Non-Potable Water Reuse Case Studies

Emerging Themes and Lessons-Learned

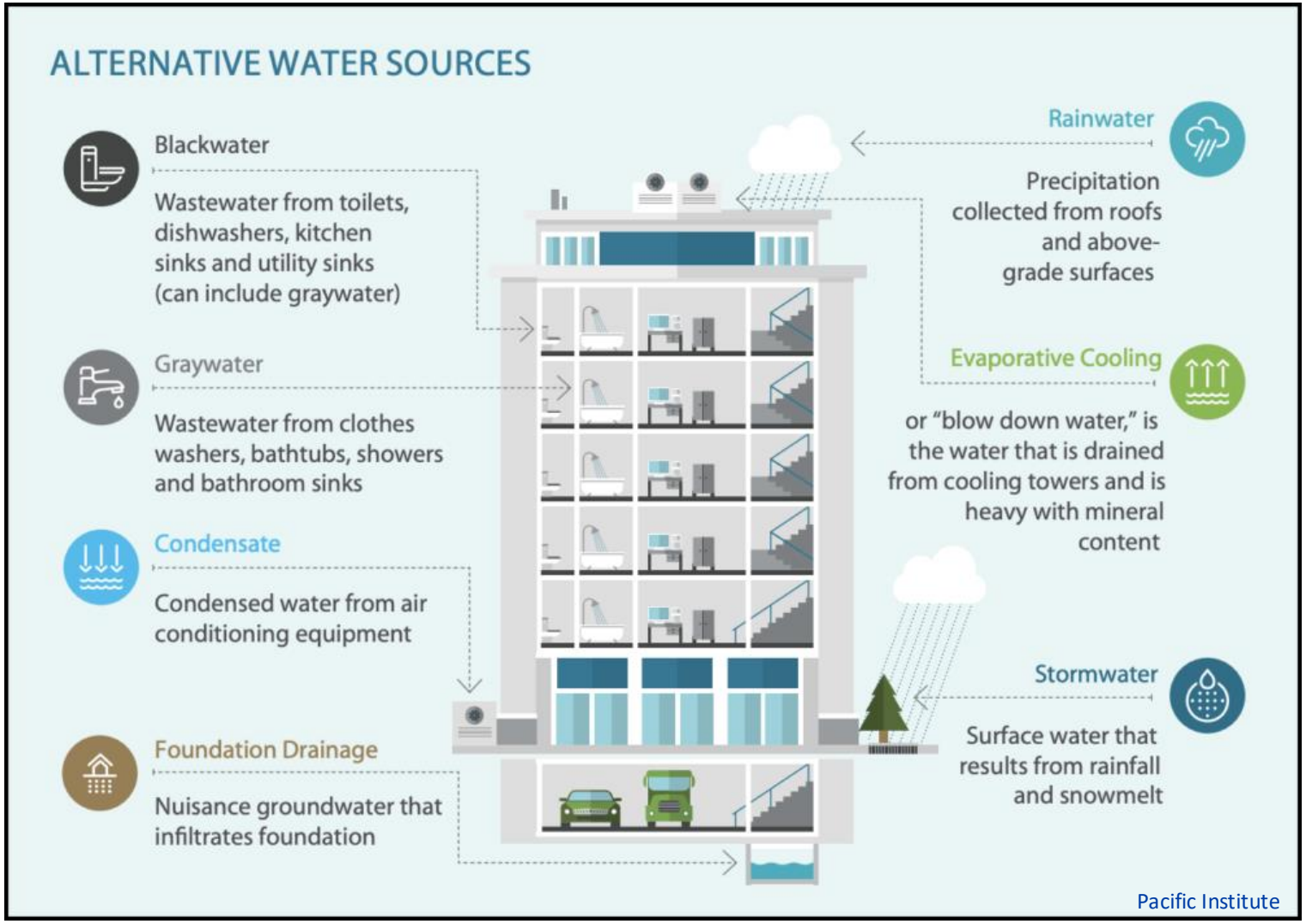
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Onsite or decentralized water systems typically treat water in a single building or small number of connected buildings

Non-potable sources include rainwater, stormwater, graywater, foundation dewatering, and condensate capture



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Water Supply in a "Water Rich" Region



- Cedar and Tolt reservoirs – Seattle owned and managed water supply
- Forecasting decades of sufficient water supply
- Wet, marine climate; 75% of rainfall October-March; seasonal demand spike driven mainly by irrigation

Why onsite water reuse?

- Conserve and diversify existing water supply
- Reduce stormwater volumes and protect water quality
- Reduce treatment expenses and capital costs
- Build ecosystem health and water/ stormwater system resilience
- Mitigate service delivery impacts of catastrophes; emergency preparedness
- Affordability opportunity; potential cost savings



Why now? Why Seattle Public Utilities?



- Changing climate and precipitation patterns



- Rapidly advancing technology is making reuse more accessible and cost-effective



- New public health guidance for reuse



- Increasing demand for sustainability



San Francisco

Requires new development over 100,000 sq ft to meet need for toilets and urinals, irrigation, and clothes washing from water reuse.

No incentive, but a robust grant program.



New York

Voluntary program incentivizes water reuse through a 25% water fee discount. Water reuse grant program may reimburse cost of design and equipment purchase.



Miami

Voluntary program provides “greywater density bonus" program that offers a 25-35% density bonus for multifamily developments using reused water for irrigation and other non-potable uses.



Denver

Denver Water’s new HQ is using reusing water from sinks and toilets for toilet flushing and rainwater for landscaping.

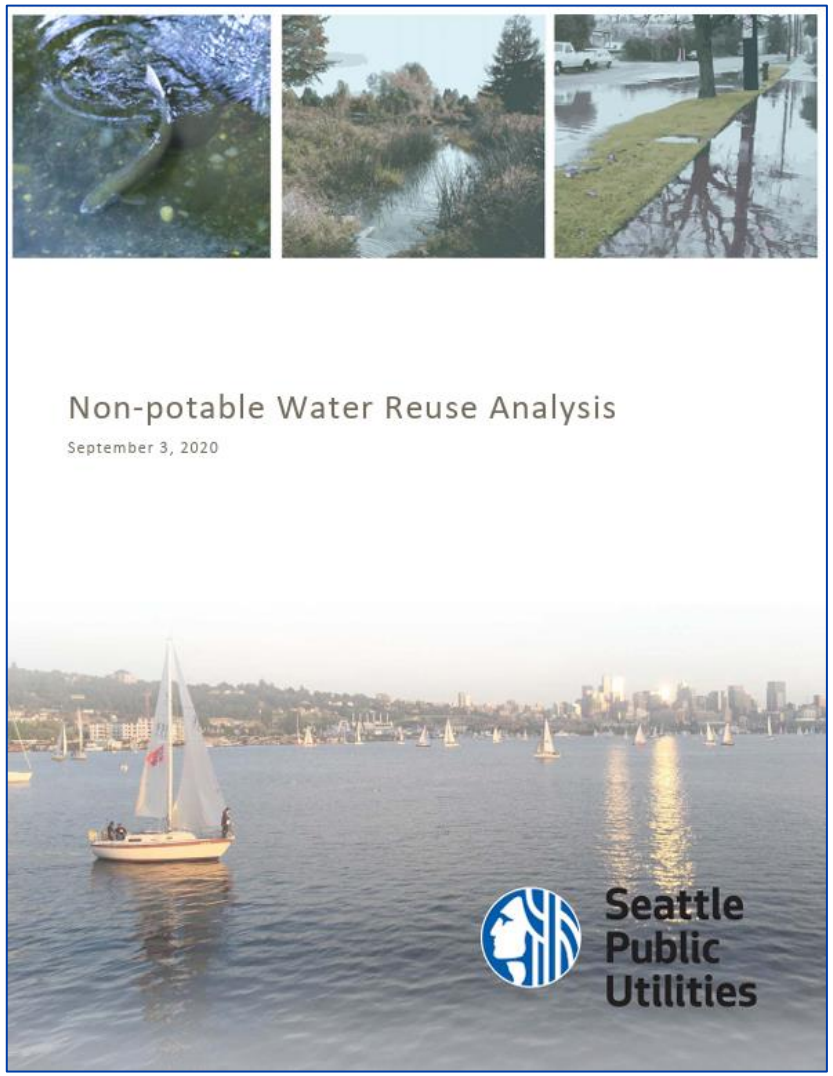
SPU Long Term Planning

Shape our Water – 50 Year drainage and wastewater plan looking at reuse to support:

- System capacity and resilience
- Water quality
- Climate resilience and adaptation

Demand Reduction Potential Assessment to:

- Identify water conservation opportunities to bolster water supply resilience
- Understand how water reuse contributes to demand reduction



ONWS Case Studies



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ONWS Case Study Objectives



- Enhance understanding of how ONWS can support traditional water efficiency programs
- Document current prevalence of ONWS within Seattle
- Examine and document performance (operational status, service life, water savings) of existing systems
- Better understand policy, financial and perceptual barriers associated systems

Existing ONWS

- Approximately 30 installations identified
- 10 examined in detail, 6 of which developed into case studies
- Also incorporated existing studies:
  - Seattle Parks Dept. (4 cases)
  - Seattle Fire Dept. (8 cases)



Study Limitations

- Few projects track performance data
- Small sample size
- Sample bias / representativeness
  - Public sector examples
  - Older systems (10- to 20-year installation history)
  - Rainwater harvest the predominant system type

Emerging Themes



Drivers

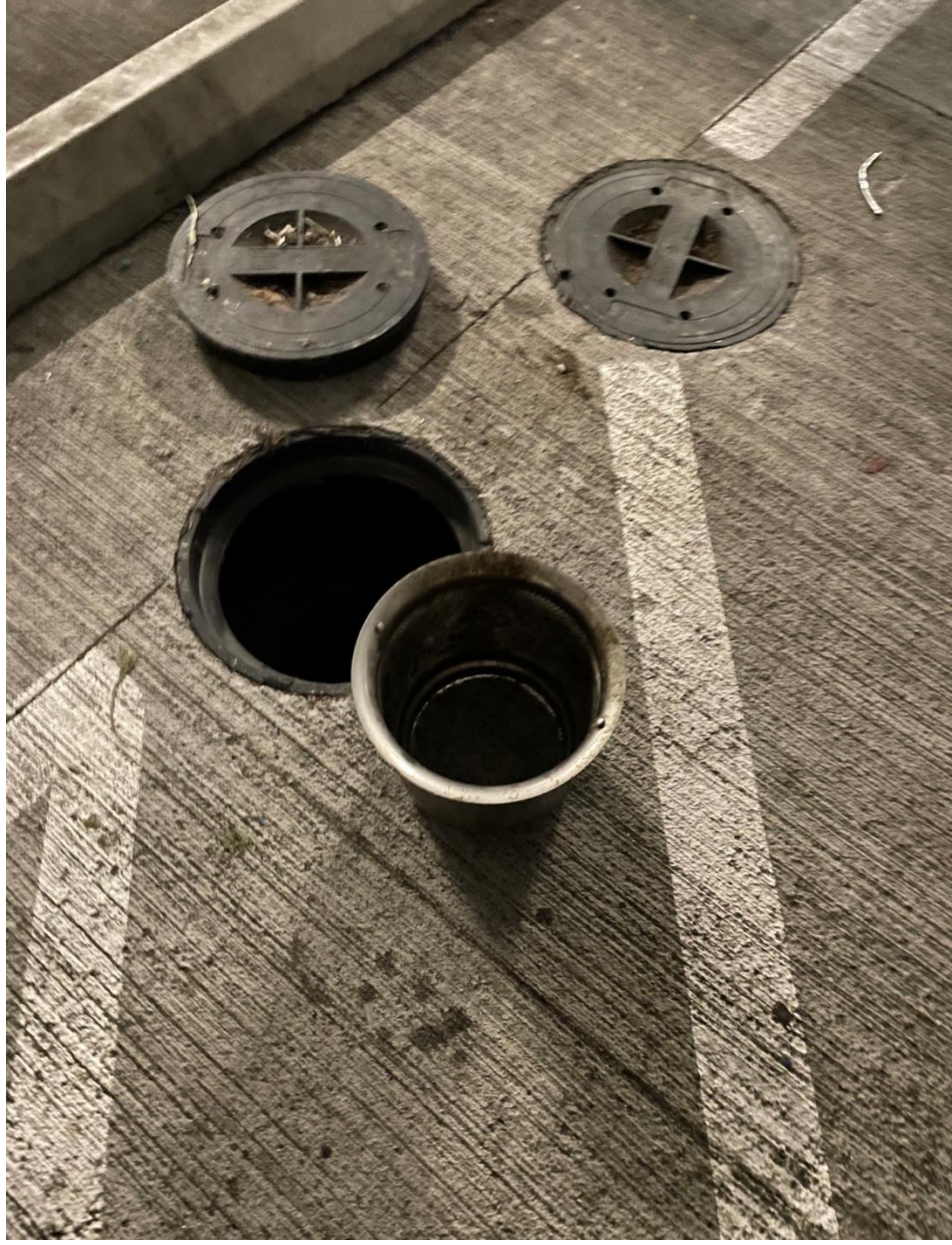
- Green building certification, Living Building Pilot
- LEED certification
- Sustainability goals
- Education and marketing



Service Life

Most longstanding systems either decommissioned or intermittently functional





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Operations & Maintenance

- Lack of training in ONWS
- System maintenance suffers during staffing transitions
- Custom-made designs mean unique challenges
- Design improvements can ameliorate many issues



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Performance

- Very few systems track performance over time
- Lost opportunity to design performance tracking (esp. via metering) in from the outset



Permitting

- Early adopter challenges
- Layers of permitting authority
- Modular and plug-and-play systems may facilitate permit approvals



Financial

- Up-front costs can be more predictable and incorporated into design
- O+M is less predictable; cost-benefit calculations are not formalized



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Some Hopeful Notes

- Despite early-adopter challenges, system owners and operators often cited such systems as “the future”
- Emerging modular and plug-and-play systems help address permitting and design challenges
- Dual water quality and water conservation benefits present opportunities for silo-busting and One Water solutions

Next steps

- Model ONWS as a measure for Demand Reduction Potential Assessment (Conservation Potential Assessment)
- Continued engagement in state rulemaking processes
- Explore further the policy, code and “stacked benefits” of ONWS



Future Opportunities



Strengthen Governance & Policy Alignment



Build Tools, Capacity, & Performance Monitoring



Expand Research and Industry Engagement

Thank you!

Questions?

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