The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.
APPENDIX 2-D: APPLICABLE DESIGN STANDARDS

Since publication of the Burbank to Los Angeles Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS), the following substantive changes have been made to this appendix:

- Tables 2-D-5 and 2-D-9 were updated to include the California Public Utilities Commission General Orders.

### Table 2-D-1 Transportation

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Feature</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Alteration of existing state and local roadways | Alignment (bridges) | Burbank to Los Angeles Project Section: Transportation Technical Report  
California HSR Ridership and Revenue Business Plan Technical Report  
Federal Railroad Administration Standards and Guidelines  
Federal Emergency Management Agency Guidelines  
Federal Highway Administration Guidelines  
National Earthquake Hazards Reduction  
U.S. Army Corps of Engineers Guidelines  
U.S. Bureau of Land Management Surveying Manual  
United States Geological Survey Standards  
AASHTO Highway Drainage Guidelines  
AREMA Manual for Railway Engineering  
California Disabled Accessibility Guidebook  
California Seismic and Safety Commission Standards and Guidelines  
California Occupational Safety and Health Administration Standards  
Caltrans Bridge Design Manuals  
Caltrans Seismic Design Criteria ver. 1.7  
Caltrans Highway Design Manual:  
  - Chapter 80 – Application of Design Standards  
  - Chapter 200 – Geometric Design  
  - Chapter 300 – Geometric Cross Section  
  - Chapter 400 – Intersections At Grade  
Caltrans Plans Preparation Manual  
Caltrans Project Development Procedures Manual  
Caltrans Standard Plans  
Caltrans Surveys Manual  
Caltrans Transportation Management Planning Guidelines  
Caltrans User’s Guide to Photogrammetric Products and Services  
Caltrans Right-of-Way Manual, and Forms and Exhibits  
Transportation Research Board Highway Capacity Manual  
Union Pacific Railroad Engineering Standards  
Amtrak Standards and Guidelines  
Southern California Association of Governments 2016 Regional Transportation Plan/Sustainable Communities Strategy  
Southern California Regional Rail Authority Engineering Standards  
Public Utilities Commission(s) |
### Appendix 2-D Applicable Design Standards

**September 2021  California High-Speed Rail Authority**

**Burbank to Los Angeles Project Section Final EIR/EIS**

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Feature</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Water Quality Control Boards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Quality Districts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flood Control Districts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| HSR = high-speed rail  
| AASHTO = American Association of State Highway and Transportation Officials  
| AREMA = American Railway Engineers and Maintenance of Way Association  
| Caltrans = California Department of Transportation  
| Amtrak = National Railroad Passenger Corporation |

**Table 2-D-2 Air Quality**

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | HSR civil work and track construction (alignment and bridges) | Burbank to Los Angeles Project Section: Air Quality Technical Report  
The Authority would comply with the California Air Resources Board, including the South Coast Air Quality Management District.  
Emissions would be tracked by the California Air Resources Board and include ozone, carbon monoxide, carbon dioxide, hydrogen sulfate, methane, NO₂, PM₂.₅, PM₁₀, sulfur dioxide, and lead. |
| Operations      | HSR operations   | Burbank to Los Angeles Project Section: Air Quality Technical Report  
The Authority would comply with the California Air Resources Board, including the South Coast Air Quality Management District.  
Emissions would be tracked by the California Air Resources Board and include ozone, carbon monoxide, carbon dioxide, hydrogen sulfate, methane, NO₂, PM₂.₅, PM₁₀, sulfur dioxide, and lead. |

**Table 2-D-3 Noise and Vibration**

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | HSR civil work and track construction (alignment and bridges) | Burbank to Los Angeles Project Section: Noise and Vibration Technical Report  
FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment Guidelines  
Federal Transit Administration Transit Noise and Vibration Assessment |
| Operations      | Alignment (bridges) | Burbank to Los Angeles Project Section: Noise and Vibration Technical Report  
FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment Guideline  
Federal Transit Administration Transit Noise and Vibration Assessment |

**HSR = high-speed rail  
Authority = California High-Speed Rail Authority  
NO₂ = nitrogen oxides  
PM₂.₅ = particulate matter smaller than or equal to 2.5 microns in diameter  
PM₁₀ = particulate matter smaller than or equal to 10 microns in diameter**

**HSR = high-speed rail  
FRA = Federal Railroad Administration**
## Table 2-D-4 Electromagnetic Fields/Electromagnetic Interference

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Electromagnetic compatibility of HSR equipment and facilities with themselves, and with equipment and facilities of HSR neighbors | HSR systems | 46 C.F.R. 15, Subpart B, Sections 15.107(a) and 15.109(b) for Class A digital devices  
European Committee for Electrotechnical Standardization  
Standard EN 50121-4, Railway Applications – Electromagnetic Compatibility, Part 4: Emissions and Immunity of Signaling and Telecommunications Apparatus |
| Electromagnetic compatibility of HSR equipment and facilities with passengers, workers, and neighbors of the HSR | HSR systems | IEEE Standard C95.6-2002 – IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz  

HSR = high-speed rail  
C.F.R. = Code of Federal Regulations  
IEEE = Institute of Electrical and Electronic Engineers  
kHz = kilohertz  
GHz = gigahertz  
FCC = Federal Communications Commission  
OET = Office of Engineering and Technology
## Table 2-D-5 Public Utilities and Energy

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
National Fire Protection Association Standards  
Caltrans *Highway Design Manual*:  
- Chapter 80 – Application of Design Standards  
- Chapter 200 – Geometric Design  
- Chapter 300 – Geometric Cross Section  
- Chapter 400 – Intersections At Grade  
Caltrans Plans Preparation Manual  
Caltrans Project Development Procedures Manual  
AREMA Manual for Railway Engineering  
Conformance with the latest technical specifications and practices of the respective utility owner.  
American National Standards Institute Standards:  
- Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications  
- Standard for Outside Plant Communications Cable  
- Communications Wire and Cable for Wiring of Premises  
- Standard for Fiber Optic Premises Distribution Cable  
- Human Factors Engineering Requirements for Visual Display Terminal Work Stations  
- Standard for Tolerance of Radiated Electromagnetic 1 Frequency Interference  
Electronic Industries Association/Telecommunications Industry Association Standards  
Underwriters’ Laboratories Inc. Publications  
National Transportation Communications for Intelligent Transportation Systems Protocol Standards  
Telecommunication Standardization Sector Standards |

Caltrans = California Department of Transportation  
AREMA = American Railway Engineers and Maintenance of Way Association
## Table 2-D-6 Hydrology

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Alteration of stream flows and water surface elevations from the placement of  | Alignment (bridges)                                                              | *Burbank to Los Angeles Project Section: Hydraulics and Floodplains Technical Report*  
  structures (e.g., piers and abutments) within stream channels                      | *Caltrans Highway Design Manual:*  
  § Chapter 810- Hydrology  
  § Chapter 820- Cross Drainage  
  *FHWA Hydraulic Design Series:*  
  § HDS-1- Hydraulics of Bridge Waterways  
  § HDS-5- Hydraulic Design of Highway Culverts  
  *AREMA Manual for Railway Engineering*  
  *AASHTO Highway Drainage Guidelines* |
| Alteration of drainage patterns from placement any type of project feature in  | All project features                                                              | *Stormwater Pollution Prevention Plan:*  
  any location, including changes from impervious surfaces and floodplain impacts      | *Burbank to Los Angeles Project Section: Stormwater Management Plan*  
  *Caltrans Highway Design Manual:*  
  § Chapter 820- Cross Drainage  
  § Chapter 830- Roadway Drainage  
  § Chapter 860- Open Channels  
  *FHWA Hydraulic Design Series No. 2 (Hydrology)*  
  FHWA Hydraulic Engineering Circular No. 22 (Urban Drainage Design Manual)  
  *AREMA Manual for Railway Engineering*  
  *AASHTO Highway Drainage Guidelines* |
| Generation of pollution from roadways                                          | State highway and local roadway modifications and crossings                      | *Stormwater Pollution Prevention Plan:*  
  *Caltrans Storm Water Quality Handbook:*  
  § Project Planning and Design Guide  
  § Stormwater Pollution Prevention Plan and Water Pollution Control Program Preparation Manual  
  *AASHTO Highway Drainage Guidelines* |

*Caltrans = California Department of Transportation*  
*FHWA = Federal Highway Administration*  
*AREMA = American Railway Engineers and Maintenance of Way Association*  
*AASHTO = American Association of State Highway and Transportation Officials*  
*BMP = best management practice*
### Table 2-D-7 Geology, Soils, and Seismicity

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | Backfilling of borings, test pits, Cone Penetration Tests, rotosonic holes, wells, and probe holes. | AASHTO Guidance:  
- AASHTO LRFD Bridge Design Specification with Caltrans Amendments  
- AASHTO Guide Specifications for Design and Construction of Segmental Concrete bridges  
- AASHTO Guide Specifications for Thermal Effects in Concrete Bridge Superstructures  

Caltrans:  
- Caltrans Seismic Design Criteria  
California Building Code  
FHWA Guidelines:  
- FHWA Drilled Shaft Construction Procedures and LRFD Design Methods, FHWA-NHI-22 10-016  
- FHWA Drilled Shafts: Construction and Procedures and Design Methods, FHWA-IF-99-26 02  
- FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slope Design and Construction Guidelines, FHWA-NHI-00-043  
- FHWA Earth Retaining 1 Structures, FHWA-NHI-99-025  
- FHWA Soil Slope and Embankment Designs, FHWA-NHI-01-026  
- FHWA Rock Slopes Reference Manual, FHWA-HI-99-00  
- FHWA Geosynthetics Design and Construction Guidelines, FHWA HI-95-038  
California Well Standards, Water Wells, Monitoring Wells, Cathodic Protection Wells:  
- Bulletins 74-81 and 74-90 |
### Table 2-D-7 Applicable Design Standards

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | Restoration of pavement | AASHTO Guidance:  
- AASHTO LRFD Bridge Design Specification with Caltrans Amendments  
- AASHTO Guide Specifications for Design and Construction of Segmental Concrete bridges  
- AASHTO Guide Specifications for Thermal Effects in Concrete Bridge Superstructures  
Caltrans:  
- Caltrans Seismic Design Criteria  
FHWA Guidelines:  
- FHWA Drilled Shaft Construction Procedures and LRFD Design Methods, FHWA-NHI-22 10-016  
- FHWA Drilled Shafts: Construction and Procedures and Design Methods, FHWA-IF-99-26 02  
- FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slope Design and Construction Guidelines, FHWA-NHI-00-043  
- FHWA Earth Retaining 1 Structures, FHWA-NHI-99-025  
- FHWA Soil Slope and Embankment Designs, FHWA-NHI-01-026  
- FHWA Rock Slopes Reference Manual, FHWA-HI-99-00  
- FHWA Geosynthetics Design and Construction Guidelines, FHWA HI-95-038 |

AASHTO = American Association of State Highway and Transportation Officials  
LRFD = Load and Resistance Factor Design  
Caltrans = California Department of Transportation  
FHWA = Federal Highway Administration

### Table 2-D-8 Hazardous Materials

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | HSR civil work and track construction (alignment and bridges) | Burbank to Los Angeles Project Section: Hazardous Materials Technical Report  
Title 49 C.F.R. Part 192, “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards”  
Title 49 Part 195, “Transportation of Hazardous Liquids by Pipeline” |

HSR = high-speed rail  
C.F.R. = Code of Federal Regulations
### Table 2-D-9 Safety and Security

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Project Features</th>
<th>Applicable Design Standards</th>
</tr>
</thead>
</table>
| Construction    | HSR civil work and track construction (alignment and bridges) | 49 C.F.R. Part 213, Section 316 for protection of the right-of-way for Class 8 and 9 tracks  
49 C.F.R. Part 214, Railroad Workplace Safety  
California Public Utilities Commission General Order No. 26-D  
FRA guidelines regarding the separation and protection of adjacent transportation systems and conventional railroads  
High-Speed Passenger Rail Safety Strategy published by FRA (November 2009)  
AREMA Manual for Railway Engineering  
Caltrans Highway Design Manual  
Caltrans Plans Preparation Manual  
Caltrans Project Development Procedures Manual |
| Operations      | Alignment (bridges)               | Be fully grade separated at crossings and fully access-controlled  
Incorporate supervisory control and data acquisition system  
Incorporate climatic and seismic monitoring systems  
Crime Prevention Through Environmental Design principles would be employed in the design of the HSR system |

HSR = high-speed rail  
C.F.R. = Code of Federal Regulations  
FRA = Federal Railroad Administration  
AREMA = American Railway Engineers and Maintenance of Way Association  
Caltrans = California Department of Transportation