

# **Critical Infrastructure Protection in the National Capital Region**

**Risk-Based Foundations for Resilience and  
Sustainability**

**Final Report, Volume 4:  
Transportation/Postal and Shipping Sectors**

**September 2005**

**University Consortium for Infrastructure Protection**

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School of Law  
George Mason University

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## Risk-Based Foundations for Resilience and Sustainability

### Final Report, Volume 4: Transportation/Postal and Shipping Sectors

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– **Notice** –

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# Transportation/Postal and Shipping

## Executive Summary

The transportation/postal and shipping sector is unique in that, from the perspective of critical infrastructure analysis, it plays three distinct roles. First, it is a vital part of the region's economy and social structure, and its disruption would play havoc with the lives of millions of people. Second, it is potential means for the delivery of a terrorist attack. Third, it is essential to the effective response to a natural disaster or terrorist attack.

Elements of the region's transportation/postal and shipping infrastructure that are particularly vulnerable to disruption by natural disaster or terrorist attack are as follows: public transit stations and vehicles, trucks and trains carrying hazardous materials, and choke points in the transportation network, most obviously bridges and tunnels.

Stakeholders in the protection of the region's transportation/postal and shipping infrastructure include numerous federal agencies, state transportation agencies, regional authorities, local governmental units, and private sector providers of passenger and freight transport. This sector has important upstream dependencies on the electric power and telecommunications industries, and downstream interdependencies with almost the whole economic and social structure of the region.

Regional stakeholders, both public and private sector, are generally aware of the need to protect critical infrastructure, and a range of measures to enhance security have been instituted since September 11, 2001. A number of vulnerability assessment and risk management tools have been deployed by agencies in the region. However, deployment of security measures has been limited by lack of funding, and the vulnerability assessment and risk management tools suffer from a lack of regional perspective. Furthermore, providers of transportation services have been reluctant to undertake changes that would unduly disrupt normal day-to-day operations.

The research team recommends the construction of a back-up operations center for the Washington Area Metropolitan Transit Authority, technologies to help guarantee that traffic signals will function effectively in case of natural disaster or terrorist attack, and vesting of authority for coordination of the region's transportation communications system in CapCom (the Capital Area Communications Network).

Further, the research team recommends that, in planning for investment in security-enhancing technologies, regional authorities give due consideration to existing operational and planning procedures; to use of technologies and processes that benefit non-emergency as well as emergency situations; and to the appropriate trade-offs between off-the-shelf and emerging technologies, and open vs. proprietary standards.

The research team believes that, in general, existing governmental arrangements are adequate platforms for most governance issues, but that a special inter-sectoral working group should be established, and that, as already noted, CapCom should have substantially increased authority.

## 1. Sector Background

The transportation/postal and shipping sector is unique in that with respect to security it fits into three distinct categories:

- Protected Asset - Transportation / postal and shipping infrastructures must be secured and protected from malevolent attacks because, as mentioned, they are critical in the support of national defense, movement of people and goods, employment of millions, generation of revenue and consumption of resources and services generated by other sectors of the economy. Loss of key elements of transportation infrastructure elements, such as a bridge or a tunnel, for extended periods of time can have catastrophic impacts on the economy and public safety.
- Method of Delivery of Malevolent Attack - Certain elements of transportation / postal and shipping sector must be secured as they can be used as a vehicle or method of delivery for malevolent attacks.
- Crisis Response System - Transportation infrastructure must be protected as it supports vital emergency service functions that are implemented in the event of an attack on other critical infrastructure sectors.

Another peculiarity of transport/postal and shipping infrastructure is that it is particularly vulnerable because of its diverse, expansive and accessible nature. These factors will be examined in this report.

### ***1.1 Sector Profile***

The geographic boundaries used for analysis in this report are based on the definition of the NCR in United States Code [40 USC 71 (b)] and includes the District of Columbia; Montgomery and Prince Georges Counties in Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; and all cities existing in Maryland or Virginia within the geographic area designated by the outer boundaries of the combined counties listed.

Our definition of the transportation/postal and shipping sector is in part based on Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT ACT) Act of 2001 and The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets. The sector is composed of:

- Fixed infrastructure – Capital assets such as facilities, roadways, information systems and voice and data communications systems.
- Conveyances – Vehicles.
- Human Capital – Private industry employees and government employees at the state, local, and federal level that are responsible for the development, operation and management of transportation systems.

The elements of the transportation/postal and shipping sector are as follows:

1. Highway System - The physical facilities themselves, including roadways, bridges and tunnels, inter-modal terminals, maintenance facilities, vehicles (private and commercial motor carriers) operating on the system and the control and information infrastructure that monitors and manages the flow of goods, vehicles, and people on the highway system.<sup>1, 2</sup>
2. Transit System - Bus, rail, or other conveyance, either publicly or privately owned, that provide the public general or special service<sup>3</sup> on a regular and continuing basis. System components include all of the vehicles, equipment, right-of-way, routes, support equipment and facilities, and buildings and real estate belonging to or operated by the public transportation authority.<sup>4</sup>

3. Rail System - Rail system infrastructure management elements such as track maintenance throughout the NCR and the vehicles that operate on and adjacent to these facilities.
4. Airport Ground Access Systems - All of the vehicles, equipment, right-of-way, routes, support equipment and facilities, and buildings and real estate that provide ground access to Washington Reagan National Airport, Dulles International Airport and Baltimore-Washington International Airport. As mentioned previously, this report purposely does not address terminal and airfield operations and their related security initiatives as they have been the focal point of significant planning, engineering, deployment and operational efforts at the Federal level.
5. Facilities, systems, and functions that support postal and shipping. For the purposes of this research, critical postal and shipping infrastructure includes:
  - Warehouses - Major facilities that support logistics providers operations are an important node in the supply chain system.
  - Intermodal facilities - Points of transfer of goods between two or more modes of transport. The postal and shipping industry utilizes all the transport modes in the bid to meet the time sensitive nature of their business. The interface of rail, road, air and sea modes creates the need to maintain or use inter-modal facilities.
  - Terminals - Dedicated loading points of the various postal and shipping organizations. These terminals serve as the starting point of the postal and shipping chain.
  - Vehicles and other Crafts – Cars, trucks, motorbikes and aircraft used to deliver goods.
  - Cyber Networks – Used to support administrative and operational functions of the shipper.

## ***1.2 Sector Characteristics***

### **Transportation Security Challenges in the Region**

Vulnerabilities of surface transportation in the National Capital Region to disruptions, including terrorist attack, are similar in many regards to those of any major metropolitan area, and different in certain ways. We discuss these similarities and differences below.

#### **Traveler Vulnerability**

Public transportation collects large numbers of people into confined station areas, rendering them vulnerable to various types of explosive or bio-chemical attacks, as demonstrated in public transit recently in London, and in years past in Tokyo and Madrid. Intercity bus or rail terminals and airports are also possible targets, and, for all the current attention to screening aircraft passengers and luggage before loading aircraft, little attention is paid to surveillance and hardening of the terminals themselves.

En route transit vehicles, most obviously buses, are also vulnerable to attack. While such have not yet been targeted in North America or Europe, they have been widely targeted in Israel. Occasional derailments and crashes of Amtrak trains in the United States show the damage that could be wrought by intentional attacks on this mode of transportation.

## **Freight Movement Disruption**

Direct terrorist attacks on freight have not thus far been a problem in the United States. But, should terrorist objectives in this country evolve towards, for example, economic disruption, attacks on freight transport could become a serious problem, involving, in particular, assaults on hazardous material conveyance -- trucks, trains and pipelines. Like passenger conveyors, freight conveyors travel over long routes which by their nature are impossible to monitor and harden in their entirety.<sup>5</sup>

## **Postal System Disruption**

The postal system is an element of freight movement of particular concern. Not only has it already been used for the delivery of toxic materials in the anthrax attacks of 2001. It is also by its very nature an extremely open system, with thousands of unmonitored points of access in the form of letter boxes. While many federal government offices now routinely irradiate their mail for security purposes, most other mail system users do not do so and an attack via the post remains a significant vulnerability.

## **Regional Mobility Impacts**

Any major metropolitan area has numerous choke points that are natural targets of a terrorist attack designed to interdict commercial or military traffic: bridges, tunnels, major surface street intersections, and major freeway interchanges. In the case of the Washington, D.C. region, there are several bridges, interchanges and intersections whose disablement would severely impair travel within the region.<sup>6</sup> Depending on the severity of the damage, disruption of traffic could continue for days or even weeks, shutting down not only commercial activity but vital functions of the federal government.

Besides being an important metropolitan area in its own right, the NCR is centrally placed along the I-95 corridor running the length of the Eastern seaboard from Florida to Maine, and along which is conducted an estimated 20% of all commerce in the United States. Particular vulnerabilities of the corridor in the National Capital Region exist at the "Mixing Bowl" interchange of I-95 and I-495 in Virginia, the Woodrow Wilson Bridge, and the American Legion Bridge. While a large explosive force would be needed to incapacitate either bridge, prudence dictates that the potential for disrupting transportation along the vital I-95 corridor be given serious consideration.

## **Calculating the Costs of Attack**

In most scenarios arising from the kinds of disruptions and attacks discussed above there are likely to be both immediate and sequential costs. Immediate costs would include loss of life, injury and illness, and property damage. Follow-on costs include vitiation of commerce, loss of income, infrastructure repair and replacement costs and undermining of confidence in a region's or nation's institutions. Damage to the aviation and tourism industries are examples of follow-on costs of the September 11, 2001, attacks on the United States.

It is impossible to estimate with any precision the costs, either immediate or follow-on, of the various types of attacks noted above. There are simply too many variables: the time of day, exact location, weather, population present at the time, effectiveness of response by authorities,

and so forth. But it is possible to catalogue the types of damage, and perhaps the very rough magnitudes, of various terrorist attack scenarios.

### **Method of Delivery of Malevolent Attack**

As noted above, transport can be not just an object of attack, but also a means of attack. The use of airplanes as “flying bombs” in the September 11, 2001, attack on New York City and the pervasive use by terrorists of trucks and autos loaded with bombs demonstrate how transport loads can be used as attack weapons. Through hijacking, subterfuge, or use of a legitimate Commercial Drivers License, terrorists could seize control of truck or train car carrying a toxic or explosive hazardous material and direct its lethal content to a pinpointed target.

Another danger is the use of cargo containers to introduce a weapon of mass destruction into the United States from abroad. While the current concern focuses on ports, of which the National Capital Region has none, there is the related danger of cargo containers on trucks or railcars, which could directly threaten the NCR. The detonation of a container loaded with explosives at a key choke point, for example a bridge or a subway tunnel, is a particular vulnerability.

#### *1.2.1 Stakeholders*

The composition of transportation/postal and shipping stakeholders in the NCR is complex for a variety of reasons, including the multi-modal nature of the services and the sizable number of jurisdictions in the NCR. Listed below are the agencies and service providers in the region’s transportation/postal and shipping sector. Appendix A provides details on selected stakeholders.

### **Regional Planning and Coordination Entities**

- Metropolitan Washington Council of Governments
- Transportation Planning Board
- National Capital Planning Commission
- Greater Washington Board of Trade
- Northern Virginia Transportation Commission

### **Highway Network Operators**

- District of Columbia DOT
- National Park Service
- Virginia Department of Transportation
- Maryland State Highway Administration
- Local jurisdictions in Virginia and Maryland

### **Regional Transit Service Providers**

- Washington Metro Area Transit Authority (WMATA) – Metrorail and Metro bus
- Corridor Transportation Corporation (CTC)
- Virginia Regional Transportation Association (VRTA)
- Potomac and Rappahannock Transportation Commission (PRTC)

### **Local Transit Service Providers**

- TransIT - Frederick County Maryland
- Ride-On Bus - Montgomery County, Maryland
- The Bus - Prince George's County, Maryland
- Arlington Transit (ART), Arlington County, Virginia
- DASH, City of Alexandria, Virginia
- City-University-Energy saver (CUE) - City of Fairfax, Virginia
- Fairfax Connector Transit System - Fairfax County, Virginia
- Loudon County Commuter Bus – Loudon County, Virginia

### **Passenger and Commuter Rail Service**

- Amtrak
- Maryland Mass Transit Administration (MTA) - Maryland Rail Commuter service (MARC)
- Virginia Railway Express (VRE)

### **Airport System**

- Metropolitan Washington Airports Authority
- Ronald Reagan Washington National Airport
- Dulles International Airport
- Maryland Department of Transportation / Maryland Aviation Administration – Baltimore Washington International Airport (BWI)

### **Postal and Express Shipping Service Providers**

- United States Postal Service (USPS)
- Federal Express (FedEx)
- United Parcel Service
- DHL
- Numerous other express shipping providers

### **Rail Freight Service Providers**

- CSX Transportation, Inc.
- Norfolk Southern Railroad

### **Bus -Private and Commercial Services**

- Greyhound
- Tour bus service providers

## **1.3 Review of Authorities**

### **1.3.1 Federal Authorities**

#### **Department of Homeland Security**

The Department of Homeland Security (DHS) is the lead agency for the overall national effort to enhance critical infrastructure protection. In this role, DHS establishes uniform policies and approaches for protection activities, and tracks performance and progress in program implementation. DHS is also the lead agency for the overall assessment of the terrorist threat to the United States. DHS also provides specific expertise in addressing the physical, human, and cyber elements of critical, and serves as the lead agency for coordination and information sharing among sector stakeholders.<sup>7</sup>

#### **Office of National Capital Region Coordination**

The Office of National Capital Region Coordination (ONCRC), located within the Department of Homeland Security, is charged with overseeing and coordinating Federal programs and domestic preparedness initiatives with state, local and regional authorities in the National Capital Region (NCR).<sup>8</sup> ONCRC has been an instrumental player in the many infrastructure security initiatives that have been carried out in the NCR by WashCOG and its member agencies.

#### **Transportation Security Administration**

In response to the September 11 terrorist attacks, the Congress passed the Aviation and Transportation Security Act (ATSA) in November 2001, which in turn resulted in the creation of the Transportation Security Administration (TSA). Initially TSA was located in USDOT, and was eventually moved to the DHS following in 2003 and is best known for aviation passenger security initiatives. TSA's primary concerns with the sector discussed in this report are the following groups:

- Highway Passenger - Primarily concerned with protecting the nation's highway systems, its passengers, and passengers aboard over-the-road motor-coaches
- Mass Transit Passenger - Activities focus on protecting the nation's mass transit system, its passengers, employees, and properties
- Rail Passenger Security - Foster activities to enhance the security of the nation's railroad systems, its passengers, employees, and properties

TSA responsibilities are analysis and distribution of intelligence information, assessments of threats to the various systems and assets, planning and coordination activities, provision of operational guidance, enforcement and development efforts, and a variety of oversight activities.

#### **Federal Highway Administration**

The Federal Highway Administration's (FHWA) surface transportation security activities focus on mobilization planning of the Strategic Highway Corridor Network (STRAHNET), and improving the operational performance of key highways and bridges during emergency transportation operations, with particular attention to roadways, ports and airports supporting military operations. With respect to security of the highway network, FHWA supports programs to:

- Facilitate improved communication and creating partnerships among local transportation and public safety agencies.
- Assemble and distributing best practices and lessons learned to assist local agencies in securing infrastructure and enhancing operational procedures.
- Provide for education, awareness, training for state and local DOT's.
- Sponsor research and development activities that focus on infrastructure security and emergency transportation operations.
- Coordinate with other federal agencies such as TSA and other modal administrations.
- Advocate planning and preparation, and having in place a program of active management of the various systems during emergency operations.<sup>9</sup>

Federal-aid highway funds may also be used to pay certain costs associated with projects that enhance the security of facilities that are strategic to national defense.

### **Federal Transit Administration**

Recognizing the potential dangers associated with the provision of public transit services, the Federal Transit Administration (FTA) has launched an aggressive national initiative to help secure infrastructure. FTA has carried out risk and vulnerability assessments and has conducted response training drills with local transportation service providers and public safety agencies around the country. At the core of these activities is FTA's mission to:

- Train all transit employees and supervisors to help foster safer passenger travel in the U.S.
- Improve emergency preparedness at the local level.
- Increase public awareness of security issues.<sup>10</sup>

It is important to note that FTA does not have broad regulatory authority over local public transit service providers. Therefore they cannot directly regulate transit systems safety and security operations.

### **Federal Railroad Administration**

The Federal Railroad Administration (FRA) is responsible for administering railroad safety law, including security related threats. The FRA Administrator acts under the guidance of the Secretary of Transportation. Railroad safety laws provide FRA with authority to issue emergency orders that help to ensure the security of railroads.

### **Surface Transportation Board**

The Surface Transportation Board (STB) was created in the Interstate Commerce Commission Termination Act of 1995 and is the successor agency to the Interstate Commerce Commission. The STB is an economic regulatory agency that Congress charged with the fundamental missions of resolving railroad rate and service disputes and reviewing proposed railroad mergers. The STB is independent, although it is administratively affiliated with the Department of Transportation.

The STB serves as both an adjudicatory and a regulatory body. The agency has jurisdiction over railroad rate and service issues and rail restructuring transactions (mergers, line sales, line construction, and line abandonment); certain trucking company, moving van, and non-contiguous ocean shipping company rate matters; certain intercity passenger bus company

structure, financial, and operational matters; and rates and services of certain pipelines not regulated by the Federal Energy Regulatory Commission.<sup>11</sup>

STB has the authority to issue rerouting orders and other restrictions that relate to rail shipments, giving it a role in the current controversy about the shipment of hazardous materials through the District of Columbia.

### **Federal Motor Carrier Safety Administration (FMCSA)**

Following the September 11, 2001, terrorist attacks on the U.S., the Department of Transportation was asked to identify areas within the transportation system that are vulnerable to terrorist attack. One major area of concern identified was the transportation of hazardous materials by trucks, where FMCSA exercises authority. FMCSA is funding field operational tests to address the hazmat issue. The authority for safety and security functions of FMCSA derive from the Motor Carrier Safety Improvement Act of 1999.

### **United States Postal Service**

The Office of Inspector General (OIG) of the U.S. Postal Service was authorized by law in 1996. Prior to the 1996 legislation, the Postal Inspection Service performed the duties of the OIG. The Inspector General, who is independent of postal management, is appointed by and reports directly to the nine Presidential appointed Governors of the Postal Service. The OIG has "oversight" responsibility for all activities of the Postal Inspection Service, a major federal law enforcement agency. Postal Inspection Service is directly responsible for protection of the Postal Service from criminal or other conduct that would undermine the safe and efficient movement of mail.<sup>12</sup>

### **National Incident Management System**

Developed by the Secretary of Homeland Security at the request of the President, the National Incident Management System (NIMS) integrates effective practices in emergency preparedness and response into a comprehensive national framework for incident management. The NIMS will enable responders at all levels to work together more effectively to manage domestic incidents no matter what the cause, size or complexity. The envisioned benefits of the NIMS:

- Standards organizational structures, processes and procedures.
- Standards for planning, training and exercising, and personnel qualification standards.
- Equipment acquisition and certification standards.
- Interoperable communications processes, procedures and systems.
- Information management systems.
- Supporting technologies – voice and data communications systems, information systems, data display systems and specialized technologies.<sup>13</sup>

#### *1.3.2 State and Local Authorities*

## **Metropolitan Washington Council of Governments**

Metropolitan Washington Council of Governments (WashCOG) is a regional organization of the Washington D.C. area local governments. It is composed of 18 local governments in the NCR plus the State of Maryland and Commonwealth of Virginia's legislatures, the U.S. Senate, and the U.S. House of Representatives.

WashCOG provides a forum to develop regional governmental responses to many issues that impact the region, including the environment, affordable housing, economic development, health and family concerns, human services, population growth, as well as public safety and transportation. WashCOG has also been instrumental in providing a platform for regional consensus building and policy-making as well as implementing intergovernmental policies, plans, programs, procedures and providing information to assist regional stakeholders in making decisions. Accordingly, WashCOG has been an entity in the coordination of transportation and postal/shipping operations in the NCR.

## **Transportation Planning Board**

The Transportation Planning Board (TPB) is an independent body that is staffed by WashCOG's Department of Transportation Planning. It is the federally designated Metropolitan Planning Organization for the NCR. TPB was created in response to the Federal-Aid Highway Act of 1962, which required state and local governments in urban areas with a population of 50,000 or more execute a continuing, cooperative, and comprehensive planning process.

TPB membership is comprised of the key transportation decision-makers in the NCR, including representatives of local governments, the District of Columbia, the departments of transportation of the State of Maryland, the Commonwealth of Virginia and the District of Columbia, WMATA, and area members of the Maryland and Virginia legislatures. The TPB provides the regional forum for transportation planning and transportation emergency preparedness coordination in support of the COG Board of Directors.<sup>14</sup> TPB has been a critical stakeholder in the planning and operations of measures to secure transportation/postal and shipping infrastructure in the NCR.

## **Management Operations and Intelligent Transportation Systems Subcommittee**

TPB's Management Operations and Intelligent Transportation Systems Subcommittee (MOITS) is responsible for advising the TPB on matters of transportation operations and management, including the implementation of Intelligent Transportation Systems (ITS) and operational strategies. The MOITS also provides a regional forum for coordination among TPB member agencies and other stakeholders, such as public safety, on these topics.<sup>15</sup> MOITS has been actively involved in the development of the regional evacuation plan for the NCR.

## **Emergency Transportation Working Group**

The Emergency Transportation Work Group supports the WashCOG Board of Directions, TPB, and National Capital Region Emergency Preparedness Council on transportation aspects of regional emergency preparedness planning coordination. The group has been instrumental in the development of the regional evacuation plan for the NCR.

## **National Capital Planning Commission**

The National Capital Planning Commission (NCPC) provides overall planning guidance for federal land and buildings in the NCR.<sup>16</sup>

## **Greater Washington Board of Trade**

The Greater Washington Board of Trade (Board of Trade) is the region's private sector representative on transportation issues among numerous others. The Board of Trade is also instrumental in involving the business community in the emergency planning process by sharing information and providing input on behalf of the region's private sector employers. The Board of Trade is the largest network of business and non-profit leaders in the region and the only group representing all industry sectors.<sup>17</sup>

## **Northern Virginia Transportation Commission**

The Northern Virginia Transportation Commission (NVTC) was established to manage and control the functions, affairs, and property of the Northern Virginia Transportation District and to develop transportation systems encouraging orderly growth and development of urban areas of the Commonwealth for the safety, comfort, and convenience of its citizens and for the economical utilization of public funds. NVTC provides a policy forum for its region and allocates almost \$100 million in state, regional, and federal transit assistance each year among the member jurisdictions. The Northern Virginia Transportation Commission, in partnership with the PRTC, is responsible for the operation and management of the VRE.<sup>18</sup>

## **CapCom**

In late 2004 TPB requested \$5 million from the United States Congress to develop "CapCom", an operations center to foster regional operations coordination for surface transportation systems. This initiative is modeled on TransCom in the New York/New Jersey/Connecticut tri-state area and is meant to provide a governance structure for regional transportation operations during normal and emergency operations. TransCom was widely regarded as essential in evacuating New York City after the September 11, 2001, attacks on the World Trade Center.

The motivation for establishing CapCom was the absence of a single entity to coordinate regional operations in real-time, and to manage incidents that have a regional impact. Managing such incidents has become a priority for transportation and public safety agencies in the region. The two primary functions of CapCom will be regional operations support and regional planning and preparedness. CapCom development efforts in 2005 have so far focused on developing the supporting governance structures.

CapCom will also host the Regional Integrated Transportation Information Systems (RITIS). RITIS will integrate existing transportation information and management systems in Virginia, Maryland, and the District of Columbia. RITIS will collect data of regional interest and fuse these data into regional information that can be used to enhance regional traveler information and transportation management functions performed by member agencies.

## **Regional Emergency Coordination Plan**

The Regional Emergency Coordination Plan (RECP) was created in April, 2002, by the WashCOG Board as a means for federal, state and local authorities to collaborate in planning,

communication, information sharing, and coordination activities before, during, or after a regional emergency. In September, 2002, the WashCOG Board approved a draft Memorandum of Understanding (MOU) for Development and Maintenance of the RECP for the National Capital Region, and for utilization of a Regional Incident Communication and Coordination System (RICCS). The RECP is the agreed plan in the event of a regional emergency.<sup>19</sup>

### *1.3.3 Statutes*

An exhaustive analysis of each of the statutes that are relevant to the transportation/postal and shipping sector is outside the scope of this report. However, one statute that directly relates to the security of infrastructure is the attempt to ban rail shipments of hazardous materials through the District of Columbia. The NCR has rail lines that pass directly through it, and there is concern that trains carrying large amounts of hazardous materials provide a means for carrying out a terrorist attack.

On February 1, 2005, the District of Columbia City Council approved emergency legislation restricting the shipment of hazardous materials within two miles of the U.S. Capitol and federal buildings. The legislation requires rail and trucking companies to receive a special permit before they can transport large quantities of hazardous chemicals through the District of Columbia. CSX, based in Jacksonville, Florida, operates rail freight services in the Baltimore and Washington areas to and from points south and west.

CSX is suing the city and asking a federal judge to strike down the ban on hazardous train shipments on the basis that it interferes with inter-state commerce. Although the issue has yet to be resolved, it has the potential to impact the transport of hazardous materials in other regions.

## **1.4 Mapping of Interdependencies**

### *1.4.1 Upstream Dependencies*

The primary upstream dependencies of transportation / postal and shipping infrastructure are electric power and telecommunications services. The dependency of the highway networks on electrical power was demonstrated during hurricane Isabel in 2003. Although some critical intersections in the region – namely in the Commonwealth of Virginia – were equipped with back-up power supplies, they were typically operational for only 24 hours, after which law enforcement officers were required to control the critical intersections, taking them away from other important duties.

### *1.4.2 Downstream Dependencies*

The downstream dependencies of transportation in time of crisis are twofold. First, the transportation sector is used to provide emergency services by first responders and to move disaster victims to places of refuge. Second, rail systems and highways systems move vital materiel and people, for example, utility maintenance personnel. Examples of critical material are chemicals required to purify water, fuel for power generation and transportation, food, medicines, and hospital supplies.

### 1.4.3 Sidestream Dependencies

Within the transportation sector, the various modes are often dependent on each other for movement of goods and people. As an example, the highway network supports the movement of goods for postal and shipping, the distribution of public transportation users to other modes (e.g., bus to rail), and the movement of air passengers to airports.

**Table 1: Transportation Upstream Dependencies**

Upstream Sector Providing Critical Service	Transportation Sector Dependencies by Mode			
	Highway	Transit	Airport	Postal and Shipping
Banking and Finance	Cash to support toll operations	Cash to support operations	Cash to support parking operations	\$1 trillion in remittances in USPS at any moment in time
Emergency Services	Traffic control Emergency Response (law enforcement, fire, emergency medical services)	Emergency response (law enforcement, fire, emergency medical services)	Emergency response (law enforcement, fire, emergency medical services)	Emergency response (law enforcement, fire, emergency medical services)
Energy	Field device operations (e.g., traffic signals)  Shared right-of-way (debris removal)	Rail operations	Terminal and parking operations.  Field device operations (e.g., traffic signals)	Fuel for vehicle operations  Processing facility operations  \$1 trillion in remittances in USPS at any moment in time (e.g., utility payments)
Health Services		Emergency response (e.g., release of biological /chemical agent)	Emergency response (e.g., release of biological / chemical agent)	Emergency response (e.g., release of biological /chemical agent)
Telecom	Communication with field devices (e.g., signage and detectors)  Traveler information dissemination.	Communications among operations staff (e.g., operations center to vehicle)		Communications among operations staff (e.g., operations center to vehicle)
Water	N/A	N/A	N/A	N/A

**Table 2: Transportation Downstream Dependencies**

Downstream Sector Dependent on Transport. Sector	Transportation Sector Mode				
	Highway	Transit	Airport	Postal and Shipping	Rail
Banking and Finance	Movement of financial paper		Movement of financial paper	Movement of financial paper  \$1 trillion in remittances in USPS at any moment in time	
Emergency Services	Movement of emergency response resources  Evacuation of affected areas  Movement of patients  Initial response by on-site emergency services staff (e.g., operations center staff)	Initial response by on-site emergency services staff (e.g., operations center staff and transit property law enforcement)	Initial response by on-site emergency services staff (e.g., operations center staff and airport property law enforcement)	Initial response by on-site emergency services staff (e.g., operations center staff and U.S. Postal Police)	Initial response by on-site emergency services staff (e.g., operations center staff and Amtrak Police)
Energy	Transport of maintenance personnel to field			\$1 trillion in remittances in USPS at any moment in time (utility payments)	Use of train engines for emergency power
Health Services	Delivery of medical goods / medicine	Movement of patients  Detection of chemical / biological agent	Movement of patients  Detection of chemical / biological agent	Detection of chemical / biological agent	Detection of chemical / biological agent

Downstream Sector Dependent on Transportation Sector	Transportation Sector Mode				
	Highway	Transit	Airport	Postal and Shipping	Rail
Telecom	Movement of temporary equipment during emergencies  Transport of maintenance personnel to field			\$1 trillion in remittances in USPS at any moment in time	
Water	Delivery of chemicals for water treatment  Transport of maintenance personnel to field			Delivery of chemicals for water treatment	

**Table 3: Transportation Sector Interdependencies**

Dependent Transportation Sector Mode	Transportation Sector Mode				
	Highway	Transit	Airport	Postal and Shipping	Rail
Highway	Fuel delivery	Regional Mobility		Movement of goods	Rail intersection operations
Transit	Movement of buses and other vehicles supporting operations  Access to rail stations				Track operations coordination
Airport	Airport access  Movement of buses and other vehicles supporting operations	Airport access		Inter-modal movement of goods	Inter-modal movement of goods
Postal and Shipping	Movement of vehicles supporting operations  Delivery of fuel	Delivery of fuel	Movement of goods  Delivery of fuel		Inter-modal movement of goods  Delivery of fuel
Rail	Rail intersection operations (who	Track operations coordination	Inter-modal movement of	Inter-modal movement of	

	is responsible)		goods	goods	
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## 2. State of Security Assessment

### 2.1 *Awareness of Value of Critical Infrastructure Protection and Critical Infrastructure Vulnerability Assessment / Risk Management*

Generally speaking transportation/postal and shipping service providers understand the value of executing vulnerability assessment/risk management activities. In large part, the recognition of this stems from the understanding that transportation/postal and shipping networks are truly regional in nature and play a critical role in the economic vitality and safety of a region. The heightened awareness of the value of critical infrastructure protection (CIP) and critical infrastructure vulnerability assessment (CIVA)/risk management (RM) results from attacks on transportation / postal and shipping infrastructure both domestically (e.g., anthrax attack on USPS in 2001) and internationally (e.g., bombings of trains in Madrid and London). These same service providers also acknowledged that it will become increasingly important to execute vulnerability assessment/risk management activities at the regional level.

### 2.2 *Availability of Appropriate Tools*

The following vulnerability assessment and risk management tools are available to the transportation/postal and shipping sector.

1. Under the guidance of the Office of Domestic Preparedness (ODP), Science Application International Corporation (SAIC) has developed the State Homeland Security Assessment and Strategy Program – Special Needs Jurisdiction Tool Kit. The toolkit was developed, applied and validated by ODP in conjunction with the Port Authority of New York – New Jersey. It was subsequently adapted for transit and currently is being applied to public transit properties nationally. The research team analyzed a version of the tool that WMATA applied in 2003. The goals of the program are to:
  - Apply a methodology and tool kit for special needs jurisdictions that is based on common metrics and is repeatable and verifiable.
  - Prioritize security countermeasures and response capability needs by identified risk.
  - Quantify risk in a manner that can be applied across various modes of transportation/postal and shipping, and internal to different functions within the specific mode.
  - Compare risk reduction potential of various countermeasures across multiple modes
  - Compare different functions of countermeasures (e.g., security, emergency response and recovery).
2. The Ohio Department of Transportation developed the Guide to Conducting Critical Asset Protection Self-Assessments to provide transit managers, operations and maintenance personnel, as well as transit police and security managers, with a set of tools to plan and conduct security assessments. The tools are intended to provide transit operators with the ability to:
  - Determine the agency’s level of security and emergency preparedness.

- Identify counter-measures that can be implemented to improve security performance and emergency response capabilities.
- Emphasize a management approach to security that promotes consistency, assures thoroughness, and enhances the integrity of the transit operation.<sup>20</sup>

3. Hazard Identification and Risk Analysis (HIRA). HIRA takes into account the following:

- Types of potential emergencies, (isolated or countywide).
- Duration of the event.
- Onset of the event and the time available for planning which may dictate response plan, i.e. shelter vs. evacuation.
- Probability and frequency of the event.

HIRA not only helps in planning, but also in identifying needs and funding sources and to some extent in prioritizing events. Each factor in the list above is given a numerical weight, and these scores are used to prioritize events.

4. Some vulnerability assessment/risk management tools not yet applied to transportation could have a practical application to the transportation sector. As an example, the “Security Self-Assessment Guide for Information Technology Systems” developed by the National Institute of Standards and Technology could be used to evaluate information systems in the transportation sector. Other such tools are:

- ASIS International – General Security Risk Assessment Guidelines
- Balancing Security and Openness – GSA Public Building Services
- National Infrastructure Protection Center – Risk Management: An Essential Guide to Protecting Critical Assets.

Unfortunately, none of these tools is specifically geared to vulnerability assessments at the regional level. Yet a negative event in one localized transportation node can have region-wide impact. As an example, loss of a Metro rail station that serves as a transfer point with other rail or bus services would likely have a significant, if not debilitating impact on the highway network of the region. Work is being done to give vulnerability assessment and risk management tools a regional perspective.

### ***2.3 Allocation of Resources to CIVA/RM***

Vulnerability assessment and risk management models have been deployed by the following National Capital Region jurisdictions.

**Washington Metropolitan Area Transit Authority** and the **Metropolitan Washington Airport Authority** both are using the *State Homeland Security Assessment and Strategy Program – Special Needs Jurisdiction Tool Kit* described above.

**Maryland State Highway Administration** (MDSHA) has employed a process that requires district engineers to identify the top 20 facilities in their individual regions that they deem critical. These facilities are then prioritized on a statewide basis. MDSHA would like to develop and employ a prioritization process that not only includes operational knowledge of the systems, but also considers such things as alternate routes and evacuation routes that have already been developed through other initiatives.

**Virginia Railway Express (VRE)** primarily considers potential threats to passengers and facilities. Because VRE is a small service provider and does not operate a complex network of services, it is a comparatively easy process to identify and manage possible vulnerabilities. VRE does not have a “standard” set of tools or procedures in house to perform this assessment but continually evaluates and updates information as it becomes available. The Federal Transit Administration recently carried out a formal vulnerability and readiness assessment of VRE and found no problem not already being addressed by VRE.

**Loudoun County, Virginia**, uses the Hazard Identification and Risk Analysis (HIRA) tool described above. Planning, outreach, education, and training are dictated by HIRA. HIRA is reviewed on an annual basis or whenever additional threats are identified. The County evaluates vulnerabilities for the following reasons:

- To address public safety issues.
- To meet statutory obligation.
- To meet the requirements of specially mandated programs, such as special needs shelter.

**Fairfax County, Virginia, Department of Transportation** uses accepted risk management models, and risk management is a major part of monthly meetings that involve planning for disasters and incident response. A series of “safety checks” meet the federal, state and local regulations. However, there is no standard set of vulnerability assessment tools, a deficiency which county officials acknowledge.

**The United States Postal Service** routinely uses a checklist to assess vulnerability of each facility. Primary concerns are potential harm to employees, damage to facilities, and interruption of operations.

**School buses:** Few tools are available for vulnerability analysis and risk assessment of school bus operations. Authorities mostly rely on experience and tabletop exercises for identifying targets and hazards.

#### ***2.4 Extent of Implementation of Critical Infrastructure Protection Measures***

Following the attacks of September 11th and the subsequent Anthrax attacks in the NCR, transportation/postal and shipping service providers in the public and private sectors implemented a variety of measures across multiple modes. These measures focus on preventing malevolent attacks, lessening the impact of an attack, supporting public safety, and responding to and recovering from attacks. A focal point of these measures is to ensure safety of travelers and transportation workers without excessive disruption of normal operations. Table 4 provides a summary of the critical infrastructure measures that have been developed and implemented in the NCR.

Transportation/postal and shipping service providers generally recognize that additional CIP measures will be required in the future, and that these must be phased in gradually because of funding constraints. It should be noted that, in carrying out the research for this report, our researchers sometimes found reluctance on the part of stakeholders, particularly in the private sector, to be forthcoming about their security programs.

**Table 4: Summary of Critical Infrastructure Protection Measures**

Mode	Infrastructure Protection Measures	
	Technology Deployment	Operational Strategies
Highway	Traffic signal controller cabin hardening  Traffic signal upgrades	CapCom  CapWIN  Community watch program  Enhanced surveillance at critical locations
Transit	Chemical and biological chemical sensors  Blast-proof trash containers  Vehicle depot hardening  Fuel supply movement to underground storage  Video surveillance enhancements	Increased law enforcement presence  Community watch program
Rail		Law enforcement rider incentive programs  Ban of hazardous materials shipment in District of Columbia
Airport	Fuel supply barrier wall hardening	Increased law enforcement presence  Parking structure monitoring
Postal and Shipping	Mail irradiation equipment	Vehicle tracking and monitoring  Vehicle inspections (deliveries to government offices)  Vehicle scanning (deliveries to government offices)  Vehicle, driver and passenger credentialing (deliveries to government offices)

USPS is the oldest federal law enforcement agency in the U.S., and it has been charged with the security of the mails for more than 200 years. It has an extensive set of procedures in place to monitor and protect the security of the mail. Since the onset of the threat of the Unabomber, and the ensuing 9-year investigation with the FBI and ultimate conviction of the perpetrator, USPS has been on heightened alert regarding security. The USPS security requirements are institutionalized through procedures that are developed centrally and followed by each postal unit. In the NCR, the regional USPS operations manager has a manager of security reporting to him, who in turn has district managers reporting to him from each of 4 districts.

The measures adopted by the Virginia Railway Express are worth recounting in detail. VRE divides its critical infrastructure activities into two categories: preventive and reactive. Examples of preventive activities include (1) categorizing who has response authority and cataloging their resources (e.g., rescue boats), (2) use of Virginia State Police bomb dogs for random inspections of trains, (3) training of employees to recognize possible threats, and (4) purchase and installation of perimeter cameras using CCTV technology.

A recent VRE initiative is to exchange free monthly ride tickets for agreements with certified law enforcement officers to provide enforcement as necessary on trains they use for their commute. Examples of reactive activities include (1) holding exercises with SWAT teams, (2) performing ballistics analyses of all components on rail vehicles, (3) expanding training from fire and rescue teams to police to inform them of vulnerabilities on trains, and (4) establishing close working relationships with FBI Joint Terrorism Teams.

## **2.5    *Extent of Evaluation of CIP Effectiveness***

Generally speaking the transportation/postal and shipping sector is more concerned with measures of operational effectiveness, such as traffic throughput and level of service, than with measures of security, which are still in their infancy. The Port Authority of New York and New Jersey is developing a security measure of effectiveness that takes into account such factors as likelihood of a particular hazard, consequence if such a hazard actually occurs, and the costs and benefits of undertaking a reduction in specified vulnerabilities.

## **3.        *Risk Reduction Programs and Processes***

### **3.1        *Risk Reduction Project and Investment Recommendations***

The research team recommends that in determining risk reduction projects, careful consideration must be given to the following factors:

*Resource optimization.* The research team recommends that with a heightened emphasis on optimizing limited resources, priority be given to infrastructure security strategies and measures that support non-emergency operations as well as enhancing transportation infrastructure safety and security. For example, a network surveillance system could support both emergency and non-emergency operations. Similarly, enhancements to regional traffic signal coordination and traffic management could greatly improve the ability to evacuate the central city during emergencies, while also upgrading highway and arterials networks during everyday operations.

*Respect for existing operational procedures.* The research team recommends that risk reduction technologies disrupt existing operations as little as possible, while bearing in mind legitimate security needs.

*Mainstreaming projects into existing planning and development processes.*

Transportation/postal and shipping infrastructure security improvements should be mainstreamed into the planning and development of standard infrastructure improvements. Specifically, improvement measures should be considered in the Transportation Improvement Program (TIP) and the Constrained Long-Range Plan (CLRP).

Mainstreaming of security improvements with other infrastructure initiatives may follow a path similar to that of intelligent transportation systems (ITS). ITS was originally not included in the transportation planning process, but is now mainstreamed in this process. For example, ITS technologies are now often included in highway infrastructure improvements.

*Balanced trade-offs between prompt deployment of off-the-shelf technologies and delayed deployment of emerging technologies.* An example of this tension can be seen in the case of biological and chemical sensors, used to detect attacks in transit stations and other confined areas. Such sensors are currently available in the marketplace, but these may become obsolete as a result of ongoing improvements through research, design and testing. Waiting to deploy technologies that are currently under development might avoid the problem of obsolescence and provide better and cheaper functions, but might also leave sensitive areas vulnerable in the meantime.

*The pros and cons of open standards.* The issue of whether or not to procure technologies that are based on open standards must also be addressed early in the procurement process. In some cases proprietary technologies can provide important functions, but procuring technologies that are not developed on open standards can preclude adding useful technologies available from other vendors. This issue should be considered in the context of regional operations. As an example, data communication systems linking different organizations throughout a region should be able to accommodate the various legacy systems in these organizations.

## **Specific Technologies**

### **Back-Up Operations Center**

The research team recommends planning and deploying full back-up operations centers for transit service providers, recognizing the cost and complexity of such projects. Yet studies have indicated that the absence of such centers is the greatest vulnerability for the correct functioning of rail systems.

### **Traffic Signal Enhancements**

In case of terrorist attack or natural disaster, traffic signals must be able to function effectively. For example, first-responder vehicles -- fire, police, ambulances, tow trucks -- moving towards the crisis location might encounter a flood of vehicle trying to evacuate, and the absence of any traffic control at intersections could spell chaos.

Back-up power systems, hardened signal control boxes, and alternate timing plans are all suggested as useful emergency preparedness tools.

### **3.2 Risk Reduction Process Improvements**

#### **Enhanced Region-wide Communications**

The importance of effective communications in time of crisis was reaffirmed on September 11 when various authorities took conflicting measures, at least in part because of inadequate communication with each other. For example, the Virginia Railway Express shut down operations just as other authorities were urging evacuation from urban to suburban Northern Virginia. In another instance, police directed motorists to bridges that had been shut down. And elsewhere travelers were told to congregate at the Pentagon for evacuation by subway, although the Pentagon subway station had been shut down.

The importance of effective communications was recognized by regional authorities immediately after September 11, and several remedial measures were undertaken. The region's Transportation Policy Board ordered the establishment and testing of procedures to insure that decision-makers from transportation and related agencies throughout the metropolitan area could communicate with each promptly in time of crisis. Emergency prepared documents were mandated. And negotiations began with Verizon phone company to sort out who should have priority use of phones in times of crisis, when the circuits would clearly be overloaded.

However, four years later, little progress has been made on these initiatives. The emergency preparedness documents are incomplete. The emergency phone "tree" linking decision-makers does not exist. And Verizon broke off negotiations out of frustration with conflicting demands.

The one initiative that has moved forward is Capital Area Wireless Integrated Network (CapWIN) and its sister organization Capital Area Communications Network (CapCom). CapWIN is a set of technology protocols and equipment facilitating real-time communication during a crisis among the more than two dozen first responder agencies in the National Capital Region. CapWIN is well-established, with 20 fulltime staff, and was used to great advantage, for example, during the January, 2005, inauguration of President Bush. CapCom is the organizational counterpart to CapWIN. It is an administrative mechanism for bringing about coordination among the region's first responder agencies. CapCom is currently seeking funding to establish itself as a fully-staffed organization. Further, as mentioned, CapCom will host the Regional Integrated Transportation Information System (RITIS). RITIS will integrate existing transportation information and management systems in Virginia, Maryland and the District of Columbia. RITIS will collect data of regional interest and fuse these data into regional information that can be used to enhance regional traveler information and transportation management functions performed by member agencies. RITIS is a fiscal year 2002 USDOT Intelligent Transportation System Integration Program earmark for the Washington, D.C. Metropolitan area.

The research team believes that CapCom is the best available organization for the effective region-wide transportation communication network required in the face of regional emergencies that impact the transportation system and recommends it be the region's transportation security project for the sector. However, it is recognized that the CapCom concept will not be implemented without controversy, and its development has not been endorsed or supported by all NCR jurisdictions.

## **Surveillance Systems**

Surveillance systems can be a powerful tool for detection and prevention of terrorist attacks, but they present significant issues. First, they may engender considerable political resistance in an open and democratic society like ours, with our extraordinary attention to individual rights and individual privacy.

Second, even if the political and cultural resistance to strong surveillance measures could be overcome, there would be major economic costs. A massive network of electronic and human surveillance would be required to observe all potential targets, and equally massive machinery for instantaneous response would also be needed. For example, some transit systems have installed bio-chemical sensors in key locations, but without constant monitoring of these sensors, and the capability for near instantaneous response to indication of danger, these sensors may facilitate prompt evacuation, but they cannot prevent the bio-chemical attack.

Similarly, work is proceeding on deployment of complex sensors around critical bridges that would hopefully identify actual terrorists in the vicinity, or, at least, the presence of explosives. But without a monitoring and response capability, the sensors alone will afford little protection.

### ***3.3 Specific Recommendations for Governance at Sector-Level***

The transportation/postal and shipping infrastructures in the NCR are robust and mature, and a variety of institutional structures have evolved over time to foster regional coordination and cooperation in planning and operations. Some of these institutional structures, like the Transportation Planning Board and its respective committees have existed for years, while others, like CapCom, are just beginning to evolve.

The research team recommends that the existing institutional structure provided by the Transportation Planning Board, the Management, Operations and Intelligent Transportation Subcommittee and CapCom be utilized as a platform to plan, develop and operate regionally based transportation/postal and shipping infrastructure security initiatives. Included in these activities should be vulnerability assessments of regional transportation/postal and shipping infrastructures.

One particular issue is conducting background checks on Commercial Driver License applicants, who might be seeking the right to drive hazmat vehicles that could be used for terrorist purposes. The procedures and technologies required to carry out such monitoring are being developed. These should be noted by officials in the NCR, but such a strategy must be national in scope to be effective, and so, for the present, the NCR should be observant but not expect to offer leadership.

### ***3.4 Specific Recommendations Addressing Interdependencies***

#### **Intra-Sectoral**

The research team believes that the institutional structures necessary to identify and analyze intra-sectoral dependencies already exist. Central to these structures is TPB, which brings together a diverse set of transportation stakeholders in the region. It is, however, likely that additional stakeholders that do not regularly participate in TPB activities will need to participate

in these activities to ensure that comprehensive analyses of intra-sector dependencies are carried out.

### **Inter-sectoral**

The research team recommends that an inter-sector platform be created in the NCR to facilitate a collaborative approach to analyzing inter-sector dependencies.

In addition, the transportation/postal and shipping infrastructure sector should try to lessen its dependence on sectors particularly vulnerable to terrorist attack or natural disaster. For example, electric power is required for the functioning of traffic signals, whose continued operation following a disaster is essential. At present such power is provided by the electric power industry. It would be prudent if traffic signals, particularly those at critical intersections, were powered by self-contained power sources.

The research team recognizes that such a conversion would be expensive, and that a low-cost strategy would be replacement only when existing signals wear out. Such life-cycle replacements, however, may be too slow for the region's security needs.

### **3.5 *Measuring Effectiveness***

At present, methods to evaluate infrastructure security initiatives are in their infancy. As such methodologies are developed, care should be taken that they mesh with existing performance measures widely used in the transportation sector, or else they are likely to be ignored by most stakeholders in the sector. These measures include traffic throughput, congestion delay time, and level of service.

### **3.6 *Managing Continuous Improvement***

It is important that a mechanism be established for continual review of the region's risk reduction strategies, because the world of international terrorism is continually evolving, and our own understanding of risk management analysis is continually evolving. Any risk management strategy, however well thought out, is likely to be outdated in only a few years, if, indeed, in not only a few months, so continual updating is absolutely essential.

Existing institutional structures such as the TPB, Management Operations and Intelligent Transportation Systems Subcommittee, Emergency Transportation Working Group, and most recently, CapWIN, have historically proven beneficial in bringing stakeholders together to address issues that are of regional significance. Regionally based institutions provide the greatest opportunity to foster cooperation and coordination, support for the inter-state deployment and operations of security initiatives, and a platform to resolve potential differences among transportation/postal and shipping stakeholders.

The research team concludes that the cooperation and coordination fostered by these institutional structures will be critical in managing continuous improvement with respect to infrastructure security, just as they have been in planning and operational issues in the past. These groups will provide a platform to identify challenges and potential solutions.

#### **4. Conclusion**

The transportation/postal and shipping sector is unique in that, from the perspective of critical infrastructure analysis, it plays three distinct roles. First, it is a vital part of the region's economy and social structure, and its disruption would play havoc with the lives of millions of people. Second, it is potential means for the delivery of a terrorist attack. Third, it is essential to the effective response to a natural disaster or terrorist attack.

Bearing in mind these factors, the research team recommends the construction of a back-up operations center for the Washington Area Metropolitan Transit Authority, technologies to help guarantee that traffic signals will function effectively in case of natural disaster or terrorist attack, and vesting of authority for coordination of the region's transportation communications system in CapCom (the Capital Area Communications Network).

Further, the research team recommends that, in planning for investment in security-enhancing technologies, regional authorities give due consideration to existing operational and planning procedures; to use of technologies and processes that benefit non-emergency as well as emergency situations; and to the appropriate trade-offs between off-the-shelf and emerging technologies, and open vs. proprietary standards.

The research team believes that, in general, existing governmental arrangements are adequate platforms for most governance issues, but that a special inter-sectoral working group should be established, and that, as already noted, CapCom should have substantially increased authority.

## **Appendix A: Sector Stakeholders**

### **Highway Network Operators**

The highway network in the NCR includes 14,100 lane miles of highways, more than 200 miles of carpool lanes. The system also includes an extensive network of over 1900 bridges in and around Washington D.C. that form a critical link in the area's transportation system, allowing people and goods to move around the region in a safe and efficient manner.<sup>21</sup>

### **District of Columbia Department of Transportation**

DDOT is also responsible for the planning, design, building, and maintenance of 1,100 miles of streets, 241 bridges, 1,600 miles of sidewalks, and 453 miles of alleys within the District of Columbia.<sup>22</sup>

### **National Park Service**

National Park Service/United States Park Police (NPS/USPP) is a unit of the Department of the Interior, National Park Service, National Capital Region, with jurisdiction in all National Park Service areas and certain other federal/state lands. NPS owns and polices some 447 miles of parkways and primary roads in the Washington metropolitan area, including the Baltimore-Washington Parkway, the Clara Barton Parkway, Memorial Bridge, Rock Creek Parkway, the Suitland Parkway, and the George Washington Memorial Parkway, as well as major portions of Constitution Avenue, Independence Avenue, and other roadways in and around the National Mall in Washington.<sup>23</sup>

### **Virginia Department of Transportation**

Virginia Department of Transportation (VDOT) is responsible for most of the highway infrastructure in the northern Virginia region, from Interstate freeways to residential subdivision streets and gravel roads in sparsely developed areas, and the associated bridges, traffic signals, signage, and other aspects of the highway system. However, Arlington County and the independent cities and towns in the region (Alexandria, Falls Church, Fairfax, Leesburg, Manassas and Manassas Park) maintain most roads within their corporate limits.

At present, VDOT maintains over 14,000 lane-miles of roadway in Northern Virginia. The Northern Virginia highway system contains over 2,000 bridges and culverts, including the Woodrow Wilson Bridge on Interstate 95. The highway system includes high-occupancy vehicle lanes (HOV) on portions of I-95, I-395, I-66, US Route 1 and the Dulles Toll Road. In addition, VDOT operates and maintains Park-and-Ride lots, which allow travelers to commute to the lot and switch modes from private auto to rail, bus, or carpools. A majority of the lots in Northern Virginia are located in the I-95/I-395, I-66 and Dulles Toll Road corridors.<sup>24</sup>

VDOT also operates the Northern Virginia Smart Traffic Center which is a high-tech communications hub that oversees more than 100 miles of roads. An extensive surveillance system provides information that enables operators to determine what is happening on these roadways at any given time. Controllers in the Smart Traffic Center monitor and evaluate interstate traffic flow, communicate information to the public and send assistance when necessary. In addition to the usual congestion mitigation, incident management and traffic

planning efforts, the Northern Virginia Smart Traffic Center is also an integral component in the management of HOV facilities.<sup>25</sup>

### **Maryland State Highway Administration**

Maryland State Highway Administration (MDSHA) is responsible for most of the major highways and associated bridges, traffic signals, signage, and other infrastructure in the State of Maryland, including Frederick, Montgomery, and Prince George's counties and local jurisdictions in the NCR. (Note that some roadways within those counties are under county or local jurisdictional responsibility.) The state maintains 7,247 miles of highways and 2,500 bridges.<sup>26</sup> In addition SHA operates many park and ride lots throughout the region, which provide access to various transit facilities.<sup>27</sup>

MDSHA also operates traffic operations centers (TOCs) statewide, including its main hub the Statewide Operations Center (SOC) located in Hanover, Maryland, near BWI Airport. The Statewide Operations Center (SOC) assists all areas of SHA by monitoring highway traffic activity through a high-tech facility. This 24-hour-a-day, seven-day-a-week communication center allows for efficient incident response through state-of-the-art technology. The SOC is home to the Chesapeake Highway Advisories Routing Traffic (CHART) program. The SOC also houses Maryland's Emergency Operations Center (EOC), which is activated for natural and man-made emergencies (snowstorms, hurricanes, nuclear facility exercises, etc.). The CHART SOC and TOC staffs provide primary support for transportation emergency preparedness and response in Maryland.<sup>28</sup>

### **Local Jurisdictions – Commonwealth of Virginia**

Local jurisdictions in the Commonwealth of Virginia, including The City of Alexandria, Arlington County, the City of Fairfax, Fairfax County, the City of Falls Church, Loudoun County, the City of Manassas, and Prince William County, are local government members of the TPB in Virginia. These local jurisdictions own and maintain a variety of local roadways and streets, and in some cases provide local transit services. There are a number of small local jurisdictions within the Northern Virginia region as well that are not TPB members, but with which major agencies may need to coordinate in emergencies.

### **Local Jurisdictions – State of Maryland**

Local Jurisdictions in the State of Maryland, including The City of Bowie, the City of College Park, Montgomery County, the City of Gaithersburg, the City of Greenbelt, the City of Takoma Park, Prince George's County, the City of Rockville, and Frederick County are local government members of the TPB in Maryland. These local jurisdictions own and maintain a variety of local roadways and streets, and in some cases provide local transit services. There are a number of small local jurisdictions within Frederick, Montgomery, and Prince George's counties that are not TPB members which provide transportation services, and with which the counties may need to coordinate in emergencies.

## **Regional Transit Service Providers**

### **Washington Metropolitan Area Transit Authority (WMATA)**

WMATA Metrorail is the second largest rail transit system in the United States. The transit service area includes the District of Columbia, Montgomery and Prince George's counties in Maryland and the Northern Virginia counties of Arlington and Fairfax and the cities of Alexandria, Fairfax and Falls Church. Between July 1, 2001 and June 30, 2002 a total of 181 million trips were made on Metrorail, which operates a fleet of 806 rail cars on a 103-mile system that includes 83 stations in 17 different jurisdictions.<sup>29</sup>

WMATA also operates Metrobus, the sixth largest bus network in the United States. Between 2001 and 2002 a total of 147.7 million trips were made on Metrobus, which operates a fleet of 1451 buses on 348 different routes with 12,490 stops and 1,738 shelters throughout the NCR. The average weekday schedule covers 163,565 miles.<sup>30</sup>

### **Corridor Transportation Corporation**

Corridor Transportation Corporation (CTC) is a private, non-profit corporation that sponsors transportation services throughout the mid Baltimore/Washington corridor. Several communities are served in Prince George's, Howard, Anne Arundel, and Montgomery Counties. CTC contracts service on eight fixed routes that offer connections to other public transportation services including Metrobus, MTA commuter services, MARC stations, and Metrorail stations with an annual ridership (FY 1998) of 273,075.<sup>31</sup>

### **Virginia Regional Transportation Association (VRTA)**

VRTA provides door-to-door, advance registration, and limited on-demand public transportation in Leesburg, Sterling, Loudoun County, the Town of Orange, Clarke County, and the Town of Warrenton. VRTA also meets the MARC commuter trains at Point of Rocks, Maryland. The association utilizes 42 buses and serves 289, 877 passengers annually.

### **Potomac and Rappahannock Transportation Commission (PRTC)**

OmniLink is a local weekday bus service operated by PRTC in Eastern Prince William County and the Manassas area. The service utilizes 16 buses and serves 590,182 passenger trips annually, operating along varying routes according to demand.<sup>32</sup>

OmniRide is PRTC's commuter bus service. OmniRide offers weekday service from locations throughout Prince William County along the I-95 corridor and Manassas area along the I-66 corridor to destinations that include the Vienna, West Falls Church and Franconia/Springfield Metrorail Stations, the Pentagon, Crystal City, downtown Washington, D.C., Capitol Hill, and the Washington Navy Yard. The service utilizes 66 buses and serves 938,778 passenger trips annually.<sup>33</sup>

MTA operates four lines of commuter express buses Between Southern Maryland and Washington, D.C. for the commuters from Calvert, Charles, St. Mary's and Prince George's Counties during the weekday peak periods.

## **Local Transit Service Providers**

### **State of Maryland**

TransIT in Frederick County Maryland operates both fixed route and demand-response transportation services for the County and for the City of Frederick. "TransIT's" fixed routes include the operation of the "Meet the MARC" shuttle for commuters that run from Frederick City to the Point of Rocks commuter rail station. There are three fixed routes that operate in the City of Frederick and the adjoining areas of the county. During fiscal year 2002 the total system ridership was 313,238 one-way passenger trips. The county also operates a commuter bus service to the Shady Grove Metro Station.<sup>34</sup>

The Montgomery County Department of Transportation operates the Ride-On Bus program with fixed routes and annual ridership 18,149,097 persons. Montgomery County's Ride-On program is comprised of service in both the rural and urbanized areas of the County. The rural Ride-On program includes a fixed route service that operates in the northwest portion of the County, connecting with the Shady Grove Metro Station.<sup>35</sup>

The BUS operated in Prince George's County, Maryland provides bus service on 13 routes operating throughout the County, serving 1,014,621 riders annually with a fleet of 85 buses.<sup>36</sup>

### **Commonwealth of Virginia**

Arlington Transit (ART) operates within Arlington County, Virginia, supplementing Metrobus with smaller, neighborhood-friendly vehicles and providing access to Metrorail. ART currently has routes serving Arlington's Crystal City, Ballston, Virginia Square and East Falls Church neighborhoods. ART has a fleet size of 7 buses with average weekly boarding's of 837 and 251,829 passenger trips annually.<sup>37</sup>

The DASH bus system in the City of Alexandria operates an eight-route system, utilizing 49 buses running seven days a week, connecting Braddock Road, Eisenhower Avenue, King Street, Van Dorn Street and the Pentagon METRO stations to points throughout Alexandria. The system serves 2.74 million passengers annually with an average weekday boarding of 9,330.<sup>38</sup>

The City-University-Energy saver (CUE) Bus System is owned and operated by the City of Fairfax in conjunction with George Mason University (GMU), which provides an annual operating subsidy. CUE provides low cost transit service within the City and to and from the Vienna/Fairfax-GMU Metrorail station and GMU Fairfax campus. CUE buses operate seven days a week utilizing 12 buses and serving 919,877 passengers annually.

The Fairfax Connector Transit System and Metrobus are the major public transit providers for Fairfax County. The Connector operates 163 buses over 54 routes with over 6.8 million passenger trips annually. The system is highlighted by its connections to Metrorail, Metrobus, Fairfax CUE, DASH, and other services including the park & ride lot at Herndon-Monroe which services the Dulles Corridor. The Connector primarily serves the Northwest, Central and Southeast sections of the county, including Tysons Corner, Reston, Herndon, Annandale, Springfield, and the Richmond Corridor.<sup>39</sup>

Loudoun County Commuter Bus sponsored system of 14 commuter buses provides weekday bus service to Washington D.C., the Pentagon and Roslyn from stops in Purcellville, Hamilton,

Leesburg and Sterling. The buses are operated by Yellow Bus Lines and serve 289, 877 passengers annually.<sup>40</sup>

## **Passenger and Commuter Rail Service**

### **Amtrak**

Amtrak trains provide service in more than 500 communities in 45 states throughout a 22,000-mile route system. In the NCR Amtrak provides frequent service from Union Station in Washington, D.C., to New York via Baltimore and Philadelphia. Amtrak owns and maintains the tracks on this northeast corridor, but uses freight rail tracks on all other routes. Amtrak runs less frequent service from Union Station towards Pittsburgh and Richmond. Union Station is the hub of the Amtrak system in the Washington region. Other Amtrak stations within the Washington metropolitan region include Alexandria, Woodbridge, and Quantico to the south, and New Carrollton and Rockville to the north, as well as points beyond the Washington metropolitan area.<sup>41</sup>

### **Maryland Mass Transit Administration**

The Maryland Mass Transit Administration (MTA) operates the Maryland Rail Commuter service (MARC) commuter rail service, a 187-mile, 41-station system commuter rail service that extends from Washington, D.C., northeast to Cecil County along the Northeast Corridor railroad owned by Amtrak (designated as the Penn Line), north to Baltimore on the CSX railroad (designated as the Camden Line), and northwest to Frederick County and Martinsburg, West Virginia on another branch of the CSX railroad (designated as the Brunswick Line).<sup>42</sup> Stations along this route include Brunswick, Germantown, Gaithersburg, Rockville, and Silver Spring with connections to Metro rail and other transit providers. MARC is operated under contract with the National Railroad Passenger Corporation (Amtrak) and CSX Transportation.

### **Virginia Railway Express**

The Virginia Railway Express (VRE) is a transportation partnership of the Northern Virginia Transportation Commission (NVTC) and the Potomac and Rappahannock Transportation Commission (PRTC). VRE provides commuter rail service from the Northern Virginia suburbs to Alexandria, Crystal City and downtown Washington, D.C. The VRE rail network contains 81 miles of track and runs on two lines. The Manassas Line of VRE provides service for 10 stations from Manassas to Washington's Union Station. The Fredericksburg Line connects the City of Fredericksburg and the I-95 corridor within Northern Virginia to Washington's Union Station with service at 12 stations. The VRE system presently runs 25 trains and carries about 13,000 passengers per day, operating primarily during the morning and evening peak commuting periods.<sup>43</sup>

### **Airport System**

The National Capital Region is served by three major commercial airports. Two of the three airports, Dulles International and Ronald Reagan National, are located in Northern Virginia while the third airport, Baltimore Washington International (BWI), is located southeast of the Baltimore Metropolitan area. Dulles and BWI offer daily domestic and international cargo and

passenger services for residents of the Baltimore/Washington Metropolitan areas. Ronald Reagan National offers domestic passenger services.

### **Maryland Department of Transportation/Maryland Aviation Administration**

Baltimore Washington International Airport (BWI) located outside the geographic boundaries of the Washington metropolitan area near Linthicum, Maryland, serves many residents of the Washington metropolitan area for their air transportation needs. The Maryland Department of Transportation/Maryland Aviation Administration administers BWI. BWI offers over 700 scheduled domestic passenger flights, 30 international flights, and 31 daily cargo flights. In 2001 over 20 million passengers and approximately 429 million pounds of cargo passed through the BWI gateway. Passenger ground transportation to and from BWI is accomplished through private automobile, taxi, public and private bus lines, and connecting shuttle bus service from Amtrak and VRE trains.<sup>44</sup>

### **Metropolitan Washington Airports Authority**

Metropolitan Washington Airports Authority (MWAA) owns and operates Ronald Reagan Washington National Airport (DCA) in Arlington and Washington Dulles International Airport (IAD) near Sterling, Virginia.

Ronald Reagan Washington National Airport occupies 860 total acres in Arlington County Virginia across the Potomac River from Washington DC. During 2002, Reagan National served over 12 million passengers on primarily "short haul" routes not exceeding 1,250 miles from Washington DC. Four cities are exempted from this flight limitation: Denver, Phoenix, Salt Lake City and Seattle. Approximately 20 passenger airlines serve National on a daily basis reaching 60 domestic cities nonstop and 3 Canadian/Caribbean gateways.

Nighttime noise restrictions require jet aircraft exercise special takeoff and landing procedures from 10:00 pm to 7:00 am, restricting flights to specific routes minimizing over flight of residential areas. As a result of flight restrictions enforced since September 11, 2001 general aviation, such as corporate and private aircraft, are prohibited from operations at Reagan National without prior approval from the Federal Aviation Administration. Passenger ground transportation is accomplished through private automobile, taxi, public and private bus lines, and direct connections to Metro's Yellow and Blue Lines via on-site station.<sup>45</sup>

Dulles International Airport is located on 11,000 acres in Loudon County in the Commonwealth of Virginia, situated approximately 26 miles from downtown Washington D.C. In 2002, Dulles served over 17.2 million passengers with 4 million of those passengers traveled internationally. Daily domestic nonstop flights serve over 72 cities and 28 international destinations. Passenger ground transportation to and from Dulles is accomplished through private automobile, taxi, public and private bus lines, and connecting shuttle bus service from Metro's Vienna Orange Line station.<sup>46</sup>

### **Rail Freight Service Providers**

#### **CSX Transportation, Inc**

CSX Transportation, Inc. operates 42,700 miles of track and serves every major population and industrial center east of the Mississippi. CSX is based in Jacksonville, Florida. CSX runs

freight services in the Baltimore and Washington areas to and from points south and west. In the District of Columbia, Maryland, and Virginia CSX operates 1,636 miles of track. Amtrak and Virginia Railway Express passenger services utilize portions of the CSX system.<sup>47</sup>

### **Norfolk Southern**

Norfolk Southern is a Virginia-based holding company with headquarters in Norfolk. It controls a major freight railroad, Northern Southern Railway Company, which runs a freight service from Baltimore through Washington to Northern Virginia and points south and west. Virginia Railway Express passenger services utilize portions of the Norfolk Southern system.<sup>48</sup>

### **Bus - Private and Commercial Services**

Greyhound service provides an extensive nationwide bus route network for passenger travel and provides services for business and group travel. Greyhound bus routes extend from a number of terminals in the Washington area to many areas of the northeast and across the country.<sup>49</sup>

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