Becoming the Model for Regionally Redundant, Resilient Infrastructure in the Pacific Northwest

Todd Perimon
Austin Peters

PNWS AWWA
Boise, ID
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Tualatin Valley Water District

Hillsboro OREGON

Beaverton OREGON

City of Wilsonville

City of Sherwood Oregon

TIGARD

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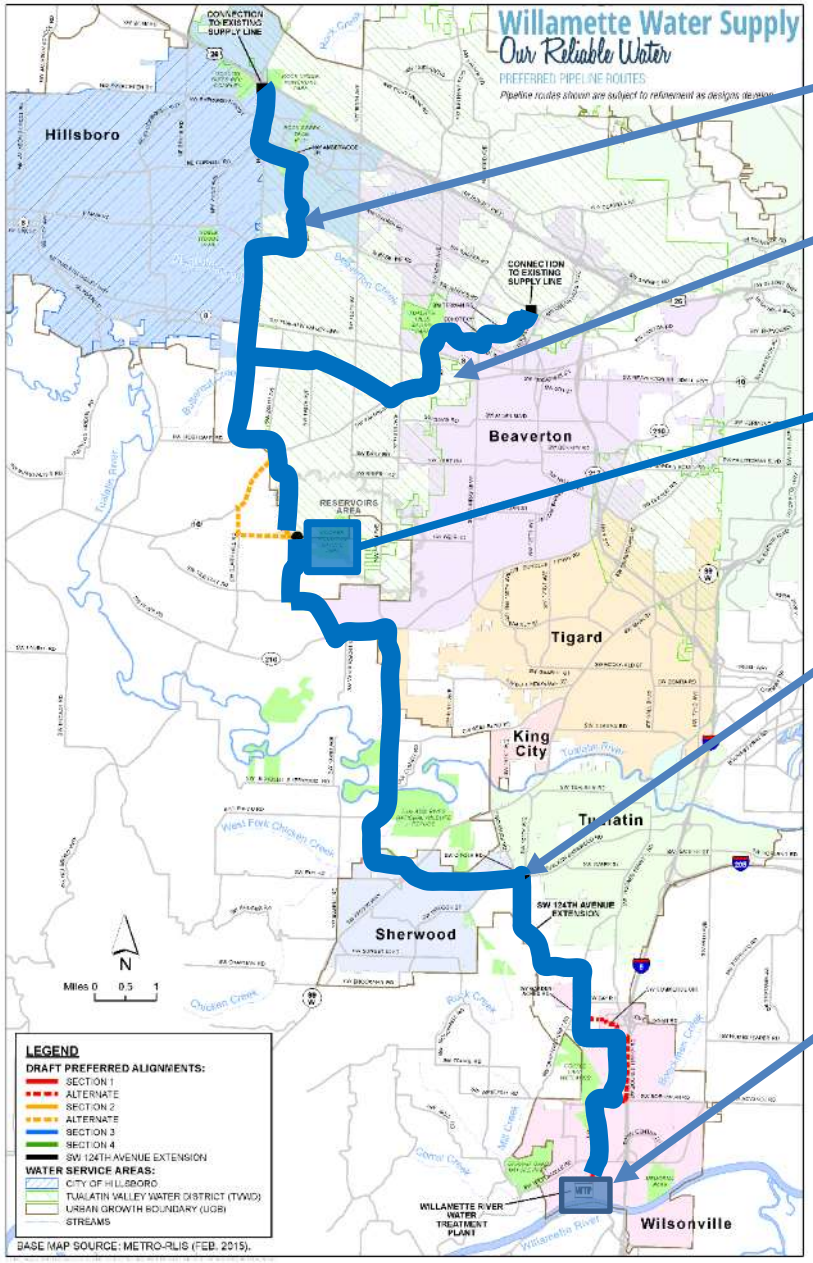
Agenda

- Overview of the WWSP
- Defining Resiliency & Redundancy
- Developing the Master Plan
- Building Consensus
- Conclusions

What is the Willamette Water Supply Program? (WWSP)

- Regional water supply program for developing new treatment, storage and conveyance infrastructure from the Willamette River.
- Partnership between TVWD and the City of Hillsboro
- The Cities of Beaverton, Tigard, Tualatin are considering their options for participation
- Wilsonville and Sherwood are currently using the existing WRWTP

WWSP Overview



Western Extensions

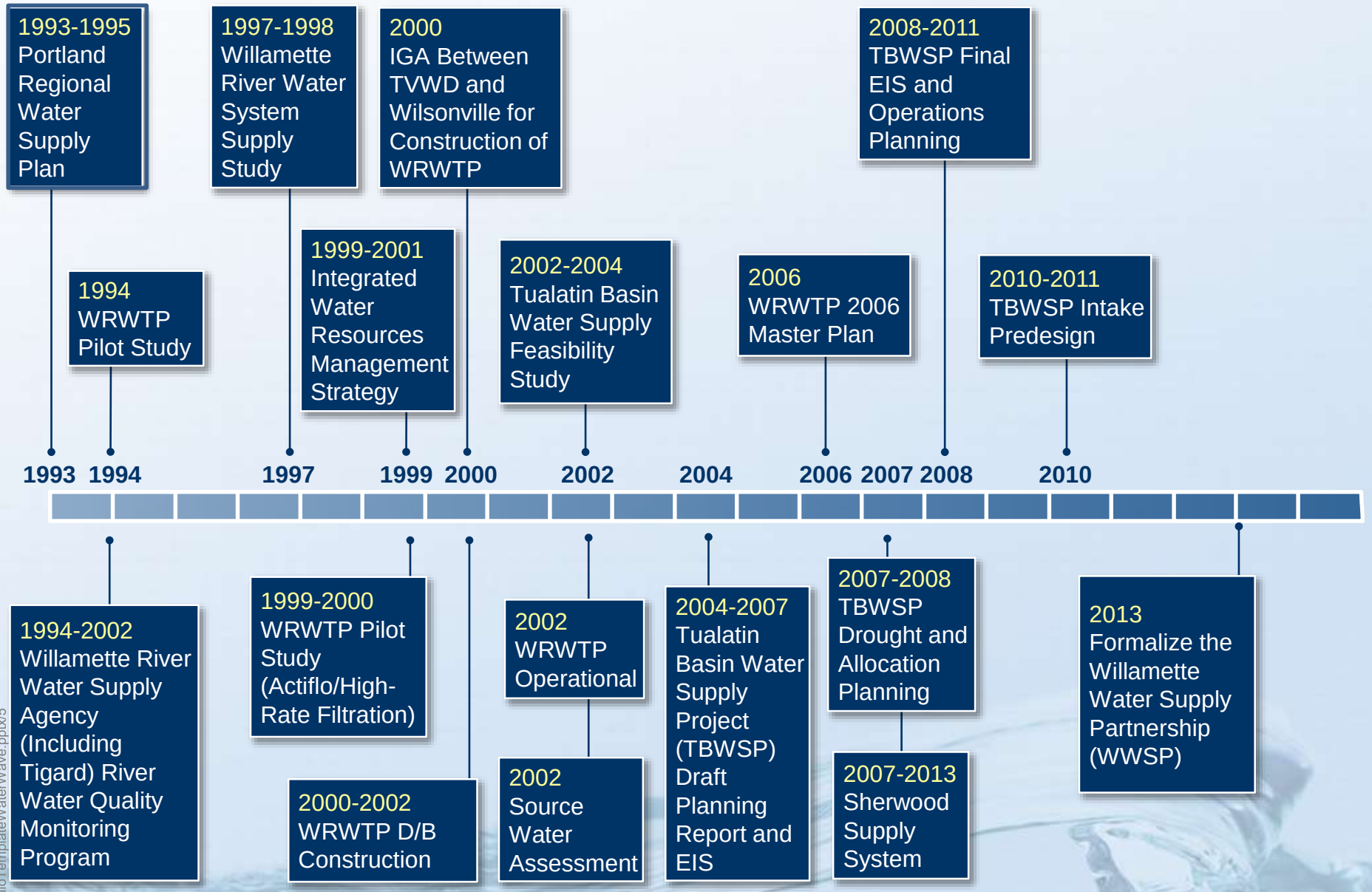
Eastern Extension

30 MG Terminal Storage

66-in Diameter Main Stem Pipeline

Existing WRWTP, Intake and RW Pump Station

The Long Road to a Regional Water Supply



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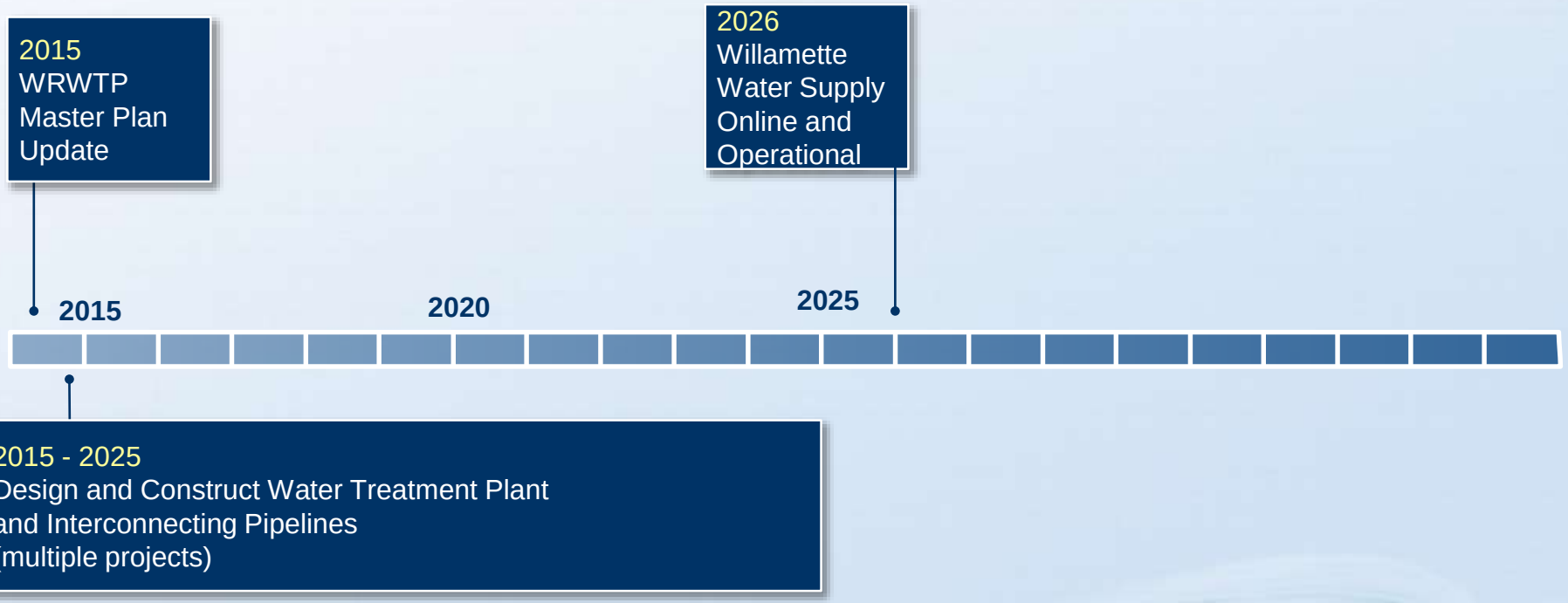
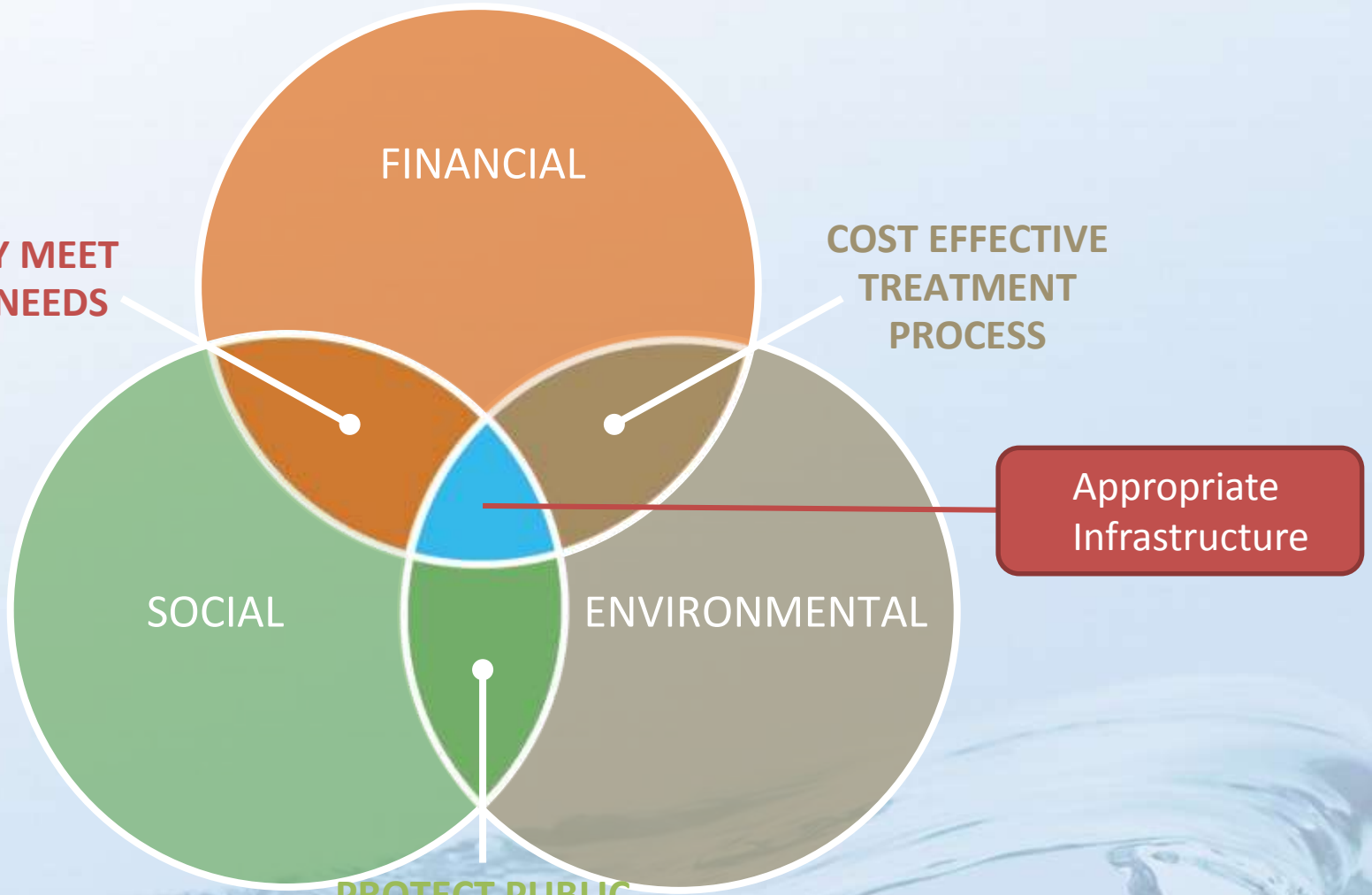


Defining Resiliency and Redundancy for the Master Plan

Traditional Philosophy for Planning/Designing Treatment Infrastructure



This is classic "Triple Bottom Line" Analysis

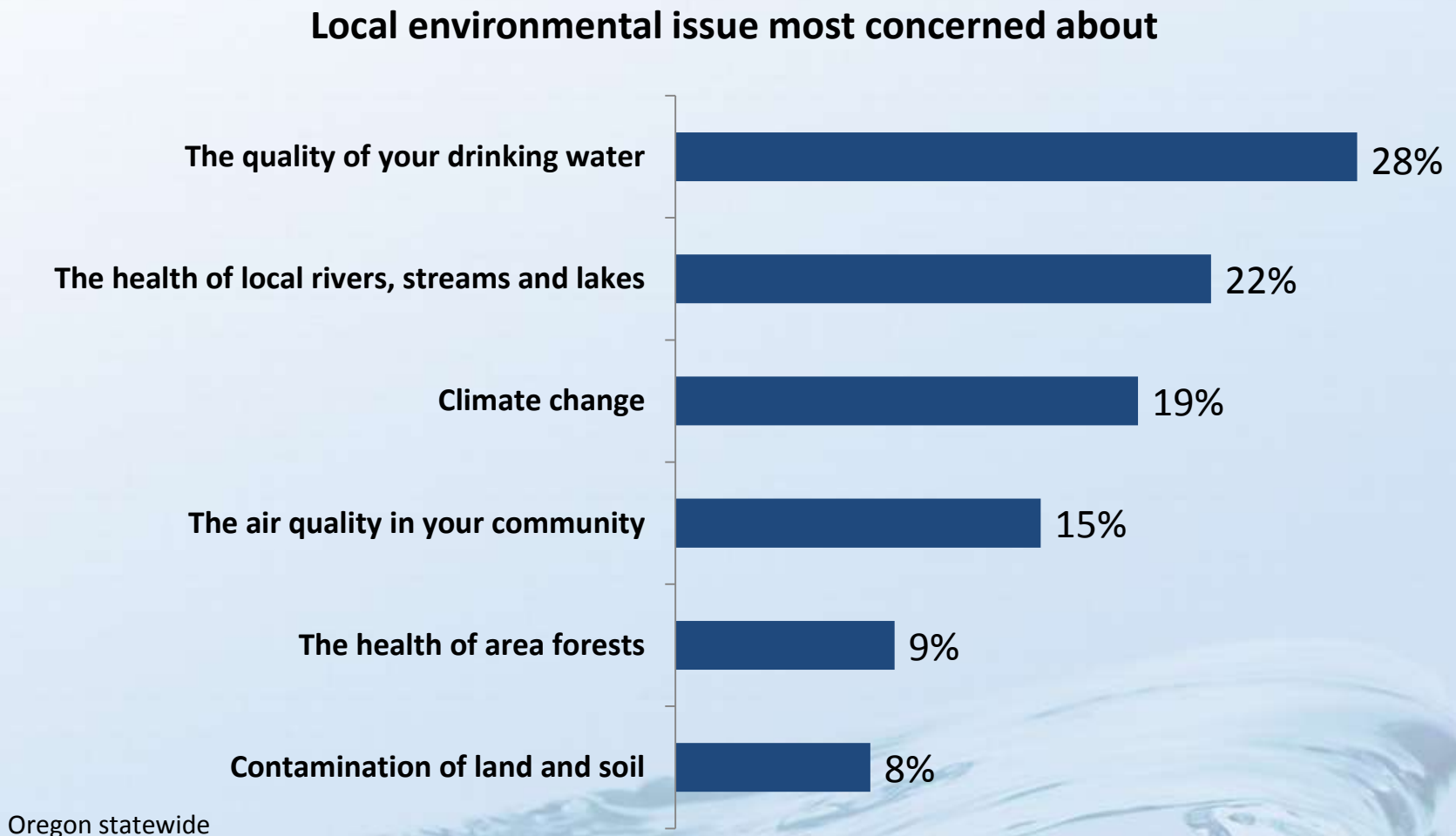
Defining Resiliency through Level of Service

Regional Redundancy

A Regional approach to Redundancy

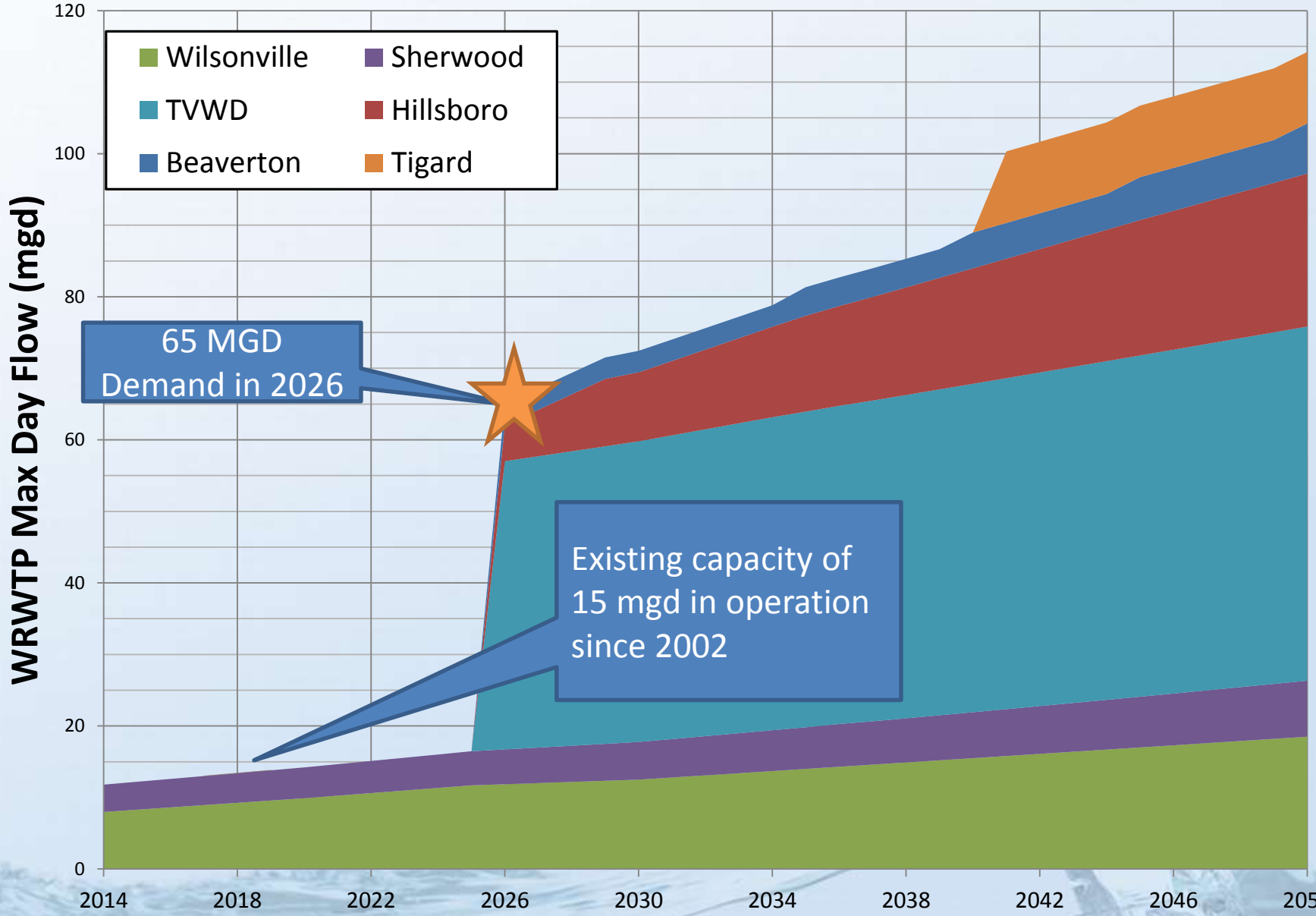
Water Quality and Quantity

Oregonians are Concerned about Water Quality

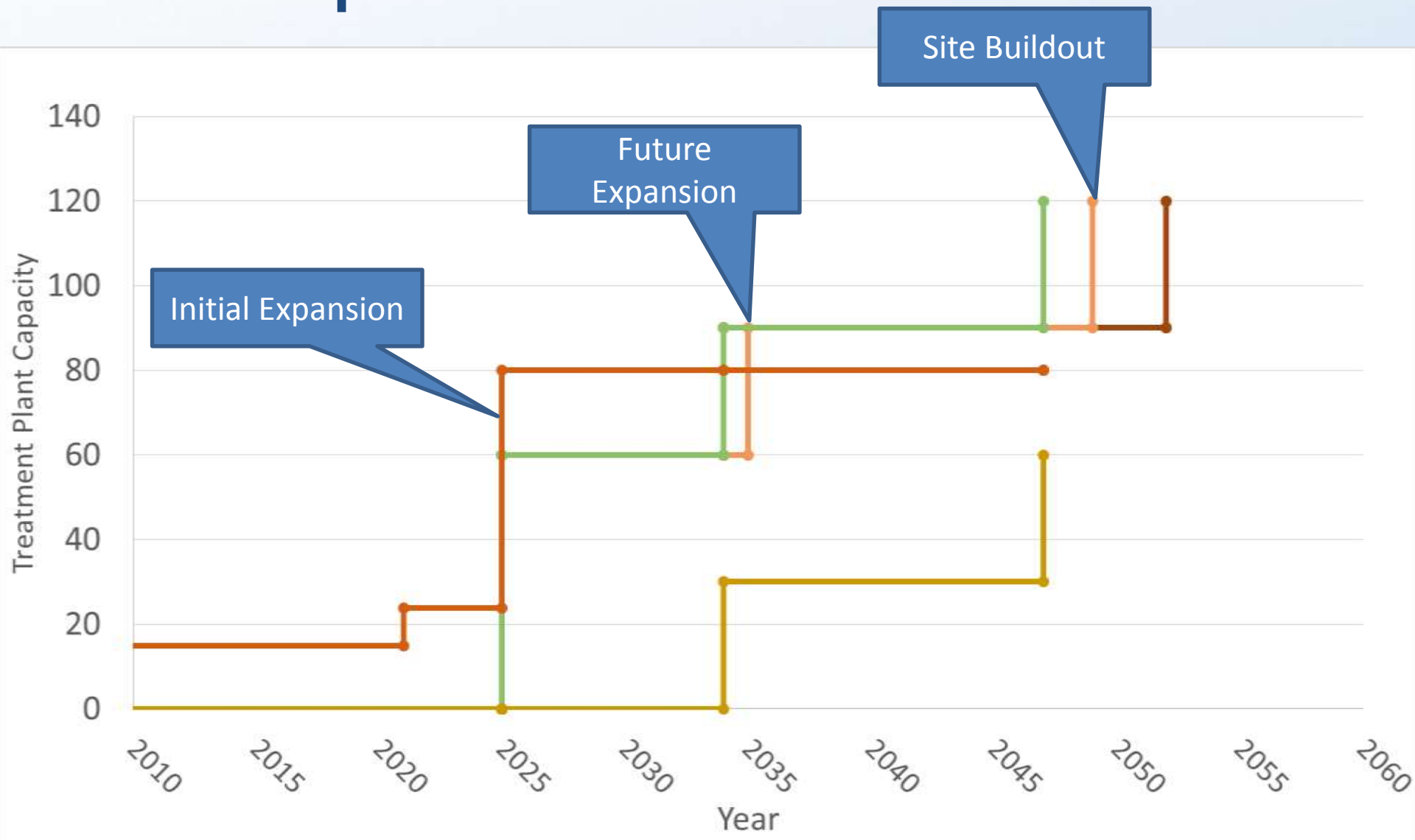


Oregon statewide

Projecting Regional Water Demands



Anticipating Future Water Treatment Plant Expansions



Seismic Design Criteria:

Anticipating the Cascadia Subduction Zone Event

Preparing for the Worst

Develop Preliminary LOS Goal Statement:

- *"Following a W catastrophic event …*
- *…within X days/weeks of the event…*
- *…delivery Y % of average day demand…*
- *…with Z water quality ."*

Developing Level of Service Goals

LOS Goal:	Regional Event (Seismic)	Local Event (Non-Seismic)

- Defined 2 distinct categories of disasters
- Identified unique LOS criteria for each event

Developing Level of Service Goals

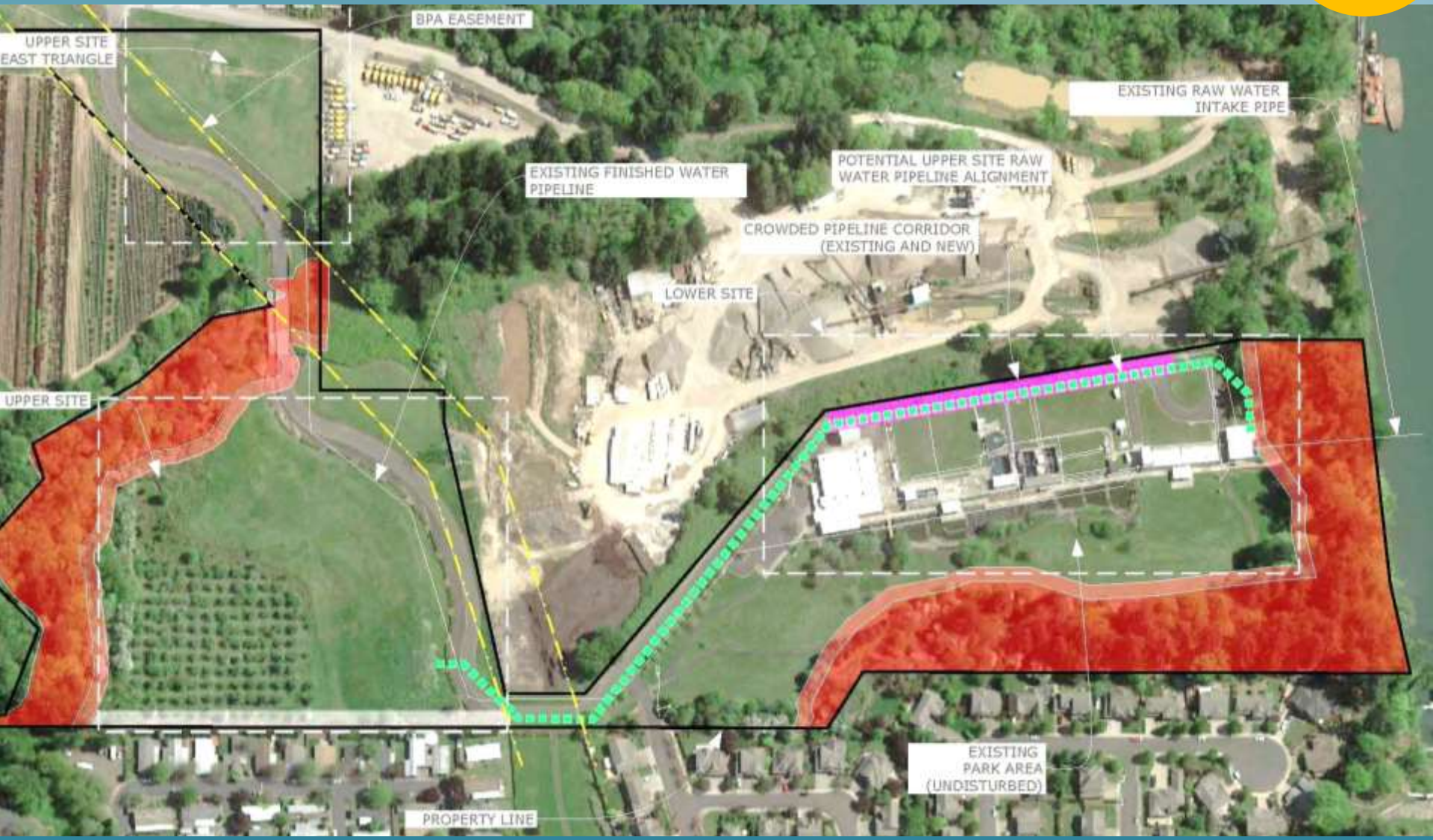
LOS Goal:	Regional Event (Seismic)	Local Event (Non-Seismic)
Catastrophic event	2,500 year	per occurrence
Acceptable delay following event	48 hours	14 days
Supply goal	50% of nameplate	100% of nameplate
Water quality goal	potable (@ minimum regulatory requirement)	potable (@ plant design criteria)

Converting Theory into an Actionable Master Plan

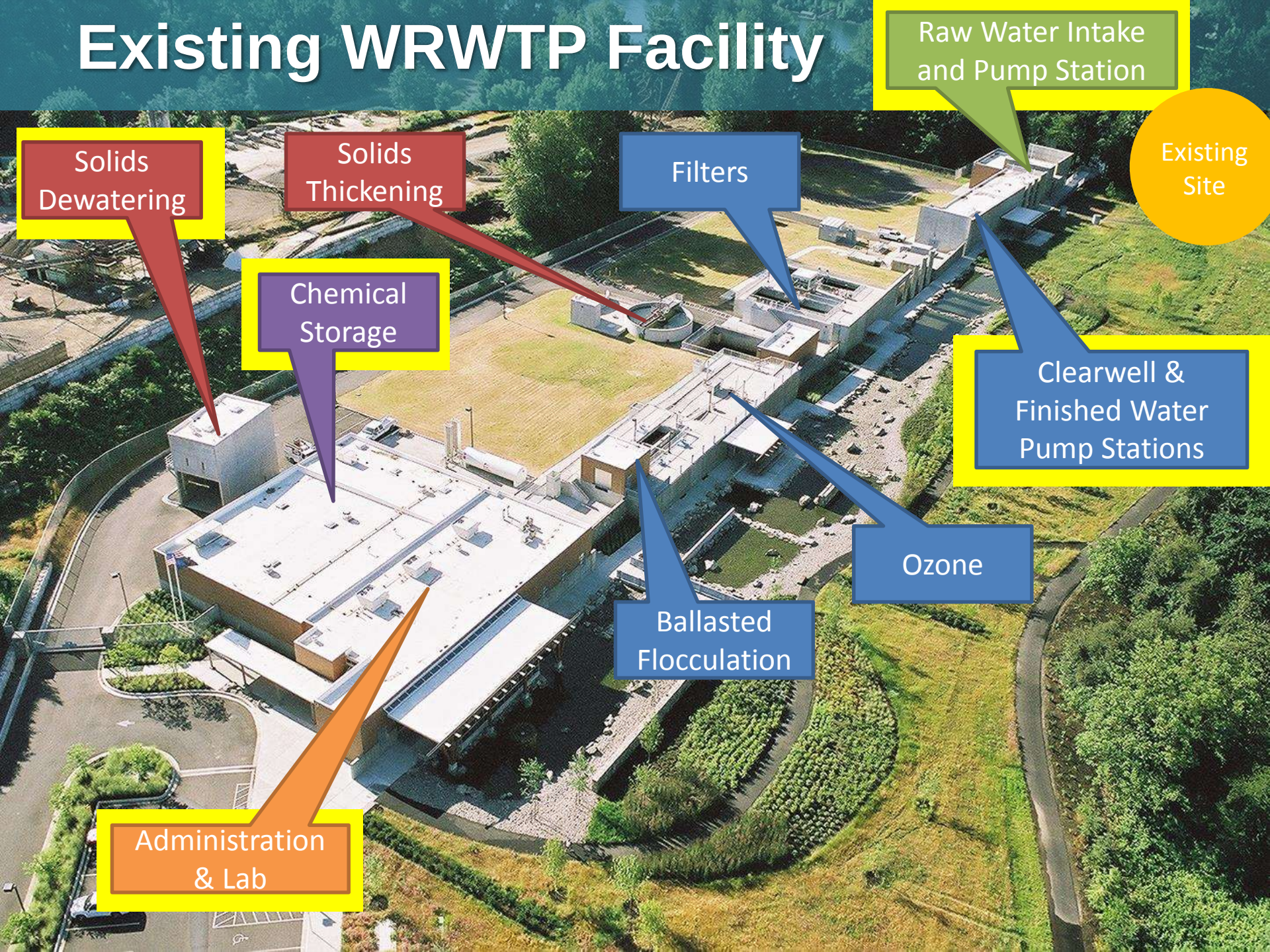
A sequence of 8 workshops developed the draft recommendations

WS#1: Existing Site Plan

Existing Site



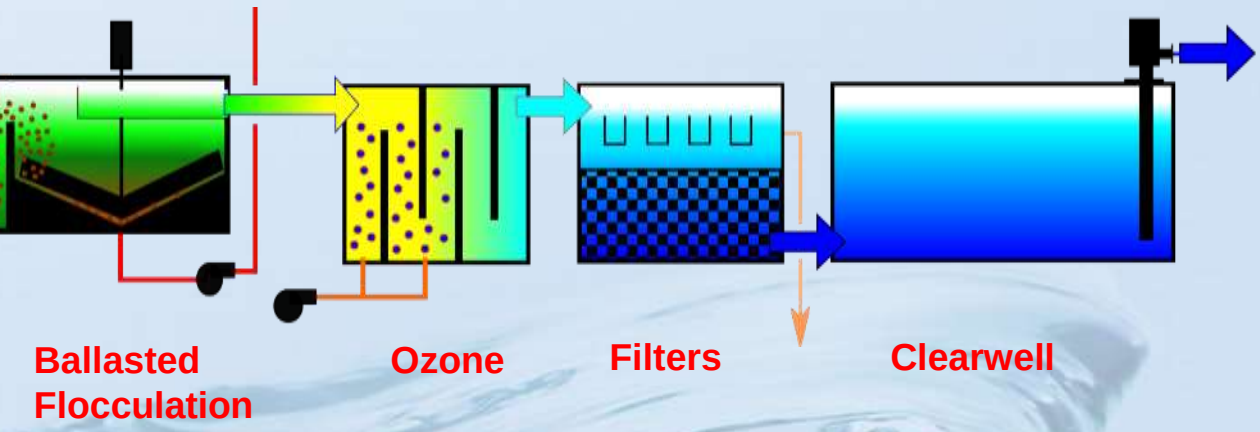
Existing WRWTP Facility



WS#2: Existing WRWTP process design incorporates multi-barrier approach

Treatment Process

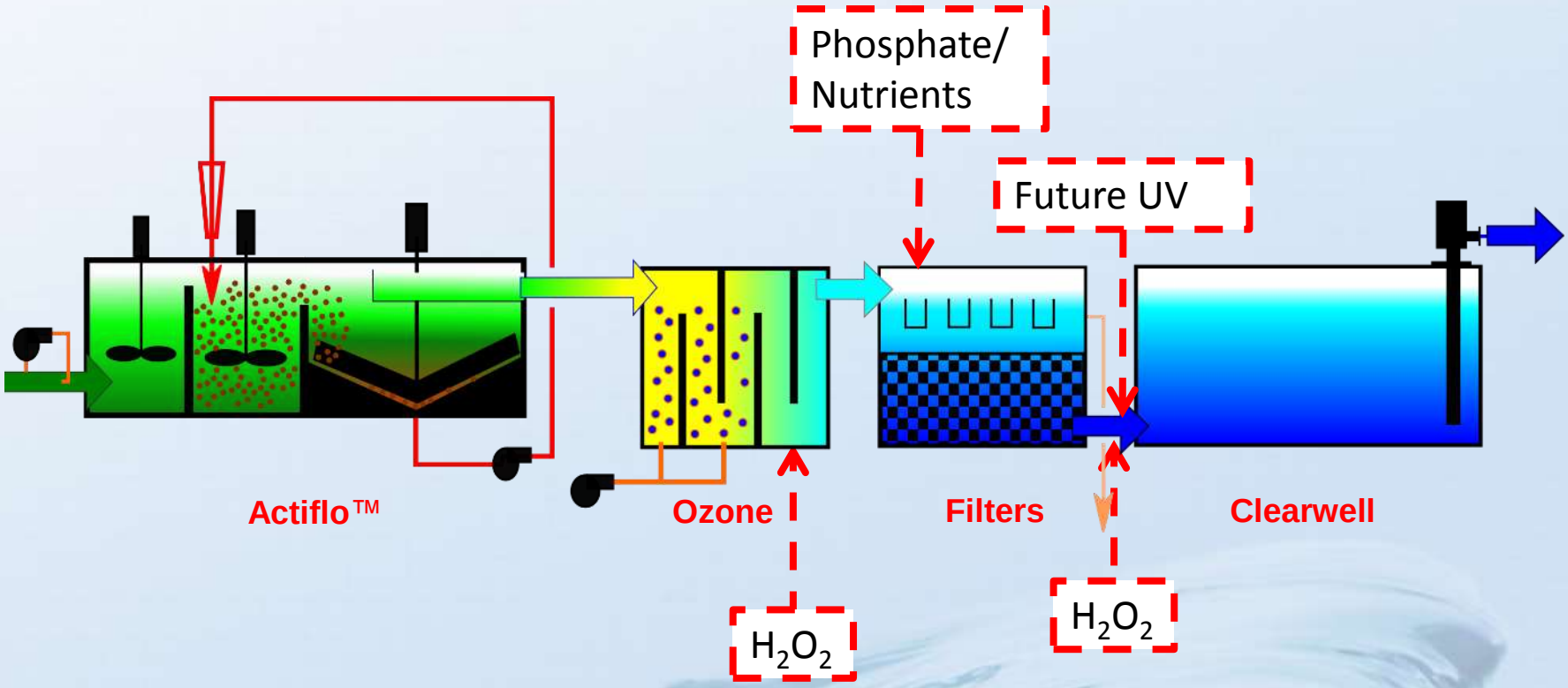
- Turbidity / Particles
- Pathogens
- Tastes and Odors
- Trace Organics



Treatment Process

Technical Advisory committee recommended treatment process

- Existing Process



Treating UCMR-3 Compounds

Treatment Process

	Treatment Process	Effectiveness Treating Compounds Listed Under UCMR-3						
		VOCs	SOCs	Metals	Chlorate	Perfluorin'd Compounds	Hormones	Viruses
Existing Processes	Ballasted Flocculation			✓				
	Ozone	✓	✓			✓	✓	✓
	GAC Adsorption	✓	✓	✓	✓	✓	✓	
	Biofiltration	✓	✓		✓		✓	
	Chlorination							✓

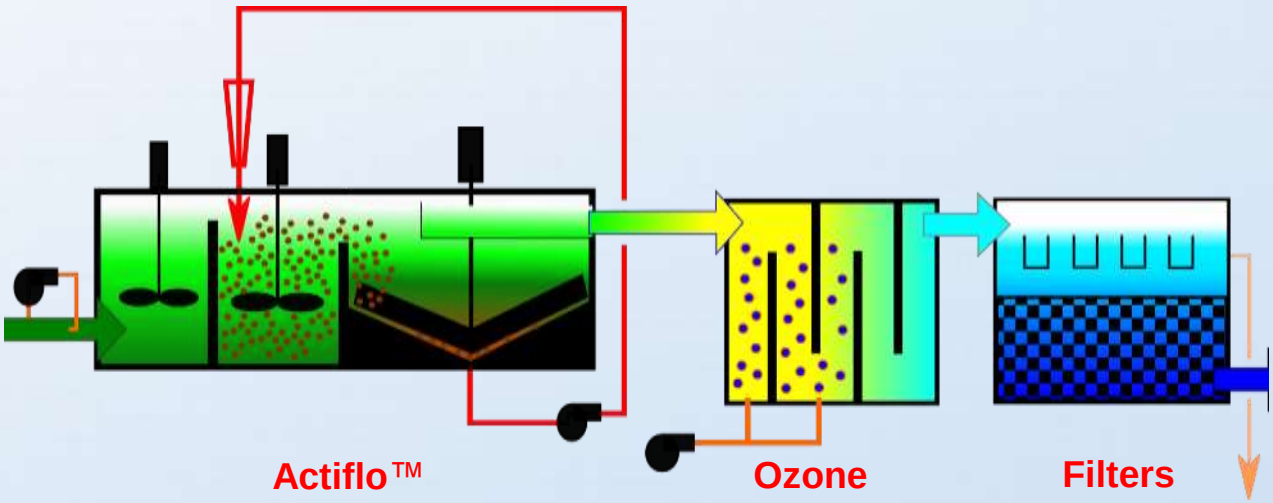
Treatment Process

Treating Other Contaminants Currently Making Headlines

	Treatment Process	Effectiveness Treating Other Contaminants of Interest					
		Algal Toxins	Endocrine Disruptors	PhACs	PCPs	N. Fowleri/ *Legionella*	Antibiotic Resistant Genes
Existing Processes	Ballasted Flocculation	✓				✓	
	Ozone	✓	✓	✓	✓	✓	✓
	GAC Adsorption	✓	✓	✓	✓		✓
	Biofiltration	✓	✓		✓		
	Chlorination	✓					✓

Alternative Treatment Procedures

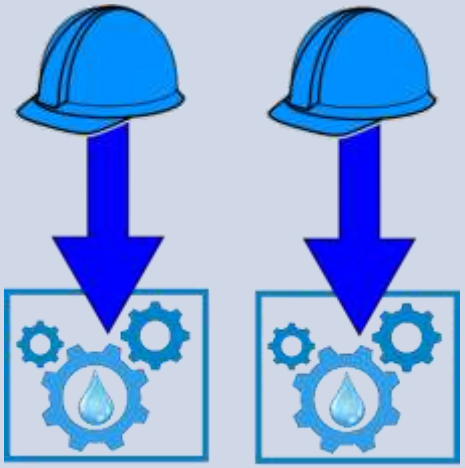
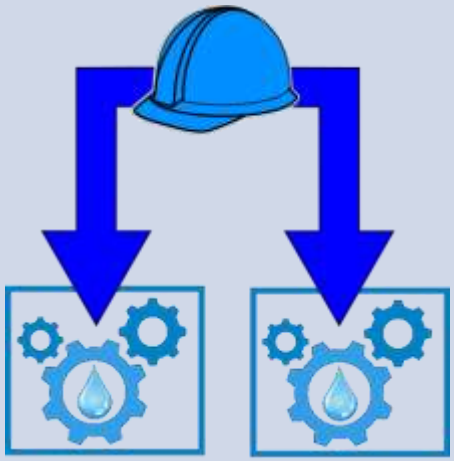
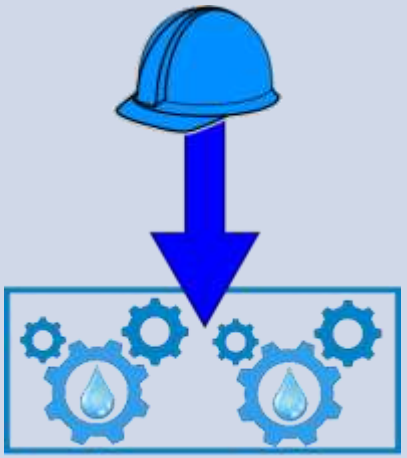
Treatment Procedures



Alternative A	(Baseline)	Maintain existing treatment procedures
Alternative B	(Modified)	Increase capacity of existing processes maintaining 1-log inactivation of Crypto
Alternative C	(SDWA Only)	Safe Drinking Water Act Compliance

WS#3: Utilization of The Existing WRWTP: Alternative operational strategies

Operational Strategies

Alt 1: 2 Plants, 2 Operators	Alt 2: 2 Plants, 1 Operator	Alt 3: 1 Plant, 1 Operator
		

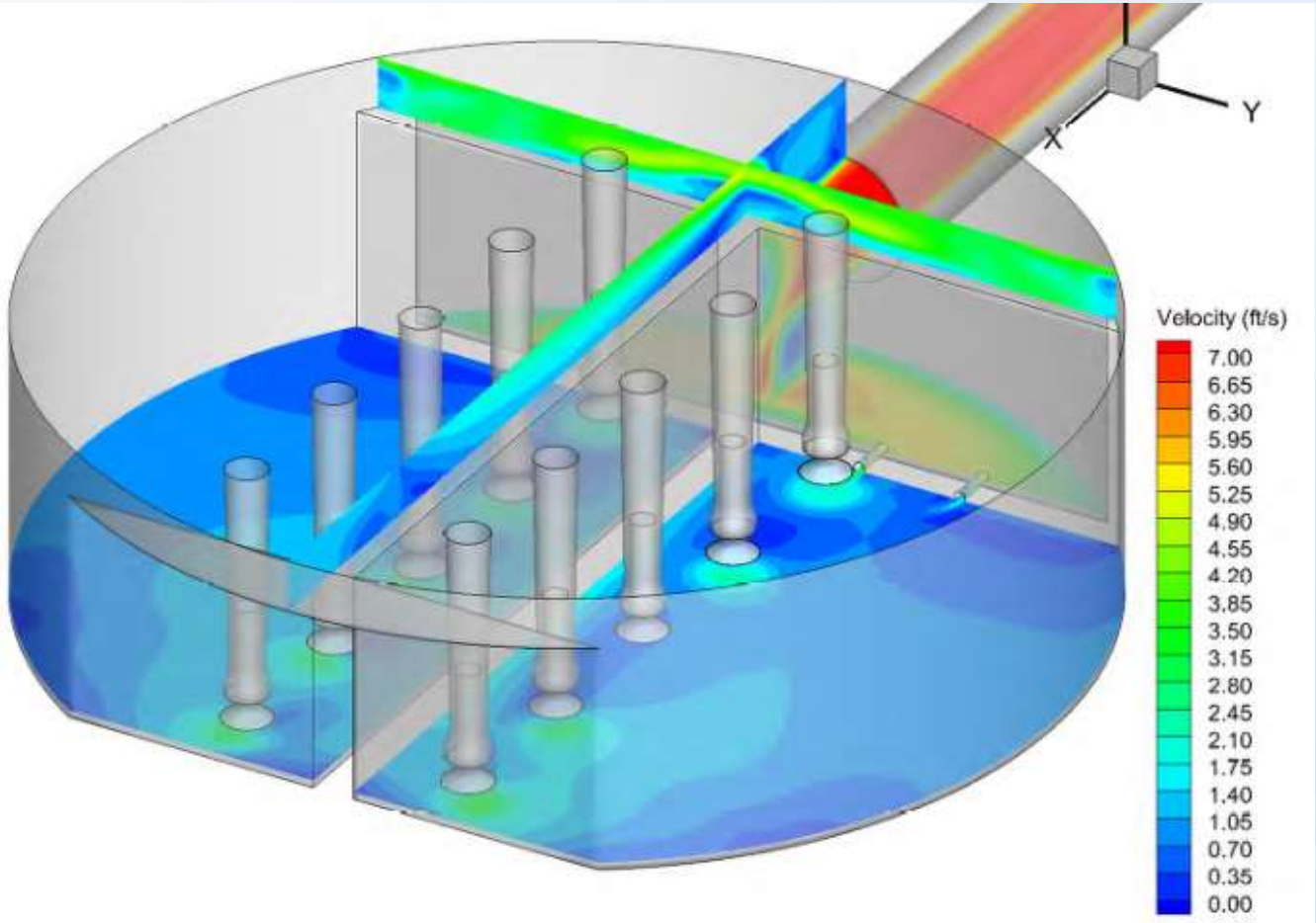
Combining operational and procedural alternatives

Combined Alternatives

	Alternative 1	Alternative 2	Alternative 3
	2 Independent WTPs 2 Independent Operations	2 Indepdendent WTPs 1 Integrated Operation	1 Integrated WTP 1 Integrated Operation
Alternative A Baseline	**1A**	**2A**	**3A**
Alternative B Modified	**1B**	**2B**	**3B**
Alternative C OHA Compliance	**1C**	**2C**	**3C**

WS#4: Maximizing existing infrastructure to minimize new construction

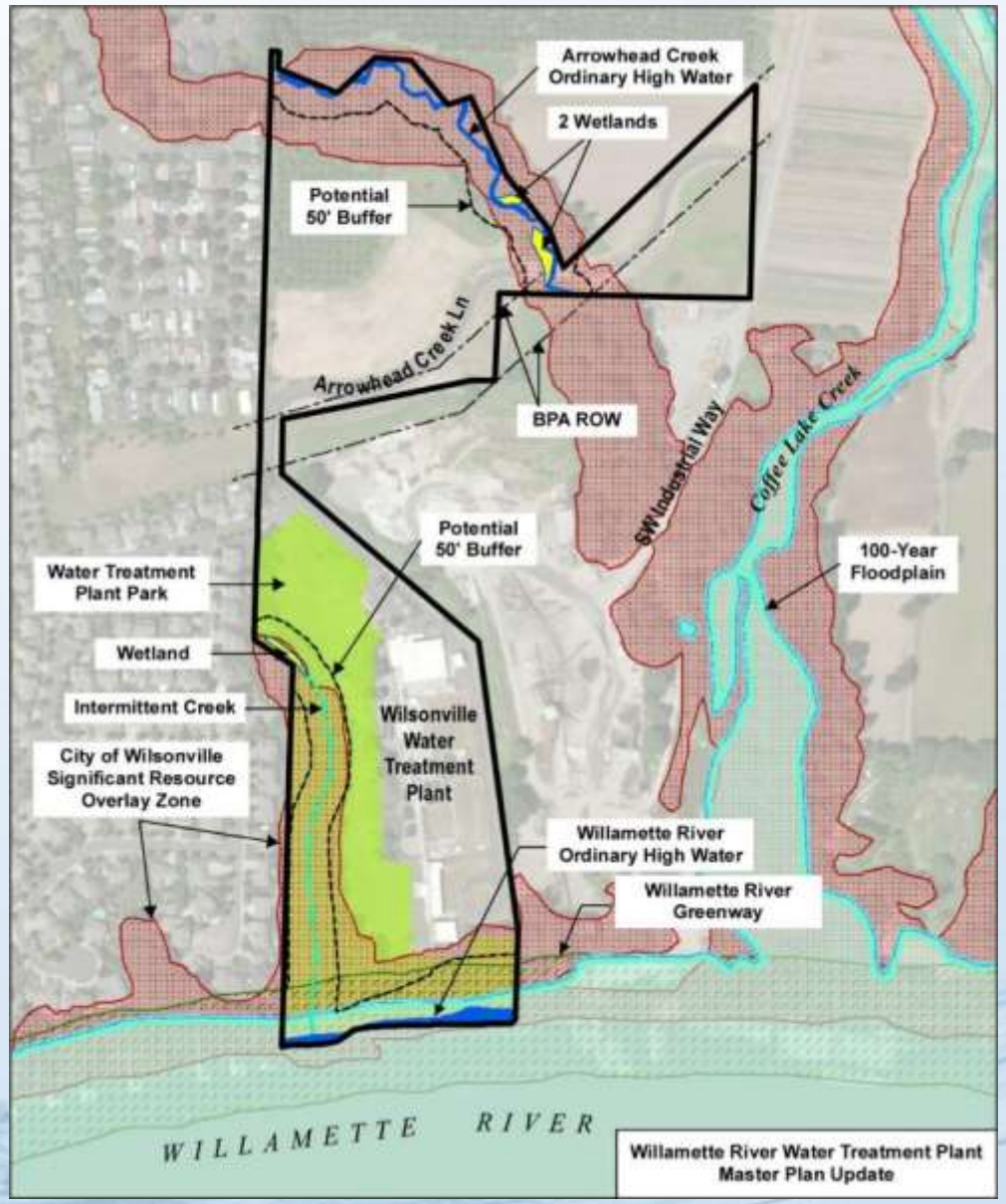
Infrastructure



The existing raw water intake was modeled to determine if additional capacity could be achieved without the need for a new intake

WS#5: Defining Site Constraints

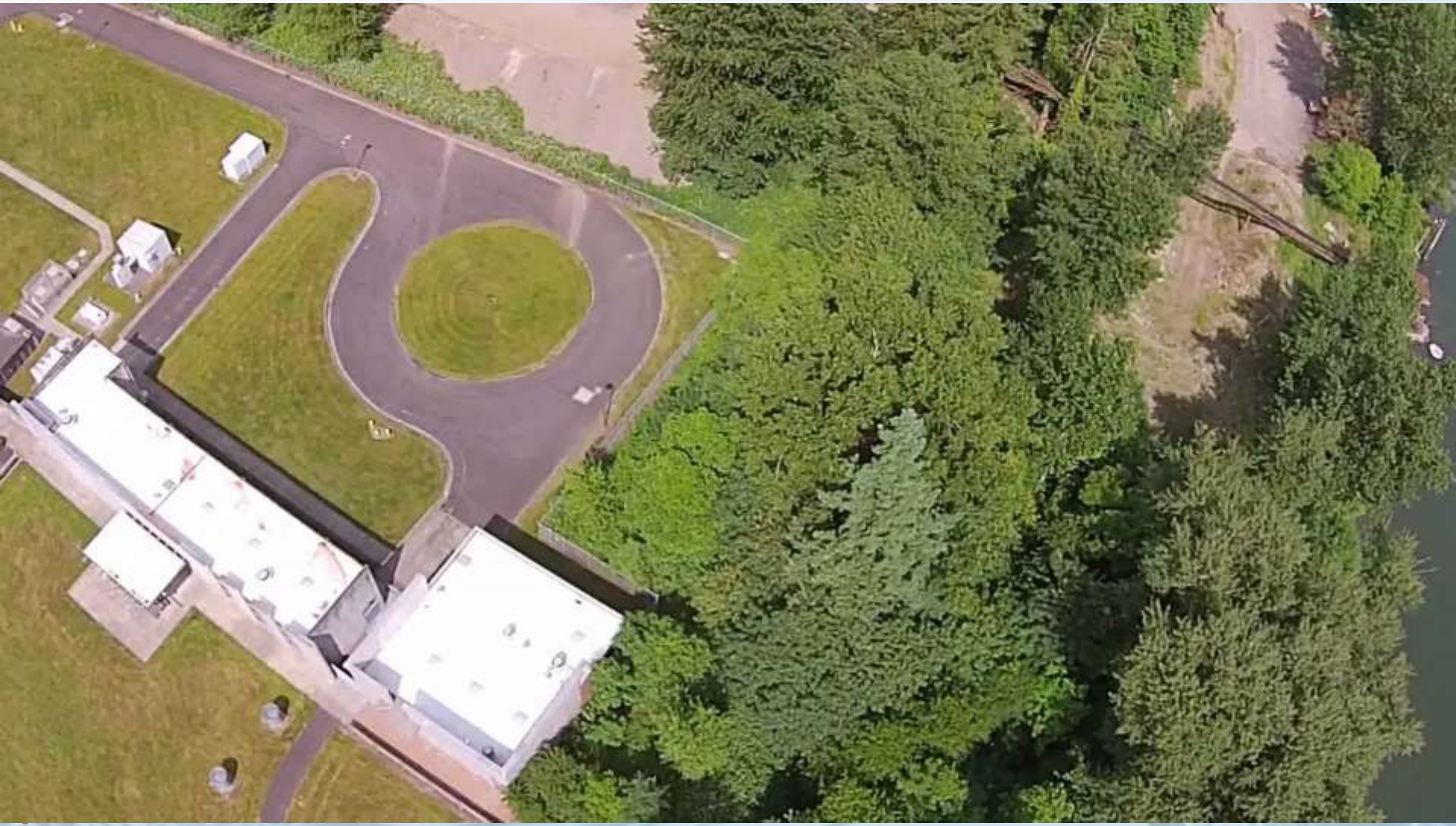
Permitting



- Existing Right-of-Ways
- Riparian buffers
- Maintaining green space
- Being a good neighbor

WS#6: Visualizing the new plant

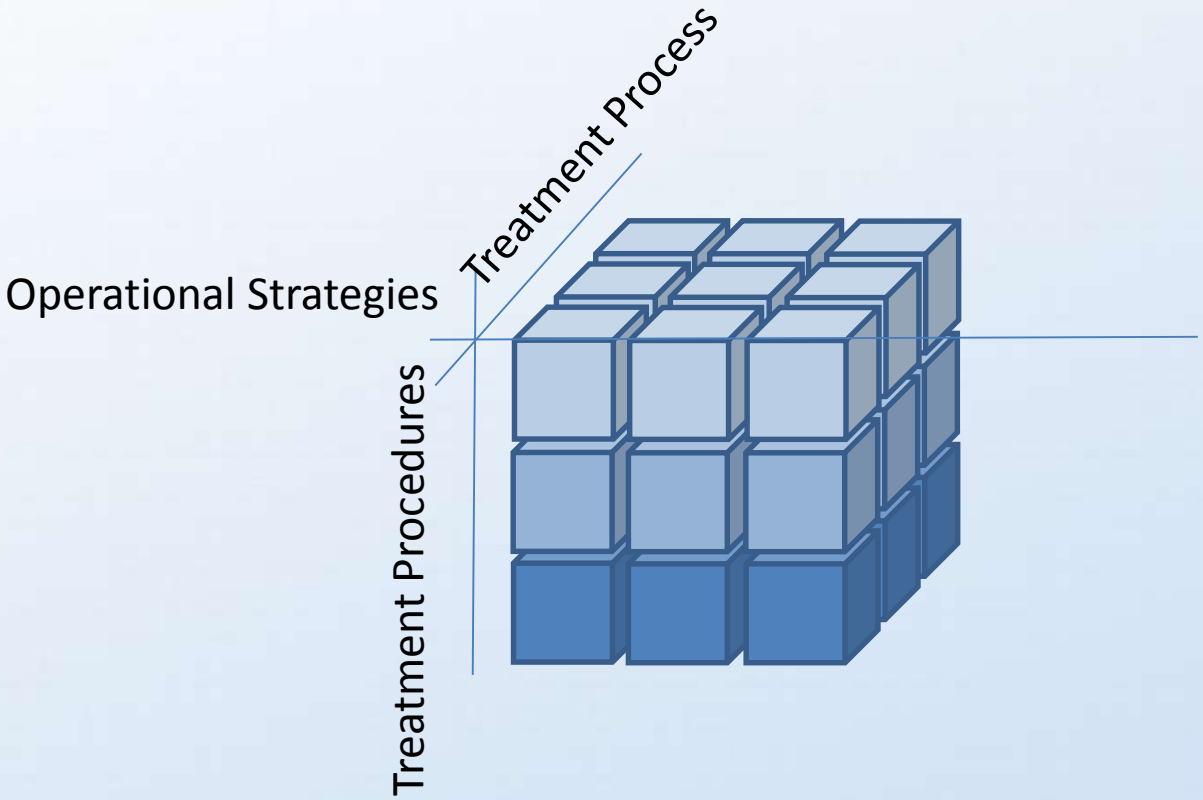
Site Utilization



WS#6: Visualizing the new plant

WS#7: Evaluating Alternatives

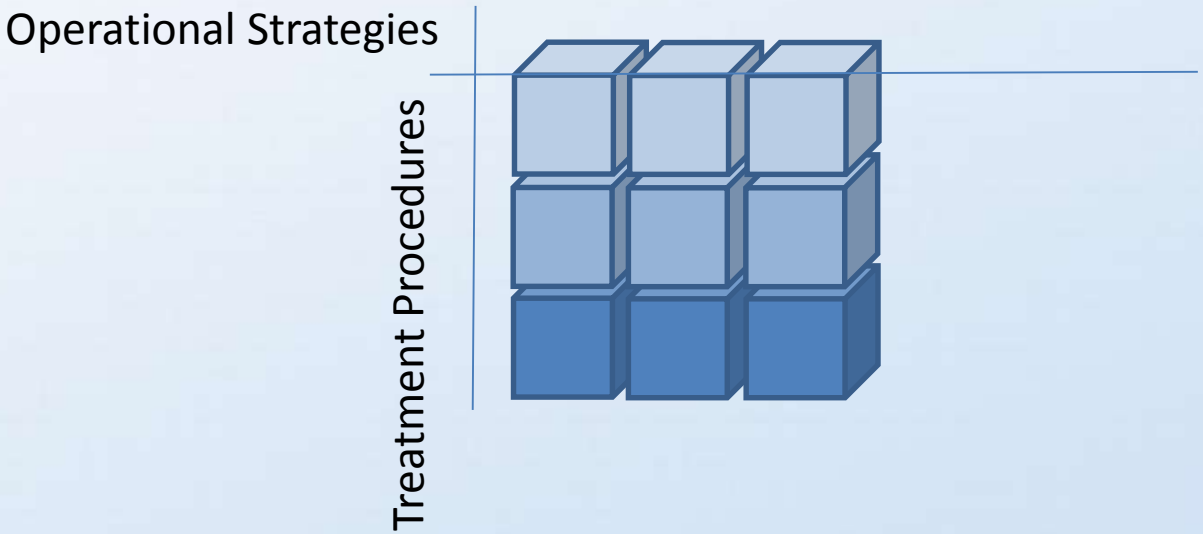
Alternatives Evaluation



Early meetings with the technical advisory committee and agency stakeholders confirmed the treatment process approach

WS#7: Evaluating Alternatives

Alternatives Evaluation



All scenarios are feasible (constructible, meet seismic criteria);
All scenarios meet quality and quantity criteria;
All scenarios provide a similar level of redundancy

WS#8: Evaluation Criteria

Alternatives Evaluation

- ***Economic Criteria***
- ***Operational flexibility***
- ***Flexibility to address future regulations***
- ***Space requirements***
- ***Permitting requirements***
- ***Constructability***
- ***Community impacts***

Enhanced Decision Making Process

- Individual meetings with partner and potential partner agencies
- Incorporate technical advisory committee recommendations
- Coordination with the Willamette Governance Group
- Engage elected officials

What's Next for the Master Plan

Update Level of Service Goals

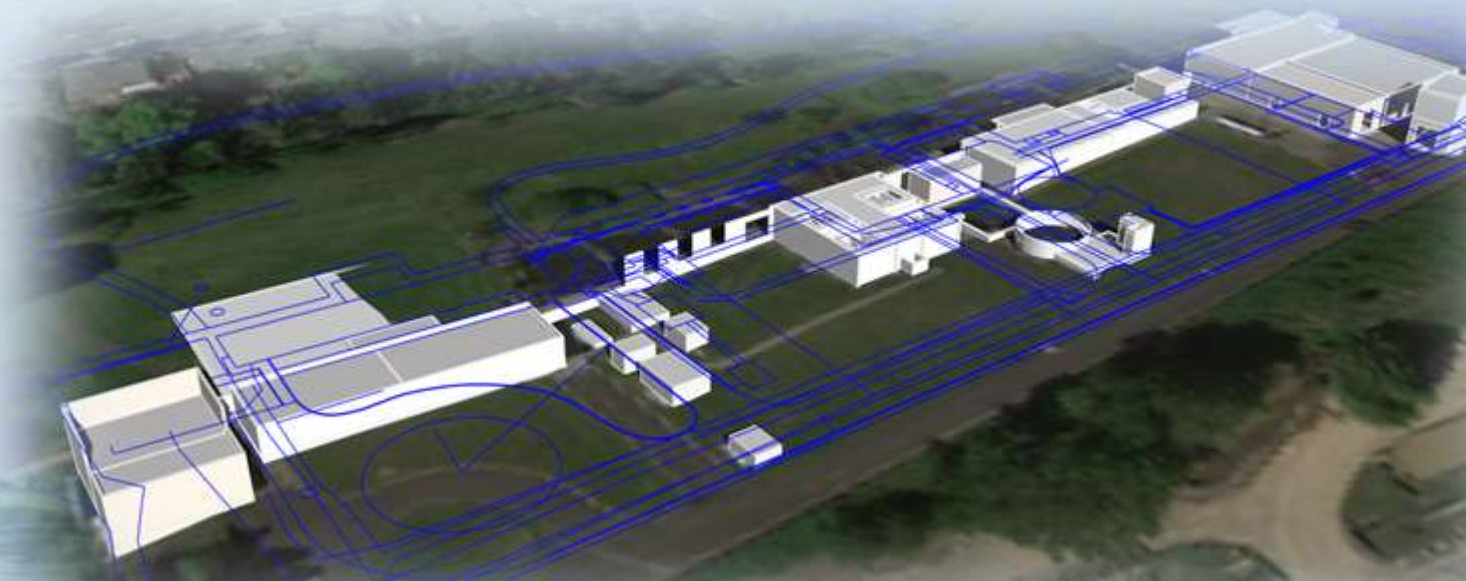
- Backup power
- Seismic performance
- System storage
- Alternative sources of supply

Selection of Preferred Expansion Alternative

- Treatment technology
- Facility Layout
- Operational Strategies

Building Consensus

- Enhanced Decision Making Process



Conclusions

- Maintaining stakeholder support though project completion requires communication, collaboration, and transparency.
- The standard approach to resiliency provides a valuable framework to start with, but resilient solutions are uniquely tailored to each project.
- Achieving resiliency and redundancy (LOS) goals starts with a good plan and a firm basis for evaluating and selecting preferred alternatives


THANK YOU
Questions?