EMERGENCY MANAGEMENT
SERVICE LAYER PLAN

June 2019

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Iowa Transportation Systems Management and Operations (TSMO)

Emergency Management (EM) Service Layer Plan

Version 1.1

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Iowa Department of Transportation

Operations Division

Traffic Operations Bureau

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VERSION CONTROL

Date	Version	Description
12/18/2018	1.0	Draft EM Service Layer Plan
6/26/2019	1.1	Final EM Service Layer Plan

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Appendix A – Traceability Matrix

LIST OF ABBREVIATIONS

AADT	Average Annual Daily Traffic
AADTT	Average Annual Daily Truck Traffic
AAR	After Action Review
AASHTO	American Association of State Highway and Transportation Officials
ATDM	Active Transportation and Demand Management
ATMS	Advanced Traffic Management System
CAD	Computer Aided Dispatch
CARS	Condition Acquisition and Reporting System
CARS	Citizen Awareness on Roadway Safety
CAV	Connected and Automated Vehicle
CCTV	Closed Circuit Television
CMB	Construction and Materials Bureau
CMM	Capability Maturity Model
COG	Continuity of Government
COOP	Continuity of Operations
CTRE	Center for Transportation Research and Education
CVO	Commercial Vehicle Operations System
DHS	United States Department of Homeland Security
DMS	Dynamic Message Sign
DOT	Department of Transportation
EM	Emergency Management
EMS	Emergency Medical Services
ESF	Emergency Support Function
FAST	Fixing America's Surface Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GTSB	Governor's Traffic Safety Bureau
HSEMD	Iowa Homeland Security and Emergency Management Department
IAP	Incident Action Report
ICE	Interstate Condition Evaluation

ICE-OPS	Interstate Condition Evaluation- Operations
ICS	Incident Command System
IMT	Incident Management Team
ISICSB	Iowa Statewide Interoperable Communications System Board
InTrans	Institute of Transportation at Iowa State University
Iowa DOT	Iowa Department of Transportation
ISP	Iowa State Patrol
ITS	Intelligent Transportation Systems
MDST	Multi-Disciplinary Safety Team
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MVE	Iowa DOT Motor Vehicle Enforcement
NCHRP	National Cooperative Highway Research Program
NIMS	National Incident Management System
NRF	National Response Framework
NUG	National Unified Goal for Traffic Incident Management
OT	Operational Technology
PSAP	Public Service Answering Point
RFP	Request for Proposals
RWIS	Road Weather Information System
SEOC	Statewide Emergency Operations Center
SHRP2	2nd Strategic Highway Research Program
SITREP	Situational Report
SOP	Standard Operating Procedure
TAM	Transportation Asset Management
TIM	Traffic Incident Management
TMC	Traffic Management Center
TOB	Traffic Operations Bureau
TRB	Transportation Research Board
TSMO	Transportation Systems Management and Operations
USDOT	United States Department of Transportation
VMT	Vehicle Miles Traveled

PART 1. INTRODUCTION

Transportation Systems Management and Operations (TSMO) is defined by the Moving Ahead for Progress in the 21st Century Act (MAP-21) as: *"Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system."*

TSMO strategies are used to proactively manage the transportation system by addressing recurring and nonrecurring congestion in real time. Strategies such as emergency management, traffic incident management, traveler information services, safety service patrols, work zone management, and freight management improve system efficiency, enhance public safety, help reduce traveler delays, and improve information access. Key to successful integration of these and other TSMO strategies are public and private agency partnerships that, when cohesive, enhance communications and collaboration among transportation partners.

Emergency Management Challenges and Opportunities

The Iowa Department of Transportation (DOT) TSMO Program Service Layers address eight focus areas for TMSO Program planning and implementation. The Emergency Management (EM) Service Layer is a critical component of the TSMO vision to provide the safe and effective management of the transportation system statewide.

While the Traffic Incident Management (TIM) Service Layer Plan addresses the day-to-day incidents that occur on the highway system, the EM Service Layer Plan clarifies Iowa DOT's role in larger scale emergencies. These include major winter storms, floods, and other less common events such as nuclear power plant emergencies, cyber security attacks, and others.

A critical element of EM is to provide a systematic, coordinated approach to managing emergencies. Effective emergency management:

- Minimizes impacts to the traveling public,

THE ROLE OF EMERGENCY MANAGEMENT IN TSMO

Iowa DOT's TSMO Program Plan is a guide that helps Iowa DOT operate existing infrastructure at its optimal, full-service potential, to meet the vision for TSMO. Emergency Management (EM) focuses on coordination with other agencies for identification, preparedness, and response to threats and all hazards.

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- Enhances the safety of responders,
- Reduces risk and economic cost, and
- Enhances the overall response to any type of emergency event regardless of whether the situation is related to the transportation system or broader in scope.

Effective emergency response requires collaboration and coordination among emergency responders and other key agencies, such as law enforcement, fire/rescue, local emergency management agencies, Iowa DOT maintenance and operations, Iowa Homeland Security and Emergency Management Department (HSEMD), Federal Emergency Management Agency (FEMA), and Federal Highway Administration (FHWA). Iowa DOT is committed to enhancing the historically strong relationships between partners.

The transportation network is one of the most important pieces of any emergency response. Virtually all response personnel, equipment, and supplies rely on some type of transportation to deliver timely support. The public needs transportation facilities to obtain critical care, gather supplies, and/or evacuate from impacted areas. Any mode of transportation may be used in responses, but the surface transportation system will likely carry most of the emergency resources.

In addition, Iowa DOT responds to both "transportation" and "non-transportation" events. Events labeled as non-transportation events are emergencies that have little or no impact to the state highway system such as animal disease incidents or flood events that do not affect state highways.

The process of developing the EM Service Layer Plan further clarifies Iowa DOT's commitment to restore safety, efficiency, and convenience to the transportation system as safely and quickly as possible after emergencies.

Emergency Management Goals and Objectives

The EM Service Layer Plan is a critical component of Iowa DOT's TSMO Program. The TSMO Program Plan identified strategic goals and objectives as well as programmatic goals and objectives. The EM Service Layer supports both the strategic and programmatic goals and objectives of the Iowa DOT. It establishes specific objectives to guide the day-to-day activities, prioritize projects and services, and establish performance-based management of EM activities in Iowa.

Table 1 shows the TSMO strategic goals and objectives for Iowa DOT. Table 2 shows the programmatic objectives identified for performance monitoring within the EM Service Layer. Note the seventh goal of security was added after the TSMO Program Plan was completed. This goal is included in this and subsequent Service Layer Plans and will be added in the next update to the TSMO Program Plan.

TABLE 1. STRATEGIC GOALS AND OBJECTIVES

Strategic Goal		Strategic Objective
	1. Safety	Reduce crash frequency and severity
	2. Reliability	Improve transportation system reliability, increase system resiliency, and add highway capacity in critical corridors
	3. Efficiency	Minimize traffic delay and maximize transportation system efficiency to keep traffic moving
	4. Convenience	Provide ease of access and mobility choices to customers
	5. Coordination	Engage all DOT disciplines, and external agencies and jurisdictions to proactively manage and operate the transportation system
	6. Integration	Incorporate TSMO strategies throughout DOT's transportation planning, design, construction, maintenance, and operations activities
	7. Security	Prepare for and mitigate potential physical and cyber security issues

Further consideration for the EM Service Layer identifies more specific objectives to support the program objectives and the TSMO strategic objectives. Iowa DOT staff and key EM partners identified Service Layer objectives, also shown in Table 2. The objectives reflect guidance from the National Incident Management System (NIMS), the National Response Framework (NRF), and other resources.

TABLE 2. EM SERVICE LAYER OBJECTIVES

Goal	Strategic Objective	Program Objective	Service Layer Objectives
✸ **Safety**	Reduce crash frequency and severity and maximize safety for the traveling public and responders	• Reduce the number of overall major crashes • Reduce the number of secondary crashes caused by traffic incidents • Reduce the number of work zone related traffic incidents • Maximize transportation safety during all types of events	1. Reduce safety impacts of emergencies on traveling public and responders 2. Reduce response time to emergencies
⧖ **Reliability**	Improve transportation reliability, increase system resiliency, and highway capacity in critical corridors	• Improve travel time reliability • Increase the resilience of the transportation system to floods, winter weather, and other extreme weather events • Work with special event generators to actively manage traffic during large scale events that impact the highway network	2. Reduce response time to emergencies* 3. Reduce duration of emergencies 4. Enhance reliability through effective COOP/COG *Response time objective applies to both Safety and Reliability Goals*
💰 **Efficiency**	Minimize traffic delay and maximize system efficiency to keep traffic moving	• Improve level of service on major freight corridors • Maximize use of existing roadway capacity • Establish network level priorities for managing traffic • Respond to and clear traffic incidents as quickly as possible • Minimize the environmental impacts of the transportation system	5. Reduce time needed to restore highways after an emergency 6. Improve system redundancy to keep the system operating during emergencies
ⓘ **Convenience**	Provide ease of access and mobility choices to customers	• Provide timely, accurate and comprehensive information to customers • No unplanned road closures or restrictions due to conditions within Iowa DOT's control • Provide high quality, machine ready data in open formats • Accommodate bike, pedestrian, transit and commercial vehicle in transportation management and operations	7. Enhance real-time information on emergencies internally, to partner agencies, and customers

Goal	Strategic Objective	Program Objective	Service Layer Objectives
Coordination	Engage all DOT disciplines, and external agencies and jurisdictions to proactively manage and operate the transportation system	• Lead Statewide and Regional Traffic Incident Management Program activities • Coordinate responses to large scale traffic incidents with adjacent states • Provide staff knowledge and management resources to enable adaptation to rapidly changing technology	8. Enhance EM multiagency coordination for all hazards 9. Increase collaboration among EM partners 10. Enhance EM interoperability 11. Coordinate response to large scale emergencies with adjacent states 12. Coordinate response with multimodal transportation partners 13. Coordinate across Iowa DOT divisions and bureaus
Integration	Incorporate TSMO strategies throughout DOT's transportation planning, design, construction, maintenance, and operations activities	• Integrate TSMO into existing Iowa DOT Policies, Plans, and Procedures • Develop standards-based systems, rooted in geospatial technologies, to improve performance management and decision support systems • Use integration and big data mining strategies to improve performance management and business intelligence • Implement integrated corridor management strategies to manage traffic across multiple jurisdictions	14. Enhance integration of EM and risk mitigation in DOT policies, plans and procedures 15. Improve data integration with emergency management partners 16. Improve integration of facilities, data networks and other support resources available to maintain essential functions identified in the COOP/COG plan
Security	Prepare for and mitigate potential physical and cyber security issues	• Integrate security planning and risk mitigation in all TSMO activities • Reduce cybersecurity vulnerabilities within the transportation system	17. Improve system resilience to emergencies and security threats 18. Reduce security risks to the system 19. Enhance safety and security for DOT personnel

The following items describe each Service Layer objective in Table 2. The EM objectives are considered broadly in an all-hazards context. All-hazards planning does not mean preparing for every possible hazard, rather it follows federal guidance being both comprehensive and risk-driven in assessing and planning for an organized response to hazards potentially affecting Iowa's communities.

1. **REDUCE SAFETY IMPACTS OF EMERGENCIES ON TRAVELING PUBLIC, DOT STAFF, AND RESPONDERS**

Safety needs to be the highest priority during any type of response. It is critical for the safety of the traveling public, DOT staff, and emergency responders to quickly respond to and clear hazards, return the transportation facility to full use, deploy traffic management resources, and to manage scenes effectively.

2. **REDUCE RESPONSE TIME TO EMERGENCIES**

Quick response to emergencies improves both safety and reliability by reducing hazards, minimizing time exposed to risk, stabilizing and transporting patients, and returning the overall transportation system to normal operations quickly.

3. **REDUCE DURATION OF EMERGENCIES**

Emergencies include a wide range of threats, hazards, and events, from natural disasters to man-made or security events to diseases. These emergencies can require a range of responses that include evacuation, alternative routes, movement of specialized response equipment, teams and supplies, long-term scene management, and various recovery efforts. To enhance the overall response, it is important to mitigate impacts and recover as quickly as possible.

4. **ENHANCE RELIABILITY THROUGH EFFECTIVE COOP/COG**

The Continuity of Operations Plan (COOP) and Continuity of Government (COG) Plan identifies essential functions that need to continue even when there is a loss of facilities, staff, or other support mechanisms. The reliability of the DOT is dependent on restoring essential functions quickly when compromised.

5. **REDUCE TIME NEEDED TO RESTORE HIGHWAYS AFTER AN EMERGENCY**

Quick restoration of the transportation system after any emergency that impacts the system improves system efficiency and reliability and supports traveler convenience and the movement of goods on Iowa highways.

6. **IMPROVE SYSTEM REDUNDANCY TO KEEP THE SYSTEM OPERATING DURING EMERGENCIES**

In an emergency, system redundancy is essential to mobility, emergency response and the economy. System redundancy may include alternative routes, alternative modes, and other strategies to provide continued operations.

7. **ENHANCE REAL-TIME INFORMATION ON EMERGENCIES INTERNALLY, TO PARTNER AGENCIES AND CUSTOMERS**

Real-time traveler information, including situational awareness, impacted locations, alternative routes, and alternate transportation modes is essential to minimize the impact to the traveling public and improve safety to motorists and emergency responders. Real-time travel time estimates, alternate route information and modal options associated with emergencies enhance convenience and system

efficiency by allowing travelers to make informed decisions about travel decisions (i.e., divert or wait). Enhanced real-time information is also essential to support situational awareness for all responders and partner agencies.

8. ENHANCE EM MULTIAGENCY COORDINATION FOR ALL HAZARDS

Multiagency coordination is essential to effective emergency management. Current coordination among Iowa DOT, law enforcement, fire/rescue, medical response, emergency management, and others can be enhanced and expanded through formal agreements, working groups and training. Enhanced multiagency coordination is required at various levels of government (i.e., federal, state, county, local) and across many emergency response disciplines.

9. INCREASE COLLABORATION AMONG EM PARTNERS

Collaboration and coordination among emergency management partners outside the DOT and across different transportation sectors can be enhanced to support coordination.

10. ENHANCE EM INTEROPERABILITY

Interoperable communications among agencies during an emergency is vital to coordinated, safe and efficient emergency management. Additionally, data interoperability and video feeds are critical resources for planning for and responding to emergencies. Multiagency data sharing supports resource management and enhances coordinated response.

11. COORDINATE RESPONSE TO LARGE SCALE EMERGENCIES WITH ADJACENT STATES

Large scale incidents and emergencies impact interstate travel and commerce, delaying the movement of goods, critical resources, and people across state lines. Enhanced coordination and cooperation with adjacent states can support safety, reliability, convenience and commerce through shared resources and information. Emergency Management Assistance Compact (EMAC) is also a tool for filling resource needs or providing resources to other impacted states.

12. COORDINATE RESPONSE WITH MULTIMODAL TRANSPORTATION PARTNERS

Rail, water, aviation, and transit systems can be impacted by emergencies, as well as provide alternate transportation for people and critical resources. Close coordination with multimodal partners is critical for situational awareness and to keep all transportation options open to support emergency response. The Iowa DOT Modal Division can provide expertise and assistance during emergencies with rail, aviation, transit, and freight partner coordination.

13. COORDINATE ACROSS IOWA DOT DIVISIONS AND BUREAUS

Engaging all DOT divisions and bureaus to support emergency management, enhance response and support security and safety is important to emergency management coordination.
- Employee Health and Safety in the Office of Employee Services is a key player in employee risk mitigation.
- The Office of Maintenance can provide timely resources to a variety of emergency situations.

- The Office of Design can integrate safety and resilience considerations into project design.

14. ENHANCE INTEGRATION OF EM AND RISK MITIGATION IN DOT POLICIES, PLANS, AND PROCEDURES

Emergency management and risk mitigation should be integrated across the DOT to enhance all hazard readiness and mitigate risk to the system and its users.

15. IMPROVE DATA INTEGRATION WITH EMERGENCY MANAGEMENT PARTNERS

Data sharing and integration is important to situational awareness and coordinated response during an emergency and supports effective resource allocation and emergency planning.

16. IMPROVE THE INTEGRATION OF FACILITIES, DATA NETWORKS AND OTHER SUPPORT RESOURCES AVAILABLE TO MAINTAIN ESSENTIAL FUNCTIONS IDENTIFIED IN THE COOP/COG PLAN

Whether the emergency is a major natural disaster or the loss of a critical facility, Iowa DOT essential services need to be maintained. Many support resources – e.g., licensing, payroll, incident response – are necessary to maintain essential services operating during normal times and during responses to major events.

17. IMPROVE SYSTEM RESILIENCE TO EMERGENCIES AND SECURITY THREATS

Resilience includes planning, preparation, mitigation/minimizing exposure, response, and recovery for a wide variety of emergencies including:
- Weather events
- Natural disasters
- Man-made disasters
- Security events and cybersecurity threats
- Other types of emergencies

18. REDUCE SECURITY RISKS TO THE SYSTEM

Security risks to the system include physical threats to the transportation system and cyber security threats to the IT and OT network used to operate and manage the system.

19. ENHANCE SAFETY AND SECURITY FOR DOT PERSONNEL

Security and safety risks during emergency response are often higher than normal.

Relationship with other TSMO Service Layer Plans

Some Service Layer Plans are completed, and others are under development or planned to be completed over the next year. Figure 1 briefly illustrates how the EM Service Layer Plan relates to the seven other plans.

FIGURE 1. EMERGENCY MANAGEMENT SERVICE LAYER PLAN RELATIONSHIPS

Report Organization

As recommended in the TSMO Program Plan, each Service Layer includes the same basic framework.

- **Part 1** - **Introduction** – Includes opportunities and challenges, builds on TSMO Plan Goals, Strategic/Program Objectives, and defines the specific Service Layer Objectives. This sets the stage for the rest of the plan.

- **Part 2 - Description of Existing Conditions, Services, Activities, and Projects** – Provides an assessment of related existing conditions and a description of existing services, activities, and projects.

- **Part 3 – Emergency Management Program Assessment** – Includes gap analysis based on a variety of industry best practices.

- **Part 4 - Performance Management** – Defines specific measures for each Service Layer Objective.

- **Part 5 - 5-Year Action Recommendations** – Provides a list of actionable recommendations by Fiscal Year, which may or may not have budget impacts.

- **Part 6 - 5-Year Service Layer Cost Estimate** – A cost estimate by fiscal year that will be used to refine the TSMO Program Plan budget estimates.

PART 2. EXISTING CONDITIONS, ACTIVITIES, AND PROJECTS

Recent Emergency Management Statistics

Since 2014, there have been over two dozen Iowa DOT designated emergency events as shown in Table 3. Most of the events are related to storm damage, flooding or winter storms. However, there are a couple events that were unique such as the response to the avian influenza and providing mutual aid response to significant hurricanes outside of Iowa. Estimated costs for recovery were included if readily available.

TABLE 3. IOWA DOT DESIGNATED EMERGENCY EVENTS SINCE 2014

Event	Description	Date	Estimated Cost
Flooding	Northwest Iowa	June 2014	4.3M
Flooding	South Central Iowa	Sept. 2014	4.4M
Avian Influenza	Dozens of infected facilities in NW Iowa; Embargoed state and local routes; set up hauling routes; erected signs on state facilities; hauled water via tankers	April – Dec 2015	181K
Tornado	Calhoun County	April 2015	1k
Flooding	Raccoon River threatened to overtop I-80 in Dallas County: water touched edge line then receded, no closure of I-80	May 2015	
Flood Related Debris Removal	Eastern Iowa; FEMA PA DR-4234	June 2015	178K
Flooding	Flooding beginning Aug 28-D1	August 2015	16K
Flooding	Flooding beginning Sep 5-D1	Sept. 2015	6K
Winter Storm	Statewide winter storm and first of season	Nov. 20, 2015	
Flooding	Flooding-D4	Dec. 2015	22K
Winter Storm	Statewide winter storm	Dec 28, 2015	
Avian Influenza	Awareness of Midwest Avian Influenza outbreak-Indiana-Multi-agency response planning	Jan. 15, 2016	
Winter Storm	Statewide winter storm	Feb. 2, 2016	
Winter Storm	Statewide winter storm; closed I-35 b/t Ames and Clear Lake due to high winds and whiteout conditions.	Feb. 8, 2016	
Flooding	Severe Weather D2, Worth, Mitchell, Clayton Counties	June 2016	9K
Severe Weather/Tornado Debris	Severe Weather/Tornadic winds produced debris in 4 counties, IA DOT D2 assisted with debris cleanup in Wright County	July 2016	74K
Flooding and related debris removal	D2 Severe Weather and Flooding, FEMA PA DR-4281	August 23-27,2016	80K

Event	Description	Date	Estimated Cost
Flooding and related debris removal	D2, D6, D5 Severe Weather and Flooding, FEMA PA DR-4289, Numerous (>50) IA HSEMD Mission Tasks responded to by IA DOT	September 21 to October 3, 2016	630K
Branches removed	Severe Storms and wind/tornado damage-Seymour	Mar 15, 2017	1K
Severe Weather/Tornado Debris	Severe weather in predominately Central and N-Central IA produced debris on many city streets in Algona-D2	May 16, 2017	21K
Severe winds/Tornado	Severe weather and high winds/tornadoes, predominately D4	June 17-18, 2017	100K
Severe Weather	High winds, flooding Eastern D2 and NE D6	July 11.2017	
Severe Weather-Tornado/Flood	High winds, flooding Eastern D2 and NE D6	July 19-23. 2017	140K
Hurricane Harvey	Request from FEMA through Iowa HSEMD to utilize Iowa DOT staff to backfill FEMA positions due to increased need in the impacted area-No details provided, declined with telework exclusion.	Sept. 8, 2017	N/A
Hurricane Irma	Request from FEMA through Iowa HSEMD to utilize Iowa DOT staff to backfill FEMA positions due to increased need in the impacted area-No details provided, declined with telework exclusion.	Sept. 23, 2017	N/A
Hurricane Irma	Request from FEMA through Iowa HSEMD to utilize Iowa DOT staff to backfill FEMA positions due to increased need in the impacted area-5 volunteers to be prepped for deployment.	Oct. 20, 2017	87K-labor and expenses 30 days for crew of 5

Current Emergency Management Roles and Responsibilities

Iowa DOT and its partners have developed a strong foundation for EM activities in Iowa. To help define current services, activities and projects, a description of EM partner roles and responsibilities are described to better understand where the specific partners fit into the lifecycle of an emergency event.

Two key state plans define overall EM roles and responsibilities:

1. The State of Iowa Emergency Operations Plan, developed and maintained by HSEMD.

2. The Iowa DOT Emergency Management Operations Plan, which addresses the capabilities and processes of the Iowa DOT in responding to emergency events.
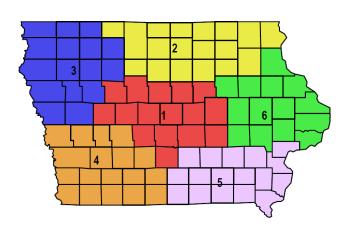
Following the Iowa DOT TSMO Strategic and Program Plans, the EM SLP links to the two state plans and describes the role of the TSMO program and its elements and processes in EM, within the broader context of statewide emergency management. The EM SLP is intended to be forward looking, providing a framework for TSMO strategies for EM in the coming five years.

Emergency Management Operating Environment in Iowa

As with most states, Iowa DOT is not the lead agency for larger scale emergency response. The primary coordinating agency in Iowa for the larger responses threats and all hazards is the Iowa HSEMD. Activities for HSEMD fall into four main phases:

- Prevention / mitigation
- Preparedness / protection
- Response
- Recovery

Each county is required by Iowa Code, Chapter 29C, to have a Local Emergency Management Commission, not to be confused with the Local Emergency Planning Commission, and an emergency management coordinator is appointed by the commission. For purposes of planning and training, Iowa is divided into six EM districts, which have been in place since 2005 as shown in Figure 2.

Region 1: Boone, Calhoun, Carroll, Dallas, Greene, Grundy, Hamilton, Hardin, Jasper, Marshall, Polk, Poweshiek, Story, Tama, Warren, Webster

Region 2: Allamakee, Bremer, Butler, Cerro Gordo, Chickasaw, Emmet, Fayette, Floyd, Franklin, Hancock, Howard, Humboldt, Kossuth, Mitchell, Winnebago, Winneshiek, Worth, Wright

Region 3: Buena Vista, Cherokee, Clay, Crawford, Dickinson, Ida, Lyon, Monona, O'Brien, Osceola, Palo Alto, Plymouth, Pocahontas, Sac, Sioux, Woodbury

Region 4: Adair, Adams, Audubon, Cass, Clarke, Decatur, Fremont, Guthrie, Harrison, Madison, Mills, Montgomery, Page, Pottawattamie, Ringgold, Shelby, Taylor, Union

Region 5: Appanoose, Davis, Des Moines, Henry, Jefferson, Keokuk, Lee, Louisa, Lucas, Mahaska, Marion, Monroe, Muscatine, Van Buren, Wapello, Washington, Wayne

Region 6: Benton, Black Hawk, Buchanan, Cedar, Clayton, Clinton, Delaware, Dubuque, Iowa, Jackson, Johnson, Jones, Linn, Scott

FIGURE 2. EMERGENCYMANAGEMENT DISTRICTS

Each county in Iowa is responsible for maintaining a comprehensive emergency plan, maintaining a response plan, mitigation plan, and recovery plan. If resource needs during an event exceed a county's capacity, HSEMD may seek a Disaster Proclamation from the governor. And if needs exceed state capacity, the governor may request a Presidential Disaster Declaration.

Emergency Support Functions (ESFs)

Iowa Emergency Management at the state level is organized by Emergency Support Functions (ESFs), following the National Response Framework. There are 15 defined ESFs, which aid in federal and other agency coordination. All the ESFs work together to plan for, respond to, and recover from emergency events as shown in Table 4.

TABLE 4. EMERGENCY SUPPORT FUNCTIONS

ESF	Name	ESF	Name	ESF	Name
1	Transportation	6	Mass Care, Emer. Assist., Temp. Housing, and Human Services	11	Agriculture and Natural Resources
2	Communications	7	Logistics	12	Energy
3	Public Works and Engineering	8	Public Health and Medical Services	13	Public Safety and Security
4	Firefighting	9	Search and Rescue	14	Recovery
5	Information and Planning	10	Oil and Hazardous Materials Response	15	External Affairs

When warranted, the HSEMD will activate the State Emergency Operations Center (EOC) and any ESFs applicable to the emergency event will report to the EOC. The EOC is located at the Joint Forces Headquarters in Johnston, Iowa, and is where coordination of information and resources to support incident command take place. EOC activation may last for just hours, or several weeks for large-scale disasters.

Iowa HSEMD Defined Emergency Scenarios

There have been several examples mentioned in preceding figures and text, but for completeness, Table 5 lists potential hazards recognized by HSEMD.

TABLE 5. HSEMD POTENTIAL HAZARDS

Natural	Human-Caused, Accidental	Human-Caused, Intentional	Other, Combination
• Agricultural disaster • Drought • Extreme heat • Hail • Levee / dam failure • River flood / flash flood • Severe winter storms • Thunderstorms / lightning • Tornadoes • Windstorms	• Fixed hazardous materials incident • Fixed radiological incident • Railway / air / waterway transportation incident • Transportation hazardous materials incident • Transportation radiological incident	• Agricultural terrorism • Chemical, biological, radiological, nuclear, explosive (CBRNE) terrorism • Cyber terrorism • Public disorder	• Animal disease, epidemic • Communication failure • Energy failure • Human disease, epidemic • Pipeline transportation incident • Structural failure • Structural fire • Wild land / grass fire

A notable example is Linn County's preparedness efforts for a radiological event with the Duane Arnold Energy Center, Iowa's only nuclear power plant. Transportation operations plays a key role in evacuation.

A second example is flooding that occurred in June and July 2018. Flooding affected multiple locations throughout the state, and county emergency management responded largely with local resources. The

state EOC was not activated, but the Iowa DOT supported response by hauling sand, equipment, and supplies, and prepared for road closures and detours. In Polk County, the emergency operations center issued action plan updates, which – together with situation reports (SITREP) – are key for communicating prevailing conditions to other agencies, management, and other stakeholders.

Traffic Management Center and Its Role in Emergency Management

Located in the lower level of Iowa DOT's Ankeny Motor Vehicle Division Building, the TMC shown in Figure 3, is the hub for many 24/7 real-time activities. The role of the TMC is similar during larger scale emergency events as it is to TIM activities.

- Early incident identification
- Dispatch Highway Helper freeway service patrols and other DOT resources
- Coordinate response actions with ISP, sheriff's departments, Maintenance, and others
- Provide information on 511, DMS, and other traveler information resources
- Populate the advanced traffic management software with specific incident response information
- Serve as a focal point for highway related emergency management activities

FIGURE 3. IOWA DOT TRAFFIC MANAGEMENT CENTER

Special Event Coordination

Iowa DOT plays an active role in supporting major special events that impact the state highway network. Special events are similar to exercises in presenting opportunities to practice emergency responses. Some of the events that require special planning and coordination with Iowa DOT and other EM partners include:

- Iowa State football games
- University of Iowa football games
- Iowa State Fair
- Farm Technology Days
- NCAA Basketball Tournaments

- Large campaign events with dignitaries requiring special security services

After Action Reviews (AARs)

The Iowa DOT helps facilitate a number of AARs to review what went well and identify areas of opportunity for improving response to and management of emergency events.

Emergency Management Training

Iowa DOT currently provides the following training for employees involved in emergency response.

- Basic (ICS100/700) – All Involved Employees
- Intermediate (ICS200/300) – Supervisors, Management
- Advanced (ICS400) – Management, Staff Heavily Involved in EM
- Executives/Senior Officials (ICS402) – Senior Management

Iowa DOT Emergency Management Exercises

The Iowa DOT plans and leads discussion at several tabletop exercises each year throughout the state. The tabletop exercises are used to clarify roles and to identify additional emergency management mitigation and preparedness needs. Each exercise includes representatives from fire, ISP, police, sheriff's department, EMS, local emergency management, towing, county highways, municipal public works, school transportation, as well as local DOT. Figure 4 shows a tabletop exercise at Le Mars.

- Average of 5-7 table top exercises conducted a year since 2013
- Typically, one in each district
- One typically focused on winter weather

FIGURE 4. TABLETOP EXERCISE

Legacy Emergency Transportation Operations Plan

Several recommendations were included in the Iowa DOT Emergency Transportation Operations (ETO) Plan. As the ETO plan is being decommissioned, relevant items have been rolled into the gap analysis

discussed in Part 3 of the report so that they will be carried forward in this EM SLP. As the TSMO Service Layers have progressed, the term ETO has been phased out in favor of EM, recognizing the broader scope and interagency nature of EM. The ETO/EM action items that are carrying forward include:

Command and Staffing
- Develop and maintain Incident Command structure and protocols
- Maintain adequate staffing for all components of the response
- Train staff in NIMS and ICS as appropriate for their roles
- Maintain emergency contact lists

Finance and Administration
- Improve the process and procedures for tracking and documentation of damages for performance management purposes, FWHA and FEMA reimbursements
- Maintain adequate staff and training to accomplish all finance and administration functions
- Develop and monitor EM performance measures

Planning
- Improve situational awareness processes
- Type resources based on NIMS typing
- Maintain and exercise the COOP plan
- Maintain EM Operations Plan and all related plans and procedures
- Update radiological plan, address roles
- Perform AARs after major events and follow up on action items

Training and Exercises
- Conduct training based on the Training Plan
- Conduct internal exercises
- Participate in external drills, exercises, conferences, and seminars; involve as many applicable staff as practical

Security, Communications
- Develop an infrastructure security plan
- Develop a cyber security plan for Information Technology (IT) and Operations Technology (OT)
- Improve emergency communications and interoperability
- Improve the notifications and public information process

Statewide Emergency Management Internal Coordination Group

The Statewide EM Coordination Group was formed in February 2018 to oversee the Iowa DOT EM Service Layer Plan and it's intended to meet routinely to discuss ongoing and emerging EM issues. The group's vision, mission and goals include:

VISION

Iowa DOT stakeholders join to improve safety related to the management of all types of emergency events DOT is involved with.

MISSION

Serve as a voice and clearinghouse to establish safe, consistent statewide response and incident management practices.

GOALS

Same as the strategic goals found in Table 1.

Iowa DOT Emergency Management Operations Plan

A key purpose of the Iowa DOT Emergency Management Operations Plan is to guide the actions of the Iowa DOT and its personnel in the event of a major incident or emergency situation. While daily incidents are addressed by the Traffic Incident Management SLP, the EM SLP emphasis is on less frequent and more severe emergency situations. These may not directly impact the road network or traffic conditions, but the Iowa DOT may have a critical role to play. Figure 5 is from the EM Operations Plan and helps illustrate the range of incident or event magnitudes. Roles and responsibilities will vary subject to the emergency event and DOT activation level, including Iowa DOT central command (Traffic Operations leading in cooperation with Maintenance and Motor Vehicle Enforcement) and area command (DOT Districts).

Other applicable information from the EM Operations Plan includes a mapping of FEMA Emergency Types in Table 6 and a business process related to responding to various emergencies based on 1) Mission requests issued by HSEMD activation and/or 2) Official activation of the SEOC in Figure 6.
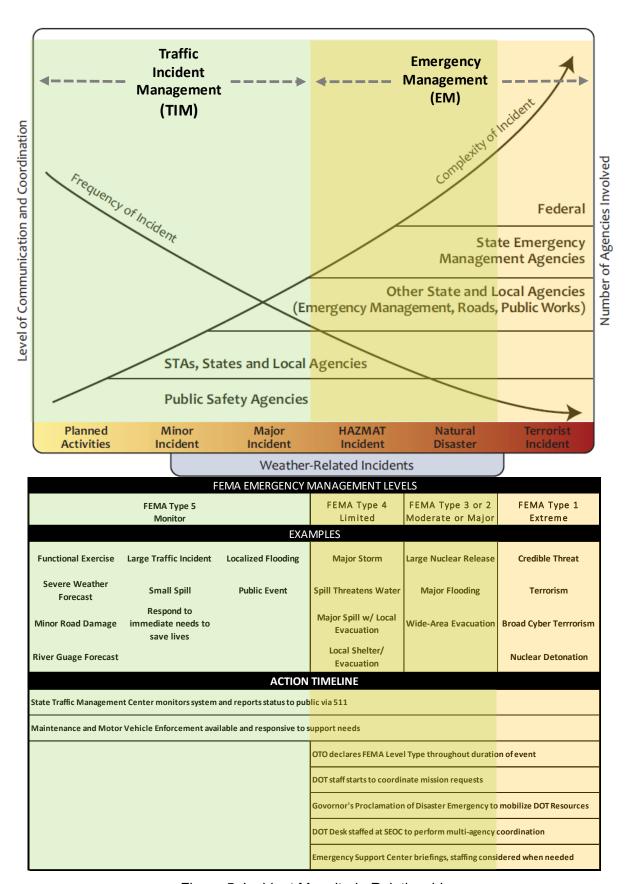
Figure 5. Incident Magnitude Relationship

TABLE 6. FEMA TO IOWA DOT EMERGENCY MANAGEMENT DEFINITIONS

TYPE	FEMA Formal Definition	Iowa DOT Definition
Type 5 Monitor	• The incident can be handled with one or two single resources with up to 6 personnel • Command and General Staff positions (other than the Incident Commander) are not activated • No written Incident Action Plan (IAP) is required • The incident is contained within the first operational period and often within an hour to a few hours after resources arrive on scene • Examples include vehicle fire, injured person, or a police traffic stop	• Average incident duration – no more than 4 hours • "Business as usual" including routine winter operations and localized flooding • Response handled with support of Maintenance and/or MVE • Most response procedures by Maintenance included in Instructional Memorandums • TOB EM staff not involved with incident response
Type 4 Limited	• Command and General staff functions are activated only if needed • Several resources are required to mitigate the incident, including a Task Force or Strike Team • The incident is usually limited to one operational period • The agency administrator may have briefings and ensure the complexity analysis and delegation of authority are updated • No written IAP is required but a documented operational briefing will be completed for all incoming resources • The role of the agency administrator includes operational plans including objectives and priorities	• Average incident duration – 4-24 hours • TRIGGERS - Mission requests and/or State Emergency Operations Center activated • Likely includes participation by a couple agencies • TOB EM staff provides on-site presence at EOC if requested • TOB EM staff coordinate mission requests • TOB provides Agency Executive Briefings
Type 3 Moderate	• When capabilities exceed initial attack, the appropriate ICS positions should be added to match the complexity of the incident • Some or all Command and General Staff positions may be activated, as well as Division/Group Supervisor and/or Unit Leader level positions • A Type 3 Incident Management Team (IMT) or incident command organization manages initial action incidents with a significant number of resources, an extended attack incident until containment/control is achieved, or an expanding incident until transition to a Type 1 or 2 IMT • The incident may extend into multiple operational periods • A written IAP may be required for each operational period	• Average incident duration - 1-3 days • TRIGGERS - SEOC activated, multiple state agencies involved in response • TOB EM staff coordinate mission requests • TOB Director sends daily situational report (SITREP) to Management Team, Strategic Communications, and TMC Program Manager with on-going situational awareness, indicating current FEMA Incident Type classification, mission response, SEOC engagement • Director's Emergency Support Center at the DOT Headquarters in Ames becomes active. TOB provides briefings as needed. • If warranted, Strategic Communications Plan activated by Strategic Communications and Policy Bureau
Type 2 Major	• This type of incident extends beyond the capabilities for local control and is expected to go into multiple operational periods. A Type 2 incident may require the response of resources out of area, including regional and/or national resources, to effectively manage the operations, command, and general staffing • Most or all the Command and General Staff positions are filled • A written IAP is required for each operational period • Many of the functional units are needed and staffed • Operations personnel normally do not exceed 200 per operational period and total incident personnel do not exceed 500 (guidelines only) • The agency administrator is responsible for the incident complexity analysis, agency administrator briefings, and the written delegation of authority	• Average incident duration - 3-7 days • TRIGGERS - SEOC activated, large DOT staff response - 50-100 • Many agencies involved possibly including federal agencies • TOB EM staff coordinate mission requests • TOB Director sends daily SITREP to Management Team, Strategic Communications, and TMC Program Manager with on-going situational awareness, indicating current FEMA Incident Type, mission response, SEOC engagement • Directors Emergency Support Center at the DOT Headquarters in Ames becomes active • DOT Area Command not affected by the incident rotate into SEOC to provide staff support
Type 1 Extreme	• This type of incident is the most complex, requiring national resources to safely and effectively manage and operate • All Command and General Staff positions are activated • Operations personnel often exceed 500 per operational period and total personnel will usually exceed 1,000 • Branches need to be established • The agency administrator will have briefings and ensure that the complexity analysis and delegation of authority are updated • Use of resource advisors at the incident base is recommended • There is a high impact on the local jurisdiction, requiring additional staff for office administrative and support functions	• Average incident duration - 7 or more days • TRIGGERS - SEOC Activated, many agencies involved in response possibly including federal (including military) organizations, massive DOT staff response – more than 100 • TOB EM Staff coordinate mission requests • TOB Director sends daily SITREP to Management Team, Strategic Communications, and TMC Program Manager with on-going situational awareness, indicating current FEMA Incident Type, mission response, and SEOC engagement • Directors Emergency Support Center at the DOT Headquarters in Ames becomes active • DOT Area Command not affected by the incident rotate into SEOC to provide staff support

Winter Weather

Winter Weather
A. Weather Forecast
B. Briefing
C. Event Occurs
D. Daily Winter Ops. SITREP as needed

Flooding Events

Flooding Events
A. River Gauge Forecast
B. Briefing
C. Event Occurs
D. Daily Central Command SITREP as needed

Event Escalates

Event Escalates

1. Emergency event(s) occur

2. Iowa DOT Receives
1) Mission Request(s) and/or
2) SEOC Activation Notice

3. TOB Director, with input from others, sends Notice of Emergency Activation and declares DOT at FEMA Incident Type 4 through 1

4. TOB Director notifies exec management/FHWA via email, phone or Alert Iowa and convenes a briefing at the Director's Emergency Support Center, briefs executives as needed
Strategic Communication Plan activated if needed

5. TOB responds as necessary to coordinate mission requests and/or provide staff at State EOC

6. TOB Director sends daily situational report (SITREP) to Management Team, Strategic Communications, and TMC Program Manager with on-going situational awareness, indicating current FEMA Incident Type classification, mission response, SEOC engagement

7. Meanwhile, TOB periodically coordinates gathering situational awareness with area command (i.e., DMMs and designated staff) and shared as needed

8. Should extended staffing at SEOC become necessary, DOT Area Command not affected by the incident rotate into SEOC to provide staff support

9. Emergency event concludes
TOB Director notifies executive management/FHWA that emergency response is over
Clean-up, recovery, and administration including reimbursement processing continues
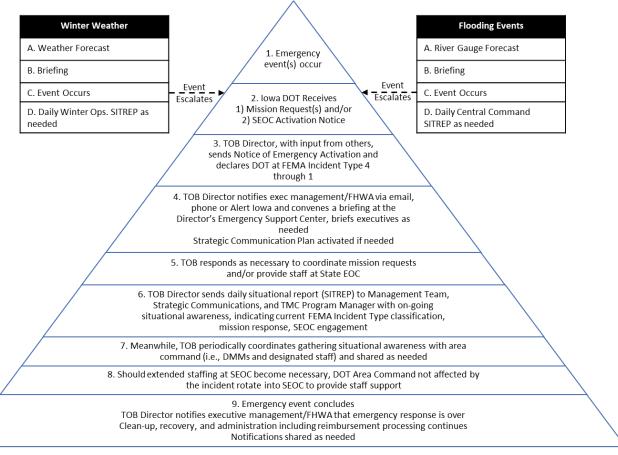Notifications shared as needed

Figure 6. Iowa DOT Emergency Management Activation and Situational Awareness Process

Regulation and Guidance for Emergency Management

Several resources together constitute the foundation for EM in Iowa. From the regulatory perspective, federal and state law dictates and/or enables various EM functions. The federal Robert T. Stafford Disaster Relief and Emergency Assistance Act (1988) targets natural disaster preparedness and coordination. The federal Post Katrina Emergency Management Reform Act (2006) reestablished FEMA and codified NIMS and ESF. Iowa Code 29C - Emergency Management and Security – authorizes HSEMD and its many functions, and includes provisions for coordination, roles, responsibilities, and interoperability. The Iowa Mutual Aid Compact (IMAC) outlines the mechanism for agencies to share resources within Iowa, while the national Emergency Management Assistance Compact (EMAC) has provided for Iowa assistance to and from other states for over 20 years. There are others, and this is not intended to be an exhaustive list.

Several guidance documents and related resources are in use for EM in Iowa and have been leveraged in the development of this plan. These remain available as ongoing resources for the Iowa DOT EM program.

- *A Guide to Emergency Response Planning at State Transportation Agencies – NCHRP - 2010*
- *Managing Catastrophic Transportation Emergencies: A Guide for Transportation Executives – NCHRP – 2014*
- *Security 101: A Physical Security Primer for Transportation Agencies – NCHRP – 2009*
- *Protection of Transportation Infrastructure from Cyber Attacks: A Primer – NCHRP – 2015*
- *Costing Asset Protection: An All-Hazards Guide for Transportation Agencies (CAPTA) – NCHRP – 2009*
- *Understanding Transportation Resilience: A 2016-2018 Roadmap – NCHRP – 2016*
- *Simplified Guide to the Incident Command System for Transportation Professionals – U. S. Department of Transportation Federal Highway Administration - 2006*
- *National Response Framework, Third Edition – United States Department of Homeland Security - June 2016*
- *National Infrastructure Protection Plan (NIPP) 2013: Partnering for Critical Infrastructure Security and Resilience - United States Department of Homeland Security*

Communications Interoperability

The general goal of interoperability is to establish standards-based, open communications among response agencies, systems and applications, and other support elements during times of need, such as major incidents or any natural or man-made emergency or disaster event where interagency coordination is critical to the effectiveness of the response. Ideally, interoperability includes voice, data and video. Interoperability may be needed at all levels: center-to-center, center-to-field, and field-to-field, depending on the magnitude and nature of the event.

Interoperability is also a critical element of TIM. The day-to-day responses are the most frequent use of inter-discipline communications, and here is where interoperability makes incremental improvements and gains buy-in at the field level. If we can become efficient at interoperability on the scenes of day-to-day traffic crashes, then interoperability will be the norm during the larger scale events. Responders and agencies will be able to communicate across agency boundaries without pulling out guide books,

and interoperability will become automatic. The Iowa Highway Helper and other key Iowa DOT field units currently have a level of interoperability with state and local agencies.

Iowa has some building blocks in place for interoperability such as memorandums of understanding (MOUs), plans, and procedures. Generally, these documents enable institutional communications and identify the players and some of the details.

- *Iowa DOT TSMO Strategic Plan* - Establishes Strategic Objective 5. Coordination, "Engage all DOT disciplines, and external agencies and jurisdictions to proactively manage and operate the transportation system."
- MOU between the ISP and the Iowa DOT TMC (formerly called Operations Support Center) - Dating back to 2010, established an agreement on what type of incidents and events require two-way communications.
- Iowa DOT Winter Weather Preparedness and Communications Plan - Identifies coordination and communications procedures.
- Iowa DOT Radio Instruction, Zones and Frequencies - Guides radio users on setting their radios to the interoperability channels. These interoperable capable radios are installed in key mobile units across the state.
- State of Iowa Emergency Response Plan/Communication (ESF-2) - Establishes a framework and responsibilities for communications during emergency events.

The State of Iowa established the Iowa Statewide Interoperable Communications System Board (ISICSB) in 2007. The mission of ISICSB is to:

> *"Develop, implement, and oversee policy, operations, and fiscal components of communications interoperability efforts at the state and local level, and coordinate with similar efforts at the federal level, with the ultimate objective of developing and overseeing the operation of a statewide integrated public safety communications interoperability system."*

The ISICSB has started the construction of a statewide interoperable radio system.

Iowa also established a FirstNet Broadband Subcommittee and Iowa DOT is represented on the committee. FirstNet is a national effort to develop a high speed, broadband wireless network for public safety. FirstNet offers a platform for improved interagency communications at all levels.

Iowa DOT shares traffic video including camera control with many partners, including law enforcement and dispatch centers, and will allow this access to any public safety agency that requests it.

PART 3. EMERGENCY MANAGEMENT PROGRAM ASSESSMENT

As part of the program assessment for the EM Service Layer development, a gap analysis was performed with input from the EM Internal Coordination Group. The gap analysis was developed using guidance from the foundational resources listed above as well as the action items from the decommissioned ETO plan. The EM gap analysis identifies the activities or components of successful EM programs including degree of implementation. Results of the gap analysis helped to shape the proposed EM activities over the next 5 years.

Tables 7 through 10 cover four key areas of emergency management:
- Planning – teams, plans, exercises, objectives, measures
- Preparation – guides, protocols, risk assessment
- Response – needs, requests, action, accountability
- Recovery – restoration, remuneration, after action reports

Each table presents several key pieces of information in the columns:
- Guidance or Best Practice – an abbreviated title or description of the service or activity, whether characterized as guidance or as a best practice
- Source – the source of the guidance or best practice, usually a previous Iowa DOT document
- Degree of implementation – the extent, effort, or resources expected to successfully implement the guidance or practice
- Current Iowa Status – helps give a snapshot of current activity, gap, or action needed
- Services and Activities – where applicable, this column indicates a link to the service or activity described in Section 5 (codes Safety, Reliability, Efficiency, Convenience, CoordiNation, Integration, SecuriTy).

TABLE 7. IOWA EMERGENCY MANAGAMENT GAP ANALYSIS – PLANNING ASSESSMENT

Guidance/Best Practice	Source	Implementation Degree			Status in Iowa	Serv. & Act. #
		H	M	L		
1. Form a collaborative planning team	2010 Guide		✓		The EM SLP Internal Coordination Group will be the planning team.	S4, R1
2. Conduct Research to Identify Hazards and Threats and Analyze Gathered Data/Perform a Security Risk Assessment	2010 Guide, Security Primer					
a) Develop an infrastructure security plan	ETO Plan, Security Primer			✓	This was done over 10 years ago for bridges, but probably needs to be updated.	T3
b) Perform a cyber security risk assessment	Protection from Cyber Attack	✓			The assessment is completed.	T2
c) Develop a cyber security plan for Information Technology (IT) and Operations Technology (OT), establish priorities, organizing roles and responsibilities	ETO Plan, Protection from Cyber Attack	✓			The plan has been developed with input from IT and Operations.	T2
3. Determine Goals and Objectives of Emergency Planning and Response Activities	2010 Guide		✓		The EM SLP project will develop the goals and objectives.	NA
4. Develop and Analyze Courses of Action and Identify Resources	2010 Guide		✓		The EM SLP project will develop the courses of action.	NA
5. Write the Iowa DOT Emergency Management Operations Plan	2010 Guide, Guide for Executives	✓			The EM Ops Plan is in final draft form. The EM SLP will add some content to this plan.	NA
a) Ensure expedited procedures are in place for emergency situations	Guide for Executives	✓			These are in place.	NA
b) Update radiological plan, address roles	ETO Plan	✓			This is in place.	NA
c) Develop a security personnel and training plan	Security Primer		✓		A training plan is in place but may need enhancements.	T1, I5
6. Approve and Implement the Iowa DOT Emergency Management Operations Plan	2010 Guide		✓		Approval of the Plan is pending upon final revisions.	NA
7. Exercise the EM Ops Plan and Evaluate Its Effectiveness	2010 Guide, Guide for Executives					
a) Conduct internal exercises	ETO Plan			✓	These could be implemented.	R8, N1

PLANNING						
Guidance/Best Practice	Source	Implementation Degree			Status in Iowa	Serv. & Act. #
		H	M	L		
b) Participate in external drills, exercises, conferences, seminars and involve as many applicable staff as practical	ETO Plan		✓		Tabletop exercises are being done, but involvement could be expanded.	C1
c) Maintain and exercise the COOP plan	ETO Plan, Guide for Executives		✓		The updated COOP/COG plan is under way.	R8
8. Review, Revise, and Maintain the Plan	2010 Guide					
a) Maintain EM Operations Plan and all related plans and procedures	ETO Plan		✓		Plan maintenance guidelines are included in the EM Operations Plan. Some related items still need to be added.	R1
b) Maintain Emergency contact lists	ETO Plan, Guide for Executives	✓			"Position List" and Management Contact List is in place.	R1
9. Develop and monitor EM performance measures	ETO Plan		✓		EM SLP project will develop performance measures.	SLP Report

TABLE 8. IOWA EMERGENCY MANAGAMENT GAP ANALYSIS – PREPARATION ASSESSMENT

Guidance/Best Practice	Source	Implementation Degree			Status in Iowa	Serv. & Act. #
PREPARATION						
		H	M	L		
1. Develop Approaches to Implement State Transportation Agency Roles and Responsibilities During Emergencies	2010 Guide, Guide for Executives					
a) Develop and maintain an incident command structure and protocols.	ETO Plan			✓	ICS/NIMS training has been done, but a policy/PPM needs to be developed.	S5, E3
b) Provide adequate staffing for all components of the response (including 24/7 responses) (Note 1)	ETO Plan, Guide for Executives			✓	This will happen if it is needed, but a procedure document should be developed to elicit an organized response. An event triage should be done as part of ICS planning.	R2
c) Implement security training (facilities, personnel, active shooter, etc.)	Security Primer		✓		Integrate into "Workday" system to plan and track training.	T1
d) Train staff in NIMS and ICS as appropriate for their roles	ETO Plan	✓			Everyone has been trained.	E3
e) Conduct training based on the Training Plan	ETO Plan		✓		Some training has been implemented, other is still needed.	N1, T1, I5
f) Develop an alternate command center/location from which to operate should access to the primary facilities and equipment be lost	Guide for Executives	✓			This is in the COOP/COG plan.	NA
g) Build a culture of cybersecurity through training	Protection from Cyber Attack	✓			Training is under way.	T1
h) Develop roles and responsibilities for multimodal coordinators.				✓	Guidance needs to be developed.	C2
2. Establish Communication Protocols and Mechanisms for Public Outreach	2010 Guide					
a) Improve situational awareness processes	ETO Plan		✓		A basic process is in place, but broader outreach is needed.	S1, S2, S3, N2, N5, I1

	PREPARATION					
Guidance/Best Practice	Source	Implementation Degree			Status in Iowa	Serv. & Act. #
		H	M	L		
b) Improve the notifications and public information process	ETO Plan	✓			"Alert Iowa", an HSEMD system is in place. May need to make sure Iowa DOT is completely plugged in.	NA
c) Assure that there is adequate communications and coordination between headquarters and the districts	Guide for Executives	✓			This is working well.	NA
3. Establish emergency evacuation/shelter-in-place/quarantine plans and traffic control and management protocols and procedures (Note 2)	2010 Guide			✓	This could be added to the EM Master Plan.	R5, R6, R7, E1, E2, I1
4. Develop Mobilization Plans for State Transportation Agency Personnel and Resources	2010 Guide					
a) Type resources based on NIMS typing	ETO Plan			✓	This is planned. Will work with equipment staff.	R4
b) Make sure that proper equipment is available to respond to emergencies	Guide for Executives		✓		A funding source/protocol is needed.	R4
5. Assure that contracts or contract mechanisms are in place to acquire needed supplies or services in an emergency	Guide for Executives		✓		Field equipment is good, a rental contract is in place. Office equipment or space may need work.	R4
6. Improve internal emergency communications – operability	ETO Plan, Guide for Executives			✓	May need to develop or update an older plan.	I4
7. Improve emergency communications interoperability	ETO Plan, Guide for Executives		✓		Interoperability is under way but needs expansion.	N3
8. Cooperate effectively with emergency responders, law enforcement, and other local agencies	Guide for Executives		✓		Cooperation is working but can be further developed.	N6
9. Cooperate effectively with the governor's office and the HSEMD	Guide for Executives		✓		Good, will continue to improve.	N6
10. Implement physical security countermeasures (Note 3)	Security Primer			✓	The plan needs to be updated.	T4, I1
11. Identify and rate critical infrastructure	Security Primer			✓	The plan needs to be updated.	T3

PREPARATION						
Guidance/Best Practice	Source	Implementation Degree			Status in Iowa	Serv. & Act. #
		H	M	L		
12. Implement cyber security countermeasures based on the cyber security plan	Protection from Cyber Attack	✓			IT and ITS sections working together to implement the plan	T2
13. Consider security and resilience during the design of assets, systems, and networks.	Guide for Executives	✓			IT and ITS sections working together to implement plan	T2

Note 1. An example of a 24/7 need are oversize/overweight permits for emergency response. These need to be expedited, so permit and bridge staff need to be available after hours at times. Other similar needs need to be identified.

Note 2. Some pieces are in the Radiological plan, but there are other scenarios (i.e., improvised nuclear bomb). There should be a protocol/guidance process that includes roles. Iowa DOT is usually not the lead agency. The concept of ingress/egress routing should be included, and contra-flow may not be a realistic solution.

Note 3. HSEMD did some work in this area (however the focus may have been broader than the needs for Iowa DOT). Facilities need to be addressed. There is also a coordination role for multimodal - RR and other modal infrastructure to gain awareness of their efforts and needs.

TABLE 9. IOWA EMERGENCY MANAGEMENT GAP ANALYSIS – RESPONSE ASSESSMENT

RESPONSE						
Guidance/Best Practice	**Source**	**Implementation Degree**			**Status in Iowa**	**Serv. & Act. #**
		H	**M**	**L**		
1. Initiate Emergency Response	2010 Guide	✓				NA
2. Address Emergency Needs and Requests for Support	2010 Guide	✓				NA
3. Support Evacuations, Shelter-in-Place, or Quarantine	2010 Guide	✓				R6
4. Implement Emergency Response Actions	2010 Guide	✓				NA
5. Continue Response Requirements	2010 Guide	✓				NA
6. Conclude Response Actions	2010 Guide	✓				NA
7. Ensure Cost Tracking and Accountability	2010 Guide					
a) Improve the process and procedures for tracking and documentation of damages for performance management purposes, FWHA and FEMA reimbursements	ETO Plan		✓		Tracking and documentation is occurring, but there is improvement needed.	E4
b) Maintain adequate staff and training to accomplish all finance and administration functions during responses	ETO Plan		✓		Training is "on the fly", may need some process improvement.	E4

TABLE 10. IOWA EMERGENCY MANAGEMENT GAP ANALYSIS – RECOVERY ASSESSMENT

RECOVERY						
Guidance/Best Practice	**Source**	**Implementation Degree**			**Status in Iowa**	**Serv. & Act. #**
		H	**M**	**L**		
1. Restore Traffic to Affected Areas	2010 Guide	✓				NA
2. Pursue FWHA and FEMA reimbursements		✓				E4
3. Identify and Implement Lessons Learned	2010 Guide, Guide for Executives					
a) Perform AARs after major events and follow up on action items	ETO Plan		✓		This is being done for traffic events, but a process needs to be implemented for major events.	N4, I3

PART 4. PERFORMANCE MANAGEMENT

The purpose of performance management is to evaluate the effectiveness of the EM program and support programmatic decisions related to resource allocation, technology deployment, planning, and action to effectively achieve program objectives. Performance management provides the foundation for outcome-based program management, measuring how well the program is performing and adapting to improve the outcome of resource prioritization and investment. For each of the EM Service Layer objectives, proposed measures have been developed to support outcome-based program management. Several measures go beyond current measures and require additional data collection and evaluation to support robust performance management. Table 11 shows the EM Service Area objectives, associated performance measure, the intent of each measure, and the source of data for the measure.

TABLE 11. EMERGENCY MANAGEMENT PERFORMANCE MEASURES AND DATA SOURCES

EM Service Layer Objective	Performance Measure	Intent of Measures	Data Source
Objective 1: Reduce safety impacts of emergencies on traveling public and responders	1.1 Response time	Quick response can reduce the potential for safety impacts by providing traffic control and scene management to protect the scene and back of queue. This should be measured as the average response time and the standard deviation, to reflect variability in response time.	TMC/ATMS Web EOC Iowa State Patrol logs
	1.2 Duration of impact to the transportation system	Clearance time is an indicator of the exposure to safety impacts. This should be measured as the average clearance time and the standard deviation, to reflect variability in response time.	TMC open-close times Web EOC
Objective 2: Reduce response time to emergencies	2.1 Response time	Quick response can reduce the potential for safety impacts by providing scene management and implementing mitigating tactics. This should be measured as the average response time and the standard deviation, to reflect variability in response time.	TMC Web EOC Iowa State Patrol logs
Objective 3: Reduce duration of emergencies	3.1 Response time	Quick response can reduce the potential for safety and reliability impacts by providing scene management and implementing mitigating tactics. This should be measured as the average response time and the standard deviation, to reflect variability in response time.	TMC Web EOC Iowa State Patrol logs
	3.2 Duration of impact to the system	The average duration of an event is an indicator of the level of impact to the system. This should be measured as the average clearance time and the standard deviation, to reflect variability in response time.	TMC open-close times Web EOC

EM Service Layer Objective	Performance Measure	Intent of Measures	Data Source
Objective 4: Enhance reliability through effective COOP/COG	4.1 Average time to implement the COOP/COG plan	The time to recover from COOP/COG issues is an indicator of DOT reliability.	Track by incident After Action Reviews
	4.2 Percent of required employees trained in NIMS/ICS	This measures the percent of employees trained in NIMS/ICS based on Training Plan requirements.	DOT training records/Workday
Objective 5: Reduce time needed to restore highways after an emergency	5.1 Duration of impact to the system	The duration of an event is a measure of the time needed to restore the highway to normal operations after an emergency. This should be measured as the average clearance time and the standard deviation, to reflect variability in response time.	TMC open-close times Web EOC
Objective 6: Improve system redundancy to keep the system operating during emergencies	6.1 Average number of alternate routes by Interstate segment	The number of preplanned alternative routes by Interstate segment is an indicator of redundancy in the system.	TIM alternate route plans
	6.2 Average additional time added by alternate route	The additional time added to a trip by diversion to an alternate route is an indicator of system redundancy.	TIM alternate route plans
	6.3 Availability of alternate mode	The number of alternative modes of transportation is an indicator of redundancy in the system.	Multimodal plans and services
Objective 7: Enhance real-time information on emergencies internally, to partner agencies and customers	7.1 Average time for awareness updates	Key emergency related information needs to be communicated.	Web EOC 511 website EINs Daily Situational Reports Situational updates sent to subscribers Social media posts
Objective 8: Enhance EM multiagency coordination for all hazards	8.1 Duration of impact to the system	Enhanced multiagency coordination should allow for a decrease in the length of time the system is impacted by an event. This measure as seen as an indicatory of coordination and should be considered by type of emergency. This should be measured as the average clearance time and the standard deviation, to reflect variability in response time.	TMC open-close times Web EOC Daily Situational Reports
Objective 9: Increase collaboration	9.1 Number of modes and EMAs sent local information	Sharing information across modes (transit, aviation, and rail) and response agencies is an indicator of collaboration.	Situational updates sent to subscribers

EM Service Layer Objective	Performance Measure	Intent of Measures	Data Source
among EM partners	9.2 Number of transit systems and EMAs reporting transit is included in emergency management planning activities	Involving transit agencies and emergency management agencies in planning activities enhances collaboration across partner agencies.	Emergency management plan review
Objective 10: Enhance EM interoperability	10.1 Percent of response agencies statewide with interoperable communications between dispatch centers	This is a measure of the interoperability between agency communications centers.	Iowa Statewide Interoperable Communications System Board (ISICSB)
	10.2 Percent of response agencies statewide with interoperable on-scene communications capability	This is a measure of radio interoperability between agencies responding to an emergency.	Iowa Statewide Interoperable Communications System Board (ISICSB)
	10.3 Percent of response agencies statewide with data sharing capability	This is a measure of data interoperability between agencies.	HSEMD Ad hoc polling
	10.4 Percent of response agencies statewide with video sharing capability	This is a measure of the video sharing interoperability.	HSEMD Ad hoc polling
Objective 11: Coordinate response to large scale emergencies with adjacent states	11.1 Average response time	This measures the response time to large scale, multiagency emergencies that require response from agencies in adjacent states.	After Action Reviews TMC Web EOC
	11.2 Average duration of impact to the system	Enhanced multiagency coordination should allow for a decrease in the length of time the system is impacted by an emergency. This measure as seen as an indicator of coordination and should be considered by type of emergency.	After Action Reviews TMC Web EOC
Objective 12: Coordinate response with multimodal transportation partners	12.1 Number of training and exercise engagements with multimodal partners	The more that partners train together the better they will coordinate during real world events. This measure is an indication of level of preparedness.	Training records After Action Reviews

EM Service Layer Objective	Performance Measure	Intent of Measures	Data Source
Objective 13: Coordinate across Iowa DOT divisions and bureaus	13.1 Number of safety and security enhancements completed	This measure will be an indicator of the progress of the emergency safety and security enhancements.	DOT training records
Objective 14: Enhance integration of EM and risk mitigation in DOT policies, plans and procedures	14.1 Number of policies, plans and procedures that specifically address EM and risk mitigation	This measure will provide an indication of the increased inclusion of emergency management and risk mitigation in new and revised documents, policies, and procedures.	DOT policy review
Objective 15: Improve data integration with emergency management partners	15.1 Number of emergency management partners with whom the DOT shares data	This measure will indicate the extent of data integration among emergency management partners.	TMC/ATMS Web EOC
Objective 16: Improve the integration of facilities, data networks and other support resources available to maintain essential functions identified in the COOP/COG plan	16.1 Number of facilities, key network elements and other resources with integration goals met	As a support role to COOP/COG this measure will be an indicator of DOT reliability.	COOP/COG Plan
Objective 17: Improve system resilience	17.1 Average duration of impact to the system and/or facilities	Resilience is the ability to recover from or adjust easily to change. Under emergency conditions, this can be measured in terms of duration of impact to the system.	After Action Reviews
Objective 18: Reduce security risks to the system	18.1 Frequency and cost of security impacts to the system and/or facilities	Risk is generally measured as a function of threat, vulnerability, cost of security events. This measure will track the total number of threats and the associated costs to determine the system risk.	After Action Reviews

EM Service Layer Objective	Performance Measure	Intent of Measures	Data Source
Objective 19: Enhance Safety and Security for DOT Personnel	19.1 Number of safety and security enhancements completed	This measure will be an indicator of the progress of the safety and security enhancement program.	Health and Safety DHS Hazard Assessments
	19.2 Percent of employees trained in security	This measure will be an indicator of employee readiness.	Health and Safety records

PART 5. EMERGENCY MANAGEMENT 5-YEAR ACTION RECOMMENDATIONS

To achieve the EM Service Layer objectives outlined earlier in the report, Iowa DOT has developed 5-Year Action Recommendations based on current conditions, gap analysis, self-assessment, and recommendations that have not moved forward.

Connecting Goals and Objectives to Services and Activities

Table 12 tracks TSMO goals and strategic objectives, identifying specific services and activities to support objectives at all three levels of planning: strategic, programmatic, and service layers. It includes statewide recommendations identified in the gap analysis as well as activities defined through the EM Service Layer planning process.

TABLE 12. RECOMMENDED EM SERVICE LAYER PLAN SERVICES AND ACTIVITIES

Goal	Service Layer Objectives	Services and Activities
✴ **Safety**	• Reduce safety impacts of emergencies on traveling public and responders. • Reduce response time to emergencies.	S1. Refine the situational awareness and notification process for emergencies as a tactic to reduce response time. S2. Develop a new weather forecasting system that addresses the needs of highway field operations. S3. Develop weather related partnership and outreach opportunities. S4. Use the EM Internal Coordination Group to keep EM related safety guidance and policies up to date. S5. Develop an SOP to activate and engage field safety officers to support emergency operations and implement active safety management.
⌛ **Reliability**	• Reduce response time to emergencies. • Reduce duration of emergencies. • Enhance reliability through effective COOP/COG	R1. Use the DOT EM Internal Coordination Group to develop and implement a process to keep emergency plans, procedures and contact lists up to date. R2. Develop staffing plans and schedules for State EOC coverage, Contingency Staffing Area, and District Area Command. R3. Identify and deploy mitigation improvement opportunities using existing infrastructure. R4. Develop a comprehensive resource management plan for major emergency response. R5. Assess existing alternate route plans for applicability to major incidents, emergencies and major special events considering bottlenecks and recurring problem areas. R6. Develop ingress/egress and evacuation route plans for major emergencies in major urban areas. R7. Integrate emergency route needs into the statewide planning and programming process. R8. Exercise the COOP/COG plan once per year.

Goal	Service Layer Objectives	Services and Activities
Efficiency	• Reduce time needed to restore highways after an emergency. • Improve system redundancy to keep the system operating during emergencies.	E1. Develop plans and SOPs and review/revise existing SOPS for long term interstate closures to decrease the time required to activate alternate routing when roads are closed. E2. Review/revise SOPs to quickly remove work zone closures when possible during major events. E3. Expand the process for implementing NIMS/ICS during events. E4. Streamline cost tracking process for emergency events and pursue FHWA and FEMA reimbursements where applicable.
Convenience	• Enhance real-time information on emergencies internally, to partner agencies and customers. • Coordinate response with multimodal transportation partners.	C1. Develop a public information plan for major emergencies. C2. Develop a plan/protocol for coordinating with and using other modes of transportation during major emergencies.
Coordination	• Enhance EM multiagency coordination for all hazards. • Increase collaboration among EM partners. • Enhance EM interoperability. • Coordinate response to large scale emergencies with adjacent states. • Coordinate across Iowa DOT divisions and bureaus	N1. Increase involvement in internal and external emergency exercises. N2. Increase interoperable video and data connections between the TMC, dispatch centers and other state and local agencies. N3. Identify new/additional key Iowa DOT field units and implement interoperable communications. N4. Perform AARs for all major events and include as many applicable staff and partners as practical. N5. Convene a team including Iowa DOT IT, Office of CIO representatives, HSEMD, etc. to address data needs and standards for EM. N6. Revise SOPs to include coordination with key agencies and resources during all phases of emergency management.

Goal	Service Layer Objectives	Services and Activities
Integration	• Enhance integration of EM and risk mitigation in DOT policies, plans and procedures. • Improve data integration with emergency management partners. • Improve integration of facilities, data networks and other support resources available to maintain essential functions identified in the COOP/COG plan.	I1. Identify, implement, and integrate technology advancements to support EM. I2. Include identified EM mitigation projects into programming and project development. I3. Use the DOT EM Internal Coordination Group to identify and implement EM related revisions to policies and procedures. I4. Develop or update an internal telecommunications "operability" backup plan for major emergencies. I5. Integrate Emergency and Incident Management training records into LMS for performance management tracking.
Security	• Improve system resilience to emergencies and security threats. • Reduce security risks to the system. • Enhance safety and security for DOT personnel.	T1. Update security training and train all employees. T2. Deploy high priority cybersecurity countermeasures. T3. Update the infrastructure security plan. T4. Deploy high priority infrastructure security countermeasures.

Services and Activities Description

For each recommendation identified in Table 9, a brief description and recommended services and activities to accomplish the tactic are provided. The services and activities range from planning projects to technology deployment to training efforts depending on the recommendation and the most effective approach for meeting the objective.

SAFETY STRATEGIES

S1. REFINE THE SITUATIONAL AWARENESS AND NOTIFICATION PROCESS FOR EMERGENCIES AS A TACTIC TO REDUCE RESPONSE TIME.

Good situational awareness and prompt emergency notification are key issues for standing up response resources quickly. Speeding up the activation will reduce initial response time. Situational awareness is both reactive and proactive. Reactive awareness and notifications are typical if the field emergency escalates beyond the capabilities of the local staff. Proactive notification comes in the form of preparedness, good weather forecasting, or timely awareness of special events. One topic that has been discussed related to creating a DOT-only version of Web EOC to improve situational awareness.

A situational awareness and notification process, and a related graphic, have been developed for the Iowa DOT EM Operations Plan but need to be refined through exercises and training. The elements of this have some overlap with services R4 (resource management) and N6 (interagency coordination), below.

S2. DEVELOP A NEW WEATHER FORECASTING SYSTEM THAT ADDRESSES THE NEEDS OF HIGHWAY FIELD OPERATIONS.

Weather forecasting for highway operations has different requirements than conventional weather forecasting, often oriented to aviation or for the public. Achieving good surface level weather forecasting and decision support for operations is critical to a DOT weather forecasting system. Working with the Office of Maintenance, a new weather forecasting system should be developed that may include in-house processes, contracting or a combination thereof. This development should start with requirements definitions from the end users including District staff and inclusion of best practices from other states.

S3. DEVELOP WEATHER RELATED PARTNERSHIP AND OUTREACH OPPORTUNITIES.

There are efforts at the national and state levels to improve weather information and forecasting. Iowa already participates in several weather-related organizations including the Aurora pooled fund study and the Clear Roads consortium. There are also related opportunities for partnerships with weather resources. Some additional efforts to consider are as follows.

- EDC4 (Road Weather Management: Weather Savvy Roads). Participation in Pathfinder to improve road weather information to travelers. More information on Pathfinder can be located at: https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/roadweather.cfm.

- Partnership with the Iowa State University (ISU) In-Trans Center for Weather Impacts on Mobility and Safety (CWIMS) (http://www.intrans.iastate.edu/cwims/) and other ISU weather related research.
- Partnership with the Iowa Flood Center (http://iowafloodcenter.org/). Partnering and data sharing with the Iowa Flood Center should be explored.

S4. USE THE EM INTERNAL COORDINATION GROUP TO KEEP EM RELATED SAFETY GUIDANCE AND POLICIES UP TO DATE.

The emergency management internal coordination group has been established. This group can be used to update and recommend improvements to EM related safety guidance and policies.

S5. DEVELOP AN SOP TO ACTIVATE AND ENGAGE FIELD SAFETY OFFICERS TO SUPPORT EMERGENCY OPERATIONS AND IMPLEMENT ACTIVE SAFETY MANAGEMENT.

Safety is paramount during emergency response. During large scale emergencies, medical resources may be overwhelmed. Injuries of responders will reduce the available responder resources and further load the medical responders. During responses, safety field officer positions should be identified in the work units who will give safety briefings for each operational period and be available to ensure that safety practices are being followed. The safety officers should have appropriate training and a reasonable span of control to be effective in their role.

RELIABILITY STRATEGIES

R1. USE THE DOT EM INTERNAL COORDINATION GROUP TO DEVELOP AND IMPLEMENT A PROCESS TO KEEP EMERGENCY PLANS, PROCEDURES, AND CONTACT LISTS UP TO DATE.

In concert with S4 the EM internal coordination group should be used to keep all EM related plans, procedures and contact lists up to date. An update process should be developed as a high priority item.

R2. DEVELOP STAFFING PLANS AND SCHEDULES FOR STATE EOC COVERAGE, CONTINGENCY STAFFING AREA, AND DISTRICT AREA COMMAND.

Developing staffing plans and schedules for the critical elements of emergency management will assure that coverage can occur at any time. These plans should be included in the EM Operations Plan and would be in place at all times. The overall objective would be to assure that people are properly trained for their role and to use the right people in the right places. Districts that have minimal or no impact during an event can provide staff for the State EOC coverage. The planning section of ICS would do an event assessment when a large-scale emergency occurs and take this role during responses.

R3. IDENTIFY AND DEPLOY MITIGATION IMPROVEMENT OPPORTUNITIES USING EXISTING INFRASTRUCTURE.

Many mitigation issues can be addressed with low cost projects or ongoing maintenance activities. A plan should be developed and routinely updated that identifies these needs from AARs, input from District Maintenance, bridge inspections and other sources. Examples include the following.

- Routine cleaning and maintenance of highway drainage.
- Drainage improvements where deficiencies are identified. Culvert inspections are currently being done and documented in Iowa DOT's inventory system.
- Additional permanent traffic control for closure prone locations (e.g. predetermined detours with flip signs).
- Ongoing identification and implementation of bridge scour mitigation needs and other bridge hardening improvements.
- Ongoing tree canopy management to prevent tree debris on the roadway during wind or ice events.

R4. DEVELOP A COMPREHENSIVE RESOURCE MANAGEMENT PLAN FOR MAJOR EMERGENCY RESPONSE.

A resource management plan will assure that resource issues can be addressed during emergency events. Elements of a resource management plan include the following.
- NIMS typing of existing resources.
- Resource availability plan based on known scenarios. Resources can be in-house, rented, contracted, or obtained through mutual aid or EMAC. Review emergency contracting options.
- Pre-scripted EMAC requests to help expedite requests for help from other states.
- Fuel and supply plan to assure availability during disasters. The fuel contracts should include 24/7 delivery service and fuel tanks should have provisions for generator operation. In addition to normal fuel supply contracting, alternate methods for obtaining all types of fuel should be identified in the event that the primary source is out of service.
- Guidance for the role of logistics and planning sections during events to support resource management.
- A funding source and protocol for funding use for emergency related equipment.
- Exploration of the use of other modes such as railroad for delivery of critical resources.

R5. ASSESS EXISTING ALTERNATE ROUTE PLANS FOR APPLICABILITY TO MAJOR INCIDENTS, EMERGENCIES, AND MAJOR SPECIAL EVENTS CONSIDERING BOTTLENECKS AND RECURRING PROBLEM AREAS.

Problem areas can be identified by event history, traffic and safety reviews, flood modelling (e.g. inundation mapping using 2D hydraulic modelling). Iowa DOT Bridge Division has these capabilities and has done much of the hydraulic modelling work. The existing information should be completed including any needed engineering studies and formalized into a plan. On an ongoing basis, this information should be used to revise the existing plans to address active traffic management during major events.

R6. DEVELOP INGRESS/EGRESS AND EVACUATION ROUTE PLANS FOR MAJOR EMERGENCIES IN MAJOR URBAN AREAS.

Evacuation for residents and the flow of resources into an affected area are critical needs during major emergencies, and streets and highways are the primary resource for these needs. An ingress/egress and evacuation plan, should be developed in concert with emergency management stakeholders and

local agencies that will allow quick identification of primary and alternate routes during a major emergency response. Include this plan in the Emergency Management Operations Plan.

R7. INTEGRATE EMERGENCY ROUTE NEEDS INTO THE STATEWIDE PLANNING AND PROGRAMMING PROCESS.

Review alternate the route plans from R5 for capacity, bridge restrictions, or other issues that may impede traffic flow during emergency response. Ongoing programming of identified improvements will add redundancy to the highway network and support emergency traffic needs. Representatives from the Office of Systems Planning and the Office of Program Management should be included in the Emergency Management Internal Coordination Group.

R8. EXERCISE THE COOP/COG PLAN ONCE PER YEAR.

Plan and schedule a COOP/COG exercise once per year. Tabletop exercises are recommended, including the key players and varied scenarios each year to cover a broad base of issues. A functional exercise is recommended every three years involving a larger group of players. This should be included in the Emergency Management Training and Exercise Plan.

EFFICIENCY STRATEGIES

E1. DEVELOP PLANS AND SOPS AND REVIEW/REVISE EXISTING SOPS FOR LONG TERM INTERSTATE CLOSURES AND TO DECREASE THE TIME REQUIRED TO ACTIVATE ALTERNATE ROUTING WHEN ROADS ARE CLOSED.

Develop a plan and process for implementing long term interstate closures. This includes identification of the need and the available/best routes, streamlining the process of activating alternate routing, use of 511, message boards, and public information.

E2. REVIEW/REVISE SOPS TO QUICKLY REMOVE WORK ZONE CLOSURES WHEN POSSIBLE DURING MAJOR EVENTS.

Identify, review, and revise any policies or guidance documents to expedite removal of work zone closures on affected routes or detour routes during major emergencies. Include language in construction contracts to allow this removal.

E3. EXPAND THE PROCESS FOR IMPLEMENTING NIMS/ICS DURING EVENTS.

An important process for DOTs is the use of NIMS and ICS during emergency response. A more detailed policy/PPM should be developed for Iowa DOT to operate under NIMS/ICS that builds on the EM Operations Plan. This process should also be included in exercise planning to practice these processes on a regular basis. Elements of NIMS/ICS that apply to Iowa DOT include the following.

- Incident Command and Unified Command
- Area Command (Districts)
- EOCs and Multi-Agency Coordination System
- NIMS, ICS, and position specific training for applicable employees.

E4. STREAMLINE COST TRACKING PROCESS FOR EMERGENCY EVENTS AND PURSUE FHWA AND FEMA REIMBURSEMENTS WHERE APPLICABLE.

Identify, review, and revise any policies or guidance documents to streamline the tracking process for emergency costs including labor, equipment, materials, and repair contracts. This will aid in tracking, performance management and the pursuit of FHWA and FEMA reimbursements. Identify roles and responsibilities for Finance and Administration section during events and include them in the staffing plans.

CONVENIENCE STRATEGIES

C1. DEVELOP A PUBLIC INFORMATION PLAN FOR MAJOR EMERGENCIES.

Develop a plan and procedure for disseminating public information during major emergencies. This can include the use of 511, message boards, news releases, outreach to motor carrier companies, and coordination with HSEMD. This should be done in concert with the Traveler Information Service Layer. A representative from the Office of Strategic Communications and Policy should be included in the Emergency Management Internal Coordination Group.

C2. DEVELOP A PLAN/PROTOCOL FOR COORDINATING WITH AND USING OTHER MODES OF TRANSPORTATION DURING MAJOR EMERGENCIES.

Develop roles and responsibilities for Multimodal Coordinators. Develop a plan and guidance for engaging other transportation modes during emergencies when applicable. This includes availability of modal coordinators when needed and involving them in situational awareness.

COORDINATION STRATEGIES

N1. INCREASE INVOLVEMENT IN INTERNAL AND EXTERNAL EMERGENCY TRAINING AND EXERCISES.

Iowa DOT currently hosts tabletop exercises and participates in external emergency exercises. Expanding the level of involvement in these exercises will increase preparedness, multiagency, and multimodal coordination. This expanded involvement should be included in an Emergency Management Training and Exercise Plan. The following are examples of methods to expand involvement.

- Broad based training on the EM Operations Plan.
- Engage other Divisions, key internal and external partners such as public transit agencies, airports, and railroads in internal and external emergency exercises.
  - o Include multimodal representatives in existing exercises.
  - o Involve as many internal and external partners as practical in emergency exercises and associated planning.
  - o Schedule an annual mode-specific exercise.
  - o During exercise design, develop scenarios that involve these partners.
- Participate in external drills, exercises, conferences, and seminars; and involve as many applicable staff as practical. Include external partners such as public transit agencies, airports, and railroads.

- Include this expanded involvement in the Emergency Management Training and Exercise Plan.

N2. INCREASE INTEROPERABLE VIDEO AND DATA CONNECTIONS BETWEEN THE TMC, DISPATCH CENTERS AND OTHER STATE AND LOCAL AGENCIES.

Develop a plan to increase interoperable communications and video sharing between the Iowa DOT TMC, key dispatch centers, and key state and local agencies. Leverage the national Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT, formerly known as ITS Architecture) to identify stakeholders, flows, and projects. Plan elements could include:

- Computer aided dispatch sharing, Highway Patrol radio logs to obtain emergency incident notification and information, hazmat spill information, etc.
- Direct information feeds from TMC to other state and local agencies to share emergency incident information.
- Increase the number of agencies sharing video.
- Develop video sharing from local agencies to Iowa DOT.
- Develop MOUs associated with video and data sharing.

N3. IDENTIFY NEW/ADDITIONAL KEY IOWA DOT FIELD UNITS AND IMPLEMENT INTEROPERABLE COMMUNICATIONS.

Iowa DOT has implemented interoperable radio communications in many field units. Develop a plan to identify and implement interoperable communications in all key field units that will be involved in emergency response.

N4. PERFORM AARS FOR ALL MAJOR EVENTS AND INCLUDE AS MANY APPLICABLE STAFF AND PARTNERS AS PRACTICAL.

After action reviews are an important part of collecting performance measures and improving the emergency response program. Institutionalize after action reviews following each major emergency. Include this guidance in the Emergency Management Operations Plan. Include external partners such as key EM partners, public transit agencies, airports, and railroads.

N5. CONVENE A TEAM INCLUDING IOWA DOT IT, OFFICE OF CIO REPRESENTATIVES, HSEMD, ETC. TO ADDRESS DATA NEEDS AND STANDARDS FOR EM.

This team of partner agencies would develop or refine the needs and the standards to facilitate a relevant and consistent approach to data sharing.

N6. REVISE SOPS TO INCLUDE COORDINATION WITH KEY AGENCIES AND RESOURCES DURING ALL PHASES OF EMERGENCY MANAGEMENT.

Identify and revise guidance documents and SOPs to assure that communications and coordination occurs with key stakeholders and resource agencies during major responses. These agencies include the following.

- Governor's Office
- HSEMD
- Other Partner State Agencies

- FWHA Division Office, Regional Emergency Transportation Coordinator (RETCO), Regional Emergency Transportation Representative (RETREP)
- FEMA Region VII Office
- Adjacent State DOTs
- Local agencies including law enforcement, fire, EMS, etc.

INTEGRATION STRATEGIES

I1. IDENTIFY, IMPLEMENT, AND INTEGRATE TECHNOLOGY ADVANCEMENTS TO SUPPORT EM.

Develop a plan and implement technology that will enhance emergency planning, preparation, response, and recovery. Examples of technologies are as follows:
- Use of unmanned aircraft systems (UAS) for inspection and situational awareness. Iowa DOT currently has two of these systems and plans to expand. Training and certifications would also be needed for District staff to operate the UAS.
- Mobile application for damage assessments.
- Automated flood monitoring and other warning systems.
- Use of simulations and virtual reality for training and exercises.

I2. INCLUDE IDENTIFIED EM MITIGATION PROJECTS INTO PROGRAMMING AND PROJECT DEVELOPMENT.

Some mitigation issues will require larger projects to address the need. A plan should be developed and routinely updated that identifies these needs from AARs, input from District Maintenance, bridge inspections and other sources. The plan should include project scopes, cost estimates, and cost-benefit analysis. Examples of these larger projects are as follows:
- Raising road and/or bridge elevations in flood prone areas.
- Pipe/culvert/bridge upgrades where highway creates a river bottleneck (pipe to box culvert, culvert to bridge, larger bridge, etc.)
- Permanent flood control (levees, flood walls, pumps, etc.)
- Road re-alignment where other options are not practical.
- Major road and bridge improvements related to security.

I3. USE THE DOT EM INTERNAL COORDINATION GROUP TO IDENTIFY AND IMPLEMENT EM RELATED REVISIONS TO POLICIES AND PROCEDURES.

As ongoing EM related policy issues are identified from AARs and other input, the EM Internal Coordination group should develop proposed policy changes and submit them for review and approval.

I4. DEVELOP OR UPDATE AN INTERNAL TELECOMMUNICATIONS "OPERABILITY" BACKUP PLAN FOR MAJOR EMERGENCIES.

Develop an emergency communications backup plan to assure that internal communications are available to support emergency response when normal systems are out. Plan elements could include:
- Use of satellite communications for backup voice and data communications.

- Two-way radio for backup voice communications.
- User training for all systems.
- Routine testing and exercising of backup systems.

I5. INTEGRATE EMERGENCY AND INCIDENT MANAGEMENT TRAINING RECORDS INTO LMS FOR PERFORMANCE MANAGEMENT TRACKING.

Integrate emergency related training records into the LMS system to assure that this training is being captured and measured. Coordinate between the Office of Traffic Operations and the Office of Employee Services to assure that the tracking process are set up to capture all security and emergency management training.

SECURITY STRATEGIES

T1. UPDATE SECURITY TRAINING AND TRAIN ALL EMPLOYEES.

Update the security training to cover all security risks. Deliver training to all Iowa DOT employees.

T2. DEPLOY HIGH PRIORITY CYBERSECURITY COUNTERMEASURES.

Following the Iowa DOT cyber security plan, implement identified high priority countermeasures.

T3. UPDATE THE INFRASTRUCTURE SECURITY PLAN.

Update the existing infrastructure security plan following FEMA National Preparedness Guidelines. Coordinate with other state agencies in relation to other Critical Infrastructure Protection Plans (CIPP) or Critical Infrastructure/Key Resources (CI/KR) work. Consider using the Costing Asset Protection Tool to assist in the assessment process.

T4. DEPLOY HIGH PRIORITY INFRASTRUCTURE SECURITY COUNTERMEASURES.

Prioritize and develop scopes and cost estimates for infrastructure countermeasures identified in the infrastructure security plan (SEC3). Examples of countermeasures include the following:
- Bridge pier protection (fencing, bollards, etc.)
- Security CCTV (included in the ITS/Communications SLP)
- Specialized PPEs for response to improvised nuclear attack, bio-agents, etc.
- Data integration with Iowa Division of Intelligence and Fusion Center.

5-Year Emergency Management Program Activities Schedule

Table 13 translates the proposed recommendations into a 5-year schedule.

TABLE 13. 5-YEAR EM PROGRAM ACTIVITIES SCHEDULE

Service/Activity/Project	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Safety Strategies					
S1. Refine the situational awareness and notification process for emergencies as a tactic to reduce response time.	▓				
S2. Develop a new weather forecasting system that addresses the needs of highway field operations.	▓				
S3. Develop weather related partnership and outreach opportunities.		▓	▓		
S4. Use the EM Internal Coordination Group to keep EM related safety guidance and policies up to date.		�e	�e	▒	▒
S5. Develop an SOP to activate and engage field safety officers to support emergency operations and implement active safety management.	▓				
Reliability Strategies					
R1. Use the DOT EM Internal Coordination Group to develop and implement a process to keep emergency plans, procedures and contact lists up to date.	▒	▒	▒	▒	▒
R2. Develop staffing plans and schedules for State EOC coverage, Contingency Staffing Area, and District Area Command.	▓				
R3. Identify and deploy mitigation improvement opportunities using existing infrastructure.		▒	▒	▒	▒
R4. Develop a comprehensive resource management plan for major emergency response.		▓			
R5. Assess existing alternate route plans for applicability to major incidents, emergencies and major special events considering bottlenecks and recurring problem areas.		▓			
R6. Develop ingress/egress and evacuation route plans for major emergencies in major urban areas.		▓			
R7. Integrate emergency route needs into the statewide planning and programming process.		▓			
R8. Exercise the COOP/COG plan once per year.		▒	▒	▒	▒

Service/Activity/Project	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Efficiency Strategies					
E1. Develop plans and SOPs and review/revise existing SOPS for long term interstate closures and to decrease the time required to activate alternate routing when roads are closed.			■		
E2. Review/revise SOPs to quickly remove work zone closures when possible during major events.			■		
E3. Expand the process for implementing NIMS/ICS during events.			■		
E4. Streamline cost tracking process for emergency events and pursue FHWA and FEMA reimbursements where applicable.	■	■	■	■	■
Convenience Strategies					
C1. Develop a public information plan for major emergencies.			■		
C2. Develop a plan/protocol for coordinating with and using other modes of transportation during major emergencies.			■		
Coordination Strategies					
N1. Increase involvement in internal and external emergency training and exercises.	■	■	■	■	■
N2. Increase interoperable video and data connections between the TMC, dispatch centers and other state and local agencies.		■	■	■	■
N3. Identify new/additional key Iowa DOT field units and implement interoperable communications.				■	■
N4. Perform AARs for all major events and include as many applicable staff and partners as practical.	■	■	■	■	■
N5. Convene team including Iowa DOT IT, Office of CIO representatives, HSEMD, etc. to address data needs and standards for EM.	■				
N6. Revise SOPs to include coordination with key agencies and resources during all phases of emergency management.				■	

Service/Activity/Project	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Integration Strategies					
I1. Identify, implement, and integrate technology advancements to support EM.					Project
I2. Include identified EM mitigation projects into programming and project development.			Ongoing	Ongoing	Ongoing
I3. Use the DOT EM Internal Coordination Group to identify and implement EM related revisions to policies and procedures.				Ongoing	Ongoing
I4. Develop or update an internal telecommunications "operability" backup plan for major emergencies.				Project	
I5. Integrate Emergency and Incident Management training records into LMS for performance management tracking.		Project			
Security Strategies					
T1. Update security training and train all employees.	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
T2. Deploy high priority cybersecurity countermeasures.	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
T3. Update the infrastructure security plan.					Project
T4. Deploy high priority infrastructure security countermeasures.					Ongoing

"Project"	Items that are a discreet project or planning activity.
Ongoing	Items that are ongoing needs for the EM program.

PART 6. 5-YEAR EMERGENCY MANAGEMENT SERVICE LAYER COST ESTIMATE

The TSMO Program budget is currently broken in four categories:

- Systems and Technical Services
- Traffic Incident and Emergency Management
- Traffic Operations Research and Decision Support
- TMC Services

Based on the proposed service and activities, the proposed annual Emergency Management budget estimate has been refined by fiscal year and is shown in Figure 7. Components of the proposed budget include the baseline budget for the category, the elements captured in the EM SLP, and the collection of services, activities, and projects listed above. Together these entail addressing, implementing, or enhancing several general areas:

- Plans, guidance, policies, procedures
- Communications, public information, and modal coordination
- Situational awareness and notifications
- Training and exercises
- NIMS/ICS implementation
- Infrastructure security, cybersecurity, countermeasures

- Interoperability, information technology, and data needs
- Mitigation strategies and work zone coordination
- Weather forecasting and partnerships
- Alternate routes, ingress/egress, and evacuation route plans
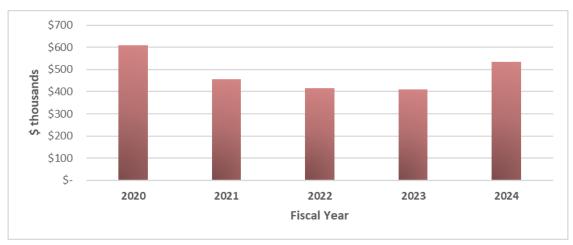- After action reviews

FIGURE 7. PROPOSED EMERGENCY MANAGEMENT FY 2020-24 BUDGET

Appendix A. Traceability Matrix

Goal	Strategic Objective	Program Objective	Service Layer Objective	Performance Measure	Services and Activities
Safety	Reduce crash frequency and severity and maximize safety for the traveling public and responders.	• Reduce the number of overall major crashes. • Reduce the number of secondary crashes caused by traffic incidents. • Reduce the number of work zone related traffic incidents. • Maximize transportation safety during all types of events.	1. Reduce safety impacts of emergencies on traveling public and responders. 2. Reduce response time to emergencies.	1.1 Response time 1.2 Duration of impact to the transportation system 2.1 Response time	S1. Refine the situational awareness and notification process for emergencies as a tactic to reduce response time. S2. Develop a new weather forecasting system that addresses the needs of highway field operations. S3. Develop weather related partnership and outreach opportunities. S4. Use the EM Internal Coordination Group to keep EM related safety guidance and policies up to date. S5. Develop an SOP to activate and engage field safety officers to support emergency operations and implement active safety management.
Reliability	Improve transportation reliability, increase system resiliency, and highway capacity in critical corridors.	• Improve travel time reliability • Increase the resilience of the transportation system to floods, winter weather, and other extreme weather events. • Work with special event generators to actively manage traffic during large scale events that impact the highway network.	2. Reduce response time to emergencies. 3. Reduce duration of emergencies. 4. Enhance reliability through effective COOP/COG.	2.1 Response time 3.1 Response time 3.2 Duration of impact to the system 4.1 Average time to implement the COOP/COG plan 4.2 Percent of required employees trained in NIMS/ICS	R1. Use the DOT EM Internal Coordination Group to implement a process to keep emergency plans, procedures and contact lists up to date. R2. Develop staffing plans and schedules for State EOC coverage, Contingency Staffing Area, and District Area Command. R3. Identify and deploy mitigation improvement opportunities using existing infrastructure. R4. Develop a comprehensive resource management plan for major emergency response. R5. Assess existing alternate route plans for applicability to major incidents, emergencies and major special events considering bottlenecks and recurring problem areas. R6. Develop ingress/egress and evacuation route plans for major emergencies in major urban areas. R7. Integrate emergency route needs into the planning process. R8. Exercise the COOP/COG plan once per year.
Efficiency	Minimize traffic delay and maximize system efficiency to keep traffic moving.	• Improve level of service on major freight corridors. • Maximize use of existing roadway capacity. • Establish network level priorities for managing traffic. • Respond to and clear traffic incidents as quickly as possible. • Minimize the environmental impacts of the transportation system.	5. Reduce time needed to restore highways after an emergency. 6. Improve system redundancy to keep the system operating during emergencies.	5.1 Duration of impact to the system 6.1 Average number of alternate routes by Interstate segment 6.2 Average additional time added by alternate route 6.3 Availability of alternate mode	E1. Develop plans and SOPs and review/revise existing SOPS for long term interstate closures and to decrease the time required to activate alternate routing when roads are closed. E2. Review/revise SOPS to quickly remove work zone closures when possible during major events. E3. Expand the process for implementing NIMS/ICS during events. E4. Streamline cost tracking process for emergency events and pursue FHWA and FEMA reimbursements where applicable.
Convenience	Provide ease of access and mobility choices to customers.	• Provide timely, accurate and comprehensive information to customers. • No unplanned road closures or restrictions due to conditions within Iowa DOT's control. • Provide high quality, machine ready data in open formats. • Accommodate bike, pedestrian, transit and commercial vehicle in transportation management and operations.	7. Enhance real-time information on emergencies internally, to partner agencies and customers.	○ Average time for awareness updates	C1. Develop a public information plan for major emergencies. C2. Develop a plan/protocol for coordinating with and using other modes during major emergencies.

Appendix A. Traceability Matrix

Goal	Strategic Objective	Program Objective	Service Layer Objective	Performance Measure	Services and Activities
Coordination	Engage all DOT disciplines, and external agencies and jurisdictions to proactively manage and operate the transportation system.	• Lead Statewide and Regional Traffic Incident Management Program activities. • Coordinate responses to large scale traffic incidents with adjacent states. • Provide staff knowledge and management resources to enable adaptation to rapidly changing technology.	8. Enhance EM multiagency coordination for all hazards.	8.1 Duration of impact to the system	N1. Increase involvement in internal and external emergency exercises. N2. Increase interoperable video and data connections between the TMC, dispatch centers and other state and local agencies. N3. Identify new/additional key Iowa DOT field units and implement interoperable communications. N4. Perform AARs for all major events and include as many applicable staff and partners as practical. N5. Convene a team including Iowa DOT IT, Office of CIO representatives, HSEMD, etc. to address data needs and standards for EM. N6. Revise SOPs to include coordination with key agencies and resources during all phases of emergency management.
			9. Increase collaboration among EM partners.	9.1 Number of modes and EMAs sent local information 9.2 Number of transit systems and EMAs reporting transit is included in emergency management planning activities	
			10. Enhance EM interoperability.	10.1 Percent of response agencies statewide with interoperable communications between dispatch centers 10.2 Percent of response agencies statewide with interoperable on-scene communications capability 10.3 Percent of response agencies statewide with data sharing capability 10.4 Percent of response agencies statewide with video sharing capability	
			11. Coordinate response to large scale emergencies with adjacent states.	11.1 Average response time 11.2 Average duration of impact to the system	
			12. Coordinate response with multimodal transportation partners.	12.1 Number of training and exercise engagements with multimodal partners	
			13. Coordinate across Iowa DOT divisions and bureaus	13.1 Number of safety and security enhancements completed	
Integration	Incorporate TSMO strategies throughout DOT's transportation planning, design, construction, maintenance, and operations activities.	• Integrate TSMO into existing Iowa DOT Policies, Plans, and Procedures. • Develop standards-based systems, rooted in geospatial technologies, to improve performance management and decision support systems. • Use integration and big data mining strategies to improve performance management and business intelligence. • Implement integrated corridor management strategies to manage traffic across multiple jurisdictions.	14. Enhance integration of EM and risk mitigation in DOT policies, plans and procedures.	14.1 Number of policies, plans and procedures that specifically address EM and risk mitigation	I1. Identify, implement, and integrate technology advancements to support EM. I2. Include identified EM mitigation projects into programming and project development. I3. Use the DOT EM Internal Coordination Group to identify and implement EM related revisions to policies and procedures. I4. Develop or update an internal telecommunications "operability" backup plan for major emergencies. I5. Integrate Emergency and Incident Management training records into LMS for performance management tracking.
			15. Improve data integration with emergency management partners.	15.1 Number of emergency management partners with whom the DOT shares data	
			16. Improve integration of facilities, data networks and other support resources available to maintain essential functions identified in the COOP/COG plan.	16.1 Number of facilities, key network elements and other resources with integration goals met	
Security	Prepare for and mitigate potential physical and cyber security issues.	• Integrate security planning and risk mitigation in all TSMO activities. • Reduce cybersecurity vulnerabilities within the transportation system.	17. Improve system resilience to emergencies and security threats.	17.1 Average duration of impact to the system and/or facilities	T1. Update security training and train all employees. T2. Deploy high priority cybersecurity countermeasures. T3. Update the infrastructure security plan. T4. Deploy high priority infrastructure security countermeasures.
			18. Reduce security risks to the system.	18.1 Frequency and cost of security impacts to the system and/or facilities	
			19. Enhance safety and security for DOT personnel.	19.1 Number of safety and security enhancements completed 19.2 Percent of employees trained in security	