

A scenic view of a winding highway bridge over a forested valley with mountains in the background. The bridge is a concrete structure with a metal railing, curving through the landscape. The surrounding area is filled with dense green trees, some showing early autumn colors. In the distance, blue-toned mountains rise against a clear sky.

The Federal Lands Highway Program

*2014*

*The Year in Review*



## ***From the desk of the Associate Administrator***

*As I reflect over the last year and write my third and final note for our accomplishment report I am once again humbled by the incredible people, partners and projects we have here in Federal Lands Highways. There is no question that this last leadership opportunity in my career with FHWA challenged and inspired me. It further reinforced my belief that people are our greatest asset and no matter how complex or controversial the project or initiative might be the people in Federal Lands find a path forward.*

*I am very proud of the collaborative way we have worked with all our partners to build some of the most picturesque projects in the country which are continually recognized by many engineering organizations. One example this past year is the National Recognition we won from the Precast/Prestressed Concrete Institute for the Foothills Parkway Bridge #2 in Tennessee. I was also privileged to see some of the great work done by one of our new partners, the Army Corps of Engineers, in the Lake Lanier and the Allatoona Lake area.*

*I am pleased with all the wonderful projects on Tribal Lands that I saw this year. It is clear we all are making a big difference in Indian Country. As I pass the torch to the next Associate Administrator it has been my honor and pleasure to work in Federal Lands and I wish you many, many years of continued success. You have earned it!*



*Joyce A. Curtis*  
Joyce A. Curtis, Associate Administrator for  
Office of Federal Lands Highway

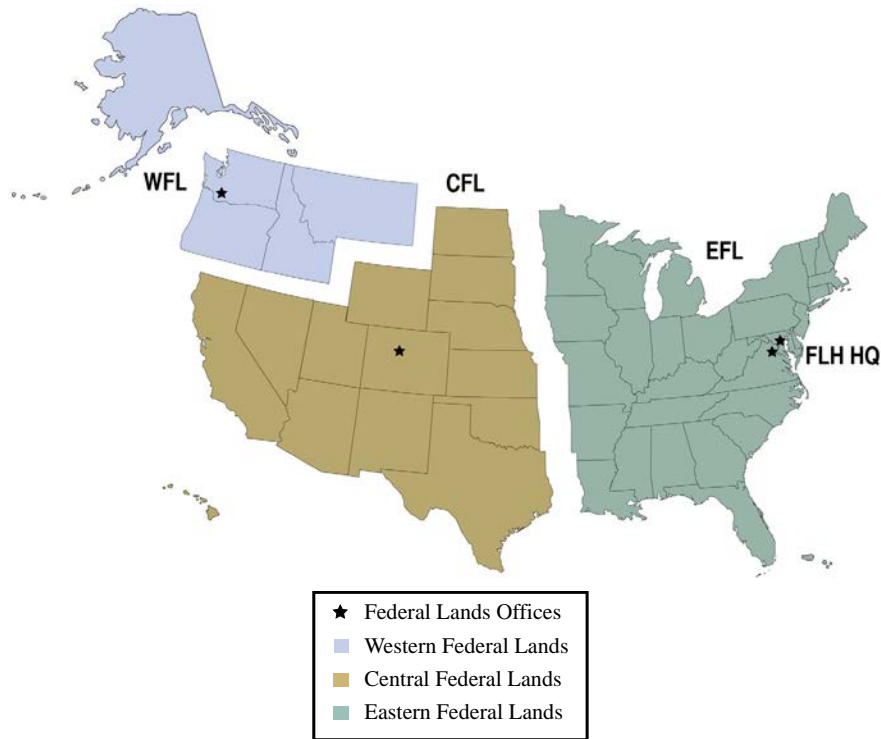
*Associate Administrator Joyce Curtis, displaying the FHWA Best Places To Work plaque at Trail Ridge Road, Rocky Mountain National Park, Colorado.*

# The Federal Lands Highway Program

## 2014

### The Year in Review

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

*Front Cover: Foothills Parkway, Bridge 2, Great Smoky Mountains National Park, Tennessee*

*Back Cover: Conzelman Road to Point Bonita, Golden Gate National Recreation Area, California*



U.S. Department of Transportation  
Federal Highway Administration  
Office of Federal Lands Highway



# 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.

*Yosemite National Park, California*

## Our Role

The Federal Highway Administration (FHWA) Federal Lands Highway Program (FLHP) was established to promote effective, efficient, and reliable administration for a coordinated program of public roads and bridges; to protect and enhance our Nation's natural 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 (Forest Service)**; **U.S. Fish and Wildlife Service (USFWS)**; **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, challenging work restrictions, and uncompromising 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 3 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 and begins at preliminary design and continues through the construction of the project. Within those areas we also focus on Innovation & Technology Deployment and Professional Development. 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 many Partners.

Now in its 32nd year, the program and our role continue to expand and now includes more Federal partners and road networks. FLH expertise and credibility has grown to deliver a wider variety of transportation projects and improvements nationwide.



*Delaware Water Gap National Recreation Area, view of Pennsylvania side of river from Mt. Tammany, New Jersey*

## The Program

### Implementing the Federal Lands Access Program (FLAP)

The Federal Lands Access Program (FLAP), authorized at \$250M, is part of Moving Ahead for Progress in the 21st Century Act, or MAP-21 legislation, the first multi-year highway authorization enacted since 2005. The program funds projects that benefit transportation facilities such as public highways, roads, bridges, trails, or transit systems that are located on, are adjacent to, or provide access to Federal lands for which title or maintenance responsibility is vested in a State, county, town, township, tribal, municipal, or local government.

Federal Lands Highway employees throughout the country were recognized for their collective contributions in implementing a transformational piece of MAP-21, the FLAP. The FLH implementation team provided outreach, collaboration, and implementation of new decision-making bodies that represent Federal, State, and local agencies. This team innovated new ways to ensure vital transportation needs were identified, worked with asset owners to collect local fiscal matching commitment, and created a robust program of projects that met MAP-21 requirements. The passage of FLAP ensures safe and vital connections are made to our most beautiful lands in America, and this team memorialized this significant milestone with the spirit of excellence, collaboration, and commitment to public service in which this Department is known.

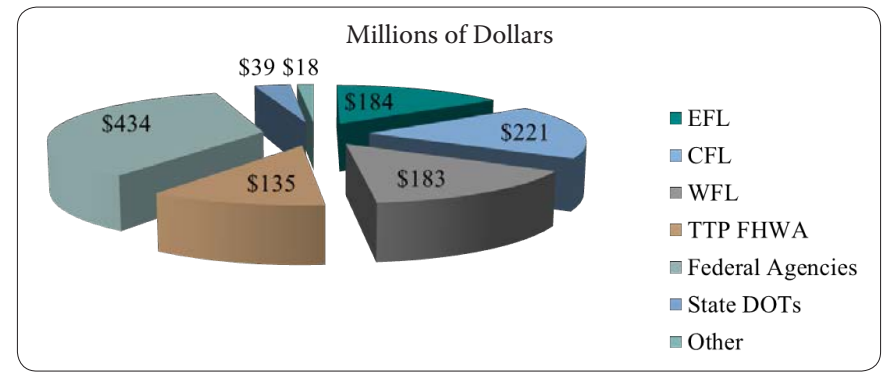
### Federal Lands Transportation Program (FLTP)

The Federal Lands Transportation Program (FLTP), authorized at \$300M, funds projects that improve access within Federal lands maintained by the BLM, the USACE, the USFWS, the Forest Service, and the NPS.

The program covers program administration, transportation planning, construction, and reconstruction of Federal lands transportation facilities. Other aspects of the program include: Research, preventive maintenance, engineering, rehabilitation, restoration, adjacent vehicular parking areas; acquisition of necessary scenic easements and scenic or historic sites with provisions for pedestrians and bicycles. The program is intended to mitigate the damage to wildlife, aquatic organism passage, habitat, and ecosystem connectivity, including the costs of constructing, maintaining, replacing, or removing culverts and bridges, as appropriate; construction and reconstruction of roadside rest areas; congestion mitigation; and other appropriate public road facilities as determined by the Secretary.

The FLTP complements the FLAP. Where the Access Program provides funds for State and local roads that access the Federal estate, the FLTP focuses on the transportation infrastructure owned and maintained by FLMA's.

### How the MAP-21 Program Obligations Break Down



### Unique Public/Private Partnership Under FLAP

Federal Lands, in partnership with the Oregon Department of Transportation, participated in the ribbon cutting/grand opening of the Mount Hood Express Bus Service, serving the City of Sandy, the Villages and Mount Hood, Ski Bowl, Government Camp, and Timberline Lodge. This project is the first transit project funded in Oregon under MAP-21 Fand is the result of a unique public/private partnership that included many government agencies, FHWA, and local businesses. The project provides more opportunity to the public for sightseeing, hiking, exploring and skiing on Mount Hood, especially in winter, when driving can be a challenge.

Bus route to Timberline Lodge, Oregon



Mount Hood Express Bus

## The Program

### Improvement Under FLTP



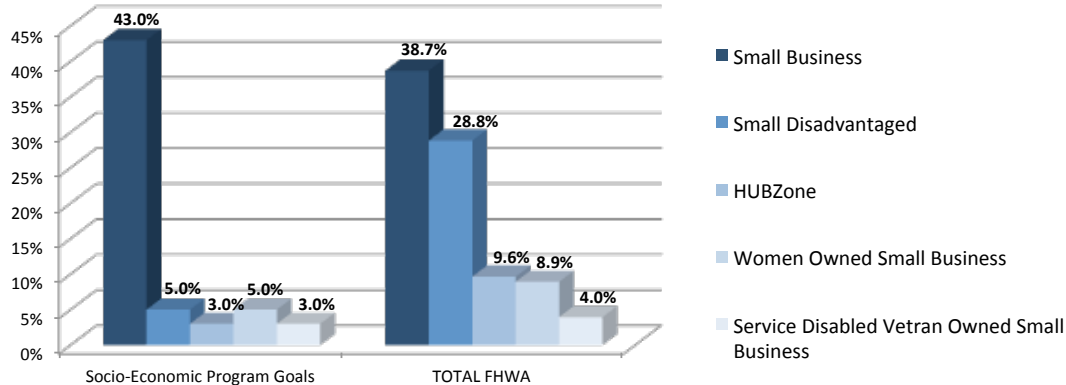
*San Luis Refuge, San Joaquin Valley, California Before & After*

### Surpassing Our Small Business Goals

There are a number of contracting and procurement opportunities to support the Federal Lands Highway program to include engineering services, construction contracts, technical and professional services, data analysis, information systems, and laboratory equipment to name a few. FLH also runs a simplified acquisition program to purchase supplies, support services, information technology, and other equipment.

FLH is committed to supporting small businesses and small business concerns. In fact, in FY 14, we surpassed the goals established by the Small Business Administration and Department Of Transportation by contracting with different small business socio-economic categories. We hope to continue and grow upon our success for FY 15.

### Utilization of Small Business



### MAP-21 PROGRAM FUNDING

**\$300M Transportation Program**

**\$250M Access Program**

**\$450M Tribal Program**

### PROGRAM DELIVERY SUCCESS

**93.8%**  
of the MAP-21 Program  
Was Expended

**1,309.4**  
Lane Miles Improved  
(Completed Construction)

**56**  
Bridges  
(Completed Construction)

## Project Delivery Awards & Recognition

### Foothills Parkway, Bridge 2 Great Smoky Mountains National Park, Tennessee

#### *Recipient of the 2014 Precast/Prestressed Concrete Institute (PCI) Award: Best Bridge with Span over 150 feet*

The designers choice of high-performance precast concrete was made to manage costs and to meet the National Park Service aesthetic requirements to mimic the mountain terrain geometrically and by coloring the concrete to match the native rock, gently blending it into the natural landscape. This project required a new approach that allowed various aspects of precast concrete construction to be performed concurrently. New methodology incorporated a temporary work trestle that provided access along the entire bridge alignment that could be reconfigured as work shifted from foundation and precast segmental piers to superstructure segment erection. A specialized segment walker placed segments in balanced cantilevers, significantly increasing progression over one-direction progressive placement methods.

With the use of high-performance concrete this structure will have the expected life span of 75- to 100-years, ensuring lasting enjoyment of the unobstructed views of the Great Smoky Mountains.

Engineering Excellence



*FLH Design Visualization prepared for use during planning stage*

*The completed bridge*



## *Project Delivery Awards & Recognition*

### **Davey's Bridge**

**Banks-Lowman Highway, Wildlife Canyon Scenic Byway  
Garden Valley, Boise County, Idaho**

*Recognized in Fall 2014 issue of **Aspire The Concrete Bridge Magazine***

The use of precast, prestressed concrete girders contributed to building a structure that is simple, aesthetically pleasing, and blends nicely into the natural environment of the rural Idaho countryside. Prestressed concrete girders provided the lowest overall cost, considering production and lifetime maintenance and reduced life-cycle costs. An optimal solution was implemented that satisfied hydraulic requirements with a single span while accommodating the need for an unusually wide bridge deck. Efficient and innovative staged construction strategy allowed for uninterrupted traffic flow.



*Setting the girders in place*



**Project Delivery Awards & Recognition**

**Raymondskill Creek Bridge (US 209)  
Delaware Water Gap National Recreation Area  
Dingman Township, Pike County, Pennsylvania**

*Recipient of the 2013-14 Association for Bridge Construction and Design (ABCD) Susquehanna Chapter Outstanding New Short Span Bridge*

The Raymondskill Creek Pedestrian Bridge project showcased Prefabricated Bridge Element Systems (PBES) technology as an economical solution by installing precast concrete abutments and a prefabricated truss superstructure. By using prefabricated elements, construction time was greatly reduced and there was minimal disturbance to the surrounding area. The new pedestrian bridge spans Raymondskill Creek and is adjacent to the U.S. Route 209 Bridge connecting with the Delaware Water Gap National Recreation Area trail system.



**Fairfax County Parkway. Phases I, II & IV  
Fairfax County, Virginia**

*Recognized with a Merit Award from the Design-Build Awards Institute of America (DBIA).*



## *Project Delivery Awards & Recognition*

### **Lamar River Bridge Northeast Entrance Road, Yellowstone National Park, Park County, Wyoming**

*Recognized in the P.E. Magazine, Special International Bridge Conference Edition, also featured in an April 2014 Modern Steel Construction magazine article*

The New Lamar River Bridge in Yellowstone National Park was selected as one of the winners of the 2014 International Bridge Conference Photographic Contest — Bridges of the U.S. Federal Lands. The bridge is a three-span 420 foot long, haunched steel plate girder. Due to high seismic activity and active faults within 50 miles of the project area (the park sits atop a massive underground volcano) seismic vulnerability had to be taken into account for the replacement structure. One of the specific goals of this project was to build a structure to withstand the environment with architectural features that matched existing structures in the park while still blending into the natural environment.



## ***Tribal Transportation Program (TTP)***

The Tribal Transportation Program (TTP), funded at \$450M, provides funds to the 566 federally recognized tribes to improve the transportation systems that are located within Indian Country. These roads, bridges, and transit systems provide basic access to community services and are vital to the safety and quality of life of tribal members. Federal Lands co-administers the TTP with the Bureau of Indian Affairs (BIA) and is responsible for the primary stewardship and oversight of these funds. More than 120 of the tribal governments operate their TTP directly through Program Funding Agreements with Federal Lands.

In 2014, FLH Leadership met with tribes in New Mexico, North and South Dakota, California, and Alaska to listen to tribal concerns and issues. The Tribal Safety Funding provided \$8.6M in funding to 183 tribes for 195 projects. The Tribal Bridge Program provided \$8.6M for the design or construction of an additional 20 bridge projects in Indian Country.

### **Cheyenne River Bridge Oglala Sioux Tribe, Custer County, South Dakota**

#### ***Bridge replacement and new roadway alignment***

The Cheyenne River bridge is a major access route for the Oglala Sioux Tribe and Custer County residents. The Tribe contributed \$1,000,000 in TTP Bridge Program funding towards the construction of the bridge, Custer County contributed \$874,000 and South Dakota DOT contributed \$1,626,000. A great example of relationship building, and funds leveraging across federal, state, county and Tribal agencies!

*before*



*after*

## *Tribal Transportation Program (TTP)*

Technical assistance and capacity building continued to be of primary importance to the FLH TTP Team. Several regional training workshops were carried out during this year, including tribal participation in the Western and Central Federal Land's Offices Winter Trainings. 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 community.



*TTP Conference held in Anchorage, Alaska*



*FLH provides Survey Training to Tribal members at the Fort Vancouver National Historic Site, Washington*

## More than 120

of the tribal governments  
operate their TTP  
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Federal Lands co-administers  
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of these funds.

*Tribal Transportation Program (TTP)*



*Chaco Culture National Historical Park, Visitors Center Access Road and Bridge Reconstruction, New Mexico*

## Tribal Transportation Program (TTP)

### Stebbins Roadway Improvements Project Stebbins, Alaska

The Stebbins Roadway Improvements Project fully reconstructed virtually all the streets in the remote tribal village of Stebbins on the Bering Sea in 2014. The project included improved roadway drainage, riding surface, and user safety on the village streets. Airborne dust caused by vehicular traffic on the old dirt and gravel road surfaces was a significant public health issue. This project addressed the dust hazard by placing higher quality, compacted aggregate road surfacing, along with an application of synthetic dust abatement material, on all of the roadways in the project. The result is a much more functional street system for the village that provides significantly lower dust production, improved air quality and user safety, and reduced road maintenance costs.



### Huerfano Bridge (BR 8105) Replacement Project San Juan County, New Mexico

Huerfano Bridge (BR 8105) Replacement Project, a joint effort of the Navajo Division of Transportation, San Juan County, New Mexico and New Mexico DOT. This “Bailey” bridge, built in the 1970’s, is known as such because it is made out of military surplus material. It rises about 12 feet over Gallegos Wash and is used daily by Huerfano residents, a Navajo Nation chapter.

The intent of this project is to replace the existing 17-span one-lane military bridge which is structurally deficient, functionally obsolete, and in a state of severe deterioration; with a two lane concrete bridge. The new concrete bridge will consist of a four-span structure with concrete girders and a cast-in-place slab deck. The project would also include approximately 150 feet of roadway reconstruction on each side of the bridge. These bridge approaches would consist of widening the existing road to conform to the width of the new two-lane bridge and shoulders, and would include the installation of safety guardrails.

An unimproved detour crossing was used upstream of the existing bridge by local residents and school buses transporting children to the Huerfano Community School. The Huerfano Community School is located south of the bridge. During inclement weather, drainage flows within the Gallegos Wash makes the detour road impassable. Once runoff recedes, it takes several weeks for the detour road to dry out to support vehicle traffic. The detour for the community is about 12 miles one-way and adds an additional 45 minutes to 1 hour to the local commute due to the condition of the unimproved detour routes. The new structure will provide a safer, faster route for the local community.



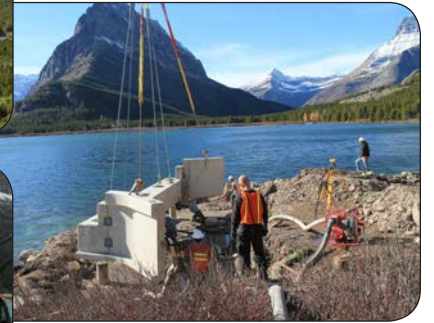
*The existing bridge*

*New bridge under construction*

## Project Delivery

### Swiftcurrent Creek Spillway Bridge Reconstruction Glacier National Park, Montana

The Swiftcurrent Creek Spillway Bridge project replaced an historic bridge built in 1929, that provided the only access to the Many Glacier Lodge, listed on the U.S. National Register of Historic Places. Precast abutments and wingwalls were required on this reconstruction project in order to meet the requirement for short term completion. The short duration was necessary to allow for little interruption of normal tourist activities, the onset of winter weather, and follow-on NPS facilities contracts requiring access to the area via the bridge. The demolition of the existing bridge started on September 26, 2014, and construction of the new bridge was completed in November 2014.



*The amazing view from the completed bridge.*



## Project Delivery

### East Verde River Crossing, Houston Mesa Road Tonto National Forest near Payson, Arizona

This reconstruction project under the Access Program included roadway realignment, three concrete bridges with precast elements, a concrete box culvert, and rockery walls. Custom color and formliner were used to enhance the bridge setting.



### **Prefabricated Bridge Element Systems considered 1st on all FLH projects**

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The FLH Office of Bridges & Structures delivered completed designs for 96 Structures on schedule (a total of 36 individual projects) to include:

- 33 New/Replacement Bridges
- 47 Rehabilitated Bridges
- 11 Box Culverts
- 3 Retaining Walls
- 1 Dock
- and 1 Stream Drop structure

### **EDC II initiative**

ABC used on 53 bridges/structures

**53 = 41 PBES + 12 GRS-IBS**

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Standard Specifications for the Construction of Roads and Bridges on Federal Highway Projects 2014 has been completed and put into practice

## Project Delivery

### South Fork Smith River Bridge Replacement Projects

Steven Memorial Bridge and Hurdy Gurdy Bridge are two major bridge projects within the Six River National Forest in northern California. The existing Hurdy Gurdy and Steven Memorial Bridges were built in the 1950s. The two replacement bridges presented the FLH design team with a number of challenges, including the use of deep foundations in a highly seismic area.



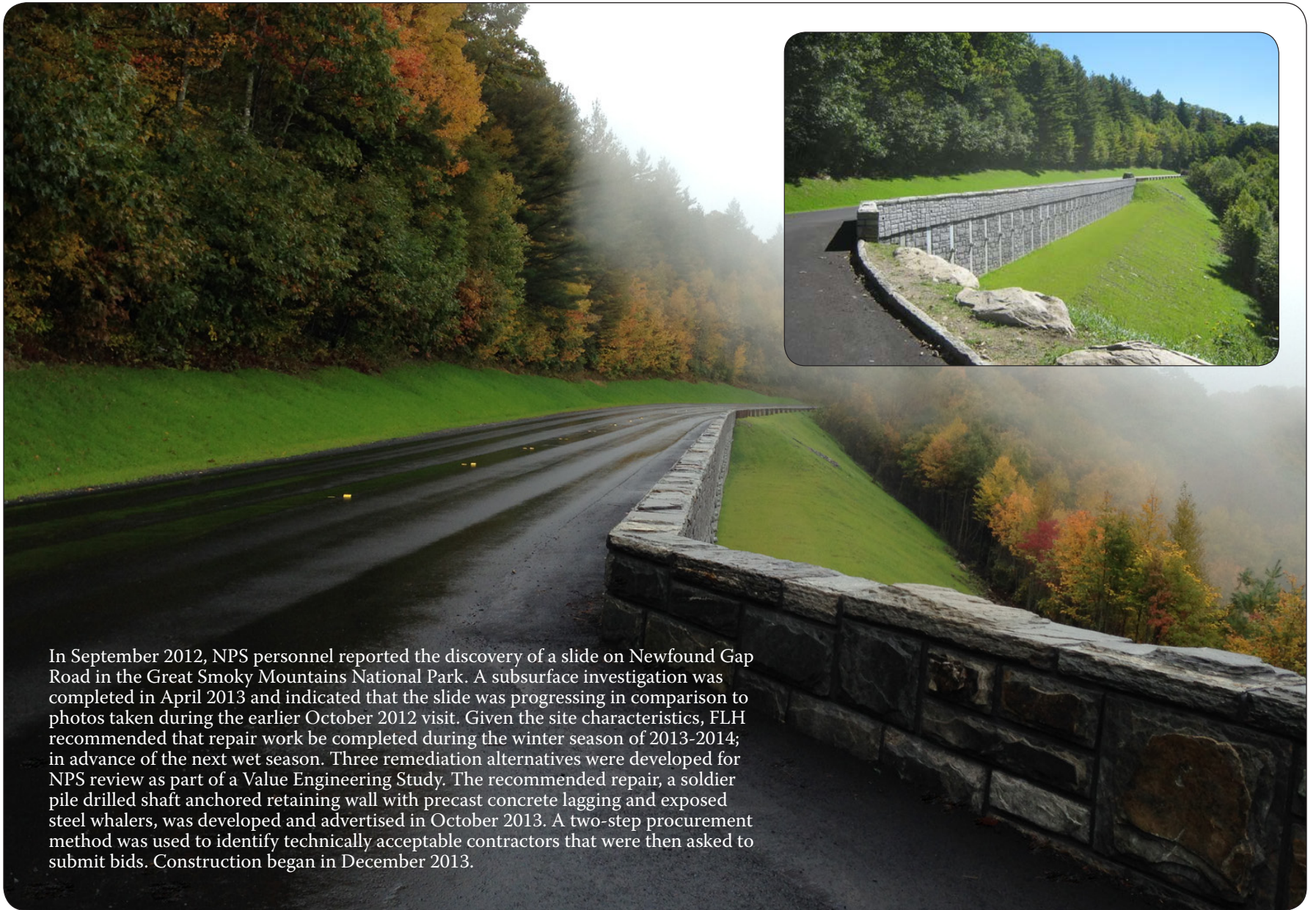
## Project Delivery

### Multi-Modal Safety

Sections of Picture Rocks Road and Sandario Road located within Saguaro National Park (SAGU) are used by park visitors, but also serve as commuter roads for local residents. A Road Safety Assessment (RSA) was requested by SAGU and Pima County DOT in 2012 due to the high number of fatal crashes. At that time, a total of nine fatal crashes occurred in the previous five years, of which five occurred within the same year. Picture Rocks Road has more than ten times the daily traffic volume of other SAGU interior roads and is year round. Having evolved from a stock trail, the roadway alignment had never been engineered for motor vehicle traffic, and the 35 mph and 40 mph speed limits are often exceeded by an average of 10 mph. Conversely, Sandario is wide and straight which invites speeding, further complicated with vertical curves this road also had sight distance concerns as well. Because of the hazardous conditions on these routes, the RSA recommendations were evaluated on site to determine if there were solutions that could be quickly implemented to help reduce the crashes until a more permanent solution could be designed and funded.

The project consisted of improvements to 19 miles of roadway in the park. Improvements included site distance, raised pavement markers, striping width, roadway edge fill, installation of rumble strips, trail crossing areas, and warning signs to improve safety. The NPS requested additional work to construct a concrete section to widen a portion of Cactus Loop Road. The section was added to the project due to the number of bike accidents that were attributed to the existing geometrics of the roadway. Bicyclists that were going at a high rate of speed were unable to make the sharp right uphill curve causing numerous accidents before the widening. Special advanced warning signs were placed at the top of the hill to warn riders to slow down. The project was completed in three months and success is attributed to the collaboration between Pima County, Saguaro National Park, and FLH.





In September 2012, NPS personnel reported the discovery of a slide on Newfound Gap Road in the Great Smoky Mountains National Park. A subsurface investigation was completed in April 2013 and indicated that the slide was progressing in comparison to photos taken during the earlier October 2012 visit. Given the site characteristics, FLH recommended that repair work be completed during the winter season of 2013-2014; in advance of the next wet season. Three remediation alternatives were developed for NPS review as part of a Value Engineering Study. The recommended repair, a soldier pile drilled shaft anchored retaining wall with precast concrete lagging and exposed steel whalers, was developed and advertised in October 2013. A two-step procurement method was used to identify technically acceptable contractors that were then asked to submit bids. Construction began in December 2013.

*Newfound Gap Road, Great Smoky Mountains National Park, North Carolina*

## Project Delivery

### Project Headlands

#### Golden Gate National Recreation Area, Marin County, California

Construction for Project Headlands Phase II was completed in 2014. The completion of this final phase of the project marks a major accomplishment in improving the roadway and trail system in the Marin Headlands and Fort Baker areas within and adjacent to Golden Gate National Recreation Area (GGNRA) in Marin County, California. The \$23.5M overall project has rehabilitated and reconstructed 10.8 miles of historic roads, and multiple trails and parking areas to improve access and safety for motorists, bicyclists and pedestrians in this high use recreation area. Major safety improvements included utilization of *Safety Edge* on all paved roads.

Due to high visitation and overall public interest in the project, an extensive Public Information Program (PIP) was implemented. The PIP included a project website and periodic eblasts (up to weekly) to provide timely construction information regarding work areas, hours, and delays.



Bridge Replacement, DesLacs National Wildlife Refuge, North Dakota Before and After



## Emergency Relief for Federally Owned Roads (ERFO)

### Fort Wadsworth, Gateway National Recreation Area Staten Island, New York

During Hurricane Sandy the massive storm surge that swept through New York City hit Staten Island particularly hard, and with the damage, important history was nearly lost. Fort Wadsworth was built to protect New York City from attack by the sea. An important component of the Fort is Battery Weed, a substantial three tier cannon battery. The seawall that was built in 1845 was destroyed by Hurricane Sandy, undermining the already compromised foundations of Battery Weed. It was necessary to rebuild the seawall to protect and maintain the important historical aesthetics of Battery Weed. To accomplish this each stone block was collected, cleaned, and cataloged. The area behind the wall was excavated and open graded stone was placed in a fabric wrap to improve drainage and prevent future water pressure build up. The massive seawall stones were replaced and sealed together with a hidden epoxy to add structural integrity to the wall without changing the look. The worst areas of the wall had a reinforced concrete backing wall built and hidden with a layer of sand and stone to add heavy reinforcement against future extreme weather events and rising tides. The seawall now looks as it did during the Civil War and has added resiliency to protect this landmark for future generations.



*Resetting historic stones*



*Major Breach Area, Historic Boat Dock*



*Wall Repaired with Stone Backing*

### Santa Clara Puye Road Santa Clara Pueblo, New Mexico

On October 24, 2013, President Obama declared a major disaster within the Santa Clara Pueblo, New Mexico. The disaster declaration was the result of severe flooding within the Los Conchas Burn Area, which contributed to the loss of property and resources within the Pueblo.

Shortly after the declaration, the Federal Emergency Management Agency (FEMA) enacted the National Disaster Recovery Framework (NDRF), which develops an interagency partnership to publish a recovery framework. As part of the NDRF, FLH, along with the USACE, BOR, USDA, BIA, NPS, New Mexico DDOT, and various other local and state agencies developed and enacted mitigation measures within the developed framework.

FLH, through the ERFO program, was responsible for restoring critical access within the Santa Clara Canyon. Access within the Canyon was vital to the work of other Federal Agencies in restoring the burn area and constructing flood mitigation measures to protect the residents and resources of the Pueblo.

Due to the emergent needs within the NDRF, an accelerated contracting technique, through use of a letter contract, was employed by FLH to begin mitigation repairs to a multi-culvert crossing structure. FLH and the contractor worked in close coordination to finalize the details of the structure design while construction repairs were underway. Due to the extreme hydraulic conditions within the burn area watershed, the crossing structure was designed to overtop and, as such, was hardened with rigid pavement, slope paving, and riprap. During construction, debris flows associated with monsoonal precipitation dammed the inlet of the structure and upstream channel, but did not damage the structure. The crossing structure was successfully completed on December 10, 2014.



*Before*



*After*

## Emergency Relief for Federally Owned Roads (ERFO)

### U.S. Highway 36, Colorado Flood Damage

During the week of September 11, 2013, a storm producing heavy rains stalled over Colorado. After several days of intense rain, Colorado's Front Range from Colorado Springs to the Wyoming border experienced catastrophic flooding. Within a day, parts of Larimer and Boulder Counties in Colorado had received upwards of 20 inches of rain. Sections of U.S. 36 were severely damaged by the flooding and closed to all traffic as a result. The U.S. 36 corridor is the primary access route from the Denver Metropolitan Area to the Town of Estes Park, surrounding communities, Arapaho and Roosevelt National Forests, and Rocky Mountain National Park.

The project to restore access to the area provided a more resilient roadway and demonstrated excellent local, state, and federal government collaboration and teamwork.



Examples of the damaged roadway



Project Completion



*Recipient of the American Public Works Association 2014 Colorado Chapter — Project of the Year*

## Emergency Relief for Federally Owned Roads (ERFO)

On June 27, 2014, Kilauea Volcano erupted and the lava flow began advancing towards the community of Pahoa, on the Big Island of Hawaii. Based on the flow location, direction and advancement, it was expected to cross State Highway 130, where approximately 10,000 cars travel through Pāhoa daily on the way to school or work would have only makeshift, one-lane gravel and dirt roads access located within the lava flow's probable path. In response to the impending need, the Hawaii Volcanoes National Park executed a Decision Memorandum to Support Emergency activities for an emergency evacuation route along the Chain of Craters Road, previously closed in the 1980's due to lava flow, which would connect to State Route 130 and maintain emergency evacuation access. Residents in the flow path were placed on an evacuation advisory and notified of possible need for evacuation.

Federal Lands was called upon to provide technical expertise to support evacuation access construction performed by the County of Hawaii. Geophysics activities were used in advance of construction to identify lava tubes and hot spots mitigating risk of delay or injury while construction engineering representation was made available to provide guidance, coordination and monitoring ensuring the best interests of the stakeholders is met. In cooperation and partnership with the Hawaii Division office, plans are in place to provide funding from FHWA's Emergency Relief Program to reimburse expenses incurred immediately following the lava flow closing State Route 130. Ground breaking of the emergency project within the Park began October 24th, the same day the Governor of Hawaii requested a Presidential Disaster Declaration.





## Emergency Relief for Federally Owned Roads (ERFO)

The US Virgin Islands Department of Public Works (DPW) requested FLH assistance to provide an emergency access road in order to close an existing bridge off Route 405, located in St. Thomas. This multi-span concrete bridge was inspected by the Federal Lands Bridge inspection team and was found to be seriously deficient.

DPW then contacted EFL and requested further assistance in providing a temporary access road so the deficient bridge could be closed. This bridge provided sole access to six properties off Route 405, and was in imminent danger of failure. It was imperative to quickly construct a temporary embankment and detour road in hilly terrain in order to remove traffic from the existing bridge. To address this situation, EFL put together a contract package on a fast track and awarded a letter contract. Construction work started on January 23, 2014, and was successfully completed on February 10, 2014, with a 21-foot wide detour road in place. The deficient bridge was closed to vehicular and pedestrian traffic and a public safety hazard was safely eliminated.



**In FY 14 FLH Responded to a total of**

## **16 Disasters**

*due to heavy rain, snow and floods throughout the following areas:*

**National Forests of Alabama  
(Tuskegee, Talladega Conecuh)**

**BLM Gila District, Arizona**

**Chiricahua National Monument, Arizona**

**Coronado National Forest, Arizona**

**San Bernardino National Wildlife Refuge,  
Arizona**

**Ouchita & Ozark National Forests, Arkansas**

**Lake Seminole Recreation Area, Florida**

**Land Between The Lakes National Recreation  
Area, Kentucky**

**Lake Okatibbee Recreation Area, Mississippi**

**Noxubee National Wildlife Refuge, Mississippi**

**BLM Las Cruces District, New Mexico**

**Carlsbad Caverns National Park, New Mexico**

**Cuyahoga Valley National Park, Ohio**

**El Yunque National Forest, Puerto Rico**

**Guadalupe Mountains National Park, Texas**

*Each disaster approved for coverage under the program may have numerous damage sites.*

## Performance Management

### Federal Lands Pavement Preservation Program

By applying a cost-effective treatment at the right time, costly rehabilitation and reconstruction can be postponed. Performing a series of successive pavement preservation treatments during the life of a pavement is less disruptive to tourist activity and traffic flow than is normally associated with reconstruction projects.



*FLH team site visit to assess pavement condition before the onset of serious damage. Sleeping Bear Dunes National Lakeshore, Michigan*

## Performance Management

One pavement preservation project administered by the Central Division encompassed 14 different National Parks (13 in New Mexico and 1 in Arizona). The project work included the placement of micro seals, chip seals, fog seals, asphalt patching, asphalt crack sealing, and cape seals. The intent to preserve all asphalt paved surfaces in these Parks was successful, and demonstrated the flexibility of the pavement preservation program and FLH's ability to collaborate with multiple Parks to complete the project under one contract. The project timeline was designed and built within one year on the initial project scoping.



*Carlsbad Cavern National Park, New Mexico*



*The Point Launch, Oklahoma*



*Buckhorn Road, Chickasaw National Recreation Area, Oklahoma*



*Perimeter Road, Chickasaw National Recreation Area, Oklahoma*

## Performance Management

### Full Depth Reclamation (FDR)

FDR is a rehabilitation technique in which the full thickness of the asphalt pavement and a predetermined portion of the underlying materials (base, subbase and/or subgrade) is uniformly pulverized and blended with an additive, such as cement, to provide an upgraded, homogenous base material. FDR can be performed at 4-12 inch depths depending on the nature of existing materials. By recycling and reusing existing pavement materials, FHWA has conserved non-renewable resources and conserved energy, besides saving tax payer dollars. Use of FDR has enhanced the structural performance of the pavement by improving its ability to carry the imposed traffic loads.

One lane remains open during FDR



FDR on this project was performed at an 8 inch depth. The NPS was pleased with the process and the quality of the finished roadway and fully supports use of FDR on their future projects. Completed Roadway, Blue Ridge Parkway, Virginia.



FDR application being observed by VDOT personnel



### Knowledge Sharing

With the successful implementation of the FDR, FHWA was approached by the Virginia Department of Transportation (VDOT) and was requested to share knowledge gained and lessons learned so that VDOT can also successfully use FDR for their roadway rehabilitation projects. VDOT was invited to visit the Blue Ridge Parkway project site to see the construction operations first hand and get technical briefing by an FLH project engineer and division materials engineer. On three separate occasions during the summer of 2014, key VDOT personnel including state and district level asphalt and materials engineers, designers and project inspectors visited the site to see the work in progress. These visits also included group and individual discussions between VDOT and FLH project personnel as to the changes initiated by FLH to the industry standard reclamation process and testing and how these changes raised the quality level of the work being performed. VDOT intends to use the lessons learned by Federal Lands and shared through these site visits as they modify their specifications and design their projects that will incorporate FDR work throughout the state.

## Performance Management

### National Bridge Inspection Standards and Compliance

The FLH Bridge Office has been delegated to conduct oversight of the 19 federal bridge inspection programs throughout the country. The oversight is conducted at the Intermediate Level through a risk-based, data driven approach. This approach assesses an agency's level of compliance in 23 metrics relating to specific components of the National Bridge Inspection Standards such as inspection staff qualifications, inspection frequency, inspection procedures, inventory data, load rating and posting of bridges. As part of the review process, any metric determined to be Non-Compliant will require improvement through approved Plans of Corrective Actions (PCA). The FLH Bridge Office also conducts annual assessments at the Minimum Level to follow up on the PCA implementation progress for non-compliant metrics.

Out of 19 federal bridge inspection programs, the NBIS Compliance assessment at the Intermediate Level has been completed for 12 – Forest Service, USFWS, USACE, U.S. Navy, U.S. Army, BIA, U.S. Air Force, BOR, Tennessee Valley Authority (TVA), U.S. Department of Energy (USDOE), National Aeronautics and Space Administration (NASA), and NPS. The reviews of the remaining of 7 Federal agencies owning bridges are currently in progress and will be completed in the first quarter of 2015.

During 2014, the FLH Bridge Office has also completed the NBIS Compliance assessment at the Minimum Level for Forest Service, USACE, and U.S. Navy. These agencies have seen significant improvement of their bridge inspection program through PCA implementation.

In addition to oversight of the federal bridge inspection programs, the FLH Bridge Office provides Federal bridge owners technical and managerial advice to assist them not only in complying with NBIS but also managing their program more efficiently. As part of this effort, the FLH Bridge Office was invited to attend the Forest Service national meeting which took place the week of January 27, 2014. The Forest Service then requested that FLH prepare an estimate to perform the inspection of all bridges on the Forest Service bridge network. A briefing conference was subsequently held with the FHWA Office of Infrastructure and with the Associate Administrator for FLH on February 25, 2014, to discuss the request and the status of the PCA. The FLH Bridge Office subsequently developed and transmitted an estimate for inspection services to Forest Service.

### Federal Bridge Inspection

#### THE FLH OFFICE OF BRIDGES & STRUCTURES

*is responsible for oversight of the  
19 federal bridge inspection  
programs nationwide.*

### NBIS Compliance

*FLH provides Federal bridge owners  
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## Performance Management

### Federal Lands Transportation Roads Performance Management and Data Collaboration Workshop

FLH hosted a “Federal Lands Transportation Roads Performance Management and Data Collaboration” workshop on June 4-6, 2014 in Shepherdstown, West Virginia. Over 40 individuals attended representing staff from NPS, USFWS, BLM, Forest Service, USACE, BIA, BOR, Department of Interior Office of the Secretary, Department of Transportation Geospatial Information Office, Volpe Center, FHWA Transportation Performance Management Office, FHWA Office of Policy and FLH.



The purpose of the workshop was to:

- reconcile concerns regarding the policy on public and FLTP transportation network definitions and their impact on FLTP funding eligibility
- draft minimum standards and processes for implementing route IDs
- develop timelines for updating FLTP inventory and data elements for collecting, analyzing, reporting, and storing road condition information for all partners
- draft standards for 1-100 road condition index, building on the experiences of NPS and USFWS
- draft an approach for collecting data beyond minimum standards and data elements, depending on individual partner needs.

During the workshop “Task Teams” at both the Agency and Interagency levels were developed. Official repository(ies) of inventory, condition data and official partner interface(s) and many corresponding short term actions were identified.

The partners came to several agreements as a result of Task Team discussion and a list of items were developed:

- public and FLTP network definitions
- a process for implementing route IDs for all partners and a plan to draft and approve minimum standards
- a process to propose, validate, and operationalize an index the partners agreed to conceptually based on a 0-100 road condition index
- timelines for completing route IDs and mapping condition data to a 0-100 road condition index

The partners proposed official repositories for inventory and condition and agreed that initial road condition data will focus on pavement “between the white fog lines” and agreed to revisit data beyond minimum standards on a partner-by-partner basis at a future time.

In addition, the FHWA Office of Policy provided a brief overview of the Transportation for the Nation Program and the reasoning behind All Road Network (ARNOLD). ARNOLD brings spatial data into one platform to limit duplication efforts and provide an open source for most up to date data.



*Road Inventory Program Data Collection Vehicle, The PathRunner, Hawaii Volcanoes National Park, Hawaii*



*Road Inventory Program Team Member recording data, Golden Gate National Historical Park, Point Bonita, California*

## Performance Management

### FLH Hosts Research Scholar — Studying Asset Management

The Federal Highway Administration Office of International Programs hosted a Research Scholar this past year from Korea. Kanghyun “Kang” Seo has been on a rotational scholar assignment to the FHWA for the past 18 months. He works as an engineer for the Korean Expressway Corporation in South Korea and was chosen to come to the US to learn about Asset Management. He spent six months at DOT Headquarters and the remaining year at Eastern Federal Lands.

Kang has spent his time in Federal Lands shadowing several transportation colleagues in different disciplines within FLH, as well as our partners in the NPS, Forest Service and USFWS. He has stated that he has learned a great deal from us that will help him in his new assignment back in Korea.

The main objective of his US visit was to research the Highway Performance Monitoring System (HPMS) and to gain understanding of how to utilize a Pavement Management System, a set of defined procedures for collecting, analyzing, maintaining, and reporting pavement data, to assist in future budgeting and decision-making.



Mr. Seo is pictured here in the center flanked on the left by the FLH Road Inventory Program Coordinator, the FLH Asset Manager, and on the right by members of the FLH Bridge & Structures Office, during a site visit.

## EXAMINING ASSET MANAGEMENT

*“The most impressive thing I have learned is the HPMS...” — Kang Seo*

*“... what I have learned in the US is very helpful and precious for me...I am looking forward to contributing to the improvement of the Korean road system in the future.” — Kang Seo*

## Innovation

### Ultrasonic Shear Wave Tomography (MIRA)

#### John Coffee Memorial Bridge, Natchez Trace Parkway, Tennessee

The John Coffee Memorial Bridge, built in 1964, is nearly a mile long bridge that carries Natchez Trace Parkway over the Tennessee River. The 2 lane, 38 span, two steel plate girder bridge provides a direct route for the traveling public from Tennessee to Mississippi. Due to the limited number of bridges spanning the Tennessee River in the region, closing this bridge would add a 25 mile detour to the travelling public. In the middle of a routine bridge maintenance project to repaint guardrails, replace bridge joints and repair some minor concrete spalls an unexpected problem was discovered. During the preparation work to fix the spalls it was discovered that there was severely deteriorated concrete of unknown extent several inches thick hidden under the minor spalls. The shotcrete layer had covered up the extent of the deteriorated concrete. Deterioration extended under one of the bearings of the plate girder. Repair work was stopped due to the extent of the deterioration. Determining the extent of the deterioration and whether the bridge needed to be closed for safety became the priority. An answer was needed fast, that preferably would not require a lot of coring or other time consuming tests. FLH turned to a non-destructive testing method, known as Ultrasonic Shear Wave Tomography (MIRA), to determine the extent of the deterioration.

FLH obtained MIRA testing equipment on loan from the FHWA Office of Asset Management, Pavements, and Construction to perform the investigation of the bridge piers. MIRA was used, to “see” through the sound shotcrete layer into the deteriorated concrete underneath, and to map the extent of the deterioration so a cost effective strategy could be developed to repair the piers. A cross section scan of a pier took less than 15 minutes to complete.

MIRA scans of the concrete piers determined that only one section was damaged. Results were verified with concrete cores. MIRA allowed the targeting of resources to determine the extent of deterioration and to develop a cost effective plan to repair the piers while the bridge remained in service.



*Horizontal Concrete Coring or Concrete Core Drilling performed by FLH Bridge Inspection staff as part of the in-depth investigation into the condition of bridge piers on the John Coffey Bridge. The retrieved concrete samples were laboratory tested to evaluate the concrete and verify initial bridge inspection findings.*



*Ultrasonic Shear Wave Tomography analysis*

*John Coffee Memorial Bridge, Tennessee*



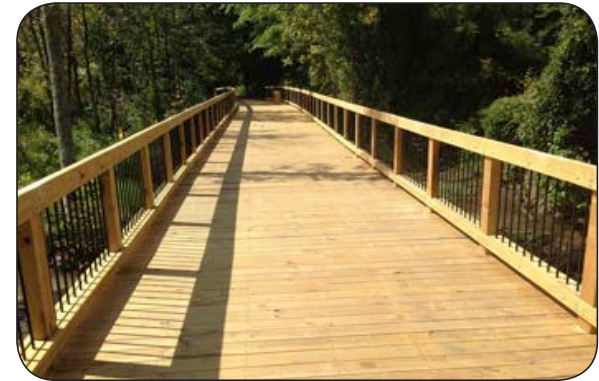
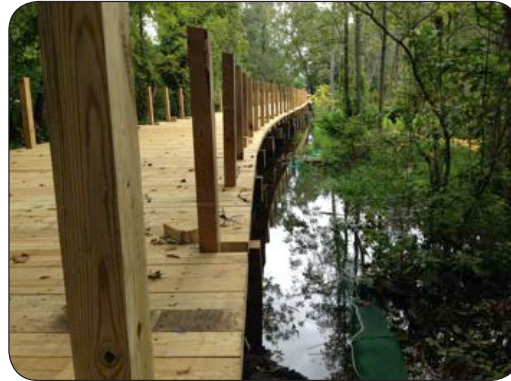


## *Innovation*

### **Helical Piles**

#### **Mount Vernon Trail Bridge Replacement, George Washington Memorial Parkway, Virginia**

This project utilized a unique foundation design to replace the 278 foot long, 10 foot wide pedestrian/bicycle timber bridge on the Mount Vernon Trail. Mount Vernon trail is an 18-mile long multi-use trail located next to the George Washington Memorial Parkway in Arlington County, Virginia. Existing piles were replaced with helical piles, a unique foundation design intended to minimize disturbance to wetland areas. Additional environmental protection measures included the use of a turbidity barrier. Construction access for bridge work was limited to the footprint of the existing bridge and the contractor was required to provide timber matting over separation geotextile to protect existing ground and vegetation.



### **Geogrid Reinforced Soil (GRS) construction**

#### **Blue Ridge Parkway Slide Repair, North Carolina**

As a result of above normal precipitation a major landslide occurred on the Blue Ridge Parkway in Buncombe County, North Carolina. Use of GRS construction was utilized in the Winter/Spring of 2014. By utilizing GRS slope construction, it was possible to reconstruct this section of roadway 275 feet long, 110 feet wide, and 38 feet high at a slope steeper than for soil embankments at 1 horizontal to 1 vertical slope. This project clearly showcases GRS technology by providing durable slide repairs using smaller footprint/less environmental disturbance and reducing construction time and materials.



## Innovation

### Use of Ground Penetrating Radar Trail Bridge Replacement, Delaware Water Gap National Recreation Area, Pennsylvania

Ground Penetrating Radar was used for in place testing of precast wall elements. The nondestructive testing to confirm rebar type and location in the precast concrete sections allowed for immediate casting after contract award. This approach provided safeguards to ensure the quality of the finished product while greatly accelerating the construction process as compared to traditional quality assurance practices.



### GRS-Integrated Bridge System (IBS) Construction Sand Creek Bridge, Oglala National Grasslands, Nebraska

GRS-IBS was used to construct the Sand Creek Bridge in Dawes County, Nebraska, which accesses the Oglala National Grasslands. Construction of both abutments (including foundations) took only 15 ten-hour work days. The project required very limited personnel and equipment. By utilizing GRS-IBS construction methods the road closure time and the need for specialized equipment and skilled-labor requirements were minimized for the project. The project was completed ahead of schedule resulting in quicker delivery and overall reduced construction cost.



## Innovation

### Contractor Manager/General Contractor (CMGC) procurement Historical Reconstruction/Safety Improvement Blue Ridge Parkway, North Carolina

This project along Blue Ridge Parkway required reconstruction of historical stone masonry retaining walls and replacement of stone masonry guardwalls with crashworthy stone faced concrete core guardwalls to meet safety requirements while maintaining the aesthetics of the parkway. Utilization of Contractor Manager/General Contractor (CMGC) procurement enabled FLH to select a contractor experienced with historic stone masonry repairs and with the local terrain. This method enabled more accurate constructability reviews and input into the design, reducing construction costs, optimizing the project budget, reducing risk for both government and the contractor, while also expediting the schedule. It was possible to provide the most efficient means of repair utilizing the most appropriate materials.



### Fiber Reinforced Polymer (FRP) Bridge Rehabilitation Wallops Island Causeway Bridge, Wallops Flight Facility NASA, Chincoteague, Virginia

FLH performed its first large scale use of FRP bridge rehabilitation at Wallops Flight Facility in Virginia. This structure is an early precast, prestressed concrete girder bridge built in 1960. The girders had delamination occurring in the bottom flanges that resulted in corrosion of the prestressing strands. Due to section loss and the load demand that NASA requires to transport its equipment to their facilities, the bridge required a solution that would restore the girders back to their original load carrying capacity as well as protect the strands from further corrosion. The proposed solution was to remove the bottom layer of gunite to determine the extent of the prestressing strand section loss. Once this was determined, an analysis was performed by FLH to determine the number of layers of FRP that were required to restore the girder. After the FRP was installed, a protective layer was added and painted to match the existing beams. In all, 46 girders were rehabilitated with FRP, in addition to two spans that had external post-tension strands wrapped to protect them from the elements.



*Carbon Fiber Wrap being installed after repair of beam surface*



*Repair material being applied to bottom of beam*



*Beam after repaired and finish coat applied*



*Causeway Bridge*

## Innovation

### Rockfall Hazard Mitigation Techniques:

#### Rock Bolt Installation Lehigh Gap, Appalachian Trail, Pennsylvania

Heavy erosion along the Appalachian Trail resulted in massive rock falls onto not just the trail, but a major State Road and a railway below. The size of material and the geometry of the site required a hybrid rockfall netting system of nearly 10,000 square yards (according to materials supplier, reported to be one of the largest such installations in North America at the time). To pin the rest of the mountain back together hundreds of rock bolts were installed for long-term stability of the mountain's many fractured faces.



#### Raised Rockfall Flexible Barrier Fence Banks-Lowman Highway, Wildlife Canyon Scenic Byway, Idaho

To address rockfall along the Banks-Lowman Highway, a raised flexible barrier fence was installed in 2014. This coupled with the raised wall, further enhances the effectiveness of the rock catchment area behind the wall providing for increased safety.



#### Wagon Drills Ketchum-Challis Highway, Sawtooth National Recreation Area, Idaho

Air powered and winch operated "Wagon Drills" along the Ketchum-Challis Highway to address the hazard of impending rockfall. These custom made drills are capable of drilling a 3.5" diameter hole up to 20' or more. The real value of these drills is their ability to access some of the steepest, highest, and most irregular terrain on the mountain to drill out the locations for rock bolts and dowels.



#### Contour Pins Ketchum-Challis Highway, Sawtooth National Recreation Area, Idaho

Draped wire mesh protection system along the Ketchum-Challis Highway in 2014. In the past, these systems have been installed free draping, without the use of contour pins. Often times this free draping creates large gaps between the mesh and the slope in locations where there are slope irregularities. These gaps can cause shadows and a "waterfall effect" that is visually distracting and unattractive. The contour pins are used to help minimize the gaps created around slope irregularities by pulling the mesh down into low spots.



## Innovation

### Design-Build

#### Deweyville to Neck Lake, North Prince of Wales Road, Alaska

On September 12, 2014, FLH officially cut the ribbon on the Deweyville to Neck Lake portion of the North Prince of Wales Road design-build project. Joining the Western Federal Lands Office, was Alaska DOT and Public Facilities, U.S. Forest Service, Alaska Department of Fish and Game, and residents and representatives of the Prince of Wales communities of Whale Pass, Naukati, Coffman Cove, Thorne Bay, Craig, and Klawock.

The \$41.6 million design-build project designed the 11-mile stretch of roadway and secured permits from the U.S. Army Corps and Alaska Department of Fish and Game in seven months. Over the course of two construction seasons, the one-lane logging road transformed into a two-lane paved roadway. The project also included construction of two bridges and installation of numerous large culvert pipes to enable fish to continue their migration upstream. The design-build request for proposals (RFP) required bidders to provide a critical path method (CPM) schedule. The schedule was used to evaluate proposals, and points were given for completing the project before the September 2015 date specified in the RFP. The awarded proposal

contained a December 2014 completion date, cutting nine months off the project. This early completion had several benefits. First, it opened the much safer new roadway to the traveling public a year earlier than anticipated. Also, by compressing the construction seasons from three to two, the potential for environmental issues related to heavy rain and erosion was dramatically reduced. From a cost-savings perspective, the early completion date reduced Western's contract administration cost by one-third.

The design-build contracting method also benefited the project and the government in other ways. Having the contractor in charge of the design allowed them to bring their construction experience, innovations, and cost savings ideas to the forefront so the engineers could incorporate those concepts into the design. Another benefit associated with the design-build delivery method was the reduced amount of paperwork. On a typical sealed bid contract, the contractor is paid on the basis of the units of work actually completed and pay notes are required to support the requested payment. With design-build, FLH contract administration staff still inspected the work to ensure compliance with the contract, but the paperwork to substantiate payment was virtually eliminated. This enabled FLH and the contractor staff to focus their time on creating efficient operations, building a quality product, and staying ahead of potential problems.



*Overnight install of fish pipes*



*Geogrid Stabilization*





U.S. Department of Transportation  
Federal Highway Administration  
Office of Federal Lands Highway