Appendix E.18 – Safety

APPENDIX E.18

SAFETY – ERRATA SHEET

No changes were made to the materials in this appendix. This Volume 2 file contains the same information as was presented in the Tier 1 Draft EIS published November 2015.

NEC FUTURE
A Rail Investment Plan for the Northeast Corridor

Safety Effects Assessment Methodology

February 25, 2014
Version FINAL

Submitted by:

PARSONS BRINCKERHOFF AECOM
A JOINT VENTURE

Table of Contents

Tables

1. Safety

1.1 INTRODUCTION

This methodology explains how proposed railroad operations and infrastructure improvements for the Tier 1 EIS Alternatives could affect railroad safety. Within the Tier 1 EIS, safety will be addressed and considered for the Study Area as a whole rather than on a state-by-state basis.

This methodology presents the regulatory framework, involved government agencies, expected regulatory and other outcomes of the Tier 1 EIS process and relevance to Tier 2, project-level assessments. It also identifies data sources, metrics and methods to be used to document existing conditions and analyze environmental consequences. This methodology may be revised as the NEC FUTURE program advances and new information is available.

1.2 DEFINITIONS

Safety includes the safe operation of the passenger railroad, equipment, and infrastructure (rights-of-way, tracks, structures, systems, stations, yards, etc.) for the Tier 1 EIS Alternatives. Safety considerations are consistent with the FRA's mission to improve railroad safety and reduce the number of accidents through the reduction in number and rates of accidents involving railroad train collisions or derailments; highway-rail grade crossings; trespassers; and railroad infrastructure.

For the NEC FUTURE Tier 1 EIS, safety aspects of the railroad will be considered as follows:

- Operational Safety: The intercity, regional, and commuter services operating along the NEC today operate different equipment types, at different speeds and with different stopping patterns. The mix of operators with separate operating practices together contributes to the overall safety of the railroad. Train collisions or derailments are representative of the type of incident related to operating practices.
- Infrastructure Safety: This refers to accidents or incidents caused by the failure of existing railroad infrastructure due to natural events or human activity. Infrastructure failures can contribute to either train-related or station-related incidents involving operating personnel and passengers.
- Modal Safety: This refers to the overall safety of passenger rail as a transportation mode when compared to other transportation modes, including highway or air travel. The safety of passenger rail as a mode compared to other modes will be considered based on the number of accidents.

The definitions listed above are based on data from the FRA website, National Transportation Safety Board website, and the NEC FUTURE project team.

1.3 RELATED RESOURCES

Safety is dependent upon data and analysis from related resources. The related resource for safety is identified in Table 1. Note that the effects assessments for this related resource will be documented within their respective Tier 1 EIS sections.

TABLE 1: RELATED RESOURCE INPUTS TO SAFETY

Resource	Input to Safety
Transportation	▪ Location of existing and proposed transportation corridors and facilities to assess compatibility with the proposed Tier 1 EIS Alternatives ▪ Location of existing and proposed passenger rail stations to assess potential effects on existing or proposed land cover classifications ▪ Existing and proposed rail operations (including service plans and fleet assumptions) ▪ Shift or change in ridership between rail, highway, or air travel modes

Source: NEC FUTURE JV Team, 2013

1.4 AGENCY AND REGULATORY FRAMEWORK

Safety is regulated by multiple federal agencies. Each of the individual railroads operating on the NEC (Amtrak, commuter railroads, freight railroads) also has specific safety procedures in place. Applicable legislation and regulations, listed in Table 2, will be considered consistent with a Tier 1 level of assessment.

TABLE 2: MANAGEMENT AND REGULATION OF SAFETY

Federal Agency	Regulatory Oversight	Description of Regulation	Regulated Resource
Federal Railroad Administration (FRA)	▪ High-Speed Passenger Rail Safety Strategy (2009)	▪ Safety standards and program guidance for HSR ▪ Applies a system safety approach to address safety concerns on specific rail lines ▪ Ensured that railroads involved in passenger train operations can effectively and efficiently manage train emergencies	▪ Existing intercity passenger rail corridors and new service.
	▪ Rail Safety Improvement Act of 2008 (Public Law 110-432)	▪ Governs governing hours of service for workers, positive train control implementation, standards for track inspection, conductor certification, highway grade crossings	▪ Rail corridors and service
	▪ Federal Railroad Administration (49 CFR Volume 4, Chapter II, Parts 200 to 299)	▪ Rules and procedure for passenger service	▪ Rail corridors and service
	▪ US Code on Railroad Safety (49 USC §§20101 et seq.)	▪ Promote safety in every area of railroad operations and reduce railroad-related accidents and incidents.	▪ Rail corridors and service
U.S. Department of Justice	▪ Americans with Disabilities Act of 1990	▪ Civil rights law that prevents discrimination based on disability	▪ Physical access to facilities and service

Source: NEC FUTURE JV Team, 2013

1.4.1 Regulatory Compliance

No formal regulatory approvals would be necessary for the Tier 1 EIS. However, the FRA will engage in dialogue with rail service providers on the methodology, assumptions, and findings of the Tier 1 EIS analysis. The requirements for subsequent Tier 2 evaluations, including compliance with FRA safety standards and operating rules, as well as consideration of state and local standards, will be described in the Tier 1 EIS.

1.5 METHODOLOGY TO ASSESS EFFECTS

This effects assessment methodology identifies the approach and assumptions for describing existing conditions for safety and environmental consequences of the Tier 1 EIS Alternatives. It identifies data sources, defines the Affected Environment considered for safety, and the approach for evaluating potential direct effects.[1] Indirect effects,[2] such as those resulting from induced growth, as a result of the Tier 1 EIS Alternatives will be addressed in a separate methodology (see Indirect Effects Assessment Methodology).

Each of the Tier 1 EIS Alternatives would be conceptually defined to be compliant with current or proposed safety standards and regulations as noted on Table 2. Although design specifics would not be known for the Tier 1 EIS Alternatives, the general applicability of safety standards with regard to vehicle design, track design, etc. would be considered in overall concept development. Detailed assessments of compliance with safety regulations would be considered during the Tier 2 project development. For the Tier 1 EIS Alternatives, compliance with current and proposed safety standards or regulations would be generally discussed and an assessment of different safety requirements will be included in the description of each of the Tier 1 EIS Alternatives as presented in Chapter 2. The assessment of safety will consider the operational and infrastructure aspects of the Tier 1 EIS Alternatives as well as the safety of passenger rail as a travel mode compared to other modes.

1.5.1 Existing Conditions

The data sources listed in Table 3 will be used to establish the existing conditions using safety records and transportation statistics. These data sources describe existing conditions based on historic data. Additional data available from related resources (see Table 1) will also be incorporated into this analysis.

[1] Direct Effects are caused by the action and occur at the same time and place (40 CFR § 1508.8)
[2] Indirect effects are those that occur later in time or are further removed in distance (40 CFR § 1508.8)

TABLE 3: DATA SOURCES FOR THE EVALUATION OF SAFETY

Resource	Data Source	Data Application
Modal Safety	▪ National Highway Traffic Safety Administration Fatality Analysis Reporting System (FARS)	▪ Data on number of accidents, injuries and deaths from motor vehicles crashes
Modal Safety	▪ National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Traffic Safety Facts	▪ Data on a variety of driver and vehicle type with their respective safety records
Modal Safety	▪ Bureau of Transportation Statistics Research and Innovative Technology Administration (RITA) National Transportation Statistics	▪ Safety statistics on a variety of transportation modes
Passenger Rail Safety	▪ FRA Office of Policy and Program Development, Rail-Highway Grade-Crossing Accidents	▪ Data on highway grade crossing accidents for the railroad system
Passenger Rail Safety	▪ FRA Office of Safety Analysis	▪ Data on accidents by railroad by type ▪ Summary statistics on accidents by type ▪ Data on trespasser incidents by railroad by location
Passenger Rail Safety	▪ Federal Transit Administration (FTA) Transit Safety and Oversight, Transit Safety and Security Statistics	▪ Summary statistics on overall safety of commuter railroads by railroad and type of incident
Passenger Rail Safety	▪ FTA National Transit Database	▪ Commuter railroad specific statistics on number of safety incidents by type
Passenger Rail Safety	▪ FTA Office of Safety and Security, State Safety Oversight Program	▪ Summary data on overall commuter rail safety
Aviation Safety	▪ FAA Accident and Incident Data	▪ Data on accidents in the aviation industry
Aviation Safety	▪ National Transportation Safety Board Aviation Accident Statistics	▪ Summary of aviation accident statistics
Modal Safety	▪ National Transportation Safety Board (NTSB), Safety Studies and Special Reports	▪ Accident data for aviation, railroad, and highway transportation modes.

Source: NEC FUTURE JV, 2013

The existing conditions for safety will be documented in the Tier 1 EIS for an established Affected Environment. In light of the network characteristics of the passenger rail system, the Affected Environment for safety is the entire Study Area. The Study Area includes a broad geographic area, stretching 457 miles from Washington, D.C., in the south to Boston, Massachusetts, in the north, and covering over 50,000 square miles. This area is sufficiently sized to:

- Encompass and account for improvements associated with a Tier 1 EIS Alternative and its Representative Route[3] including infrastructure improvements (such as embankments, aerial structures, track improvements), ancillary facilities (such as stations, yards, and parking structures), or service changes.
- Consider the relative safety of modes operating within the Study Area and the potential safety effects of travelers shifting transportation modes.

Existing conditions relative to operational and infrastructure safety within the Affected Environment will be defined as follows:

- The annual number of accidents (train collisions or derailments) related to operating practices will be tabulated for existing NEC operations (including statistics available for Amtrak intercity as well as commuter or regional railroads). For portions of the NEC with freight operations, safety statistics will also be compiled for passenger rail and freight related incidents.
- The annual number of accidents related to infrastructure (track or signal system caused), mechanical and electrical failures, or equipment failures[4] will be tabulated for existing NEC operations (including statistics available for Amtrak intercity as well as commuter or regional railroads).

Existing conditions for modal safety within the Affected Environment will be defined by:

- Safety statistics available for each transportation mode (highway, aviation, bus, and rail) operating within the Study Area will be compiled for comparable time periods. This analysis will provide an indicator of relative modal safety.

1.5.2 Environmental Consequences

Environmental consequences for the Tier 1 EIS Alternatives will be assessed for operational and infrastructure safety and modal safety within the Affected Environment. Existing conditions will establish a baseline for comparison purposes; the consequences of the Tier 1 EIS Alternatives will be qualitatively assessed based on the extent to which they change conditions that are known to contribute to the overall safety of the NEC or passenger rail operations. The overall assessment of consequences of the Tier 1 EIS Alternatives will be qualitative; however, it will be based on a quantitative discussion of the safety metrics for existing operations.

It is expected that the aspects of safety considered in the Tier 1 EIS would differentiate between a No Action Alternative and Build Alternatives that maintain existing operating practices and those that propose significant changes in rail infrastructure and new off-corridor rights-of-way. The assessment of consequences will consider proposed service plans, operating practices, equipment

[3] Representative Route refers to a proposed route or potential alignment for a Tier 1 EIS Alternative. The Representative Route includes the physical footprint of the improvements associated with the Tier 1 EIS Alternatives. The horizontal and vertical dimensions of the footprint of the Representative Route are based on prototypical cross-sections for these improvements. The Representative Route is used as a proxy for estimating the potential effects of a route whose location could shift during subsequent project-level reviews.
[4] http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx

types, and infrastructure improvements for the Tier 1 EIS Alternatives to identify potential operational conflicts or improvements to infrastructure that could affect safety.

Operational and Infrastructure Safety

The assessment of operational and infrastructure safety will highlight factors associated with shared use compared to segregated operations. Shared or mixed use operations are those where multiple operators with different operating practices and equipment types can operate on the same track. FRA Safety Standards[5] identify the requirements for the safe interaction of rail vehicles in these shared use operations. Within the Affected Environment, both on and off the NEC, commuter, intercity, and freight trains operate in compliance with FRA track, vehicle and highway-grade crossing standards for shared use operations. In contrast, Tier 1 EIS Alternatives could include segregated services in which different operating practices, equipment types, and services operate on segregated rail rights-of-way, for example, as in dedicated high speed rail services operating exclusively on dedicated tracks.

Other factors contributing to the safety of the railroad infrastructure (track, roadbed, structures, stations, yards, etc.) include its condition as a function of age and/or maintenance, the configuration of track, interlockings and signal systems and how different services and different equipment types operate together (e.g., whether or not it requires conflicting equipment moves), and the vulnerability of the infrastructure to natural events. Passenger and employee safety features include fire and life safety elements, public address systems, and video surveillance.

The following analysis will be completed to assess the effects of each Tier 1 EIS Alternative on operational and infrastructure safety:

- Describe the changes, relative to existing conditions, in operating practices associated with Tier 1 EIS Alternatives. These changes will be summarized for the No Action Alternative, Alternatives that include Shared Use operations (within existing NEC or on new rights-of-way) and those that include segregated operations (different services types and equipment operating on segregated rail infrastructure).
- Describe how proposed shared use or segregated operations could contribute to or minimize risk of accidents within the Affected Environment.
- Describe how the proposed infrastructure and equipment improvements associated with each Tier 1 EIS Alternative could change the safety of the existing NEC. Specific conclusions will consider the service, equipment and other characteristics of the Tier 1 EIS Alternatives compared to current statistics for infrastructure and equipment safety incidents, and summarized for the No Action, Shared Use and Segregated operation Alternatives.

Modal Safety

NEC Future has the potential to shift travel to passenger rail, with accompanying effects on overall traveler safety. As travelers moving from autos, air, and vehicular transportation to rail there may be a positive impact on the safety of the road network and air travel.

[5] Federal Railroad Administration (49 CFR Volume 4, Chapter II, Parts 200 to 299)

The following analysis will be completed for Modal Safety:

- Compare ridership mode shift and vehicle miles traveled statistics for each of the Tier 1 EIS Alternatives and present in tabular form.
- Discuss the overall safety statistics for each mode as described for existing conditions and evaluate the Tier 1 EIS Alternatives effects on increasing or decreasing usage of modes with more favorable safety statistics.
- Summarize the potential change in public safety from the alternatives.

1.5.3 Mitigation Strategies

A menu of potential mitigation measures will be developed on a programmatic scale for further consideration in Tier 2. Examples of programmatic mitigation measures for safety include grade-separated crossings or separation of different vehicles with different performance characteristics.

1.6 TIER 1 EIS Outcomes

The Tier 1 EIS safety assessment will:

- Describe effects to operational and infrastructure safety in relation to proposed improvements to infrastructure, changes in equipment or changes in operating practices
- Compare safety statistics for alternative modes (highway, rail, air and bus) and identify implications to public safety of potential shift to modes with different safety statistics.

1.7 APPLICABILITY TO TIER 2 ASSESSMENTS

The Tier 1 analysis will identify areas where there are potential safety considerations with regard to the operations or infrastructure improvements associated with Tier 1 EIS Alternatives. These considerations will be used to inform design standards, develop operating practices, and coordinate amongst the operating railroads in support of subsequent more detailed Tier 2 environmental analyses. Additionally, FRA will identify ways in which agency coordination during the Tier 1 EIS process could create efficiencies and help streamline subsequent Tier 2 reviews and approvals.