

Preparing Transit Systems for Extreme Weather

A DVRPC Climate Adaptation Forum | October 23, 2017 | Meeting Summary

Welcome and Introductions

Rob Graff, manager of DVRPC's Office of Energy & Climate Change Initiatives, welcomed attendees and panelists. Mr. Graff described DVRPC's ongoing Climate Adaptation Forum series, of which this workshop is the fourth. Previous Forums have focused addressing the challenges climate change poses to trees and urban forestry, public health, and waterfront development. He also gave a brief overview of DVRPC's other climate resiliency work and then introduced the moderator for the day's session, Jon A. Carnegie, AICP/PP, Executive Director of the Alan M. Voorhees Transportation Center at Rutgers, The State University of New Jersey.

Presentations

Jon A. Carnegie, AICP/PP, Executive Director of the Alan M. Voorhees Transportation Center at Rutgers, The State University of New Jersey

Jon A. Carnegie, AICP/PP, introduced the Alan M. Voorhees transportation center and described its broad efforts to address pressing transportation challenges. Then Mr. Carnegie presented on the findings of [TCRP A-41](#), *Improving the Resiliency of Transit Systems Threatened by Natural Disasters*, focusing on the extreme weather portions of the research, and outlining the associated guidebook (forthcoming). Mr. Carnegie and his collaborators interviewed and researched a variety of transit agency approaches to climate and extreme weather resiliency. The guidebook presents best practices and tools for transit system operators and others looking to improve the resiliency of transit systems. The guidebook presents actionable, step-wise approach, designed for easy in-house printing and binding. The guidebook is meant to be flexible and usable to operators at different stages in a resiliency effort or those that have not yet started. The guidebook, research report, and other materials and literature will be available at resilienttransit.org.

The research and guidebook document 17 case studies and demonstrate the different, and sometimes, complementary motivations transit agencies cited for their addressing resiliency. These include: past disaster experience; as a facet of asset management and maintaining a state of good repair; as a facet of the agency's sustainability and environmental stewardship approach; or, as motivated by particular leaders inside or outside the organization.

In all this work, Mr. Carnegie emphasized the need to think beyond one's own agency, and address interdependencies with other sectors, including how transit is an essential resource for helping other sectors bounce back from an extreme weather or other disasters.

Beth Termini, Senior Director, Environment & Sustainability, Amtrak

Beth Termini's group oversees and coordinates environment and sustainability efforts at Amtrak and also manages environmental compliance and remediation. Amtrak served 31.3 million riders in FY16 and took in \$2.1 billion in ticket revenues. The system serves 46 states and 500+ rural and urban communities. Given its geography, Amtrak has experience with wide-range of extreme weather and other disruptive events. They manage a variety of risks and impacts on an ongoing basis from service suspension due to extreme weather or other events, to the effects of temperature on rail infrastructure. Amtrak has taken or will take steps to maintain resiliency, including implementing design standards for capital investment, carrying out vulnerability assessments, elevating equipment out of flood zones, investing in distributed generation and developing microgrids, as well as broader greenhouse gas reduction efforts, which will pay dividends not only for Amtrak, but also for all who will be affected by the impacts of climate change.

Rohan Hepkins, Assistant General Manager, Delaware River Port Authority / Port Authority Transit Corporation (PATCO)

PATCO is subsidiary of the Delaware River Port Authority (DRPA). PATCO operates a 13-station light-rail line in New Jersey and Philadelphia. Mr. Hepkins described the system as small and self-contained, funded by fare box revenues and by the DRPA. While small, the system covers a variety of territory, from the suburban to the urban and carries 38,000 daily weekday riders.

Hepkins described PATCO's extreme weather operations plan. This includes establishing a command center and placing employees at other regional emergency command centers (e.g. Philadelphia, New Jersey). Hepkins identified flooding as the biggest vulnerability of the system and experience in Sandy has prompted improvements at yards and the purchase of new equipment and vehicles more resilient to weather. He also described the importance, as well as the difficulty in making the decision to shut down the service before extreme weather hits. This decision must be made in coordination with local leaders, but it can keep customers and employees out of harm's way.

Dennis Stefanski, PE, Program Manager – Special Projects, Southeastern Pennsylvania Transportation Authority (SEPTA)

Dennis Stefanski, PE, started his remarks by acknowledging that we are experiencing extreme weather in Greater Philadelphia. Rather than having a specific office working on sustainability and resiliency in isolation, SEPTA seeks to engrain these values across the agency's culture. SEPTA has taken a variety of steps to increase resiliency, from the small and relatively inexpensive (e.g., sandbagging vulnerable structures prior to storms) to the more extensive and expensive (e.g., elevating equipment, developing new turn backs). SEPTA's general approach is to group climate-related vulnerabilities by functional class/group, identify vulnerable assets, and implement strategies (low cost and higher cost). They are opportunistic in implementing change as part of standard capital improvements, but also will pursue additional funding when available. He also described looking across modes, for instance, to understand how buses could be deployed during a region-wide power outage and what minimal power would be needed at depots to support these operations.

Brad Mason, Director, Capital Resilience & Continuity, New Jersey Transit Corporation (NJ Transit)

Brad Mason described resilience as inherently complex and noted that solutions don't happen "overnight." He acknowledged NJ TRANSIT suffered \$709 million in damage resulting from Superstorm Sandy. This prompted development of NJ Transit's Resilience Program (njtransitresilienceprogram.com). This effort puts a program management structure in place to implement resiliency projects, such as replacing wind-vulnerable wooden catenaries supports with steel, elevating communications huts, and hardening facilities with flood barriers. NJ TRANSIT is currently working on five primary projects: NJT Grid (100 MW gas-powered plant to energize rail lines in North Jersey in coordination with Sandia labs), hardening and elevating train control and communication huts, the Long Slip Fill and Rail Enhancement project, the Raritan River Bridge Replacement; and the Delco Lead Storage and Inspection Facility project, which will allow for safe storage of vehicles and quick inspections and deployment after disasters. Mason also described a coastal storm surge emergency warning system NJ TRANSIT is piloting at the Hoboken Terminal and Yard and the Meadows Maintenance Complex with the FTA Office of Research, Demonstration, and Innovation and Stevens Institute of Technology. Innovative storm surge monitoring and warnings may provide a stronger basis on which to make operational decisions during periods of extreme weather.

Conclusion and Next Steps

Chris Linn, manager of DVRPC's Office of Environmental Planning, thanked the panelists and gave brief summary of the day's proceedings. He encouraged continued collaboration and described how DVRPC's ongoing work serves as a way to continue the conversation in the region around these topics.