

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



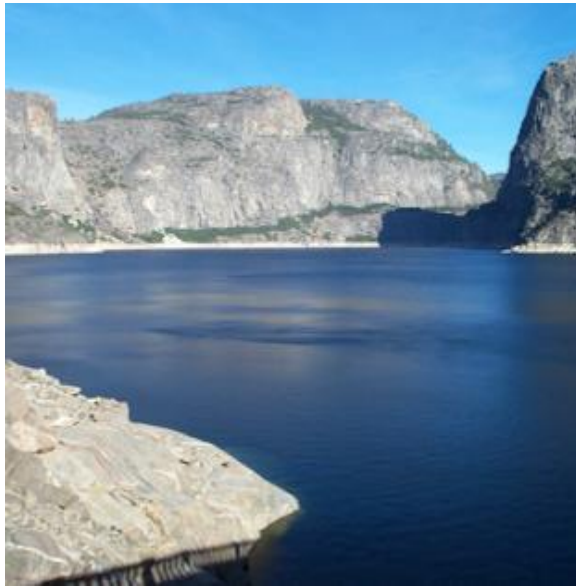


Water Reuse in Urban Environments

**Paula Kehoe
San Francisco Public Utilities Commission
October 4, 2018**



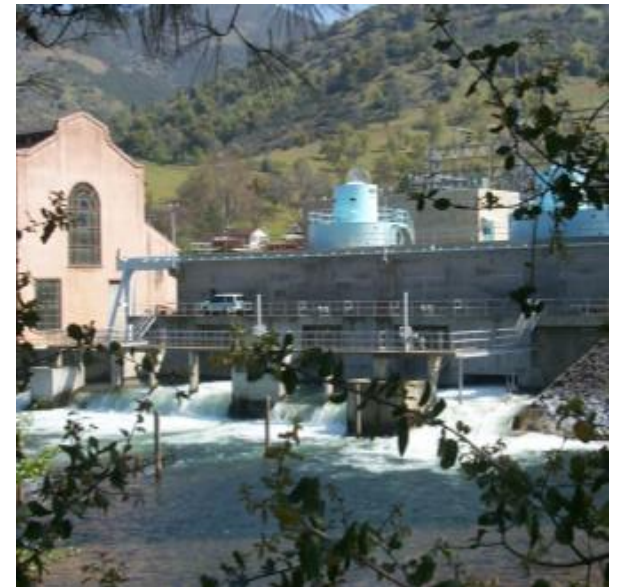
San Francisco Public Utilities Commission



Water: delivering high quality water every day to 2.7 million people



Wastewater: protecting public health and the environment



Power: generating clean energy for vital City services



San Francisco's Local Water Program

HETCH HETCHY **+ LOCAL WATER**

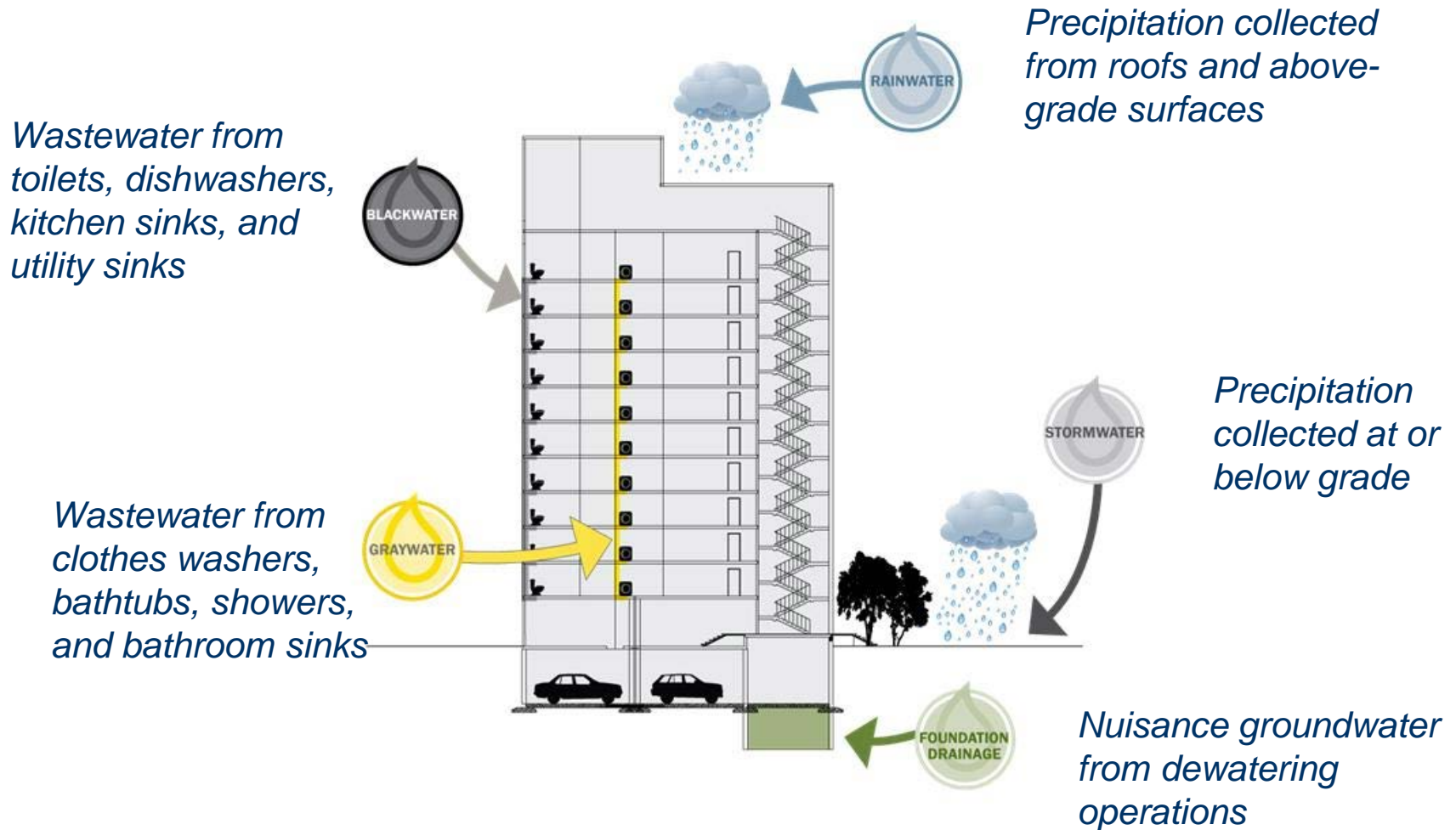
Better together.

Conservation
Groundwater
Recycled Water

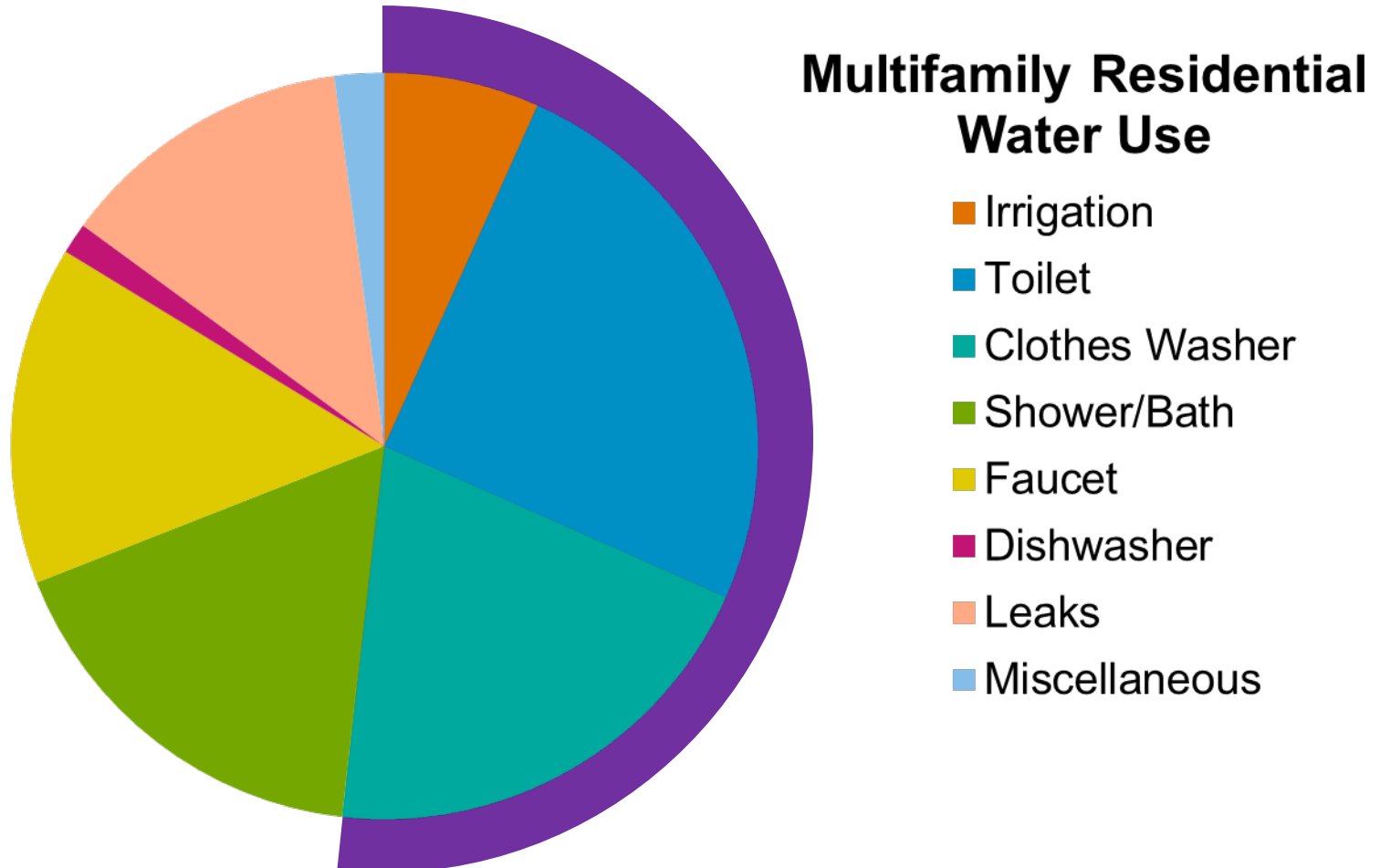
Opportunity to Re-think Building Design & How Water is Used



Buildings Produce Alternate Water Sources



Up to 50% of Demands are Non-potable in Multi-family Residential Buildings



Source: adapted from Alliance for Water Efficiency

Up to 95% of Demands are Non-potable in Commercial Buildings



Office Water Use

- Sanitary
- Cooling Tower Make-up
- Irrigation
- Single-Pass Cooling
- Kitchen
- Miscellaneous

Innovative Onsite Non-potable Water Use at SFPUC Headquarters

Rainwater Harvesting System

- 25,000 gallon cistern
- Reuse for irrigation

Wetland Treatment System

- Collects and treats building's wastewater
- Reuse for toilet flushing
- 5,000 gpd capacity



Developers Interested in Collecting & Treating Water Onsite

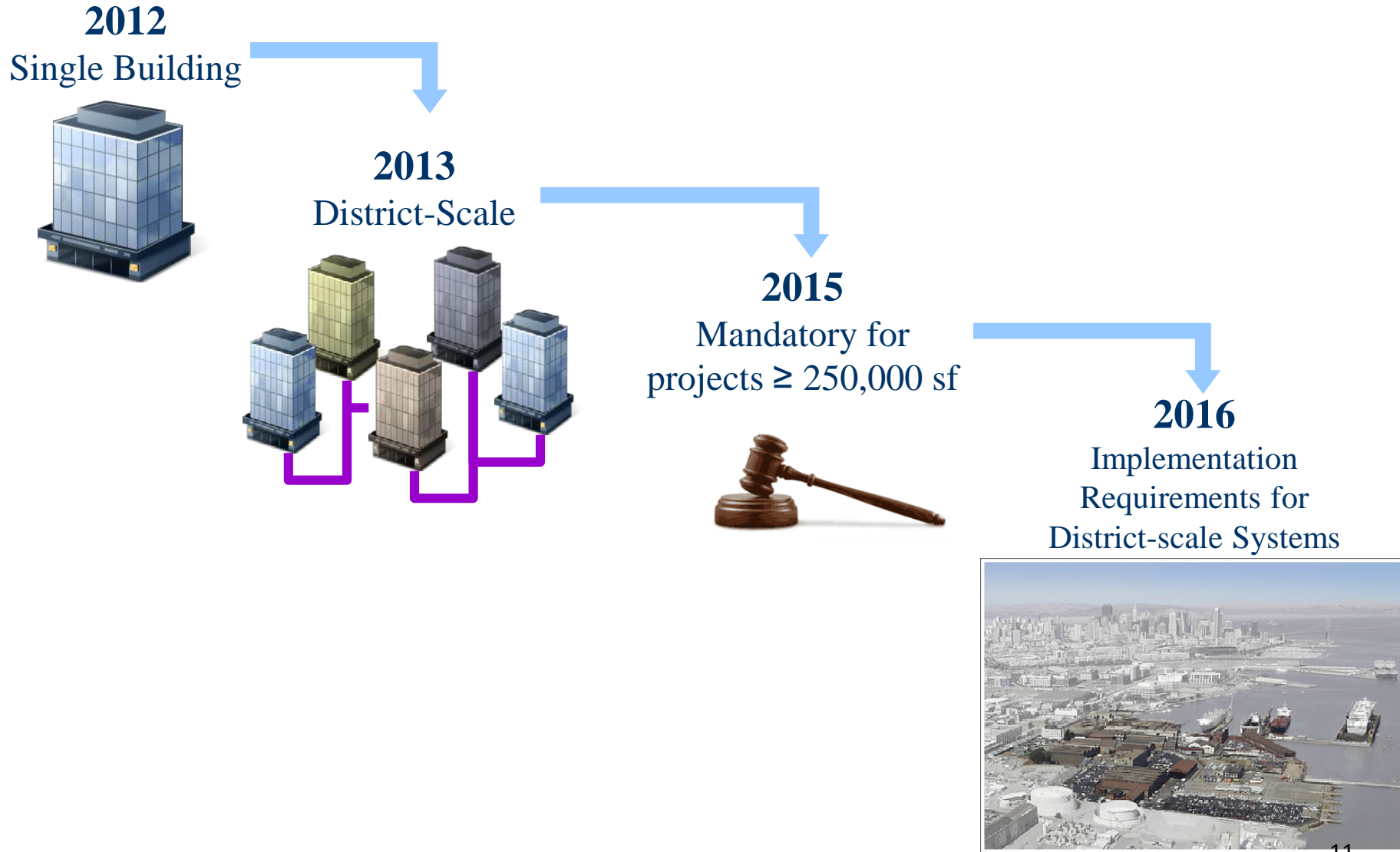




San Francisco Ordinance & Roles and Responsibilities

SFPUC	SFDPH	SFDBI	SFPW
Program Administration and Cross-Connection Control	Public Health	Construction	Right of Way and Mapping
<p>Review onsite non-potable water supplies & demands</p> <p>Administer citywide project tracking & annual potable offset achieved</p> <p>Provide technical support & outreach to developers</p> <p>Manages Cross-Connection Control Program</p>	<p>Issue water quality & monitoring requirements</p> <p>Review and approve non-potable engineering report</p> <p>Issue permit to operate onsite systems</p> <p>Review water quality reporting</p>	<p>Conduct Plumbing Plan check and issue Plumbing Permit</p> <p>Inspect and approve system installations</p>	<p>Issue Encroachment Permits as needed for infrastructure in the Right-of-Way (if needed)</p> <p>Includes condition on a subdivision map or a parcel map requiring compliance with the Non-potable Ordinance prior to approval and issuance of said map (if applicable)</p>

An Evolving Non-potable Water Program



Hampton Inn

Rainwater for Toilet Flushing



181 Fremont

Graywater for Toilet Flushing



Salesforce Tower





San Francisco
Water
Power
Sewer

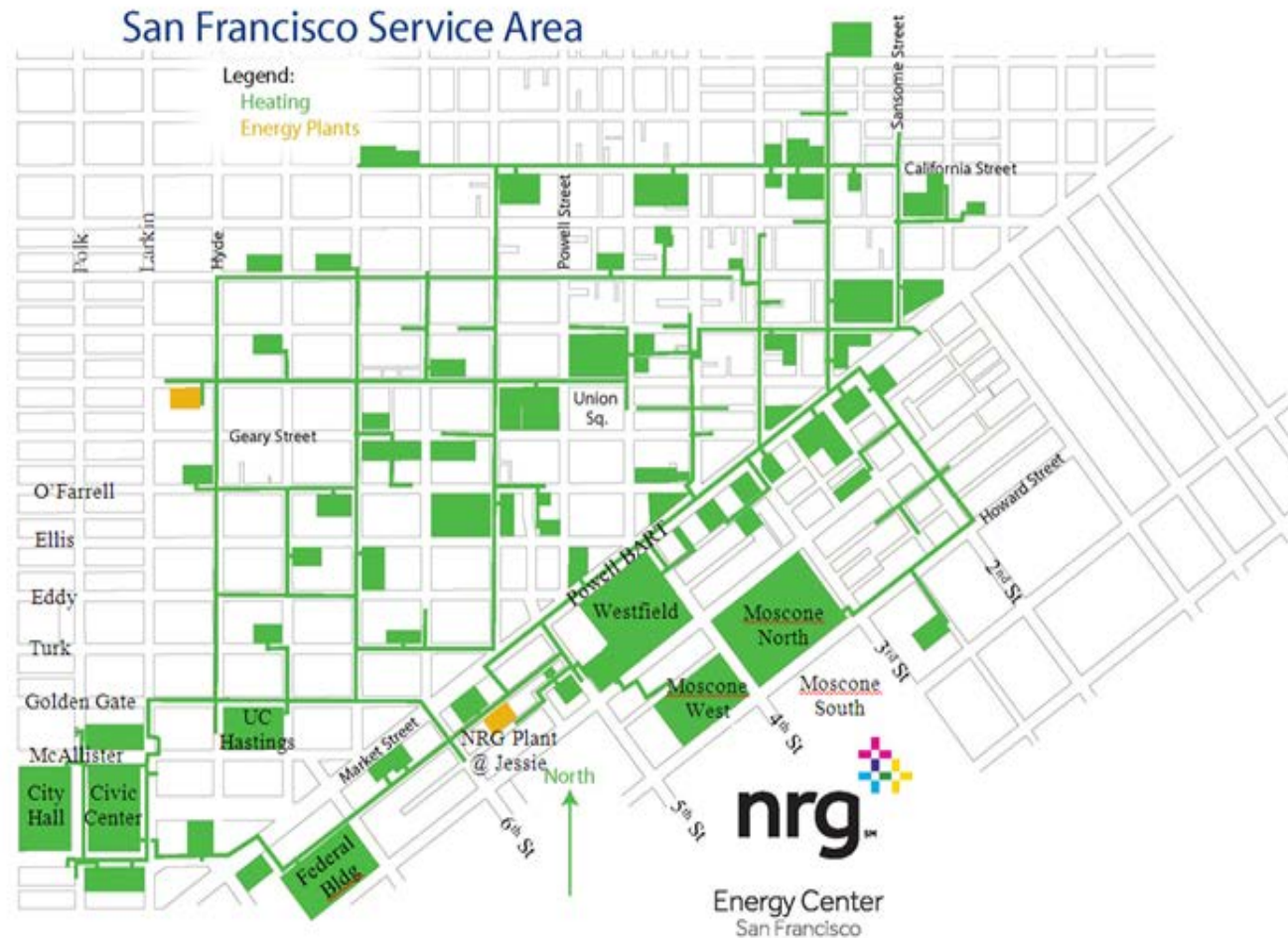
Moscone Convention Center

Foundation Drainage for Flushing, Irrigation, and Street Sweeping



NRG-BART Project

Foundation Drainage for Downtown Steam Loop



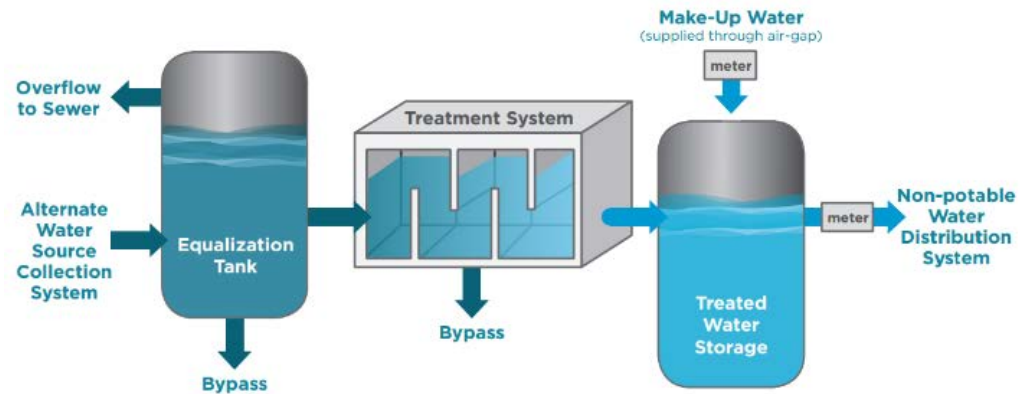
Key Utility Considerations

- Wastewater flows and odors
- Revenue impacts
- Capacity charge adjustments
- Excess use charges
- Policy synergies
- SFPUC capital projects



Key Program Considerations

- Water and sewer connections
- Backflow protection requirements
- Cross connection test prior to operation
- Operator capacity





SF Non-Potable Water Program Observations

- Interagency collaboration and requires dedicated staff for oversight and management
- Voluntary program before mandatory program
- Adapt to an evolving industry (technology, science and regulations)
- Cultural shift for utility
- Transforming the way we live and work in SF

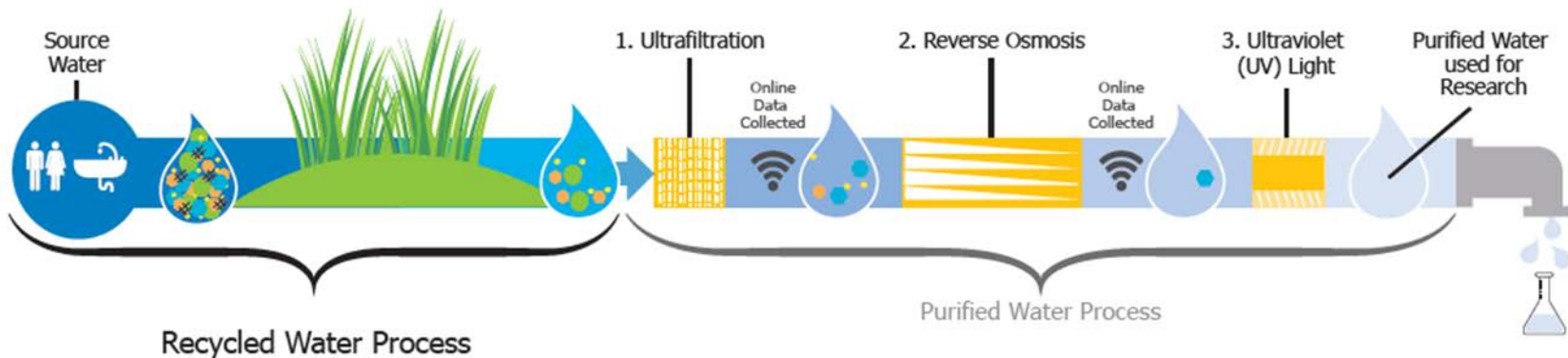
Expanding Non-potable Water Program

- Expanding focus to include brewery process water onsite treatment and reuse
- Contact and non-contact uses
- Grant opportunities



Piloting Purified Water Project

- Produce purified water from recycled water at SFPUC headquarters
- Research project including additional treatment and real time monitoring
- Community outreach and public education



Innovation in Urban Water Systems

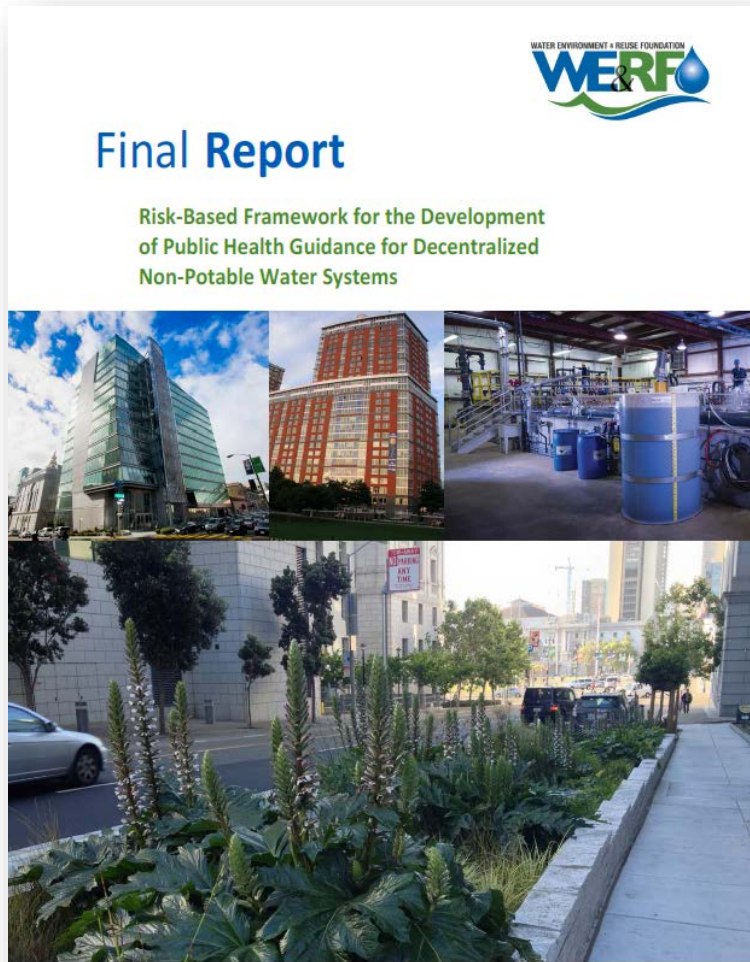
San Francisco • May 2014



Addressing Barriers Water Quality and Governance



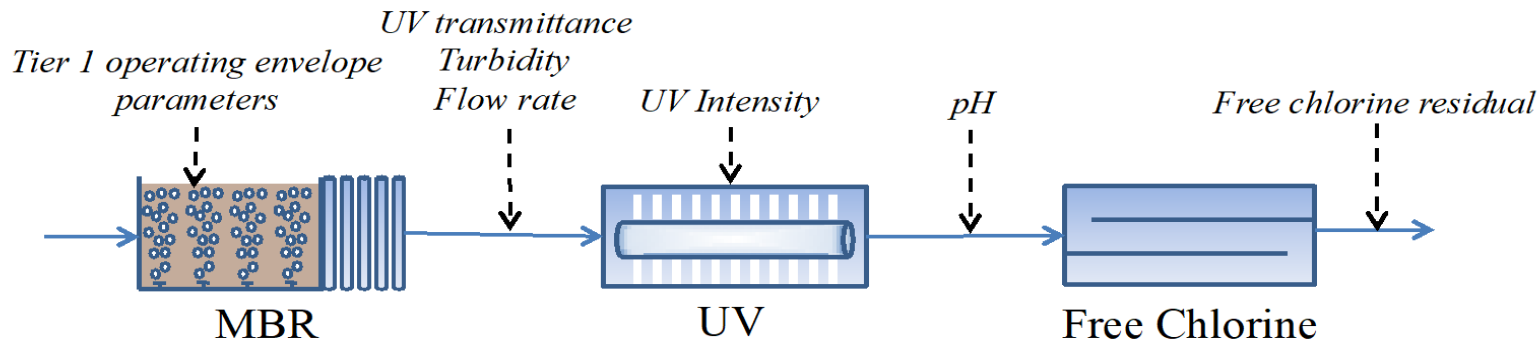
New Technical Guidance for Public Health Standards for Onsite Water Systems



- Current water quality standards are not health risk based
- Risk-based pathogen Log Reduction Targets (LRTs) were established using a methodology that estimates the potential health risk associated with exposure to viruses, protozoa, and bacteria
- Methodology is based on widely accepted practices for potable reuse and drinking water

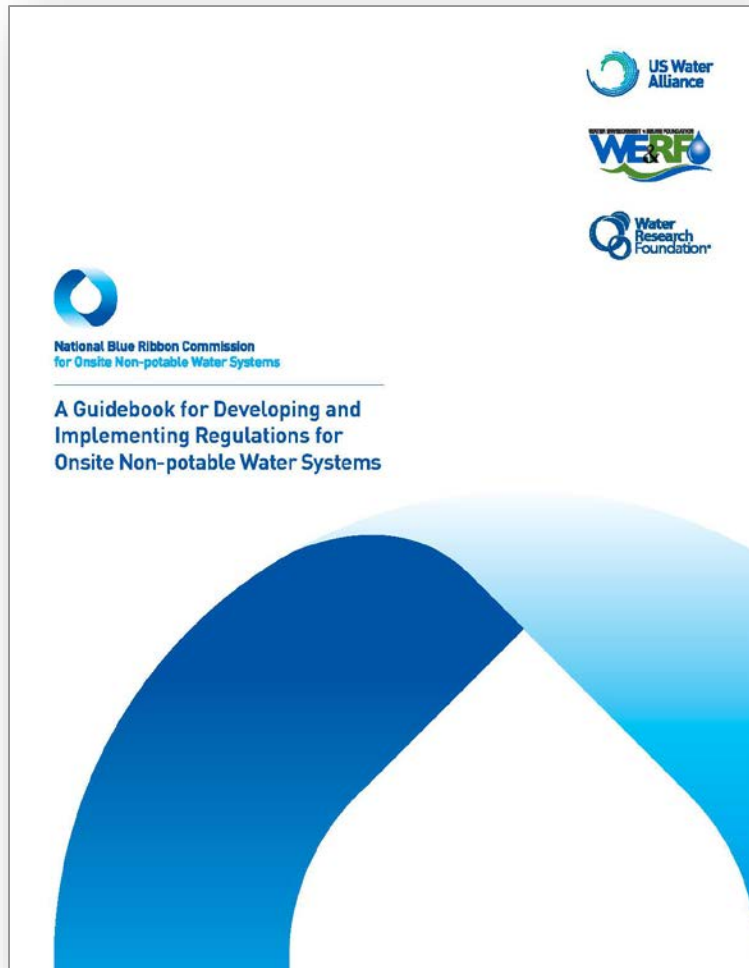
Log Reduction Targets			
Alternate Water Use Scenario	Enteric Viruses	Parasitic Protozoa	Enteric Bacteria
Blackwater			
Outdoor use	8.0	7.0	6.0
Indoor use	8.5	7.0	6.0
Graywater			
Outdoor use	5.5	4.5	3.5
Indoor use	6.0	4.5	3.5
Roof Runoff			
Outdoor use	N/A	N/A	3.5
Indoor use	N/A	N/A	3.5
Stormwater			
Outdoor use	3.0	2.5	2.0
Indoor use	3.5	3.5	3.0

Example Blackwater Treatment Train



					Total	Required
Pathogen Crediting	Virus	1.5	3.5	5	10	8.5
	Protozoa	2	6	0	8	7
	Bacteria	4	3.5	0	7.5	6
Validation and Field Verification		Field verification of operation within Tier 1	Validation for dose of 80 mJ/cm ²	Tracer study or assumed baffling factor of 0.1		
Treatment System Requirements		Effluent turbidity < 0.2 NTU; Operation within Tier 1; Effluent UVT > minimum validated value for UV reactor	UV dose > 80 mJ/cm ²	CT of 450 mg-min/L 90-min T _{Modal}		

Guidebook for Developing and Implementing Policies for ONWS



- Model State Regulation
- Model Local Ordinance
- Program Rules to be implemented with the state regulation or local ordinance
- Intended to create nationally consistent treatment standards and management approaches from state-to-state

3 Pathways to Implementation

- States Develop Regulation and Local Authority Implements
- States Develop Regulation and Implements
- Local Authority Develops Regulation and Implements



Stakeholder Outreach CA Statewide Policy for Onsite Systems

STAKEHOLDER OUTREACH IN THE STATE OF CALIFORNIA



CALIFORNIA WATER POLICY CHALLENGE: Bridging the Gap between Water Innovation and Regulation in California

Developing a Statewide Policy for
Onsite Non-Potable Water Systems



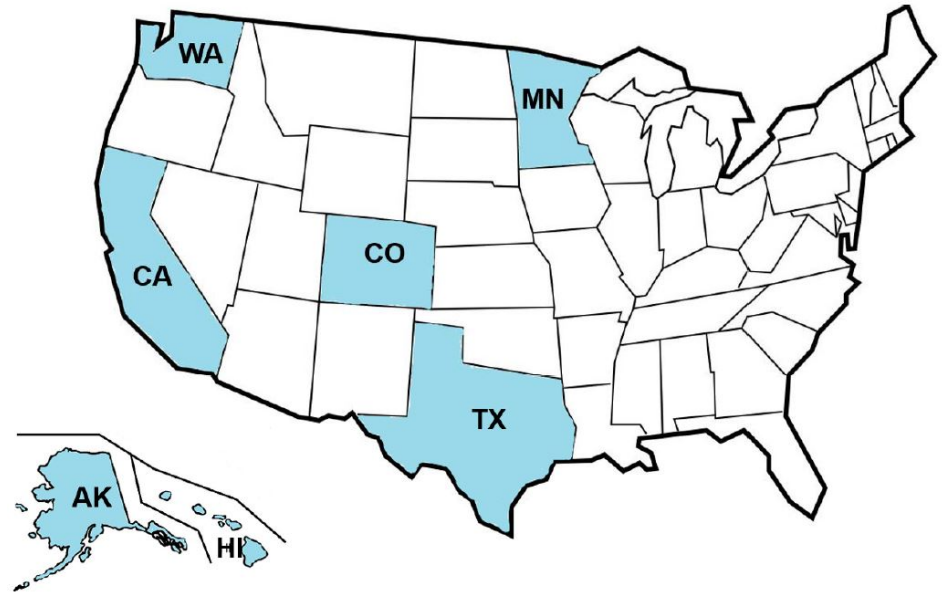
IMAGINE | H₂O
WINNER



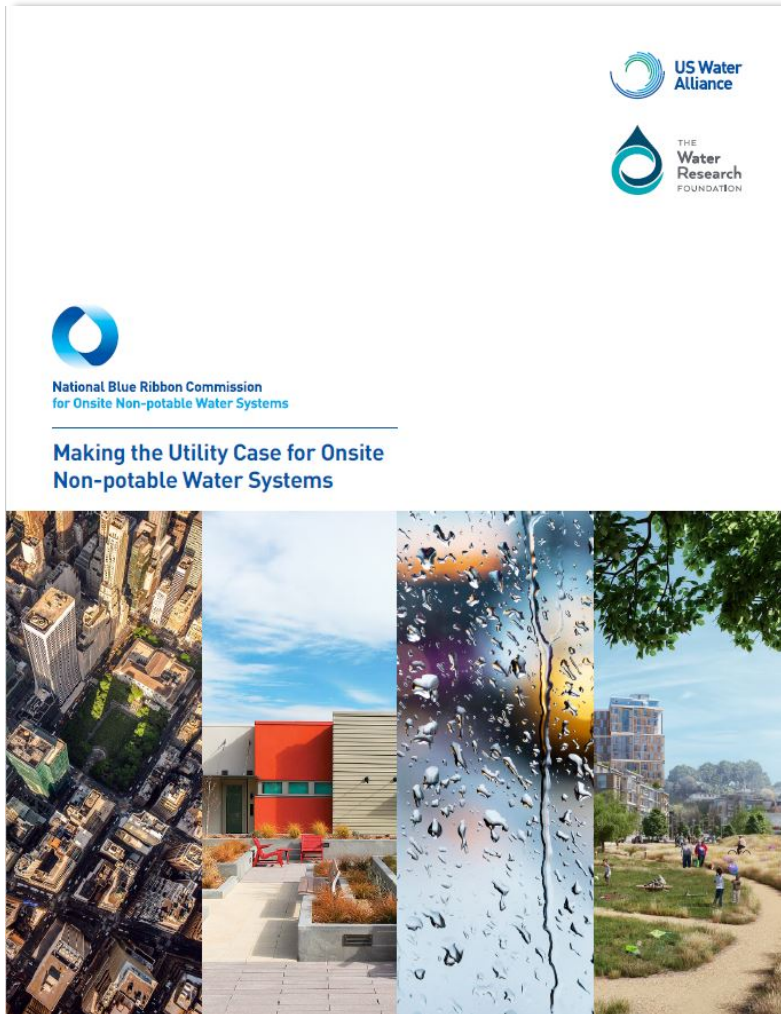
- SFPUC and AWE won the Imagine H2O California Water Policy Challenge
- SFPUC and AWE held 3 stakeholder workshops in SAC, SF, and LA to gather feedback on a statewide policy
- Statewide policy focuses on establishing water quality standards & monitoring and reporting requirements for onsite non-potable water systems

Jurisdictions Moving Forward with Risk Based Approach

- San Francisco
- California, SB 966
- Colorado, Regulation #84
- Minnesota
- Washington State
- Texas, Hawaii, Alaska



Making the Utility Case for ONWS



- Report inspires One Water leaders to consider onsite water systems in their water resource and resilience planning
- Helps water and wastewater utilities and others understand the benefits and drivers behind onsite non-potable reuse



Highlights of the Making the Utility Case Document

- **Drivers:**
 - Fostering system resilience, diversifying water supplies, managing stormwater, meeting regulatory requirements, deferring capital costs, and generating environmental and community amenities
- **Key Considerations for Implementation:**
 - Protecting public health, establishing oversight programs, addressing revenue impacts, and managing wastewater flows and odors
- **Role of Utility Leadership:**
 - Educational and outreach, regulatory and permitting oversight, O&M, system integrator or owner

BLUEPRINT for Onsite Water Systems

A Step-by-Step Guide for Developing a Local Program to Manage Onsite Water Systems



Training Manual for Engineers, Operators, Utilities and Regulators



DESIGN ENGINEER



REGULATOR



OPERATOR



UTILITY

- Developing a guidance manual and training materials to identify the skills and knowledge required to design and permit treatment systems that meet the risk-based water quality standards
- Estimated completion late 2018/early 2019



THANK YOU
sfwater.org/np

