



## Washington State DOT Considers Potential Climate Change Impacts In Projects & Plans

Washington State DOT (WSDOT) is taking into account changing climate conditions and more extreme weather as part of the state's strategy to achieve a more sustainable transportation system. WSDOT is addressing the potential impact of climate change and ways to incorporate resilience throughout its system, including planning, design, and project delivery.

As part of this strategy, WSDOT has issued three separate guidance documents: one considering how future climate conditions might affect projects that are in development, a second evaluating potential greenhouse gas emissions generated by projects, and a third considering changing climate conditions and extreme weather as part of transportation planning.

### Considering Future Climate Conditions

A key emphasis area for the state DOT is ensuring that proposed projects are resilient to future climate impacts and severe storm events. In this regard, the Guidance for Project-Level Climate Change Evaluation helps WSDOT's project teams consider environmental trends and incorporate available information into project documentation.

"Past trends for a specific resource (water, habitat, air) may not be accurate predictions for the future; instead, we need to look at scientifically-based projections of the changing climate as part of our analysis," according to the guidance.

As part of the project development process, WSDOT staff are directed to consult the agency's statewide Climate Impacts Vulnerability Assessment and consider the range of potential impacts using a GIS layer that shows the locations of climate change threats on the state transportation network. WSDOT staff also consider a summary of anticipated climate impacts compiled by the University of Washington's Climate Impacts Group (see table below).

Some Potential Impacts of Concern for Washington State's Infrastructure	
Projected Climate Change	Potential Impacts on State Highways, Rail, and Ferries
<ul style="list-style-type: none"> <li>• Increase in average winter precipitation and more extreme precipitation</li> <li>• Change in timing of precipitation (more rain, less snow)</li> <li>• Change in storm track with some extreme storms with higher than normal snow accumulation</li> </ul>	<ul style="list-style-type: none"> <li>• More rock fall, mudslides, sink holes, road bed failure</li> <li>• Increased large-scale river flooding</li> <li>• More localized flooding due to poor drainage or higher groundwater table</li> <li>• Severe wind-related road closures</li> <li>• Blown-down trees, signs</li> <li>• Less snow removal, on average (some extreme snows)</li> </ul>
<ul style="list-style-type: none"> <li>• Sea-level rise, higher storm surge</li> <li>• More frequent and extensive inundation of low-lying areas (both temporary and permanent)</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal erosion and landslides weaken roadbed and bridge footings</li> <li>• Damage to stormwater drainage and tide gates</li> <li>• Saltwater corrosion of facilities</li> <li>• Detours around frequently flooded coastlines</li> </ul>

Source: WSDOT

The Project-Level Climate Change Evaluation Guidance provides "template" language that can be tailored to specific projects and included with the related environmental documents. The language describes the projected climate impacts over the next 50 years and provides direction on specifying what features of the project will help build resilience. These features may include stormwater flow control, design, or changes to bridge height.

The document also provides examples of projects that considered the vulnerability assessment and the elements to improve resilience.

## Analyzing Greenhouse Gas Emissions from Projects

Because WSDOT considers greenhouse gas (GHG) emissions to be an issue of global concern, the agency's Guidance for Project-Level Greenhouse Gas Evaluations under National Environmental Policy Act (NEPA) and the Washington State Environmental Protection Act (SEPA) provides direction on disclosing such emissions as part of each project's "cumulative effects" analysis. The guidance provides a standard analytical process, as well as additional template language to be included in environmental documents.

Three types of GHG emissions are analyzed:

- **OPERATIONAL**—including tailpipe emissions from vehicles using project roadways and upstream emissions from the fuel cycle (i.e., emissions released through extraction, refining, and transportation of fuels used by vehicles traveling in the project area).
- **CONSTRUCTION**—primarily from fuel used to build the project, but also emissions from traffic delays due to project construction and materials used.
- **MAINTENANCE**—emissions from routine maintenance activities and equipment.

Project analysis can range from a brief qualitative analysis to a full quantitative analysis. The type of analysis is determined by the environmental document and the potential impacts.

Projects processed as NEPA Categorical Exclusions (CEs) generally require no analysis because they would have little or no effect on GHG emissions.

Projects that have a small potential to change GHG emissions, especially operational emissions are classified as "documented CEs" under NEPA or "checklist" projects under the SEPA require only a brief one or two-sentence qualitative analysis. The guidance provides template language for such brief analyses, including operational, construction, and maintenance issues.

For example, for a project that is expected to improve traffic flow, the qualitative analysis would say: *"The project is expected to improve traffic flow, which should reduce operational greenhouse gas emissions. Construction greenhouse gas emissions will result primarily from fuel used in construction equipment."*

Projects processed as environmental assessments (EAs) or environmental impact statements (EISs) require a comprehensive quantitative analysis. These analyses could be conducted at the planning level, or project level. The analyses must use specified federal models and tools to calculate operational, fuel cycle, and construction/maintenance emissions. For EA's, the analysis is included in the air quality discipline report, and for EIS's, the analysis is placed in the energy discipline report. The guidance also provides template language to include in EA's and EIS's, including:

- A description of sources of GHG in the state,
- Efforts underway to reduce such emissions,
- WSDOT's approach to climate change at the project-level,



## Climate Impacts Vulnerability Assessment

### REPORT

*Prepared by the Washington State Department of Transportation  
for submittal to the Federal Highway Administration*

In fulfillment of the matching grant of Surface Transportation Research, Development, and Deployment for as obligated by the FHWA–Washington Division, FHWA program code 4L30.

WSDOT's statewide vulnerability assessment helps the agency account for the effects of climate change on its transportation system. *Image: WSDOT*

- How specific project features will impact GHG emissions, and
- How project construction will affect GHG emissions including how such emissions will be minimized.

A summary of the GHG analysis, as well as the standard text are then to be included in the cumulative effects section of either the EA or the EIS.

Carol Lee Roalkvam, the Policy Branch Manager at WSDOT's Environmental Services Office states: "WSDOT's guidance documents support state policy on climate change and sustainability and now are in use on all projects that require EA's and EIS's. The process is going great and teams are continuously learning as analysis tools evolve. While there are no federal requirements to conduct GHG analyses, we have found that the public and other agencies appreciate the information included on climate change issues.

## Considering Climate Change in Planning

Under WSDOT's approach, climate change issues are addressed during transportation planning, before specific projects are proposed.

WSDOT's [Guidance for Considering Impacts of Climate Change in WSDOT Plans](#) calls for planners to consider the Climate Impacts Vulnerability Assessment and consult with WSDOT environmental office to determine potential impacts for specific planning areas or modes.

The planning process considers whether:

- Climate change will adversely impact current or future multimodal transportation infrastructure;
- Planning partners have considered transportation assets in the local or regional long-term natural hazard reduction plans; and
- Climate change will impact transportation services to vulnerable or underserved populations.

Plans also should document potential risks from extreme weather and how the plan will promote resilience.

The guidance also offers implementation advice and links to examples for specific types of planning studies.

WSDOT is finding that many local jurisdictions are including climate-related threats in local hazard risk reduction plans. Individual planning efforts are able to integrate new information from their local partners to help improve coordination across multiple sectors and jurisdictions. "While the planning guidance is still in the early phase of implementation, it will continue to evolve as more studies are completed," Roalkvam said.

For more information on WSDOT's approach to considering climate change in its projects and programs, contact Carol Lee Roalkvam, at [carollee.roalkvam@wsdot.wa.gov](mailto:carollee.roalkvam@wsdot.wa.gov)

“WSDOT plans and projects undergoing environmental review (at NEPA EIS and EA level) will document how climate change and extreme weather vulnerability are considered, and propose ways to improve resilience.”

—WSDOT Strategic Plan

## Resources:

- [AASHTO Resilient and Sustainable Transportation Systems Technical Services Program](#)
- [Center for Environmental Excellence by AASHTO](#)
- [Washington State DOT Addressing Climate Change in Planning and Project Documents Web Page](#)
- [FHWA Vulnerability Assessment and Adaptation Framework](#)
- [FHWA Sustainable Transportation/Resilience Web Page](#)
- [FHWA Sustainable Transportation/Energy & Emissions Web Page](#)

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#### Examples of Washington State Projects and Plans that Address Climate Change and GHG Emissions:

- 2018 [SR 432/433](#) (2018)
- 2018 [I-405](#) (Recent NEPA EAs) (2018)
- 2017 [SR 509 Gateway Phase 1](#) (2017)
- 2017 [I-5 Mounts Road to Thorne Ln EA](#) (2017)
- 2013 [Mukilteo Multimodal Ferry Terminal FEIS](#) (2013)
- 2009 [SR 520 Bridge Replacement](#) (2009)

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