

Everett Water Supply Resiliency

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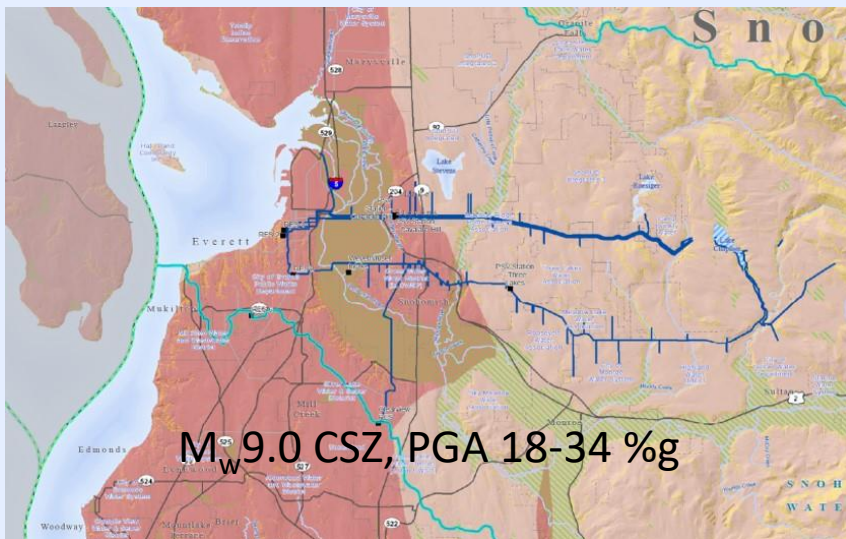


Resiliency Parameters

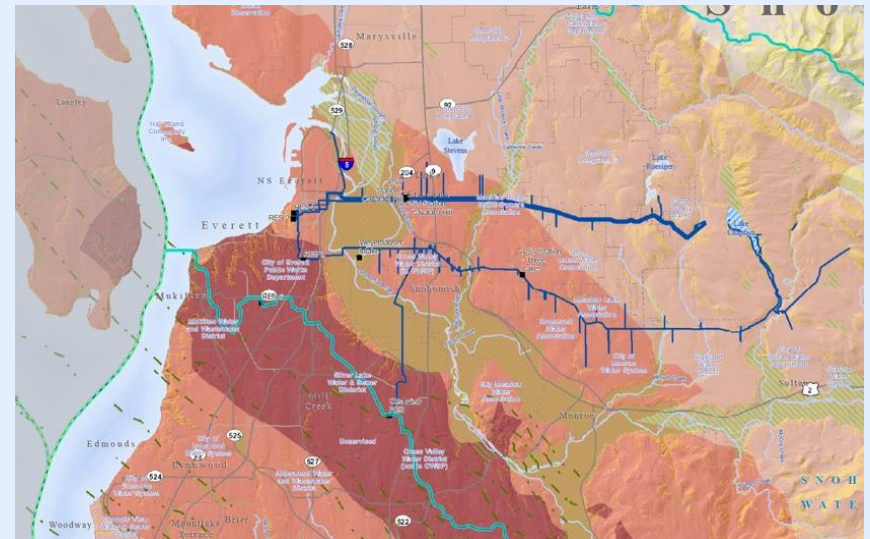
- Critical/essential facilities
- Designed to resist earthquakes with 2% chance in 50 years
- Equivalent to M_w 7.4 SWIF earthquake

Earthquakes Considered

Cascadia Earthquake



South Whidbey Island Fault



$M_w 7.4$ SWIF is 3 – 4 times
more violent than $M_w 9.0$ CSZ

Importance Post-EQ Water Supply

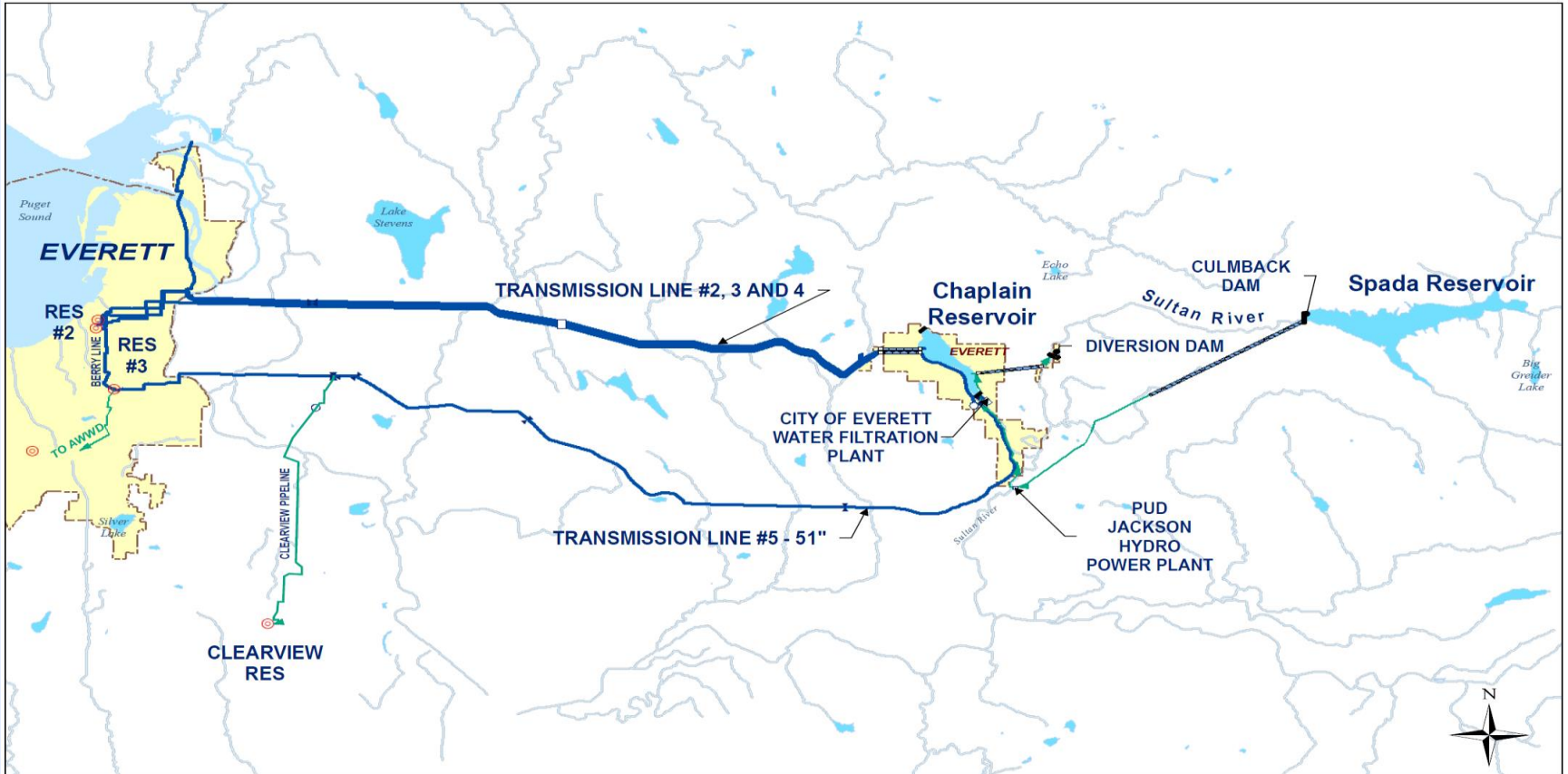
- Public health
- Fire fighting
- Economic continuity

Everett Earthquake Likelihood

In next 50 years (USGS):

- 14% chance of M_w 9.0 CSZ
- 15% chance of M_w 6.5+ surface fault
- 85% chance >1 deep earthquake

Everett Water Supply System



Resiliency Project Findings

M_w 7.4 SWIF earthquake:

- Res 2 complete damage
- Res 3 & 6 extensive damage
- Chaplain N&S dams extensive damage
- WFP moderate damage
- 20+ breaks/leaks in TLs

Economic Cost

Regional System ¹	Cascadia Subduction Zone	South Whidbey Island Fault	Seattle Fault	Tacoma Fault
Everett	\$70M	\$490M	\$10M	\$0
SPU/Cascade	\$810M	\$1,550M	\$1,770M	\$240M
Tacoma	\$750M	\$20M	not evaluated	\$1,110M
Total Loss	\$1,630M	\$2,060M	\$1,780M	\$1,360M

1. Economic losses are calculated based on a FEMA methodology that uses a value of \$103/person/day to calculate the community impact due to a complete water outage. Economic losses do not consider losses due to loss of life or injuries, damage to property, losses due to boiled water or curtailment requirements, or losses due to fire damage arising from lack of water for firefighting. When added, the loss estimates could be significantly greater, possibly two to three times the losses estimated above depending on the severity of the scenario..

Everett Seismic Mitigation

- TLs 2 & 3 - 2009
- Pile-supported TL 5 - 2010
- Water supply risk assessment - 2012
- WFP OP bldg. seismic retrofit - 2017

Everett Seismic Mitigation

- Resiliency study – 2016/2018
- Distribution main replacement with earthquake resistant pipe - now
- Replace Res 2 – in design

Short Term (10 Yrs) Mitigation Plan

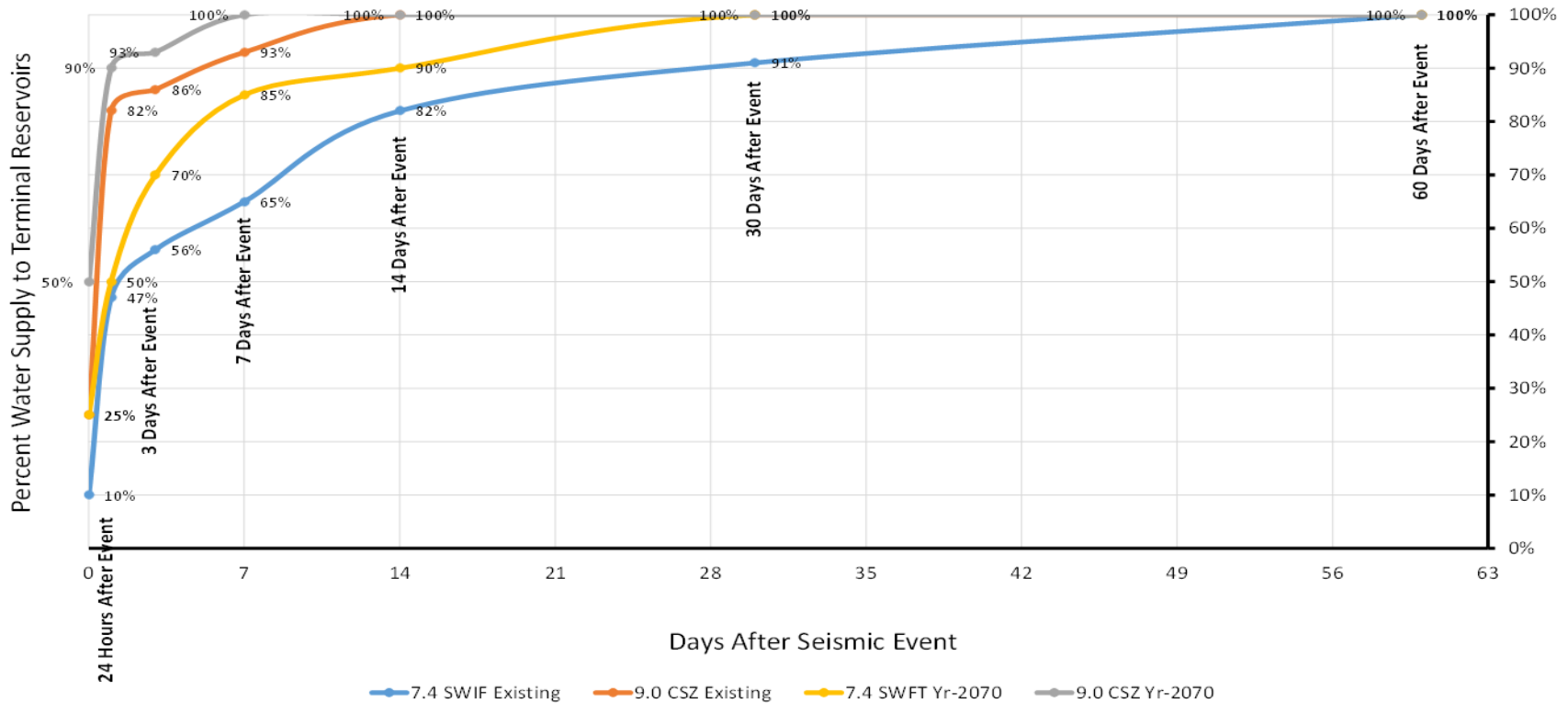
- Enhance preparedness & response
 - Finalize earthquake response plan
 - Augment TL repair material stocks
 - Assess emergency drinking water
- Implement resiliency CIP program
Totaling \$94 Million over 10 Yrs

Short Term (10 Yrs) Mitigation Plan

- Implement water isolation strategies
 - Isolation valves at Res 2, 3 & 6
 - EQ resistant distribution system
 - Add strategic valves for isolating
- Keep Res 4 as non-potable storage

Water Supply Recovery Curves

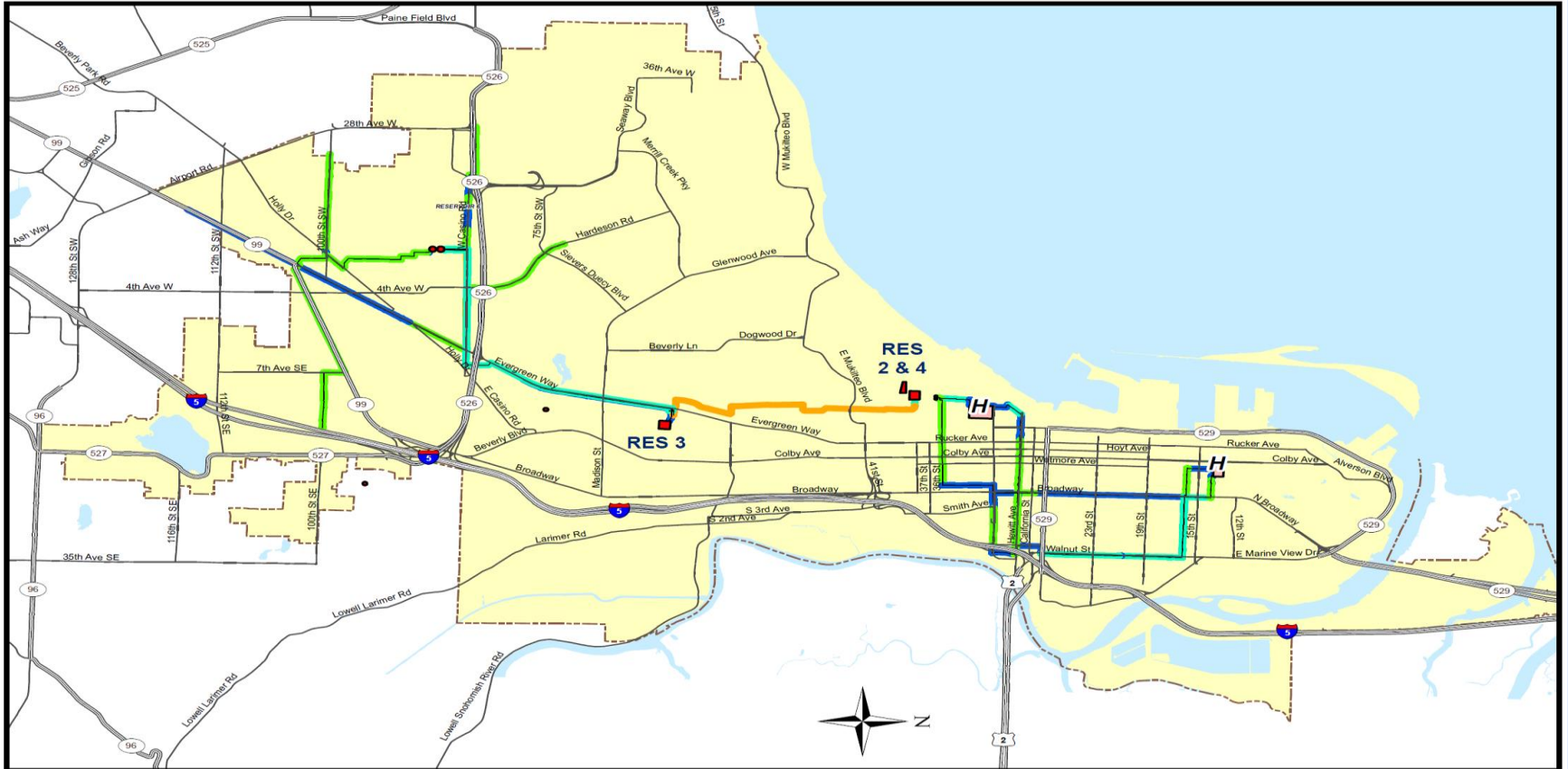
Everett's Water Supply Recovery Time



Long Term (50 Yrs) Mitigation Plan

- Backbone Distribution System
 - Use earthquake resistant pipe
 - Implement isolation strategy
- Upgrade/replace vulnerable facilities
 - Reservoirs 3, 6
 - Key pump stations & support facilities

Everett Water Backbone System



Summary

- Seismic planning is a long term priority
- Seismic projects are in the water CIP
- Seismic planning is a city-wide effort

Questions?