King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Fremont Siphon Sewer Project
Public Meeting
November 30, 2010

MWH

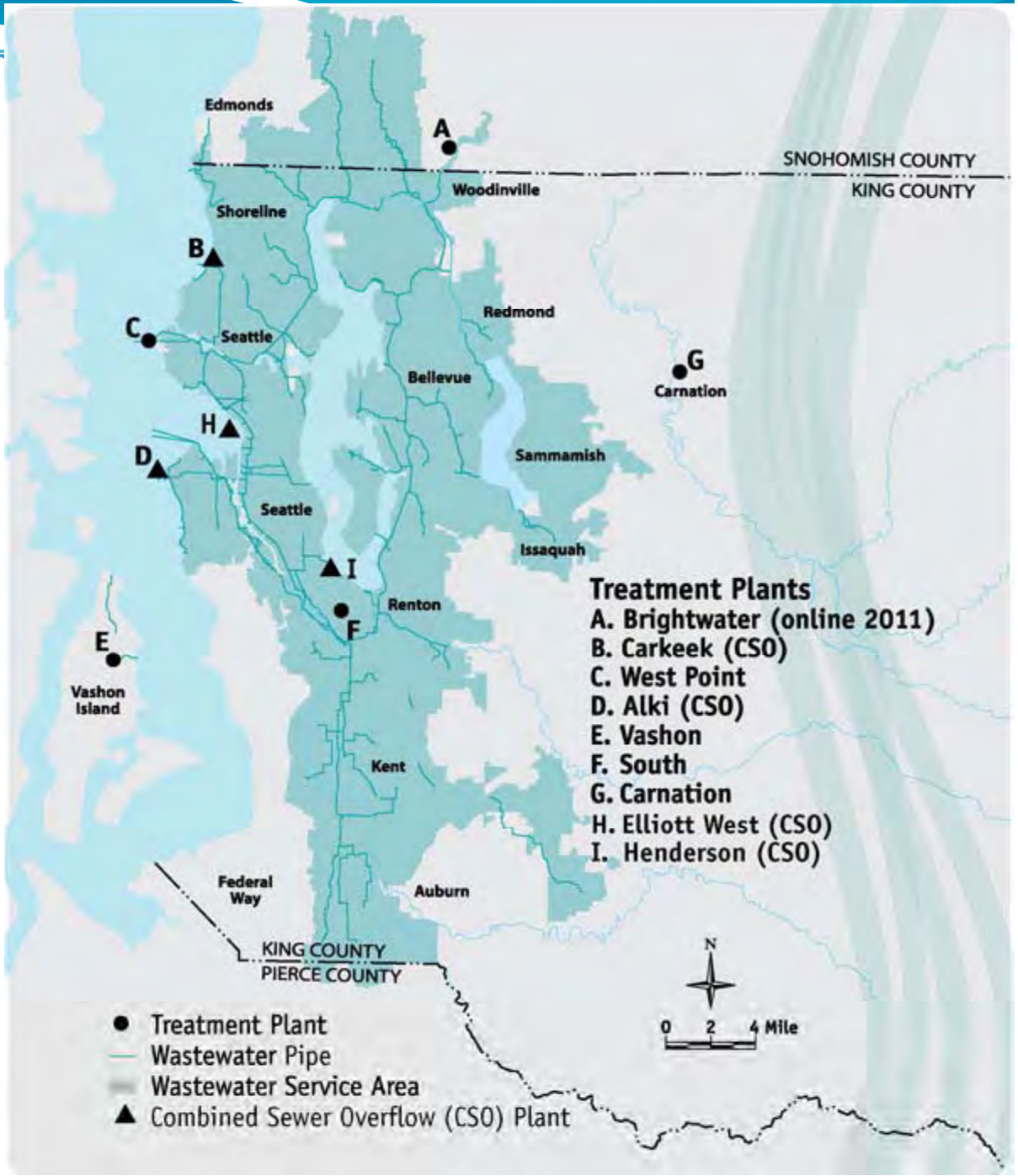
JACOBS ASSOCIATES

Meeting Agenda

- Introduction to King County WTD
- Wastewater systems in the Fremont/Queen Anne area
- Decision process for the Fremont Siphon Project
- Project Approaches and Alternatives
- Community Considerations
- How King County works with communities during construction
- Next steps
- Questions and comments

King County's Wastewater Service Area

- About 350 miles of conveyance pipes
- 42 pump stations
- 4 treatment plants
- 4 CSO treatment facilities

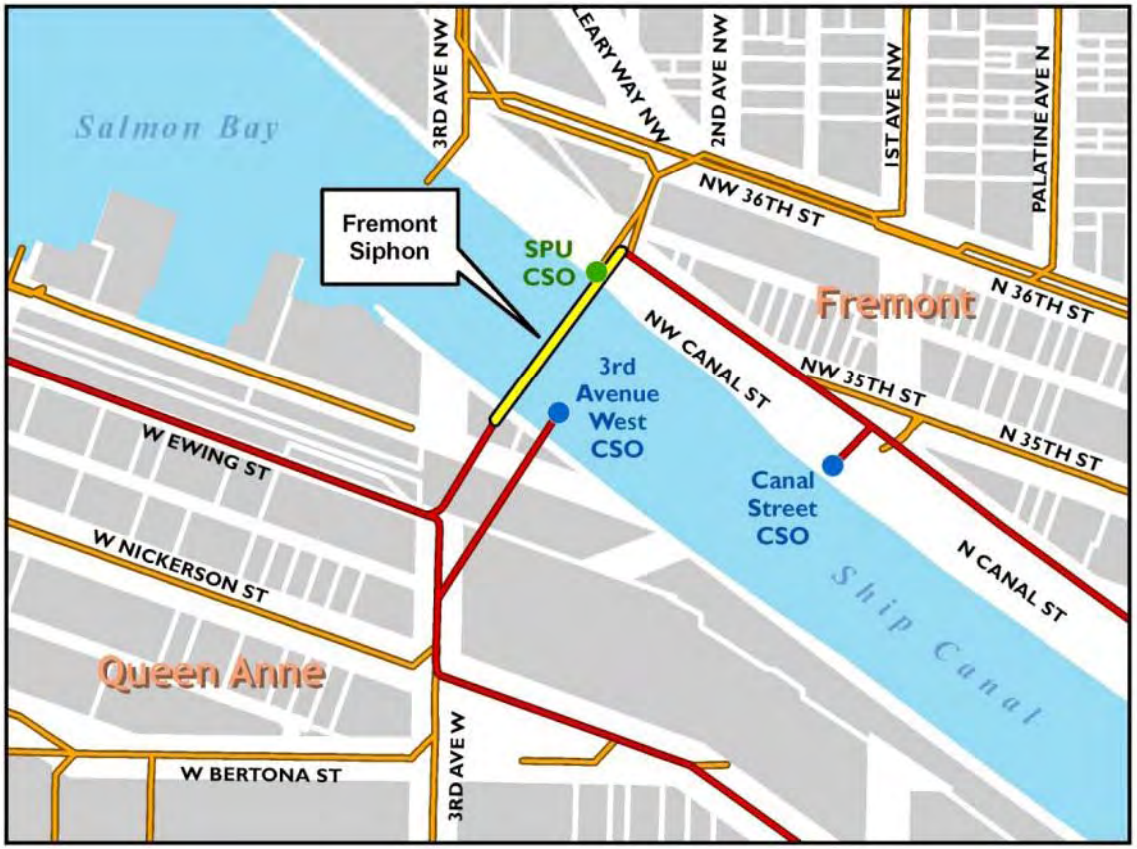


Seattle is a Combined Service Area

- Stormwater and wastewater are conveyed in the same pipes
- Relief points in the system– combined sewer overflows (CSOs) prevent flooding and backups

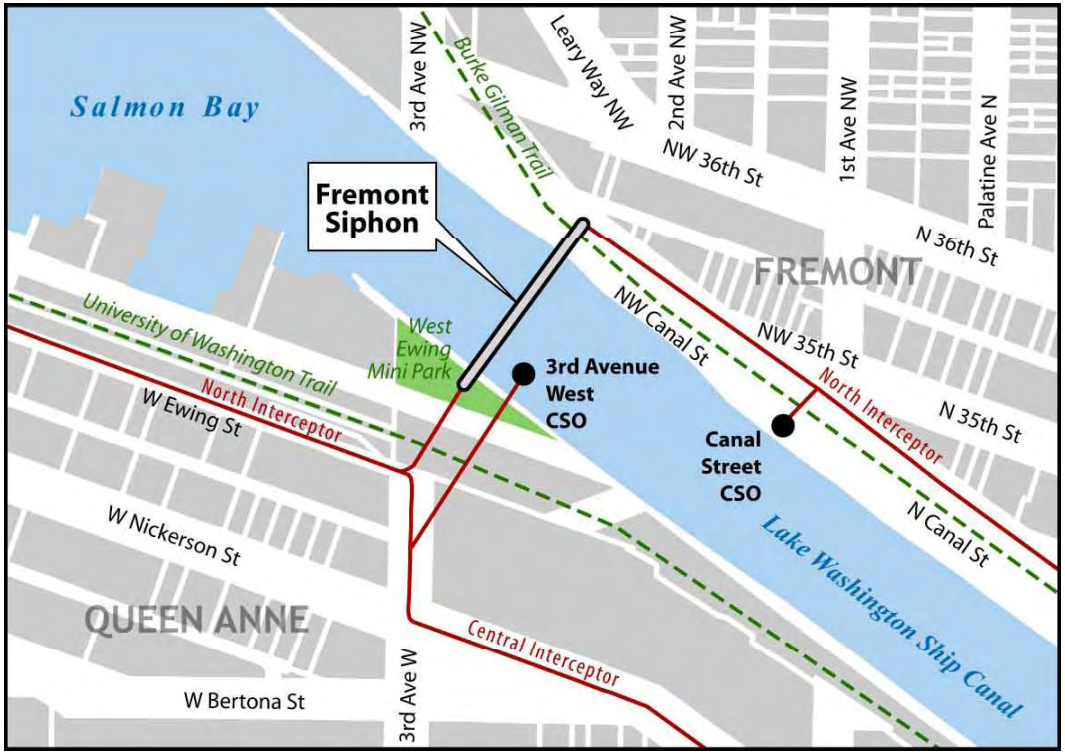
Wastewater conveyance in the project area

- Seattle Public Utilities collects most residential flow
- King County receives flow from SPU's system
- Both SPU and King County have CSO facilities that discharge into the Ship Canal



Siphon Overview

- Located under the Lake Washington Ship Canal, west of the Fremont Bridge
- Pipes were constructed as the North Trunk Sewer from 1907-1913
- Siphon pipelines after almost 100 years of service need replacement



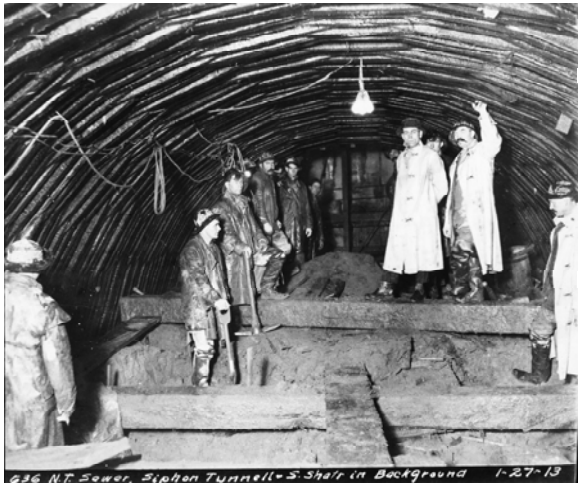
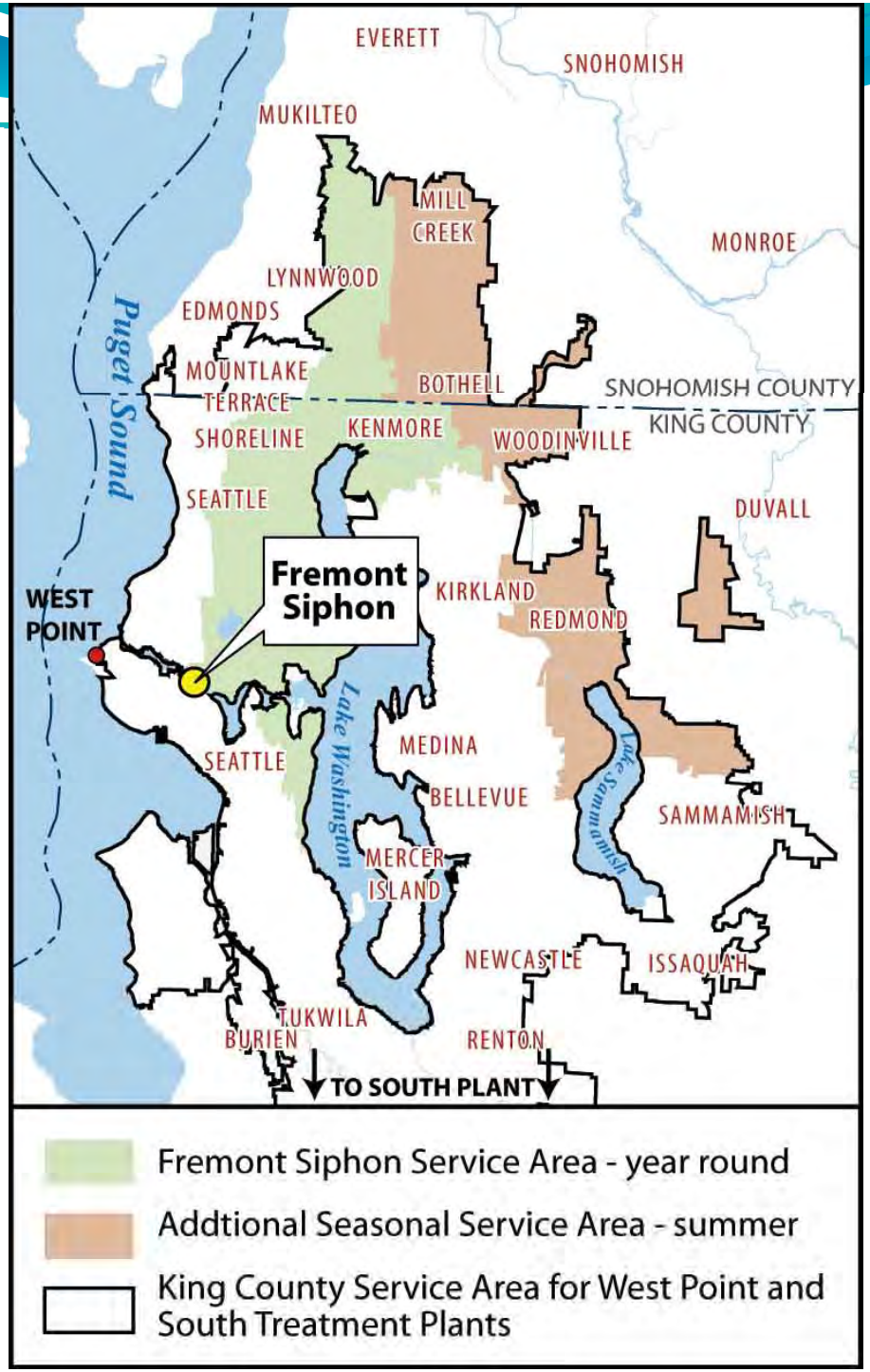


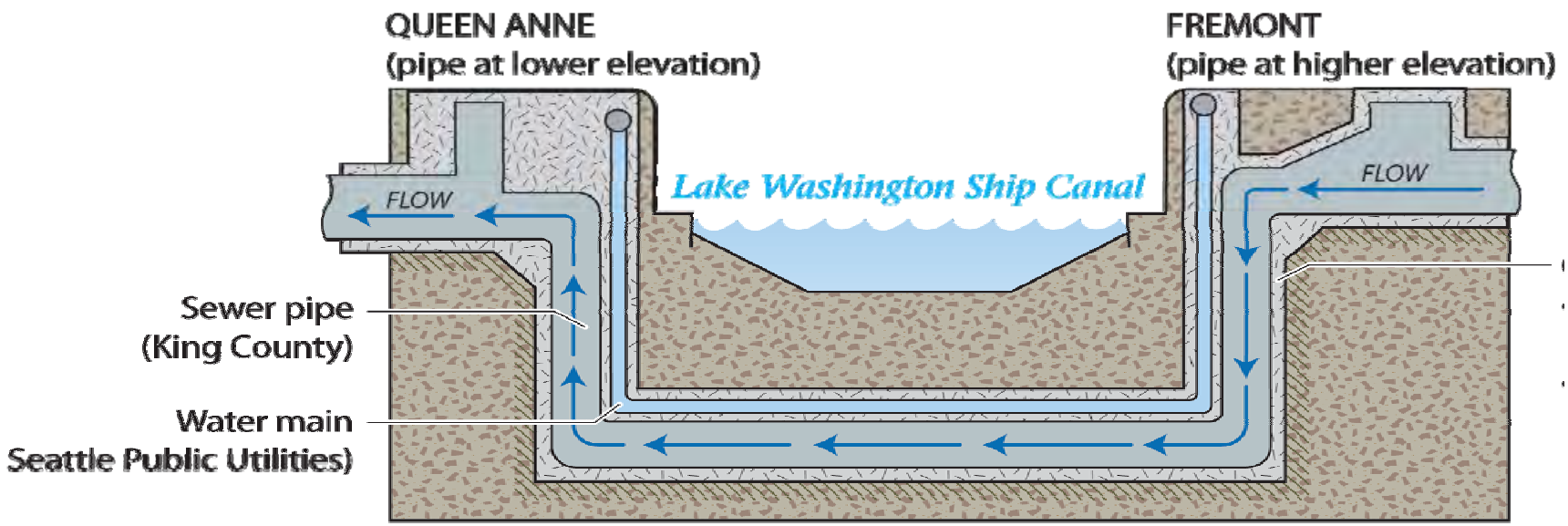
Photo courtesy of Seattle Municipal Archives

Fremont Siphon Service Area

- Service area of 60 square miles year round and an additional 54 square miles in the summer
- Siphon carries up to 220 million gallons per day, half the capacity of the West Point Treatment Plant

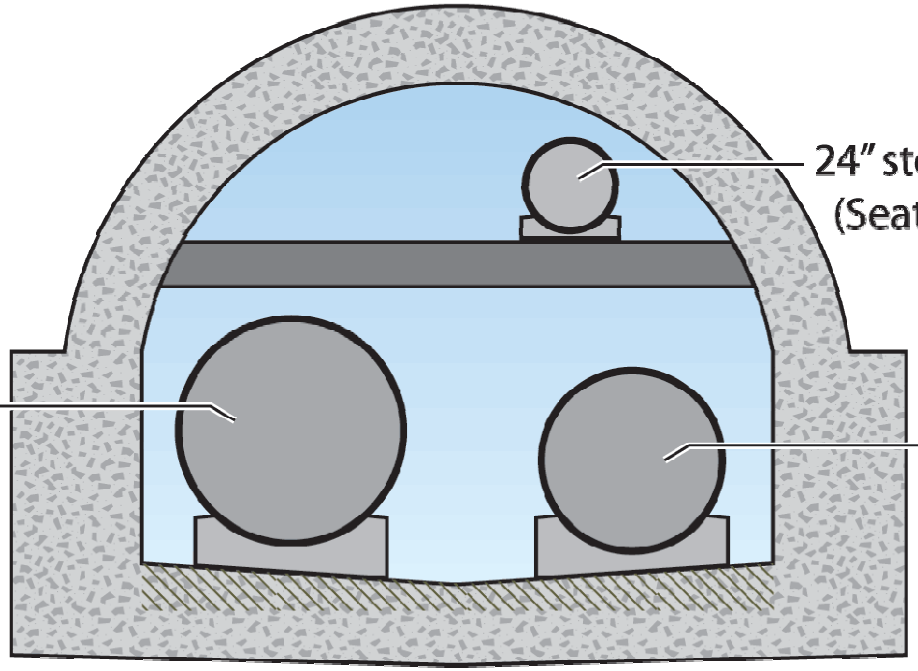


The Fremont Siphon is Installed in a Utility Corridor



The Utility Corridor is a Concrete Tunnel

Current design



Monitoring Our Pipes

King County is monitoring conditions during the Fremont Siphon project

- Monitoring the tunnel
- Monitoring water quality
- Performing visual inspections

Project Schedule

- Decision on recommended project- early 2011
- Project Design, Environmental Review, and Permitting- 2011 to 2014
  - SEPA threshold determination and comment period after 30% design is completed
- Construction – Beginning late 2014; duration depends on project alternative

Project Approaches

- Rehabilitate the existing siphon pipes
- Replace the existing siphon pipes in the same location
- Establish a new pipeline crossing under the Ship Canal

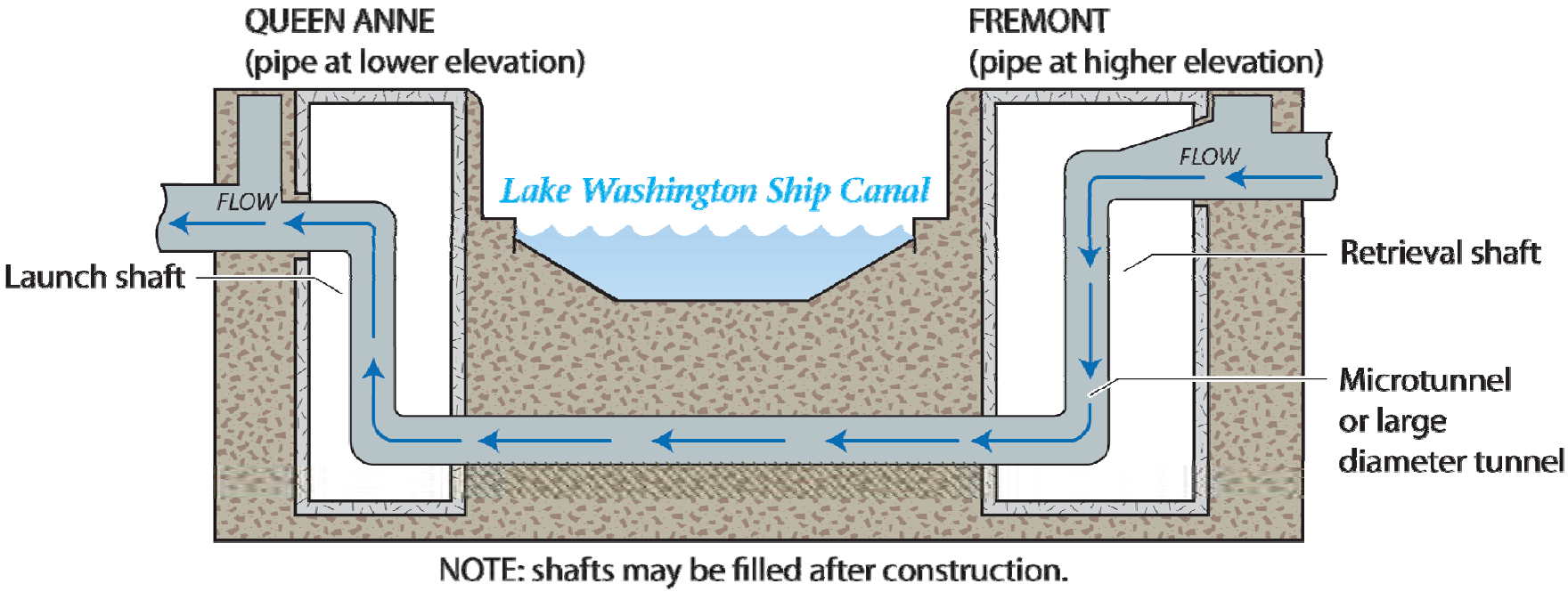
Evaluation Criteria

- Land use and permitting
- Environmental
- Design and operations
- Community impacts
- Planning level cost
- Risk
- SPU water main considerations

Project Alternatives

- New pipes installed in twin microtunnels in a new crossing under the Ship Canal
- New pipes installed in a large tunnel in a new crossing under the Ship Canal
- Maintain current location using new pipes and a microtunnel bypass
- Maintain current location using existing pipes

Establishing a New Pipeline Crossing



New pipelines with equivalent hydraulic profile and capacity would be installed at a separate location under the Ship Canal using one of two methods.

Alternative: New Microtunnel Crossing

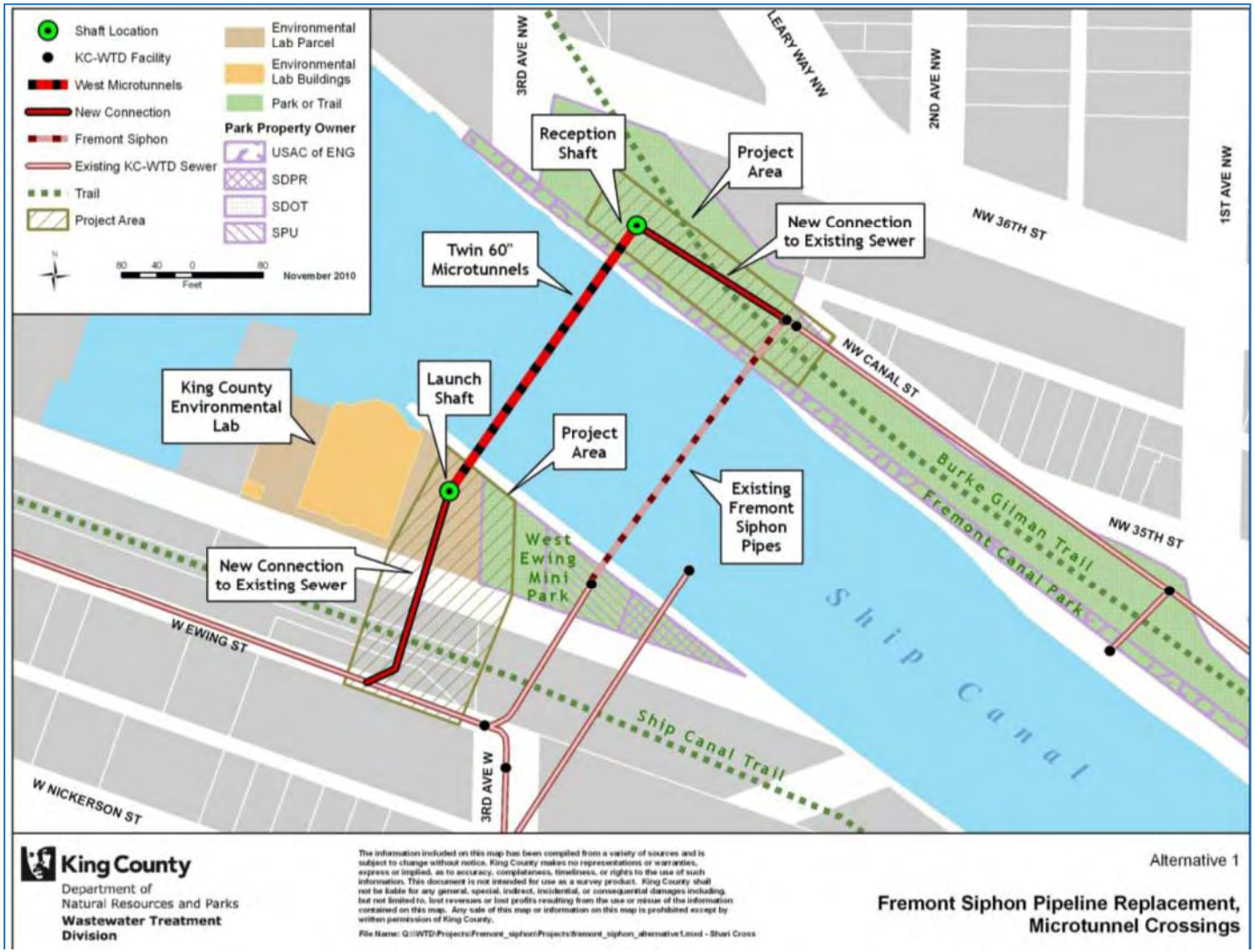
- King County has extensive experience with microtunneling
- The crossing is good length for this technique
- This option allows siphon to continue operating without bypass during construction
- Replicates existing pipes and maintains capacity
- Strategy needed for addressing potential tunneling risk

Microtunneling is a remotely operated tunneling method

Pipe sections are fed through the launch shaft

A slurry separation plant is used to process excavated soils from the microtunnel

New pipes installed in twin microtunnels in a new crossing under the Ship Canal



Community Considerations During Design

- Bike trails in project area
- Existing vegetation in project area
- Conditions for construction activities

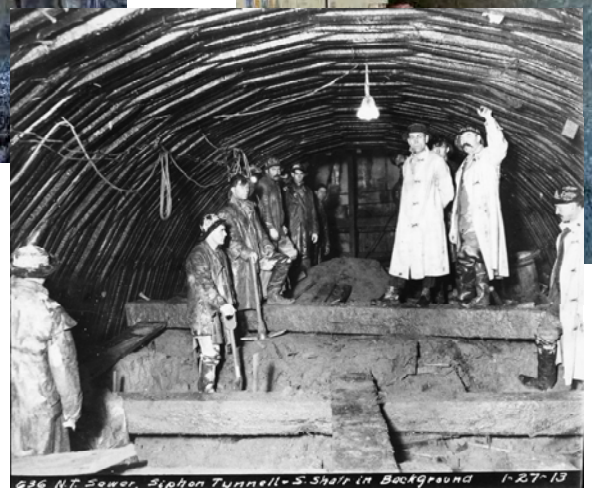
Fremont side, near 2nd Ave

Queen Anne side, by West Ewing Mini Park

Alternative: New Large Tunnel Crossing

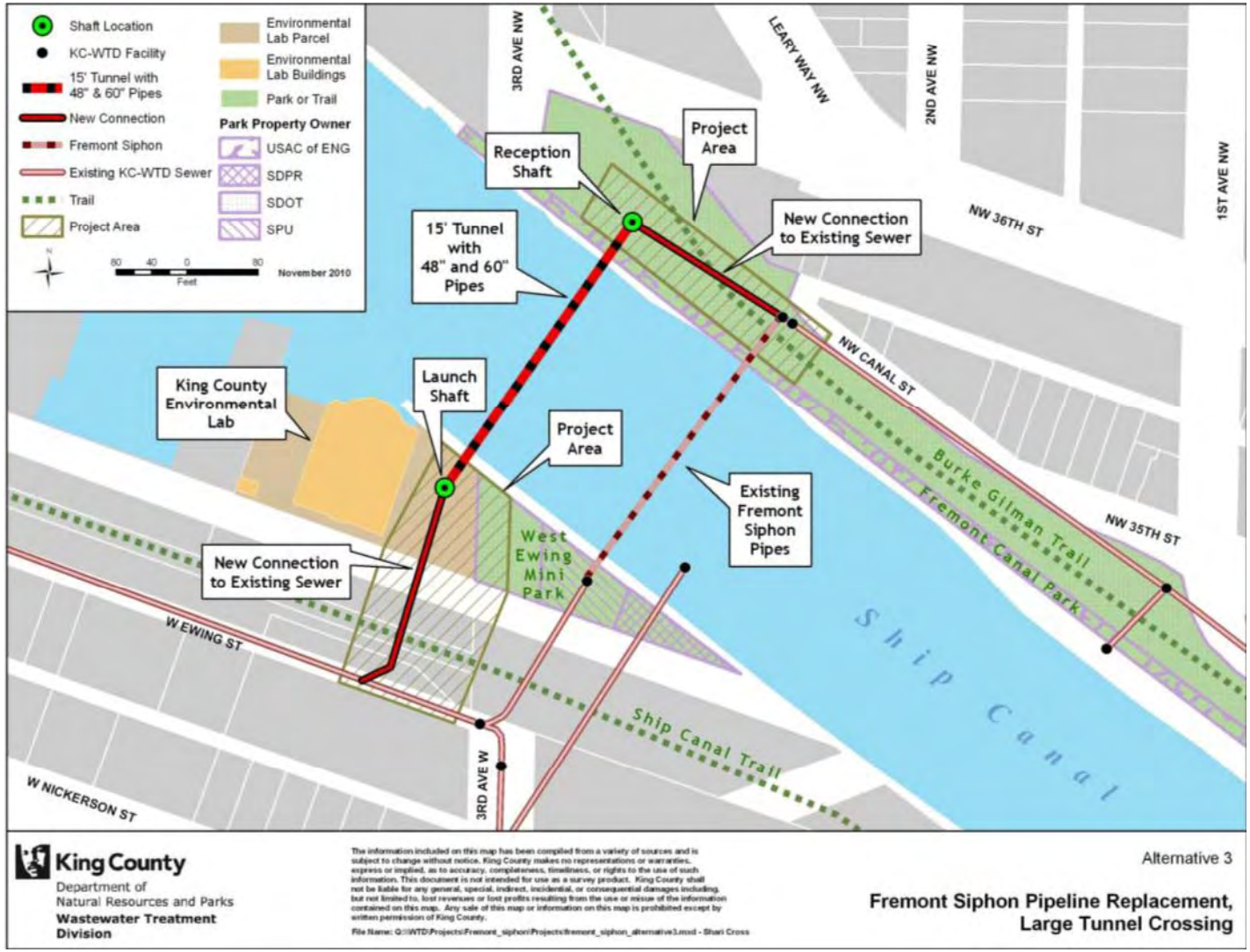
- This option allows siphon to continue operating without bypass during construction
- Replicates existing pipes and maintains capacity
- Method requires people to work inside the tunnel
- Strategy needed for addressing potential tunneling risk

“Hand-Mined” Tunnel



“Hand mined” tunnels, today (above) and in the early 1900’s (right)

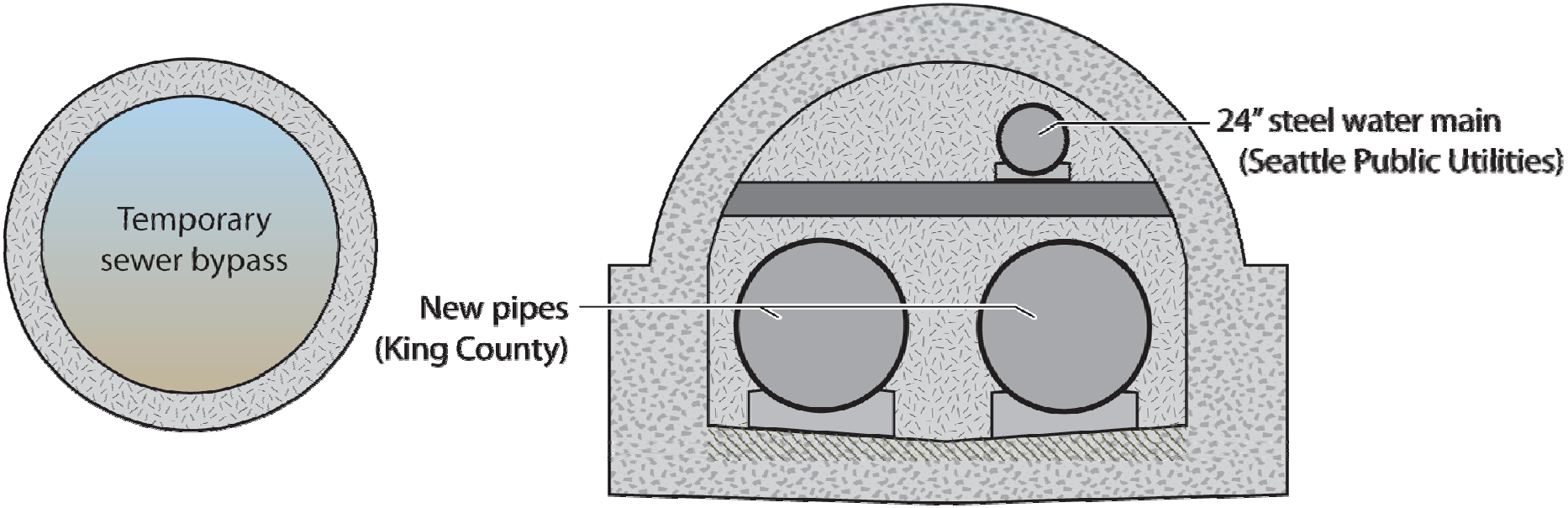
New pipes installed in a large tunnel in a new crossing under the Ship Canal

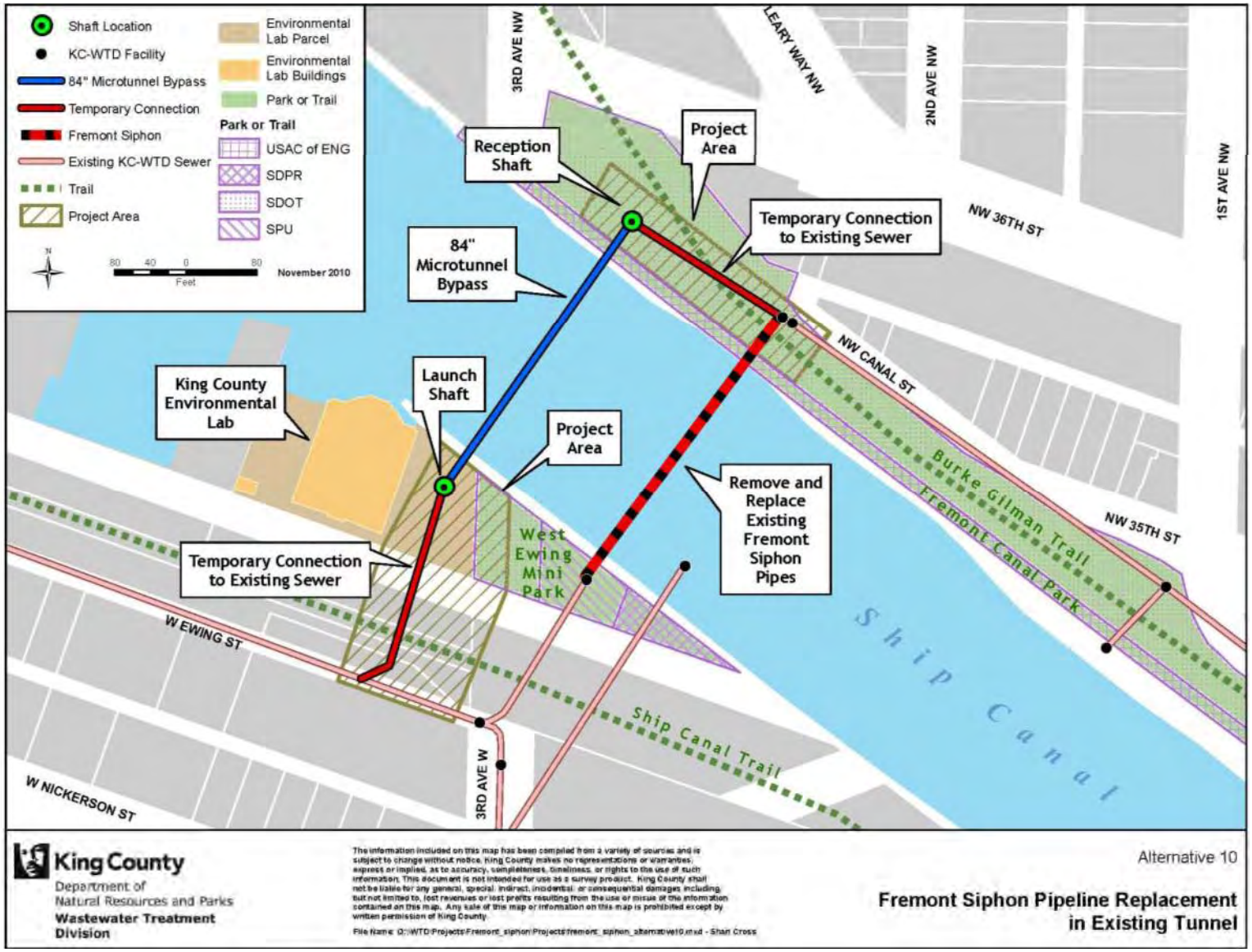


Alternative: Maintain Current Location Using New Pipes and a Microtunnel Bypass

- Microtunnel provides sewer bypass during construction
- New microtunnel provides flexibility for future capacity needs and redundancy
- Potential to reduce future flexibility of shared utility corridor
- Temporary community impacts similar to new crossing options

New pipes installed in existing tunnel while wastewater is diverted through a bypass




Shaft Location
KC-WTD Facility
84" Microtunnel Bypass
Temporary Connection
Fremont Siphon
Existing KC-WTD Sewer
Trail
Project Area
Environmental Lab Parcel
Environmental Lab Buildings
Park or Trail
Park or Trail
USAC of ENG
SDPR
SDOT
SPU
80 40 0 80
Feet
November 2010
Reception Shaft
Project Area
Temporary Connection to Existing Sewer
84" Microtunnel Bypass
Launch Shaft
King County Environmental Lab
Project Area
Remove and Replace Existing Fremont Siphon Pipes
Temporary Connection to Existing Sewer
West Ewing Mini Park
3RD AVE NW
LEARY WAY NW
2ND AVE NW
1ST AVE NW
NW 36TH ST
NW CANAL ST
NW 35TH ST
Burke Gilman Trail
Fremont Canal Park
W EWING ST
Ship Canal Trail
3RD AVE W
W NICKERSON ST
Ship Canal
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Wastewater Treatment Division
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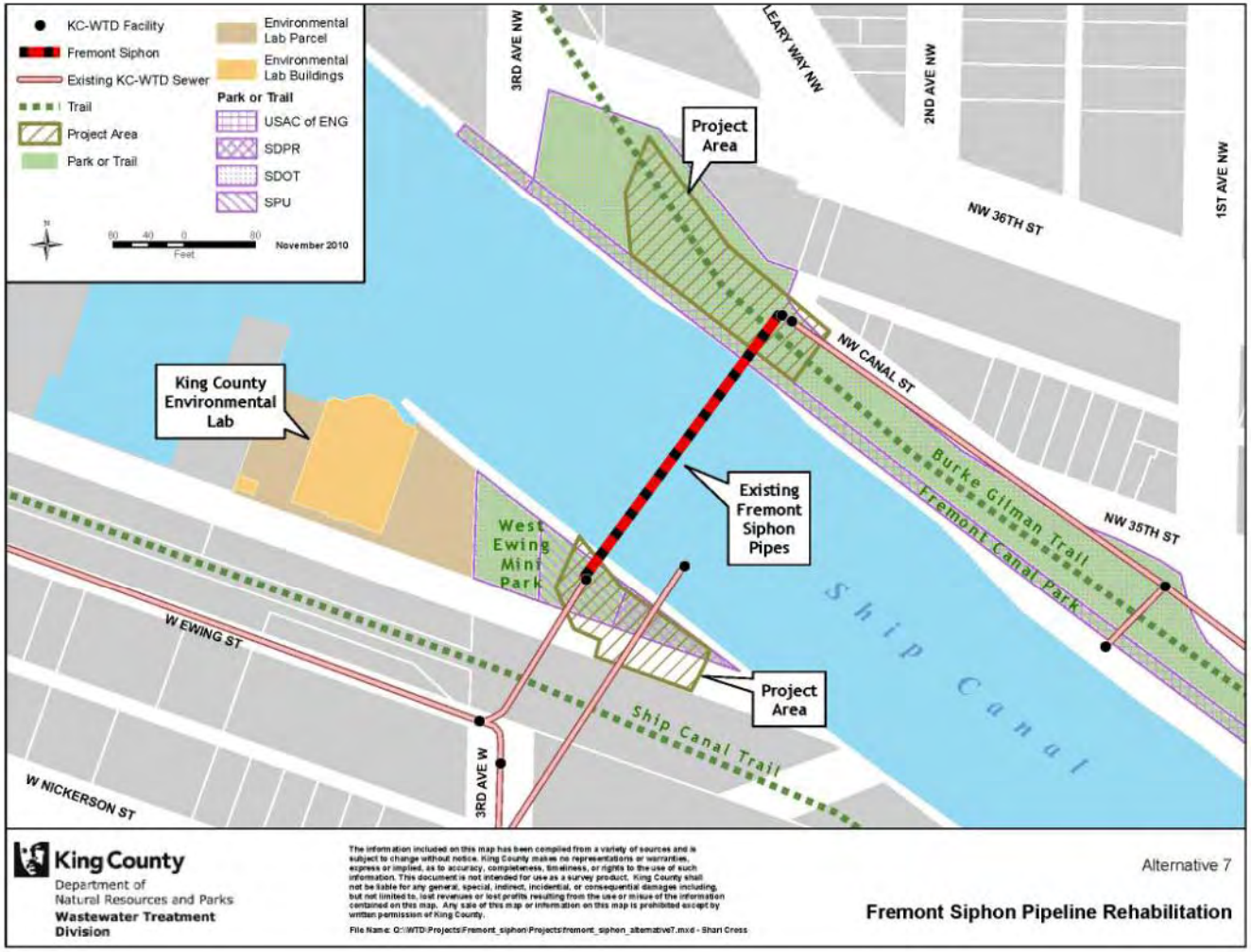
Alternative 10
Fremont Siphon Pipeline Replacement in Existing Tunnel

Alternative: Maintain Current Location Using Existing Pipes

- Highest risk alternative
- Partial or full bypass may be required in construction emergency
  - Multiple pipes laid on the bottom of the Ship Canal
  - Pumps running 24/7 to convey flows
  - Potential closure of Canal Street
- Shortest duration of all alternatives
- Reduces future flexibility of shared utility corridor

Maintaining Current Alignment Using Existing Pipes

Use concrete to encase wastewater pipes and maintain integrity for the next 50 years



Summary of Project Alternatives

Alternative	County Experience	Const. Risk	Temporary Impacts to Neighbors	Planning Level Cost to KC	Impacts to Shared Utilidor
New Pipes in Twin Microtunnel	Experience with Microtunnel	Equivalent • *Micro-tunnel risk*	Equivalent	Equivalent	None
New Pipes in Large Tunnel	No experience with hand mining	Equivalent • *Tunnel risk*	Equivalent	Equivalent	None
New Pipes in Utilidor, with Bypass	Experience with Microtunnel	Equivalent • *Micro-tunnel risk*	Equivalent	2nd Lowest	Potential
Reinforce Existing Pipes in Utilidor	No Experience	Highest •*Pipe failure costly*	Lowest •*Without pipe failure*	Lowest •*Risk cost high*	Certain •*Access* •*Future use*

How we will work with you during the project

What we know: Project location is a densely populated urban area.

- Construction activities
  - Truck and worker traffic
  - Working hours
  - Noise, light, dust
- Access-
  - Local businesses and residences
  - Services and deliveries
  - Parks
  - Bike trails
  - Seattle Pacific University student activities

How we will keep in touch during design and construction

- Email notices to interested people and groups
- Public meetings
- Presentations to community groups
- One on one information exchange
- Web and newsletter updates
- Fliers and doorhangers

FREMONT SIPHON
sewer project

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Project Newsletter FALL 2010

King County proposes projects to update the Fremont Siphon

Salmon Bay
Fremont Siphon
FREMONT
QUEEN ANNE
Lake Washington Ship Canal

Fremont Siphon location

King County protects public health and the environment by conveying and treating the region's wastewater at two award-winning treatment plants, South Plant in Renton, and West Point, located in Seattle's Discovery Park.

The Fremont Siphon is a critical conveyance line that carries wastewater from the

Building the Fremont Siphon Tunnel, 1913. Photo provided by Seattle Municipal Archives.

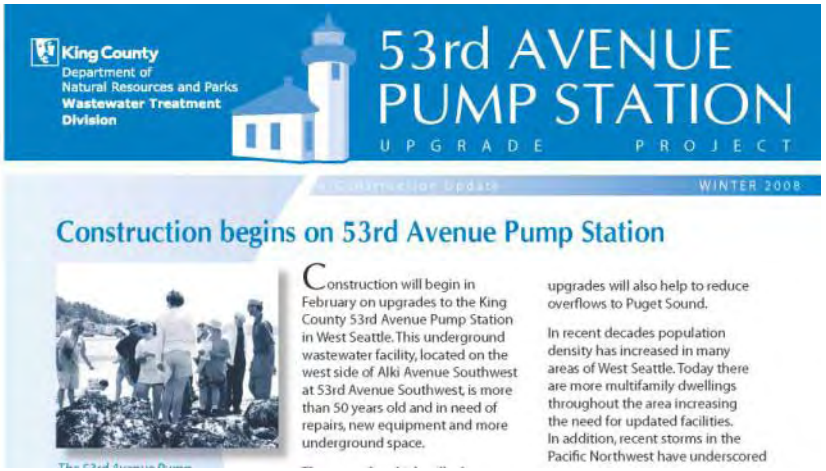
King County

Community Input During Facility Design

- Project team provides updates at milestones during design
- Community feedback and information considered in facility design
- Local requirements and community concerns identified as project design proceeds

King County Continues Outreach Throughout Construction

- Preconstruction community meetings with the contractor
- Advance notice of work
- Neighborhood and community group briefings



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53rd AVENUE PUMP STATION
UPGRADE PROJECT

WINTER 2008

Construction begins on 53rd Avenue Pump Station

Construction will begin in February on upgrades to the King County 53rd Avenue Pump Station in West Seattle. This underground wastewater facility, located on the west side of Alki Avenue Southwest at 53rd Avenue Southwest, is more than 50 years old and in need of repairs, new equipment and more underground space.

upgrades will also help to reduce overflows to Puget Sound.

In recent decades population density has increased in many areas of West Seattle. Today there are more multifamily dwellings throughout the area increasing the need for updated facilities. In addition, recent storms in the Pacific Northwest have underscored

King County

We Work to Minimize Construction Impacts

- Approved Traffic Control Plan
- Maintain emergency and local access
- Provide advance public and agency notice of traffic disruptions

Problem Solving During Construction

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

North Beach Storage Pipeline Project
24/7 Construction Hotline
206-XXX-XXXX
In an emergency, dial 911

- Address access issues for residents, services, and deliveries

Brightwater Project, Swamp Creek Connector, Kenmore

- Work with construction management team to address odor, noise, dust, and other concerns

After Construction

Boeing Creek Park, Shoreline- Underground Flow Control Structure

- Restoration of project areas
- Address questions and concerns during operations
- Notification of maintenance activities

Keeping up to date on the Fremont Siphon Project

- Website: www.kingcounty.gov/environment/wtd/Construction/Seattle/FremontSiphon.aspx
- Phone: 206-263-7301
- Email: monica.vandervieren@kingcounty.gov

Questions?