

# HILLSBOROUGH COUNTY MPO 2035 LONG RANGE TRANSPORTATION PLAN

## SECURITY TECHNICAL REPORT



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## EXECUTIVE SUMMARY

The 2035 Long Range Transportation Plan (LRTP) is one of the three key documents the Hillsborough County Metropolitan Planning Organization (MPO) develops as part of its responsibilities as a transportation policy-making board mandated by federal and state law. The LRTP is a blueprint guiding priorities for development programs and transportation projects within Tampa, Temple Terrace, Plant City, and unincorporated Hillsborough County. The other two documents the MPO develops are the Unified Planning Work Program (UPWP), and Transportation Improvement Program (TIP).

National, regional, and local concerns regarding security and emergency management call for the MPO to play a meaningful role, by:

1. Providing a forum for regional coordination
2. Allocating financial resources for planning
3. Acting as a resource for transportation system analysis

Incorporating security considerations in transportation planning is not just a Federal requirement, but an opportunity for the MPO to increase the long-term security and resilience of the area's transportation system, as well as the region.

The MPO's role needs to supplement and support the existing emergency management framework, i.e. agencies and other stakeholders that have plans, conduct programs and are engaged in various security and emergency management activities.

This report summarizes the findings and analysis of research, interviews and stakeholder outreach conducted to assess the security capabilities and needs within Hillsborough County. The activities performed during this part of the LRTP planning process helped to:

- Determine the important assets vulnerable to hazards and threats (Critical Infrastructure/Key Resources – CI/KR)
- Identify opportunities for improvement in the security aspects of the current transportation system

The CI/KRs identified as being the most critical and vulnerable to natural hazards, accidents and terrorist incidents are:

- Interstate Systems (I-4, I-75, I-275)
- U.S. Highways (e.g. U.S. 92, U.S. 301)
- State Roads (e.g. S.R. 60)
- Selmon Crosstown and Veterans Expressways
- Tampa International Airport
- MacDill Air Force Base
- Peter O Knight Airport
- Plant City Airport
- Tampa Executive Airport
- Port of Tampa
- Howard Frankland Bridge
- Freight Activity Centers
- Rail Networks
- Pipeline Network
- HART Transit System

The key opportunities for improvement lie in the areas of:

- Enhanced planning for population growth, development, and multi-modal and intermodal integrated transportation system requirements to fully consider the risks from natural and man-made hazards and threats;
- Regular and targeted coordination between emergency management and transportation planning agencies, project developers, and implementing organizations;
- Protecting key infrastructure assets by increasing situational awareness, retrofitting, and leveraging enhanced communication systems e.g. Intelligent Transportation Systems (ITS); and
- Increased resiliency by adding capacity (e.g. expanding modes), redundancy (alternative routes for key choke points) and capabilities for response and recovery.

To support the safety and security goals of the LRTP, this report recommends that the MPO not only consider security-oriented stand-alone projects, e.g. security cameras or ITS, but integrate security as a component of the regional transportation planning process on a continuous basis.

The specific recommendations, elaborated within the report, are:

1. Expand the prioritization process to account for transportation security;
2. Invest to support the resiliency and integration of the CI/KRs;
3. Align MPO existing programs and resources with local and regional security initiatives; and
4. Leverage the transportation assets and technology to support emergency management response, recovery, and redevelopment

## INTRODUCTION

Transportation security is an essential aspect of Hillsborough County's transportation system and its ability to support economic vitality and help sustain and improve the quality of life of its users and the community as a whole. The Department of Transportation defines security as *the freedom from intentional harm and tampering that affects both motorized and non-motorized travelers, and may also include natural disasters*<sup>1</sup>.

The primary goal of transportation security planning in Hillsborough County is to enhance the safety and security of the transportation system for both motorized and non-motorized users. The goals, objectives, and policies related directly and indirectly to security in the 2035 Long Range Transportation Plan (LRTP) are intended to improve the security of the transportation system within Hillsborough County by developing a more resilient and robust transportation system. The benefits realized from the development and implementation of an integrated and effective security program include greater ability to mitigate, respond, and recover from a man-made or natural incident.

The purpose of this Technical Report is to develop the baseline for the Security Element of the 2035 Long Range Transportation Plan through the engagement of stakeholders, review and analysis of existing plans and programs, and recommendation of approaches and strategies to enhance security.

Specifically, the report is presented in four major components:

- Transportation Security Overview,
- Hazards/Threats and the Critical Infrastructure/Key Resources,
- Strategic Opportunities to further enhance the system's preparedness and/or resiliency, and
- Transportation Security Strategies in the LRTP.

## 1.0 OBJECTIVE OF THE TRANSPORTATION SECURITY TECHNICAL REPORT

The objective of this technical report is to develop appropriate elements for the 2035 Update of the Hillsborough County Long Range Transportation Plan (LRTP) to address emergency relief and disaster preparedness plans, strategies, and policies, which support homeland security and safeguard the personal security of all motorized and non-motorized users. This is being done in support of the following identified goal and objectives included in the LRTP:

### **LRTP Goal V: Enhance the safety and security of the transportation system for both motorized and non-motorized users**

#### **Security Objectives:**

- Provide for safer travel for all modes of transportation, including walking, bicycling, transit, auto, and freight;
- Increase the security and resiliency of the multi-modal transportation system; and
- Improve the ability of the transportation network to support emergency management response and recovery efforts.

To fulfill the requirements of this technical report, the consultant completed the following activities:

1. **Conducted stakeholder interviews** (December 2008 and January 2009). Representatives from the various emergency management, law enforcement, and transportation agencies/authorities in Hillsborough County, the City of Tampa, and the surrounding region were interviewed to obtain their input for the LRTP. The purpose of these interviews (see Appendix C for list of those interviewed) was to identify potential objectives and gaps related to security and emergency management that the MPO could address through the LRTP.
2. **Reviewed plans and program documents** (December 2008 - February 2009). The consultant completed a comprehensive document review of relevant local and regional plans, policies, and initiatives to identify potential threats and hazards, and better understand how other agencies are addressing security and emergency management demands. This background review helped determine potential gaps that the MPO may be able to fill in the future as it engages more actively with the existing transportation security and emergency management community.
3. **Conducted a workshop to validate findings and obtain additional guidance and recommendations from the stakeholders** (February 2009). The consultant organized a workshop of local and regional stakeholders to validate preliminary findings, share lessons and ideas, and provide input for the safety, security, and emergency management sections of the LRTP. A copy of the workshop's agenda and the presentations used in the workshop are included in Appendix C.

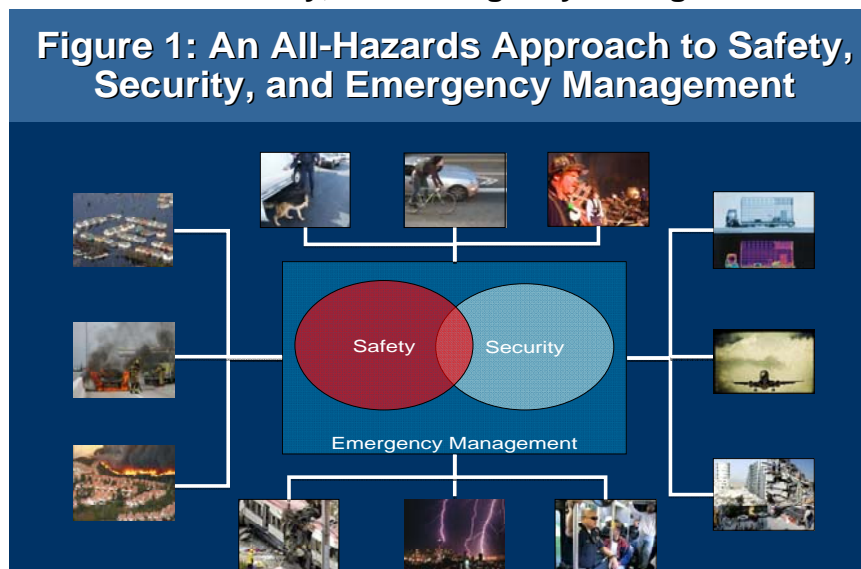
4. **Updated the LRTP security chapter.** The information obtained from this report and the previously referenced activities are the basis for the updated LRTP chapter on safety and security for intermodal transportation.

## 2.0 DEFINING SECURITY IN THE LRTP CONTEXT

According to the U.S. Department of Transportation (DOT), security goes beyond safety and includes the planning to prevent, manage, or respond to threats of a region and its transportation system and users<sup>2</sup>. For the purposes of this analysis, security is defined as protection of persons or property from intentional damage or destruction caused by vandalism, criminal activity, or terrorist events. It also encompasses responses to emergencies caused by either large-scale natural disasters or man-made events.

As highlighted in **Figure 1**, strong relationships exist among transportation safety, security, and emergency management. To maximize the benefits of planning and infrastructure development, an “all-hazards approach” is fundamental to ensure the transportation system and its users are prepared for events that may occur under normal conditions, as well as for potentially catastrophic incidents. The Department of Homeland Security’s (DHS’) security strategy, legislative mandates, presidential directives, and other homeland security doctrine, as well as industry practitioners, emphasize the importance of developing and implementing an all-hazards approach to address potential hazards and threats<sup>3</sup>. This requires determining potential threats and assessing the risks to the region’s critical infrastructure and resources. Coordination must occur among regional and local stakeholders from the transportation and emergency management communities for effective risk assessments and exercises.

**Figure 1: An All-Hazards Approach to Safety, Security, and Emergency Management**



Source: Google Images



## 3.0 ROLE OF MPO IN TRANSPORTATION SECURITY PLANNING

### 3.1 FEDERAL REQUIREMENTS - SAFETEA-LU

Federal requirements set forth by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users ([SAFETEA-LU](#)) have been a major catalyst for promoting the engagement of metropolitan and state transportation planning agencies with transportation security and emergency management activities. Safety has traditionally been a requirement for organizations planning and maintaining highways and other surface transportation assets (i.e. Highway Safety Act of 1966).

SAFETEA-LU is a relatively new requirement for state transportation planning agencies and the metropolitan planning organizations. Although safety, security, and emergency management issues have been addressed in previous LRTPs, this is the first time security of the transportation system is a stand-alone planning factor. Section 23 CFR 450.322 (h) states that: “The Metropolitan Transportation Plan should include .... “(as appropriate) emergency relief and disaster preparedness plans and strategies and policies that support homeland security (as appropriate) and safeguard the personal security of all motorized and non-motorized users.”

In addition, the National Infrastructure Protection Plan (NIPP), developed to define the CI/KR protection component for achieving DHS priorities, clearly emphasizes “resiliency” by including it in the three goals for the Transportation Sector Specific Plan:

1. Prevent and deter acts of terrorism using or against the transportation system;
2. Enhance resilience of the U.S. transportation system; and
3. Improve the cost-effective use of resources for transportation security.

Increasingly, leaders at the federal, regional, and local level of various agencies and organizations are realizing that protecting the transportation system so that it can be functional and useful in the response and recovery stages of disaster or incident is of the utmost importance.

The U.S. DOT recommends the MPO LRTPs consider projects, strategies, and services that will “increase the security of the transportation system for motorized and non-motorized users.” Other key planning documents, such as the UPWP and the TIP, could also benefit from emphasizing the initiatives related to security and coordination with other regional plans.

### 3.2 SCOPE OF ACTIVITIES

MPOs can play a valuable role in security and emergency management, due to their role allocating federal funds to improve the performance of the transportation system. The role of each respective MPO can vary depending on many factors, including:

- The size of the region;
- The history, experience, and projected vulnerability of the region;
- Local capabilities and resources available to deal with events; and
- The staff and capabilities of the MPO and its past experience.

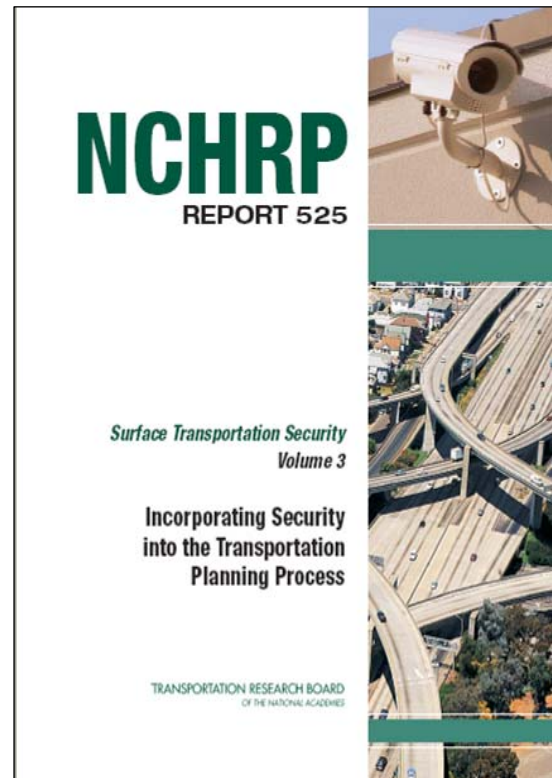
According to NCHRP Report 525 V.3, security considerations in metropolitan/local transportation planning are most evident in projects involving operational systems and equipment, particularly intelligent transportation systems (ITS) for highway networks and video monitoring and surveillance systems for public transit facilities and vehicles. More specific areas being addressed by MPOs include interagency coordination and communication regarding emergency operations, equipment, mutual aid, threat notification, awareness and information sharing, and policy development. All these efforts are intended to promote increased prevention, protection, redundancy, and recovery.

MPOs can strive to incorporate security considerations in their planning processes, in addition to funding projects that mitigate risk to transportation infrastructure assets.

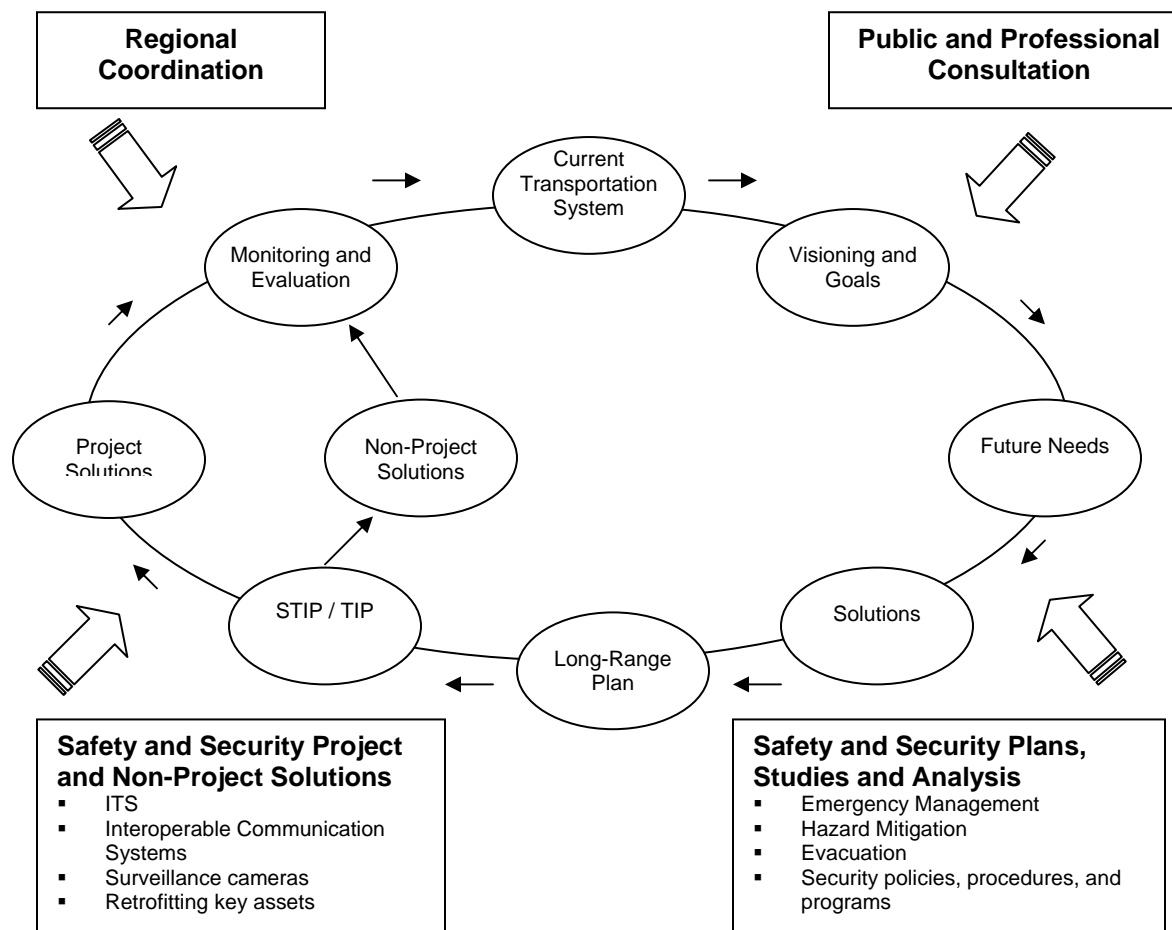
**Figure 2** shows how security can become an integral part of MPO plans, such as the LRTP and TIP.

Additionally, three potential roles MPOs can fill include:

- Provide a forum for multi-jurisdictional coordination;
- Allocate financial resources for planning; and
- Act as a resource for transportation system analysis and geographic information.



**Figure 2: Incorporating Safety and Security into MPO Planning Activities**



Source: Adapted from TRB - NCHRP Report 525 V.3 - Incorporating Security Into the Transportation Planning Process.

### 3.3 EXPERIENCE OF OTHER MPOs

Given that security is a relatively new stand-alone requirement for the LRTP process, many MPOs (including many in Florida) are currently in the process of updating their LRTPs, which will include a dedicated section on transportation security planning. In the last update of their LRTP, most Florida MPOs incorporated safety and security explicitly in their goals and objectives. Other relevant information regarding other MPOs in Florida was summarized in the report “The 2008 Review of Florida’s MPO Long Range Transportation Plans”<sup>4</sup>.

Limited research has been done to document how MPOs are addressing this new SAFETEA-LU requirement as well as how security and emergency management stakeholders are involved in the development of the LRTP. Still, the NCHRP Report 525 and the other documents referenced in its Appendix, provide a wealth of information that can be useful for MPOs and other stakeholders incorporating security into the LRTP or other long-term transportation planning considerations.

A review of individual MPO websites provides additional insight into some of the security related activities MPOs are supporting. **Table 1** summarizes some of the key aspects of how MPOs from larger cities are incorporating security into the LRTP update process.

**Table 1: List of Security Activities MPOs are Incorporating into the LRTP Update Process**

MPO	Population	Description of Activities
<a href="#">Boston MPO</a>	2.6 million	<ul style="list-style-type: none"> <li>▪ Support designs and fund projects and programs that address security problems and enhance secure travel</li> <li>▪ Support, through planning and programming, the installation, operation, upgrading, and timely maintenance of system infrastructure, including ITS</li> <li>▪ Participate in regional planning for security initiatives, such as evacuation and contingency measures, and homeland security</li> </ul>
<a href="#">Denver Regional Council of Governments</a>	2.8 million	<ul style="list-style-type: none"> <li>▪ Assess threats to and vulnerabilities of the transportation system;</li> <li>▪ Coordinate with federal, state, regional and local agencies; and</li> <li>▪ Develop and implement projects and strategies that enhance security of transportation facilities and users</li> </ul>
<a href="#">Southern California Association of Governments' (SCAG)</a>	18 million	<ul style="list-style-type: none"> <li>▪ Provide a coordinating forum working with the region's transportation agencies and planning agencies.</li> <li>▪ Identify policy directions and conduct planning regarding resource needs</li> <li>▪ Offer GIS and transportation modeling expertise to support security and emergency management planning and deployment and evacuation preparedness and response.</li> </ul>

Additional information on what other MPOs are doing to incorporate security into the LRTP can be found at the website of the Association of Metropolitan Planning Organizations (<http://www.ampo.org>) and the Florida Metropolitan Planning Organization Advisory Council (<http://www.mpoac.org>).

## 4.0 KEY STAKEHOLDERS IN EMERGENCY MANAGEMENT PLANNING AND TRANSPORTATION SECURITY FOR HILLSBOROUGH COUNTY

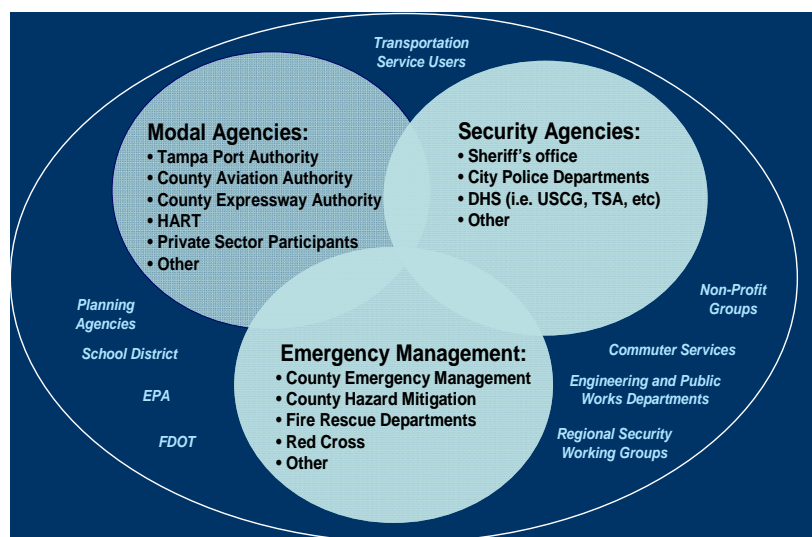
As described in the hazards section of this report, Florida has an extensive history dealing with natural disasters. Florida is the most hurricane prone state in the nation, and southern Florida is especially vulnerable to natural hazards. Hillsborough County has experienced hurricanes and tropical storms at a frequency of one occurrence every 3.62 years<sup>5</sup>. Man-made threats are also a growing concern to the region, especially given the importance of the CI/KRs located in Tampa and the surrounding region.

### 4.1 OVERVIEW OF EXISTING GROUPS AND FORUMS

To address the issues associated with the constant presence of threats and hazards, an active and robust community of stakeholders has been developed over time. This informal network integrates personnel and resources across the local, state, and federal levels to help address potential hazards. Transportation providers and planning agencies have become increasingly involved in these initiatives. This process has been expedited following federal mandates to enhance the transportation system's mitigation, preparedness, prevention, response, and recovery capabilities issued since September 11, 2001.

In Hillsborough County, the security and emergency management network includes representatives from the emergency management, law enforcement, and transportation agencies/authorities from the County, the City of Tampa, Temple Terrace, and Plant City. Error! Not a valid bookmark self-reference. provides an overview of some of the key groups and regional stakeholders involved in emergency management and transportation security. Although many of these stakeholders have an extensive history of working together directly, others such as some transportation service providers are relative newcomers and are now becoming more directly engaged.

**Figure 3: Stakeholders in Emergency Management Planning and Transportation Security**



The above-mentioned stakeholders have different roles and responsibilities for emergency management and transportation security. Below is a representative list of the agencies, organizations, and forums that are actively involved in coordination regarding emergency management and security in Hillsborough County:

- The Tampa Bay Urban Area Security Initiative (UASI) Critical Infrastructure Protection Committee;
- The Regional Domestic Security Task Force (RDSTF);
- Florida Department of Transportation (FDOT);
- Hillsborough County Emergency Management (CEM);
  - Infrastructure Advisory Committee
- Hillsborough County Public Works (PW);
- Hillsborough County Hazard Mitigation;
  - Post Disaster Redevelopment Plan (PDRP) related committees
- Florida Division of Emergency Management;
- Tampa Bay Regional Planning Council (TBRPC);
  - The Regional Awareness Program
  - Evacuation Modeling
- Area Maritime Security Committee (AMSC);
- Tampa Area Safety Council;
- Tampa Downtown Security Network;
- Regional Coordination with U.S. DOT, Federal Highway Administration (FHWA), Federal Motor Safety Carrier Administration (FMSCA), Federal Transit Administration (FTA); DHS (i.e. Federal Emergency Management Agency, Transportation Security Administration, U.S. Coast Guard), and other agencies;
- The Florida Fire Chiefs' Association (FFCA); and
- Florida Emergency Preparedness Association (FEPA).

#### **4.2 RELEVANT TRANSPORTATION SECURITY AND EMERGENCY MANAGEMENT PLANS AND POLICIES**

Some of the most relevant plans, policies, and programs developed by the above-mentioned agencies and organizations to enhance the regional emergency management and transportation security capabilities of the region are listed in

**Table 2.** Additional plans, policies, and resources related to transportation security and emergency management area referenced in an appendix.

**Table 2: Key Regional Plans and Leading Agencies**

<b>Plans</b>	<b>Leading Agency/Group</b>
<a href="#"><u>Regional Evacuation Plan</u></a>	TBRPC
<a href="#"><u>Hillsborough County Comprehensive Emergency Management Plan (CEMP)</u></a>	Emergency Operations Center Operations Group
<a href="#"><u>Statewide Emergency Response Plan</u></a>	Florida Fire Chief's Association
<a href="#"><u>Tampa International Airport Master Plan</u></a>	Aviation Authority
<a href="#"><u>Intelligent Transportation System (ITS) Master Plan</u></a>	Hillsborough MPO
<a href="#"><u>Tampa Port Master Plan</u></a>	Tampa Port Authority
<a href="#"><u>Tampa Bay Regional Goods Movement Study</u></a>	FDOT
<a href="#"><u>Hillsborough Metropolitan Planning Organization Transportation Improvement Program – 2008-2013</u></a>	Hillsborough MPO
<a href="#"><u>Multimodal Trade Corridor Assessment Study</u></a>	FDOT
<a href="#"><u>Post-Disaster Redevelopment Plan</u></a>	Hillsborough Hazard Mitigation
<a href="#"><u>Florida's Strategic Intermodal System Plan</u></a>	FDOT

## 5.0 SECURITY AND EMERGENCY PREPAREDNESS

DHS has worked to establish forums and mechanisms for emergency management and security partners to plan, prepare for, and fund regional programs to address issues related with transportation security and emergency management. These efforts have been successful in Hillsborough County: the region has implemented policies, programs, and procedures for interaction among emergency management personnel, law enforcement, and county and state organizations that have traditionally had a role in transportation security.

In addition, the modal agencies have taken steps to ensure the transportation system is efficient, safe, and secure. Each modal agency works closely with its respective stakeholders to develop policies, plans, and programs that enhance the resiliency of each transportation mode and the intermodal networks.

There are numerous activities being implemented by the respective modal agencies to enhance the transportation system's security and emergency management capabilities (see examples at the end of this chapter). The interrelationship between security and emergency preparedness is becoming more prevalent and synergies between these areas need to be maximized to obtain the full benefit of plans and infrastructure development. As discussed in the recommendations section of this report, there are several opportunities for regional transportation planning agencies to support existing initiatives and activities being implemented by the emergency management and security community. The section below highlights some of the key emergency management agencies, their respective roles, and potential areas for increased engagement by transportation planning agencies.



## 5.1 FLORIDA DIVISION OF EMERGENCY MANAGEMENT<sup>6</sup>

Florida's Division of Emergency Management (DEM) plans for and responds to both natural and man-made disasters, including the range of hazards listed in Table 4. A core activity of this division is the preparation and implementation of a statewide [Comprehensive Emergency Management Plan](#) (CEMP), as well as conducting drills and exercises to test state and county emergency response capabilities. The division is also the state's liaison with federal and local agencies on emergencies of all kinds. Division staff members provide technical assistance to local governments as they prepare emergency plans and procedures. They also conduct emergency operations training for state and local governmental agencies.

DEM as the State Coordinating Agency is responsible for developing and maintaining the State Hazard Mitigation Plan. The Hazard Mitigation Plan was last updated in 2007 and approved by the Federal Emergency Management Agency (FEMA) on August 24, 2007. FEMA approved the revised enhanced component of the Plan on September 5, 2008. This maintains Florida's eligibility to receive funding under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), a mechanism by which the President can make federal aid available through a declaration of a major disaster. The Stafford Act authorizes temporary housing, grants for immediate needs of families and individuals, repair of public infrastructure, emergency communications systems, and other forms of assistance<sup>7</sup>.

After a disaster, the Division conducts damage assessment surveys and advises the Governor on whether to declare an emergency and seek federal relief funds. The division maintains a primary Emergency Operations Center (EOC) in Tallahassee. The division also operates the State Warning Point, a state emergency communications center staffed 24 hours each day. The center maintains statewide communications with county emergency officials.

The Division operates several mitigation programs, implemented by the units shown in **Table 3:**

The transportation planning process could benefit from closer coordination with the State's Emergency Management Division; insight from the activities performed by the state may help FDOT and the MPO prioritize certain projects, programs, and activities if it carries particular importance to Florida's emergency management plans and programs.

**Table 3: Units, Programs, and Plans of Florida's  
Division of Emergency Management**

Unit/Program	Description
<b>Natural Hazards Unit</b>	Administers the state's natural hazards planning programs and coordinates other natural hazard-specific programs including: (i) Comprehensive Emergency Management, (ii) Continuity of Operations, (iii) the Hurricane Program, and (iv) Catastrophic Planning. The Unit is also responsible for developing and updating the state's Comprehensive Emergency Management Plan (CEMP).
<b>Comprehensive Emergency Management Planning (CEMP)</b>	Coordinates with county Emergency Management agencies to help them prepare well-organized and functional emergency management plans.
<b>Continuity of Operations Planning</b>	An effort to ensure the continued performance of essential functions during a wide range of potential emergencies.
<b>Hurricane Program</b>	Coordinates statewide hurricane planning efforts by leading the development and update of the eleven regional evacuation studies. Aid local governments in establishing evacuation zones and routes as well as appropriate shelter locations. Provides training on evacuation decision-making tools such as Hurvac and the Sea, Lake, and Overland Surge from Hurricanes (SLOSH) model.
<b>Catastrophic Planning</b>	The Florida Catastrophic Planning (FLCP) Project considers two catastrophic events: a breach of the Herbert Hoover Dike around the waters of Lake Okeechobee and a Category 5 hurricane making landfall in South Florida, which has a population of nearly seven million.

## 5.2 HILLSBOROUGH COUNTY EMERGENCY MANAGEMENT<sup>8</sup>

Hillsborough County Emergency Management is responsible for planning and coordinating the evacuation and sheltering of county residents in the event of a natural or manmade disaster. This agency is also responsible for planning, orchestrating and coordinating response actions and continuity of government in the aftermath of a major disaster. One of the key plans developed by the County's Emergency Management Department is the [Comprehensive Emergency Management Plan](#) (CEMP). The CEMP provides information on hazards, threats, vulnerabilities, exercises, roles and responsibilities for the stakeholders in the region. The CEMP is a comprehensive document that identifies the key issues affecting the Tampa Bay region.

The transportation planning process could benefit from closer coordination with the County's Emergency Management Department to ensure that the analysis conducted in the CEMP is considered in the development of the UPWP, LRTP, and the TIP.

### 5.3 HILLSBOROUGH COUNTY HAZARD MITIGATION SECTION<sup>9</sup>

The Hazard Mitigation Section, which is part of the Planning and Growth Management Department, provides disaster-planning services to Hillsborough County citizens and other local agencies. Disaster planning services include floodplain management, flood insurance, grants assistance, and vulnerability assessments. The Section works with the Federal Emergency Management Agency, the Florida Division of Emergency Management, and local groups to provide technical assistance to homeowners, businesses, developers, and the engineering community. This group prepares background information that is then incorporated into work performed by the county departments of Development Services, Public Works, and Public Safety. There are three principal objectives that guide the direction of the Hazard Mitigation Section, which are as follows:

1. Unify countywide initiatives that seek to reduce the county's vulnerability to man-made and natural disasters;
2. Ensure that county agencies and departments follow guidelines established through the National Flood Insurance Program (NFIP) and maintain these records with an aim to retain the county's favorable insurance rating; and
3. Assist government entities, county residents, and businesses with various projects to reduce their vulnerability.

One of the key plans the Hazard Mitigation Section is developing is the [Post Disaster Redevelopment Plan](#) (PDRP). The PDRP is a requirement of all Florida coastal counties and municipalities, and is encouraged for inland communities. It identifies how a community will redevelop and recover long-term after a disaster. The plan covers policies, operational strategies, and roles and responsibilities for implementation that will guide decisions that affect long-term recovery and redevelopment of the community after a disaster. The plan emphasizes seizing opportunities for hazard mitigation and community improvement, in line with the goals of the local comprehensive plan and with full participation of the citizens.

Recovery topics addressed in the plan include business resumption and economic redevelopment, housing repair and reconstruction, infrastructure restoration and mitigation, short-term recovery actions that affect long-term redevelopment, sustainable land use, environmental restoration, and financial considerations as well as other long-term recovery issues identified by the community.

There are numerous technical advisory committees (TACs) that support the development of the PDRP, including the Infrastructure TAC, currently chaired by a staff person from TECO Energy Company (TECO). The Infrastructure TAC conducts many activities that could add value to the MPO's planning process. For example, representatives of the TAC have:

- Assessed the highly vulnerable infrastructure or facilities that could be better protected or relocated;
- Listed prioritized public infrastructure and facility redevelopment issues and actions that can be taken to address each issue;
- Listed policies, procedures and programs that may affect the restoration of public infrastructure and facilities;
- Assigned responsibilities, timeframes for completion, and estimates of costs and benefits for each action; and
- Developed a planning timeline to address identified issues.

Given the important role that the transportation system serves to the region and the catalyst role it can play in a post-disaster redevelopment scenario, it is important that the MPO and the relevant stakeholders involved in the PDRP planning process are well aligned and coordinate closely. In fact, one of the important outcomes of the LRTP Workshop held on February 12, 2009 was a recommendation that the MPO become involved with the Local Mitigation Strategy (LMS) to ensure it supports the Infrastructure TAC and other sub-groups working with the County through the Long-Term Post Disaster Redevelopment planning process. Close coordination and communication with these groups could help ensure that federally funded transportation infrastructure projects which support the overall PDRP, receive a priority ranking in FDOT's and the MPO's selection process.

Coordinators for the county's hazard mitigation plan should include the projects identified in the TIP in the mitigation plan. These projects should be evaluated and ranked (ranks may be modified depending on the significance of the storm).

#### **5.4 EXAMPLES OF LOCAL TRANSPORTATION SECURITY INITIATIVES**

The Hillsborough Area Regional Transit Authority (HART) undertakes the following activities as part of its effort to enhance their system's security:

- Complete and update (on an yearly basis) the Safety and Security Management Plan (SSMP) and the System Security and Emergency Preparedness Plan (SSEPP) for bus and rail operations;
- Update the hurricane plan specific to HART (on an yearly basis); and
- Actively participate in the County's Emergency Operations Center (EOC) on an as needed basis to address emergency situations.

In addition, HART also sits on the Tampa Area Safety Council and actively participates in drills and exercises, including supporting special urban task force units, to prepare and test the system's ability to address potential threats and hazards.

The Port of Tampa is currently implementing a Strategic Risk Management Plan (SRMP) and has spent over \$50 million dollars on cameras and other security measures in recent years. The Port is the petroleum gateway for west and central Florida, and one of the nation's most important fertilizer handling ports (see **Figure 4**).

Figure 4: The Port of Tampa



Source: <http://www.hillsboroughcounty.org/transtaskforce/resources/publications/info/031008portwainio.pdf>

Since the Port is of tremendous economic importance to the region, significant resources are devoted to ensure the secure transportation and storage of these bulk commodities (many of which are hazardous) as well as the safe transportation of cruise line passengers and other users. Port operations also rely on a regional pipeline system that is consequential to transporting much of the bulk liquid commodities from the Port to storage facilities or other destinations.

Resources from both the public and private sector are being directed towards security initiatives. The Tampa Pipeline Corporation for example, has recently been increasing pipeline security to mitigate potential vandalism or other intentional acts and to help county agencies deal with potential future leaks. Since November 2007, when a pipeline vandalism incident occurred<sup>10</sup>, the Pipeline Corporation is working more closely with emergency management agencies to provide maps and diagrams of key points in the pipeline, increasing safety training, and improving the Corporation's capabilities to secure potential leaks.

The Hillsborough County Airport Authority (AA), which is responsible for Tampa International (TPA) and other airports, is also actively working with the Transportation Security Administration (TSA) and other stakeholders to ensure the security of transportation service users. For example, TPA has been the site of operational tests and evaluation of explosives trace detection portals at passenger security checkpoints as well as well as participating in various regional security programs.

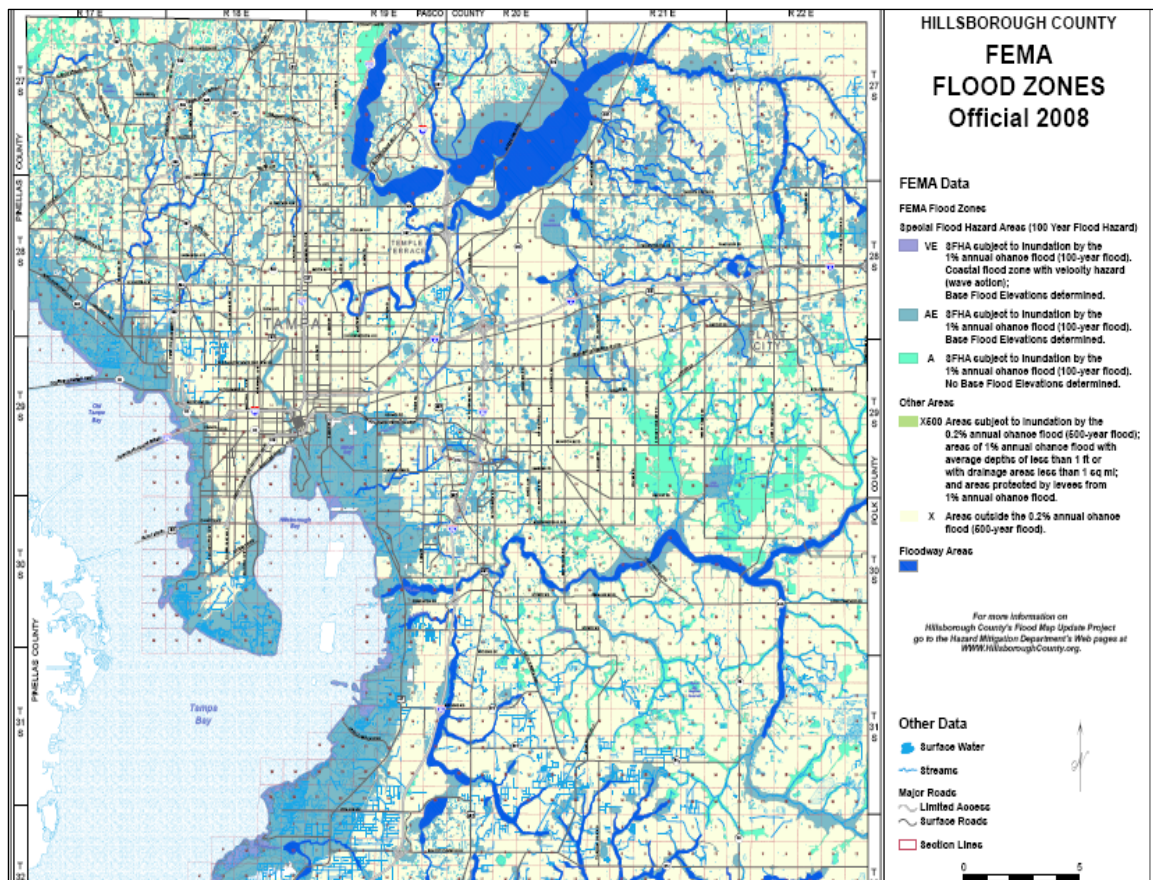
The Tampa-Hillsborough Expressway Authority (THEA) also works closely with local, state, and federal stakeholders to ensure the security of the regionally defined transportation projects with toll-funding that it implements and preserves. The implementation of projects such as the all-electronic open road tolling (ORT) system<sup>11</sup> will improve the region's vehicle detector and classifier capabilities. The ORT system will provide benefits to the transportation system by making it more efficient and safer,

and if integrated with various security efforts and initiatives, it also offers potential for enhancing the security of those respective segments as well as other parts of the transportation system.

## 6.0 IDENTIFICATION OF HAZARDS AND THREATS IN THE REGION<sup>12</sup>

As previously mentioned, Florida is the most hurricane prone state in the nation, and Southern Florida is especially vulnerable to natural hazards. According to the Hillsborough Comprehensive Emergency Management Plan (CEMP), the County includes an area of 1,073 square miles. All coastal areas of the county along the Tampa Bay and Hillsborough Bay and areas along the three county rivers are considered hazard areas for hurricane storm surge. Since 1871, the County has experienced 37 hurricanes and tropical storms, which is equivalent to an occurrence every 3.62 years. The low-lying areas of the county are considered fresh water flood prone areas. **Figure 5** highlights the flood prone zones in Hillsborough County and the vulnerability of these areas to various flood events. Still, in recent years heavy development has occurred in many of the flood prone areas in the County and the high population density make these areas even more vulnerable to potential disasters.

Figure 5: Hillsborough County FEMA Flood Zones<sup>13</sup>



Hurricanes are not the only hazard that poses a potential threat to Hillsborough County, as the county's population and the transportation resources are vulnerable to many other natural hazards and man-made threats. **Table 4** lists the key regional hazards that have been identified in the CEMP and discussed in detail during the LRTP update process.

**Table 4: Potential Hazards and Threats**

1. Hurricanes and Tropical Storms	11. Extreme temperatures
2. Tornadoes	12. Civil Disturbances
3. Flooding	13. Mass Immigration
4. Thunderstorms	14. Drought
5. Airplane Crash	15. Exotic Pests and Diseases
6. Hazardous Materials	16. Disease and Pandemic Outbreaks
7. Coastal Oil Spill	17. Critical Infrastructure Disruption
8. Terrorism	18. Special Events
9. Wildfires, Forest and Brush Fires	19. Major Transportation Incidents
10. Sinkholes	

Man-made threats such as acts of terrorism are a growing concern to the region, especially given the importance of the CI/KRs located in Tampa and the surrounding region. The wide range of potential hazards and threats to the region, which have different levels of probabilities of occurrence and consequences, make it difficult to plan and prepare for a specific incident or event. Therefore, it is essential to have an integrated approach to enhance the transportation system's overall ability to mitigate, respond, and recover from an incident. To maximize the benefits of transportation planning and infrastructure development, an "all-hazards approach" is an ideal framework to ensure the transportation system and its users are prepared for events that may occur under normal conditions, as well as potential catastrophic incidents. The section below discusses some of potential impacts the above-mentioned hazards can have on the transportation system and infrastructure as well as how some of these hazards may be magnified due to climate change.

## 6.1 POTENTIAL IMPACTS OF HAZARDS AND THREATS ON THE TRANSPORTATION SYSTEMS AND INFRASTRUCTURE

Different hazards and threats can have devastating impacts to the transportation system. Not only can potential hazards and threats affect the transportation system's ability to function as designed, but even more importantly, it may affect its ability to deliver emergency supplies or assist with timely evacuation of citizens during a time of emergency.

The impacts and consequences of hazards and threats vary greatly depending on the scope and magnitude of the event as well as numerous other factors. The impacts may be felt at the local, regional, and national levels. Past experiences, exercises and simulations can provide additional insight as to potential impacts specific events and

scenarios may inflict on the transportation network. Agencies within DHS and other federal, state, and local agencies, use tools such as the Maritime Security Risk Assessment Model (MSRAM), the Computer Based Assessment Tool (CBAT), and other tools to evaluate CI/KRs. These agencies and various local and state entities periodically conduct exercises to determine potential impacts and consequences that different hazards and threats may pose to the transportation system.

For example, the Florida Division of Emergency Management (DEM) is currently developing the Florida Catastrophic Planning (FLCP) Project, which considers two catastrophic events: a breach of the Herbert Hoover Dike around the waters of Lake Okeechobee and a Category 5 hurricane making landfall in South Florida. Other agencies are conducting table-top exercises, drills, and even full-scale exercises to test the system and provide training opportunities to relevant agencies and staff in preparing for a potential event.

As discussed in further detail in the next section, much of the information used in these tools to determine probability of an incident and potential consequences from the incident is classified (Security Sensitive Information (SSI)).

SSI is controlled under the provisions of the Critical Infrastructure Information Act of 2002, 49 CFR Part 1520, and may only be disclosed to persons with a “need to know,” as defined in 49 CFR 1520.5. This may pose a challenge to some agencies that desire the information for planning purposes, but do not have staff with security clearances.

Still, it is possible to discuss some general impacts that can be predicted for catastrophic incidents. For the purposes of illustrating some potential impacts that can be a result of hazards or threats, a hypothetical list of potential impacts is included in **There is** a strong correlation between damage to the transportation network and the ability of a community or businesses located in the affected area to respond and recover from disruptions. The transportation network is essential to effective response and recovery efforts, but also for pre-disaster preparation; this is something that needs to be reflected in the prioritization process and ultimately in planning documents such as the LRTP. For example, effective transportation planning and integrated systems are fundamental to support evacuation of the vulnerable population. **Figure 6** highlights the concept of resiliency and how the potential impacts mentioned above may have short and long-term implications. From a planning perspective, the resiliency profile may also be categorized into a pre-incident phase, a response phase, and a recovery stage. Investment in the transportation network, as guided by the MPO and its tools such as the LRTP, should be used to strengthen a system’s resiliency and its capabilities across all three phases.



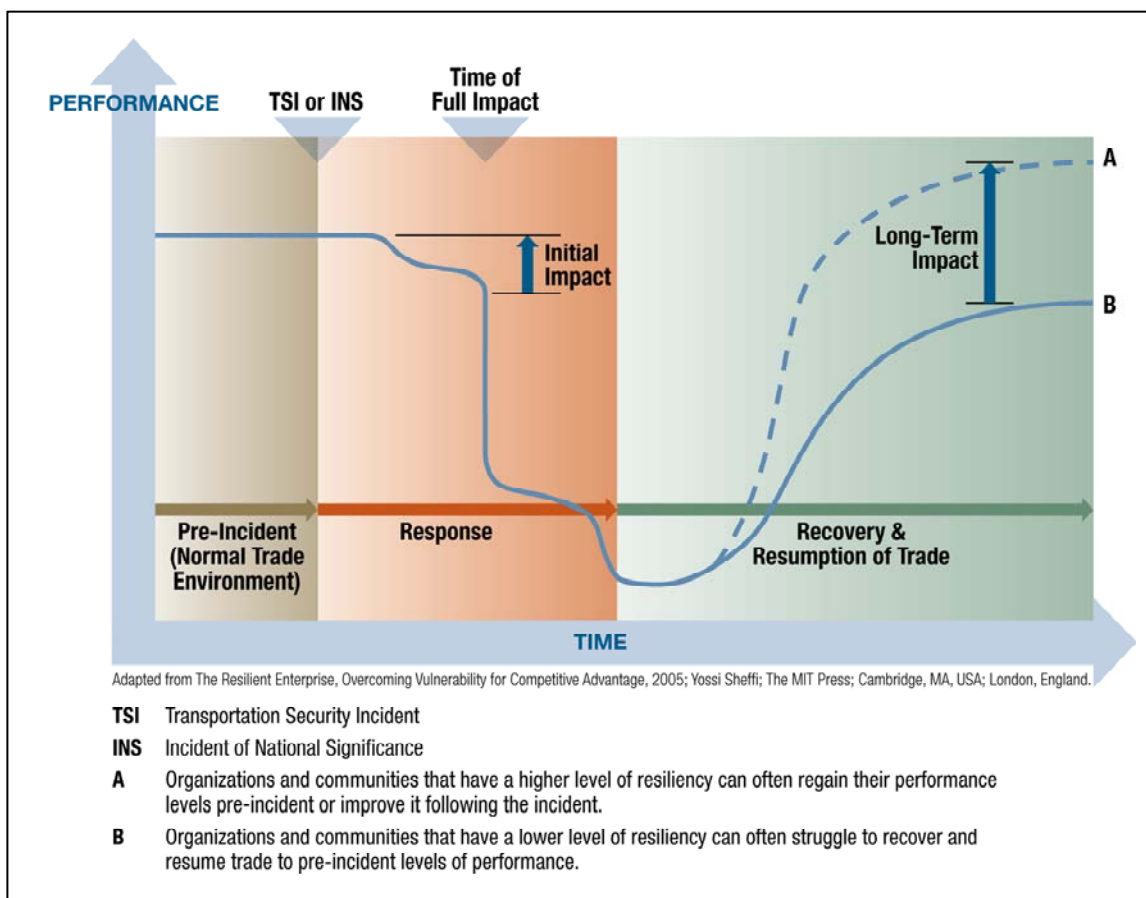
Table 5.

There is a strong correlation between damage to the transportation network and the ability of a community or businesses located in the affected area to respond and recover from disruptions. The transportation network is essential to effective response and recovery efforts, but also for pre-disaster preparation; this is something that needs to be reflected in the prioritization process and ultimately in planning documents such as the LRTP. For example, effective transportation planning and integrated systems are fundamental to support evacuation of the vulnerable population. **Figure 6** highlights the concept of resiliency and how the potential impacts mentioned above may have short and long-term implications. From a planning perspective, the resiliency profile may also be categorized into a pre-incident phase, a response phase, and a recovery stage. Investment in the transportation network, as guided by the MPO and its tools such as the LRTP, should be used to strengthen a system's resiliency and its capabilities across all three phases.

**Table 5: Sample List of Potential Impacts of Hazards and Threats<sup>14</sup>**

Transportation Mode	Description of Potential Incidents and Impacts
Surface	<ul style="list-style-type: none"> <li>▪ Roads, bridges, interchanges, overpasses may become flooded, damaged, or inoperable (due to a terrorist blast event) – at a minimum, capacity may be decreased to handle lower traffic volumes</li> <li>▪ Critical Infrastructure/Key Resources (CI/KR) may be damaged or destroyed (creating a choke point especially for bridges and roads/highways that don't have alternative routes)</li> <li>▪ Vehicles may be damaged or deemed inoperable (if they are in the vicinity of an incident or even if the incident does not affect the vehicles directly, but do so indirectly (i.e. block the supply of fuel to the region, disable key roads, etc) and limit mobility for citizens</li> <li>▪ Severe traffic congestion – reduce connectivity/productivity</li> <li>▪ Emergency services may be limited or unavailable depending on the severity of the incident and location – may limit response to minor incidents which may in turn become worse or impede the system's ability to respond to major events</li> <li>▪ Damage to intermodal networks – disruption to intermodal systems may affect personal and cargo handling activities</li> </ul>
Maritime	<ul style="list-style-type: none"> <li>▪ Damage to:                             <ul style="list-style-type: none"> <li>○ Port and Harbor facilities (i.e., wharf, piers, storage facilities, etc.)</li> <li>○ Equipment (i.e., gantry cranes, vehicles, etc.)</li> <li>○ Other intermodal links and nodes or supporting supply systems (i.e., utilities)</li> </ul> </li> <li>▪ Destruction to pipelines transporting critical fuel supplies to and from the Port could impact the local economy as well as the region that depends on fuel supplies coming from the Port of Tampa</li> <li>▪ The single channel to the Port may be blocked, cutting off access to the Port</li> <li>▪ If the Port cannot operate at normal capacity, there would be significant impact on local and regional economy</li> <li>▪ Hazmat spills could cause environmental and operational issues</li> </ul>
Air	<ul style="list-style-type: none"> <li>▪ Damage to:                             <ul style="list-style-type: none"> <li>○ Facility infrastructure (i.e., runway, terminals, air control tower, etc)</li> <li>○ Equipment (i.e., planes, vehicles, etc)</li> <li>○ Intermodal networks</li> </ul> </li> <li>▪ Disruption to:                             <ul style="list-style-type: none"> <li>○ Fuel supplies</li> <li>○ Communication devices</li> </ul> </li> <li>▪ These issues would significantly delay or interrupt operations in the area</li> </ul>
Rail	<ul style="list-style-type: none"> <li>▪ Damage to:                             <ul style="list-style-type: none"> <li>○ Rail tracks and alignments</li> <li>○ Vehicles</li> <li>○ Cargo storage facilities</li> <li>○ Intermodal networks</li> </ul> </li> <li>▪ Hazmat spills could cause environmental and operational issues</li> </ul>
Pipeline	<ul style="list-style-type: none"> <li>▪ Damage to:                             <ul style="list-style-type: none"> <li>○ Above and below ground pipelines</li> <li>○ Intermodal networks</li> </ul> </li> <li>▪ Hazmat spills</li> </ul>

Figure 6: The Resiliency Factor – Quantifying the Disruption Profile



Domestic and international experience also highlights the important role all modes of transportation have in preparing for, responding, and recovering to disruptive events caused by hazards and threats. The MPO's planning process needs to take into account potential disruption to the supply chain (especially for enterprises that rely on just-in-time systems) and the resulting consequences. The resiliency of the transportation system and the community culture/resources are key factors in determining the length of time it takes for a community to respond and recover.

In recent years, research has been undertaken to document the role of transportation in mitigating, responding, and recovering from potential threats and hazards. For example, the Transportation Research Board (TRB) has researched the important role that transit can play in emergency evacuation in the [Special Report 294](#). The TRB also commissioned several reports that cover critical aspects related to these issues, some of which were captured in the [Research Results Digest 87](#).

Key findings from this research show that transit can play a critical role in emergency evacuation, particularly in evacuating citizens that lack access to a private vehicle and special-needs populations. Issues that influence the extent of transit's role in an

emergency evacuation include the characteristics of the urban area, the type of emergency (e.g., advance-notice, no-notice), the predisposition of the public to both follow evacuation orders and use transit, available resources, and the characteristics of the transit system itself.

The study highlighted that capacity issues, particularly congestion on urban area highways where buses also travel, are likely to limit evacuation capability in many urban areas. Throughout the transportation planning process, the point of capacity and congestion of roads was highlighted as a particularly important issue. The research goes on to recommend that emergency operations plans all available modes of transportation, including transit, be incorporated in evacuation plans and plans to deal with catastrophic situations. Additional recommendations highlighted in Special Report 294 (taken directly from the report) include:

- Including transit providers, as well as social service agencies, in the development of emergency plans;
- Identifying transit-dependent populations and those requiring special assistance in an evacuation through registries and computer mapping and providing this information to emergency responders, including information on where these individuals should be taken, well in advance of an event;
- Specifying responsibilities of transit staff in an emergency (essential personnel), providing for the evacuation needs of the staff's families, and securing transit equipment to the extent possible;
- Establishing means of communication, including contingency communications plans, among transit agency personnel and with other emergency responders;
- Developing memoranda of understanding with neighboring jurisdictions, sometimes across state lines, and standby contracts with private providers to help ensure that transit vehicles, including accessible equipment and trained drivers, will be available to meet surge requirements in an emergency and that transport destinations will be clear;
- Establishing protocols with a clear chain of command and checklists for critical transit personnel and emergency responders;
- Providing emergency evacuation information in accessible formats to the public, particularly to vulnerable populations, regarding how they can access transit (e.g., bus staging areas) and obtain assistance, if necessary, in an emergency evacuation; and
- Undertaking frequent drills and exercises, including transit agencies, under a wide range of emergency scenarios to see how well evacuation plans work in practice and planning revisions on the basis of this experience.

DHS, and other local, state, and federal agencies and organizations have led the development of industry-leading tools that help assess the potential impacts each hazard and threat may pose to CI/KRs. DHS also conducts numerous drills and exercises across the nation to support and engage the broader emergency

management and security community and test the research that quantifies the probability of specific hazards and threats impacting CI/KRs. The MPO should be aware of these activities and work to ensure its efforts and regional investments complement the available tools and initiatives.

## 6.2 EMERGING ISSUES RELATED TO CLIMATE CHANGE

Recently, greater concern and interest has focused on potential issues associated with climate change, and the impact it may have on the transportation system. According to the Intergovernmental Panel on Climate Change (IPCC)<sup>15</sup>, climate change will have a significant impact on transportation. A recent Transportation Research Board (TRB) report, entitled *Potential Impacts of Climate Change on U.S. Transportation*<sup>16</sup>, presents in details the science and expected occurrences climate change will have on the nation's transportation system.

The TRB report was commissioned to provide guidance for transportation decision makers to identify key issues affecting the way U.S. transportation for some of the potential impacts of climate change. This report states that the five climate changes of particular importance to transportation are:

- Increases in very hot days and heat waves;
- Increases in Arctic temperatures;
- Rising sea levels (99% probability of occurrence);
- Increases in intense precipitation events; and
- Increases in hurricane intensity (66% probability of occurrence)

This report further explains that Florida and other Gulf Coast states are among areas already impacted by the early signs of climate change. The effects of the hurricanes and tropical storms frequently experienced in Florida are only expected increase in intensity and frequency. It also states that the greatest impact of climate change for North America's transportation systems will be flooding of coastal roads, railways, transit systems, and runways because of rising sea levels and storm surges.

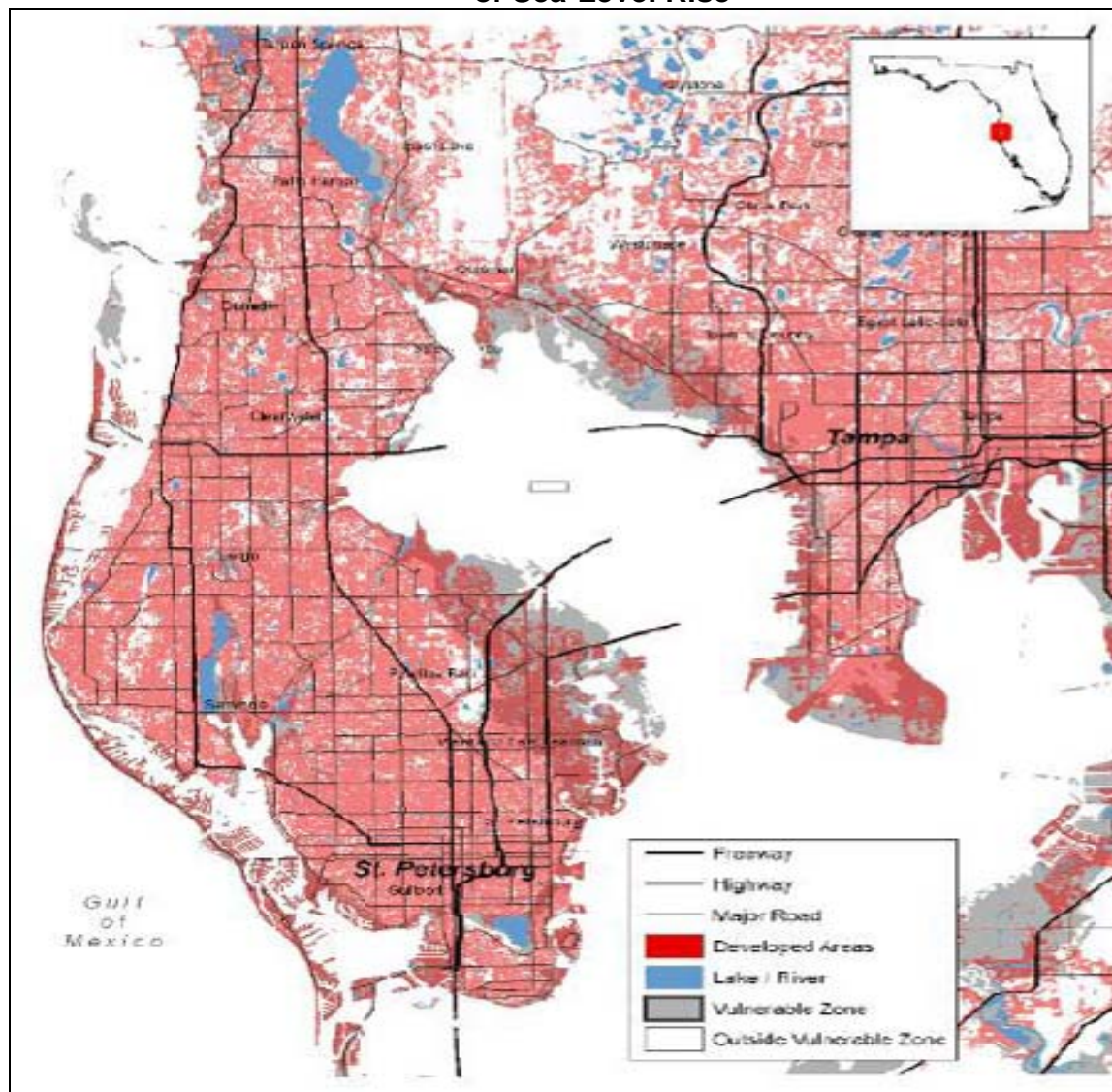
The impacts from these hazards will vary by transportation mode, location, and the condition of the local system, but it is expected to be widespread and costly in both human and economic terms. As the country experienced during Hurricane Katrina and following other natural hazards, the impact of extreme weather events to the infrastructure is very real and tremendously costly. **Figure 7** shows a picture of bridges that were damaged due to the powerful effects of Hurricane Katrina.

Figure 7: Impact of Hurricane Katrina to Bridges along the Gulf Coast Region<sup>17</sup>:



The potential impact and specific actions to be taken in Hillsborough County will have to be researched carefully, in coordination with other agencies and planning efforts. Initial research, such as a report by Tufts University entitled *Florida and Climate Change – The Costs of Inaction*, project that several areas that contain important transportation infrastructure may be flooded due to expected rising sea-levels<sup>18</sup>. As highlighted in **Figure 8**, extensive areas of Hillsborough County are vulnerable to a potential 27 inches of sea-level rise, which according to the authors of this report is projected to be reached by around 2060 in the business-as-usual case.

**Figure 8: Tampa/St Petersburg: Areas Vulnerable to 27 Inches of Sea-Level Rise<sup>19</sup>**



As this map emphasizes, if the 27 inches of sea-level rise scenario becomes reality, many residential areas and CI/KRs in the transportation system will be impacted given that Hillsborough County has a large number of residents living in low elevation coastal zones.

The issue of climate change was briefly discussed with stakeholders during the LRTP Security and Emergency Management Workshop in February 2009, and is the focus of discussion in other forums regionally, nationally, and internationally. Climate change is also being discussed informally as part of the Post-Disaster Redevelopment Plan (PDRP) development process. In particular, stakeholders involved with the PDRP update process are assessing the potential impact that changes to sea levels will have over the next 20 years. The potential impact of the higher sea levels to critical transportation systems could greatly affect the local and state economies and greatly

influence the county's long-term redevelopment and reconstruction following a major disaster.

## 7.0 DESCRIPTION OF REGIONAL MULTI-MODAL TRANSPORTATION SYSTEM

### 7.1 CRITICAL INFRASTRUCTURE/KEY RESOURCES (CI/KRS)

As described in other sections of the LRTP, Hillsborough County has an extensive transportation network. This network is strengthened by other infrastructure that supports the basic operation of the transportation system. For the purposes of the LRTP update process, stakeholders were asked in interviews and during the Workshop to provide input as to what they perceived were the Critical Infrastructure/Key Resources (CI/KRs) essential to the quality of life of the County's citizens and to its economic vitality<sup>20</sup>. The key CI/KR identified during the LRTP update process include the assets listed in Table 6.

**Table 6: Critical Infrastructure/Key Resources (CI/KRs) Identified during the LRTP Update Process**

Critical Infrastructure/Key Resource (CI/KR)
1. Interstate Systems (I-4, I-75, I-275)
2. U.S. Highways (e.g. U.S. 92, U.S. 301)
3. State Roads (e.g. S.R. 60)
4. Selmon Crosstown and Veterans Expressways
5. Tampa International Airport
6. MacDill Air Force Base
7. Peter O Knight Airport
8. Plant City Airport
9. Tampa Executive Airport
10. Port of Tampa
11. Howard Frankland Bridge
12. Freight Activity Centers
13. Rail Networks
14. Pipeline Network
15. HART Transit System

These CI/KRs were identified by stakeholders as being the most important transportation assets in the region, or were identified as such in the various plans that were reviewed for the LRTP update process. The locations of some of these CI/KRs are highlighted on

**Figure 9.**



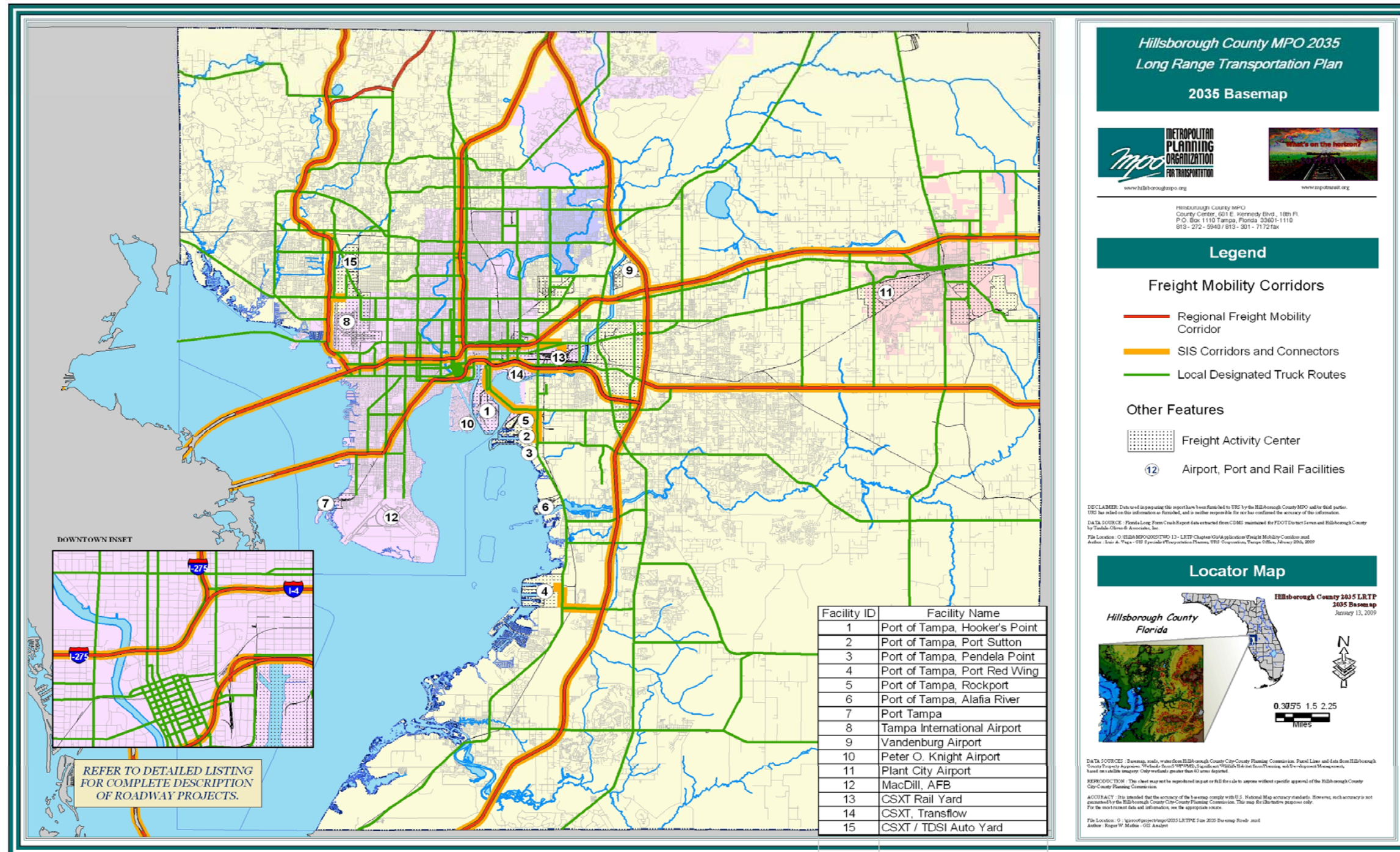


Figure 9: Location of Regional CI/KRs<sup>21</sup>

## 7.2 POTENTIAL TARGETS, BOTTLENECKS, AND CHOKE POINTS

During the LRTP Security and Emergency Management Workshop, the participants were asked to break up into two groups to discuss and prioritize the CI/KRs (high, medium, and low) and identify potential gaps in the transportation system's resiliency. The Workshop participants were divided into two groups to provide a more interactive forum for discussion. Each group had a representative from the different areas of emergency management and security, including law enforcement/fire department, public works, modal agencies, other county agencies and the MPO. The groups prioritized the CI/KRs according to criteria selected by each group. Components of the prioritization criteria included:

- The role of CI/KRs in the normal daily functioning of the community;
- The role of CI/KRs in responding to a potential disruptive event; and
- The role of CI/KRs in contributing to long-term recovery from a disruptive event.

The Group rankings of the assets are presented in **Table 7**. As captured in this table, although the groups following different approaches to prioritize CI/KRs, there was general agreement as to most of the CI/KRs that are considered the highest priority.

**Table 7: Ranking of the Regional Transportation System's Critical Infrastructure/Key Resources**

		Ranking					
		High		Medium		Low	
CI/KR	Group →	1	2	1	2	1	2
1	Interstate Systems (I-4, I-75, I-275)	x	x				
2	U.S. Highways (e.g. U.S. 92, U.S. 301)	x	x				
3	State Roads (e.g. S.R. 60)	x			x		
4	Selmon Crosstown and Veterans Expressways			x	x		
5	Tampa International Airport	x	x				
6	MacDill Air Force Base			x	x		
7	Peter O Knight Airport					x	x
8	Plant City Airport					x	x
9	Tampa Executive Airport					x	x
10	Port of Tampa	x	x				
11	Howard Frankland Bridge		x	x			
12	Freight Activity Centers			x	x		
13	Rail Networks			x			x
14	Pipeline Network		x	x			
15	HART Bus Network System			x	x		

In addition, the following assets were also identified and ranked by workshop participants as critical (or deserving special consideration) given their characteristics as a potential choke points or lack of redundancy.

1. I-275/I-4 Interchange (H)
2. Veterans I-275/Airport Interchange (H)
3. Bruce B. Downs Boulevard (New Tampa) – (H) – lack of redundancy
4. Exposed Pipelines (H)
5. Ports (Hazmat storage and transportation) (H)
6. Airports /FAA/Air Traffic Control (H)
7. Veterans Expressway (H)
8. Selmon Expressway (H)
9. Bridges: Howard Frankland Bridge (H); Courtney Campbell (H); Gandy Bridge (H); Hillsborough River Bridges (L)
10. Other Roads: US-41 (M), SR 60 (M), Dale Mabry Hwy (M), US 92(L), US 301 (L)
11. I-75/I-4 Interchange (M)
12. CSX Freight along Broadway (L)

The importance of the utilities that support the transportation system were also highlighted as was the role that hospitals/MedEvac play in emergency situations. Potential threats and hazards that can affect pipelines are issues of special consideration. For example, portions of Tampa Pipeline's 80 miles of pipe are exposed and the section under the U.S. 301 Bridge over the Alafia River was punctured in November 2007 by a teenager<sup>22</sup>. This incident created a cloud that prompted a half-mile evacuation of residents that lasted for two days, and caused businesses and schools in the area to close. This incident highlights the vulnerability of sections of the pipeline system to potential vandalism and other threats.

It is also important to note that the MacDill Air Force Base is located in the City of Tampa and is a CI/KR as well, although it is not included in the list of “public transportation infrastructure” referred to in this report. The requirements of the CI/KRs related to MacDill Air Force Base are not considered in this report, but are nevertheless important to a regional assessment. In the case of a catastrophic event, the Department of Defense would likely be called upon to provide additional support to immediate response and recovery efforts, which may exceed capabilities of the civilian authorities.

Given that it was not clear how the MPO could incorporate issues related to utilities, hospitals, and other related aspects in its planning efforts, it was determined that some of the above mentioned CI/KRs may not be specifically addressed in long range transportation planning and perhaps can be considered in general resiliency plans.

It is also important to reemphasize that the CI/KR list above and its ranking was done by participants during the LRTP Workshop, and does not necessarily reflect official lists maintained by DHS or views of all stakeholders.

## 8.0 GAP ANALYSIS OF THE REGIONAL TRANSPORTATION SYSTEM

During the interview process and the Workshop, stakeholders were asked to discuss existing security and emergency management systems, capabilities, and forums. In addition, they were asked to identify gaps in these existing structures and areas that the LRTP and MPO can support, and the best ways for it to do so. In addition, a detailed document review conducted by consultant staff also helped determine potential gaps that the MPO may be able to fill in the future as it engages more actively with the existing network involved with transportation security and emergency management.

The gap analysis focused on the following broad categories: (i) redundancy, (ii) capacity, (iii) planning, (iv) coordination, and (v) communication. The key gaps/issues, as well as the description of existing or potential LRTP projects/initiatives that could help address the identified issues are presented in **Table 8**.

**Table 8: Gap Analysis of the Regional Transportation System**

Gaps/Issues	LRTP Update Findings	Description of Existing or Potential LRTP Project/Initiative to Address Relevant Issues/General Comments	LRTP Project Identified
<p><b>A. Redundancy/ Capacity</b></p>	<ul style="list-style-type: none"> <li>▪ Specific Road and highway segments lack redundancy                             <ul style="list-style-type: none"> <li>○ There are multiple North-South routes, but the East-West routes need additional alternatives to increase redundancy in the roadway system</li> <li>○ Bruce B. Downs Boulevard (New Tampa) does not have any redundancy as it only has one way in/one way out</li> </ul> </li> <li>▪ There is insufficient diversify of utilization across the modes of transportation for citizens and commodities                             <ul style="list-style-type: none"> <li>○ There is over-reliance in personal transportation and related infrastructure</li> <li>○ Additional efficient intermodal and multi-modal systems need to be developed</li> </ul> </li> </ul>	<p>Existing roads could be widened/expanded if and when possible, but a more balanced distribution of traffic between all modes, including non-motorized modes of transportation is required</p> <ul style="list-style-type: none"> <li>▪ Add mass transit options that alleviate congested roads</li> <li>▪ Promote non-motorized transportation alternatives where applicable</li> <li>▪ Intrastate Highway System Projects, TBARTA, County, and HART Initiatives could alleviate some of these issues</li> </ul>	<p>Yes (i.e. Super Express corridors and bus rapid transit improvements on two corridors: Bruce B. Downs Boulevard and Lee Roy; Selmon Crosstown Expressway)</p>
	<ul style="list-style-type: none"> <li>▪ The maritime sector in Southern Florida lacks redundancy for handling and storing critical liquid bulk commodities                             <ul style="list-style-type: none"> <li>○ Port of Tampa is the region's major provider for gasoline, coal, chemicals and other critical bulk commodities</li> <li>○ Storage facilities and pipeline distribution system transporting hazardous liquid bulk need to be closely monitored, and in some cases additional security or at a minimum more information should be shared with law enforcement authorities and emergency personnel</li> </ul> </li> </ul>	<p>The environmental and operational challenges need to be overcome to develop other regional ports (i.e. this extends beyond Hillsborough County but potential impact would certainly affect the County) to provide a potential alternate route and additional capacity for the region. This issue may be considered as the region assesses its capability to compete for the Post-Panamax Shipping business</p> <ul style="list-style-type: none"> <li>▪ Potential federal funding opportunities to enhance capabilities in these areas may include:                             <ul style="list-style-type: none"> <li>○ Port Security Grant Program (PSGP)</li> <li>○ Hazardous Materials Emergency Preparedness Grant Program (HMEP)</li> </ul> </li> </ul>	<p>No</p>
	<ul style="list-style-type: none"> <li>▪ Lack of alternative transportation routes at critical intersections could leave the system vulnerable to significant disruptions to local and regional passenger traffic as well as to the supply chain of critical commodities                             <ol style="list-style-type: none"> <li>a. I-275/I-4 Interchange</li> <li>b. I-75/I-4 Interchange</li> <li>c. Veterans I-275/Airport Interchange</li> <li>d. Veterans Expressway</li> <li>e. Selmon Expressway</li> <li>f. Local Roads: US-41 and SR 60</li> </ol> </li> </ul>	<p>Additional infrastructure and alternative routes (in areas where inadequacies have been identified), increases system-wide trade and benefits business on a daily basis as well as right after a disruption</p> <ul style="list-style-type: none"> <li>▪ Development of a Light Rail Transit (LRT) system or other mass transit projects could also provide redundancy for major transportation needs/routes</li> <li>▪ Light Rail: Station Planning and Right of Way Acquisition Program HART</li> <li>▪ Several Intrastate Highway System Projects, County, and HART Initiatives</li> </ul>	<p>Yes (i.e. Various I-275 and I-4 highway capacity projects.)</p>
	<ul style="list-style-type: none"> <li>▪ Lack of funding for private or public infrastructure (i.e. road infrastructure, mass transit systems, port and airport related facilities) to add to required system capacity, flexibility, and redundancy.</li> </ul>	<p>Add flexibility, capacity and redundancy which support system-wide resiliency</p> <ul style="list-style-type: none"> <li>▪ Additional infrastructure (in areas where inadequacies have been identified), increases quality of life of the citizens and benefits business on a daily basis as well as in a recovery event</li> </ul>	<p>Yes (i.e. Light Rail Transit System - Northeast and West Corridor)</p>

Gaps/Issues	LRTP Update Findings	Description of Existing or Potential LRTP Project/Initiative to Address Relevant Issues/General Comments	LRTP Project Identified
	<ul style="list-style-type: none"> <li>▪ There are transportation assets located in vulnerable areas which could be especially impacted by natural hazards, especially in the future if sea level rises to the level projected by many climate change experts                             <ul style="list-style-type: none"> <li>a. Resources should be focused on CI/KRs that have the greatest impact on the economy and well being of the region’s citizens, to the supply chain infrastructure of critical commodities whose functionality is not duplicated elsewhere (e.g., bridges, cargo handling equipment, intermodal facilities, and power and water sources).</li> </ul> </li> </ul>	<p>Work with various stakeholders to identify CI/KRs that are vulnerable and develop solutions to address them and help strengthen the overall transportation system</p>	<p>No</p>
<p><b>B. Communications/Coordination</b></p>	<ul style="list-style-type: none"> <li>• Level of Service (LOS) agreements are increasingly a concern for new development and future transportation projects need to account for the LOS and evacuation requirements</li> <li>• Need to identify location of pipelines and inform the location to law enforcement to help reduce accessibility and protect them. Currently the information exists but is kept secure. In the future, it would be beneficial to keep maps marked as “sensitive” but made accessible to emergency management and law enforcement personnel on a need-to-know basis.</li> <li>• Inconsistent and discontinuous road names – future efforts could develop/determine a better system for naming roads or even renaming some existing roads. This issue is especially important from a law enforcement and emergency personnel standpoint to be able to communicate and respond effectively in a time-sensitive situation.</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage coordination with emergency management community, departments of public works, and the Florida Department of Transportation for design of new infrastructure to build in components such as surveillance systems at critical interchanges and other monitoring tools. Increased coordination and collaboration among the various security planning entities will help to maximize the benefit of plans and infrastructure development <sup>23</sup>.</li> <li>• Potential federal funding opportunities to enhance capabilities in these areas may include:                             <ul style="list-style-type: none"> <li>○ Port Security Grant Program (PSGP)</li> <li>○ Urban Area Security Initiative (UASI)</li> <li>○ Transit Security Grant Program (TSGP)</li> <li>○ Hazardous Materials Emergency Preparedness Grant Program (HMEP)</li> </ul> </li> </ul>	<p>No</p>
<p><b>C. Planning</b></p>	<ul style="list-style-type: none"> <li>• Increased coordination between transportation planning agencies and hazard mitigation planning agencies and emergency management community could improve the planning process for several plans long term plans being developed.</li> <li>• Security Checks (APB) at airports, port and other such facilities should be established and enforced consistently.</li> <li>• Any/all organizations should ensure that their adopted security policies and procedures are being followed and tested periodically.</li> </ul>	<ul style="list-style-type: none"> <li>• State Homeland Security Grant Program (SHSP)</li> <li>• Better align planning efforts and interaction with other agencies within the county, especially Hazard Mitigation Unit and Emergency Management.</li> </ul>	<p>No</p>

## 9.0 TRANSPORTATION SECURITY GUIDELINES AND STRATEGIES IN THE LRTP

### 9.1 VISION

Integrate security as an underlying component of regional transportation planning to complement and support existing emergency management and security stakeholders, policies, plans and programs in order to enhance the system's overall resiliency.

### 9.2 GOALS AND OBJECTIVES

The MPO has adopted the following goals and objectives to guide the 2035 Update of the LRTP.

#### **LRTP Goal V: Enhance the safety and security of the transportation system for both motorized and non-motorized users**

##### **Security Objectives:**

- Provide for safer travel for all modes of transportation, including walking, bicycling, transit, auto, and freight
- Increase the security and resiliency of the multi-modal transportation system
- Improve the ability of the transportation network to support emergency management response and recovery efforts

### 9.3 RECOMMENDATIONS

#### **1. Expand the Prioritization Process to account for Transportation Security**

Security/emergency management issues are important criteria in transportation planning and the prioritization of federally funded transportation projects and need to be considered in the UPWP, TIP, and the LRTP.

Efforts to prioritize existing and future transportation infrastructure investments to enhance transportation security may be dedicated projects for this purpose or those that have such a component within them. Regional transportation projects that include elements of security and emergency management components, or that address issues associated with Critical Infrastructure/Key Resources (CI/KRs), should receive a higher priority in the MPO's evaluation mechanism. These projects can range in size and scope, but should generally support incident prevention, protection, redundancy, and recovery.

Potential rating criteria may include the project's benefit to the system in:

- Improving the system's normal daily performance;
- Improving the system's ability to respond to a potential disruptive event; and
- Improving the system's capabilities to minimize loss due to incident and expedite a long-term recovery from a disruptive event.

This rating criteria mentioned above can be measured by indicators such as the ones shown as an example in **Table 9**. The indicators identified in this table could help with evaluation of potential projects and investments as it relates to:

- Risk Reduction Effect to potential Threats and Vulnerabilities to CI/KRs
- How much additional capacity will it provide to the system?
- What impact will it have on providing alternative routes to potential choke points?
- What impact will it have on reducing emergency response and resumption time?
- Does it support recovery after a security incident?
- Does it enable better coordination and communication during and after an emergency?

**Table 9: Sample Security Rating Criteria**

Prioritization Criteria (Score each item: Yes=1, No=0)			Project #1	Project #2
1	<b>Relationship to Evacuation Route or CI/KR</b>	Provides any improvement to a designated Evacuation Route, and/or Critical Infrastructure/Key Resource (CI/KR) ranked “High” or “Medium”	1	0
2	<b>Capacity</b>	Enhances transportation system capacity and interface of modes and users, particularly with regard to how system would be used during response/recovery	1	0
3	<b>Redundancy</b>	Provides redundancy to key corridors and alleviates potential issues at critical choke points in system or supply chain	0	1
4	<b>Recovery</b>	Facilitates or improves ability of transportation system to support post-incident recovery activities	1	1
5	<b>Coordination and Communication</b>	Improves ability of transportation management and/or emergency management agencies to share information and coordinate activities during incident response and recovery	0	0
<b>TOTAL SCORE</b>			<b>3</b>	<b>2</b>

Each project can achieve an overall score of 0 – 5 (5 being the highest)

This sample rating criteria could in turn help to compare different projects across modes and jurisdictions. Incorporating security and emergency criteria as part of the UPWP, TIP, and the LRTP development will help ensuring that emergency management and security is considered as part of alternative analyses, comprehensive plans, and other major investment studies.



## 2. Invest to Support the Resiliency and Integration of the CI/KRs

The MPO has to consider the relevant information on CI/KRs in its planning efforts and priorities for all federally funded transportation projects in Hillsborough County. Transportation projects that address CI/KR related issues should receive special consideration in the prioritization criteria for federally funded projects given the importance of these assets to the region's transportation system. The Department of Homeland Security's Office of Infrastructure Protection is a key agency with which the MPO should coordinate in the future to ensure that Critical Infrastructure/Key Resources are fully considered in its future planning efforts.

Investments that address issues related to CI/KRs help enhance the system's overall resiliency and its ability to provide a higher level of performance for operations under normal environments, as well as during a potential incident. Effective projects and initiatives that support the development of the system's capacity, redundancy, coordination/communication, and planning will increase the resiliency of the overall system. A long-term view considering issues related to climate change will also be required to avoid adverse impacts in the future, especially as it relates to the transportation infrastructure around the vulnerable low-lying areas. Another important emergency management issue to consider both from a transportation planning and a hazard mitigation standpoint is the newly adopted transportation evacuation level-of-service (LOS) standard within the Comprehensive Plan<sup>24</sup> for both the Coastal High Hazard Area and the Coastal Planning Area. The LOS standard provides planning and policy direction for development activities in the coastal planning area, including restrictions on development activities where such activities would damage or destroy coastal resources, and in areas subject to destruction by natural disaster.

Insight from the activities performed by the county, private sector participants, and other stakeholders in preparation of the Post Disaster Recovery Plan (PDRP) could help FDOT and the MPO in the prioritization of projects, programs, and activities if it carries particular importance to the County's PDRP or LOS standards.

It will also be important to coordinate research and future investment in vulnerable areas with similar activities being undertaken by the Post-Disaster Redevelopment Plan, Hazard Mitigation, and aligning recommendations with Florida's Energy and Climate Change Action Plan<sup>25</sup>. Future planning can incorporate issues related to climate change. The use of existing and new tools can support the planning process and the implementation of transportation projects that are more robust and can withstand the projected consequences of changes in the global climate. For example, the World Bank<sup>26</sup> has developed a set of tools to help policy makers address issues related with climate change at the local and regional level to help guide transportation decision makers in identifying key issues and potential impacts of climate change and may be a good starting point for discussion.

### 3. Align MPO Existing Programs and Resources with Local and Regional Security Initiatives

The wealth of resources and capabilities available to the MPO should be aligned and used to support existing local and regional security initiatives. It is important that the MPO directly incorporate emergency management and transportation security-related issues in its work program and planning efforts and work closely with the Tampa Bay Regional Planning Council (TBRPC) to ensure that the latest information relevant to the regional evacuation plan is included in its planning efforts. The TBRPC sponsors the official regional awareness program. The latest evacuation studies, published as of 2006 and the evacuation route information were evaluated as part of this LRTP update process. The TBRPC and its partners are in the process of updating these studies and related models. The current evacuation studies and routes are the published guidelines until 2010 at which point the updates will be released.

The MPO should strive to coordinate with and leverage funding opportunities in conjunction with the Hazard Mitigation Plan. To more fully incorporate emergency management and security considerations in its planning activities, the MPO could benefit from participating in some of the previously mentioned forums (i.e. Post-Disaster Redevelopment Plan) as well as coordinating with the state and county divisions of emergency management.

The transportation planning process also could benefit from closer coordination with the State's Emergency Management Division to ensure that the analysis conducted in the catastrophic planning, the hurricane program, and CEMP are considered in the development of the UPWP, LRTP, and TIP. Insight from the activities performed by the state may help FDOT and the MPO prioritize certain projects, programs, and activities if it carries particular importance to Florida's emergency management plans and programs.

The MPO could also look to leverage potential funding opportunities more traditionally focused on hazard mitigation or security initiatives. Potential federal funding opportunities to enhance capabilities in these areas may include:

- Port Security Grant Program (PSGP)
- Urban Area Security Initiative (UASI)
- Transit Security Grant Program (TSGP)
- Hazardous Materials Emergency Preparedness Grant Program (HMEP)
- Various other FEMA Grant Programs

The PDRP Infrastructure TAC may be one group the MPO begins to engage with in the near future. Given that this TAC is discussing many issues that are of interest to the MPO, the MPO could explore the potential to join this or other forums to ensure alignment and inclusion regarding transportation infrastructure assets and long-term regional planning. The organizational chart provided in Appendix A provides some topic areas where the MPO may be able to engage.

The MPO may also consider participating or otherwise supporting the establishment of a forum for regular and focused discussions on the linkage between transportation and emergency management. This support could help increase communication and coordination between transportation stakeholders and emergency response representatives. Rather than creating a new forum, existing groups like the Regional Domestic Security Task Force (RDSTF) or other established forums may be appropriate for these purposes.

In Florida, there are seven RDSTFs that are co-chaired by a local Sheriff or Police Chief and a Florida Department of Law Enforcement (FDLE) Special Agent in Charge (SAC). The RDSTFs are the foundation of Florida's Domestic Security structure. Task force members include first responders from the disciplines of fire/rescue, emergency management, public health and hospitals, as well as law enforcement. The task forces also work in partnership with schools, businesses, and private industries<sup>27</sup>. According to the FDLE website, RDSTFs use a multi-discipline approach to provide support to the community by serving as a force multiplier for local agencies, and working in conjunction with emergency management professionals.

MPO participation in existing security and emergency management forums, such as the PDRP Infrastructure TAC or the RDSTF is welcome and could help enhance the dialogue on infrastructure planning.

#### **4. Leverage the transportation assets and technology to support emergency management response, recovery, and redevelopment**

Although the modal agencies have been actively involved in recent security exercises, the MPO and other regional planning groups have not been active participants in these activities across transportation modes. MPO participation in regional assessments or at least strong coordination with DHS would help to ensure that security information is being considered in various transportation planning efforts. Future security and emergency management exercises and training programs may benefit from the participation of the respective modal agencies working in collaboration with transportation planning groups.

To further enhance the transportation system's security and emergency response capabilities, the MPO should strive to promote and support projects that:

- Leverage ITS investments to improve situation awareness and interoperable communications;
- Leverage Congestion Mitigation and Air Quality (CMAQ) funding, should the metropolitan area become eligible for such funding in the future;
- Create and maintain databases to provide transportation related information which can be of use for evacuation planning; and
- Maximize Geographical Information Systems (GIS) capabilities.

ITS investments offer a significant opportunity to support emergency management, security personnel, and other stakeholders to prevent and respond to man-made or natural incidents. This is especially true for efficient operation of the surface transportation system, which plays an essential role in responding to natural disasters and other catastrophic incidents. Fully leveraging the ITS capabilities can improve traffic management, law enforcement, emergency management and homeland security activities.

The integration of ITS, GIS, and data management and communication capabilities can provide security stakeholders with real time tools essential to developing and implementing a rapid and efficient response to man-made threats or natural hazards. These resources may also be beneficial in supporting the development of interactive and dynamic evacuation plans that can support response and recovery to major incidents. Through its existing activities and capabilities, combined with additional resources and partnerships as needed, the Hillsborough County MPO can play a significant role in ensuring the resiliency of the region and its ability to recover from a potential catastrophic incident.

## 10. REFERENCES

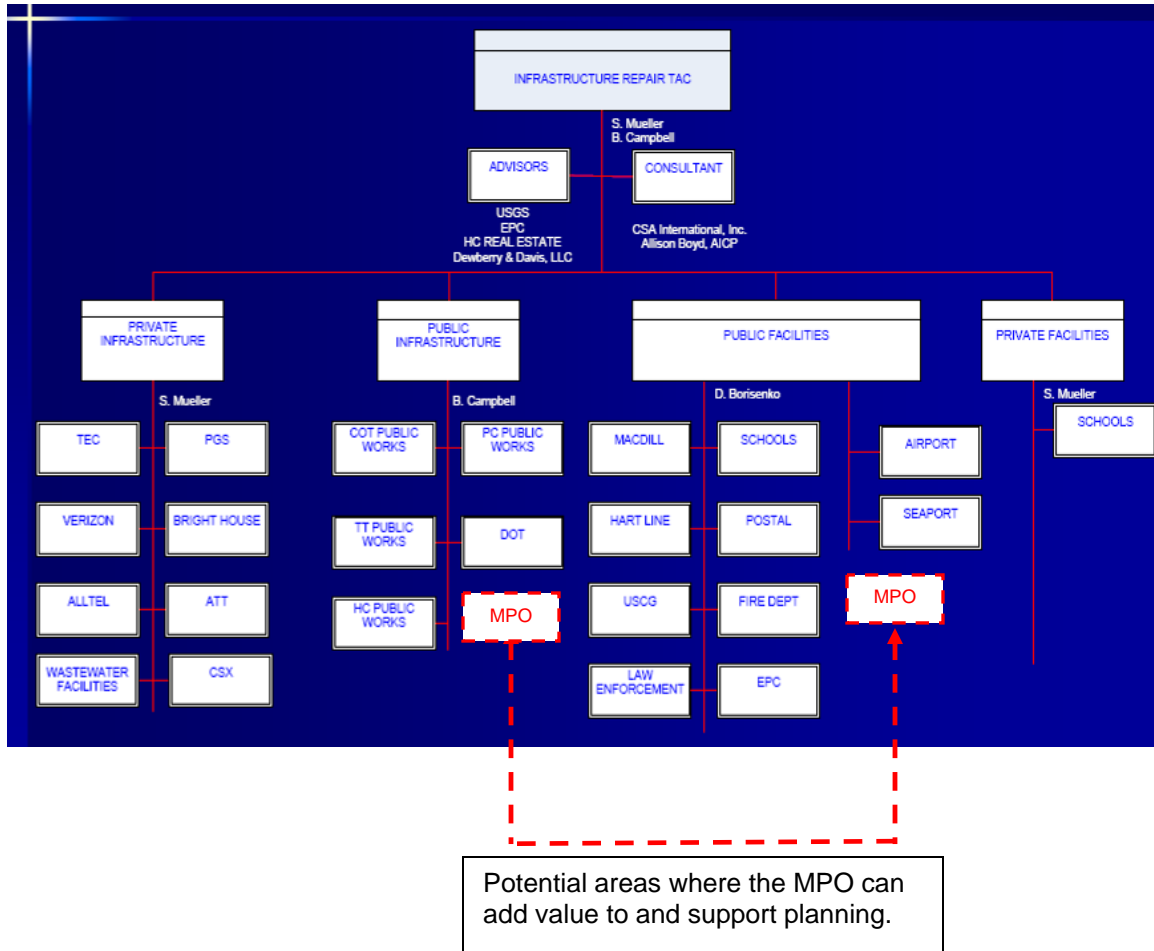
- 1 <http://www.planning.dot.gov/documents/BriefingBook/BBook.htm#13BB>.
- 2 The Transportation Planning Process: Key Issues. A Briefing Book for Transportation Decisionmakers, Officials, and Staff  
(<http://www.planning.dot.gov/documents/BriefingBook/BBook.htm#13BB>).
- 3 TR News: All-Hazards Preparedness, Response, and Recovery  
(<http://onlinepubs.trb.org/onlinepubs/trnews/trnews250.pdf>).
- 4 The 2008 Review of Florida's MPO Long Range Transportation Plans – October 2008  
<http://www.cutr.usf.edu/programs/pcm/files/2008-11-LRTPReview.pdf>.
- 5 Hillsborough County Comprehensive Emergency Management Plan (CEMP)  
<http://www.hillsboroughcounty.org/emergency/resources/publications/cempfinal.pdf>.
- 6 Information from this section was taken from Florida Division of Emergency Management's website  
([http://floridadisaster.org/about\\_the\\_division.htm](http://floridadisaster.org/about_the_division.htm)).
- 7 <http://www.fas.org/sgp/crs/homesecc/RL33053.pdf>.
- 8 Information from this section was taken from Hillsborough County Emergency Management's website  
(<http://www.hillsboroughcounty.org/emergency/>).
- 9 Information from this section was taken from Hillsborough County's Hazard Mitigation website  
(<http://www.hillsboroughcounty.org/pgm/hazardmit/>).
- 10 <http://www.msnbc.msn.com/id/21777101/>.
- 11 Presentation by THEA to the Infrastructure Task Force  
<http://www.hillsboroughcounty.org/transtaskforce/resources/publications/info/031008expresswayauthoritywaggoner.pdf>.
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<http://www.hillsboroughcounty.org/emergency/resources/publications/cempfinal.pdf>.
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<http://www.asce.org/files/pdf/instfound/1-Wong-CascadiaEarthquakeHazardsRisk.pdf>.
- 15 IPCC is the scientific intergovernmental body established to provide the decision-makers and others interested in climate change with an objective source of information about climate change.  
[http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr\\_spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf).
- 16 TRB Report SR290 - Potential Impacts of Climate Change on U.S. Transportation  
<http://onlinepubs.trb.org/onlinepubs/sr/sr290.pdf>.
- 17 <http://mceer.buffalo.edu/publications/bulletin/06/20-01/images/katrina2bridges-lg.jpg>.
- 18 *Florida and Climate Change – The Costs of Inaction*, Tufts University. November 2007  
[http://ase.tufts.edu/gdae/Pubs/rp/Florida\\_lr.pdf](http://ase.tufts.edu/gdae/Pubs/rp/Florida_lr.pdf).
- 19 [http://ase.tufts.edu/gdae/Pubs/rp/Florida\\_lr.pdf](http://ase.tufts.edu/gdae/Pubs/rp/Florida_lr.pdf) (pg. 41).
- 20 The U.S. Department of Homeland Security has developed a comprehensive taxonomy of transportation critical infrastructure and key resources. See Transportation Systems Critical Infrastructure and Key Resources Sector-Specific Plan as Input to the National Infrastructure Protection Plan (May 2007), Appendix 5.  
[http://www.tsa.dhs.gov/assets/pdf/transportation\\_base\\_plan\\_appendixes.pdf](http://www.tsa.dhs.gov/assets/pdf/transportation_base_plan_appendixes.pdf).
- 21 Source URS.
- 22 <http://www.tbo.com/news/metro/MGBKW9EBKBF.html>.
- 23 The Hillsborough County [Post-Disaster Redevelopment Plan](#) and the [Local Mitigation Strategy](#) are examples of plans and programs that would benefit from close coordination with the TIP and other plans developed by the MPO.  
<http://www.theplanningcommission.org/hillsborough/comprehensiveplan>.
- 24 <http://www.dep.state.fl.us/ClimateChange/team/file/phase2report08.pdf>.
- 25 [http://siteresources.worldbank.org/INTEASTASIA/PACIFIC/Resources/226262-1217025557988/climatecities\\_section03.pdf](http://siteresources.worldbank.org/INTEASTASIA/PACIFIC/Resources/226262-1217025557988/climatecities_section03.pdf).
- 26 <http://www.fdle.state.fl.us/Content/getdoc/949c2698-2ed4-478c-ad98-7f9a6fbb91d7/Domestic-Security-Organization.aspx>.
- 27

## APPENDICES

### Appendix A

The MPO could potentially support/provide input to the PDRP Infrastructure TAC in a few different areas, including transportation planning issues related to public infrastructure and public facilities. Potential areas of participation are highlighted in Figure A1 below.

**Figure A1: Post-Disaster Redevelopment Plan Infrastructure Repair TAC Organizational Chart**



## Appendix B

According to the Intergovernmental Panel on Climate Change (IPCC)<sup>1</sup>, climate change will have a significant impact on transportation. A recent Transportation Research Board (TRB) report, entitled *Potential Impacts of Climate Change on U.S. Transportation*<sup>2</sup>, was commissioned to provide guidance for transportation decision makers to identify key issues affecting the way U.S. transportation for some of the potential impacts of climate change.

This report states that the five climate changes of particular importance to transportation are:

- Increases in very hot days and heat waves,
- Increases in Arctic temperatures,
- Rising sea levels (99% probability of occurrence),
- Increases in intense precipitation events, and
- Increases in hurricane intensity (66% probability of occurrence).

The impacts will vary by mode of transportation and region of the country, but they will be widespread and costly in both human and economic terms

Potentially, the greatest impact of climate change for North America's transportation systems will be flooding of coastal roads, railways, transit systems, and runways because of global rising sea levels, coupled with storm surges and exacerbated in some locations by land subsidence.

### **Rising sea levels, combined with storm surges**

- More frequent interruptions to coastal and low-lying roadway travel and rail service due to storm surges.
- More severe storm surges, requiring evacuation or changes in development patterns
- Inundation of roads, rail lines, and airport runways in coastal areas
- More frequent or severe flooding of underground tunnels and low-lying infrastructure
- Potential for closure or restrictions at several of the top 50 airports that lie in coastal zones, affecting service to the highest-density populations in the United States
- Erosion of road base and bridge supports
- Reduced clearance under bridges
- Changes in harbor and port facilities to accommodate higher tides and storm surges

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<sup>1</sup> [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr\\_spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf)

<sup>2</sup> Information from this section was summarized directly from the TRB Report entitled *Potential Impacts of Climate Change on U.S. Transportation*.  
<http://onlinepubs.trb.org/onlinepubs/sr/sr290.pdf>



**Increases in intense precipitation events**

- Increases in weather-related delays and traffic disruptions
- Increased flooding of evacuation routes
- Increases in airline delays due to convective weather
- Increases in flooding of roadways, rail lines, subterranean tunnels, and runways
- Increases in road washout, damages to rail-bed support structures, and landslides and mudslides that damage roadways and tracks
- Increases in scouring of pipeline roadbeds and damage to pipelines

## Appendix C

### Workshop – Draft Agenda Long Range Transportation Plan (LRTP) Safety, Security, and Emergency Management February 12, 2009 – 9:00 am – 12:00 pm

**Location:** Hillsborough County Center Building, 601 E. Kennedy Blvd.,  
Tampa, FL 33602 (18th Floor, Planning Commission Board Room)

#### Program Overview:

<u>Time</u>	<u>Topic</u>
9:00 – 9:15 am	Welcome, Introductions and Announcements (Ray Chiamonte)
9:15 – 9:45 am	Overview of the Hillsborough County Metropolitan Planning Organization (MPO) and the Long Range Transportation Plan Update Process (Joe Zambito)
9:45 – 10:00 am	Overview of the Safety, Security, and Emergency Management Section of the LRTP (Jordan Karp)
10:00 – 10:15 am	Break*
10:15 – 11:15 am	Breakout Groups (Elisson Wright/Shubha Shrivastava) <ul style="list-style-type: none"> <li>▪ Identification of Transportation Assets/Hazards</li> <li>▪ Prioritizing Critical Infrastructure/Key Resources</li> <li>▪ Identification of Strategic Opportunities to further enhance the system's preparedness and/or resiliency</li> <li>▪ Potential opportunities/roles for the MPO</li> </ul>
11:15 – 11:45 am	Group Reports (Stakeholder Representatives)
11:45 – 12:00 pm	Next Steps and Closing Remarks (Rich Clarendon)

\* Light refreshments will be provided for the workshop participants

**Sign-In Sheet**  
**Workshop – Long Range Transportation Plan (LRTP)**  
**Safety, Security, and Emergency Management**  
**February 12, 2009 – 9:00 am – 12:00 pm**

**Location:** Hillsborough County Center Building, 601 E. Kennedy Blvd.,  
Tampa,  
FL 33602 (18th Floor, Planning Commission Board Room)

Name	Organization
1. Morris Favata	Hillsborough County Sunshine Line
2. George Shiley	City of Plant City Fire Chief/EM
3. Jacqueline Berrien	Hillsborough Area Regional Transit (HART)
4. David Kelsey	Hillsborough Area Regional Transit (HART)
5. Dan Fulcher	Hillsborough County Emergency Management
6. Dan Kelly	Tampa-Hillsborough Expressway Authority (THEA) (HNTB-GEC)
7. Fred Nutt	Hillsborough County Public Works Department
8. Jose M. Lopez	Hillsborough County Public Works Department
9. Luiz Bisacchi	Hillsborough County Public Works Department
10. Eugene Henry	Hillsborough County Hazard Mitigation
11. Terry Hensley	Florida Department of Transportation (FDOT)
12. Buddy Rudolph	Hillsborough County Sheriff's Office
13. Nadine Jones	Hillsborough County Aviation Authority (AA)
14. Ram Kancharla	Tampa Port Authority
15. Joe Zambito	Hillsborough County Metropolitan Planning Organization (MPO)
16. Rich Clarendon	URS Corporation
17. Shubha Shrivastava	URS Corporation
18. Jordan Karp	URS Corporation
19. Elisson Wright	URS Corporation

## Appendix D

### Photos from the LRTP Security and Emergency Management Workshop February 12, 2009



Welcome Remarks from Ramond [Chiamonte, Executive Director Hillsborough County MPO](#)



Stakeholders discussing security and emergency management issues related to the LRTP

## Appendix E

### Additional Security Planning Resource Materials FHWA Guidance - Consideration of Security in the Planning Process

#### Security Topics Related to the Planning Process

The following resources were provided by FHWA<sup>3</sup> and describe how transportation agencies can consider security as stand-alone factor in the statewide and metropolitan transportation planning process.

The resources are divided into the following topic areas:	<u>Page</u>
▪ General Transportation Planning Security Resources	9
▪ Providing a forum for interagency coordination in states and metropolitan areas including conducting training and exercises	10
▪ Modeling emergency response and evacuation	12
▪ Planning for recovery, financing and system adaptation	14
▪ Application of community and context sensitive solutions in security design	15
▪ Engaging the public on security issues from preparedness to evacuation to recovery	15
▪ Border security coordination (for border states or states with major points of entry)	16

Resources of particular interest are designated with a star ★ and may be good place to begin learning about a specific security topic area.

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<sup>3</sup> The FHWA Office of Planning Oversight & Stewardship provided this information on December 2008 as a list of useful resources for MPOs and other agencies to use for security planning.

## General Transportation Planning Security Resources

- ✦ NCHRP 525, “Incorporating Security into the Transportation Planning Process;” see [http://trb.org/news/blurbs\\_detail.asp?id=5028](http://trb.org/news/blurbs_detail.asp?id=5028)
- ✦ Examples of security planning from Houston-Galveston Area Council, San Diego Association of Governments, Oregon State Department of Transportation and the Ohio-Kentucky-Indiana Regional Council of Governments. See <http://www.planning.dot.gov/state.asp#pubs>
- “The Role of the Metropolitan Planning Organization (MPO) In Preparing for Security Incidents and Transportation System Response” by Michael D. Meyer. See [www.planning.dot.gov/Documents/Securitypaper.htm](http://www.planning.dot.gov/Documents/Securitypaper.htm)
- "Security Considerations in Transportation Planning" from Steven Polzin at CUTR; see <http://www.cutr.usf.edu/pubs/Security%20paper%200402.doc>
- “Volume II: Effective Practices In State Department of Transportation Security Planning;” from the Volpe National Transportation System Center; see [http://www.pooledfund.org/documents/TPF-5\\_085/effective\\_practices.pdf](http://www.pooledfund.org/documents/TPF-5_085/effective_practices.pdf)
- A scan of 15 recently completed State long range plans includes three with sections on security planning: Arizona, Ohio and Virginia. See [www.fhwa.dot.gov/hep10/state/index.html#practice](http://www.fhwa.dot.gov/hep10/state/index.html#practice).
  - While Arizona’s plan does not identify security as one of its key policies, an appended report entitled, “Security Considerations in Long-Range Transportation Planning: A White Paper for The Arizona Department of Transportation,” analyzes potential transportation security concerns for the transportation network as a whole and discusses how security can be integrated into long-range transportation planning
  - Ohio’s plan identifies four security strategies: predict, harden targets, educate and, respond and recover. As a part of its security activities, ODOT has plans, manuals, procedures and policies to manage security incidents, and coordinates with non-transportation security agencies
  - Virginia’s plan describes extensive security preparedness measures, including coordinating with the Office of Commonwealth Preparedness and Virginia Department of Emergency management
- FHWA Emergency Transportation Operations Planning Documents located at <http://ops.fhwa.dot.gov/opssecurity/index.htm> and at [http://ops.fhwa.dot.gov/opssecurity/evac\\_plan\\_doc\\_flyer/index.htm](http://ops.fhwa.dot.gov/opssecurity/evac_plan_doc_flyer/index.htm)

- The Infrastructure Security Partnership; see [www.tisp.org](http://www.tisp.org)
- ITE site for [www.ite.org/security/index.asp](http://www.ite.org/security/index.asp)

Providing a forum for Interagency Coordination in states and metropolitan areas including conducting training and exercises

- Baltimore Regional Operations Coordination Project. 2002, Baltimore Regional Transportation Board. See article in Public Roads, November/December 2004 (Vol. 68, No. 3) located at <http://www.tfhr.gov/pubrds/04nov/02.htm>.
- Capitol Region COG (Hartford, CT) Table Top Incident Management Exercise. 2001, Capitol Region COG. See [http://www.crcog.org/homeland\\_sec/index.html](http://www.crcog.org/homeland_sec/index.html) and [http://www.crcog.org/publications/TransportationDocs/IncMgmt/IM\\_TSBreport.pdf](http://www.crcog.org/publications/TransportationDocs/IncMgmt/IM_TSBreport.pdf).
- GAO Report 04-1009, "Homeland Security: Effective Regional Coordination Can Enhance Emergency Preparedness;" see [www.gao.gov/new.items/d041009.pdf](http://www.gao.gov/new.items/d041009.pdf)
- Hampton Roads Planning District Commission (HRPDC) - Hampton Roads, VA. HRPDC coordinates the Regional Emergency Management Technical Advisory Committee (REMTAC). REMTAC promotes the multilateral operation of emergency support functions such as evacuation and shelter planning and disaster planning for special needs populations. See <http://www.hrpdc.org/transport/emergency.shtml>.
- Houston-Galveston Area Council (H-GAC) - Houston, TX. H-GAC received funding from the Texas Division of Emergency Management (DEM) to prepare a regional hazard mitigation plan. H-GAC and 70 local governments developed a comprehensive plan that identifies regional hazards, vulnerabilities, and capabilities. The MPO held disaster mitigation planning workshops with community leaders as one tool for developing the mitigation plan. In the meetings participants were asked to complete a Risk and Capability Assessment; build a region wide consensus on disaster mitigation goals; and discuss possible mitigation actions. The final results from these meetings were incorporated into the Regional Hazard Mitigation Plan. This collaborative effort kept H-GAC informed of Metro Transit Authority's Regional Transit Security Strategy Guide that was previously prepared as a result of a transit security grant. See <http://www.h-gac.com/HGAC/Programs/Disaster+Preparedness/Regional+Mitigation+Plan.htm>

- “Integrating Security into Small MPO Planning Activities.” A presentation by Mark Lofgren from the Rural Transportation Safety and Security Center of the Upper Great Plains Transportation Institute at North Dakota State University at the 2007 Western Plains MPO Conference; see [http://www.sddot.com/pe/Projdev/planning\\_mpo.asp](http://www.sddot.com/pe/Projdev/planning_mpo.asp)
- Metropolitan Washington Council of Governments. Metropolitan Washington Council of Governments Regional Emergency Coordination Plan. 2002. [http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION\\_ID=16&SUBCLASSIFICATION\\_ID=26](http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION_ID=16&SUBCLASSIFICATION_ID=26)
- Ohio-Kentucky-Indiana Regional Council of Governments (OKI) – Cincinnati, OH. The Ohio-Kentucky-Indiana Regional Council of Governments created the Regional Homeland Security Coordinating Committee to provide leadership and coordination of the homeland security and domestic terrorism preparedness efforts in the region. The committee – comprised of the region’s county emergency management associations, county representatives, and other interest groups – will review these individual efforts from a regional perspective to insure that no vulnerabilities exist in the region’s response efforts. The Committee has been charged with developing a Regional Emergency Response Plan. The committee also provides a forum for the creation and implementation of new ideas related to homeland security and identification of the appropriate clearinghouse for funding regional projects. <http://www.oki.org/transportation/homelanddefense.html>.
- Oregon Department of Transportation (ODOT). ODOT prepared a series of background papers to brief the 14-member Safety and Security Committee and to provide an overview of actions taken by ODOT and its partners in preparing for man-made and natural disasters. ODOT used the Joint Policy Advisory Committee on Transportation as a means of coordinating with MPOs and transit agencies in the region on security issues. ODOT consulted with the Tri-County Metropolitan Transportation District (the regional transit provider in Portland Oregon) on its Regional Transit Security Grant in 2005. Here is a link to the Transportation Security portion of the Oregon Transportation Plan: <http://www.oregon.gov/ODOT/TD/TP/docs/otpSafety/Security.pdf>
- ❖ This joint FHWA/AMPO report summarizes the results of the workshop held in Orlando, Florida on January 30 and 31, 2008, on addressing security planning for natural and manmade disasters. Representatives from nine MPOs shared their experiences, success stories and challenges in this area. The ultimate goal of the workshop was to allow senior staff from a variety of MPOs to come together to share information and learn from each other in a facilitated open discussion setting. We developed this report to summarize the workshop discussions and results for the use and benefit of MPOs and their planning partners across the country.



[http://www.ampo.org/assets/library/172\\_securitywkshpjan08final.pdf](http://www.ampo.org/assets/library/172_securitywkshpjan08final.pdf)

### Modeling Emergency Response and Evacuation

- ⊛ NCHRP 8-36 (53) / 20-59(27) Peer Review of Disaster Response Issues in Transportation brought together several state and MPO planning directors to discuss priority issues in security, disaster response, and planning; see <http://planning.transportation.org/?siteid=30&pageid=1399>
- ⊛ Southeast Regional Planning and Economic Development District (Taunton, Massachusetts) Hurricane Evacuation Route Evaluation; see [http://www.srpedd.org/HERE\\_FULLL.pdf](http://www.srpedd.org/HERE_FULLL.pdf)
- “Report to Congress on Catastrophic Hurricane Evacuation Plan Evaluation” U.S. Department of Transportation in cooperation with the U.S. Department of Homeland Security (June 1, 2006); see <http://www.fhwa.dot.gov/reports/hurricanevacuation/>
- “A Study of the Impact of Nine Transportation Management Projects on Hurricane Evacuation;” see [www.its.dot.gov/JPODOCS/REPTS\\_TE/13940\\_files/13940.pdf](http://www.its.dot.gov/JPODOCS/REPTS_TE/13940_files/13940.pdf)
- Batchelor et. al. Hurricane Floyd Lessons Learned. 2000, North Carolina DOT. See <http://www.ncdot.org/doh/operations/floydlessons/PDF/HurricaneFloydLL.pdf>.
- Jafari et. al. “Technological advances in evacuation planning and emergency management: current state of the art.” 2003, Rutgers University, Center for Advanced Infrastructure & Transportation. See <http://www.cait.rutgers.edu/finalreports/EVAC-RU4474.pdf>.
- NOAA Costal Services Center, Hurricane Planning and Impact Assessment Reports. See <http://www.csc.noaa.gov/hes/general.html>.
  - Southeast United States Hurricane Evacuation Traffic Study, 2000
  - Hurricanes Bertha and Fran in North and South Carolina: Evacuation Behavior and Attitudes toward Mitigation, March 1997
  - The Next Step Incorporating Information from Comprehensive Hurricane Evacuation and Property Loss Studies into Community Emergency Plans and Programs, 1991
  - Islands Task Force Report: A Briefing on Hurricane Evacuation Study Needs in the United States Island Communities, 2001

- Perkins et. al. “Modeling transit issues unique to hurricane evacuations: North Carolina's small urban and rural areas.” 2001, The Transportation Institute, North Carolina Agricultural and Technical State University. See <http://www.ncat.edu/~traninst/Perkins%20Final%20Report%202001.pdf>
- San Diego Association of Governments (SANDAG) - San Diego, CA. SANDAG created the Public Safety Committee that focuses on homeland security and emergency preparedness. SANDAG integrated the Traffic Management Centers across regional borders, in cooperation with federal intelligence agencies. SANDAG prepared a Transit Emergency Planning Manual based on the experiences of those participating in emergency preparedness. SANDAG hosted an Emergency Transportation Operations Preparedness and Response Workshop. [http://www.sandag.cog.ca.us/uploads/publicationid/publicationid\\_1166\\_4520.pdf](http://www.sandag.cog.ca.us/uploads/publicationid/publicationid_1166_4520.pdf).
- Urbina, E. A. A State-o-the-Practice Review of Hurricane Evacuation Plans and Policies. Louisiana State University, May 2002. See [http://etd.lsu.edu/docs/available/etd-0418102-140236/unrestricted/Urbina\\_thesis.pdf](http://etd.lsu.edu/docs/available/etd-0418102-140236/unrestricted/Urbina_thesis.pdf)
- TRB Subcommittee on Emergency Evacuation. See <http://www.rsip.lsu.edu/anb10-3/Resources/resources.htm>
- V. P. Sisiopiku et. al. Regional Traffic Simulation for Emergency Preparedness. 2004, University Transportation Center for Alabama. See [http://utca.eng.ua.edu/projects/final\\_reports/03226fnl.pdf](http://utca.eng.ua.edu/projects/final_reports/03226fnl.pdf)
- ITE Presentation on “Transportation for Emergency Response and Recovery” see [http://www.ite.org/security/ITE\\_emerg\\_response.ppt](http://www.ite.org/security/ITE_emerg_response.ppt)
- Reuben B. Glodblatt and Kevin Weinisch, “Evacuation Planning, Human Factors, and Traffic Engineering Developing Systems for Training and Effective Response,” TR News 238 (May-June 2005) see <http://onlinepubs.trb.org/onlinepubs/trnews/trnews238.pdf>
- Identification and Analysis of Factors Affecting Emergency Evacuations - Main Report (NUREG/CR-6864, Vol. 1) see <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6864/v1/> or <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6864/index.html>. This study examines the efficiency and effectiveness of public evacuations of 1,000 or more people, in response to natural disasters, technological hazards, and malevolent acts, occurring in the United States between January 1, 1990, and June 30, 2003.

- Routes to Effective Evacuations Primer Series: Using Highways during Evacuation Operations for Events with Advance Notice (FHWA-HOP-06-109) located at [http://ops.fhwa.dot.gov/publications/evac\\_primer/00\\_evac\\_primer.htm](http://ops.fhwa.dot.gov/publications/evac_primer/00_evac_primer.htm)
- Routes to Effective Evacuations Primer Series: Using Highways during Evacuation Operations for Events with Little to No Advance Notice (FHWA-HOP-06-109) located at [http://ops.fhwa.dot.gov/publications/evac\\_primer/00\\_evac\\_primer.htm](http://ops.fhwa.dot.gov/publications/evac_primer/00_evac_primer.htm)
- Managing Pedestrians During Evacuations of Metropolitan Areas (FHWA-HOP-07-066) located at <http://ops.fhwa.dot.gov/publications/pedevac/index.htm>
- CALTRANS report exploring the variables that contribute to vehicular movement in an emergency environment. [http://www.dot.ca.gov/newtech/researchreports/reports/2008/final\\_report\\_project\\_06-03\\_03-13-08.pdf](http://www.dot.ca.gov/newtech/researchreports/reports/2008/final_report_project_06-03_03-13-08.pdf)

#### Planning for recovery, financing and system adaptation

- ❖ Washington State DOT. “Development of a Freight System Resiliency Plan” (August 2008) This research report proposes a methodical process to develop a long-term statewide freight system recovery (defined as freight system resiliency) plan to enhance the state’s ability to rapidly recover after a disaster and restore freight service from disruptions. A set of eight practical steps is established to develop a FSR plan. The report also offers practical how-to explanations for each step with relevant example(s) as well. While developed for WSDOT, the process can be transplanted elsewhere easily for any state DOT to develop a FSR plan. [http://www.wsdot.wa.gov/NR/rdonlyres/023FC2C7-DD28-4EB6-8203-98560DA76CB7/0/WSDOT\\_FSR\\_Report\\_v25.pdf](http://www.wsdot.wa.gov/NR/rdonlyres/023FC2C7-DD28-4EB6-8203-98560DA76CB7/0/WSDOT_FSR_Report_v25.pdf)
- “Conceptualizing and Measuring Resilience: A Key to Disaster Loss Reduction,” by Kathleen Tierney and Michel Bruneau in TR News (May-June 2007); see [http://www.trb.org/news/blurb\\_detail.asp?id=7870](http://www.trb.org/news/blurb_detail.asp?id=7870)
- American Planning Association. “Planning for Post-Disaster Recovery and Reconstruction” (PAS 483/484) 1998, see [www.planning.org/bookservice/description.htm?BCODE=P483](http://www.planning.org/bookservice/description.htm?BCODE=P483)
- Proceedings of the 1997 Post Hurricane Highway Recovery Workshop . 1997, FHWA Virginia Division. See [www.sys.virginia.edu/students/capstone/past/cap1999/11\\_16\\_VDOT.doc](http://www.sys.virginia.edu/students/capstone/past/cap1999/11_16_VDOT.doc).

- Volpe System Transportation Center. Long-Term Community Recovery Assessment Tool, 2005. See [www.volpe.dot.gov/infosrc/journal/2003/pdfs/chap3.pdf](http://www.volpe.dot.gov/infosrc/journal/2003/pdfs/chap3.pdf)
- “Potential Cost Savings from the Pre-Disaster Mitigation Program,” from the Congressional Budget Office, Publication No. 2926 (September 2007); see <http://www.cbo.gov/ftpdocs/86xx/doc8653/09-28-Disaster.pdf>
- “Regional Disaster Resilience: A Guide for Developing an Action Plan” developed by The Infrastructure Security Partnership (TISP) June 2006; see [http://www.tisp.org/rdr\\_guide](http://www.tisp.org/rdr_guide)
- Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I Draft Report; U.S. Climate Change Science Program Synthesis and Assessment Product 4.7 (Lead Agency: U.S. Department of Transportation; and Coordinating Agency: U.S. Geological Survey, U.S. Department of the Interior) October 2007; see <http://www.climatechange.gov/Library/sap/sap4-7/default.php> -- While this study focuses on long-term impacts of climate change, it provides an example of scenario-based risk assessment that could be applied to security and disaster management.
- Emergency Relief Manual (Federal-Aid Highways) Interim Update - August 2003, Office of Infrastructure, Office of Program Administration, Federal Highway Administration located at <http://www.fhwa.dot.gov/reports/erm/index.cfm>

#### Application of community and context sensitive solutions in security design

- Federal Transit Administration, The Public Transportation System Security and Emergency Preparedness Planning Guide (2003) <http://transit-safety.volpe.dot.gov/Publications/Default.asp>
- Designing for Security in the Nation's Capital (2001) located at [http://www.ncpc.gov/publications\\_press/publications.html](http://www.ncpc.gov/publications_press/publications.html) or at [http://www.ncpc.gov/planning\\_init/security/DesigningSec.pdf](http://www.ncpc.gov/planning_init/security/DesigningSec.pdf)

#### Engaging the public on security issues from preparedness to evacuation to recovery

- Hampton Roads Planning District Commission (HRPDC) - Hampton Roads, VA. HRPDC maintains an emergency management website which provides educational disaster preparedness information and local emergency contacts for residents of the region. See <http://www.hrpdc.org/transport/emergency.shtml>.

- “Communicating with the Public Using ATIS During Disasters: A Guide for Practitioners” Report FHWA-HOP-07-068; see <http://ops.fhwa.dot.gov/publications/atis/index.htm>
- “Public Participation in Natural Hazard Mitigation Policy Formation: Challenges for Comprehensive Planning,” by David R. Godschalk, Samuel Brody and Raymond Burby in Journal of Environmental Planning and Management, Volume 46, Issue 5, pages 733-754 (September 2003) see <http://archone.tamu.edu/epsru/pdf/03-07A.pdf>
- The Nuclear Regulatory Commission's “Guideline for External Risk Communication” located at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0308/index.html>

Border security coordination (for Border States or states with major points of entry)

- Robinson et. al., Border and Transportation Security: Possible New Directions and Policy Options (2005) Congressional Research Service. See <http://www.fas.org/sqp/crs/homsec/RL32841.pdf>.
- “Border Security and Canada-US Integration: Toward a Research Policy Agenda: A Symposium at Western Washington University” Summary of Proceedings (2005). The goal of this one-day symposium was to examine the impacts of new security measures on border functions, management and economic integration in the Canada-US context; see [http://www.thetbwg.org/library-library\\_e.htm](http://www.thetbwg.org/library-library_e.htm)