



APPENDIX D: PROFILES OF PARTICIPANT AGENCIES

Puerto Rico Highways and Transportation Authority

Speakers:

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Director, PRHTA Soil Engineering Office

Eng. Miguel Pellot

Chief of Engineering, PRHTA

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The Puerto Rico Highways and Transportation Authority (PRHTA) is a public corporation under the Department of Transportation and Public Works (DTPW) of Puerto Rico. The agency was founded by Law 74 of June 23, 1965, Law 74 of June 23, 1965 as a public corporation under the authority of DTPW. Its mission would be the development, operation and maintenance of toll roads, major highways and mass transit projects of Puerto Rico, tasks originally under the purview of DTPW. The agency started in 1966 with their first project, a new bridge for highway PR-2 across the Grande de Manatí River, and has since developed numerous other infrastructure projects throughout the Island along its 54 years of history.

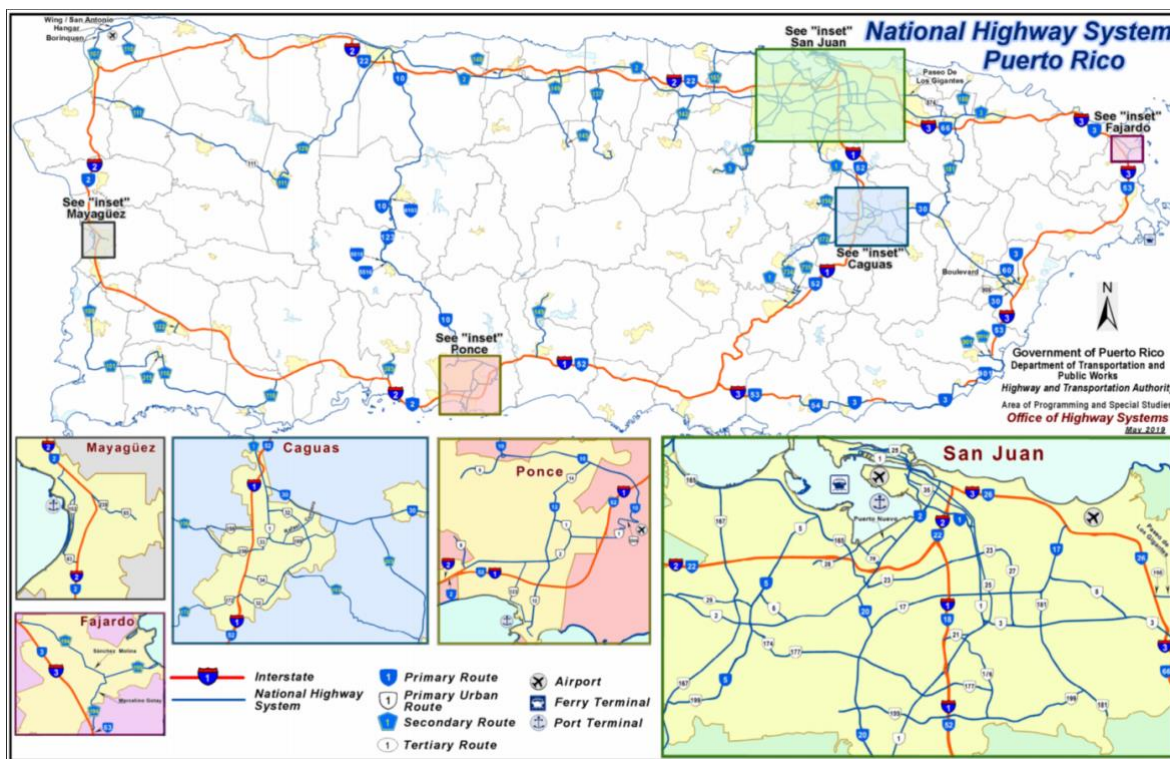


Figure D 1: National Highway System of Puerto Rico. Source: PRHTA.

As of 2019, the agency and its 1,400 employees administer 4,814 centerline miles of roads in Puerto Rico, of which 798 pertain to the National Highway System, 650 correspond to their primary road classification, 1,000 are secondary roads, 3,164 belong to the tertiary network and all of which include approximately 2,300 bridges. PR-52, the Island's first toll highway, connecting the cities of San Juan and Ponce, and starting in 1968. Other noteworthy projects include the following:

- PR-22, the Island's second toll highway, connecting the cities of San Juan and Arecibo, and starting in 1969
- The Minillas Tunnel of PR-22, with construction starting in 1978 and providing full separation of motor traffic from the urbanistic core of the Santurce ward in San Juan
- PR-26, a highway connecting the capital to the Luis Muñoz Marín International Airport starting in 1982
- the Teodoro Moscoso Bridge, the first public-private partnership project ever built in the United States and built from 1992 to 1994
- The Tren Urbano, the first metro rail transit system of the Caribbean and constructed from 1997 to 2004.

At the time of the peer exchange, PRHTA was implementing an aggressive plan for the obligation of \$155 million in funds allocated through the United States Department of Transportation, of which \$135 million for FHWA-related projects and \$20 million for FTA-related projects. These funds contribute to four key goals of the agency:

- Completion of their highway system
- Development of key improvements of the highway network
- Traffic Safety
- Congestion mitigation

Historically, PRHTA has been effective in using federal funds for these and previous objectives, but the more recently financially constrained environment has limited the agency's ability of using these funds as it has lacked the corresponding funds to complete the match. To reverse this trend, PRHTA and FHWA established a Memorandum of Understanding (MOU) in February 29, 2016, whose objective is streamlining project delivery and revamping operations, such that their share of federally-allocated funds could be used more effectively. Among the MOU's priorities are:

- Improvement of federal-aid billing procedures, These have the objective of reducing the time for payment to contractors to a maximum of 40 days of receiving the contractor's invoice, reducing physical documentation and utilizing electronic funds transfer and payment tracking
- Validation of toll credit availability, compliance with FHWA guidance and modification of toll credit utilization, such as to comply with their approval, tracking and reconciliation
- Development of organizational capacity, in which the traditional sequential procedure of planning, designing and constructing is replaced with a cycle by adding operation, preservation and data feedback for the planning of future projects, in such a way that maintaining existing infrastructure takes precedence to continue the fulfillment of the objectives associated to such assets in a 10-year horizon. Further adding to these capabilities are quality standards, strong governance, efficient organization, efficient project delivery and financial control reform; ultimately within the restrictive framework set forth by PROMESA and the Financial Oversight Management Board of Puerto Rico.
- Expediting of project delivery, which is tied to fulfilling the agency's TAMP requirements and in particular meeting federal requirements for pavement and bridge condition, following with the adoption of good asset management practices, sustaining highway conditions into the future, generation of certifiable documents and shifting the agency's staff to an asset management mindset.

Attainment of financial and organizational objectives involve the use of digital platforms, among which PRHTA uses Office 365 (e-mail), Oracle Primavera Unifier (electronic project monitoring and bidding systems), and Oracle e-Business Suite (financial billing). By July 30, 2019, attainment of the MOU tasks had reached a financial progress level of 67.0%, or \$9.04 out of \$13.5 million of the MOU budget, and a schedule progress level of 78.8%, or 1,247 out of 1,583 days, with an estimated completion date by June 30, 2020.

Along with the financial and institutional reorganization, PRHTA began the development of its Transportation Asset Management Program (TAMP). Among its core requirements, the TAMP must specify how PRHTA intends to meet federal pavement and bridge condition targets, demonstrate the adoption of good asset management practices and the sustenance of highway conditions in the future. The generated document must be certifiable, set and directed to achieve NHS pavement and bridge condition targets and meeting these objectives within the time frame. The minimum required targets are no more than 10% of NHS bridges in poor condition, no more than 5% of the Interstate highway pavements in poor conditions, and attaining the locally defined pavement condition targets for the rest of the NHS network. Failure to meet these requirements would result in a reduction of federal participation in highway project funding, to 65% of the value of eligible projects, with the consequence of reducing PRHTA's flexibility for project implementation due to the inability to meet the proportionately higher State DOT match of 35%.

Colorado Department of Transportation

Speaker:

Eng. Ty Ortiz

Manager, CDOT Geohazards Program

The Colorado Department of Transportation (CDOT) is the government agency in charge of all the State's transportation infrastructure. CDOT encompasses 5 districts, 3,000 employees, an annual VMT of 28 billion, an annual budget of \$2.1 billion for all of the state's transportation modes and servicing a population of 5 million inhabitants, of which 3 million are concentrated around the Denver metropolitan area. Some notable CDOT infrastructure assets include 3,451 bridges, 35 mountain passes and the oversight of 278 out of 522 avalanche paths of this state. Transportation, and in particular freight, represent a very large portion of Colorado's economy, moving \$341 billion worth of goods per year, equivalent to an annual 75 tons per capita and representing up to a third of economic activity, both directly and indirectly. Due to this high reliance on transportation for its economy, congestion represents a major challenge, where 1 hour of congestion affecting I-70 represents a \$1 million loss to the state's economy. In relation to geotechnical challenges, I-70 suffers periodic closures along Glenwood Canyon associated to rock falls and rock slides interrupting traffic.

CDOT actively engages in a robust Asset Management Program, encompassing 12 asset classes with an annual budget of \$764 million per year, representing 36% of the budget. Geological hazards were first incorporated in 2014 as a dedicated asset class, with a dedicated budget of \$10 million and defined separately to other geotechnical assets classes, such as tunnels, culverts and walls. Assets forming part of this program include 5,990 culverts with an inner diameter of 48 inches or more, 20 tunnels, 3,225 retaining walls and 3,437 geohazard segments of interest; all of which are of interest for cross-asset optimization goals. The program addresses issues such as landslides, rock falls, rock slides and embankment distress issues. Not included are avalanches, which currently are addressed through maintenance, but in which CDOT has interest in addressing in the Geological Hazards asset class.

Washington State Department of Transportation

Speaker:

Eng. Marc Fish

Engineering Geologist and Administrator

WSDOT Unstable Slopes Management Program

The Washington State Department of Transportation (WSDOT) is the agency in charge of the State's highway network and its other transportation systems. WSDOT is headquartered in Olympia and administers its transportation infrastructure in six regions of the State: Northwest, North-central, East, Southwest, South-central and Olympic Peninsula. WSDOT's Geotechnical Office provides services to all regions, needing up to 5 to 6 hours to reach most locations of the state, and up to 3 days when reaching the most remote parts of the distant areas. Their staff includes 11 engineers, 10 geologists and 16 drillers divided into five crews, and is directed by the State Geotechnical Engineer, a position distinct from that of the State Geologist. Among the staff duties, geotechnical engineers specialize in project management and foundations of structures (bridges, retaining walls), while engineering geologists manage projects related to linear earthworks (cuts, fills, trenches) and slope stability issues (slope ratings, mitigation designs and project management).

WSDOT has a general annual budget of \$2 billion and oversees 75,000 lane-miles of roadway, covering a land area roughly equivalent to the State of Colorado, but with twice the population. As part of its activities, WSDOT applies a wide variety of geologic and geotechnical designs to address issues related to the numerous slopes and cliffs found throughout the state, with conceptual designs incorporated into 2-year plans. These include slope blasting, rock fall nets, rock fall fences, debris flow fences, rock bolts and dowels, horizontal drainage systems, shear keys, slope benching, shear-key shaft drilling, shotcrete and slope scaling (removal of loose rock pieces).

New Hampshire Department of Transportation

Speaker:

Eng. Krystle Pelham

Engineering Geologist

NHDOT Bureau of Materials and Research

The New Hampshire Department of Transportation (NHDOT) is the agency in charge of all transportation infrastructure in the state. This DOT guides its actions in accordance to its mission and purpose statements:

- **Mission:** Transportation excellence enhancing the quality of life in New Hampshire.
- **Purpose:** Transportation excellence in New Hampshire is fundamental to the state's economic development. The Department is charged with providing safe travel options for people and goods and to provide a system that is well maintained, efficient, and reliable.

NHDOT is headed by a Commissioner, Deputy Commissioner, and the Assistant Commissioner and Chief Engineer, and is divided into five divisions: project development, operations, finance, policy and administration, and the Aeronautics, Rail and Transit division. The Asset Management Office responds directly to the Commissioner and is given a higher hierarchy than the DOT groups.

As part of its responsibilities, the DOT has 1,643 permanent employees, operates with a budget of \$668 million as of FY 2018, sourced from federal funds (33%), State Highway Fund (30%), turnpike/toll revenues (17%), general funds (7%) and capital (3%). Out of this budget, \$406 million are used for construction and aid to municipal infrastructure, while \$262 million correspond to operating costs. Its infrastructure includes the following elements:

- 4,600 centerline-miles of roadway
- 100,000 highway signs
- 75 million feet of striping
- 440 signalized intersections

- 203 miles of active state-owned rail lines
- 25 public airports and landing strips, of which 12 of these eligible for federal funding
- 12 local public transit systems
- 89 miles of turnpike (toll freeway)
- 2,161 state bridges and 1,688 municipal bridges

Geologic and geotechnical projects are created through the Project Development, but struggle to maintain a consistent funding level. Like other NHDOT projects, these undergo planning, engineering design and construction, with projects scheduled as part of 10-year transportation plans through 2-year update cycles. The bulk of geotechnical program investments derives from the \$22.4 million betterment program.

Geotechnical activities form part of the Bureau of Materials and Research, a department consisting of 22 full-time positions including administration, the Geotechnical section, Materials Technology, Pavement Management and Research. Geotechnical staff totals 15, including 3 geologists and 5 geotechnical engineers. Among the activities conducted through this section are:

- Subsurface exploration, including exploration logs
- Geotechnical evaluations and treatment developments for all DOT-owned structures: roadways, slopes, fills, bridges, walls, drainage structures, sound barriers, small buildings, among others.
- Provision of geotechnical reports summarizing evaluations and treatment recommendations
- Conduct geological evaluations of bedrock and maintaining a rock cut inventory.

FHWA Western Federal Lands

Speaker:

Eng. Douglas A. Anderson

Geologist and Engineering Geologist

Western Federal Lands Highway Division

FHWA Federal Lands Highways (FLH) is a division of the Federal Highways Administration, and unlike its parent agency, Federal Lands acts as the civil infrastructure agency and DOT for the Department of Defense, Native American Tribal Lands and the numerous Federal Land Management Agencies (FLMA's), representing approximately 30% of the land of the United States. Additionally, Federal Lands also provides assistance to states and territories in critical scenarios, such as might be the case when confronting major natural disasters. To meet its obligations, the agency has a 700-member strong staff and is divided into three regional divisions, distributed by the amount of total land area owned by the federal agencies located within each:

- **Eastern:** covers the states and territories east of the Mississippi River, headquartered in Sterling, VA.
- **Central:** covers the states and territories of the Great Plains, the Southwest and the Pacific, headquartered in Lakewood, CO.
- **Western (WFL):** covers the Pacific Northwest states and Alaska, headquartered in Vancouver, WA.

This agency provides a full lifecycle management to its infrastructure, known as a *cradle to grave* process, encompassing scoping, design, construction, inspections, operation, maintenance and rehabilitation. Its highway network overall supports low traffic volumes, but due to the variety of environments and land uses it handles, Federal Lands has its own research offices, equipment, design details, specifications and estimation documents. It also leverages the diversity of environments to deploy innovative designs and practices during their research and development stage, contributing knowledge and experience to research

and innovation programs including the State Highway Research Program (SHRP), EDC, NCHRP and the Coordinated Technology Implementation Program (CTIP).

Each fiscal year, WFL conducts 50 project designs and administers 50 construction projects, representing a financial obligation of \$200 million and approximately 200 employees. FY 2017 had a larger budget of \$242 million. Geologic and geotechnical activities are the responsibility of its Geology and Geotechnical team, consisting of 1 supervisor team leader, 3 engineering geologists and 6 geotechnical engineers/geological engineers.

WFL is conducting the Unstable Slope Management Program (USMP), one of the key elements of the agency's Geotechnical Asset Management activities in particular, and the TAMP in general. Under this program, strategies implemented primarily address low-volume roads, with the additional challenge of doing this for a wide variety of soil types and environments throughout its jurisdiction. Among the unstable slope challenges it handles are embankment failures, debris flows, mudslides, rock slides, rock avalanches and rock falls. Surpassing these in frequency and total cost is the swelling and heaving of soil and subgrades, the speaker indicates that WFL's experience with this issue can prove useful to PRHTA due to the abundance of laterite and swelling clay soils present throughout Puerto Rico.

Applying GAM throughout its jurisdiction becomes a complicated challenge due to the various customer agencies WFL has:

- National Park Service (NPS)
- U. S. Forest Service (USFS)
- Bureau of Land Management (BLM)
- Bureau of Reclamation (BoR)
- Bureau of Indian Affairs (BIA), this one representing 40% of the USDOT budget
- U. S. Fish and Wildlife Service (FWS)
- U. S. Army Corps of Engineers (USACE)

Out of these, the NPS, the USFS and the BLM tend to have the most consistent interest and funding to take on the maintenance of their transportation infrastructure, and thus have become the strongest partners of WFL.