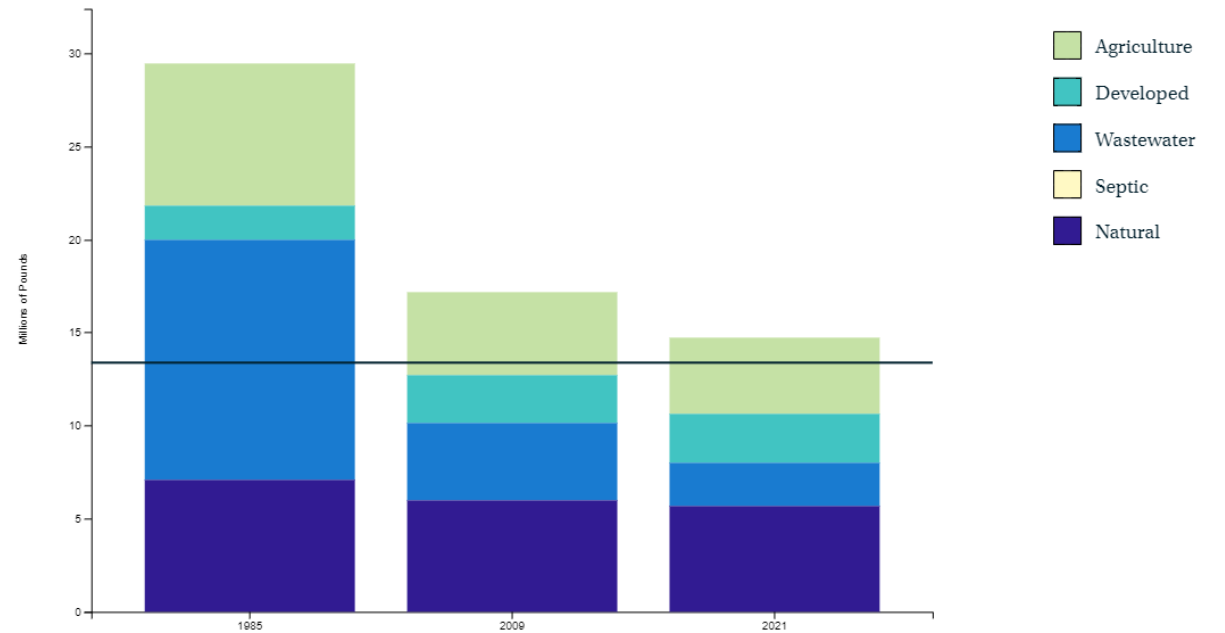
Source: Chesapeake Progress

## Modeled Phosphorus Loads to the Chesapeake Bay (1985-2021)

Loads simulated using CAST19 and jurisdiction-reported data on wastewater discharges. \*The natural sector includes, in part, forests and wetlands which are preferable land use types with the lowest loading rates among sources.

[VIEW CHART](#) [VIEW TABLE](#)

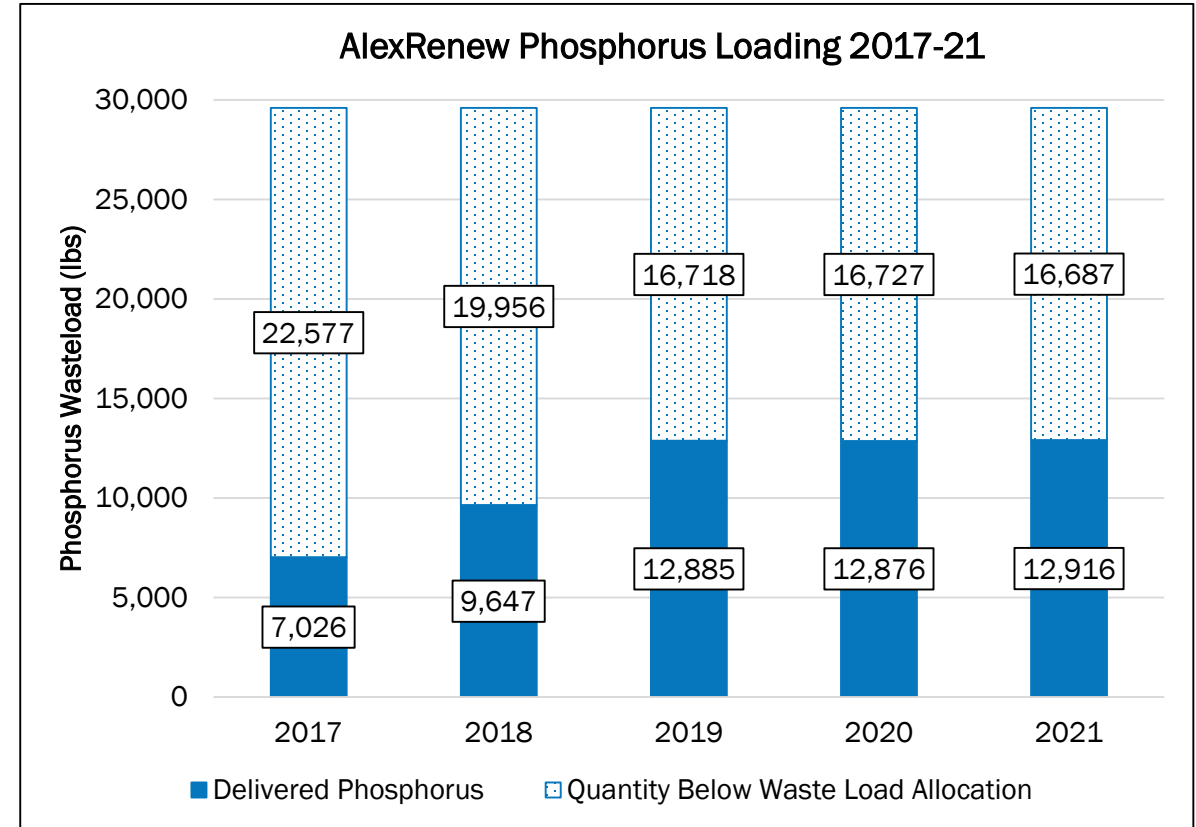
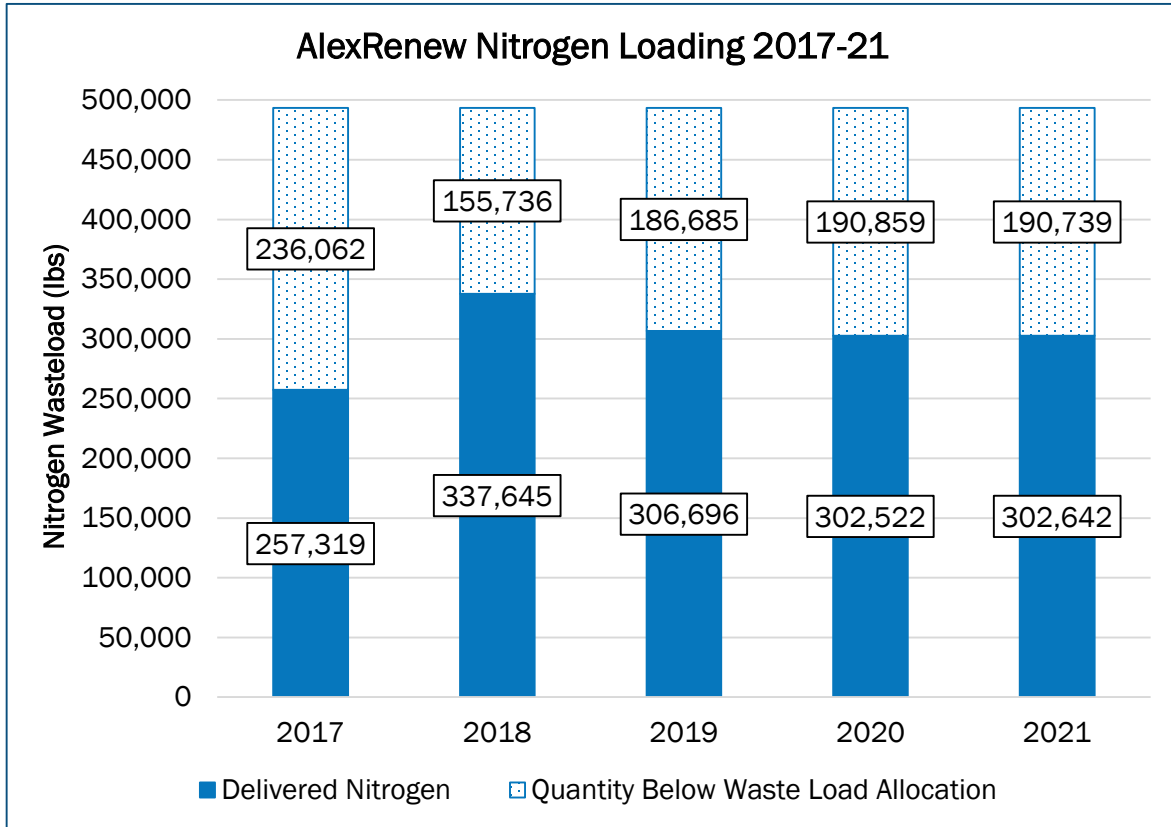
**Loads by Source** **Loads by Jurisdiction**



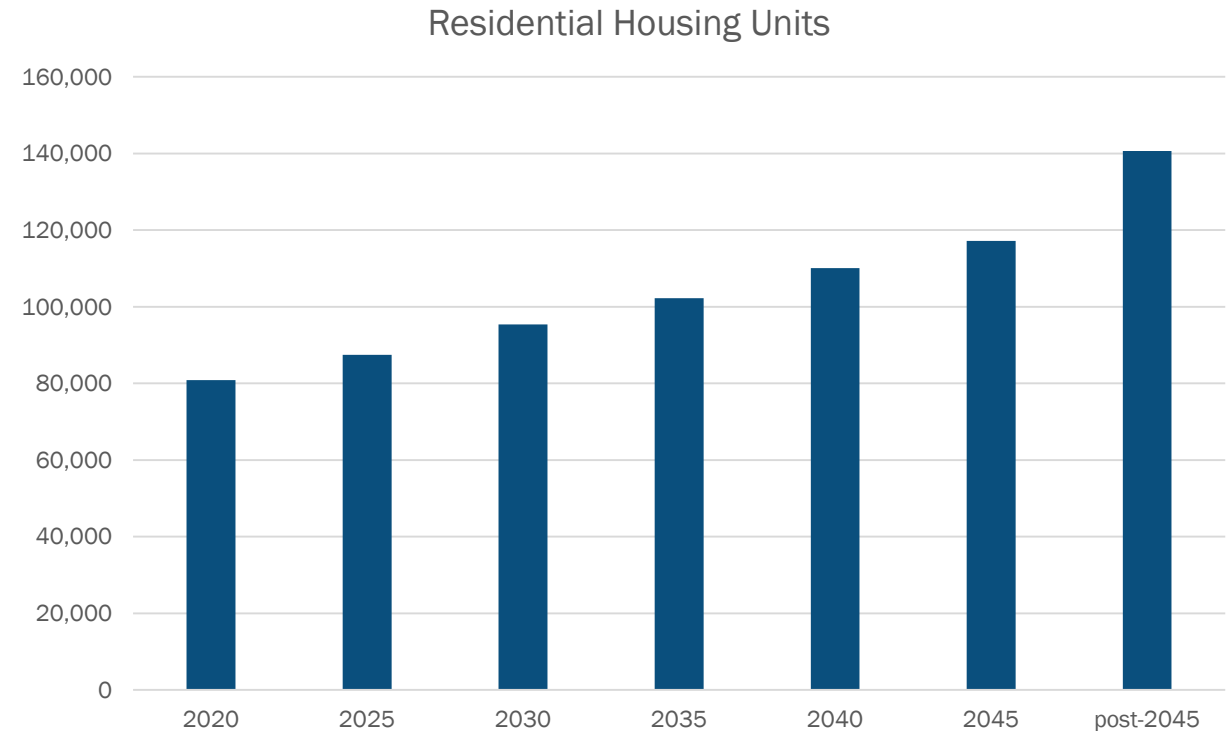
Source: Chesapeake Progress

# AlexRenew discharges to the main stem of the Potomac River, with some of the most stringent nitrogen and phosphorus limits in the country

VPDES Permit Number	Annual N Waste Load Allocation	Annual P Waste Load Allocation
VA0025160	493,381 lbs	29,603 lbs

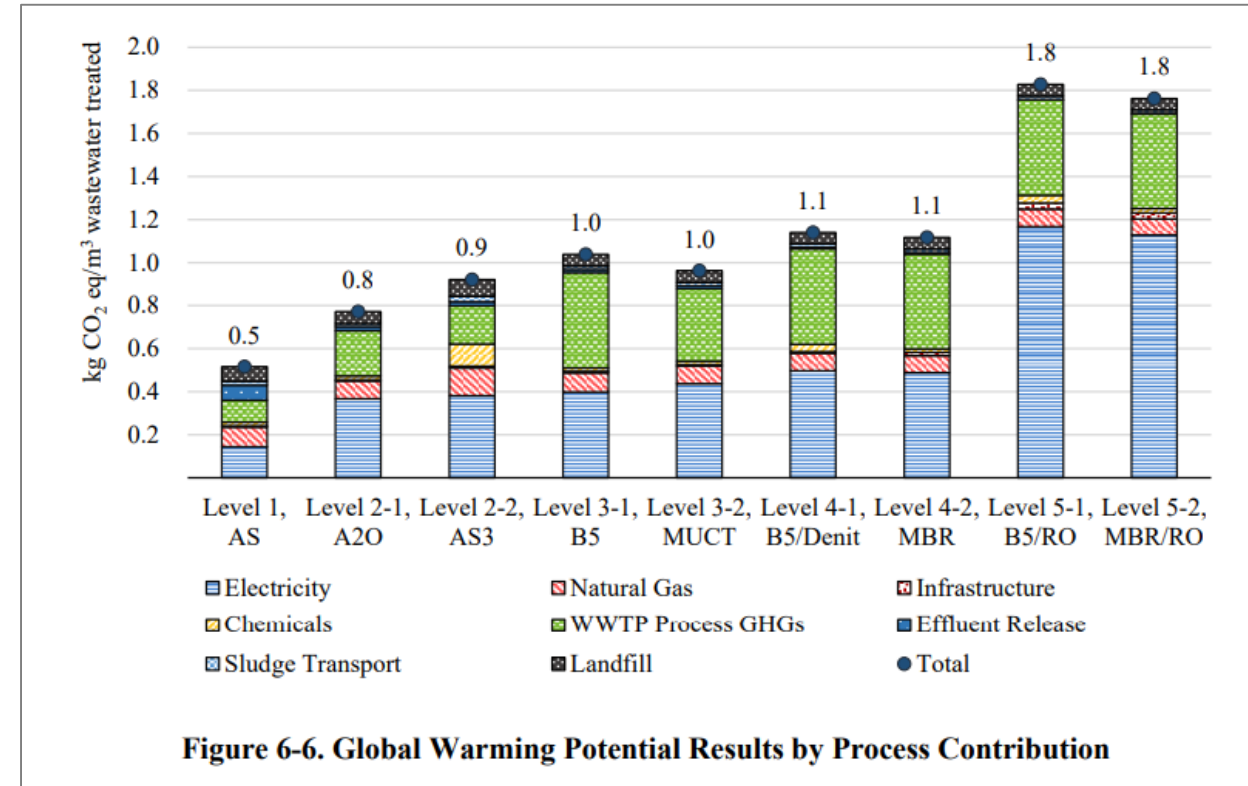
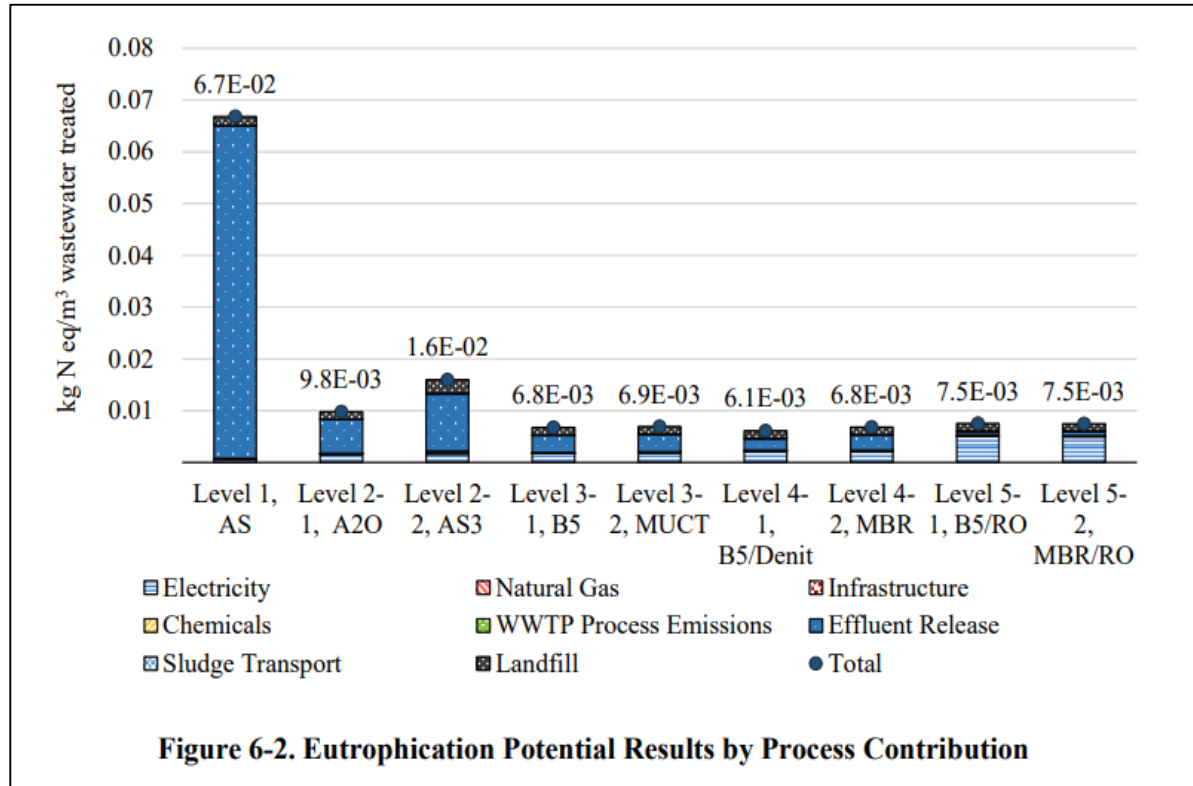


# Regional Growth Will Add Additional Pressures to Meeting Bay Goals





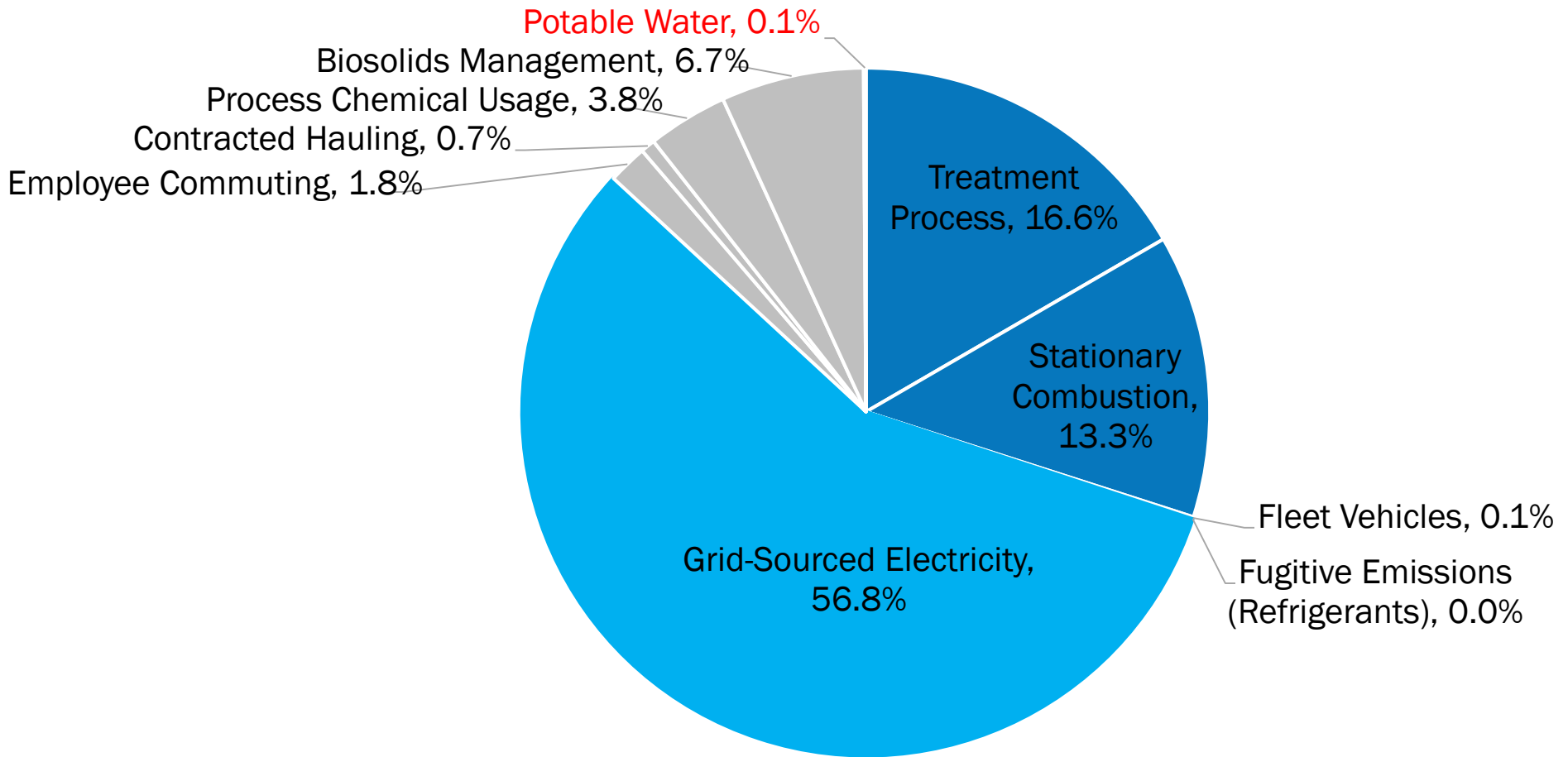
# Achieving Nutrient Targets With Conventional Advanced Treatment Technologies Poses Environmental and Social Tradeoffs






Level	Total Nitrogen, mg/L	Total Phosphorus, mg/L
1	no target specified	no target specified
2	8	1
3	4-8	0.1-0.3
4	3	0.1
5	<2	<0.02

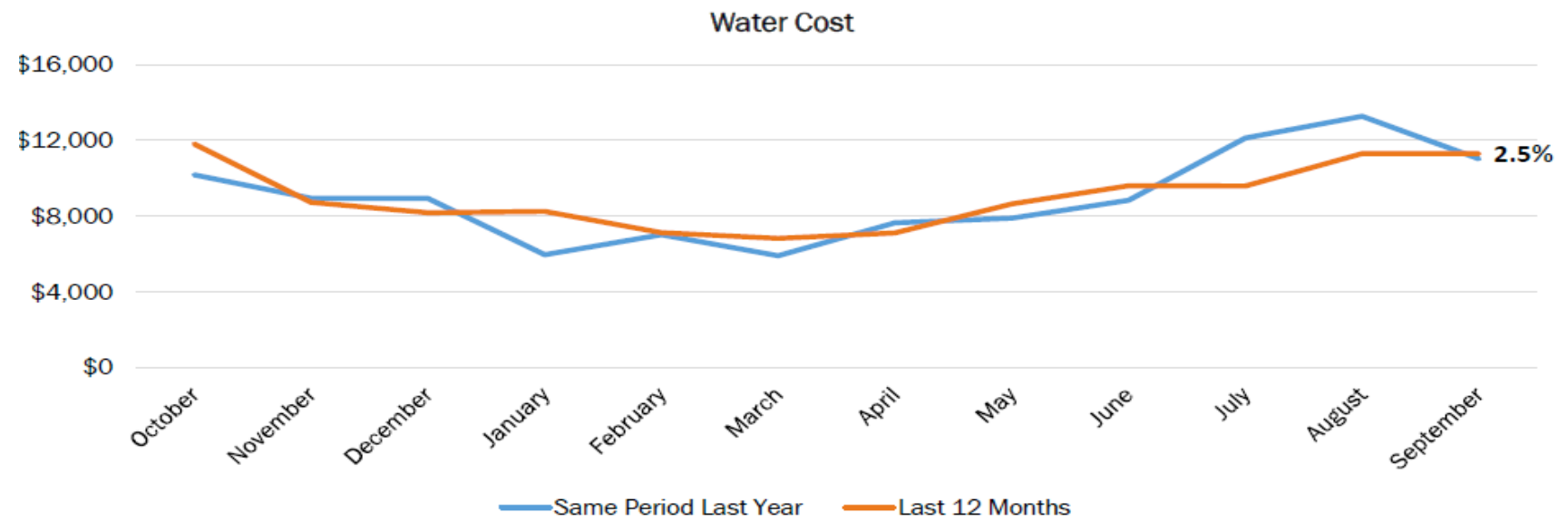
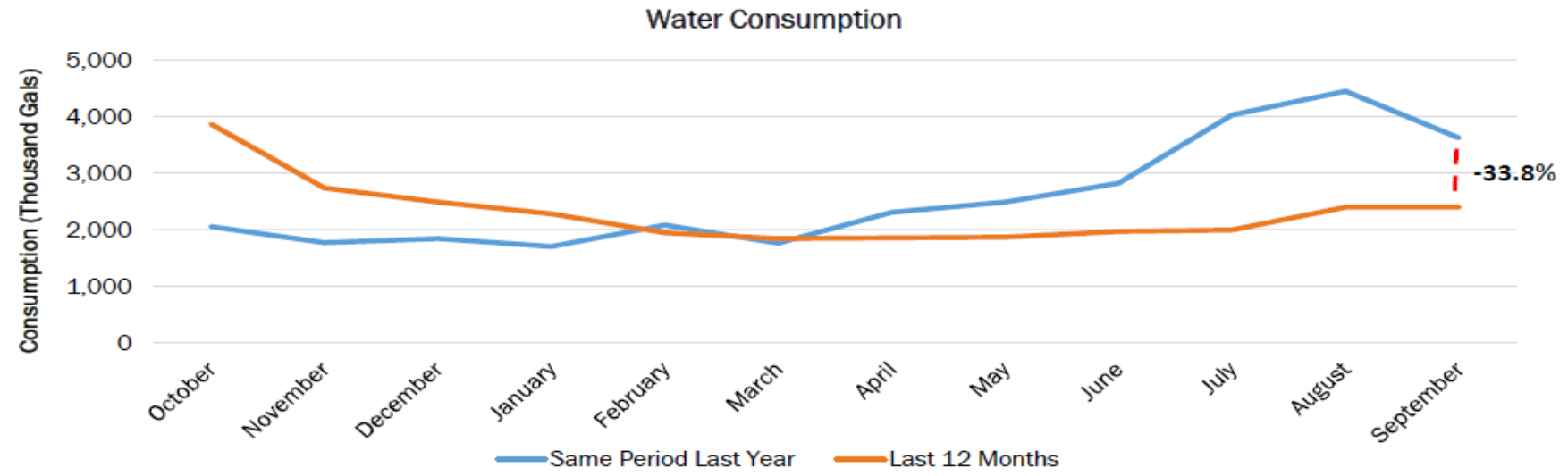


# Reducing Potable Water Use Reduces GHG Emissions



-  **Scope 1:** Direct emissions from company-owned and controlled resources
-  **Scope 2:** Emissions from electricity purchased from the grid
-  **Scope 3:** Emissions linked to company operations from upstream and downstream services

# Increasing Water Costs Are Zeroing Out Efficiency Gains



# Virginia Regulation Allows for a Variety of Uses of Reclaimed Water

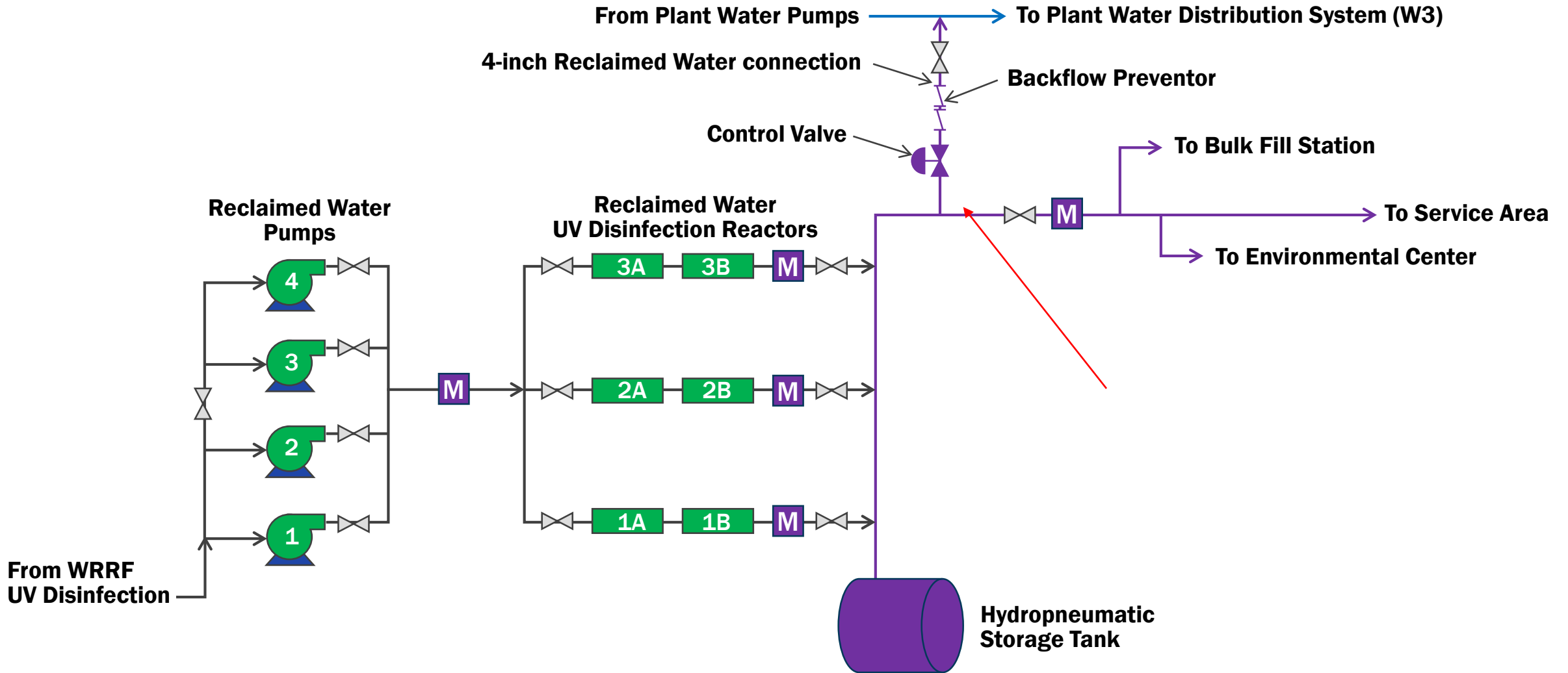


Reuses of Reclaimed Water	
Level 1 Reclaimed Water	Level 2 Reclaimed Water
<p>All types of landscape irrigation in public access areas (i.e., golf courses, cemeteries, public parks, school yards and athletic fields)</p> <p>Toilet flushing</p> <p>Fire fighting or protection and fire suppression in non-residential buildings</p> <p>Outdoor reuses ( i.e., lawn watering and non-commercial car washing)</p> <p>Commercial car washes</p> <p>Commercial air conditioning systems</p> <p>Irrigation for any food crops not commercially processed, including crops eaten raw</p> <p>Landscape impoundments with potential for public access or contact</p> <p>Commercial laundries</p> <p>Ship ballast</p>	<p>Irrigation for any food crops commercially processed</p> <p>Irrigation for non-food crops and turf, including fodder, fiber and seed crops; pasture for foraging livestock; sod farms; ornamental nurseries; and silviculture</p> <p>Landscape impoundments with no potential for public access or contact</p> <p>Soil compaction</p> <p>Dust control</p> <p>Washing aggregate</p> <p>Making concrete</p> <p>Irrigation to establish vegetative erosion control</p> <p>Livestock watering</p> <p>Aquaculture</p> <p>Stack scrubbing</p> <p>Street washing</p> <p>Boiler feed</p> <p>Once-through cooling</p> <p>Recirculating cooling towers</p>

# AlexRenew Reclaimed Water System

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# AlexRenew's System Can Deliver 2 MGD of Level 1 Reclaimed Water



# With no 'Market' in Alexandria We Created Our Own



**Alexandria is a densely-populated, urban community**



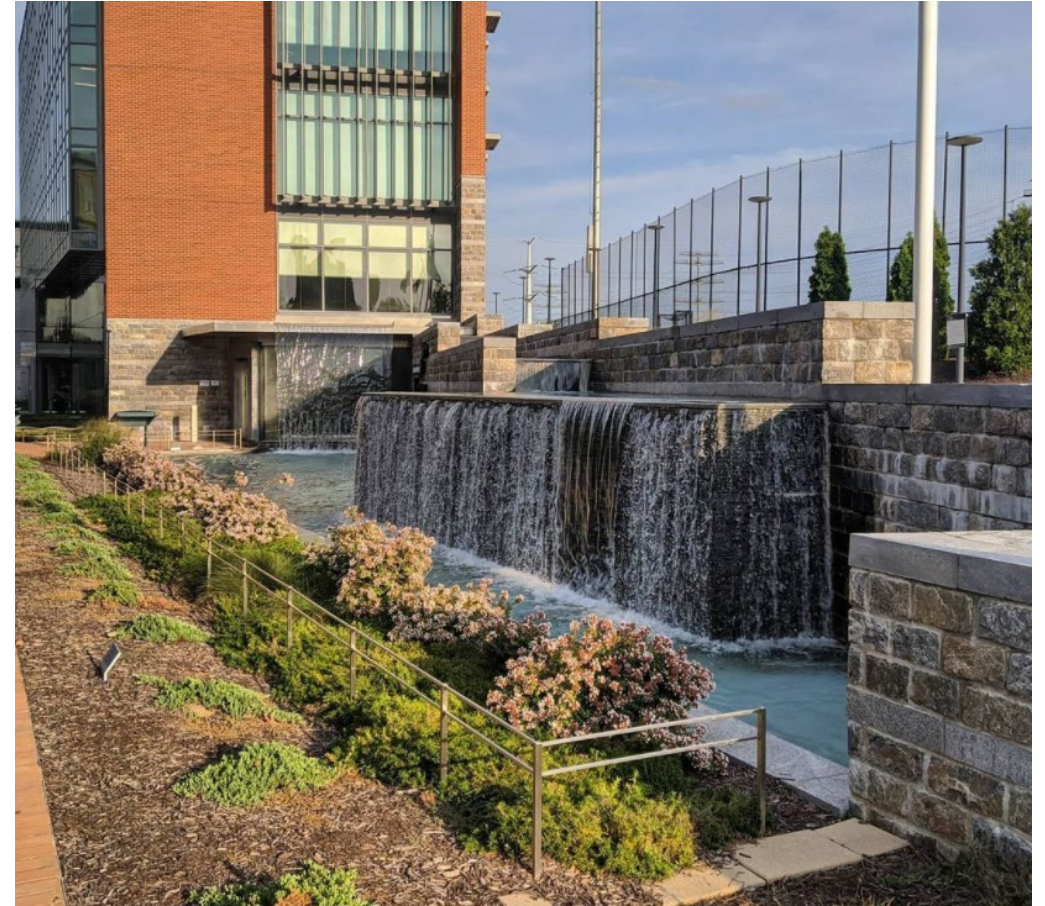
**No golf courses or other large green spaces for irrigation using purified water**



**No medium or large sized industrial users of purified water**



**AlexRenew looks at each project for opportunities for any type of resource recovery**



# Used for All Non-potable Applications in our Environmental Center





# Used in the Educational Lobby for Fish Tank and Green Wall

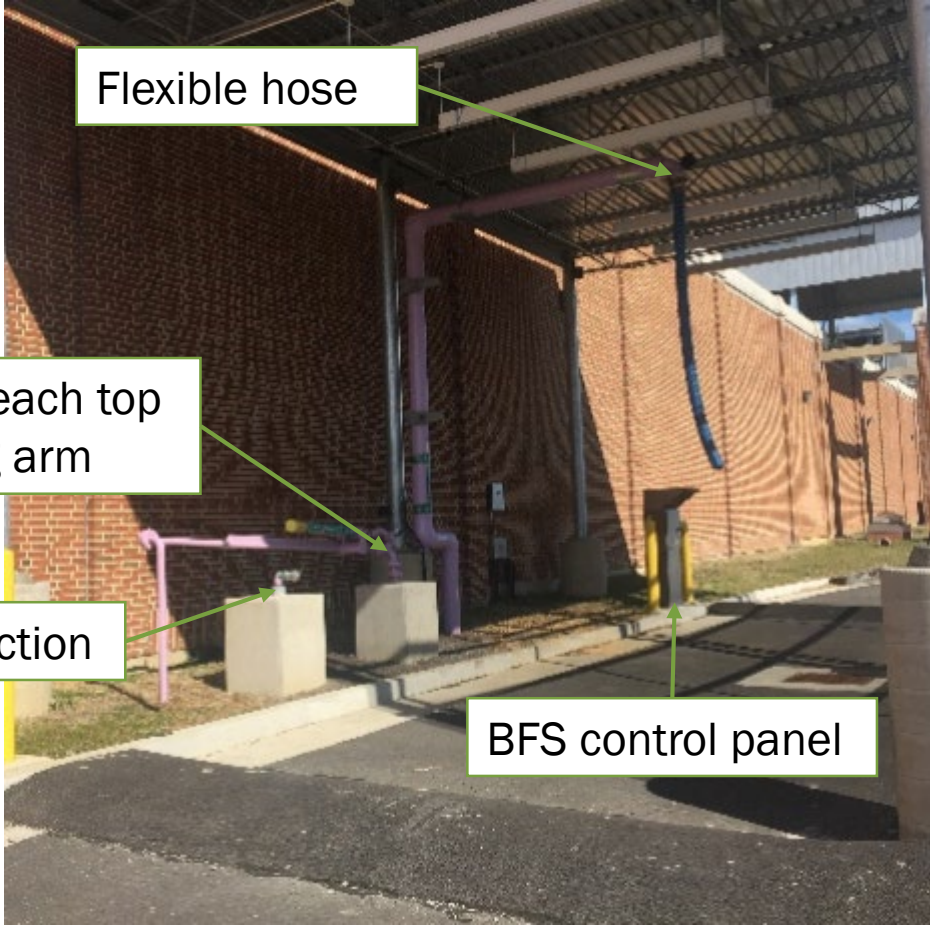


Native Fish Tank



Lobby Green Wall

# The Bulk Fill Station Creates Opportunities for Offsite Use



Flexible hose

Fixed reach top loading arm

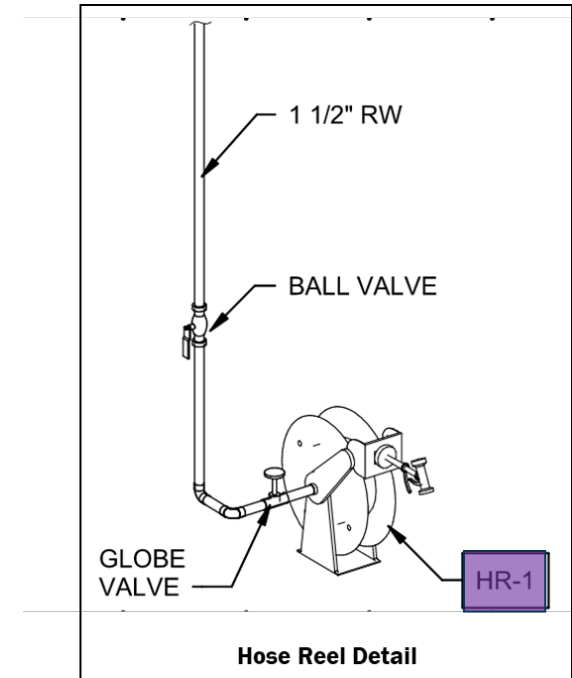
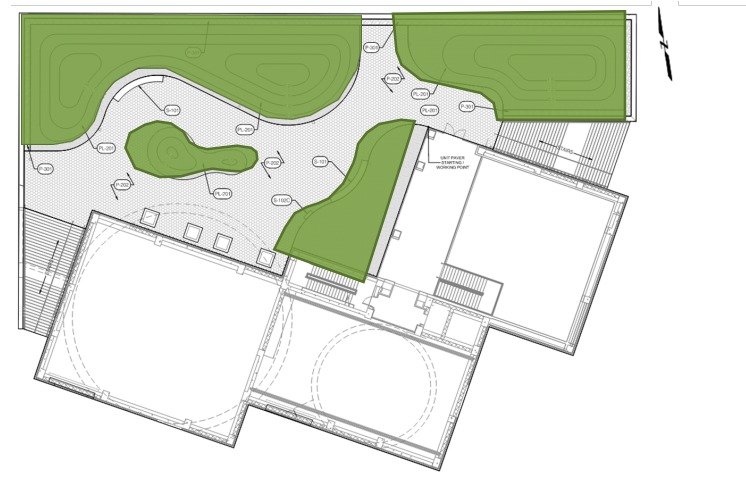
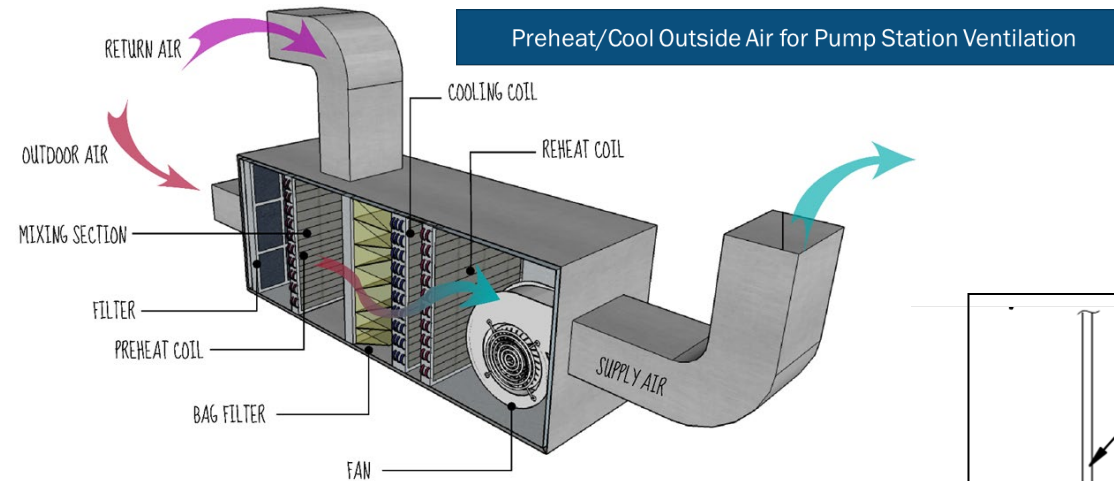
Hose connection

BFS control panel

# RiverRenew Created New Opportunities for Onsite Use

Reclaimed water will serve the following new applications:

- Cooling and Heating Systems
- Green Roof
- Pump Station and Crane Floors
- Exterior Wall Hydrants
- Restrooms



# Challenges and Future Plans

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# Challenges Exist to Expanding Local Reclaimed Water Use

## Market

- How do we expand the local market for our reclaimed water?

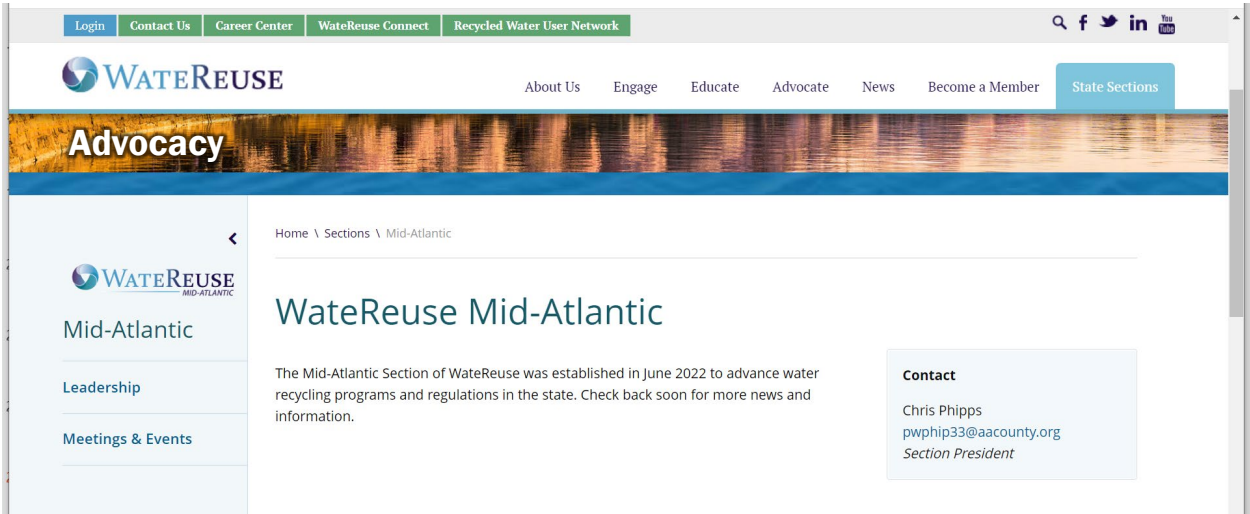
## Staffing

- How do we attract and retain talent to operate and expand the system?

## Regulations

- How can we create a regulatory framework that doesn't hinder progress while protecting public health?

# AlexRenew is Working to Shape a Water-Positive Future





To learn more, visit [www.alexrenew.com](http://www.alexrenew.com)