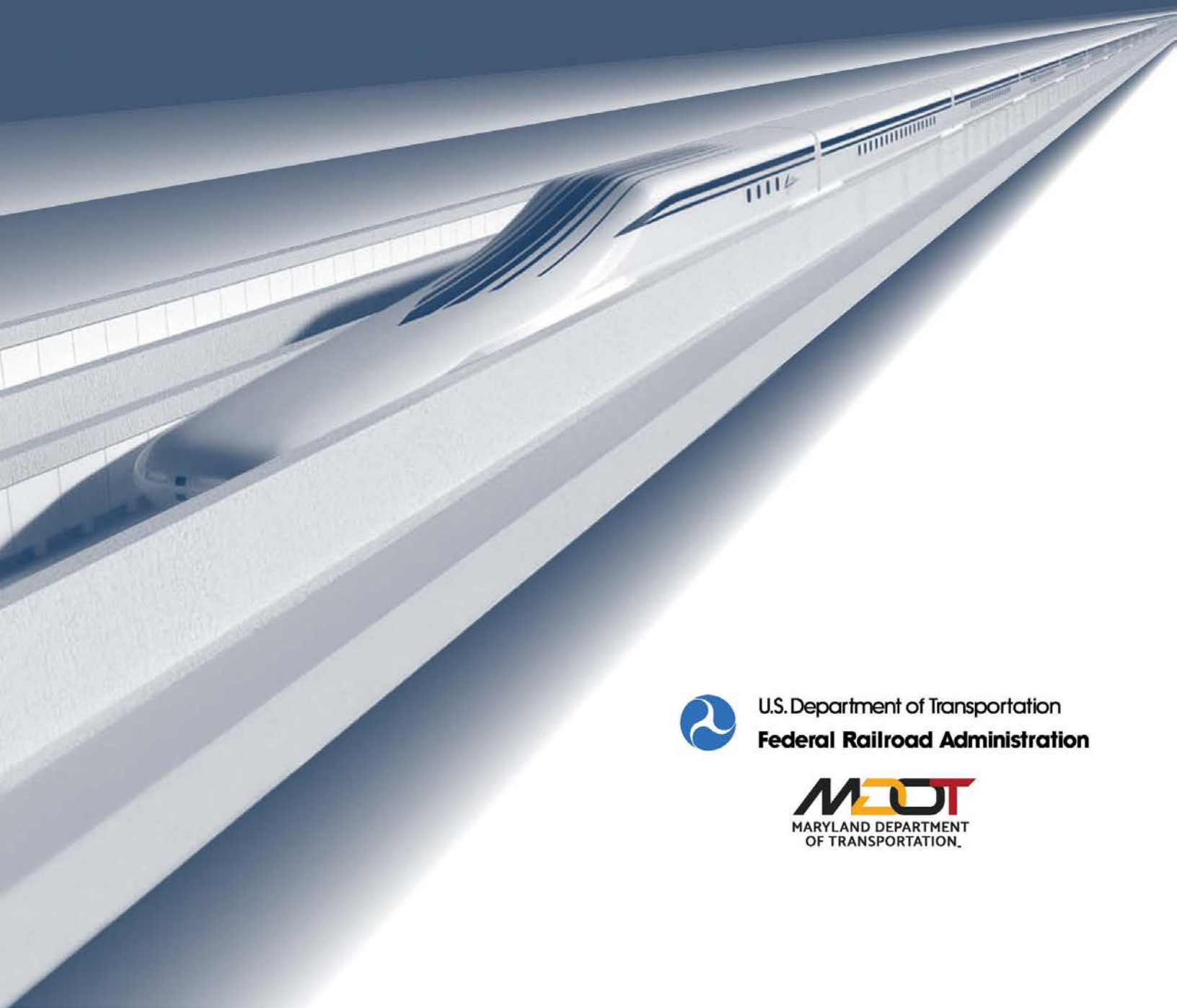
Section 4.22

System Safety and Security

BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(f) EVALUATION



U.S. Department of Transportation
Federal Railroad Administration

MARYLAND DEPARTMENT OF TRANSPORTATION

4.22 System Safety and Security

4.22.1 Introduction

This section discusses potential safety and security risks associated with the Superconducting Magnetic Levitation Project (SCMAGLEV Project) system on the surrounding human and natural environment as well as issues that could result from the interference of human or environmental hazards on normal operations.

4.22.2 Regulatory Context

In accordance with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500 - 1508, and the Federal Rail Administration's (FRA) Procedures for Considering Environmental Impacts, 64 Fed. Reg. 28545 (May 26, 1999), the FRA assessed the transportation or use of any hazardous materials which may be involved in the alternatives, and the level of protection afforded residents of the affected environment from construction period and long-term operations associated with the alternatives. is responsible for carrying out the railroad safety laws of the United States, including the safety of non-highway ground transportation that runs on electromagnetic guideways, such as the SCMAGLEV Project. Specific SCMAGLEV elements may also be subject to the jurisdiction of the following:

- Transportation Security Administration (TSA)
- Occupational Health and Safety Administration (OSHA)
- Federal Aviation Administration (FAA)
- Federal Highway Administration (FHWA)
- Maryland Department of Transportation/Maryland Aviation Administration (MDOT/MAA)

The SCMAGLEV Project introduces technology that does not currently operate in the United States. Therefore, FRA may issue a Rule of Particular Applicability (regulations that apply to a specific railroad or a specific type of operation (RPA)) or a Rule of General Applicability, to impose requirements or conditions by order(s) or waiver(s), or take other regulatory action(s) to ensure that the SCMAGLEV Project is operated safely.

As noted above, although the SCMAGLEV Project will not operate on traditional "rail" elements, it will otherwise be subject to FRA safety oversight approval and FRA rules of general applicability. Other Federal requirements expected to apply or guide new Federal regulatory action for the SCMAGLEV Project include TSA's Security Directives RAILPAX-04-01 and RAILPAX 04 02; Rail Safety Improvement Act of 2008; 49 C.F.R. Part 1580 (Rail Transportation Security); Emergency Planning and Community

Right-to-Know Act (42 U.S.C. § 11001-11050); Presidential Policy Directive PPD-8: National Preparedness (PPD-8); The Americans with Disabilities Act (ADA) of 1990 (42 U.S.C. § 12101 et seq.).

In addition to adhering to all state and local fire codes, the following state and local programs and planning documents are relevant to understanding the local framework for risk assessment, coordination, response, and recovery:

Maryland Department of Transportation Rail Safety Oversight Program - The Maryland Department of Transportation (MDOT) Rail Safety Oversight Program is required under the Moving Ahead for Progress in the 21st Century Act (MAP-21) requiring the designation of a state agency for oversight and enforcement of regulations promulgated by the Federal Transit Administration (FTA). Transit Agencies subject to this program include any light, heavy, or rapid rail system, monorail, inclined plane, funicular, trolley, or automated guideway within the state's jurisdiction, assuming two factors: it is not regulated by FRA; and it is included (or declared intent to be included) in FTA's calculation of fixed guideway route miles or formula grant program.

Maryland Emergency Preparedness Program - The Maryland Emergency Preparedness Program (MEPP) was launched in 2013 to provide a risk-based and capabilities-based approach to homeland security and emergency management in fulfillment of the Presidential Policy Directive 8: National Preparedness (PPD-8). The MEPP includes the State Training and Exercise Plan and the State Hazard Mitigation Plan (HMP), which are strategic planning documents that identify goals and objectives and can prioritize resource allocation. The HMP was published in 2016 and includes risk and vulnerability assessments across multiple hazards and counties.

District Preparedness Framework - DC Code § 7-2202.0-2208 established the District of Columbia's Homeland Security and Emergency Management Agency (HSEMA) as the agency responsible for preparing a comprehensive homeland security and emergency management program. HSEMA prepared the District Preparedness Framework, adopted with Mayor's Order 2014-215 in September 2014. The District Preparedness Framework addresses all natural, technological, or human-caused hazards and integrates with Federal civil defense plans for the national capital.

District Prevention/Protection Program - The District Prevention/Protection Program develops the District of Columbia's approach to preventing, avoiding, or deterring an imminent threat or action against people, critical infrastructure, the environment, or the economy. This program assigns prevention and protection responsibilities across District agencies and describes strategies for coordination between agencies.

District of Columbia All-Hazards Mitigation Plan - The objective of HSEMA's District of Columbia All-Hazards Mitigation Plan (HMP) is to reduce loss of life and property by decreasing the impact of disasters and emergencies through support for protection and prevention activities, coordinated response, and recovery initiatives. The HMP fosters resiliency to all hazards by improving the District's capacity to deter, deflect, absorb, or withstand the effects of disasters and emergencies. Mitigation

activities conducted before or after a disaster can reduce the impact of damage sustained by communities and citizens; help to eliminate the repetitive damage cycle; reduce costs to taxpayer; and reduce the resources expended to prepare for, respond to, and recover from future disasters.

District Response Plan - The 2015 District Response Plan (DRP) provides guidance on how District agencies and departments, nongovernmental organizations (NGO), voluntary organizations, and regional and Federal partners respond to disasters in the District of Columbia. The DRP organizes agencies and departments that are involved in homeland security and emergency management into functional areas according to capabilities, skills, resources, and authorities. Using this functional organization, the DRP outlines how resources will be leveraged and implemented and how Federal, regional, private sector, and nonprofit partners will be engaged for support. This plan also describes the mechanism for mobilizing resources in the event of a disaster or emergency.

District Recovery Base Plan (DRBP) - The DRBP documents the capabilities required to promote recovery from all types of disasters and emergencies in the District of Columbia. This plan includes the role of individuals, families, neighborhood leadership, and private or non-profit partnerships in addressing the recovery needs of the community following a disaster or emergency.

4.22.2.1 Methodology

The term safety involves protection of people and property from accidents, while security refers to protection from intentional acts. This analysis includes an assessment of safety hazards and security threats as well as an inventory of emergency service capabilities, critical facilities and vulnerable locations. FRA documented the emergency response capabilities and vulnerable locations for a 500-foot radius around the SCMAGLEV alignments, stations, facilities, and construction limits (SCMAGLEV Project Affected Environment). The analysis of emergency response capabilities includes any fire, medical or law enforcement agency whose service area includes any part of the Safety and Security Affected Environment. In addition, this inventory includes all hospitals within or the nearest available hospital to the 500-foot radius Safety and Security Affected Environment. Appendix B provides geographic context of the Build Alternatives.

This analysis defines a critical facility as any building or public infrastructure which will provide services during an emergency such as hospitals, first responders or governmental entities. Vulnerable locations include sites which, if affected, could amplify safety or security concerns (such as hazardous materials sites) or expose large or vulnerable population centers (such as schools or stadiums). Hospitals and mass transit stations will be both a critical facility (providing care or transportation services in the event of an emergency) and a vulnerable location.

FRA also considered the impacts from severe weather events, transportation hazards, and crime. To best reflect available data and to capture the geographically dispersed

nature of severe weather events, FRA documented natural hazards at the county or district level for Washington, D.C., Prince George's County, Anne Arundel County, Baltimore County, and Baltimore City during the 17-year analysis timeframe[1]. Transportation hazards (fatalities by mode of travel) and security threats related to terrorism are described for national and state-level geographies. Local crime rates are reported for potential station locations, portal locations, and trainset maintenance facility (TMF) sites. The SCMAGLEV Project is likely to operate as a closed system, criminal activity in areas where the SCMAGLEV system will pass without stopping is not anticipated to affect the security of passengers, employees, or the general public.

The inventory of hazards, threats, and vulnerable locations relies on the following sources of information:

- National Oceanic Atmospheric Association (NOAA), Storm Events Database, 2000-2017;
- United States Geological Survey (USGS), Earthquake Hazards Program, 2000-2017;
- Bureau of Transportation Statistics (BTS);
- Federal Bureau of Investigation (FBI), Uniform Crime Reporting Program: 2017 Crime in the United States Tables 5, 8, 10, and 11;
- University of Maryland, National Consortium for the Study of Terrorism and Responses to Terrorism (START), Global Terrorism Database, 2000-2017;
- Inventory of hazardous materials sites documented in Section 4.15 Hazardous Materials and Solid Waste and corresponding Appendix D.8;
- Inventory of major utility crossings and substations documented in Section 4.20, Utilities; and,
- Inventory of community facilities documented in Appendix D.3 Socioeconomic Environment Technical Report.

This analysis relies on definitions of weather events and direct damage assessment methodology established by NOAA[2] and USGS[3], uniform crime reporting criteria established by the FBI, and terrorism criteria established by the National Consortium for the START. FRA used these criteria to establish the historic frequency and severity of a particular hazard within assessed geographies. As shown in **Table 4.22-1,** the frequency for a particular hazard is described in terms of the number of events recorded per year and the severity is described in terms of average recorded property damage,

[1] USGS, Earthquake Hazards Program, 2000-2017

[2] http://www.nws.noaa.gov/directives/sym/pd01016005curr.pdf

[3] https://earthquake.usgs.gov/data/comcat/

injuries, or deaths per event. Severity is classified based on the highest rating across any of the three indicators shown.

Table 4.22-1: Hazard Frequency and Severity Indicators

Frequency	Description	Number of Events (annualized)		
High	Probable occurrence within one year	1.0 or more		
Medium	Probable occurrence within five years	0.2 to 1.0		
Low	Probable occurrence in a timeframe exceeding five years or not at all	0.0 to 0.2		
Severity	**Description**	**Injuries**	**Fatalities**	**Damages**
High	Average event causes multiple injuries/fatalities or severe damage	>1.0	>1.0	Over $1 million
Medium	Average event causes occasional injuries/fatalities or moderate damage	0.1 to 1.0	0.1 to 1.0	$100,000 to $1 million
Low	Average event rarely causes injuries or fatalities with minimal damage	< 0.1	< 0.1	Under $100,000

The inventory of critical infrastructure and vulnerable locations is subject to refinement based on ongoing coordination with local emergency services providers and the outcomes of the Project Sponsor's hazards analysis (see Section 4.22.6). For purposes of the DEIS analysis, critical infrastructure is defined to include locations that provide a resiliency, response, or recovery function such as government buildings, emergency services, trunk utilities, and major transportation nodes and segments. Vulnerable locations are places where large or vulnerable population groups may gather, such as schools, stadiums, transit hubs, institutional housing (such as prisons or asylums), or other locally defined places, which will require heightened coordination in the event of an emergency.

Because SCMAGLEV technology does not currently operate in the United States, this evaluation is based on safety and security observations of international operation of SCMAGLEV technology and an analysis of proposed design specifications and safety controls.

This analysis utilizes a three-step process to identify potential safety or security impacts.

1. Establish the risk, in terms of the frequency and severity of historic events and existing conditions, of a particular safety hazard or security threat based on documented events and conditions.

2. Evaluate the proposed technology for its ability to avoid or withstand a particular safety hazard, deter security threats or monitor vulnerabilities.

3. Determine the potential for the SCMAGLEV system to impede or enhance emergency response capabilities.

4.22.3 SCMAGLEV Project Affected Environment

This section describes natural hazards, transportation operational hazards, crime and terrorism, emergency response, and critical or vulnerable locations.

4.22.3.1 Natural Hazards

Across all counties within the Project Study Area, cyclonic weather (hurricanes, tropical storms, and tornados) account for the most severe damage, including weather events originating within and outside of the Project Study Area. Although no hurricanes made landfall from 2000 to 2017, Hurricane Isabel in September 2003 and Hurricane Irene in August 2011 produced tropical storm conditions and flooding inside the SCMAGLEV Project Affected Environment. Tornadoes were more frequent but accounted for less total damage. Flash floods were the highest frequency natural hazards in all counties. Flooding occurred at a high frequency in all but Baltimore City. Blizzards on February 5 and 10, 2010 and January 23, 2016 affected multiple counties, disrupting air and surface transportation, but did not result in any documented damage or casualties.[4] The potential for seismic activity is low, as noted in Section 4.13 Geology. No earthquakes have originated in the counties crossed by the Build Alternatives over a 17-year analysis timeframe. However, a 3.6 magnitude earthquake occurred near Germantown, MD (approximately 20 miles northwest of the District of Columbia) on July 16, 2010 outside of the SCMAGLEV Project Affected Environment. While many residents within the Safety and Security Affected Environment felt minor ground movement, no injury or damage was recorded.[5]

4.22.3.2 Transportation Operational Hazards

Highway fatalities comprise the vast majority of transportation related fatalities (over 90 percent per year). Railroad and water transportation each account for approximately two percent of all transportation fatalities, while air and transit each account for approximately one percent.[6] Among transit modes, heavy rail and commuter rail have the lowest accident rate per million vehicle miles of travel, but due to higher passenger loads, they have more fatalities per accident and a higher average fatality rate per million vehicle miles of travel.[7] A comparison of fatalities per passenger mile reveals that making a particular trip by car increases a traveler's odds of fatality by 30 times compared to making the same trip by mass transit. Motorcycle was the riskiest mode of

[4] NOAA, Storm Events Database, 2000-2017

[5] USGS, Earthquake Hazards Program, 2000-2017

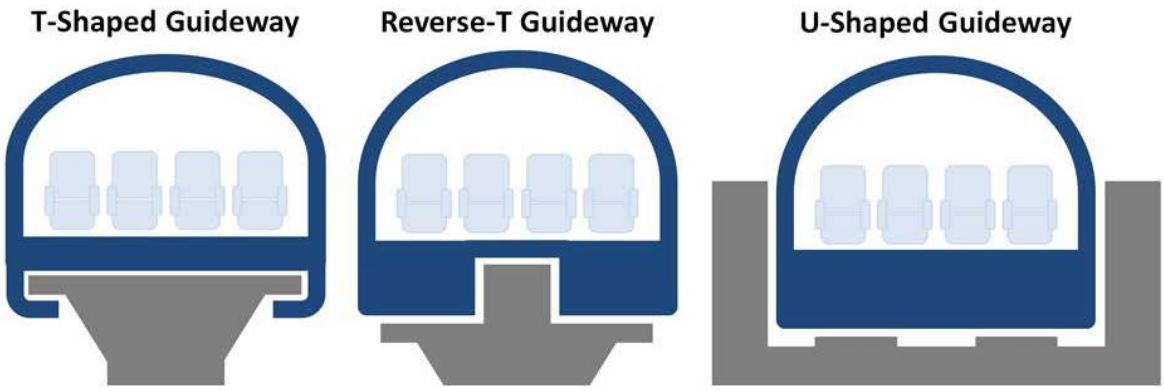
[6] Bureau of Transportation Statistics, Table 2-1, Transportation Fatalities by Mode

[7] Bureau of Transportation Statistics, Table 2-33, Transit Safety Data by Mode for All Reported Accidents

travel, with 212 fatalities per billion passenger miles, and commercial air travel was the safest, with a fatality rate of 0.07 per billion passenger miles. It is estimated that the overall fatality rate for cars and trucks is 7.3 and long-haul train service is 0.43 billion passenger miles, respectively.[8]

No comparable fatality data is available as SCMAGLEV technology does not yet operate in the United States. Internationally, SCMAGLEV technology made its first successful test run in 1972 and has been operating for over 50 years on multiple test track facilities in Japan. In 1980, the Miyazaki test track was modified from a reverse T-shaped guideway to a U-shaped guideway which will be utilized for this project, as shown in **Figure 4.22-1**. The combination of the U--shape design and electromagnetic suspension makes it difficult for a vehicle to derail, and as a result no crashes have been recorded. For more information about the SCMAGLEV technology, see Chapter 3 Alternatives Considered.

Figure 4.22-1: SCMAGLEV U-Shaped Guideway



4.22.3.3 Crime and Terrorism

The University of Maryland's Global Terrorism Database identified six terrorism events throughout the state of Maryland and 14 in the District of Columbia between 2000 and 2017. These terrorist activities in Maryland and Washington, D.C. directly affected 17 individuals, including 7 fatalities and 10 injuries, with over $15 million in property damage. The majority (55 percent) of these events targeted government properties or elected officials. Half (50 percent) involved packages or letters rigged with explosive, incendiary or biological weapons. Over half (57 percent) of all fatalities and 70 percent of all injuries occurred in October 2001, when a series of letters contaminated with anthrax were sent to various elected officials and public figures.

[8] Savage, Ian, 2013, "Comparing the Fatality Risks in United States Transportation Across Modes and Over Time," Table 2, Passenger Fatalities per Billion Passenger Miles 2000-2009

No incidents of terrorism directed at rail stations or transportation infrastructure have been reported in Maryland or Washington, D.C. At the national level, only five out of 382 events (one percent) were directed at public transit facilities. Two bombing attempts at passenger rail stations, one in Harlem, New York in 2010 and the other in Chester, Pennsylvania in 2011, were both prevented at the respective rail stations, resulting in no injury or property damage. On September 18, 2016, security forces defused four out of five explosive devices near a train station in Elizabeth, New Jersey, resulting in minor property damage but no injury. The fourth incident occurred on October 22, 2017, when a secured area of an Amtrak locomotive was breached which triggered the train's emergency stop but did not lead to any damage or injury. Finally, on December 11, 2017 an attempted suicide bomber caused injury to himself and three others at a Port Authority bus terminal in Manhattan, New York. Records in the University of Maryland database indicate that educational, religious, and governmental facilities are several times more likely to be targeted than transportation facilities.

Table 4.22-2 provides a summary of crime rates by local jurisdictions where station alternatives are proposed. Criminal activity around the proposed Mount Vernon Square Station is approximated using crime rates for Washington D.C. and Baltimore City crime rates correspond with both the Cherry Hill and Camden Yards terminal station options. The proposed Baltimore Washington International Thurgood Marshall Airport Station (BWI Marshall Airport Station) is patrolled by Maryland Transportation Authority (MDTA) police officers and is located within the Anne Arundel County Police Department's jurisdiction. Total crimes are reported for MTA police and the Anne Arundel County Police Department. Crime rates for unincorporated Anne Arundel County are estimated based on the population of Anne Arundel County less the population of the city of Annapolis, the only jurisdiction within the county with a police department that reports known offenses separately to the FBI.[9]

Table 4.22-2: 2017 Offenses known to Law Enforcement for Affected Localities

Offense Type	Murder	Rape	Robbery	Aggravated Assault	Burglary	Larceny Theft	Motor Theft
Known Offenses (Washington, D.C.)	116	443	2,351	3,674	1,808	24,490	2,545
Rate per 10,000 Residents (Washington, D.C.)	1.7	6.4	33.9	52.9	26.1	352.9	36.7
Known Offenses (MDTA)	0	0	1	31	6	143	48
Known Offenses (Anne Arundel)	13	156	556	1,286	1,593	8,598	622

[9] The FBI maintains a uniform crime reporting system – all local jurisdictions must report crime to FBI and this allows for consistent definitions and reporting criteria from one jurisdiction to the next.

Offense Type	Murder	Rape	Robbery	Aggravated Assault	Burglary	Larceny Theft	Motor Theft
Rate per 10,000 Residents (Anne Arundel)	0.2	2.9	10.4	24.1	29.8	161.0	11.6
Known Offenses (Baltimore City)	342	382	5,879	5,827	8,041	17,008	5,171
Rate per 10,000 Residents (Baltimore City)	5.6	6.2	95.9	95.0	131.1	277.4	84.3

Source: FBI, 2017 Crime in the United States, Table 8, District of Columbia; Table 11, Maryland State, Tribal and Other Agencies and Table 10, Maryland Counties; Table 8, Maryland Cities

The TSA officers provide an extra layer of security between the publicly accessible area of BWI Marshall Airport (including the proposed station) and the secure area restricted to departing and arriving air passengers and airport staff. Operation and construction of the SCMAGLEV Project in this proximity to the BWI Marshall Airport will require compliance with all applicable FAA and TSA rules for airport safety and security.

4.22.3.4 Emergency Response

Emergency response capabilities include law enforcement, fire protection, and emergency medical services. Law enforcement is provided in overlapping layers of Federal, state, county, and local jurisdictions. Federal law enforcement authorities such as the FBI; Drug Enforcement Administration (DEA); Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE); Immigrations and Customs Enforcement (ICE); United States Secret Service (USSS); and TSA have statutory authority to enforce certain Federal laws in the SCMAGLEV Project Affected Environment. Washington, D.C. has over 40 law enforcement entities, more than any other location in the United States. In addition to local police departments (i.e., Metropolitan Police of D.C.), there are many Federal law enforcement entities (e.g., U.S. Capital Police, U.S. Marshals, U.S. Park Police). The Maryland State Police have jurisdiction across most of the Safety and Security Affected Environment except the District of Columbia.

Federal agencies that provide medical, fire, or emergency management services such as Federal Emergency Management Agency (FEMA), the National Disaster Medical System (NDMS), U.S. Department of the Interior (DOI), and the U.S. Forest Service will have jurisdiction anywhere in the SCMAGLEV Project Affected Environment in the event of a declared disaster. The Maryland Emergency Management Agency (MEMA) leads emergency response, recovery, and mitigation efforts across the state. Washington's HSEMA leads emergency response, recovery, and mitigation efforts across the District.

The Washington-Baltimore area has one of the largest and most extensive medical systems in the United States. The nearest medical facilities to the SCMAGLEV Project Affected Environment include Howard University Hospital, University of Maryland (UM) Prince George's Hospital Center, Doctor's Community Hospital, UM Laurel Medical

Center, Medstar Harbor Hospital, Medstar Washington Hospital, and University of Maryland Medical Center. Distance to fire departments (FD) and EMS first responders for proposed stations, Fresh Air/Emergency Egress (FA/EE) and other vertical access facilities[10] are shown in **Table 4.22-3**.

Table 4.22-3: First Responders by Vertical Access Locations (Stations and Fresh Air/Emergency Egress Facilities)

Vertical Access Facility (Alternative)	Fire Department	Distance from Facility to Fire Department
Station: Mount Vernon Square (J-01 thru 06 and J1-01 thru 06), Washington, D.C.	DHS Special Ops; D.C. Fire Department E-16	2,000 ft/0.38 mile; 2,400 ft/0.45 mile
FA/EE: Montana Ave. (J-01 thru 06 and J1-01 thru 06), Washington, D.C.	D.C. Fire Department E-26; DC Fire Medical	3,800 ft/0.72 mile; 3,900 ft/0.74 mile
FA/EE: Kenilworth Ave. Vertical Access (J-01 thru 06 and J1-01 thru 06), Prince George's County, MD	Bladensburg FD	2,400 ft/0.45 mile
FA/EE: Riverdale Rd. (J-01 thru 06 and J1-01 thru 06), Prince George's County, MD	West Lanham Hills FD; Riverdale Heights FD	4,700 ft/0.89 mile; 5,300 ft/1.00 mile
FA/EE: Allsworth Ct. (J1), Anne Arundel County, MD	Fort Mead FD; Maryland City FD	9,500 ft/1.80 miles; 17,000 ft/3.22 miles
FA/EE: MD 100/Harmans Rd. (J-01 thru 06 and J1-01 thru 06), Anne Arundel County, MD	Harmans Dorsey FD	3,600 ft/0.68 mile
FA/EE: Telegraph Rd. (J-01 thru 06 and J1-01 thru 06), Anne Arundel County, MD	Harmans Dorsey FD; Severn FD	5,800 ft/1.10 miles; 8,000 ft/1.52 miles
FA/EE: Mathison Way (J and J1) BWI Marshall Airport, Anne Arundel County, MD	BWI Fire & Rescue	2,300 ft/0.44 mile
FA/EE: Camp Meade Rd./Aviation Blvd. (J and J1), Anne Arundel County, MD	Linthicum Vol FD; Ferndale Vol FD	4,100 ft/0.78 mile; 6,700 ft/1.27 miles
Station: Baltimore Washington Thurgood International Marshal Airport (J-01 thru 06 and J1-01 thru 06), Baltimore County, MD	BWI Fire & Rescue; Fire Company 43	7,400 ft/1.40 miles
FA/EE: I-895 (J-01 thru 06 and J1-01 thru 06), Baltimore County, MD	English Consul Vol FD; Landsdowne Vol FD	3,300 ft/0.63 mile; 7,800 ft/1.48 miles
Station: Cherry Hill (J-01 thru 03 and J1-01 thru 03), Baltimore City, MD	Baltimore City FD E-58; Baltimore City FD SS-47	1,500 ft/0.28 mile; 5,350 ft/1.01 miles
Station: Camden Yards (J-04 thru 06 and J1-04 thru 06), Baltimore City, MD	Baltimore City FD S-02	2,400 ft/0.45 mile

4.22.3.5 Vulnerable Locations and Critical Facilities

As described in Section 4.15 Hazardous Materials and Solid Waste, the preliminary analysis identified no high-risk hazardous materials sites (that is no sites with a Risk

[10] Vertical Access Facilities refers to those with elevators and stairways and all associated equipment, facilities, and systems for vertical transportation located through the various floors/levels of the property. At this time only vertical access associated with stations and FA/EE locations have been identified by the Project Sponsor, additional vertical access locations are anticipated for the viaduct as part of the final design and will be incorporated in the Final EIS.

Ranking of 5 or “highest risk”) within the SCMAGLEV Project LOD or Affected Environment. The hazardous materials analysis did identify sites within the SCMAGLEV Project Affected Environment with a Risk Ranking of 3 or 4, which represent the most potential for hazardous materials to be present in the soil and groundwater. These sites pose a greater potential risk to human health and the environment and have been identified by FRA as vulnerable locations. An alternative-by-alternative summary of these sites’ locations relative to proposed project elements, any available information on the suspected hazardous material sources and background history, risk rankings, remediation status, and potential mitigation are detailed in Section 4.15 and illustrated in the Appendix B.3, Natural Resources Mapping.

Other vulnerable locations located within the 500-foot SCMAGLEV Project Affected Environment include the DC Convention Center, National Aeronautics and Space Administration (NASA) Goddard Geophysical and Astronomical Observatory (GGAO), U.S. Department of State Beltsville Information Management Center, Tipton Airport, M&T Bank Stadium, Oriole Park at Camden Yards, Baltimore Convention Center, Federal Reserve Bank of Richmond, Edward A. Garmatz U.S. District Courthouse, transit stations (Washington Metropolitan Area Transit Authority (WMATA) facilities, MDOT MTA Light Rail Transit (LRT) stations, correctional facilities, and multiple schools. Critical facilities located within the 500-foot SCMAGLEV Project Affected Environment include BWI Marshall Airport, National Park Service (NPS) Police Headquarters, District of Columbia Fire Engine #16 Station, Linthicum Fire Station, Beltsville Agricultural Research Center (BARC), NASA Goddard Space Flight Center (GSFC), National Security Administration (NSA) Headquarters, Fort George H. Meade, and the USSS James J. Rowley Training Center facilities.

Three vulnerable locations, the Youth Rehabilitation Services Department, Thomas J.S. Waxters Children’s Center, and the New Beginnings Youth Development Center/Maya Angelou Academy, are in the immediate vicinity of the access ramp associated with the Build Alternatives J1-01 through J-06 to the MD 198 TMF site. The New Beginnings Youth Development Center/Maya Angelou Academy will also be in the immediate vicinity of the alignment access ramps associated with Build Alternatives J-01 through J-06 (see Section 4.4 Neighborhoods and Community Resources for additional information about these facilities).

4.22.4 Environmental Consequences

4.22.4.1 No Build Alternative

The No Build Alternative reflects existing conditions and programmed infrastructure projects and improvements. Under the No Build Alternative, the SCMAGLEV Project will not be constructed, but similar safety and security hazards will exist as those documented in this section. The No Build Alternative assumes that the frequency and severity of some safety and security hazards could increase relative to existing conditions as a result of population growth as follows:

- Natural hazards will likely occur at the same frequency with potential for damage increasing as population density and property values increase.
- Frequency of criminal activity could increase proportionately with population and socio-economic conditions.
- Emergency response times will remain steady, as programmed transportation improvements offset congestion and the number of emergency responders and resources increase to serve an expanding population.
- The demand for law enforcement, fire protection and emergency medical services will increase, relative to frequency of crime, with population and business growth.

4.22.4.2 Build Alternatives

FRA determined that the Build Alternatives will be similar in terms of potential Safety and Security concerns and impacts. Differences are confined to the degree to which roadway modifications may affect emergency response times; the identification of first responders for various station, TMF site and emergency access locations; and specific vulnerable locations and critical infrastructure within proximity of each alternative.

Ability to Avoid/Withstand Existing Environmental Hazards

All Build Alternatives will include elements, such as station facilities, guideway, passenger vehicles, and maintenance facilities, that are at risk from extreme weather or seismic events that will create a need for the safe evacuation of passengers and employees.

Common weather events, such as snow and ice, may pose a risk to passengers and operations on a more regular basis. In areas of the SCMAGLEV system that are at the surface or exposed to weather, daily maintenance will occur to minimize risks to passengers, including snow and ice removal. During overnight hours, crews will conduct inspections for any foreign objects or situations that may affect operations. Maintenance, such as deicing and debris clearance, will occur as needed to continue safe operations.

Adequate drainage along the Build Alternatives and at facilities is the key to preventing safety hazards related to flooding and flash flooding. There are several strategies to reduce the impacts to drainage, including retention of existing elevations, construction of retention/detention ponds, minimization of fill in sensitive areas, and active storm water management, as described in Section 4.10 Water Resources. As a result of implementing these strategies, safety risks due to flooding will not be significantly greater than for the No-Build Alternative. In addition, adequate drainage and stormwater management facilities will also ensure there will be no potential flooding impact associated with soil absorbance displaced by proposed tunnel. It is anticipated that near surface soil absorption of floodwater will not be affected by deep tunnels and where tunnels approach surface levels, will be mitigated by proper stormwater management facilities.

As stipulated by Compliance Measure #3 (see Section 4.22.6), the Project Sponsor will be required to prepare a hazard analysis that will stipulate the required hazard controls needed to sufficiently address identified risks, including risks associated with extreme weather. The hazard controls may include hazard detection equipment, such as rain and temperature gauges, seismographs, or other early warning sensors as necessary. In addition, the Project Sponsor's commitment to the required Emergency Preparedness Plan (see Section 4.22.6, Compliance Measure #4) will specify the conditions under which service will be suspended, such as during or in preparation for extreme weather events as well as emergency communication protocols.

Following a critical weather or seismic event, inspections of guideway, structures, bridges, and other system elements will be a priority; and the necessary repairs and operational precautions, such as service suspension or speed restrictions, will be implemented as necessary and prudent. As outlined in Compliance Measure #2, the Project Sponsor will need to develop, as part of FRA's regulatory approval process, a System Inspection, Testing, and Maintenance Program which will include the protocols for clearing the guideway of any debris and inspecting for and addressing any resulting damages. It will be the Project Sponsor's responsibility to demonstrate that its hazard controls, Emergency Preparedness Plan, and Inspection, Testing and Maintenance Program can adequately address all identified hazards prior to FRA's final regulatory approval and operation of the SCMAGLEV Project. As a result of this process and the Project Sponsor's compliance with the safe operation and hazard controls identified, extreme weather in the proximity of the SCMAGLEV Project is not expected to result in significant environmental impact.

Transportation Operational Safety

Train derailments are not an issue for the SCMAGLEV system as they are with other fixed guideway systems. The U-shaped SCMAGLEV guideway has a concrete base slab with sidewalls that envelop the vehicles and prevent derailments for both tunnel and viaduct segments. Metal coils installed into the sidewalls of the guideway are key to the SCMAGLEV's propulsion, levitation and guidance. The SCMAGLEV technology has never had a collision or derailment in the 50-year history of operation in Japan.

According to the Project Sponsor, extraordinary efforts to avoid accidental collisions are bolstered by the use of a state-of-the-art Control System that mitigates the potential for train-to-train collisions and over-speeding. The signaling system is operational at all speeds and extends into the TMF. The exclusive and dedicated right-of-way (ROW) does not have grade crossings and is equipped with intrusion prevention and detection systems to assure nothing can enter the ROW that could create an unsafe condition.

Additionally, the collision avoidance approach mandates that during trainset operating hours, all maintenance of way (MOW) activities are prohibited and strict temporal separation of MOW activities from passenger service is enforced. The turnout from the MOW facility is locked out, and individuals are prohibited from entering the guideway. During maintenance hours, MOW equipment access to the mainline is permitted through the turnouts from the MOW facility. Maintenance hours will commence as soon

as safe and practicable after the conclusion of revenue service each day. Prior to the operation of the trainsets following maintenance hours, the entire mainline is checked to ensure nothing has been left on the guideway that will create a safety risk.

Operating rules for the SCMAGLEV system are unique. They are simplified in many respects due to the automated, driverless operation, and the dedicated operation that utilizes one specific type of trainset.

The accident avoidance approach also requires a comprehensive training and qualification program for all employees that perform safety-related tasks, which minimizes the potential for human error.

The Project Sponsor will provide documentation of the System Safety Program (SSP) (see Section 4.22.6, Compliance Measure #1) to FRA. The SCMAGLEV Project will import Central Japan Railway Company design safety features, safety culture, and safe operating procedures developed through decades of refinement of industry best practices. Prior to operation of the SCMAGLEV system, the Project Sponsor must demonstrate that its proposed technology and safety program will sufficiently mitigate operational risks.

The Project Sponsor will also develop a System Inspection, Testing, and Maintenance Program (see Compliance Measure #2). Regular inspection and maintenance will help prevent mechanical failures and ensure the safety of the guideway.

System Security

The SCMAGLEV design will control access to the operational corridor by using a combination of tunnel and viaduct sections, with security fencing as needed per the threat/hazard analysis. Specific details regarding proposed intrusion prevention measures (such as fencing specifications, security lighting, Closed Circuit Television (CCTV), and intrusion sensors) may include confidential or sensitive information. These aspects of system security will be developed in consultation with local law enforcement agencies and FRA as part of the required hazard analysis program and implementation of hazard controls (see Compliance Measure #3). Through this process, the Project Sponsor is responsible for demonstrating that its security design is sufficient to address all identified security vulnerabilities prior to operation of the SCMAGLEV Project. The potential for criminal activity, such as theft, vandalism and violence onboard the SCMAGLEV system or at facilities, will be addressed through a System Security Plan (see Compliance Measure #5).

Accordingly, the Project Sponsor has documented the following overview of element-specific security and intrusion protection measures:

- Maintenance Access: Access to the guideways is strictly prohibited and prevented when trains are operating, from 5:00 AM to 11:00 PM. During the nighttime maintenance hours, 11:00 PM to 5:00 AM, guideway access is limited to maintenance personnel entering from the MOW facilities or other facilities or

stations. Details of monitoring systems, security lighting, and other deterrents will be developed in the future.

- Viaducts: Focus on the protection of the ROW from external threats such as vandalism, launching of objects onto the ROW, and trespassers. Viaduct sections are generally a minimum of 10 meters (33 feet) above ground level. In certain areas fencing will be installed at the right-of-way line, protecting a total width of 22 meters (72 feet). The fencing will be a minimum of 3 meters (10 feet) high. Security lighting is not planned along the entire viaduct section. Security lighting will be provided at the following locations:
  - Where SCMAGLEV facilities are sited under or adjacent to the viaduct.
  - Where the viaduct profile grade line (guideway level) is less than 10 meters (33 feet) above the ground.
- Tunnels: Access to tunnel sections is physically limited to the following entrance points, where access will be strictly controlled: Passenger stations; FA/EE facilities; Tunnel portals.
- Tunnel Transition Portals: As with viaduct sections, the focus will be to ensure the integrity of the ROW at tunnel transition portals, where the guideway changes from tunnel to viaduct, and the protection of the ROW from external threats such as vandalism, launching of objects onto the ROW, and trespassers. Fencing will be installed at the right-of-way line to prevent access. The right-of-way width at portals is 24 meters (79 feet). Right-of-way fencing will be a minimum of 3 meters (10 feet) high. Security lighting will be provided around the perimeter.
- Open Cut Sections: At some tunnel transition portals, there will be a section of open cut tunnel, where the guideway depth is as much as 35 meters (115 feet) below ground level. As with viaduct and portal sections, the Project Sponsor will ensure the integrity of the ROW. Security follows these key concepts: protection of the ROW from external threats such as vandalism or terrorism, launching of objects onto the ROW, and trespassers. Protective measures such as fencing, cameras and security lighting will be provided around the open cut section as determined in the final design.
- Stations and Facilities: Access to restricted areas in station and facilities will be strictly controlled to prevent entry by any unauthorized personnel. Fencing, cameras and security lighting will be provided as incorporated in the final design.

Cyber threats exist for railway systems. Of particular concern are computer-based train systems operations, signal and control systems, and other communications. The Project Sponsor will incorporate measures, such as installing software that monitors and protects the system from cyber threats. As planning for the SCMAGLEV Project progresses, more detailed planning to protect against cyber threats will occur.

Passenger Safety

Measures of passenger safety will be included within the SCMAGLEV Project design, construction, and operation as described below. The SCMAGLEV Project will be

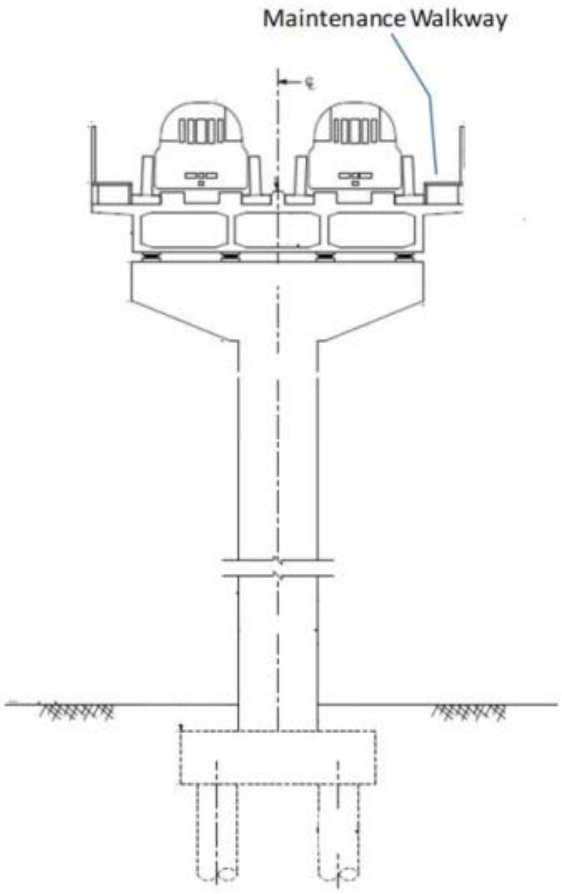
designed to meet applicable municipal, state, and Federal fire safety requirements. Materials used in constructing the interior will meet applicable Federal, state, and local flammability and smoke emission characteristics and testing standards.

The need for emergency services to access the SCMAGLEV facilities or ROW will consist primarily of non-preventable incidents such as a passenger medical emergency. SCMAGLEV Project design features will minimize the potential for train accidents; therefore, the need for emergency response to incidents will be extremely rare. Notwithstanding, the Project Sponsor will collaborate with local responders and FRA to develop an Emergency Preparedness Plan (see Section 4.22.6, Compliance Measure #4) which will facilitate emergency response in case of severe weather, power outages, medical, fire, or other emergencies.

In the event of an onboard emergency, the SCMAGLEV system will provide for emergency communication between the passengers and on-board crew or General Control Center staff. This could be used for either a medical emergency or a security threat, such as an act of terrorism. Trainsets will be outfitted with a clearly marked “SOS” button, located at one end of each vehicle. When activated, the “SOS” button sends a signal directly to the onboard crew and the General Control Center and allows passengers to speak directly to on-board crew or General Control Center staff.

Emergency access will be provided at station areas and at vertical access points collocated with ventilation shafts or FA/EE facilities as specified for each alignment alternative in this section. On average, full vertical access at ventilation shafts will be spaced at approximately three-mile intervals. The emergency operations procedures will attempt to stop the train near a FA/EE. At typical operating speeds, this will take less than a minute. If a train is unable to stop at a designated location, passengers will alight from the train and use the maintenance walkway on either side of the viaduct structure to walk to a designated egress location with stairs and emergency response access. Maintenance walkways are shown on **Figure 4.22-2.** Designated egress locations for the will be coordinated with local emergency response organizations and documented in the Final Environmental Impact Statement (FEIS).

Figure 4.22-2: Viaduct with Maintenance Walkways



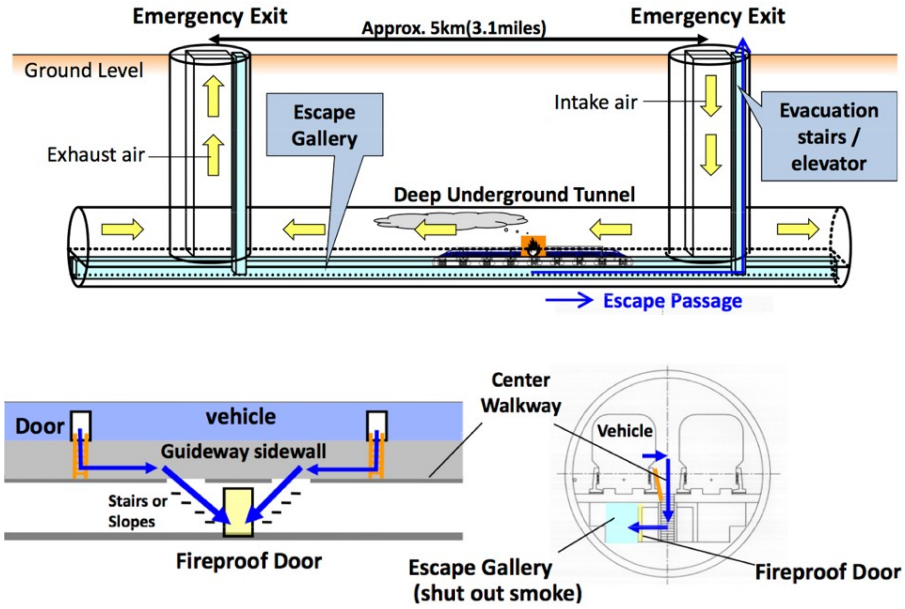
Where this is not feasible, passengers can access a more secure escape gallery located below the guideway running level. FA/EE vertical access between the guideway running level and the escape gallery will be spaced approximately every 800 feet. Once reaching the escape gallery, passengers will be separated from the guideway by fireproof doors in an independently ventilated corridor and will be out of immediate danger in the event of an emergency (see **Figure 4.22-3**). Optimum walk time (if a vehicle should stop between FA/EE vertical access locations) to reach the surface is estimated at approximately 30 minutes.[11]

Viaduct sections will include a walkway to reach vertical access at select pier locations adjacent to roadways easily accessible by affected emergency responders. Exact pier locations will be determined through ongoing engineering refinement and coordination

[11] Based on 1.5-mile distance to nearest ventilation shaft and 3 mph average walking speed.

with local emergency service providers. All above and below ground emergency access walkways and escape galleries will meet ADA, OSHA and National Fire Protection Association (NFPA) standards for safe and accessible design (see Section 4.22.6, Compliance Measure #6.

Figure 4.22-3: Emergency Evacuation Exits for Tunnel Sections



Emergency Response Capabilities

The potential for SCMAGLEV operation or construction to impact emergency response capabilities will vary by element being constructed (viaduct, tunnel, or facility). The SCMAGLEV system is grade separated (either in tunnel or viaduct) from the local transportation network which minimizes permanent impacts to emergency response times within the vicinity of the SCMAGLEV system regarding non-system related emergencies. Any temporary or permanent reconstruction or rerouting of public roads must be coordinated with the appropriate local jurisdiction. Through state and local roadway modification permitting requirements, the Project Sponsor will have to demonstrate that proposed modifications will not significantly impact emergency response times. However, the ability to respond to emergencies within the system may require additional time due to limited access areas.

Critical and Vulnerable Facilities

The most notable differences in the presence of a critical or vulnerable facility within the SCMAGLEV Project Affected Environment are associated with the selection of the TMF site and Baltimore terminal station alternative. The MD 198 TMF site will increase the number of critical and vulnerable facilities (three) in proximity to the SCMAGLEV Project and the degree of transportation modifications and potential emergency service disruption, as BARC Airstrip (two) and BARC West TMF sites (two). The Camden Yards

Station terminal option, as compared to the Cherry Hill Station terminal option, will increase the number of critical and vulnerable locations in proximity of the SCMAGLEV Project and may result in longer emergency response times to the station, given its location in a higher density location with increased traffic conditions.

4.22.4.3 Short-Term Construction Effects

Construction of the SCMAGLEV Project will include activities such as digging and tunneling using multiple tunnel boring machines (TBM), ground clearing, pile driving, excavating, grading, and the stockpiling of soil, muck, and materials. All construction impacts are anticipated to be short-term in duration and will cease upon completion of construction. Construction is estimated to take just under seven years.

The potential health effects of construction vehicle and equipment emissions are documented in Section 4.16 Air Quality, Section 4.15 Hazardous Materials and Solid Waste, and Section 4.21 Public Health and Safety. If not properly operated, secured, and maintained, construction equipment could also create a risk to the physical safety of employees, contractors or other individuals authorized to be present on construction sites. In addition, movement of vehicles or equipment to a site or between sites could present additional hazards to nearby traffic or pedestrian movements. Potential construction safety impacts can be reduced through compliance with local construction permitting requirements.

Temporary roadway closures and rerouting during construction are likely. This could affect emergency responses times. As planning for the SCMAGLEV Project progresses, detailed maintenance of traffic plans will be prepared in accordance with local requirements. The Project Sponsor will have to demonstrate that temporary closures or rerouting will not significantly impact emergency response times. Section 4.2 Transportation contains information on maintenance of traffic plans generated by the Project Sponsor; however, these plans require additional review by and coordination with local emergency responders to determine if there will be impact to response times. The Project Sponsor has stated that they will be conducting this coordination as part of the FEIS.

4.22.5 Safety and Security Compliance Measures and Mitigation

The SCMAGLEV Project, as proposed, will establish a safety and security program which utilizes a combination of preventative design features and other technologies, plans and procedures, and adequate provisions for emergency access to reduce or eliminate potential safety and security impacts at stations, portals, viaducts, fresh air and emergency egress areas, and TMF site. The following crash avoidance design features of the SCMAGLEV system are integral to the minimization of potential safety and security impacts:

- Dedicated ROW that is completely grade separated from freight, automobile and pedestrian traffic;
- No bi-directional service on any segment;

- Security fencing, physical barriers, and an intrusion detection system to secure the entire ROW; and
- Signaling and communications system.

The Project Sponsor will also ensure contractor compliance with approved health and safety plans addressing construction worker safety and issues including fall protection, hearing/eye protection, hazardous materials storage, etc. These issues have also been noted in Sections 4.1, 4.16 Air Quality, and 4.17 Noise and Vibration.

The Project Sponsor will ensure compliance with all applicable safety, inspection, maintenance, training and security requirements as developed through a Rule of Particular Applicability, order(s) or waiver(s), or other regulatory action(s) taken by FRA to ensure the system is operated safely. Prior to operating the SCMAGLEV system, the Project Sponsor in coordination with TSA will develop the following compliance measures for review and approval from FRA.

Compliance Measure #1: System Safety Program (SSP)

The Project Sponsor will commit to and submit an SSP Plan to FRA for review and approval, prior to operation of the SCMAGLEV system. The purpose of the SSP Plan is to systematically evaluate safety hazards and manage risks through on-going preventative and corrective actions, including a risk-based hazard management program and hazard analysis. The SSP Plan shall address the following:

- Safety philosophy, culture and program goals;
- Safety roles and responsibilities within the organization, including the lines of authority used to manage safety issues;
- SSP implementation process and milestones;
- Maintenance, repair, and inspection program (see Compliance Measure #3);
- Operating and safety rules and maintenance procedures, as well as techniques used to verify compliance of staff and contractors with these rules and procedures;
- SSP training requirements for employees and contractors; and,
- Description of hazard management program (see Compliance Measure #2).

After FRA approval of the SSP Plan, the Project Sponsor shall annually assess implementation of and compliance with the SSP Plan and report findings and improvement plans to FRA. The Project Sponsor shall be responsible for ensuring employees have received the appropriate level of training for their position and documenting all required safety training events as part of its safety program. FRA may conduct audits of the SSP for compliance with the approved SSP plan.

Compliance Measure #2: Hazard Analysis

The Project Sponsor will make a commitment to establish a risk-based hazard management program and conduct hazard analyses. This hazard management program will establish the process used to identify and analyze hazards; methods for determining frequency, severity, and corresponding risk of identified hazards; procedures for identifying hazard controls or mitigating actions; and risk management roles and responsibilities within the organization. A preliminary hazard analysis submitted with the SSP Plan will identify hazards and appropriate follow-up actions for the Project Sponsor to implement to reduce or eliminate risks. The Project Sponsor will perform additional hazard analysis accompanying any significant operational changes, system extensions, modifications, or other circumstances impacting safety of the SCMAGLEV Project.

Compliance Measure #3: Inspection, Testing, and Maintenance

Although specific testing and maintenance requirements for the SCMAGLEV Project are still under development, the Project Sponsor will make a commitment to develop a system inspection, testing and maintenance program, based on best practices developed through operation of Central Japan Railway Company's SCMAGLEV test track. This plan will be submitted to FRA in conjunction with the SSP. The Project Sponsor will be responsible for ensuring that the proposed standards, maintenance protocol, and schedules for regular inspection and cleaning will be sufficient to address identified hazards and promote safe, reliable operations.

Compliance Measure #4: Emergency Preparedness Plan

The Project Sponsor will prepare an Emergency Preparedness Plan and submit to FRA for review and approval. The plan will include:

- On-board and control center communication protocol;
- Employee emergency preparedness training, including a schedule for initial and periodic training within the first 180 days of passenger service and procedures for testing an individual who is employed by the railroad, under a contract or subcontract with the railroad, or employed by a contractor or subcontractor to the railroad for emergency preparedness qualifications;
- Procedures involving operations on elevated structures and in electrified territory;
- Program for communication and training for any local emergency responders who could reasonably be expected to respond during an emergency situation. This program shall include participation in emergency simulations and distribution of the Emergency Preparedness Plan;
- Inventory and location of emergency equipment with schedule of maintenance for replacement of first-aid kits, on-board emergency equipment, and on-board emergency lighting;
- Program for passenger awareness of emergency procedures, to enable passengers to respond properly during an emergency; and

- Procedures regarding passengers with disabilities.

The Emergency Preparedness Plan should reflect local emergency management guidance. The Project Sponsor will solicit coordination with and feedback from potentially affected emergency responders in order to demonstrate that its plan adequately addresses concerns regarding emergency response capabilities.

Compliance Measure #5: System Security Plan

The Project Sponsor will to develop a System Security Plan, in consultation with the TSA, prior to operation of the system. At minimum, the System Security Plan will document the processes for mitigating and/or eliminating the security threats, vulnerabilities, and risks to safeguard the personal security of passengers and employees. The passenger and employee screening procedures developed through the System Security Plan will comply with all applicable state and Federal regulations, including TSA's RAILPAX-04-01 and RAILPAX-04-02. The System Security Plan will also demonstrate how the SCMAGLEV Project's planned security protocols at the proposed BWI Marshall Airport Station will comply with all TSA and FAA rules regarding airport security.

Compliance Measure #6: Compliant Facility Design

During final design, the Project Sponsor or its contractual designee will ensure that the design of stations, guideway, and maintenance facilities meet all applicable Federal and state requirements. This includes providing sufficient access to walkways and corridors which meet ADA standards, facilities which meet OSHA, NFPA standards, fire life safety, and compliance with any other applicable state or local building codes.

Compliance Measure #7: Liability Coverage

The Project Sponsor will be responsible for maintaining insurance liability coverage as required in accordance with applicable law.

As the SCMAGLEV Project design is further refined, additional mitigation measures may be implemented to further reduce impacts associated with the construction and operation of the SCMAGLEV system, including:

- Modeling of potential response time impacts associated with the SCMAGLEV Project construction; and
- Enhanced coordination with specific emergency service providers.