I. General Design Requirements

A. Design Service Life

1. The default minimum design service life for the assets under the purview of this EP are as follows:

a. Stations:

i. Major Stations (high capacity, dense urban hubs with intermodal connections): 75 years or as guided by code and industry practice with respect to the importance to the public safety and use, visibility, and location permanence.

ii. Other Stations: 50 years

b. Maintenance Facilities and other Buildings: 50 years

c. Bridges: 100 years

i. Includes the span of moveable bridges

ii. Rehabilitation: 75 years

d. Tunnels 100 years

e. Miscellaneous Structures

i. Signal bridges, culverts, retaining walls, and other miscellaneous structures over, under, or mutually influenced by the ROW: 75 years

f. Notes:

i. Tunnels and major bridge crossings are designed for a nominal 100-year structural life but are considered functionally indefinite assets. Design should emphasize long-term durability, low-maintenance materials, minimal reliance on inaccessible components, and resilience to environmental and operational stressors. Similar considerations should be provided for major stations.

ii. Internal and 'perishable' components including mechanical, electrical, exposed plumbing, communications, life safety, and finishes are understood to have shorter design lives consistent with industry norms and operational expectations. Design Consultant will apply appropriate service life assumptions to these systems based on their function, criticality, and maintainability.

iii. Regardless of system design life, all systems shall be designed and configured for ease of maintenance, replacement, and future upgrade in support of the overall long-term serviceability of the asset listed above.

B. Building Resiliency

1. Amtrak Engineering Services has embraced the National Academies definition of resilience as "the ability to plan for, absorb, recover from, and more successfully adapt to adverse events." The Design Contractor shall develop recommendations and rationale for the Project's Resiliency. Amtrak Engineering Services will review and provide direction.

C. Security / Anti-Terrorism Considerations During Design

1. General:

a. Transit systems and their facilities / infrastructure are potentially vulnerable or attractive targets for security breaches, including Amtrak's national passenger rail network. Many Amtrak principal facilities are located in densely developed central cities, directly adjacent to rail and highway corridors and waterways, posing

particular security challenges. Station facilities pose a particular challenge as public access is a fundamental requirement.

b. Security and Anti-terrorism Design Measures:

c. Based on the complexity of the project, the Scope of Work may include a Threat, Vulnerability, and Risk Assessment (TVRA) as part of the Preliminary Engineering Phase. Augmented criteria resulting from that study's approved conclusions will be incorporated into the Final Design.

d. The absence of a TVRA does not absolve the Design Consultant from considering, recommending, and incorporating appropriate security and anti-terrorism design measures into the facility to protect personal safety of passengers and employees, resources, structure, and continuity of operations against hazards. The Design Consultant shall consider facility design, access management, communications, technology, and security system integration best practices to respond to the project's particular surrounding environment and needs. The Design Consultant shall implement best practices to harden the physical assets, prioritizing security sensitive areas, and collaborating with Amtrak operating / maintenance staff and security / police representatives. The Amtrak Project Manager will provide the Design Consultant with Amtrak's Emergency Management and Corporate Security's Design Guidance, Practices and Recommendations as relevant to the specific project.

D. Vandalism Protection:

1. The Design Consultant shall incorporate appropriate design measures to protect the facility against vandalism.

E. Additional Structures Design Resources

1. As appropriate to the Project asset(s) and noted herein, refer to the Amtrak Bridge Design Manual.

2. As appropriate to the Project asset(s) and noted herein, refer to the Amtrak Stations and Corporate Facilities Design Manual.

3. Additional Engineering Practices may be provided as required for the Project asset(s) under development.

F. Project Definition Report (as defined in the Section 0 Glossary)

1. The Project Definition Report must receive formal approval from Engineering Services Design Manager prior to advancing design beyond the 15% stage. The PDR must include a formal statement of criteria and basis of design for the Project.

II. Amtrak Adopted Codes and Standards

A. Instruction, Coordination, and Arbitration

1. The contents of EP4000 are minimum design requirements that can and should be thoroughly coordinated with other rail discipline Engineering Practices and standards, as well as both listed and unlisted state or local codes, standards, and requirements to establish the project-specific design criteria.

2. No information herein absolves the Design Consultant from performing and executing a thorough code review (A) within the Project Definition Report (PDR) as directed in EP4000 - Section 1, (B) as a stand-alone Code Analysis document, and/or (C) as part of standard and documented professional A/E design due diligence. Conflicts or gaps shall be brought to the DM's attention for resolution.

3. Where prescriptive code requirements are impossible to implement or would cause significant hardship for the Project, a performance-based design may be permitted following written request to and approval by Amtrak Engineering Services.

a. When performance design is utilized, prescriptive Codes and other requirements referenced herein shall serve as a baseline.

b. The Design Consultant will support performance design with appropriate modeling and analytical methodology as necessary to provide design solutions that meet or exceed prescriptive code requirements, as determined and accepted by Amtrak Engineering Services.

c. Note: Performance design may trigger the need for a formal peer review. This will be addressed on a case-by-case basis.

4. Final Authority: Amtrak Engineering Services, functioning in the role described herein, has the sole and final authority to accept or reject any provisions of state and local codes and/or directives from state and local government officials. Final direction on any conflicts or deviations is under the authority of the Vice President of Engineering Services or the Deputy Chief Engineer, Structures and Stations.

B. General

1. Federal Codes and Regulations: Amtrak (and therefore any subsidiary project) is subject to all Federal laws, codes, and regulations. Examples include the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA) Section 106, Occupational Safety and Health Administration (OSHA) regulations (where not augmented or superseded by railroad safety requirements like Fall Protection rules on bridges), and the Americans with Disabilities Act (ADA).

2. Exemption: National Railroad Passenger Corporation (Amtrak) is exempt from State and local building, zoning, subdivision, and similar laws, including those requiring permits and approvals as provided for in the Rail Passenger Service Act, 49 U.S.C. §24902(j) as well as local authorizations that could impact Amtrak's rates, routes, or service (49 U.S.C. §24301). This exemption pertains to any Project or improvement undertaken by or for the benefit of Amtrak.

3. Recognition of State and Local Codes: Amtrak recognizes that state and local codes represent important regional interests and conditions. Amtrak's policy (APIM 3.22.6.1) is to comply with state and local building codes (and associated reference codes / documents) unless directed otherwise by Amtrak. For projects that cross jurisdictional lines (code-asset applicability, state, owner/tenant, etc.), the Design Consultant's project-specific code analysis will identify conflicts or locally-differentiated requirements for Amtrak PM/DM review, approval and implementation in defining the project's compliance, certification, and/or enforcement protocols.

4. Authority Having Jurisdiction (AHJ): Statutes governing Amtrak often negate external entities from functioning as an AHJ for Amtrak Projects or property. These statutes do not affirmatively give Amtrak legal jurisdiction. Amtrak is not an AHJ. If the exemptions apply, Amtrak decides how to proceed and how to certify compliance. Therefore, in lieu of an external AHJ, Amtrak Engineering Services is the arbiter for regulatory and compliance requirements and associated exemptions and variances.

a. Washington Union Station is an exception to this AHJ arrangement, as the Federal Railroad Administration (FRA) is the designated AHJ. Amtrak will provide direction to the Design Consultant for FRA compliance requirements.

5. Design Exception Requests (DERs): In accordance with the above-referenced role and Amtrak Policy, waivers from state and local code may be granted by the Amtrak Deputy Chief Engineer – Structures. A template DER form can be is provided as a Word Document Template within the EP4000 catalog that shall be modified for submission to suit the project demands. See EP0007, "Design Directives and Variances."

a. Additionally, in the course of design development or in response to comments made by Amtrak Design personnel during the formal Amtrak Design Review process, a Design Consultant and / or Project Sponsor may require a Design Exception to Amtrak Engineering Practices, Industry Standards, Typical Details, or Minimum

Technical Requirements in order to satisfy safety and engineering concerns. These exceptions should also default to the DER process as part of the project record or a similar documented process at the discretion of the Amtrak Design Manager. Amtrak shall have sole discretion regarding approval or rejection of any DER submitted.

b. Design Exceptions Request (DER) forms should be submitted during the Design Development process as early as possible and need not follow the standard Milestone submission cadence.

c. Scenarios requiring a Design Exception Request (DER) form include but are not limited to:

i. Addressing conditions associated with overlapping asset classes – for example, a tunnel ventilation plant may exist in a station, or a bridge may also serve as the roof of a building

ii. Addressing new work in existing or "grandfathered" conditions

iii. Right-of-Way Clearances

iv. Catenary Clearances

v. Track Clearances

vi. Relief from a prohibitive code or recommended practice

vii. Relief from an unsafe or potentially dangerous threat

viii. Relief from an Amtrak Engineering Practice stipulation due to unique project constraints

6. See EP0007 for additional information on Design Directives, a formal document issued by Amtrak Engineering Services that serves to articulate the resolution to a technical issue. A Design Directive is most appropriate as a preemptive measure to resolve a conflict or provide required clarification, while a Design Exception Request follows the traditional "Variance" cadence when standard or code compliance is not practicable.

7. In addition to voluntary compliance with state and local building codes, Amtrak has generally adopted the technical requirements of the nationally recognized codes and standards referenced below for all design and construction work performed on all Amtrak facilities. The technical requirements of these codes and standards are supplemented by mandates of Federal laws, regulations, and executive orders.

8. Design Consultant shall not contact state or local code officials without communication and approval from the Amtrak Design Manager and Project Manager.

C. Permits, Code Reviews and Code Variances

1. Amtrak must obtain all Federal permits and state/federal environmental and historic permits under the purview of the National Environmental Policy Act (NEPA). Additional details are provided within Section 3.01 – General Requirements and/or Section 1.00 – Design Contract Technical Delivery.

2. Exemption: Amtrak is exempt from State and local building, zoning, subdivision, and similar laws, including those requiring permits and approvals.

3. As a normal practice of design, the Design Consultant will assemble a list of all normally required permits and approvals for Amtrak's review and indication as to which items are mandatory, which will be voluntarily obtained, and which will fall under Amtrak's exemption. This list is to be provided within the project Deliverables in accordance with Section 1.00 – Design Contract Technical Delivery.

4. Voluntarily Obtain Permits: Amtrak may voluntarily elect to obtain building permits, other select permits, certificates of occupancy, or to comply with the associated regulations in select circumstances. Such determinations will be made by the Amtrak Project Manager and Design Manager on a case-by-case basis after consultation with Amtrak's Law Department and Amtrak Engineering Services.

5. Should Amtrak agree to obtain State or local permits, the Design Consultant will review all potential external code variance requests with Amtrak Engineering Services for disposition before contacting the State or local agency.

6. At the completion of a project, Amtrak Engineering Services, at its sole discretion, may or may not elect to pursue Certificates of Occupancy or other similar documentation from a local jurisdiction, or self-issue said documentation. The Design Consultant will perform all requisite services to support the requirements pursuant to this process.

   a. If unstated in the Scope of Work, at a minimum, the Design Consultant is responsible for the Design Phase elements of this process including code compliance reviews, permitting submittals / approvals, and design modifications as directed by Amtrak Engineering Services or the standard applicable AHJ, such that certification could be obtained following requisite construction-phase reviews and inspections.

   b. Consult with the PM and DM for Amtrak building or system certification and/or commissioning requirements. This does not absolve the Design Consultant from producing and documenting all required commissioning and testing specifications and requirements.

D. Buildings and Structures

1. Stations: In addition to the minimum technical requirements listed herein, refer to and incorporate the requirements and typical details in the "Amtrak Stations and Corporate Facilities Design Manual," available on Amtrak's Engineering Practices and Standards Library website.

2. All Buildings, as well as platforms adjacent to, above, or below a building and/or covered by a canopy:

   a. International Code Council (ICC) Family of Codes: available through http://www.iccsafe.org

      i. International Building Code (IBC)

      ii. International Existing Building Code

      iii. International Plumbing Code

      iv. International Mechanical Code

      v. International Energy Conservation Code

      vi. Other ICC codes may be used or referenced depending on specific site or building conditions.

      vii. Note: Amtrak major stations and certain facilities are considered Risk Category III, Substatial Hazard to Human Life as defined by IBC. Amtrak Engineering Services will provide guidance to the Design Consultant on a case-by-case basis.

   b. National Fire Protection Association (NFPA), National Electric Code (NEC) (70): available through http://ww.nfpa.org

      i. NFPA 130, 2014 Edition: Amtrak adopts NFPA 130 for platforms, tunnels and associated connected spaces extending from the platform to the public way. For facilities that contain areas beyond the platform and connected spaces, these areas may be defined as the public way, whereupon the means of egress shall comply with IBC Chapter 10. Amtrak can provide additional guidance and interpretation on application of the adoption of NFPA 130 upon request on a specific project basis.

   c. National Standards: Organizations producing voluntary national standards are recognized by Amtrak in various chapters of Amtrak EP4000, including but not limited to, those referenced below. Consistent with Amtrak's policy to comply with nationally recognized standards to the extent practicable, these standards shall be employed as indicated in EP4000. Except as noted above, the latest edition of the nationally recognized

standards herein, in effect at the time of the design contract award, shall be employed during the design and construction of the project.

i. Where/if a revision **(YEAR)** is provided adjacent to a code or standard, that year is a required baseline to apply in order to align potential conflicts in accepted codes for assets or asset families that are subject to multiple adjacent state or municipal jurisdictions, including wayside (along the tracks of Amtrak's ROW) unmanned assets and appurtenances which fall exclusively under Amtrak's discretion for code adoption. Where no state or local guidance is provided and code analysis proves that no conflicts will arise, the latest edition of the nationally recognized code/standard, in effect (not simply published, recognizing that referenced standards often lag adoption behind the primary code) at the time of the design contract award, may be employed during the design and construction of the project with approval of the DM.

ii. National Standards:

(i) Note: Refer to SP-002, SP-003 & SP-004 from the Stations & Corporate Facilities Design Manual for a comprehensive list of applicable industry standards.

AASHTO	American Association of State Highway and Transportation Officials
AREMA	American Railway Engineering and Maintenance of Way Association, Manual for Railway Engineering
ACI	American Concrete Institute
ADA	Americans with Disabilities Act (associated guidelines and standards)
AISC	American Institute of Steel Construction
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BIA	Brick Industry Association
CSI	Construction Specification Institute
DOTAS	Department of Transportation Accessibility Standards
EPA	Environmental Protection Agency
FM	Factory Mutual
IECC	International Energy Conservation Code **(2015)**, minimum baseline

IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
LEED	U.S. Green Building Council
NCMA	National Concrete Masonry Association
NDS	National Design Specification (American Wood Council – AWC)
NEMA	National Electrical Manufacturer's Association
NFPA 101	Life Safety Code
NFPA 70 / NEC	National Electric Code **(2014)**, minimum baseline
NFPA 90A	Air Conditioning and Ventilating Systems
NFPA	National Fire Protection Association
NRCA	National Roofing Contractors' Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration
SMACNA	Sheet Metal and Air conditioning Contractor's National Association
SMACNA	Guidelines for Seismic Restraints of Mechanical Systems
SMACNA	Fire and Smoke Damper Installation Guide
SMACNA	Standards for Duct Construction
TMS	The Masonry Society
UL	Underwriters' Laboratories

d. Amtrak Engineering Practices (EP):

i. Various Amtrak Engineering departments have created EPs (Amtrak internal link), standards and/or specifications for specific disciplines (Track, Electric Traction (ET), Communication & Signals (C&S), Structures). These EPs will be made available by the Amtrak Project Manager or Design Manager, as appropriate to suit the scope of the project.

ii. External facing Engineering Practices and Standards can be located here: https://www.amtrak.com/engineering-practices-library

iii. Typically applicable documents and Engineering Practices include, but are not limited to, the following:

(i) EP0002: Amtrak NEPA-Related Requirements for Projects with Federal Involvement

(ii) EP3014: Maintenance and Protection of Railroad Traffic during Operations

(iii) EP4006: Enclosed Station Platforms and Built-Over Tunnels

(iv) EP4010: Amtrak CAD and BIM Standards

(v) Amtrak Stations & Corporate Facilities Design Manual

(vi) AED-1: Specification, Procedures, and Design Criteria to be Employed by Electrification Consultants Engaged in the Design of Electrification Facilities.

(vii) AED-2: Catenary Structure Loading, Design Criteria, and Standards for Use on the Northeast Corridor and Keystone Branch.

(viii) C.E.500b: National Railroad Passenger Corporation (Amtrak) Electrified Territory Outline Specification for Electrification, Transmission, and Distribution.

(ix) Specification No. 63: Track Design

(x) Specification No. 150: Storm Water Management Policy

(xi) Standard Plan 70003.001.01: Roadway Sections

(xii) Standard Plans 70050.001.08 & 700050.002.08: Minimum Roadway Clearances

(xiii) Land Survey Standards and Procedure Manual

(xiv) EP 2031: Track Monitoring for Work Disturbing Roadbed

E. Accessibility, Redundancy, and Resiliency Standards:

1. Non-Public Transportation Facilities:

a. The Americans with Disabilities Act ("ADA") standards are issued by the Department of Justice (DOJ) and the Department of Transportation (DOT) and are apply to all buildings for new construction and alterations. DOJ's standards apply to all facilities covered by the ADA, except public transportation facilities (see below), which are subject to DOT's standards. DOJ's ADA Standards (2010) can be found at: http://www.ada.gov/2010ADAstandards_index.htm.
These standards are typically incorporated at the code level and, in accordance with the mandate for Federal, State, and Local code compliance statements above, are to be incorporated and adhered to as a manner of standard practice. Exceptions will follow the DER process.

2. Public Transportation Facilities:

a. All spaces used by Amtrak passengers, as well as access to and from those spaces, public rights of way (PROW), parking lots, platforms, and other related locations shall comply with the ADA Standards for Transportation Facilities, effective 11/29/2006 (2006 DOTAS). The 2006 DOTAS can be found at: http://www.access-board.gov/ada-aba/ada-standards-dot.cfm

F. Other Amtrak Standards - Standards can be provided by your Design Manager or Project Manager from the following sites:

1. Digital Technology: Current Standards Repository (Amtrak internal link)

2. Workplace Planning and Design Practices (Author: Real Estate): <Amtrak link under development>

3. Fleet Diagrams (Author: Mechanical): Amtrak Fleet Diagrams Library (Amtrak internal link)

4. Signage (Author: Stations and Facilities): Stations Signage; < Amtrak Non-Station Signage Standards link under development>