

18.1 INTRODUCTION

This chapter describes the conceptual design and approach for incorporating safety and security measures into the design of the Preferred Alternative. During final design, construction, Project commissioning, and startup, detailed safety and security analyses will continue to be developed. This analysis identifies existing system safety- and security-related requirements, policies, procedures, protocols, and infrastructure and identifies those elements proposed to be added.

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18.2 ANALYSIS METHODOLOGY

During development of this Environmental Impact Statement (EIS), the Federal Railroad Administration (FRA) and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of safety and security are summarized in this chapter.

18.1.1 REGULATORY CONTEXT

Amtrak and NJ TRANSIT rail operations on the Northeast Corridor (NEC) in the Project area are regulated and/or monitored by Federal, state, and local agencies, including the FRA, Federal Transit Administration (FTA), New Jersey Department of Transportation (NJDOT), New York State Department of Transportation (NYSDOT), and Federal, state, and local law enforcement. The National Railroad Passenger Corporation (Amtrak) is responsible for assessing and implementing safety and security measures for the NEC and its trains in the study area. NJ TRANSIT, in collaboration with Amtrak, is responsible for assessing and implementing safety and security measures for its trains in the study area.

FRA has established regulations related to passenger train emergency preparedness,¹ which have all been directly considered in the design development of the Preferred Alternative.

¹ 49 CFR Part 239.



In addition, other governmental agencies and industry organizations provide safety and security related regulations, criteria and guidance for infrastructure design and operations. While not exhaustive, the following is a list of relevant agencies and organizations:

- American National Standards Institute (ANSI);
- American Public Transportation Association (APTA);
- American Society of Civil Engineers (ASCE);
- Federal Department of Homeland Security (DHS) including Transportation Security Administration (TSA), DHS Protective Security Coordination Division, DHS Office of Cyber and Infrastructure Analysis, DHS National Infrastructure Simulation and Analysis Center, and DHS Science and Technology;
- The Federal Occupational Health and Safety Agency (OSHA);
- FRA (FRA guidance includes, but is not limited to *Emergency Preparedness Guidelines for Passenger Trains*, and standards for design, maintenance, inspection, and operations of railroads);
- FTA (FTA guidance includes, but is not limited to, the Transit Security Handbook, Public Transportation System Security and Emergency Preparedness Guide, and Safety Certification Handbook); and
- National Fire Protection Association (NFPA); and
- United States Coast Guard (USCG).

The USCG reserves a security zone in all waters within 25 yards of critical Project structures, such as ventilation facilities. However, none of the Preferred Alternative's critical structures, including the new ventilation facilities, would be within 25 yards of the water; therefore, this does not apply.

Among the NFPA standards that apply to the Preferred Alternative is the NFPA Standard for Fixed Guideway Transit and Passenger Rail Systems (NFPA 130). NFPA 130 specifies the latest fire protection and life safety requirements for underground, surface, and elevated fixed guideway transit and passenger rail systems. NFPA 130 identifies numerous factors, including emergency ventilation, emergency exits, walkways to evacuate a train, access to the nearest position of safety, and fire standpipe systems.

18.1.2 ANALYSIS TECHNIQUES

This analysis identifies existing system safety- and security-related requirements, policies, procedures, protocols, and infrastructure and identifies elements that would be incorporated into the Preferred Alternative to address fire-life safety and security in compliance with all applicable Federal, state, and local regulations. The analysis also identifies potential impacts and benefits of the safety and security elements that would be components of the Preferred Alternative.

18.1.3 STUDY AREA

The study area for this analysis is the Project site itself, as defined in Chapter 4, "Analysis Framework."

18.3 AFFECTED ENVIRONMENT: EXISTING CONDITIONS

Amtrak maintains the NEC and the North River Tunnel in accordance with FRA regulations and requirements as well as other applicable Federal regulations. Among the FRA regulations are requirements for inspection of tracks, signals, bridges, and rail equipment. Amtrak's capital

program includes required upgrades to operating systems, such as the provision of a Positive Train Control signaling system in the study area as mandated by the Rail Safety Improvement Act of 2008; such a system is currently in place in the North River Tunnel. NJ TRANSIT adheres to the same requirements as Amtrak for its rail equipment that operates on the NEC to and from Penn Station New York (PSNY).

NJ TRANSIT and Amtrak provide operating crews with security awareness training related to security along the NEC right-of-way. Both organizations have policies and protocols in place to react to security threats and emergency situations, including alternative service plans for the NEC if trains are unable to operate through the North River Tunnel or into PSNY. NJ TRANSIT, the Port Authority of New York & New Jersey (PANYNJ), and Amtrak work together to coordinate their approach to security threats and emergencies. The Penn Station Security Task Force (PSSTF) assesses threats and vulnerabilities at PSNY, conducts drills regularly, and coordinates safety and security activities of the various railroads that use PSNY. The Fire Life Safety Committee ensures appropriate coordination among emergency responders and agencies within PSNY.

18.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

Under future conditions, existing safety and security measures and procedures would continue to be in place and continued maintenance would be conducted and repairs made in the North River Tunnel to assure continued safe operations.

The PSSTF will continue to assess threats and vulnerabilities at PSNY, conduct drills, and coordinate safety and security activities of the various stakeholders operating within PSNY: the operating railroads (Amtrak, Long Island Rail Road (LIRR), NJ TRANSIT) and their police and security forces including Metropolitan Transportation Authority (MTA) Police, NJ TRANSIT Police, the New York City Police Department, tenants in PSNY, and Madison Square Garden. The Amtrak Fire Safety and Security Manager assigned to PSNY and the New York tunnel system leads the Tunnel Life Safety Task Force–Emergency Response Committee activity, and coordinates those committee meetings. The Life Safety Task Force–Emergency Response Committee (ERC)² will continue to provide coordination among emergency responders and agencies. In addition, Amtrak is currently undertaking an inventory of the intrusion security systems, with the purpose of aligning these systems among the different passenger rail carriers, as part of a separate project.

18.5 IMPACTS OF NO ACTION ALTERNATIVE

In the No Action Alternative, the existing North River Tunnel will remain in service, with continued maintenance as necessary to address ongoing deterioration to the extent possible. However, without a full rehabilitation of the North River Tunnel, damage to the tunnel caused by Superstorm Sandy would continue to degrade systems in the tunnel. This deterioration combined with the tunnel's age and intensity of use would likely lead to increasing instability of rail operations in the tunnel, the need for increasingly frequent unplanned maintenance and repairs, and may lead to its eventual closure. While the existing North River Tunnel is

² The ERC meetings are chaired by the Amtrak Regional Emergency Manager, and the ERC consists of the following members: Amtrak, NJ TRANSIT, LIRR, Amtrak Police, MTA Police, NJ TRANSIT Police, New York City Police Department, New York City Fire Department, North Hudson Regional Fire-Rescue Department, New York City Office of Emergency Management, FRA, TSA, the New York State Public Transportation Safety Board, Madison Square Garden, One Penn Plaza, Two Penn Plaza, and the United States Postal Service.



operational, existing safety and security measures and procedures would continue to be followed under the No Action Alternative. If the North River Tunnel was closed, safety and security measures would be in place to secure the tunnel during repairs, as are now in place. Therefore, no impacts to safety and security would occur under the No Action Alternative.

18.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

Safety and security impacts that could occur during construction of the Preferred Alternative relate to the need to keep the construction sites, materials, and equipment secure, and construction workers safe from natural events (e.g., severe storms, flooding, earthquakes), or emergencies caused by human error, mechanical failure, or intentional human intervention. The Preferred Alternative will address and avoid these potential impacts, as described below.

During construction of the Preferred Alternative, including construction of the new tunnel and its approach tracks in New Jersey and rehabilitation of the existing North River Tunnel, all construction sites would be secured at a minimum through the use of fencing or other passive security measures (e.g., lighting). In addition, active security measures (e.g., cameras, intrusion detection), security personnel, monitoring of various activities, and adherence to strict protocols for entrance of construction workers to construction sites, and the inspection of materials would also be employed at the construction sites. Construction contractors would be required to meet all applicable safety and security requirements, including those specified by Amtrak, NJ TRANSIT, and state and Federal agencies, including the New Jersey Department of Environmental Protection (NJDEP), the New York State Department of Environmental Conservation (NYSDEC), the New York City Department of Environmental Protection (NYCDEP), the Transportation Security Administration (TSA), the USCG, U.S. Environmental Protection Agency (EPA), and OSHA. Safety and security measures would be employed during construction to ensure the safety of workers, including flagmen as needed, and ensuring that the required railroad safety training has been completed by all workers that would be in the vicinity of the active NEC tracks during construction of the Preferred Alternative. Before beginning work, contractors will be required to develop for review and approval a Safety and Security Plan (SSP) that will cover the surface alignment worksite, as well as other work in its contract, if any. The SSP will be required to meet all relevant Federal and Amtrak MW 1000³ requirements for safe construction of track and signal infrastructure.

Safety and security would be coordinated with various Federal and state law enforcement and safety agencies including but not limited to DHS, TSA, New Jersey and New York State Police, Amtrak Police, NJ TRANSIT Police, MTA Police and PANYNJ Police; and local municipal police and fire departments including but not limited to: New York City Police (including Counterterrorism Unit and Emergency Medical Services Unit), North Bergen Police (New Jersey), Fire Department of the City of New York (FDNY), North Hudson Regional Fire and Rescue (New Jersey), and New York City Office of Emergency Management. Safety and security measures would be developed to address natural events (e.g., severe storms, flooding, earthquakes), or emergencies caused by human error, mechanical failure, or intentional human intervention.

During final design, worker and public safety and security requirements, procedures and protocols would be identified in greater detail and included in project design performance specifications for each phase of construction.

³ *Limits and Specifications for the Safety, Maintenance and Construction of Track, MW1000*, National Passenger Railroad Corporation (Amtrak), September 1998.

With these measures in place, construction of the Preferred Alternative would not result in adverse impacts to safety and security.

18.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

During operation of the Preferred Alternative, the potential safety- and security-related impacts that could occur relate to keeping rail passengers, railroad employees, and equipment safe and secure from natural events (e.g., severe storms, flooding, earthquakes), or emergencies caused by human error, mechanical failure, fire, or intentional or unintentional human intervention. Measures have been developed to address and avoid, minimize, and mitigate these potential impacts, which will be incorporated into the design of the Preferred Alternative.

When the Preferred Alternative is complete and operational, all applicable FRA regulations and guidance relative to the operation of railroad infrastructure, including tracks, train signals (including Positive Train Control), and bridges, would be followed. Similarly, all applicable Amtrak and NJ TRANSIT guidelines and standards would be followed. Coordination with law enforcement agencies would be undertaken to ensure the highest level of safety and security. Design and operation of the Preferred Alternative, including the new Hudson River Tunnel and the rehabilitated North River Tunnel would take into account NFPA 130 requirements, where applicable and practicable, and regulations, criteria and guidance provided by ANSI, APTA, ASCE, DHS agencies, including TSA, DHS Protective Security Coordination Division, DHS Office of Cyber and Infrastructure Analysis, DHS National Infrastructure Simulation and Analysis Center, and DHS Science and Technology, OSHA, FRA FTA, and USCG.

The design of the Preferred Alternative would include a number of safety and security measures, including the following:

- **Supervisory Control and Data Acquisition (SCADA) system:** Amtrak's existing SCADA system is a supervisory control system for train control, electric traction, and communications. The existing SCADA systems would be modified to incorporate the new Hudson River Tunnel systems. The SCADA system would provide supervisory control systems for train control, electric traction, communications, blue light stations, tunnel ventilation, pump and flood gate control, fire-life safety, access control, and security systems. (New Hudson River Tunnel and North River Tunnel)
- **Ventilation:** In accordance with NFPA 130, a mechanical ventilation system is required for tunnels greater than 1,000 feet long. The new Hudson River Tunnel would have a ventilation system designed to bring fresh air into the tunnel passively, through normal train movement. It would also have an active component, driven by fans, to remove hot air from the tunnel during congested (i.e., perturbed) conditions, when trains are stopped or moving slowly for extended periods, particularly during the summer. The active component would also be used to control and exhaust hot air and smoke during emergency conditions, such as a fire on a train in the tunnel. The jet fans that would be part of the ventilation system would be capable of 100 percent reversible flow to control the propagation of smoke and hot gases away from the direction of egress. The fans would be used to move smoke so that smoke-free emergency routes are available for safe evacuation of passengers and fire-fighting operations. Smoke would be pulled away from the train to allow passengers to exit to the nearest cross passage upstream of the fire. Ventilation would provide tenable air within the tunnels in the event of a fire by controlling the air flow within separate ventilation zones, which would be controlled by the SCADA system. The system would permit passengers to egress to the nearest cross passageway (upstream of the fire) by providing a smoke-free path while the smoke is removed. The ventilation zones would be large enough to

accommodate the longest trains that would operate in the tunnel so that all trains can travel in separate zones and no zone would accommodate two trains at the same time. This would isolate smoke and hot gases within an area occupied by an incident train. Ventilation would be provided from the new tunnel's three fan plants, working together to move fresh air toward the incident train and smoke away from it. (New Hudson River Tunnel)

- **Emergency walkways and egress and access:** Emergency egress and access walkways would be provided in both the new Hudson River Tunnel and the rehabilitated North River Tunnel. During a fire emergency in either the new Hudson River Tunnel or the rehabilitated North River Tunnel necessitating train evacuation, the evacuation would be performed to the high bench side, which would meet the intent of NFPA 130 (A6.3.1.1) and would serve as an egress walkway. The high bench would incorporate embedded ladders at regular intervals to allow for access to and from the trackbed below.

The high bench in the new Hudson River Tunnel would have cross passages approximately every 750 feet apart throughout the length of the tunnel. The egress walkway would permit passengers to exit a tube affected by a fire or smoke incident and enter the other tube. Fire-rated doors at the cross passages would separate the tubes. Emergency exits would be designed in accordance with NFPA 130 as well as NFPA 101, Life Safety Code. Emergency exits would also provide tunnel access for emergency responders. Egress and access points to the Hudson River Tunnel would be located at the Hoboken and Twelfth Avenue fan plants and also at the Palisades portal. When the tunnel ventilation system is activated in a fire emergency, the proposed tunnel ventilation design will prevent infiltration of smoke and hot gasses into the emergency stairways in the vent shafts at the access and egress locations.

For the North River Tunnel, cross passages are located approximately every 100 feet between the two tubes of the North River Tunnel in the hard rock section of the tunnel beneath the Palisades and another cross passage is located at the Manhattan shoreline. Emergency egress and access is available at the North River Tunnel's portals and the Weehawken and Eleventh Avenue ventilation shafts.

A Fire Alarm Control Panel and other incident command response interfaces⁴ would be accessible at the designated access locations. Exits to street level would consist of fire-resistant enclosed stairways and passageways. All emergency exits would be clearly marked and identified and would feature emergency lighting at the point of exit, and additional signage would be placed at intervals within the tunnel identifying the distance to the next exit point in either direction. (New Hudson River Tunnel and North River Tunnel)

- **Emergency rescue power:** An electrified third rail for rescue equipment and potential Long Island Rail Road equipment access would be located on the low bench side of the tunnel. While generally not used for transportation, the third rail could be utilized in an emergency. (New Hudson River Tunnel and North River Tunnel)
- **Lighting:** New lighting would be provided in both the new and rehabilitated tunnels that complies with the relevant requirements of the regulatory agencies, and satisfies operational and safety requirements of the agencies and operating railroads. For the Hudson River Tunnel, lighting would be powered from the Hoboken and Twelfth Avenue fan plants, where there would be emergency generators and uninterruptable power source (UPS) systems to assure continuous illumination in emergency situations. (New Hudson River Tunnel and North River Tunnel)

⁴ Incident command response interfaces can include an Incident Command System (ICS), which is a standardized approach to the command, control, and coordination of emergency response providing a common hierarchy within which responders from multiple agencies can be effective. Interfaces can also include other devices or communications systems that allow emergency responders to communicate with others.

- **Emergency communication/blue light stations:** An emergency communication system that utilizes blue light stations would be located along the tunnel. Identified by their distinctive blue light, the stations would be located at emergency exits and cross passageways and would provide an emergency phone for emergency personnel to communicate with the Operations Control Center (OCC). Additionally, trained personnel can disconnect traction power from a track via switches within a blue light station's protective enclosure. Blue light stations also provide access to firefighting equipment including fire extinguishers and standpipe connections. Each blue light station would have a unique identification code to aid in response. Trained personnel can disconnect the third rail traction (direct current power only from the existing communication safety stations and blue light stations, throughout the Amtrak New York tunnel system. (New Hudson River Tunnel and North River Tunnel)
- **Fire standpipe systems:** Both the new Hudson River Tunnel and the existing North River Tunnel would be equipped with new standpipe systems. Standpipes would provide water for firefighting and would be complimented with tunnel drains sized to accommodate firefighting activities. The fire standpipe systems would be air pressurized monitored dry standpipe systems equipped with SCADA automatic water charging capability. These systems would be designed to accommodate a Class I Fire in accordance with applicable fire codes and Amtrak requirements. (New Hudson River Tunnel and North River Tunnel)
- **Positive Train Control:** Both the new Hudson River Tunnel and the rehabilitated North River Tunnel would have a Positive Train Control system. The PTC on the NEC is a transponder-based train control system that prevents train accidents by automatically controlling train speeds and movements should a train operator fail to take appropriate action for the conditions at hand. (New Hudson River Tunnel and North River Tunnel.)
- **Low bench:** A low bench wall would be provided along the outer wall of the new tunnel and the rehabilitated North River Tunnel to provide operating and maintenance personnel with access to the underside of a railroad car. (New Hudson River Tunnel and North River Tunnel)
- **Other electronics:** Both the new Hudson River Tunnel and the rehabilitated North River Tunnel would include automated fire detection systems (a linear heat detector), closed-circuit television monitoring, and other safety and security systems. For the rehabilitated North River Tunnel, the existing in-tunnel monitoring and security systems will be replaced with modern technology. (New Hudson River Tunnel and North River Tunnel)
- **Training and operational coordination:** Amtrak will coordinate with the Fire Department of New York and emergency responders in New Jersey (the North Hudson Regional Fire Rescue and Hoboken Fire Rescue) to develop a Response Plan in advance of tunnel construction and operation. Amtrak and NJ TRANSIT would continue to ensure the proper security awareness training of operating crews with security awareness information and training related to potential threats to safety and security along the NEC right-of-way. Both organizations would continue to have policies and protocols in place to react to security threats and emergency situations, including alternative service plans for the NEC if operations were disrupted. NJ TRANSIT, PANYNJ, and Amtrak would continue to work together to coordinate their approach to security threats and emergencies. The PSSTF would continue to assess threats and vulnerabilities at PSNY, conduct drills, and coordinate safety and security activities of the various stakeholders. The PSNY Fire Life Safety Committee would continue to provide appropriate coordination among emergency responders and agencies. (New Hudson River Tunnel and North River Tunnel)



With these measures in place, the Preferred Alternative would result in permanent improved safety and security for Amtrak and NJ TRANSIT NEC passengers, operations personnel, and train operations between the Frank R. Lautenberg Secaucus Junction Station and PSNY.

18.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

The Preferred Alternative would be designed to meet Federal, state, and local standards related fire-life safety. With those features, no adverse impacts related to safety would result and no additional mitigation is required. *