# Appendix B
## Short-Term Improvements

Because realigning the Washington, DC freight railroad would take years to implement, this study also investigated possible short-term improvements to the existing railroad to improve security and railroad operations. These short-term improvements are operational and capacity programs that CSX could accomplish in a relatively short amount of time. These improvements do not extend to major infrastructure investments such as a new Potomac River crossing or the replacement of the Virginia Avenue Tunnel, thus, they would not eliminate all the capacity and security issues.

## Objectives and Assumptions

The objectives of the short-term improvements are to:

- Enhance security,
- Achieve greater reliability for all train service, and
- Increase rail line capacity.

The short-term improvement investments must be compatible with the ultimate relocation of the rail freight main lines. In addition, both operational and capacity short-term improvements should:

- Keep freight trains moving. Freight railroads use velocity as a measure of operating performance. Velocity is the average speed of a train from one point to another, or the distance between two points divided by the actual time it takes a train to operate between those points. Maintaining a high velocity and keeping freight trains moving not only improves rail line capacity but also enhances security. A terrorist would have a more difficult time attacking a moving train than a stopped or stationary train.

- Enable traffic growth. This growth should apply to both freight and passenger traffic. Improved reliability is of paramount importance to achieving traffic growth. The present operational practices and infrastructure constrain velocity and cause delay, thereby inhibiting growth.

## The Current Operation

The main lines through Washington, DC are among the busiest mixed-use (passenger-commuter-freight) rail lines in the eastern United States. While the District does not produce or receive a significant amount of freight rail traffic, for the past 150 years the city has stood as a crossroads for north-south and east-west trunk lines. The train movements through the area are significant. Figure B-1 illustrates both the current and projected train volumes on the principal lines passing through Washington.[1]

The current CSX infrastructure on the north-south route is essentially a two-track railroad between Richmond and Baltimore with portions of single track on either side of the Anacostia River in Washington, DC and Prince George's County. Considering the commuter operations north of Washington and south of Washington, the CSX railroad is operationally like two single track railroads side by side during commuter train hours with one track used for passenger trains and the other track for freight. This occurs because the different speeds and stopping patterns of freight and passenger trains make fleeting the trains—running passenger and freight one behind the other—impractical. The different speeds of the various types of trains also make dispatching the railroad a challenge. Generally, slower freight trains stop and wait for faster trains to run, reducing the velocity of the line. In some cases, freight trains wait for slower trains because the frequent stops make commuter trains the slowest trains on the line, despite a passenger train's ability to achieve a higher maximum authorized speed.

With few places to hold trains or stage them in order to advance the freights between passenger train schedules, a security issue is created because trains stop and wait. With the passenger trains on the line, train dispatchers must be careful in moving the freight trains to avoid passenger train delay. That means, in the current operation, that all but the highest priority freight trains stop and wait.

1 The future volumes shown are for 2012-2015. Future commuter train volumes depend on negotiation with the operating railroad.

# Short-Term Improvements

The current holding locations for freight are shown in Figure B-2.

## Operational Reliability

The reliability of passenger trains and expedited intermodal freight trains is reasonably good, but other freights tend to be delayed on the average from an hour to an hour and a half through the area. Hazardous material (hazmat) tank cars are generally located on these lower-priority trains.

This study ran a model to simulate reliability performance statistics. The 2001 Actual results were based on data obtained from CSX on a specific two-week period in 2001, considered a typical operating environment. The 2001 with Committed Projects used the same 2001 actual train data, but the trains were run over enhanced infrastructure agreed upon in a Memoranda of Understanding between CSX, Maryland, and Virginia. The 2007 results used the same enhanced infrastructure but raised the passenger and freight train levels to 2007 projected railroad traffic levels.

With additional infrastructure, the 2001 train performance showed a notable improvement from the actual. With additional infrastructure and 2007 traffic levels, the reliability would be similar to 2001 actual. In other words, additional trains had consumed the additional capacity. In addition, the delay per 100 train miles (TM) for Other Freight was considerably more. These results show that at best, the committed projects will maintain present reliability levels, and at worst, will result in a 14 percent increase in Other Freight—the type of trains that hazmats run on—delays.

## Current Security Operations

An analysis of recent terrorist attacks in the world and current intelligence shows that terrorists conduct a great deal of operational pre-planning. This includes observing transportation operations, taking surveillance photographs, making videos and drawings, and using the internet to gather as much

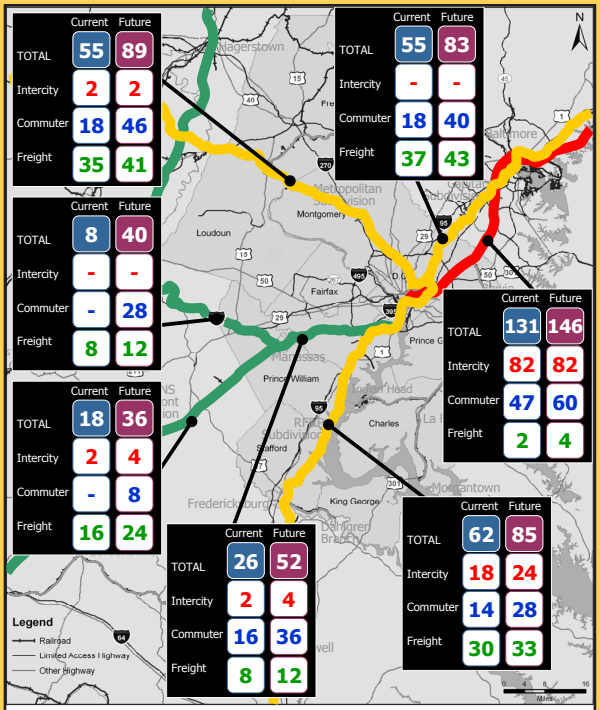


Figure B-1. Current and Projected Train Volumes
Source: CSX, Amtrak, VRE, MARC

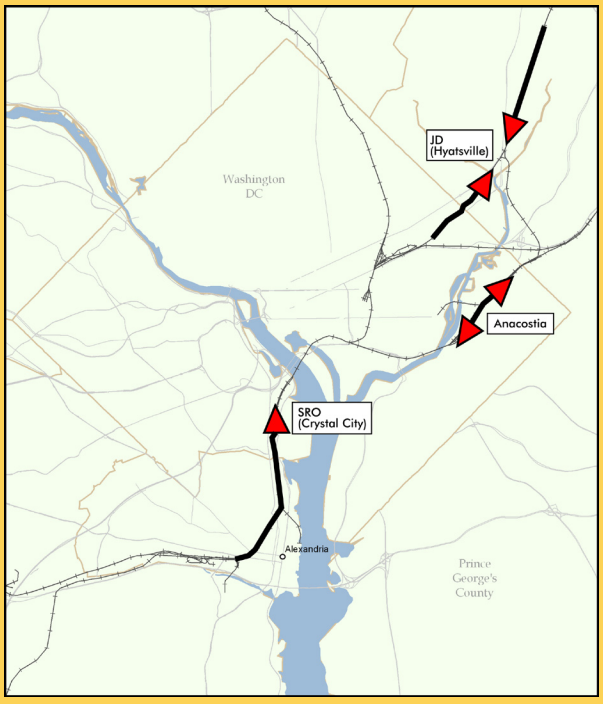


Figure B-2. Current Train Holding Locations

# Short-Term Improvements

information as possible about their target. Terrorists make observations of physical structures as well as work and response patterns of employees, passengers and law enforcement personnel, attempting to identify all aspects of security of their intended targets.

Analysis and intelligence sources report that terrorist groups are less likely to attack a target if they believe that their probability for success is low. Two of the leading reasons for terrorists canceling an attack are (1) after surveillance and operational pre-planning, they determine the target is too well protected, and (2) their plans have been discovered by law enforcement or other authorities.

Thus, identifying locations where a terrorist could cause a hazmat-filled tank car carrying a toxic inhalation hazard (TIH) to rupture helps to prioritize security resources. The critical locations are:

- Railroad infrastructure, such as bridges, overpasses, interlockings, and switches, may be sabotaged by a terrorist, causing train derailment and the rupture of a tank car carrying TIH cargo.
- Sidings where TIH cargo is temporarily stored to serve customers are the most vulnerable locations for a direct attack because the tank cars are stationary, access to tankers is unrestricted, and security patrols and surveillance of the tankers are presently minimal to non-existent. Attempting to target and attack a moving tank car would be much more challenging.
- Locations where railroad infrastructure and sidings are adjacent to major population and business centers, hospitals, schools, government offices, national or historic icons, utility hubs, and other transportation centers are the most critical. Such a situation exists on the current rail alignment, where trains are held in Crystal City, Anacostia, and Hyattsville, and where the existing rail line runs through the District.

A terrorist could derail a train hauling TIH cargo with a vehicle-borne improvised explosive device (VBIED). Strategically parked next to the railroad right-of-way (ROW) or under an overpass, a truck similar to one

Table B-1. Operational Reliability Simulation Results

| | 2001 Actual | 2001 with Committed Short-Term Projects | 2007 |
|---|---|---|---|
| Intermodal Avg. Delay (Mins/100 TM) | 13.3 | 11.6 | 13.7 |
| Other Freight Avg. Delay (Mins/100 TM | 39.4 | 33.7 | 44.8 |
| Commuter On-Time Performance | 87% | 90% | 87% |


Figure B-3. Illegally Parked Truck Under Overpass

used in the Murrah Building attack in Oklahoma City or the first World Trade Center bombings could derail a train and rupture tank cars. Security assessments should identify exposed areas where a VBIED could cause catastrophic consequences. Those areas should be secured from truck traffic, or rigorously patrolled by local law enforcement if the latter is not possible. The use of active or passive anti-ram vehicle barriers, such as concrete walls, Jersey Barriers, fixed bollards, and restraining cable,[2] that create stand-off distances against VBIEDs is one means of reducing that threat; strictly enforcing "no parking, no standing" zones is another.

During this study, vehicles were observed to be parked in critical areas, such as under a railroad bridge with clearly visible "no parking" signs at the location.

The Department of Homeland Security's Infrastructure Protection group (DHS/IP) has been working with several Washington, DC region jurisdictions (including Fairfax County, VA; Arlington County, VA; Prince George's County, MD; Montgomery County, MD; and the District of Columbia) to help secure the Washington, DC region freight rail system. Technologies that have been employed in the area include intrusion detection and virtual fence systems. Additionally, DHS/IP has been developing "best practices" and training for emergency responders and hazmat teams, as well as identifying the best Personal Protective Equipment to be used for responding to and recovering from a TIH agent release. These initiatives significantly increase the security of the region and should continue.

## Emergency Response Capabilities

Fire, police, and sheriff departments and hospitals all have roles in emergency response. Separately, each category of emergency responders performs specific tasks that assist people, protect property, and help recover from a disaster. Under emergency conditions, emergency responders integrate resources to provide their capabilities to local or regional emergencies, such as hazmat spills, mass casualties, or area-wide evacuations. Typically, the first responders to a hazmat spill or release are fire, law enforcement and emergency medical service departments. They operate from mobile and fixed locations throughout the Washington, DC region and are trained to serve the community's public safety needs. Hospitals and emergency care centers play a support role, as they manage care following initial treatment by first responders.

Across the Washington, DC region, the movement of rail tank cars containing unknown quantities of hazardous industrial chemicals increases the potential hazards encountered by emergency responders. Under these circumstances, the derailment of a train moving hazmat cargo, or the malfunction or willful sabotage to tank car hatches, seals, or valves may cause the cargo to leak, spill, or discharge into the environment and surrounding communities. Although emergency responders are not provided with advance information about the types or quantities of hazardous cargo transiting their jurisdictions, they know that hazards exist through placarding and experience with hazmat emergencies. They have prepared hazmat incident management, command, and operations plans for hazmat releases. They conduct emergency preparedness drills, typically with railroads and state and federal governments. In the event a release is beyond their technical capability, additional technical assistance is available from private-industry experts. Additionally, state and federal governments provide added resources, as requested.

In the study region, six fire and emergency medical service departments operate hazmat response units. These units have personnel trained to the hazmat technician and above levels. At the technician level, trained personnel can approach the point of release to stop the flow of hazmat from its source (e.g., tank, container, etc). Several departments within the region have personnel specially trained in rail tank car firefighting techniques, structures, and nomenclature. All jurisdictions with emergency response agencies are signatories to mutual assistance agreements that

2 FEMA 426, Risk Management Series Reference Manual, para 2.4.3 Anti-Ram Barriers

support local, regional, and state-level responses to incidents involving rail tank cars carrying hazardous cargo.

Numerous emergency responders in the Washington, DC region, listed in Table B-2, provided information for this study. Those that did not do so cited operational security concerns about the protection of sensitive information.

## Incident Management

Incident management implements recovery operations by coordinating and unifying tasks, assets, and people. All fire and emergency medical service departments and police and sheriff agencies in the study region use the National Incident Management System (NIMS) model to manage emergency incidents, including incidents involving rail tank cars carrying hazardous cargo. Specifically, an incident commander (IC) from the fire and emergency medical service department manages on-site operations; a unified incident management team (police and sheriff agencies, public affairs, engineers, etc.) sets up position near the accident site to collectively provide support to recovery operations. Hospitals and emergency care centers, however, manage incidents independent of incident site management. For example, they coordinate and synchronize patient flow from the incident site to receiving medical facility, but once patients are received at a facility; care is managed by the facility's staff. Using the NIMS model for incident management is an effective recovery operations tool.

## Mutual Aid Agreements

Mutual aid agreements provide emergency responders with increased operational capabilities that they otherwise may not possess. Several fire and emergency medical service departments have the resources to deploy offensive measures to seal hazmat source points, whereas other departments without the capability to deploy offensive measures must rely on mutual aid agreements with other jurisdictions

**Table B-2. Sources of Emergency Responce Information**

| Fire | Police/Sheriff | Hospital |
|---|---|---|
| • Prince William County, VA - Dept. of Fire & Rescue<br>• Stafford County, VA - Fire, Rescue & Emergency Services Dept.<br>• Arlington County, VA - Fire Dept.<br>• City of Alexandria, VA - Fire Dept.<br>• Prince George's County, MD - Fire & EMS Dept.<br>• Ann Arundel County, MD - Fire Dept.<br>• Charles County, MD - Dept. of Emergency Services<br>• Washington, DC - Fire & Emergency Medical Services<br>• Virginia Depatment of Emergency Management | • Prince William County, VA - Sheriff's Office<br>• Prince William County, VA - Police Dept.<br>• Stafford County, VA - Sheriff's Office<br>• Arlington County, VA - Police Dept.<br>• City of Manassas, VA - Police Dept.<br>• City of Manassas Park, VA - Police Dept.<br>• Charles County, MD - Sheriff's Office<br>• Prince George's County, MD - Sheriff's Office<br>• Ann Arundel County, MD - Police Dept.<br>• Washington, DC - Metropolitan Police Dept. | • Northen Virginia Hospital Alliance<br>• Maryland Institute for Emergency Medical Services Systems (MIEMSS)<br>• Virginia Department of Health, Emergency Preparedness & Response Programs, Hospitals Coordinator |

to manage such incidents. All fire and emergency medical service department jurisdictions in the study region have mutual aid agreements with other local municipalities, as members of the Council of Governments, or because of their location within a region. Further, some fire and emergency medical service departments have automatic aid agreements in force with other departments to respond to specific types of incidents e.g., hazmat. This means that two fire and emergency medical service departments will automatically respond to an incident under the terms of their agreement. Whether mutual aid or automatic aid agreements are in force, all fire and emergency medical services benefit from the increased operational capabilities that agreements provide.

Virginia has instituted a regional hazmat team concept to support hazmat incidents in multiple jurisdictions. Specifically, the Virginia Department of Emergency Management (VDOEM) has partnered with hazmat units from fire and emergency medical service departments throughout the state to serve as collateral duty Regional Hazardous Material Response Teams (RHMRT). When activated through mutual aid agreements, the teams provide all the municipalities within their designated region with hazmat response capabilities and state-level VDOEM resources. The Northern Virginia RHMRT is the City of Alexandria's Fire Department. The City of Fredericksburg Fire Department is the RHMRT for the Fredericksburg region.

## Training

Beyond the basic professional training level, emergency professionals responding to railroad hazmat incidents require advanced and specialized training. To be prepared, training in the advanced levels of hazmat, personal protection equipment, and rail tank car firefighting are essential to the mounting of an effective response to rail tank car incidents.

In the study region, all fire and emergency medical service departments and police and sheriff agencies comply with Occupational Safety and Health Administration (OSHA) standards for emergency responder hazmat training. In order of increased responsibilities, the five levels are awareness, operations, technician, specialist, and on-scene incident commander. All fire and emergency medical service departments and police and sheriff agencies in the region conduct one or more of the hazmat levels training sessions annually.

Hazmat training is one type of important training available to emergency responders. All fire and emergency medical service departments and police and sheriff agency personnel are trained to the awareness level in the Washington, DC region. At this level, personnel know how to report a hazmat incident. At the operations level, personnel can deploy defensive measures to the hazmat incident i.e., damming or diverting the flow to contain the spread of hazmats without coming in contact with it. Police and sheriff agency personnel are not trained at this level of response, but all fire and emergency medical service department personnel are. Also, in the study region, several fire and emergency medical service departments and police sheriff agencies train personnel to the technician level. A technician deploys offensive actions to approach the point of release to stop the flow of hazmats by plugging or patching holes, capping or closing shut-off valves, etc at its point of source. Several technician level personnel are also trained in rail car nomenclature and fire fighting tactics, whereas police and sheriff agencies that train to the technician level apply their training to criminal investigations of rogue chemical laboratories and forensics crime scene processing.

Only three fire and emergency medical service departments have trained personnel to the specialist level. The police and sheriff agencies do not train to this level. Specialists are required to have more working knowledge about hazmats than those trained to the technician level. Only one fire and emergency medical service department has trained personnel to the on-scene incident commander level. Their duties are previously listed.

Also, PPE training and equipment are essential

elements to protect emergency responders from contact with hazmats. All fire and emergency medical service departments and police and sheriff agencies personnel are trained in the OSHA PPE ensemble guidelines. Each ensemble provides a different level of protection and is rated in descending order of protection as Level A, B, C, and D. The fire and emergency medical service departments with hazmat units provide Level A and B ensembles for their personnel, while several police and sheriff agencies provide Level C ensembles to their personnel.

Further, fire and emergency medical service responders trained in special rail tank car firefighting techniques are important to managing rail tank car incidents because of their experience. Fire and emergency medical service responders receive in-service rail tank car firefighting training scheduled by their departments. Several departments have firefighters who are specially trained in rail tank car structures, nomenclature, and specific firefighting techniques. Also, the freight rail companies that operate in the region as well as several off-site private enterprise emergency preparedness training organizations offer specialized rail tank car training. This training, coupled with hazmat training, provides a base line capability for fire and emergency medical service departments responding to rail tank car incidents.

## Operations

***Fire and emergency medical service departments.***
Holistic and effective responses to incidents involving rail tank cars carrying hazmat include contingency preparedness, incident management, and operational planning. Within the study region, there are six separate fire and emergency medical service departments that operate hazmat units. These units are staffed by personnel who are trained to the Technician level and above. They have developed plans, policies, and procedures to respond to incidents that involve rail tank cars carrying hazardous cargo. For instance, at the onset of an incident involving rail tank cars carrying hazmat, it is for the emergency responders to know the types and locations of hazardous cargo within a specific train set. Therefore, through strategic planning, a communication bridge between the freight rail's 24-7 emergency operations center and hazmat communication centers is established to provide the on-scene commander and hazmat unit with the critical information necessary to deploy an effective response and recovery operation.

Many factors influence the level of support deployed to a hazmat incident site. Fire and emergency medical service departments' hazmat units have established predetermined responses to hazmat incidents; however, the IC may increase or decrease the levels of support depending on factors associated with the incident. Hazmat units have outlined the numbers of personnel, apparatus, and equipment that should be deployed to a hazmat incident. For example, as many as 12 to 15 personnel, along with supporting apparatus and equipment, may be deployed to a hazmat incident site. The initial response team may include a Chief (Command Staff), Safety Officer, Emergency Medical Services Supervisor and staff, Hazmat Technicians and fire fighters. Also, supporting apparatus such as an engine, truck, and rescue along with light & air, foam, and hazmat support units may be deployed, along with responders to the incident site.

***Police and Sheriff Agencies***
Police and sheriff agencies operational plans address several phases of their response to hazmat incidents. Initially, hazmat incidents are treated as crime scenes until such time as they are declared non-criminal in nature. They are responsible for securing the scene, gathering evidence, and searching for and apprehending perpetrators. They control area entry and keep unsuspecting residents from the incident site, provide direct support to the functions of the IC, and support the incident management team during hazmat incidents. Also, they provide law enforcement services, such as site perimeter cordon, traffic management around the incident site, and assisting with an area evacuation, if required. They are the link to state and local law enforcement agencies.

# Short-Term Improvements

*Hospitals and emergency care centers*

Personnel injured at a hazmat incident site or from the effects of released hazmat require transportation to a treatment site and care. In the study region, hospitals and emergency care centers have organized their emergency planning to respond to such a need. In Virginia, hospitals and emergency care center emergency planning is organized by regions and under the coordination of Regional Healthcare Coordination Centers (RHCC). These centers are strategically located throughout the state to assist hospitals and emergency care centers with emergency management during a disaster. Among other things, the RHCCs direct ambulances from the incident site to a designated medical facility, and coordinate requests for additional staff, pharmaceuticals, general supplies, or equipment to meet the medical facility's emergent demands. The Northern region RHCC, located in Falls Church, encompasses the Northern Virginia region and operates on a stand-by status until activated.

Hospitals and emergency care centers in Maryland are also organized into regions and in the early stages of coordinating their regional emergency planning efforts. The hospitals and emergency care centers in Howard, Anne Arundel, Prince George's, and Charles counties are carved into two hospital regions and coordinate their emergency planning with the other facilities in their region and county. They have the capabilities to either network through internet databases, email, phones, and/or communicate through two-way radio systems to communicate emergent conditions or make requests for emergency support from other facilities. In the same counties, all patient logistics are centrally coordinated through the state's Emergency Medical Resource Center (EMRC). It operates 24-7 and coordinates and communicates the transport of patients by ambulance to a designated medical facility for treatment. A second state-funded EMRC is under construction. When operational, it will provide patient logistics support to a wider area of the state.

Hospitals and emergency care centers in the Washington, DC region have access to specific internet-based systems and network databases that enable them to notify other facilities of emergent incidents, exchange information, and request medical resources. Specifically, in Montgomery County, Maryland, all hospitals, ambulance, fire, and police are connected to a dedicated 800 MHz radio system. This system enables county emergency responders to coordinate and manage their emergency incidents. Finally, the Northern RHCC in Virginia coordinates with its regional medical facilities, and several surrounding county emergency management organizations, through either unsecured or secured landline, voice-over-internet protocol, or satellite phones, as well as through shortwave and 800 MHz radio systems.

# Short-Term Improvements

Field visits were made and data was collected along the current freight rail alignment to assess opportunities for short-term improvements. Based on this data, the study identified several actions that could reduce the possibility of a terrorist incident, minimize the effects of an attack to railroad infrastructures, and improve railroad reliability and capacity.

The short-term improvements discussed in this appendix fall into two categories:

- Operational improvements are changes to day-to-day practices, policies, and methods that improve rail security and reliability, such as training, security patrols, and train scheduling.
- Capacity improvements include infrastructure and equipment changes that would improve capacity while also improving rail security and reliability.

## Operational Improvements

The following operations measures can enhance the security and reliability of freight traffic through the area. All of the measures listed would keep freight moving and allow for traffic growth.

### Build Additional Inspection Tracks

Freight cars, including tank cars, are generally inspected at the beginning of their run and when they are switched into freight trains. These inspections are important because while some equipment failures are quick and catastrophic, many are gradual. A trained equipment maintenance employee can detect equipment irregularities that may indicative of a pending failure.

Given the through-traffic nature of the rail freight in the Washington, DC area, few freight trains are made up in the area; freight cars are inspected 50 or more miles away. However, because trains are often held on either side of Washington due to schedule delays, there is an opportunity to build inspection tracks as long, secure signaled, passing sidings where maintenance and security staff could inspect the train. These inspection tracks could be built on the Metropolitan Subdivision for trains coming from the west, on the Capital Subdivision for trains coming from the east, and on the RF&P Subdivision for trains coming from the south.

The inspection tracks described would be the railroad equivalent of truck weighing and inspection stations that are on major highways, usually close to state borders. To be effective without compounding delay, these tracks must be purpose-built, secured facilities known as "Safe Havens." The Safe Havens should be areas that may be easily secured and away from mainline tracks.

The drawback of this recommendation is that it is labor intensive to put several pair of eyes on a freight train, and even in the best of circumstances, the implementation of such a plan will cause some delay. However, manual inspections will reduce the probability of having a car failure on a train that carries hazmat through a High Threat Urban Area (HTUA).

### Install Wheel Defect Detectors

The electronic version of manual inspection is defect detection. This technology eliminates the need for manual labor and train stoppages. Presently, defect detectors for hot journal and dragging equipment are located along the main lines at 10 to 15 mile intervals. These detectors guard against two of the most common causes of train accidents and equipment failures: failed journals—the journal is where the axles are housed in the trucks—and dragging equipment. When it is dragged through a switch, a large piece of dragging equipment often causes a train accident.

The location of defect detectors on the CSX main lines is shown in Figure B-4. The Norfolk Southern and Amtrak have also installed and maintained defect detectors on their lines.

There are no defect detectors in the Washington, DC area for the train wheels themselves, even though defective wheels cause significant accidents. The wheels can crack or even shatter under movement.

# Short-Term Improvements

Adding wheel defect detectors for trains approaching the District could identify defective wheels and enable that car to be removed from the train. CSX would also need to provide a safe, multi-track siding for the car to be removed.

Purchasing, installing, and maintaining additional defect detectors would involve a capital and operating cost.

## Additional Track and Signal Maintenance

An effective track and signal maintenance program will reduce incidence of derailments. However, the human side of defect detectors is to have maintenance of way, signal maintainers, and maintenance of equipment employees on hand 24-7. These employees do not usually prevent a breakdown of trains and infrastructure, but their presence ensures a quick response and usually a more rapid resolution of the problem. It may not always be possible to prevent a track, signal, or equipment failure, but it is possible to mitigate the effects of those failures by having qualified people on duty. This type of maintenance presently occurs, but it should be increased. The disadvantage of this recommendation is that labor can be costly and the dedicated staff required for these operations can be difficult to obtain.

## Review Train Scheduling and Dispatching

Railroad management continually reviews train operations and delays to improve performance. The operating elements that need constant review are blocking instructions, schedules, and priorities of trains. CSX calls the blocking strategies—which cars are forwarded on which trains, a function of car-type, destination, and priority—the One Plan. The One Plan's goal is to move freight as expeditiously as possible and to switch the trains as few times as possible.

This plan should have continued attention and frequent review to ensure that it is most effective. In particular, CSX should seek to switch hazmat trains as few times as possible. The fewer times a car is switched, the less likely a train will be idle during

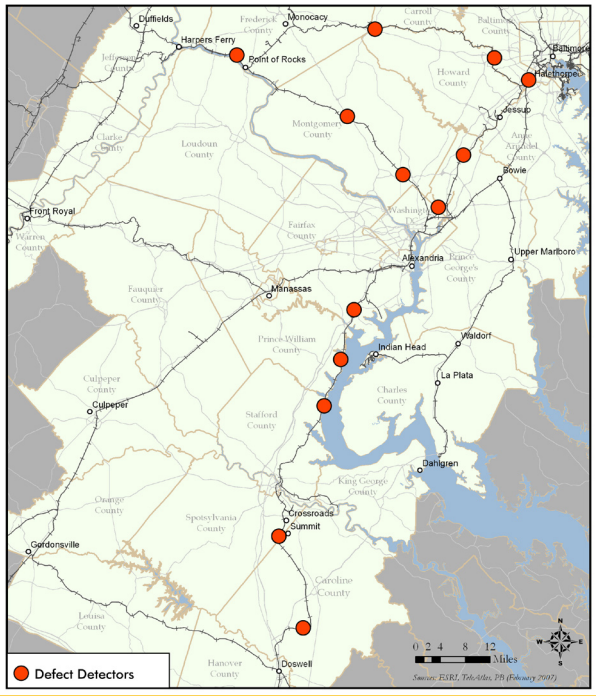


Figure B-4. Defect Detector Locations

# Short-Term Improvements

the process, and the less likely a hazmat car will be ruptured by accident during the switching move.

## Raise Freight Operating Speeds and Install Automatic Train Control

Freight train operating speeds on the Metropolitan Subdivision between QN Tower and Georgetown Junction, on the Alexandria Extension, and approaching the wye at JD Tower at Hyattsville are below the maximum allowable speeds. Though these tracks are maintained at Class IV levels, meaning they can accommodate freight speeds up to 60 mph, they operate as low as 30 mph due to a policy decision. Raising the operating speed to Class IV would decrease the time it takes to get through the area.

Though not a short-term improvement, Automatic Train Control (ATC) could also increase train speeds and enhance safety. This feature would allow faster train speeds and would instantly alert train operators of a disruption to the track circuitry. ATC should be installed on the CSX lines north of Washington, similar to how it is on the RF&P Subdivision south of Washington. However, this is a more expensive, longer-term project.

## Enhance Security and Maintenance where Trains Stop

It is easier to strike a stationary target than one that is moving. Trains that are detained for (1) other train movements to pass, (2) loading or unloading freight, or (3) left on sidings for delivery need to be protected.

The locations where trains idle, as well as sidings that may be used to store TIH, should be identified and the following actions should be taken in these areas:

- Increase security patrols
- Install and/or maintain fencing and other barriers
- Remove excessive vegetation and foliage
- Install lighting
- Use CCTV with intelligent video detection software and integrated with intrusion detection technologies where possible

Fencing, gates, and lighting deter terrorists from carrying out attack. These types of hardware increase the possibility of a criminal or terrorist being detected and delay their time to get to a target. A well-maintained fence and locked gate can delay the terrorist, increasing time for their detection, as well as giving law enforcement more time for response. In addition, excessive vegetation and foliage overgrowth around a railroad creates camouflage and cover for would-be criminals and terrorists to move about undetected as well as creating areas for planting improvised explosive devices (IEDs) or staging equipment to be later used by terrorists.

Local law enforcement should be made aware of stationary trains within their respective areas, whether they are planned stops or unexpected delays.

## Develop Interagency and Inter-Jurisdictional Agreements

Strong inter-agency/inter-jurisdictional memorandums of agreement (MOA) are critical to protecting a rail environment. They define the coordinated responses and respective responsibilities to both threats and incidents, the sharing of resources and sharing of information, which includes coordination of communications. Some of the local jurisdiction hazmat units in the Washington, DC region have established MOAs. However, there are no such agreements in the region that include railroad companies and law enforcement units. These types of MOAs should be developed. Rail agencies and companies must have the support of local law enforcement for patrols and security checks, timely responses to reports of suspicious incidents and intrusion alarm activations, as well as investigations of suspicious incidents and responses to actual incidents. Law enforcement units agencies can also enforce “no parking” and “no standing” restrictions in critical locations. In addition, all information from these reports and responses must be centralized for the best analysis. The sharing of information, the timely responses to suspicious activity reports and intrusion alarms, the analysis of this information at a central office, and the coordinated regional response to an

attack are critical in protecting assets from terrorism. This is best supported in formal, well-constructed MOAs.

The timely response and timely sharing of information is most important today, in light of recent attacks by terrorists where numerous targets were struck simultaneously or nearly so. One isolated suspicious incident may be meaningless, but identified and connected with similar incidents in different areas occurring at the same time may indicate a "dry run" or be an actual attack. The intelligence community has advised that terrorists have conducted "dry runs" in the past prior to actual attacks, in part to gauge security force responses. The London and Madrid train bombings are just a few of examples of simultaneous attacks. Only by timely responses and timely sharing of that information will there be a chance to deter, or minimize an attack. A "dry run" detected greatly reduces the possibility of an actual attack of the same target.

## Develop a Security Awareness Campaign

Local governments and law enforcement agencies should support programs such as, "See Something, Say Something"[3] campaigns where private citizens are encouraged to report unusual or suspicious railroad activity to law enforcement. This could be done by identifying and recruiting volunteer civic groups and clubs that may, by the nature of their activities, be at a location near the railroad and have an opportunity to observe suspicious behavior. Government employees and students should be made aware of these programs and asked to participate. Existing programs such as "Transit Watch"[4] and the New York City Police Department's civilian report programs are excellent sources for any municipality or agency to glean ideas for their own program, including literature, posters, and reporting protocols.

Again, the intelligence community reports that historically, terrorists conduct surveillances, sometimes well in advance of their planned attacks, and that the discovery of terrorist surveillances by law enforcement in the recent past has caused the terrorists to abandon some of their intended targets, opting for other targets where their plans remained undetected.

This study recommends developing a security awareness campaign that includes freight railroads. Citizens would report unusual activity to a railroad or other hotline, where the suspicious activity is then investigated and analyzed.

## Conduct Regional Drills and Training

Response to a threat or incident is more successful when the participants, especially from different jurisdictions, know one another instead of meeting for the first time during a real situation. Conducting inter-agency drills with the actual persons who will be involved in an event is the best way to prepare for an emergency. Emergency drills are held in the Washington, DC region, but not on a regional level or with all entities that would be involved in a railroad incident.

There is a great deal of training aids available from the federal government on the National Incident Management System (NIMS)[5]; appropriate personnel within each jurisdiction should become certified for their role during an event.

Training and drills should be regularly scheduled, and should include multi-agency participants. Most drills, especially regional ones, should be well publicized. Terrorists are aware of large-scale drills, and the intelligence community believes that these drills will deter them from attacking. Being well-equipped, trained, and drilled is the best way to mitigate any situation.

In addition, an important part of a successful drill is the critique and follow-up actions. A successful drill identifies the weaknesses in a response. These weaknesses should be addressed at the critique, changes made to the emergency plan, and then tested

3 http://www.mta.info/mta/security/seesomething.htm
4 http://transit-safety.volpe.dot.gov/security/Transit-Watch/
5 http://training.fema.gov/

again. Unbiased, outside observers are the best means for fair, constructive critiques.

Finally, first responders and hazmat teams should be properly equipped and have the most current training available.

*Strategies Considered but Not Recommended*

The study explored the possibility of consolidating the hazmat traveling through the area into a single train or a few trains. This would enable the shipments to be guarded and observed more intensively. In fact, railroads have tried this tactic before.

Such a suggestion, however, runs contrary to the idea of keeping freight moving because railcars sit longer in classification yards up and downstream.[6] Another major flaw in this strategy is that if a hazmat train derails intentionally or accidentally, the result could be catastrophic due to the large concentration of hazmat affected.

This strategy is not recommended because the security risks outweigh the potential benefits.

## Capacity Improvements

The states typically address railroad capacity improvements on an ongoing basis as part of a program to increase commuter service and service reliability. Railroads, in general, have limited resources to commit to capital projects. CSX and Norfolk Southern (NS), with an over-15,000-mile system, have a backlog of urgent capital priorities.

In the Washington, DC area, CSX has already identified a number of projects that would reduce the single-track segments and create some three-track segments in joint freight-passenger territory, both in Maryland and Virginia. CSX has already completed construction that converted the Benning Yard area to double-track, eliminating one of the area's bottlenecks. There is now double track from M Street (the mouth of Virginia Avenue Tunnel) to Chesapeake Jct just west of the District line.

Figure B-5 depicts the Committed Capacity Improvements funded by Maryland and Virginia.

Progress is being made on these projects to eliminate bottlenecks and facilitate the movement of freight and passenger trains. These projects should be complete by 2010.

The next priority capacity improvements, as shown in Figure B-6, have already been identified through separate study.

These improvements continue to reduce the bottlenecks in Maryland and Virginia. None of these projects would prevent the relocation of the freight line away from Washington, DC, and each of the improvements would have some residual benefit to the passenger operation if the freights were relocated.

In addition to implementing the Committed Capacity Improvements, this study recommends additional crossovers and improved signaling. This would reduce headways between trains, thereby increasing the line capacity.

### Strategies Considered but Not Recommended

This study considered a short-term strategy that would reroute the hazmat trains along an existing alignment west of Washington, DC. In this option, hazmat trains would follow the Western Existing alignment identified in Section 3 of this report, while priority intermodal trains would follow the existing CSX mainline. This was considered as a short-term strategy because it would require modest capital improvements. This study found the strategy unsuitable for the long term, however, as it would limit Anacostia River waterfront improvements and related urban development.

With this short-term strategy, there are selected

6 Association of American Railroads, January 2006, "HazMat Transport: Mandatory Rerouting and Pre-Notification."

# Short-Term Improvements

improvements that both CSX and NS would need to undertake in order to make this operationally viable. CSX would need to make improvements on the Old Main Line to accommodate double stacks and improve signaling. The limiting factors for double-stacks on the Old Main Line are all bridges and tunnels. Because of clearance considerations, some of the Main Line would need to remain single track.

If CSX were to reach the NS line via Doswell and Gordonsville or Charlottesville, there would need to be an effort to upgrade the existing Piedmont Subdivision, now leased to the Buckingham Branch Railroad. If the connection were to be made at Charlottesville, then a new connection would need to be constructed in the northeast quadrant of the CSX-NS crossing at the Charlottesville passenger station. The NS main line and the B Line would require additional double tracking, and the B-Line would need to be signaled.

Because hazmat cars are not clustered together on trains, all but priority intermodal and passenger service would be rerouted onto the Western Existing alignment. This route would be significantly longer than the existing CSX main line route, making it less competitive. In addition, hazmat trains would be rerouted onto a longer, less modern railroad network, increasing the risk of derailment and a TIH release.

This strategy is not recommended because it would be uncompetitive and circuitous, using slower, secondary main lines. The circuitous routing would increase exposure to a potential accident or incident by prolonging transit times, which is contrary to the goal of keeping trains moving.

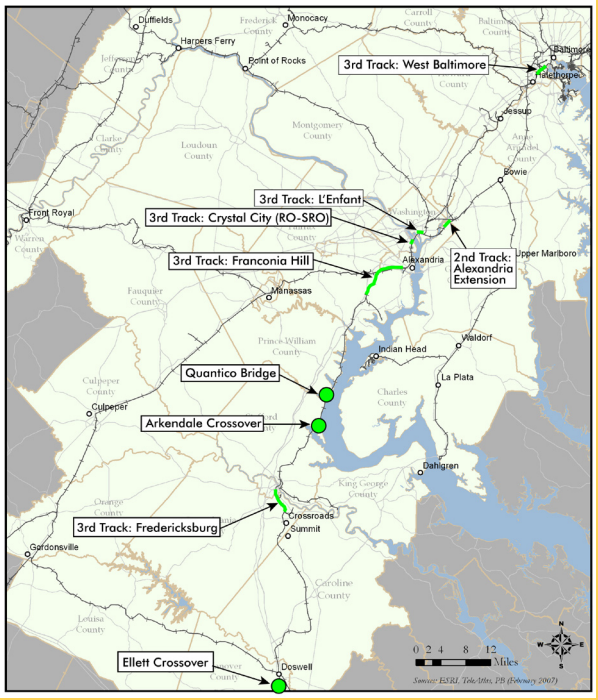


Figure B-5. Committed Capacity Investments

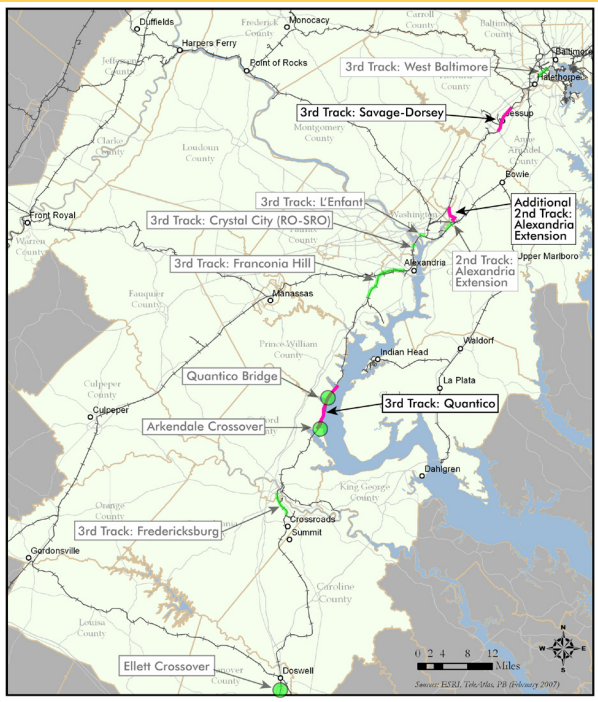


Figure B-6. Next Priority Capacity Investments

## Conclusions

The operations and security environment of existing freight railroad need improvement. Hazmat trains are delayed over an hour through the Washington, DC region. Due to capacity and operational constraints, these trains stop near concentrations of employment and residential population and pose a security risk. In addition, the Washington, DC region lacks comprehensive inter-jurisdictional and interagency programs and agreements that would enhance terrorism detection and emergency response if an incident did occur.

Though one of the assumptions of this analysis was to keep freight trains moving, no set of short-term improvements can substantially increase train velocity. The short-term capacity improvements identified allow freight to be moved in increments rather than waiting for an uninterrupted slot across the whole territory, as is often the case now. Freight trains presently sit in HTUAs because that is where the sidings are. The effect of the short-term improvements would be that trains sit for less time and, in many cases, farther away from the HTUA. Having more and better places to sit enables trains of all types to keep moving.

By creating a layered approach to security, there are several initiatives that could mitigate the terrorist threat to rail freight in the Washington, DC region. These range from depriving a terrorist of a target, to deterrence and delay, and include detection and response.

Though the short-term improvements identified could reduce the security risk, minimize the effects of a security incident, and improve railroad reliability and capacity, they would not solve the major capacity and security problems. Freight railroad capacity would still be constrained by the Virginia Avenue Tunnel, passenger and freight rail would continue to share the same alignment, and the freight railroad carrying hazmat would continue to run alongside federal office buildings and the U.S. Capitol.

# Short-Term Improvements

Table B-3. Summary of Short-Term Security Improvements

| Threat | Protective Countermeasures |
|---|---|
| IED placed on track to damage a tank car carrying TIH by exploding car or causing derailment that would result in ruptured car | • Surveillance cameras<br>• Sensors<br>• Maintain fencing, lock gates<br>• Low-cut, well maintained landscaping<br>• Security lighting<br>• Security patrols<br>• Publicized drills<br>• Support public awareness programs like "Transit Watch" |
| Sabotage to cause derailment resulting in ruptured tank car carrying TIH | • Surveillance cameras<br>• Sensors<br>• Fences, locked gates<br>• Low-cut, well maintained landscaping<br>• •Security lighting<br>• Security patrols<br>• Publicized drills<br>• Employee awareness training<br>• Patrols/inspections of ROW<br>• Support public awareness programs like "Transit Watch" |
| VBIED placed under RR tunnel/ overpass or near ROW to cause derailment resulting in ruptured tanker carrying TIH | • Post "no parking" "no-standing" signs at all critical locations with strict enforcement<br>• Support public awareness programs like "Transit Watch"<br>• Local law enforcement patrols of streets near critical railroad structures |