

Disaster Response and Evacuation

USER SERVICE

An Addendum to the

ITS Program Plan

Prepared for:

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Prepared by:

National ITS Architecture Team

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PREFACE

Comments and Feedback on this User Service document are welcome.
Please contact Lee Simmons, Program Manager, National ITS Architecture
Phone: (202) 366-8048
Email: lee.simmons@fhwa.dot.gov

ITS Joint Program Office
Federal Highway Administration (HOIT)
US Department of Transportation
400 Seventh Street, SW
Washington, D.C. 20590

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1. INTRODUCTION

1.1 Overview

The surface transportation system plays a crucial role in responding to natural disasters, terrorist acts, and other catastrophic events. The Disaster Response and Evacuation (DRE) User Service uses intelligent transportation systems (ITS) to enhance the ability of the surface transportation system to respond to and recover from such disasters. The user service provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and provides more efficient, safer evacuation for the general public if needed. In addition, the transportation system includes a wealth of trained professionals and resources that constitute a portion of the disaster response. Use of ITS to prioritize, allocate, and track these personnel and resources also provides a more effective response to disasters.

All types of disasters are considered in this user service including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as terrorism, nuclear, chemical, biological, and radiological weapons attacks terrorist acts.). The basic ITS capabilities for disaster response and evacuation are essentially the same in all of these scenarios, although specific disasters do have unique characteristics (e.g., the amount of warning available, responder risks, local site management (is it a crime scene?), chances for secondary events, recovery

operations required, scope and scale of the damage).

Broad inter-agency coordination is critical in disaster scenarios, with transportation professionals performing well-defined roles in the larger context of the multi-agency response to the disaster. The user service describes the need to coordinate and integrate DRE activities within diverse organizations in order to improve the safety of the responders and the public at large, and improve the performance and effectiveness of the transportation system as a part of the overall disaster response.

1.2 Purpose

The primary purpose of the DRE User Service is to identify the transportation-related needs of the relevant stakeholders. Based on these needs, the DRE User Service describes the services that ITS should provide and the accepted disaster response operational concepts that provide the context for this user service. The DRE User Service provides a starting point to help the transportation community and other emergency responders to use technology and data communications to improve disaster planning and response performance. This extends beyond the initial response and evacuation and includes longer term recovery operations that include transportation infrastructure restoration and support for reentry of evacuees.

This DRE User Service document also provides the narrative necessary for the expansion of the National ITS Architecture. Based on the documentation of this user service, the necessary National ITS Architecture components (e.g., functional requirements, Market Packages, Architecture Flow Diagrams, Subsystems, etc.) will be developed or enhanced as appropriate in order to more fully incorporate Disaster Response and Evacuation.

The DRE User Service is closely related to the Incident Management User Service. Both user services cover the various aspects of emergency response including situation awareness and resource coordination. This user service focuses on larger scale events that require coordination outside the community/affected area, including state and possibly Federal support.

2. USER NEEDS

2.1 Overview

Every year, natural disasters including hurricanes, floods, severe winter storms, and earthquakes require an effective coordinated response by agencies at the federal, state, and local level. In addition, the events of September 11, 2001 dramatically underscored the need for effective planning and response for unprecedented terrorist acts.

A major disaster may severely damage the transportation system in the impacted area. Local transportation activities will be hampered by damaged facilities, equipment, and infrastructure, as well as disrupted communications and electrical services. At the same time, the disaster will create significant demands on the transportation system in and around the disaster area as it is used to transport:

- Outbound evacuees
- Inbound mutual aid operational resources
- Inbound state & federal operational resources
- Outbound returning mutual aid operational resources
- Inbound support shipments
- Inbound returning evacuees
- Outbound state & federal resources

This section is focused on identifying the needs of state and local transportation agencies that participate in a broader disaster response by emergency management, public safety, and many other allied agencies. The needs are defined in two subsections:

Disaster Response: The needs associated with providing an effective response to a disaster or pending disaster, using transportation assets to minimize the loss of life and damage to property, and effectively manage the surface transportation system before, during, and after the disaster.

Evacuation Coordination: The needs associated with evacuating the general public from the affected area and managing reentry. These needs address disasters that are anticipated or occur slowly (e.g., hurricanes) as well as disasters that occur rapidly, without warning, and allow little or no time for preparation or public warning (e.g., terrorist acts).

2.2 Disaster Response

The following needs are partially derived from “A Guide to Updating Highway Emergency Response Plans for Terrorist Incidents”, May 2002, developed by PB Farradyne for AASHTO. This Guide was itself developed based on the best relevant practices from State DOTs, including those that cope with major emergencies such as earthquakes and hurricanes. The user needs identified in the Guide were expanded and refined to cover all transportation agencies and all types of disasters. The user needs for Disaster Response are as follows:

Planning/Preparedness

- Coordinate plans between agencies to include identification of conflicts or dependencies among agency plans. This includes coordination of general emergency management plans, continuity of operations plans, and shorter-duration operational plans prepared during the response and recovery phases.
- Improve access to alerting systems and information regarding threat levels. This includes the Homeland Security Advisory System (HSAS) and related systems for terrorist alerts, the weather forecasts, watches, and warnings issued by the National Hurricane Center, other National Weather Service components and other weather service providers, and the various early warning systems operated by federal, state, and local emergency management agencies.

Detection

- Use surveillance systems to detect indicators of a potential disaster, a disaster that is occurring, or a disaster that has occurred. This includes, but is not limited to, environmental sensors, threat sensors (e.g., radiological, nuclear, biological, and chemical), and infrastructure monitoring sensors. Surveillance capabilities must be able to distinguish between normal every day operations or incidents and major catastrophic events.
- Transportation systems and personnel must coordinate with and alert other agencies to recognize a disaster is in progress.

Verification

- Transportation systems and personnel need to coordinate with field personnel and equipment to verify that a disaster is occurring or has occurred and communicate relevant information to all responding agencies.
- Provide assistance in determining the nature of the disaster, extent of damage, and any potential hazards. This includes sharing information collected from environmental sensors.

Availability/Survivability

- Improve operational availability of critical management, information, communications, and control systems in potential disaster scenarios.
- Transportable ITS systems could be deployed when local system operations are impacted by the disaster. These systems should be rapidly deployable, not depend upon infrastructure, and should be designed for temporary use until local systems are returned to service.

Initial Response

- Assist with evacuation of persons from immediate peril.
- Transportation personnel may be among the first on the scene. Identify those personnel and resources that would be involved in an initial response and provide these personnel with timely, accurate information on applicable biological, chemical, radiological and other hazards is necessary. It is also critical to provide personnel with the correct precautionary and protective measures that need to be implemented.

- Transport materials, personnel, and supplies in support of emergency activities. Assistance may include transporting resources from federal, state, and local agencies, or from private commercial companies.
- Assess the condition of highways, bridges, tunnels, transit facilities and services, traffic management centers, and other components of the transportation infrastructure and:
 - Close those determined to be unsafe;
 - Post signs and barricades;
 - Notify law enforcement, emergency management, and other response agency personnel;
 - Develop detour routings as appropriate;
 - Review/terminate existing work zone closures as necessary.
 - Transfer transportation control/management to alternate centers
- Assess and report impacts to airports, ports, waterways, and other transportation facilities in the disaster area.
- Support hazardous materials containment response and damage assessment.
- Receive dispersion information for nuclear, biological, or chemical attacks or other disasters involving hazardous materials, weather information for weather-related disasters, hydrographic information for floods, and other information that can be used to determine the extent of the impact area. Use this information to modify transportation management strategies, determine evacuation requirements, and inform and protect transportation agency response personnel.
- Geographic areas may need to be quickly closed when a decision is made to quarantine or lockdown a site (e.g., to protect the public from exposure to hazards in incidents involving nuclear, biological, or chemical agents). Adapt traffic control strategies and provide driver and traveler information to support the establishment and minimize the impact of a secure perimeter around a disaster area in these scenarios.
- Prioritize and/or allocate resources necessary to maintain and restore the region's transportation infrastructure.
- Avoid unnecessary duplication of resources while ensuring appropriate response.
- Provide all available and obtainable transportation resource support including:
 - Transportation equipment, e.g., transit vehicles, passenger and utility vans, trucks and/or trailers; aircraft, aircrews, and ground and operations personnel for transportation of emergency officials and emergency response personnel;
 - Transportation facilities, e.g., vehicle repair facilities, equipment, and personnel; fleet parking and storage areas to be used for staging, parking, and storage of emergency vehicles; motor pool and vehicle service facilities and personnel for refueling and servicing emergency vehicles;
 - Transportation personnel, identifying personnel resources and special certifications/skills as applicable.
 - Vehicular traffic management and control signs and devices of various types
 - Vehicular traffic flow information from permanent and temporary monitoring sites.
- Assign personnel to emergency operations center(s) to coordinate with and assist public safety agencies and other agencies involved in disaster response and recovery efforts.
- Support communications between transportation personnel and their families and loved ones. Transportation agencies have found that their employees need to know that their families are safe so they can focus on their assigned tasks in an emergency.

System Surveillance and Management

- Monitor and control transportation systems and infrastructure, and coordinate transportation activities with other agencies (local, state, and Federal).
- Monitor and coordinate the closure of high-risk facilities such as bridges, tunnels, or flood and landslide prone sections of roadway.
- Assist state and local government entities in determining the most viable available transportation networks to, from, and within the disaster area and regulate the use of those networks for the movement of people, equipment, supplies, records, etc.
- Establish and manage emergency access. Identify specific traffic management actions to maintain a smooth flow for transport of emergency resources, including traffic control points, barricade plans, and potential one-way/reverse lane operations.
- Provide any highway clearances and waivers required to expedite the transportation of high-priority materials and the evacuation of personnel during periods of declared emergencies.

Critical Service Restoration

- Coordinate roadway clearance activities. Remove and/or assist in debris removal and disposal, as appropriate, to provide emergency access to disaster areas or to assist in eliminating health and safety problems associated with debris.
- Prioritize recovery operations and perform emergency repairs in the disaster area. Coordinate with other jurisdictions that are managing, supporting, or are impacted by the repair activities.
- Assist in the design and implementation of alternate transportation services, such as transit systems, to temporarily replace transport capacity lost to disaster damage.
- Coordinate with efforts to restore utilities. Issue permits required to repair/restore utility lines or pipes. Provide needed equipment and/or technical assistance to support restoration of critical public works.

Agency Communications

- Share disaster response and evacuation information among all allied agencies, including transportation (e.g., traffic operations, maintenance, transit) and non-transportation (e.g., public safety and emergency management) agencies.
- Coordinate traffic control strategies supporting emergency response across jurisdictions.
- Coordinate transit service changes across jurisdictions.
- Integrate with existing Incident Command System practices of public safety agencies.

Public Information

- Provide information on road closures, infrastructure damage, debris removal, and restoration activities related to highway systems and facilities.
- Provide real-time traffic information and traffic reports for roads within the affected area or on roads leading into the area.
- Provide updated transit service information for the disaster area.
- Assign appropriate personnel at key disaster sites to oversee operations and to provide consistent, verified public information to emergency management agencies, public information officers, and the media.

Special Needs Associated with Terrorist Attacks

- Basic training and information is needed so that transportation personnel can identify possible signs and consequences of terrorist incidents and take appropriate actions including the consideration of their own safety and initial management of the area as a potential crime scene.
- Response resources may be required far beyond those originally anticipated, especially where a weapon of mass destruction (WMD) is used that initially leaves few distinguishing marks. Transportation response resources need to be available but may also need to be protected as the consequences spread.

2.3 Evacuation Coordination

The following needs are based on a study of the hurricane evacuation performed for Hurricane Floyd in 1999. This study was documented in "I-4 ITS Corridor Framework Phase II Working Paper #1: Evacuation Coordination User Service Development", December 1999, prepared by PBS&J for Florida DOT. Over 3 million people were evacuated as a result of Hurricane Floyd, which skirted the east coast of Florida and made landfall in South Carolina. This evacuation resulted in overloading of evacuation routes, causing extreme delays and exposing evacuees to personal risk. In South Carolina, in-state trips took six times longer than normal. In Florida, Interstate 10 motorists traveling out of Jacksonville reported traveling just 35 miles in seven hours. Citizens and government officials expressed their dissatisfaction with the management of the evacuation process and the lack of information regarding travel conditions and services along the routes and at evacuation destinations.

The needs identified by this analysis were reviewed, revised, and extended to ensure that evacuations associated with all types of disasters are addressed. Hurricanes are anticipated and occur slowly, providing time for adequate warning and an orderly, well-planned evacuation. Other types of disasters may occur rapidly, without warning, and allow little or

no time for evacuation preparation or public warning. Whether an evacuation is pre-planned and directed by local government, or is a spontaneous evacuation by a portion of the population, many agencies will be involved and must coordinate. The identified needs for evacuation are:

Planning/Preparedness

- Develop evacuation plans at the county, state, and multi-state levels. Data must be collected and archived for the development of these plans and to ensure the validation of the models used in developing the plans. The data shall include items such as traffic flow, speed, occupancy, traveler behavior, and a log of events.
- Coordinate evacuation routes across jurisdictional boundaries. Examine and modify evacuation route designs if necessary to accommodate evacuation management strategies. For example, reversible lane operations and the use of shoulders as an additional lane might require modifications to interchange designs.
- Coordinate current work zone activities so they do not all impact traffic at the same time for parallel routes in case of a terrorist incident or other incident with no forewarning.
- Develop service restoration plans for the transportation system. Where evacuation is not feasible, such plans must allow for immediate transport of critical supplies to support shelter-in-place strategies.
- Reduce the time required for implementation and setup of various evacuation strategies due to the short time period available for evacuation in some types of disasters. For example, creation of a modeling/simulation tool to assist in the development (in near real-time) of evacuation plans. Also, lane reversal might not be a feasible alternative for disasters with little or no forewarning if it takes a long time to setup the operation.
- Improve management of the evacuation process. Strategies to reduce the demand must be considered including identifying shelters near evacuation origins, increasing the use of transit, and evacuating in shifts rather than all at once.
- Improve management of evacuation routes to accommodate evacuation for events of various severities ranging from small localized flood evacuations through large-scale weapons of mass destruction (WMD) evacuations.
- Plan for the evacuation of those with special needs. This includes the elderly and handicapped as well as hospitals and other institutions with resident populations. Transit plays a critical and unique role in meeting this need.

Evacuation Management

- Efficiently utilize the available capacity to reduce the potentials for operational failures during evacuation. For example, review and terminate work zone closures where possible along the evacuation routes to maximize capacity of these routes and use transit services to the extent possible to optimize the use of available capacity. Operational failures can cause gridlock, long hours of delays, vehicle breakdowns, frustrated travelers, and significant risks to the evacuees.
- Improve management of the local streets that provide access to and from evacuation routes. The capacity of these streets should be increased and efficiently utilized to prevent creating bottlenecks at the access points. In recent evacuation operations, queues from surface streets extended to limited access facilities resulting in a decrease in the capacities of evacuation routes.
- Improve the efficiency of detecting, responding to, and clearing incidents on evacuation routes. The drop in evacuation route capacities due to incidents could result in the failure of the evacuation process even if the analysis performed during evacuation planning indicates that the routes can accommodate the traffic in non-incident conditions.
- Improve the warning and preparation information provided to evacuation destinations. Evacuee traffic information can be used by transportation management at the destination to pre-configure their systems to anticipate and better handle the increased demand.
- Provide shelter-in-place information and utilize transportation resources to expedite relief to the endangered population in cases where evacuation is not possible because little/no warning is provided and transportation resources are limited or severely impacted.
- Maintain emergency services access to the disaster area and the evacuation routes themselves by providing for and managing emergency service access routes in the opposite direction and/or across the major evacuation routes where necessary.
- Improve management of evacuation termination under emergency circumstances. This includes decision support to determine when to terminate an evacuation, communication of salient emergency public information to

motorists, and roadway management including interchange shutdown, traffic diversion and the opening of "refuges of last resort" or other safe havens.

- Ensure the efficient, safe and secure reentry of the evacuees to their counties. This includes preventing unauthorized people from entering a disaster area, clearing dangerous debris, and restoring electricity. The reentry decisions must balance safety and security with the public's desire to return home.

Public Information

- A comprehensive public information strategy is necessary. Coordinate evacuation public information between emergency management, transportation, and other allied agencies so that consistent, accurate information is provided to evacuees.
- Provide real-time information to evacuees regarding:
 - The services available at the evacuation destinations and along the evacuation routes. In recent evacuation operations, motorists were frustrated with the lack of information regarding hotel rooms, gas, bathrooms, restaurants, and shelters. In addition, evacuees were not informed about accommodations for people with special needs (e.g., disabled, elderly and pets/livestock).
 - The evacuation route conditions such as the expected travel time to their destinations, incidents, road closures, lane closures, weather, the route to a certain destination, and the availability of alternative routes. In recent evacuation operations, motorists were left without information regarding what to expect on their trips while waiting for hours in traffic.
 - Information regarding conditions in their home counties. This has been a problem because the media at evacuation destinations is not normally interested in broadcasting information about counties that are not in their coverage areas.
 - Information regarding available transit services supporting evacuation.
- Provide alternative evacuation destinations to evacuees that request this information. In recent evacuations, many motorists left their homes without knowing where they are going.
- Share current and forecast evacuation information between transportation, emergency management, law enforcement, and other allied agencies at the county, multi-county, and multi-state levels. This coordination must include the evacuated counties (evacuation origins), host and response counties (evacuation destinations and counties that provide assistance in the evacuation process) and counties on evacuation routes. Counties must work as a team during evacuation. Multi-state response is also important to ensure that evacuees from one state do not compound evacuation problems in another state.
- Establish policies, controls, and interfaces that support the lifting of the toll and transit fees. During recent evacuations, delays in lifting the toll fees in South Carolina increased the dissatisfaction of the evacuees.

Special Needs Associated with Terrorist Attacks

- Develop evacuation plans that provide alternative routing for the possibility that a terrorist attack has rendered critical infrastructure or a quarantined area unavailable for evacuation.
- Provide evacuation planning for high visibility events (e.g., Olympics) where there may be a great influx of visitors not normally accounted for in disaster evacuation scenarios.
- Provide for evacuation contingencies with respect to multiple, and/or clustered disasters impacting evacuation in a relatively short timeframe

3. SERVICE DESCRIPTION

3.1 Overview

The following major ITS functions support disaster response and evacuation, addressing the user needs identified in Chapter 2. Each major function (in bold) is further explained with more detailed descriptions and narrative text.

3.2 Disaster Response

Coordinate Response Plans. Emergency response strategies and plans are developed and coordinated in advance of a disaster. Operational plans are developed and coordinated across agencies and jurisdictions in advance of a disaster and during the disaster response/recovery.

Monitor Alert Levels. As the likelihood of a natural disaster or terrorist attack increases, plans are executed, systems are brought on-line, resources are staged, and personnel assignments are made to increase readiness. Information from alerting and advisory systems such as the Homeland Security Advisory System and the National Hurricane Center are monitored and the transportation system is prepared to respond. For example, Emergency Operations Centers may be activated and transportation personnel assigned to those centers.

Detect and Verify Emergency. Although they are not a primary point of detection, transportation agencies may be among the first to identify and report a disaster due to the broad distribution of transportation personnel and surveillance systems. Once detected, the system must verify the emergency, identify potential hazards, define the impact area, and notify public safety and other allied response agencies. Conversely, an emergency notification system is used to alert transportation agencies to disasters that have been identified by other means.

Assess Infrastructure Status. The impact of the disaster on transportation infrastructure and associated ITS systems must be assessed using asset management systems, surveillance systems and sensors, built-in diagnostics of the systems themselves, on-scene reports, and inspections. Damage is assessed and detours or alternative transportation resources are identified.

Coordinate Response. Information is shared with the emergency operations centers and incident command during the course of the disaster response. This coordination continues as the initial response is completed and transitions into recovery. The transportation system provides information on egress and ingress routes for the scene and staging areas, routes for specific origins and destinations on request, transportation system condition information including video surveillance information, and information on transportation resources and personnel that are available, en-route, or deployed at the scene. Transportation resources include construction and maintenance equipment used at the scene and transit vehicles that may be used to move emergency response personnel to and from the scene. The public safety systems provide current situation information and make requests for resources and information.

Critical Service Restoration. Critical transportation and utility services damaged by the disaster are restored. Emergency maintenance and construction activities are planned, coordinated, and initiated. Emergency access to right-of-way, permits, and needed equipment and resources are coordinated as necessary to support restoration of critical public works (e.g., utilities).

Manage Area Transportation. Depending on the nature of the emergency and the status of the infrastructure, closures and detours may be implemented and transit schedules may be modified. Closures may exclude all vehicles except for emergency vehicles or other special vehicles. Special traffic control strategies to manage traffic in the vicinity of the disaster may be implemented to limit and/or manage traffic in the area.

Provide Traveler Information. The transportation system will coordinate with public information offices of the allied emergency response agencies in providing traveler information for the disaster scene and surrounding area. Information provided would include information on special traffic restrictions, detours and closures, special transit schedules, and traffic conditions surrounding the scene. Information on care facilities, shelters, and evacuation information is also provided, as covered in the next section.

3.3 Evacuation Coordination

Evacuation Planning Support. Federal, state, and local transportation, emergency, and law enforcement agencies can be involved in evacuation planning, depending on the scale of the disaster and the evacuation. The evacuation plan may evacuate the affected population in shifts, use more than one evacuation route, maximize use of transit, and include several evacuation destinations to spread demand and thereby expedite the evacuation, where possible. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, or along the evacuation route must be informed of the plan.

Evacuation Traveler Information. The public must be provided with real-time evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary. Once the decision is made to evacuate, evacuation times, one or more evacuation destinations, the evacuation route (tailored for the evacuee),

available transit services, expected travel times, expected evacuation durations, and other information are provided that are necessary for an orderly evacuation. This function will also provide guidance for returning to evacuated areas, information regarding clean-up, and other pertinent information to be distributed from Federal, State, and Local Agencies.

Information on the services (shelters, medical services, hotels, restaurants, gas stations) along the evacuation route and at the evacuation destination are also important to the evacuee and should include real-time information on availability and address special needs (disabilities, the elderly, pets/livestock, etc.). Real-time information on traffic conditions, closures, road and weather conditions, and incident information are also provided along with information on alternative routes so that evacuees can better anticipate their travel times and select alternate routes where available.

Evacuation Traffic Management. Special traffic control strategies are implemented to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Incident management on the evacuation route is paramount with critical need for service patrols to minimize the traffic flow impact of minor incidents. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Toll and transit agencies must also be notified so that tolls and fares are eliminated during an evacuation. Traffic control strategies are also implemented to facilitate reentry to the evacuated area.

Evacuation Resource Sharing. An effective information sharing service is implemented that keeps all agencies in all affected jurisdictions apprised of the evacuation plan and evacuation status. Resources are coordinated through the same information sharing capability. Resource requirements are accurately forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times. Current status of all resources are tracked so that resource status is known at all times.

4. OPERATIONAL CONCEPT

4.1 Overview

By definition, the disasters that are addressed by this user service are of a scale that overwhelms local agency resources and require state and possibly federal support. The operational concepts and the associated roles and responsibilities of federal, state, and local transportation agencies in such disasters are defined at the federal level in a Federal Response Plan (FRP) and for each state in emergency management plan(s). These broad multi-agency plans are often supplemented by Emergency Operations Plans that are specific to a particular transportation agency. Many of these plans have been or are in the process of being revised to reflect the increased awareness and focus on terrorist threats as a result of the events of September 11th, 2001.

This section distills the specific concepts of operations that are defined in these plans into typical high-level transportation-related operational concepts that provide a context for the user service. The presentation begins with a local operational concept and then moves to state, and finally Federal level operational concepts, consistent with the disaster response itself which frequently begins with a local response and then escalates up to include state and federal agencies. The operational concepts that are identified are only representative and should not be prescribed in the architecture. The local, state, and federal emergency management and operations plans are the authoritative source for detailed concepts of operations for disaster response and evacuation.

4.2 Situation

4.2.1 Disaster Condition

A major disaster may severely damage the transportation system in the impacted area. Local transportation activities will be hampered by damaged facilities, equipment, and infrastructure, as well as disrupted communications and electrical services. At the same time, the disaster will create significant demands for national, regional, and local transportation of resources to provide for relief and recovery. A coordinated effort by federal, state, and local agencies may be required to meet these demands for movement of essential resources, as well as for clearing and restoration of

the transportation system.

Large scale disasters may also force the evacuation of at-risk areas. Whether an evacuation is pre-planned and directed by local government, or is a spontaneous evacuation by a portion of the population, many agencies will be involved and must coordinate. Some disasters are anticipated or occur slowly, providing time for adequate warning and an orderly, well-planned evacuation. Other disasters occur rapidly, without warning, and allow little or no time for evacuation, preparation or public warning.

4.2.2 Assumptions

1. The transportation infrastructure will sustain damage, limiting access to the disaster area. Access will improve as routes are cleared and repaired or as detours are built.
2. The demand on the transportation system will exceed locally controlled or accessible capacity, demanding assistance from the state, and possibly the Federal Government.
3. Infrastructure damage and communications/electrical service disruptions will inhibit efficient coordination of transportation support during the immediate post-disaster period. Such disruptions may require alternate or back-up management centers to coordinate the transportation response.
4. Maintenance and construction and other supporting facilities and resources may also be damaged and demand for these resources will exceed local capabilities.
5. Gradual clearing of access routes and improved communications will permit an increased flow of emergency relief, although localized distribution patterns might remain unusable for a significant period.
6. The movement of relief supplies may create congestion in the transportation network both nationally and regionally, requiring imposition of controls.
7. When threatened by a disaster, the public will act in its own best interest and will spontaneously evacuate dangerous areas. Some persons may refuse to evacuate regardless of the circumstances.
8. The disaster and disaster response will be dynamic and depart from planned scenarios in unpredictable ways. For example, backup systems may be stressed and fail, planned alternate routes may also be impacted, and secondary incidents may impede the response.

4.3 Local Agencies

The following "typical" operational concept for local agencies is derived from a sampling of State, Regional, and Local Emergency Management Plans.

1. Emergency responses to individual incidents will be handled to the extent practical by local emergency response organizations (EROs, e.g., law enforcement, fire and rescue, and emergency medical services). The local EROs will be overwhelmed with calls for service, however, and will receive early assistance from surrounding jurisdictions under existing mutual aid agreements. Later assistance will come from more distant localities, and eventually also from the Federal Government in conjunction with a federal response to disaster, requested by the Governor, and managed by FEMA. The allocation of these mutual aid resources to the emergency calls for assistance, as well as the repair, recovery, reconstitution, remediation, and replacement actions will be managed by the closest Emergency Operations Center that remains in service after the disaster. Staging areas are established to hold resources, pending assignment. Comprehensive resource management principals are followed and a common resource tracking system is established to the extent practicable. A regional EOC may be established to oversee the response to large, multi-jurisdictional disaster areas. Continual coordination and liaison will be established and maintained between all of the EOCs involved in disaster response operations. Each EOC will establish and maintain connections to agencies under their control that will provide resources in support of the disaster response.
2. The entire disaster response will be organized using the principles of the Incident Management System, according to the Federal, State, and Local Response Plans. Each individual incident will be conducted by a designated Incident Command, and will involve resources from several jurisdictions. Incident Command itself may be a single individual, or

may be a Unified Command involving command authorities from different jurisdictions. Each EOC will be organized using IMS principles, with several important differences, compared to IMS organizations at individual incidents. EOCs may be more likely to use Unified Command, more staff will be involved than for an individual incident, and a much greater emphasis will be placed on the planning, logistics, and finance/administration sections. Functioning at the Area Command echelon, EOCs will concentrate on policy formulation, strategic direction, and resource allocation. The operational sections at EOCs will concentrate on theater level operational matters, while individual incidents will emphasize tactical operations.

4.4 State Agencies

The following operational concept is derived from a sampling of State Emergency Management Plan Transportation Annexes. It represents a compilation and generalization of the more specific concepts of operations that are included in these plans.

1. A network of Emergency Operations Centers will be activated for a major disaster, including state, regional, and local centers. A State Emergency Operations Center, operated by the State Emergency Management Agency, is staffed by personnel from all functional areas including transportation. Other Emergency Operations Centers will be activated, normally including one or more EOCs operated by the State DOT. Exchange of information and coordination between these state EOCs and between these state EOCs and federal and local centers enables a coordinated multi-agency response to the disaster including, if necessary, evacuation.

2. Requests for transportation-related assistance may be generated in several ways. A request may be forwarded from the local and regional EOCs to the State EOC, or the request may be forwarded from one of the State DOT Emergency Operations Centers. In either case, coordination between the State DOT and the State EOC is essential so that the appropriate transportation response is carried out and all affected agencies have visibility into the status of this response.

3. When transportation requests exceed the capability of the state, the State DOT will coordinate transportation activities with adjacent states and the US DOT.

4. Damage assessments and situation reports flow into the EOC from local response agencies and the EOC relays this information to federal regional operations center(s) when federal agencies are involved.

5. Specialized tools may be used at the state and federal levels to support specific types of evacuations. For example, the Evacuation Traffic Information System (ETIS) is a travel demand forecasting model that can be used by states to forecast congestion levels and vehicles crossing state lines during hurricane evacuations and share this information with other affected states.

4.5 Federal Agencies

The Federal Emergency Management Agency (FEMA) Federal Response Plan (FRP) defines the concept of operations for coordinating delivery of Federal assistance and resources to State and local governments overwhelmed by a major disaster or emergency. The FRP defines the following set of Emergency Support Functions (ESFs):

- ESF 1-Transportation
- ESF 2-Communications
- ESF 3-Public Works and Engineering
- ESF 4-Fire Fighting
- ESF 5-Information and Planning
- ESF 6-Mass Care
- ESF 7-Resource Support
- ESF 8-Health and Medical Services
- ESF 9-Urban Search and Rescue
- ESF 10-Hazardous Materials
- ESF 11-Food
- ESF 12-Energy

The following operational concept is based on the ESF 1-Transportation annex, which is under the primary responsibility of US DOT and the primary area of ITS application. Many of the other ESFs could also use or indirectly benefit from ITS technologies. Consult the FRP for a complete detailed description of the Federal concept of operations for disaster response.

1. The Disaster Transportation Management System (DTMS) provides a structure for managing the acquisition of transportation services and the deployment of relief and recovery resources from around the Nation into the disaster area. The DTMS includes two components:
 - a. Time-Phased Force and Deployment Lists (TPFDLs), which are planned, prioritized lists of the most critical Federal assets to be deployed rapidly to the disaster site; and
 - b. Movement Coordination Centers (MCCs) to assist in the procurement of transportation assets and track the movement of resources to the disaster area. The MCC team is led by DOT and includes representatives from the Department of Defense (DOD), FEMA, General Services Administration (GSA), and Forest Service. All FRP agencies must notify the MCC when transportation arrangements are made, so that resources can be tracked and reception plans executed.
2. When a disaster occurs, the Secretary of Transportation will appoint a DOT Crisis Coordinator to manage the overall DOT response. Principal headquarters operations is conducted at the DOT Headquarters Crisis Management Center (CMC). DOT will also provide support to the Emergency Support Team at FEMA headquarters. The Activation Information Management System (AIM) is used to collect and report the status of the Transportation infrastructure and keep senior decision makers at the CMC and elsewhere within DOT apprised of the disaster situation.
3. In the local disaster area, direction of the federal transportation response is provided by the DOT Regional Emergency Transportation Coordinator (RETCO). The RETCO is responsible for coordinating the Federal transportation response activities within the assigned jurisdiction. The RETCO will activate elements required to meet the demands of the disaster, including representation to the Regional Operations Center, Emergency Response Team, and the field MCC. A designated Emergency Coordinator in each FHWA division office supports the RETCO, provides situation information back to Headquarters, and coordinates the FHWA-portion of the response in the disaster area.
4. In specific types of disasters (e.g., terrorist events), federal agencies (e.g., the FBI) will assume command of the incident and establish a Joint Operations Center (JOC) that may or may not be physically collocated with the local EOC.

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