Bay Area Water Infrastructure – Planning and Implementation

Michael Carlin, Deputy General Manager, SFPUC
THE SFPUC COMBINED SEWER SYSTEM
Our Combined Sewer System

During major storms, combined sewers discharge to the Bay or Pacific Ocean.

Stormwater collects in gutters and catch basins.

Domestic Sewage (sinks, showers, toilets, etc.)

Pumped to Treatment Plant

Sewer Main

Transport/Storage Box

During major storms, combined sewers discharge to the Bay or Pacific Ocean.
Our Combined Sewer System

Avg. DWF: 75mgd
Total Wet Weather Cap.: 575mgd

Avg. DWF: 0mgd
Wet Weather Cap.: 150mgd

Avg. DWF: 60mgd
Wet Weather Cap.: 250mgd

Avg. DWF: 15mgd
Wet Weather Cap.: 175mgd

100-year-old system: 1,000+ miles of pipes, 3 treatment facilities and 27 pump stations
Our Combined Sewer System
Westside Transport/Storage Structure
OUR CHALLENGES
Aging Infrastructure
33% of our sewers are over 100 years old – dating back to the Gold Rush
Channel Force Main failed in the ‘89 earthquake

Seismic Vulnerability
Southeast Plant treats 80% of the City’s flow and is vulnerable to failure
FRAMEWORK FOR CAPITAL PLANNING
Framework for Capital Planning: The Public Mandate

- **1999 – Proposition H:** Places Rate Cap on SFPUC
- **2002 – Proposition E:** Gives SFPUC Authority to Set Rates
The Public Mandate

Sewer System Improvement Program
7 Public Workshops

2005-2010
2009-2010
June 2010
July 2010

Stakeholder Input

Sewer System Master Planning Effort

Digester Task Force
18 months

SSIP Levels of Service
Goals Endorsed & Resolution Adopted

Sewer System Improvement Program Report

Digester Task Force

SSIP Levels of Service
Goals Endorsed & Resolution Adopted
The Public Mandate

Program Management Contract Award
July 2011
Central Bayside System Improvement Project Planning & Design Contract Award

SSIP Validation Process & Workshops 3 Public Workshops
Jan 2012
Southeast Biosolids Digester Project Planning & Design Contract Award
Feb 2012

Commission Authorizes Development of Phase I Projects Representing $2.7B
Aug 2012

Stakeholder Input
May 2013
Levels of Service Goals

Provide a Compliant, Reliable, Resilient, & Flexible System that **Respond to Catastrophic Events**

Integrate Green & Grey Infrastructure to **Manage Stormwater** and **Minimize Flooding**

Provide **Benefits** to Impacted **Communities**

Modify the System to **Adapt to Climate Change**

Achieve **Economic & Environmental Sustainability**

Maintain **Ratepayer Affordability**
SEWER SYSTEM IMPROVEMENT PROGRAM
Sewer System Improvement Program (SSIP)

Grey.

system and seismic reliability & redundancy

Green.

Innovative stormwater management solutions

Clean.

Protecting public health & the environment
## Total Program Cost

<table>
<thead>
<tr>
<th></th>
<th>PHASE I</th>
<th>PHASE II</th>
<th>PHASE III</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment Plants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Biosolids Digester Facilities Project</td>
<td>$2,047</td>
<td></td>
<td></td>
<td>$3,669</td>
</tr>
<tr>
<td>• Southeast Plant Improvements</td>
<td></td>
<td>$1,215</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Oceanside Plant Improvements</td>
<td></td>
<td></td>
<td>$407</td>
<td></td>
</tr>
<tr>
<td>• Northpoint Facility Improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collection System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reliability and Operational</td>
<td>$412</td>
<td>$1,928</td>
<td>$476</td>
<td>$2,816</td>
</tr>
<tr>
<td>• Green Infrastructure Projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Central Bayside Syst. Improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City &amp; Consultant Program Management</strong></td>
<td>$125</td>
<td>$152</td>
<td>$43</td>
<td>$320</td>
</tr>
<tr>
<td><strong>Land Acquisition</strong></td>
<td>$128</td>
<td></td>
<td></td>
<td>$128</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$2,712</td>
<td>$3,295</td>
<td>$926</td>
<td>$6,933</td>
</tr>
</tbody>
</table>

*All dollars in Millions*
Southeast Treatment Plant Upgrades

$1,750M

- Land Reuse of 1801 Jerrold Avenue (Asphalt Plant)
- Land Reuse of 1800 Jerrold Avenue (Central Shops)
- New Headworks (Grit) Replacement
- Oxygen Generation Plant
- Primary/Secondary Clarifier Upgrades
- Building 521 Replacement
- Facilitywide DCS Control Upgrade
- Power Feed and Primary Switchgear Upgrades
- Existing Digester Gas Handling Improvements
- Existing Digester Roof Repairs
- Biosolids Digester Facilities Project (BDFP)
- Primary Sludge Handling Improvements
- Existing Digester Roof Repairs

North Point Wet Weather Facility Upgrades

$113M
Oceanside Treatment Plant Upgrades

$183M

- Fine Screen and Grit Removal Enhancements
- Odor Control Optimization
- Oxygen/Aeration System Replacement
- Digester Gas Utilization Upgrades
- Westside Pump Station Redundant Force Main Improvements
- Westside Pump Station Reliability Improvements
Collection System Upgrades $410M

Citywide Collection System Projects

- Advanced Rainfall Prediction
- Operational Decision System
- Large Sewers, Tunnels, and Odor Control
- Pump Stations and Force Main Improvements
- CSD Structure and Transport/Storage Boxes
- Interdepartmental Projects
- Urban Watershed Stormwater Management (Citywide)
Green Infrastructure
Early Implementation Projects (EIPs)

BUDGET:
$57M

Baker Beach
Green Street
Richmond Watershed
May 2016

Sunset Blvd
Greenway
Sunset Watershed
August 2015

Holloway
Green Street
Lake Merced Watershed
October 2015

Chinatown
Green Alley
North Shore Watershed
May 2016

Wiggle
Neighborhood
Green Corridor
Channel Watershed
January 2016

Mission & Valencia
Streets Green Gateway
Islais Creek Watershed
November 2015

Upper Yosemite
Creek Daylighting
Yosemite Watershed
July 2016

Visitacion Valley
Green Nodes
Sunnydale Watershed
December 2015

*Construction Start Dates Indicated
EIP: Wiggle Neighborhood Green Corridor Phase 1- Fell & Oak Streets

**Constructed!**
PROGRAM IMPLEMENTATION
Urban Watershed Assessment Recommendations

Policies + Programs + Projects

Education, Grants, and Incentives
Stormwater Design Guidelines
Green and Grey Infrastructure
Locating the Projects

- Watershed Needs
- Physical Suitability
- Social/Environmental Needs
- Location Alternatives
- Location Alternatives Comparison Metrics
- Preferred Project Location

Concept Planning:
- Length
- Area Managed
- Construction Cost Projection
- Annual Volume Captured
- Annual CSD Volume Reduction
- CSD Reduction Unit Cost

Locations:
- Sunset Boulevard
- Sloat Boulevard
- Irving Street
Triple Bottom Line Analysis Sample Output

Sunset Boulevard Green Retrofit
- F1: $-117*
- F2: $-32*

Sloat/W Potral Green Retrofit
- F1: $-184*
- F2: $-39*

Irving Street
- F1: $-258*
- F2: $-48*

Note: Financial criterion ratings are based on cost effectiveness (annualized cost per annual CSD volume reduction) and select projects only.
Permit Evaluation & Future Regulations

Ocean Beach

Mission Creek

Vicente CSD Structure

Division CSD Structure
Stakeholder Engagement

- Neighborhood Presentations
- Facility Tours
- Website & Social Media
- Urban Watershed Game
- Open Houses & Workshops
- Online & iPad Surveys
- Media
Conclusions

- Right projects at the right time
- The right skills at the right time
- Integrated governance structure
- Support from stakeholders
- Timely decision-making through good governance
- Balanced approach with TBL
- Risk management to foresee inevitable hurdles
- Controls systems that provide transparency, confidence and endorsement
THANK YOU.

sfwater.org/ssip
ssip@sfwater.org