



TRANSPORTATION RESEARCH BOARD

Cooperative Research Programs Security, Emergency Management, and Infrastructure Protection Research Status Report – January 2019

Alert to Security: A Message from TRB Executive Director Neil Pedersen

Since September 11, 2001, government agencies and the American public have looked to the scientific and engineering communities to develop faster, more efficient ways to detect, thwart, and respond to terrorist attacks on the transportation system. TRB committees and research programs have responded to this challenge and have developed a bookshelf of security resources and guides for transportation professionals, decision makers, and members of the general public available on the web at www.TRB.org/SecurityPubs. In June 2015 the TRB Executive Committee designated “Resilience” as a “hot topic” along with “Transformational Technologies” and “Transportation & Public Health.”

In addition, TRB maintains a wide-ranging transportation system security and emergencies website and disseminates periodic updates on [TRB and National Academies](#) security activities.

Visit [TRB's Security and Emergencies website](#) to find links to TRB security-related publications, resources, and highlights of selected transportation security research-related activities taking place in the United States and other countries.

TRB is part of the National Academies of Sciences, Engineering, and Medicine.

Since September 11, 2001, 219 security-, emergency management-, and infrastructure protection-related planning and implementation projects have been initiated through programs managed by the Transportation Research Board (TRB). One hundred ninety-four of these projects have been completed; 19 projects are in progress; and 6 projects have contracts pending or are currently in development. This report, updated monthly, provides information on about \$32 million worth of completed and ongoing TRB security research. For more information, use the Transportation Research International Documentation (TRID) database—the world’s largest, most comprehensive bibliographic resource on published and ongoing transportation research. TRID contains more than 1.1 million records with 200,000+ links to free or fee-based full text. <https://trid.trb.org>.

This report includes information on research that is formally coordinated between the Transit Cooperative Research Program and National Cooperative Highway Research Program. The report also highlights security-related projects developed under TRB’s Airport Cooperative Research Program, Hazardous Materials Cooperative Research Program, Transit Innovations Deserving Exploratory Analysis Program, National Cooperative Freight Research Program, Legal Research Program, and Commercial Truck and Bus Safety Synthesis Program.

Surface transportation agencies recognize that because of their broad policy responsibility, public accountability, large and distributed workforces, heavy equipment, and robust communications infrastructure, they are uniquely positioned among civilian government agencies to swiftly take direct action to protect lives and property. The institutional heft of such agencies also provides a stable base for campaigns to mitigate or systematically reduce risk exposure over time through all-hazards capital investments. Work under the Cooperative Research Programs is designed to assist transportation agencies in adopting the National Incident Management System (NIMS). In his September 8, 2004, letter to state governors, DHS Secretary Tom Ridge wrote that “NIMS provides a consistent nationwide approach for Federal, State, territorial, tribal, and local governments to work effectively and efficiently together to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity.”

The American Association of State Highway and Transportation Officials (AASHTO) and the American Public Transportation Association (APTA) Security Affairs Committee provide steering direction to the coordinated CRP Security Research under NCHRP and TCRP, respectively. **TRB’s Transportation Resilience Innovations Summit and Exchange (RISE) was held in Denver, Colorado, October 8-10, 2018.** For more information, visit www.transportationris summit.com.

Project	Budget	Status	Description
ACRP (Airport Cooperative Research Program)			
2-40 Climate Change Adaptation Planning: Risk Assessment for Airports	\$500,000	Complete December 2014	Develop a climate change adaptation guidebook for airports that identifies potential impacts from climate change; assesses related airport risks; and provides guidance for managing related uncertainty, developing a prioritized actions plan, and implementing the actions plan as an adaptive management process. Published as <i>ACRP Report 147: Climate Change Adaptation Planning: Risk Assessment for Airports</i>
2-74 Integrating Climate Change Risk into Airport Management Systems	\$400,000	Complete March 2018	Develop a handbook for airport planners, management, airport operations staff, as well as others that integrates current and projected climate change-related risks into airport management systems and planning at airports of a variety of sizes, types and geographical locations. Published as ACRP Report 188: Using Existing Airport Management Systems to Manage Climate Risk
2-78 Climate Resilience and Benefit Cost Analysis--A Handbook for Airports	\$450,000	Contractor's final report anticipated November 2018	Develop a BCA handbook for airport infrastructure projects designed to improve resilience to long-term impacts of climate change and extreme weather events
3-18 Operational and Business Continuity Planning for Prolonged Airport Disruptions	\$350,000	Complete June 2013	A guidebook for airport operators to plan and prepare for catastrophic events that have the potential for prolonged airport closure causing adverse impacts to the airport, and to the local, regional, and national economy. Published as <i>ACRP Report 93</i> .
4-04 Exercising Command-Level Decision Making for Critical Incidents at Airports Phase 4	\$400,000 \$100,000	Complete December 2011	An affordable, NIMS-compliant training & exercise system for individuals and jurisdictions to use (a) in basic, remedial, & annual training, and (b) to help meet the requirements of CFR Part 139.
4-04A Evaluating the Airport Emergency Response Operations Simulation (AEROS) Tool	\$290,000	Complete September 2014	The objectives of this research are to (1) assess the overall usefulness of the AEROS simulation tool and its scenarios and (2) provide recommendations, as applicable, to ensure its effectiveness as a training tool for the airport industry.
4-04B Emergency Management Training for Airport Critical Incidents	\$219,000	Complete December 2017	<i>ACRP Research Report 187: Transportation Emergency Response Application (TERA) Support Materials for Airport EOC Exercises</i> provides tools for airport staff tasked with planning, coordinating, and facilitating a functional Emergency Operations Center (EOC) exercise. The report guides airport staff in using the TERA software to facilitate or enhance federally mandated tabletop exercises. TERA is available online . TERA is not a website hosted or supported by TRB or the National Academies; however, users may register without a fee to use the site. Templates for the exercise player briefing, exercise plan, controller/facilitator handbook, and evaluator handbook are available for download through a zipped file .
4-10 Airport-to-Airport Mutual Aid Programs	\$300,000	Complete March 2012	A guidebook to help public airport operators of all sizes and types to develop and implement national and/or regional airport-to-airport mutual aid programs (MAPs) to plan, assess, respond, and recover from an event that adversely affects operations of the airport. <i>ACRP Report 73, Airport-to-Airport Mutual Aid Programs</i>
4-11 Guidebook on Integrating GIS in Emergency Management at Airports Report 88: Guidebook on Integrating GIS in Emergency Management at Airports .	\$275,000	Complete February 2013	A guidebook for airport operators that will (1) outline the capabilities of GIS with respect to emergency management; (2) examine the benefits, costs, and challenges associated with integrating GIS into emergency management for airports and their mutual aid partners; and (3) provide guidance on implementation and use of GIS to support emergency management. <i>ACRP Report 88</i> .

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ACRP (Airport Cooperative Research Program)			
4-12 Integrating Web-Based Emergency Management Collaboration Tools into Airport Operations	\$400,000	Complete July 2013	A guidebook to be used by airports and their disaster management response team to evaluate internet based communications and control, to prepare training tools, and to provide best management practices for integration and implementation into emergency response management. <i>ACRP Report 94.</i>
4-13 Integrating Community Emergency Response Teams at Airports	\$325,000	Complete July 2013	A model CERT program for the airport community that includes (1) an awareness plan and description of benefits, (2) implementation guidance, (3) steps for integrating into airport emergency response planning, and (4) a pilot program. <i>ACRP Report 95.</i>
4-15 A Tool for Developing Airport Terminal Incident Response Plans	\$325,000	Complete April 2014	Develop a scalable tool that airport operators can use to create and maintain integrated incident response plans that address hazards in and around airport terminals. These response plans should cover evacuation, shelter-in-place, relocation, and repopulation/recovery and be applicable to a variety of sizes and types of airports and airport terminals. Hazards should include natural and man-made incidents. Published as <i>ACRP Report 112.</i>
4-19 Airport Emergency Planning Template: NIMS - Incident Command System Compliance	\$300,000	Complete August 2018	Develop (1) an electronic template that will extract airport-user input information and text through interactive sequential inquiries in order to prepare a draft airport-specific, NIMS/ICS compliant Airport Emergency Plan; (2) a user-guide, training curriculum and tools for learning how to use the template; and (3) electronic interactive instructions and guidance embedded into the template to help users understand the regulatory context of each element of the AEP with cross-references to Part 139, AC 150/5200-31C, and other relevant documents for guidance
4-20 Design Considerations for Airport Emergency Operations Centers (EOCs)	\$250,000	Complete March 2018	Identify the detailed considerations necessary to help an airport design an effective airport EOC. The detailed considerations should include, at a minimum, physical, technological, functional, operational, and governance factors. Published as <i>ACRP Research Report 189: Design Considerations for Airports EOCs.</i>
4-21 Emergency Communication Models for Persons with Disabilities and Non-English Speakers	\$400,000	Contractor's Final Report ant. August 2018	Develop guidance and tools for airports of all types and sizes that will aid in the effective communication for passengers and personnel with disabilities or other challenges during emergencies. This should include people with cultural and language differences, as well as those with access and functional needs.
5-01 Guidance for Developing Regionally-Coordinated Airport Emergency Plans for CBRNE Events	\$250,000	Complete September 2008	Guidance for plans for events involving chemical, biological or radiological (CBR) agents, or detonation of nuclear or explosive devices. <i>ACRP Report 12, An Airport Guide for Regional Emergency Planning for CBRNE Events.</i>
5-02 Airport Cyber Security Best Practices	\$350,000	Complete February 2015	(1) A guidebook to help airports develop and/or maintain a cyber security program and (2) multi-media material(s) that address risk awareness by highlighting the different cyber security threats likely to be confronted by airports that can be used by cyber security/IT professionals to educate airport staff. <i>ACRP 140: Guidebook on Best Practices for Airport Cybersecurity</i>
6-01 Airport and Air Carrier Resource Manual: Employees Coping with Traumatic Events	\$300,000	Complete June 2009	A resource manual of human-impact considerations & practices for airport & air carrier managers related to human-made accidents, attacks, or natural disaster events. <i>ACRP Report 22, Helping Airport and Air Carrier Employees Cope with Traumatic Events</i>

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ACRP (Airport Cooperative Research Program)			
6-03 Establishing a Coordinated Local Family Assistance Program for Airports	\$300,000	Complete October 2016	Develop a guidebook for airports to establish a local program to assist victims and families as impacted by an aviation disaster. Report 171: Establishing a Coordinated Local Family Assistance Program for Airports
10-10 Guidebook for Airport Irregular Operations (IROPS) Contingency Planning	\$600,000	Complete February 2012	A practical airport guidebook for commercial passenger service airports of all sizes to develop, continually evaluate, and/or update their contingency plans for procedures pertaining to IROPS that may cause significant disruptions to customers. ACRP Report 65: <i>Guidebook for Airport Irregular Operations (IROPS) Contingency Planning</i>
10-13 Integrating NIMS for Personnel and Resources at Airports	\$200,000	Complete August 2013	Guidance to all size airports in integrating NIMS in response to incidents/accidents and events regardless of the size, cause, or complexity of such events. ACRP Report 103: A Guidebook for Integrating NIMS for Personnel and Resources at Airports
10-14 Being Prepared for IROPS: A Business Planning and Decision-Making Approach	\$300,000	Complete November 2013	A reference document that provides a decision-making process for airport management to use in justifying airport planning and funding decisions (capital and O&M) related to supporting IROPS contingency planning. Report 106 .
10-20A Guidance for Planning, Design, and Operations of Airport Communications	\$ 99,000	Complete March 2017	TRB's Airport Cooperative Research Program (ACRP) Research Report 182: Guidance for Planning, Design, and Operations of Airport Communications Centers helps airports of all sizes determine which type of airport communications center best meets their operational needs. Various functions include dispatch of police, emergency response, maintenance requests, and monitoring of airport systems. In some cases, individual departments have "siloed" these functions into separate call centers. Myriad factors need to be addressed in considering the best approach to providing necessary airport services for employees and for the public. Published as ACRP Report 182: Guidance for Planning, Design, and Operations of Airport Communication Centers .
10-22 ACRP Web-Only Document 31: Improving Stakeholder Engagement in Aircraft Accident Response Planning	\$500,000	Complete January 2017	Develop (1) guidance for airports in identifying and engaging aircraft accident response stakeholders, for both the initial and long-term response, when planning for aircraft accidents and (2) educational materials, e.g., video, interactive software, etc., that airports can use to engage accident response stakeholders and help each stakeholder to understand the impact of its responsibilities within the larger context of a response to an aircraft accident.
10-23 IROPS Stakeholder Communication and Coordination	\$400,000	Complete December 2015	Develop guidance to assist stakeholder communication and coordination as airports and airlines implement IROPS contingency plans. ACRP Report 153: Guidebook for IROPS Stakeholder Communication & Coordination
10-25 ACRP Research Report 170: Guidebook for Preparing Public Notification Programs at Airports	\$200,000	Complete August 2016	(1) gather and summarize information on public-notification program goals, practices, and technologies and (2) develop guidance on planning, deployment, and operation of airport public-notification programs.
11-01/Topic 9-01, Airport Public Health Preparedness and Response: Legal Rights, Powers, and Duties	\$ 80,000	Complete February 2018 Publication pending	Develop best practices for airport lawyers and managers that outline the legal rights, powers, and duties of an airport in addressing the spread of communicable diseases through air travel
11-02 Task 5, Quarantine Facilities for Arriving Air Travelers: Identification of Planning Needs and Costs	\$ 50,000	Complete October 2007	Needs and associated costs to safely & effectively receive, quarantine, and care for up to 200 arriving air travelers. ACRP Report 5, <i>Quarantine Facilities for Arriving Air Travelers: Identification of Planning Needs and Costs</i>

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ACRP (Airport Cooperative Research Program)			
11-02 Task 6, Interagency - Aviation Industry Collaboration on Planning for Pandemic Outbreaks	\$ 100,000	Complete September 2007	A workshop of airport and airline representatives with the various federal agencies involved in responding to a potential pandemic to clarify roles, discuss issues of mutual interest, and identify further coordination activities needed. <i>Conference Proceedings 41</i> http://www.trb.org/news/blurbs_detail.asp?id=9208
11-02 Task 11, How Proposed Firefighting Standards Would Impact Airports	\$ 60,000	Complete June 2009	Contractor's final report is available as <i>ACRP Web-Only Document 7</i> . Executive summary published as <i>ACRP Research Results Digest 7</i> .
11-02 Task 13, Symposium on the Transmission of Disease at Airports and on Aircraft	\$ 100,000	Complete April 2011	<i>TRB Conference Proceedings 47: Research on the Transmission of Disease in Airports and on Aircraft</i> http://www.trb.org/Main/Blurbs/163870.aspx
11-02 Task 17, Risk Assessment of Proposed ARFF Standards	\$ 100,000	Complete January 2011	Analyze the extent to which NFPA and ICAO ARFF standards beyond FAR Part 139 requirements may be expected to reduce fatalities and/or mitigate serious injuries associated with aircraft accidents on or directly adjacent to airport property. ACRP <i>Web-Only Document 12: Risk Assessment of Proposed ARFF Standards</i> .
11-03/Topic S01-11 Continuity of Operations Planning for Small Airports	\$ 40,000	Complete October 2016	Compile effective practices applicable to smaller airports with fewer staff to assist managers in developing site-specific plans. The audience for the report is airport operators who seek practical planning tools and routine management practices to maintain resilient operational and business capacity during a disruption regardless of cause. ACRP <i>Synthesis 78</i>
11-03 Topic S04-01, General Aviation Safety Management and Security Practices	\$ 30,000	Complete May 2007	Reviews resources used in the development of safety & security programs, funding sources & issues that determine the amount of money spent on such programs, & current practices to keep GA facilities safe & secure. ACRP <i>Synthesis 3, General Aviation Safety and Security Practices</i>
11-03 Topic S04-08, Managing Aerial Firefighting Activities on Airports	\$ 40,000	Complete May 2012	ACRP <i>Synthesis 32: Managing Aerial Firefighting Activities on Airports</i> highlights current airport and agency--primarily the U.S. Forest Service--practices, policies, and procedures at airports called upon to support aerial wildland firefighting suppression efforts.
11-03 Topic S04-09, Model Mutual Aid Agreements for Airports	\$ 40,000	Complete January 2013	ACRP <i>Synthesis 45: Model Mutual Aid Agreements for Airports</i> presents information on mutual aid agreements, addressing nearly every type of emergency that could affect airports and require outside resources. The report is designed to assist airport operators in creating and sustaining effective emergency management mutual aid partnerships by documenting the specifics of existing agreements.
11-03 Topic S04-11, Synthesis 50: Effective Cooperation Among Airports and Local and Regional Emergency Management Agencies for Disaster Preparedness and Response	\$ 40,000	Complete January 2014	Survey and report on how airports interface with local emergency management agencies for disaster preparedness and disaster response. The audience for this report includes airport operators that would be called upon for disaster preparedness and response, and the local emergency management agency partners
11-03/Topic S04-12 Airport Emergency Post-event Recovery Practices	\$ 40,000	Complete May 2015	ACRP <i>Synthesis 60: Airport Emergency Post-Event Recovery Practices</i> explores approaches to improving the overall resiliency of airports through planning for the recovery phase of emergency response

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ACRP (Airport Cooperative Research Program)			
11-03/Topic S04-16 Emergency Communication Planning for Airports	\$ 40,000	Complete July 2016	ACRP Synthesis 73: Emergency Communications Planning for Airports explores emergency communications planning and is specifically designed for use by airport senior management, public information officers, and first responders and emergency managers. The report includes sample communication plan tables of contents, field operations guides, and a checklist of effective communications plans.
11-03/Topic S04-17 Table Top and Full-scale Exercises for General Aviation, Non-hub and Small Hub Airports	\$ 40,000	Complete July 2016	ACRP Synthesis 72: Tabletop and Full-Scale Emergency Exercises for General Aviation, Non-Hub, and Small Hub Airports provides small airports with the tools and practices needed to practice emergency response. The report provides sample exercise tools and plans, a checklist of effective practices for tabletop and full-scale emergency exercises, and a road map for developing an effective exercise program
11-03 Topic S10-12, Synthesis 57: Airport Response to Special Events	\$ 40,000	Complete July 2014	Explores issues related to planning, organizing, and applying lessons learned, as well as addressing potential surprises and impacts on operations and customer services related to a variety of non-aeronautical events that occur both on and off an airport. ACRP Synthesis 57 offers six case examples designed to help demonstrate how airports of all sizes plan, manage, and recover from special events
11-08(16-03) Forum on Airport Roles in Reducing Communicable Diseases Transmission	\$100,000	Contractor's Final Report anticipated December 2017	Convene an industry forum and build upon the established knowledge to discuss the challenges airports face in reducing the transmission of communicable diseases, quantify data to determine the risk of specific infectious diseases for airlines and airports, identify specific measures to mitigate the transmissions of diseases, and implementation priorities and other potential solutions and/or areas for further research. The presenters will include public health officials, epidemiologists, and airline environmental and occupational health experts.
CTBSSP (Commercial Truck & Bus Safety Synthesis Program)			
CTBSSP-1 Security Measures in the Commercial Trucking and Bus Industries	\$ 40,000	Complete April 2003	Review and summary of terrorist-related security status and needs of the trucking and commercial bus industries. Commercial Truck and Bus Safety Synthesis 2: <i>Security Measures in the Commercial Trucking and Bus Industries</i>
HMCRP (Hazardous Materials Cooperative Research Program)			
HM-01 Hazardous Materials Commodity Flow Data and Analysis	\$300,000	Complete May 2010	HMCRP Report 3: <i>Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies</i>
HM-03 A Guide for Assessing Emergency Response Needs and Capabilities for Hazardous Materials Releases	\$350,000	Complete November 2010	HMCRP Report 5: <i>A Guide for Assessing Community Emergency Response Needs and Capabilities for Hazardous Materials Releases</i>
HM-04 Emerging Technologies Applicable to Hazardous Materials Transportation Safety and Security	\$350,000	Complete November 2010	Develop a candidate list of near- and longer-term technologies for use in enhancing the safety & security of hazardous materials transportation; identify emerging technologies; and identify potential impediments to and opportunities for development, deployment & maintenance. Published as <i>HMCRP Report 4</i> .
HM-08 Consolidated Security Credential for Persons Who Transport Hazardous Materials	\$250,000	Complete February 2011	HMCRP Report 6: <i>Feasibility of a Consolidated Security Credential for Persons Who Transport Hazardous Materials</i>
HM-11 Improving Local Community Recovery from Disastrous Hazardous Materials Transportation Incidents	\$200,000	Complete June 2012	HMCRP Report 9: <i>A Compendium of Best Practices and Lessons Learned for Improving Local Community Recovery from Disastrous Hazardous Materials Transportation Incidents</i>

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HMCRP (Hazardous Materials Cooperative Research Program)			
HM-12 Hazardous Materials Transportation Risk Assessment: State of the Practice	\$200,000	Complete November 2012	Identify existing tools, methodologies, approaches, and key sources of data for assessing hazardous materials transportation risks in the public and private sectors; characterize the capabilities and limitations of each; and identify where there are significant gaps and needs in the available tools and approaches. <i>HMCRP Report 12: Hazardous Materials Transportation Risk Assessment: State of the Practice</i>
HM-15 A Guide for Communicating Emergency Response Information for Natural Gas and Hazardous Liquids Pipelines	\$250,000	Complete July 2014	Develop a guide for natural gas and hazardous liquid pipeline operators and emergency responders that (1) includes the appropriate emergency response content that should be provided to emergency responders; (2) recommends effective means of disseminating this guidance by pipeline operators to recipient emergency response organizations and by those emergency response organizations to sub-units; and (3) recommends strategies for implementing and exercising the emergency response plan. <i>HMCRP Report 14: Guide for Communicating Emergency Response Information for Natural Gas and Hazardous Liquids Pipelines</i>
NCFRP (National Cooperative Freight Research Program)			
NCFRP 17(001) Marine Highway Transport of Toxic Inhalation Hazard (TIH) Materials	\$200,000	Complete March 2012	Examine the benefits of transporting a larger share of chlorine and anhydrous ammonia via the marine highway system than is currently transported. For purposes of this study, the marine highway marketplace will be limited to U.S. domestic shipments. This includes inland waterway shipments and coastwise shipments. Published as <i>NCFRP Report 18</i> .
NCFRP 37 Making U.S. Ports Resilient as Part of Extended Intermodal Supply Chains	\$200,000	Complete April 2014	Develop a set of high level guidelines, illustrated by example studies, that will help seaport authorities as well as the state DOTs in which such ports are located to minimize lost throughput capacity resulting from a major disruption. Published as <i>NCFRP Report 30</i> .
NCFRP 50 Improving Freight Transportation Resilience in Response to Supply Chain Disruptions	\$600,000	Contractor's Final Report ant. March 2019	Improve freight transportation system resilience by developing guidance for stakeholders to mitigate and adapt to logistical disruptions resulting from regional, multi-regional, or national adverse events. The research should build upon previous or current work on the built environment. The intended audience should include state freight advisory councils and other coordinating bodies.
TCRP (Transit Cooperative Research Program)			
A-33 Communication with Vulnerable Populations: A Transportation and Emergency Management Toolkit	\$350,000	Complete March 2011	How to create a communication process to reach vulnerable populations regarding their transportation options in emergencies. This toolkit provides a guiding framework and tools for constructing a scalable, adaptable communication process built on a network of agencies from public, private, and nonprofit sectors. <i>TCRP Report 150: Communication with Vulnerable Populations: A Transportation and Emergency Management Toolkit</i>
A-33A Using Pictograms to Make Transit Easier to Navigate for Customers with Communication Barriers	\$100,000	Complete September 2012	Focus on the potential practical value of directive pictograms to discover how they could help communicate important transportation messages to diverse audiences. <i>TCRP Web-Only Document 59</i>

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TCRP (Transit Cooperative Research Program)			
A-36 Command-Level Decision Making for Transit/Transportation Emergency Managers Co-funded by NCHRP 20-59(49)	\$435,000 \$155,000 \$ 94,000 \$132,000 \$220,000 \$360,000 \$ 50,000	Contractor's Final Report ant. June 2018 First 6 scenarios complete March 2013	A NIMS-compliant training & exercise system for individuals and jurisdictions to use for free (a) in basic, remedial, & annual training, and (b) in conformance with transit regulations and standards. <i>TCRP Web-Only Document 60/NCHRP Web -Only Document 200: Command-Level Decision Making for Transit Emergency Managers</i> . See also NCHRP 20-59(49) & ACRP 4-04B
A-37 Paratransit Emergency Preparedness and Operations Handbook	\$350,000	Complete August 2012	A Handbook that provides guidance to paratransit service providers, including public transportation agencies and other public and private paratransit service providers, about how to prepare for all types of emergencies, including (a) events with notification such as floods, hurricanes, blizzards, and pandemics, as well as (b) events with no notification, including those that may cause regional disruptions such as earthquakes, power blackouts, fires, and acts of terrorism. Published as <i>TCRP Report 160</i> .
A-41 Improving the Resiliency of Transit Systems Threatened by Natural Disasters	\$350,000	Complete May 2017	TRB's Transit Cooperative Research Program (TCRP) Web Only Document 70: Improving the Resilience of Transit Systems Threatened by Natural Disasters, Volume 1: A Guide offers practices for transit systems of all sizes to absorb the impacts of disaster, recover quickly, and return rapidly to providing the services that customers rely on to meet their travel needs. The report shows how to identify and implement appropriate resilience strategies to strengthen operations and infrastructure throughout an agency. It explores ways that agencies can become more resilient through incremental adjustments in planning and small changes in what they do every day. The guide also shows how to identify critical transit-related interdependencies and engage in broader regional resilience efforts. The guide is accompanied by Volume 2: Research Overview and Volume 3: Literature Review and Case Studies .
A-44 Mitigation Strategies for Deterring Trespassing on Transit Rail Rights of Way	\$250,000	In development	Produce an industry guidebook that includes strategies to reduce the number of trespassing events on railroad rights of way. The guidance will include risk mitigation strategies such as different types of fencing, monitoring systems, design considerations, and strategies to combine risk mitigation efforts. This guidance may be useful to designers of new rail systems, existing rail transit agencies, local development firms, local municipalities, and other stakeholder entities that influence the transit system and local land development adjacent to the railroad.
A-45 Analysis of Fare Evasion Implications and Enforcement Approaches	\$150,000	In development	Report on the status and expected near-term initiatives in fare evasion and fare evasion enforcement. The final deliverable should assist transit agencies better understand the methods used to calculate the fare evasion rate and cost, the implications of fare evasion, and the effectiveness and impact of fare evasion policies.
C-18 Strategic Plan for Meeting Transit Industry Wireless Communications Needs NCHRP 20-59(40)	\$225,000 \$ 48,000 \$ 50,000	Complete October 2012	Development of strategic plan and support for standing up the Joint Council on Transit Wireless Communications. Foundation documents and timely information can be found at www.transitwireless.org . See 20-59(40).

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TCRP (Transit Cooperative Research Program)			
D-15 Effective Practices for the Protection of Transportation Infrastructure from Cyber Incidents Co-funded with NCHRP 20-59(48)	\$150,000 \$150,000	Complete December 2015 under NCHRP 20-59(48)	Develop (1) a primer and (2) a briefing for transportation system owners and operators explaining the nature of cyber events and their operational and safety impacts. Published as NCHRP Web-Only Document 221/TCRP Web-Only Document 67: Protection of Transportation Infrastructure from Cyber Attacks: A Primer .
F-18 Policing and Security Practices for Small- and Medium-Sized Public Transit Systems	\$150,000	Complete November 2014	(1) identify current policing and security practices (including the methods used to decide whether—and which—security measures to use), (2) develop baseline options for security measures and methods (including a menu of proven security measures), and (3) identify potential enhancements to existing methods appropriate for small- and medium-sized transit systems. TCRP Report 180 .
H-35 Supplemental funding for TRB Policy Study on The Role of Transit in Emergency Evacuation	\$ 65,000	Complete December 2008	Explores the roles that transit systems can play in accommodating the evacuation, egress, and ingress of people from and to critical locations in times of emergency. TRB Special Report 294: <i>The Role of Transit in Emergency Evacuation</i>
J-3 (Spring 2002) Safety and Security Issues at All-Bus Systems in Small- to Medium-Sized Cities in Western Europe: International Transit Studies Program	\$162,500	Complete June 2002	Brief report includes transportation information on the cities and facilities visited, lessons learned, and discussions of policies and practices that could be applied in the United States. TCRP Research Results Digest 58: <i>Safety and Security Issues at All-Bus Systems in Small- to Medium-Sized Cities in Western Europe</i>
J-3 (Spring 2007) Emergency Preparedness, Response, and Recovery in the Transit Industry	\$162,500	Complete June 2007	Brief report includes transportation information on the cities and facilities visited in China, Korea, and Japan; lessons learned; and discussions of policies and practices that could be applied in the United States. TCRP Research Results Digest 87: <i>Emergency Preparedness, Response, and Recovery in the Transit Industry</i>
J-4 Transit IDEA Project 35 Innovative Bioterrorism Detection Technology for Transit Security	\$ 82,000	Complete August 2005	Conduct tests of an innovative detection technology that has shown preliminary promise for real time detection of biological organisms
J-4 Transit IDEA Project 37 Bandwidth Expansion and Real-Time Surveillance for Security on Transit Buses	\$ 81,000	Complete May 2005	Develop & test enhanced real-time surveillance technology for security on transit buses, including remote viewing, monitoring, & alerting functions at a central control room
J-4 Transit IDEA Project 40 Counter Terrorism Chemical Detector for Rail Transit Systems	\$ 80,000	Complete December 2005	Develop and design a prototype technology to detect chemical agents in subway stations and rail cars.
J-4 Transit IDEA Project 42 Detection of Radioactivity in Transit Stations	\$ 81,000	Complete October 2006	Develop and test a prototype system to enable the use of “charge coupled device” (CCD) security cameras to detect and identify the nature of ambient radioactivity levels and nearby radioactive materials, particularly dirty bombs.
J-4 Transit IDEA Project 45 Chemical and Biological Decontamination System for Rail Transit Facilities	\$ 79,500	Complete January 2007	Develop and design a prototype system to deliver decontamination solutions in subway stations.
J-4 Transit IDEA Project 48 Biometric Notification Network for Transit Employees	\$ 80,000	Terminated April 2009	Develop & test a prototype biometric notification network for transit employees, contractors, & vendors. System to provide transit officials with real-time notification of biometric ID card use.
J-4 Transit IDEA Project 53 Ultraviolet Germicidal Irradiation for Transit Buses	\$ 72,000	Complete February 2009	Design, install, test, and evaluate UVGI for elimination of viruses, bacteria, mold, fungi, and airborne pathogens on transit buses. Evaluate impact on maintenance costs of bus air conditioning systems by use of UVGI.
J-4 Transit IDEA Project 54 Detection of Radioactivity in Transit Stations—Phase II	\$ 79,000	Complete October 2009	Develop & test a prototype system to enable the use of “charge coupled device” (CCD) security cameras to detect & identify the nature of ambient radioactivity levels & nearby radioactive materials, particularly dirty bombs.

Project	Budget	Status	Description
TCRP (Transit Cooperative Research Program)			
J-4 Transit IDEA Project 56A Detection of Explosives and Weapons in Transit Systems	\$ 65,000	Complete December 2014	Develop and test a small-size, low-cost, extremely low-power sensor-locator for detection of explosives and weapons in rail transit systems.
J-4 Transit IDEA Project 80 Enhancing Safety and Security of Transit Systems Using Computer Vision	\$100,000	Complete October 2017	Provide bus drivers the ability to detect distractions and fatigue during driving in order to prevent accidents. The final report is available.
J-5 Topic 7-01 Transit Security Versus Civil Rights	\$ 25,000	Complete March 2005	Legal Research Digest 20, <i>Transit Passengers and Civil Rights</i>
J-5 Topic 9-01 Privacy Issues with the Use of Smart Cards	\$ 25,000	Complete May 2007	Legal Research Digest 25, <i>Privacy Issues with the Use of Smart Cards</i>
J-5 Topic 10-01 Sidewalks and Subways—Legal Distinctions between City Streets and Mass Transit Facilities as Public Fora	\$ 24,000	Complete March 2009	Legal Research Digest 29, <i>First Amendment Implications for Transit Facilities: Speech, Advertising, and Loitering</i>
J-5 Topic 10-03 Competitive Bid Requirements Intersection with the Need for Confidentiality of Specifications for Security Purposes	\$ 25,000	Complete April 2010	Legal Research Digest 32, <i>Reconciling Security, Disclosure, and Record Retention Requirements in Transit Procurements</i>
J-5 Topic 15-02 Legal Issues in Emergency Planning and Operation	\$ 32,000	Complete August 2013	Legal Research Digest 44, <i>Legal Issues in Public Transit Emergency Planning and Operation</i>
J-5 Topic 16-02 Legal Issues Concerning Transit Agency Use of Electronic Customer Data, Estimated Compensation	\$ 49,750	Complete December 2016	TCRP Legal Research Digest (LRD) 48: Legal Issues Concerning Transit Agency Use of Electronic Customer Data explores the advantages, disadvantages, risks, and benefits for transit agencies moving to electronic, cloudbased, and other computerized systems for fare purchases and for communicating with customers. “Smart” fare cards are now commonplace, and private businesses and transit agencies are using or planning to use smartphones, smart cards and credit cards, and other systems to obtain payment, location, and other personal data from customers. This digest updates TCRP LRD 14: Privacy Issues in Public Transportation (2000) and TCRP LRD 25: Privacy Issues with the Use of Smart Cards (2008) and covers additional dimensions of collection and use of personal information using new technologies developed since those studies. Appendix A-D are available online only.
J-5 Topic 16-03 Public Transit Emergency Preparedness against Ebola and Other Infectious Diseases: Legal Issues	\$ 55,625	Complete March 2017	TCRP Legal Research Digest 50: Public Transit Emergency Preparedness Against Ebola and Other Infectious Diseases: Legal Issues examines responses to infectious disease epidemics and identifies legal issues that may be confronted by transit agencies. It considers federal and state laws and available court decisions affecting transit agencies’ responses to infectious disease outbreaks, including potential cohesiveness among transit agencies’ procedures and federal and state guidance. The digest also examines the legal basis for the protocols that public transit agencies and other transportation providers such as airlines have planned or implemented to respond to epidemics and pandemics. This report builds upon the 2014 NCHRP Report 769: A Guide for Public Transportation Pandemic Planning and Response .
J-6, Task 60 The Case for Searches in Public Transportation	\$ 30,000	Complete July 2005	Legal Research Digest 22, <i>The Case for Searches on Public Transportation</i>
J-6, Task 67 Strategic Assessment of Wireless Capabilities and Needs for the Public Transportation Industry	\$100,000	Complete December 2007	J-6/Task 67: develop a profile of current radio-frequency and wireless-data usage for the transit industry and assess future needs. Provided to APTA. See C-18 and 20-59(40).

Project	Budget	Status	Description
TCRP (Transit Cooperative Research Program)			
J-6, Task 70 Security Standards and Guidelines Pertinent to Public Transportation	\$ 50,000	Complete March 2009	Identify and categorize security standards and guidelines pertinent to public transportation, and format them in a tool supportive of standards development activities. Delivered to APTA June 2009.
J-7 Topic SA-24 Video Surveillance Uses by Rail Transit Agencies	\$ 35,000	Complete April 2011	Implementation, use, and other issues associated with rail surveillance, including stations, park and ride lots, and infrastructure. Published as TCRP <i>Synthesis 90</i> .
J-7 Topic SA-33 Critical Incident Management and Clearance Practices for Rail Transit	\$ 40,000	Complete April 2015	Information on successful practices for incidence response within the commuter rail, light rail, and rapid transit transportation industry. Published as TCRP <i>Synthesis 114</i> .
J-7 Topic SA-36 On-Board Electronic Surveillance Technologies for Buses	\$ 40,000	Complete June 2016	Document the current use of electronic surveillance technology by transit agencies onboard buses. Published as Synthesis 123
J-7 Topic SA-39 Managing Extreme Weather at Bus Stops	\$ 45,000	Complete May 2017	TCRP Synthesis 129: Managing Extreme Weather at Bus Stops documents current practices of transit systems to determine methods and procedures used for maintaining transit stops and associated infrastructure during and following such weather events. This synthesis provides a state-of-the-practice report on transit systems' management of extreme weather events; associated planning; management responsibilities; efforts to respond; standards and specifications; associated legal claims; and communication with customers.
J-7 Topic SA-40 Planning and Design for Fire/Smoke in Underground Passenger Rail Systems	\$ 45,000	Complete February 2017	Provide state-of-the-practice information for the planning, design, and operations for fire/smoke incidents in underground or enclosed conditions of passenger rail systems. Published as TCRP Synthesis 124
J-7 Topic SF-13 Improving Transit Security Update	\$ 25,000	Complete August 2008	An update of TCRP Synthesis 21, <i>Improving Transit Security</i> (1997). Documents state of the practice to include anti-terrorism techniques. TCRP Synthesis 80, <i>Transit Security Update</i> (2009).
J-7 Topic SF-14 Practices to Protect Bus Operators from Passenger Assault	\$ 35,000	Complete December 2011	TCRP Synthesis 93, Practices to Protect Bus Operators from Passenger Assault highlights practices and policies implemented by transit agencies to deter and mitigate assaults on bus operators
J-7 Topic SF-19 Addressing Difficult Customer Situations	\$ 45,000	Complete March 2017	TCRP Synthesis 127: Addressing Difficult Customer Situations explores issues surrounding difficult customers or passengers and the variety of circumstances that can arise when they utilize transit system facilities or vehicles. The report identifies current practices used by transit agencies to prevent, prepare for, and deal with these incidents
J-7 Topic SH-16 Transit Agency Practices in Interacting with People Who are Homeless	\$ 40,000	Complete March 2016	A literature review, survey of selected transit agencies, and detailed case examples/profiles will be accomplished to report on the state-of-practice, including innovations, lessons learned, challenges, and gaps in information. TCRP Synthesis 121: Transit Agency Practices in Interacting with People Who Are Homeless
J-10(1) Transit Security Roundtables	\$330,000	Complete December 2002	Four roundtables on public transportation security held January-May 2002. Report delivered to APTA Dec. 2002.
J-10(2) Security White Papers	\$ 20,000	Complete August 2002	Briefs: 1) on decontamination procedures after chem/bio/rad events; 2) technology clearinghouse options. Contractor's final reports delivered to APTA August 2002.
J-10(3) A Guide to Public Transportation Security Resources	\$ 5,000	Complete April 2003	Published as TCRP Research Results Digest 59: <i>A Guide to Public Transportation Security Resources</i>
J-10(4) International Transportation Associations Transit Security Summit	\$ 20,000	Complete September 2002	More than 60 participants from Belgium, Canada, France, Mexico, Spain, United Kingdom, and United States

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TCRP (Transit Cooperative Research Program)			
J-10A(1) Update of Federal Transit Admin. Transit System Security Program Planning Guide and Transit Security Handbook	\$150,000	Complete August 2002	Contractor's final report and companion CD delivered to FTA August 2002. On FTA web site as <i>The Public Transportation System Security and Emergency Preparedness Planning Guide</i> .
J-10A(2) Security-Related Training and Customer Communications	\$400,000	Complete December 2003	TCRP Report 86, Public Transportation Security, Volume 5: <i>Security-Related Customer Communications and Training for Public Transportation Providers</i>
J-10A(3) Intrusion Detection for Public Transportation Facilities	\$250,000	Complete March 2003	Technologies and security practices for detecting and prosecuting intruders. TCRP Report 86, Public Transportation Security, Volume 4: <i>Intrusion Detection for Public Transportation Facilities Handbook</i>
J-10A(4) Scan for Tools for Evaluating and Prioritizing Anti-Terrorist Security Measures for Transit Applications	\$ 25,000	Complete June 2003	To determine whether the development of transit-specific tools for prioritizing security measures is necessary or appropriate for transit systems. Delivered to APTA.
J-10B(1) Emergency Response Mobilization Strategies and Guidelines for Transit	\$400,000	Complete April 2004	Public transportation's role in emergency evacuation and providing staging support for emergency responders. TCRP Report 86, Public Transportation Security, Volume 7: <i>Public Transportation Emergency Mobilization and Emergency Operations Guide</i>
J-10B(2) Use of Portable Explosive Detection Devices	\$200,000	Complete February 2004	TCRP Report 86, Public Transportation Security, Volume 6: <i>Applicability of Portable Explosive Detection Devices in Transit Environments</i>
J-10B(3) Robotic Devices	\$ 20,000	Complete December 2002	TCRP Report 86, Public Transportation Security, Volume 3: <i>Robotic Devices: A Guide for the Transit Environment</i>
J-10B(4) Communication of Threats	\$ 20,000	Complete June 2002	Guidelines for peer exchange of security threats among public transportation providers. TCRP Report 86, Public Transportation Security, Volume 1: <i>Communication of Threats: A Guide</i>
J-10B(5) Transit Use of Dogs	\$ 15,000	Complete June 2002	Primer on use for security patrols, explosives detection, and chem/bio detection. TCRP Report 86, Public Transportation Security, Volume 2: <i>K9 Units in Public Transportation: A Guide for Decision Makers</i>
J-10C Guidelines for Transportation Emergency Training Drills and Exercises Co-funded by NCHRP 20-59(18)	\$100,000	Complete October 2005	For use by transportation systems and emergency responders in the planning, design, development, implementation, and evaluation of drills and exercises. <i>NCHRP Report 525/TCRP Report 86, Vol. 9, Guidelines for Transportation Emergency Training Exercises</i>
J-10D Developing and Updating Security Plans: A Pilot Course for Rural and Community-based Public Transportation Systems	\$200,000	Complete August 2005	TCRP Report 86, Public Transportation Security, Volume 10: <i>Hazard and Security Plan Workshop Instructor Guide for Rural, Small Urban, and Community-Based Public Transportation System Operations</i> .
J-10E A Guide to Transportation and Hazards Resources Co-funded by NCHRP 20-59(24).	\$ 37,500	Complete December 2008	Security-related research and resources, and an introduction to interdisciplinary research and applications undertaken by the hazards research community. NCHRP Research Results Digest 333/TCRP Research Results Digest 90, <i>A Guide to Planning Resources on Transportation and Hazards</i>
J-10F Transportation Agency Continuity of Operations Plans Co-funded by NCHRP 20-59(21).	\$100,000	Complete May 2005	Guidance for efficiently resuming transportation agency operations following a terrorist attack or other natural or man-made disasters. NCHRP Report 525/TCRP Report 86, Vol. 8, <i>Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies</i>
J-10G Making Transportation Tunnels Safe and Secure Co-funded by NCHRP 20-67.	\$200,000	Complete June 2006	Mitigation countermeasures are presented for (a) threats related to crime and terrorism and (b) hazards related to natural events. NCHRP Report 525/TCRP Report 86, Vol. 12, <i>Making Transportation Tunnels Safe and Secure</i>
J-10H Security Measures for Ferry Systems	\$150,000	Complete February 2006	Provide guidance on risk assessment approaches and on security measures. TCRP Report 86, Vol. 11, <i>Security Measures for Ferry Systems</i>

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TCRP (Transit Cooperative Research Program)			
J-10J Public Transportation Passenger Security Inspections: A Guide for Decision Makers	\$100,000	Complete February 2007	Guidance that a public transportation agency may use when considering whether to introduce a passenger security inspection program into its operations. TCRP Report 86, Vol. 13, <i>Public Transportation Passenger Security Inspections: A Guide for Policy Decision Makers</i>
NCHRP (National Cooperative Highway Research Program)			
3-63 Assessment of Sharing Information Between Public Safety and Transportation Agencies for Traffic-Incident Management	\$200,000	Complete April 2004	Presents lessons learned from around the country. NCHRP Report 520, <i>Sharing Information between Public Safety and Transportation Agencies for Traffic Incident Management</i> .
NCHRP (National Cooperative Highway Research Program)			
3-121 Incorporating Freight, Transit, and Incident Response Stakeholders into Integrated Corridor Management (ICM): Processes and Strategies for Implementation	\$400,000 \$150,000	Contractor's Implementation completion ant. September 2019	Develop guidance for transportation decision makers to incorporate freight, transit, and incident response stakeholders into the integrated corridor management (ICM) process. Publication pending
3-129 Essential Communications: A Guide to Land Mobile Radio (LMR)	\$450,000 plus \$100,000 from 20-59(38)	Contractor's final report ant. July 2020	Create a guidebook to be used in design, funding, procuring, and governing statewide, regional, or local Land Mobile Radio (LMR) systems. The guidebook and associated resources will assist state, local, tribal, and territorial departments of transportation; transit; and other public safety entities in understanding and making key decisions with respect to the selection of wireless voice and data communication systems.
8-36(34) Incorporating Security into the Transportation Planning Process: Research for the AASHTO Standing Committee on Planning	\$ 50,000	Complete June 2004	Documents strategies, processes, and practices. NCHRP Report 525 Vol. 3, <i>Incorporating Security into the Transportation Planning Process</i>
8-36 Task 69 (03) / 20-59(27) Peer Review of Disaster Response Issues in Transportation Planning	\$ 50,000	Complete October 2007	State and MPO planning directors discussed priority issues in security, disaster response, and planning. Published on the AASHTO Standing Committee on Planning website at http://www.transportation.org/sites/planning/docs/NCHRP%208-36(69-3)_Disaster_Peer_Exchange_FINAL.pdf
8-107 A Guidebook for Emergency Contracting Procedures for Administration of a Regional Emergency	\$250,000	Contractor's final report ant. December 2019	Develop a contracting strategies guidebook for concurrent regional emergencies. The primary audience is state DOTs administering multiple projects over a region involving multiple routes
12-72 Blast-Resistant Highway Bridges: Design and Detailing Guidelines	\$950,000	Complete November 2008	The objective of this project is to develop design guidance for improving the structural performance and resistance to explosive effects of new and existing bridges. NCHRP Report 645, <i>Blast-Resistant Highway Bridges: Design and Detailing Guidelines</i>
12-106 Proposed Guidelines for Performance-Based Seismic Bridge Design	\$300,000	Contractor's final report ant. March 2019	Develop: (1) proposed AASHTO guidelines for performance-based seismic bridge design and (2) proposed revisions to the AASHTO Guide Specifications for LRFD Seismic Bridge Design to link with the proposed AASHTO guidelines for performance-based seismic bridge design
12-110 Proposed New AASHTO Load Rating Provisions for Implements of Husbandry	\$550,000	Contractor's final report ant. October 2019	(1) Propose new implements of husbandry (IoH) load rating provisions for the AASHTO Manual for Bridge Evaluation (load factor rating "LFR" and load and resistance factor rating "LRFR") and related revisions to the AASHTO LRFD Bridge Design Specifications; and (2) develop a set of protocols to evaluate IoH with various configurations for load rating and overload permits

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NCHRP (National Cooperative Highway Research Program)			
14-29 Assessing, Coding, and Marking of Highway Structures in Emergency Situations	\$400,000	Complete March 2016	The objective of this project is to develop (a) a process for assessing highway structures in emergency situations, (b) guidelines for coding and marking, and (c) selected training and implementation material. Published as <i>NCHRP Report 833</i> and as <i>NCHRP Web-Only Document 223</i>
15-61 Applying Climate Change Information to Hydrologic and Hydraulic Design of Transportation Infrastructure	\$750,000	Contractor's final report ant. March 2019	Develop a design guide of national scope to provide hydraulic engineers with the tools needed to amend practice to account for climate change
17-75 Leveraging Big Data to Improve Traffic Incident Management	\$275,000	Complete August 2018 Publication pending	Provide guidelines that: (1) describe current and emerging sources of Big Data that could improve traffic incident management; (2) describe potential opportunities to leverage Big Data that could advance traffic incident management state of the practice; (3) identify potential challenges (e.g., security, proprietary, inter-operability issues) for Traffic Incident Management agencies to leverage Big Data; and (4) develop a matrix of Big Data options for Traffic Incident Management agencies to use based on their current capabilities
20-5 Topic 39-5 Transportation's Role in Emergency Evacuation and Reentry	\$ 30,000	Complete December 2008	A comprehensive and systematic review of current practice for evacuation and repopulation, considering the use of modes for low-mobility individuals. NCHRP Synthesis 392, <i>Transportation's Role in Emergency Evacuation and Reentry</i> (2009).
20-5 Topic 43-11 Expedited Procurement Procedures for Emergency Construction Services	\$ 40,000	Complete December 2012	A comprehensive and systematic review of current practice, explores procurement procedures being utilized by state departments of transportation in coordination with federal agencies to repair and reopen roadways in emergency situations. <i>NCHRP Synthesis 438</i> .
20-5 Topic 43-15 Models for Effective Emergency Medical Services Response to Motor Vehicle Crashes in Rural Areas	\$ 40,000	Complete March 2013	A comprehensive and systematic review of current practice, obtaining information on successful rural emergency responses that are able to provide emergency services within one hour on rural roads. NCHRP Synthesis 451: Emergency Medical Services Response to Motor Vehicle Crashes in Rural Areas
20-5 Topic 44-1 FEMA and FHWA Emergency Relief Funds Reimbursements to DOTs—NCHRP Synthesis 472	\$ 40,000	Complete April 2015	NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems." A comprehensive and systematic review of current practice, synthesize the range of things DOTs can do, and in some cases are doing, to ease their response effort, secure appropriate reimbursements, and simplify cost identification.
20-5 Topic 44-8 Response to Extreme Weather Impacts on Transportation Systems—NCHRP Synthesis 454	\$ 40,000	Complete May 2014	A comprehensive and systematic review of current practice, this synthesis will support the preparation of better adaptation planning and will set the stage for a unified, accessible resource that can be used to support DOT planning, preparation and budgetary requests.
20-5 Topic 44-12 Interactive Training for All-Hazards Emergency Planning, Preparation, and Response for Maintenance and Operations Field Personnel—NCHRP Synthesis 468	\$ 40,000	Complete February 2015	NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems." A comprehensive and systematic review of current practice, to identify and synthesize existing tools, training, and exercises that can be used to effectively prepare transportation maintenance and operations forces for their roles in emergencies.
20-5 Topic 45-17 Real-time Visualization of Geotechnical Data for Disaster Prevention and Response	\$ 40,000	Complete December 2014	A comprehensive and systematic review of current practice, to identify and synthesize capabilities of installed instrumentation as well as remote sensing that can be used for real-time measurement, management and visualization of geotechnical data. <i>NCHRP Synthesis 467: Visualization of Technical Data for Hazard Mitigation and Disaster Response</i>

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-5 Topic 46-11 NCHRP Synthesis 497 : Post-Extreme Event Damage Assessment and Response for Highway Bridges	\$ 40,000	Complete December 2016	Reviews the procedures that state departments of transportation and two local authorities, New York City and Los Angeles County, use to assess the damage in bridges in response to extreme events and conduct emergency response activities. Extreme events include those with geological sources (such as earthquakes and landslides), from hydro-meteorological sources (such as hurricanes and floods), or those of man-made origin, either accidental (such as truck crashes) or malicious (such as terrorist attacks).
20-5 Topic 46-16 Minimizing Roadway Embankment Damage From Overtopping	\$ 40,000	Complete August 2016	A comprehensive and systematic review of current practice, to develop a reference document for City, County and State Hydraulic Engineers to protect roadways from extended periods of inundation. <i>NCHRP Synthesis 496: Minimizing Roadway Embankment Damage from Flooding</i>
20-6 Topic 13-2 Contracting Procedures During War or a Disaster	\$ 25,000	Complete June 2007	NCHRP Project 20-6, "Legal Problems Arising Out of Highway Programs" provides authoritatively researched, specific, limited-scope studies of legal issues & problems having national significance & application. NCHRP Legal Research Digest 49: <i>Emergency Contracting: Flexibilities in Contracting Procedures During An Emergency</i>
20-6 Topic 17-3 / 20-59(41) Legal Definition of "First Responder"	\$100,000	Complete June 2013	(1) Identify the legislation, regulations, and executive orders in which the term "first responder" is defined; (2) briefly summarize the legislation / regulation / order to understand their scope and purpose; (3) provide the definition existing in the source documents; and (4) highlight any commonalities or inconsistencies between the definitions. NCHRP Research Results Digest 385: <i>The Legal Definitions of "First Responder"</i>
20-6 Topic 19-2 Legal Aspect of Environmental Permitting in the Emergency Response Environment	\$47,000	Complete December 2014	Compare and contrast environmental resource, regulatory, and other processes that various governmental entities use to facilitate recovery from catastrophic events. Government agencies stand to benefit from these case studies that demonstrate successful responses to the challenges faced. The research product will include 1) surveys of governments at the various levels for actions and processes; 2) applicable case law, statutes, regulations, and other authorities; and 3) identification of techniques and strategies to expedite recovery. NCHRP Legal Research Digest 64: <i>Legal Aspect of Environmental Permitting in the Emergency Response Environment</i>
20-6 Topic 21-4 Liability of Transportation Entity for the Unintentional Release of Secure Data or the Intentional Release of Monitoring Data on Movements or Activities of the Public	\$65,000	Complete August 2015 Published as NCHRP Legal Research Digest 71	Transportation entities collect various amounts of data for transportation related purposes. Without debating the legitimacy of the purpose for the specific data collected, what liability exists for the accidental release of data that was to be securely held by the entity for a transportation related purpose? Similarly, what liability exists for the intentional release of data generated from the monitoring of the movements or activities of the public? The main objective of this research is to review what statutes, regulations or common law exist regarding the release of data collected for transportation purposes. Included in this research are questions concerning the application of public records laws and the application of any constitutional, statutory or common law privacy rights.
20-7 Task 151A A Guide to Updating Highway Emergency Response Plans for Terrorist Attacks	\$100,000	Complete May 2002	Planning guidance for state departments of transportation incorporates the Incident Command System. Contractor's final report is available on the AASHTO web site at http://security.transportation.org/sites/security/docs/guide-ResponsePlans.pdf

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-7 Task 151B A Guide to Highway Vulnerability Assessment	\$100,000	Complete May 2002	Guidance for state departments of transportation to identify vulnerable facilities and appropriate countermeasures. The contractor's final report, <i>A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection</i> , is available on the AASHTO web site at http://security.transportation.org/sites/security/docs/guide-VA_FinalReport.pdf
20-7 Task 151C Transportation Security: Sharing Information & Task Force Support	\$ 50,000	Complete Continued as 20-59(14)	Support for the AASHTO Task Force on Transportation Security
20-7 Task 181 Multi-State Transportation Operations Program: Status and Critical Issues	\$ 50,000	Complete October 2004	June 2004 workshop provides a critical review in the development of a briefing document and presentation; shared with appropriate TRB, AASHTO, and ITE executives and committees
20-7 Task 230 Safety and Security in Roadway Tunnels	\$ 45,000	Complete April 2008	Workshop, November 2007, identified the scope of the issues, outlined needed research, & identified potential funding for underground transportation system initiatives & practices. Workshop report to AASHTO, April 2008.
20-7 Task 239 Identification and Delineation of Incident Management and Multi-Agency Emergency Response Functions	\$ 25,000	Complete September 2009	Define, compare, and contrast the functions associated with (a) day-to-day incident management activities and (b) multi-agency emergency response activities in order to define and target state DOT job functions, research, training, and committee related activities. Published as NCHRP Report 525, Vol. 16, Appendix L— White Paper on Emergency Response Functions and Spreadsheet Tool for Emergency Response Functions
20-7 Task 321 Developing a Framework for Emergency Responder/Roadside Worker Struck-by/Near-miss Database	\$ 50,000	Complete April 2013	Identify data inputs and assess and recommend data collection protocols as a first step in developing the struck-by/near-miss database for roadside workers and emergency responders. The final report has been disseminated to AASHTO and is available for download here .
20-7 Task 345 Planning for Transportation System Management & Operations	\$ 80,000	Complete June 2014	Understand the state of the practice in highway and traffic operations program planning and to begin defining alternative approaches to develop and administer these plans. The final report has been disseminated to AASHTO and is available for download here .
20-7 Task 352A Strategic Plan for the AASHTO Highway Subcommittee on Systems Operations and Management	\$ 35,000	Complete December 2013	Refocus SSOM's strategic plan. The final strategic plan has been delivered to the Committee for their use.
20-7 Task 352B Plan for the Transportation Operations Center of Excellence	\$ 60,000	Complete August 2014	Develop a plan for the establishment of an Operations Center of Excellence. Briefing material was prepared for the AASHTO Annual Meeting. The final plan has been delivered to the AASHTO Highway Subcommittee on Systems Operations and Management for their use.
20-7 Task 359 Next Generation National Transportation System Management & Operations (TSM&O) Research Framework	\$ 83,000	Complete January 2016	Create a plan for developing a sustainable transportation system management and operation (TSM&O) research program. \$ 12,100 in project funds have been set aside for a workshop.

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-7 Task 365 Strategic Transportation Systems Management & Operations Program Planning Lead States Initiative Development & Evaluation	\$ 90,000	Complete September 2016	(1) Coordinate incorporation of the AASHTO Guide to System Operations Management CMM methodology into the application of the TSM&O Program Planning Framework in transportation agencies of several lead states; (2) Coordinate peer comparison and evaluation of these lead state application experiences; (3) Summarize lessons learned and opportunities for refinement of both the CMM methodology and the Program Planning Framework, as well as the agency-specific program planning processes utilized; and, (4) Document guidance for continued integrated application of the CMM and Framework techniques. Publication pending. Contractor's final report is available for download.
20-7 Task 378 Assessing Risk for Bridge Management	\$100,000	Complete September 2016	Develop proposed AASHTO guidelines for a data-driven risk assessment at the bridge and structure level. At the minimum, the guidelines should consider risks from natural and man-made hazards and should be suitable for use in a bridge management system. Agency's final report was submitted to the AASHTO SCOBS, T-1 Security
20-24(109) Research on Enhancing Transportation System Resilience	\$500,000	See 20-59(54) & 20-59(55)	Develop a resilience research roadmap and resilience white papers that will inform a primer and series of briefings for senior executives on transportation resilience
20-59(1) AASHTO Security Research Workshops and Forums	\$100,000	Complete April 2003	Identification & prioritization of a research agenda for state DOTs, US DOT, and NCHRP. Phase 1 report (April 2002) on AASHTO web site. Phase 2 workshop support complete April 2003.
20-59(2) Bridge/Tunnel/Highway Infrastructure Vulnerability Workshops	\$277,000	Complete June 2004	Regional, interactive workshops: NY, TX, CA. NCHRP Report 525 Vol. 4, <i>A Self-Study Course on Terrorism-Related Risk Management of Highway Infrastructure</i>
20-59(3) Blue Ribbon Panel on Bridge and Tunnel Security	\$128,200	Complete September 2003	Expert group meeting & establishing guidelines (includes \$63,200 from FHWA). <i>Recommendations for Bridge and Tunnel Security</i> (2003) is on the FHWA web site at http://www.fhwa.dot.gov/bridge/security/brp.pdf
20-59(4) White Paper on Highway Security Issues for Reauthorization	\$ 25,000	Complete April 2002	Transportation reauthorization recommendation changes due to new security needs. Contractor's final report delivered to AASHTO April 2002
20-59(5) National Needs Assessment for Ensuring Transportation Infrastructure Security	\$150,000	Complete December 2002 See 20-59(26).	Transportation facilities needs assessment, with recommendations to meet new security needs. Contractor's final report is on AASHTO web site.
20-59(6) State DOT Field Personnel Security Manual	\$ 50,000	Complete October 2003	Guidance for DOT field personnel as stand-alone document. NCHRP Report 525 Vol. 1, <i>Responding to Threats: A Field Personnel Manual</i>
20-59(6A) State DOT Field Personnel Security Training CD	\$ 40,000	Complete December 2005	Stand-alone CD-ROM based training program for self-instruction. NCHRP Report 525 Vol. 7, <i>System Security Awareness for Transportation Employees</i>
20-59(6B) Enhanced DOT Participation in NTI Train-the-Trainer Workshops for Security Awareness	\$100,000	Complete September 2009	National Transit Institute training for several modes is available by direct delivery and in train-the-trainer versions.
20-59(7) Transportation Security Information Clearinghouse 20-59(7A) Support to Panel in Developing ISAC Recommendations	\$125,000 \$ 25,000	Complete February 2006	Development and one year of operation of a web-based clearinghouse for transportation security information. 20-59(7/Task 1) TSIC Outreach & Support cancelled.
20-59(8) Emergency Transportation Operations Preparedness and Response Workshop: Adaptations for Rural and International Border Crossing Situations	\$195,000	Complete January 2004	Regional, interactive workshops held in Washington, New Mexico, Minnesota, and Idaho Contractor's final report delivered to AASHTO February 2004
20-59(9) Methods for Determining Transportation and Economic Consequences of Terrorist Attacks	\$250,000	Complete October 2005	NCHRP Report 525 Vol. 11, <i>Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points</i>

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NCHRP (National Cooperative Highway Research Program)			
20-59(10) Secure Communication Infrastructure	\$378,600	Complete April 2004	NCHRP Report 525 Vol. 2, <i>Information Sharing and Analysis Centers: Overview and Supporting Software Features</i>
20-59(11) Emergency Traffic Operations (ETO) Management	\$350,000	Complete February 2005	Guidance for state DOTs to coordinate activities with law enforcement, fire service, and emergency management. NCHRP Report 525 Vol. 6, <i>Guide for Emergency Transportation Operations</i>
20-59(11A) ETO Guide Implementation Planning	\$100,000 \$ 5,000	Complete January 2007	A workshop was held in March 2006. Contractor's final report and brochure delivered to AASHTO February 2007.
20-59(12) Follow-up Security and Emergency Response Survey of State Transportation Agencies	\$ 500	Complete August 2004	2003 follow-up to the TRB/AASHTO November 2001 Security and Emergency Response Survey of State Transportation Agencies.
20-59(13A) Follow-up on A Guide to Updating Emergency Response Plans for Terrorist Incidents	\$ 6,000	Complete November 2003	Comments on 20-7/151A A Guide to Updating Highway Emergency Response Plans for Terrorist Attacks
20-59(13B) Follow-up on A Guide to Highway Vulnerability Assessment for Critical Asset Identification & Protection	\$ 35,000	Complete June 2004	User comments on Project 20-7/151B, including those stimulated by a presentation and a half-day workshop conducted under this project.
20-59(14) Support for the AASHTO Special Committee on Transportation Security	\$223,000	Complete December 2007	(continuation of 20-7/151C). NCHRP Report 525 Vol. 5, <i>Guidance for Transportation Agencies on Managing Sensitive Information</i> .
20-59(14A) Research Support for AASHTO's Special Committee on Transportation Security and Emergency Management (SCOTSEM)	\$ 91,000	Complete September 2012	Research support for the SCOTSEM strategic plan; support for SCOTSEM information dissemination practices; research support for SCOTSEM meetings; development, administration, and analysis of the SCOTSEM Security Survey; and general research support for the SCOTSEM committee, subcommittees, and task forces.
20-59(14B) Research Support for the AASHTO Special Committee on Transportation Security and Emergency Management (SCOTSEM)	\$245,000	Complete September 2015	Produce three products to be considered for use by SCOTSEM: (1) the National Needs Assessment for Ensuring Transportation Infrastructure Security (2016-2022); (2) the All Hazards Security and Emergency Management Research Implementation Plan (2014-2016); and (3) <i>Fundamentals of Effective All Hazards Security Management for State DOTs</i> (Second Edition)
20-59(14C) Strategic Plan Implementation Support for the AASHTO Special Committee on Transportation Security and Emergency Management (SCOTSEM)	\$ 15,000 \$100,000	Complete February 2017	Provide technical and strategic support to the SCOTSEM transition per the adopted <i>4th Generation Strategic Directions</i> . Facilitate research deployment/dissemination. Coordinate/integrate outreach and stakeholder engagement. Final report delivered to AASHTO SCOTSEM Leadership Team.
20-59(15) AASHTO Modifications of Consultant Reports	\$ 0	Cancelled December 2010	Editorial support for converting consultant reports to AASHTO publications. Anticipated need did not develop.
20-59(16) Preparation of Educational Materials: Outreach	\$ 50,000	Complete January 2005	Materials for communicating specifically to federal agencies outside the FHWA. To AASHTO, January 2005.
20-59(16A) Preparation of Educational Materials: Funding Guide	\$ 50,000	Complete October 2004	Materials for communicating funding opportunities to state transportation agencies. Final report on AASHTO website.
20-59(16B) Security Framework: Fundamentals of Transportation Security for DOTs	\$ 100,000	Complete December 2007	Compelling, understandable materials to effectively communicate to state DOT leadership (a) goals for transportation security and (b) fundamental actions that state transportation agencies can take and have taken. To AASHTO, February 2008.
20-59(17) Guide to Risk Management of Multi-modal Transportation Infrastructure	\$400,000 \$245,000	Complete September 2008 TRB Webinar held 4 November 2009	CAPTA provides users with a <i>capital planning and budgeting tool, used as a strategic point of departure for resource allocation decisions</i> . CAPTA enables an executive to base allocation decisions on objective data about assets. NCHRP Report 525, Vol. 15, <i>Costing Asset Protection, An All Hazards Guide for Transportation Agencies (CAPTA)</i> . See 20-59(50)

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-59(18) Guidelines for Transportation Emergency Training Drills and Exercises Co-funded by TCRP J-10C	\$100,000	Complete October 2005	For planning, design, development, implementation, and evaluation of drills and exercises. NCHRP Report 525/TCRP Report 86, Vol. 9, <i>Guidelines for Transportation Emergency Training Exercises</i>
20-59(19) Transportation Response Options: Scenarios of Infectious Disease, Biological Agents, Chemical, Radiological or Nuclear Exposure: Transportation's Role in Public Health Emergencies	\$251,000	Complete October 2005	Technical information on chemical, biological, and radiological threats; vulnerabilities of the transportation system to these agents; consequence-minimization actions that may be taken. Includes a software tool, user's guide, and executive briefing slides. NCHRP Report 525, Vol. 10, <i>A Guide to Transportation's Role in Public Health Disasters</i>
20-59(20) Enhanced Communications Interoperability: Assessment of Emerging Voice/Data Integration Tools	\$ 0	Cancelled December 2003 due to overlap with FHWA.	Develop a framework/guide/service for use by the transportation community and others to prepare for the purchase or management of interoperable communications /data transmission systems and networks. Cancelled.
20-59(21) Transportation Agency Continuity of Operations Plans Co-funded by TCRP J-10F.	\$100,000	Complete May 2005	Develop guidance for efficiently resuming transportation agency operations following a terrorist attack or other natural or man-made disasters. NCHRP Report 525/TCRP Report 86, Vol. 8, <i>Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies</i>
20-59(22) Guidelines for Emergency Quarantine and Isolation Controls of Roads in Rural Areas	\$200,000	Complete May 2008	Establish recommended practices and procedures for emergency quarantine and isolation controls for local and state roads with minimal resources typical for a rural region. NCHRP Report 525, Vol. 13, <i>A Guide to Traffic Control of Rural Roads in an Agricultural Emergency</i>
20-59(23) A Guide to Emergency Response Planning at State Transportation Agencies	\$300,000	Complete September 2009	Develop a recommended Guide for use by state transportation agencies in planning and developing their organizational functions, roles, and responsibilities for emergency response within the all-hazards NIMS context. NCHRP Report 525, Vol. 16, <i>A Guide to Emergency Response Planning at State Transportation Agencies</i>
20-59(24) A Guide to Transportation and Hazards Resources Co-funded by TCRP J-10E.	\$ 37,500	Complete December 2008	Security-related research and resources, and an introduction to interdisciplinary research and applications undertaken by the hazards research community. NCHRP Research Results Digest 333/TCRP Research Results Digest 90, <i>A Guide to Planning Resources on Transportation and Hazards</i>
20-59(25) Security Research Plan	\$ 75,000	Complete October 2007	Develop a recommended 3-year security research plan for consideration by the AASHTO Special Committee on Transportation Security. Delivered to AASHTO.
20-59(26) National Needs Assessment for Transportation Security	\$ 99,000	Complete September 2008	Update of the 2002 transportation facilities needs assessment, with recommendations to meet new security needs. Delivered to AASHTO.
20-59(27) / 8-36 Task 69 (03) Peer Exchange Series on State and Metropolitan Transportation Planning Issues: Disaster Response Issues in Transportation Planning	\$ 50,000	Complete October 2007	A peer review session bringing together several state and MPO planning directors to discuss priority issues in security, disaster response, and planning. Available at http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1283
20-59(28) Security 101: Physical Security Standards and Guidelines for Transportation	\$ 50,000	Complete August 2008	Identify concepts of operations and reference design considerations. NCHRP Report 525, Vol. 14, <i>Security 101: A Physical Security Primer for Transportation Agencies</i>
20-59(29) Transportation Security Research Implementation Plan	\$ 90,000	Complete November 2010	Recommendations for institutionalizing security elements into transportation (e.g., training, workshops, peer exchanges). Delivered to AASHTO.
20-59(30) Incident Command System (ICS) Training for Field Level Transportation Supervisors and Staff	\$100,000	Complete December 2015	Develop specialized Incident Command System (ICS) training for field level transportation supervisors and staff; the intended audience is state transportation agency field staff members, but the training would also be applicable to city and county transportation field staff members. Published as <i>NCHRP Web-Only Document 215</i> .

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-59(30A) Train-the-Trainer Regional Workshops for NCHRP 20-59(30) <i>Incident Command System for Field Level Transportation Supervisors and Personnel</i>	\$150,000 \$300,000	Contractor's Final Report anticipated April 2019	Create the documentation for a train-the-trainer course to increase the number of trainers available to deliver the course nationally. The course will be piloted at four regional locations, then taken to individual states
20-59(31) Co-Location of Emergency Operations Centers and Intelligent Transportation Centers	\$ 0	Cancelled May 2009 due to overlap with FHWA	Consider the roles of the Emergency Operations Center (EOC) and the Intelligent Transportation Center (ITC) during emergencies, disasters and catastrophes. Review the types of technology used; conduct case studies; consider the design for day to day uses and disaster response, cost benefit of co-location, case studies of real events where ITC assets have served a disaster response role in the US and abroad, seek out lessons learned from real events in the US and abroad. Cancelled.
20-59(32) A Transportation Guide for All Hazards Emergency Evacuation	\$300,000	Complete May 2012	Develop specific all hazards transportation guidance consistent with lessons learned as a result of major incidents. Published as <i>NCHRP Report 740: A Transportation Guide for All Hazards Emergency Evacuation</i> .
20-59(33) Pre-Event Planning to Support Transportation Infrastructure Recovery	\$150,000	Complete November 2012	Develop a guide that provides pre-event recovery planning principles, processes, tools, and appended resource materials for use by planners and decision makers in pre-event planning to support transportation infrastructure recovery. Published as <i>NCHRP Report 753, A Pre-Event Recovery Planning Guide for Transportation</i> .
20-59(33)A Update of A Pre-Event Recovery Planning Guide for Transportation	\$ 30,000	In development	An overall review and update of NCHRP Report 753, A Pre-Event Recovery Planning Guide for Transportation.
20-59(34) Methodologies to Estimate the Economic Impacts of Disruptions to the Goods Movement System	\$300,000	Complete June 2012	Describes the impacts of bottlenecks and interruptions to the flow of goods through the nation's major freight corridors and intermodal connectors, the dynamics of that flow in response to disruptions, and the full economic impact on public and private entities beyond just the critical infrastructure and the carriers that depend on that flow. Published as <i>NCHRP Report 732</i> .
20-59(35) Securing Transportation Structures, Systems, and Facilities—Long Term R&D Plan	\$ 0	Cancelled	Identify and define problems in the area of transportation security that need to be solved through R&D. Reach out to owners, practitioners, experts and others in each different area of transportation modes and determine critical problems that exist for securing the facilities. This list of essential needs will be used by others to develop long term, long range R&D plans.
20-59(36) Managing Catastrophic Transportation Emergencies: A Guide for Transportation Executives	\$100,000	Complete March 2014	Develop a Guide for preparing transportation agency executives and senior leaders for their roles and decision points in response to and recovery from catastrophic emergencies, including those in which transportation systems are affected. Published as <i>NCHRP Web-Only Document 206: Managing Catastrophic Transportation Emergencies: A Guide for Transportation Executives</i> and as an AASHTO publication
20-59(37) Debris Management Handbook for Local and State DOTs	\$150,000	Complete January 2014	Handbook with recommended practices and procedures for debris management for local, tribal, and state transportation and public works agencies. <i>NCHRP Report 781: A Debris Management Handbook for State and Local DOTs and Departments of Public Works</i>
20-59(38) Voice and Data Interoperability for Transportation	\$100,000	Incorporated into NCHRP 3-129	Develop a guide that will assist transportation and transit agencies in making key decisions with respect to the identification and selection of interoperability hardware and related choices.

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-59(39) Synthesis of Airport Closings and Emergency Evacuation Problems	\$ 0	Cancelled November 2011 due to overlap with ACRP Project 4-15	Capture data on the specific problems that recent airport closings or evacuations have caused and present recommendations and solutions on how such disruptions can be handled so as to reduce the adverse impact on travelers and air industry personnel alike, protect the health and safety of these individuals, and be prepared to address the substantial problems that travelers, the general public, and employees will face.
20-59(40) Transit Wireless Communications Joint Council Establishment	\$ 50,000	Complete October 2012	Provide initial support for the establishment of a Joint Council to implement the strategic plan per recommendations of TCRP Project C-18, Strategic Plan for Meeting Transit Industry Wireless Communications Needs.
20-59(41) / 20-6 Topic 17-3, Legal Definition of "First Responder"	\$100,000	Complete June 2013	1) identify the legislation, regulations, and executive orders in which the term "first responder" is defined; 2) briefly summarize the legislation / regulation / order to understand their scope and purpose; 3) provide the definition existing in the source documents; and 4) highlight any commonalities or inconsistencies between the definitions. Published as NCHRP RRD 385, The Legal Definitions of "First Responder"
20-59(42) A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events	\$250,000	Complete December 2013	A Guide with principles and resources for facilitating regional transportation planning, coordination, and operations across all modes for disasters, emergencies, and significant events. Published as NCHRP Report 777: A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events
20-59(43) Incorporating Transportation Security Awareness into Routine State DOT Operations and Training	\$100,000	Complete May 2014	Develop a guide for incorporating transportation security awareness into routine state DOT operations and training. Published as NCHRP Report 793
20-59(44) A Guide for Public Transportation Pandemic Planning and Response	\$200,000	Complete December 2013	Pandemic planning guide for use by all transit agencies with emphasis on (a) small urban and rural transit agencies; (b) human service transportation providers; and (c) the state DOTs that provide oversight for grant recipients in both categories. Published as NCHRP Report 769: A Guide for Public Transportation Pandemic Planning and Response .
20-59(46) Development of Peer Review and Peer Exchange Programs for Security and Emergency Management	\$ 36,000	Complete August 2012	Security and emergency management peer exchange for State DOTs. The 2012 Peer Exchange was supported by TRB and AASHTO staff.
20-59(47) Emergency Exit Signs and Marking Systems for Highway Tunnels 20-07(336)	\$150,000 plus \$ 50,000	Complete August 2015	Develop a proposed guide for emergency exit signs and marking systems (i.e., visual and audible) for highway tunnels, incorporating the most current technology and results of recent studies of human response in emergency evacuation. The proposed guide for emergency exit signs and marking systems should be presented in a format suitable for consideration in appropriate standards. NCHRP Web-Only Document 216
20-59(48) Effective Practices for the Protection of Transportation Infrastructure from Cyber Incidents Co-funded with TCRP D-15	\$150,000 \$150,000	Complete December 2015	Develop (1) a primer and (2) a briefing for transportation system owners and operators explaining the nature of cyber events and their operational and safety impacts. Published as NCHRP Web-Only Document 221/TCRP Web-Only Document 67: Protection of Transportation Infrastructure from Cyber Attacks: A Primer
20-59(49) Facilitation and Coaching Support for the 50 States Exercise: Command Level Decision Making Co-funded with TCRP A-36	\$ 94,000 \$132,000 \$220,000 \$435,000 \$155,000 \$360,000 \$ 50,000	Contractor's Final Report anticipated June 2020	Exercise support for the 2012 and 2013 security and emergency management peer exchanges for State DOTs http://www.trb.org/Calendar/Blurbs/166997.aspx . New scenarios and support for on-site support are co-funded with TCRP A-36. Also see ACRP 4-04B

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-59(50) Mainstreaming Transportation Hazards and Security Risk Management: CAPTA Update and Implementation	\$175,000	Complete September 2016	(1) update and enhance the CAPTA methodology and CAPTool for realistic costing and (2) create and apply an implementation plan to inform state transportation agencies and other stakeholders of the updated products. Published as NCHRP Web-Only Document 233: Mainstreaming Transportation Hazards and Security Risk Management: CAPTA Update and Implementation
20-59(51)A Security 101: A Cyber & Physical Security Primer for Transportation Agencies	\$100,000	Complete April 2018	Develop a recommended second edition of Security 101 for use by transportation personnel without a security background whose work requires them to address, perform, or supervise security or infrastructure protection activities as a part of their overall job responsibilities. Publication pending. Workshops to be conducted under NCHRP 20-124.
20-59(51)B A Guide to Emergency Management at State Transportation Agencies, Second Edition	\$100,000	Complete September 2017	Develop a recommended Second Edition Guide for use by state transportation agencies in planning and developing their organizational functions, roles, and responsibilities for emergency response within the all-hazards context of the National Incident Management System (NIMS). Publication pending. Workshops to be conducted under NCHRP 20-116.
20-59(51)C Research Support for Implementing Security, Emergency Management, and Infrastructure Protection at State Transportation Agencies	\$100,000	Complete February 2018	Assist the AASHTO SCOTSEM in accomplishing the goals, objectives, and activities outlined in its 2017 Work Plan: (1) Outreach and Stakeholder Engagement (2) Research Results Dissemination (3) Work Plan Implementation Final report delivered to AASHTO.
20-59(52) Communications Worker Credentialing Requirements	\$ 75,000	Complete December 2016	NCHRP Web-Only Document 232: Communications Worker Credentialing Requirements focuses on credentialing requirements needed for communications workers to physically access disaster-impacted areas to restore damaged wireline telecommunication networks. Under the advice of a Federal Communications Commission (FCC) panel that reviewed the impact of Hurricane Katrina on communications networks, the Warning, Alert and Response Network (WARN) Act designated cable companies and other telecommunications services as “essential service providers” for emergency management. Credentialing is a system by which identification cards or other tokens are used to authenticate a person and verify their expertise and qualifications for the purpose of access.
20-59(53) FloodCast: A Framework for Enhanced Flood Event Decision Making for Transportation Resilience	\$250,000 \$250,000	Complete September 2019	Develop a strategic framework and a prototype tool for enhanced flood event decision making. The framework and tool should help state DOTs plan, manage risks, mitigate hazards, and respond to flood and flash flood events. Publication pending. Continuation project is being scoped.
20-59(53A) FloodCast for Every DOT: Conversion of the National Water Model Results into Extent and Depth Products for State DOT Flood Forecasting, Response, and Recovery.	\$650,000	Contractor’s Final Report anticipated December 2020	Convert National Water Model (NWM) results into an extent and depth product that can easily be ingested into current decision making frameworks of state DOTs. In addition to a utility to produce usable NWM out-puts, this work will include guidance in the form of a manual supplemented by training sessions with interested DOTs on the process for consuming and integrating this data into existing systems.
20-59(54) Transportation System Resilience: Research Roadmap and White Papers	\$200,000	Contractor’s Final Report anticipated June 2019	Develop a research roadmap and three white papers for senior executives on transportation resilience

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-59(55) Transportation System Resilience: CEO Primer & Engagement	\$300,000	Contractor's Final Report anticipated December 2019	Develop a primer and a series of briefings for state DOT CEOs and senior executives on transportation resilience
20-59(56) Support for State DOT Transportation Systems Resilience and All-Hazards Programs	\$250,000	Contractor's Final Report anticipated May 2019	1) assist SCOTSEM (or its successor Committee) in developing a new Strategic Plan covering the period 2019-2023; 2) continue providing support services to assist in accomplishing strategic goals as articulated in a new Strategic Directions Plan; and 3) provide support for post-Summit initiatives
20-65(13) State Public Transportation Division Involvement in State Emergency Planning, Response, and Recovery	\$100,000	Complete January 2008	Identify best internal/external state planning, response, and recovery policies & practices pertaining to weather-related emergencies, emphasizing state public transportation and state passenger rail division involvement. Published as <i>NCHRP Research Results Digest 326</i> .
20-67 Making Transportation Tunnels Safe and Secure Co-funded by TCRP J-10G.	\$200,000	Complete June 2006	Mitigation countermeasures are presented for (a) threats related to crime and terrorism and (b) hazards related to natural events. NCHRP Report 525/TCRP Report 86, Vol. 12, <i>Making Transportation Tunnels Safe and Secure</i>
20-101 Guidelines to Incorporate the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change	\$300,000	Complete July 2018 Publication pending	Provide guidance that enables transportation decisionmakers to integrate analysis of the costs and benefits of adaptation measures in preparation for extreme weather events and climate change.
20-102 Impacts of Connected/Automated Vehicles on State and Local Transportation Agencies	\$6.5 million	19 tasks in development or in progress, 5 completed	(1) identify critical issues associated with connected vehicles and automated vehicles that state and local transportation agencies and AASHTO will face, (2) conduct research to address those issues, and (3) conduct related technology transfer and information exchange activities. Summary of NCHRP 20-102 Activities
20-110 A Guide to Ensure Access to the Publications and Data of Federally Funded Transportation-Related Research	\$250,000	Complete June 2018 Publication pending	Develop guidance and activities to assist state DOTs, other public agencies, and transportation research organizations to efficiently and effectively ensure access to the results of federally funded transportation-related research
20-116 Emergency Management in State Transportation Agencies	\$750,000	In development RFP anticipated March 2019	Develop and implement a comprehensive deployment and change management strategy assisting states that wish to more effectively evaluate and implement the revised Emergency Management guidelines recommended in the updated A Guide to Emergency Response Planning at State Transportation Agencies, Second Edition and related material developed in NCHRP 20-59(51B)
20-117 Deploying Transportation Resilience Practices in State DOTs	\$1 million	Contractor's Final Report anticipated June 2019	Assist state DOTs and other entities in achieving a resilience-focused culture in their organization through developing (1) a Transportation Resilience Guide and Toolkit (with associated model curricula) and (2) a national summit and peer exchange on transportation resiliency. The resilience guide and toolkit should present the state of the art and the state of the practice. The national summit and peer exchange should showcase effective practices across the transportation enterprise, particularly focused on implementation within the varied policy environments of state DOTs. TRB's Transportation Resilience Innovations Summit and Exchange (RISE) was held in Denver, Colorado, October 8-10, 2018. For more information, visit www.transportationrisesummit.com .

Project	Budget	Status	Description
NCHRP (National Cooperative Highway Research Program)			
20-121 State DOT Contributions to the Study, Investigation, and Interdiction of Human Trafficking	\$300,000	Contractor's Final Report anticipated March 2020	The objectives of this research are (1) to identify how state DOTs can assist and/or enhance the existing efforts in combatting human trafficking and (2) to develop guidance and a suite of tools that support effective training, policy, and collaboration practices related to mitigating human trafficking. The target audiences of this research include, but are not limited to: <ul style="list-style-type: none"> • Leadership within state DOTs • State DOT field staff • Contractors • Industry stakeholders • Collaborative partners
20-124 Deploying Transportation Security Practices in State DOTs	\$750,000	In development RFP anticipated March 2019	Develop and implement a comprehensive deployment and change management strategy assisting states that wish to more effectively evaluate and implement the revised security guidelines recommended in the updated Security 101 Primer and related material developed in NCHRP 20-59(51)A
24-47 Revised Clear-Water and Live-Bed Contraction Scour Analysis	\$500,000	Contractor's Final Report anticipated April 2019	Develop live-bed and clear-water contraction scour equations suitable for use in risk-based bridge design for a wide range of hydraulic conditions, contraction ratios, and bed material (cohesive, non-cohesive and rock--see Special Note H) and gradation uniformities.

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