Diversifying the Water Supply Portfolio

Annual Technology Transfer Workshop
November 14, 2012

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San Francisco Public Utilities Commission
Presentation Outline

• Water Supply Performance Objectives

• Water Supply Programs

• Alternate Water Sources Program
Water Supply Performance Objectives

• Meet average annual water demand of 265 million gallons per day (mgd) from the SFPUC watersheds during non-drought years through 2018.

• Limit rationing to a maximum 20 percent system-wide reduction during extended droughts.

• Diversify water supply options during non-drought and drought periods.

• Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.
Water Supply Diversification

• Regional
  • Groundwater 7.2 mgd

• Local
  • Conservation: 13 mgd
  • Groundwater: 4 mgd
  • Recycled Water: 4 mgd
  • Alternate Water Sources: tbd
Westside Groundwater Basin
Proposed Regional Groundwater Storage and Recovery Project

- In-lieu conjunctive use
- Dry year water supply project
- Extract 7.2 mgd over 7.5 years (design drought planning horizon)
- Partners: Daly City, San Bruno and Cal Water
Proposed Groundwater Storage and Recovery Project Well Locations

Installation of 16 wells

Water System Connections:
- 4 to Daly City
- 3 to Cal Water
- 3 to San Bruno
- 7 to SFPUC

Treatment includes chloramination, fluoridation, pH adjustment and manganese filtration based on site specific conditions
Regional Groundwater Schedule

- **Environmental:**
  - Notice of Preparation released June 2009
  - Draft EIR expected Feb 2013
  - Certification in late 2013

- **Design:** 2010-2013

- **Bid and Award:** 2013

- **Construction:** 2014-2016
Proposed San Francisco Groundwater Project

Project Scope:

• 6 wells (4 new, modify 2 existing wells)

• 5 wells blend into Sunset Reservoir

• Lake Merced well connects to distribution system
In-City Groundwater Distribution

- 4 mgd total annual average
- Addition of Chlorine
- Blend in small quantities
San Francisco Project Schedule

- **Environmental:**
  - Notice of Preparation released Dec 2009
  - Draft EIR expected late 2012/early 2013
  - Expect certification in late 2013

- **Design:** 2010-2013

- **Bid and Award:** 2013

- **Construction:** 2014-2016
Conservation Programs

• Water Audits

• Rebates
  • Toilets, Residential & Commercial Clothes Washers and Urinals

• Large Landscape Grants
  • Funding for irrigation system replacements, turf, etc.
  • CII grant program

• Ordinances
  • Commercial & Residential Properties- low flow fixtures
  • Water Efficient Irrigation Ordinance- water budgets
Implementing our Recycled Water Program on Multiple Scales

- Centralized facilities
- Building-scale
- District scale
Recycled Water Ordinance

- New developments & major alterations over 40,000 SF
- Irrigated landscapes over 10,000 sf
- Requires recycled water systems for toilet/urinal flushing, irrigation, & cooling.
Regional Recycled Water Partnerships to Serve Retail Customers
SFPUC is Proposing to Build Recycled Water Plants in-City
Reuse of Alternate Water Sources
Expand Water Reuse to On-site Building Scale – Residential & Commercial

3.4 mgd

- New NR: 29%
- New MFR: 19%
- New SFR: 6%
- Existing SFR: 19%
- Existing MFR: 7%
- Existing NR: 12%
- Existing Parks: 8%
Building-Scale: Residential Programs

- Rainwater Harvesting Program
- Residential Graywater Program
Building-Scale: Large Commercial, Mixed-Use, & Multi-Family Residential
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
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
Projected Large-Scale Development in San Francisco (>100,000sf)

- **Office**: 16%
- **Retail**: 3%
- **MFR or Mixed Use Residential**: 7%
- **Industrial**: 1%
- **Institutional**: 73%

San Francisco Bay

[Map showing projected large-scale development locations]
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?
# New City Ordinance for On-site Reuse Addresses Oversight Gaps

<table>
<thead>
<tr>
<th>SFPUC</th>
<th>SFDPH</th>
<th>SFDBI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Administration</strong></td>
<td><strong>Public Health</strong></td>
<td><strong>Construction</strong></td>
</tr>
<tr>
<td>Review on-site non-potable water supplies &amp; demands</td>
<td>Issue water quality &amp; monitoring requirements</td>
<td>Conduct Plumbing Plan check and issue Plumbing Permit</td>
</tr>
<tr>
<td>Administer citywide project tracking &amp; annual potable offset achieved</td>
<td>Review and approve non-potable engineering report</td>
<td>Inspect and approve system installations</td>
</tr>
<tr>
<td>Provide technical support &amp; outreach to developers</td>
<td>Issue permit to operate on-site systems</td>
<td></td>
</tr>
<tr>
<td>Provide financial incentives to developers</td>
<td>Review water quality reporting</td>
<td></td>
</tr>
</tbody>
</table>
Overview of On-site Systems

- Application
  - Non-potable Water Engineering Report
    - Plumbing Permit
- Construction Requirements
  - Construction Certification Letter
    - Cross Connection Inspection
- Start-Up Permit (90 days)
  - Temporary Use Permit (9 months)
  - Final Use Permit (annual renewal)

Design | Construction | Operation
### Water Quality Criteria – Consistent with State Codes

<table>
<thead>
<tr>
<th>Alternate Water Source</th>
<th>Proposed Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackwater</td>
<td>Title 22</td>
</tr>
<tr>
<td>Graywater</td>
<td>California Plumbing Code - NSF-350</td>
</tr>
<tr>
<td>Rainwater</td>
<td>California Plumbing Code - Table</td>
</tr>
<tr>
<td>Stormwater</td>
<td>No state codes - SFDPH to establish</td>
</tr>
<tr>
<td>Foundation Drainage</td>
<td></td>
</tr>
</tbody>
</table>

- SFDPH will permit onsite systems and require monitoring and reporting.
### Draft Monitoring and Reporting Frequency

<table>
<thead>
<tr>
<th>System Type</th>
<th>Rainwater</th>
<th>Stormwater</th>
<th>Foundation Drainage</th>
<th>Graywater</th>
<th>Blackwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-Up Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(90 days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Use Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9 months)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Use Mode</td>
<td>Less Rigorous/Frequent</td>
<td>Less Rigorous/Frequent</td>
<td>Less Rigorous/Frequent</td>
<td>Less Rigorous/Frequent</td>
<td>More Rigorous/Frequent</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Basic Project Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Calculate Indoor Water Demand</td>
</tr>
<tr>
<td>Step 3</td>
<td>Calculate Indoor Non-potable Supply</td>
</tr>
<tr>
<td>Step 4</td>
<td>Calculate Outdoor Water Demand</td>
</tr>
<tr>
<td>Step 5</td>
<td>Calculate Outdoor Non-potable Supply</td>
</tr>
<tr>
<td>Step 6</td>
<td>Summary of Building Potential</td>
</tr>
<tr>
<td>Step 7</td>
<td>Define Project Specific Demands &amp; Supplies</td>
</tr>
</tbody>
</table>

*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 6 of 7: Summary of Building Potential**

**Legend:**
- **User Input:**
- **Linked From User Input:**
- **Default Value:**
- **Auto-Generated Value:**

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

#### A. Total Demand (No user input needed - auto-calculated)

<table>
<thead>
<tr>
<th>Demand Types</th>
<th>Annual Water Demand (gpm)</th>
<th>Average Monthly Demand (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domestic Fixtures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Showerhead</td>
<td>7,260</td>
<td>61.3</td>
</tr>
<tr>
<td>Commercial Rm. Faucet</td>
<td>3,175</td>
<td>26.5</td>
</tr>
<tr>
<td>Washing Machine</td>
<td>1,596</td>
<td>13.3</td>
</tr>
<tr>
<td>Toilet (Water Closet)</td>
<td>1,322</td>
<td>11.1</td>
</tr>
<tr>
<td>Kitchen Faucet</td>
<td>1,021</td>
<td>8.7</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>90</td>
<td>0.8</td>
</tr>
<tr>
<td>Subtotal</td>
<td>5,077</td>
<td>42,600</td>
</tr>
<tr>
<td><strong>Commercial Fixtures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Decorative Water Feature</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Commercial Laundry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outdoor Demand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>5,077</td>
<td>42,600</td>
</tr>
</tbody>
</table>

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**Notes:**
- Values are in gallons per minute (gpm) for the month of September.
### Potential Potable Water Savings

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Potable Water Offset (gpy)</th>
<th>% Potable Water Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40K sf</td>
<td>100K sf</td>
</tr>
<tr>
<td>Office</td>
<td>119,000</td>
<td>285,000</td>
</tr>
<tr>
<td>Mixed Use Development</td>
<td>175,000</td>
<td>424,000</td>
</tr>
</tbody>
</table>
## Estimated Costs for On-site Systems

<table>
<thead>
<tr>
<th>Bldg. Size (sf)</th>
<th>Treatment Systems ($M)</th>
<th>Dual-Collection System ($M)</th>
<th>Dual- Distribution System ($M)</th>
<th>Total Capital ($M)</th>
<th>% Constr. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>500K</td>
<td>0.3 - 0.4</td>
<td>1.1 – 1.8</td>
<td>1.6 –2.6</td>
<td>3.1 – 4.8</td>
<td>2.9% - 3.5%</td>
</tr>
<tr>
<td>200K</td>
<td>0.2 - 0.3</td>
<td>0.5 – 0.7</td>
<td>0.6—1.0</td>
<td>1.3 – 1.9</td>
<td>3.1% - 3.5%</td>
</tr>
<tr>
<td>100K</td>
<td>0.1 - 0.3</td>
<td>0.2 – 0.4</td>
<td>0.3—0.5</td>
<td>0.8 – 1.0</td>
<td>3.6% - 3.7%</td>
</tr>
<tr>
<td>40K</td>
<td>0.1 – 0.3</td>
<td>0.1 – 0.2</td>
<td>0.1—0.2</td>
<td>0.4 – 0.5</td>
<td>4.3% - 5.5%</td>
</tr>
</tbody>
</table>
Grant Program for Large Alternate Water Source Projects

• The SFPUC will offer financial incentives 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
Summary of Non-potable Water Program Resources

- http://sfwater.org/np
- Water Use Calculator
- Grant Program
- Guidebook
- SFDPH Rules and Regulations
- Project Application
- Technical Assistance
Conclusion

The SFPUC is excited about the Non-potable Water Use Program 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

Next Steps:
• District Scale Water/Wastewater Utility Study
Thank You

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