

PRACTICAL DESIGN AT WORK — DESIGN



Washington State
Department of Transportation

US 2 Tumwater Canyon Bridge Replacements

Background

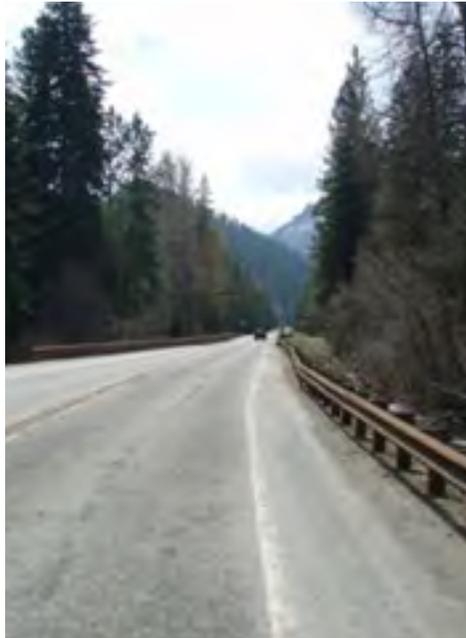
Beginning approximately 10 miles west of Leavenworth, US 2 hugs the bank of the Wenatchee River as it meanders through a steep canyon known locally as the Tumwater Canyon. The two-lane highway was constructed on an abandoned rail line. It includes three narrow, aged and decayed bridges, constructed between 1900 and 1936, to cross the Chiwaukum Creek, Wenatchee River and Drury Canyon Creek. These bridges were bound by a combination of waterways, wetlands, mountains and a U.S. Forest Service campground.

Original plan

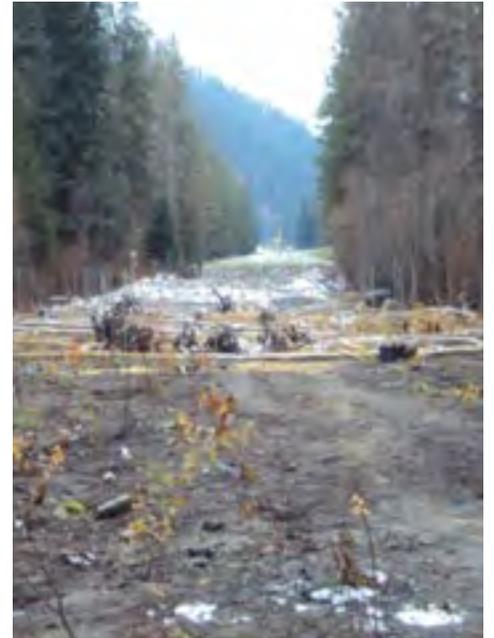
All three bridges were planned to be replaced in and around their original footprint, requiring multiple construction stages. Under most circumstances, this typically would lessen a project's impact to the surrounding environment. In the case of this project, the surrounding environment dictated the design approach.

Practical design solution

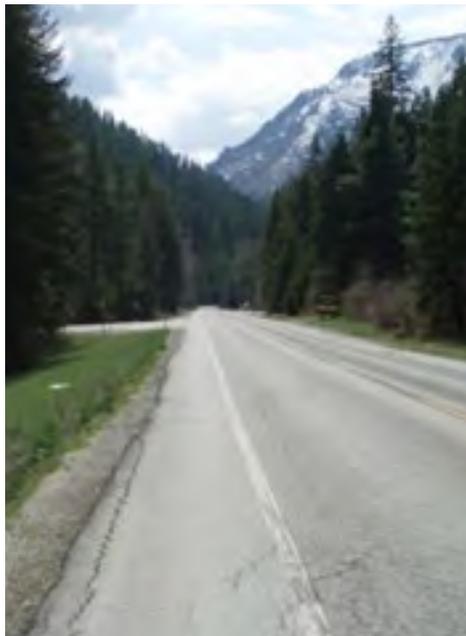
At the beginning of the design phase, WSDOT established an interdisciplinary team (IDT), composed of local agency and WSDOT representatives. The IDT allowed the various permitting agencies to communicate directly with each other and helped WSDOT to quickly identify design priorities. It was through this collaborative process that realigning US 2 became the



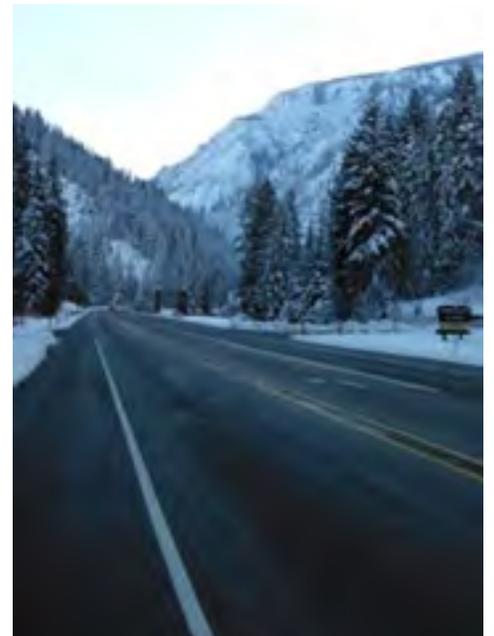
Wetland Mitigation Area (Before)



Wetland Mitigation Area (After)



Wenatchee River Bridge (Before)



Wenatchee River Bridge (After)

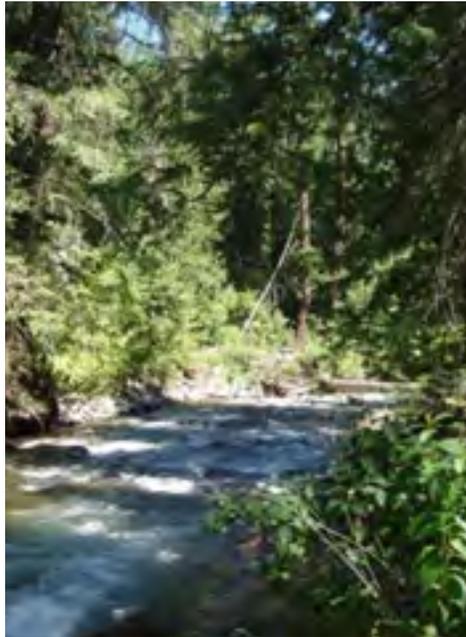
obvious cost-effective and environmentally-sensitive solution. By realigning the highway, we drastically reduced impacts to adjacent wetlands, removed a fish barrier, provided a wetland mitigation site, and moved highway traffic away from campsites. In addition to the environmental benefits, realignment allowed for efficient construction and reduced project costs.

Results

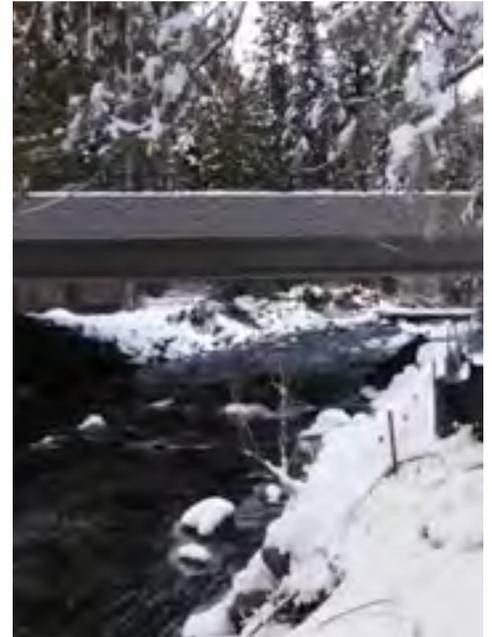
Safety: The new wider bridges have increased bicycle and pedestrian safety by providing additional shoulder width across three waterways. Construction of a left-turn lane into the Tumwater Campground has also reduced the likelihood of rear end collisions.

Community coordination: Early communication with local agency representatives was the basis for a successful project. The design concept for realigning the highway was introduced by non-WSDOT members of the IDT. Collaboration with the USFS was the key to WSDOT successfully obtaining a federal grant to construct the left-turn lane into the Tumwater Campground. On several occasions, design alternatives were presented to Leavenworth citizens and community leaders, which strengthened support for the project.

Economic Vitality: US 2 serves as a major freight corridor through the Cascade Mountains as well as a major tourism, recreational, and bicycle access route connecting eastern and western Washington. Replacing the bridges ensures that this route will continue to provide service for years to come. Realigning the roadway allowed construction to be done with minimal impact to traffic.



Chiwaukum Creek Bridge (Before)



Chiwaukum Creek Bridge (After)



Cost: With the highway on a new alignment, WSDOT was able to construct the two largest bridges during a single stage. Single-stage construction reduced contract expenditures by condensing construction time and minimizing the

amount of temporary materials used to construct each bridge. The practical design solution resulted in a cost savings of almost \$4M, the total project cost decreasing from \$17M to \$13.3M.