

Memorandum

Date: April 12, 2013

To: John Kovash, Mayor
Members, West Linn City Council

From: Chris Jordan, City Manager 

Subject: Council Schedule

April 15 Council Work Session

The topics for the work session include:

- A presentation on the Oregon Resilience Plan for Water and Wastewater Systems by Mark Knudson of the Tualatin Valley Water District. The Resilience Plan focuses on the rapid recovery of these systems following a catastrophic event. A copy of the presentation is attached.
- Emergency Water Supply Planning by the Regional Water Consortium
- Other Items the Council may wish to discuss
- A Video created by Portland General Electric regarding the Willamette Falls area. (Note: due to copyright concerns, the televised portion of the Council meeting will terminate prior to the showing of this video.)

April 22 Citizens Budget Committee and Council Work Session

On April 22 at 6:00, the Citizens Budget Committee will meet to receive the 2014-2015 Proposed Budget and the presentation of the Budget Message. Following the Budget meeting, the Council will meet in a work session with the main topic being an update on the planning for the former Blue Heron property in the Willamette neighborhood. We expect members of our task force to be in attendance and assist staff with the presentation.

The Citizens Budget Committee will next meet on April 29.

Please let me know if you have any questions.

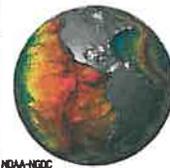
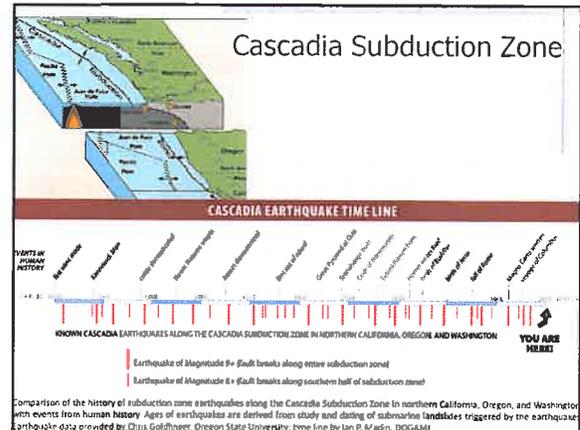
Attachment

The Oregon Resilience Plan For Water & Wastewater Systems

West Linn City Council Work Session

April 15, 2013

Mark Knudson, P.E.
Tualatin Valley Water District

House Resolution 3

74th OREGON LEGISLATIVE ASSEMBLY 2013 Regular Session

Enrolled
House Resolution 3

Sponsored by Representative BOONIA, Representatives URWAN, KEELER, MOHLAN, WITT, and
also COURTNEY, JOHNSON, KRUSE, VERGER, WHITSETT

- ◆ **Goals:**
 - Protect lives
 - Achieve rapid economic recovery following event
- ◆ **Based on Cascadia Subduction Zone EQ, tsunami**
 - Magnitude 9 Event – 500 year return period
- ◆ 50-years to implement recommendations
- ◆ Plan to Legislature by February 28, 2013

The Oregon Resilience Plan

- ◆ Coordinated by Oregon Seismic Safety Policy Advisory Commission (OSSPAC)
- ◆ Eight Task Groups
 - Magnitude 9 Event – The Scenario
 - Business Continuity
 - Critical & Essential Buildings
 - Energy
 - Information & Communications
 - Transportation
 - Tsunami Risk Mitigation
 - **Water & Wastewater**



Kobe, Japan - 1995

Water & Wastewater Resilience Plan

- ◆ Co-chairs: Mark Knudson (TVWD) and Mike Stuhr (PWB)
- ◆ Participants included representatives of ~ 45% of state
 - Portland, TVWD, Salem, Gresham, Eugene, Coos Bay, Bend, Pendleton
 - PSU, OSU, U of P, multiple consultants
- ◆ Four zones: Tsunami, Coast, Valley, East
- ◆ Approach
 - Identify event (maps)
 - Identify requirements & expectations
 - Identify performance of existing systems
 - Identify interdependencies
 - Identify "gaps" in systems performance
 - Generate recommendations



Cascadia Scenario Impact Zones

Why Are Water Systems Vulnerable?

- ◆ Causes of damage
 - Tsunami (inundation)
 - Shaking (acceleration & velocity)
 - Permanent Ground Deformation (landslide, liquefaction, subsidence)
 - Cumulative effects
- ◆ System Vulnerability



The Great San Francisco EQ - 1906

Why Are Water Systems Vulnerable?

- ◆ Large, complex systems, multiple failures
 - Source, treatment, pumping, storage, distribution

Why Are Water Systems Vulnerable?

- ◆ Recovery highly dependent on other systems
 - Energy, transportation, people, equipment, financial

Why Are Water Systems Vulnerable?

- ◆ Location, location, location

Why Are Water Systems Vulnerable?

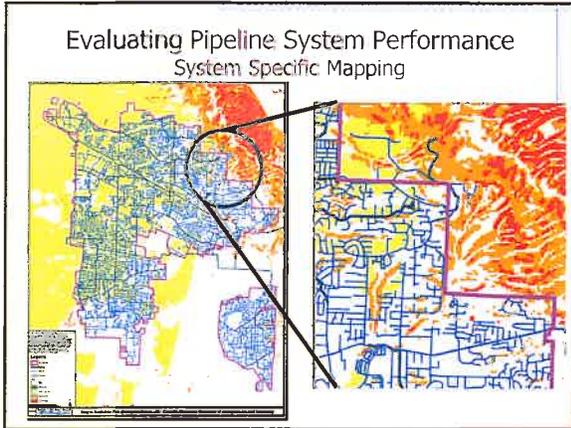
- ◆ Age, age, age (and condition)

Why Are Water Systems Vulnerable?

- ◆ Pipelines vulnerable to structural damage

Why Are Water Systems Vulnerable?

- ◆ Pipelines vulnerable to ground deformation

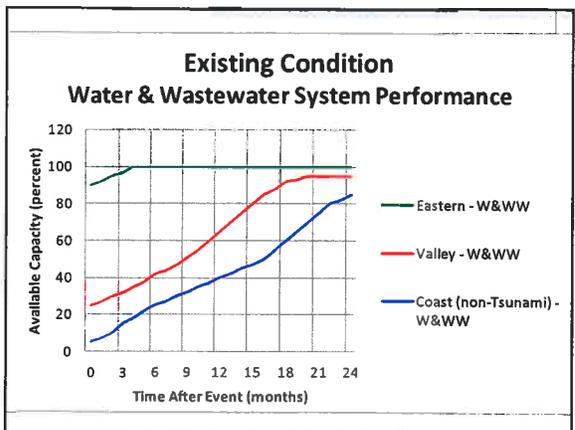
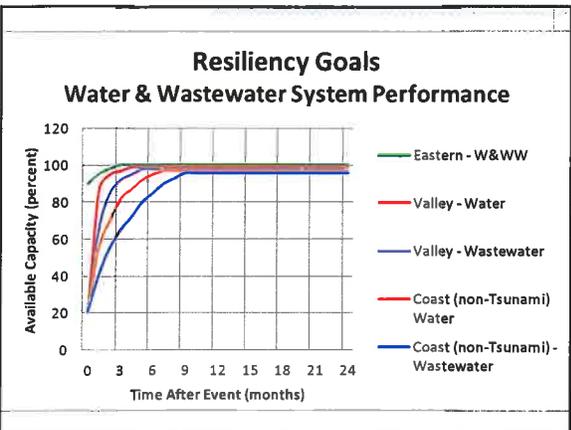
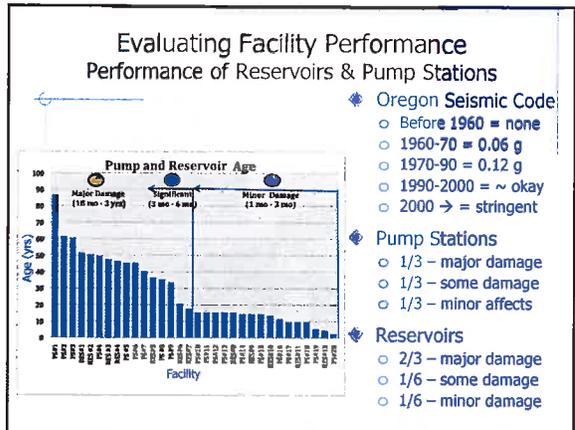


- ### Evaluating Pipeline System Performance
- #### System Specific Pipe Performance Estimates
- Estimate of main line leaks & breaks
 - "Seismic Fragility Formulations for Water Systems" American Lifeline Alliance, 2011
 - Based on empirical data from prior events
 - Input: Peak Ground Velocity, Permanent Ground Deformation, length of pipe, pipe material
 - Output: number of main leaks & breaks by pipe type
 - Estimate of service line leaks & breaks
 - Based on anecdotal data for similar events
 - About 7% of all service lines fail (2% on utility side & 5% on customer side)

Water Pipeline System Performance

Characteristic	Main Lines	Services
Length, Number	4,592 miles	385,600 connections
Number of Breaks	2,656	7,712 (utility side)
Number of Leaks	941	19,280 (customer side)
Total Leaks & Breaks	3,597	26,992

- Unprecedented number of pipeline failures
 - Equivalent to ~16 years of breaks
- Will required ~3 months to repair
 - Assumes 3 hrs/break, 12hrs/d, 7d/wk, unlimited materials, equipment & transportation
 - Does not include repairs to customer-side



Water & Wastewater Findings & Conclusions

- ◆ Significant gap between goals and existing state
- ◆ If CSZ EQ occurs today, it will result in dramatic change in "life as we know it" for W & WW
 - Most water systems will drain contents
 - Major structural damage to supply facilities, WTPs, pump stations
 - Change in traditional firefighting methods
 - Emergency water distribution required
 - Significant risks to public health & safety
- ◆ Water generally better prepared than wastewater
 - Wastewater limitations will create critical public health risks
 - Need for wide-emergency sanitation
 - Contamination of rivers, streams
 - Contamination downstream of Portland – sewage & chemicals

Water & Wastewater Findings & Conclusions

- ◆ Resiliency upgrades will improve recovery times
 - Focus on system "backbone" & water supply to critical facilities
 - Coordinate with first responders to plan priorities & response
 - Coast (non-tsunami) could recover in 1 – 6 months
 - Valley could recover in < 1 month
 - Significant improvements in public health & safety
- ◆ Costs will be significant but can be managed
 - Have long-term plan for making improvements over 50 years
 - Invest in "backbone" and "low hanging fruit"
 - Include seismic improvements with ongoing investments
 - Incremental costs are limited when part of replacement & maintenance of aging infrastructure

Water & Wastewater Recommendations

- ◆ Reset public expectations for recovery times
 - "72 hours" not realistic – more like "72 days"
 - Emergency water distribution systems
- ◆ Require seismic response plans by all sectors
 - Include business continuity, employee & family support
- ◆ Require seismic assessments for all systems
 - Part of periodic update of master plan
 - Characterize risks, impacts & recover times
- ◆ Fire & water agencies to set joint standards
 - Water supply & fire fighting expectations
 - Identify key water supply points & standards

Water & Wastewater Recommendations

- ◆ Include seismic upgrades as part of CIP
 - Focus on establishing hardened supply "backbone"
 - Additional priorities - master plan & asset management
 - State to include seismic requirements in design review
 - Industry associations to establish pipeline standards
- ◆ Agencies to set post-event compliance goals
 - Expectations for regulatory compliance & standards
 - Expectations for emergency water distribution
 - Expectations for temporary sanitation & waste disposal

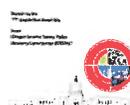
State Plan Findings & Conclusions

- ◆ Eastern Oregon will experience limited impacts
 - Can serve as resource for staffing, material & equipment
- ◆ Tsunami areas will take years to recover, if ever
- ◆ Coast critically impacted; up to 3 years
 - High seismic impacts due to proximity to fault, PGD & subsidence
 - Highly isolated due to transportation & energy disruptions
- ◆ Extensive impacts to Valley; 6 months – 1 year
 - Extensive damage to facilities built prior to early 1990s
 - Recovery hampered by impacts to transportation & energy
 - Staffing, access to material & equipment critical limitations



State Plan Findings of Other Sectors

- ◆ Oregon is far from resilient today to impacts of a great Cascadia Subduction Zone Earthquake
 - Casualties (1,250 to more than 10,000)
 - Economic Loss (close to 20% state GDP)
 - More than one million truck loads of debris
- ◆ Interdependencies will slow response & recovery
- ◆ Critical vulnerability of liquid fuels



State Plan Findings of Other Sectors

◆ Most businesses can tolerate only 2 - 4 weeks of disruption to critical services

Critical Service	Zone	Estimated Time to Restore Service
Electricity	Valley	1 to 3 months
Electricity	Coast	3 to 6 months
Police and fire stations	Valley	2 to 4 months
Drinking water and sewer	Valley	1 month to 1 year
Drinking water and sewer	Coast	1 to 2 years
Top-priority highways (partial restoration)	Valley	6 to 12 months
Healthcare facilities	Valley	18 months
Healthcare facilities	Coast	3 years



State Plan Next Steps

- ◆ Work with Oregon's Legislative Assembly to keep the 50-year goal in view
- ◆ Advocate community-level planning
- ◆ Support public / human resilience
- ◆ Invest in civic infrastructure
- ◆ Conduct joint planning with Washington



State Plan Recommendations

- ◆ Conduct comprehensive assessments of structures and systems that underpin Oregon's economy
- ◆ Launch a sustained program of capital improvement in Oregon's public structures
- ◆ Craft a package of incentives to engage Oregon's private sector to advance seismic resilience
- ◆ Update Oregon's public policies



Tualatin Valley Water District Next Steps

- ◆ TVWD Seismic Resiliency Strategy
 - Updated design standards
 - Budget proposal
 - Facility assessment
 - Integration with master plan & asset management
 - Prioritization of capital improvements
 - Coordination with fire & emergency responders
 - Business recovery & continuity planning
 - Update Water Supply Strategy & Master Plan

Tualatin Valley Water District