Streamlining Regulations: San Francisco's Non-potable Water Program

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San Francisco Public Utilities Commission

Presentation Outline

- Overview of the SFPUC
- Water Supply Portfolio
- Non-potable Water Program
  - Building Scale (residential & commercial)
  - District Scale

Services We Provide

Regional Water System

SFPUC is Near Completion on Major Water System Improvements

- Water System Improvement Program (WSIP)
  - Repair, replace, and seismically upgrade the system's deteriorating pipelines, tunnels, reservoirs, pump stations, storage tanks, and dams
  - Water Supply Diversification
  - $4.6 billion

HETCH HETCHY
WATER SYSTEM
IMPROVEMENT
PROGRAM

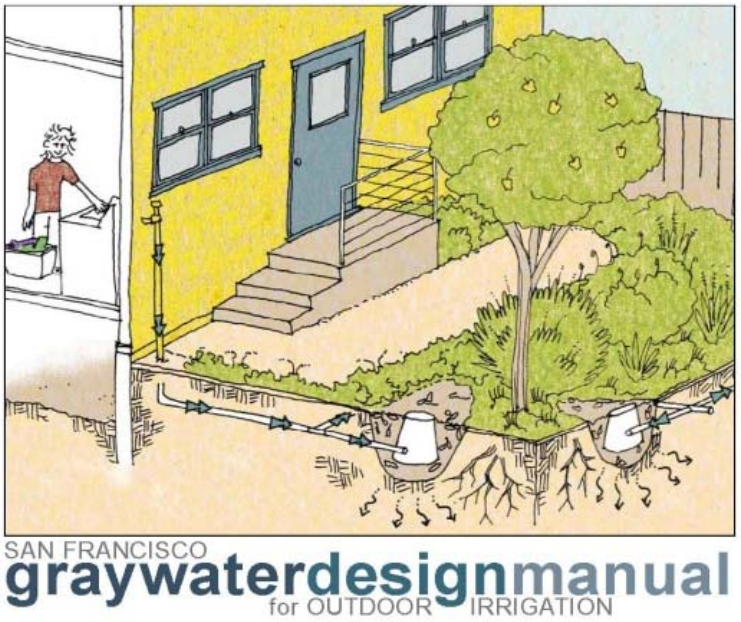
Diversifying Our Water Supply Portfolio

- Conservation: reduce demands by 4 mgd
- Municipal Recycled Water: produce 4mgd
- Local Groundwater: develop potable supply 4mgd
- Conjunctive Use: develop 7.2 mgd for droughts

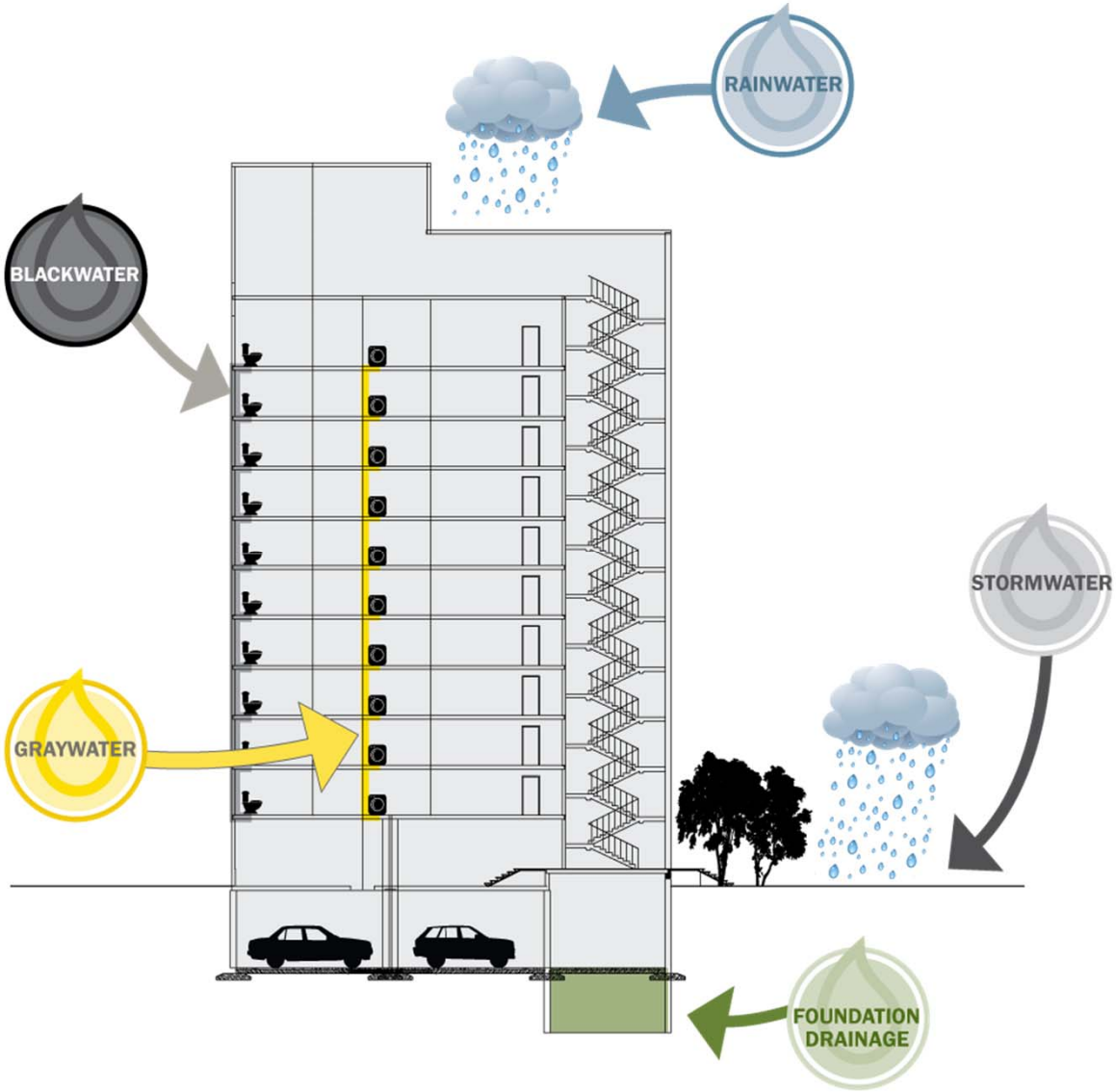
Expand Portfolio to Include Alternate Water Sources

Existing Non-potable Programs for Residential Customers

- Rainwater Harvesting Program
- Residential Graywater Program



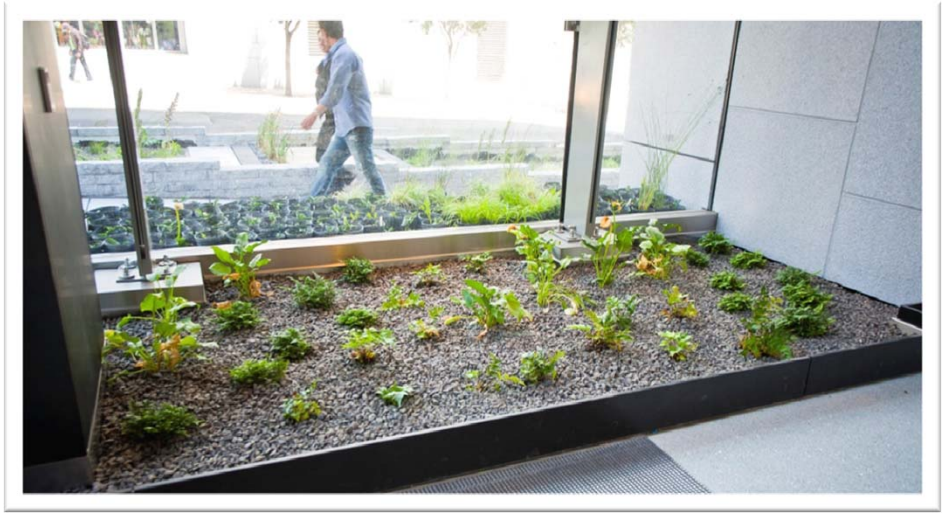
Alternate Water Sources Available within Buildings



On-site Non-potable Water Use at the New SFPUC Headquarters

- Living Machine
  - Collects and treats buildings gray and blackwater
  - Reuse for toilet flushing
  - 5,000 gpd
- Rainwater Harvesting
  - 25,000 gallon cistern

Reduces water use in the building by 60%.



On-site Non-potable Water Projects are being Proposed in San Francisco

Transbay

Rainwater & graywater for toilets

Public Safety Building

Graywater for irrigation

Moscone Center

Foundation drainage for irrigation

Integrating On-site Non-potable Water is Challenging

- Regulatory questions:
  - What permits are required to operate an on-site treatment and reuse system?
  - Who issues permits and oversees operations?
  - Who sets water quality standards?

Current oversight of alternate water use

- Current CA codes only cover 2 types:
  - Municipally-supplied recycled water – Title 22
  - Onsite graywater for residential subsurface irrigation applications – Chapter 16, CA Plumbing Code

- 2013 CA Plumbing Code Update:
  - Expands on-site graywater reuse standards
  - Includes on-site rainwater standards

Important Regulatory Oversight was Still Unclear

- CPC provides construction requirements
- Who provides ongoing operation and maintenance of alternate water source systems to ensure the protection of public health and the public water system post-construction?

CITY ORDINANCE

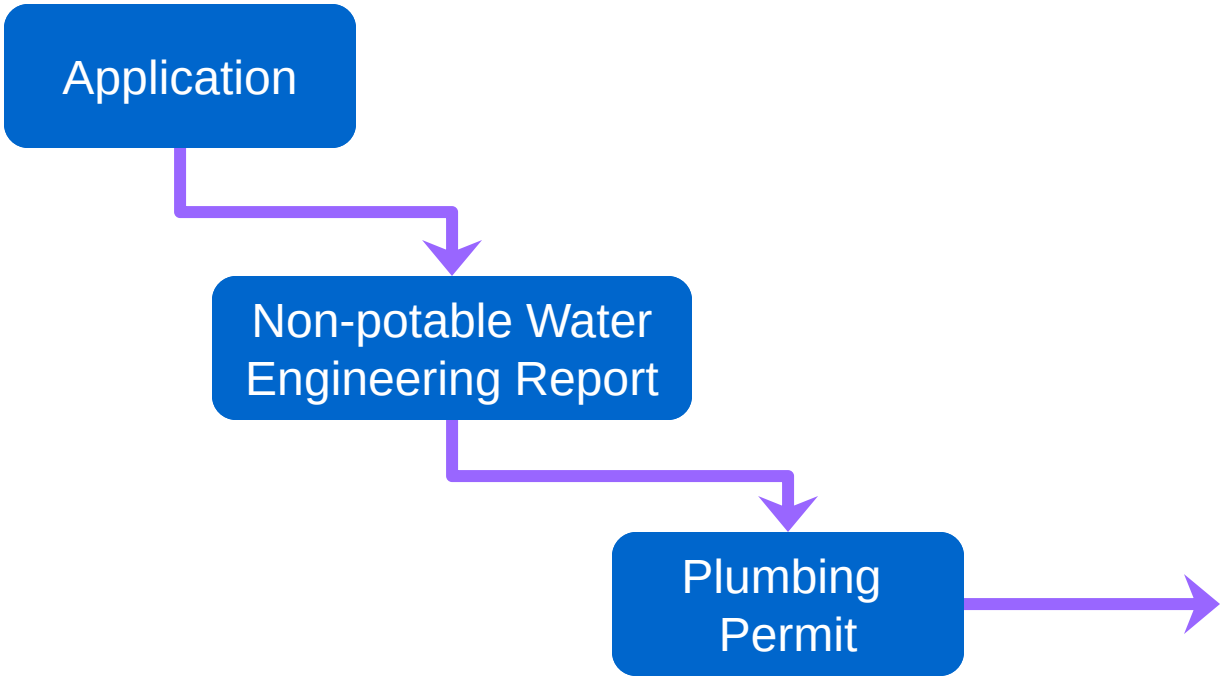
Role of City Agencies

SFPUC	SFDPH	SFDBI
Program Administration	Public Health	Construction
Review on-site non-potable water supplies & demands Administer citywide project tracking & annual potable offset achieved Provide technical support & outreach to developers Provide financial incentives to developers	Issue water quality & monitoring requirements Review and approve non-potable engineering report Issue permit to operate on-site systems Review water quality reporting	Conduct Plumbing Plan check and issue Plumbing Permit Inspect and approve system installations

Key Steps for On-Site Systems

- Three Important Phases
- Critical Steps to Take within Phases

Major Steps for *Designing* Your On-site System



Steps to take During Design Phase

- **Step 1: Application**
  - Submit your on-site application to the **SFPUC** as soon as possible
  - Receive technical and regulatory guidance to move forward on your project
- **Step 2: Non-potable Water Engr. Rpt (NWER)**
  - Submit NWER to SFDPH detailing design and technical aspects for meeting water quality requirements
- Step 3: Plumbing Permit
  - Submit plumbing plans to SFDBI cross connection protection and bypass capabilities
  - NWER approval is a pre-requisite for issuance of plumbing permit

Water Quality Criteria – Consistent with State Codes

Alternate Water Source	Proposed Regulations
Blackwater	Title 22
Graywater	California Plumbing Code - NSF-350
Rainwater	California Plumbing Code - Table
Stormwater Foundation Drainage	No state codes - SFDPH to establish

- SFDPH will permit onsite systems and require monitoring and reporting

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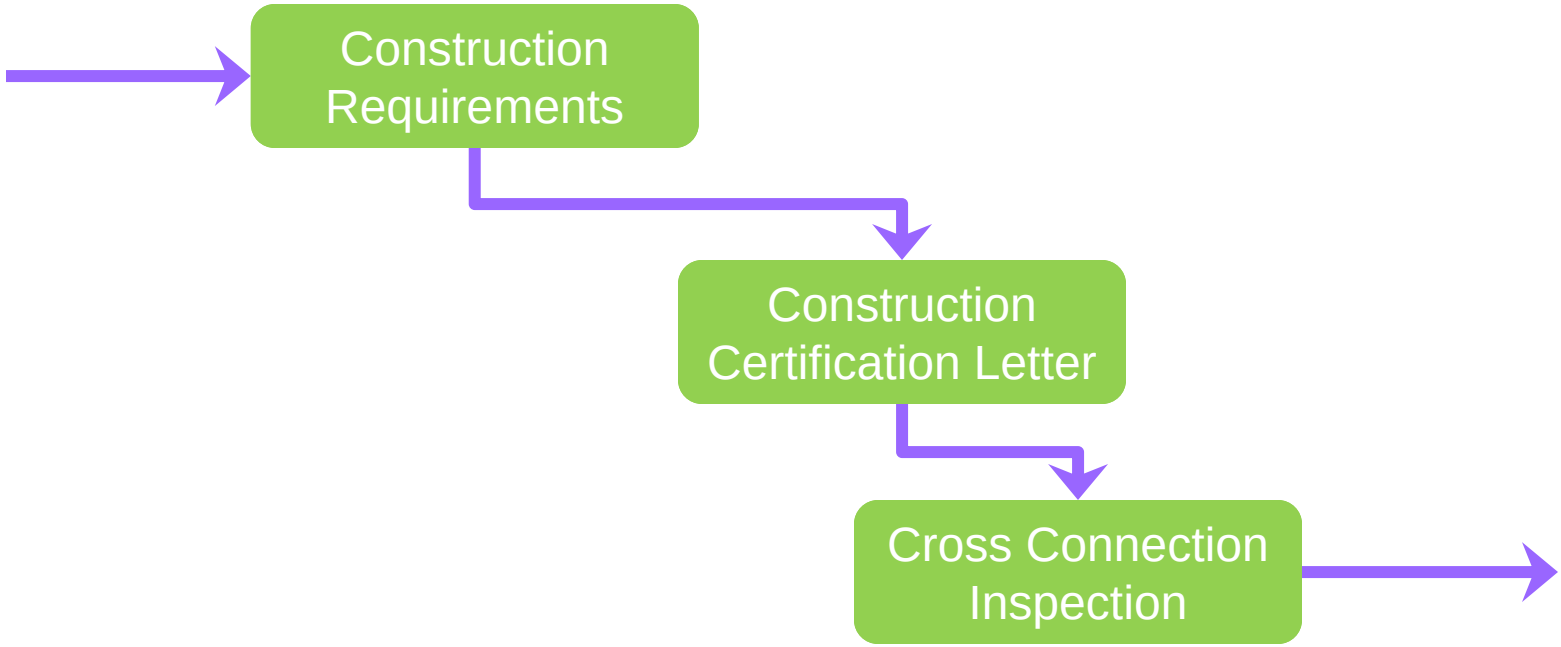
Major Steps for *Constructing* Your On-site System

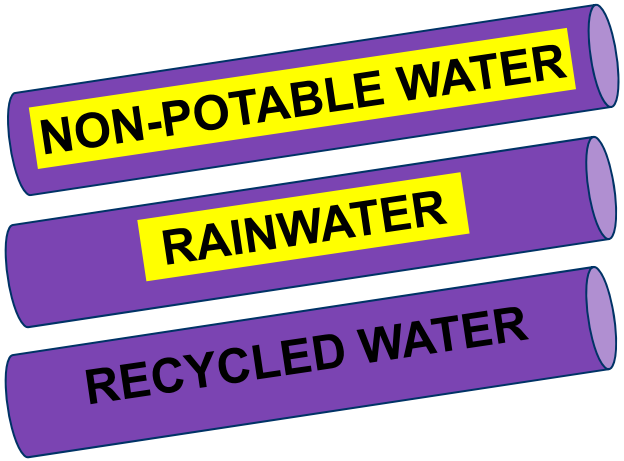


Steps to take Post-Construction

- **Step 4: Construction Requirements**
  - Signage & identification, bypass, make-up water
- **Step 5: Construction Certification Letter**
  - Submit letter to **SFDPH** certifying systems was constructed in accordance with NWER
- **Step 6: Cross Connection Control**
  - Certify all backflow prevention assemblies
  - Certify potable and non-potable water systems are not cross-connected.
  - Both test are required prior to SFDBI sign-off

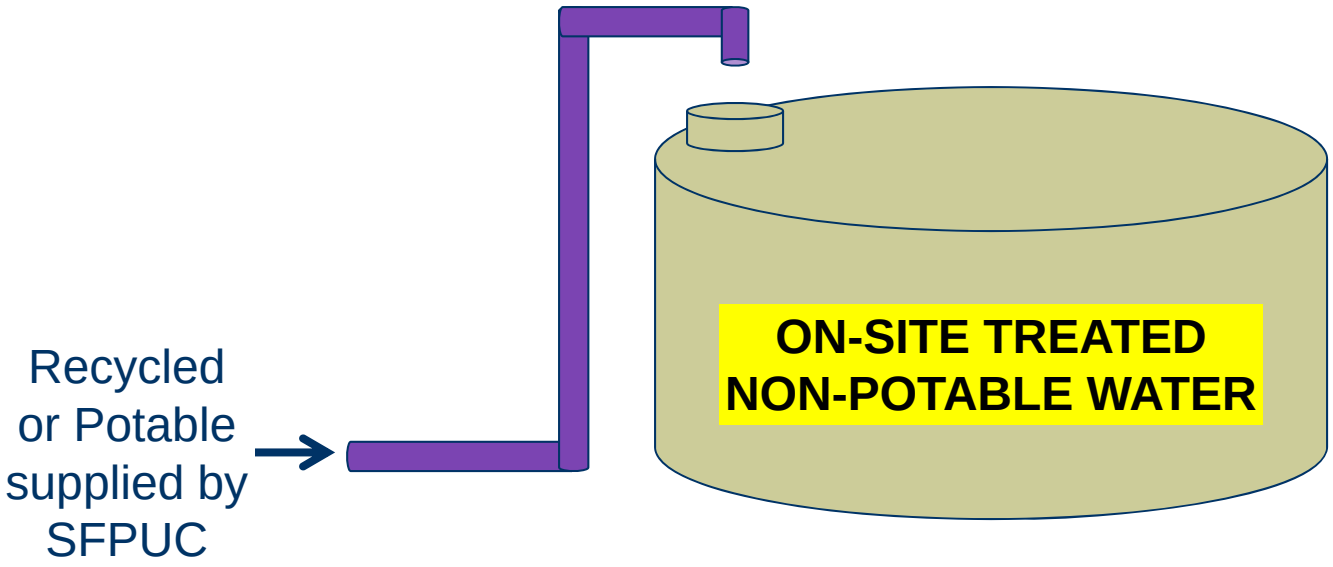
System Construction - Identification

- Purple pipe for all non-potable water
- Pipe labeling and signage will identify type
  - “On-site Treated Non-potable,” “Rainwater,” “Recycled,” etc.
  - Consistent with proposed 2013 California Plumbing Code



System Construction – Make-Up Water

- Municipal recycled water as make-up/backup supply to on-site non-potable water systems:
  - If RW not available, potable water will be supplied
  - Same backflow protection requirements as potable



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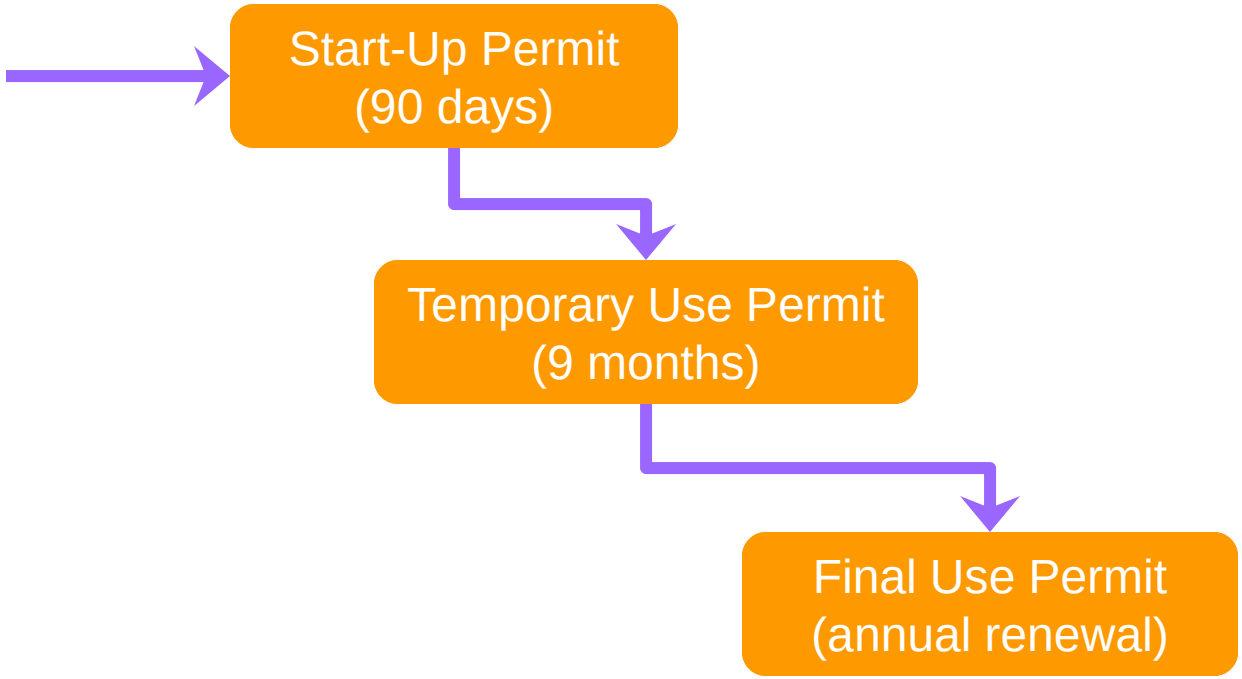
Major Steps for *Operating* Your On-site System

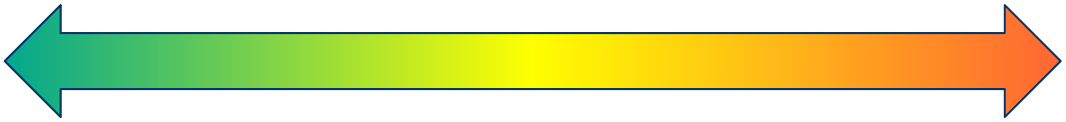


DPH Permits for Operating Your System

- **Start-Up Permit (90 days)**
  - On-site water is treated and sent to sewer to allow for fine-tuning and troubleshooting of system.
- **Temporary Use Permit (9 months)**
  - On-site water is treated and supplied to non-potable end uses. More frequent monitoring while system is further refined.
- **Final Use Permit (annual renewal)**
  - Continued operation, monitoring and reporting to ensure water quality compliance.

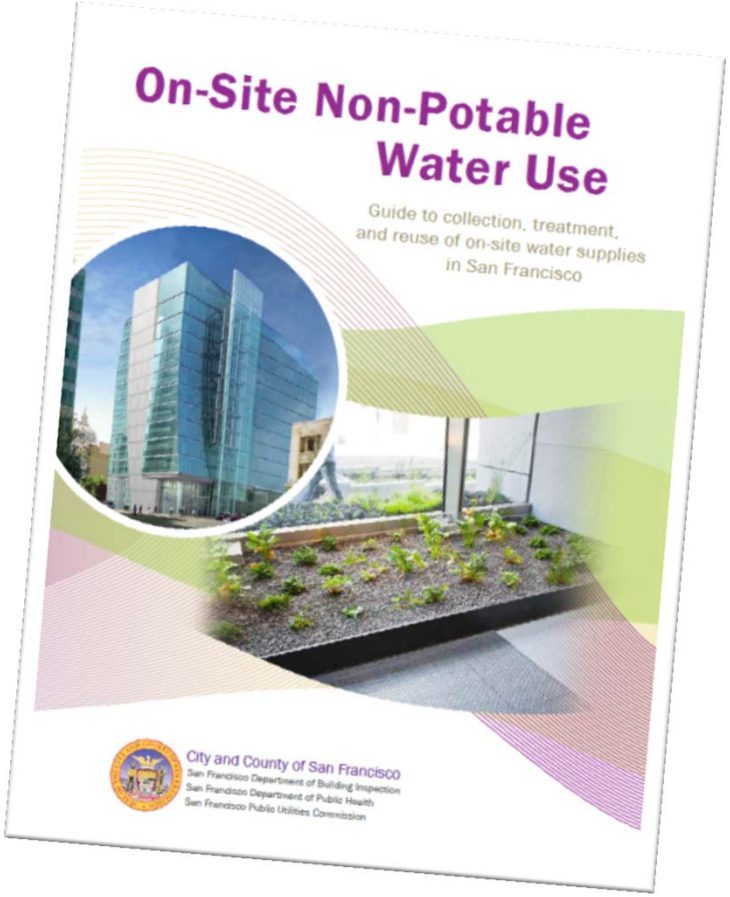
Draft Monitoring and Reporting Frequency

	Rainwater	Stormwater	Foundation Drainage	Graywater	Blackwater
Start-Up Mode *(90 days)*					
Temporary Use Mode *(9 months)*					
Final Use Mode					



SFPUC provides technical assistance and financial incentives

- On-site Non-potable Guidebook
- Water use Calculator
- Grant Program
- Project review meetings



Water Use Calculator

Sheet No.	Proposed Regulations
Step 1	Basic Project Information
Step 2	Calculate Indoor Water Demand
Step 3	Calculate Indoor Non-potable Supply
Step 4	Calculate Outdoor Water Demand
Step 5	Calculate Outdoor Non-potable Supply
Step 6	Summary of Building Potential
Step 7	Define Project Specific Demands & Supplies

Default values are provided based on:

SFPUC Water Demand Conservation Model
SF Green Building Requirements
LEED Default Occupancy Counts

Water Use Calculator

NON-POTABLE WATER CALCULATOR

Step 2 of 7:

NON-POTABLE WATER CALCULATOR

Step 4 of 7: Calculate Outdoor Water Demand (Landscape Irrigation, Outdoor Water Features)

Project Name: *ABC Building*

NON-POTABLE WATER CALCULATOR

Step 6 of 7: Summary of Building Potential

Project Name: *ABC Building*

LEGEND:

User Input	
Linked from User Input	
Default Value	
Autogenerated Value	

Instructions:
An accounting of total demand and onsite supplies for the project are summarized below.
No user input is needed for this step.

A. TOTAL DEMAND (No user input needed - auto-calculated)

Demand Types	Ave Daily Water Demand (gpd)	Annual Water Demand (gpy)	Average Monthly Demand (gal/mth)											
			January	February	March	April	May	June	July	August	September	October	November	December
DOMESTIC FIXTURES - Commercial														
Showerhead	13	4,745	395	395	395	395	395	395	395	395	395	395	395	395
Lavatory Faucet	120	43,800	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650
Urinals	174	63,510	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293	5,293
Toilet (Water Closet)	891	325,171	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098	27,098
Kitchen Faucet	180	65,700	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475	5,475
Low Flow Sprayer - Restaurants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,378	503,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000
DOMESTIC FIXTURES - Multi-Family Residential														
Showerhead	2,143	782,071	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173	65,173
Bathroom Faucet	392	143,062	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922
Bath	503	183,413	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284	15,284
Washing Machine	2,299	839,222	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935	69,935
Toilet (Water Closet)	1,222	446,059	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172	37,172
Kitchen Faucet	2,829	1,032,686	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057	86,057
Dishwasher	90	32,721	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727
SUBTOTAL	9,477	3,459,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300	288,300
HVAC/COOLING														
Conventional Cooling	1,957	714,775	43,821	46,461	55,045	55,979	61,290	64,418	67,319	69,580	72,727	72,729	58,922	46,486
SUBTOTAL	1,957	714,800	43,900	46,500	55,100	56,000	61,300	64,500	67,400	69,600	72,800	72,800	59,000	46,500
OTHER INDOOR DEMANDS THAT CAN BE MET WITH NON-POTABLE SUPPLIES														
Indoor Decorative Water Feature	100	25,000	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083
Commercial Laundry	34	1,768	147	147	147	147	147	147	147	147	147	147	147	147
<Please specify here>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	134	26,800	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
OUTDOOR DEMANDS														
Landscape Irrigation	N/A	106,727	0	0	0	0	13,999	25,093	27,823	24,817	14,995	0	0	0
Decorative Water Feature	100	25,000	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083
<Please specify here>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	100	131,800	2,100	2,100	2,100	2,100	16,100	27,200	30,000	27,000	17,100	2,100	2,100	2,100
GRAND TOTAL	13,047	4,835,700	378,600	381,200	389,800	390,700	410,000	424,300	430,000	429,200	422,500	407,500	393,700	381,200

Potential Potable Water Savings

Building Type	Potable Water Offset (gpy)				% Potable Water Reduction
	40K sf	100K sf	200K sf	500K sf	
Office	119,000	285,000	562,000	1.3 M	**78%**
Mixed Use Development	175,000	424,000	841,000	**2.1 M**	22%

Estimated Costs for On-site Systems

Bldg. Size (sf)	Treatment Systems ($M)	Dual-Collection System ($M)	Dual- Distribution System ($M)	Total Capital ($M)	% Constr. Cost
500K	0.3 - 0.4	1.1 – 1.8	1.6 –2.6	3.1 – 4.8	2.9% - 3.5%
200K	0.2 - 0.3	0.5 – 0.7	0.6—1.0	1.3 – 1.9	3.1% - 3.5%
100K	0.1 - 0.3	0.2 – 0.4	0.3—0.5	0.8 – 1.0	3.6% - 3.7%
40K	0.1 – 0.3	0.1 – 0.2	0.1—0.2	0.4 – 0.5	4.3% - 5.5%

Grant Program for Large Alternate Water Source Projects

- The SFPUC will offer financial incentives up to $250,000 for new projects that replace potable water use with on-site alternate water sources

- Proposed projects shall be **100,000 sf or more**

- Proposed projects shall replace potable water use for one of the following:
  - **All toilet flushing demands** or
  - **Reduce 40% of potable water use**

Next Steps

- District Scale Water/Wastewater Utility Study
- Conducting Research
  - Applications
  - Regulations
  - Rate Structures
- Work with DBI, SFDPH and DPW to finalize program by summer 2013

District-scale Water Reuse is Taking Place Across U.S. and Abroad

Conclusion

The SFPUC is excited about the Non-potable Water Use Program on a Building and District Scale as it:

- Streamlines the process for developers
- Reduces combined sewer impacts from new developments
- Replaces the use of drinking water for toilet flushing and irrigation in new large developments and commercial structures

Thank You

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