



King County

Barton, Murray, Magnolia, and North Beach



**North Beach
Public Meeting
March 30, 2010**

CSO Facilities

carollo
Engineers...Working Wonders With Water™



TETRA TECH

And Associated Firms

Meeting Purpose

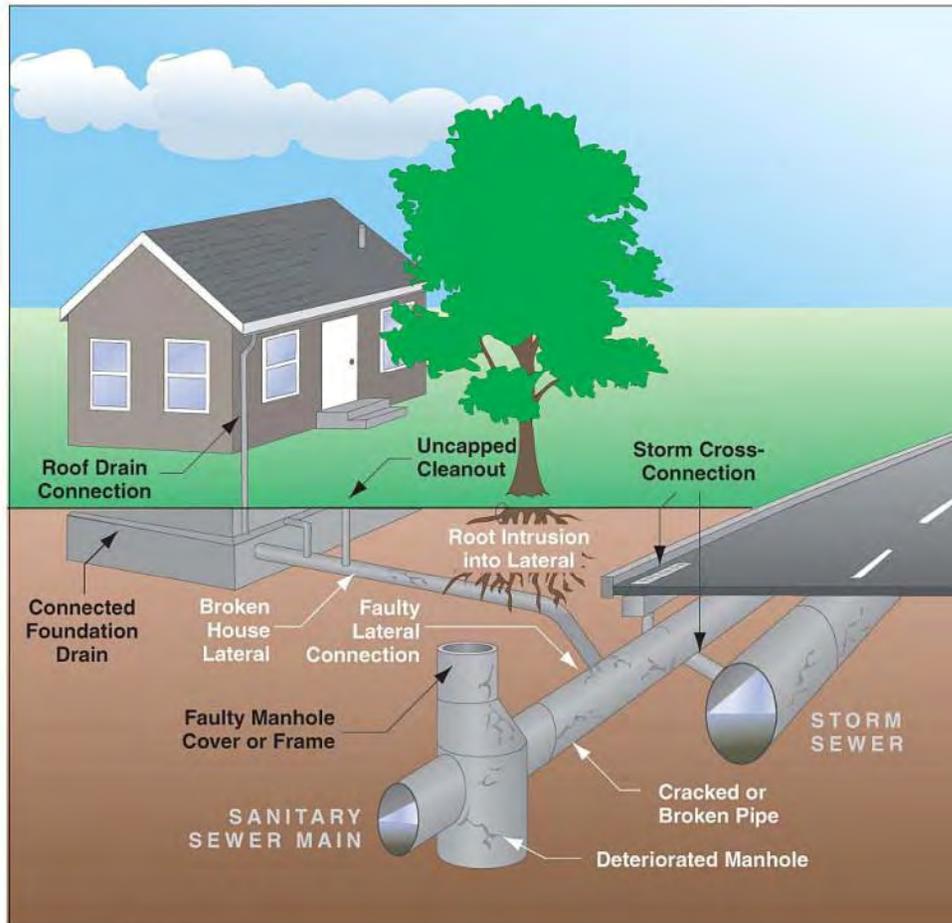
- To present three alternative means for CSO control in the North Beach basin
- To present how these alternatives were developed
- To explain why the three alternatives are being recommended for further evaluation
- To get input from the community on the alternatives

Meeting Agenda

- CSO Control Program Overview
- CSO Beaches Project Objectives
- CSO Control Approaches
- North Beach Basin Requirements
- North Beach Basin Alternatives
- Next Steps

CSO Control Program Overview

The North Seattle Sewer System



Key:

- ← Inflow Source
- ← Infiltration Source

King County
Department of Natural Resources and Parks
Wastewater Treatment Division
Regional I/I Control Program

- Conveys wastewater to treatment plants
- Pipelines & pump stations were sized to capture most of the flow
- Relief points - CSOs - were built to discharge when flows exceed capacity in County system
- Inflow and infiltration react to rain like a CSO

What is the CSO Control Requirement?

- Set by State Regulations (WAC 173-245)
- One untreated event per year on average
- Protect public health, environment, and aquatic life by 2030
- Ecology set West Point permit deadlines
 - CSOs must be controlled to the state regulation
 - Ecology & EPA can use fines and court orders to enforce requirements
 - EPA is tracking King County's compliance schedule

CSO Project Objectives

- King County has 38 CSOs
- Over half are controlled
- CSO Beach projects are a priority due to location near popular beaches
- CSO Beach projects under construction 2013



Public Input Opportunities To Date

- 2007 – 2009
 - Community groups and service organizations
 - Community meetings
 - Newsletters and website
- October 2009 – Public Open Houses on CSO control approaches
- March 2010 – Public meetings on alternative means for CSO control

Project Timeline – 2010 - 2011

- Spring 2010 –
 - Public meetings for 3 alternatives
 - Refinement of alternatives
- Early Summer 2010 – Define proposal for further environmental review
- Summer to Fall 2010 -
 - Report back to public
 - Draft Facility Plan preparation
- December 31, 2010 – Draft Facility Plan to Ecology
- Early 2011 – Public comment on SEPA

CSO Control Approaches

CSO Control Approaches

- Approaches Considered
 - Storage
 - On-site Treatment
 - Conveyance & Treatment
 - Peak Flow Reduction
 - Combination of Approaches

All approaches evaluated for each basin

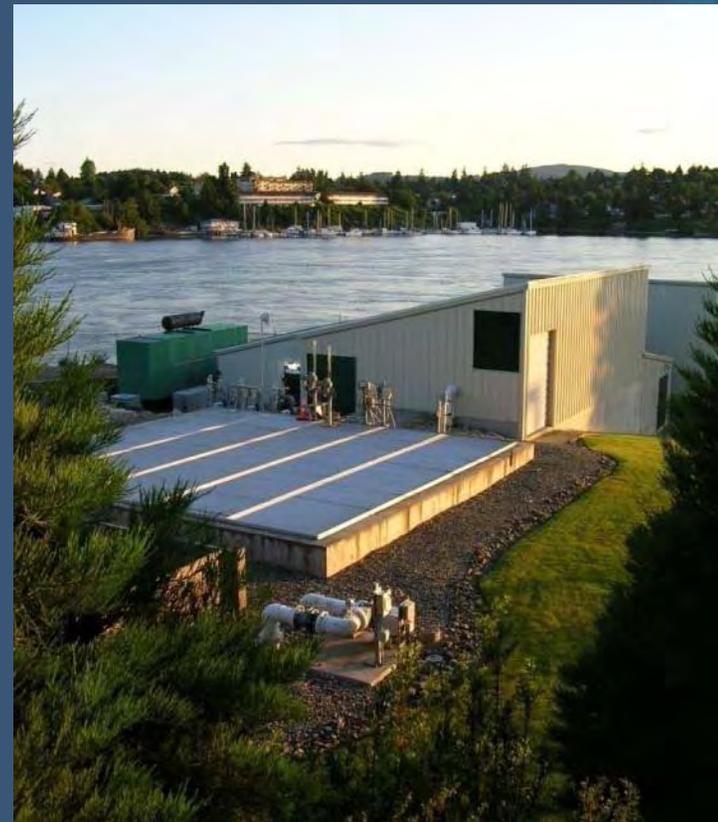
Storage Approach

- Peak flows diverted into storage during wet weather
- Stored flow drained back to collection system following wet weather
- May be “centralized” at bottom of basin, centralized higher in basin, or distributed within basin
- Majority of facility is typically underground
 - Associated facilities located aboveground



On-site Treatment Approach

- Treatment facilities located near the CSO point
- Peak flows are treated and discharged
- Facilities operate only during wet weather events
- May be “centralized” at bottom of basin or centralized higher in basin



Conveyance & Treatment Approach

- Flow conveyed to downstream County facilities where flows are treated and discharged
- Requires increased:
 - Pumping capacity
 - Pipeline capacity
 - Treatment capacity



Peak Flow Reduction Approach

- Separate stormwater from sewer system
 - Disconnect down spouts
 - Re-route stormwater to storm drainage system
- Green stormwater infrastructure (GSI)
 - Roadside rain gardens, bio-swales
 - Green roofs
 - Street trees
 - Pervious pavement
- Inflow and Infiltration (I/I) reduction

How were Alternatives Developed?

- Control approaches evaluated on a basin-specific basis
- Critical questions:
 - Is there sufficient room to site and construct the facility?
 - Is it feasible to construct?
 - Will the alternative capture sufficient peak flow?

How were the Alternatives Evaluated?

- Individual alternatives were evaluated using a range of factors:
 - Land Use/Permitting
 - Environmental
 - Community
 - Costs
 - Operations & Maintenance
 - Design and engineering
- Your input used to shape and inform our work



Evaluation Results

- On-site Treatment
 - Land use challenges
 - Operations and maintenance requirements
- Conveyance & Treatment
 - Conveyance and downstream treatment capacity limitations
 - Conveyance permitting and construction
- Peak Flow Reduction (Stormwater Separation, GSI, & I/I Reduction)
 - Limited impervious surfaces connected
 - Potential groundwater /surface water impacts
 - Flooding
 - Slope stability
 - Storm water collection/treatment

North Beach Basin Control Requirements & Flow Distribution

Basin Description and Control Requirements

- 633 acres
- North Beach CSOs
 - Average 10 events per year
 - Average 2.2 million gallons per year
- Control requirements
 - 150,000 – 230,000 gallons of storage, **or**
 - 5.5 mgd treatment capacity, **or**
 - 5.5 mgd additional conveyance capacity, **or**
 - 5.5 mgd I/I reduction



North Beach Basin Flow Distribution

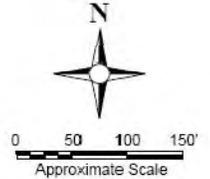
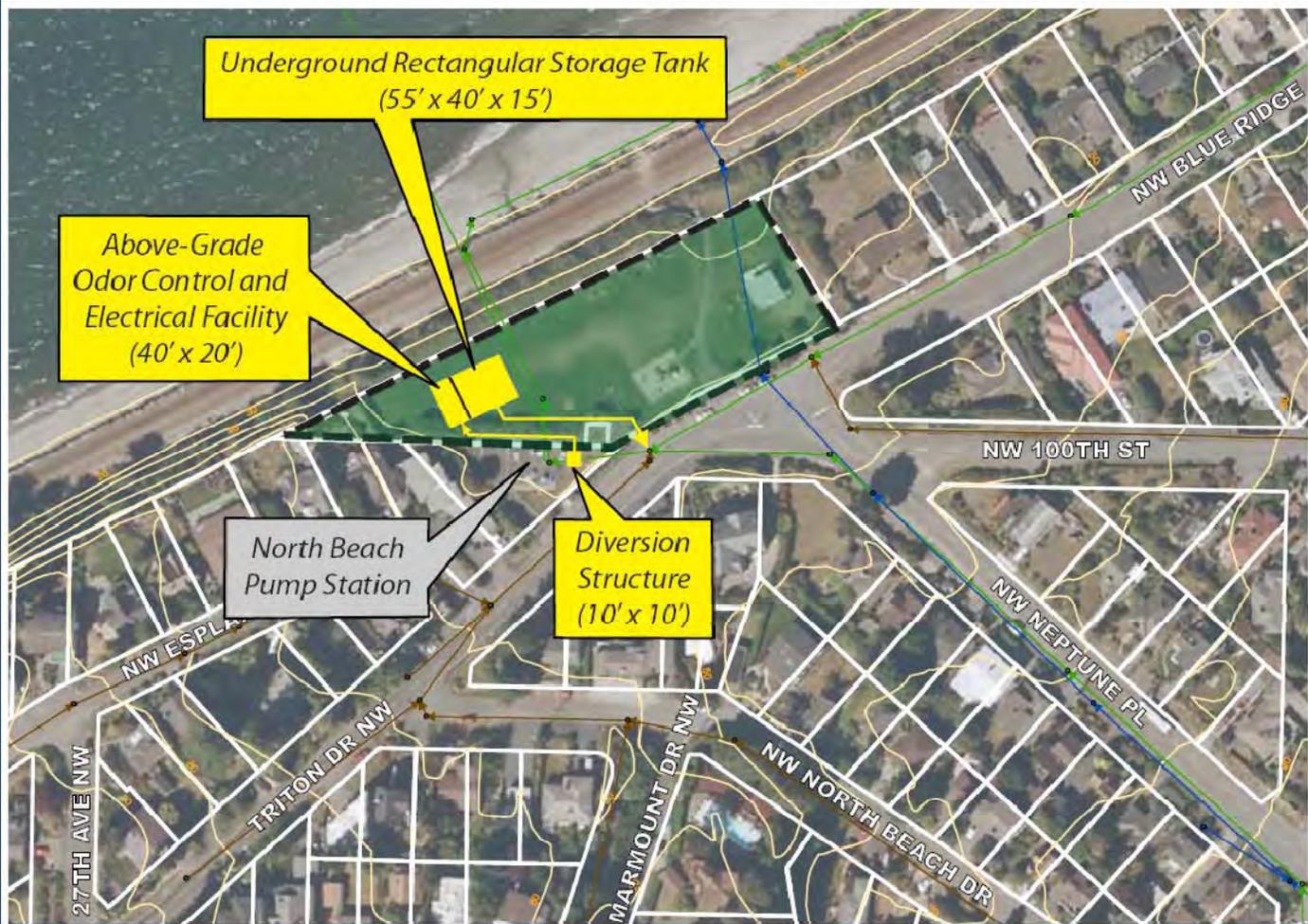
- Flow converges at North Beach Pump Station (4 sub-basins)
- Control requires capturing ~65% of peak flow rate
- => Centralized approach at bottom of basin required



North Beach Basin Alternatives



Rectangular Underground Storage in Blue Ridge Park



Legend

- Combined Sewer System
- Storm Sewer System
- Sanitary Sewer System
- 10' Topographic Contour

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Blue Ridge Park



Rectangular Underground Storage in Blue Ridge Park

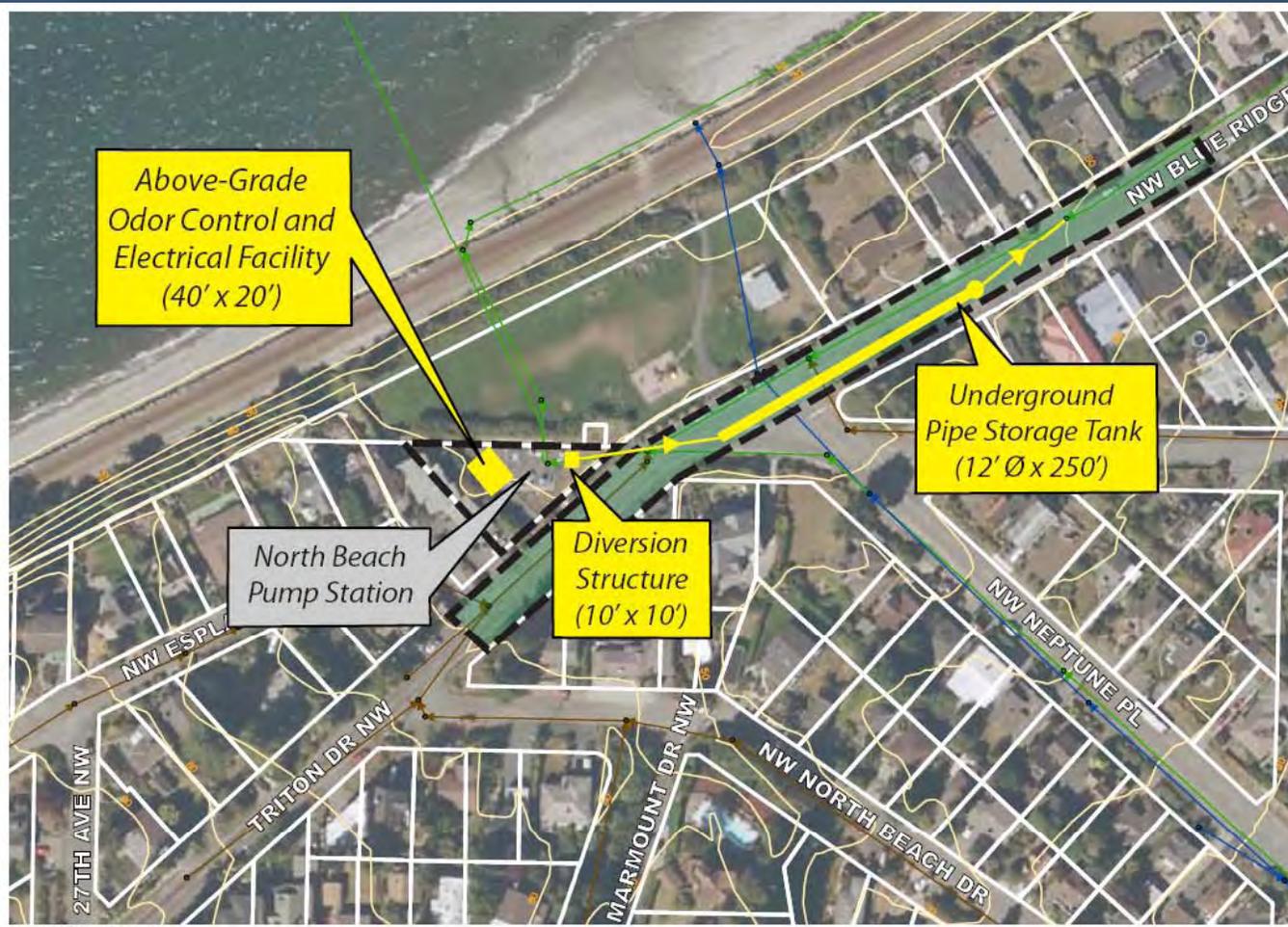
- **Benefits**

- Peak flows captured passively
- Single, underground facility
- Lowest O&M complexity, safe access for crews
- Similar to other county facilities

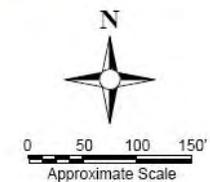
- **Challenges**

- Use of portion of private park for facility
- Requires shoreline permit
- Access to Blue Ridge Park during construction

Pipeline Storage in Right-of-Way



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Legend

- Combined Sewer System
- Storm Sewer System
- Sanitary Sewer System
- 10' Topographic Contour

NW Blue Ridge Drive and Triton Drive NW



Pipeline Storage in Right-of-Way

- **Benefits**

- Peak flows captured passively
- Single, underground facility
- Lowest O&M complexity
- Similar to other county facilities

- **Challenges**

- Access limitations to residences during extended construction period
- Street access (closures) for operation and maintenance activities
- Lack of construction staging area

Rectangular Underground Storage with Pump Station in Blue Ridge Park

- Addresses CSO control requirement &
- Replaces existing North Beach Pump Station and force main



Rectangular Underground Storage with Pump Station in Blue Ridge Park



Blue Ridge Park and Crown Hill



Rectangular Underground Storage with Pump Station in Blue Ridge Park

- **Benefits**

- Peak flows captured passively
- Single, underground facility
- Lowest O&M complexity, safe access for crews
- Similar to other county facilities
- Replaces existing North Beach Pump Station and force main

- **Challenges**

- Use of portion of private park for facility
- Requires shoreline permit
- Access to Blue Ridge Park restricted during construction
- Increased capital and O&M costs for pump station

Questions, Responses, and Public Input



Contact Information to Provide Input

- Web: www.kingcounty.gov/csobeachprojects
- E-mail: CSOBeachProjects@kingcounty.gov
- Phone: 206-263-7301
- Feedback forms
- Feedback and info received by mid-April will be considered during evaluation of the three alternatives

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