



Resiliency Planning:

PFAS Treatment Strategy for Surface Water Treatment Plant

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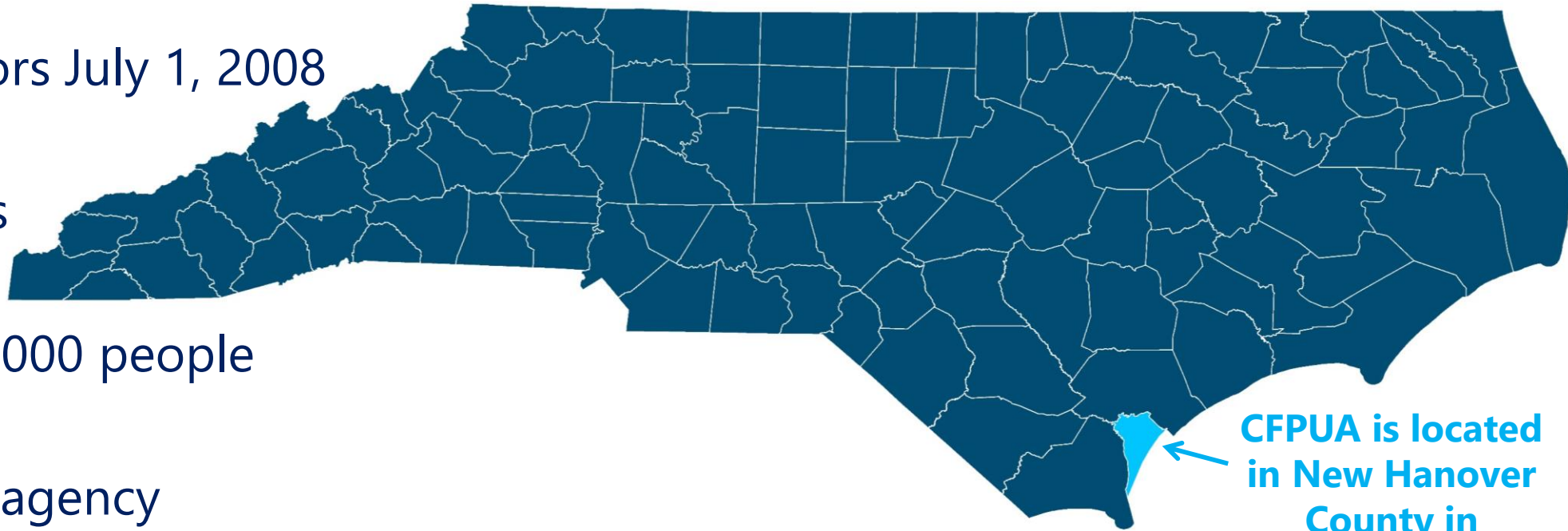
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PFAS & GenX Treatment Strategies



CFPUA At A Glance

- Created in 2007 by City of Wilmington and New Hanover County
- Opened our doors July 1, 2008
- 300+ employees
- Serves over 200,000 people
- Self-supporting agency
- 11-member Board



CFPUA is located
in New Hanover
County in
Southeastern
North Carolina

CFPUA Facilities & Infrastructure

Wastewater System

- 2 wastewater treatment plants
 - Northside: 16 MGD
 - Southside: 12 MGD
- 148 sewer pump stations
- 1,030 miles of gravity sewer and force mains

Water System

- 3 water systems
 - 2 groundwater
 - 1 surface water
- 2 water treatment plants
 - Sweeney: 35 MGD
 - Richardson: 6 MGD
- 1,100 miles of water mains
- 9 storage tanks



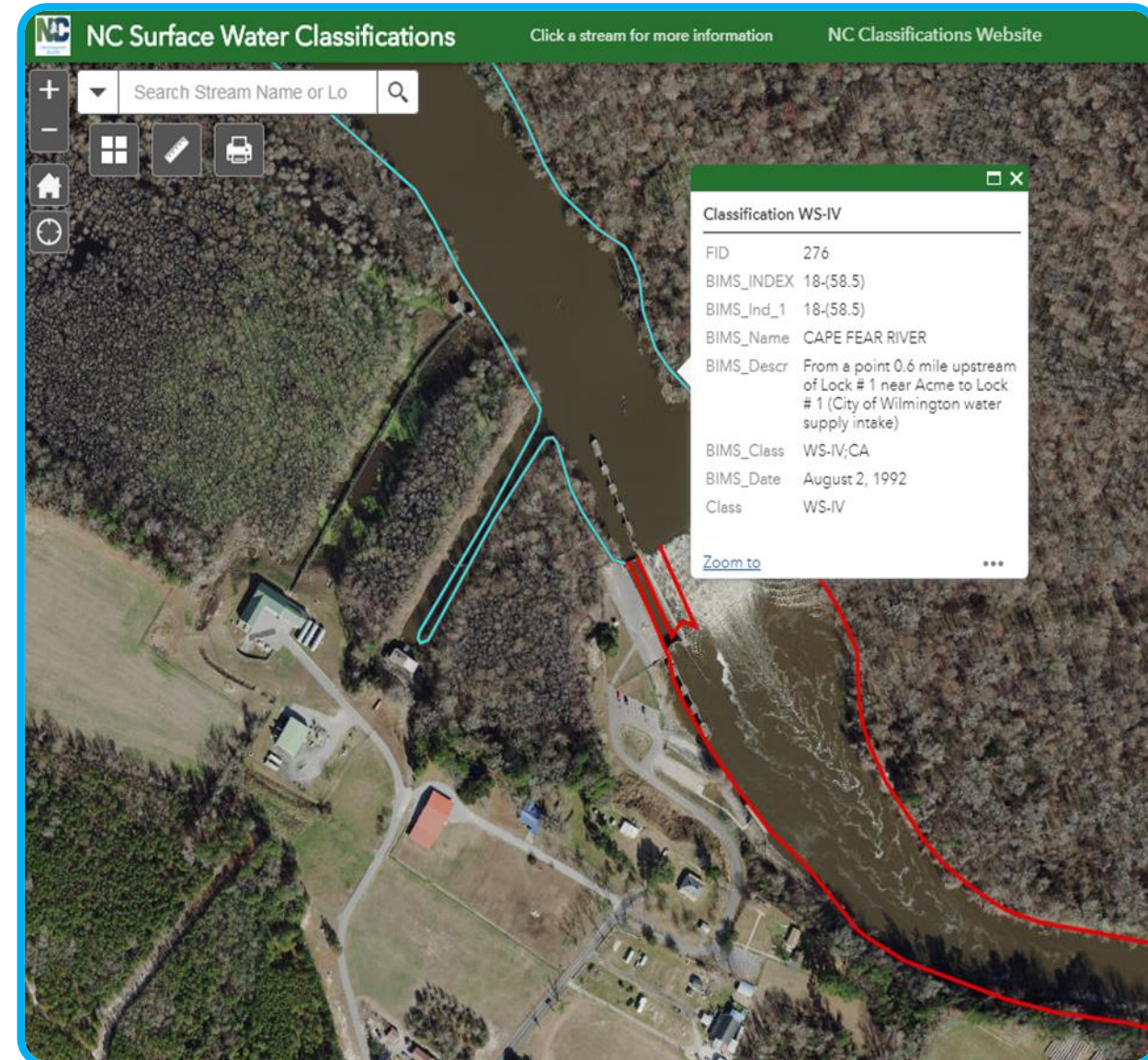
Sweeney Water Treatment Plant

- Conventional treatment
 - Rapid, flocculation, sedimentation, filtration
- Raw water ozonation
- Pre-filter ozonation
- Biofiltration with granular activated carbon
- UV inactivation
- Chlorine disinfection
- More advanced treatment methods required for PFAS (per- & polyfluoroalkyl substances)



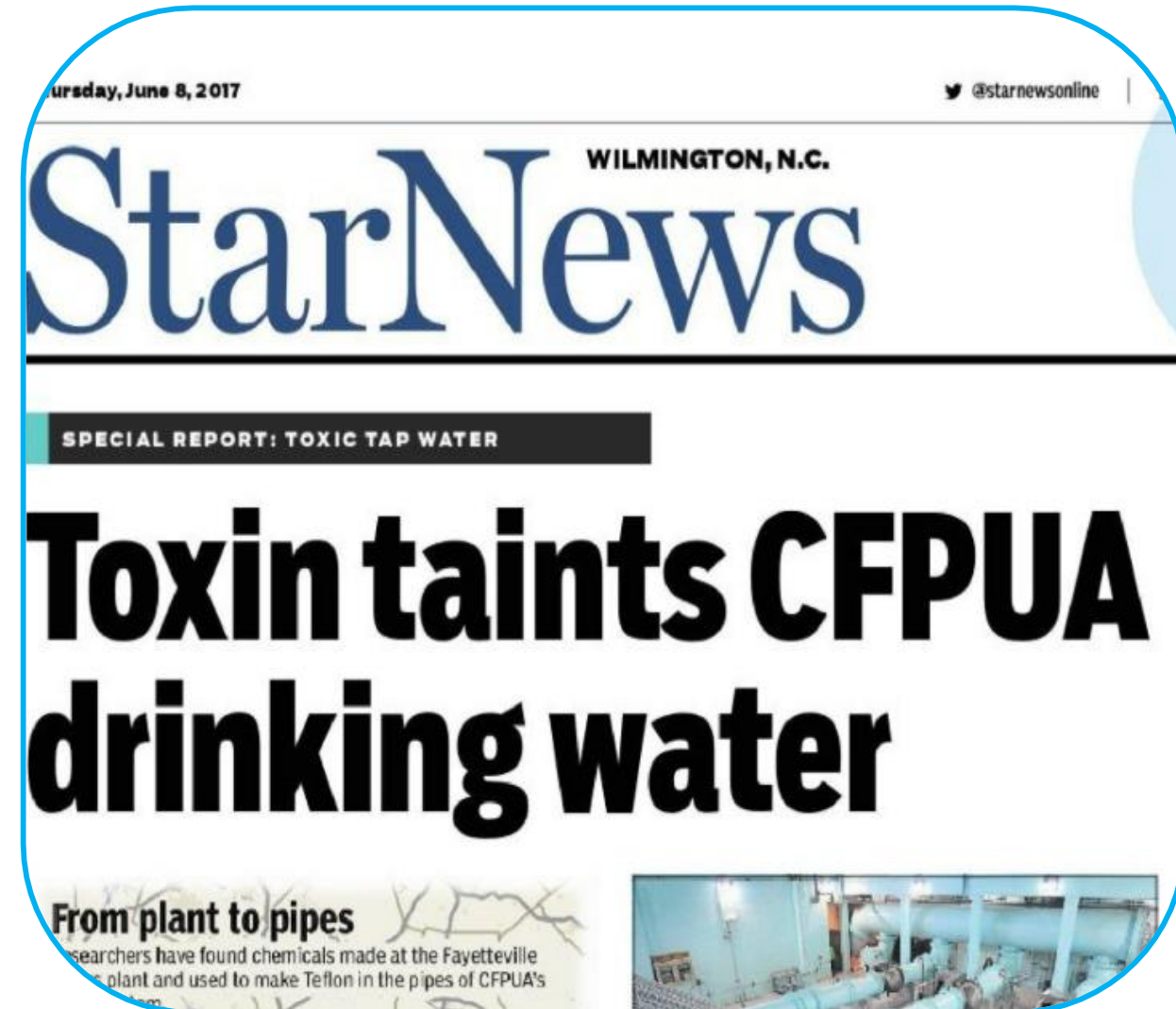
Source Water Planning Before 2017

- Participated in pertinent studies with researchers from universities, EPA, and industry groups
- Voluntarily tested for various emerging compounds such as 1,4-Dioxane, PFOA, and PFOS
- Participated in EPA's UCMR process
- Installed advanced treatment technologies at both water treatment plants
- Planned for acute risks such as train derailments, algal blooms and large SSOs



GenX Discovery

- June 2017, Wilmington StarNews published an article on the presence of GenX and other short-chain PFAS in CFPUA raw and finished water
- Sparked crisis of consumer confidence
- CFPUA has spent approximately \$3.5 million on this issue so far
 - \$358,000 - on sampling costs
 - \$2.2 million for treatment study, design & pilot study expenses for ASR & Sweeney
- What actions have we taken?



Addressing PFAS In Source Water

Working with Researchers and Regulators

- Partnering with UNCW to identify new compounds in the River
- Coordinating with NCDEQ to remain informed on regulatory actions regarding Chemours' Fayetteville Works site
- Monitoring NCDHHS to understand potential health impacts of these compounds

Communicating With the Public

- Updating website with latest PFAS sampling results
- Providing customers with regular water-quality updates by email, bill inserts and other methods
- Holding community meetings with HOAs, civic organizations, schools, and other groups

Monitoring Water & Pursuing Treatment Options

- Testing has detected more than 21 different PFAS compounds in our finished water
- Conducting pilot studies at our treatment plant and at our ASR site
- Implementing interim treatment using existing GAC filters in the plant
- Designing permanent upgrade to the plant



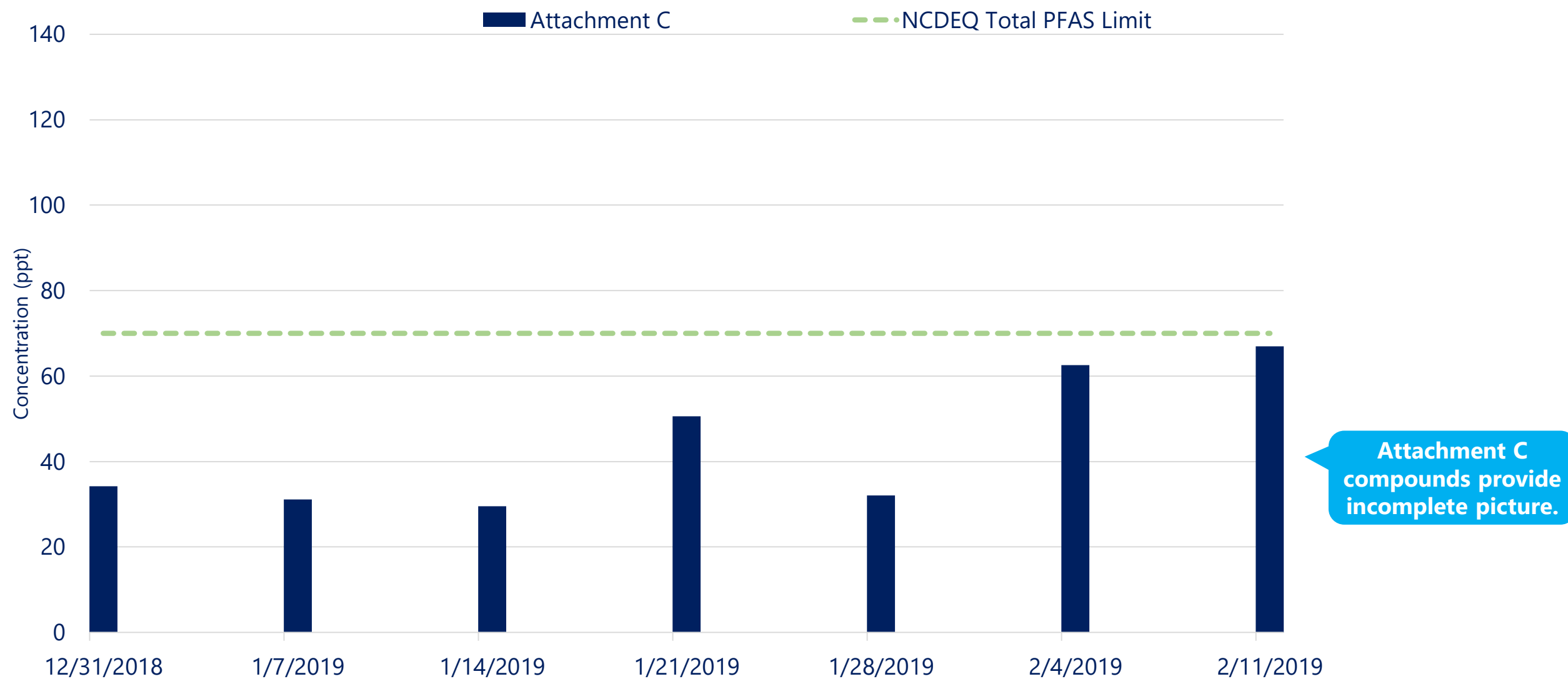
PFAS: Source Control Or Water Treatment?

- Chemours has stopped discharging wastewater to the Cape Fear River, but levels of PFAS remain in raw water.
- Potential sources of ongoing PFAS contamination:
 - Groundwater at Chemours plant
 - River sediment
 - Air emissions
- N.C. Department of Environmental Quality Consent Order
 - Approved by judge February 25, 2019
 - Requires additional controls at the Chemours facility.
 - Addresses only PFAS that NCDEQ and Chemours agree come from the plant: "Attachment C"
- **Will it stop PFAS from affecting our drinking water?**



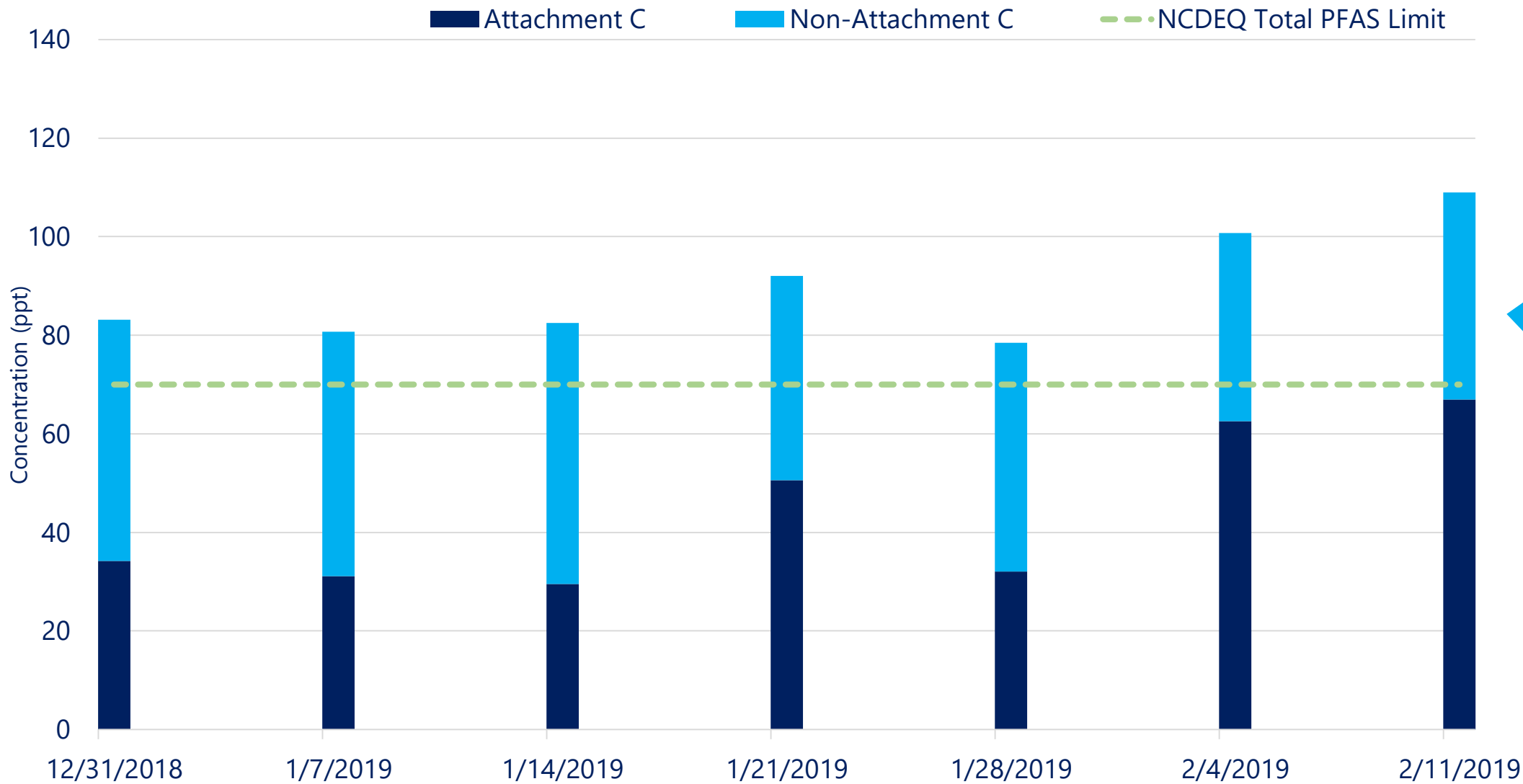
PFAS Levels In The Cape Fear River

PFAS in Sweeney Raw Water



PFAS Levels In The Cape Fear River

PFAS in Sweeney Raw Water

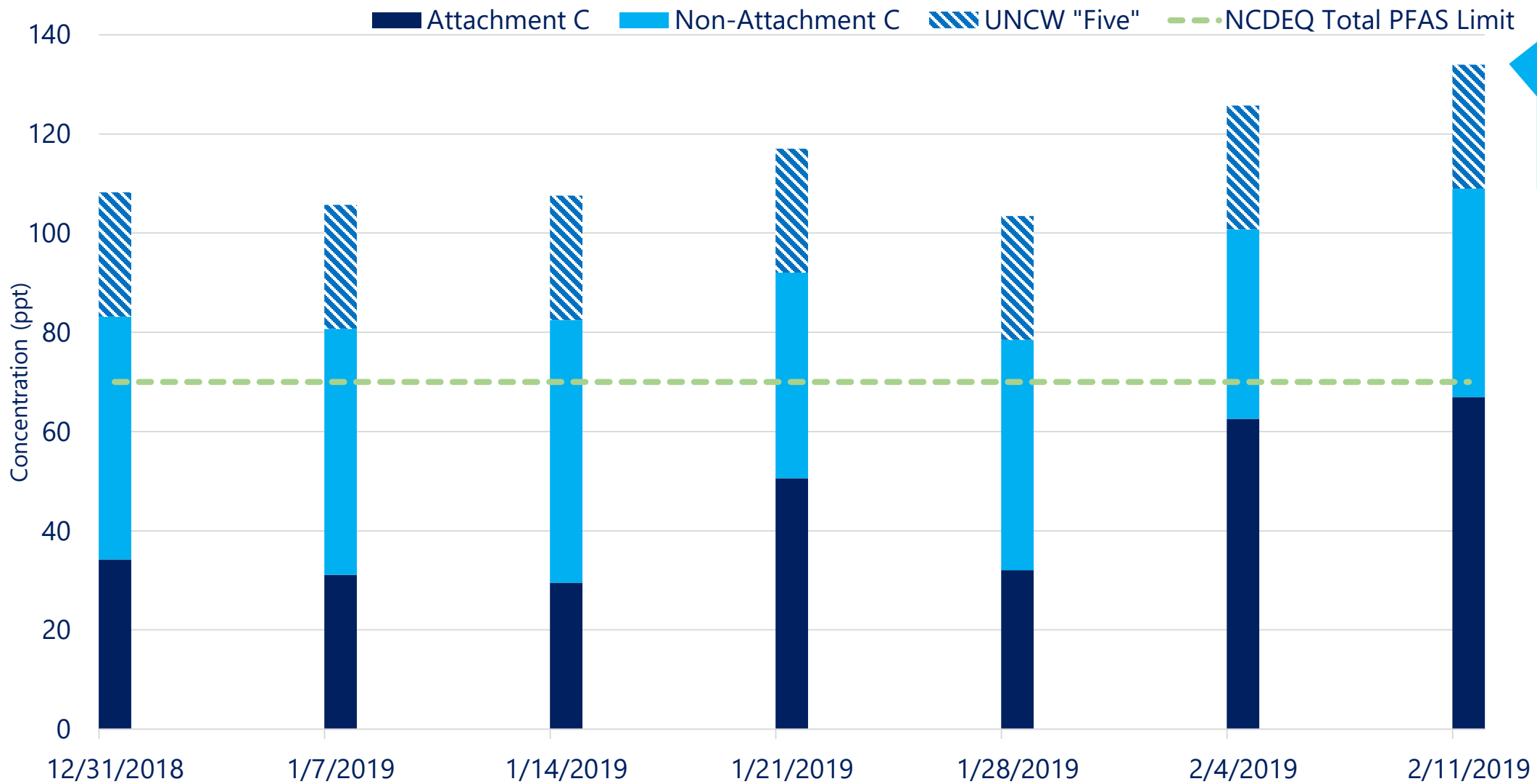


CFPUA regularly sees several other PFAS compounds in Sweeney raw water

Attachment C compounds provide incomplete picture.

PFAS Levels In The Cape Fear River

PFAS in Sweeney Raw Water



UNCW detected five others found only downstream of Chemours. Concentrations are unknown

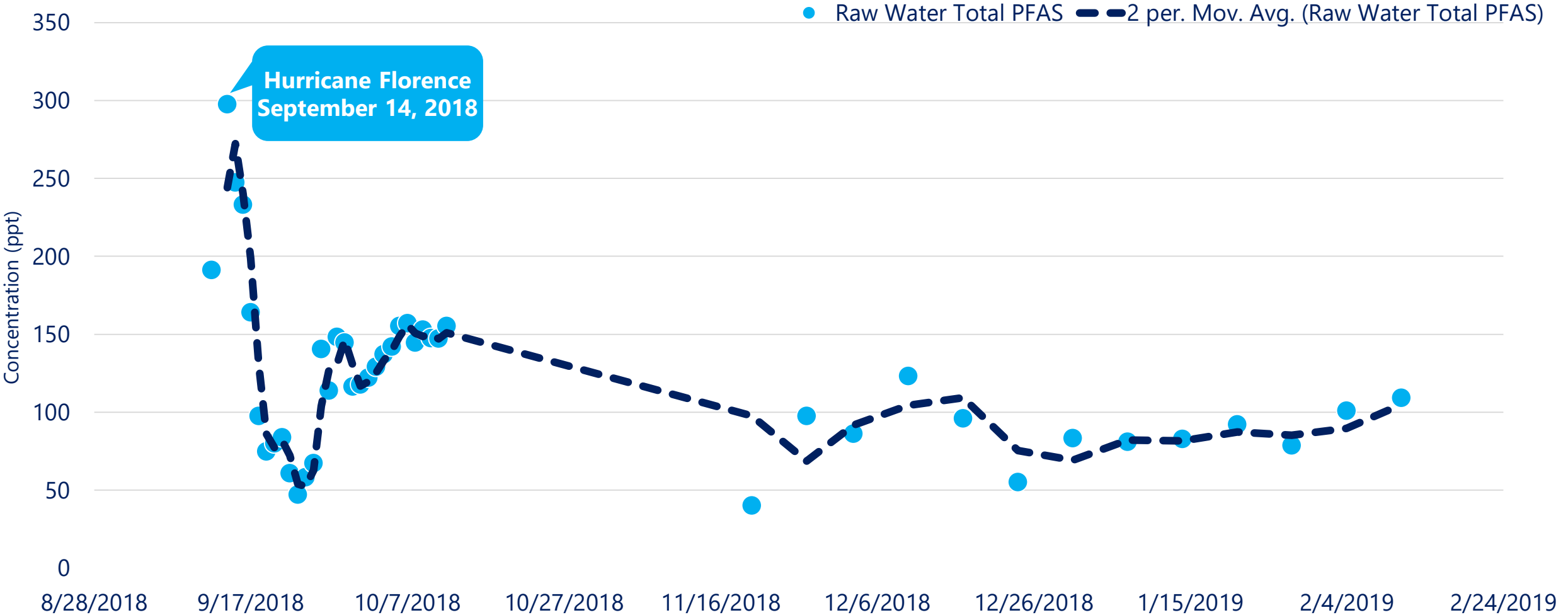
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PFAS Monitoring At Sweeney

- Total PFAS levels fluctuate – sometimes with significant spikes

Raw Water Total PFAS Concentration

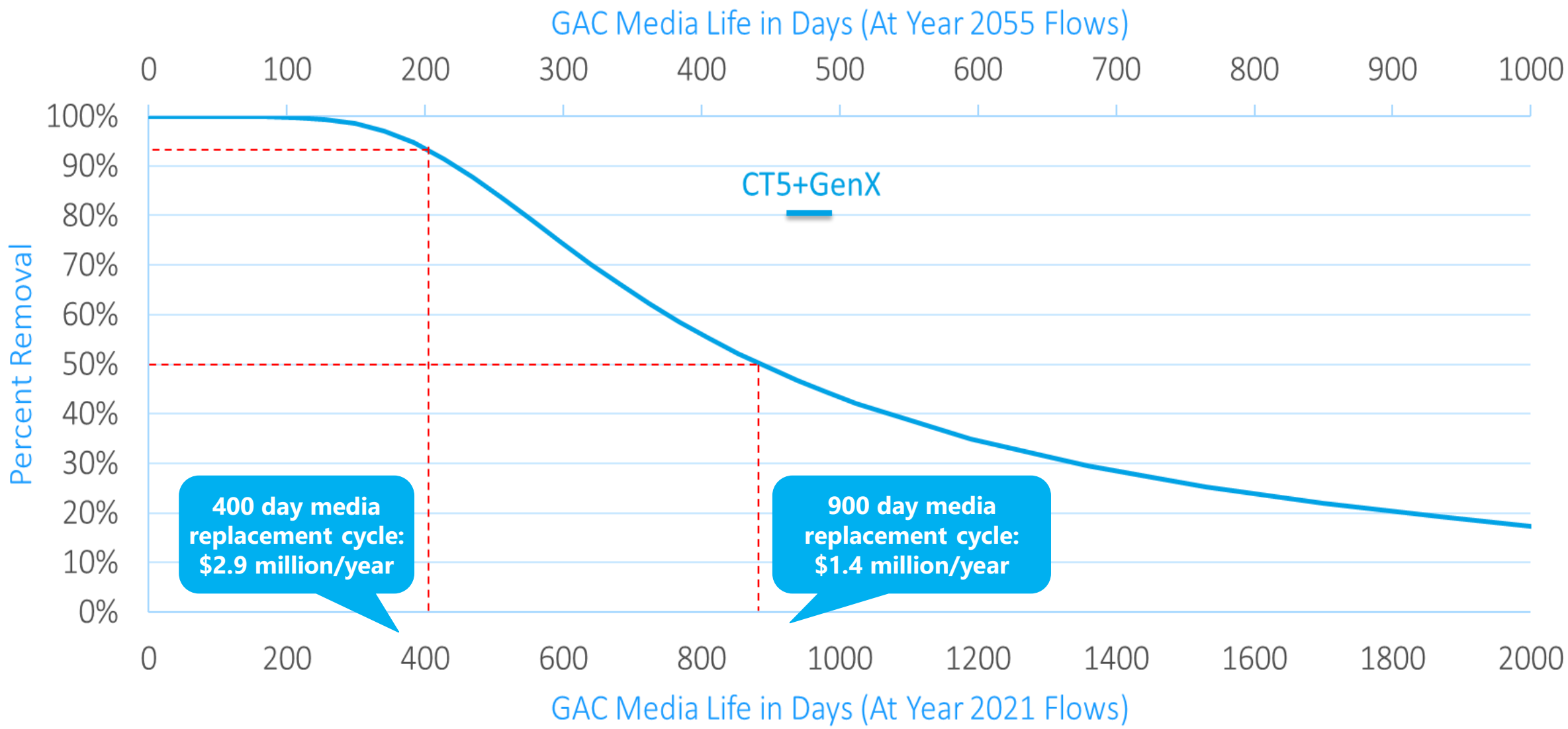


Treatment for Long-Term PFAS Presence: A Pilot Study

- Technologies Considered
 - Granular Activated Carbon
 - Ion Exchange
 - Reverse Osmosis
- Operational Strategies
- Criteria for Full-Scale Design
- Considerations
 - Removal Rates
 - Environmental Impacts
 - Rate Impacts and Cost
- Secondary benefits if implemented for PFAS treatment



GAC Media Life: When Do GenX & Other PFAS Begin to Break Through?



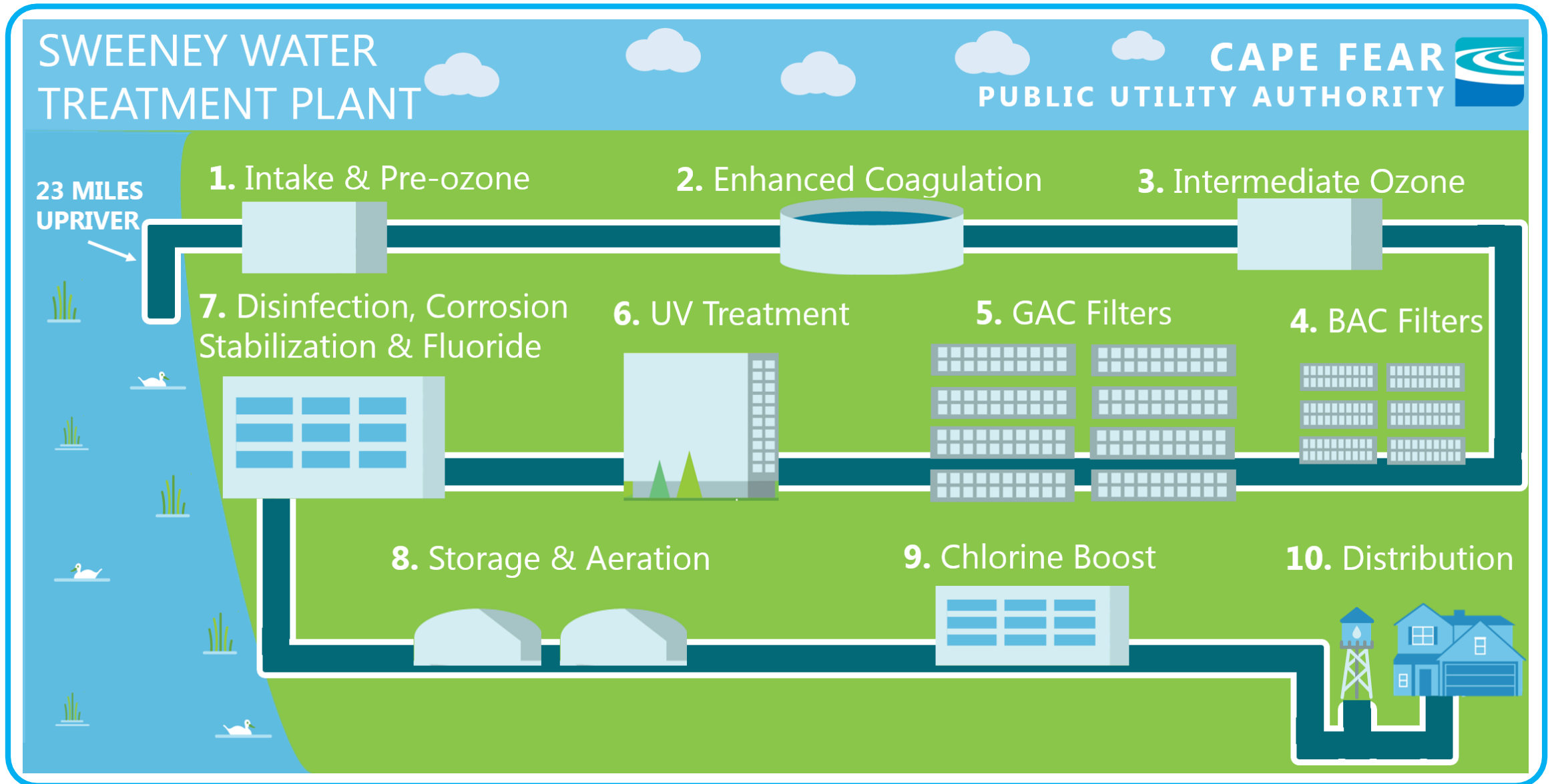
Considerations for Selecting a PFAS Treatment Process

	Granular Activated Carbon	Ion Exchange	Reverse Osmosis
PFAS removal	Effective at PFAS reduction	Effective at PFAS reduction	Provides broad removal of all varieties of PFAS
Flexibility	Can be modified to adapt to changes in regulations	Limited flexibility	Limited flexibility because RO provides broad removal
Corrosion control	Consistent with existing corrosion-control program	Consistent with existing corrosion-control program	Requires additional treatment to prevent lead and copper corrosion
Environmental	Removes PFAS from the environment	Filter media must be disposed of, cannot be destructed like carbon	Creates waste stream with concentrated PFAS levels to Cape Fear River (NPDES permit required)

Considerations for Selecting a PFAS Treatment Process

	Granular Activated Carbon	Reverse Osmosis
Capital Costs	\$46 Million	\$150 Million
Annual Operating Costs	\$2.9 Million	\$4.7 Million
Lifecycle Net Present Value	\$215 Million	\$504 Million

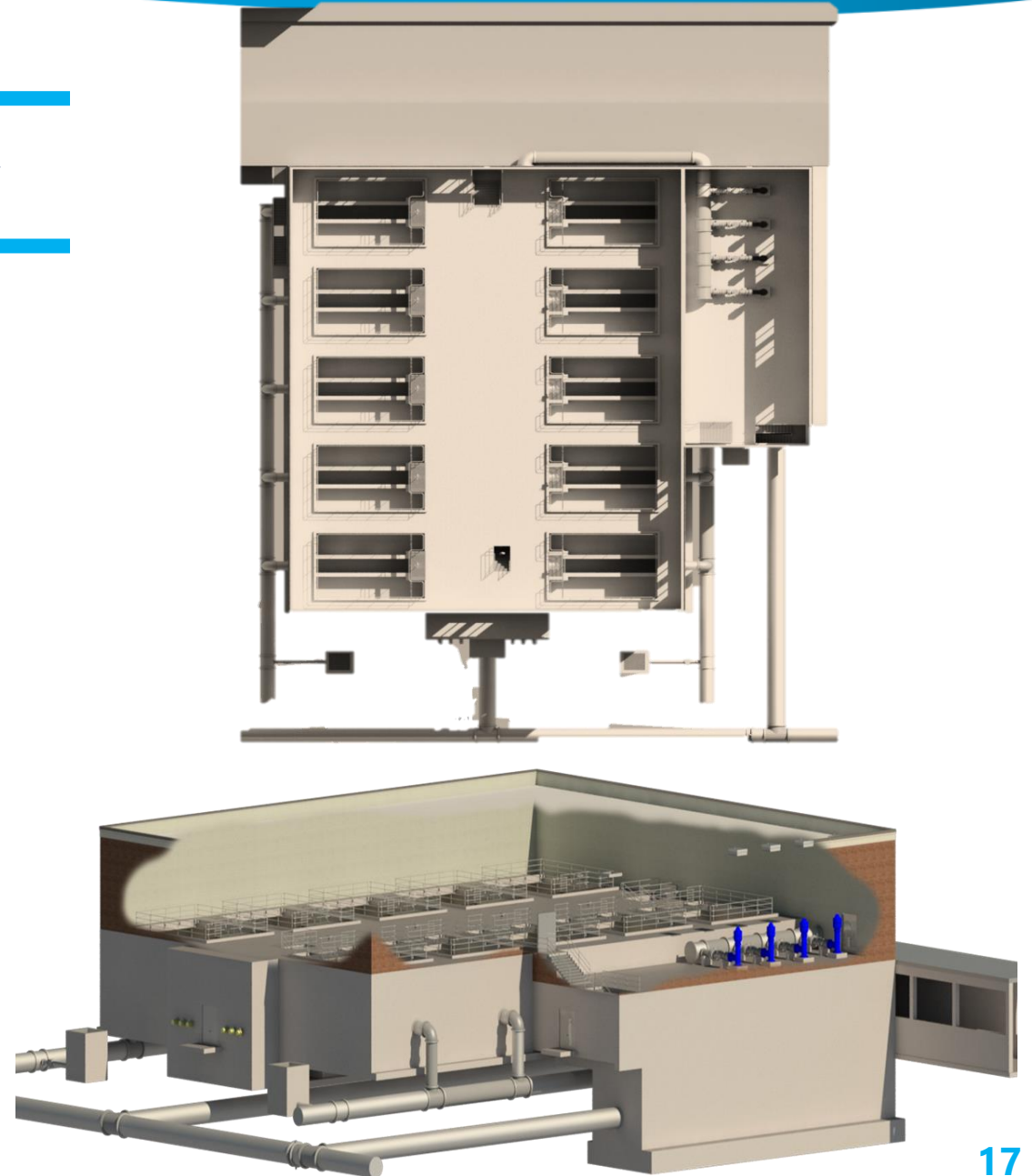
Upgrade Sweeney with Granular Activated Carbon



Conceptual GAC Facility (44 MGD)

Granular Activated Carbon Contactor Design Summary

Number of GAC Contactors	8
Design Flow Rate (each)	5.50 MGD
Type	Concrete Basin
Size (each)	20 x 41 feet
GAC Media Depth	12.5 feet
Contact Time at Design Flow	20 minutes



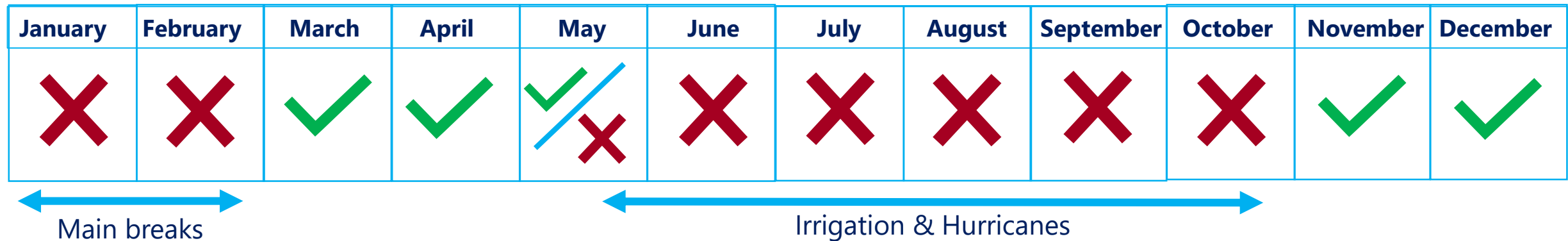
How Would An Upgrade at Sweeney Plant Help?

- Reduce levels of PFAS compounds in drinking water using Granular Activated Carbon (GAC) filtration method
- What are the benefits of GAC?
 - Reduces levels of PFAS in drinking water
 - Removes PFAS from the environment
 - Works with plant's previous treatment investments
- Would not be operational until Spring 2022
- **Can we take interim steps to reduce PFAS until then?**

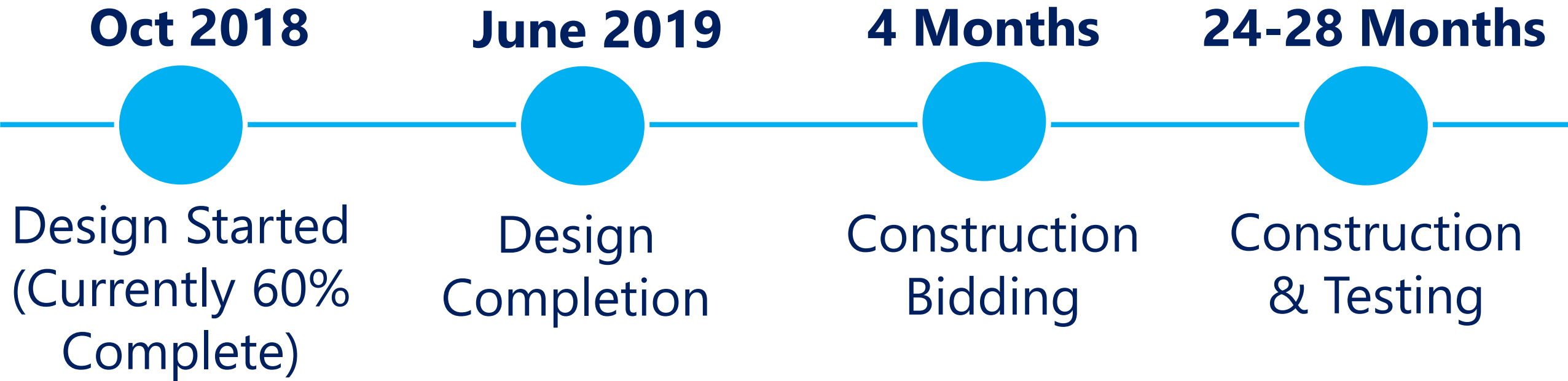


Interim Steps: Limited PFAS Reduction

- Replacing existing filter media will help, but it is not a long term solution
- Existing biological filters not designed to remove PFAS compounds
- Must be phased and staggered to ensure we retain biological mode benefits
- Not a permanent strategy because
 - Narrow window for replacement, shown in green below
 - Impacts ability to remove other contaminants such as 1,4-Dioxane, a “likely carcinogen,” according to EPA



Long-term PFAS Treatment Timeline



Note: Bidding and construction subject to CFPUA Board approval

How Does Addressing Source Water Contamination Affect Rates?

Capital:

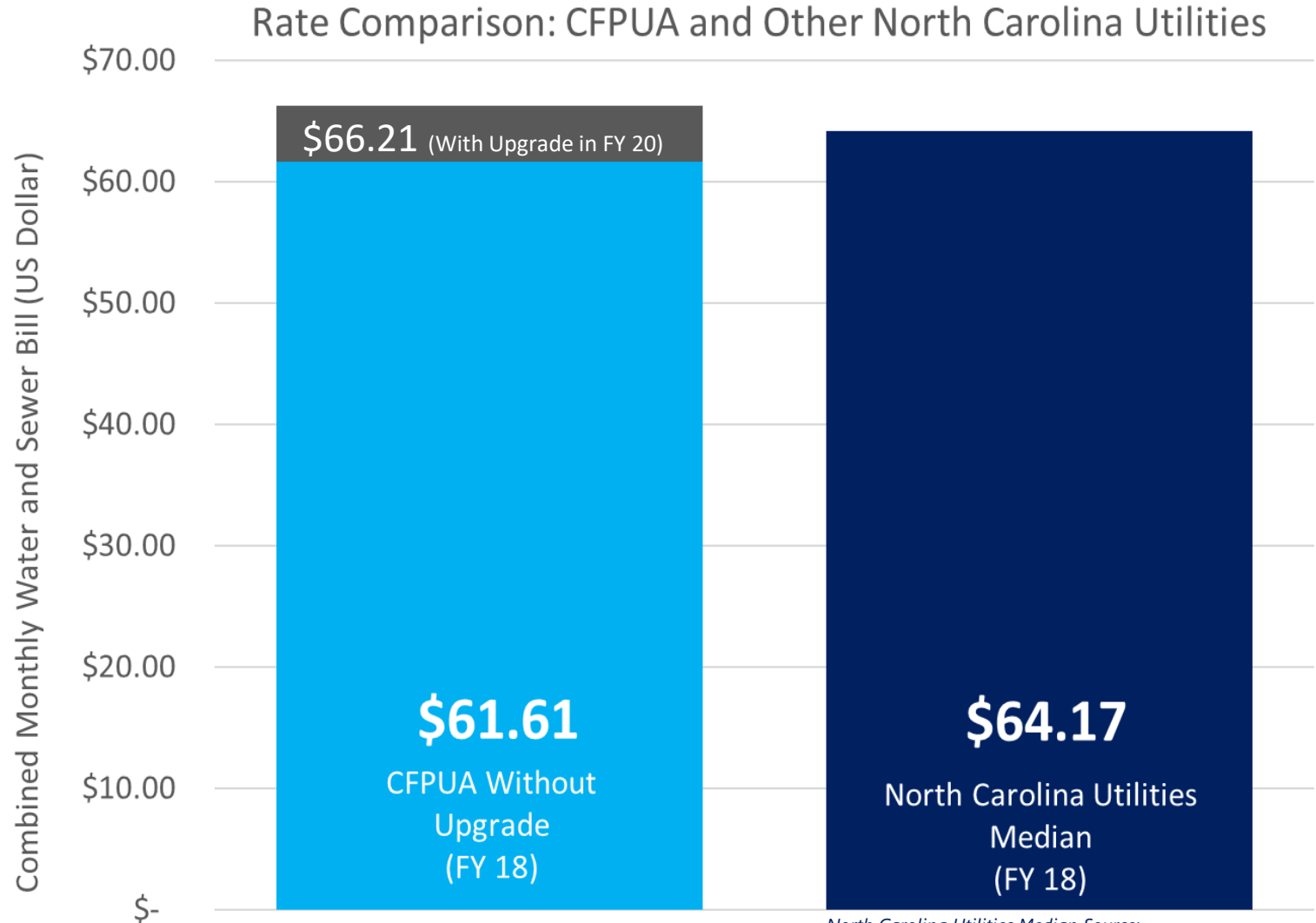
- \$46 million which translates to approximately \$2.7 million in annual debt service over 25 years.

Operating Costs:

- \$2.9 million starting in FY22, with increases thereafter proportional to increased flows.

Rates:

- Impact to average residential customer's monthly bill is approximately \$2.50 starting in FY20 (debt service only) and approximately \$4.60 starting in FY22 (debt service and operating costs).



North Carolina Utilities Median Source:
UNC School of Government Environmental Finance
Center; [NC Water and Wastewater Rates Dashboard](#)



Reducing Exposure to PFAS in Drinking Water

- Current regulatory framework for drinking water is insufficient
- Additional emerging contaminants are being detected
- Scientific research on PFAS such as GenX suggests that reducing exposure protects health
- CFPUA has developed long-term and interim solutions for PFAS reduction
- An effective response to PFAS includes source control and advanced water treatment



THANK YOU



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