

RWSP Update

Climate Impact Preparedness and Natural Hazard Resiliency

Background “101” & Current Conditions

Presented to the Metropolitan Water Pollution Abatement Advisory
Committee (MWPAAC) Engineering and Planning Subcommittee

February 5, 2026

RWSP Road Map - *Tentative*

- **Module #1:** Draft “Sets of Actions” for 8 categories of capital investments for 3 Conceptual Approaches Q2 2025 – Q1 2026
- **Module #2:** Evaluation Framework and Affordability Metrics to compare Approaches and evaluate tradeoffs to inform selection of Final Proposal Q2 2026 – Q3 2026
- **Module #3:** Planning level cost estimation for the 24 sets of detailed actions Q2 2026 – Q1 2027
- **Module #4:** Phase 1 Financial Policies Q1 2026 – Q4 2026
- **Module #5:** Draft RWSP with 3 Conceptual Approaches with associated cost estimates (and DEIS, if needed) 2027
- **Module #6:** Apply Evaluation Framework from Module #2 to determine *which* sets of Actions 2027/28
- **Module #7:** Final Proposed Plan (may be a hybrid set of actions from the 3 Approaches) with RWSP Policies and Phase 2 Financial Policies (and FEIS, if needed) 2028/29

Agenda

- What are Climate Change Mitigation, Climate Preparedness and Natural Hazard Resiliency?
- Policies
- Natural Hazard Resiliency
 - Why is it important?
 - Relevant policies
 - Progress and accomplishments
- Climate Preparedness
 - Why is it important?
 - Relevant policies
 - Progress and accomplishments
- Climate Change Mitigation
 - Why is it important?
 - Relevant policies
 - Progress and accomplishments

Scope of Climate Topics

Natural Hazard Resiliency

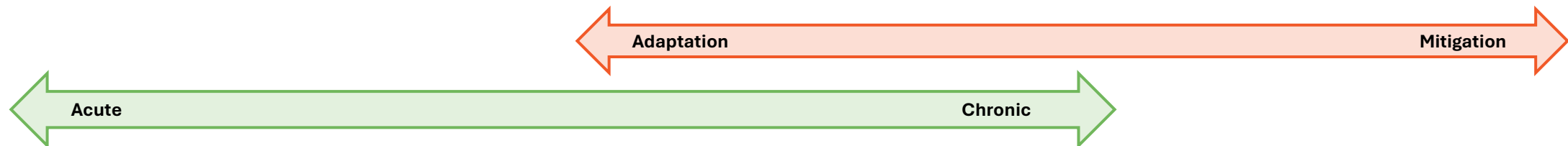
The act of **reducing the impact and susceptibility of hazards** on our wastewater system, people, property, and the environment.

Climate Preparedness

The process of **adjusting to and preparing for the effects of climate change** to reduce or avoid disruption of wastewater services, regulatory violations or other risks.

Climate Change Mitigation

The act of **reducing the amount greenhouse gases (GHG)** being released into the atmosphere, which lessens the impacts of climate change in the future.



King County Policies

King County Code (K.C.C. 28.86) does **not** explicitly have wastewater specific policies for:

- Natural hazard resiliency
- Climate preparedness
- Climate change mitigation
 - KC 28.86.090 does call for the beneficial use of methane (GHG) produced at the treatment plants for energy and other purposes
 - KC 28.86.140 requires that WTD address the adverse environmental impacts caused by the project

King County does have policies in other sections of code that apply to WTD and that will be covered later in the specific topic sections.

Natural Hazard Resiliency

What are Natural Hazards?

HAZARDS



Seismic/Liquifaction Scenarios



Cascadia Subduction Zone (CSZ)

- Magnitude 9.0
- Approximately 500-year recurrence interval



Seattle Fault (SF)

- Magnitude 7.2
- Approximately 5,000- to 6,000-year recurrence interval



South Whidbey Island Fault (SWIF)

- Magnitude 7.4
- Approximately 4,000- to 5,000-year recurrence interval



Natural Hazards



Extreme Weather

- Windstorms, lightning, tornadoes/funnel clouds
- Significant snowfall, ice, and/or freezing rain



Flooding

- Riverine, Urban, and Mechanical Flooding



Landslides



Tsunami (SF)

About Hazard Resiliency

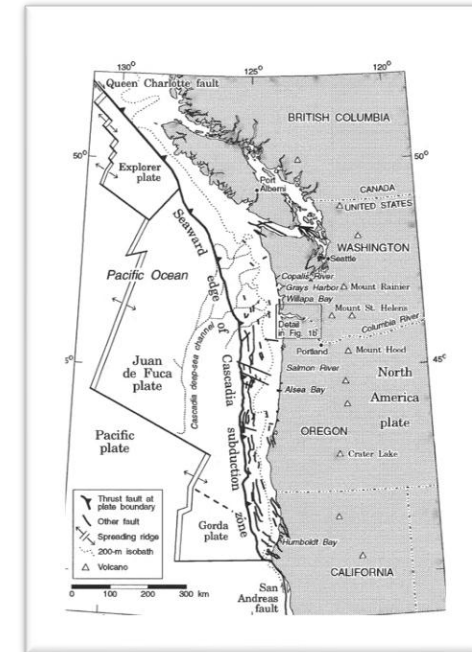


- **Natural hazards** affect public health and welfare
- There are estimated to be long downtimes in portions of the system in some scenarios
- Preparing proactively costs less than emergency repairs

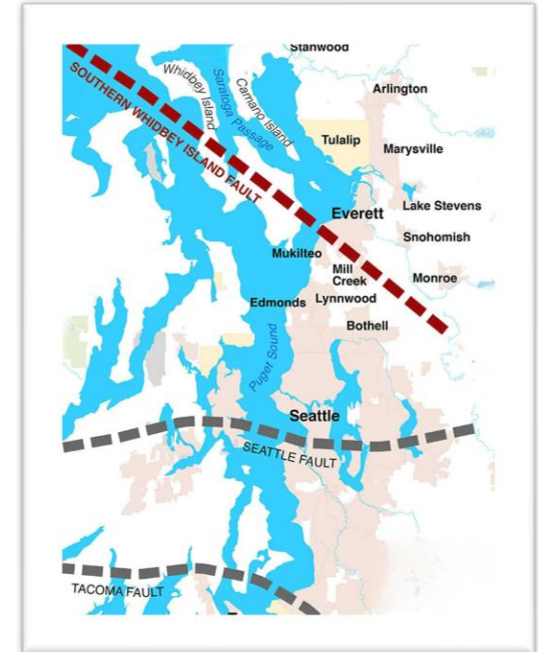
Natural Hazard Resiliency

Earthquakes:

- Known potential threat, major faults considered Cascadia Subduction Zone, Seattle fault & South Whidbey Island Fault
- Wastewater infrastructure is *among the most vulnerable lifeline infrastructure in King County*



Cascadia
Subduction Zone
M9.0



South Whidbey
Island Fault
M7.4
Seattle Fault
M7.2

Natural Hazard Resiliency

Flooding/Tsunami Vulnerability Map

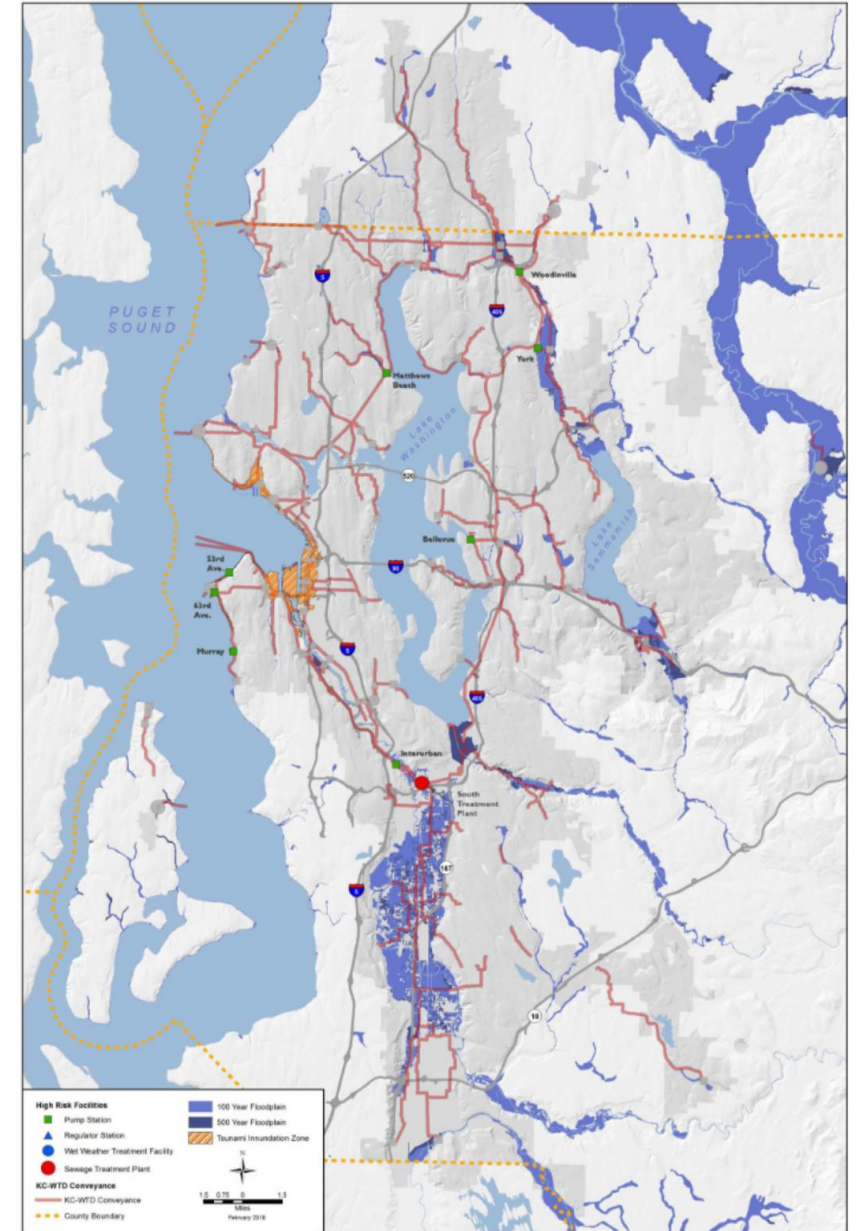


Flooding:

- Riverine, Urban (100-year)
- Mechanical Failure Flooding



Tsunami



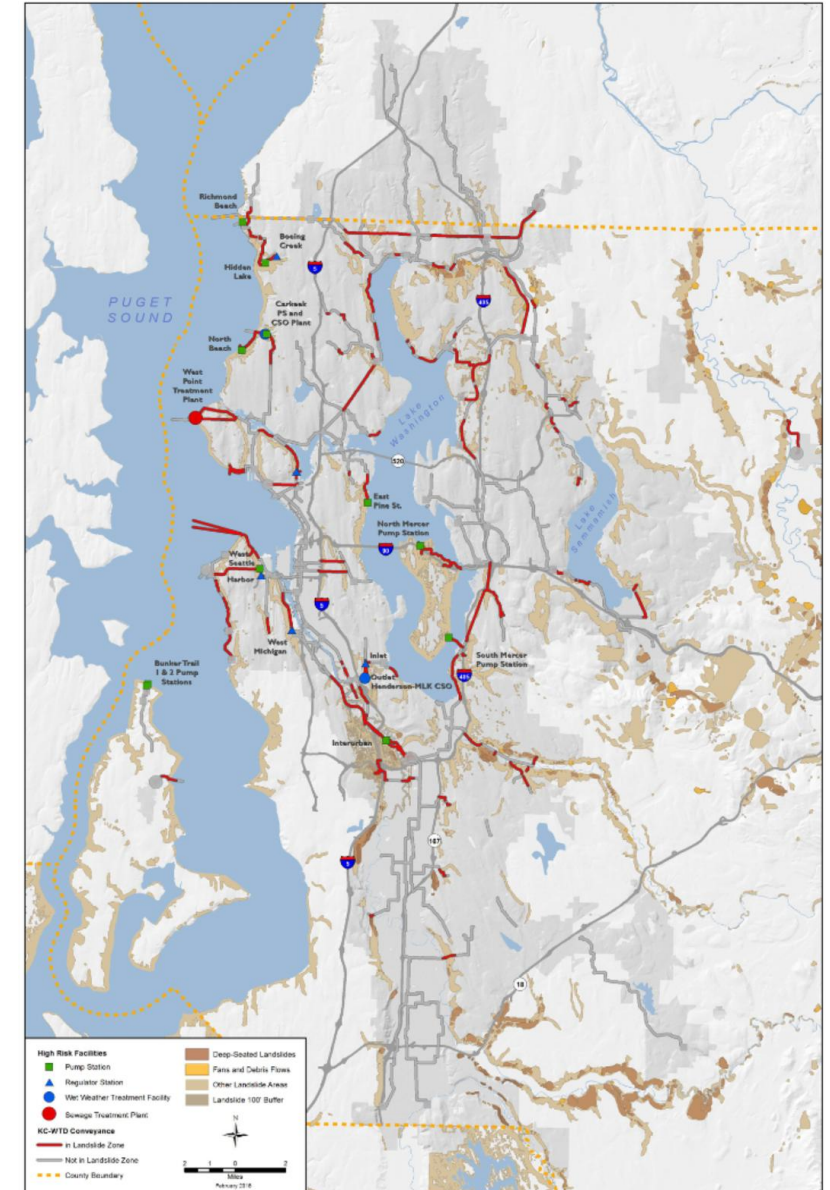
Natural Hazard Resiliency

Landslide Vulnerability Map



Landslides:

- Deep-seated Landslides
- Fans and Debris Flows



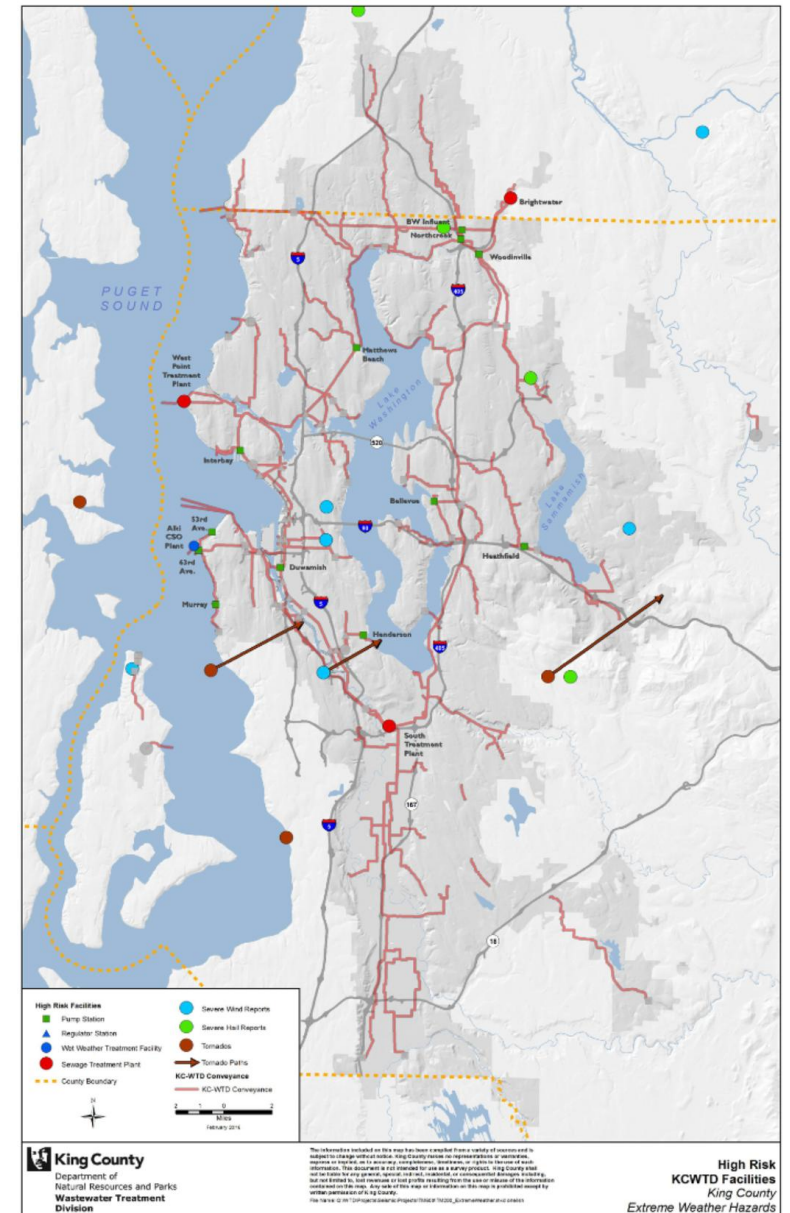
Natural Hazard Resiliency



Extreme Weather:

- High Wind
- Severe Hail
- Tornados/Funnel Clouds
- Other (Lighting, significant snowfall, ice and freezing rain)

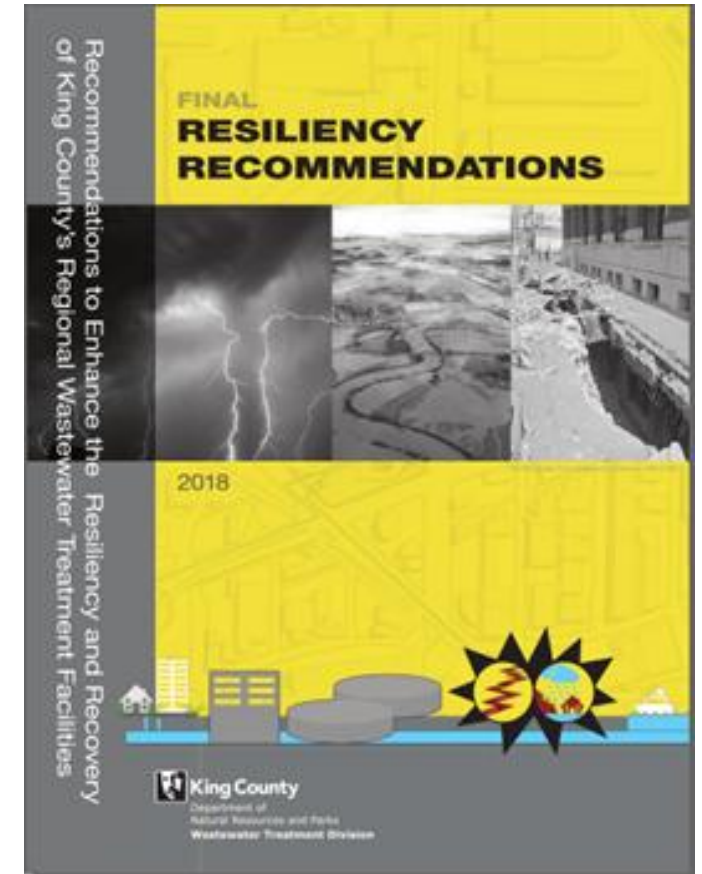
Extreme Weather Vulnerability Map



Recommendations to Enhance the Resiliency of King County's Regional Wastewater Treatment Facilities (2018)

Assessing Assets and Hazards by:

- Criticality Factors (Life Safety, Public Health, Consequential Damage, Facility Criticality, Environmental)
- Risk
 - Consequence of Failure on System Performance
 - Probability of Failure – Vulnerability to Hazard
- Team Validation
- Equity and Social Justice
- West Point Treatment Plant, Independent Assessment Final Report Dated July 18, 2017
- *Differs from King County regional Hazard Mitigation Plan – which isn't specific to wastewater infrastructure*



Hazard Resiliency: Accomplishments

- **Completed natural hazard resiliency study** to better inform risks and investments.
- Coordinated/implemented through the Portfolio Process
- Implementation of the recommendations:
 - Resiliency included in scope of upcoming projects if identified facility is due for upgrade.
 - More intentional consideration for resiliency given in construction of new projects.
 - Example - SPTP Influent Pump Station Seismic Upgrades.

Climate Preparedness

How is Climate Change Affecting the Regional Wastewater System?

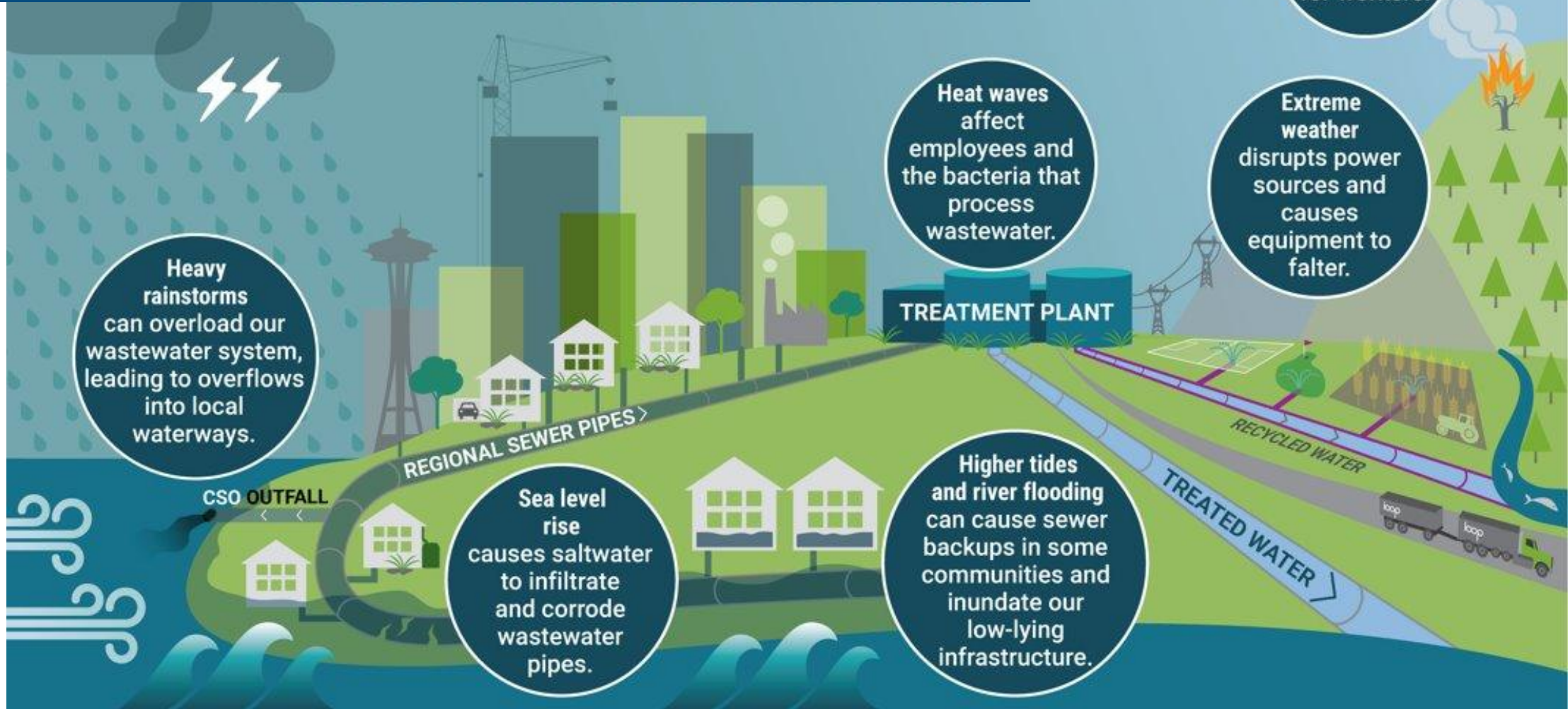
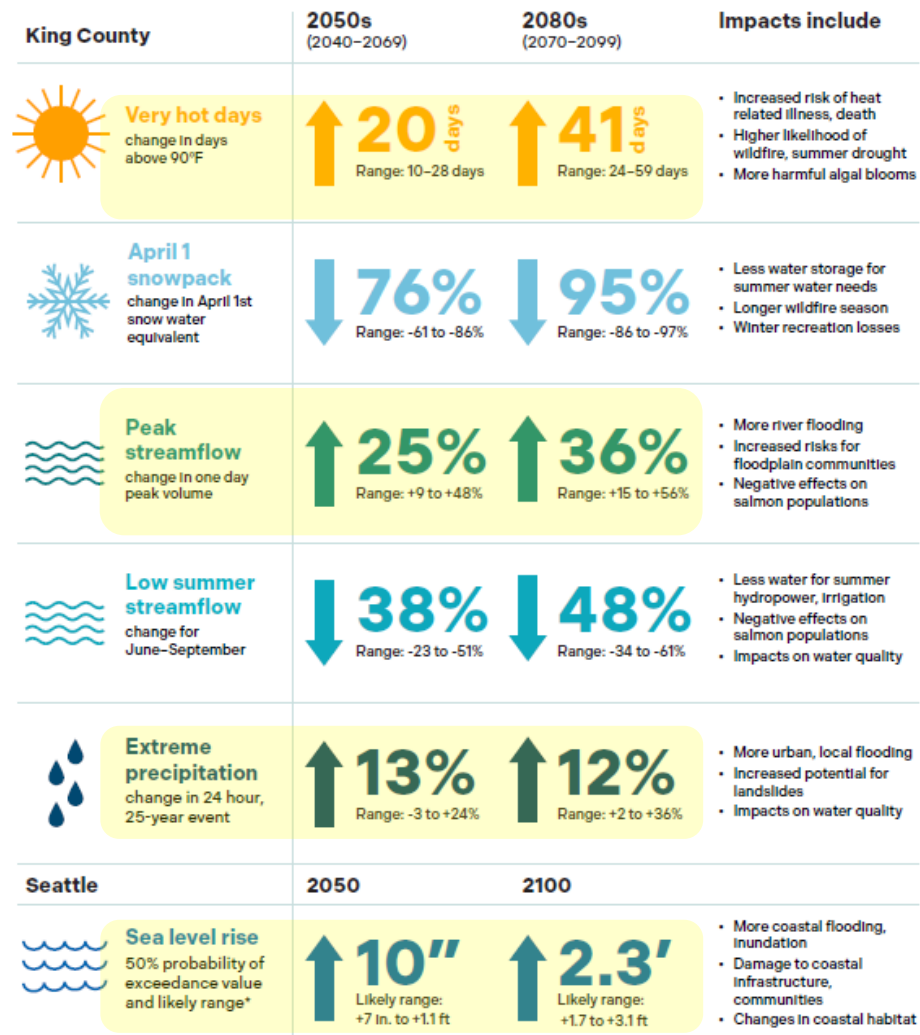


Figure 25. Projected Impacts of Climate Change in King County¹⁸

Projected changes in very hot days, snowpack, peak streamflow, summer streamflow, extreme precipitation, and sea level rise in King County under a high greenhouse gas emissions scenario. Changes are relative to 1980–2009 unless noted otherwise.



*Change in sea level rise relative to 1991–2009 average.

Sources: Climate Mapping for a Resilient Washington | Climate Impacts Group; UW Climate Impacts Group Interactive Sea Level Rise Data Visualizations (Miller et al. 2018)

What Are the Projected Climate Changes?

Rainfall:

Projections show increases in rainfall intensity, but natural variability makes change of impacts and timing uncertain.

Flooding:

Sea level and river flows are projected to increase causing increased coastal and river flooding in winter.

Other climate hazards such as extreme temperatures, wind, extreme weather, wildfires, smoke and drought are also projected to be changing.

Climate Preparedness Policy Landscape

KC Strategic Climate Action Plan and Comprehensive Plan are WTD's primary policy drivers on climate preparedness.

- 2025 SCAP, multiple climate-ready capital project actions
- 2024 Comp Plan, Environment, E-221 to 242 polices on integrating climate preparedness into County-owned facilities, building technical capacity, prioritizing equity and collaboration with others
- 2024 Comp Plan, Services, Facilities & Utilities F-431 and 433 policies on considering siting new facilities and relocating existing facilities in relation to the floodplain (has exception for wastewater)

**Local policies are changing in response to State laws and regulations.
Changes in federal policies are uncertain.**



How is WTD Preparing?



Invest in climate science and data



Plan for future investments



Build climate-ready capital projects



Partner and engage with others along the way

Examples of Climate Preparedness Strategies

1

Increase storage tank size



2

Install flood barriers



3

Adjust HVAC for extreme temps/poor air quality



4

Improve power quality



What have we accomplished?



Invest in climate science and data

- **Completed multiple climate hazard and vulnerability studies** on sea level rise and heavy rainfall for CSO compliance to better inform risks as climate science improved.



Plan future investments

- **Launched Climate Adaptation Planning Program** in 2025 to strategically prepare the wastewater system for climate change.
- **Updated project delivery processes** to reduce compliance risks on CSO projects and improve documentation of how project teams are reducing climate risk on projects.

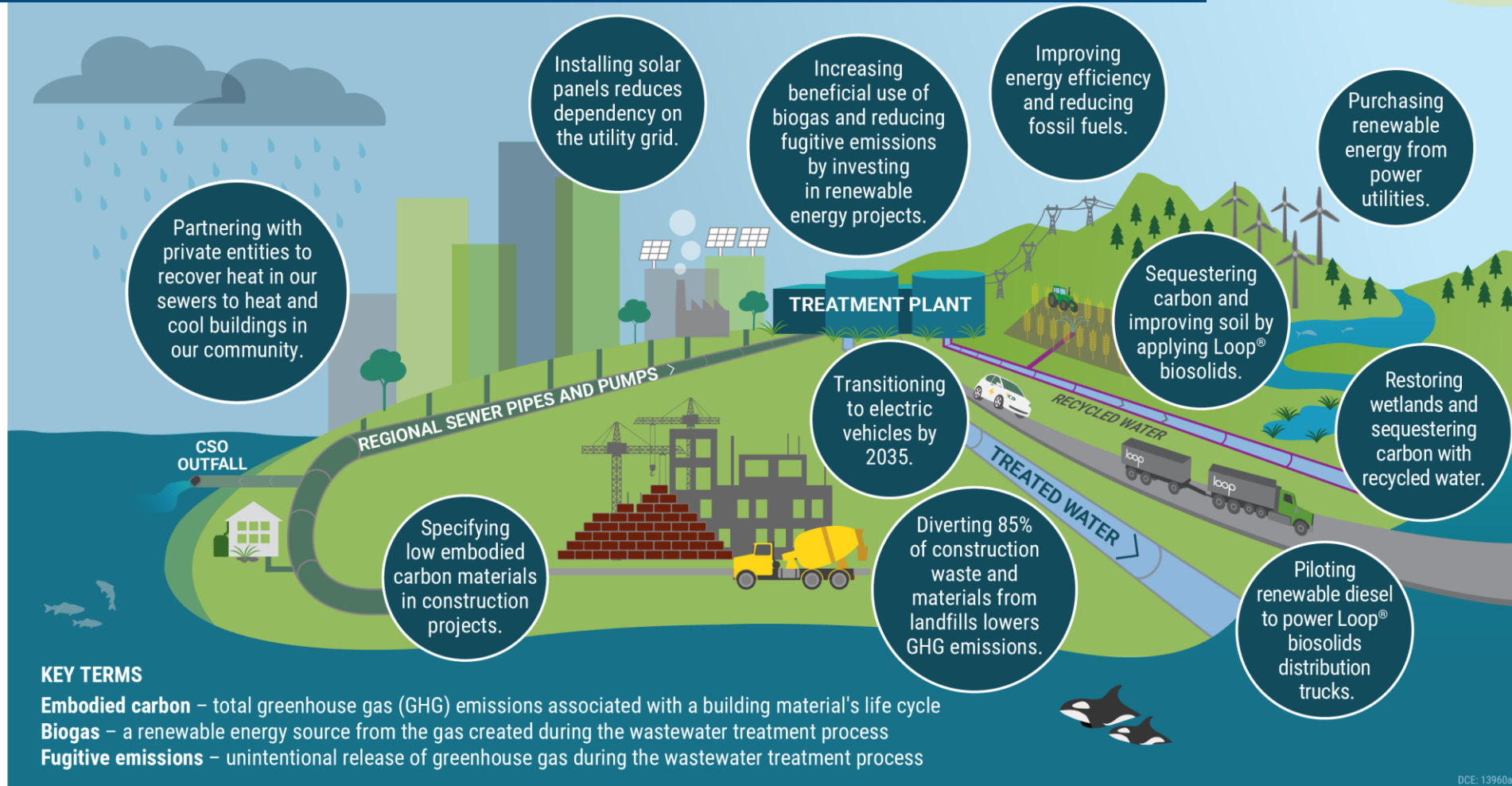


Build climate-ready capital projects

- **Constructed** projects with consideration of future conditions e.g. Georgetown Wet Weather Treatment Station
- **Designed** projects with consideration of future conditions e.g. West Duwamish CSO Storage

Climate Change Mitigation

How is WTD Mitigating Climate Change Impacts to the Regional Wastewater System?



King County Climate Mitigation Policies

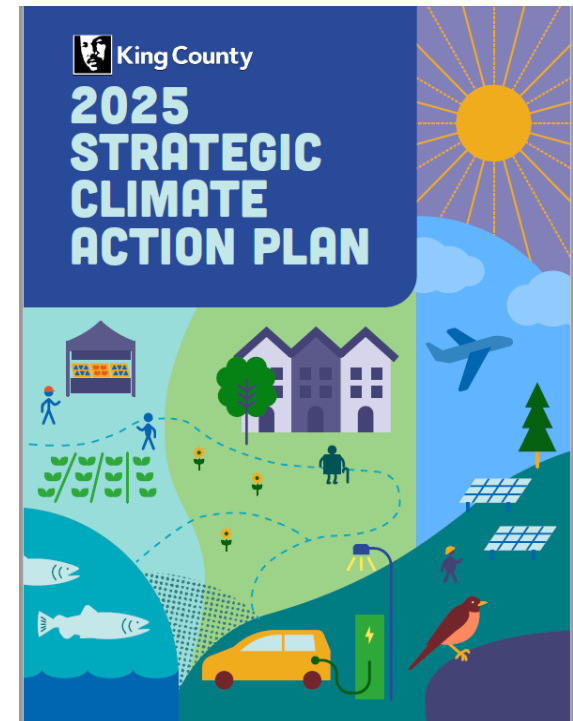
KC Strategic Climate Action Plan is WTD's primary policy driver on climate mitigation and includes commitments addressing:

energy use (efficiency and reduction)
waste diversion, fossil fuel reduction
compost
sustainable materials
optimizing biogas

renewable energy
tree planting
zero-emission fleet
alternative fuels

Other relevant policies:

- King County Code Title 18: Environmental Sustainability Program (2025)
- King County Comprehensive Plan (2024)
- Washington State Energy Code (2021)
- Local, state and federal partner grants, incentives and direct pay opportunities for climate change mitigation efforts



WTD's GHG Emissions

Emission Sources:

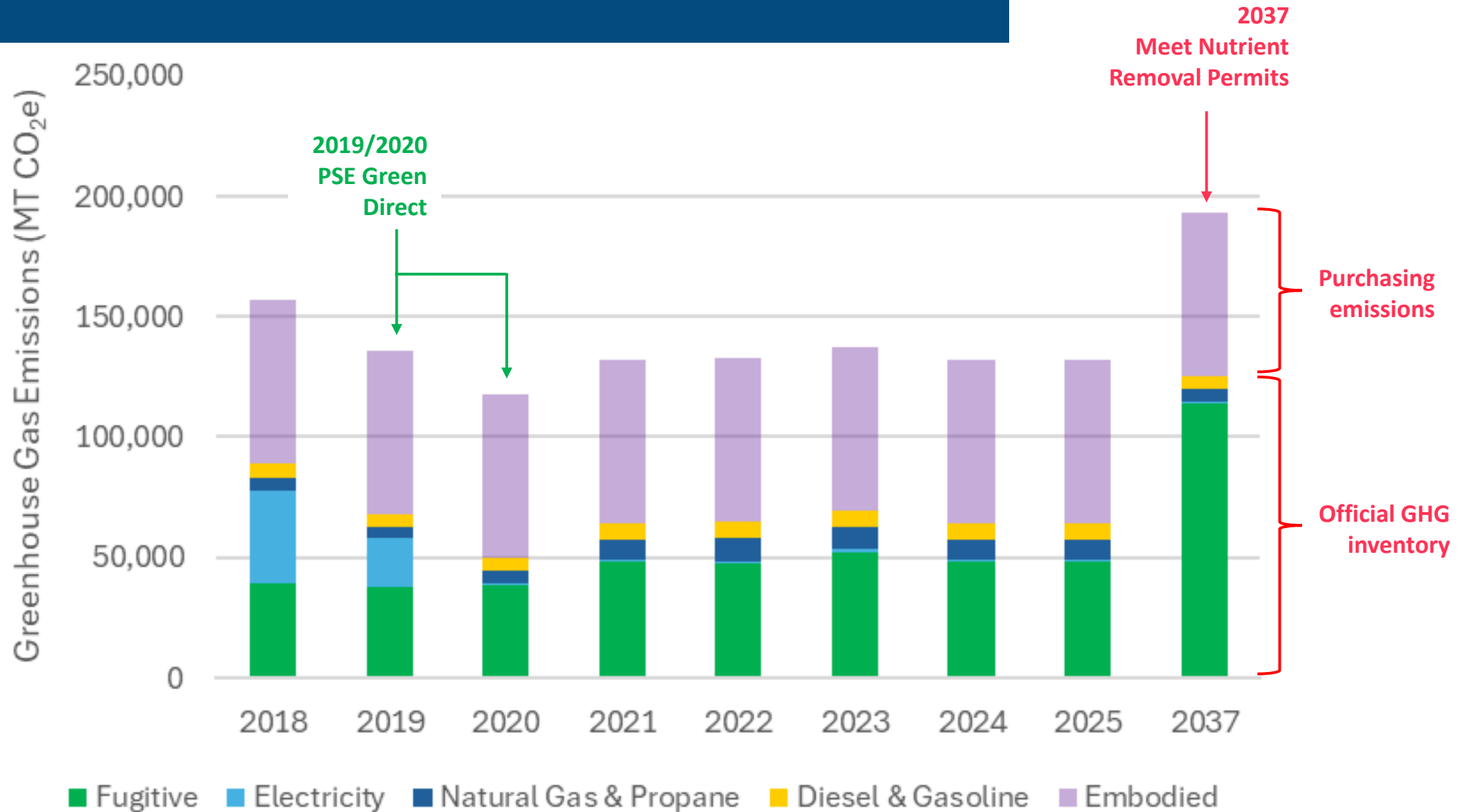
- **Facility Power:** electricity, propane and natural gas to power operations, including boilers
- **Fugitive Emissions:** a mix of Methane and Nitrous Oxide emissions from across the treatment process
- **Transportation Fuels:** gasoline and diesel for fleet vehicles and biosolids hauling trucks
- **Embodied Carbon:** emissions related to the construction materials used in capital projects

Carbon Sequestration and/or Regional Offsets:

- Loop Biosolids offset for land application
- Renewable electricity produced at West Point from biogas
- South Plant renewable natural gas (RNG)

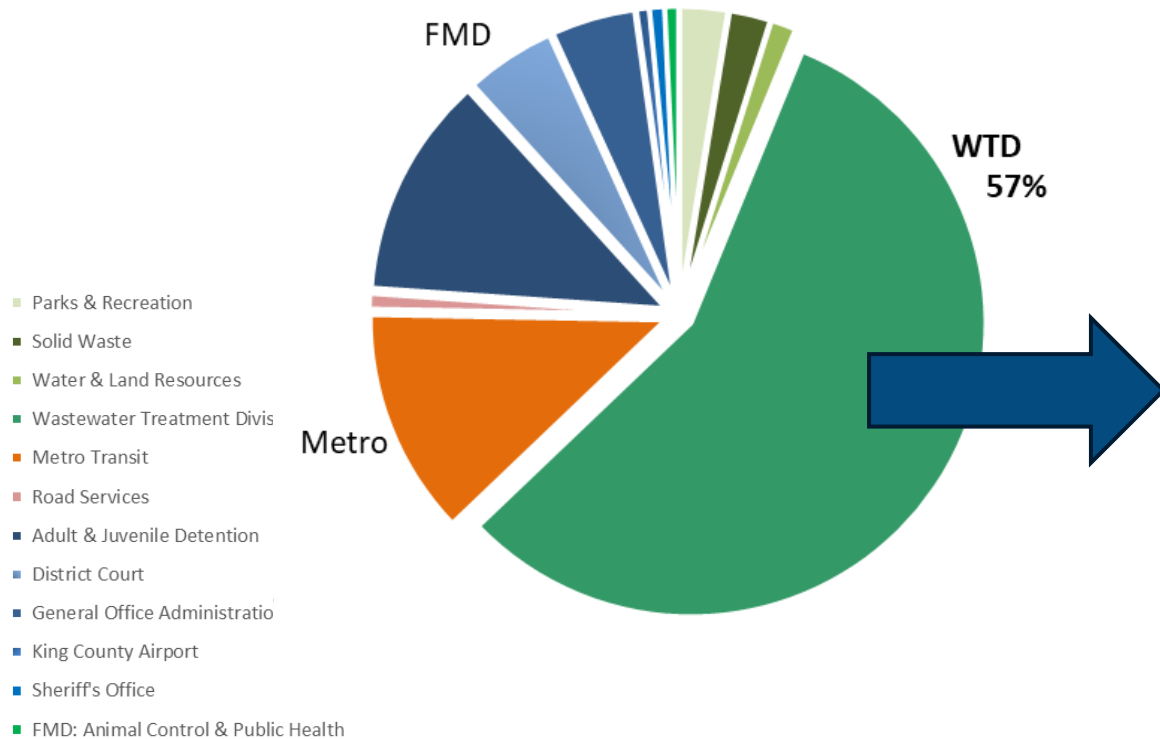


WTD Gross Carbon Emissions

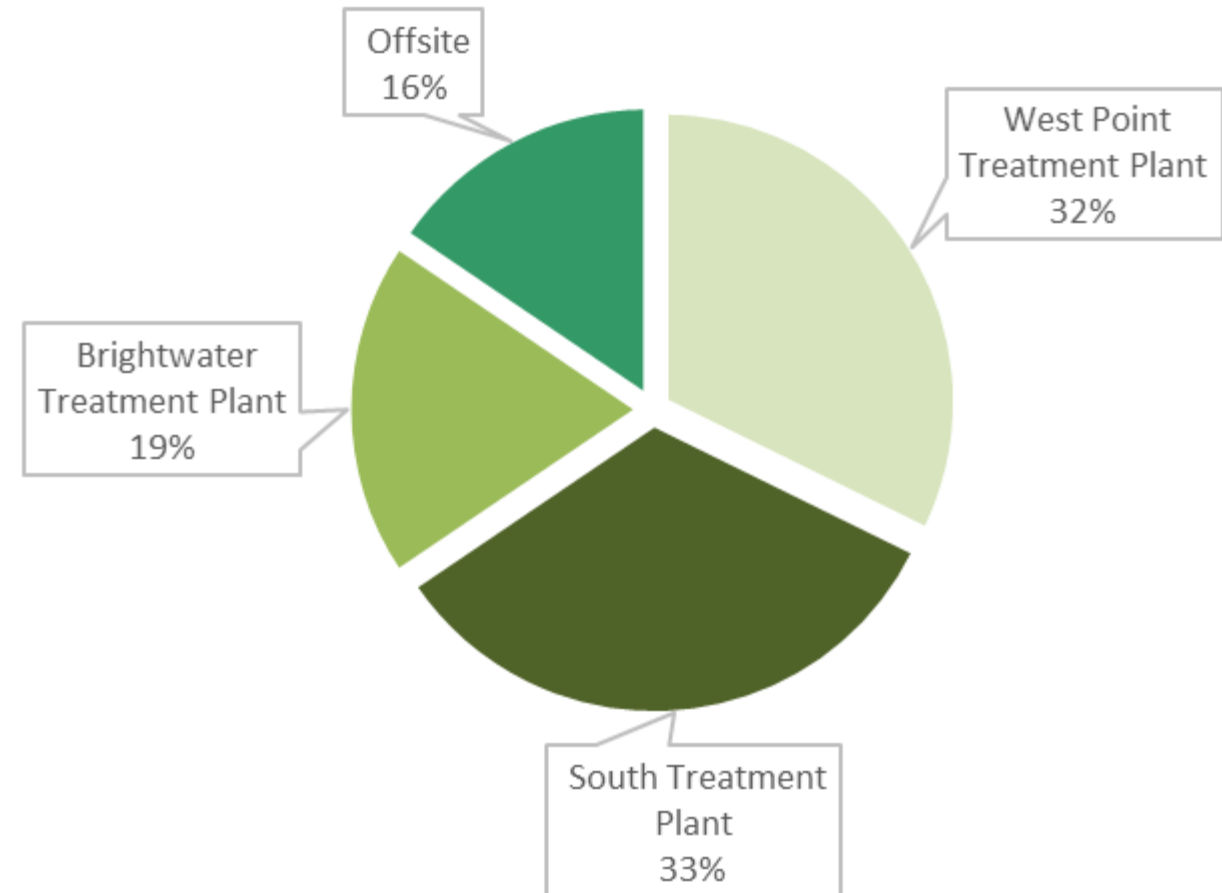


WTD Energy Use – Countywide & Site-Based

King County Government Energy Use

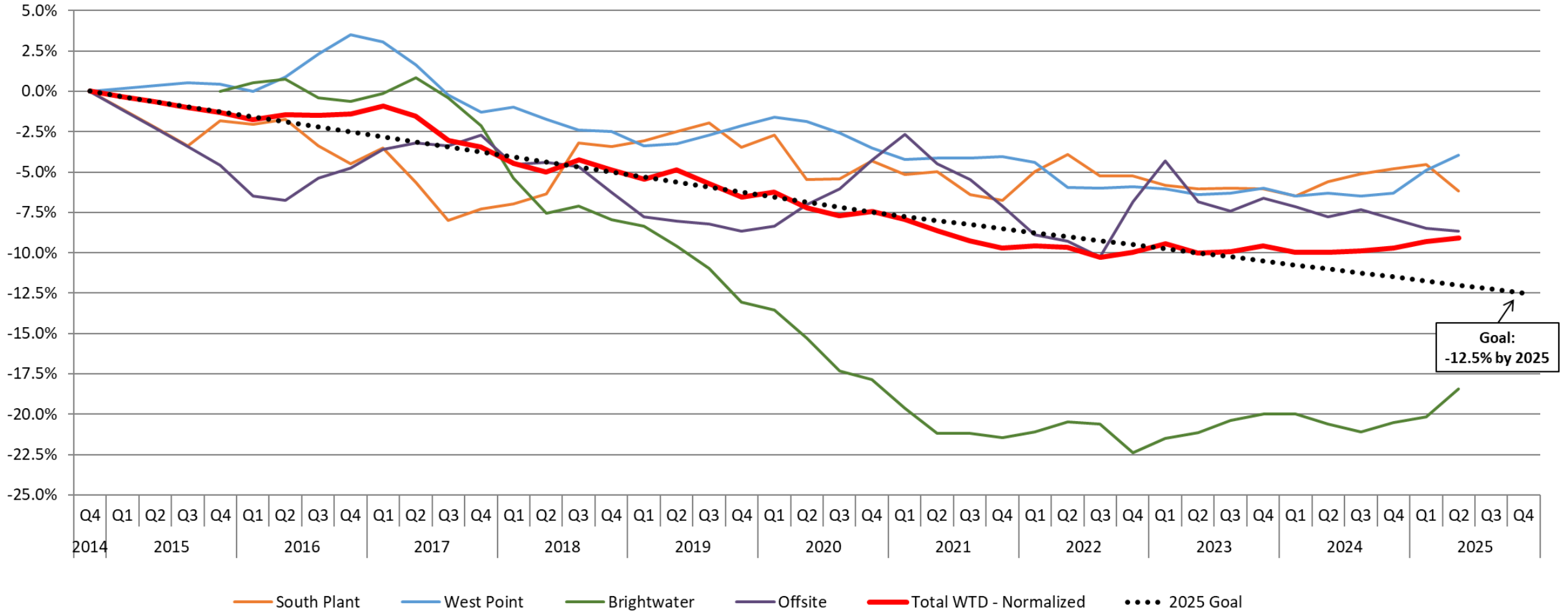


WTD Energy Use by Site - 2024



WTD's Energy Use & Efficiency Progress

Tracking WTD's progress towards its 12.5% energy reduction goal by 2025
(based on normalized electricity use)



What are WTD's Ongoing Climate Mitigation Efforts?



Energy reduction efforts



Solar program and installation



Lowering GHG emissions associated with our construction materials



Biosolids and compost land application



Sewer heat recovery



Biogas optimization



Sewer heat recovery project in South Lake Union.

Examples of WTD's Climate Mitigation Work

Renewable Energy



An 80-kW solar installation on West Point's Power Quality Building.

Energy Reduction



Replacing the plants' existing digester sludge circulation pumps will more than double the energy efficiency of this solids mixing process.

Embodied Carbon



West Duwamish CSO project's specs will reduce the embodied carbon of its concrete by 56% compared to the industry standard.

Q & A



King County | Wastewater Treatment