Seismic Resilience Projects Update

City Council Work Session

September 22, 2015

Michael Stuhr, P.E., Director
Portland Water Bureau
Presentation Today

• Willamette River Crossing Project Briefing

• Washington Park Reservoir Improvements Project Update
  • Why the project is important
  • What the Water Bureau has accomplished
  • Site challenges and the plan to address them
  • Impact to water rates
  • Project schedule
  • Discussion of alternatives
  • Next steps

• Your Questions
Introduction

• This fall, City Council will hear about two projects critical to earthquake resilience on the west side:
  • Willamette River Crossing
  • Washington Park Reservoir Improvements Project
• The two projects will provide resilience for facilities that serve more than 360,000 people.
Willamette River Crossing Project

• The Water Bureau has budgeted for this project since the Fiscal Year 2007-08 revised budget.

• Project goal is to provide a large seismically resilient pipe to carry water to the west side of Portland.

• Initial project estimate in 2009 was $57 million (low confidence).
Washington Park Reservoir Improvements Project – Background

- The Long Term 2 Enhanced Surface Water Treatment Rule requires covering open reservoirs.

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<th>2008</th>
<th>2012</th>
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<td>Commissioner Leonard directs the bureau to prepare for conventional LT2 compliance.</td>
<td>Council approves ordinances to authorize alternative contract and hire geotechnical and design consultants.</td>
<td>Council directs the bureau to move forward with LT2 reservoir requirements.</td>
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2006 – 2013

Council members collaborate with bureau in six major attempts to appeal LT2 rule, obtain a variance, or achieve a schedule exemption.
Washington Park Reservoir Improvements Project – Importance

• This large water reservoir is **key for seismic resilience**.

• **Hub for water** on west side.

• **Serves three hospital complexes** and part of the **industrial Northwest**.

• **Serves downtown core** that generates an estimated **$8 billion yearly in economic activity**.

• **The site is a historic landmark**.
Area served by Washington Park outlined in blue.
Washington Park Reservoir Improvements Project – Outreach

• More than 2 years of meetings and events with the community.

• Outreach started before project design began and will continue through the life of the project.

• Community helped steer design of project features.
Washington Park Site Challenges

September 2015

- **90% design** phase gives clear picture of site challenges:
  - Large ancient landslide
  - Weak soils on top of bedrock
  - Limited space and access
- Geotechnical investigation reveals more complex site.
Plan to Address Challenges

• **Reservoir 3—Drinking Water Storage**
  - Strong temporary walls, called shoring.
  - Thick permanent earth wall.
  - Compressible buffer layers and anchors.
  - Drilled shafts embedded in bedrock.

• **Reservoir 4 Site**
  - Fill material to restore hillside slope.

• **Limited Space and Access**
  - Move soils between site with conveyor belt.
  - Provide traffic management and security.
Cross Section of Reservoir 4 Area

Material to restore slope

Landslide above site
Strengthening the Reservoir 3 Site

Shoring walls to protect the site from earth movement.
Reservoir 3 Landslide and Seismic Resilience

Measures to protect the reservoir from landslides and earthquake movement.

- Thick wall of mechanically stabilized earth
- Compressible layers
Cross Section of Typical Underground Reservoir
Cross Section of Completed Reservoir 3

- Landslide
- Mechanically stabilized earth wall
- Landslide buffer
- Drilled shafts
- RESERVOIR
- Tie-back anchors
- Seismic buffer
- Light brown means embedded in weak soils
- Dark brown means embedded in solid rock
Cross Section of Typical Underground Reservoir

2009 project estimate – $62.3 million
Cross Section of Completed Reservoir 3

2015 project estimate – $170 million
Rate and Bill Impacts – Net Increases

• Approximately 0.9 percent every year over the next five years.

• Up to $2 per month for the typical single-family residential customer.
Construction Pause

• Two-year **pause** in heavy construction after Reservoir 3 is complete.

• Allows soils to become **compact enough to bear the weight** of the reflecting pool and other surface features at Reservoir 3.

• The bureau will **provide security and site maintenance** during the pause.

• Meets LT2 rule **compliance deadline**.
Proposed Changes to Schedule

Initial Schedule

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Proposed Schedule

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Alternatives Analysis

• Between 2002 and 2009, the bureau considered other alternatives.

• Washington Park was the most feasible alternative.
  • Chosen for elevation that allows water to flow back downhill.
  • Hub for large water pipes that carry water all over the city.
  • Relocating pipes would be expensive and disruptive.
  • Using the Washington Park site meets the compliance timeline.
## Next Steps

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<td>Washington Park</td>
<td>Update neighbors and community</td>
<td>Council hearing on ordinance to authorize construction contract</td>
<td>Obtain permits, prepare site, start construction</td>
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<td>Willamette River Crossing</td>
<td>Council hearing on ordinance to authorize alternative Design-Build contract</td>
<td>Select Owner’s Representative (project management) consultant</td>
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Your Questions