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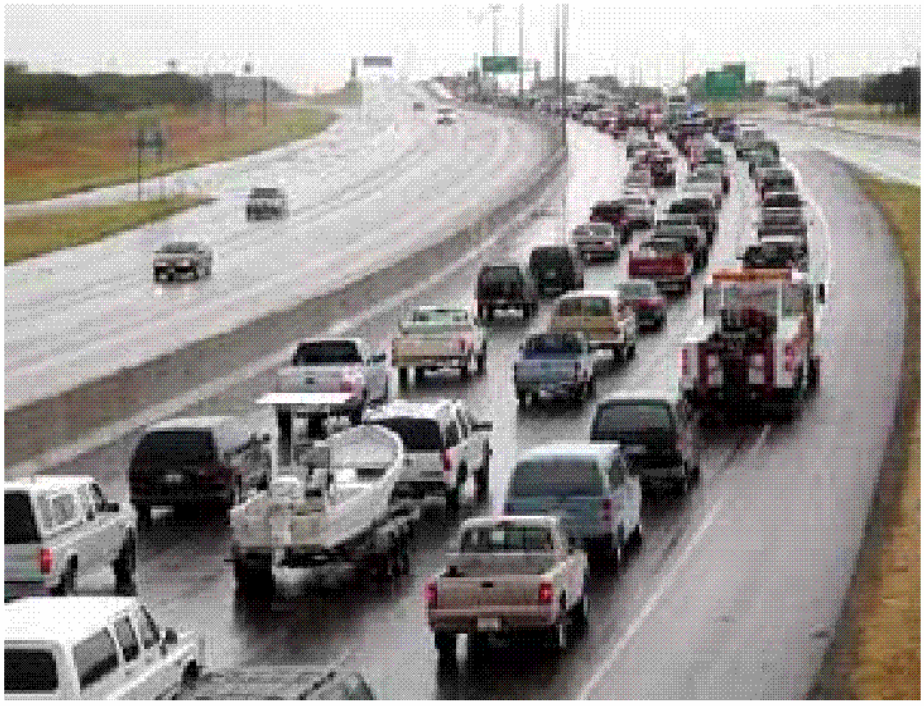
ENTERPRISE

# Transportation Management Plan & ITS Implementation During Mass Evacuation



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ADOT

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# EXECUTIVE SUMMARY

## Background - Understanding the Need

Recent natural and man-made disasters throughout the United States have accentuated a growing concern among Departments of Transportation (DOTs) within and outside of the Enterprise group regarding their preparedness to respond to such incidents. Hurricane and tornado strikes, coupled with episodes of terrorism and mass power failure have all highlighted the need to evacuate large masses of people in an organized and orderly manner.

Evacuations may result from an assortment of causes:
- Unplanned events such as a major terrorist attacks;
- Infrequent recurring events such as hurricanes, floods or tornados; or
- Planned regular events such as residents in a community "evacuating" to head to lakes or recreational areas on weekends in the summer.

While the first two examples are the primary emphasis of this study, the research also applies to any situation in which a mass of travelers needs to share transportation infrastructure to get quickly from point A to point B.

## The Project Vision

The initial purpose of this project is to establish the extent to which Intelligent Transportation Systems (ITS) technologies are being used to support mass evacuation procedures at a statewide level. Information will be gathered to assess the potential difficulties of installing new systems and their associated coordination. Subsequently, lists of actions and so-called "next steps" have been created that individual state Departments of Transportation (DOTs) could take to further mobilize ITS resources during mass evacuations and other emergencies.

The report is intended to serve as a resource for DOTs in the following manner:
- To view a glimpse of how other states use ITS to manage Mass Evacuations;
- To garner ideas that they can then discuss with there states' Emergency Management groups;
- To serve as a resource, should the individual ENTERPRISE states embark on future efforts to implement ITS for support of evacuations.

## Research Approach

The project research focused on two key elements. The initial element was a comprehensive review of statewide emergency planning documents. This involved examining individual states' electronic and printed files for evidence of any in-place

strategies and varying chains of command. Secondly, one on one telephone conversations were conducted with state DOTs to assess the current level of readiness and understanding for using ITS resources during mass evacuation.

## Summary of Research Results

Key findings of this research included:

- **Published guidance for the use of ITS technologies as part of an emergency management plan is limited at both local and national levels**. Searches undertaken for this study and by concerned DOTs have consistently failed to locate a standardized national plan for statewide action to large-scale evacuation situations. Available information is more often than not focused on one particular type of situation (i.e. a hurricane, or terrorist use of so-called 'dirty' WMD).

- **Less than one third of the interviewed DOTs had a state level plan for mass evacuation.** The survey results indicate that a surprisingly low percentage of State DOTs consider themselves prepared for mass evacuation events on a statewide level. Although this survey does not show local emergency evacuation plans, it should be noted that some states delegate the development of evacuation plans to the local jurisdictions.

- **The majority of interviewed states already have capable ITS equipment at their disposal that could be coordinated during mass evacuations.** The survey listed a broad range of ITS resources and equipment that could be used to support mass evacuations and emergency transportation events, ranging from Dynamic Messaging Signs (DMS), to statewide condition reporting systems. This indicates that there is currently a wide gap between the existing ITS capabilities of the state DOT and the comprehension of their potential use.

## Conclusions and Recommendations to States

In light of these findings, a set of guidelines for using ITS resources has been developed to offer feasible "next steps" that states could take to integrate their existing ITS systems during state emergencies. These include: -

- Organization of a statewide intra-agency management plan capable of hierarchically coordinating all relevant departments.

- Cooperation with existing physical command centers (typically operated by Emergency Operations Agencies) to ensure that existing ITS hardware and software can be controlled from within the centers.

- Implementation that cooperates with and/or builds upon existing Traffic Management Centers (either at the statewide level or regional level) that would

enable centralized DMS and CCTV operation, as well as traffic monitoring. Control of DMS and CCTV should bypass agency barriers and allow those agencies responsible for managing evacuations to control needed equipment, if allowed as part of the state's evacuation procedures.

- Implementation of a statewide condition reporting system that may be accessed by individuals throughout the state using Internet connectivity. Statewide condition reporting systems should allow the manual and/or automated entry of mass evacuation events, and allow for description of the event causing the evactuation, detour routes, road closures, and recommendations to travelers.

- The pooled information from ITS systems should be made readily available to relevant agencies and the general public through systems such as 511 and traveler information web pages. These could be automatically activated by the condition reporting system.
    - State 511 systems should support an option that contains evacuation information upon answering, without any caller interaction. Non-evacuation information should also be available, but agencies should have the ability to emphasize evacuation reports.
    - States operating web pages should have the ability to display pre-designed evacuation pages as needed.

- States should migrate towards controlling all Dynamic Message Signs (DMS) and CCTV cameras from any authorized center. National ITS standards being developed by ITE/AASHTO should be considered as the primary mechanism to govern "center to center" information exchanges that enable this decentralized control of hardware and software. Action Plans described earlier should contain provisions for the posting of DMS messages.

A comprehensive list of conclusions (including additional recommendations for states) as well as state emergency agencies, their contact details, and published emergency response plans is presented in the appendices of this report.

# Transportation Management Plan and ITS Implementation During Mass Evacuation

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# 1. Introduction

## 1.1 Purpose

The purpose of this document is to show how Intelligent Transportation Systems (ITS) technologies can be used during mass evacuation procedures. Material in this report will serve as a starting point for State Departments of Transportation (DOTs) to revise their plans and procedures for responses to both natural and man-made disasters, including terrorism-related incidents.

This project will assist the states in the development of effective transportation management plans for mass evacuation events by providing guidance for the application of ITS technologies and procedures. This will be based on the actual experiences of other states, which have been involved with mass evacuation, as well as those agencies that have used ITS technologies during such events. Because there are no official documents and information related to this subject, research will provide guidance to the ENTERPRISE group, as well as other agencies, in developing plans during mass evacuation events.

**Purpose**

The purpose of this project is to:

- Show how ITS technologies can be used during mass evacuation operations.
- Serve as a starting place for State DOTs to revise their Transportation Management Plans (TMP) for response to natural and man-made disasters.
- Provide guidelines for using ITS components and resources during mass evacuation operations
- Show how agencies can be involved in the process and increase their state of readiness.

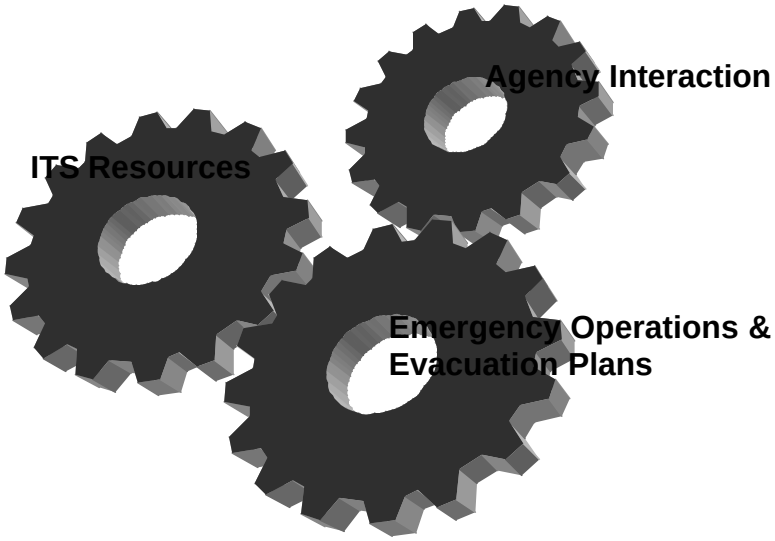



**Figure 1-1: Primary Areas of Interest**

This project focuses on three primary areas related to the use of ITS resources to support mass evacuation and emergency operations. The report is logically organized around these three primary concepts:

**ITS Resources (Sections 2 & 3)** – The primary focus of this project is on identifying Intelligent Transportation System resources that are available for supporting mass evacuation operations and developing guidelines for using those resources.

**Agency Coordination (Section 4)** – Due to the complex nature and wide-reaching effects of emergencies and disasters, multi-agency coordination is an important aspect of providing any kind of response, including mass evacuation. Agency coordination occurs at three primary levels: Federal, State and Local.

**Emergency Operations & Evacuation Plans (Section 5)** – Mass evacuation and emergency management plans provide the roadmap for bringing intelligent transportation systems resources into the picture and for coordinating among agencies.

## 1.2 Goals and Objectives

The primary goal of the Mass Evacuation & ITS project is to provide a document that illustrates the implementation of a transportation management plan utilizing ITS technologies and procedures as part of the overall effort during and after mass evacuation. This report summarizes the current state of the practice and provides guidance based on the following objectives:

- Develop a set of "best management practices" or "recommendations" for use of ITS infrastructure during mass evacuation.
- Identify the types of ITS infrastructure that are critical to mass evacuation and how those components can be used effectively and in a timely manner. Some types of ITS components considered include:
    - Fixed and Portable Dynamic Message Signs (DMS)
    - CCTV surveillance
    - Traffic Detectors
    - Reversible Roadways (Contra-flow)
    - 511 Traveler Information
    - Internet
    - Highway Advisory Radio (HAR) and Low Power FM (LPFM)
    - Emergency Alert System (EAS)
    - Portable Traffic Management Systems (PTMS)
    - Public cable TV and radio broadcasts
    - Road Weather Information Systems (RWIS)
    - Condition Reporting Systems
- Provide for one or more redundant Traffic Management Centers (TMCs).
- Give guidance on best use of roadway infrastructure surveillance and information dissemination mechanisms during a mass evacuation.
- What the DOTs should be doing during mass evacuation and with whom to coordinate the required roles and responsibilities.

## 1.3 Background

In response to recent homeland security concerns, transportation agencies are starting to reassess their roles and responsibilities in the event of security threats or disasters requiring a mass evacuation. During a mass evacuation, the key role of the transportation agencies is to provide primary support for movement of vehicles, supplies, and emergency resources through the transportation network. With the deployment and wide availability of ITS technologies spurred over the last 10 years by Federal funding, state transportation agencies are now equipped with some very powerful tools for managing and operating transportation and its associated network. Federal funding under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Transportation Equity Act for the 21st Century (TEA-21) of 1998 have provided the funding for state investments in ITS resources and equipment.

**Based on initial research, there is currently very little guidance on the use of ITS technologies and procedures as part of a comprehensive emergency and transportation management plan during a mass evacuation**. In fact, while most states and local agencies are working aggressively to update their plans in light of national security threats, there is a realization that many of the plans do not take advantage of available ITS technologies and procedures that could vastly improve evacuation operations.

One of the few good sources of information regarding the use of ITS technologies and procedures for mass evacuation events is from the states that face threats of severe hurricanes and tropical storms each year. Many of these states have actual and recent experience in conducting mass evacuations during hurricane and flood events. This highlights the fact that while some states have long had sound evacuation plans, other states are less prepared and have little experience or guidance available for developing effective plans and making use of current ITS technologies and procedures.

In a recent report by the Louisiana State University (LSU) Hurricane Center entitled "National Review of Hurricane Evacuation Plans and Policies" [8], published in 2001, the following summarized the preparedness of State DOTs to use new technologies, such as ITS, to assist in mass evacuations:

> *"In recent meetings and conferences organized for the purpose of discussing plans and practices for evacuation, it was apparent that many DOT officials were neither aware of the current state of practice nor the way in which new technologies [such as ITS] and methods could be used to better address evacuation-related problems."*

## 1.4 Evacuation and Mass Evacuation Defined

For the purposes of this report, Table 1-1 provides definitions of the key terms "Evacuation" and "Mass Evacuation" that are central to this project.

**Table 1-1: Evacuation Definitions**

| | |
|---|---|
| **Evacuation** | The movement of people to a safe area, from an area believed to be at risk, when a hazard or disaster requires action. |
| **Mass Evacuation** | An evacuation of 10,000 or more people. |
| **Emergency / Disaster** | Synonymous terms for an unplanned event that can cause deaths or significant injuries to employees, customers, or the public, or that can shut down businesses, disrupt operations, cause potential environmental damage, or threaten a facility's financial standing. |

Although this report deals with "mass evacuation", the reality is that even a minor evacuation in many smaller communities (including coastal, mountainous, and rural areas) may jam roadways and cause transportation operation issues that need to be addressed. The impact of evacuations has more to do with the capabilities of the existing transportation network and the ability to augment those capabilities using ITS resources.

## 1.5 Overview of Mass Evacuation

While much of the historical experience with mass evacuations in the United States has resulted from natural disasters (e.g. hurricanes in the Southeastern U.S. and earthquakes and volcanoes in the Western U.S.), recent terrorism attacks and other man-made, technological disasters have focused new attention on the potential need to be prepared for mass evacuation.

The need for new focus on mass evacuation planning and the use of ITS resources to support mass evacuations is highlighted in several lessons learned from the recent experiences of September 11th terrorist attacks in New York City and Washington, D.C. The following conclusions were identified in "A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents" [15], which was developed under the American Association of State Highway and Transportation Officials (AASHTO) Security Task Force:

- **The need for specific operations regimes such as mass evacuation and emergency access.** Public reaction in both New York and Washington, D.C. on 9/11 included a large amount of self-evacuation as people left the affected area and united with their families. In both the New York and Washington, D.C. areas, multi-modal transportation resources were mobilized in an ad-hoc fashion to accommodate these demands. The need for a more organized approach to evacuation and emergency access was clearly demonstrated.
- **Capitalizing on Intelligent Transportation Systems technology for traffic control and communications**. In New York, TRANSCOM's multi-agency communications capability proved its value in keeping multiple agencies up to date regarding post-incident travel conditions. At the same time, the ITS traffic management features were used to accommodate the need for reverse flows (Contra-flows) and special emergency access in and out of Manhattan and the Washington, D.C. areas.

Existing transportation and emergency management plans may need to be adjusted for characteristics such as scale, additional responder risks, crime scene management, and other factors related to the use of Weapons of Mass Destruction. The need for special transportation responses, e.g., evacuation, quarantining, may be introduced.

## 1.6 Mass Evacuation Scenarios and Current Examples

Mass evacuation scenarios are as varied as the hazards that threaten each state, region, or local area. Typically, each state conducts a hazard analysis to determine the specific hazards that threaten their jurisdiction. Table 1-2 provides a listing of potential hazards that could result in the need for mass evacuation based on a survey of each state's emergency operations plans.

**Table 1-2: Causes of Mass Evacuation**

| Mass Evacuation Scenario | Examples |
|---|---|
| **Natural Disasters** | • Hurricanes<br>• Floods<br>• Fires<br>• Earthquakes<br>• Volcanoes<br>• Tsunamis<br>• Tornados<br>• Disease Outbreaks<br>• Mudslides<br>• Winter Storms |
| **Man-made (Technological) Disasters** | • Terrorist threats or attacks using Weapons of Mass Destruction (WMD)<br>• Hazardous Materials (HAZMAT) spills and accidents<br>• Nuclear and Radiological Disasters<br>• Dam Failures<br>• Electrical Grid Failure |

### Current Examples of Evacuation

The following recent examples of disasters resulting in evacuations and emergency road closures illustrate the variety of real-life scenarios that affect emergency transportation operations. All of these scenarios result in the use of State DOT resources and would benefit from the efficient and coordinated use of ITS resources.

**Example 1: Northridge, California Earthquake of 1994**

Figure 1-2 shows the collapse of a bridge on Interstate 10 near Los Angeles, California, following the Northridge Earthquake of January 17, 1994. This earthquake measured 6.7 on the Richter scale and caused extensive damage to elevated structures along Interstates and other transportation infrastructure.

**Figure 1-2: Damage from Northridge Earthquake**
(Photo Credit: FEMA)

## Example 2: Hayman Colorado Wildfire of 2002

Figure 1-3 shows the mass evacuation of a community near the Hayman Wildfire in Colorado, which started on June 8, 2002, burning over 137,000 acres and costing over $39.1 million. The fire resulted in the closure of several state highways and the evacuation of over 13,000 residents.

**Figure 1-3: Mass Evacuation During Colorado Wildfires**
(Photo Credit: FEMA)

**Example 3: Hurricane Floyd in 1999**

Hurricane Floyd, which hit the Atlantic Coast from Florida to Virginia in September 1999, dumped more than 20 inches of rain in some parts of eastern North Carolina. Hurricane Floyd was classified as the worst natural disaster on record in North Carolina, causing over $6 billion in insured and uninsured damage and resulting in the largest peacetime mass evacuation along the Eastern seaboard.

- In Florida alone, over **800,000 households** were evacuated in the wake of Hurricane Floyd.
- The per lane traffic volumes during evacuations for Hurricane Floyd in the State of Florida in September 1999 reached peaks of **1,500—1,600 vehicles per hour per lane**. [12]
- Overall, Hurricane Floyd caused the evacuation of over **2.5 million** people.

The North Carolina Department of Transportation deployed more than 2,500 workers and 2,000 units of DOT equipment to repair damages at 2,067 sites affected by the hurricane. In total, more than 700 roads were damaged in North Carolina alone. Figure 1-4 shows some of the heavy damage that was inflicted on roadways near Tarboro, North Carolina as a result of Hurricane Floyd.

**Figure 1-4: Road Damage from Hurricane Floyd**
(Source: FEMA)

**Example 4: Terrorist Attacks on the New York City Twin Towers of the World Trade Center and the Pentagon in Arlington, Virginia in 2001.**

In New York City on September 11, 2001, approximately **1.2 million** people were evacuated in the hours following the attacks on the twin towers of the World Trade Center. Figure 1-5 shows the destruction.

**Figure 1-5: World Trade Center Terrorist Attack in New York City**
(Photo Credit: FEMA)

In the aftermath of the terrorist attack on the Pentagon in Crystal City, Virginia, on September 11, 2001, (Figure 1-6) an estimated **800,000 to 1 million** people were evacuated from the District of Columbia area in approximately 4 hours using 14 major evacuation routes. [13]

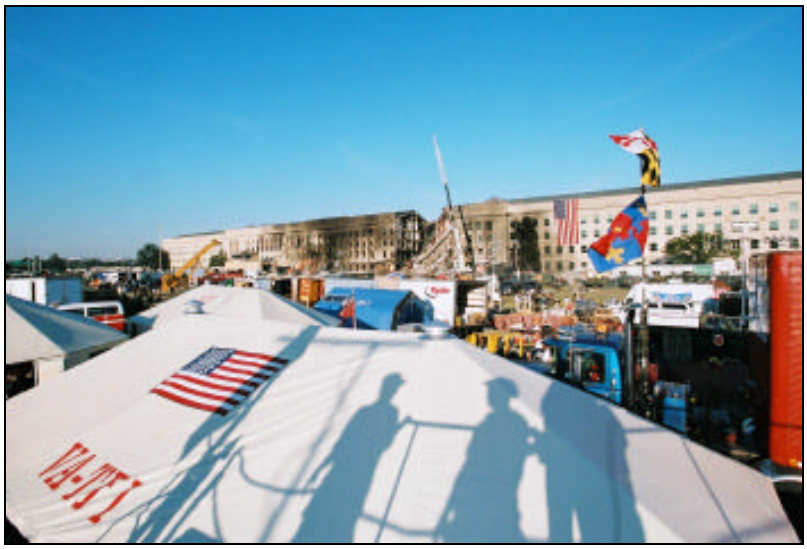


**Figure 1-6: Pentagon Terrorist Attack**
(Photo Credit: FEMA)

### 1.6.1 Levels of Evacuation

States typically use three different levels of evacuation which can be used depending on the type and severity of the emergency. Table 1-3 describes each of these levels. The type of evacuation has an influence on the participation rate of evacuees, and thus the amount of traffic generated during a mass evacuation operation. In transportation and emergency management planning, the level (or type) of evacuation should be keyed to the type of disaster or threat.

**Table 1-3: Levels of Mass Evacuation**

| Evacuation Level | Description |
|---|---|
| **Voluntary** | • Targeted to people most vulnerable to hurricane storm surge and extreme winds, including offshore workers, persons on coastal islands, and other special populations having particularly long lead-time requirements.<br>• No special traffic control or transportation measures are usually taken during voluntary evacuations and people remain if they choose. |
| **Recommended** | • Issued when a storm has a high probability of causing a threat to people living in at-risk areas.<br>• Decision to evacuate is left up to the individuals.<br>• Very few special transportation arrangements are made. |
| **Mandatory** | • The most serious type of evacuation, in which authorities put maximum emphasis on encouraging evacuation and limiting ingress to coastal or other at-risk areas.<br>• Evacuation transportation plans go into effect. |

Source: Louisiana State University Hurricane Center

### 1.6.2 Emergency and Mass Evacuation Principles

While the notification and preparation times for hurricanes may be up to a week in advance, terrorism events raise the possibility of no advance notification.

The following summarizes some of the basic principles of emergency and mass evacuation:

- A disaster can occur with little or no warning and can cause an extreme emergency condition in any area of a region, state, or the nation.
- Disasters and emergencies vary in scope and intensity, ranging from small, local incidents with minimal damage to multi-jurisdictional, regional disasters with extensive devastation and loss of life.

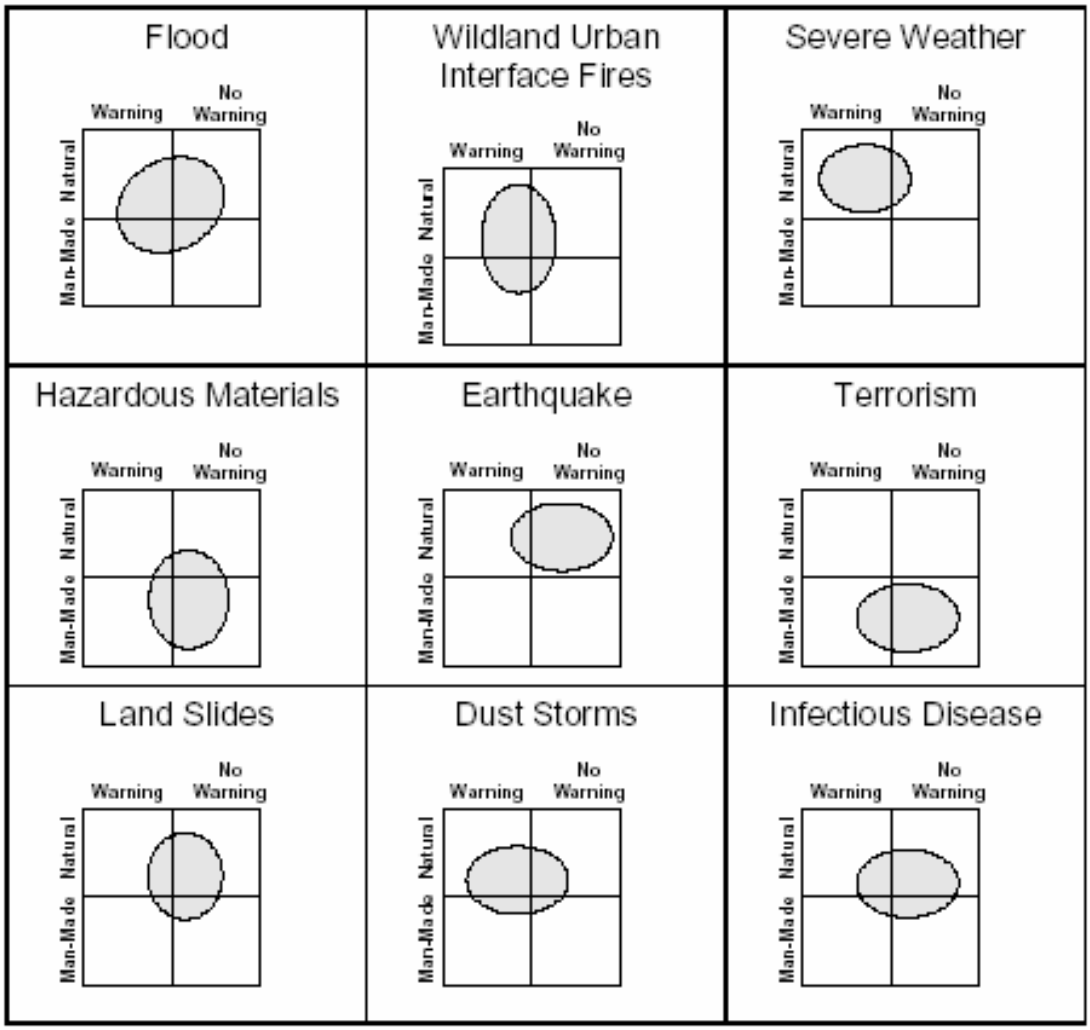



**Figure 1-7: Disaster Characteristics**
(Source: Idaho Emergency Operations Plan)

The following provides a list of emergency functions:

**Table 1-4: Emergency Functions**

| Function | Description |
|---|---|
| Detection | The ability to detect the presence and use of chemical, biological, radiological, and nuclear weapons. This term is also discussed as the ability to detect breaches in cyber security and impending attack. |
| Preparedness | Actions taken in advance of an emergency/disaster to develop operational capabilities and facilitate response operations. Such measures may include the development of plans, procedures, warning and communications systems, and |

| | |
|---|---|
| | mutual aid agreements and emergency public information. |
| Prevention | Tools or procedures developed to detect and to prevent a terrorist attack. These activities are also discussed relative to the information and intelligence sharing that would be used to thwart terrorist activity. |
| Protection | The protection of people, critical infrastructure, and key assets in an effort to deny terrorists the opportunity to inflict lasting harm. |
| Response | Actions taken during or after an emergency/disaster to save lives, minimize damages and enhance recovery operations. These measures include activation of emergency operation centers, plans, emergency communications systems, public warnings, mass care, shelters, search and rescue, and security measures. |
| Recovery | Actions taken over the short or long term to return vital life support systems to minimum standards or to return life to normal or improved levels. Such measures include damage assessment, supplemental assistance, economic impact studies, and mitigation of damages sustained. |

The development of mass evacuation plans, transportation management plans, and emergency operations plans is part of the Preparedness phase.

The actual implementation of mass evacuation, transportation management, and other types of emergency operations plans, whether locally or at the state level is part of the Response and Recovery phases.

# 2. Intelligent Transportation Systems Resources for Mass Evacuation

This section outlines the Intelligent Transportation System resources that can be used to support mass evacuation and emergency operations. These resources are typically owned and maintained by the State DOT; however, they are also increasingly owned and operated by some local jurisdictions and, in some cases, community groups. This section also discusses the requirements identified for conducting mass evacuation operations and identifies the ITS components and resources that can be used to support and expedite such operations.

***Objective: Identify the types of ITS infrastructure that are critical to homeland security and mass evacuation, and how those components can be used effectively and in a timely manner.***

It is the responsibility of the State DOT and the State Emergency Management Agency to decide which ITS components are available and necessary for use during a potential mass evacuation or other emergency operation scenario. Similar to other resources that the State DOT brings to the emergency management umbrella, ITS resources must be recognized and planned for use. An awareness of these resources will allow them to be rapidly employed during disasters where time is a critical factor.

These ITS components should be addressed in state and local emergency operations plans, either at the general level or specifically planned for.

**Table 2-1: Potential ITS Resources**

| Intelligent Transportation System Components | |
|---|---|
| • Dynamic Message Signs | • Emergency Alert System |
| • CCTV Surveillance | • Internet Websites |
| • Traffic Detection | • Condition Reporting Systems |
| • Low Power FM Radio | |
| • Highway Advisory Radio | |
| • 511 Traveler Information | |
| • Road Weather Information Systems | |
| • Traffic Signal Systems | |
| • Ramp Meters | |


**Figure 2-1: ITS Resources for Mass Evacuation**

## 2.1 Description of ITS Components

This section provides a basic description of each of the key ITS resources identified for mass evacuation applications through surveys of the State DOT and current state of the practice.

**Dynamic Message Signs** are electronic or mechanical signs that allow the display and manipulation of visual words, numbers, and symbols as roadway or travel conditions change. The term is used interchangeably with Changeable Message Signs (CMS) and Variable Message Signs (VMS).

**Closed Circuit Television (CCTV) surveillance** uses video cameras and image processing software to provide visual surveillance and verification of roadways and other transportation infrastructure.

**Traffic Detection** uses one or more in-pavement and roadside sensor to provide real-time traffic statistics such as vehicle counts, vehicle speeds, traffic volumes, occupancy, and vehicle classification. Traffic data collected at the roadside can be stored, processed, and transmitted to a central location, such as a Traffic Management Center (TMC) for live monitoring of traffic conditions or for storage and reporting. Traffic detector data is very versatile and can be used to support a variety of transportation applications, including traffic operations, incident analysis, design, and planning.

**Low Power FM and Highway Advisory Radio.** Low Power FM (LPFM) radio and Highway Advisory Radio (HAR) provide a way to deliver roadway, weather, and traveler information to virtually any traveler who has a standard AM/FM radio in their vehicle. This technology can be used as a stand-alone tool or in conjunction with other technologies, such as Internet websites or information kiosks.

LPFM radio uses a low-power FM transmitter to broadcast vital traveler information to local travelers over a standard FM radio frequency, similar to an FM music station. This allows travelers to tune into the traveler information station easily using their standard AM/FM car radio. Similarly, HAR uses a low-power AM transmitter.

These two radio services were created by the Federal Communications Commission (FCC) in order to provide traveler and safety information, and can be used for disseminating mass evacuation information. HAR, the first of these two services, was first made available in 1977, while LPFM was first made available in 2000 and is still being developed.

Broadcast licenses are required to operate LPFM or HAR services and are available from the FCC through a competitive application process. These licenses are available exclusively to non-commercial groups, such as educational, public safety, and transportation organizations.

**511 Traveler Information.** In March 1999, the U.S. Department of Transportation (USDOT) petitioned the FCC to adopt a national, three-digit telephone number to allow easy access to transportation and traveler information. In July 2000, the FCC responded by designating 511 as America's national traveler information telephone number. The FCC ruling establishing the 511 number left implementation issues and schedules up to state and local agencies and telecommunications carriers.

The national 511 Traveler Information Number can be used by anyone who has access to either a landline phone or a wireless phone, whether at home or on the road. Similar to other nationally designated three-digit numbers, the 511 Traveler Information Number provides easy 3-digit dialing to get up-to-date messages on road, traffic and weather conditions and other information affecting travel plans. A voice-activated or touchtone interface allows users to get information easily through simple menus.

The concept is that eventually, callers anywhere in the United States will be able to dial 511 (similar to dialing 411 for directory assistance) to receive current traffic and traveler

information for the state or local area from which the call is made. The current vision for 511 coverage would allow the traveler to obtain local area information as well as any other area within the state. Travelers, at a minimum, would be able to obtain information about a particular route or get a summary for an entire region. As 511 grows and becomes more popular, additional options would be added. The inset below provides more information on how 511 traveler information works.

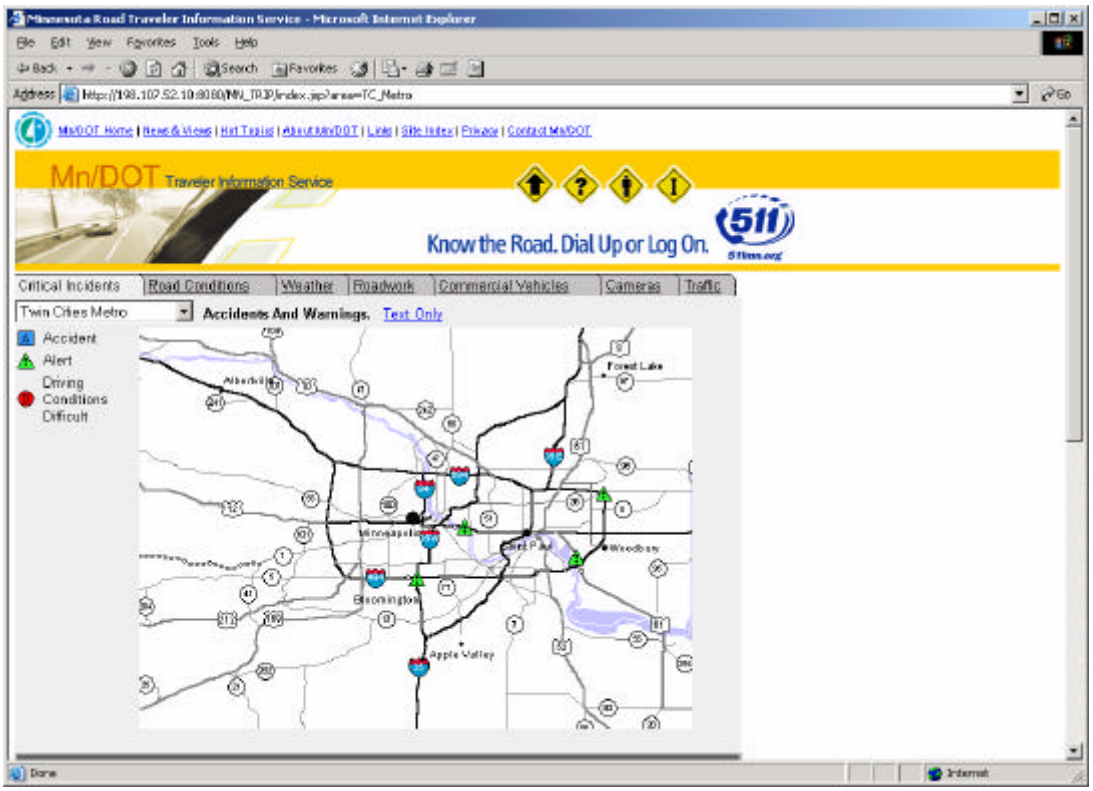



**Figure 2-2: ITS Components**
(Source: Minnesota DOT 511 Website)

## Road Weather Information Systems

A Road Weather Information System (RWIS) is a combination of technologies that collect, transmit, model, and disseminate weather and road condition information. These systems benefit roadway maintenance crews and travelers by providing up-to-the-minute information on local weather and road conditions.

Unlike regional forecasting centers, roadside weather stations (also called Environmental Sensor Stations or ESS) can provide weather and road conditions exactly when and where it is most needed. The information may be shared with regional forecast centers to help provide more accurate and reliable area forecasts.

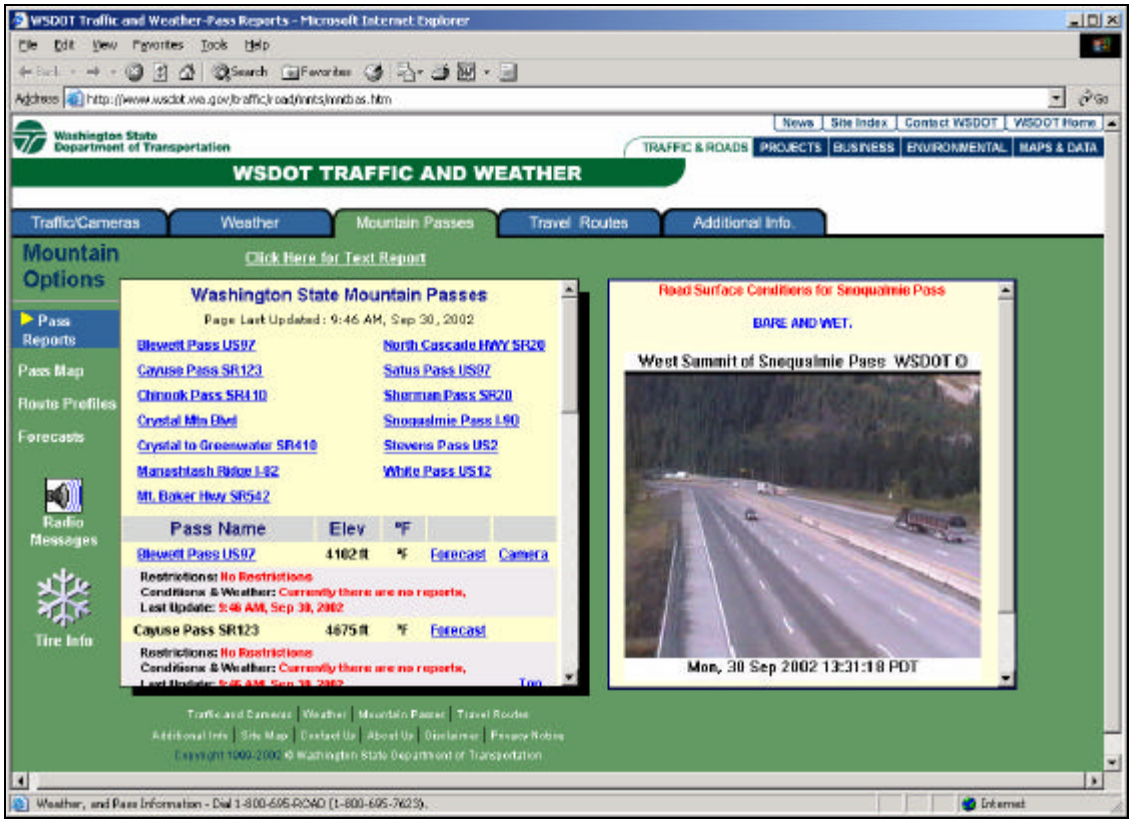



**Figure 2-3: ITS Components**
(Source: Washington State DOT Website)

## Condition Reporting System

Condition reporting systems help collect and centralize all of the vital traffic management and traveler information for a state or region, including information on active work zones, vehicle accidents, driving conditions, weather advisories, and traffic congestion. At least eleven states now operate statewide condition reporting systems, including Alaska, Arizona, Iowa, Minnesota, Missouri, New Mexico, Kentucky, Oregon, Maine, New Hampshire, and Vermont.

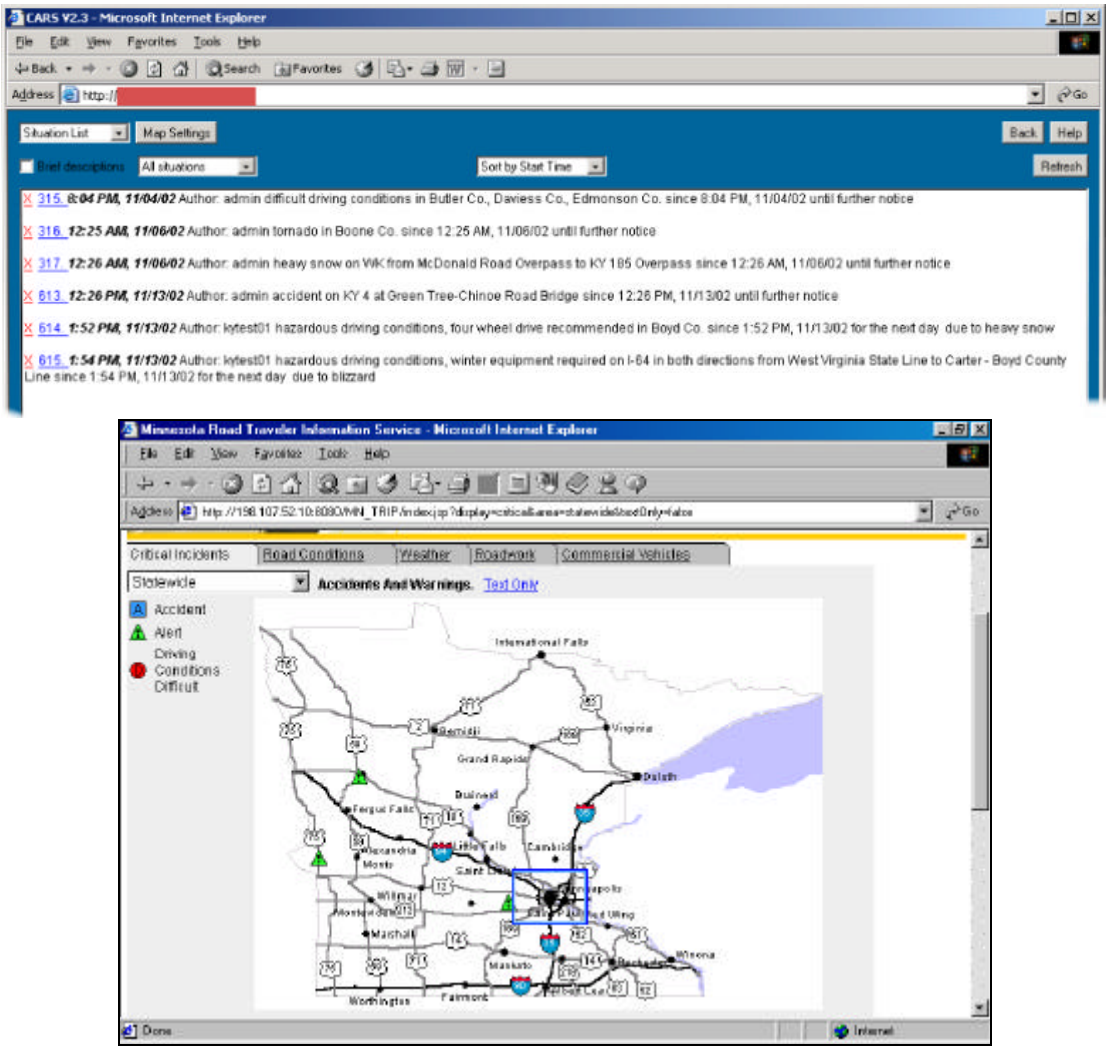



**Figure 2-4: Condition Reporting System Output**
(Source: Minnesota CARS Website)

Statewide condition reporting systems, which are typically owned and operated by the State DOT, contain information that would be of vital importance during mass evacuation

and other emergency operations. Since condition reporting systems can be used to collect and disseminate information on a statewide basis, they provide a great tool for centralized or decentralized emergency operations and support for mass evacuations.

## Internet Websites

Internet websites have become a standard and inexpensive way to provide information to the public. One advantage of Internet websites is that any user that has access to a computer with a web browser can gain access to information across the Internet.

Agency surveys showed that many State DOTs are using Internet websites to disseminate a wide variety of transportation-related information to its constituents.

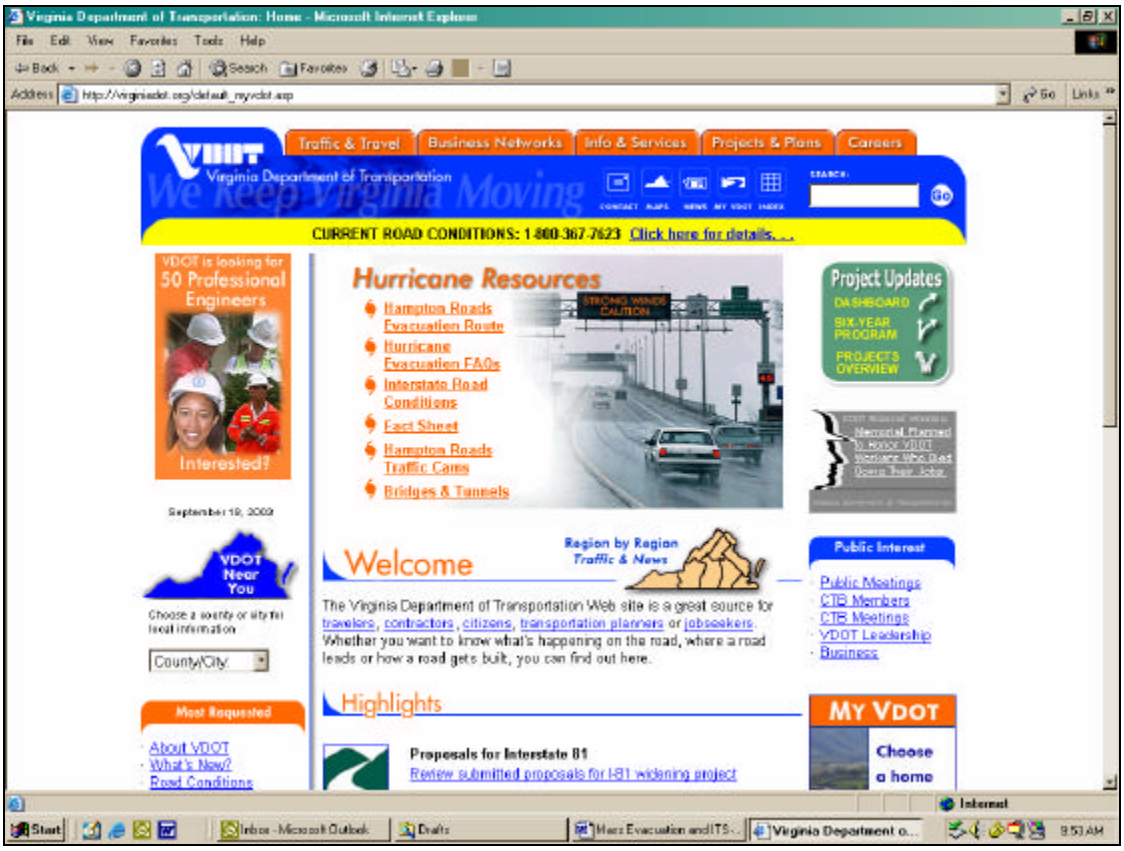



**Figure 2-5: Hurricane Evacuation Resources and ITS via Internet Websites**
(Source: Virginia Department of Transportation)

With a growing list of ITS resources that are typically available through the State DOT, the next task is to determine how those resources can be used specifically to support mass evacuations and emergency operations when the need arises. The following subsection discusses the requirements for supporting mass evacuations.

## 2.2 Mass Evacuation Support Requirements

Based on the literature search, agency surveys, and a comprehensive review of state emergency operations plans regarding mass evacuation operations for all hazards, the following six support requirements have been identified for supporting mass evacuation and emergency operations:

1. ***Provide evacuation traffic control and operations.***
2. ***Provide traffic and weather surveillance for evacuation and emergency operations.***
3. ***Disseminate evacuation information to evacuees and host communities (e.g. evacuation route information, available shelters, weather announcements, etc.)***
4. ***Ensure continuity of operations.***
5. ***Support emergency response and the evacuation of low-mobility groups.***

This is based in part on a survey of Statewide Emergency Operations Plans (SEOPs) and the specific emergency support functions assigned to the State Department of Transportation. The following briefly describes each of the identified requirements:

- **Provide evacuation traffic control and operations** – Under this requirement, the State Department of Transportation either provides or supports traffic control and operations for the evacuation and return of citizens prior to, during, and after an emergency.

- **Provide traffic and weather surveillance to support evacuation and emergency operations** – Under this requirement the State Department of Transportation supports evacuation and emergency operations by collecting and providing vital information on traffic and weather. This is typically done using surveillance technologies that are owned and maintained by the DOT (e.g. CCTV surveillance cameras, traffic detectors, roadway weather information systems (RWIS), etc.).

- **Support the dissemination of evacuation information to evacuees and host communities (e.g. evacuation route information, available shelters, weather announcements, etc.)** – Under this requirement, the State DOT either provides information directly to evacuees or supports other agencies with evacuation information.

- **Ensure continuity of operations –** this requirement addresses the need to have contingency plans for continuing and maintaining operations in the event of a disaster.

- **Support emergency response and the evacuation of low-mobility groups** – this requirement addresses the need to provide support for emergency response and the evacuation of groups of people that need assistance with evacuation. The State DOT, if required, provides support to the emergency responders, law enforcement, and other emergency response groups that have lead responsibility for these functions.

This provides a broad cross-section of emergency support requirements based on the surveys of available emergency plans. Each State DOT will have different supporting roles (and thus requirements) based on the responsibilities outlined and set forth in their respective State Emergency Operations Plan (SEOP).

By addressing a cross-section of requirements for supporting mass evacuations, each state can select the relevant requirements and map them to the ITS resources that will be most valuable in supporting mass evacuation and emergency operations.

The following section provides the mapping of various ITS technologies to the mass evacuation support requirements and provides guidelines for using the various ITS technologies based on the current state of practice and feedback gathered from agency surveys.

# 3. Guidelines for Using ITS Resources to Support Mass Evacuation Operations

This section maps ITS technologies to specific mass evacuation support requirements and presents "guidelines", or "best management practices", as well as recommendations for using ITS resources in the most effective way, either locally or on a statewide basis.

These best management practices have been developed based on actual deployment experience and on agency surveys conducted as part of this project. Note that these are not intended to be standards, but rather guidance that agencies may want to consider when incorporating ITS resources into their Transportation Management Plans for mass evacuation.

***Objective: Develop a set of "best management practices" or recommendations for use of ITS infrastructure during mass evacuation.***

## 3.2 Mapping of ITS Resources to the Requirements

With a set of mass evacuation support requirements clearly defined, the next logical step is to narrow the focus onto specific ITS components or resources that may be available for a response to the need for mass evacuations and other state emergencies.

Table 3-1 provides a mapping of potential ITS resources to each of the six mass evacuation support requirements defined in Section 2. This mapping is intended to be a tool to assist state and local agencies in identifying the ITS components that could be used to address the specific requirements of mass evacuation and emergency operations as defined in their state.

By reviewing the State Emergency Operations Plan and other state and local level planning documents, the State DOT (as well as other agencies sharing responsibility for mass evacuations) can determine its responsibilities and thus requirements. This serves as the starting point for using the mapping provided in Table 3-1. Once the mapping exercise has been completed, the agency can review its inventory of ITS resources and identify specific resources that it has at its disposal for use during an evacuation. The final step will be to include those technologies and usage guidelines in transportation management planning documents and provide awareness and coordination for ITS with other agencies at the federal, state, and local levels.

**Table 3-1: ITS Solutions Mapped to Mass Evacuation Requirements**

| Requirement | Possible ITS Solutions |
|---|---|
| 1. Provide evacuation traffic control and operations | • Contra-flow (or reverse flow) traffic operation<br>• Implementation of evacuation traffic signal timing plans<br>• Implementation of special ramp metering plans<br>• Use of PTMS platforms, such as a smart trailer |
| 2. Provide traffic and weather surveillance for evacuation and emergency operations | • CCTV cameras<br>• Traffic detectors<br>• Use of PTMS platforms, such as a smart trailer<br>• Road Weather Information Systems (RWIS)<br>• Condition Reporting Systems |
| 3. Disseminate evacuation information to evacuees and host communities (e.g. evacuation route information, available shelters, weather announcements, etc.) | • Use of redundant communication modes and systems<br>• Dynamic Message Signs (DMS)<br>• 511 Traveler Information<br>• Cable/Satellite Television<br>• Low-Power FM (LPFM) Radio<br>• Highway Advisory Radio (HAR)<br>• Use of portable traffic management system (PTMS) platforms, such as a smart trailer<br>• Emergency Alert System (EAS)<br>• Condition Reporting System (CRS) |
| 4. Provide continuity of traffic and emergency operations | • Redundant Traffic Operations Centers<br>• Co-location of emergency operations staff within the TOC<br>• Virtual Traffic Operations Centers (VTOCs) |
| 5. Support emergency response and evacuation of low-mobility groups (e.g. extended care facilities, hospitals, the elderly, etc.) | • CAD-to-TMC Integration<br>• Condition Reporting Systems (CRS)<br>• Automatic Vehicle Location (AVL)<br>• Computer Aided Dispatch (CAD) Systems |

## 3.2 Provide evacuation traffic control and operations

Providing evacuation traffic control and operations during mass evacuation operations is one of the primary requirements since it directly determines the length of time to evacuate an area and directly impacts the safety of those being evacuated. The use of ITS resources has already been shown to increase the efficiency of mass evacuation operations and the safety of evacuees.

The following provides some guidelines for use of ITS resources during mass evacuations based on real experience from actual operations:

### *Contra-flow Traffic Operation*

Contra-flow traffic operation (also called "Reverse Lane operation") is one of the most common tools used to rapidly evacuate people from metropolitan areas. Contra-flow operation works by reversing traffic flow on some or all of the lanes, thus maximizing traffic flow in a single direction away from the evacuation area. This is typically done with the help of ITS resources and in accordance with a contra-flow operations plan that has been developed prior to an evacuation operation.

According to the Louisiana State University (LSU) Hurricane Center's "National Review of Hurricane Evacuation Plans and Policies" [8]:

- There are currently no recognized standards or guidelines for the design, operation, and location of contra-flow segments.
- Most contra-flow designs have been adapted from standard practices and past evacuation experience.

There are at least four common operational scenarios for reverse lane (or contra-flow) operation based on studies of states that have contra-flow operation plans. The scenario selected for implementation will depend on policies and procedures of the individual State DOT, but the scenarios here serve as a starting place:

- Scenario 1a – Normal Traffic Operation
- Scenario 1b – Normal Plus One Contra-flow Lane
- Scenario 1c – Normal with Shoulder and One Contra-flow Lane
- Scenario 1d – Normal Plus Two Contra-flow Lanes

Figure 3-1 shows hurricane evacuation traffic using normal traffic operation (Scenario 1). With the inbound lanes virtually unused, the evacuation capacity is limited and the unused capacity is wasted.

**Figure 3-1: Traffic Operations without Reverse Lanes During Hurricane Evacuation**
(Photo Credit: FEMA)

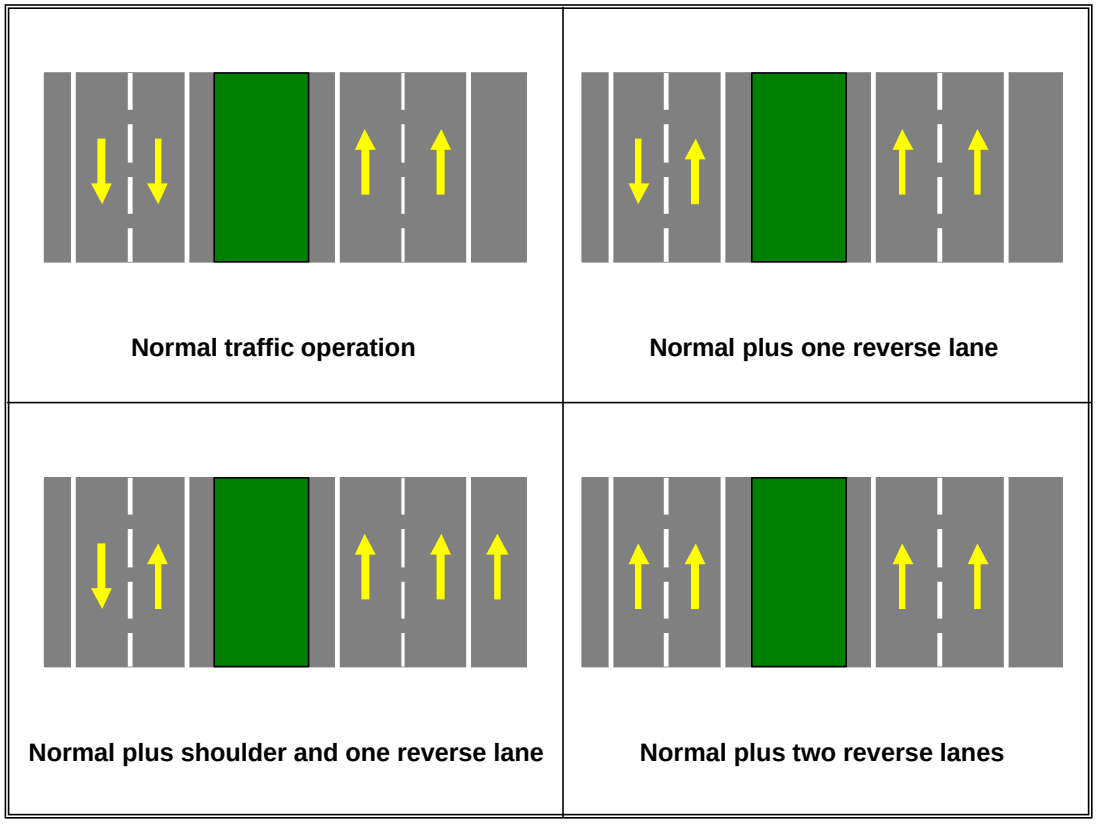


**Figure 3-2: Lane Reversal (Contra-flow) Operations Scenarios**

### *Dynamic Message Signs*

One of the most valuable ITS resources for supporting mass evacuation and emergency operations is fixed and portable DMS signs. These signs, which are typically either two or three-line, can be used to display many different messages (and icons), including:

- Information for tuning into HAR/LPFM stations
- Evacuation route instructions
- Evacuation orders
- Weather conditions
- Travel times and other road conditions
- Travel advisories and warnings
- Traffic control

For example, Figure 3-3 shows the posting of hurricane evacuation route instructions on a fixed dynamic message sign located in the freeway right-of-way.


**Figure 3-3: Fixed DMS for Hurricane Evacuation Directions**
(Photo Credit: FEMA)


**Figure 3-4: Portable DMS Used for Mandatory Evacuate Order**
(Photo Credit: FEMA)


**Figure 3-5: Portable DMS on I-70 in North Carolina**
(Source: CNN)

The following are several guidelines and considerations for use of fixed and portable DMS during mass evacuation operations:

- **Develop pre-programmed DMS messages for supporting mass evacuation.** The State DOT should seek to develop pre-programmed DMS messages that can be displayed rapidly during a mass evacuation operation. The messages may need to be customized for the type and size of the dynamic message signs, for example two-line versus three-line signs.

- **Develop DMS messages for each specific evacuation route.** The State DOT should develop dynamic messaging plans that are specific to each major evacuation route and document them in the local emergency operations plans.

- **Invest in a fleet of portable DMS units available for rapid deployment for mass evacuation.** Have available a fleet of portable DMS signs that can be rapidly deployed for mass evacuations.

- **Develop a plan for coordinating the use of portable DMS equipment from different districts in the event of a statewide emergency.**

- **Consider mass evacuation support requirements when deploying new fixed DMS infrastructure.** The State DOT should consider mass evacuation signing needs as a factor when planning, designing, and deploying new fixed DMS as part of the overall traffic management system. For example, plan to install fixed DMS signs at critical hurricane routes and other evacuation route junctions.

- **Implement a Condition Reporting System that can link DMS with other ITS systems.** The State DOT should consider integrating support for their fixed and portable DMSs into a statewide Condition Reporting System to provide remote control and status reports of DMS.

### *Traffic Signal Systems*

One of the quickest and most available resources for supporting mass evacuations, especially in metropolitan and small urban areas, is traffic signal systems. Especially in urbanized areas, traffic signals move vehicles from downtown areas onto arterials and highways that lead away from downtown. By coordinating with the local jurisdictions that operate the traffic signal systems, mass evacuations and other emergency operations can be greatly expedited.

Most jurisdictions have several traffic signal timing plans that may be used during various events and roadway conditions. For example, the Washington, D.C. district has a Fourth of July signal timing plan that is designed to move traffic from the central business district to the outlying suburbs in Virginia and Maryland. In order to accomplish this, the signal timing plan favors all outbound traffic flows to move vehicles out of the city as quickly as possible.

This is an item that should not be overlooked by state and local planning agencies in formulating plans for mass evacuation operations.

Example: During the events of September 11, the Washington, D.C. area traffic signal system was put into its 'July 4' mode to allow for maximum traffic flow out of the District of Columbia and Pentagon areas.


**Figure 3-6: Traffic Signal System Feeding Interstate Evacuation Route**

Based on surveys of state agencies and the current practices, the following is recommended:

- **Where existing traffic signal timing plans are not sufficient, develop evacuation timing plans that can be rapidly implemented.** In some jurisdictions, traffic signal timing plans already exist, maximizing the outbound flow of traffic from downtown areas. In cases where these plans do not already exist, the State DOT should work with the local jurisdictions to develop evacuation timing plans that can be rapidly implemented in the event of an emergency. The objective of these special timing plans should be to move vehicles as quickly as possible onto major evacuation routes.

- **Implement control capabilities for remote operation of traffic signal systems.** In the event of a mass evacuation or emergency, the lead and supporting agencies in charge of evacuation should have the capability to remotely control and monitor all traffic signal

systems that affect the evacuation. This will require a large degree of institutional coordination among state, county, and local jurisdictions.

## 3.3 Provide traffic and weather surveillance for evacuation and emergency operations

Providing traffic and weather surveillance information is also critical for mass evacuation and emergency operations. Armed with both traffic and weather information, operations personnel and participating agencies can make better decisions both before and during mass evacuation. It also assists emergency responders in rescue operation and in clearing incidents caused by mass evacuation operations.

### *Closed Circuit Television (CCTV) Cameras*

One of the most commonly used and valuable surveillance resources, at least for State DOTs, is the CCTV camera. Most States have deployed CCTV cameras along major roadways in urbanized areas to assist in the monitoring of traffic flows and roadway conditions throughout the transportation network. Using CCTV cameras, which are centrally monitored by traffic personnel at Traffic Management Centers, roadway slowdowns and incidents can be detected quickly and used to dispatch all of the necessary resources to mitigate the incident and return traffic flow to its previous condition.

Figure 3-7 illustrates the availability of CCTV camera images through the Delaware Department of Transportation website. A common practice is to provide a table of the available cameras, a map of cameras with clickable camera icons, or thumbnail images with descriptions.

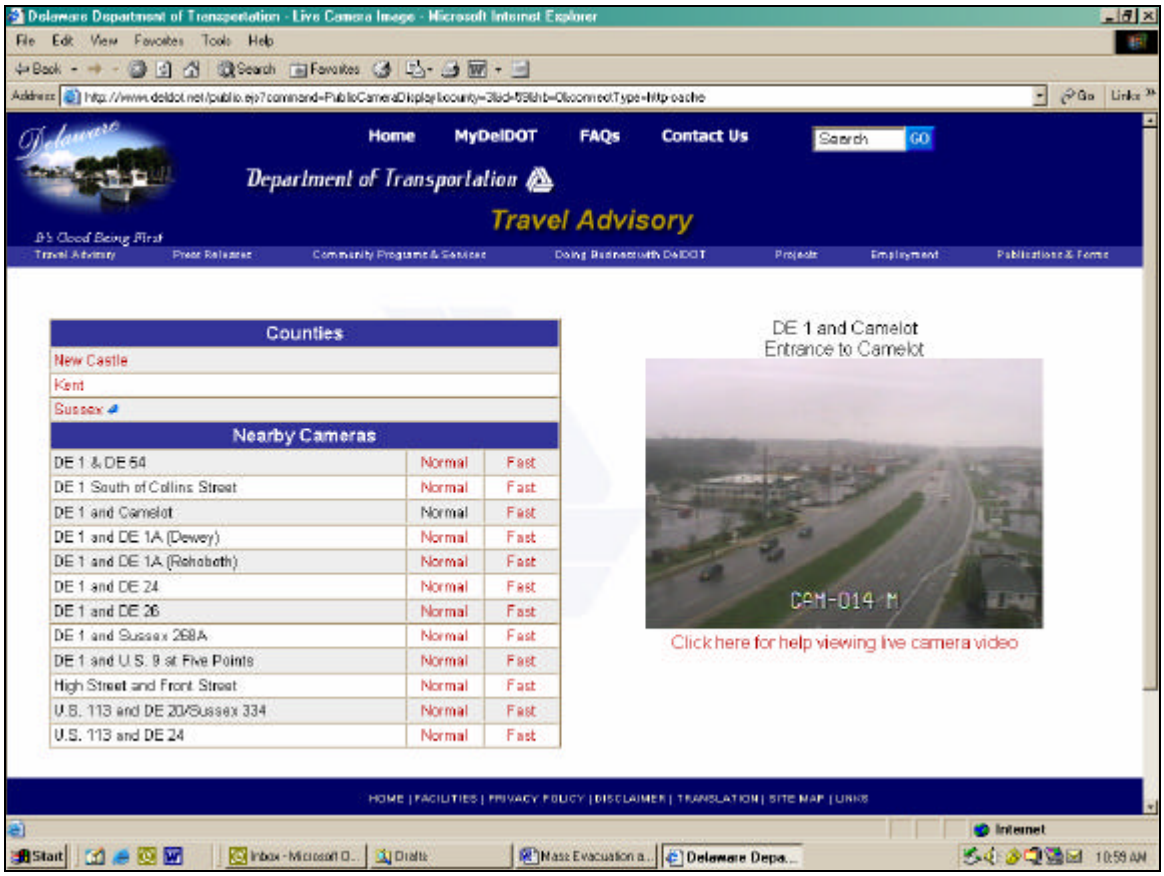



**Figure 3-7: CCTV Camera Access via Internet Website**
(Source: Delaware Department of Transportation)

Although CCTV cameras are very useful for verifying roadway and weather conditions during an evacuation event, such as a hurricane, one of the issues that impact their use is their ability to remain operational during a disaster event. Figure 3-8 shows an actual CCTV camera view along Virginia Beach Boulevard in Virginia Beach, Virginia, during the onset of Hurricane Isabel, which struck the mid-Atlantic region of the East Coast on September 18, 2003. Although most of the CCTV cameras along the beachfront were not operational, many of the inland cameras, such as the one shown below, were operational and available throughout the hurricane event.


**Figure 3-8: CCTV Camera Image Taken During Hurricane Isabel**
(Source: Virginia Department of Transportation)

Once traffic and roadway data is collected at a central location, such as a Traffic Management Center, it can then be processed, stored, and disseminated to travelers and other users via a number of different information distribution technologies, such as DMS, HAR and LPFM radio, Internet websites, 511 Traveler Information systems, and Cable Television.

## 3.4 Disseminate evacuation information to evacuees and host communities (e.g. evacuation route information, available shelters, weather announcements, etc.)

The dissemination of evacuation information to evacuees and host communities requires quick and efficient dissemination. This not only requires information to be presented to evacuees that have already left home and are on the roads (en-route travelers), but to those that are staying posted on evacuation (pre-trip travelers). Information must also be provided to the host communities where evacuees will be arriving. This will prepare those host communities for evacuees.

Another thing to note is that preparedness for mass evacuation starts with educating citizens about what to do in the event of a natural or man-made hazard. Public education

is an important tool that can increase the level of preparedness for a region or even a nation.

Traveler information dissemination mechanisms have traditionally been divided into pre-trip information and en-route information. Possible uses of ITS in disseminating information regarding threats and mass evacuation are provided in Table 3-1.

**Table 3-2: Traveler Information Dissemination Mechanisms**

| En-route Information | Pre-trip Information |
|---|---|
| • Dynamic Message Signs (DMS)<br>• 511 Traveler Information<br>• Low-Power FM (LPFM)<br>• Highway Advisory Radio (HAR)<br>• Emergency Alert System (EAS)<br>• Portable Trailers | • Cable and Satellite Television<br>• Internet Websites<br>• 511 Traveler Information |

### *HAR and LPFM*

HAR and LPFM radio services are very useful tools for disseminating road and weather information (including evacuation information) to en-route drivers in the event of an emergency. Typical traveler information provided over Low Power FM and Highway Advisory Radio stations includes, but is not limited to:

- Traffic and roadway conditions
- Major accidents or events that affect traffic
- Alternate routes
- Weather information, watches and warnings
- Local amenities (such as lodging and gas stations)
- Special events, such as festivals, parades, or sports events
- Evacuation information

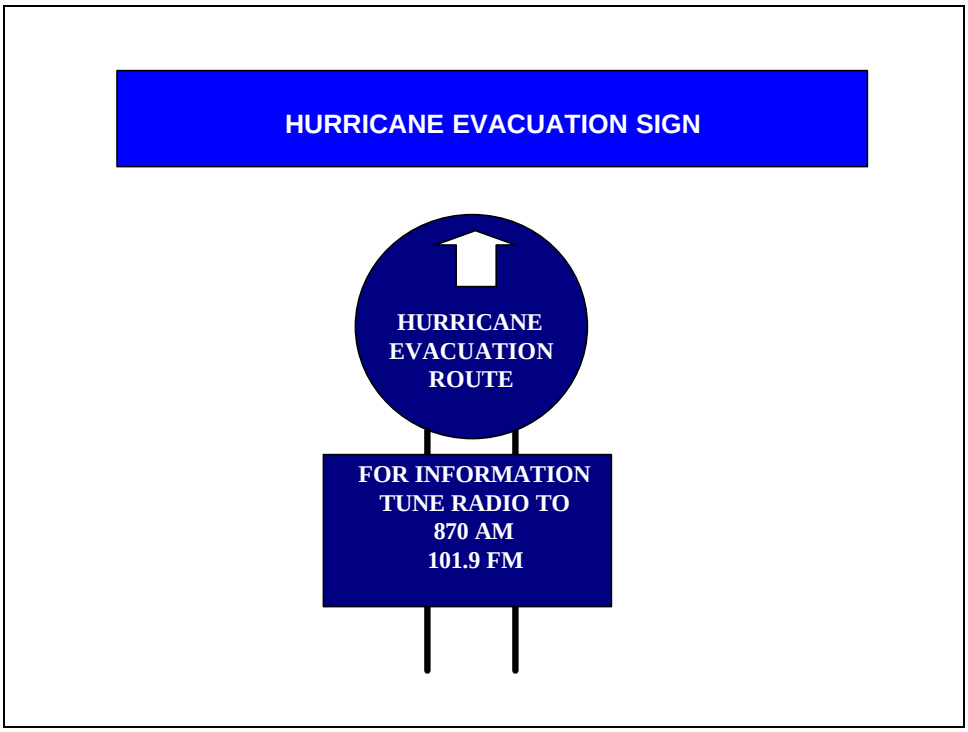



**Figure 3-9: Highway Advisory Radio / Low Power FM Sign**

HAR and LPFM content can also be provided over the Internet with access through a website.

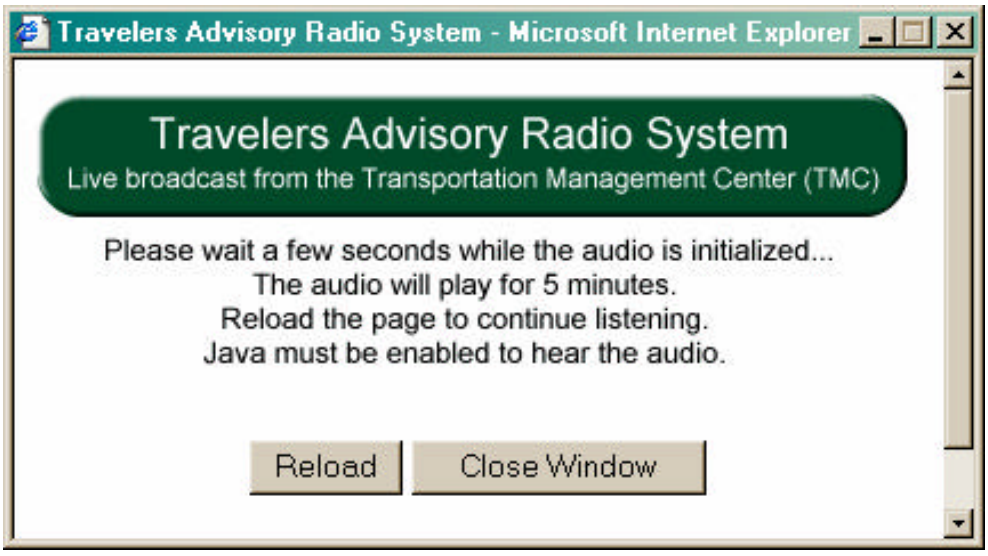



**Figure 3-10: Traveler Advisory Radio via Internet**
(Source: Delaware DOT Website – www.deldot.net)

**Emergency Alert System**

Emergency Alert Systems (or EAS) were established by the FCC to provide emergency notifications (including evacuation information) to the population through traditional broadcasting media, such as AM/FM radio and television. In fact FCC regulations require that operators of HAR and LPFM stations provide EAS capability so that regular programming can be automatically overridden whenever an EAS message is put into effect.

Local and county emergency operations centers have the ability to input messages directly to EAS in much the same way as the NWS. Radio and television stations also have capabilities to initiate an EAS message. FCC rules also require broadcasters to monitor at least two independent sources for emergency information, ensuring that emergency information is received and delivered to viewers and listeners.

### *Internet Websites*

Internet websites are a very effective and cost-efficient way to get real-time information to potential evacuees. Information that is typically provided online includes:

- Current weather conditions, including watches, warnings, and advisories.
- Current traffic and roadway conditions.
- Evacuation routes and plans.
- Emergency preparation and check-lists.
- Hazard-specific information.
- Host community and shelter information for evacuees.

Recommendations for using Internet websites for supporting mass evacuations:

- **Display or provide links to evacuation traffic and weather information.** The State DOT should use their website to display or provide links to vital traffic and weather information for the evacuation area, host area, and evacuation routes out of the affected area.

- **Provide viewable and printable copies of evacuation route maps.** One of the common practices identified among states was the availability of viewable and printable copies of evacuation route maps through the website.

- **Provide list of available ITS information sources on the website to inform more educated users.** The State DOT should provide a small area on their website home page that provides a list of available information sources that the public can access during evacuations and other emergencies. The website should also be modified to have the

capability to default to a set of emergency pages and information sources in the event of a mass evacuation.

- **Advertise the website address where evacuation information can be found.** As a method for directing users to available evacuation and emergency information, the State DOT (or other cooperating agencies) should "advertise" the website address on DMS, television, radio, LPFM, HAR, and 511 Traveler Information systems during a mass evacuation.

- **Develop a set of rapidly deployable evacuation and emergency web pages.** It is recommended that the State DOT (along with other coordination partners) develop a set of web pages for providing mass evacuation information for specific types of emergencies or disasters that may affect the state or local area. This should also be accompanied by a plan for rapidly displaying these pages when a disaster occurs. The information should include information on the type of event and what can be done.

- **Provide a public display version of the roadway map from the State DOT's Condition Reporting System.** The State DOT can make available over an Internet website a public read-only map and/or text view of the affected transportation network using their Condition Reporting System.

Examples: The following provides some examples of websites that provide public information about emergencies and mass evacuations, including mass evacuation routes.

- **Hampton Roads, Virginia.** The Hampton Roads Emergency Management Committee (HREMC) public information website (http://www.hremc.org).

- **Mt. Ranier, Washington.** The Washington State Emergency Management Agency provides online access to and display of mass evacuation routes for the area surrounding Mount Ranier, illustrated in Figure 3-11:

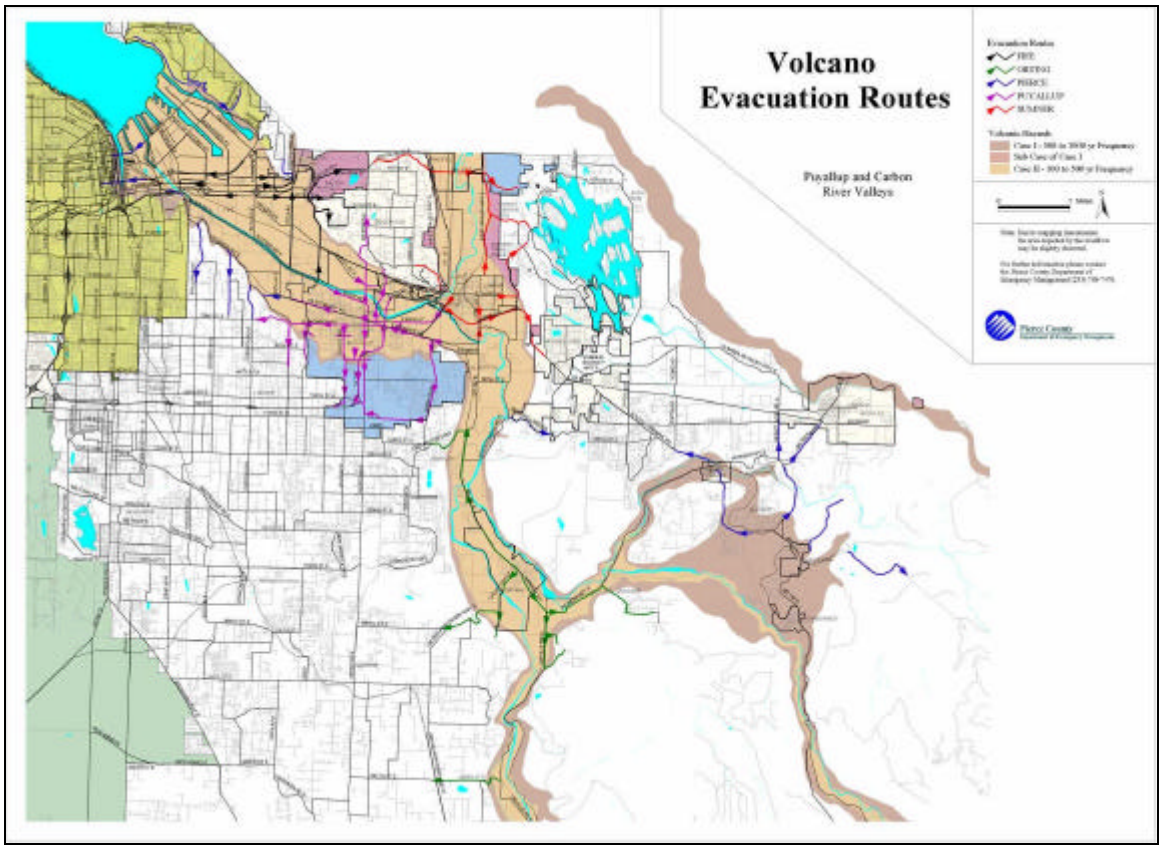



**Figure 3-11: Posting of Evacuation Routes on Internet Website**
(Source: Washington State Emergency Management Agency)

## 3.5 Provide continuity of traffic and emergency operations

The continuity of traffic and emergency operations during a mass evacuation operation or other emergency event is essential for ensuring that operations will continue despite the situation. This is typically addressed in what is referred to as a Continuity of Operations Plan (COOP). For example, if the primary TOC or TMC must be closed or evacuated during a mass evacuation event, there needs to be a backup plan for continuing operations.

There are a number of options for providing continuity of traffic and emergency operations during critical events. In fact, most states have several types of centers that are available during emergency operations, including:

- State and Local Emergency Operations Centers
- Traffic Management Centers / Traffic Operations Centers
- Virtual Traffic and Emergency Operations Centers

Each of these options is discussed in more detail below. As states prepare and plan for emergencies, it is recommended that these options are considered.

### *3.5.1 State and Local Emergency Operations Centers*

Each state has a Statewide Emergency Operations Center (SEOC) and multiple Local Emergency Operations Centers (LEOCs) for emergency and disaster operations. These are typically located at a secure location, like a military base or other secure installation. Many of these facilities were originally built after World War II and during the Cold War and continue to serve as the focal point and dispatch in the event of statewide and regional emergencies.

State and Local EOCs are typically activated and staffed whenever emergencies or disasters occur and are activated in accordance with different levels that are specified in the emergency operations plans. The following is an example of the levels of activation:

**Level 1: Basic Monitoring Operations and Low Impact Emergencies**
Level 1 is the most basic level of activation for an EOC and represents the normal day-to-day operation of the EOC. At this level of activation, the basic EOC staff monitors events that do not pose an immediate threat, but which could escalate to a more significant event. For example, the EOC staff may monitor a tornado watch or warning or a flood or flash flood watch or warning.

**Level 2: Partial Activation for Minor Emergencies**
This level of activation involves partial staffing of the EOC during minor emergencies that require a coordinated response. During a Level 2 activation, certain local government agencies, utilities and social service organizations automatically send personnel to the EOC to coordinate activities. This may include local and/or State DOT staffing. Also at this level of activation the local government has the capability to effectively respond to the situation without, or with little, State or Federal assistance.

**Level 3: Full-Scale Activation for Major Emergencies**

The most common scenario is for selected State DOT staff to be assigned for co-location at the State EOC during emergencies of statewide concern.

Typical staffing of an SEOC during an emergency event would include the following:

- State Department of Transportation
- State Police or State Patrol
- State Department of Agriculture
- State Department of Environmental Protection
- Federal Emergency Management Agency
- State Emergency Management Agency Staff
- Water, Gas, and Electrical Utility Companies and Commissions
- Telephone and Telecommunications Companies and Commissions

- State Government (including liaisons from neighboring states)
- State Emergency Medical
- Red Cross
- Salvation Army

### *3.5.2 Traffic Management Centers*

Traffic Management Centers (TMCs) are typically owned and operated by the State DOT and are set up to support traffic management and operations during normal operating conditions. Traffic Management Centers serve four basic functions, as follows:

- Collecting traffic information
- Synthesizing or processing information
- Storing information
- Disseminating information

More specifically, TMCs serve many functions

In some cases, TMCs are set up to

#### Redundancy and Continuity of Operations for TMCs

In this approach, traffic operations are continued at a redundant TOC or carried on under another TOC, for example, in a TOC located in another district. Figure 3-12 shows the co-location of staff at a TOC during a hurricane event.

**Figure 3-12: Emergency Operations Center Activation**
(Photo Credit: FEMA)

Based on studies of statewide emergency plans and continuity of operations plans, the following considerations and recommendations should be taken into account:

- **Redundant Communication Systems.** Another important factor to consider in planning for continuity of operations is having redundant communications modes or systems (for example, wireline and wireless) in case one mode of communication is knocked out.

The FHWA has initiated a study on how to provide optimal protection of the telecommunications networks that have been implemented by agencies to support their information infrastructure (infostructure). The outcome of this study will be a set of recommendations on how to increase the level of security of these systems [taken from "Improving Surface Transportation Operations in Emergency Situations"].

### Co-location of Operations Staff

**Example:** The Virginia Department of Transportation's (VDOT) Smart Traffic Center in Arlington, Virginia was used to co-locate military and emergency personnel during the terrorist attacks on the Pentagon on September 11, 2001. Due to the proximity of the Smart Traffic Center to the Pentagon and the extensive capabilities of the center, it served as a critical temporary facility for both mass evacuation and emergency response operations.

### *3.5.3 Virtual Traffic and Emergency Operations Centers*

One of the more recent advancements in operations centers is the concept of the virtual operations center. With the advancement in Internet and information technologies,

A Virtual Traffic Operations Center (VTOC) is a relatively new operating concept in which some or all of the functions of a physical TMC or TOC are implemented using Internet protocols and information technology, thus allowing remote traffic operations and management.

## 3.6 Support emergency response and the evacuation of low-mobility groups

Some states call on the State DOT to assist emergency response as part of a mass evacuation. In these cases, the State DOT may play a supporting role to emergency response by utilizing ITS resources and providing the proper coordination and planning. Figure 3-13 illustrates an emergency response vehicle en-route during a recent evacuation from Colorado wildfires and the transport of low-mobility groups during a hurricane evacutation.

In some state plans, the State DOT is required to support the evacuation of low-mobility groups, which may include such groups as nursing homes, hospitals, disabled persons and senior citizens, as well as jails and correctional facilities. Although this requirement is not a key focus for this study, it is a necessary requirement in some situations. The evacuation and sheltering of low-mobility groups can also be assisted by ITS technologies.


**Figure 3-13: Emergency response and assistance of low-mobility groups during mass evacuation**
(Photo Credits: FEMA)

- **Integration of Computer Aided Dispatch (CAD) with TMC**. One key way that ITS can be leveraged during emergency response is by integrating Computer Aided Dispatch (CAD) systems with Traffic Management Centers. This provides many benefits to emergency response by integrating and sharing traffic and emergency information. This can be accomplished in part by providing an interface from CAD to the State DOT's Condition Reporting System.

# 4. Emergency Operations Agency Coordination

This section focuses on looking at three levels of agency interactions for emergency operations and mass evacuation. One of the primary themes in planning for mass evacuations and other emergency operations is the establishment of working relationships and agreements with lead and supporting agencies.

***Objective: What the DOTs should be doing during mass evacuation and with whom to coordinate the required roles and responsibilities.***

Transportation management plans for emergency operations and mass evacuations typically define which agencies are responsible and the nature of their roles in responding to transportation needs during emergencies and disasters. In defining the agency interaction and responsibilities, the plan generally assigns a Primary or Lead Agency and a number of Supporting Agencies and Organizations, as follows:

**Primary and Supporting Agencies**

**Primary or Lead Agency** – The primary or lead agency is responsible for coordinating and leading the emergency support function.

**Supporting Agencies/Organizations** – The supporting agency is responsible for assisting the primary or lead agency as requested.

According to the survey of states' emergency operations and transportation management plans conducted as part of this project, the State DOT is typically assigned to be the lead agency for transportation support during emergencies. This is not a surprise. In fact, about 78% of the plans surveyed identified the State DOT as the lead agency for transportation support during mass evacuations and emergency operations. In all of the plans that did not identify the State DOT as the lead agency, the State DOT was identified as a supporting agency. In these plans, lead responsibility was assigned to the Department of Public Safety or the Department of Criminal Justice.

## 4.1 Three Levels of Agency Coordination

There are three primary levels of agency coordination that can occur based on the nature and extent of the emergency. These are Federal, State, and Local. Figure 4-1 illustrates each of the three hierarchical levels.

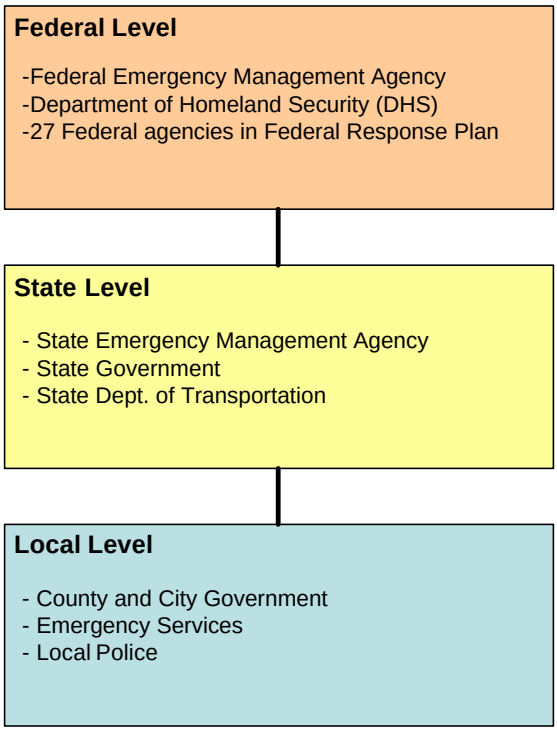



**Figure 4-1: Three Levels of Agency Coordination**

| Comparison Chart for ESF #1 Organizations | | |
|---|---|---|
| **State Organizations** | **Federal Organizations** | **Local Organizations** |
| Ohio Department of Transportation | U.S. Department of Transportation | Local; Engineer and Street Departments |
| (see footnote #1) | U.S. Department of Agriculture **1** | (see footnote #1) |
| Adjutant General's Department | Department of Defense | (no comparable organization/will interface with local EMA for missions) |
| (see footnote #2) | Department of State **2** | (see footnote #2) |
| (see footnote #3) | U.S. Customs **3** | (see Footnote #3) |
| Ohio Emergency Management Agency | Federal Emergency Management Agency | Local Emergency Management Agencies |
| (see footnote #4) | General Services Administration **4** | (see footnote #4) |
| (see footnote #5) | Tennessee Valley Authority **5** | (see footnote # 5) |
| Ohio EMA (for referral purposes only) | U. S. Postal Service | Local Post Offices and EMA Directors |

**Figure 4-2: Agency Coordination at Three Levels**
(Source: Ohio State Emergency Operations Plan)

## 4.2 Federal Level Agency Coordination

Federal level agency coordination for emergency management is outlined in the Federal Response Plan, which provides agreement between 29 different Federal agencies. Figure 4-2 illustrates this coordination by showing the Primary Agency and Supporting Agencies for each of the twelve Emergency Support Functions.

| # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESF / Agency | Transportation | Communications | Public Works and Engineering | Firefighting | Information and Planning | Mass Care | Resource Support | Health and Medical Services | Urban Search and Rescue | Hazardous Materials | Food | Energy |
| USDA | S | S | S | P | S | S | S | S | S | S | P | S |
| DOC | | S | S | S | S | | S | | | S | | |
| DOD | S | S | P | S | S | S | S | S | S | S | S | S |
| DOEd | | | | | S | | | | | | | |
| DOE | | | | | S | | S | S | | S | | P |
| HHS | | | S | | S | S | | P | S | S | S | |
| DHS | S | P | | S | P | S | S | S | P | S | S | S |
| HUD | | | | | | S | | | | | | |
| DOI | | S | S | S | S | | | | | S | | S |
| DOJ | | | | | S | | | S | S | S | | |
| DOL | | | S | | | | S | | S | S | | |
| DOS | S | | | | | | | | | S | | S |
| DOT | P | | | | S | | S | S | | S | | S |
| TREAS | | | | | S | | | | | | | |
| VA | | | S | | | S | S | S | | | | |
| AID | | | | | | | | S | S | | | |
| ARC | | | | | S | P | | S | | | S | |
| EPA | | | S | S | S | | | S | | P | S | |
| FCC | | S | | | | | | | | | | |
| GSA | S | S | | | S | S | P | S | | | S | |
| NASA | | | | | S | | S | | S | | | |
| NRC | | | | | S | | | | | S | | S |
| OPM | | | | | | | S | | | | | |
| SBA | | | | | S | | | | | | | |
| TVA | S | | S | | | | | | | | | S |
| USPS | S | | | | | S | | S | | | | |

P = Primary Agency: Responsible for Coordination of the ESF

S = Support Agency: Responsible for Supporting the Primary Agency

**Figure 4-3: Emergency Support Functions – Federal Level**
(Source: Federal Response Plan)

For example, Table 4-1 illustrates the Primary and Supporting Agencies for provision of Emergency Support Function #1: Transportation. At the Federal Level of interaction, the USDOT is responsible for leading and seven additional agencies have been identified for playing supporting roles.

**Table 4-1: Federal Level Coordination for Transportation Support Function**
(Source: Federal Response Plan)

| ESF #1 - TRANSPORTATION |
|---|
| **Primary Agency** |
| U.S. Department of Transportation (DOT) |
| **Supporting Agencies** |
| U.S. Department of Agriculture (DOA), Forest Service |
| U.S. Department of Defense (DOD) |
| U.S. Department of Homeland Security |
| U.S. Department of State |
| General Services Administration |
| Tennessee Valley Authority |
| U.S. Postal Service |

## 4.3 State Level Coordination

The coordination of agencies at the state level is determined by each state. Similar to the way that the Federal Response Plan defines agency interaction at the Federal level, the State Emergency Operations Plan is the document for defining the interaction of state level agencies.

According to a review of state emergency operations and emergency management plans, the primary partners to the DOT for emergency management and transportation management planning include:

- State Emergency Management Agency
- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHWA) State Office
- National Guard

### Coordinating ITS Resources Across the State

In addition to coordination among state agencies for response to statewide emergencies, the State DOT should coordinate internally for the mobilization and use of ITS resources across districts or regions of the state, and possibly among departments. According to interviews and surveys of State DOTs, a statewide response to an emergency could

require mobilization of ITS resources from multiple DOT districts or regions; however, there are currently few plans in place that would expedite the sharing and mobilization of these valuable ITS resources. This would ensure that the full resources of the DOT could be requisitioned in the event of a major regional or statewide emergency.

For example, the Kansas Department of Transportation indicated that for a large mass evacuation (for example, in the Kansas City metro area), multiple transportation districts could be called upon to provide portable DMS equipment. Each region currently has approximately six of its own DMS units. In the event of an emergency, these could be requisitioned for a short period of time to address a regional emergency that requires additional equipment on an emergency basis (for example, the evacuation of Kansas City).

Based on this, the following recommendation is made:

- **Plan for the coordination of statewide ITS resources, especially portable resources.** It is recommended that the State DOT plan for the coordination of statewide ITS resources for use during mass evacuations and other emergencies.

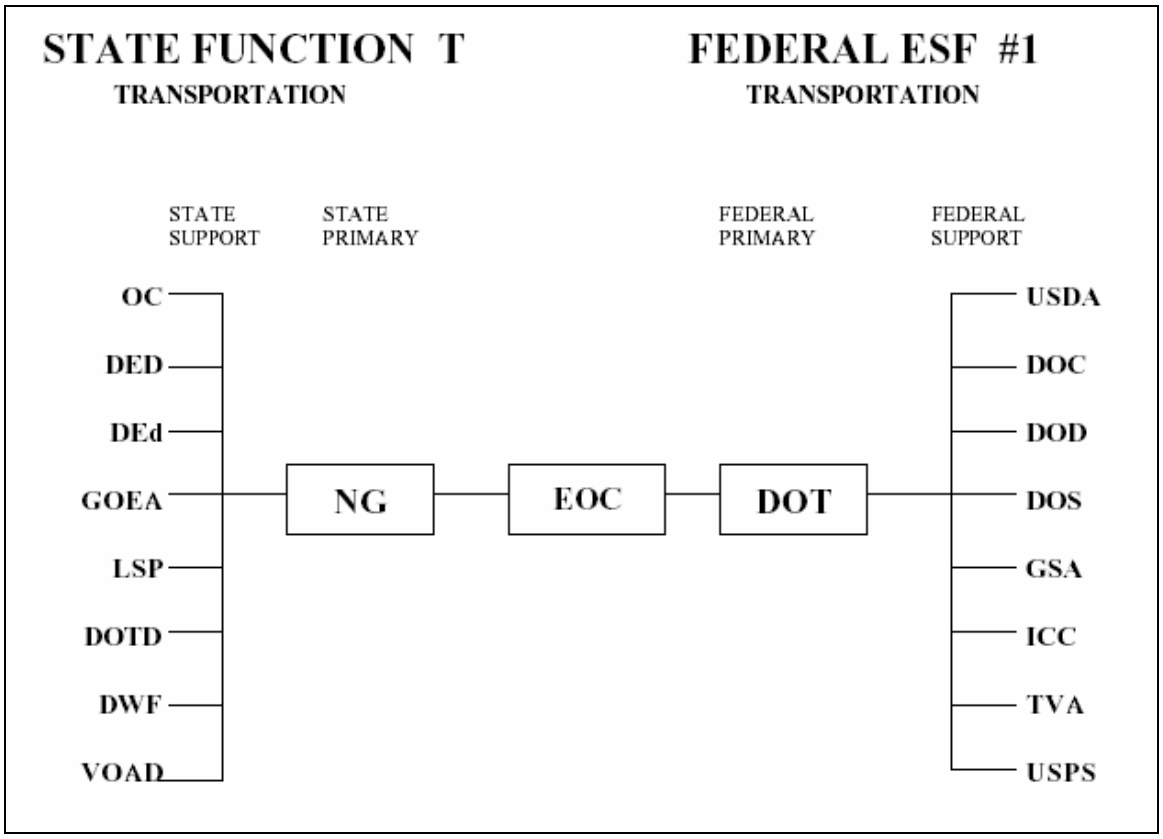



**Figure 4-4: State – Federal Level Coordination**
(Source: State of Nebraska Emergency Operations Plan)

As the complexity and frequency of disasters increases, there is a greater need for coordination and planning. The development of new computing and communications technologies, and intelligent transportation systems, has created new potential for improving coordination among agencies involved in incident response. Future development will capitalize on new technologies and improved coordination and communication among the three levels of agencies.

## 4.4 Future Developments

Based on recent events, which include both natural and man-made disasters, there is an increasing need for more coordination between Federal, state, and local resources responding to emergencies. The ITS America (ITSA) Board of Directors recently approved and proposed a new policy which outlines a number of actions to take the next steps towards a National integrated system for incident notification and response.

The recently proposed Integrated Incident Management Policy proposes that safety, security, and operations be integrated into a seamless notification and response system, with close cooperation and coordination between disciplines, stakeholders, and government agencies. The ITSA Board recommended the following next steps:

- ITS America take a leadership role in a coordinated process to develop an interdisciplinary National Response Plan (NRP) and a National Incident Management System (NIMS) that includes, but is not limited to, transportation issues such as hazardous material, mass casualty, and large scale incidents.
- Coordination occur among the leadership of response organizations, including police, fire, emergency medical services, hospitals, transportation operators, towing, emergency management, and public health.
- The USDOT work with the Department of Homeland Security (DHS) to bring first responders together in an "end-to-end fashion" (from incident prevention to final recovery) to integrate responses to more common and likely events such as a highway incident with hazardous materials to the more extreme events such as terrorism assaults.
- The DHS should require that the development of coordinated national plans include state and local leadership from the transportation and other response communities.
- Each state should work with local interests to develop response plans (which would include mass evacuation plans), in accordance with NRP and NIMS, for managing a broad range of emergencies such as hazardous material incidents, major highway crashes and bio-terrorism incidents.
- State and Local plans address common protocols for managing incidents as well as interoperable and integrated voice and data communications for emergency response.

- ITSA should take a leadership role in the effort to build integrated and interoperable emergency communications and facilitate discussion among pertinent players to achieve operationally sound and practical solutions.
- Incident management standards should be continually refined and implemented.

# 5. Mass Evacuation and Emergency Operations Plans

This section discusses how mass evacuation planning and Transportation Management Plans fit into the overall planning picture for emergency management. It also discusses emergency and evacuation planning as it relates to the three levels of agency interaction discussed in Section 4. With an increasing array of emergency management documentation, where do mass evacuation plans fit into the picture? This section looks at the levels of emergency operations plans and how ITS resources can be reflected in those plans.

As illustrated in Section 4, agency interaction for mass evacuation and emergency management in general occurs at three levels. Planning for mass emergency operations also occurs on all three levels.

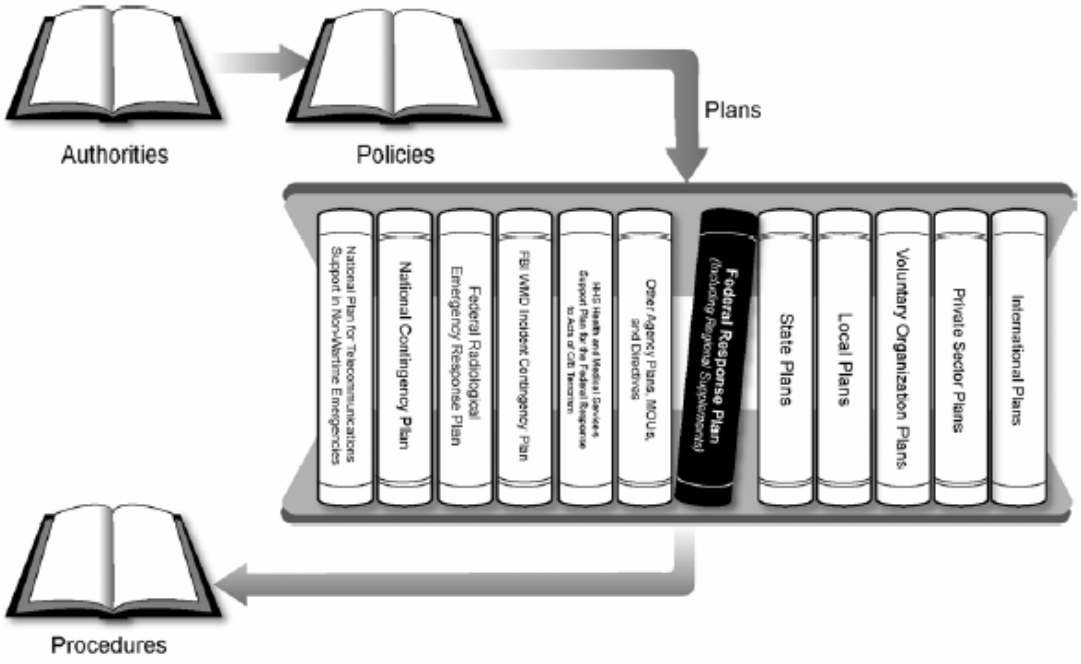
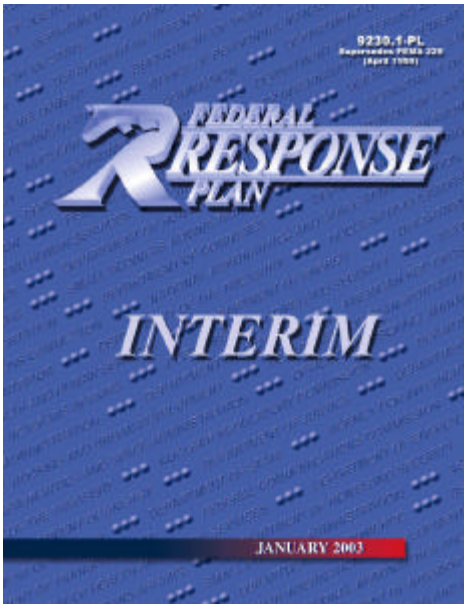



**Figure 5-1: Emergency Planning Relationships**
(Source: FEMA Federal Response Plan)

## 5.1 Federal Response Plan




The Federal Response Plan (FRP), which is developed and maintained by the Federal Emergency Management Agency (FEMA), provides the guidelines for Federal level interaction and support for emergency management. The FRP outlines how the Federal government assists the State and Local governments when a disaster or emergency overwhelms or exceeds their ability to respond. In other words, if the resources of the State and Local government are not sufficient to deal with the disaster or emergency, then Federal resources can be brought in to assist.

The latest version of the FRP [9230.1-PL] was published in January 2003 and is accessible online at the FEMA website: http://www.fema.gov/rrr/frp/.

The FRP is a signed agreement among 27 Federal departments and agencies, including the American Red Cross, that:

- Provides the mechanism for coordinating delivery of Federal assistance and resources to augment efforts of State and local governments overwhelmed by a major disaster or emergency.
- Supports implementation of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (42 U.S. Code 5121, et seq.), as well as individual agency statutory authorities.
- Supplements other Federal emergency operations plans developed to address specific hazards (Hazard Specific Response Plans).

The FRP is implemented in anticipation of a significant event likely to result in a need for Federal assistance or in response to an actual event requiring Federal assistance under a Presidential declaration of a major disaster or emergency. The FRP also specifies the Federal level resources that can be deployed for declared disasters, such as specialized teams for damage assessment, emergency communications, medical assistance and support, urban search and rescue, emergency power restoration, and community relations, equipment and supplies, and facilities such as Disaster Field Offices, mobilization centers, and Disaster Recovery Centers.

### Emergency Support Function Concept

The Emergency Support Function (ESF) concept was originally developed by FEMA to define the types of emergency resources that may be required during a disaster or emergency and to direct those resources in times of need. In all, the Federal government defines twelve emergency support functions, as described in Table 4-2.

**Table 5-1: Emergency Support Functions**

| Emergency Support Functions |
|---|
| **ESF 1: Transportation**. Providing civilian and military transportation.<br>Lead agency: Department of Transportation |
| **ESF 2: Communications**. Providing telecommunications support.<br>Lead agency: National Communications System |
| **ESF 3: Public Works and Engineering**. Restoring essential public services and facilities.<br>Lead agency: U.S. Army Corps of Engineers, Department of Defense |
| **ESF 4: Fire Fighting**. Detecting and suppressing wild land, rural and urban fires.<br>Lead agency: U.S. Forest Service, Department of Agriculture |
| **ESF 5: Information and Planning**. Collecting, analyzing and disseminating critical information to facilitate the overall federal response and recovery operations.<br>Lead agency: Federal Emergency Management Agency |
| **ESF 6: Mass Care**. Managing and coordinating food, shelter and first aid for victims; providing bulk distribution of relief supplies; operating a system to assist family reunification.<br>Lead agency: American Red Cross |
| **ESF 7: Resource Support**. Providing equipment, materials, supplies and personnel to federal entities during response operations.<br>Lead agency: General Services Administration |
| **ESF 8: Health and Medical Services**. Providing assistance for public health and medical care needs.<br>Lead agency: U.S. Public Health Service, Department of Health and Human Services |
| **ESF 9: Urban Search and Rescue**. Locating, extricating and providing initial medical treatment to victims trapped in collapsed structures.<br>Lead agency: Federal Emergency Management Agency |
| **ESF 10: Hazardous Materials**. Supporting federal response to actual or potential releases of oil and hazardous materials.<br>Lead agency: Environmental Protection Agency |
| **ESF 11: Food**. Identifying food needs; ensuring that food gets to areas affected by disaster.<br>Lead agency: Food and Nutrition Service, Department of Agriculture |
| **ESF 12: Energy**. Restoring power systems and fuel supplies.<br>Lead agency: Department of Energy |

The following summarizes observations based on a comprehensive review of state emergency operations plans:

- **State plans follow the Emergency Service Function concept defined by FEMA.** Most state emergency plans follow the Emergency Service Function concept in defining the state-level resources that are available in the event of a declared emergency.
- Of interest to the State Department of Transportation is ESF #1: Transportation.
- **The exact ordering and specification of Emergency Service Functions, such as Transportation, is defined by each state.** Each state defines its own emergency service functions, which may vary in order and scope depending on the state. They generally follow the FEMA concept, but may vary slightly.
- **State Emergency Service Functions are identified in the State Emergency Operations Plan.** The emergency service functions are typically defined in the State Emergency Operations Plan. A listing of emergency operations plans by state, along with website links to those documents, is provided in Appendix E of this report.

## 5.2 State Level Plans

At the state level, there are a number of plans that address emergency transportation operations and mass evacuations. Based on an extensive literature search and interviews with state agencies, the following were identified:

- State Emergency Operations Plans
- Transportation and Evacuation Annexes to the SEOP
- Hazard Specific Response Plans
- State Emergency Highway Traffic Regulation Plans
- Continuity of Operations Plans

This is not an exhaustive list of all the plans that may be available, but provides a basic framework of the types of documents that are typically available across different states. These plans serve the purpose of identifying the current state of practice for formalizing the use of intelligent transportation system resources during emergency evacuations.

### *5.2.1 State Emergency Operations Plans*

The focal point for planning at the state level resides with the State Emergency Management Agency, which is typically responsible for statewide planning for emergency operations is usually in the form of a Statewide Emergency Operations Plan (SEOP). These are typically developed by the state Emergency Management Agency, which is modeled after the FEMA model set forth in the FRP. It is developed with input from all of the government agencies that provide leading or supporting roles in the

emergency support functions for statewide emergency operations, including the State DOT.

The purpose of the Statewide Emergency Operations Plan is to:

- Describe conditions that impact state disaster response operations.
- Describe the hazards that threaten the people, property, and resources of the state.
- Predetermine disaster response related actions to be taken by state, local, and private sector agencies.
- Assign emergency management tasks.
- Specify how the state will organize in response to disaster emergencies.

### *5.2.2 Transportation and Mass Evacuation Annexes to the SEOP*

An evacuation annex provides additional specific provisions for evacuating areas and populations threatened by the hazards the jurisdiction faces. Many states surveyed have developed separate evacuation annexes to their state emergency operations plans.

Examples: The following are specific examples of states that have developed an Evacuation Annex to their SEOP. At least six states have developed these annexes, as follows:

- Arizona Emergency Response and Recovery Plan – ESF#15: Evacuation Annex (http://www.dem.state.az.us/serrp/esf15.pdf)
- Louisiana Emergency Operations Plan Supplement B1: Southwest Louisiana Hurricane Evacuation and Sheltering Plan (http://www.loep.state.la.us/Plans/EOPSupplement1b.pdf)
- State of Okalahoma Emergency Operations Plan, ESF#1 Transportation, Appendix 1: Evacuation (pp. 40-43) (http://www.odcem.state.ok.us/pte/EOP2002.pdf)
- Texas – Texas State Emergency Management Plan, Annex E: Evacuation of the State of Texas Emergency Management Plan (ftp://ftp.txdps.state.tx.us/dem/plan_state/state_annex_e_evacuation.pdf)
- Commonwealth of Virginia Emergency Operations Plans – Functional Annex C: VDOT Hampton Roads Hurricane Evacuation Traffic Plan (http://www.vaemergency.com/library/eopvol5/eopvol5a2.pdf)
- West Virginia Emergency Operations Plan, Annex E: Evacuation (http://www.state.wv.us/wvoes/WV%20Plan%20documents/WV%20Plan-ANNEX%20E.doc)

### 5.2.3 Hazard Specific Response Plans

In addition to the SEOP, which generally addresses all hazards, each state typically has at its disposal a number of Hazard Specific Response Plans (HSRP) that address evacuation responses to specific potential hazards or threats that may arise. These HSRPs can be included in the SEOP as an annex or may stand alone and simply be referenced by the SEOP. Each HSRP assigns one or more organizations with primary and supporting responsibilities.

Examples: The following are specific examples of Hazard Specific Response Plans:

- Virginia State Emergency Operations Plan, Volume 5: Virginia Hurricane Emergency Response, August 2001. Basic Plan — Functional Annex B, Attachment 1, (http://www.vaemergency.com/library/eopvol5/eopvol5a1.pdf)

- The State of Oregon Emergency Management Plan provides a reference list of nineteen different HSRPs for specific hazards ranging from chemical and WMD emergencies to volcanoes. Figure 4-2 shows an excerpt that lists the HSRPs that exist for the State of Oregon and where the plans reside.

(http://www.osp.state.or.us/oem/library/plans/emp/oregon%20emp-%20volume%202%20-emergency%20operations.pdf)

### 5.2.4 Emergency Highway Traffic Regulation Plans

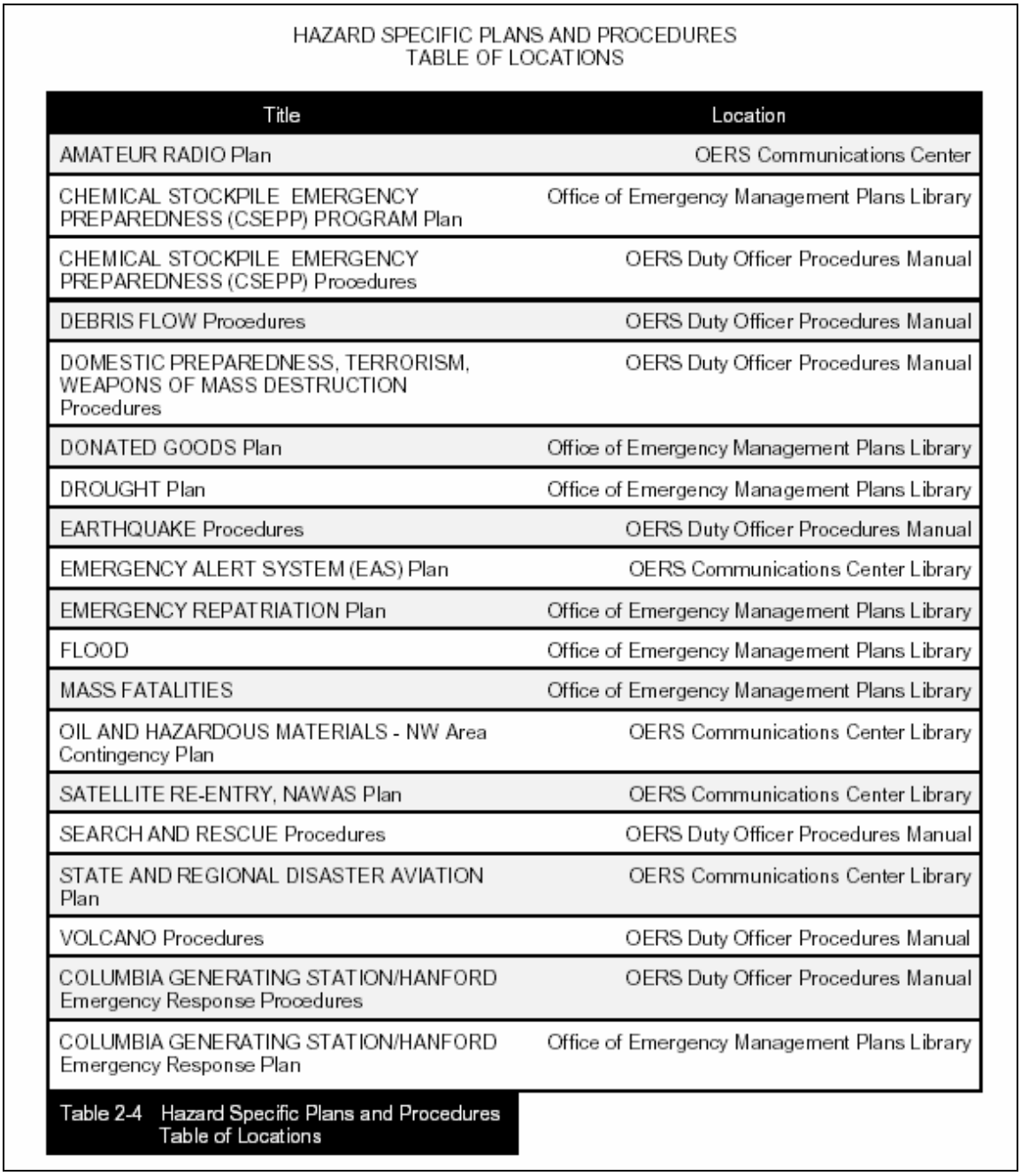
Much of the planning for emergency transportation operations was initiated during the Cold War years starting in the 1950s and 1960s as the states prepared for the possibilities of nuclear conflict. On November 18, 1988, the Presidential Executive Order 12656

To assist states in coordinating emergency highway traffic regulations, the Federal government recently published a guide titled “

Examples: The following are specific examples of Emergency Highway Traffic Regulation Plans and annexes:

- State of Arkansas Emergency Operations Plan, Annex J: Highway and Transportation, Appendix 1: Emergency Highway Traffic Regulation Plan (http://www.adem.state.ar.us/StateEOP/Appendix%20J1%20Emergency%20Highway%20Traffic%20Regulations.doc)

- South Carolina Emergency Operations Plan, Annex 16 Emergency Traffic Management (http://www.state.sc.us/emd/library/eop/annex-16.pdf)



HAZARD SPECIFIC PLANS AND PROCEDURES
TABLE OF LOCATIONS

| Title | Location |
|---|---|
| AMATEUR RADIO Plan | OERS Communications Center |
| CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS (CSEPP) PROGRAM Plan | Office of Emergency Management Plans Library |
| CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS (CSEPP) Procedures | OERS Duty Officer Procedures Manual |
| DEBRIS FLOW Procedures | OERS Duty Officer Procedures Manual |
| DOMESTIC PREPAREDNESS, TERRORISM, WEAPONS OF MASS DESTRUCTION Procedures | OERS Duty Officer Procedures Manual |
| DONATED GOODS Plan | Office of Emergency Management Plans Library |
| DROUGHT Plan | Office of Emergency Management Plans Library |
| EARTHQUAKE Procedures | OERS Duty Officer Procedures Manual |
| EMERGENCY ALERT SYSTEM (EAS) Plan | OERS Communications Center Library |
| EMERGENCY REPATRIATION Plan | Office of Emergency Management Plans Library |
| FLOOD | Office of Emergency Management Plans Library |
| MASS FATALITIES | Office of Emergency Management Plans Library |
| OIL AND HAZARDOUS MATERIALS - NW Area Contingency Plan | OERS Communications Center Library |
| SATELLITE RE-ENTRY, NAWAS Plan | OERS Communications Center Library |
| SEARCH AND RESCUE Procedures | OERS Duty Officer Procedures Manual |
| STATE AND REGIONAL DISASTER AVIATION Plan | OERS Communications Center Library |
| VOLCANO Procedures | OERS Duty Officer Procedures Manual |
| COLUMBIA GENERATING STATION/HANFORD Emergency Response Procedures | OERS Duty Officer Procedures Manual |
| COLUMBIA GENERATING STATION/HANFORD Emergency Response Plan | Office of Emergency Management Plans Library |

Table 2-4 Hazard Specific Plans and Procedures Table of Locations

**Figure 5-2: Hazard Specific Response Plans**
(Source: State of Oregon Emergency Management Plan)

### *5.2.5 Continuity of Operations Plans*

The purpose of Continuity of Operations Plans (COOP) is to provide for the continuation of operations in the event of an emergency or disaster, especially one that affects one or more operations centers. Disasters can result in the loss of primary electrical power,

communications, and other services that are essential for day-to-day operation. Also, physical operations centers, such as EOCs and TMCs, can be destroyed or damaged to the point of being inoperable. It is in these situations that a backup plan for continuing operations is essential. Without these plans and arrangements in place in advance of disasters, the agency runs the risk of being inoperable for an extended period of time when operations capabilities are most critical.

Example: The Arizona Department of Transportation has developed a Continuity of Operations Plan for the State of Arizona.

## 5.3 Local Emergency Operations Plans

According to the survey of state agencies and a review of state emergency plans nationwide, the responsibility for developing specific mass evacuation plans is given to local level entities, such as counties, cities and towns, and special facilities. Often these mass evacuation plans are developed to address a specific hazard or threat which is posed to the local area (e.g. hurricane, volcano, terrorist threat, radiological event at a nuclear plant, etc.), as opposed to the higher-level "all hazards" approach that is prevalent at the State and Federal levels. These are typically documented in a Local Emergency Operations Plan (LEOP).

**Example:** The State of Oklahoma Emergency Operations Plan includes the following language, which places the responsibility for developing evacuation plans with the local jurisdictions:

"To provide for orderly and expeditious evacuation of any part of the population of the State of Oklahoma should such action be required. Each local jurisdiction is responsible for developing its own evacuation plan and, if an evacuation situation arises, implementing their plan. The Oklahoma Department of Civil Emergency Management will provide support as requested by the local jurisdiction."

Other examples of emergency evacuation plans that are developed by local jurisdictions, such as cities and counties, versus development at the state level, are as follows:

- Kansas City, Missouri Comprehensive Emergency Operations Plan
- Pierce County, Washington Mass Evacuation Plan for Mt. Ranier Volcanic Activity.
- Harris County Texas Basic Plan, Annex E Evacuation Harris County (http://www.hcoem.org/basic_plan/annexE2001.pdf)

However, in states that have readily identified statewide threats (such as hurricanes), the State Department of Transportation often develops mass evacuation plans.

## 5.4 Recommendations for Evacuation Planning

The following provides recommendations regarding the development of evacuation and emergency transportation management plans for the viewpoint of a State DOT:

### *5.4.1 Create inventory of ITS resources and ITS coverage*

It is recommended that the State DOT plan for the coordination of statewide ITS resources for use during mass evacuations and other emergencies. A good starting point is for DOTs to compile a list of statewide and regionally available ITS resources into a single document, as well as creating visual aids to determine the geographic areas and roads covered by these resources. The next step is to create a table of the type of disaster scenarios that are most likely to occur in their state, and then cross-reference the various ITS resources that would be most beneficial to each disaster type. Liaisons with the local, state and federal emergency response agencies can assist in creating these lists, or depending on the sensitivity of the information, the liaisons may go so far as providing copies of the top-level disaster scenarios.

Once the ITS inventory table is established, then the DOT should start to understand how to blend the type and scale of a disaster with the various types of ITS deployments. Type of disaster provides details on the type of damage that may be caused by the event. For example, hurricanes almost always bring heavy rains and flooding which can disrupt large stretches of roadways. Earthquake prone areas can experience wide area disruptions of road, rail and utilities, as well.

Scale may include but is not limited to understanding how large of a geographic area may have been disrupted, how many people may be affected, roads that may have been rendered unusable, and bridges that may have collapsed.

This type of study will allow the DOT to better understand and utilize the resources already available. Additionally, this will assist in the building of a template for regional coordination of ITS resources.

### *5.4.2 Modify existing emergency plans to utilize available ITS infrastructure and resources.*

Emergency management activities, such as mass evacuations, are generally highly institutionalized and rely on standard authorities, chains of command, and procedures. For instances of disaster it is likely that a more rapid response would be required. Once the problem has been identified, pre-determined plans should be instigated to allow streamlined chains of command that are based around the specific disaster. For example, the leading agencies would vary significantly for an incidence of flooding and a terrorist bombing.

The emergency response documents should be written using a standard form and common terminology to promote consistency and to reduce any confusion. Standardization should cross agencies within the state, but also states and regions. During large-scale emergencies requiring multi-state or federal participation, a shared understanding of plans written with common language and methods would save valuable time and avoid confusion. Therefore, modification of existing emergency management plans and procedures for mass evacuation should generally work within the existing frameworks, with any additions conforming to national standards.

To provide the fastest response to a developing emergency situation, the introduction of an automated system could provide immediate and significant benefits. Whilst a number of states have successfully implemented Condition Reporting Systems to automate their ITS equipment during everyday events, many have been found to be underutilizing their system during emergency and mass evacuation situations. For example, the Condition Acquisition and Reporting System (CARS) used by a growing number of states has so-called *Action Plans* which are triggered by their pre-designed emergency incident. Once activated they are able to control all forms of state ITS to best deal with the situation. As an example, for flooding this could include DMS messages directing traffic to safety, automated Low Power FM broadcasts (LPFM) and updated 511 scripts to keep the public informed, and dynamic traffic flow models to help the Highway Patrol plan for what they are likely to encounter.

For states with an existing Condition Reporting System, the cost of creating and implementing *Action Plans* for their system is low. States without an automated Condition Reporting System may find that the benefits for mass evacuation alone outweigh the costs of installing a system that will also provide significant ITS benefit to everyday operations. An screenshot from an actual action plan in place for a scenario involving an explosion is shown below, taken from the Minnesota CARS system. More detailed information explaining Action Plans and Condition Reporting Systems is included in the appendix of this report.

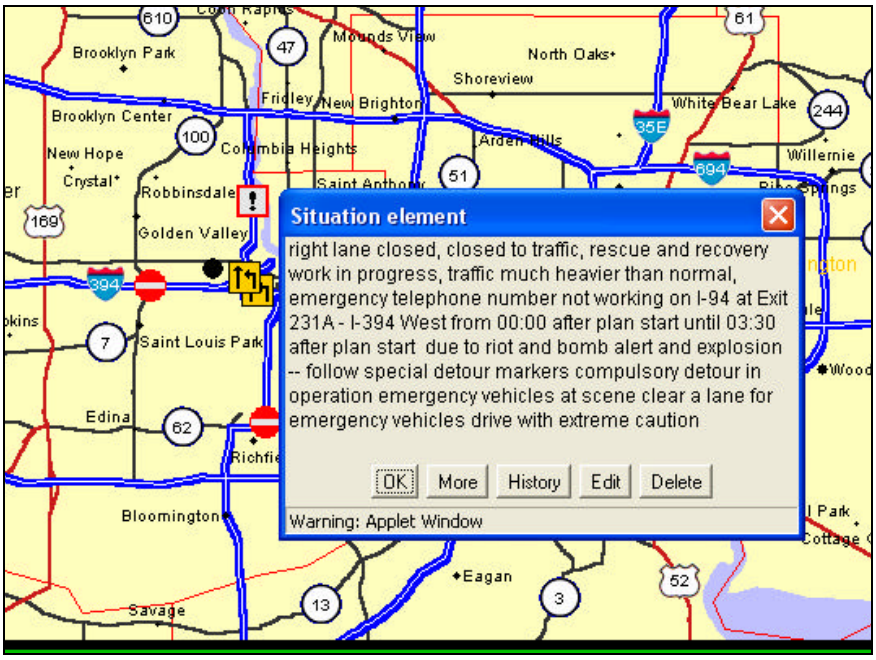



**Figure 5-3: MNDOT CARS Action Plan**

### *5.4.3 Work with the State Emergency Management Agency to develop and Evacuation Annex*

In cooperation with the state DOT, plans should be drawn up to develop an Evacuation Annex for use during running of state Emergency Operations Plans. The facility would house all significant divisions within the agency and those of other state agencies such as police and fire departments. Working in close proximity, in a center designed to withstand the physical and infrastructural problems associated with disasters, officials can better use and coordinate the ITS resources available to the State DOT.

At present there is significant variation in the quality and size of Evacuation and Emergency Operations Centers (EOC). Standardization of these facilities should be attempted, following new guidelines that could be drawn up at the federal level. Equipment at each annex needs to be fully switchable at very short notice. This allows for the building to immediately take control of a whole host of government services as soon as an emergency situation develops. A good example of a current successfully operating EOC is that of Washington State at Camp Murray. The facility is designed to withstand earthquakes and other natural disasters, house a multitude of systems, and accommodate officials from not just a wide range of state departments but also local volunteer and federal agents.

Many of the systems in use today are multi-centric or even web-based which allows them to be controlled from a host of different locations. This flexibility is of particular use to EOCs trying to quickly instigate evacuation plans. A good example of this, again, is a Condition Reporting System, which as a web-based application, can be easily accessed

and controlled from any internet-ready personal computer. The action of switching from DOT control to EOC control is seamless in that both can simultaneously control and receive event information, leaving no weak point in the change of command during an emergency event.

### *5.4.4 Create cooperation and understanding on different scales*

**Local**

In order to increase awareness of evacuation plans and chains of command, State DOTs should commence an overt plan of outreach amongst local agencies and groups. Presentations and open meetings can encourage local jurisdictions such as cities, towns, counties, DOT districts, and large facilities, to develop mass evacuation plans that take advantage of ITS resources available through the State DOT's District or Region offices. This will benefit all should obvious command directions be broken during an emergency situation as groups will be better prepared to function correctly alone.

**Statewide**

As this report has outlined, emergency planning and operations for mass evacuations requires intra-agency cooperation. This report can be presented at emergency planning meetings and functions to raise the level of awareness of ITS resources and their availability and application to support mass evacuation and other emergency operations. By presenting the uses of ITS equipment to other groups it is likely that spin-off uses will be found by other State Government agencies for the benefit of all. Therefore a recommendation of this report is that State DOTs increase their presence at intra-agency meetings, with Powerpoint presentations and other forms of outreach to raise awareness of the potential their systems can offer others.

**National/Regional**

Finally, DOTs can influence groups outside of their physical boundaries. Historically, federal organizations have had a monopoly on national decision-making, with overruling control in emergency situations resolving to them. During past incidents this arrangement has proved problematic, with responsible agencies not being as informed about the local area as a similar state-run group would have been. Potentially dangerous situations have arisen from federally organized groups running without access to bridge dimensions and weight limits that state DOT groups would have known.

A first step towards establishing greater influence for state-level DOTs is through joining committees regionally and nationally related to emergency management, and attending relevant trade shows across the country. By lobbying national groups and meetings, states can increase their control and at the same time help federal groups appreciate the intricacies of emergencies within each specific state.

There are currently a number of national programs and committees that are addressing the issues of mass evacuation and emergency operations. Aside from being involved

with the agency coordination and planning initiatives in your state and local area, these are good places to learn the latest state of the practice. Further information can be found about all three programs and groups in Appendix E:

- Federal Highway Administration (FHWA) Emergency Management and Preparedness Program
- Transportation Research Board (TRB) Subcommittee on Emergency Evacuation – A3B01(4)
- National Emergency Management Association (NEMA)

# 6. Conclusions and Next Steps

This section provides a summary of conclusions drawn from this project as well as recommended next steps for State DOT for leveraging intelligent transportation systems resources. The conclusions and next steps are drawn from a combination of literature search efforts, agency surveys, and the review of state emergency operations plans and evacuation plans and documents.

The following conclusions and next steps are organized by major concept area:

**ITS Resources for Mass Evacuation**

- Coordinate statewide ITS resources, especially the mobile and portable ITS resources, for use during statewide emergencies. For example, portable variable message signs and portable traffic management systems.
- Utilize a condition reporting system to centrally collect, store, and provide traffic, roadway, and weather conditions throughout the state and the affected regions.
- Increase inventory and/or availability of portable ITS equipment, such as portable VMS, portable HAR, and portable traffic management system (PTMS) trailers.
- Provide ITS outreach at emergency planning meetings and functions to increase the awareness of ITS resources and their availability and application to support mass evacuation and other emergency operations. This document is intended to be an outreach tool.
- Provide a copy of this report to the State DOT's emergency management coordinator as a tool to increase awareness of intelligent transportation systems resources available for supporting emergency and evacuation operations.
- Integrate access to the State DOT's ITS resources at the State Emergency Operation Center. For example, make CCTV surveillance control and/or images available from the SEOC.
- There is a need for improved inter-agency communication and streamlined information exchange during evacuations and other emergency operations. This can be facilitated by improved and modernized communication systems and information exchange protocols.
- It is recommended that the State DOT modify their Condition Reporting System, if available, to handle statewide action plans for evacuations and other emergencies. The State DOT should develop simple action plans for each major type of disaster.
- Each State DOT should develop a set of reporting procedures for entering evacuation and emergency situations into their Condition Reporting System for use in the event of a disaster. These procedures may identify and include non-standard reporting sources that are used only during disasters. The objective of the procedures is to make sure that evacuation and disaster reporting from around the state or region affected can be done rapidly and accurately.

## Agency Coordination

- **Plan for the coordination of statewide ITS resources, especially portable resources.** It is recommended that the State DOT plan for the coordination of statewide ITS resources for use during mass evacuations and other emergencies.

- **Improve inter-agency coordination and information exchange.** There is a need for improved inter-agency communication and streamlined information exchange during evacuations and other emergency operations. This can be facilitated by improved and modernized communication systems and information exchange protocols. One example of this is the integration of Computer Aided Dispatch (CAD) with the TMC. Another example is the implementation of Center-to-Center communication protocols for standardized information exchange.

- **Stay informed of latest evacuation and emergency committee activities.** It is recommended that key State DOT staff in charge of emergency coordination stay posted on the latest research and proceedings of national mass evacuation and homeland security efforts, including those listed under Section 5.5 of this report. These efforts are a good source for identifying new opportunities and best practices for agency coordination.

- **Coordinate for specific ITS responses to different types of disasters.** The State DOTs should consider developing transportation management plans that outline specific ITS responses and coordination for each major type of disaster that can occur in the state.

- **Coordinate with the State Emergency Management Agency for accessing the Condition Reporting System.** The State DOT should work with their State Emergency Management Agency and Emergency Operations Center(s) to ensure that access to Condition Reporting System information is available at state and local EOCs.

- **Share CCTV images and traffic data.** The State DOT should share CCTV images and traffic data with the state and local EOCs. This sharing of images and data can be facilitated and automated using a Condition Reporting System.

## Emergency Management and Mass Evacuation Planning

- **Modify existing emergency plans to utilize available ITS infrastructure and resources.** Emergency management activities, such as mass evacuations, are generally highly institutionalized and rely on standard authorities, chains of command, and procedures. The emergency response documents should be written using a standard form and common terminology to promote consistency and to reduce any confusion. Modification of existing emergency management plans and procedures, including those for mass evacuation, should generally work within the existing frameworks.

- **Work with the State Emergency Management Agency to develop an Evacuation Annex to the State Emergency Operations Plan.** State Emergency Planning Agencies, in cooperation with the State DOT, should develop an Evacuation annex to the State Emergency Operations Plan that specifies the use and coordination of ITS resources provided by the State DOT. A review of the States indicated that only 22% of States that had published State Emergency Operations Plans had Evacuation Annexes.

- **Encourage and assist with the development of evacuation plans at the local level.** Encourage local jurisdictions, such as cities, towns, counties, DOT districts, and large facilities, to develop mass evacuation plans that take advantage of ITS resources available through the State DOT's District or Region offices.

- **Utilize and expand this report for outreach both within the State DOT and with other agencies, such as the State Emergency Management Agency.** The State DOT staff should use this report at emergency planning meetings and functions to raise the level of awareness of ITS resources and their availability and application to support mass evacuation and other emergency operations.

- **Get involved with some of the national and regional programs and committees that are currently addressing mass evacuation and emergency operations.** There are currently a number of national programs and committees that are addressing the issues of mass evacuation and emergency operations.

# 7. Acronyms

The following provides a list of acronyms used in this report:

| | |
|---|---|
| CCTV | Closed Circuit Television |
| CMS | Changeable Message Signs |
| COOP | Continuity of Operations Plan |
| CRS | Condition Reporting System |
| DHS | Department of Homeland Security |
| DMS | Dynamic Message Sign |
| DOT | Department of Transportation |
| EAS | Emergency Alert System |
| ESF | Emergency Support Function |
| FCC | Federal Communications Commission |
| HAR | Highway Advisory Radio |
| HSRP | Hazard Specific Response Plan |
| ISTEA | Intermodal Surface Transportation Efficiency Act |
| ITS | Intelligent Transportation Systems |
| LEOP | Local Emergency Operations Plan |
| LPFM | Low Power FM |
| NIMS | National Incident Management System |
| PTMS | Portable Traffic Management System |
| RWIS | Road Weather Information System |
| SEOC | State Emergency Operations Center |
| SEOP | State Emergency Operations Plan |
| TEA-21 | Transportation Equity Act for the 21st Century |
| TMC | Traffic Management Center |
| TMP | Transportation Management Plan |
| TOC | Traffic Operations Center |
| TRB | Transportation Research Board |
| USDOT | U.S. Department of Transportation |
| VMS | Variable Message Sign |
| VTOC | Virtual Traffic Operations Center |

# 8. References

The following provides a list of references used for this project:

(1) "***Homeland Security and ITS -- Supplement to the National ITS Program Plan: A Ten-Year Vision***". September 2002; prepared by ITS America.
http://www.itsa.org/resources.nsf/Files/PPRA_Security_Final/$file/PPRA_Security_Final.pdf

(2) "***A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection***"; prepared by SAIC, May 2002.
http://security.transportation.org/community/security/guides.html

(3) "***A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents***"; prepared by PB Farradyne, May 2002.
http://security.transportation.org/community/security/guides.html

(4) "***Protecting Public Surface Transportation Against Terrorism and Serious Crime: An Executive Overview***"; Prepared by Mineta Transportation Institute (Brian Michael Jenkins), College of Business, San Jose State University, San Jose, CA 95192-0219, September 2001.
http://transweb.sjsu.edu/publications/TerrorismExOverv.htm

(5) "***Protecting Public Surface Transportation Against Terrorism and Serious Crime: Continuity Research on Best Security Practice***"; Prepared by Mineta Transportation Institute (Brian Michael Jenkins & Larry N. Gersten), College of Business, San Jose State University, San Jose, CA 95192-0219, September 2001.
http://transweb.sjsu.edu/publications/terrorism_final.htm

(6) ITS Journal; ***Surface Transportation Security Lessons Learned from 9/11***, September 2002.

(7) ***Request for Applications, Number DTFH61-02-X-00089***; Procurement Request No. 77-40-2019; Surface Transportation Security and Reliability Information System Model Deployment; US DOT, FHWA.
http://www.nawgits.com/fhwa/02x89synopsis.html

(8) ***National Review of Hurricane Evacuation Plans and Policies***; Brian Wolshon, Elba Urbina, Marc Levitan; LSU Hurricane Center, 2001.

(9) ***2001 Survey of State Evacuation Practices: Planning, Operations, and Needs***; presentation by Brian Wolshon, Ph.D., P.E., LSU Hurricane Center, 2001.
http://www.ops.fhwa.dot.gov/emp/10

(9) ***"Using ITS in Helping Florida Manage Evacuations"***; Bob Collins, Florida Division of Emergency Management.
http://www.ops.fhwa.dot.gov/emp/56

(10) ***The National Strategy for Homeland Security***, The White House

(11) ***Disasters By Design: A Reassessment of Natural Hazards in the United States***; Dennis S. Mileti, National Academy of Sciences, 1999.

(12) ***Executive Summary: Southeast United States Hurricane Evacuation Study***.

(13) ***Minutes of Subcommittee Meeting: A3B01(4) – Transportation Research Board Subcommittee on Emergency Evacuation***, January 14, 2002.

(14) Traffic Technology International; "***Security Blanket***"; Amy Tang McElwain and Nora Salinas; April/May 2003, pp. 60-63.

(15) ***A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents*** [NCHRP Project 20-07/Task 151A]; Prepared by PB Farradyne for American Association of State Highway and Transportation Officials' Security Task Force; May 2002.

(16) ***Emergency Transportation Initiatives***, Brandy Hicks, Federal Highway Administration; presentation given at the TRB A3B01(4) Hurricane Evacuation Transportation Workshop, April 14-15, 2003.
http://san-antonio.tamu.edu/trba3b01-4/Resources/resources.htm

(17) ***Evacuation Liaison Team (ELT)***, Brandy Meehan and Mike Foran; presentation given at the TRB A3B01(4) Hurricane Evacuation Transportation Workshop, April 14-15, 2003.
http://san-antonio.tamu.edu/trba3b01-4/Resources/resources.htm

(18) ***South Carolina Hurricane Evacuation Plan 2002***, South Carolina Department of Transportation; presentation given at the TRB A3B01(4) Hurricane Evacuation Transportation Workshop, April 14-15, 2003.
http://san-antonio.tamu.edu/trba3b01-4/Resources/resources.htm

(19) ***Transportation Security: Post-September 11th Initiatives and Long-Term Challenges***, United States General Accounting Office, GAO-03-616T, March 31, 2003.

(20) ***The National Strategy for the Protection of Critical Infrastructures and Key Assets***, The White House, February 2003.

(21) "***Security Blanket***", Amy Tang McElwain and Nora Salinas; Traffic Technology International, April/May 2003, pp. 60-63.

(22) "***Securing the Roads: U.S. Actions to Enhance Surface Transportation Security***", Vince Pearce; Traffic Technology International.

(23) ***Maryland's Reaction and Response to the Events of September 11th – A Case Study***

(24) *Freeway Management and Operations Handbook, Chapter 12: Freeway Management During Emergencies & Evacuations* (Draft Document), Federal Highway Administration, May 2003. http://ops.fhwa.dot.gov/Travel/traffic/documents/FMOH_Chapter12_Draft_Ver1.doc

# APPENDIX A: RESEARCH METHODOLOGY

This project consists of four main tasks to be completed within a six-month project schedule. The work breakdown for this project is as follows:

## Task 1: Literature Search

A thorough literature search will be conducted to identify available documents and research related to the use of ITS components as part of mass evacuation procedures. One example of such research is a study conducted by Louisiana State University, which identified CCTV, VMS, and traffic detection as useful tools during mass evacuation.

## Task 2: Agency Surveys and Interviews

This task will identify and make telephone contacts with all 50 State transportation departments to learn what each department's current plans are for the use of ITS technologies and procedures in the event of mass evacuation.

Some examples of questions that agencies will be asked include:

- Does your agency have a transportation management plan (TMP) for mass evacuation?
- Does the TMP address the use of intelligent transportation systems components during mass evacuation event?
- What types of ITS components are included?
- How would ITS components be used during a mass evacuation event?
- How can the various ITS components from different agencies be integrated?

It is anticipated that more detailed follow-up questions will be asked of those agencies that have actual experience in mass evacuations. For example, Houston (Texas DOT and Houston Transtar) has had two major flooding events in the past five years due to torrential rains that accompanied tropical storms, resulting in mass evacuations. This real-life experience is anticipated to provide a solid basis for gathering operational guidance on the use of ITS during mass evacuation events.

## Task 3: Draft Report

A concise draft report will be developed to document the results of the literature search and agency interviews. The report will contain summaries of the responses received in tabular and graphical formats. A main focus area of the report will be recommendations for the use of ITS technologies and procedures for mass evacuation events. The consultant will also endeavor to qualitatively identify the benefits of using ITS technologies during evacuations. The report will include an Executive Summary of key findings.

## Task 4: Final Report

Following review by ENTERPRISE and other interested parties, the project consultant will incorporate comments and prepare a final report. The report will be presented both electronically and in hard copy formats to ENTERPRISE members. The consultant will develop a PowerPoint presentation of the project findings for public presentation.

# APPENDIX B: SAMPLE AGENCY SURVEY QUESTIONAIRE

**State: Washington** **Contact: Mr. Bill Legg**

**Survey Questions**

1. **Does your agency have a transportation management plan (TMP) for mass evacuation?**

-No, only if there is a recognized risk. For example, Pierce Co. has evacuation route planning due to mud/run off from Mt. Rainer. There is also volcanic risk and tsunamis.

2. **What state and local agencies does the DOT coordinate with for Mass evacuation?**

-Pierce county (copy of plan available)
-State Patrol (WS DOT would take orders from)
-Homeland security person

3. **Does the TMP address the use of Intelligent Transportation Systems components during the mass evacuation event?**

There are no specific plans for usage of ITS.

4. **What types of ITS do you currently have in place that could be used?**

-DMS -Website
-CCTV -RWIS
-HAR

5. **What types of ITS components are included?**

N/A (Should states be developing specific plans?)

6. **How would ITS components be used during a mass evacuation event?**

7. **How can various ITS components from different agencies be integrated?**

-Coordinated signal systems that manage between state, county, and cities
-Some VHS, HARs, and CCTVs owned by cities
-Internet website links.

## Additional Notes on Washington State

**Matilla, WA:** Located on the Columbia River. Has an army nerve gas storage facility and has a regional evacuation plan. The plan includes VMS, sirens, phone tree system, and media alerts. The system is tied to weather monitoring. WSDOT have installed VMS and have purchased DS part of the project.

**EOC:** This dates back to the mid-1970's. Washington state has statewide an EOC on a military base, North of Olympia. Olympia would become the central operations point. Every agency would us SEOC.

*The statewide emergency management division works when the statewide military department DOT has a workstation at the EOC ready to go.

**Activation Examples:** Massive flooding around Seattle and Lahar forest fires

*DOT has construction equipment for recovery.

*No way to currently input into CARS.

# APPENDIX C – AGENCY SURVEY RESULTS

This appendix presents a summary of the results and conclusions of the agency surveys and emergency operations plan reviews that were conducted as part of this project.

## The Survey Process

The survey process that was used to gather current information on the state of practice for mass evacuations involved a two-pronged approach.

The first part involved researching all 50 State Emergency Management Agencies and reviewing each State Emergency Operations Plan (SEOP) along with any transportation and evacuation annexes. Appendix E provides contact information for each of the State Emergency Management Agencies as well as names and links to the state emergency operations and management plans that are available online.

The second part of the process involved calling State DOTs to interview ITS and emergency transportation liaisons about ITS resources and mass evacuation plans and procedures in their state. These liaisons are typically State DOT employees that have been assigned the role of coordination between the State DOT agency and the State Emergency Management Agency for the purpose of mass evacuation and transportation planning in the event of emergencies. Most of the liaisons contacted not only knew about emergency transportation planning, but were also aware of the ITS resources available. A sample copy of the survey questionnaire is provided in Appendix B of this report.

## The Survey Results

The following provides a summary of the survey results, findings, and recommendations for each of the seven questions that were answered as part of the survey:

### 1. Does your agency have a transportation management plan (TMP) for mass evacuation?

Of the State DOT agencies surveyed, approximately 29% of them had a state level plan for mass evacuation. The survey results indicate that a surprisingly low percentage of State DOTs are currently prepared for mass evacuation events on a statewide level. Although this survey does not show local emergency evacuation plans, it should be noted that some states delegate the development of evacuation plans to the local jurisdictions.

In a review of all fifty states and the District of Columbia's Statewide Emergency Operations Plans, approximately 53% of states published their SEOP on the Internet. Several of the states did not make their plans available through their website due to security concerns. Appendix D and Appendix E of this report provide contact

information and a listing of published SEOPs with website links. Only 22% of the states had Evacuation Annexes to their SEOP.

One recommendation of this report is to ensure the preparedness of the State DOT for mass evacuation events by developing a state level transportation management plan for mass evacuation.

Based on the results of this survey question, we recommend the following:

- **Work with the State Emergency Management Agency to develop an Evacuation Annex to the State Emergency Operations Plan.** State Emergency Planning Agencies, in cooperation with the State DOT, should develop an Evacuation annex to the State Emergency Operations Plan that specifies the use and coordination of ITS resources provided by the State DOT.

- **Encourage and assist with the development of evacuation plans at the local level.** Encourage local jurisdictions, such as cities, towns, counties, DOT districts, and large facilities, to develop mass evacuation plans that take advantage of ITS resources available through the State DOT's District or Region offices.

**2. What state and local agencies does the DOT coordinate with for mass evacuation?**

The state and local agencies that the State DOT coordinates with for transportation and mass evacuation emergency operations is typically specified in the State Emergency Operations Plan that each state emergency management agency develops and maintains. The SEOP identifies the lead agency and a number of supporting agencies for emergency operations such as mass evacuation.

An interesting finding of the survey is that not all states assign the State DOT as the lead agency for the Transportation support function. In fact, only approximately 80% of the states identified the State DOT as the lead agency.

In states that did not assign the State DOT the lead role for the transportation support function, they typically assigned other state agencies such as the Department of Public Safety, the Department of Criminal Justice, or the State Police. In any event, transportation emergency planning reflects a high level of coordination and cooperation between the State DOT and state law enforcement agencies, especially the State Police or State Patrol.

**3. Does the TMP address the use of Intelligent Transportation Systems components during the mass evacuation event?**

Of the State DOT agencies surveyed, approximately 29% of the state plans reviewed currently address the use of ITS resources. In addition to the surprisingly low percentage of State DOTs that have transportation management plans for mass evacuation, there was

a correspondingly low percentage of plans that currently address the use of ITS components for mass evacuation events.

Based on this finding of the survey, the following recommendations are made:

- **Utilize and expand this report for outreach both within the State DOT and with other agencies, such as the State Emergency Management Agency.** The State DOT staff should use this report at emergency planning meetings and functions to raise the level of awareness of ITS resources and their availability and application to support mass evacuation and other emergency operations.

- **Get involved with some of the national and regional programs and committees that are currently addressing mass evacuation and emergency operations.** There are currently a number of national programs and committees that are addressing the issues of mass evacuation and emergency operations. Section 4.4 of this report provides a listing and a brief overview of the programs and committees that currently exist. Most of these initiatives are relatively new and have only been started recently based on an increasing interest in mass evacuation operations.

**4. What types of ITS do you currently have in place that could be used?**

Not surprisingly, 100% of the states surveyed had ITS resources available for use during mass evacuations and other transportation emergencies. In fact, most State DOTs already have a broad inventory of ITS equipment and resources that could be utilized directly or requisitioned for use in emergency situations. This indicates that there is currently a very wide gap between the existing ITS capabilities of most State DOTs and the planning and preparedness for use of those capabilities in the event of a mass evacuation.

Based on the findings of this survey, the following recommendations are made:

- **Inventorying of ITS Resources.** The State DOTs should inventory their existing ITS resources available for use during mass evacuations and other transportation emergencies. This would include both field equipment as well as central systems such as control center capabilities.

- **Sharing of ITS Resources.** The State DOTs should also make sure that arrangements are in place for sharing or requisitioning ITS resources available across the state in the event of large transportation emergencies in which the resources of one region are exhausted.

- **Modify existing emergency plans to utilize available ITS infrastructure and resources.** Emergency management activities, such as mass evacuations, are generally highly institutionalized and rely on standard authorities, chains of command, and procedures. The emergency response documents should be written using a standard form and common terminology to promote consistency and to reduce any confusion. Modification of existing emergency management plans and procedures, including those for mass evacuation, should generally work within the existing frameworks.

## 5. What types of ITS components are included?

A survey of state agencies and a review of transportation emergency operations plans indicated that a broad variety of ITS resources are mentioned in plans. The most commonly identified ITS resources for evacuation were fixed and portable VMS signs, HAR, CCTV surveillance cameras, traffic signal control, Internet websites, and Traffic Management Centers (central control). Other ITS components that were mentioned, but less commonly utilized, were RWIS, ramp meters, gate closures, kiosks, 511 traveler information, traffic detection, AVL, and condition reporting systems.

The results of this survey indicate a large gap between the ITS resources that are currently available within State DOTs and the planning for their usage during a mass evacuation event or other transportation emergency.

Based on these findings, the following actions are recommended:

- **Modify existing emergency plans to utilize available ITS infrastructure and resources.** The State DOTs should update existing plans to take advantage of the available ITS resources.

- **Work with the State Emergency Management Agency to develop an Evacuation Annex to the State Emergency Operations Plan.** The State DOTs, in cooperation with the State Emergency Management Agencies and supporting agencies, should develop an Evacuation annex (or similar plan) to the State Emergency Operations Plan. The Evacuation annex specifies the use and coordination of ITS resources provided by the State DOT. A review of the States indicated that only 22% of States that had published State Emergency Operations Plans had Evacuation Annexes.

## 6. How would ITS components be used during a mass evacuation event?

Based on the survey and review of state emergency transportation plans, the following provides a summary of the ways that State DOTs currently use ITS resources to support mass evacuation:

- Activation of plans to use Contra-flow or reverse lanes to facilitate mass evacuations. These types of plans for reverse lanes were found almost exclusively in Southeastern states affected by the threat of hurricanes. Several states have plans for Contra-flow and/or have already utilized Contra-flow operations for hurricane evacuations, including Florida and South Carolina.

- Use of Traffic Management Centers to collect, disseminate, and exchange information for mass evacuation operations and other emergency transportation operations. For example, the Colorado DOT

The survey of state agencies and plans echoed the findings of the recent report by the Louisiana State University (LSU) Hurricane Center entitled "National Review of Hurricane Evacuation Plans and Policies" [8], published in 2001, the following summarized the preparedness of State DOTs to use new technologies, such as ITS, to assist in mass evacuations: *"In recent meetings and conferences organized for the purpose of discussing plans and practices for evacuation, it was apparent that many DOT officials were neither aware of the current state of practice nor the way in which new technologies [such as ITS] and methods could be used to better address evacuation-related problems."*

### 7. How can various ITS components from different agencies be integrated?

The final question asked during the agency survey process was how ITS components could be integrated and shared across agencies or regions in the state. Most of the State DOTs surveyed responded with at least one recommendation. The following provides a summary of existing practices and ideas gathered from the State DOTs for utilizing and integrating ITS components for mass evacuations and other transportation emergencies:

- **Integrate Access to CCTV Cameras.** Integrate access to CCTV camera images at the State Emergency Operations Center to provide availability of DOT cameras during an emergency.

- **Center-to-Center Information Exchange.** Implement Center-to-Center communications between various Traffic Management Centers around the state to allow full coordination of traffic operations in the event of an emergency. This can be accomplished using the National Transportation Communication for ITS Protocol (NTCIP) standards for Center-to-Center (C2C) information exchange and eXtensible Markup Language (XML) standards.

- **Access to Regional ITS Resources.** Access to the ITS components of various State DOT districts and regions can be coordinated through the state and regional Traffic Management Centers.

- **Sharing and Requisitioning of ITS Resources.** Develop plans to allow State DOT districts or regions to supply equipment that is normally operated locally, but which can be used elsewhere temporarily to support mass evacuations or other emergency operations.

- **Traffic Signal System Coordination and Integration.** Develop plans and capabilities for coordinating and remotely controlling traffic signal systems in the event of a mass evacuation or other emergency. A lot of coordination is required between the state, counties, and cities for this to happen.

- **Coordination with Local Jurisdictions for Sharing of ITS Resources.** Contact cities and counties to identify ITS equipment that is owned and operated by the local jurisdictions. Some local jurisdictions own and operate DMS, HAR, CCTV, and other ITS resources that may be used to support mass evacuations.

- **Internet Website Information Access.** Provide Internet website links to available emergency evacuation plans and other information that will prepare the public and provide assistance in the event of a disaster.

# APPENDIX D: STATE EMERGENCY MANAGEMENT AGENCIES AND EMERGENCY OPERATIONS PLANS

## Table D-1: State Emergency Management Agencies and Contacts

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| Alabama | Alabama Emergency Management Agency (www.ema.alabama.gov) | Alabama Emergency Management Agency<br>5898 County Road 41<br>P.O. Drawer 2160<br>Clanton, Alabama 35046-2160<br>Phone: (205) 280-2200<br>Fax: (205) 280-2495 |
| Alaska | Alaska Division of Emergency Services (www.ak-prepared.com) | PO Box 5750<br>Fort Richardson, AK 99505-5750<br>(907) 428-7000 (800)-478-2337<br>Fax: (907) 428-7009<br>emer_svcs@ak-prepared.com |
| Arizona | Arizona Division of Emergency Management (www.dem.state.az.us) | Arizona Division of Emergency Management<br>5636 E. McDowell Road<br>Phoenix, AZ 85008<br>(602) 244-0504 or<br>1-800-411-2336 |
| Arkansas | Arkansas Department of Emergency Management (www.adem.state.ar.us) | Arkansas Department of Emergency Management<br>P. O. Box 758<br>Conway, AR 72033-0758<br>Main switchboard:.. (501) 730-9750<br>Fax:.. (501) 730-9754<br>Email.....Webmasters@adem.state.ar.us |
| California | California Office of Emergency Services (www.oes.ca.gov) | Governor's Office of Emergency Services<br>P.O. Box 419047<br>Rancho Cordova, CA 95741-9047 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | | Warning Center (24 hour)..... (916) 845-8911<br>Facsimile (FAX) Number..... (916) 845-8910 |
| Colorado | Colorado Office of Emergency Management<br>(www.dlg.oem2.state.co.us/oem/oemindex.htm) | 15075 South Golden Road<br>Golden, Colorado 80401-3979<br>Office: 303 273-1622<br>Fax: 303 273-1795 |
| Connecticut | Connecticut Office of Emergency Management | |
| Delaware | Delaware Emergency Management Agency<br>(www.state.de.us/dema/index.htm) | 165 Brick Store Landing Road<br>Smyrna, DE 19977<br>(302) 659-DEMA (3362) or (877) SAY-DEMA<br>Fax (302) 659-6855 |
| Florida | Florida Division of Emergency Management<br>(www.floridadisaster.org) | Division of Emergency Management<br>2555 Shumard Oak Boulevard<br>Tallahassee, Florida 32399-2100<br>(850) 413-9900 |
| Georgia | Georgia Emergency Management Agency<br>(www2.state.ga.us/GEMA/) | Georgia Emergency Management Agency<br>P.O. Box 18055<br>Atlanta, GA 30316-0055<br>Tel: (404) 635-7000<br>1-800-TRY-GEMA (In Georgia)<br>Fax: (404) 635-7205 |
| Hawaii | Hawaii State Civil Defense<br>(www.scd.state.hi.us/) | Hawaii State Civil Defense<br>3949 Diamond Head Rd<br>Honolulu, HI 96816<br>(808) 733-4300<br>scdwebmaster@scd.state.hi.us |
| Idaho | Idaho Bureau of Disaster Services | Bureau of Disaster Services |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | (www2.state.id.us/bds/index.htm) | 4040 Guard Street<br>Boise, Idaho 83705-5004<br>(208) 334-3460 |
| Illinois | Illinois Emergency Management Agency<br>(www.state.il.us/iema/) | Illinois Emergency Management Agency<br>110 East Adams Street<br>Springfield, Illinois 62701<br>24-Hour Response (800) 782-7860<br>24-Hour Fax (217) 782-2589 |
| Indiana | Indiana Emergency Management Agency<br>(www.ai.org/sema/index.html) | State Emergency Management Agency<br>402 West Washington Street, Room W-246<br>Indianapolis, IN 46204-2739<br>Telephone: 317-232-1413<br>Fax: 317-232-0146 |
| Iowa | Iowa Emergency Management Division<br>(www.state.ia.us/government/dpd/emd/index.html) | Iowa Emergency Management Division<br>Hoover State Office Building, Level A<br>Des Moines, IA 50319<br>(515)281-3231 |
| Kansas | Kansas Division of Emergency Management<br>(www.accesskansas.org/kdem/) | Division of Emergency Management<br>2800 SW Topeka Blvd.<br>Topeka, KS 66611-1287<br>Phone: (785) 274-1409<br>Fax: (785) 274-1426 |
| Kentucky | Kentucky Division of Emergency Management<br>(kyem.dma.state.ky.us/) | Kentucky Division of Emergency Management<br>100 Minuteman Parkway<br>Frankfort KY, 40601<br>(502) 564-7815 or (800) 255-2587<br>Fax (502) 607-1614 |
| Louisiana | Louisiana Office of Emergency Preparedness | Office of Emergency Preparedness |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | (www.loep.state.la.us/) | 7667 Independence Boulevard<br>Baton Rouge, LA 70806<br>Phone: (225) 925-7500<br>Fax: (225) 925-7501 |
| Maine | Maine Emergency Management Agency<br>(www.state.me.us/mema/) | Address not available.<br>Phone: (207) 626-4503<br>Fax: (207) 626-4499<br>Arthur W. Cleaves, Director<br>Art.w.cleaves@maine.gov |
| Massachusetts | Massachusetts Emergency Management Agency<br>(www.mass.gov/portal/index.jsp?pageID=aghome&agid=mema) | Massachusetts Emergency Management Agency<br>400 Worcester Road<br>Framingham, MA 01702-5399<br>Tel: (508) 820-2000 |
| Maryland | Maryland Emergency Management Agency<br>(http://www.mema.state.md.us/) | MEMA<br>Camp Fretterd Military Reservation<br>5401 Rue Saint Lo Drive<br>Reisterstown, MD 21136<br>1-877-MEMA-USA |
| Michigan | Michigan Emergency Management Division<br>(www.michigan.gov/msp/0,1607,7-123-1593_3507---,00.html) | Michigan Emergency Management Division<br>Michigan State Police Headquarters<br>714 S. Harrison Road<br>East Lansing, Michigan 48823<br>Information: (517) 332-2521 |
| Minnesota | Minnesota Division of Emergency Management<br>(www.dps.state.mn.us/emermgt/#) | Minnesota Division of Homeland Security and Emergency Management<br>Emergency Response Commission<br>444 Cedar Street, Suite 223<br>Saint Paul, MN 55101-6223<br>DEM phone: (651) 296-2233 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | | ERC phone: (651) 297-7372<br>Fax: (651) 296-0459<br>E-mail: dps.dem@state.mn.us |
| Missouri | Missouri State Emergency Management Agency<br>(www.sema.state.mo.us/semapage.htm) | State of Missouri<br>State Emergency Management Agency<br>P.O. Box 116<br>Jefferson City, Missouri 65102<br>Jerry B. Uhlmann, Director<br>Phone: (573) 526-9101 |
| Mississippi | Mississippi Emergency Management Agency<br>(www.msema.org/index.htm) | Mississippi Emergency Management Agency<br>P.O Box 4501<br>Jackson, MS 39296-4501<br><br>1410 Riverside Drive<br>Jackson, MS 39202-1297<br>Phone: 601-352-9100 (24 Hr)<br>Fax: 601-352-8314 |
| Montana | Montana Disaster and Emergency Services<br>(www.discoveringmontana.com/dma/des/) | Disaster and Emergency Services<br>P.O. Box 4789 - 1900 Williams Street<br>Helena, Montana 59604-4789<br>Phone: 841-3911<br>Fax: 841-3965 |
| Nebraska | Nebraska Emergency Management<br>(www.nebema.org/) | The Nebraska Emergency Management Agency<br>1300 Military Road<br>Lincoln, Nebraska 68508<br>(402) 471-7421<br>Fax - (402) 471-7433 |
| New Hampshire | New Hampshire Office of Emergency Management<br>(www.nhoem.state.nh.us/) | N.H. Department of Safety<br>Division of Fire Safety & Emergency Management |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | | Bureau of Emergency Management<br>10 Hazen Drive<br>Concord, New Hampshire 03305 |
| New Jersey | New Jersey Emergency Management Section<br>(www.state.nj.us/njoem/) | NJOEM<br>NJ State Police Division Headquarters<br>P.O. Box 7058<br>West Trenton, New Jersey 08628<br>Phone: (609) 882-2000 |
| Nevada | Nevada Division of Emergency Management<br>(www.dem.state.nv.us/index.htm) | Nevada Division of Emergency Management<br>2525 South Carson Street<br>Carson City , NV 89701<br>(775) 687-4240<br>Fax (775) 687-6788 |
| North Carolina | North Carolina Emergency Management<br>(www.dem.dcc.state.nc.us/) | |
| North Dakota | North Dakota Division of Emergency Management<br>(www.state.nd.us/dem/) | North Dakota Division of Emergency Management<br>PO Box 5511<br>Bismarck, ND 58506<br>(701) 328-8100 - phone<br>(701) 328-8181 – fax |
| New Mexico | State of New Mexico Department of Public Safety<br>(www.dps.nm.org/) | Mailing Address:<br>State of New Mexico Department of Public Safety<br>PO Box 1628<br>Santa Fe, New Mexico 87504<br><br>Physical Address:<br>4491 Cerrillos Road<br>Santa Fe, New Mexico 87504<br>Phone: (505) 827-9000 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| New York | New York State Emergency Management Office (www.nysemo.state.ny.us/) | State Emergency Management Office<br>1220 Washington Avenue<br>Suite 101, Building 22<br>Albany, NY 12226-2251<br>Email: postmaster@semo.state.ny.us<br>Emergency Coordination Center Staffed 24 Hrs<br>(518) 457-2200 |
| Ohio | Ohio Emergency Management Agency (www.state.oh.us/odps/division/ema/) | Ohio Department of Public Safety<br>Ohio Emergency Management Agency<br>2855 West Dublin-Granville Road<br>Columbus, Ohio 43235-2206<br>General Information: (614) 889-7150<br>Fax Number: (614) 889-7183 |
| Oklahoma | Oklahoma Department of Civil Emergency Management (www.odcem.state.ok.us/) | Oklahoma Department of Civil Emergency Management<br>P.O. Box 53365<br>Oklahoma City, Oklahoma 73152-3365<br>Phone: 405-521-2481<br>Fax: 405-521-4053<br><br>Physical Address:<br>2401 North Lincoln Blvd, Suite C51 |
| Oregon | Oregon Emergency Management (www.osp.state.or.us/oem/) | Mailing Address:<br>Oregon Emergency Management<br>P.O. Box 14370<br>Salem, Oregon 97309-5062<br>(503) 378-2911<br>Fax: (503) 373-7857<br><br>Physical Address:<br>3225 State St,<br>Salem, Oregon 97301 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | | |
| Pennsylvania | Pennsylvania Emergency Management Agency (www.pema.state.pa.us/) | Pennsylvania Emergency Management Agency<br>2605 Interstate Drive<br>Harrisburg, PA 17110-9364<br>General Number: (717) 651-2007<br>Fax: (717) 651-2040 |
| Rhode Island | Rhode Island Emergency Management Agency (www.state.ri.us/riema/) | Rhode Island Emergency Management Agency<br>645 New London Avenue<br>Cranston, RI 02920<br>(401) 946 – 9996 |
| South Carolina | South Carolina Emergency Management Division (www.state.sc.us/emd/) | South Carolina Emergency Management Division<br>1100 Fish Hatchery Rd.<br>West Columbia, SC 29172<br>Phone: 803-737-8500 |
| South Dakota | South Dakota Office of Emergency Management (www.state.sd.us/military/sddem.htm) | South Dakota Division of Emergency Management<br>118 West Capitol Avenue<br>Pierre, SD 57501<br>Phone: (605) 773-3231<br>Fax: (605) 773-3580 |
| Tennessee | Tennessee Emergency Management Agency (www.tnema.org/) | Tennessee Emergency Management Agency<br>3041 Sidco Drive<br>Nashville, TN 37204<br>Phone: (615) 741-0001<br>Fax: (615) 242-9635 |
| Texas | Texas Division of Emergency Management (www.txdps.state.tx.us/dem/) | Physical Address:<br>Texas Department of Public Safety<br>Emergency Management Service<br>5805 North Lamar Blvd.<br>Austin, Texas 78752-4422 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| | | Mailing Address:<br>Texas Department of Public Safety<br>Emergency Management Service<br>P O Box 4087<br>Austin, Texas 78773-0001<br>Phone: (512) 424-2138<br>Fax: (512) 424-2444 |
| Utah | Utah Division of Comprehensive Emergency Management (cem.utah.gov/) | Division of Emergency Services and Homeland Security<br>Rm. 1110, State Office Bldg.<br>Salt Lake City, UT 84114<br>1-801-538-3400<br>Toll Free 1-800-SL-FAULT<br>Fax: 1-801-538-3770 |
| Vermont | Vermont Emergency Management (www.dps.state.vt.us/vem/index.htm) | Vermont Emergency Management<br>103 South Main Street<br>Waterbury, VT 05671-2101<br>(802) 244-8721 or 1-800-347-0488 |
| Virginia | Virginia Department of Emergency Management (www.vdem.state.va.us/) | Virginia Department of Emergency Management<br>Public Affairs Office<br>10501 Trade Court<br>Richmond, VA 23236<br>Phone: (804) 897-6510<br>E-Mail: pio@vdem.state.va.us |
| Washington | Washington Emergency Management Division (emd.wa.gov/) | Washington State Military Department<br>Emergency Management Division<br>Building 20, M/S: TA-20<br>Camp Murray, WA 98430-5122<br>General Administrative Number: 800-562-6108 |

| State | State Emergency Management Agency | Contact Information |
|---|---|---|
| Washington D.C. | Washington D.C. Emergency Management (dcema.dc.gov/main.shtm) | Washington D.C. Emergency Management Agency<br>2000 14th Street NW, 8th Floor<br>Washington, DC 20009<br>Phone: (202) 727-6161 |
| Wyoming | Wyoming Office of Homeland Security<br>(formerly the Wyoming Emergency Management Agency)<br>(wyohomelandsecurity.state.wy.us/) | Wyoming Office of Homeland Security<br>5500 Bishop Blvd<br>Cheyenne, Wyoming 82009<br>(307) 777-HOME (4663)<br>Fax (307) 635-6017 |
| West Virginia | West Virginia Office of Emergency Services<br>(www.state.wv.us/wvoes/) | West Virginia Office of Emergency Services<br>Building 1, Room EB-80<br>1900 Kanawha Blvd., East<br>Charleston, WV 25305-0360<br>Phone: 304-558-5380<br>Steven S. Kappa, WVOES Director<br>Email: skappa1@wvoes.state.wv.us |
| Wisconsin | Wisconsin Emergency Management<br>(emergencymanagement.wi.gov/) | Wisconsin Emergency Management<br>Department of Military Affairs<br>2400 Wright Street<br>PO Box 7865<br>Madison WI 53707-7865<br>Phone: (608) 242-3232<br>Fax: (608)242-3247 |

**Table D-2: State Emergency Management Operations Plans**

| State | Link to State Emergency Operations Plan |
|---|---|
| Alabama | State of Alabama Emergency Operations Plan<br>http://www.ema.alabama.gov/images/docs/EOP.doc |
| Alaska | Alaska Emergency Operations Plan<br>http://www.ak-prepared.com/plans/acrobat_docs/eopbroch.pdf |
| Arizona | State of Arizona Emergency Response and Recovery Plan<br>http://www.dem.state.az.us/serrp/<br><br>ESF #1: Transportation Infrastructure Annex<br>http://www.dem.state.az.us/serrp/esf01.pdf<br><br>ESF #15: Evacuation Annex<br>http://www.dem.state.az.us/serrp/esf15.pdf<br><br>Arizona DOT Transportation Security and Continuity Plan |
| Arkansas | State of Arkansas Emergency Operations Plan<br>http://www.adem.state.ar.us/state_of_arkansas_emergency_oper.htm<br><br>Annex J – Highway and Transportation<br>http://www.adem.state.ar.us/StateEOP/Annex%20J%20Highway%20and%20Transportation.doc<br>Appendix 1 – Emergency Highway Traffic Regulation<br>http://www.adem.state.ar.us/StateEOP/Appendix%20J1%20Emergency%20Highway%20Traffic%20Regulations.doc<br>Appendix 2 – Emergency Action Plan – Bobby Hopper Tunnel<br>http://www.adem.state.ar.us/StateEOP/Appendix%20J2%20Tunnel%20Emergency%20Action%20Plan.doc |
| California | California Emergency Plan<br>http://www.oes.ca.gov/OEShomeP.nsf/All/CA+Emergency+Plan/$file/CEP.pdf |
| Colorado | Colorado State Emergency Operations Plan |

| State | Link to State Emergency Operations Plan |
|---|---|
| | www.dola.state.co.us/oem/operations/plan/SEOP2003/table.htm |
| Connecticut | |
| Delaware | Not available through the website. |
| Florida | State of Florida Comprehensive Emergency Management Plan<br>http://floridadisaster.org/bpr/Projects/CEMP%20Online/cemp2000.htm |
| Georgia | Not available through the website. |
| Hawaii | Not available through the website. |
| Idaho | Idaho Emergency Operations Plan<br>http://www2.state.id.us/bds/Library/idahopbasicplan.pdf |
| Illinois | Not available through the website. |
| Indiana | Indiana Comprehensive Emergency Management Plan<br>http://www.ai.org/sema/emerg_mgt/cemp.html |
| Iowa | Homeland Security and Emergency Management Division Strategic Plan<br>http://www.state.ia.us/government/dpd/emd/ResourceRoom/StratPlan03.pdf |
| Kansas | Kansas Planning Standards<br>http://www.accesskansas.org/kdem/kpstableof.htm |
| | Kansas City Comprehensive Emergency Operations Plan<br>http://www.kcmo.org/manager/oem/basicplan.pdf |
| Kentucky | Kentucky Emergency Operations Plan<br>http://kyem.dma.state.ky.us/KY%20EOP/tableofcontents.htm |
| Louisiana | Louisiana 2001 Emergency Operations Plan<br>http://www.loep.state.la.us/Plans/stateeop2001.pdf |

| State | Link to State Emergency Operations Plan |
|---|---|
| | |
| | Emergency Operations Plan Supplement B1: Southwest Louisiana Hurricane Evacuation and Sheltering Plan<br>http://www.loep.state.la.us/Plans/EOPSupplement1b.pdf |
| Maine | Not available through the website. |
| Massachusetts | Massachusetts Comprehensive Emergency Management Plan<br>http://www.mass.gov/agency/documents/mema/1102-StateCEMPlan.doc |
| Maryland | Not available through the website. |
| Michigan | Not available through the website. |
| Minnesota | For security reasons, the MEOP has been removed from our web site. If you would like a copy of the MEOP, please send a letter, preferably on company letterhead requesting a copy. Please describe who you are and why you are requesting the plan. Send your request to:<br><br>ATTN: Request for MEOP<br>Minnesota Division Emergency Management<br>444 Cedar Street, Suite 223<br>St. Paul, MN 55101-6223 |
| Missouri | State of Missouri Emergency Operations Plan<br>http://www.sema.state.mo.us/seoppage.htm |
| Mississippi | No available through the website. |
| Montana | Not available through the website. |
| Nebraska | State of Nebraska Emergency Operations Plan<br>http://www.nebema.org/seop.html.pdf<br><br>Emergency Highway Traffic Regulation Plan<br>http://www.nebema.org/hwypln.html |

| State | Link to State Emergency Operations Plan |
|---|---|
| | |
| New Hampshire | New Hampshire State Emergency Operations Plan<br>http://www.nhoem.state.nh.us/Planning/contents.shtm |
| New Jersey | Not available through the website. |
| Nevada | State of Nevada Comprehensive Emergency Management Plan<br>http://www.dem.state.nv.us/STATE%20OF%20NEVADACOMPREHENSIVE%20EMERGENCYMANAGEMENT%20PLANState.pdf |
| North Carolina | Not available through the website. |
| North Dakota | Not available through the website. |
| New Mexico | Not available through the website. |
| New York | New York State Comprehensive Emergency Management Plan<br>Available from website, but in unknown format. |
| Ohio | Ohio Emergency Operations Plan<br>http://www.state.oh.us/odps/division/ema/Ohio_EOP/Contents.pdf |
| Oklahoma | State of Oklahoma Emergency Operations Plan (EOP)<br>http://www.odcem.state.ok.us/pte/EOP2002.pdf<br>Has Appendix 1 to ESF#1 to address Evacuation specifically. |
| Oregon | State of Oregon Emergency Management Plan<br>http://www.osp.state.or.us/oem/library/plans/emp/oregon%20emp-%20volume%202%20-emergency%20operations.pdf |
| Pennsylvania | Not available through website. |
| Rhode Island | Not available through website. |

| State | Link to State Emergency Operations Plan |
|---|---|
| South Carolina | South Carolina Emergency Operations Plan<br>http://www.state.sc.us/emd/library/sceop.htm<br>Annex 1 – Transportation Services<br>http://www.state.sc.us/emd/library/eop/annex-01.pdf<br>Annex 16 – Emergency Traffic Management<br>http://www.state.sc.us/emd/library/eop/annex-16.pdf |
| South Dakota | Not available through website. |
| Tennessee | Tennessee Emergency Management Plan (TEMP)<br>Not available on the website.<br><br>**NOTE:** Because of the events of Sept. 11, 2001, the Director's Office has decided not to post the content of these plans on the agency's web site. If you need to review a copy of the documents, please contact your local emergency management office or the Tennessee Emergency Management Agency's Planning Section Chief at 615-741-0640. Authorized local government users and state Emergency Services Coordinators may view the plan online at the TEMA LocalWEB or StateWEB Web sites. |
| Texas | Texas State Emergency Management Plan<br>http://www.txdps.state.tx.us/dem/documents.htm#stateplan<br>Annex E – Evacuation<br>Annex S – Transportation |
| Utah | Not available. |
| Vermont | No statewide plan available.<br>Vermont Model Emergency Operations Plan<br>http://170.222.24.9/vem/MODEL.pdf |
| Virginia | Commonwealth of Virginia Emergency Operations Plans<br>http://www.vaemergency.com/library/eplan.cfm<br><br>Volume 5: Virginia Hurricane Emergency Response, August 2001<br>Basic Plan — Functional Annex B, Attachment 1, (3.4MB pdf) |

| State | Link to State Emergency Operations Plan |
|---|---|
| | http://www.vaemergency.com/library/eopvol5/eopvol5a1.pdf<br><br>Functional Annex C : Virginia DOT Hampton Roads Hurricane Traffic Control Plan<br>http://www.vaemergency.com/library/eopvol5/eopvol5a2.pdf<br><br>Volume 7: Virginia Department of Transportation Emergency Operations (Virginia Department of Transportation), July 2000 (Limited distribution) |
| Washington | Washington State Emergency Operations Plan<br>http://emd.wa.gov/6-rr/rr-forms-pubs/e-ops/eop/eop-idx.htm<br>Washington State Comprehensive Emergency Management Plan<br>http://emd.wa.gov/3-map/a-p/cemp/01-cemp-idx.htm |
| Washington D.C. | District of Columbia District Response Plan<br>http://dcema.dc.gov/info/drp.shtm |
| Wyoming | Not available through the website. |
| West Virginia | West Virginia Emergency Operations Plan<br>http://www.state.wv.us/wvoes/WV%20Emergency%20Operations%20Plan.htm<br>Annex E: Evacuation<br>http://www.state.wv.us/wvoes/WV%20Plan%20documents/WV%20Plan-ANNEX%20E.doc<br>Annex K: Transportation<br>http://www.state.wv.us/wvoes/WV%20Plan%20documents/WV%20Plan-ANNEX%20K.doc |
| Wisconsin | Not available. |

# APPENDIX E: NATIONAL PROGRAMS AND COMMITTEES

## Federal Highway Administration (FHWA) Emergency Management and Preparedness Program

The FHWA's Emergency Management and Preparedness (EMP) Program (http://www.ops.fhwa.dot.gov/emp/) was established under FHWA Order 1910.2B on October 21, 1997. This program was created to promote a state of readiness and to provide outreach to various state and local transportation agencies regarding emergency management and preparedness.

During emergency situations, the FHWA supports the needs of the traveling public, State and local agencies, and other Federal agencies through its emergency management and preparedness program. In order to accomplish this goal, the FHWA maintains a state of readiness that allows its staff to be prepared for and capable of responding to the effects of emergencies and natural disasters. The FHWA EMP Program addresses four major program areas:

1. Communications
2. Continuity of Government Operations
3. Natural Disaster Planning and Response
4. National Security Coordination.

One of the resources offered through the EMP Program is a training seminar titled the "Emergency Management and Preparedness Training Seminar". This training seminar provides up-to-date information reflecting the most recent developments in various Federal government emergency management programs. The course instructors include personnel from the FHWA Office of Transportation Operations and DOT's Regional Emergency Transportation Representatives.

The main topics of discussion for the seminar include:

- Roles and responsibilities of Division Office Emergency Coordinators
- Division Office reporting requirements regarding certain highway incidents and incidents related to emergencies and natural disasters
- Continuity of Operations (COOP) plan development
- The role of the Division Office regarding national security issues
- Division Office participation in the Federal Response Plan (FRP)

## Transportation Research Board (TRB) Subcommittee on Emergency Evacuation – A3B01(4)

The TRB Subcommittee on Emergency Evacuation (http://san-antonio.tamu.edu/trba3b01-4/) is concerned with all preparedness and operational issues

associated with evacuations for both natural and man-made threats. These include the full spectrum of activities including: evacuation transportation management and policy, evacuation planning and travel/behavioral analysis and forecasting, the planning and design of transportation infrastructure for evacuation; the analysis and modeling of evacuation transportation operations; evacuation traffic control and enforcement; the development, implementation and operation of ITS data acquisition and communication systems; and the use of mass-transit and other means for the movement of low-mobility individuals.
The mission of the Subcommittee is to serve as the national focal point for evacuation-related transportation issues. The subcommittee provides leadership for the cooperation and coordination of individuals and agencies. It also promotes the advancement, dissemination, and implementation of state-of-the-art methods and systems for enhancing evacuation efficiency and safety.

The TRB Subcommittee on Emergency Evacuation website has a good list of papers, presentations, and other resources from recent meetings and conferences available for download. Go to http://san-antonio.tamu.edu/trba3b01-4/Resources/resources.htm for more information.

## National Emergency Management Association (NEMA)

The National Emergency Management Association (http://www.nemaweb.org/) is the professional association of state emergency management directors. NEMA's mission is to:

- Provide national leadership and expertise in comprehensive emergency management.
- Serve as a vital emergency management information an assistance resource.
- Advance continuous improvement in emergency management through strategic partnerships, innovative programs, and collaborative policy positions.