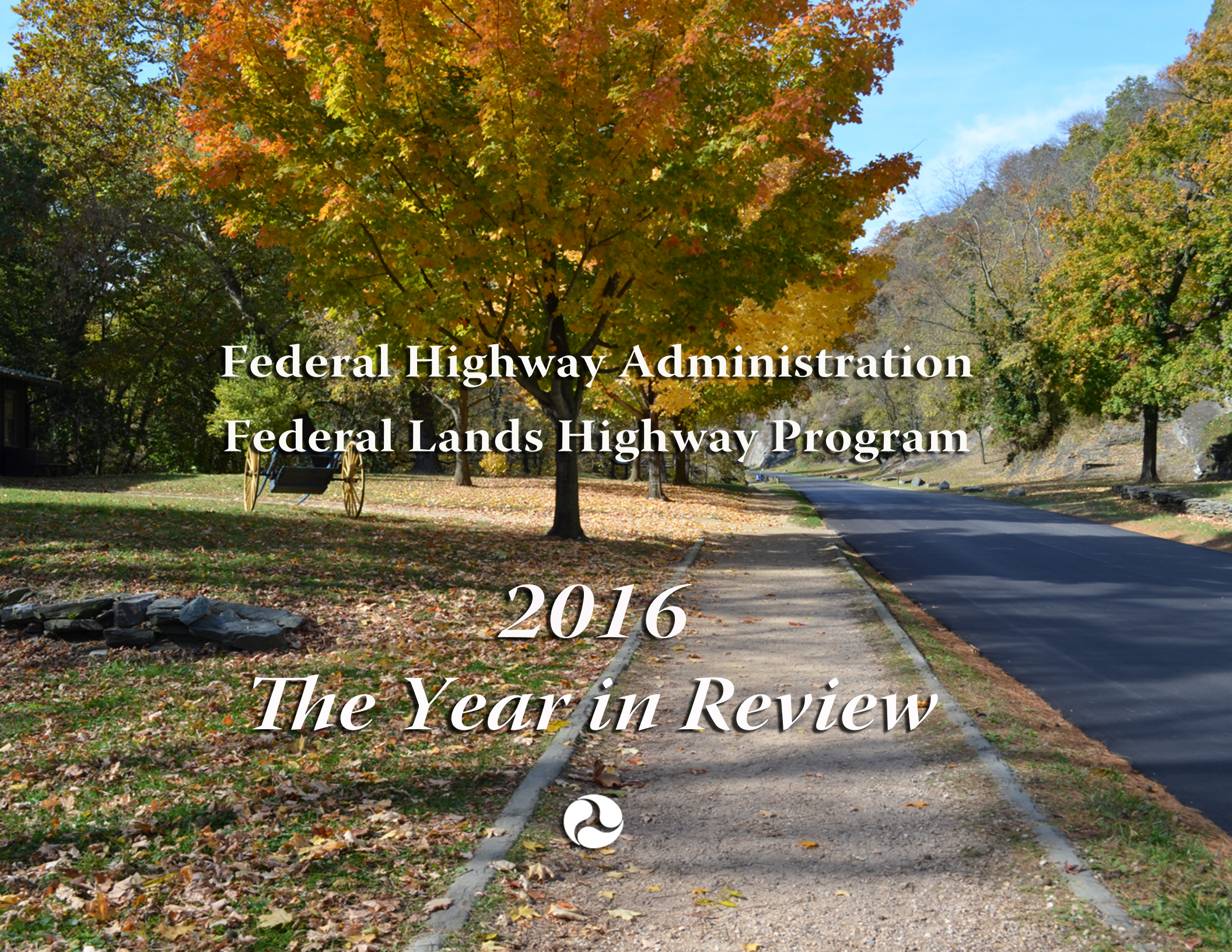


Federal Highway Administration
Federal Lands Highway Program

2016
The Year in Review

From the desk of the Associate Administrator

This report celebrates a record year of accomplishments by the Federal Highway Administration, Office of Federal Lands. Our previous record years were in 2010 and 2011, at the height of the American Recovery and Reinvestment Act (ARRA), when Federal Lands contracted $511 million and $516 million in infrastructure improvements. In 2016 Federal Lands exceeded these years by contracting $656 million in infrastructure improvements. These contracts were in support of an overall $1.4 billion program consisting of projects for our Federal Land Management partners, our Tribal partners, State Departments of Transportation, and other partner agencies such as the Department of Defense. We were only able to accomplish this through fostering relationships and partnering with each of our stakeholders to deliver projects that meet unique and challenging requirements.

During the upcoming year, we will be completing our Single Enterprise Initiative. Under this multi-year initiative, Federal Lands made our systems more transferable and consistent across all of our offices nationally. The Single Enterprise has fostered a business operating environment that enables the Federal Lands Divisions to share work and balance workload based on partner requirements rather than regional capabilities. We'll have the opportunity in the upcoming year to put the Single Enterprise into practice as our Eastern Division will assist the Central Division in delivering projects. The collaboration between the Eastern and Central Divisions will allow Federal Lands to be more responsive to our partners' needs and is another step forward in continually improving the efficiency and responsiveness of our project delivery.

Under the Single Enterprise Initiative, we also made improvements to our Tribal Transportation Program. This upcoming year we will begin moving our Tribal Coordinators from our Federal Land Division Offices to our Federal-aid Division Offices. This will allow the Tribal Transportation Program to better collaborate with the Federal-aid side of FHWA and be closer to the Tribal Communities we serve. The Emergency Relief for Federally Owned Roads (ERFO) Program had its third largest year ever. Also, during 2016 the ERFO Program completed development of the Mobile Solution for Assessment and Reporting (MSAR). The MSAR is a cloud based information system and will assist mobile inspection teams in providing real-time information to decision makers, greatly increasing the timeliness and efficiency of disaster response.

Our projects tell our story best. The next several pages highlight some of the projects we delivered in 2016. Please take a few minutes to see what we accomplished!

Timothy G. Hess, P.E.
Associate Administrator for Federal Lands
Federal Highway Administration

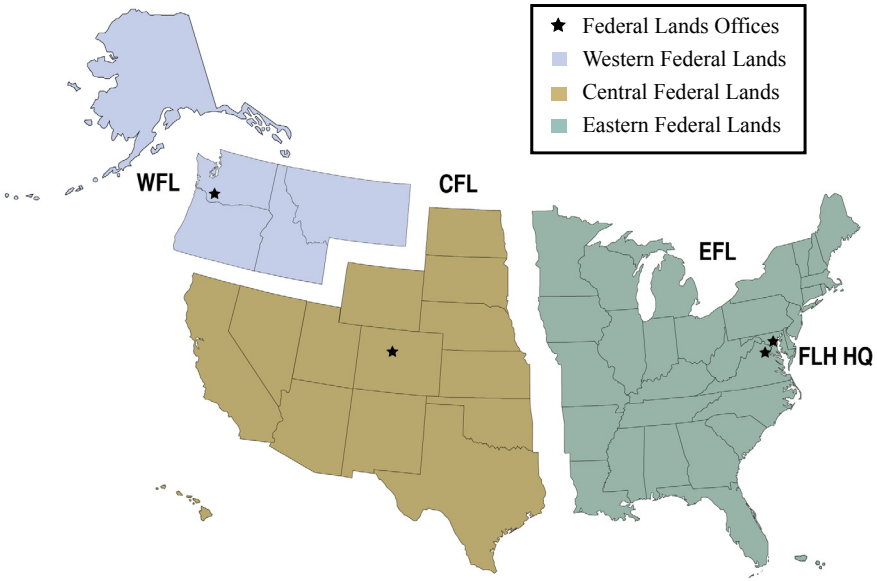
Onsite at Foothills Parkway bridge construction site, Great Smoky Mountains National Park, Tennessee (left to right) Tim Hess with Sandy Otto, Director Western Federal Lands; Melisa Ridenour, Director Eastern Federal Lands; Ric Suarez Director Central Federal Lands.

The Federal Lands Highway Program

2016

The Year in Review

Table of Contents



Our Role 1

The Federal Lands Programs 2-3

The Tribal Transportation Program 4-7

Project Delivery Showcase 8-27

Emergency Relief for Federally Owned Roads 28-33

Transportation Asset Management 34-35

Technical Assistance 36-41

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U.S. Department of Transportation
Federal Highway Administration

Special thanks to the Federal Lands employees responsible for taking the majority of the beautiful photographs contained in this report.

Front Cover: Harpers Ferry National Historical Park, West Virginia

Back Cover: Rock Creek Road, Forest Highway 89, Inyo National Forest, California

Vision

To be the partner of choice to Federal Lands Management Agencies and Tribes. We will implement innovative transportation solutions that provide access to and through public lands.

Mission

Improving transportation to and within Federal and Tribal Lands by providing technical services to the highway/transportation community, as well as building accessible and scenic roads that ensure the many national treasures, within our Federal Lands, can be enjoyed by all.

Grand Loop Road, Yellowstone National Park, Wyoming

The Federal Highway Administration (FHWA) Federal Lands Highway Program (FLHP) was established in 1982 to promote effective, efficient, and reliable administration for a coordinated program of public roads and bridges; to protect and enhance our Nation's natural and cultural resources; and to provide needed transportation access for Native Americans. The Federal Government, through various Federal Land Management Agencies (FLMAs): the **National Park Service (NPS)**; **USDA Forest Service (FS)**; **U.S. Fish and Wildlife Service (FWS)**; **Bureau of Indian Affairs (BIA) and Tribal Governments**; **Bureau of Land Management (BLM)**; **Department of Defense (DOD)**; **U.S. Army Corps of Engineers (USACE)**; and **Bureau of Reclamation (BOR)**, have ownership responsibilities for more than 30% of the Nation's land. This responsibility covers more than 500,000 miles of public and administrative roads on federal land across the U.S. and its island territories.

The Office of Federal Lands Highway (FLH) is relied upon by these partners to solve and manage unique challenges that are wide-ranging in environment, geography and complexity, through engineering solutions that are sensitive to the context of the land. We are often confronted by unique terrain, work restrictions, and challenging deadlines. Whether it is building highly visible and political projects, constructing roads that are national landmarks, or providing critical access on low-volume transportation facilities, FLH is at the forefront of consistently delivering distinct and sound engineering projects.

FLH consists of a Headquarters Office (HFL) in Washington, District of Columbia and three field Division Offices: Eastern Federal Lands (EFL) in Sterling, Virginia; Central Federal Lands (CFL) in Lakewood, Colorado; and Western Federal Lands (WFL) in Vancouver, Washington.

Federal Lands' role is categorized into two areas: Program Administration and Project Delivery. Program Administration addresses stewardship and oversight for our resources; as well as management and oversight of the program including responsibility for the Highway Trust Fund, totaling over $1 billion per year. Project Delivery is the development of projects from scoping and preliminary design through the construction of a project. Within those areas, we support Innovation & Technology Deployment and Professional Development that comprise FLH's four business lines. All of this comes together to support the delivery of the program.

FLH is uniquely enabled and entrusted to administer many different types of funds to facilitate transportation improvements for our Partners.

Now in its 34th year, the program and our role continue to expand to include more Federal partners and road networks. FLH expertise and credibility has grown to deliver a wider variety of transportation projects and improvements nationwide.

We are responsible for:

- ***Transportation Planning***
- ***Program Administration***
- ***Project Management***
- ***Environmental Compliance***
- ***Preparation of Plans, Specifications and Estimates (PS&E)***
- ***Contract Administration***
- ***Construction Supervision and Inspection***
- ***Technical Assistance to the Highway Community***

Our engineering and technical expertise includes:

- ***Highway and Bridge Design***
- ***Survey and Mapping***
- ***Hydraulics***
- ***Geotechnical***
- ***Traffic***
- ***Safety***
- ***Intelligent Transportation Systems***
- ***Design Visualization***
- ***Materials***
- ***Consultant and Construction Contract Acquisition***
- ***Road and Bridge Inventory and Inspection***
- ***Asset Management***

We employ practices and techniques of the FHWA Every Day Counts Innovations (EDC), designed to shorten project delivery, enhance durability and safety, improve environmental sustainability and increase efficiency through technology and collaboration in our daily business.

Federal Lands and Tribal Transportation Program (FLTTP)

The FLTTP established under the Moving Ahead for Progress in the 21st Century Act (MAP-21) authorizes annual funding through three primary programs: the Federal Lands Access Program (FLAP), the Federal Lands Transportation Program (FLTP), and the Tribal Transportation Program (TTP). Through these programs, FLH works with numerous Federal agencies and Indian Tribes as well as State and Territorial partners to deliver projects.

Federal Lands Access Program (FLAP)

The FLAP provides flexibility for a wide range of transportation projects in the 50 States, the District of Columbia, and Puerto Rico. FLAP was established to improve state and county transportation facilities that provide access to high-use recreation sites and economic generators within Federal lands.

Federal Lands Transportation Program (FLTP)

The FLTP, authorized at $335 million in FY 2016, provides funding for the management and upkeep of approximately 50,000 miles of federal public roads and other assets comprising partners' Federal lands transportation facility inventory. The program provides funding to the NPS, FS, FWS, BLM, BOR, USACE, and eligible independent federal agencies (IFA). To date, the Presidio Trust Corporation is the sole IFA to be included in the FLTP. The Presidio will begin receiving funds in 2017. Of the three programs that comprise the FLTTP, the FLTP incorporates performance based management principles outlined in MAP-21 and reinforced under the Fixing America's Surface Transportation (FAST) Act. The FLTP places emphases on performance goals defined by the Secretary of Transportation and FLMA(s) and is intended to target funds toward multi-modal transportation facilities that access high use recreation destinations and federal economic generators within the federal estate.

Nationally Significant Federal Lands and Tribal Transportation Projects

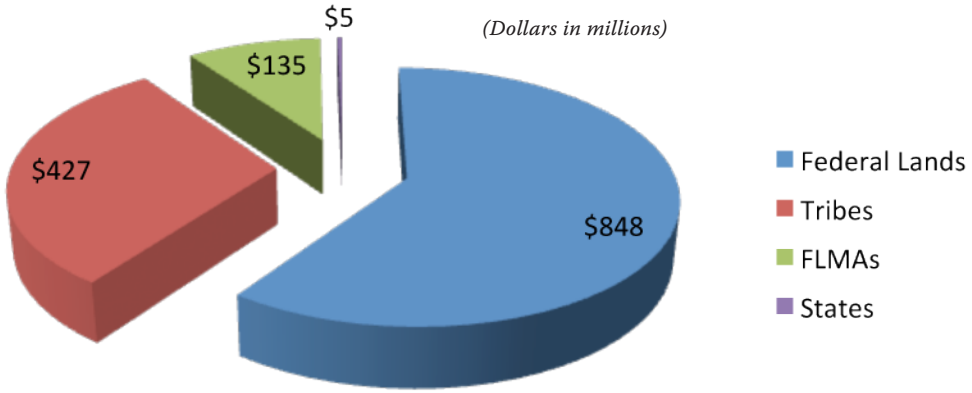
The recently approved FAST Act, included a new program entitled "Nationally Significant Federal Lands and Tribal Transportation Projects" which is intended to provide a reliable source of funding for major, high cost projects that typically cannot be funded with FLTP resources due to the scope and expense of the project. This program is funded through the General Fund and to date has not received an appropriation. In 2016, FLH developed program guidance in the event this program is funded by Congress to ensure we are positioned to deliver it in a timely manner.

Sand Creek Bridge replacement project in Crook County, Wyoming. FLAP Project consisting of removal and replacement of 6 bridges. The new bridges are precast concrete structures supported by GRS abutments or micro piles.

Overall Funds Obligated

In 2016, $1.41 billion in Federal funds were obligated by Federal Lands and its partners. Of this amount, $848 million was obligated at our Division Offices, with $656 million of this amount being in construction contracts, a one year record for the Office of Federal Lands. Another $427 million was delivered by Federally Recognized Indian Tribes through the BIA and FHWA. The remaining $140 million was transferred to our partners at various FLMAs and State Departments of Transportation (DOTs) for use on their projects and in administration of the Federal Lands Programs.

Program Funds Obligated by Executing Agent



FLAP/FLTP Loan and Borrow Agreements

FLAP lended over $30 million to FLTP to advance multiple projects. Loan/Borrow transactions increased leverage between programs, helping our partners move projects up during FY 2016.

Whitney Portal Road, California
Successfully completed FLAP project maintained by Inyo County, this road lies primarily on federal lands including BLM and Inyo National Forest (see page 15)

MAP-21 FY 2016 PROGRAM FUNDING

$300 million FLTP
$250 million FLAP
$450 million TTP

PROGRAM DELIVERY SUCCESS

93.4%
of the MAP-21 FY 2016 Programs were expended

887
Lane Miles (Completed Construction)

1,300
Lane Miles (Awarded)

76
Bridges (Completed Construction)

73
Bridges (Awarded)

Tribal Transportation Program (TTP)

Success in the Program

The TTP in 2016

The TTP, authorized at $465 million in FY 2016, provides funds to the 567 federally recognized Tribes to improve the transportation systems that are located within or provide access to Indian Country. These roads, bridges, and transit systems most often provide basic access to community services and help to enhance the quality of life of Tribal members.

Federal Lands co-administers the TTP with the BIA and is responsible for the primary stewardship and oversight of program funds. Approximately 130 of the Tribal governments operate their TTP directly through Program Funding Agreements with FHWA.

The Tribal Safety Funding set-aside provided approximately $9 million in funding to 74 Tribes for 77 safety-related projects. The Tribal Bridge Program set-aside will be $13.95 million for the design and/or construction of bridge projects in Indian Country. Technical assistance and capacity building continued to be of primary importance for the Office of Tribal Transportation. In collaboration with the Tribes and FLMAs, various workshops and training sessions aimed at Tribal Transportation issues and opportunities, including policy, planning, funding, and technical training took place throughout the year. Overall FLH's commitment to improve the outreach and delivery of the TTP has resulted in a program that is making a difference to the Tribal communities.

New Memorandum of Agreement between the Wampanoag Tribe of Gay Head (Aquinnah) (WTGHA) and the Woods Hole, Martha's Vineyard and Nantucket Steamship Authority

The Woods Hole, Martha's Vineyard and Nantucket Steamship Authority, referred to as The Steamship Authority, is the statutory regulatory body for all ferry operations to and from the islands from the Massachusetts mainland, as well as being an operator of ferry service from the mainland Cape Cod to the islands of Martha's Vineyard and Nantucket, and the only ferry operator to carry automobiles to the island. The Authority also operates several freight vessels, thus serving as the main link for shipping any commercial goods to Martha's Vineyard and Nantucket that are not transported by air.

The Steamship Authority and the Wampanoag Tribe of Gay Head (Aquinnah) agreed to a memorandum of understanding under which the tribe will initially transfer $200,000 in federal Tribal Transportation Funds (TTF) to the boatline for operation and maintenance expenses. In return, enrolled and eligible tribal members will receive a 20% discount on passenger and auto fares. Once the $200,000 threshold has been reached, the program will be re-evaluated and a determination will be made about adding additional TTP funds.

Steamship Authority General Manager, Wayne Lamson (left) and Wampanoag Tribe of Gay Head (Aquinnah) Tribal Council Chairman, Tobias Vanderhoop sign the agreement providing funding and other resources to improve the operation and maintenance of the Steamship Authority fleet, and reduce the cost of ferry transit services, providing Tribal members with greater access to basic community services on the Massachusetts mainland.

Federal Lands hosted the TTP Oklahoma/Eastern Region Tribal Workshop in October

Representatives from the FHWA Federal Lands, BIA, Department of Interior Division of Energy and Mineral Development, Oklahoma DOT, Chickasaw Nation, Citizen Potawatomi Nation, Eastern Band of Cherokee Nation, Miami Nation, Osage Nation, Pawnee Nation, Seneca Nation, Ramah Navajo, Muskogee Creek Nation and Wampanoag Tribe of Gay Head (Aquinnah) were in attendance.

The three-day workshop provided the opportunity for tribal members, officials and FHWA program personnel to discuss agreement processes and ongoing tribal concerns and issues. Technical training included, gravel road inspections, Long Range Transportation Plan updates and costs, and review of legislation. The goal was to not only strengthen technical knowledge, but relationships, to provide maximum benefit for the tribal communities served by the TTP Program.

Participants expressed feedback on the success of the workshop by sharing that gathering together to see what other tribes are accomplishing, is an inspiration to all, and that the time spent with their partners and presenters was invaluable.

Workshop participants receive instruction from Federal Lands Pavement and Materials Technician on completing an onsite pavement assessment

Federal Lands Technology & Innovation Specialist provides practical instruction on inspection of gravel roads

Tribal Transportation Program (TTP)

Successfully Completed Projects under TTP

Alakanuk Community Streets Improvements Project, Alaska

Funded by TTP and TIGER funds, this project in the remote village of Alakanuk, Alaska, is situated on flat terrain next to the Yukon River that is extremely flood-prone. A major component of the project was to raise the grade of the streets and install riprap shoulder protection where needed, to help protect against the impact of future flooding. Further reconstruction included excavation and installation of embankment, culverts, boardwalk transition connections, and the addition of crushed aggregate surfacing, dust control palliative, revegetation and signage. The Association of Village Council Presidents (AVCP) force account crews performed virtually all of the construction work. Construction management was provided by consultants, contracted by AVCP.

This project benefits all forms of transportation in this community: vehicles, ATV's, buses and pedestrians through improved dust control, and improved access to boat landings and storage areas. The safety improvements bring these roadways up to engineered standards providing not only safe but reliable transportation throughout the village. The improvements will also reduce future maintenance costs for this community.

School children and other local residents make use of their newly reconstructed road.

AVCP administration staff and the TTP tribal coordinator gathered for a final project review.

Finished roadbed showing riprap fillslope protection and (left) view of raised road and riprap culvert inlet.

All images courtesy of Mike McIntyre, AVCP Photographer

Dust Control Pilot Project, Ruby, Alaska

The Dust Control Pilot Project in Ruby, Alaska, is a FHWA Coordinated Transportation Implementation Program (CTIP) project governed by a Program Agreement between FHWA and the Native Village of Ruby. The Agreement authorized the Tribe to manage and administer the Pilot program through the FHWA TTP. This Pilot addresses a significant problem for remote Alaska communities, and the outcome is a game changer for Tribal communities.

Dust has been identified as a major health and safety issue in remote villages. The problem with delivering dust control measures to these remote locations in the past has been that the heavy trucks and equipment cannot access remote locations which are off the roadway system, or which can't be reached by river barge traffic. Through this pilot program, we have demonstrated that Tribes can take control of their own program, at a relatively low cost, by using light weight equipment flown into the village. Smaller scale equipment enables these communities to deliver dust control projects themselves.

The FHWA Federal Lands Highway Tribal Transportation Program, working with partners like the Environmental Protection Agency (EPA) and the University of Alaska/Fairbanks, is a leader in the implementation of existing technologies through innovative methods. In this case, it was as simple as using air transport of light weight equipment to access remote locations, greatly improving the quality of life and health, for communities living in remote Alaska.

Equipment being off loaded from small cargo plane

Palliatives being applied to road surface

Treated roadway

Ruby Road Crew Staff pose with their FHWA TTP Tribal Coordinator (far right)

Multi-use Pathway, Bryce Canyon National Park, Utah

On May 19, 2016, FLH along with representatives from Bryce Canyon City, FS, NPS, Garfield County, and local community supporters celebrated a ribbon cutting for the 5 mile accessible shared use pathway. This project ties into the Utah Scenic Byway Highway 12 bike path in Bryce Canyon City, Utah and travels through a portion of Dixie National Forest before ending at Inspiration Point in Bryce Canyon National Park.

Federal Lands designed the multi-use pathway, administered the contract, and oversaw the construction. The FLTP and Utah FLAP funded the work on this $3.2 million project.

Beckwourth-Genesee Road, Plumas National Forest, California

The Beckwourth-Genesee Road project was a two lane 3R-4R asphalt pavement project that extends north for 9.7 miles from CA Highway 70 through the town of Beckwourth and Plumas National Forest. Approximately one mile of the roadway was constructed on new alignment, while the remaining existing alignment was brought up to current standards (10 foot lanes, two foot paved shoulders). The northernmost 4.4 miles consisted of gravel surface. The project took nearly two full construction seasons to complete.

Innovations incorporated into the project included a GRS bridge, warm-mix asphalt, and use of Intelligent Compaction. FLH provided on-site training to contractor and owner personnel prior to construction of the GRS bridge, and deployment of Intelligent Compaction technology.

The $10.66 million project was funded through the FLAP, with local match funds provided via California toll credits. Partner agencies included Plumas County, Plumas National Forest, and the California State Fish & Game Department.

George Washington Memorial Parkway, Arlington County, Virginia

The Mount Vernon trail along the George Washington Memorial Parkway near Reagan National Airport passes under the airport exit ramp bridge in very close proximity to the travel lane. In the interest of improving safety for pedestrian and vehicular traffic, a guardwall with railing was installed to seperate pedestrians, and bikers from vehicular traffic. As there was little room to offset the wall footing, the guardwall was designed to build over the existing electric transmission line.

Street view

Trail view

After

Before

Rocky Mountain Greenway Refuge Access Trail, Colorado

On June 4, 2016, FLH celebrated a dedication and ribbon cutting event for the completion of the Refuge to Refuge Trail Project. This 7 mile stretch of trail connects Two Ponds National Wildlife Refuge in Arvada with the Westminster Hills Open Space. The Rocky Mountain Greenway Trail program is Colorado's response to President Obama's America's Great Outdoors Initiative to reconnect Americans with our nation's natural resources. The trail is intended to close gaps in existing trail networks and develop new trails where needed to ultimately create an 80 mile long continuous route toward Rocky Mountain National Park that will pass through more than 10 municipalities, 6 counties and 4 federal land areas.

This trail segment is one piece of a much larger vision initiated in 2012 when Colorado Governor Hickenlooper and Interior Secretary Salazar introduced the Rocky Mountain Greenway as a regional trail system to provide transportation links between Denver area communities and better connect residents to open spaces, parks and the metro area's three national wildlife refuges.

Guanella Pass Road Reconstruction Project, Colorado

The 22 mile Guanella Pass Road Reconstruction Project, a FLTP and Colorado FLAP funded project celebrated completion on June 24, 2016 with a ribbon cutting. The project ties Clear Creek and Park County together by a Scenic Byway. The Guanella Pass roadway travels through a portion of Arapaho and Roosevelt National Forest. FLH designed this Scenic Byway pathway, administered the contract, and oversaw the construction. Total construction cost for the roadway was $80 million encompassing 3 projects beginning in 2004.

Red Rock Canyon National Conservation Area

Red Rock Scenic Drive, Nevada

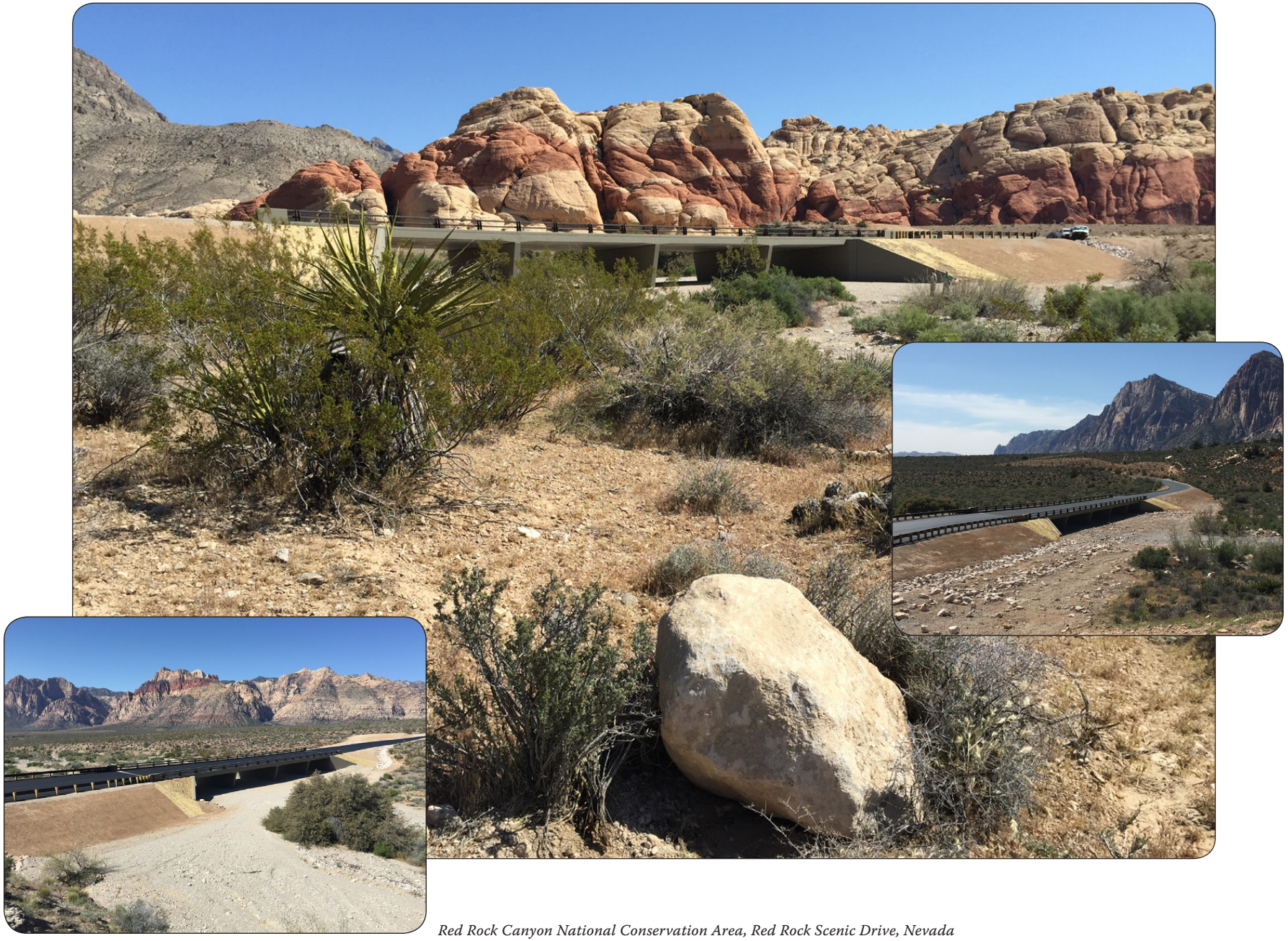
A 2005 Resource Management Plan for Red Rock Canyon National Conservation Area (RRCNCA) identified the need for transportation improvements. Since 1982, visitation to the area had increased fourfold. This led to increased roadway deterioration, disturbance to sensitive roadside vegetation, unsafe pedestrian-vehicle interaction, and stranded vehicles during flash flood events. The original roadway was created with Low Water Crossings (LWC) at two major washes along Scenic Loop Drive that were subject to alluvial fan debris flows during high precipitation events. Such precipitation events are a seasonal occurrence in the Nevada desert and Scenic Loop Drive was subject to repeated closures as the LWC became filled with sediment and boulders during flash floods. There was high potential for travelers to become stranded.

As visitation continued to increase, Scenic Loop Drive became the de facto overflow parking during peak visitation as the twelve existing parking areas were undersized and poorly striped/signed. Unauthorized trails and vegetative disturbance became more common and increasingly disruptive. To address the transportation needs, Federal Lands, in partnership with the BLM proposed a multi-phased suite of improvements utilizing innovative delivery and design methods. Phases of the project included the same major elements of purpose & need, (1) improving traffic flow and safety for vehicles, bicyclists, equestrians, and pedestrians (2) reducing operations and maintenance costs (3) protecting and conserving the resources, and (4) improving visitor experience in the RRCNCA.

In addition to working within the extensive scope and array of improvements in an environmentally sensitive area, the project faced the challenge of an accelerated schedule in order to maximize federal funds before their expiration date. Four Environmental Assessments were completed in the span of 15 months, including Finding of No Significant Impacts\Records of Decision for project phases and their associated geotechnical clearances.

The RRCNCA project has utilized the streamlining of the EDC initiative by pairing BLM, FHWA, and consultant environmental staff. The collaborative effort resulted in a streamlined review process in the design and NEPA portions of the project. The core values of the area, including protecting the natural resources while providing an excellent visitor experience, were preserved while maintaining an accelerated project delivery schedule.

The completed project improves the safety and mobility of the travelling public in every area of this section of the Red Rock Canyon National Conservation Area.



Red Rock Canyon National Conservation Area, Red Rock Scenic Drive, Nevada

Steady Progress on US Route 1, Fairfax County, Virginia

The Department of Defense, Office of Economic Adjustment, provided a $180 million grant to Virginia Department of Transportation (VDOT) and Fairfax County in 2012, and requested that Federal Lands deliver this politically sensitive, highly visible, and complex project on their behalf. The project's scope and intent is to provide improved access to the new Fort Belvoir Hospital via US Route 1. The project will provide 6 lanes and reserved median space for future transit from Telegraph Road to Mount Vernon Highway. A Design-Build contract was awarded in April of 2013, with construction starting in the summer of 2014. A majority of the 3.68 miles of roadway reconstruction, new alignments, signalized intersections, and drainage improvements were completed and open to traffic in December 2016. Final asphalt surfacing and remaining work is scheduled to be completed June 1, 2017.

Hillside Pedestrian Bridge, Cuyahoga Valley National Park, Ohio

The project consisted of the rehabilitation of the Hillside Pedestrian Bridge in Cuyahoga Valley National Park, Ohio. The bridge crosses the Cuyahoga River, and provides pedestrian access to the Canal Exploration Center via an excursion offered by the Cuyahoga Valley Scenic Railroad.

A 2015 bridge inspection determined that the floor system of the bridge was in very poor condition. The deterioration was so severe that the bridge was immediately closed for public safety. Closure of the bridge eliminated visitor access to the Canal Exploration Center and the railroad.

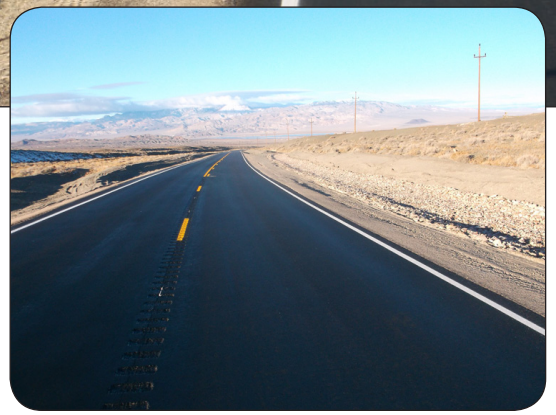
This would have a big impact on visitors' experience to the Park. NPS sought FLH assistance in completing a fast track project to repair the damage. In order to minimize the disruption to visitor services, the NPS requested that the bridge be reopened by March 2016 to coincide with the resumption of rail service after the winter shutdown. The construction contract was awarded within three months. Despite harsh winter conditions, construction was substantially completed and the bridge was opened to the public two days ahead of the Park's deadline.

Silver Peak Road, Nevada

This 3R/4R project started at the intersection of Silver Peak Road and US Route 95 in Esmeralda County, Nevada and proceeded west 16.5 miles along Silver Peak Road towards the only active lithium mine in North America and the town of Silver Peak.

Representatives from the County and the BLM Tonopah Field Office were in attendance at the Final Inspection and expressed their appreciation for the project and the many safety improvements made. Consistent roadway width, roadway surface, delineators, rumble strips, pavement markings and significant drainage improvements dramatically improve the safety of this route. The improvements also help prevent future flash floods from overtopping the roadway, all of which will significantly reduce the County's maintenance. The County produced aggregate base as an in-kind match contribution which allowed this rural remote county with a total population of 832 people to satisfy the Nevada FLAP match requirements in addition to some cash contribution.

BLM and the County were very complimentary of the working relationship on this project.



Harpers Ferry National Historical Park, West Virginia

The project in and around the town of Harpers Ferry focused on pavement preservation of existing roadways and parking areas. The work included addressing Americans with Disabilities Act (ADA) requirements, asphalt pavement milling, full-depth pavement patching, crack cleaning and sealing, asphalt concrete pavement chip sealing and overlay.

Whitney Portal Road, California

Whitney Portal Road is a two-lane paved major collector roadway accessing Whitney Portal Trailhead in the Inyo National Forest and the Alabama Hills Recreation Area of the BLM. The project is a 3R plus asphalt rehabilitation project, with 4R segments, that extends 11.2 miles westward from the town of Lone Pine, California to the Whitney Portal Recreational Area. The road is primarily on federal lands including BLM and Inyo National Forest and is maintained by Inyo County. Improvements consisted of widening along portions of the route to accommodate a shared-use shoulder, excavation and embankment work to fit the proposed template on the existing available roadway width, with sections of realignment, and full depth reclamation of the entire length. Project challenges included: maintaining access throughout construction while fitting the reconstructed roadway on a narrow footprint in steep, winding mountainous terrain; minimizing rockfall; and implementation of carbon fiber reinforced polymer strips to retrofit/strengthen an existing bridge deck. Ground penetrating radar technology was used on an existing bridge to confirm deck overhang reinforcement, this provided additional details on deck and rail modifications for design. The $10.7 million project was funded through the FLAP, with local match funds provided via California toll credits. Partner agencies included Inyo County, Inyo National Forest, and the BLM.

Kutz Bridge, Independance Avenue, Washington, DC

The Kutz Bridge located within West Potomac Park carries Independence Avenue over the tidal basin. This bridge is located on one of the main routes into Washington, D.C. and is heavily used by commuters, visitors, tour buses and trams. Vehicle and pedestrian usage of this bridge has risen significantly in the last five years. The purpose of the project was to rehabilitate the structure to address maintenance issues and to widen the bridge's south sidewalk to meet ADA requirements and to increase safety for pedestrians and bicyclists using the bridge.

The Kutz Bridge, first known as the Independence Avenue Bridge, was constructed in 1942 and completed in 1943 and is listed on the National Register as a contributing element of the East & West Potomac Parks Historic District. The original guardrails were added in the 1960's.

The work included asphalt pavement milling, structural concrete, concrete deck repair, pier and abutment repairs, cleaning and painting of the bridge rail, reinforcing steel, Superpave asphalt concrete pavement overlay, repointing stone masonry pier and abutments, removal and installation of traffic railing, south sidewalk widening, and other miscellaneous work. With continued maintenance, this project results in a useful life expectancy of approximately 25-30 more years for this bridge.

Pleasant Valley Road Relocation

Lost Trail National Wildlife Refuge, Montana

In 1892 the Great Northern Railroad began its run through Pleasant Valley. With the steepness and curves typical to the area the railroad later decided to build a different track from Whitefish, Montana, closing the Pleasant Valley line permanently in October 1904. The track then became a road. The FWS saw this project as an opportunity to restore the land to its natural condition.

In order to build the railroad track, 19th century railroad workers dug two borrow ditches along each side of the track, elevating the track 5-6 feet above the wetland. This construction artificially constrained Pleasant Valley Creek, intercepting the flow of water and draining the wetlands adjacent to the railroad grade. Federal Lands project specialists worked with Lost Trail National Wildlife Refuge and developed a plan to restore the wetlands which included removing the railroad grade and relocating the refuge road outside of the wetland.

The project not only removed the railroad grade, but also relocated the road, and installed several AOPs (Aquatic Organism Passage culverts). Thereby not only restoring valuable wetlands but also keeping the land publicly accessible.

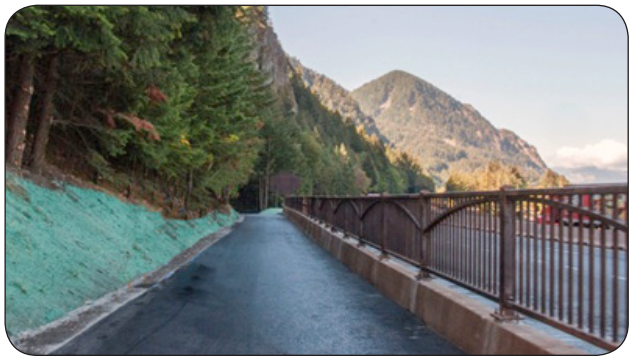
Before (left), and after (right) views of the relocated refuge road looking east (above) and west (below)

Historic Columbia River Highway State Trail, Lindsey Creek to Starvation Creek Trail, Oregon

Originally built in the early 20th century, the Historic Columbia River Highway created a scenic byway through the Columbia River Gorge, now part of the Columbia River Gorge National Scenic Area. With the construction of Interstate 84, the old highway became fragmented and broken. The dream to restore the highway for recreational users began in 1987 when the Oregon DOT was charged to work with the Oregon Parks and Recreation Department, the State Historic Preservation Office and Travel Oregon to reconnect and restore the trail.

In 2016, working in cooperation with the Forest Service, Oregon DOT and Oregon Department of Parks and Recreation, Federal Lands completed 1.2 of the remaining 10 miles with the construction of the Lindsey Creek to Starvation Creek Trail.

A celebration of this historic event occurred on Saturday, September 24, 2016. Officials from all cooperating agencies, members of the public, and Senator Peter DeFazio joined the festivities. Federal Lands participated in the Self-Guided Tour, stationed at the overlook to Hole-in-the-Wall Falls, one of three newly accessible waterfalls.



Steinwehr Avenue Road Diet, Gettysburg, Pennsylvania

Steinwehr Avenue, the historic battle roadway through the Borough of Gettysburg was completed in 2015 and commemorated with a ribbon cutting ceremony in May 2016. This revitalization has greatly impacted the economic development of the Borough. The project applied the principles of a "road diet", a safety-focused EDC innovation. The project resulted in safer and more pleasant accommodation for all users with improvement in on-street parking, lighting, streetscape furniture, landscaping, pedestrian sidewalks, and separated bicycle lanes. Touted as a major success that has resulted in the development of many new businesses and rejuvenation of long standing fixtures in the community.

Representatives from the Borough, the Business Improvement District, the NPS, FLH, Pennsylvania DOT and pedestrian groups participated in the ceremonial ribbon cutting and a tour of the project area

View of Steinwehr Avenue, looking south toward the Gettysburg National Military Park Entrance on the left

"The Steinwehr project has become an inspiration for the rest of the main arteries through town."

— President of Main Street Gettysburg.org

Pelican Creek Bridge Seismic Site Response Study, Fishing Bridge to East Entrance Road, Yellowstone National Park, Wyoming

Pelican Creek is a low gradient meandering stream that flows into the north end of Yellowstone Lake over a natural floodplain on the order of 2,000 feet wide. A causeway currently constricts the creek to a relatively narrow 140 foot wide bridge opening, and the existing bridge is deteriorating. Removal of the causeway fill and construction of a replacement bridge of approximately 1,500 feet in length will restore the wetland flows across this sensitive area. The bridge will be supported on 8 piers with a total of 40 steel pipe piles driven to over 100 feet in depth.

Yellowstone National Park is a seismically active area, and the proximity of the new bridge to active faults resulted in relatively high engineering code-based predicted earthquake loads on the bridge and pile-supported substructures. In addition, the surrounding loosely deposited sand and silt sediments are at risk of liquefaction and lateral flow from earthquake shaking, resulting in increased pile sizes and depths to resist the additional liquefaction-induced settlements and ground displacements at the abutments.

To fine-tune the seismic design, FLH geotechnical engineers performed special non-linear effective stress computer modeling of the ground response in conjunction with laboratory liquefaction testing of intact soil samples obtained from the site. The study produced a significantly lower predicted site response from earthquake shaking. The lower predicted earthquake loads will result in a significant cost savings to both the foundation system and superstructure.

Turner Fairbank Intersection Control For Cooperative Vehicle and Pedestrian Movement, McLean, Virginia

FLH was the partner of choice for the Turner Fairbank Highway Research Center (TFHRC) to design and construct a new testbed to study vehicle and pedestrian movements at intersections. FLH's expertise provided the flexibility to incorporate multiple research needs while meeting the current design and construction standards. This project was both an example of FLH's project delivery and technical assistance expertise.

The main research need was met by constructing a new signalized intersection and upgrading an existing signalized intersection to study vehicle and pedestrian movement. The intersections were equipped with the latest state-of-the-practice technology that allows users to communicate with IT infrastructure. This research test bed will provide valuable insight to improve the safety of pedestrians and autonomous vehicles of tomorrow, while also actively being used by staff at TFHRC in their daily commute to work.

Supplementary research goals were also incorporated into the project to improve the use of the two most commonly used materials in everyday roadway construction — Portland cement concrete and asphalt concrete pavements.

The project incorporated experimentation with alternative materials that significantly reduce CO2 emissions and the amount of water used to produce a more durable concrete as compared to ordinary Portland Cement Concrete. This initiative aims to reduce our environmental footprint by improving concrete, the most common construction material that is responsible for a sizeable percentage of the total global carbon emission.

The project further aims to improve yet another widely used roadway construction material with significant environmental and economic impact, asphalt concrete. New, full-scale test lanes were constructed at the TFHRC Pavement Testing Facility to study the effects of variable density on pavement performance. This research will help determine how pavement construction can be improved to make asphalt pavements more durable and longer lasting.

FLH also incorporated tested and proven technology that emerged from past research at TFHRC consisting of Geosynthetic-Reinforced Soil. This technology was used to solve embankment slope instability issues at the new intersection.

The new roadway (Reid Circle), built to redirect traffic to the newly constructed signalized intersection is equipped with the latest technology Advanced Transportation Controller that supports a wide-range of Intelligent Transportation Systems applications for complex intersections.

Geosynthetic-Reinforced Soil with Concrete Masonry Units used to build embankment

New pavement at the Asphalt Testing Facility, TFHRC, McLean, Virginia

Views of the new intersection constructed with alternative construction materials

Glenn Highway, Route 1, Chickaloon Bridge, Alaska

The Glenn Highway Chickaloon Bridge Project is the first constructed, of several planned projects along the Glenn Highway (Alaska Route 1) east of Palmer, Alaska between mileposts 66.5 and 92.0. The project was delivered under a compressed schedule per request of the Alaska Department of Transportation and Public Facilities (AKDOT & PF), in order to move public traffic to the new bridge as the existing structure was functionally obsolete and past its repairable service life. This section of the Glenn Highway is classified as a rural principle arterial-interstate and is a significant transportation and freight corridor, providing access to interior Alaska, Canada, and the Continental U.S. as well as providing a connection between the Anchorage/Wasilla area and Glennallen to Valdez.

The AKDOT & PF requested, and the FHWA Alaska Division Office concurred, that WFL would lead the NEPA compliance and project delivery activities. A previously completed environmental assessment of project impacts was reevaluated and FLH collected topographic survey data, developed hydraulic, and geotechnical, solicited the contract, and administered the project construction. For the highway and bridge designs WFL was assisted by EFL. Working closely with the AKDOT & PF, the Chickaloon Native Village, and various state agencies project compliance was completed and safe and functional access was restored via this initial project.

Naukati Road Reconstruction, Tongass National Forest, Alaska

Installation/Conversion of Aquatic Organism Passages

For aquatic life such as fish and salamanders, streams, rivers, and lakes are their natural home that are also used for travel. Essentially they are the "highways" in their life. Historically, when roads were built and culverts installed, little consideration was given to the passage of aquatic life. Now, when roads are repaired and replaced, fish passage becomes a key component to the design and construction of a road repair or replacement project. An example of this is the Naukati Road project on Prince of Wales Island, Alaska.

Imagine yourself as a fish who needs to get across a roadway through a culvert. If the culvert is too small you might not be able to fit to get across the road. If the culvert is too high or you don't have a big enough pool to make a "running start" so to speak at the jump, you might not be able to jump into the culvert. Even if you had the muscles and the "running start" necessary to jump into the culvert, the water might be going too fast for you to swim past the culvert entrance and through the culvert. Maybe the culvert accumulated debris, trash or a lot of dirt at its entrance/exit. This may make you decide not to try swimming through the culvert. If the culvert is too long with no places to rest and/or hide or too dark, that might also make you think twice about entering the culvert. These are just some of the factors that designers face when replacing old culverts with AOPs.

Better culvert design creates better conditions for fish and other aquatic creatures to pass under roadways. Along the Naukati Road, four new AOPs were installed. These new structures will now allow Coho Salmon, Pink Salmon, Dolly Varden Char and Cutthroat Trout to safely pass underneath the paved roadway. These projects address the environment to improve roads both for general access, recreational use and as habitat.

The first of four installed on the project, this 108 inch AOP replaces a 36 inch culvert

Constructing a habitat

Interstate 564 Intermodal Connector Project, Norfolk Virginia

The I-564 Intermodal Connector Project is a $160 million critical investment for the Hampton Roads District of Virginia, with stakeholders consisting of VDOT, the US Navy, City of Norfolk, Virginia Port Authority, and Norfolk Southern Railroad.

This project was on the shelf for over 15 years while VDOT and the US Navy tried to come to agreements on construction alignments, easements, environmental impacts, and maintenance responsibilities. Within 1 year, the FLH Eastern Division was brought in and had a Memorandum of Agreement developed that the parties could sign, allocated funding that was set to expire, and awarded a Design-Build Contract shortly thereafter.

The project is on track to open access to the Virginia Port Authority's new TIGER funded gate by the end of 2017.

Fence posts for the Navy Security Perimeter Fence

Driving production pile in Pier 1A foundation for the Ramp C Flyover Bridge 602

I-564 Ramp C Flyover Bridge construction looking West to Hampton Boulevard Norfolk International Terminals North Gate, the Virginia Port Authority's largest terminal, Norfolk, Virginia

Red Dirt Bridge constructed in 1945 spans the Colorado River, the existing 200 foot long 5-span steel bridge (foreground) running parallel with a railroad bridge is undergoing replacement under the FLAP program. — Colorado River Road, Gypsum, Colorado

View of the original bridge.

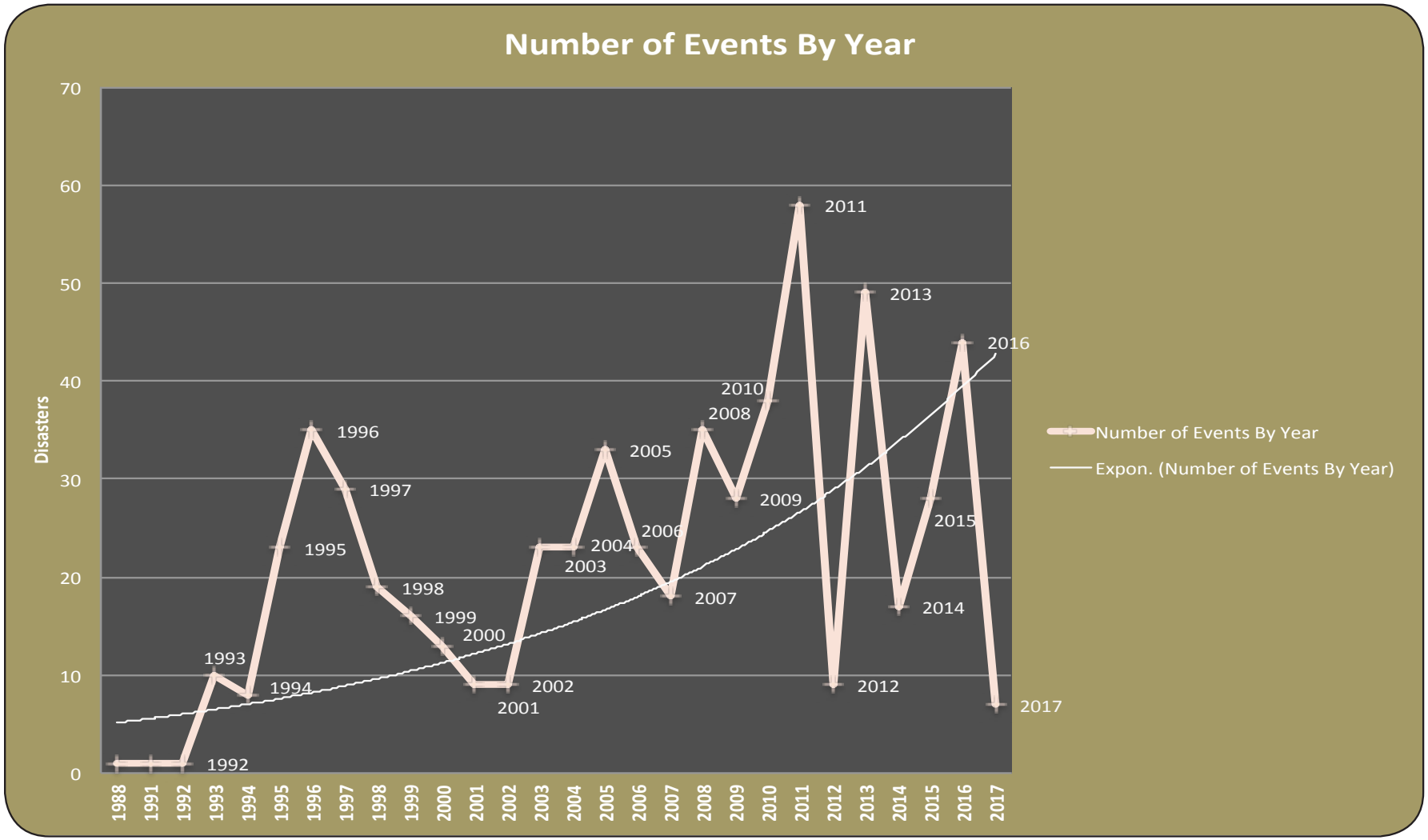
Replacement of the historic South Fork Smith River Bridge. Work continues through staged construction, under a CMGC contract. The main arch is undergoing reconstruction with the original bridge still in place and carrying traffic during construction. — Crescent City, California

Reconstruction and rehabilitation of Rock Creek Road included widening to accomodate shared use shoulders, (insets) this neccessitated use of rockery and MSE walls to accomodate widening. — Forest Highway 89, Inyo National Forest, California

Successful implementation of Context Sensitive Solutions to protect locally significant resources; (inset) Pull-off installed to alleviate removal of trees along the route — Rock Creek Road, Forest Highway 89, Inyo National Forest, California

Federal Lands and the ERFO Program

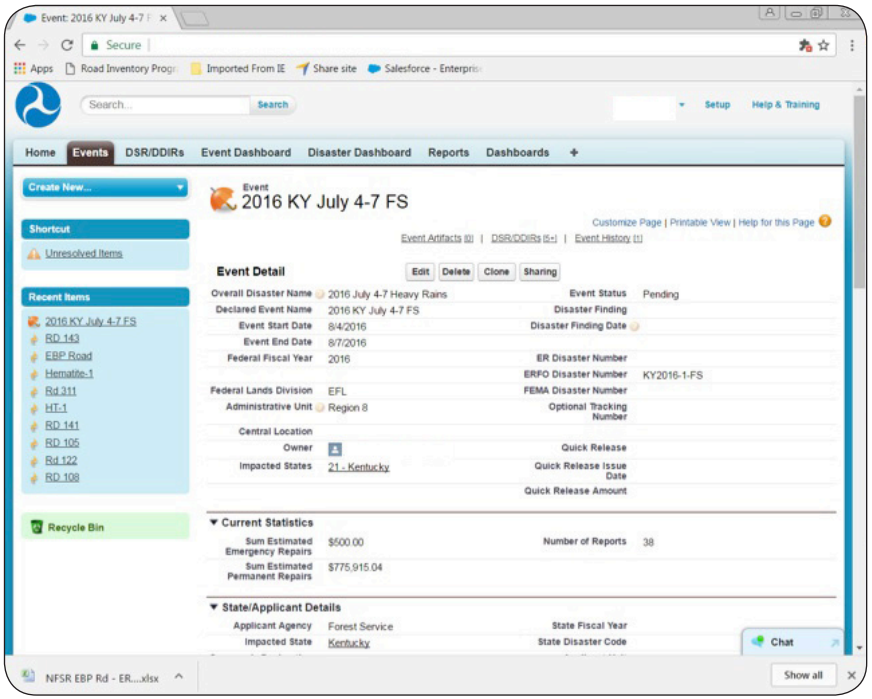
Nationally, the ERFO program registered 44 approved events in 2016. These events affected 6 Tribes, 12 Parks, 30 Forests, 22 Refuges, 5 Corps of Engineers Recreational Facilities and 6 BLM tracts. FLH responded to significant event frequency increases (25% or greater) in Alabama, Georgia, Mississippi, Louisiana, Texas and South Carolina. The total allocation for the ERFO program was $69.9 million, with $16.3 million allocated to the Federal Land Management Agencies and $53.6 million allocated to the FLH Division Offices.



2016 was the third highest in number of events on record

Mobile Solution for Assessment and Reporting (MSAR) pilot for Fed-aid and FLH

MSAR is a cloud based information system developed by FHWA for use by our partners to gather data in support of the Emergency Relief (ER) and ERFO Programs. It is an enterprise tool that enables the integration of mobile device technology, online forms, dashboard reporting, Geospatial tracking, offline map viewing & reporting, and corporate workflow. The technology is specifically targeted for mobile inspection teams needing an automated tool to create disaster inspection reports, view spatial data, plan inspection routes, provide real-time information to decision-makers, and efficiently enter and manage disaster data all in one place. MSAR can also be modified to add bridge inspection report and design scoping report data.



MSAR web portal provides a streamlined organized overview of the many impacts of a disaster

Example of damage site inspected by Forest Service personnel using MSAR — Trigg County, Kentucky

Assisting Federal Emergency Management Agency (FEMA)

In 2012 during a meeting in Northern Minnesota the Region 5 Director of FEMA was introduced to the ERFO program by the EFL ERFO Coordinator and the ERFO National Program Manager in an effort to respond to the needs of the Fond du lac Tribe. That meeting resulted in a new partnership and cooperation that has since been expanded to shared resources and information. This relationship has resulted in joint assessment efforts involving Engineers and Disaster Specialists from both agencies on both public and private land. The combination of expert technical and disaster management personnel has been utilized in South Carolina, Alabama and on Cherokee Tribal lands.

FLH also worked with the Office of the Secretary of Transportation Emergency Support Function Coordinator in a pilot to provide assistance to FEMA for the flooding disaster in South Carolina at the end of 2015. This pilot was approached in a corporate manner with all three FLH divisions engaged, the effort was led out of the Eastern Division. FEMA was grateful for our quick response and professional support. Lessons learned from the pilot were assessed, resulting in successful practices being incorporated into a long-term approach. This was quickly put into action in Alabama in January 2016 after a state of emergency was declared due to severe storms, tornadoes, and flooding.

Badwater Road, Death Valley National Park, California

Badwater Road over Jubilee Pass was re-opened to visitors and locals during a ceremonial ribbon cutting on August 12, 2016. Emergency reconstruction was required to restore access after severe storms and devastating flash floods exceeded a 500 year event and closed over 1000 miles of roads in October 2015. The project scope for Badwater Road included partial repair and debris removal for over 11 miles and full reconstruction of more than a half mile where the road was completely destroyed.

Federal Lands provided immediate disaster assessment and accelerated project delivery services including use of streamlined design processes, with Rapid Response Road Construction and Repair Multiple Award Task Order Contracts, and emergency consultation along with continual engagement with the NPS.

Reconstruction was completed using $1.6 million in funds provided by the ERFO program on behalf of the NPS. Badwater Road provides vitally important primary access to the south end of the park, as well as through access for neighboring communities and tribal members in an environmentally, historically, and culturally sensitive area. Close collaboration with partners has resulted in all but a few miles being reopened to the public. Death Valley National Park is an internationally renowned destination with more than a million visitors annually. This reconstruction project was a critical step in restoring the transportation system in the area, work continues on the accelerated delivery of several other major reconstruction projects in Death Valley National Park.

Badwater Road, Before

Badwater Road, After

Catwalk National Recreation Area Trail Reconstruction

Gila National Forest, New Mexico

The Catwalk National Recreation Trail was reopened to visitors during a ribbon cutting ceremony May 28, 2016, attended by field representatives of Senator Udall, Senator Heinrich, and Representative Pearce. The Catwalk was reconstructed on behalf of the Forest Service following devastating floods in September 2013. The trail, following the historic alignment of an 1880's mining pipeline, clings dramatically to the side of Whitewater Canyon while suspended above a creek. The Catwalk National Recreation Area is a vitally important economic generator for the Forest Service and the surrounding communities as an internationally renowned destination for recreation by tens of thousands of visitors annually. The reopening of the reconstructed Catwalk Trail signals to many locals and longtime visitors the beginning of revitalization for the region following several forest fires and floods.

This project was a success in a variety of ways. It was made possible due to new ERFO eligibility for the repair of damaged trail facilities, and represents one of the first and largest ERFO trail projects to be completed under MAP-21. The project leveraged the innovation and ingenuity of a design-build contract to quickly restore the distinctive suspended walkways and pedestrian trail bridges. The final design allowed for replacement of the destroyed facilities in a context sensitive manner that respected the historic, aesthetic, and environmental aspects of the area while providing ADA access for future generations of visitors. Construction was accelerated to ensure that the Catwalk Recreation Area would be fully open by the start of the 2016 summer season. The partnership and engagement between stakeholders and the local community was monumental throughout the restoration process.

Canarsie Pier Reconstruction, Gateway National Park, New York/New Jersey

Canarsie Pier located in Brooklyn, New York juts squarely into Jamaica Bay. The site has been popular for over 300 years as a location for fishing and recreation. In October 2013 the tidal surge from Hurricane Sandy submerged the pier and damaged many of the piers' assets. The loss of pavers and the subsidence of others, in addition to the loss of all site lighting, left the pier much less safe and usable for the local community. FLH worked through the ERFO program with the Gateway National Recreation Area and New York Harbor Parks to restore the pier, thus also restoring an essential community resource.

A popular fishing and recreational spot once again

Monongahela National Forest, West Virginia

ERFO Damage Assessments

FLH deployed 27 individuals for multiple weeks to assist the Forest Service in developing Damage Survey Reports related to rain emergency events in the Monongahela National Forest, West Virginia and the Chequamegon-Nicolet National Forest, Wisconsin. The teams inspected well over 140 damaged sites dispersed through different areas of the Forests. This effort required extensive collaboration between the ERFO Team and multiple FLH disciplines.

Federal Lands teams faced many challenges as part of this effort. In Monongahela National Forest, damaged sites were dispersed in an extensive geographical area that covered almost 1/3 of the land of the state!

In Chequamegon-Nicolet teams had to complete assessments late in the summer when ticks and mosquitoes are an unfortunate – and abundant – reality of the job. Some of the roads were nearly impassable with any kind of vehicle; engineers had to walk through arduous terrain for miles to get to damaged sites.

Total estimated cost for restoring roadways back to pre-disaster condition is estimated over $20 million for the Monongahela and over $10 million for the Chequamegon-Nicolet.

Damage along Williams River Road — Forest Service Road 86, Monongahela National Forest, West Virginia

Chequamegon-Nicolet National Forest, Wisconsin

ERFO Damage Assessments

Views of road and culvert damage — Forest Service Road 194, Chequamegon-Nicolet National Forest

Puerto Rico Rt. 191 near El Yunque National Forest, Puerto Rico

Damaged Roadway embankment

Gabion Wall Construction

Completed Wall

Completed Roadway

Road Inventory Program (RIP)

Through 2015, the Road Inventory Program (RIP) sections managed the nationwide program and provided services for the NPS and the FWS separately from different field offices. With the use of state-of-the-art equipment and engineering expertise, this program documents information such as the condition of paved and unpaved roads, geometrics, and drainage of existing Federal Lands' roads. The data collected using the automated collection vehicle also includes a video log for interagency staff and managers to define and support decisions for improvement projects. This information supports the FLH Performance Management Team through developing route identification standards and condition ratings for paved and unpaved roads.

With the passage of MAP-21 and FAST, the RIP became performance-based and additional Federal partners were added, resulting in a need for additional capacity. During 2016, FLH restructured RIP into one national FLH Team, managed from the Eastern Division, to be more responsive and consistent with the technical assistance needs and expectations of our FLMA partners. The goal of the RIP consolidated team is to promote the sharing of resources across multiple partner data collection efforts, have more flexibility to address immediate needs and changing priorities, and save travel costs. With the nationally consolidated FLH Team, the RIP data collection efforts will be developed to realize efficiencies across partners.

Data collection — East Entrance Road near Sylvan Pass, Yellowstone National Park, Wyoming

Verification of GPS and pavement condition ratings — Lamar Valley, Yellowstone National Park, Wyoming

FLH and FWS staff undergo training on rating road conditions using an iPad application rating system during the 2016 FWS Regional Transportation Coordinator meeting — Santa Ana National Wildlife Refuge, Texas

Bridge Inspection Program (BIP)

The Bridge Inspection Program is responsible for the safety inspection and structural rating of structures owned by the National Park Service and various other Federal agencies in accordance with the National Bridge Inspection Standards (NBIS).

A total of 1,044 NBI structures were inspected and 1,163 inspection reports were completed in the past year. In addition, approximately 600 load ratings and 58 scour evaluations were performed. The Bridge Inspection Program also finalized preparations for the inspection of highway tunnels in accordance with the new National Tunnel Inspection Standards (NTIS).

During this years' inspection cycle in the Western states, the team was assisted by bridge engineers from several local Federal-aid offices.

Traffic control during inspections is not always effective with the locals! — image captured from inside the "Snooper" inspection vehicle — Yellowstone River Bridge, Wyoming

BIP Team coordinates last minute details in preparation for fracture critical inspection of the Gardner River Bridge

View of the valley below

Gardner River Bridge — Yellowstone National Park, Wyoming

Big Thompson River Bridge — Rocky Mountain National Park, Colorado

Many Glacier Road, Glacier National Park, Montana

Remote Geotechnical Monitoring — Landslide Instrumentation

Many Glacier Road provides access into the east side of Glacier National Park and most of the road follows the shoreline of Sherburne Reservoir. The road crosses a landslide complex that has damaged nearly three miles of the road. Geotechnical investigation and monitoring at the site showing the worst damage is in process to determine cause and to design mitigation.

The road is typically closed four to five months through the winter. Therefore it was necessary to deploy instrumentation that would not require a technician to travel to the site for readings. The instrumentation that was selected to monitor the landslide included five ShapeAccelArrays to monitor ground movement, 10 vibrating wire piezometers to monitor groundwater levels, and a rain gauge to collect precipitation data. Data from all of the instruments is collected two times per day using an automated, on-site data collection system. Power and phone service are not available at the site so solar panels and satellite communications are used for power and data transmission, respectively. The data is sent to a server and can be viewed via web by the project geotechnical engineers at Western Federal Lands. The website also provides the reservoir level data from the adjacent reservoir as obtained from the BOR website. The site has been monitored for over one year now and the nearly continuous data has allowed geotechnical engineers to draw conclusions about the relationships between landslide movement, precipitation, and the reservoir level.

FHWA Administrator Greg Nadeau and Western Federal Lands Division Director Sandra Otto visit the base station in a large landslide area within Glacier National Park

Sullivan Bridge, Valley Forge National Historical Park, Pennsylvania

The new Sullivan Bridge over the Schuylkill River within Valley Forge National Historic Park forms a critical link in the Circuit Trails, a vast regional trail network composed of hundreds of miles of interconnected trails. Prior to the completion of these two bridges, bicyclists and pedestrians had to use a narrow (4 foot) boardwalk path alongside the Pennsylvania Route 422 Bridge.

Federal Lands contributed to this project by leading the Value Analysis and providing support on design, resulting in the new four span bicycle and pedestrian trail bridge spanning Schuylkill River.

Cuyahoga Valley National Park, Fitzwater Maintenance Facility, Ohio

Geotechnical Engineering Study

The NPS, in partnership with Cuyahoga Valley Scenic Railroad (CVSR), provides excursion passenger rail service at Cuyahoga Valley National Park. The NPS expressed concerns regarding a recurring settlement problem on the main track at Switch 2 located immediately south of the Fitzwater Maintenance Facility. Switch 2 is located where the river sharply meanders to the west, the distance between Switch 2 and the river bank on the east is only approximately 25 feet. This site is very susceptible to settlement and has exhibited ground movement over the last 15 years, requiring frequent repair and maintenance.

The NPS is currently proposing a site development plan to accommodate the growth and development of CVSR for the next 20 years and thus requested FLH to perform an engineering study and recommend landslide mitigation measures, if needed. In July, FLH drilled one soil boring, performed laboratory analysis, and installed an inclinometer to track ground movement that will be monitored on a bi-monthly basis. The site is particularly challenging with the movement of trains and their associated vibrations as well as the proximity of Cuyahoga River.

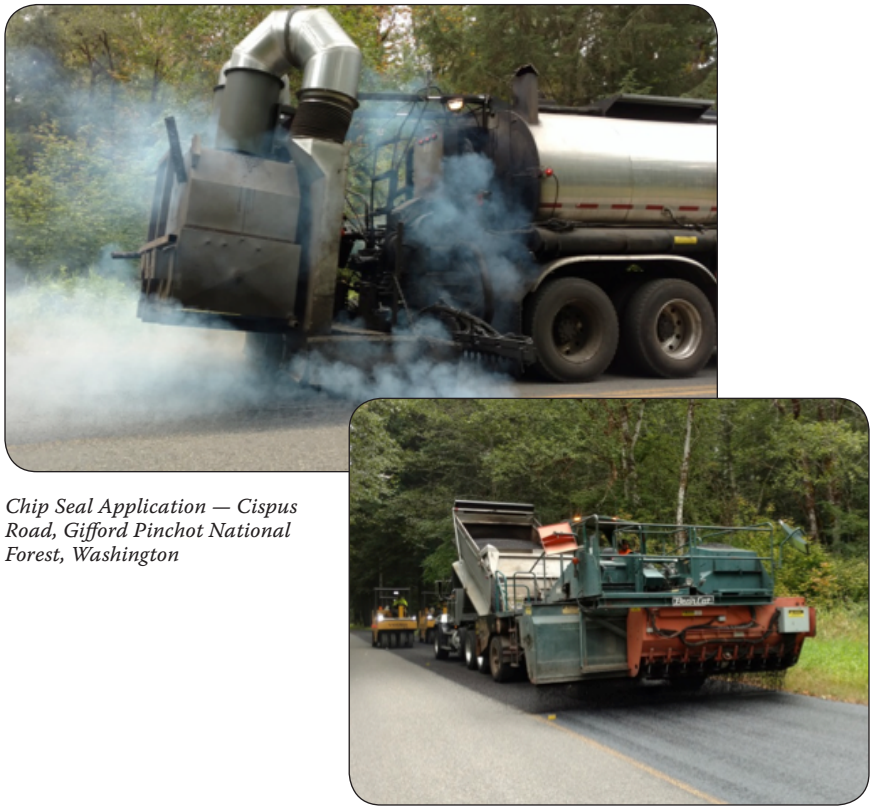
FLH Drill Crew installing slope inclinometer to monitor ground movement

Asphalt Rubber Chip Seal Application and Use On Federal Lands Projects

Asphalt rubber chip seals are a hot applied chip seal utilizing an asphalt binder blended with recycled tire rubber. The blended asphalt binder provides a durable, flexible product that is less susceptible to brittleness at lower temperatures. Asphalt rubber chipseals can be applied at lower temperatures than a conventional chipseal. This provides a larger temperature range to be able to construct surface preservation techniques in areas that have cooler, moister climates.

FLH Materials staff worked to establish a specification for utilizing the asphalt rubber chip seal on Federal Lands Highway construction projects and performed a pilot project on Cispus Road in Lewis County, Washington.

This process provides yet another opportunity to recycle and reuse rubber tires, reducing the quantity going into landfills. The pilot project will be monitored over time to evaluate durability and practicality for future projects.



Chip Seal Application — Cispus Road, Gifford Pinchot National Forest, Washington

George Washington Memorial Parkway, Arlington County, Virginia

Emergency Sinkhole Repair

On August 9, 2016, NPS reported the presence of a 4x3 foot wide, 6 foot deep sinkhole near Spout Run, a very busy commuter stretch on the Parkway. Federal Lands responded with a geotechnical engineer to the site within a few hours to meet with the NPS maintenance crew and evaluate site conditions to propose the quickest most economical solution. The maintenance crew, under the direction of the geotechnical engineer, completed the sinkhole repair the following day. The repair consisted of cutting around the area, removing material and backfilling with a combination of fabric and stone, and placing asphalt. The entire repair process was performed by the park maintenance crew with their own equipment, within one day, minimizing disturbance to traffic.

FLH Geotechnical engineers employ the use of Ground Penetrating Radar to evaluate subsurface conditions and identify areas prone to soil loss in order to minimize future sinkhole formation along the Parkway

Cape Canaveral National Seashore, Florida

Pavement Preservation Program

The NPS Southeast Region is implementing a Pavement Preservation program in the FLTP. There is an increased emphasis on preventive maintenance in the NPS and this project is part of it. The Canaveral National Seashore is located on a barrier island on the east coast of Florida in Brevard County. The park was established to preserve nearly 58,000 acres of ocean, beach, dune, hammock, lagoon, salt marsh, and pine flatland habitats. Roads and parking areas included in this project have been selected based on their recommended treatments from the Pavement Management System and their assessments during field reviews. The purpose of this project is to place a preservation treatment on all paved road and parking areas in the park on an 8-10 year cycle.

The project consists of the resurfacing of approximately 18 miles of roadway within the Canaveral National Seashore. The work includes crack cleaning and sealing, placing seal coat surface treatment, asphalt pavement overlay and patching on paved roads and parking areas, and other miscellaneous work. A 3.75 inch thin lift asphalt concrete pavement (4.75 mm mix) was placed over a chip seal to mitigate reflective cracking. The chip seal crack relief layer is a relatively new technique to help expand the number of candidate projects for preservation treatments with minor cracking and extend pavement life.

Extending the Life-Cycle of Defense Access Roads

The mission of the Defense Access Road (DAR) Program requires safe and reliable access to the launch facilities 24 hours a day, 7 days a week, and 365 days a year. This requires a coordinated effort between the US Air Force, FLH, and the associated County Maintenance entities.

Traffic volume and speed, environmental factors, and lack of appropriate maintenance cause aggregate surfaced access roads to degrade over time.

The operating assumption has been that one half-inch or more of aggregate is lost each year, leading to a 4 inch aggregate surfacing layer lasting approximately 6 to 8 years. The DAR Program has dealt with this loss of aggregate for the past few decades by simply replacing the aggregate on the road when it is depleted. Reducing the rate of the aggregate depletion will increase the life-cycle of the access roads and therefore decrease future reconstruction and maintenance costs.

Using calcium chloride as a stabilization agent is one method to increase the life-cycle of aggregate surfaced roads. Calcium chloride draws moisture into the aggregate layer. This keeps the aggregate at a moisture content that allows the fine portion of the aggregate to stay in the layer acting as a binding agent, rather than turn into dust and be lost. Keeping the fines in the layer significantly reduces the amount of aggregate loss sustained.

To deploy this technology, specifications were developed to address the properties of the imported aggregate, calcium chloride application rate, mixing processes and construction requirements. The major factor in the construction is to closely monitor the amount of moisture in the aggregate to ensure that the completed product does not exceed the optimum moisture limit. Since calcium chloride has an affinity for moisture, including atmospheric moisture, construction requirements established appropriate weather limitations to provide a quality finished product.

As part of the on-going evaluation, the FLH Western Division has also been developing a test method to determine the amount of calcium chloride in stabilized aggregate. The concentration of calcium chloride in a stabilized road surface will decrease over time due to the effects of weather and traffic. For roads that have been previously treated, the test method will determine the amount of stabilizing agent remaining which in turn will provide the additional amount for resurfacing and reshaping.

Through monitoring the performance of the aggregate roads, the benefits of this road stabilization technique can be determined. The first reviews of roads that have been treated have shown marked performance improvements. In the latest road reviews for the development of the 2017 construction project, roads treated in 2011 are showing reduced aggregate loss and improved driving surfaces compared to untreated roads. The amount of additional aggregate needed to recondition these roads has been reduced by 50%. The on-going monitoring will be the key to determine the appropriate rate of treatment and the expected life. Experience has shown that too much stabilizing agent causes the road surface to be unstable, resulting in a muddy rutted road. Using too little results in increased costs without a significant improvement in the road performance. As data and construction information is gathered and reviewed, we will continue to refine the specification to determine the optimum combination of materials and construction techniques to provide the highest benefit to our partners.

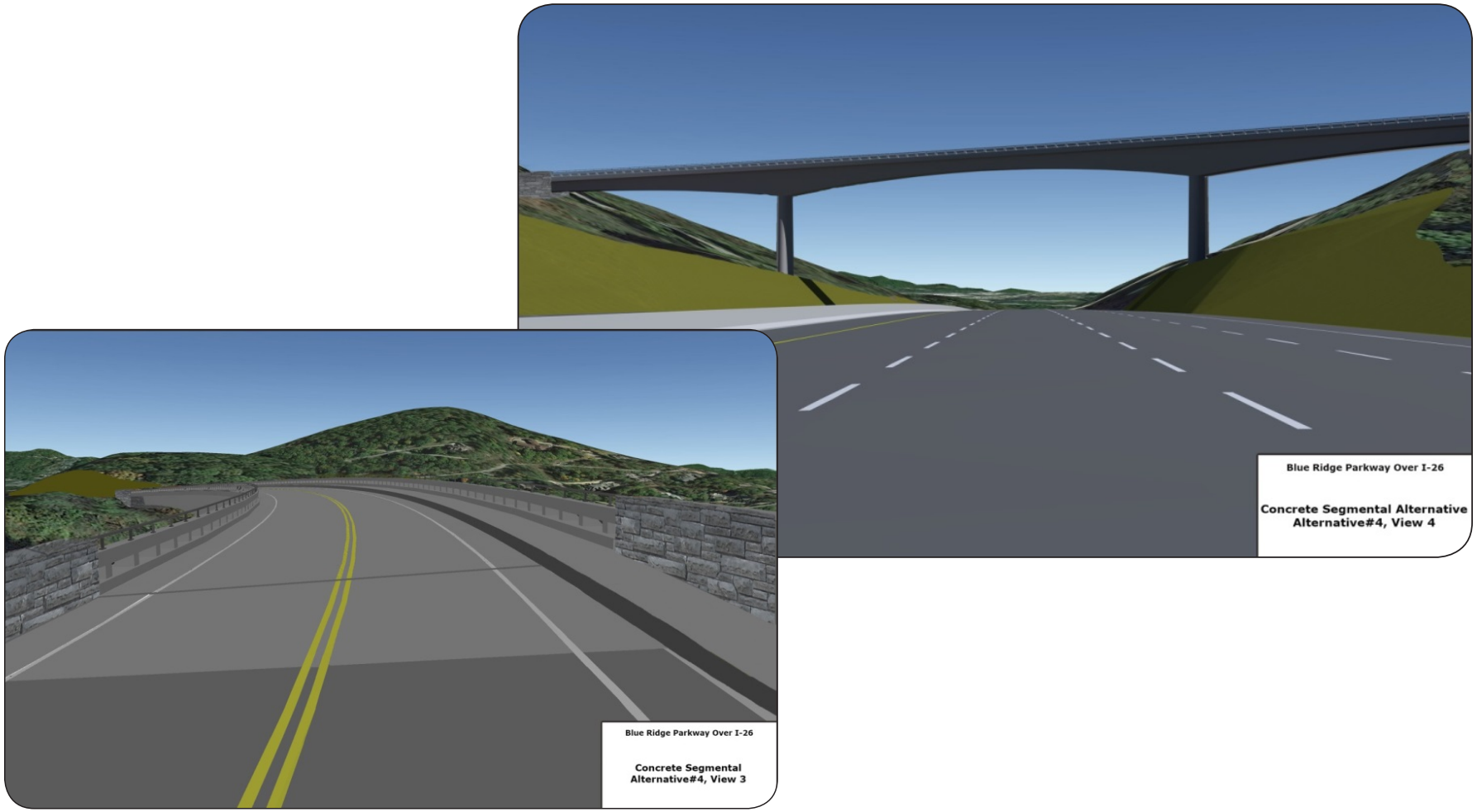
Untreated road constructed in 2012 Note: raveling, loose surface condition, aggregate loss

Treated road constructed in 2010 Note: tight surface, reduced aggregate loss

Calcium chloride distributor

Design Visualizations — Concrete Segmental Bridge Alternatives for Blue Ridge Parkway structure over Interstate 26

The FLH Eastern Division has prepared many design visualizations for preliminary conceptual designs on several projects to provide a better graphical representation of design alternatives to our partners and the public. This is both obviously useful as design progresses but also has become a notable tool for providing the public with project details and outcome during the environmental process. Design visualization aids decision making and helps identify potential issues before the project reaches the construction stage. FLH has used design visualization on a wide range of projects from comparing alternatives for the rehabilitation of the Arlington Memorial Bridge at George Washington Memorial Parkway in Washington, D.C. to providing the graphical alignment of a proposed beach access road at Chincoteague National Wildlife Refuge in Maryland. It is currently being used to design concrete segmental bridge alternatives for a proposed Blue Ridge Parkway structure over I-26 in North Carolina.

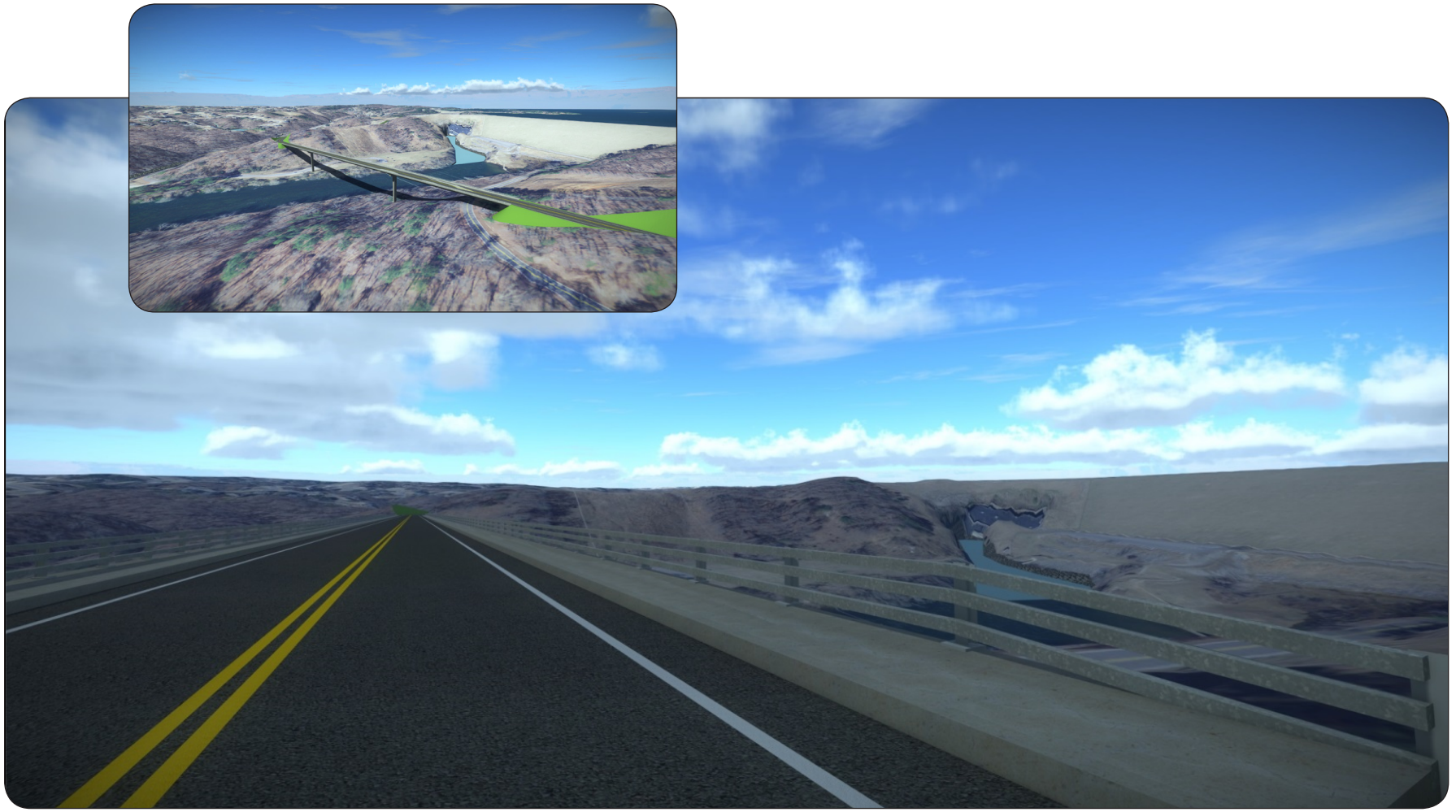


Design Visualizations provide static views of Concrete Segmental Bridge Alternatives for a Blue Ridge Parkway Bridge over I-26, North Carolina

Bridge Conceptualization using Immersive Reality Software — Buford Dam Road Feasibility Study for the U.S. Army Corps of Engineers

We used the latest immersive reality software to visualize a possible new bridge for one of the preliminary/conceptual alternatives on the Buford Dam Road Feasibility Study for the USACE.

Using "immersive reality software" enables us to use US Geological Survey terrain and imagery to quickly "place" locations for road and bridge alternatives. It is helpful because we are able to gauge the impacts of a proposed alignment and adjust it in real-time to mitigate problems and related complications for the placement of a project. While not a finalized design, the "immersive reality software" is a useful tool for quickly determining the feasibility of a project, obtaining a basic scoping-level estimate for the design, and producing visualizations of the conceptual roadway.



Bridge concept visualized using immersive reality software as part of the Feasibility Study for the USACE — Buford Dam Road, Georgia

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