**American Association of State Highway and Transportation Officials**

**Special Committee on Research and Innovation**

FY2020 NCHRP Problem Statement Outline

**1. Problem Title**

Organizational and Operational Models used by State DOTs for Emergency Response

How are state DOTs organized to support the demands of transportation emergencies and how do they transfer resiliency to mobilize Emergency Support Function 1 (ESF1) responsibilities for local communities?

**2. Background**

NCHRP Report 525, Volume 16: A Guide to Emergency Response Planning at State Transportation Agencies was adopted in 2012 as a guide to state DOTs on how emergency response should occur within transportation agencies. Since then NCHRP has sponsored other research to add practical guidance to the emergency response function of DOTs (to be discussed below in the literature review). However, there is a gap in the research relating to recommended state DOT operational models for emergency response. The importance of the topic has been well established; the types of actions and related responsibilities have been identified; desire outcomes have been defined, but research is lacking on recommended ways DOTs should organize themselves for effectively participating in emergency response.

A key research need identified by the NCHRP Project 20-117 panel and research team is effective organizational structure for the Emergency Response activities of transportation agencies. The importance of Emergency Management activities to State DOTs is highlighted in AASHTO’s 2014 Fourth Generation Strategic Plan which helped form the basis for the new AASHTO Committee on Transportation System Security and Resilience; and, in fact, the following three of the six goals of AASHTO’s 2014 Fourth Generation Strategic Plan which helped form the basis for the new AASHTO Committee on Transportation System Security and Resilience (TSSR) are related emergency management.

* Goal 3: “Investigate, develop, and report on recent advances in infrastructure protection, security, and emergency management issues in urban and statewide environments, including consideration of their social and economic impacts.
* Goal 4: Advance the state-of-the-practice and awareness of transportation infrastructure protection and emergency management through training, technical assistance and technology transfer activities.
* Goal 5: Develop, promote and encourage effective working relationship among state transportation officials and other stakeholder responsible for various aspects of transportation infrastructure protection, emergency management and system operations.”

Organizational structure can and does make a difference in the effectiveness of emergency response and related emergency activities and initiatives.As noted in 2017 AASHTO Understanding Transportation Resilience: A 2016–2018 Roadmap for Security, Emergency Management, and Infrastructure Protection in Transportation Resilience, emergency management is an essential component of resilience, but the current frameworks may not be ideal.

For decades, State DOTs have been developing and honing all-hazards emergency response procedures and protocols, and have become adept at responding to a range of emergencies and incidents, and fulfilling their federal responsibilities, namely ESF#1 responsibilities such as emergency access and evacuation support.

However, the increased frequency and intensity of disasters have galvanized the transportation community to start focusing on resilience and systematic resilience-based approaches to plan, prepare, respond, and recover from these costly events. Further, new federal guidance requirements such as the 2015 Fixing America’s Surface Transportation (FAST) Act incorporates the concept of resilience into transportation planning guidance, and evolving and expanding state, regional, and local requirements provide State DOTs with additional impetus to integrate resilience practices and initiatives into emergency response, and identify effective organizational and operational models for emergency response. This effort will help agencies save money as well as lives and support State DOTs in their path towards resilience.

**3. Literature Search Summary**

The TRB Cooperative Research Programs and the AASHTO Special Committee on Transportation Security and Emergency Management (SCOTSEM) have sponsored and produced relevant research products related to the topic of emergency management and emergency response. The 2015 AASHTO *Fundamental Capabilities of Effective All Hazards Infrastructure Protection Resilience, and Emergency Management for State DOTs,* adopted by AASHTO in 2015, covers all-hazards planning fundamentals including response, defined as “Capabilities necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred.”

The 2010 NCHRP Report 525, Volume 16: A Guide to Emergency Response Planning at State Transportation Agencies had been adopted by AASHTO in 2012 and designed to assist executive management and emergency response planners assess plans and identify areas needing improvement. Authorized in 2015, the NCHRP 20-59(51)Bproject produced an updated Guide, *A Guide to Emergency Management at State Transportation Agencies, Second Edition*, 2017 which recognized significant advances in the field of transportation emergency management including standards and guidance at the federal level through implementation of NIMS/ICS, National Preparedness Framework and National Transportation Recovery Strategy. The work focused on all-hazards emergency management, current practices in emergency response planning and maintaining a resilient transportation system during emergencies. The updated Guide includes the nature and degree of hazards and threats; institutional context of emergency management; steps required to develop an emergency preparedness program; stakeholders and regional collaboration; and, training and exercises. The updated Guide also contains a thorough review of relevant Emergency Management literature and broadens context to community, region, resilience, and sustainability.

Responsibilities for emergency response span the entire State DOT hierarchy from senior executives to frontline personnel.*NCHRP Web‐only Document 206: Managing Catastrophic Transportation Emergencies: A Guide for Transportation Executives* is targeted towards transportation executives on managing catastrophic transportation emergencies and is useful for newly appointed executive level leaders of transportation organizations. This AASHTO guide supports agency’s emergency preparedness capabilities - preparing for, responding to and recovering from a major event – as they are critical to safe and efficient operation of the nation’s transportation network.

Coordination and public information/warning is very important during emergencies. Regional planning is discussed in *NCHRP Report 777:* *A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events* and *TCRP Report 150: Communication with Vulnerable Populations*.

Training including drills and exercises is essential in preparing emergency response personnel for their roles and can help ensure effective emergency response. Transportation Emergency Response Application or TERA, a web-based simulation system for training and exercising transportation emergency operations and response, was created through a joint TCRP/NCHRP project originally focused on transit emergency managers but later expanded to include State DOT roles as well. The project report is contained in the 2014 TCRP Web-Only Document 60 / NCHRP Web-Only Document 200: Command-Level Decision-Making for Transit Emergency Managers. NCHRP Web-Only Document 215 Incident Command System (ICS) Training for Field Level Transportation Supervisors and Staff generated NIMS/ICS field level training content on various media. *NCHRP Synthesis Report 468:* *Interactive Training for All‐Hazards Emergency Planning, Preparation, and Response for Maintenance and Operations Field Personnel*highlights the importance of Maintenance and Operations personnel in emergency preparedness and response, and identifies interactive emergency training tools and sources that may be applied by the managers of maintenance and operations field personnel along with obstacles to their implementation. An older 2006 TCRP Report 86/NCHRP Report 525, Guidelines for Transportation Emergency Training Exercises, contains useful information as well.

Cost recovery activities, an important responsibility of emergency response personnel, reimburses State DOTs for all or a portion of funds expended for eligible activities.Presented in the NCHRP Synthesis 472: FEMA and FHWA Emergency Relief Funds Reimbursements to State Departments of Transportation, 2015 are an overview of the federal disaster reimbursement programs: FHWA Emergency Relief (ER) and the Federal Emergency Management Agency (FEMA) Public Assistance (PA), challenges and effective practices of state DOTs and useful resources for the two federal programs.

Transportation aspects of large-scale, multi-jurisdictional evacuation for both notice and no-notice events are addressed in the *NCHRP Report 740: A Transportation Guide for All-Hazards Emergency Evacuation*.

The AASHTO 2016-2018 Resilience Research Program produced or is expected to produce research products relevant to this topic as it pertains to resilience:

* Deploying Transportation Resilience Practices in State DOTs (2017–2018)
* NCHRP Project 20-59(54) Resilience Research Roadmap (Pre- and Post-Summit versions) (2016–2018) – The Roadmap addressed the challenges in reconciling four interrelated topics: Critical Infrastructure; Risk Management; Protection; and All-Hazards Emergency Management by identifying resilience as the overarching strategy to unify the concepts.
* NCHRP Project 20-59(54) Transportation Resilience White Papers (2017) - White Papers providing an Economic Perspective, Environmental Perspective, and Cyber Perspective are written for transportation policy makers and executives to provide a mechanism by which they can engage their peers together with elected and appointed officials who may be unfamiliar with the conversation surrounding transportation resilience.
* NCHRP Project 20-59(55) CEO Primer on Transportation Resilience (2016) - The objectives of this project are to develop a primer and a series of briefings for state DOT CEOs and senior executives on transportation resilience. The literature review focused on theoretical and applied literature to gain an understanding of prior work, both domestic and international; its evolution into current transportation planning and policy; and the likely directions of resilience’s continued integration into DOT business practices.
* NCHRP Project 20-59(55) CEO Engagement Forums (2017–2018)
* NCHRP Synthesis 20-05/Topic 48-13 Resilience in Transportation Planning, Engineering, Management, Policy, and Administration - The objective of this synthesis study was to document resilience efforts and how they are organized, understood, and implemented within transportation agencies’ core functions and services. The case studies provide insights on resilience policy, modeling, funding, and design standards and practice.
* NCHRP Project 20-117 Deploying Transportation Resilience Practices in State DOTs (2017-2019)
  + Summit and Peer Exchange (2018)
  + Resilience Guide and Toolkit (2017-2019)

The literature review conducted through AASHTO’s Resilience Research Program and results of the projects listed above, namely, the 20-117 project, revealed several models and frameworks of organizational change (e.g., RAMCAP Plus Process being used by the Colorado DOT to incorporate resilience into its Transportation Systems Management and Operations (TSM&O) framework).

In addition, the NCHRP 20-116 project has been tentatively approved for funding and is in the initial stages of development. The project objectives are to develop and implement a comprehensive deployment and change management strategy to assist State DOTs in implementing the NCHRP 20-59(51)B Guide. Because the results of this Guide and 20-116 project contain information pertinent to organizational and operational frameworks and models for emergency response, they should be carefully mined to incorporate relevant findings and avoid duplication of work. However, the need for additional and more thorough research on best practice organizational/operational structure for emergency response still remains.

**4. Research Objective**

NCHRP currently has a project under development entitled "Emergency Management in State Transportation Agencies." This project is intended to more "effectively bridge the gap between all-hazards emergency response research and DOT practice and thereby improve the DOT’s response over a broad continuum of emergencies affecting the nation’s travelers, economy, and infrastructure."

The research objective of this requested project is to augment the purpose of the project currently in development. The project will examine how state DOTs utilize different organizational models to fulfill their Emergency Support Function 1 and related Emergency Response responsibilities, facilitate timely and effective emergency response on DOT assets and support communities impacted by different conditions that may require DOT resources to support response and recovery of operations. More specifically, the research is expected to:

* Analyze and capture the different organizational and operational models used by state DOTs
* Identify best practices and options
* Capture how the models were implemented, cost of implementation, how they were evaluated, and how they may have evolved

The methodology will likely include a survey of state DOTs and case studies of best practices implemented by state DOTs.

**5. Implementation Planning**

As discussed in a NCHRP 20-59(51)B Technical Memorandum, a recent survey of state DOTs*, 2017 State Transportation Security and Emergency Management Survey Results*, (July 2017), identified preferred methods for the effective organizational mainstreaming of emergency management into their agencies with classroom and on-line training as significantly favored by state DOTs and indicated that a mix of learning-based approaches is most suitable for agencies.

Recommendations on How to Best Deploy the Updated 51B Emergency Response Research Findings/Products into Practice presented in the NCHRP 20-59(51)B Technical Memorandum should also be consulted. They include the following Tier 1, 2, and 3 recommendations:

* Tier 1 – Best recommendations - classroom instruction, regional workshops, and webinars.
* Tier 2 – Better - a National Symposium, and
* Tier 3 – Good - Coordinated Posting of Materials via Web, Downloadable Presentations, Pocket Reference Guide, Peer Review Program, Conference Presentations, Peer-to-Peer Ambassadors, Case Studies, Peer Exchange Program, and You-Tube videos.

**6. Estimate of Problem Funding and Research Period**

Recommended Funding**:**

$600,000

Research Period:

18 Months

**7. Urgency and Potential Benefits**

Because effective emergency response is a key component of a resilient transportation organization, understanding the influence of organizational and operational structures on emergency response and best practices and options with respect to those structures is important and ultimately affects the ability of the state DOT in providing the best possible response for a given situation. This translates into lives saved, injuries averted, and damage to transportation infrastructure and assets mitigated.

As natural disasters increase in frequency and intensity, the negative impacts of the disasters on transportation assets and infrastructure and systems will increase as well. Therefore, the urgency of this project cannot be overstated.

**8. Person(s) Developing the Problem Statement**

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**9. Nomination for AASHTO Monitor**

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**10. Potentially Interested AASHTO Councils and/or Committees**

NA

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Please submit completed problem statement at:

[**http://bit.ly/NCHRP2020Submittal**](http://bit.ly/NCHRP2020Submittal)

*Questions on the process can be directed to* [*lsundstrom@nas.edu*](mailto:lsundstrom@nas.edu?subject=NCHRP%20FY2019%20Problem%20Statement%20Submittal)*.*

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