The Office of Federal Lands Highway



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The Mike O'Callaghan–Pat Tillman Memorial Bridge over the Colorado River at Hoover Dam. Photo: McNary Bergeron & Associates Inc.

The Office of Federal Lands Highway (FLH) provides program stewardship and transportation engineering services for planning, design, construction, and rehabilitation of the highways and bridges that provide access to and through federally owned lands. The federal government has title to about 650 million acres—roughly 30% of the total area of the United States. There are more than 300,000 miles of federally owned roads.

FLH has four offices—Headquarters, and Eastern, Central, and Western Divisions—to provide services to the FLH partners. FLH works closely with the federal land management agencies (FLMAs) and many state and territorial partners. FLMAs include the Bureau of Indian Affairs (BIA), U.S. Forest Service (USFS), National Park Service (NPS), Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), Military Surface Deployment and Distribution Command (SDDC), U.S. Army, U.S. Army Corps of Engineers (USACOE), U.S. Navy, Tennessee Valley Authority, and the Bureau of Reclamation (BOR).

The Federal Lands Highway Program

The primary purpose of the Federal Lands Highway Program (FLHP) is to provide financial resources and technical assistance for a coordinated program of public roads that service the transportation needs of federal and Indian lands. One of the major factors associated with the success of the program is the Federal Highway Administration's strong relationship with our federal, state, local, and tribal partners.

The FLH Bridge Office

Within FLH, each of the three Divisions (Eastern, Central, and Western) has a Bridge Office. The Eastern (EFLHD) Office is the largest of the three Divisions with 29 people. The Central (CFLHD) and the Western (WFLHD) Offices are made up of nine and three people, respectively.

The FLH Bridge Program

The FLH Bridge Office performs bridge engineering in three program areas: Bridge Inspection, Bridge Asset Management, and Bridge Design and Construction.

The Bridge Inspection Program (BIP) Team based in EFLHD performs bridge safety inspections for eight federal agencies across a nationwide geographic area. The BIP unit inspects nearly 2000 structures with the National Park Service (NPS) structures accounting for approximately 95% of the total. The WFLHD staff also performs safety inspections for a select portion of the Bureau of Land Management's inventory in the State of Oregon.

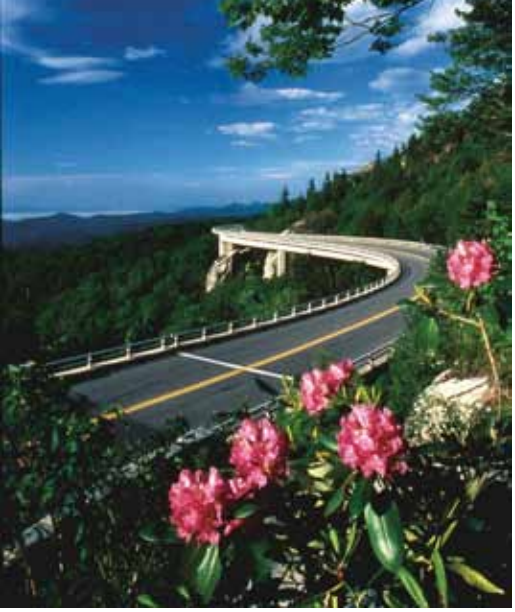
The Bridge Asset Management team, located in EFLHD, works with all three FLH Divisions and in partnership with the NPS to assist in developing their bridge rehabilitation/replacement program. Evaluative and predictive tools are used to formulate recommended work priority lists for each of NPS's seven geographic regions.

The Bridge Design and Construction Program is carried out by staffs in the three FLH Divisions. The FLH Bridge Office is focused on designing bridges in-house, providing review expertise for structures designed by others, and providing technical support for the building of these structures.

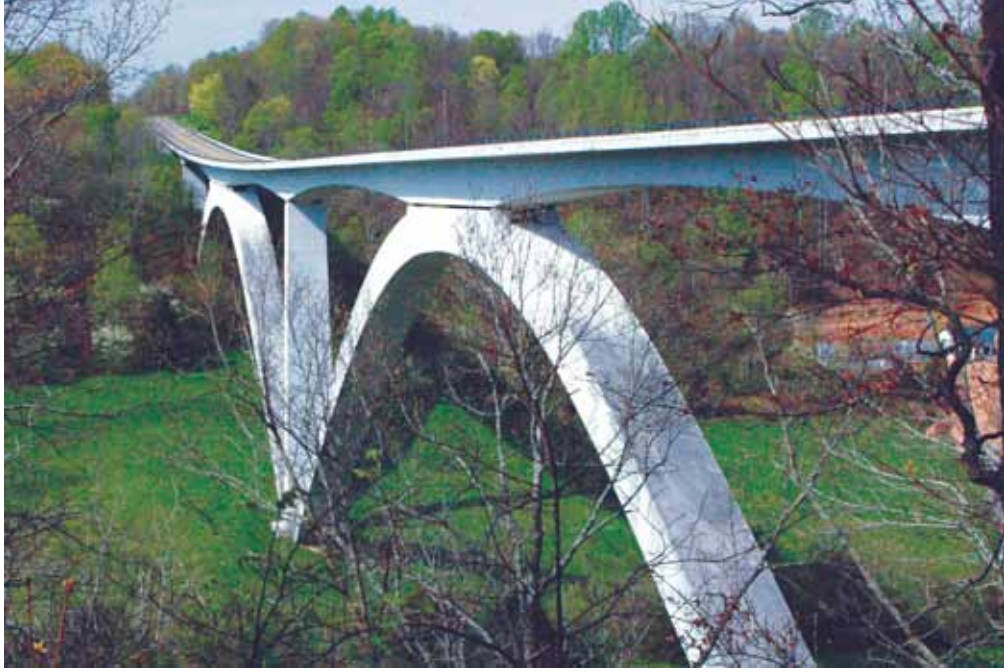
Concrete Bridge Projects

Over the years, FLH has often been tasked with building bridges in sensitive sites where aesthetic and environmental considerations greatly influence the choice of structure type and construction method. In many cases, concrete has offered the preferred solution. Several notable examples are; the O'Callaghan-Tilman Memorial Bridge, which bypasses the Hoover Dam and employs a segmental concrete arch as the main supporting component; the Blue Ridge Parkway Viaduct—a precast segmental concrete box girder with very severe horizontal alignment challenges that was erected using top-down construction; and the Natchez Trace Arch Bridge—a segmental concrete box girder that is supported on segmental concrete arches and pier columns.

A current challenging project is the design and construction of Bridge No. 2 on the Foothills Parkway in Tennessee. The EFLHD Bridge staff provided the conceptual engineering for this project and is now providing technical assistance to help administer its final design and



Blue Ridge Parkway or Linn Cove Viaduct in North Carolina. Work began on the viaduct in June 1979 and was completed in November 1982 at a final cost of $9.8 million. Photo: FHWA.



Natchez Trace Parkway Arch Bridge located in Williamson County, Tenn., is the first segmentally constructed concrete arch bridge in the United States. Photo: FHWA.

construction. The Foothills Parkway is located in the mountainous foothills of the Tennessee Valley adjacent to the Great Smoky Mountains National Park. Bridge No. 2, in Blount County, is a significant precast segmental single-cell box girder bridge currently under construction for the NPS. The design-build project is led by EFLHD and funded by the American Recovery and Reinvestment Act. The EFLHD is working in partnership with the NPS to administer the design and construction of the Parkway.

The bridge length is 790 ft with five spans (125, 180, 180, 180, and 125 ft). The mountainous terrain required a complex alignment for the bridge. The geometry of this bridge includes a reverse horizontal curve alignment with spirals and a vertical alignment that includes a sag curve on a steep 8% grade.

Precast segments are being used for both the piers and superstructure with the intent of enabling this work to proceed simultaneously while the construction of foundations and temporary erection structures takes place at the site. The foundations require micropiles that vary in length due to variable geotechnical conditions. The erection of segments will be done from the top down for the piers and will use the balanced cantilever method for the superstructure.

The superstructure consists of 92 segments and the substructure consists of 20 segments. The typical superstructure segment has a constant depth of 9 ft 0 in. and a width of 36 ft 10 in. weighing 100 kips each. The top slab is transversely post-tensioned. The substructure segment widths vary from 10 ft 0 in. to 13 ft 8 in., are hollow, and will also be post-tensioned. Difficult site constraints of steep terrain and extremely limited access from only one end of the bridge prevents the contractor from erecting precast segments with traditional cranes and overhead erection trusses. A temporary trestle/falsework system, supporting an elevated rail system that will be used by a gantry crane to erect the bridge, is being constructed to gain access to the site and construct the bridge. The temporary trestle is supported by micropiles that will be cut down 2 ft below the ground line after the falsework is removed.

The last of the segments was cast in August. Erection of the segments will begin in October and is scheduled to be completed in spring 2012. Finally, a high-performance concrete overlay will be placed in early spring. The completion of this bridge will grant the contractors access to the other bridge sites on the "Missing Link" of the parkway. The Foothills Parkway target opening date for the public is 2016.

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On the project site, a temporary trestle is in place as work gets started on Foothills Parkway Bridge No. 2. Photo: FHWA.

Column and girder segments are shown stored in the casting yard for Foothills Parkway Bridge No. 2 in Tennessee. Photo: FHWA.