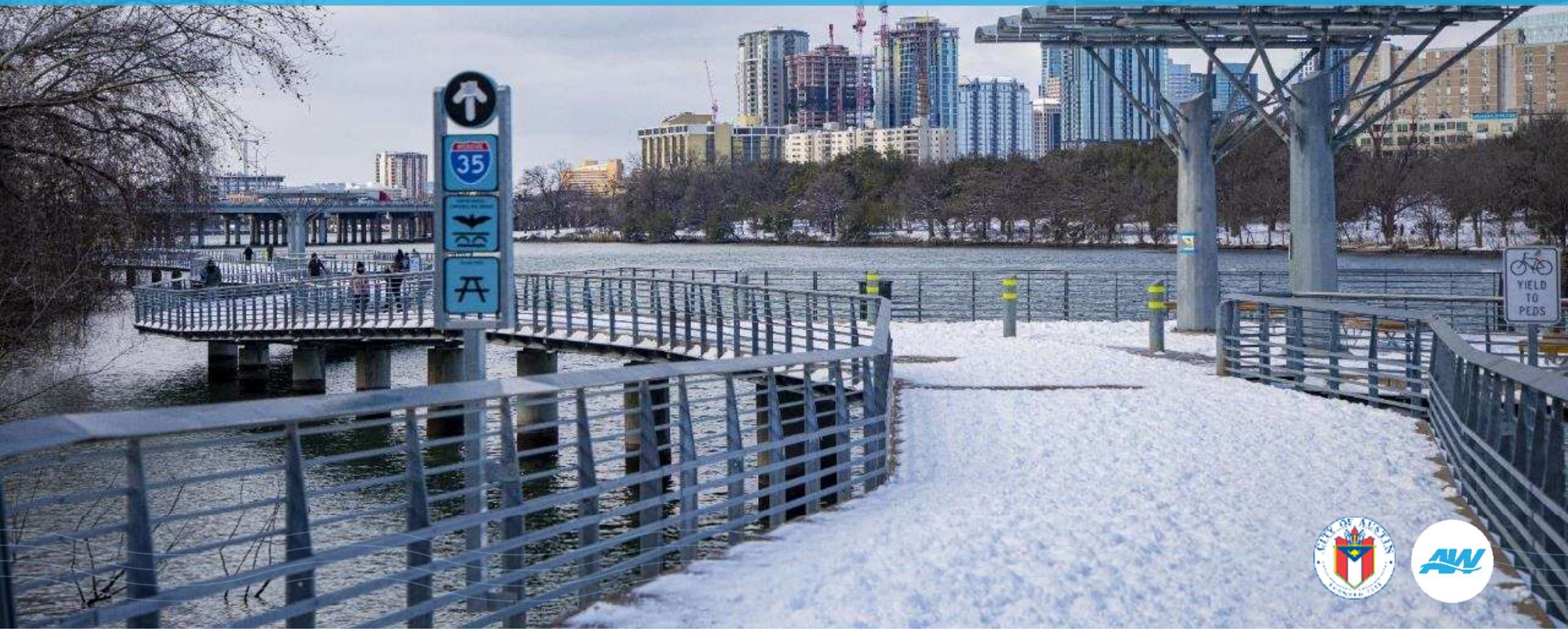
Ready for Anything

Austin Water's Journey in Adaptation & Resilience



Agenda

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Austin Water Director
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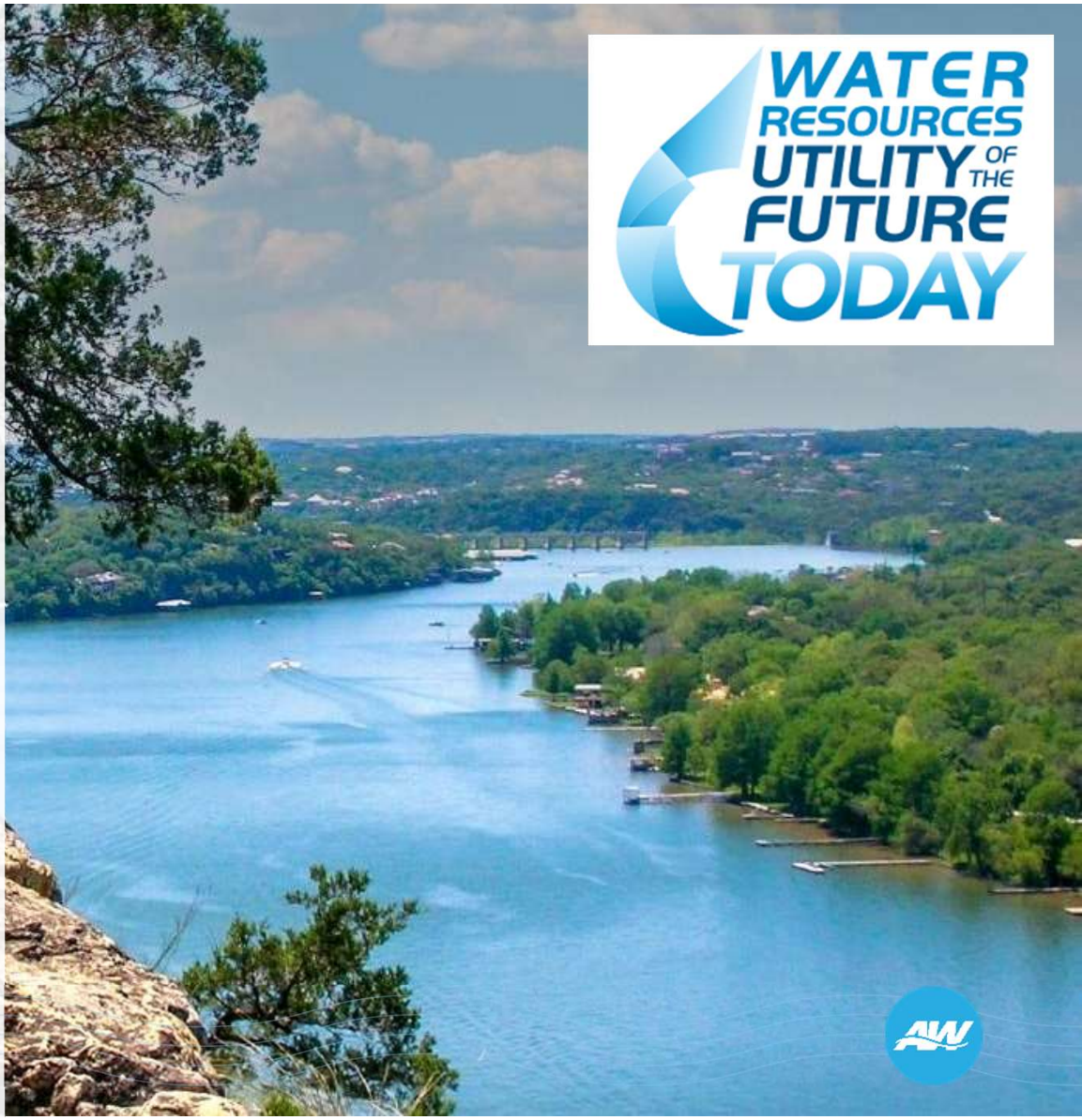
Austin Water Assistant Director, Customer Experience

- **Austin Water Overview**
- **Emergency Incidents**
  - Colorado River Flood (2018)
  - Zebra Mussel Infestation (2019)
  - Fire Foam Incident (2020)
  - Winter Storm Uri (2021)
  - Ullrich Water Treatment Plant Turbidity Event (2022)
- **Resiliency Improvements**
  - Communications
  - Emergency Management
  - Operations
  - Infrastructure Priorities
  - Employee and Leadership Development
- **Applying Lessons Learned – Winter Storm Mara**

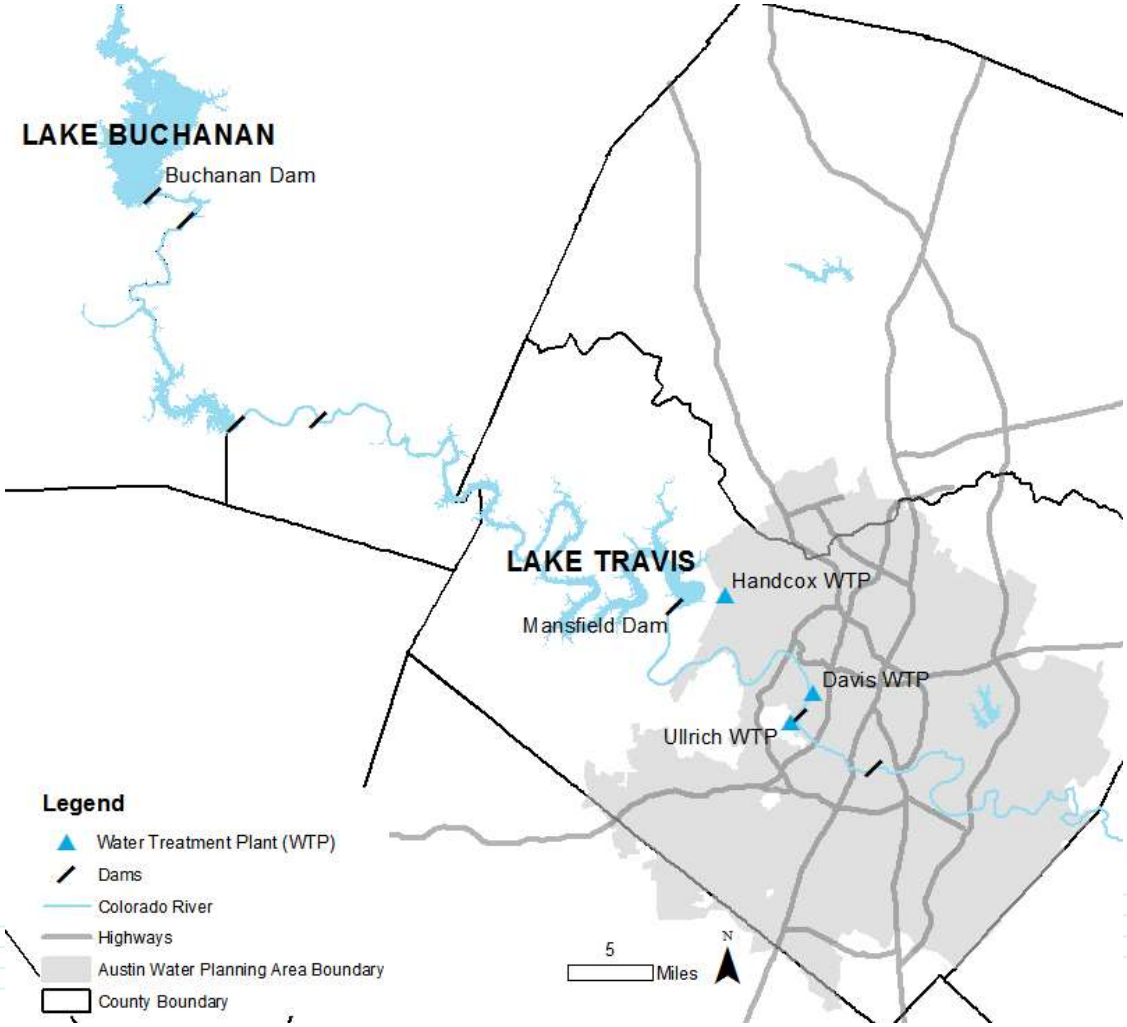
Austin Water Overview

Austin WATER

- 1,300+ employees
- Over 1M customers
- 548 square mile service area
- Surface water supply from Lower Colorado River
- 6 major treatment plants
- 7,000+ miles of pipeline
- $1.37B CIP FY2023-27



Water Supply



Colorado River:

- Combination of State-granted water rights & long-term contract with LCRA
- Up to 325,000 acre-feet per year

LCRA reservation & use fees pre-paid in 1999:

- Additional use payments trigger when average for 2 consecutive years exceeds 201,000 acre-feet per year

Emergency Incidents

Colorado River Flood

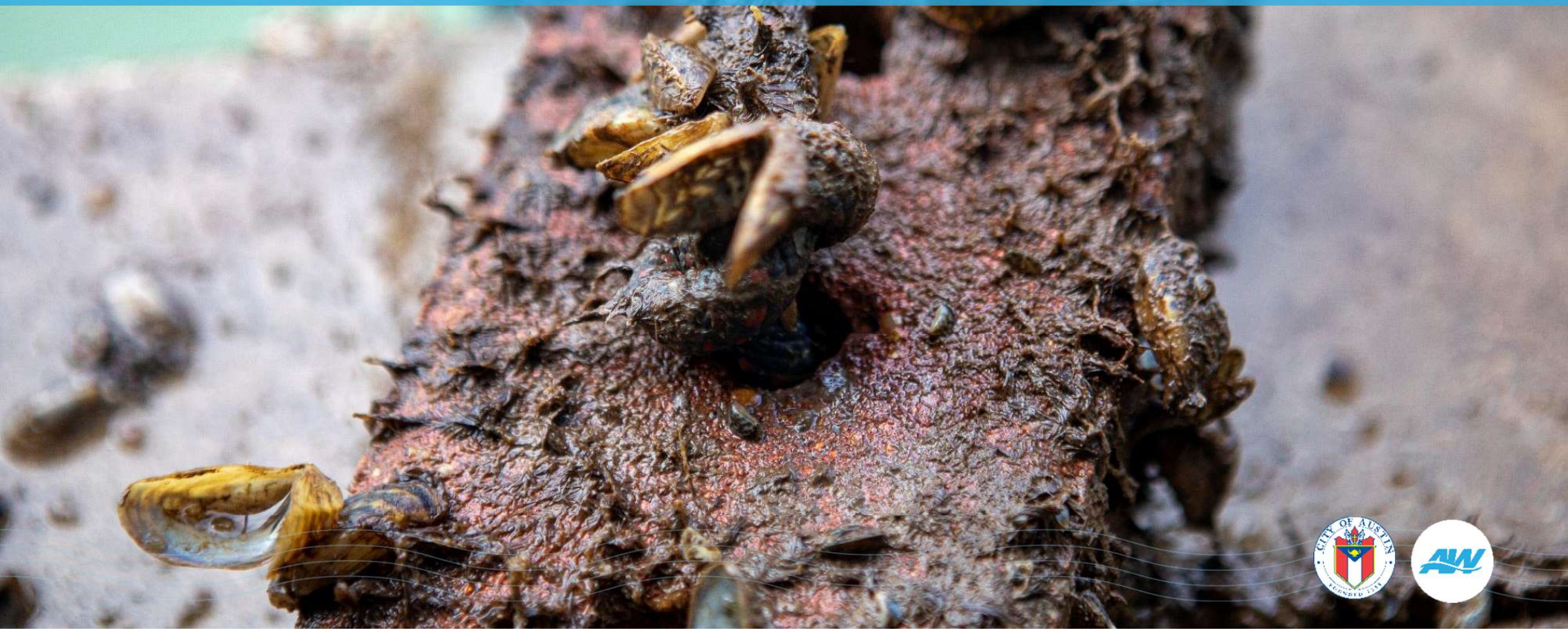
Timeline

- **Oct 15:** Increased rainfall to the NW of Austin
- **Oct 18**: Began 24-hour manned Operations at the dam
  Staged AW Department Operations Center (DOC) for possible activation
  Treatment Plants began to see elevated raw water turbidity
- **Oct 21:** AW DOC Activation
- **Oct 22:** Preemptive Boil Water Notice
- **Oct 24:** AW released TCEQ required Mandatory Boil Water Notice
- **Oct 28:** Boil Water Notice Rescinded

Challenges

- Incoming raw water damaging to plants
  - High turbidity placed demands on filtration, pumps, and related infrastructure
- Water quality expectations
- Requests for public reduction in usage
- Water supply versus water quality
- Communication:
  - City Leaders
  - TCEQ
  - City/County Partners
  - Customers
  - Wholesale and Large Volume Customers

Zebra Mussels Infestation



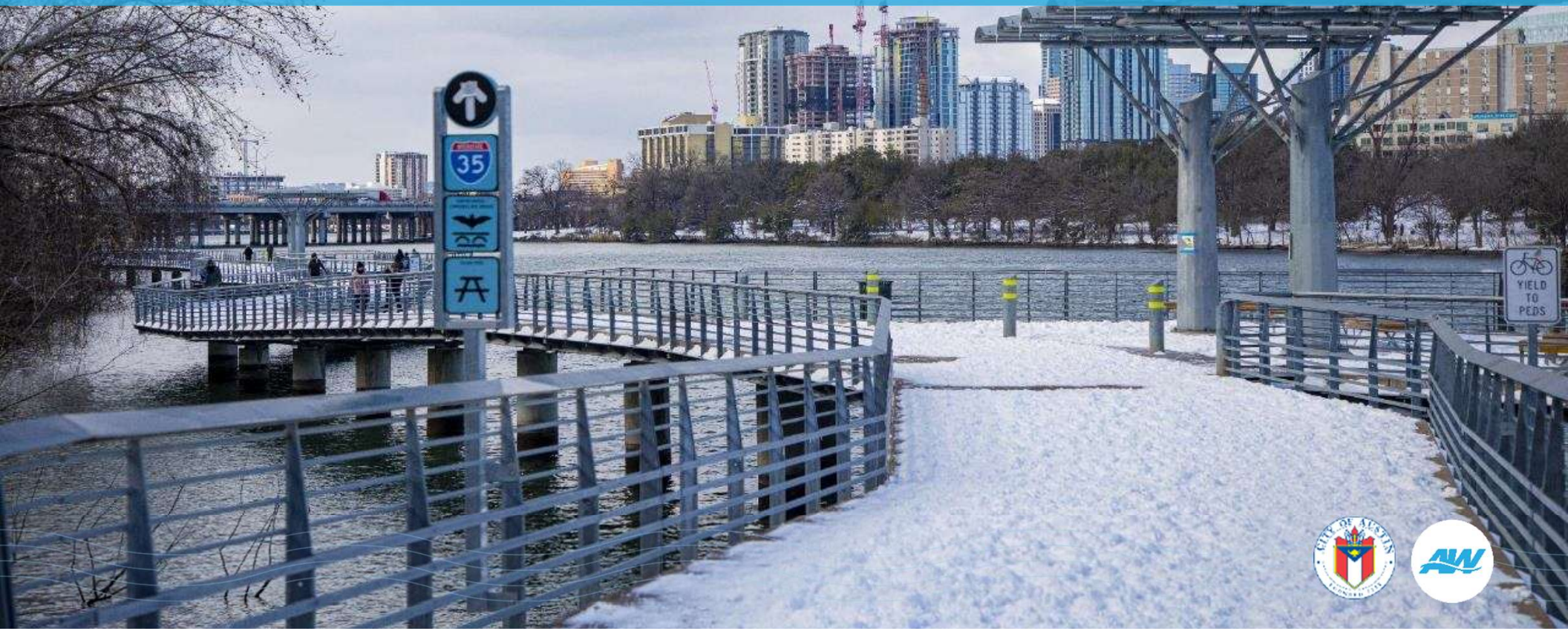
Incident Overview & Challenges

- **2017:** Zebra Mussels detected in Lakes Austin and Travis
- **2018**: Contract established for inspecting and cleaning intakes
  Intake screens at Handcox WTP 100% covered with mussels
- **2019:** Taste and odor issue emerged at Ullrich WTP from dead zebra mussels in the raw water pipeline
  Powder activated carbon used to reduce taste and odor compounds
- **2020:** Copper sulfate feed system installed to control and prevent future infestations
- **Key Challenges:**
  - Lack of early planning for zebra mussel infestations
  - Procedures for taking lines out of service for inspections and cleaning

Fire Foam Incident

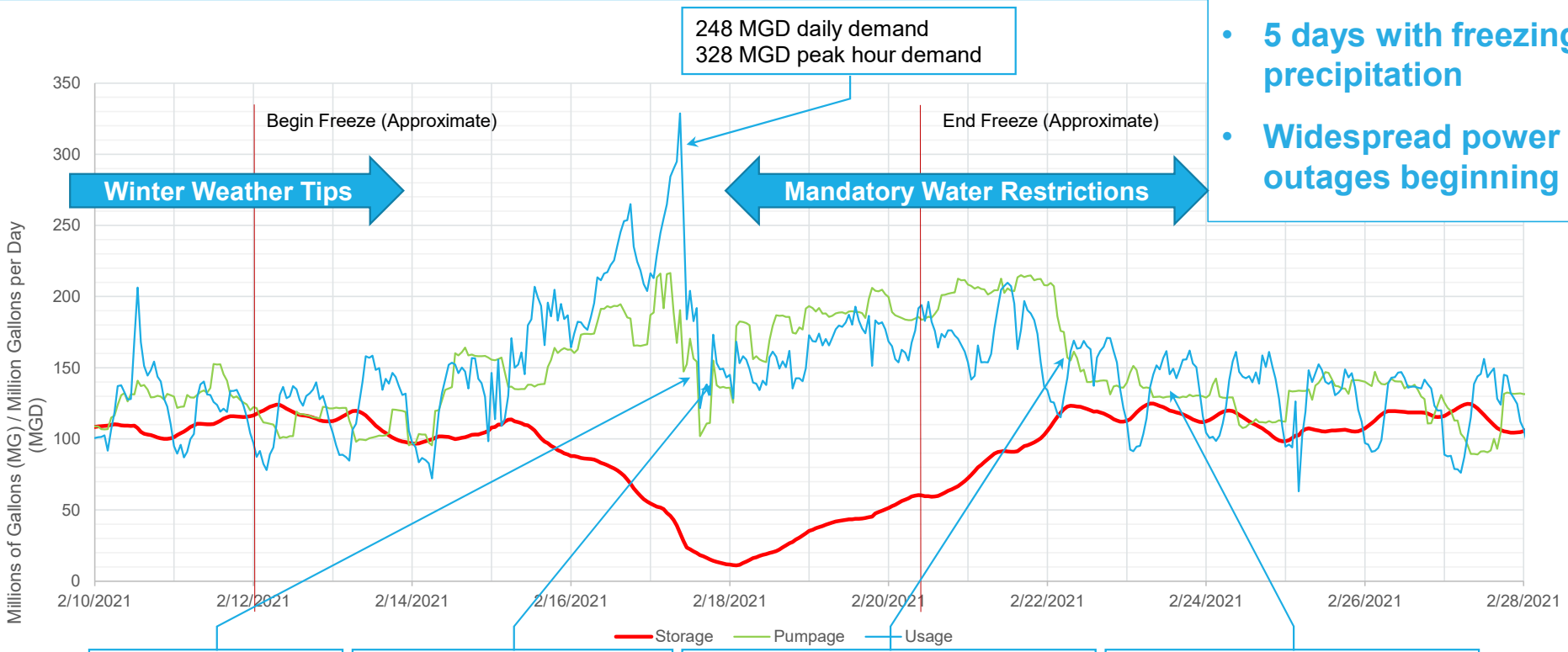
- Austin Fire Department responded to a fire and connected fire foam to a publicly supplied hydrant
- Connection created backflow to water distribution system
- Foamy water was reported to AW Dispatch by customers
- Austin Water initiated flushing procedures and public notifications
- New Standard Operating Procedures were developed in coordination with Austin Fire Department on proper connection and notification procedures

Winter Storm Uri



Event Overview

- 164 consecutive hours below freezing
- 5 days with freezing precipitation
- Widespread power outages beginning 2/15



Ullrich Power Outage
2/17 @ 2:00 PM

Citywide Boil Water Notice
2/17 @ 8:30 PM

Central Zone Boil Water Notice lifted
2/22 @ 5:30 AM

Citywide Boil Water Notice lifted
2/23 @ 11:45 AM

Timeline

- **Feb 9-14:** Protect your pipes from freezing weather tips distributed to customers
- **Feb 15-16**: Longhorn Dam operations shifted to manual with loss of power
  Water pressure, storage levels dropped in SW Austin
- **Feb 17:** Water demand peaked at all time high
  Power outage at Ullrich WTP limited production
  Low pressure and widespread outages began
  Citywide boil water notice issued
- **Feb 18-21:** Mandatory conservation requirements instituted
  Treatment plant production capacity restored
  Storage levels restored
- **Feb 22-23:** Boil water notice lifted for all pressure zones
- **Feb 24:** Mandatory water use restrictions lifted

Challenges

- Winter preparedness messaging around dripping pipes
- Treatment plant preventative maintenance activities scheduled for traditionally low demand winter months
- Power reliability and resilience
- Emergency water distribution
- Emergency planning for extreme cold conditions
- Staff training for emergency incidents

Ullrich WTP Turbidity Event

Timeline

- **Feb 4:** Seeding process commences at 5 PM and noted in pass down notes

  Night shift directed to monitor sludge disposal and keep basins online

  Basin turbidities start to climb at 9:30 PM

- **Feb 5**: Turbidity exceeded 100 NTU by 2:30 AM and source misdiagnosed

  Basin remained online throughout night shift

  No supervision notified throughout the night shift

Incident Challenges

- As basin exceeded turbidity SOP standards, night shift misdiagnosed cause
- Filter SOP was not followed when filters overloaded
- SCADA was not reviewed until 4:00 AM, at which time seeding was stopped
- No action was taken to turn off basin by night shift
- Supervisors were not notified by night shift

External Review Key Findings

- Austin Water's Power Reliability and Emergency Preparedness Plan is effective.
- The Ullrich Water Treatment Plant infrastructure is adequately designed with sufficient capacity and Austin Water treatment processes are appropriate.
- Austin Water has taken steps to mitigate water quality risks and improve operational resiliency at its water treatment plants.
- Austin Water's emergency management structures are well thought out, suitably structured, and aligned with FEMA standards.

Resiliency Improvements

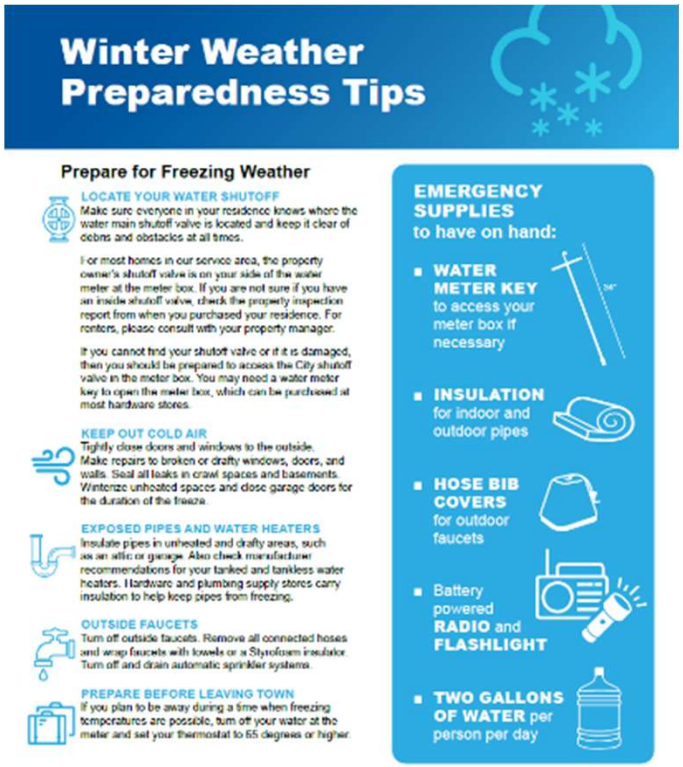
Communications

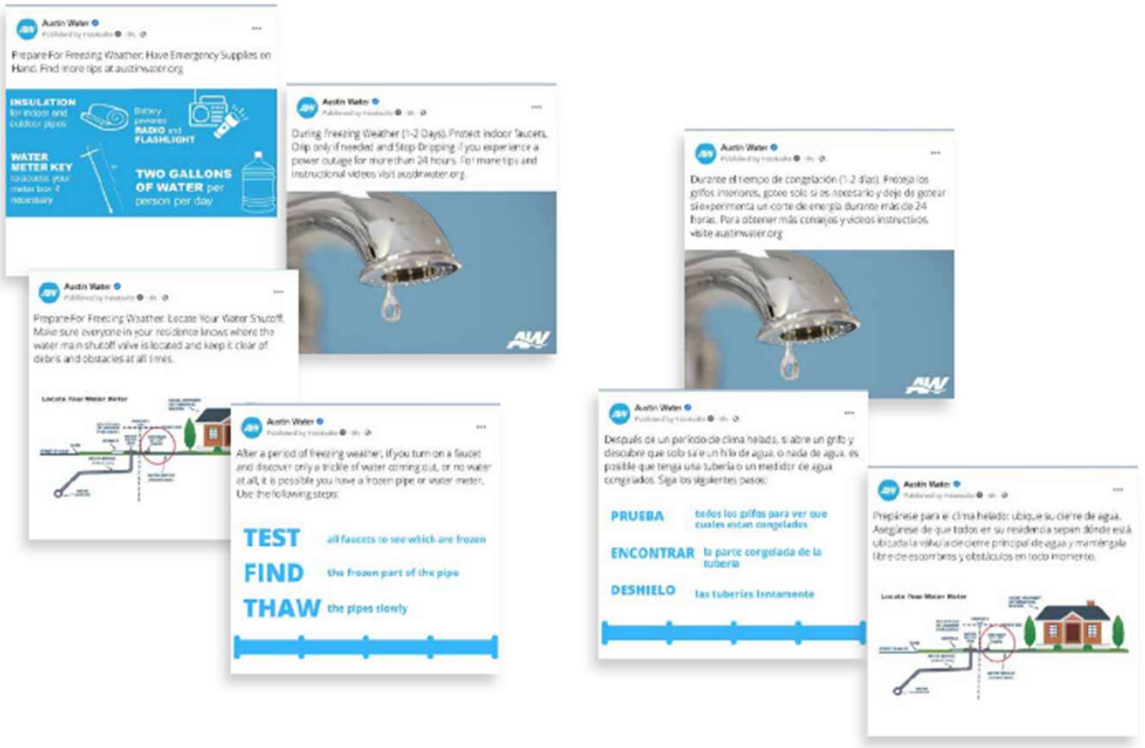
Communications
Key Recommendations

- Adjust and enhance Winter Weather Preparedness messaging
- Increase use of My ATX Water portal notifications during emergencies
- Conduct targeted outreach to multi-family properties
- Media updates timed to align with news cycle
- Provide media training for Austin Water leadership
- Enhance internal communications for Austin Water staff
- Provide public information in languages other than English

Winter Weather Preparedness Materials

Tips, Social Posts, Notifications – 6 languages





Winter Weather Preparedness Materials

Educational Videos and Tools

Toolkit Distribution

City of Austin Utilities Customer Service Centers

Service Outage Map

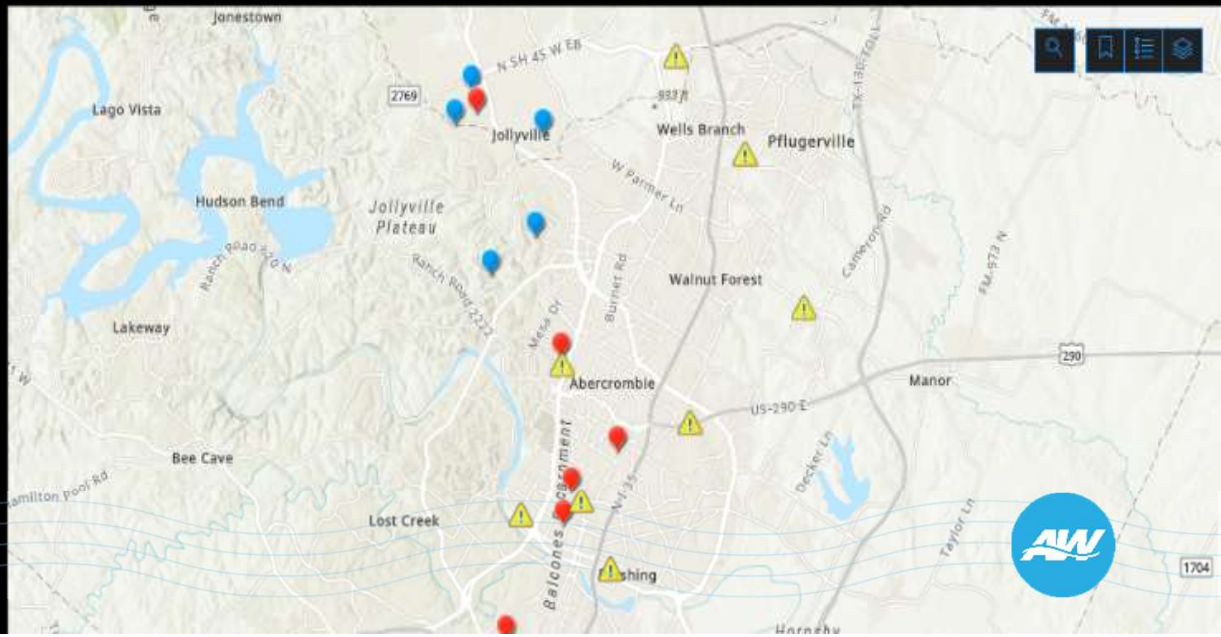
AW Leak & Outage Map

Current Shutouts	Leaks Pending Repair	Leaks Pending Inspection
12	8	9
Last update: a few seconds ago	Last update: a few seconds ago	Last update: a few seconds ago

Current Shutouts

Address:
5005 PARMER LN
Reference #:
SR 968691
Details:
5005 E PARMER LN
From:
1/5/2022, 8:52 AM
To:

Address:
2513 SETON AVE
Reference #:
SR 961452
Details:
2513 SETON AVE
From:
1/10/2022, 9:00 AM
To:



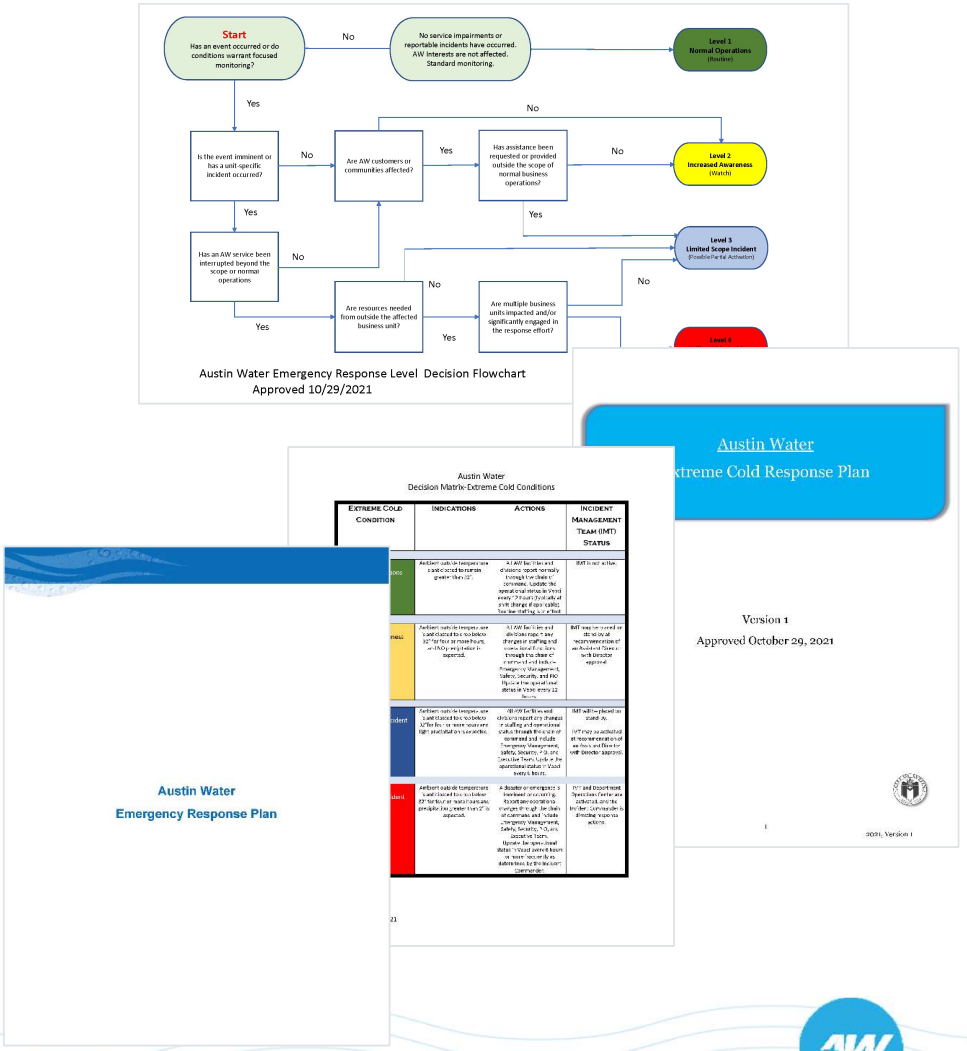
Emergency Management

SB3 Emergency Preparedness Plan

- **SB3 Deadlines**
  - **November 1, 2021:** Notify power providers of critical loads
  - **March 1, 2022**: Submit Emergency Preparedness Plan to TCEQ identifying options to be used
  - **July 1, 2022:** Implement Emergency Preparedness Plan
- **Extensive system-wide review of Austin Water water facilities**
  - Electrical system hardening and redundancy at critical sites
  - Critical Load designation status from Austin Energy for critical facilities
  - Treatment, pumping, and storage capacity management and demand management

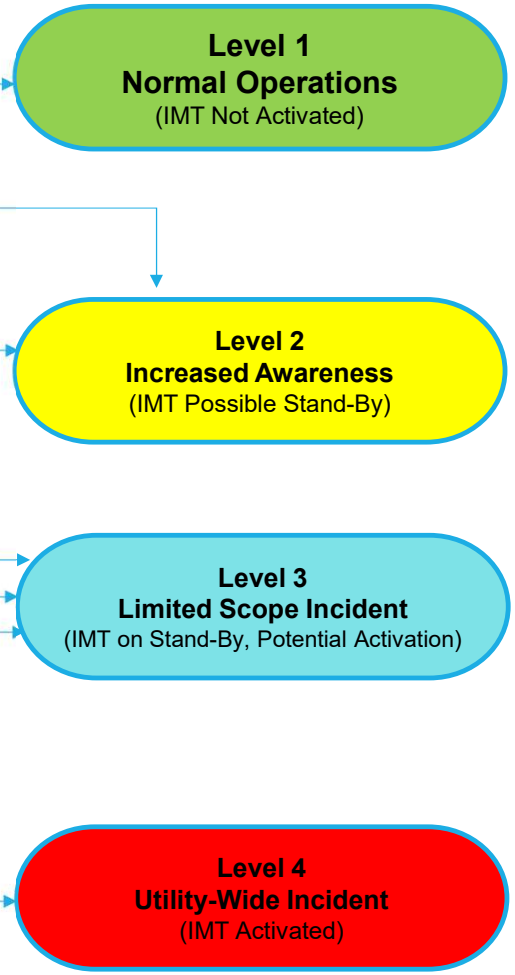
Emergency Response Plan Updated

- Extreme Cold Response Plan
- Decision Matrices:
  - Extreme Cold Conditions
  - General Operations Conditions
- Enhanced emergency communications
- Emergency alternate drinking water supplies
- Added data on Wastewater Facilities
- Emergency Water Use Restrictions Procedures



Situational Awareness Improvements

- Decision Matrices for Incident Management Team consider:
  - National Weather Service forecasts for extreme weather
  - Austin Water operational status and impairments
  - External events in the community
- As conditions worsen, IMT status is elevated
- Pre-determined activation triggers preparations for varied incidents beyond weather
- Exercise VEOCI on low-stakes events



Staffing and Training

- Expanded Emergency Management Team with clearly defined roles
- Emergency Plans Officer Senior focused on community resilience
- Incident Management Team
  - Three rotating shifts
  - Enhanced communications role
  - Reporting process
- Incident Command System Training
  - Online and in-person training
  - Reporting process

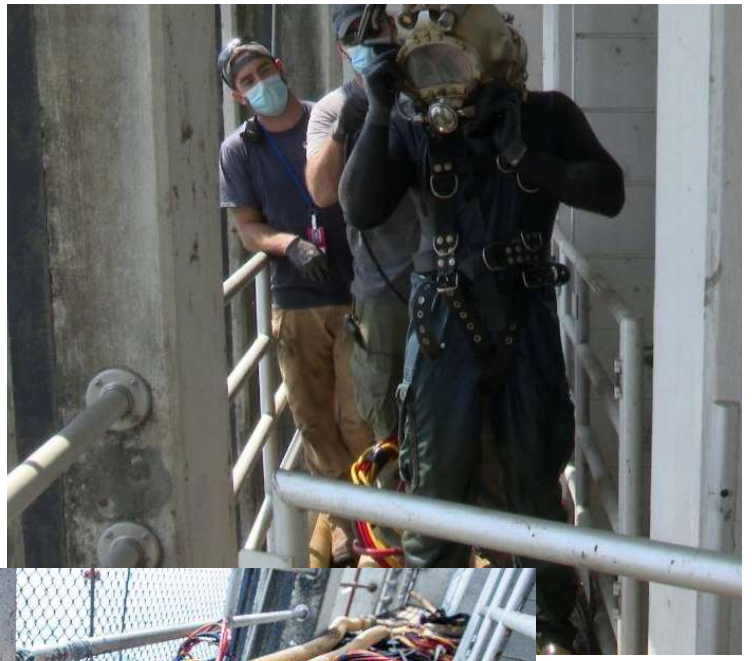
Emergency Supplies

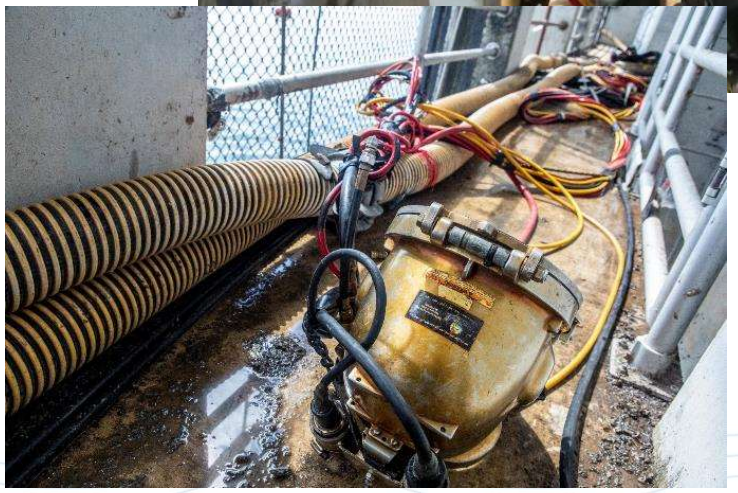
- **Hub Warehouse Equipped for Incidents and Emergencies**
  - Shelter in Place Supplies for staff: cots, blankets, meals ready to eat, bottled water, and hygiene kits
  - Emergency water distribution supplies for customers: bottled water, water totes, fire hydrant adaptors
- **Two Potable Water Trucks Delivered**
- **Bottled Water Contracts Ready**
  - Local vendor with supply on hand
  - Second vendor for multiple truck load shipments

Operations

Cleanings and Inspections for Zebra Mussels

- Water Treatment Plant cleaning and inspections have occurred at least annually since 2019
- Most recent inspections occurred at all three plants in November and December 2022
- Observations confirmed that zebra mussel accumulation has decreased





Ullrich Water Treatment Plant

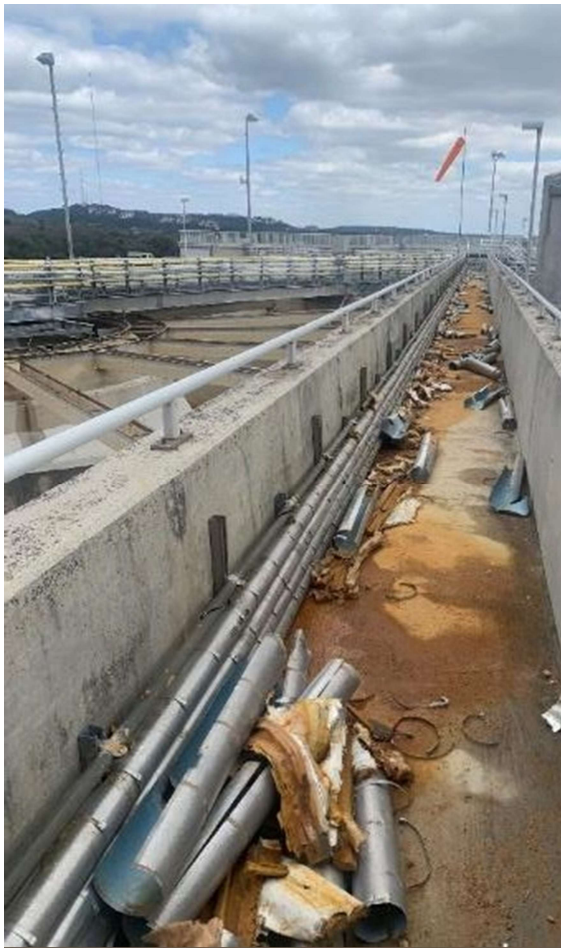
2022 Pre- and Post-Removal from Trash Rack

Typical soft growth on Ullrich Trash Rack

Post-Cleaning Trash Rack

Winter Weather Preparations

- Completed storm damage repairs and piping insulation
- Secured alternative chlorine analysis tools
- Winter weather and safety supplies stocked
- Winterization Standard Operating Procedures updated



Updated Capacity Availability Protocols

- Updated Maintenance and Operations Protocols to meet higher water demand in winter
- Facility Concurrence Process to avoid multiple outages
- Situational Awareness of chemical storage, staffing availability, production capacity
- Using technology to inspect in-service infrastructure - ROVs

Operations Procedures

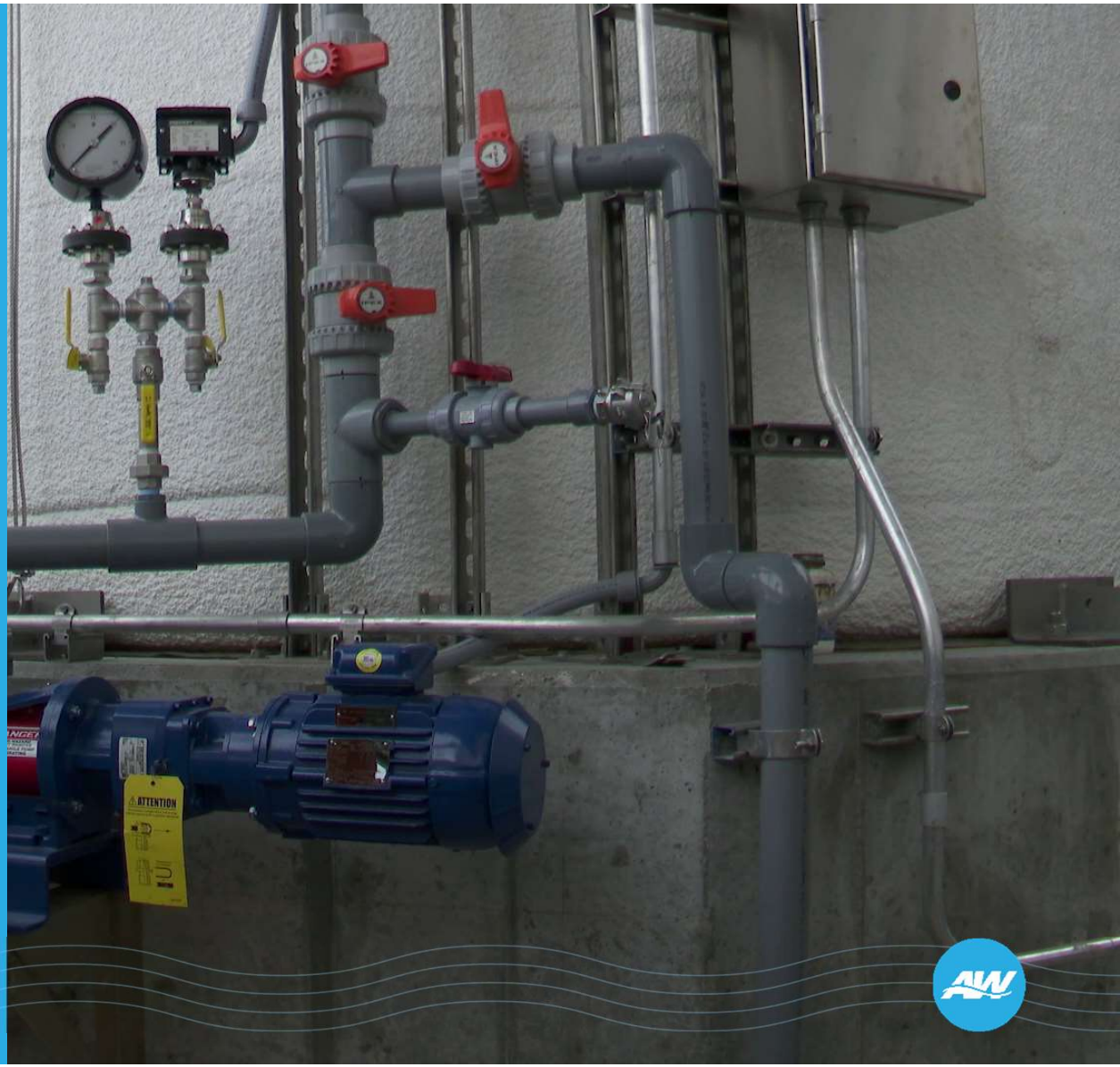
Other Key Recommendations

- Increased remote SCADA access
- Timer-based seeding only
- Enhanced shift pass down communication procedures
- Training on plant parameters, action levels, and regulatory requirements
- Filter control logic improvements
- External notifications for alarms
- Formalized operations training plan
- Review and update SOPs and guidelines

Infrastructure Priorities

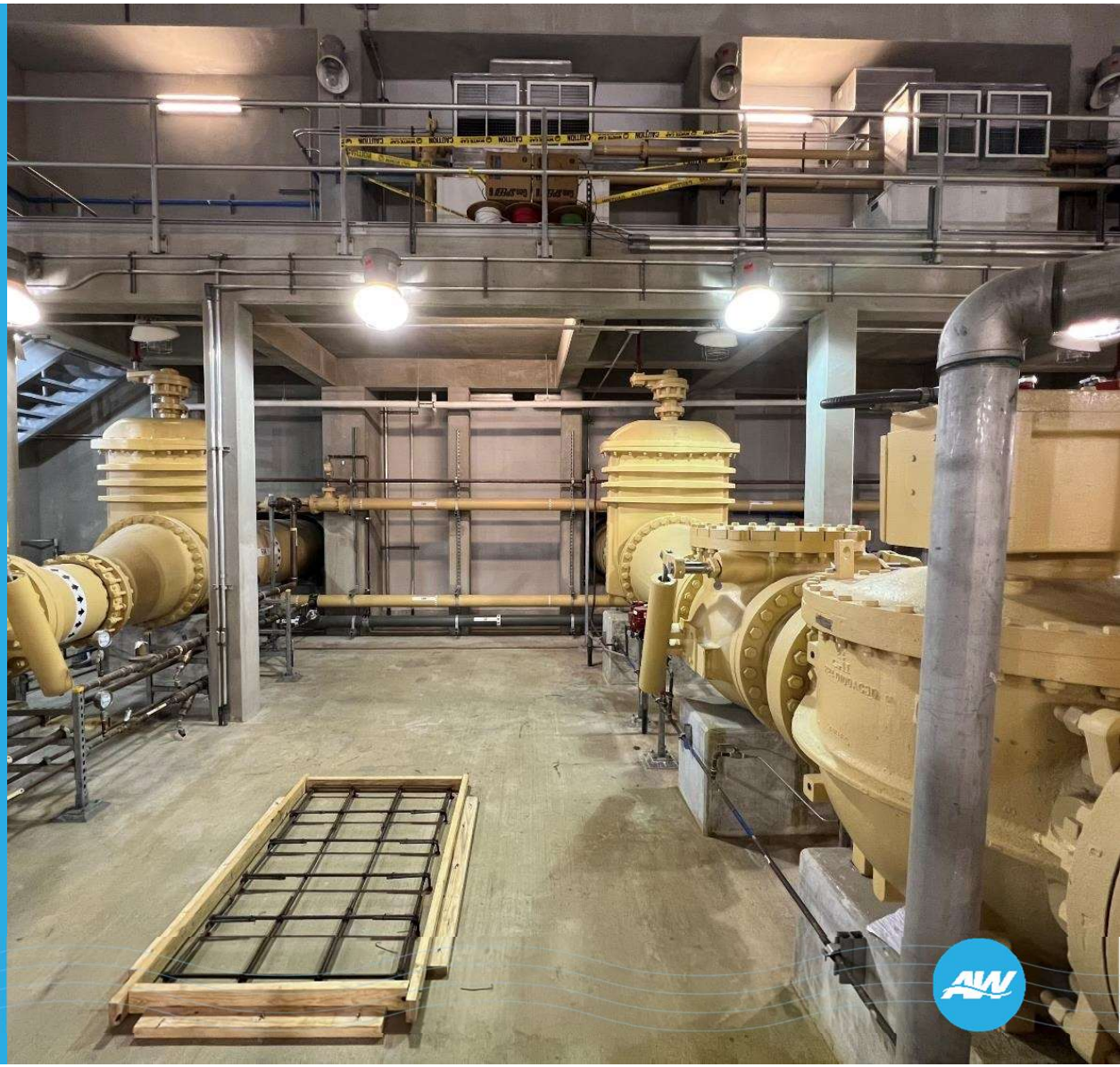
Polymer Chemical Feed System

- Removes high levels of silt and decreases turbidity
- Completed at Ullrich WTP in October 2021
- Completion at Davis and Handcox WTPs in 2023



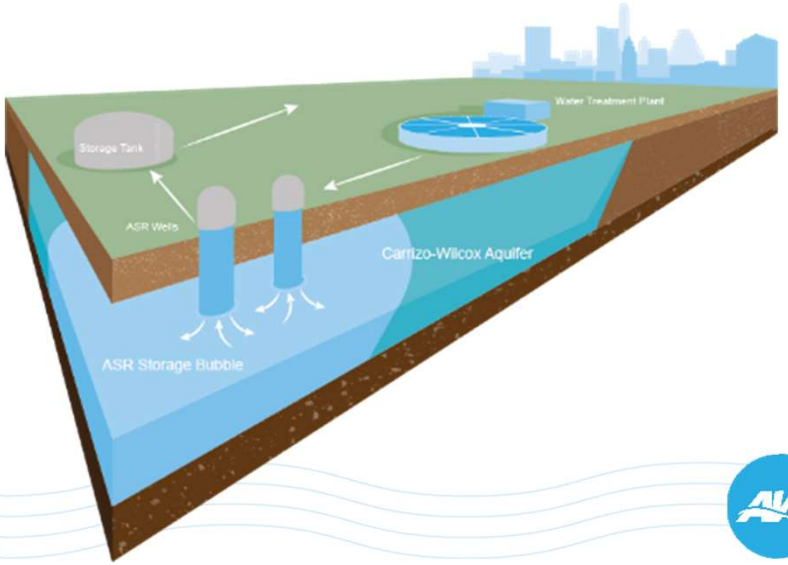
Copper Ion Generation System

- Construction began last fall
- Substantial completion expected Winter 2024
- Electrical, structural and civil work progressing



Strategic Investments

- Aquifer Storage and Recovery
- My ATX Water
- Reclaimed Water



Electrical System Renewal

Davis WTP
35th St Main Power Feed Replacement

Davis Lane Pump Station
Dual Power Feed

Berl L. Handcox, Sr. WTP

Ullrich WTP
Low Service Pump Station Electrical Feed Renewal

Davis WTP
Electrical Substation

Center Street Pump Station Replacement

South First
Service Center Operations Center

Ullrich WTP
2.5kV Electrical System & Finished Water Pumping Improvements

Davis WTP
Power Distribution Upgrade Phase B

2010	2015	2020	2025	2030
$40 million		$210 million		$130 million

WC WWTP Electrical Substation No. 1

HB BMP Digester Electrical Improvements

Great Hills Lift Station
Electrical Improvements

Bintliff Lift Station
Electrical Improvements

WC WWTP Electrical Substation No. 2

Lost Creek WWTP
Electrical Improvements

Springfield Lift Station
Electrical Improvements

Southland Oaks Lift Station
Electrical Improvements

Wild Horse WWTP
Dual Power Feed

Lift Station On-Site Emergency Generators
Great Hills
Tracor
Texas Plume
Bintliff
Barrington Oaks

SAR WWTP Train A&B Improvements and Electrical Substation

WC WWTP Electrical Substation No. 3

HB BMP
Plant-wide Electrical Replacement

WWTP Wastewater Treatment Plant
WTP Water Treatment Plant
SAR South Austin Regional
WC Walnut Creek
HB BMP Hornsby Bend Biosolids Management Plant

Prioritized Water Resiliency Projects

- Renewing Austin pipeline renewal program
- Reservoir, storage tank, transmission mains, pumping projects
- WTP resiliency projects
- Operations center improvements
- Continue programmatic approach to electrical resiliency
- Include AW “betterments” in mobility projects

Electrical Reliability Projects

- Davis WTP Power Distribution Upgrade
  - Implement ability to transfer power between feeds on the Austin Water side
- Ullrich WTP Low Service Pump Station Electrical Feed Renewal
  - Implement third feed with automatic transfer capability
- Davis Lane Pump Station Electrical Resiliency Project
- South Austin Regional Wastewater Treatment Plant Substation
- Lift Stations, Pump Stations and Data Centers generators
- Evaluate locations for third-party power generation

Employee Leadership & Development

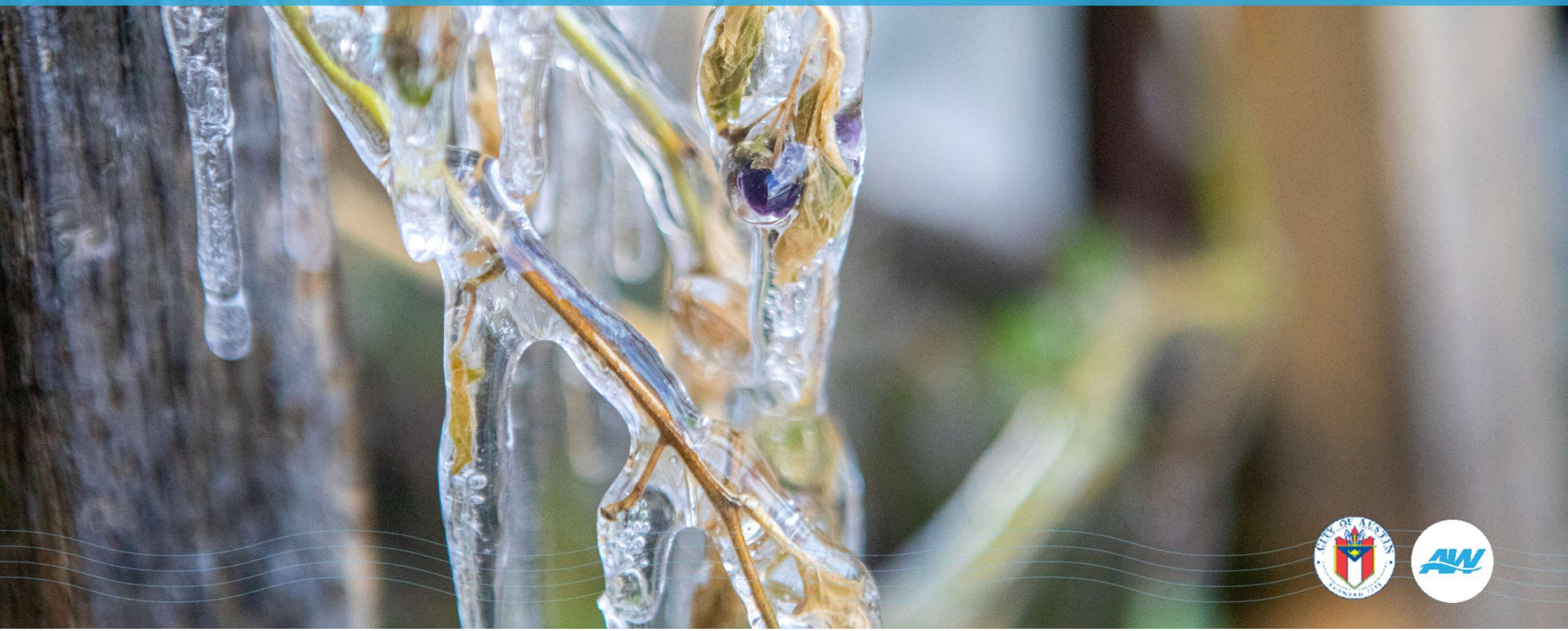
Employee Leadership & Development

Key Recommendations

- Continue to recruit and retain a skilled workforce
- Continue to advocate for increased compensation
- Incorporate new training positions for Operations and Maintenance staff
- Train personnel for plant-specific knowledge
- Improve communication between Pumping and Plant Operations
- Review management structure to support plant operations
- Evaluate emergency planning and training at each plant

Applying Lessons Learned

Winter Storm Mara



Questions / Discussion