



In coordination with Oklahoma DOT

Combined Service-Level Final Environmental Impact Statement and Record of Decision

Prepared by



June 2017

Combined Final Environmental Impact Statement and Record of Decision

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Service-Level Final Environmental Impact Statement

Prepared by



June 2017

FEDERAL RAILROAD ADMINISTRATION

**Texas-Oklahoma Passenger Rail Development Program
Combined Service-Level Final Environmental Impact Statement/Record of Decision**

Submitted pursuant to the National Environmental Policy Act (42 U.S.C. 4321 et seq.); Federal Railroad Administration Procedures for Considering Environmental Impacts (64 FR 28545, May 26, 1999); Council on Environmental Quality's regulations implementing NEPA (40 CFR parts 1500-1508); Federal Transit Administration's Environmental Impact and Related Procedures (23 CFR Part 771).

by the:

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Sponsoring Agency

Texas Department of Transportation (TxDOT)

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This Final Service-level Environmental Impact Statement (FEIS) considers development of an intercity passenger rail system that enhances existing passenger rail service and provides new passenger rail service between Oklahoma City and South Texas (Laredo, Corpus Christi, Brownsville), with potential extension to Monterrey, Mexico. This FEIS evaluates the potential service-level effects of an enhanced passenger rail system on air quality, greenhouse gas, climate change, water quality/resources, noise and vibration, solid waste, biological resources, wetlands, floodplains, coastal zone, energy, utilities, geologic resources, aesthetic/visual resources, land use and prime farmland, socioeconomic conditions, environmental justice, public safety and hazardous materials, recreational areas, historic and architectural resources, archaeological resources, travel demand and transportation, public health, and, Section 4(f) and Section 6(f) resources.

Final Environmental Impact Statement

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1. Final Environmental Impact Statement

The Texas Department of Transportation (TxDOT), along with the Federal Railroad Administration (FRA), has prepared this service-level environmental impact statement (EIS) to evaluate intercity passenger rail service alternatives for the Texas-Oklahoma Passenger Rail Program (Program), extending from Oklahoma City to the Texas-Mexico border. The U.S. Army Corps of Engineers is a Cooperating Agency in the preparation of this EIS. Preparation of the EIS is one of two primary objectives of the Texas-Oklahoma Passenger Rail Study (Study). In addition to the EIS statement, the Study includes preparation of a service development plan for the corridor to guide further development and capital investment in passenger rail improvements identified in the Service-Level Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). The Oklahoma Department of Transportation (ODOT) is a partnering state agency for the Study and the EIS. The Draft Environmental Impact Statement (DEIS) was issued on July 15, 2016, with the public comment period occurring between July 15 and August 29, 2016.

This service-level EIS addresses broad corridor issues and alternatives in accordance with the tiered environmental review guidance contained in FRA's High-Speed Intercity Passenger Rail Program. This service-level analysis is sometimes called "Tier I," but for the purpose of the EIS, the use of "service-level" will continue to be used to distinguish this analysis from potential subsequent "Tier 2" or "project-level" analyses. Subsequent project-level National Environmental Policy Act (NEPA) evaluations will analyze site-specific projects based on this service-level evaluation. The build alternatives have been developed to a level of detail appropriate for a service-level analysis: preliminary alignments represent potential corridors where rail improvements could be implemented but do not specify the precise location of the track alignment. The preliminary alignments are based on conceptual engineering that considers and avoids obvious physical or environmental constraints. These alignments have not been refined to optimize performance, reduce cost, or avoid specific properties or individual environmental resources. For alternatives selected at the service level for further evaluation, the above considerations would be assessed at the project level.

Program stakeholders, members of the public, local governments, elected officials, non-governmental organizations, and federal, state, and local agencies have been involved in preparation of the DEIS and FEIS for the Program through public meetings, scoping meetings, advisory committee and stakeholder meetings, and individual briefings.

The DEIS was issued pursuant to the Fixing America's Surface Transportation Act (FAST Act) (Public Law 114-94). In part, the FAST Act streamlined the NEPA process where possible, including the issuance of a combined FEIS/ROD, as described in Section 1311 of the FAST Act. The primary purpose of this combined Errata FEIS/ROD is to respond to substantive comments received during the public comment period and to state the decision, identify the alternatives considered in reaching the decision, and state the means to avoid, minimize, or

mitigate effects appropriate for a service-level EIS. This combined FEIS/ROD is organized as follows:

- Chapter 1: FEIS
 - Section 1.1 provides an overview of the FAST Act for the completion of a combined FEIS/ROD by errata.
 - Section 1.2 documents the selection of the NEPA Preferred Alternatives.
 - Section 1.3 provides an overview of the public outreach that has occurred since the release of the DEIS.
 - Section 1.4 contains the errata to the DEIS.
- Chapter 2: ROD
 - Section 2.1 contains the introduction.
 - Section 2.2 provides a summary of the alternatives considered.
 - Section 2.3 contains a summary of the public outreach and opportunities to comment on the DEIS.
 - Section 2.4 provides the NEPA Selected Alternatives Description and basis for decision.
 - Section 2.5 contains the measures to minimize harm.
 - Section 2.6 provides a list of the anticipated permits and approvals required for construction of the Program.
 - Section 2.7 provides the determinations and findings for 4(f) and 6(f) properties.
 - Section 2.8 contains the FRA Decision.

The FEIS/ROD also contains the following appendices:

- Appendix A: Public Hearing Distribution List
- Appendix B: Public Hearing Legal Notices – English and Spanish
- Appendix C: Public Hearing Materials
- Appendix D: Public Hearing Sign-in Sheets
- Appendix E: Public Hearing Transcripts
- Appendix F: Copy of All Comments Received During Comment Period
- Appendix G: Response to Comment Matrix
- Appendix H: Revised DEIS Sections

1.1 FAST Act Provisions

Section 1311 of the FAST Act, *Accelerated Decisionmaking in Environmental Reviews* (Section 1311 provides for the preparation of an FEIS by attaching errata sheets to the DEIS if certain conditions are met, as detailed in FEIS Section 1.1.1 below. In addition, Section 1311 requires, to the maximum extent practicable, and unless certain conditions exist (as

detailed in Section 1.1.2 below), that the lead agency develop a single document that combines the FEIS and ROD. The use of errata sheets in this combined FEIS/ROD complies with the requirements of the FAST Act.

1.1.1 Use of Errata

The use of errata sheets, in lieu of writing an entirely new FEIS that repeats a great deal of information already published in the DEIS, is appropriate when comments received on a DEIS are minor and the responses to those comments are limited to factual corrections or explanations as to why the comments do not warrant further response. Comments received on the Program required only factual corrections and minor clarifications to the DEIS. None of the comments warranted further response in the form of additional alternatives or consideration of undisclosed effects.

In accordance with Title 23 United States Code (U.S.C.) Section 139(n)(1), the errata sheets are being utilized and made available to the public to the same extent as the DEIS. Continued availability of the DEIS is also being ensured.

The DEIS is currently available to the public on the TxDOT website:

(<https://www.txdot.gov/inside-txdot/projects/studies/statewide/texas-oklahoma-rail.html>)

and at the following public locations:

- TxDOT Laredo District Office, 1817 Bob Bullock Loop, Laredo, TX 78043
- TxDOT Rail Division Office, 118 East Riverside Drive, Austin, TX 78704
- North Central Texas Council of Governments (NCTCOG), 616 Six Flags Drive, Arlington, TX 76011
- ODOT, 200 NE 21st Street, Oklahoma City, OK 73105
- FRA, 1200 New Jersey Avenue SE, Washington, D.C., 20590

The DEIS errata are included in this combined FEIS/ROD and are also available with the DEIS on the TxDOT website and at the locations noted above. The updated sections from the DEIS are included as Appendix H to this combined FEIS/ROD. The section updates provided in Appendix H are also incorporated by reference into the corresponding technical reports originally prepared in support of the DEIS.

1.1.2 Combined FEIS/ROD

Traditionally, and in accordance with the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] § 1506.10(b)(2)), FEIS and ROD documents are issued separately with a minimum 30-day period between the FEIS and ROD. As explained above, the FAST Act, to the maximum extent practicable, directs the lead agency to expeditiously develop a single document that consists of an FEIS and ROD unless:

- The FEIS makes substantial changes to the proposed actions that are relevant to environmental or safety concerns.
- There is a significant new circumstance or information relevant to environmental concerns and that bears on the proposed action or the impacts of the proposed action.

Additionally, the applicable requirements for both an FEIS and a ROD must be met for the issuance of a single combined FEIS/ROD document.

This combined FEIS/ROD does not include substantial changes to the proposed action in terms of environmental or safety concerns, nor are there significant new circumstances or information relevant to environmental concerns of the proposed action or its effects.

The Program has met the FAST Act Section 1311(a) and 1311(b) requirements for the issuance of a combined FEIS/ROD, including the following:

- Identification of the preferred alternatives (NEPA Preferred Alternatives), included in Section 1.2 of the FEIS.
- Summary of the public outreach efforts, comments received on the DEIS, public hearing responses, and public and agency coordination activities that have taken place since the issuance of the DEIS, included in Section 1.3 of the FEIS.

1.2 Selection of NEPA Preferred Alternatives

This section discusses the overall Program Purpose and Need (Section 1.2.1, Overall Program – Purpose and Need) and also identifies the preferred alternatives as the NEPA Preferred Alternatives, selected from those presented in the DEIS. It specifically discusses the potential transportation and environmental effects of the NEPA Preferred Alternatives as compared with the No Build Alternative (refer to Section 1.2.2 for further detail on the Preferred Alternatives). The discussions within Section 1.2.2 demonstrate why the NEPA Preferred Alternatives remain the preferred alternatives following the formal DEIS comment period.

The U.S. Environmental Protection Agency (EPA) published the Notice of Availability (NOA) for the DEIS in the *Federal Register* on Friday, July 15, 2016, thus beginning the formal 45-day public review and comment period. Distribution of the DEIS to local, regional, state, and federal agencies, interested and affected parties, and the public provided opportunity for review and comment. The review and comment period ended on August 29, 2016. TxDOT held three public hearings, on August 9, 10, and 11, 2016, where verbal and written comments could be made regarding the DEIS.

No substantive comments were received on the DEIS that would result in changes to the NEPA Preferred Alternatives. Additionally, no comments raised new circumstances or

provided new information relevant to environmental or safety concerns that would warrant a change to the recommended NEPA Preferred Alternatives.

1.2.1 Overall Program – Purpose and Need

The purpose and need statement for the Program identifies two levels of discussion:

- Overall purpose and need for the entire 850-mile Program corridor from Oklahoma City to south Texas (Figure FEIS-1)
- Purpose and need specific to each of the three geographic sections that compose the Program corridor:
 - Northern Section: Oklahoma City, Oklahoma, to Dallas and Fort Worth, Texas
 - Central Section: Dallas and Fort Worth to San Antonio
 - Southern Section: San Antonio to South Texas

1.2.1.1 Purpose

The purpose of the overall Program is to enhance intercity mobility by providing enhanced passenger rail service as a transportation alternative that is competitive with automobile, bus, and/or air travel. The purposes of the Program in the three geographic sections are as follows:

- Northern Section: To provide efficient and reliable intercity passenger rail service along the Northern Section of the Program corridor that is competitive with other travel options
- Central Section: To provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is competitive with other travel options
- Southern Section: To provide efficient and reliable intercity passenger rail service from San Antonio to south Texas that is competitive with other mode options

The specific objectives for the overall Program and the three geographic sections are detailed in Chapter 1 of the DEIS.

1.2.1.2 Need

The need for the overall Program arises from the inadequacies of existing passenger rail service and other modes of transportation to meet current and future mobility needs in the Program corridor. The need specific to the three geographic sections are as follows:

- Northern Section: Population and economic growth in the Northern Section are projected to increase intercity passenger travel demand beyond that which can be accommodated by the existing highway, intercity passenger rail, and air travel

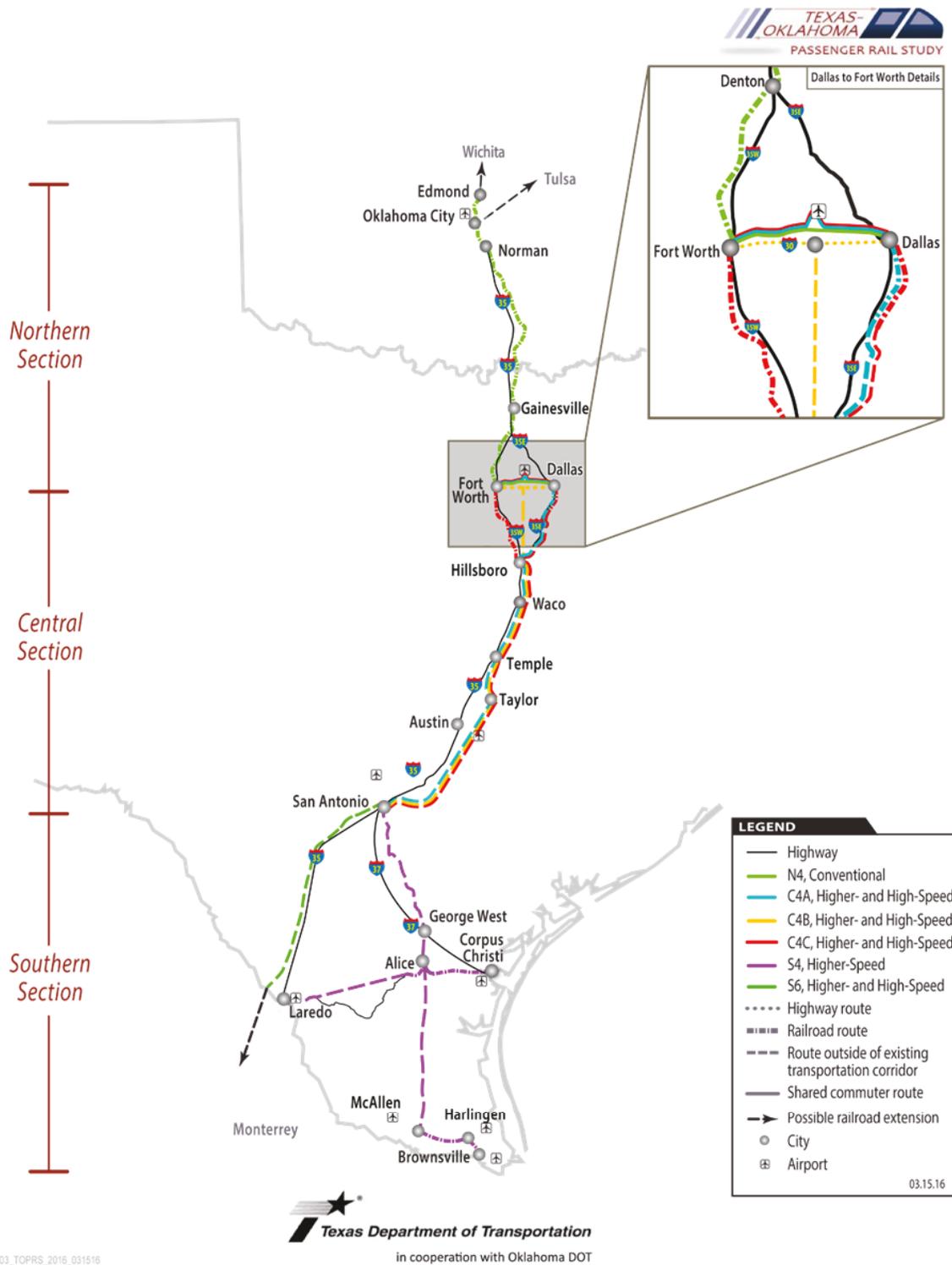


Figure FEIS-1: Texas-Oklahoma Passenger Rail Program Corridor

systems in the Northern Section. Specific needs for the Northern Section are the following:

- Increasing population density and changes in demographic profile require alternatives in regional mobility.
- Existing constrained passenger rail service that competes with freight for rail line capacity is affected by delays and makes it difficult to attract business or short-travel riders.
- Inefficient connections with other modes of travel reduce the attractiveness of passenger rail as an intercity travel alternative.
- Local governments require regional support to improve interregional connectivity.
- Central Section: Multiple transportation, land use, socioeconomic, and environmental considerations drive the need for the Program in the Central Section. Specific needs for the Central Section are the following:
 - Changing transportation demand of an increasing transit-dependent population requires an alternative mode.
 - Inefficient and infrequent rail service limits ridership.
 - Increasing congestion and unreliable travel times on both the existing highway and rail services require an alternative interregional service.
 - Poor and declining air quality requires more sustainable modes of travel.
- Southern Section: Population and economic growth in the Southern Section will increase intercity passenger travel demand beyond that which can be accommodated by the existing highway and air travel systems. Air service options available in the Southern Section are limited. Specific needs for the Southern Section are the following:
 - Regional and cross-border travel is constrained by uncompetitive trip times, poor reliability, and low levels of passenger convenience.
 - Poor and declining air quality requires more sustainable modes of travel.

The need for the overall Program and the three geographic sections is detailed in Chapter 1 of the DEIS.

1.2.2 Comparison of Transportation and Environmental Consequences

This section discusses the potential transportation and environmental effects of the NEPA Preferred Alternatives as compared with the No Build Alternative. The effects of the NEPA Preferred Alternatives on transportation and the environment would differ substantially from the No Build Alternative.

This service-level analysis only evaluates a preliminary alignment to represent each alternative, based on conceptual engineering that considered and avoided obvious physical or environmental constraints. The service-level analysis generalized effects for a large area within which the Project Area may occur and reports both the potentially adverse and beneficial effects without knowing the exact footprint of the alignment. These alignments are not refined to optimize performance, reduce cost, or avoid specific properties or individual environmental resources, or for any other such considerations. For alternatives recommended at the service level for further evaluation, the above considerations will be assessed at the project level. The project-level analysis will determine specific project impacts while the service-level analysis evaluates and describes the general effects by alternative. The service-level analysis includes general best management practices (BMPs), design features, and mitigation strategies that address effects on a broad, service-level scale. The subsequent project-level analysis would include, but not be limited to, specific and targeted BMPs, design features, and mitigation strategies.

A broad corridor of study with a width of 500 feet has been identified along each route (EIS Study Area). Unless described differently in the DEIS resource sections, the EIS Study Area is the area in which potentially affected environmental resources in proximity to each alternative are identified. The EIS Study Area provides an envelope that encompasses the construction footprint of the alternatives and the areas in which impacts from each resource could occur. It also includes infrastructure that may be needed to support the Program, such as roadway shifts, grade separations, construction activities, and associated features that are not a part of service-level design, such as stations and parking, traction-power substations, power lines, and maintenance-of-way facilities, as described in the DEIS Chapter 2, *Alternatives*. Data for potentially affected counties were obtained from TxDOT. The area for which the data were collected is identified as the “Study Vicinity.” Typically, county-wide data were collected for counties partially or completely within the EIS Study Area.

Table FEIS-1, presented at the end of this section, summarizes the results of the analysis of the No Build Alternative and the NEPA Preferred Alternatives. The table includes text updates/revisions required for DEIS Tables ES-3, ES-4, and ES-5, Summary of Resource Effects in the Northern, Central, and Southern Sections, respectively, as a result of responding to agency comments. These revisions are discussed in Section 1.4 DEIS Errata Sheets.

1.2.2.1 No Build Alternative

The No Build Alternative would not fulfill the Program’s purpose and need but is carried forward as a baseline alternative against which the build alternatives are compared. The No Build Alternative would consist of the existing transportation network, including roadway, passenger rail, and air travel in the Study Vicinity, as well as maintenance of and planned improvements to these systems, as identified using transportation plans of the regional

metropolitan planning organizations within the Study Vicinity. The transportation improvements included in the No Build Alternative are listed in Chapter 2 of the DEIS.

1.2.2.2 NEPA Preferred Alternative: Northern Section Alternative N4A Conventional Rail (Oklahoma City to Dallas and Fort Worth)

Alternative N4A Conventional (N4A CONV) assumes diesel-locomotive hauled equipment running three to six daily round trips. Two or three of the round trips would operate on an accelerated schedule, making roughly seven stops, with remaining “local” trains making as many as 12 stops.

Compared with the No Build Alternative evaluated in the DEIS, the N4A CONV Alternative would achieve the following:

- Increase the number of daily round trips along the Amtrak Heartland Flyer route (Oklahoma City to Fort Worth) from one daily round trip to three to six daily round trips, with two or three of the round trips operating on an accelerated schedule making roughly seven stops, with the remaining “local” trains making as many as 12 stops.
- Extend from Fort Worth to Dallas along the existing Trinity Railway Express (TRE) route without requiring a transfer and provide improvements to existing station facilities and new train equipment with more onboard amenities, including business class available for a premium price.
- Have similar environmental effects during operation as the No Build Alternative, except it would have a beneficial effect on passenger transportation because of the proposed incremental system and service improvements. Temporary effects during construction would be slightly more than the No Build Alternative.
- Provide connectivity with current and planned intercity passenger rail and air passenger services with planned connections to the major airports in the Study Area.

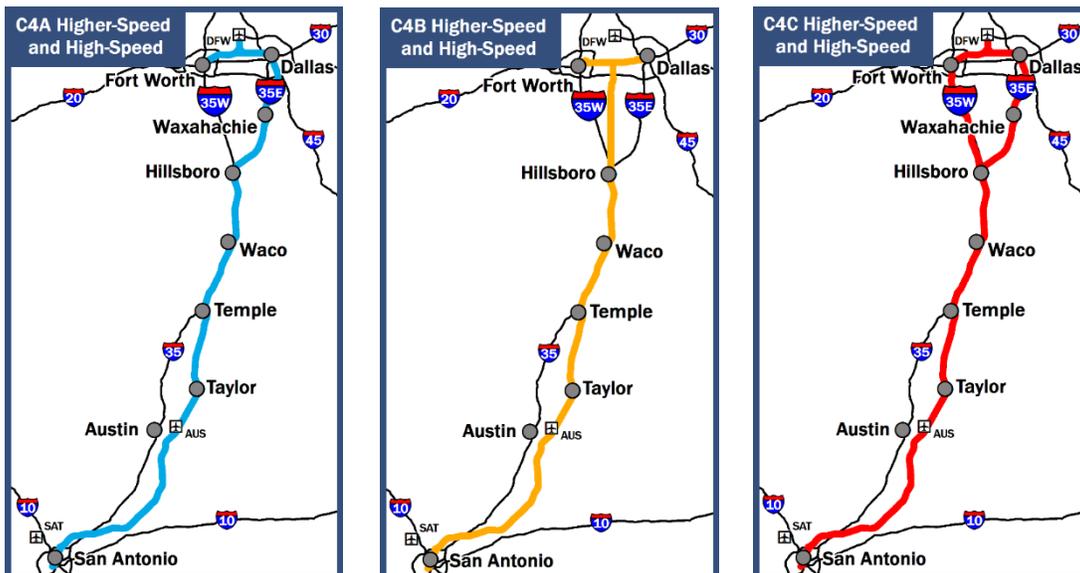


1.2.2.3 NEPA Preferred Alternatives: Central Section Alternatives C4A High-Speed Rail, C4B High-Speed Rail, and C4C High-Speed Rail (Dallas and Fort Worth to San Antonio)

Alternatives C4A High-Speed Rail (C4A HSR), C4B High-Speed Rail (C4B HSR), and C4C High-Speed Rail (C4C HSR) assume electric-powered, high-speed rail service running 12 to 20 daily round trips. Express trains would likely make six stops, while C4A HSR and C4C HSR local trains would make up to nine stops, and C4B HSR local trains would make up to eight stops.

Compared with the No Build Alternative evaluated in the DEIS, the C4A HSR, C4B HSR, and C4C HSR alternatives would achieve the following:

- Increase the number of daily round trips along the Amtrak Texas Eagle route (Fort Worth to San Antonio) from one round trip per day to up to 20 round trips per day.
- Provide much faster service between Dallas and Fort Worth and San Antonio, reducing the average rail trip from approximately 8 hours to approximately 2 hours.
- Provide improvements to existing station facilities as well as new train equipment.
- Provide substantial benefits to the Study Area in both air quality and energy due to use of electric-powered train cars.
- Reduce congestion on Interstate Highway (IH)-35 by diverting ridership from highway to train, which would also help improve air quality by reducing emissions from highway traffic.



1.2.2.4 NEPA Preferred Alternative: Southern Section Alternative S4 Higher-Speed Rail (San Antonio to South Texas)

Alternative S4 Higher-Speed Rail (S4 HrSR) assumes new diesel-locomotive hauled equipment running four to six daily round trips. Depending on corridor demand model forecasts, the primary service may be designated as Laredo-Alice-San Antonio and Corpus Christie-Alice-San Antonio, with a connecting feeder from Brownsville, Harlingen, and McAllen.

Compared with the No Build Alternative evaluated in the DEIS, the S4 Alternative would achieve the following:

- Provide public benefits that include meeting more local transportation needs to serve South Texas than any other alternative.

- Introduce a reliable linkage between the industrial development areas in south Texas and the other economic centers to meet increasing traveler demand.
- Provide a more affordable, efficient, and safe intercity travel alternative to air travel.
- Provide a more sustainable travel option to support air quality improvements needed in the area.

1.2.2.5 NEPA Preferred Alternatives: Southern Section Alternatives S6 Higher-Speed Rail and S6 High-Speed Rail (San Antonio to Laredo, with potential extension to Monterrey, Mexico)

Alternative S6 Higher-Speed Rail (S6 HrSR) assumes new diesel-locomotive hauled equipment running four to six daily round trips between San Antonio and Laredo, which would be the only U.S. stops for this alternative. If an extension from Laredo to Monterrey were added, the frequency of trips to Monterrey is assumed to be the same as those from San Antonio to Laredo.

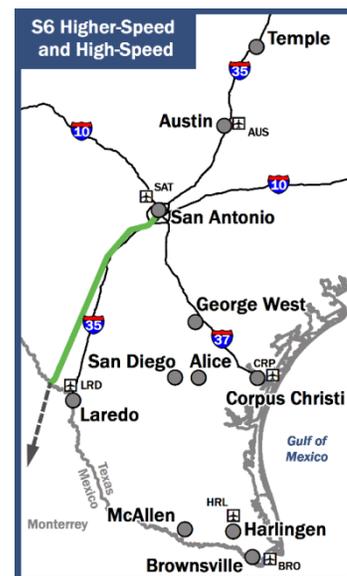
Alternative S6 High-Speed Rail (SR HSR) assumes electric-powered, high-speed service running eight to 12 daily round trips between San Antonio and Laredo. If an extension from Laredo to Monterrey were added, the frequency of trips to Monterrey is assumed to be the same as those from San Antonio to Laredo.

Compared with the No Build Alternative evaluated in the DEIS, the S6 Alternatives would achieve the following:

- Provide public benefits that include meeting more local transportation needs to serve Laredo and Monterrey, Mexico.
- Introduce a reliable linkage between Laredo and San Antonio to meet increasing traveler demand.
- Provide a more affordable, efficient, and safe intercity travel alternative to air travel.
- Provide more secure cross-border travel between the US and Mexico, with the extension to Monterrey, Mexico.

1.2.3 Recommendation

The DEIS showed that the NEPA Preferred Alternatives for the three Project corridor sections (Northern, Central, and Southern) and corresponding speed conventions would achieve the Purpose and Need, perform effectively in terms of Program goals and objectives within the



respective geographic sections, and represent the least environmentally damaging practicable alternatives compared with the No Build Alternative and other build alternatives considered and evaluated. Preferred alternatives are recommended for each geographic section separately because the Program does not analyze alternatives for the entire Program corridor between Oklahoma City and Laredo/Brownsville, but rather between the endpoint cities of each geographic section (Northern, Central, and Southern). In addition, more than one alternative in the Central and Southern Sections could be built in the future to provide different service types or serve different cities. Recommendation of these Preferred Alternatives does not preclude connectivity between geographic sections of the Program, but it does not assume connectivity either. Details about how preferred alternatives might connect would be analyzed during project-level analysis after completion of this service-level EIS.

As discussed above, comments were received during the public comment period, which raised points of information, clarification, or correction. However, comments received during the public comment period on these information points did not result in new information or introduce any new discipline based analyses across technical disciplines that were not previously conducted or that would otherwise modify the selection of the NEPA Preferred Alternatives.

Table FEIS-1: Summary of No Build Alternative and NEPA Preferred Alternatives Resource Effects

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Air Quality	No Effect	Based on limited construction activities and emissions, along with reduced emissions during operation: Negligible (adverse) short-term (construction) and negligible (benefit) long-term regional (operation) effects.	Based on short-term construction emissions and based on operational pollutant emission reductions: Substantial (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on lower short-term construction emissions and based on operational pollutant emission reductions: Moderate (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on short-term construction emissions and based on operational pollutant emission reductions: Substantial (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on construction and operation of new infrastructure: Substantial (adverse) short-term (construction) effects and substantial (adverse) long-term regional (operation) effects.	Based on a shorter alignment and a shift in mode choice and lower pollutant emissions: Moderate (adverse) short-term (construction) and moderate (adverse) long-term regional (operation) effects.	Based on increased construction activities and use of electrified train engines: Substantial (adverse) short-term (construction) effects and negligible (benefit) long-term regional (operation) effects.
Air Quality – GHG and Climate Change ^a	No Effect	Beneficial effect (5% reduction)	Beneficial effect (20% reduction)	Beneficial effect (18% reduction)	Beneficial effect (15% reduction)	Negative effect (2% increase)	Negative effect (3% increase)	Negative effect (16% increase)
Water Quality	No Effect	Surface waters: Negligible effects on waterbodies crossed by the EIS Study Area based on the use of existing railway infrastructure and corridors, and through project design and implementation of BMPs. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs. Erosion: Moderate effect due to the acreage of erosive soils crossed,	Surface waters: More waterbodies than C4B HSR, fewer than C4C HSR (700 features; 24,187 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs.	Surface waters: Fewer waterbodies than C4A HSR and C4B HSR (650 features; 18,870 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs.	Surface waters: More waterbodies than C4A HSR and C4B HSR (850 features; 23,084 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs.	Surface waters: More waterbodies than S6 HrSR and S6 HSR (443 features; 13,928 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible due to amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs. Erosion: More erosive	Surface waters: Fewer waterbodies than S4 HrSR (255 features; 2,921 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible due to amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs. Erosion: Less erosive soils crossed (4 crossed) but more acreage (691 acres) than S4 HrSR. Negligible effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs. Groundwater: Less aquifers crossed (12,450 acres) than S4 HrSR. Negligible effect as a result of no Sole Source aquifer recharge area crossings, acreage of unconfined aquifer	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		<p>which would be minimized with use of construction BMPs.</p> <p>Groundwater: Negligible effect as a result of no Sole Source Aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of BMPs.</p>	<p>Erosion: Less erosive soils crossed than C4B HSR and C4C HSR (101 crossed). More acreage than C4B HSR and less than C4C HSR (1,424 acres). Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed than C4B HSR and less than C4C HSR (25,775 acres crossed). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>Erosion: More erosive soils crossed than C4A HSR and less crossed than C4C HSR (116 crossed). Less acreage than C4A HSR and C4C HSR (1,395 acres). Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: Less aquifers crossed than C4A HSR and C4C HSR (23,160 acres). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>Erosion: More erosive soils crossed (123 crossed) and more acreage (1,706 acres) than C4A HSR and C4B HSR. Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed than C4A HSR and C4B HSR (31,900 acres). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>soils crossed (22 crossed) but less acreage (678 acres) than S6 HrSR and HSR. Negligible effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed (27,610 acres) than S6 HrSR and HSR. Negligible effect as a result of no Sole Source aquifer recharge area crossings, acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>crossings. and implementation of stormwater treatment measures and BMPs.</p>	
Noise and Vibration	No effect	Noise- and vibration-sensitive land uses are present in the EIS Study Area and would be subject to moderate effects.	Higher amount of noise- and vibration-sensitive land uses than C4B HSR, but lower amount than C4C HSR. Moderate effects.	Lowest amount of noise- and vibration-sensitive land uses as compared to C4A HSR and C4C HSR. Negligible effects.	Highest amount of noise- and vibration-sensitive land uses as compared to C4A HSR and C4B HSR. Moderate effects.	Highest amount of noise- and vibration-sensitive land uses as compared to S6 HrSR and S6 HSR. Moderate effects.	Lowest amount of noise- and vibration-sensitive land uses as compared to S4 HrSR. S6 HSR affects more receivers than S6 HrSR; however, both would have negligible effects.	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		<p><i>Noise^b</i> Category 2 receivers: 15,395 acres Category 3 receivers: 245 facilities</p> <p><i>Vibration</i> Category 1 receivers: 1 land use Category 2 receivers: 11,247 acres Category 3 receivers: 24 facilities</p>	<p><i>Noise^b</i> Category 2 receivers: 19,466 acres Category 3 receivers: 227 facilities</p> <p><i>Vibration</i> Category 2 receivers: 11,919 acres Category 3 receivers: 39 facilities</p>	<p><i>Noise^b</i> Category 2 receivers: 15,549 acres Category 3 receivers: 179 facilities</p> <p><i>Vibration</i> Category 2 receivers: 9,566 acres Category 3 receivers: 35 facilities</p>	<p><i>Noise^b</i> Category 2 receivers: 22,799 acres Category 3 receivers: 256 facilities</p> <p><i>Vibration</i> Category 2 receivers: 12,387 acres Category 3 receivers: 44 facilities</p>	<p><i>Noise^b:</i> Category 2 receivers: 8,753 acres Category 3 receivers: 62 facilities</p> <p><i>Vibration</i> Category 2 receivers: 2,181 acres Category 3 receivers: 17 facilities</p>	<p><i>Noise^b:</i> Category 2 receivers: 687 acres Category 3 receivers: 1 facility</p> <p><i>Vibration</i> Category 2 receivers: 172 acres Category 3 receivers: 0 facilities</p>	<p><i>Noise^b:</i> Category 2 receivers: 1,586 acres Category 3 receivers: 3 facilities</p> <p><i>Vibration</i> Category 2 receivers: 240 acres Category 3 receivers: 0 facilities</p>
Solid Waste Disposal	No Effect	Negligible effects to landfills.	Landfills present in the counties in the EIS Study Area affected by the alternatives would experience negligible effects.					
Natural Ecological Systems and Wildlife	No Effect	<p>54% non-developed land covers. Negligible effects during construction and operation.</p> <p>Wildlife corridors and assemblages outside of proposed route. Negligible effects during construction and moderate effects during operation.</p> <p>10% of EIS Study Area composed of higher ecological value land coverage. Alignment would not likely be fenced, making wildlife movement vulnerable to increased risk for strikes from additional rail traffic.</p>	<p>62% non-developed land covers. Substantial effects during construction and moderate effects during operation.</p> <p>Wildlife corridors and assemblages potentially associated with proposed route.</p> <p>Sensitive plant communities.</p> <p>Substantial effects during construction and moderate effects during operation.</p> <p>18% of EIS Study Area composed of higher ecological value land</p>	<p>64% non-developed land covers. Substantial effects during construction and moderate effects during operation.</p> <p>Wildlife corridors and assemblages potentially associated with proposed route.</p> <p>Sensitive plant communities.</p> <p>Substantial effects during construction and moderate effects during operation.</p> <p>18% of EIS Study Area composed of higher ecological value land</p>	<p>62% non-developed land covers. Substantial effects during construction and moderate effects during operation.</p> <p>Wildlife corridors and assemblages potentially associated with proposed route.</p> <p>Sensitive plant communities.</p> <p>Substantial effects during construction and moderate effects during operation.</p> <p>15% of EIS Study Area composed of higher ecological value land</p>	<p>68% non-developed land covers. Moderate effects during construction and operation.</p> <p>No reported wildlife corridors or assemblages. Negligible effects during construction and operation.</p> <p>15% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.</p>	<p>92% non-developed land covers. Substantial effects during construction and moderate effects during operation.</p> <p>No reported wildlife corridors or assemblages or sensitive plant communities. Negligible to moderate effects. There is higher potential for effects from HSR than HrSR because HSR noise and vibration would travel farther than that generated by HrSR.</p> <p>21% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and operation.</p>	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		Negligible effects during construction and operation.	coverage. Substantial effects during construction and moderate effects during operation.	coverage. Substantial effects during construction and moderate effects during operation.	coverage. Substantial effects during construction and moderate effects during operation.			
Wetlands	No Effect	Wetlands and other waterbodies are present in the EIS Study Area and would experience negligible effects. Waterbodies: 537 waterbodies; 103 acres; 317,365 linear feet. Wetlands: 271 wetlands; 363 acres.	More waterbodies and wetlands than C4B HSR, but fewer than C4C HSR. Moderate effects. Waterbodies: 700 waterbodies; 153 acres; 316,909 linear feet. Wetlands: 349 wetlands; 312 acres.	Fewest waterbodies and wetlands compared to C4A HSR and C4C HSR. Moderate effects. Waterbodies: 650 waterbodies; 99 acres; 293,669 linear feet. Wetlands: 309 wetlands; 181 acres.	Most waterbodies and wetlands compared to C4A HSR and C4B HSR. Moderate effects. Waterbodies: 850 waterbodies; 164 acres; 400,363 linear feet. Wetlands: 391 wetlands; 345 acres.	Most waterbodies and wetlands compared to S6 HrSR and S6 HSR. Moderate effects. Waterbodies: 443 waterbodies; 74 acres; 247,448 linear feet. Wetlands: 189 wetlands; 142 acres.	Fewest water bodies and wetlands compared to S4 HrSR. Moderate effects. Waterbodies: 255 waterbodies; 29 acres; 120,488 linear feet. Wetlands: 83 wetlands; 57 acres.	
Threatened and Endangered Species	No Effect	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Moderate effects during construction and operation. Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation. Habitat: Potential occurrences of habitat corresponding to	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation. Habitat: Potential occurrences of habitat	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation. Habitat: Potential occurrences of habitat corresponding to	Sensitive plant species: Federally listed and other sensitive plant species. Substantial effects during construction and moderate effects during operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effects during construction and moderate effects	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species: Federally listed and other sensitive wildlife species. Moderate effects during construction and operation. Potential occurrences of habitat corresponding to sensitive plants and wildlife species. Moderate effects during construction and operation.	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		species. Moderate effects during construction and operation.	sensitive plants and wildlife species. Moderate effects during construction and operation.	corresponding to sensitive plants and wildlife species. Moderate effects during construction and operation.	sensitive plants and wildlife species. Moderate effects during construction and operation.	during operation. Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species. Moderate effects during construction and operation.		
Flood Hazards and Floodplain Management	No Effect	Floodplains and floodways are present in the EIS Study Area and would experience negligible effects. Floodplains: 2,005 acres Floodways: 410 acres	More floodplains and floodways than C4B HSR, but fewer than C4C HSR. Negligible effects. Floodplains: 2,212 acres Floodways: 815 acres	Fewest floodplains and floodways. Negligible effects. Floodplains: 2,193 acres Floodways: 582 acres	Most floodplains and floodways. Negligible effects. Floodplains: 2,691 acres Floodways: 961 acres	Cannot compare against S6 HrSR and S6 HSR because of data constraints. Negligible effects. Floodplains: 3,011 acres Floodways: 4 acres	National Flood Hazard Layer data missing for much of EIS Study Area. Negligible effects (based upon comparison of floodplain and floodway acreage). Floodplains: 453 acres, based on limited data Floodways: 12 acres, based on limited data	
Coastal Zone Management	No Effect	Not applicable because there are no coastal zone management areas.				10 miles of alignment in Nueces County Coastal Management Zone. Negligible effects.	Not applicable because there are no coastal zone management areas.	
Energy	No Effect	Negligible adverse effects during construction and negligible beneficial effects during operation. Annual energy savings: 114,000 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 1,812,892 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 2,264,999 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 1,413,391 MBTUs	Moderate adverse effects during construction and moderate beneficial effects during operation. Annual energy savings: 229,024 MBTUs	Moderate adverse effects during construction and moderate beneficial effects during operation. Annual energy savings: 295,143 MBTUs	Substantial adverse effects during construction and substantial beneficial effects during operation. Annual energy savings: 398,507 MBTUs
Utilities ^c	No Effect	361 utility crossings. Negligible effects.	424 utility crossings. Substantial effects	315 utility crossings. Substantial effects.	744 utility crossings. Substantial effects.	847 utility crossings. Moderate effects.	84 utility crossings. Moderate effects.	84 utility crossings. Moderate effects.

Resources	Alternatives								
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR	
Geologic Resources ^d	No Effect	Geologic risks could be avoided or minimized by meeting building standards. Moderate effects from geologic hazards. No change in access to, or reduction of, high-value minerals. Negligible effects on mineral resources.	Risks associated with geologic hazards could be avoided or minimized by meeting building standards. Moderate effects from geologic hazards. None of the alternatives would affect access or availability of high-value minerals. Negligible effects on mineral resources.						
Aesthetics and Visual Quality	No Effect	49 miles of the alignment near sensitive viewers. 46 miles would have negligible effects, 1 mile, would have moderate effects, and 2 miles would have substantial effects. The overall effect would be negligible.	47 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 36 miles would have moderate effects, and 11 miles would have substantial effects. Overall, the effect of C4A HSR would be substantial.	49 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 36 miles would have moderate effects, and 13 miles would have substantial effects. Overall, the effect of C4B HSR would be substantial.	62 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 51 miles would have moderate effects, and 11 miles would have substantial effects. Overall, the effect of C4C HSR would be substantial.	50 miles of the alignment near sensitive viewers. 36 miles would have negligible effects, 6 miles would have moderate effects, and 8 miles would have substantial effects. Overall, the effect of S4 HrSR would be moderate.	18 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 16 miles would have moderate effects, and 2 miles would have substantial effects. Overall, the effect of S6 HrSR would be moderate.	18 miles of the alignment near sensitive viewers. S6 HSR would affect more sensitive viewers than S6 HrSR. 0 miles would have negligible effects, 0 miles would have moderate effects, and 18 miles would have substantial effects. Overall, the effect of S6 HSR would be substantial.	
Land Use and Prime Farmlands	No Effect	Land use: High land use compatibility. Negligible effects. Prime Farmland: 6,140 acres of prime farmland. Low potential prime farmland conversion and	Land use compatibility: Medium land use compatibility. Moderate effects. Prime farmland: 10,440 acres. Moderate effects.	Land use compatibility: Medium land use compatibility. Moderate effects. Prime farmland: 10,440 acres. Moderate effects.	Land use Compatibility: Low land use compatibility. Moderate effects. Prime farmland: 10,217 acres. Substantial effects.	Land use Compatibility: Low land use compatibility. Moderate effects. Prime farmland: 10,217 acres. Substantial effects.	Land use Compatibility: Medium land use compatibility. Substantial effects. Prime farmland: 12,435 acres. Substantial effects.		

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		bisection. Negligible effects.						
Environmental Justice and Socioeconomics	No Effect	Socioeconomics: Negligible effects. Environmental Justice: Negligible effects.	Environmental Justice: Moderate effects. Socioeconomics: Moderate effects.			Environmental Justice: Substantial effects. Socioeconomics: Moderate effects.		
Public Health	No Effect	Negligible (adverse) effects relating to air quality during construction. Negligible (benefit) long-term effects relating to air quality during operation. Negligible effects relating to groundwater and hazardous materials.	Moderate (adverse) effects during construction related to air quality. Negligible (benefit) long-term effects relating to air quality during operation. Negligible effects relating to groundwater and hazardous materials.			Moderate (adverse) effects during construction related to air quality. Moderate (adverse) long-term regional effects during operation associated with diesel trains and vehicles idling near high concentrations of sensitive populations. Negligible effects relating to groundwater and hazardous materials.	Moderate (adverse) effects during construction related to air quality. Negligible (adverse) long-term regional effects during operation. Negligible effects relating to groundwater and hazardous materials.	Moderate (adverse) effects during construction related to air quality. Negligible (benefit) long-term regional effects during operation. Negligible effects relating to groundwater and hazardous materials.
Public Safety and Hazardous Materials	No Effect	Public Safety: Improved crossing safety over No Build Alternative but continued collision risk associated with crossings. Negligible effects. Hazardous Materials: 8 sites. Negligible effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 9 sites. Moderate effects.			Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 8 sites. Moderate effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 12 sites. Moderate effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no collision risk. Negligible effects. Hazardous Materials: 0 sites. Negligible effects.

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Recreational Areas and Opportunities ^e	No Effect	Negligible effects from construction activities and property acquisition. 56 recreational resources.	More recreational resources than C4B HSR, but fewer than C4C HSR. Substantial effects from construction activities and property acquisition. 57 recreational resources: 28 in urban, 17 in suburban, 12 in rural areas.	Fewest recreational resources compared to C4A HSR and C4C HSR. Substantial effects from construction activities and property acquisition. 51 recreational resources: 28 in urban, 15 in suburban, 8 in rural areas.	Most recreational resources compared to C4A HSR and C4B HSR. Substantial effects from construction activities and property acquisition. 62 recreational resources: 33 in urban, 17 in suburban, 12 in rural areas.	Highest number of recreational resources compared to S6 HrSR and S6 HSR but effects reduced because of greater use of existing rail right-of-way. Moderate effects from construction activity and property acquisition. 54 recreational resources: 38 in urban, 4 in suburban, 12 in rural areas.	Fewest number of recreational resources compared to S4 HrSR. Negligible effects from construction activity and property acquisition. 3 recreational resources: 1 in urban, 0 in suburban, 2 in rural areas.	
Historic Resources ^e	No Effect	Moderate effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 35 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	More known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources than C4B HSR, but fewer than C4C HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 45 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Fewest known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to C4A HSR and C4C HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 38 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Most known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to C4A HSR and C4B HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 52 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Most known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to S6 HrSR and S6 HSR. Moderate effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 36 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	No known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources. Negligible effects.	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Archaeological Resources ^e	No Effect	Moderate effects from demolition or disturbance of resources. 1 NRHP-eligible site and 14 undetermined eligible archaeological sites.	More identified sites than C4B HSR, but fewer than C4C HSR. Substantial effects from disturbance or demolition of resources. 1 NRHP-eligible site and 25 undetermined eligible archaeological sites.	Fewest identified sites compared to C4A HSR and C4C HSR. Substantial effects from disturbance or demolition of resources. 2 NRHP-eligible sites and 18 undetermined eligible archaeological sites.	Most identified sites compared to C4A HSR and C4B HSR. Substantial effects from disturbance or demolition of resources. 1 NRHP-eligible site and 26 undetermined eligible archaeological sites.	Most identified sites compared to S6 HrSR and S6 HSR. Moderate effects. 1 NRHP-eligible site and 20 undetermined eligible archaeological sites.	Moderate effects. 0 NRHP-eligible sites and 7 undetermined eligible archaeological sites.	Substantial effects. 0 NRHP-eligible sites and 7 undetermined eligible archaeological sites.
Section 4(f)/Section 6(f)	No Effect	65 Section 4(f) properties and 3 Section 6(f) properties in the EIS Study Area. The alternative may avoid Section 4(f) resources by remaining inside existing rail or transportation right-of-way.	64 Section 4(f) properties and 3 Section 6(f) properties in the EIS Study Area. All of the Central Section alternatives are likely to result in a potential use of Section 4(f) resources. Design refinements to avoid specific Section 4(f) properties and/or to minimize harm will be addressed at the project level.	62 Section 4(f) properties and 2 Section 6(f) properties in the S4 HrSR Study Area. 1 Section 4(f) property and 0 Section 6(f) properties in the S6 HrSR and HSR study areas. Southern Section alternatives may avoid Section 4(f) resources by remaining inside existing rail or transportation right-of-way or by implementing variations of the evaluated alternatives at the project-level that would traverse areas where no Section 4(f) resources have been identified.				
Travel Demand and Transportation	No Effect	Effects on Transit Providers: 50% and 44% of bus and air passengers would be diverted to rail, respectively. This would have substantial (negative) effects on both bus and air service providers. Change in VMT: Negligible (beneficial) effects. 0.6% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service	Effects on Transit Providers: 22% and 68% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 8.6% reduction in VMT. Potential secondary beneficial	Effects on Transit Providers: 23% and 70% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 9% reduction in VMT.	Effects on Transit Providers: 21% and 62% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 7.2% reduction in VMT. Potential secondary beneficial	Effects on Transit Providers: 23% and 64% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Negligible (beneficial) effects. 0.2% reduction in VMT.	Effects on Transit Providers: 9% of bus passengers would be diverted to rail. Resulting in moderate effects on bus service providers. No effect on air carriers. Change in VMT: Negligible (beneficial) effects. 0.4% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus	Effects on Transit Providers: 15% of bus passengers would be diverted to rail, resulting in moderate effects on bus service providers. No effect on air carriers. Change in VMT: Negligible (beneficial) effects. 0.9% reduction in VMT. Potential secondary beneficial effect (reduced congestion)

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		providers.	effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more reliable scheduling and increased revenue.	Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more reliable scheduling and increased revenue.	effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more reliable scheduling and increased revenue.	Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more reliable scheduling and increased revenue.	service providers.	to bus service providers.

^a All build alternatives in the Southern Section would have higher GHG emissions in 2035 compared to No Build Alternative, partially due to the conservative assumptions made in the travel demand modelling for the Southern Section. Build alternatives in the Southern Section would have net GHG emission increases compared to No Build Alternative, primarily due to the addition of the new rail transportation mode that did not previously exist in the region. However, the levels of GHG reduction in the Northern and Central Section alternatives are greater than the levels of GHG increases estimated for the Southern Section alternatives. When GHG emissions from the build alternatives in the Northern, Central, and Southern Sections are combined and compared to the combined emissions from the No Build Alternative, the results indicate that the Program would result in a net GHG emission reduction in 2035.

^b Category 1 noise- and vibration-sensitive land uses are those that are set aside for serenity and quiet, such as outdoor amphitheaters. Category 2 noise- and vibration-sensitive land uses include residences and hotels. Category 3 land uses include churches, schools, recreation areas, and similar land use activities with which noise and vibration could interfere.

^c The most intense effect for each alternative is presented in the table; however, alternatives may include additional, less intense effects depending on urban or rural locations, density of utilities, and if existing or new track would be constructed.

^d The most intense effect for each alternative is presented in the table. However, alternatives may include additional, less intense effects depending on specific geologic hazards.

^e The most intense effect for each alternative is presented in the table. However, some alternatives may include additional less intense effects depending on urban, suburban, or rural locations.

BMP = best management practice

GHG = greenhouse gas

MBTU = million British thermal units

NRHP = National Register of Historic Places

VMT = vehicle miles traveled

1.3 Public Outreach since the Release of the DEIS

1.3.1 Notice of Availability

An NOA for the DEIS was published on July 15, 2016, in the *Federal Register*. The NOA informed interested parties that the DEIS for the Program was available for public review. This publication initiated a 45-day comment period intended to encourage participation by the public through their review and input on the findings presented in the DEIS.

The NOA announced three public open houses/public hearings, and invited comments through multiple means. Comments on the DEIS could be provided via the following:

- By **email** to Mark.Werner@txdot.gov
- By **postal mail** to Mark Werner, Rail Division, TxDOT, 125 E. 11th Street, Austin, TX 78701-2483
- By **telephone** to Mark Werner at (512) 486-5137
- By comment card at three public open houses/public hearings:
 - Tuesday, August 9, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - TxDOT Laredo District Office, 1817 Bob Bullock Loop, Laredo, TX 78043, Large Meeting Room
 - Wednesday, August 10, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - TxDOT Austin District, 7901 N. IH-35, Austin, TX 78753, Big 7, District Hearing Room
 - Thursday, August 11, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - NCTCOG, 616 Six Flags Drive, Arlington, TX 76011, Transportation Council Room
- Through the Program's website: <https://www.txdot.gov/inside-txdot/projects/studies/statewide/texas-oklahoma-rail.html>

Following the publication of the NOA, the DEIS was made available on the following websites:

- Program website: <https://www.txdot.gov/inside-txdot/projects/studies/statewide/texas-oklahoma-rail.html>
- FRA website: <https://www.fra.dot.gov/Page/P0716>

A hard copy of the DEIS was also made available at the following sites:

- TxDOT Laredo District Office, 1817 Bob Bullock Loop, Laredo, TX 78043
- TxDOT Rail Division Office, 118 East Riverside Drive, Austin, TX 78704
- NCTCOG, 616 Six Flags Drive, Arlington, TX 76011
- ODOT, 200 NE 21st Street, Oklahoma City, OK 73105
- FRA, 1200 New Jersey Avenue SE, Washington, D.C., 20590

Digital copies of the DEIS were also distributed to selected agencies and stakeholders for their review. The list of agencies and stakeholders that received notification of the availability of the DEIS is included in Appendix A.

1.3.2 2016 Public Open Houses/Public Hearings

The Council on Environmental Quality regulation (40 CFR § 1506.6) defines the public involvement requirements that must be upheld to satisfy the requirements of the NEPA process. This regulation states that if a DEIS is to be considered at a public hearing, the agency should make the statement available to the public at least 15 days in advance (unless the purpose of the hearing is to provide information for the DEIS). The NOA for the DEIS was published on July 15, 2016, 25 days before the public hearing.

TxDOT announced the availability of the DEIS, public meetings, and public hearings through legal notices published in the following newspapers along the Program corridor:

- Oklahoma City – *The Oklahoman* – English and Spanish
- Dallas Morning News – English and Spanish
- Fort Worth – *Arlington Star Telegram* – English
- *La Estrella* (Spanish version of *Star Telegram*) – Spanish
- *Waco Tribune-Herald* – English and Spanish
- *Austin American Statesman* – English and Spanish
- *San Antonio Express News* – English and Spanish
- Brownsville – *The Herald* – English and Spanish

No legal notice was published in the Laredo area; however, articles announcing the public open house/public hearing ran in the online version of the *Laredo Morning Times* on July 27 and August 8, 2016. Both the English and Spanish notices are included in Appendix B.

TxDOT hosted public open houses/public hearings on August 9, 10, and 11, 2016, in Laredo, Austin, and Dallas, respectively, to engage the public during the 45-day comment

period and to allow the public to submit verbal comments on the findings presented in the DEIS. These meetings were focused on providing public access to professional staff to help answer questions and offer guidance on how to review and comment on the DEIS. During the open houses/public hearings, materials were made available, including the DEIS with appendices, exhibits, and there was a DEIS overview video presentation. Upon arrival, attendees were given the opportunity to sign up to speak and provide verbal comments. All exhibits provided at the meeting can be found in Appendix C.

The public engaged with professional staff and were given opportunities to obtain clarification on the information presented in the DEIS. More than 170 individuals attended at least one of the public open houses/public hearings. Of these attendees, 13 speakers who provided verbal comments. The sign-in sheets for each of the public open houses/public hearings is provided in Appendix D. The transcript for each hearing is provided in Appendix E, along with the signed TxDOT Public Hearing Certification.

1.3.3 Limited English Proficiency Communities

As part of the DEIS public comment period outreach efforts, a Spanish version of the legal notice was published in the newspapers noted above. Spanish interpreters were available at the public open houses/public hearings. In addition, a Spanish language version of the DEIS overview video presentation and other materials were prepared in Spanish to ensure equal opportunity and access for Limited English Proficiency populations at the public open houses/public hearings. These materials included the following:

- Program fact sheet
- Public hearing informational board
- Public comment card

1.3.4 DEIS Comments Received

The Program, as a whole, received general support. Many stakeholders and the public provided their support of the NEPA Preferred Alternatives based on the comments received during the comment period. However, some commenters expressed concern over the estimated capital cost of the proposed alternatives, the perception that ridership could be substantially lower than projected to justify a significant capital improvement, and localized safety concerns regarding at-grade rail crossings (only applicable to the conventional and higher-speed rail alternatives).

During the 45-day comment period, TxDOT received 178 comment letters or comment cards from various citizens, stakeholders, and agencies in addition to the comments provided by speakers at the public hearings. All comment letters/cards received during the comment period are included in Appendix F. In all, a total of 337 comments were received, ranging from comments of general support or opposition to substantive comments received from NCTCOG, Texas Parks and Wildlife Department (TPWD), and EPA. All comments were

delineated and recorded, along with the responses, in a response to comments matrix (Appendix G).

A total of 61 comments were received from private citizens. One comment of support was received from a tribal nation (Chickasaw Nation), and one from a Mexican government agency (TÜV Rheinland Mexico, Rail division). A total of 184 comments were received from various groups, local businesses, city council members, committee members, and local government officials. TxDOT received 90 comments from agencies.

Most comments received from NCTCOG, TPWD, and EPA were focused on a project-level study as opposed to a service-level study. A conference call was held on September 12, 2016, with TPWD, in conjunction with TxDOT and FRA, during the response to comment process to discuss the comments received from the two agencies. This coordination helped to clarify the scope of the DEIS and to procure consensus among the agencies as to how the comments would be resolved. Some agency comments required corrections or revisions be made to the DEIS. These updates are included Section 1.4, DEIS Errata Sheets, and more detail regarding the resolution of these comments is provided in that section.

The majority of comments received from groups (stakeholders) and local government officials were in regard to the proposed alignments and station locations, in some cases requesting specific locations in their areas, along with service types, specifically high-speed versus higher-speed rail particularly in the Central Section. Most of these comments were supportive of the proposed Program. Comments received from the Laredo area noted the need for the Program to continue from Laredo into Monterrey, Mexico.

Comments received from private citizens noted approval for the Program. Some comments noted concern for the impacts the Program could have to private lands and areas adjacent to and along the alternative alignments. A few noted concern for the cost of the Program and whether ridership would be great enough to allow the Program to be profitable. The response to comments matrix included in Appendix G shows only substantive comments and responses. All other comments not shown in this matrix were more general in context, and the corresponding response to those comments is “Comment Noted.”

1.4 DEIS Errata Sheets

The DEIS errata sheets contained in Table FEIS-2 capture changes that have been incorporated in direct response to comments received during public circulation (DEIS issued July 15, 2016). The changes incorporated into the DEIS are minor and have not affect the selection of the Preferred Alternatives. The table is organized into two sections based on the two types of errata prepared for this EIS:

- 1. Revised EIS Sections.** These are revised DEIS sections, where responses to comments required inclusion of additional information, minor data and wording corrections, and

section formatting updates at multiple locations within the sections to retain readability of each section. The changes have been summarized and the revised sections have been provided so that the reader can more easily follow those revisions. The table lists the topics that were revised in each section in response to comments, and then refers the reader to Appendix H where the full revised sections can be found. The revised sections discussed in the first section of the errata table and presented in Appendix H are:

- DEIS Executive Summary
 - Table ES-3: Summary of Resource Effects in the Northern Section
 - Table ES-4: Summary of Resource Effects in the Central Section
 - Table ES-5: Summary of Resource Effects in the Southern Section
- DEIS Section 3.1.7 Greenhouse Gas and Climate Change
- DEIS Section 3.5 Ecological Systems and Wildlife
- DEIS Section 3.7 Threatened and Endangered Species
- DEIS Chapter 11 References (additional references added)

2. **Individual Revisions to DEIS.** These are individual corrections or additional information provided outside of the revised sections noted above. Revised sections in which these individual changes were made are not included in Appendix H because the changes are minor in nature and easily described with just the table entry. Sections, subsections, and page numbers are provided for each revision in this part of the table, with the exception of the change noted in Section 3.15, which is a blanket one-word change made in multiple locations throughout that section.

These errata sheets, and the tabular presentation and revised sections, are provided in lieu of a complete update of the DEIS pursuant to Section 1311 of the FAST Act. The updates and revisions noted in this errata sheet do not change the selection of the NEPA Preferred Alternatives, nor do they introduce new discipline-based analyses that were not previously conducted. The combined FEIS/ROD is being used in conjunction with the DEIS to present the most current data.

Table FEIS-2: DEIS Errata Sheet

Chapter	Section	Subsection	Page	Action Taken
Revised EIS Sections				Revised sections are included in Appendix H. Numerous revisions have been incorporated throughout the sections noted below, and the types of revisions made are described in the section. However, individual revisions are not included, nor are specific page numbers provided.
Executive Summary	ES.5	NA	ES-15 – ES-31	Changes have been incorporated into Executive Summary Table ES-3: Summary of Resource Effects in the Northern Section, Table ES-4: Summary of Resource Effects in the Central Section by Alternative, and Table ES-5: Summary of Resource Effects in the Southern Section by Alternative to account for revisions to Sections 3.1.7, Greenhouse Gas and Climate Change; 3.5, Natural Ecological Systems and Wildlife; and 3.7, Threatened and Endangered Species, made in response to agency comments during the DEIS Public Comment Period. Revisions made to Sections 3.1.7 and 3.5 do not affect the overall determinations of the alternatives. While revisions to Section 3.7 do include changes to the overall determinations, see the entry for Chapter 3, Section 7 below, which shows they do not impact the selection of the NEPA preferred alternatives. (See Appendix H.)
3	1	7	Multiple	In response to comments received from EPA, additional information has been added in Section 3.1.7, Greenhouse Gas and Climate Change, to Chapter 3, Air Quality. This information provides a supplement to the higher-level analysis that had previously been performed and included in the DEIS. This subsection represents more detailed information than originally provided in the DEIS analysis. The results of this additional information set do not affect the environmental determinations, nor does it affect the selection of the NEPA Preferred Alternatives. (Full subsection provided in Appendix H.)

Chapter	Section	Subsection	Page	Action Taken
3	5	Multiple	Multiple	<p>Multiple revisions have been made throughout Section 3.5. These changes do not affect the environmental determinations, nor do they affect the selection of the NEPA Preferred Alternatives.</p> <ul style="list-style-type: none"> ▪ Section 3.5.1, Laws, Regulations, and Orders, has been revised to add detail and clarity to the TWPD regulations (p. 3.5-1). ▪ References to specific acreage amounts of reported presence of wildlife corridors and assemblages and sensitive plant communities have been removed, and the associated text and table references have been updated throughout to reflect this revision. The term “acreages” has been changed to “locations” throughout the section. ▪ A brief description of the Texas Natural Diversity Database (TXNDD) and discussion of the use of TXNDD in the analysis of the natural ecological systems and wildlife has been added to Section 3.5.2, Methodology (p. 3.5-3). Discussions of the use of TXNDD have been revised throughout Section 3.5, and additional language on the future use TXNDD has been added to Section 3.5.6, Subsequent Analysis (p. 3.5-41). ▪ The references to “located” or “occur” with respect to potential occurrences of habitats have been changed to “reported” throughout Section 3.5.3. ▪ Minor, non-substantive changes have been made throughout the section to support the needed changes and to add clarity. <p>(Full subsection provided in Appendix H.)</p>

Chapter	Section	Subsection	Page	Action Taken
3	7	Multiple	Multiple	<p>Multiple revisions have been made throughout Section 3.7 in response to TWPD comments received during the DEIS public comment period:</p> <ul style="list-style-type: none"> ▪ A supplemental county-by-county listing of special-status species, consistent with the Northern, Central, and Southern Sections, has been added to bolster the previously conducted analysis of the potential plant and animal species that could be effected. This is included in Table 3.7-6. ▪ The term “critical habitat” has been replaced with “habitat” throughout Section 3.7 because the critical habitat designation represents a high-level of refinement that would be reserved for project-level analysis, including the incorporation of the official “critical habitat” designation. Associated text and table discussions have been revised throughout the section as needed to reflect this change. ▪ Minor, non-substantive changes have been made throughout the section to support the needed changes and to add clarity. ▪ Based on the new data set acquired from TWPD, the potential effect determination was revised from negligible to moderate for all determinations to account for the possibility of occurrences of sensitive plant and wildlife species within the corridor. However, the change in determinations did not affect the overall ranking of the alternatives, nor did it affect the choice of the NEPA Preferred Alternatives. <p>(Full subsection provided in Appendix H.)</p>
11	NA	NA	Multiple	<p>References for Sections 3.1, 3.7, and 3.17 have been added to Chapter 11, References. The revised section in Appendix H includes only the added references.</p> <p>(See Appendix H.)</p>

Chapter	Section	Subsection	Page	Action Taken
Individual Revisions to DEIS				Individual revisions incorporated in response to comments at specific locations within the DEIS.
1	5	2.1	1-20	The word “capitol” has been changed to “capital.”
2	1	2	2-9	Alternative C4C (HrSR and HSR) has been included in Table 2-3: Route Alternatives Analysis Recommendations. The route alternative analysis recommendation for Alternative C4C (Higher-Speed Rail and High-Speed Rail) was to “carry forward.” This alternative was carried forward for analysis in the DEIS.
2	2	1	2-12	Table 2-4 column header has been changed from “New HOV” to “New HOV or Managed Lanes.”
2	2	1	2-13	Table 2-6 column header has been changed from “New HOV” to “New HOV or Managed Lanes.”
3	1	1.1	3.1-1	GHG impacts and climate change effects have been included in the Final EIS.
3	1	3.1	3.1-10	The Dallas-Fort Worth air basin has been included in the first row of Table 3.1.2, General Climate and Existing Air Quality Conditions for the Northern Section.
3	1	3.1	3.1-10	Wherever the DEIS referred to the “Dallas-Fort Worth – Arlington Basin” the language has been changed to the “Dallas-Fort Worth air basin.”
3	1	3.1	3.1-10	Table 3.1.2, General Climate and Existing Air Quality Conditions, has been updated to include Kaufman, Parker, Navarro, Rockwall, and Wise in the list of counties that occur in the Dallas-Fort Worth air basin. In addition “Collins” County has been changed to “Collin” County.
3	1	3.2	3.1-12	Section 3.1.3.2, Northern Section: Oklahoma City to Dallas and Fort Worth, has been updated to include Collin, Kaufman, Parker, Rockwall, and Wise as counties that are in nonattainment for ozone.
3	1	4.1.2	3.1-15	The statement: “About 50 percent of electric power production for Texas and Oklahoma is

Chapter	Section	Subsection	Page	Action Taken
				<p>from coal, with the remainder of production from the combustion of natural gas and renewable sources, which generate fewer emissions than the combustion of diesel (U.S. Energy Information Administration 2014).” has been changed to read: “About 25 and 24 percent of electric power production for Texas and Oklahoma, respectively, is from coal, with the remainder of production from the combustion of natural gas and renewable sources, which generate fewer emissions than the combustion of diesel (U.S. Energy Information Administration 2014).”</p>
3	1	5.1	3.1-25	<p>The first three bullets under Section 3.1.5.1, Construction Phase, have been replaced with the following text:</p> <ul style="list-style-type: none"> ▪ Develop a Construction Emissions Mitigation Plan that may include the following control measures in order to reduce impacts associated with emissions of particulate matter and other pollutants from construction-related activities: <ul style="list-style-type: none"> – Fugitive Dust Source Controls <ul style="list-style-type: none"> ○ Use of low-emissions vehicles during construction, and use of newer and well-maintained equipment. ○ Stabilization of heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent, or other approved soil stabilizing method, that will not result in loss of vegetation, or increase other environmental impacts. ○ Use of water during grading, as necessary, on disturbed areas in construction sites to control visible plumes. ○ Cover or treat soil storage piles and disturbed areas that remain inactive for longer than 10 days with appropriate dust

Chapter	Section	Subsection	Page	Action Taken
				<p>suppressant compounds.</p> <ul style="list-style-type: none"> ○ Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers or, alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard. ○ Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions and 10 miles per hour or less on unpaved areas within construction sites on un-stabilized (and unpaved) roads, with posted visible speed limit signs at construction site entrances. ○ Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable, and provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable. ○ Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation). ○ Use of wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related

Chapter	Section	Subsection	Page	Action Taken
				<p>windbreaks in place until the soil is stabilized or permanently covered with vegetation.</p> <ul style="list-style-type: none"> ○ Identify sensitive receptors in the project area, such as schools, hospitals, and residences, and specify the means by which impacts to these populations will be minimized (e.g., locating construction equipment and staging zones (concrete and asphalt batch plants) away from sensitive receptors and building air intakes). <p>– Storm Water Controls:</p> <ul style="list-style-type: none"> ○ Use of sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways and ensure consistency with the project’s Storm Water Pollution Prevention Plan, if such a plan is required for the project.
3	14	6	3.14-14	<p>The following sentences have been inserted before the last sentence of the first paragraph of the section:</p> <p>“The land use analysis will also involve reviewing and analyzing consistency with the objectives of federal, state, tribal or local land use plans, policies and controls in the project-level areas. The subsequent analysis will also include consistency evaluations of all types of formally adopted documents for land use planning, conservation, zoning and related regulatory requirements.”</p>
3	15		Multiple	<p>The U.S. Census Bureau refers to “disabled populations” rather than “handicapped populations.” Wherever Section 3.15, Socioeconomics and Environmental Justice, referred to “handicapped” the language has been changed to “disabled.”</p>

Chapter	Section	Subsection	Page	Action Taken
3	17	4.5.2	3.17-45	<p>The paragraph that stated: “As Alternative S6 Higher-Speed Rail extends south, it would require a new alignment through rural areas of south Texas. It would bisect Chaparral Wildlife Management Area; however, impacts on that resource may be avoided at the project level. There are large areas nearby where the alignment could be routed to minimize potential impacts on the wildlife management area. If it can be avoided, the construction phase of Alternative S6 Higher-Speed Rail would have negligible effects on recreational resources.”</p> <p>has been changed to read:</p> <p>“As Alternative S6 Higher-Speed Rail extends south, it would require a new alignment through rural areas of south Texas. Based on the service-level route alignment, it would bisect the Chaparral Wildlife Management Area. However, based upon future project-level analysis and opportunities to modify the route alignment, impacts on that resource may be avoided at the project level. While the presence of large areas near this wildlife management area could provide avoidance options to minimize potential effects, the current alignment would still introduce a physical encroachment. Therefore, the construction and operation of Alternative S6 Higher-Speed Rail would have a moderate effect on recreational resources.”</p>
3	17	2	3.17-2	Resource “Texas Parks and Wildlife Department websites for parks and wildlife management areas” has been deleted.
3	17	6	3.17-47	<p>Additional text has been added to include:</p> <ul style="list-style-type: none"> ▪ Review of Land and Water Resources Conservation and Recreation Plan (LWRCRP) 2012 Statewide Inventory will be conducted during project-level analysis. ▪ Detailed coordination with TPWD regarding route alignment options to avoid or minimize effects to recreational resources will be conducted.

Chapter	Section	Subsection	Page	Action Taken
4	8		4-56	Step 2 paragraph has been replaced in its entirety with the following: “Conduct a more detailed, project level evaluation to determine if additional Section 4(f) or 6(f) properties are located in the Study Area, including Ray Roberts WMA and Chaparral WMA, (that were not identified at the service level). Project-level processes will also include a step to confirm the eligibility of assumed Section 4(f) properties, including ownership details, property boundaries, and NRHP eligibility if the property is a historic property. In addition, property management practice details from resource management plans for refuges, parks, and recreational properties will be reviewed. This review will be closely coordinated with TPWD.”



In coordination with Oklahoma DOT

Record of Decision

Prepared by



June 2017

FEDERAL RAILROAD ADMINISTRATION

**Texas-Oklahoma Passenger Rail Development Program
Final Service-Level Environmental Impact Statement
Record of Decision**

Submitted pursuant to the National Environmental Policy Act (42 U.S.C. 4321 et seq.); Federal Railroad Administration Procedures for Considering Environmental Impacts (64 FR 28545, May 26, 1999); Council on Environmental Quality's regulations implementing NEPA (40 CFR Parts 1500-1508); Federal Transit Administration's Environmental Impact and Related Procedures (23 CFR Part 771).

by the:

Federal Railroad Administration

Sponsoring Agency

Texas Department of Transportation

Cooperating Agencies

U.S. Army Corps of Engineers



Paul Nissenbaum
Associate Administrator
Federal Railroad Administration

Date: 10/23/17

The following persons may be contacted for additional information concerning this document:

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The Federal Railroad Administration (FRA) is issuing this Record of Decision (ROD) concurrently with the Final Service-level Environmental Impact Statement pursuant to Section 1311 of the Fixing America's Surface Transportation Act (Pub. L. 114-94). Through this ROD, FRA selects the Alternatives N4A Conventional Rail (N4A CONV), C4A High-Speed Rail (C4A HSR), C4B High-Speed Rail (C4B HSR), C4C High-Speed Rail (C4C HSR), S4 Higher-Speed Rail (S4 HrSR), S6 Higher-Speed Rail (S6 HrSR), and S6 High-Speed Rail (S6 HSR) for further review in project-level studies for intercity passenger rail service between Oklahoma City and South Texas (Laredo, Corpus Christi, Brownsville). Alternatives N4A CONV, C4A HSR, C4B HSR, and C4C HSR would enhance existing rail service, reduce travel times, and improve service reliability. Alternatives S4 HrSR, S6 HrSR, and S6 HSR would introduce passenger rail service into the area, reduce travel times, and improve service reliability.

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2. Record of Decision

2.1 Introduction

This is the Federal Railroad Administration's (FRA) service-level Record of Decision (ROD) for the Texas-Oklahoma Passenger Rail Study (Study) conducted by the Texas Department of Transportation (TxDOT). FRA is an operating administration of the U.S. Department of Transportation (USDOT) and the federal Lead Agency for the service-level Environmental Impact Statement (EIS) conducted under the National Environmental Policy Act (NEPA). The federal Cooperating Agency for the process is the U.S Army Corps of Engineers.

This ROD addresses broad corridor issues and alternatives. Subsequent project-level NEPA evaluations will analyze site-specific projects based on the service-level evaluations. The build alternatives have been developed to a level of detail appropriate for a service-level analysis: preliminary alignments represent potential corridors where rail improvements could be implemented but do not specify the precise location of the track alignment. The preliminary alignments are based on conceptual engineering that considers and avoids obvious physical or environmental constraints. These alignments have not been refined to optimize performance, reduce cost, or avoid specific properties or individual environmental resources. For alternatives selected at the service level for further evaluation, the above considerations would be assessed at the project level.

Based on the service-level analysis as presented in the Draft Environmental Impact Statement (DEIS) and Final EIS (FEIS), FRA has selected the following alternatives:

- Alternative N4A Conventional Rail service (N4A CONV) from Oklahoma City to Fort Worth with service extending to Dallas. Alternative N4A CONV would provide enhanced opportunities and improvements over the existing service, with faster service and more frequent connections.
- Alternative C4A High-Speed Rail service (C4A HSR) from Dallas-Fort Worth to San Antonio. Service would operate between Fort Worth and Dallas with a stop at Dallas/Fort Worth International Airport (DFW) and extend south from Dallas to San Antonio. This service would provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel modes and options. It would also help alleviate congestion along Interstate Highway 35 (IH-35) and provide connecting service to major regional air carrier services such as Austin-Bergstrom International Airport (AUS) and DFW.
- Alternative C4B High-Speed Rail service (C4B HSR) from Dallas and Fort Worth to San Antonio. Service would operate between Fort Worth to Dallas with a stop in Arlington, then continuing south from Arlington to San Antonio. This service would provide

efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel modes and options. This alternative would help alleviate congestion along IH-35 and provide connecting service to major regional air carrier services such as AUS and DFW.

- Alternative C4C High-Speed Rail service (C4C HSR) from Dallas and Fort Worth to San Antonio. Service on this route would operate in a clockwise direction, running from Hillsboro to Fort Worth, east to Dallas, with a stop at DFW, back to Hillsboro, and south to San Antonio. This service would provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel modes and options. It would also help alleviate congestion along IH-35 and as provide connecting service to major regional air carrier services such as AUS and DFW.
- Alternative S4 Higher-Speed Rail service (S4 HrSR) from San Antonio to Brownsville with an east-west leg from Laredo to Corpus Christi intersecting the north-south service in Alice. This alternative introduces intercity passenger rail service as a new alternative to transportation modes for the region and would provide an equitable and affordable intercity travel alternative to automobile, bus, and air service.
- Alternative S6 Higher-Speed Rail service (S6 HrSR) and Alternative S6 High-Speed Rail service (S6 HSR) from San Antonio to Laredo, extending to Monterrey, Mexico. These alternatives are selected only if the Monterrey, Mexico, connection is built. S6 HSR would be more compatible with the recommended Preferred Alternatives in the Central Section (i.e., C4A, C4B, and C4C HSR), which are all high-speed alternatives; however, if higher-speed rail is more compatible with the infrastructure in Mexico, S6 HrSR could be preferred. The S6 Alternatives introduce intercity passenger rail service as a new alternative to transportation modes for the region and would provide an equitable and affordable intercity travel alternative to automobile, bus, and air service. With the extension to Monterrey, they would provide opportunity for efficient international cross-border travel.

FRA selected alternatives for each geographic section separately because the study did not identify a single service type (conventional, higher-speed, or high-speed) that could feasibly serve all three geographic sections as a single service type. Instead, FRA selected alternatives between the endpoint cities of each geographic section (Northern, Central, and Southern—see Section 2.1.2 for descriptions). In addition, FRA selected more than one alternative in the Central and Southern sections because these alternatives would provide different service types or serve different cities. These selected alternatives do not preclude connectivity between geographic sections of the Texas-Oklahoma Passenger Rail Program (Program), but do not assume connectivity either. Details about how selected alternatives might connect to other geographic sections or other rail service will be analyzed during future project-level analyses.

This ROD describes the NEPA Selected Alternatives and documents FRA's decision-making process in identifying the alternatives. This ROD does not grant approval for construction, funding, or permitting within the decision-making steps; instead, it provides for further detailed planning and potential project-level analysis of the NEPA Selected Alternatives.

Based upon the consideration of the data presented in the DEIS, FEIS, and this ROD, FRA has made its decision that the service-level alternatives as presented above are selected for further consideration at the project-level. A more detailed description of the NEPA Selected Alternatives is provided in Section 2.4 of this ROD. Additional rationale for this decision is contained in the remainder of this ROD.

2.1.1 Planning Development Process

High-speed passenger rail has been under consideration in Texas since the late 1980s. In the 1990s, a private consortium was awarded a franchise to design, build, and operate high-speed rail in the state, though lack of funding and other obstacles prevented that project from moving forward. In 2000, FRA designated the South Central Corridor, including the area between San Antonio and Dallas and Fort Worth, as a future high-speed rail corridor. In 2010, TxDOT received a grant from FRA to study passenger rail in that corridor. In 2010, the Texas A&M Transportation Institute, in cooperation with TxDOT and the FRA, completed a study that evaluated the potential for development of an intercity rail and express bus system in Texas. The results of that study indicated a critical need for efficient travel scenarios for both freight and passenger demand. The study developed a preliminary concept plan with potential costs and benefits for intercity transportation corridors that would be served by an intercity rail/express bus system and would not preclude a future rail system capable of operating at higher speeds.¹

The environmental process for the Program began with the Notice of Intent to prepare an EIS, which was published in 2013 and initiated Study Scoping, which progressed parallel with the Alternatives Analysis process. The Scoping process concluded in 2013, with the final Scoping Report being submitted to TxDOT and FRA in November 2013. Comments received during the Scoping process were categorized and gathered into a master comment matrix and considered during the DEIS analysis process. The Notice of Availability for the DEIS was published on July 15, 2016. Table ROD-1 lists the milestones of this NEPA environmental process.

¹ Texas A&M Transportation Institute. 2010. *Potential Development of an Intercity Passenger Transit System in Texas – Final Project Report*. FHWA/TX-10/0-5930-2. May 2010.

Table ROD-1: NEPA Environmental Process Milestones and Dates

Milestones	Date
Notice of Intent Published	March 13, 2013
Scoping Meetings	March 25 to April 4, 2013
Scoping Report	November 20, 2013
Alternatives Analysis Report	November 11, 2014
Draft EIS	July 1, 2016
Notice of Availability for DEIS Published	July 15, 2016
Public Comment Period	July 15 to August 29, 2016
Public Hearings	August 9, 10, 11, 2016

2.1.2 Purpose and Need

The purpose and need statement for the Program identified two levels of discussion:

- Overall purpose and need for the entire 850-mile Program corridor from Oklahoma City to south Texas (see Figure FEIS-1).
- Purpose and need specific to each of the three geographic sections that compose the Program corridor:
 - Northern Section: Oklahoma City, Oklahoma, to Dallas and Fort Worth, Texas
 - Central Section: Dallas and Fort Worth to San Antonio
 - Southern Section: San Antonio to South Texas

2.1.2.1 Overall Program – Purpose

The purpose of the Program is to enhance intercity mobility by providing enhanced passenger rail service as a transportation alternative that is competitive with automobile, bus, and/or air travel. The objectives of the overall Program are the following:

- Provide high-quality intercity rail service that will offer competitive travel times, schedule reliability, and traveler comfort.
- Encourage more efficient and environmentally sensitive modes of intercity travel.
- Provide an equitable and affordable intercity travel alternative.
- Enhance interconnectivity between intercity rail services, regional transit services, and major regional airports.

- Enhance environmental sustainability by facilitating regional land use and transit-oriented development plans within the Program corridor.
- Enhance interregional access to employment, entertainment, recreation, health, and shopping opportunities within the Program corridor.
- Coordinate and avoid conflicts with freight rail operations and facilities.
- Be a cost-efficient investment where the projected train service revenue meets or exceeds the following percentages² of operations and maintenance costs:
 - Conventional rail (speeds up to 90 miles per hour [mph]) = 50 percent
 - Higher-speed rail (speeds up to 125 mph) = 75 percent
 - High-speed rail (speeds up to 220 to 250 mph) = 100 percent

2.1.2.2 Overall Program – Need

The need for the Program arises from the inadequacies of existing passenger rail service and other modes of transportation to meet current and future mobility needs in the Program corridor, which are the following:

- Population and economic growth will increase travel demand, generate additional roadway and aviation congestion, and reduce automobile, aviation, and transit reliability, thereby requiring regional mobility alternatives.
- Limited intercity passenger rail service and capacity and lack of interregional connectivity restrict both mobility and economic development.
- Declining air quality resulting from increased travel demand and congestion requires more environmentally sustainable modes of travel.
- Growth in truck and rail freight has negative effects on the safety of the transportation system.

2.1.2.3 Northern Section – Purpose and Need

2.1.2.3.1 Northern Section – Purpose

The purpose of the Program in the Northern Section is to provide efficient and reliable intercity passenger rail service along the Northern Section of the Program corridor that is competitive with other travel options. The specific objectives are the following:

² For the EIS, cost efficiency is defined as the estimated percentage of operating cost (including operations and maintenance of the service) that could be recovered through service revenue such as passenger fares. The higher the percentage, the greater the cost efficiency. Capital costs such as the cost of rail construction and purchase of train sets is not included in the evaluation of cost efficiency. The three different cost-efficiency thresholds reflect the expectation that higher-speed rail and, to an even greater extent, high-speed rail, are capable of higher rates of cost recovery (higher cost efficiency) compared with conventional rail service.

- Provide faster and more frequent intercity connections between central Oklahoma and communities in southern Oklahoma and the state of Texas, specifically the Dallas and Fort Worth region in north Texas. These potential improvements in speed and frequency would also apply to local transit connections in the Dallas-Fort Worth Metroplex, as well as a connection to the national intercity rail network.
- Enhance opportunities for rail service that is connected with current and planned intercity passenger rail and air passenger services, such as linking with DFW.
- Reduce delays and bottlenecks to create competitive passenger rail service travel times compared with other modes of intercity travel, including private vehicles, buses, and air carriers.
- Provide intercity passenger rail service that supports the transit-oriented development objectives of the *Intermodal Transportation Hub Master Plan for Central Oklahoma*.³
- Protect the carrying capacity of freight rail.
- Provide mode alternatives that help meet the region's air quality attainment goals.

2.1.2.3.2 Northern Section – Need

Population and economic growth in the Northern Section are projected to increase intercity passenger travel demand beyond that which can be accommodated by the existing highway, intercity passenger rail, and air travel systems in the Northern Section. Specific needs for the Northern Section are the following:

- Increasing population density and changes in demographic profile require alternatives in regional mobility.
- Existing constrained passenger rail service that competes with freight for rail line capacity is affected by delays and makes it difficult to attract business or short-travel riders.
- Inefficient connections with other modes of travel reduce the attractiveness of passenger rail as an intercity travel alternative.
- Local governments require regional support to improve interregional connectivity.

2.1.2.4 Central Section – Purpose and Need

2.1.2.4.1 Central Section – Purpose

The purpose of the Program in the Central Section is to provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is competitive with other travel options. Specific objectives include the following:

³ Association of Central Oklahoma Governments. 2011

- Provide efficient intercity rail service to DFW as a more environmentally sustainable option to commuter flights, and provide regional connectivity for long-distance passengers upon arrival and departure.
- Provide connecting service to hubs for major regional air carrier services, such as AUS and DFW, where passenger rail becomes the regional leg of a long-distance domestic or international journey.
- Provide a viable transportation option compared to continued expansion of IH-35.
- Avoid conflicts with freight rail operations and congested track areas.
- Provide direct, intercity rail service between Dallas and Fort Worth.
- Provide opportunities for interconnected service with other planned intercity passenger rail services (such as the proposed high-speed rail from Dallas to Houston).
- Provide intermodal connections with transit in served urban areas.
- Protect the carrying capacity of freight rail.

2.1.2.4.2 Central Section – Need

Multiple transportation, land use, socioeconomic, and environmental considerations drive the need for the Program in the Central Section, including the following:

- Changing transportation demand of an increasing transit-dependent population requires an alternative mode.
- Inefficient and infrequent rail service limits ridership.
- Increasing congestion and unreliable travel times on both the existing highway and rail services require an alternative interregional service.
- Poor and declining air quality requires more sustainable modes of travel.

2.1.2.5 Southern Section – Purpose and Need

2.1.2.5.1 Southern Section – Purpose

The purpose of the Program in the Southern Section is to provide efficient and reliable intercity passenger rail service from San Antonio to south Texas that is competitive with other mode options. Specific objectives include the following:

- Provide an equitable and affordable intercity travel alternative.
- Meet future intercity travel demand along the IH-35, IH-37, and U.S. Highway 281 corridors.
- Provide opportunity for efficient international cross-border travel.
- Coordinate with and avoid negative affects to freight rail operations or facilities.
- Meet the region's air quality attainment goals.

In addition, there is a desire to have an option to extend passenger rail service to Monterrey, Mexico, based upon previous passenger rail operation and upon the interest and support expressed for this option during the EIS scoping period.

2.1.2.5.2 Southern Section – Need

Population and economic growth in the Southern Section will increase intercity passenger travel demand beyond that which can be accommodated by the existing highway and air travel systems. Air service options available in the Southern Section are limited. Specific needs for the Southern Section include the following:

- Regional and cross-border travel is constrained by uncompetitive trip times, poor reliability, and low levels of passenger convenience.
- Poor and declining air quality requires more sustainable modes of travel.

2.2 Alternatives Considered in Draft Environmental Impact Statement

The following sections describe the alternatives considered in the DEIS and the basis for the decision that ultimately led to the selection of the previously identified NEPA Preferred Alternatives (FEIS Section 1.2, Selection of NEPA Preferred Alternatives).

The DEIS evaluated the following alternatives:

- No Build Alternative
- Build Alternatives, several of which were recommended as NEPA Preferred Alternatives

2.2.1 No Build Alternative

Federal regulations require that a No Build Alternative be evaluated in an EIS (40 Code of Federal Regulations [CFR] §1502.14 2014). The No Build Alternative was used as the baseline against which the other alternatives were compared for the extent of environmental and community effects.

The No Build Alternative includes the existing and planned transportation programs and projects scheduled to be built and implemented before forecast year 2035. The No Build Alternative includes:

- The existing transportation network, including roadway, passenger rail, and air travel
- Maintenance and planned improvements to these systems, including the following:
 - Roadway Projects: 401 planned
 - Interstate IH-35: 49 planned to increase the capacity along IH-35 by 2035
 - Passenger Rail Routes: 14 planned with planned dates from 2020 to 2035
 - Airport Capacity-building Improvement Project: One planned by 2030

Information necessary to define the No Build Alternative was collected from current regional transportation plans within the Study Vicinity, as well as from websites describing services such as train schedules. Further information on the planned projects in the Study Vicinity that comprise the No Build Alternative is contained in DEIS Chapter 2, Alternatives.

2.2.2 Build Alternatives

The following 10 alternatives were evaluated in the DEIS:

- Northern Section: Alternative N4A CONV
- Central Section: Alternatives C4A, C4B, and C4C with higher-speed rail (HrSR) and Alternatives C4A, C4B, and C4C with high-speed rail (HSR)
- Southern Section: Alternative S4 with HrSR and Alternative S6 with HrSR and Alternative S6 with HSR

2.2.3 Screening Criteria and Metrics

2.2.3.1 Screening Criteria

To evaluate and compare the route alternatives, screening criteria were established to determine how well the route alternatives would fulfill the Program's purpose and need, meet local and regional goals, the level of stakeholder support, and the potential for environmental impacts. The criteria were grouped into the following four categories: alternative attributes, operational criteria, infrastructure criteria, and environmental criteria. The criteria and the measures used to evaluate each are listed in Table ROD-2.

Table ROD-2: Route Alternatives Analysis Screening Criteria

Criterion No.	Criterion	Measure
ALTERNATIVE ATTRIBUTES		
1a	Access to stations	Total population of cities served by stations
1b	Access to stations with endpoint cities removed	Total population of cities served by stations with endpoint cities removed
2	Ridership for each alternative	Ridership (annual trips)
3	Length of route	Length of route in miles
4	Cost to construct alternative	Total capital cost for alternative (\$)
OPERATIONAL CRITERIA		
5	Revenue/operating cost ratio	Revenue/operating cost (%)
6	Reduce travel times	Time reduction vs. automobile travel time
7	Enhance mode share on rail	Rail mode share (%)

Criterion No.	Criterion	Measure
INFRASTRUCTURE CRITERIA		
8	Capital cost per passenger-mile	Capital cost per passenger-mile (\$)
9	Minimize right-of-way/real estate impacts	Acres of non-transportation right-of-way within EIS Study Area
10	Provide additional improvements to national railroad network	Professional judgment (value of improvements and risk reduction evaluation)
ENVIRONMENTAL CRITERIA^a		
Minimize Impacts on Natural Resources		
11a	Wetlands	Acres within EIS Study Area
11b	Critical habitat	Acres within EIS Study Area
Minimize Impacts on Cultural/Recreational Resources		
12a	National and State Historic Places	Number of historic sites
12b	River and stream crossings	Number of river and stream crossings (proxy for likelihood of finding cultural resources along alternative because archaeological resources are often found along waterways)
12c	Parks and open space	Acres within EIS Study Area
Minimize Impacts on Social Resources		
13a	Prime farmland	Acres within EIS Study Area
13b	Sensitive receptors	Number of schools, places of worship, and hospitals within EIS Study Area
13c	Environmental justice	Number of census blocks with % minority greater than state

^a In the Route Alternatives Analysis, a broad corridor of study with a width of 500 feet has been identified along each route as the EIS Study Area, unless described differently in the DEIS resource sections.

2.2.3.2 Screening Metrics

In addition to the criteria noted above in Table ROD-2, the following metrics were also used to analyze the Program alternatives. Metrics that differentiate between alternatives are based on the Program purpose and need, as well as the purpose and need for each geographic section (see above).

2.2.3.2.1 Northern Section: Alternative N4A – Oklahoma City to Dallas and Fort Worth

Due to feasibility based on initial ridership and cost information, only one alternative was considered in the Northern Section: Alternative N4A CONV. This alternative would include most of the same rail line that has been upgraded by TxDOT and Oklahoma Department of Transportation (ODOT) as part of an ongoing passenger rail improvement program and therefore would represent a good use of resources that can be further built upon.

2.2.3.2.2 Central Section: Alternatives C4A, C4B, and C4C – Dallas and Fort Worth to San Antonio

Six alternatives were considered in the Central Section: Alternatives C4A Higher-Speed (C4A HrSR) and C4A HSR, C4B Higher-Speed Rail (C4B HrSR) and C4B HSR, and C4C Higher-Speed Rail (C4C HrSR) and C4C HSR. In the Central Section, four key metrics were identified using studies completed for the Program (TxDOT 2016a, 2016b, 2016c) that could be used to differentiate between alternatives:

- Break-even or profitability:⁴ revenue to operating cost ratio, or the ability for an alternative to pay for itself.
- Capital cost investment:⁵ cost to construct an alternative.
- User (train rider) and non-user societal benefits:⁶
 - Safety – former highway users switching by choice to train (measured by passenger miles traveled diverted from automobile to train); reduction in fatal and non-fatal automobile accidents.
 - Value-of-time – former highway users (and users of other modes, such as bus or sometimes air) switching by choice to rail (measured by estimated mode-specific number of hours saved); less time traveling from ultimate trip origin to ultimate trip destination.
 - Cars off the road – reduction in automobile usage.

⁴ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Business and Financial Plan (TxDOT 2016c).

⁵ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Capital Investment Plan (TxDOT 2016a).

⁶ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Public Benefits Assessment (TxDOT 2016b).

- Environmental effects: The conclusions on effects for resources analyzed as part of the EIS do not identify important differences between alternatives in the Central Section for the service-level evaluation (see DEIS Chapter 3, Affected Environment and Environmental Consequences). However, there are differences in quantitative measures that can be used to support a general ranking of the alternatives, in conjunction with the other differentiating metrics.

2.2.3.2.3 Southern Section: Alternatives S4 and S6 – San Antonio to South Texas

Three alternatives were considered in the Southern Section: S4 HrSR, S6 HrSR, and S6 HSR.

Alternative S4 HrSR was the only alternative considered between San Antonio and Brownsville and would provide public benefits that include meeting more local transportation needs than any other alternative, which supports the Southern Section purpose and need. Although the potential magnitude of environmental effects are quantitatively greater for this alternative than the other Southern Section alternatives (S4 HrSR serves three different southern endpoint cities), it would contribute to operational performance in the Southern Section by serving the population centers of the southern-most part of the Study Area. So although the environmental criterion value would be highest for this alternative, this condition could be avoided with project-level refinement of the route and would not be expected to be a fatal flaw.

Four key metrics were identified for S6 HrSR and S6 HSR alternatives using studies completed for the Texas-Oklahoma Passenger Rail Study (TxDOT 2016a, 2016b, 2016c) that could be used to differentiate between alternatives:

- Break-even or profitability:⁷ revenue to operating cost ratio, or the ability for an alternative to pay for itself.
- Capital cost investment:⁸ cost to construct an alternative.
- User (train rider) and non-user societal benefits:⁹
 - Safety – former highway users switching by choice to train (measured by passenger miles traveled diverted from automobile to train); reduction in fatal and non-fatal automobile accidents.

⁷ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Business and Financial Plan (TxDOT 2016c).

⁸ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Capital Investment Plan (TxDOT 2016a).

⁹ Based on analysis completed as part of the Texas-Oklahoma Passenger Rail Study EIS-Phase Public Benefits Assessment (TxDOT 2016b).

- Value-of-time – former highway users (and users of other modes, such as bus or sometimes air) switching by choice to rail (measured by estimated mode-specific number of hours saved); less time traveling from ultimate trip origin to ultimate trip destination.
- Cars off the road – reduction in automobile usage.
- Environmental effects: The conclusions on effects for resources analyzed as part of the EIS do not identify important differences between alternatives in the Southern Section (S6 HrSR and S6 HSR) for the service-level evaluation (see DEIS Chapter 3, Affected Environment and Environmental Consequences). However, there are differences in quantitative measures that can be used to support a general ranking of the alternatives, in conjunction with the other differentiating metrics.

2.2.4 NEPA Preferred Alternatives from the DEIS

Based on the service-level DEIS evaluation of each of the build alternatives, the following alternatives were recommended as the NEPA Preferred Alternatives that may be considered for potential future project-level analysis, as noted above:

- Northern Section: Alternative N4A CONV
- Central Section: Alternatives C4A, C4B, and C4C HSR
- Southern Section: Alternative S4 HrSR and Alternatives S6 HrSR and S6 HSR

As noted above in ROD Section 2.1 and in DEIS Chapter 2, Alternatives, Alternatives S6 HrSR and S6 HSR are recommended as preferred alternatives only if a connection to Monterrey, Mexico, is established.

These NEPA preferred alternatives have been reviewed and approved by FRA and TxDOT for presentation to the public for review and comment, as described in the following section.

2.3 Public Outreach and Opportunities to Comment

Agencies, non-governmental groups, and the public have been engaged throughout preparation of the EIS for the Program as required by federal and state law. NEPA mandates agency and public participation in defining and evaluating the effects of the Program alternatives. The Program has also followed USDOT guidelines for public participation, including Title VI of the Civil Rights Act of 1964 (42 United States Code [U.S.C.] § 2000 (d)) and Executive Order (12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 *Federal Register* 7629 (February 16, 1994).

NEPA requires that a DEIS provide full disclosure of the environmental impacts associated with a proposed action. The agencies and the public must be given a reasonable opportunity to comment on that action.

The public has been engaged through:

- Public meetings, workshops, and information sessions
- Meetings with community groups and neighborhoods
- Program newsletters and email distribution lists
- Program website
- Interaction with community organizations
- Presentations to boards and elected officials

Informational materials at all public meetings, including presentation materials, handouts, and comment sheets, have been available in Spanish as well as English, and a Spanish-speaking staff member has been present at all meetings.

All DEIS public outreach materials are included in Appendix C

The public review and comment period for the DEIS began when the Notice of Availability was published in the *Federal Register* on July 15, 2016 (81 *Federal Register* 46077), and ended on August 29, 2016. Three public open houses/public hearings on the DEIS were held:

- Tuesday, August 9, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - TxDOT Laredo District Office, 1817 Bob Bullock Loop, Laredo, TX 78043, Large Meeting Room
- Wednesday, August 10, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - TxDOT Austin District, 7901 N. IH-35, Austin, TX 78753, Big 7, District Hearing Room
- Thursday, August 11, 2016
 - Public Open House from 5:30 p.m. to 6:00 p.m.
 - Public Hearing from 6:00 p.m. to 8:00 p.m.
 - North Central Texas Council of Governments, 616 Six Flags Drive, Arlington, TX 76011, Transportation Council Room

More than 70 people attended the meeting in Laredo, more than 50 in Austin, and more than 40 in Arlington. Thirteen (13) attendees provided verbal comments on the DEIS at the public open houses/public hearings. Comments received on the Program during the public comment period required factual corrections and minor clarifications to the DEIS; however, no comments warranted further response in the form of additional alternatives or consideration of undisclosed effects.

Comments on the DEIS and exhibits, sign-in forms, and speaker registration cards provided at the public hearings can be found in Appendices C, D, and F of this combined FEIS/ROD.

2.4 Description of the NEPA Selected Alternatives and Environmental Effects

The ROD signals formal federal approval of an EIS and records a federal agency's decision(s) concerning the proposed action for which the agency has prepared the EIS. The proposed action presented in the service-level EIS is to recommend Preferred Alternatives along the Study corridor that may be moved forward into a project-level evaluation.

As noted in DEIS Chapter 2, Alternatives, the Preferred Alternatives are recommended for each geographic section separately. More than one alternative in the Central and Southern Sections were moved forward as Preferred Alternatives because the alternatives provide different service types for independent destinations.

As reflected in the DEIS, more than one of these alternatives could be built in the future, and details on connecting the alternatives will be determined during project-level studies. Recommendation of these Preferred Alternatives does not preclude connectivity between geographic sections of the Study, but it does not assume connectivity either.

FRA has approved the seven Preferred Alternatives as presented in the EIS and, as described above, as the NEPA Selected Alternatives for further analysis at the project-level. This section presents the basis for the decision, a description of each of the alternatives, and a summary of the environmental effects.

2.4.1 Basis for the Record of Decision

The documents considered in making this decision include:

- Long-range planning reports from agencies along the Study Area
- Texas-Oklahoma Passenger Rail Study Service-Level and associated technical reports and supporting documents
- *Texas-Oklahoma Passenger Rail Study Service-Level Service Development Plan* associated technical reports and support documents
- Responses to comments received on the DEIS
- Combined FEIS/ROD (Fixing America's Surface Transportation Act [FAST Act] Section 1311 (a)(b))
- Section 4(f)/6(f) Evaluation
- Technical studies/memoranda
- Correspondence
- Other documents in the project file

A detailed list of referenced materials is included in Chapter 11 of the DEIS.

2.4.2 NEPA Selected Alternatives Description

The NEPA Selected Alternatives have been developed to a level of detail appropriate for a service-level analysis and as a result, the route alternatives described below represent a potential corridor where rail improvements could be implemented but do not specify the precise location of the track alignment. Potential alignments are described as “following” railway corridors, which could mean that they are sharing existing tracks, are located within an existing right-of-way (ROW), or are generally adjacent to existing tracks depending on the service type. As noted above, the NEPA Selected Alternatives are not approving construction, funding, or permitting. They are based on conceptual engineering and have not been refined to optimize performance, reduce cost, or avoid specific properties or individual environmental resources. For alternatives selected at the service level for further evaluation, the above considerations would be assessed at the project level.

FRA has selected Alternative N4A CONV in the Northern Section. In the Central Section, FRA has selected Alternatives C4A HSR, C4B HSR, and C4C HSR; these selected Central Section alternatives differ in how the area from Dallas and Fort Worth to Hillsboro would be serviced but provide identical service from Hillsboro south to San Antonio. In the Southern Section, FRA has selected Alternative S4 HrSR, which would provide service from San Antonio into South Texas (Brownsville) with an intersecting east-west corridor from Laredo to Corpus Christi. FRA has also selected Alternatives S6 HrSR and S6 HSR in the Southern Section from San Antonio to Laredo but only if the project-level study includes the extension from Laredo to Monterrey, Mexico. Both Alternatives S6 HrSR and S6 HSR service types have been selected because it is not known which speed would be more compatible with the infrastructure in Mexico.

2.4.2.1 Alternative N4A Conventional

Alternative N4A CONV would begin in Edmond, Oklahoma, and follow the BNSF rail alignment south to Oklahoma City. The alternative would continue south along the Burlington Northern Santa Fe (BNSF) rail alignment to Norman, Oklahoma; through Metro Junction, near Denton, Texas; and on to Fort Worth (as does the Heartland Flyer). From Fort Worth, the alternative would continue to Dallas following the Trinity Railway Express (TRE) tracks. From Edmond, Oklahoma, to Dallas, the route would be approximately 260 miles long. Because existing freight traffic would not preclude passenger service along this section of track, the route would provide passenger rail service on the existing BNSF track, with potential improvements within the existing BNSF ROW.



Alternative N4A CONV would provide several improvements over the existing Heartland Flyer service. Alternative N4A CONV would increase the number of daily round trips along this route (the Heartland Flyer currently offers one round trip per day), and the N4A route would extend from Fort Worth to Dallas without requiring a transfer (the Heartland Flyer service currently terminates in Fort Worth). In addition, Alternative N4A CONV would provide improvements to existing station facilities, and new train equipment with more onboard amenities, including business class available for a premium price.

Alternative N4A CONV assumes diesel-powered, steel-wheeled trains operating on steel tracks at speeds up to 79 to 90 mph. It assumes use of existing railroad ROWs primarily, which may be fenced, and existing railroad track. Roadway crossings may be grade-separated depending on the type of roadway and amount of traffic. Modifications such as double-tracking could be constructed within existing ROW to accommodate additional trains.

Alternative N4A CONV assumes running three to six daily round trips. Two or three of the round trips would operate on an accelerated schedule, making roughly seven stops, with remaining “local” trains making as many as 12 stops.

2.4.2.2 Alternative C4A High-Speed Rail

Alternative C4A HSR would begin in Fort Worth and follow the TRE tracks east to Dallas. From Dallas, it would follow the BNSF alignment south toward Waxahachie where it would enter a new alignment outside existing highway and rail corridors to accommodate maximum operating speeds. Though outside existing transportation corridors, the southern portion of Alternative C4A HSR would generally follow the BNSF alignment for about 250 miles, extending south from Waxahachie through Hillsboro, Waco, Temple, Taylor, and Austin to San Antonio.

Alternative C4A HSR assumes electric trains powered by an overhead power supply system. Train sets are steel wheel on steel rail, but designed to operate at high speeds with an aerodynamic shape, and suspension and braking systems are designed for high-speed travel. Trains would operate at speeds up to 220 to 250 mph. The entire ROW would be fenced and fully grade-separated. This service type could only reach maximum speed outside existing transportation corridors because existing railroad alignments are not compatible with the speeds required, and they do not have the required space for separation of freight and HSR. In areas where this service type is within existing transportation corridors, it would operate at lower speeds.

Alternative C4A HSR assumes running 12 to 20 daily round trips. Express trains would likely make six stops, while local trains would make up to nine stops.



2.4.2.3 Alternative C4B High-Speed Rail

Alternative C4B HSR would serve both Fort Worth and Dallas, with trains following a new elevated high-speed alignment over IH-30. In Arlington (between Dallas and Fort Worth), the alternative would turn south to Hillsboro on an alignment outside existing transportation corridors. The alternative would then follow the same high-speed alignment as Alternative C4A HSR from Hillsboro to San Antonio.

Alternative C4B HSR assumes electric-powered, high-speed service running 12 to 20 daily round trips. Express trains would likely make six stops, and local trains would make up to eight stops.



2.4.2.4 Alternative C4C High-Speed Rail

Alternative C4C HSR would follow the same potential alignment as Alternative C4A HSR from Fort Worth east to Dallas and south to San Antonio but would include a link from Hillsboro directly to Fort Worth parallel to the Union Pacific Railroad (UPRR) alignment. Service on the Alternative C4C HSR route would operate in a clockwise direction, running from Hillsboro to Fort Worth, east to Dallas, back to Hillsboro, and south to San Antonio in order to serve Fort Worth directly (while also being compatible with the general service for Alternative C4A HSR).

Alternative C4C HSR assumes electric-powered high-speed service running 12 to 20 daily round trips. Express trains would likely make six stops, while local trains would make up to nine stops.



2.4.2.5 Alternative S4 Higher-Speed Rail

Alternative S4 HSR would begin in San Antonio and continue southeast along the UPRR alignment to George West, where it would continue outside existing transportation corridors to Alice. At Alice, the alternative would divide into three legs at a stop. The first leg would travel west along the Kansas City Southern (KCS) Railway to San Diego, Texas; then it would travel outside existing transportation corridors to just east of Laredo in an alignment that would allow higher speeds and rejoin the KCS Railway to enter the more highly developed Laredo area. The second leg would travel south along abandoned railroad tracks to McAllen and east to Harlingen and Brownsville. The third leg would travel east along



the KCS Railway to Corpus Christi.

Alternative S4 HrSR assumes new diesel-locomotive hauled equipment on the same steel tracks that support conventional rail but may require improvements such as upgrading wooden ties with concrete ties, improving signaling, and upgrading roadway crossings. Trains would operate at speeds up to 110 to 125 mph. Where proposed within an existing railroad ROW, this alternative would share ROW with the existing railroad, but separate tracks would be constructed for passenger service. The alternative could operate on a single track with passing locations and would not require double-tracking. Where proposed outside an existing transportation corridor, the alternative would be designed with curves and other features that could accommodate high-speed rail service, if warranted by ridership and economically feasible, in the future. The design would not include electrification or a full double track, and some at-grade crossings would remain.

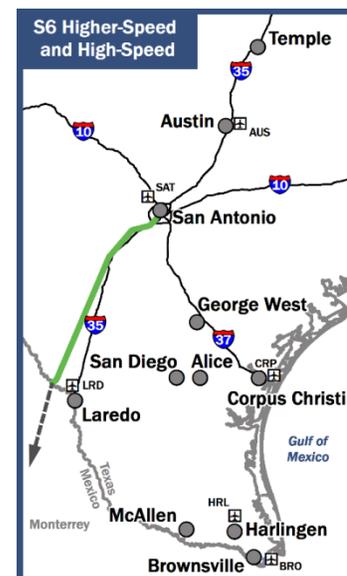
Four to six daily round trips would operate. Depending on corridor demand model forecasts, the primary service may be designated as Laredo-Alice-San Antonio and Corpus Christi-Alice-San Antonio, with a connecting feeder from Brownsville, Harlingen, and McAllen.

2.4.2.6 Alternative S6 Higher-Speed and High-Speed Rail

Alternatives S6 HrSR and S6 HSR would begin in San Antonio and travel south on a new alignment outside existing transportation corridors to a station near the Laredo-Columbia Solidarity Bridge, which crosses the Rio Grande north of Laredo. The alternative would then cross on a new railway bridge to join a new rail line being constructed in Mexico, which would continue to Monterrey. This Study only examined the physical effects of the U.S. component of this new line, but it considered the ridership impact of such a connection.

Alternative S6 HrSR assumes new steel-wheel diesel-locomotive hauled equipment running four to six daily round trips between San Antonio and Laredo, which would be the only U.S. stops for the alternative. If an extension from Laredo to Monterrey were added, the frequency of trips to Monterrey is assumed to be the same as those from San Antonio to Laredo.

Alternative S6 HSR assumes electric-powered, high-speed service running eight to 12 daily round trips between San Antonio and Laredo. If an extension from Laredo to Monterrey were added, the frequency of trips to Monterrey is assumed to be the same as those from San Antonio to Laredo.



2.4.3 Effects of the NEPA Selected Alternatives

The service-level analysis in the EIS evaluated a preliminary alignment to represent each alternative, based on conceptual engineering that considered and avoided obvious physical or environmental constraints. The analysis reviewed generalized effects for a large swath of land within which the Project Area may occur and reported both the potentially adverse and beneficial effects without knowing the exact footprint of the alignment. These alignments were not refined to optimize performance, reduce cost, or avoid specific properties or individual environmental resources, or for any other such considerations. Based on the NEPA Selected Alternatives the above considerations will be assessed at the project level. The project-level analysis will determine specific project impacts while the service-level analysis evaluated and described the general effects by alternative.

Table ROD-3 summarizes the potentially adverse and beneficial effects of the No Build Alternatives and the NEPA Selected Alternatives, which were assessed for both long-term and short-term effects. Long-term benefits and effects from operation were assessed through the year 2035. Short-term effects were primarily those associated with construction activities.

Table ROD-3: Summary of the No Build Alternative and NEPA Selected Alternatives Resource Effects

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Air Quality	No Effect	Based on limited construction activities and emissions, along with reduced emissions during operation: Negligible (adverse) short-term (construction) and negligible (benefit) long-term regional (operation) effects.	Based on short-term construction emissions and based on operational pollutant emission reductions: Substantial (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on lower short-term construction emissions and based on operational pollutant emission reductions: Moderate (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on short-term construction emissions and based on operational pollutant emission reductions: Substantial (adverse) short-term (construction) effects and substantial (benefit) long-term regional (operation) effects.	Based on construction and operation of new infrastructure: Substantial (adverse) short-term (construction) effects and substantial (adverse) long-term regional (operation) effects.	Based on a shorter alignment and a shift in mode choice and lower pollutant emissions: Moderate (adverse) short-term (construction) and moderate (adverse) long-term regional (operation) effects.	Based on increased construction activities and use of electrified train engines: Substantial (adverse) short-term (construction) effects and negligible (benefit) long-term regional (operation) effects.
Air Quality – GHG and Climate Change ^a	No Effect	Beneficial effect (5% reduction)	Beneficial effect (20% reduction)	Beneficial effect (18% reduction)	Beneficial effect (15% reduction)	Negative effect (2% increase)	Negative effect (3% increase)	Negative effect (16% increase)
Water Quality	No Effect	Surface waters: Negligible effects on waterbodies crossed by the EIS Study Area based on the use of existing railway infrastructure and corridors, and through project design and implementation of BMPs. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs.	Surface waters: More waterbodies than C4B HSR, fewer than C4C HSR (700 features; 24,187 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural	Surface waters: Fewer waterbodies than C4A HSR and C4B HSR (650 features; 18,870 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural	Surface waters: More waterbodies than C4A HSR and C4B HSR (850 features; 23,084 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to low amount of impervious surfaces and implementation of structural	Surface waters: More waterbodies than S6 HrSR and S6 HSR (443 features; 13,928 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible effect due to amount of impervious surfaces and implementation of structural stormwater	Surface waters: Fewer waterbodies than S4 HrSR (255 features; 2,921 linear feet of listed Section 303(d) impaired waters). Moderate effects due to the acreage and linear feet crossed. Runoff: Negligible due to amount of impervious surfaces and implementation of structural stormwater management practices and construction BMPs. Erosion: Less erosive soils crossed (4 crossed) but more acreage (691 acres) than S4 HrSR. Negligible effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs. Groundwater: Less aquifers crossed (12,450 acres) than S4 HrSR. Negligible effect as a result of no Sole Source aquifer recharge area crossings, acreage of unconfined aquifer crossings, and implementation of stormwater	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		<p>Erosion: Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: Negligible effect as a result of no Sole Source Aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of BMPs.</p>	<p>stormwater management practices and construction BMPs.</p> <p>Erosion: Less erosive soils crossed than C4B HSR and C4C HSR (101 crossed). More acreage than C4B HSR and less than C4C HSR (1,424 acres). Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed than C4B HSR and less than C4C HSR (25,775 acres crossed). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>stormwater management practices and construction BMPs.</p> <p>Erosion: More erosive soils crossed than C4A HSR and less crossed than C4C HSR (116 crossed). Less acreage than C4A HSR and C4C HSR (1,395 acres). Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: Less aquifers crossed than C4A HSR and C4C HSR (23,160 acres). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>stormwater management practices and construction BMPs.</p> <p>Erosion: More erosive soils crossed (123 crossed) and more acreage (1,706 acres) than C4A HSR and C4B HSR. Moderate effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed than C4A HSR and C4B HSR (31,900 acres). Negligible effect as a result of no Sole Source aquifer recharge area crossings, low acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>management practices and construction BMPs.</p> <p>Erosion: More erosive soils crossed (22 crossed) but less acreage (678 acres) than S6 HrSR and HSR. Negligible effect due to the acreage of erosive soils crossed, which would be minimized with use of construction BMPs.</p> <p>Groundwater: More aquifers crossed (27,610 acres) than S6 HrSR and HSR. Negligible effect as a result of no Sole Source aquifer recharge area crossings, acreage of unconfined aquifer crossings, and implementation of stormwater treatment measures and BMPs.</p>	<p>treatment measures and BMPs.</p>	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Noise and Vibration	No effect	Noise- and vibration-sensitive land uses are present in the EIS Study Area and would be subject to moderate effects. <i>Noise^b</i> Category 2 receivers: 15,395 acres Category 3 receivers: 245 facilities <i>Vibration</i> Category 1 receivers: 1 land use Category 2 receivers: 11,247 acres Category 3 receivers: 24 facilities	Higher amount of noise- and vibration-sensitive land uses than C4B HSR, but lower amount than C4C HSR. Moderate effects. <i>Noise^b</i> Category 2 receivers: 19,466 acres Category 3 receivers: 227 facilities <i>Vibration</i> Category 2 receivers: 11,919 acres Category 3 receivers: 39 facilities	Lowest amount of noise- and vibration-sensitive land uses as compared to C4A HSR and C4C HSR. Negligible effects. <i>Noise^b</i> Category 2 receivers: 15,549 acres Category 3 receivers: 179 facilities <i>Vibration</i> Category 2 receivers: 9,566 acres Category 3 receivers: 35 facilities	Highest amount of noise- and vibration-sensitive land uses as compared to C4A HSR and C4B HSR. Moderate effects. <i>Noise^b</i> Category 2 receivers: 22,799 acres Category 3 receivers: 256 facilities <i>Vibration</i> Category 2 receivers: 12,387 acres Category 3 receivers: 44 facilities	Highest amount of noise- and vibration-sensitive land uses as compared to S6 HrSR and S6 HSR. Moderate effects. <i>Noise^b</i> : Category 2 receivers: 8,753 acres Category 3 receivers: 62 facilities <i>Vibration</i> Category 2 receivers: 2,181 acres Category 3 receivers: 17 facilities	Lowest amount of noise- and vibration-sensitive land uses as compared to S4 HrSR. S6 HSR affects more receivers than S6 HrSR; however, both would have negligible effects. <i>Noise^b</i> : Category 2 receivers: 687 acres Category 3 receivers: 1 facility <i>Vibration</i> Category 2 receivers: 172 acres Category 3 receivers: 0 facilities	<i>Noise^b</i> : Category 2 receivers: 1,586 acres Category 3 receivers: 3 facilities <i>Vibration</i> Category 2 receivers: 240 acres Category 3 receivers: 0 facilities
Solid Waste Disposal	No Effect	Negligible effects to landfills.	Landfills present in the counties in the EIS Study Area affected by the alternatives would experience negligible effects.					
Natural Ecological Systems and Wildlife	No Effect	54% non-developed land covers. Negligible effects during construction and operation. Wildlife corridors and assemblages outside of proposed route. Negligible effects during construction and moderate effects during	62% non-developed land covers. Substantial effects during construction and moderate effects during operation. Wildlife corridors and assemblages potentially associated with	64% non-developed land covers. Substantial effects during construction and moderate effects during operation. Wildlife corridors and assemblages potentially associated with	62% non-developed land covers. Substantial effects during construction and moderate effects during operation. Wildlife corridors and assemblages potentially associated with	68% non-developed land covers. Moderate effects during construction and operation. No reported wildlife corridors or assemblages. Negligible effects during construction and operation.	92% non-developed land covers. Substantial effects during construction and moderate effects during operation. No reported wildlife corridors or assemblages or sensitive plant communities. Negligible to moderate effects. There is higher potential for effects from HSR than HrSR because HSR noise and vibration would travel farther than that generated by HrSR. 21% of EIS Study Area composed of higher ecological value land coverage. Substantial	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		operation. 10% of EIS Study Area composed of higher ecological value land coverage. Alignment would not likely be fenced, making wildlife movement vulnerable to increased risk for strikes from additional rail traffic. Negligible effects during construction and operation.	proposed route. Sensitive plant communities. Substantial effects during construction and moderate effects during operation. 18% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.	proposed route. Sensitive plant communities. Substantial effects during construction and moderate effects during operation. 18% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.	proposed route. Sensitive plant communities. Substantial effects during construction and moderate effects during operation. 15% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.	proposed route. Sensitive plant communities. Substantial effects during construction and moderate effects during operation. 15% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.	15% of EIS Study Area composed of higher ecological value land coverage. Substantial effects during construction and moderate effects during operation.	effects during construction and operation.
Wetlands	No Effect	Wetlands and other waterbodies are present in the EIS Study Area and would experience negligible effects. Waterbodies: 537 waterbodies; 103 acres; 317,365 linear feet. Wetlands: 271 wetlands; 363 acres.	More waterbodies and wetlands than C4B HSR, but fewer than C4C HSR. Moderate effects. Waterbodies: 700 waterbodies; 153 acres; 316,909 linear feet. Wetlands: 349 wetlands; 312 acres.	Fewest waterbodies and wetlands compared to C4A HSR and C4C HSR. Moderate effects. Waterbodies: 650 waterbodies; 99 acres; 293,669 linear feet. Wetlands: 309 wetlands; 181 acres.	Most waterbodies and wetlands compared to C4A HSR and C4B HSR. Moderate effects. Waterbodies: 850 waterbodies; 164 acres; 400,363 linear feet. Wetlands: 391 wetlands; 345 acres.	Most waterbodies and wetlands compared to S6 HrSR and S6 HSR. Moderate effects. Waterbodies: 443 waterbodies; 74 acres; 247,448 linear feet. Wetlands: 189 wetlands; 142 acres.	Fewest water bodies and wetlands compared to S4 HrSR. Moderate effects. Waterbodies: 255 waterbodies; 29 acres; 120,488 linear feet. Wetlands: 83 wetlands; 57 acres.	
Threatened and Endangered Species	No Effect	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during	Sensitive plant species: Federally listed and other sensitive plant species. Substantial	Sensitive plant species: Potential occurrences of sensitive plant species. Moderate effects during construction and operation. Sensitive wildlife species. Federally listed and other sensitive wildlife species. Moderate effects	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		<p>operation.</p> <p>Sensitive wildlife species: Federally listed and other sensitive wildlife species.</p> <p>Moderate effects during construction and operation.</p> <p>Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species.</p> <p>Moderate effects during construction and operation.</p>	<p>construction and operation.</p> <p>Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation.</p> <p>Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species.</p> <p>Moderate effects during construction and operation.</p>	<p>construction and operation.</p> <p>Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation.</p> <p>Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species.</p> <p>Moderate effects during construction and operation.</p>	<p>construction and operation.</p> <p>Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effect during construction and moderate effect during operation.</p> <p>Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species.</p> <p>Moderate effects during construction and operation.</p>	<p>effects during construction and moderate effects during operation.</p> <p>Sensitive wildlife species: Federally listed and other sensitive wildlife species. Substantial effects during construction and moderate effects during operation.</p> <p>Habitat: Potential occurrences of habitat corresponding to sensitive plants and wildlife species.</p> <p>Moderate effects during construction and operation.</p>	<p>during construction and operation.</p> <p>Potential occurrences of habitat corresponding to sensitive plants and wildlife species. Moderate effects during construction and operation.</p>	
Flood Hazards and Floodplain Management	No Effect	<p>Floodplains and floodways are present in the EIS Study Area and would experience negligible effects.</p> <p>Floodplains: 2,005 acres</p> <p>Floodways: 410 acres</p>	<p>More floodplains and floodways than C4B HSR, but fewer than C4C HSR.</p> <p>Negligible effects.</p> <p>Floodplains: 2,212 acres</p> <p>Floodways: 815 acres</p>	<p>Fewest floodplains and floodways.</p> <p>Negligible effects.</p> <p>Floodplains: 2,193 acres</p> <p>Floodways: 582 acres</p>	<p>Most floodplains and floodways. Negligible effects.</p> <p>Floodplains: 2,691 acres</p> <p>Floodways: 961 acres</p>	<p>Cannot compare against S6 HrSR and S6 HSR because of data constraints.</p> <p>Negligible effects.</p> <p>Floodplains: 3,011 acres</p> <p>Floodways: 4 acres</p>	<p>National Flood Hazard Layer data missing for much of EIS Study Area. Negligible effects (based upon comparison of floodplain and floodway acreage).</p> <p>Floodplains: 453 acres, based on limited data</p> <p>Floodways: 12 acres, based on limited data</p>	

Resources	Alternatives								
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR	
Coastal Zone Management	No Effect	Not applicable because there are no coastal zone management areas.				10 miles of alignment in Nueces County Coastal Management Zone. Negligible effects.	Not applicable because there are no coastal zone management areas.		
Energy	No Effect	Negligible adverse effects during construction and negligible beneficial effects during operation. Annual energy savings: 114,000 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 1,812,892 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 2,264,999 MBTUs	Substantial adverse effects during construction, and substantial beneficial effects during operation. Annual energy savings: 1,413,391 MBTUs	Moderate adverse effects during construction and moderate beneficial effects during operation. Annual energy savings: 229,024 MBTUs	Moderate adverse effects during construction and moderate beneficial effects during operation. Annual energy savings: 295,143 MBTUs	Substantial adverse effects during construction and substantial beneficial effects during operation. Annual energy savings: 398,507 MBTUs	
Utilities ^c	No Effect	361 utility crossings. Negligible effects.	424 utility crossings. Substantial effects	315 utility crossings. Substantial effects.	744 utility crossings. Substantial effects.	847 utility crossings. Moderate effects.	84 utility crossings. Moderate effects.	84 utility crossings. Moderate effects.	
Geologic Resources ^d	No Effect	Geologic risks could be avoided or minimized by meeting building standards. Moderate effects from geologic hazards. No change in access to, or reduction of, high-value minerals. Negligible effects on mineral resources.	Risks associated with geologic hazards could be avoided or minimized by meeting building standards. Moderate effects from geologic hazards. None of the alternatives would affect access or availability of high-value minerals. Negligible effects on mineral resources.						
Aesthetics and Visual Quality	No Effect	49 miles of the alignment near sensitive viewers. 46 miles would have negligible effects, 1 mile, would have moderate effects, and 2 miles would have substantial effects. The	47 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 36 miles would have moderate effects, and 11 miles would have substantial	49 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 36 miles would have moderate effects, and 13 miles would have substantial	62 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 51 miles would have moderate effects, and 11 miles would have substantial	50 miles of the alignment near sensitive viewers. 36 miles would have negligible effects, 6 miles would have moderate effects, and 8 miles would have substantial	18 miles of the alignment near sensitive viewers. 0 miles would have negligible effects, 16 miles would have moderate effects, and 2 miles would have substantial effects. Overall, the effect of S6	18 miles of the alignment near sensitive viewers. S6 HSR would affect more sensitive viewers than S6 HrSR. 0 miles would have	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		overall effect would be negligible.	effects. Overall, the effect of C4A HSR would be substantial.	effects. Overall, the effect of C4B HSR would be substantial.	effects. Overall, the effect of C4C HSR would be substantial.	effects. Overall, the effect of S4 HrSR would be moderate.	HrSR would be moderate.	negligible effects, 0 miles would have moderate effects, and 18 miles would have substantial effects. Overall, the effect of S6 HSR would be substantial.
Land Use and Prime Farmlands	No Effect	Land use: High land use compatibility. Negligible effects. Prime Farmland: 6,140 acres of prime farmland. Low potential prime farmland conversion and bisection. Negligible effects.	Land use compatibility: Medium land use compatibility. Moderate effects. Prime farmland: 10,440 acres. Moderate effects.	Land use compatibility: Medium land use compatibility. Moderate effects. Prime farmland: 10,440 acres. Moderate effects.	Land use Compatibility: Low land use compatibility. Moderate effects. Prime farmland: 10,217 acres. Substantial effects.	Land use Compatibility: Low land use compatibility. Moderate effects. Prime farmland: 10,217 acres. Substantial effects.	Land use Compatibility: Medium land use compatibility. Substantial effects. Prime farmland: 12,435 acres. Substantial effects.	
Environmental Justice and Socioeconomics	No Effect	Socioeconomics: Negligible effects. Environmental Justice: Negligible effects.	Environmental Justice: Moderate effects. Socioeconomics: Moderate effects.			Environmental Justice: Substantial effects. Socioeconomics: Moderate effects.		
Public Health	No Effect	Negligible (adverse) effects relating to air quality during construction. Negligible (benefit) long-term effects relating to air quality during operation. Negligible effects relating to groundwater and hazardous materials.	Moderate (adverse) effects during construction related to air quality. Negligible (benefit) long-term effects relating to air quality during operation. Negligible effects relating to groundwater and hazardous materials.			Moderate (adverse) effects during construction related to air quality. Moderate (adverse) long-term regional effects during operation associated with diesel trains and vehicles idling near high concentrations of	Moderate (adverse) effects during construction related to air quality. Negligible (adverse) long-term regional effects during operation. Negligible effects relating to groundwater and hazardous materials.	Moderate (adverse) effects during construction related to air quality. Negligible (benefit) long-term regional effects during operation. Negligible effects relating to groundwater and hazardous materials.

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
						sensitive populations. Negligible effects relating to groundwater and hazardous materials.		
Public Safety and Hazardous Materials	No Effect	Public Safety: Improved crossing safety over No Build Alternative but continued collision risk associated with crossings. Negligible effects. Hazardous Materials: 8 sites. Negligible effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 9 sites. Moderate effects.			Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 8 sites. Moderate effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no associated collision risk. Negligible effects. Hazardous Materials: 12 sites. Moderate effects.	Public Safety: Improved crossing safety over No Build Alternative. No at-grade crossings and no collision risk. Negligible effects. Hazardous Materials: 0 sites. Negligible effects.
Recreational Areas and Opportunities ^e	No Effect	Negligible effects from construction activities and property acquisition. 56 recreational resources.	More recreational resources than C4B HSR, but fewer than C4C HSR. Substantial effects from construction activities and property acquisition. 57 recreational resources: 28 in urban, 17 in suburban, 12 in rural areas.	Fewest recreational resources compared to C4A HSR and C4C HSR. Substantial effects from construction activities and property acquisition. 51 recreational resources: 28 in urban, 15 in suburban, 8 in rural areas.	Most recreational resources compared to C4A HSR and C4B HSR. Substantial effects from construction activities and property acquisition. 62 recreational resources: 33 in urban, 17 in suburban, 12 in rural areas.	Highest number of recreational resources compared to S6 HrSR and S6 HSR but effects reduced because of greater use of existing rail right-of-way. Moderate effects from construction activity and property acquisition. 54 recreational resources: 38 in urban, 4 in suburban, 12 in rural areas.	Fewest number of recreational resources compared to S4 HrSR. Negligible effects from construction activity and property acquisition. 3 recreational resources: 1 in urban, 0 in suburban, 2 in rural areas.	

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
Historic Resources ^e	No Effect	Moderate effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 35 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	More known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources than C4B HSR, but fewer than C4C HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 45 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Fewest known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to C4A HSR and C4C HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 38 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Most known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to C4A HSR and C4B HSR. Substantial effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources. 52 known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources.	Most known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources compared to S6 HrSR and S6 HSR. Moderate effects from acquisition or rehabilitation, restoration, or expansion of existing railroad-related historic resources.	No known NRHP-listed, NRHP-eligible, or potentially NRHP-eligible historic resources. Negligible effects.	
Archaeological Resources ^e	No Effect	Moderate effects from demolition or disturbance of resources. 1 NRHP-eligible site and 14 undetermined eligible archaeological sites.	More identified sites than C4B HSR, but fewer than C4C HSR. Substantial effects from disturbance or demolition of resources. 1 NRHP-eligible site and 25 undetermined eligible archaeological sites.	Fewest identified sites compared to C4A HSR and C4C HSR. Substantial effects from disturbance or demolition of resources. 2 NRHP-eligible sites and 18 undetermined eligible archaeological sites.	Most identified sites compared to C4A HSR and C4B HSR. Substantial effects from disturbance or demolition of resources. 1 NRHP-eligible site and 26 undetermined eligible archaeological sites.	Most identified sites compared to S6 HrSR and S6 HSR. Moderate effects. 1 NRHP-eligible site and 20 undetermined eligible archaeological sites.	Moderate effects. 0 NRHP-eligible sites and 7 undetermined eligible archaeological sites.	Substantial effects. 0 NRHP-eligible sites and 7 undetermined eligible archaeological sites.
Section 4(f)/Section 6(f)	No Effect	65 Section 4(f) properties and 3 Section 6(f) properties	64 Section 4(f) properties and 3 Section 6(f) properties in the EIS Study Area. All of the Central Section alternatives are likely to result in a potential use of Section 4(f) resources. Design refinements to			62 Section 4(f) properties and 2 Section 6(f) properties in the S4 HrSR Study Area. 1 Section 4(f) property and 0 Section 6(f) properties in the S6 HrSR and HSR study areas. Southern Section alternatives may avoid		

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
		in the EIS Study Area. The alternative may avoid Section 4(f) resources by remaining inside existing rail or transportation right-of-way.	avoid specific Section 4(f) properties and/or to minimize harm will be addressed at the project level.					Section 4(f) resources by remaining inside existing rail or transportation right-of-way or by implementing variations of the evaluated alternatives at the project-level that would traverse areas where no Section 4(f) resources have been identified.
Travel Demand and Transportation	No Effect	Effects on Transit Providers: 50% and 44% of bus and air passengers would be diverted to rail, respectively. This would have substantial (negative) effects on both bus and air service providers. Change in VMT: Negligible (beneficial) effects. 0.6% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers.	Effects on Transit Providers: 22% and 68% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 8.6% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more	Effects on Transit Providers: 23% and 70% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 9% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more	Effects on Transit Providers: 21% and 62% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Substantial (beneficial) effects. 7.2% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more	Effects on Transit Providers: 23% and 64% of bus and air passengers would be diverted to rail, respectively. Resulting in moderate and substantial effects on bus and air service providers, respectively. Change in VMT: Negligible (beneficial) effects. 0.2% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers. For air carriers the potential benefits may include the opportunity to shift from short-haul to longer-haul flight operations, which may include more	Effects on Transit Providers: 9% of bus passengers would be diverted to rail. Resulting in moderate effects on bus service providers. No effect on air carriers. Change in VMT: Negligible (beneficial) effects. 0.4% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers.	Effects on Transit Providers: 15% of bus passengers would be diverted to rail, resulting in moderate effects on bus service providers. No effect on air carriers. Change in VMT: Negligible (beneficial) effects. 0.9% reduction in VMT. Potential secondary beneficial effect (reduced congestion) to bus service providers.

Resources	Alternatives							
	No Build Alternative	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR	S6 HSR
			reliable scheduling and increased revenue.					

^a All build alternatives in the Southern Section would have higher GHG emissions in 2035 compared to No Build Alternative, partially due to the conservative assumptions made in the travel demand modelling for the Southern Section. Build alternatives in the Southern Section would have net GHG emission increases compared to No Build Alternative, primarily due to the addition of the new rail transportation mode that did not previously exist in the region. However, the levels of GHG reduction in the Northern and Central Section alternatives are greater than the levels of GHG increases estimated for the Southern Section alternatives. When GHG emissions from the build alternatives in the Northern, Central, and Southern Sections are combined and compared to the combined emissions from the No Build Alternative, the results indicate that the Program would result in a net GHG emission reduction in 2035.

^b Category 1 noise- and vibration-sensitive land uses are those that are set aside for serenity and quiet, such as outdoor amphitheaters. Category 2 noise- and vibration-sensitive land uses include residences and hotels. Category 3 land uses include churches, schools, recreation areas, and similar land use activities with which noise and vibration could interfere.

^c The most intense effect for each alternative is presented in the table; however, alternatives may include additional, less intense effects depending on urban or rural locations, density of utilities, and if existing or new track would be constructed.

^d The most intense effect for each alternative is presented in the table. However, alternatives may include additional, less intense effects depending on specific geologic hazards.

^e The most intense effect for each alternative is presented in the table. However, some alternatives may include additional less intense effects depending on urban, suburban, or rural locations.

BMP = best management practice

GHG = greenhouse gas

MBTU = million British thermal units

NRHP = National Register of Historic Places

VMT = vehicle miles traveled

2.5 Measures to Minimize Harm

The DEIS included best management practices (BMPs), design features, and mitigation strategies that address effects on a broad, service-level scale. Each resource evaluation in Chapter 3 of the DEIS included a list of strategies that would be considered and further developed at the project-level of analysis. Strategies included, but would not be limited to, conceptual avoidance and minimization measures for the next phase of design, suggestions for programmatic agreements, and descriptions of options for replacing or re-establishing the affected resources. Table ROD-4 includes a list of commitments or mitigation measures that would be considered and further developed at the project level of analysis.

Table ROD-4: Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
Air Quality (AQ) Section 3.1		
AQ-01 DEIS Section 3.1.5.1	Temporary, short-term emissions increases associated with construction activities	<ul style="list-style-type: none"> ▪ Use of low-emission vehicles during construction, and/or use of newer and well-maintained equipment ▪ Effects from concrete and asphalt batch plants would be limited by placing these facilities away from sensitive populations, such as those found at schools, hospitals, and residences, to the extent possible ▪ Potential fugitive dust effects would be mitigated through BMPs such as water sprays during demolition; wetting, paving, or landscaping exposed earth areas; covering dust-producing materials during transport; limiting dust-producing construction activities during high wind conditions; and providing street sweeping and tire washes for trucks leaving the site ▪ Traffic congestion emissions can be reduced using site-specific traffic management plans (TMPs); temporary signage and other traffic controls; designated staging areas, worker parking lots (with shuttle bus service if necessary), and truck routes; and prohibition of

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<p>construction vehicle travel during peak traffic periods</p> <ul style="list-style-type: none"> ▪ Localized air pollutant increases associated with traffic near construction sites would be addressed by mitigation strategies discussed further on in this table under table Section 3.20, Travel Demand and Transportation, as well as by implementing enhanced accessibility and signal design practices
AQ-02 DEIS Section 3.1.5.2	Emissions from diesel trains	<ul style="list-style-type: none"> ▪ Use Tier 4 diesel locomotive engines ▪ Implement additional measures to reduce diesel locomotive idling times ▪ Locate tracks, stations, and other supporting facilities away from populated areas and sensitive receptors
AQ-03 FEIS Section 3.1.7.3	Climate effects	<ul style="list-style-type: none"> ▪ Review the latest climate science trends for any applicable updates to the projections and/or trends ▪ Undertake targeted modelling of site-specific riverine and coastal flood potential ▪ Undertake joint probability riverine and coastal flood analysis ▪ Consider additional interim sea level rise scenarios (e.g., between 1 foot and 6 feet) to better quantify the timing of the risk and prioritization of improvements ▪ Consider increasing levels of coastal storm surge intensity (as the science progresses), or larger coastal storm surge events (e.g., 500-year event) ▪ Incorporate adaptation considerations into design to minimize risk exposure and increase ability to recover from extreme events ▪ Incorporate consideration of adaptation costs (i.e., more resilient infrastructure) as well as increased maintenance costs and service disruptions associated with likely increased flooding and extreme heat effects

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
Water Quality (WQ) Section 3.2		
WQ-01 DEIS Section 3.2.5	Erosion, sedimentation, and runoff during construction	<ul style="list-style-type: none"> ▪ Erosion <ul style="list-style-type: none"> – Phasing and construction sequencing – Temporary seeding of cleared areas – Mulching – Erosion control blankets – Reinforced matting ▪ Sedimentation <ul style="list-style-type: none"> – Hay bales, silt fences, dikes, and baffles – Stabilized construction access – Controlled temporary stock pile areas ▪ Runoff <ul style="list-style-type: none"> – Runoff diversion measures – Level spreaders – Subsurface drains
WQ-02 DEIS Section 3.2.5	Runoff and water quality effects during operation	<ul style="list-style-type: none"> ▪ Use of wet and dry retention/detention ponds, vegetated swales and conveyance systems, adequate buffers around or adjacent to water resources and systems (e.g., streams, lakes, ponds, stormwater runoff, groundwater recharge areas, and erodible soils) ▪ Use of most up-to-date industry standards for addressing water quality (e.g., porous surfacing and pavement)
Noise and Vibration (NV) Section 3.3		
NV-01 DEIS Section 3.3.5	Construction noise	<ul style="list-style-type: none"> ▪ Require noise control measures to ensure compliance with all federal and local guidelines and noise limits
NV-02 DEIS Section 3.3.5	Operation noise	<ul style="list-style-type: none"> ▪ Locate the alignment far away from noise-sensitive receivers ▪ Adjust the vertical and horizontal alignments ▪ Construct noise barriers, including sound walls and vegetative buffers, and alter property rights for construction of noise barriers ▪ Use noise berms ▪ Create noise buffer areas

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> ▪ Sound insulate buildings ▪ Implement operational controls, such as reducing train horn noise in compliance with the Quiet Zone requirements in FRA's whistle ban regulation in the Train Horn Rule (49 CFR Part 222)
NV-03 DEIS Section 3.3.5	Construction vibration	<ul style="list-style-type: none"> ▪ Select and use equipment and construction techniques that produce the least vibration
NV-04 DEIS Section 3.3.5	Operation vibration	<ul style="list-style-type: none"> ▪ Use operational controls, such as restricting vibration-inducing activities to locations that have no potentially affected receivers or restricting vibration-inducing activities to less-sensitive times of day ▪ Use highly resilient rail fasteners which fasten the rail line to the rail tie and reduces vibration ▪ Use design features such as thick slabs in tunnels and floating slabs or rail ties that reduce vibration
Solid Waste Disposal (SWD) Section 3.4		
SWD-01 DEIS Section 3.4.5	Construction waste generation	<ul style="list-style-type: none"> ▪ Divert construction and demolition waste from landfills by reusing or recycling to reduce the amount of solid waste generated ▪ Segregate and/or recycle the waste at an appropriately permitted recycling facility or contract with an authorized agent to collect unsegregated waste and recycle at a permitted recycling facility in compliance with federal, state, and local regulations
Natural Ecological Systems and Wildlife (NESW) Section 3.5		
NESW-01 DEIS Section 3.5.5	Disturbance of terrestrial and aquatic habitats and wildlife during construction	<ul style="list-style-type: none"> ▪ Design routes outside existing transportation corridors with alternative pathways or undercrossings to maintain wildlife migratory paths or corridors ▪ Follow local ordinances for erosion, sediment, and stormwater controls during construction
NESW-02 DEIS Section 3.5.5	Disturbance of wildlife during operation	<ul style="list-style-type: none"> ▪ Construct multiple and varying crossing structures at wildlife crossing points to provide connectivity for species likely to use a given area

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> ▪ Determine and construct the appropriate number, spacing, and location of wildlife crossing structures based on species-specific information ▪ Monitor structures for obstructions, such as detritus or silt blockages, that impede wildlife movement ▪ Manage human activity near wildlife crossing structures, with measures such as fencing and signage
Wetlands (WL) Section 3.6		
WL-01 DEIS Section 3.6.5	Construction effects on waters of the U.S.	<ul style="list-style-type: none"> ▪ Route selection and route adjustments ▪ Temporary work space siting during design iterations ▪ Demarcate wetlands outside the construction corridor as “no work zones” ▪ Co-location of the proposed Program alternative with previously disturbed construction areas ▪ Use construction methods that limit temporary workspace through waters of the U.S ▪ Topsoil segregation and replacement in temporarily excavated wetlands ▪ Expedite construction in and around wetlands ▪ Store fuel, lubricant, and hazardous material or locate of equipment refueling areas outside waters of the U.S. boundaries ▪ ROW inspections during and after construction ▪ Repair of erosion control or restoration features as necessary until permanent re-vegetation is successful ▪ Restore waters of the U.S. to the original contours and flow regimes to the extent practical ▪ Promote natural revegetation through the available topsoil seed bank ▪ Follow the 2008 U.S. Environmental Protection Agency and U.S. Army Corps of Engineers Wetland Compensatory Mitigation Rules (33 CFR Parts 325 and 332, 40 CFR Part 230) emphasizing a watershed-level approach to compensation where impacts on waters of the U.S. are unavoidable. The hierarchy of mitigation preferences is mitigation banks, in-lieu fee programs, and permittee-responsible mitigation

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
Threatened and Endangered Species (TES) Section 3.7		
TES-01 DEIS Section 3.7.5	Disturbance of terrestrial and aquatic habitats and wildlife during construction	<ul style="list-style-type: none"> ▪ Confirm the boundaries of listed plant and wildlife habitat prior to the start of construction to avoid or minimize effects on these areas ▪ Conduct preconstruction surveys and monitoring in advance of clearing, grading, or construction to identify protected nest sites and avoid these areas until nesting has completed ▪ Implement seasonal restrictions on construction work during key breeding, nesting, migration, and growth periods to protect individual species ▪ Provide for the mitigation of project areas by improving marginal habitats or creating mitigation banks at key locations within the affected watersheds and habitat ranges, as necessary
TES-02 DEIS Section 3.7.5	Disturbance of wildlife during operation	<ul style="list-style-type: none"> ▪ Construct multiple and varying wildlife crossing structures at crossing points to provide connectivity for species likely to use a given area ▪ Construct at least one wildlife crossing structure within an individual's home range and where suitable habitat for species occurs (if possible) on both sides of the crossing structure ▪ Monitor structures for obstructions, such as detritus or silt blockages, that impede wildlife movement ▪ Manage human activity near wildlife crossing structures with the use of fencing, signage, etc.
Flood Hazards and Floodplain Management (FHFM) Section 3.8		
FHFM-01 DEIS Section 3.8.5	Effects on floodplains during construction	<ul style="list-style-type: none"> ▪ Create temporary diversion channels capable of handling a flood event ▪ Create coffer dams (or other temporary work structures) so as not to create a rise in downstream or upstream flood levels ▪ Limit construction during the rainy season ▪ Minimize the amount of soil and vegetation disturbance during construction

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> Maintain vegetative buffers between project work and the flooding source (Association of State Floodplain Managers)
FHFM-02 DEIS Section 3.8.5	Effects on floodplains during operation	<ul style="list-style-type: none"> Maximize the spans of bridges and box culverts to reduce the amount of fill material at the approach. Where feasible—and as part of TxDOT (TxDOT 2004), ODOT (ODOT 2009), and rail design standards (BNSF/UPRR 2007)—new stream crossings should take into consideration the 100-year flow and provide hydrologic connectivity to the adjacent watercourses. Hydrologic modeling would be used to confirm flood capacities are maintained and floodplain extents and depths would not affect previously unaffected properties adjacent to the EIS Study Area. Provide compensatory flood storage in other Program areas Minimize the amount of upstream and downstream channelization Elevate new construction above the 100-year floodplain Provide flood openings in new construction Provide channel training in areas of ephemeral or intermittent flow
Coastal Zone Management (CZM) Section 3.9		
CZM-01 DEIS Section 3.9.5	Pollution of coastal zone management areas during construction (applicable only to Alternative S4 HrSR)	<ul style="list-style-type: none"> Use water pollution prevention measures (refer to measures in WQ01 above)
CZM-02 DEIS Section 3.9.5	Pollution of coastal zone management areas during operation (applicable only to Alternative S4 HrSR)	<ul style="list-style-type: none"> Use water pollution prevention measures (refer to measures in WQ01 above) Keep development within the existing railroad ROW to the extent possible and avoid filling within the CZM beyond current fills. A potential exception could be any filling associated with the modification or replacement

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<p>of the bridge crossing Oso Creek.</p> <ul style="list-style-type: none"> ▪ Locate additional required ROWs adjacent to existing transportation facilities and ROWs. Access to the project or local traffic circulation would use the existing roadway network. Avoid impounding or draining coastal wetlands to the extent possible. ▪ Implement standard train safety protocols to minimize risk of coastal resources being affected by spills associated with train derailment
Use of Energy Resources (UER) Section 3.10		
UER-01 DEIS Section 3.10.5	Energy consumption during construction	<ul style="list-style-type: none"> ▪ Use energy-saving equipment and facilities to reduce electricity demand ▪ Develop and implement a construction energy conservation plan ▪ Locate construction material production facilities onsite or within proximity to the project site ▪ Use newer and more energy-efficient construction vehicles ▪ Implement a program to encourage construction workers to carpool or use public transportation for travel to and from the construction site
Utilities (UT) Section 3.11		
UT-01 DEIS Section 3.11.5	Utility conflicts during construction	<ul style="list-style-type: none"> ▪ Involve utility operators/owners during preliminary design ▪ Relocate utilities outside of the alignments ▪ Develop relocation and construction phasing plans around peak usage hours to minimize utility disruptions ▪ Make adjustments to the rail alignments and profiles to avoid major utility lines or facilities ▪ During final design, consult with each utility provider/owner to avoid or reduce potential impacts on existing and planned utilities through design refinements

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
UT-02 DEIS Section 3.11.5	Utility conflict during operation	<ul style="list-style-type: none"> ▪ Provide insulation against electromagnetic interference ▪ Where new alignments would cross existing utilities, encase the utilities in strong culverts or conduits to prevent damage
Geologic Resources (GEO) Section 3.12		
GEO-01 DEIS Section 3.12.5	Geologic- and soil-related hazards	<ul style="list-style-type: none"> ▪ Implement engineering standards in accordance with local requirements or industry standards, including the International Building Code ▪ Prepare and implement erosion and sediment control plans
Aesthetic and Visual Resources (AVR) Section 3.13		
AVR-01 DEIS Section 3.13.5	Visual disruption during construction	<ul style="list-style-type: none"> ▪ Minimize pre-construction clearing ▪ Limit the removal of buildings to those that would obstruct project components ▪ When possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views ▪ Regrade areas disturbed by construction, staging, and storage to original contours and revegetate with plant material similar in numbers and type after construction ▪ Avoid locating construction staging sites within immediate foreground distance (0 to 500 feet) of the sensitive-viewer types ▪ Minimize light disturbance during construction so that the lighting will be shielded and directed downward
AVR-01 DEIS Section 3.13.5	Visual disruptions during operation	<ul style="list-style-type: none"> ▪ Develop and apply specific design guidelines applicable to major design features, while taking into account the surrounding visual quality ▪ Minimize visual disruption by screening elevated guideways adjacent to residential areas ▪ Establish consultation with local jurisdictions to identify and integrate local design features into the key project features and future station designs through a collaborative, context-sensitive solutions approach ▪ Where appropriate, plant trees along the edges of the

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<p>ROWS in locations adjacent to residential areas</p> <ul style="list-style-type: none"> ▪ Incorporate fencing or screening in areas with new project features in proximity to sensitive viewers ▪ Include full shielding of all new and replacement lighting features ▪ Incorporate vegetation around structures, columns, and other components associated with the alternatives ▪ Utilize complimentary and consistent colors, patterns, and textures on structures, columns, and noise barriers associated with the alternatives ▪ Incorporate pavement treatments at future stations commensurate with context sensitive solutions ▪ Utilize vegetation (to block access) and surface coatings on alternative components that would be resistant to graffiti and weather ▪ Minimize and mitigate visual disruption from sound barriers by providing surface treatments (color and texture) along with the use of alternate materials (transparent mediums where appropriate)
Land Use and Prime Farmland (LUPF) Section 3.14		
LUPF-01 DEIS Section 3.14.5	Land acquisition	<ul style="list-style-type: none"> ▪ Avoid land use acquisitions through alignment adjustments and design changes ▪ Provide relocation assistance in accordance with the Uniform Relocation and Real Property Acquisition Policies Act of 1970, as amended
Socioeconomics and Environmental Justice (SEJ) Section 3.15		
SEJ-01 DEIS Section 3.15.6	Socioeconomics and environmental justice effects	<ul style="list-style-type: none"> ▪ Consult with local governments and planning agencies, with consideration given to minimizing barrier effects to maintain neighborhood integrity, including grade-separating planned rail lines and streets, new pedestrian crossings, new cross-connection points, improved visual quality of project facilities, and TMP to maintain access during and after construction ▪ Develop design strategies for application at the project level to avoid or minimize the temporary or permanent

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<p>acquisition of residential and nonresidential property</p> <ul style="list-style-type: none"> ▪ Avoid potential displacement and acquisitions (temporary use and/or permanent and nonresidential property) to the extent feasible by considering further alignment adjustments and design changes at the project level ▪ Conduct outreach to affected communities as part of the decision-making process, and this outreach would be documented
SEJ-02 DEIS Section 3.15.6	Temporary construction-related community cohesion effects	<ul style="list-style-type: none"> ▪ Provide opportunities for community involvement early in project-level studies ▪ Conduct design workshops within each affected neighborhood to develop an understanding of key vehicle, bicycle, and pedestrian linkages across the rail corridor so that those linkages can be preserved, including the use of grade-separated crossings ▪ Ensure that connectivity (pedestrian/bicycle and vehicular crossings) across the rail corridor is maintained where necessary to maintain neighborhood integrity ▪ Develop a TMP to reduce barrier effects during construction ▪ Maintain connectivity during construction to the extent feasible
Public Safety and Hazardous Materials (PSHM) Section 3.16		
PSHM-01 DEIS Section 3.16.5	Public safety and security risks	<ul style="list-style-type: none"> ▪ Develop a construction health and safety plan to limit risks to human health ▪ Implement a construction transportation plan that includes traffic control measures to address temporary road closures, provisions for detours, alternative routes, and procedures for coordination with emergency service providers ▪ Implement construction site security measures, such as securing equipment and materials after hours in locked storage areas and use of security personnel

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> ▪ Implement operational security measures, such as access control and security monitoring systems ▪ Follow safety design standards for track and roadway design ▪ Comply with federal and state rules for rail vehicular movements, such as ROW fencing, use of contemporary signaling, Positive Train Control systems, and adequate clearance between parallel passenger and freight rail tracks ▪ Incorporate engineering safety measures and BMPs for at-grade and grade-separated rail crossings in accordance with federal and state regulations ▪ Implement standard safety precautions at stations, such as textured warning strips along platform edges, properly designed lighting, adequate platform depth to allow passengers to stand away from active tracks, and grade separated pedestrian crossings of rail tracks. Other station improvements that promote safety may include designating pedestrian and vehicle spaces and adding passenger pick-up and drop-off zones. ▪ Maintain adequate separation between adjacent passenger and freight rail tracks to prevent derailed trains from entering the adjacent rail trackway. Include physical barriers, such as crash walls, in areas where adequate physical separation cannot be attained. These types of design features would follow the design and safety standards and recommended practices in the 2014 Manual for Railway Engineering (American Railway Engineering and Maintenance-of-Way Association 2014) and federal Track Safety Standards (49 CFR Part 213). ▪ Coordinate with emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route needs ▪ Develop and implement an emergency response plan in the event of an act of terrorism, natural disasters, and other emergencies

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
PSHM-02 DEIS Section 3.16.5	Construction effects related to hazardous materials	<ul style="list-style-type: none"> ▪ Develop and implement a safety and security plan for services in sealed corridors, such as high-speed rail, where access is limited by fencing or on viaducts (e.g., Dallas to Houston) ▪ Use construction safety procedures, equipment stockpiling methods, material handling plans, and solid waste management procedures that protect human health and the environment and minimize hazardous materials releases during construction ▪ Develop specific environmental health and safety plans and procedures that protect construction workers, surrounding communities, and the environment ▪ Develop and implement a spill prevention, control, and countermeasure plan to handle potential hazardous material spills ▪ Develop and implement a soil and material handling plan in the event that undocumented contamination is encountered ▪ Use personal protection, workplace monitoring, alternative designs, and evaluation of construction methods that limit the effect from contaminated materials ▪ Follow applicable federal and state regulations for removal and disposal of hazardous materials, such as asbestos or lead-based paint, if such materials are encountered during building or structure renovation or demolition

Recreational Areas and Opportunities (RAO) Section 3.17

RAO-01 DEIS Section 3.17.5	Effects on recreational areas during construction	<ul style="list-style-type: none"> ▪ Minimize generation of dust and debris ▪ Avoid recreational resources ▪ Use detours (for pedestrians, bicycles, and vehicles) and provide partial access to recreational resources ▪ Recreational resource enhancements ▪ Potential land replacement for long-term adverse effects
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Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> ▪ Preserve public access to, and function of, remaining park areas during construction ▪ Implement context-sensitive design, plantings, vegetative screenings, and sound barriers ▪ Restore resources which are temporarily affected to pre-construction or better conditions ▪ Shift and narrow new ROWs to avoid encroachments on recreation areas
Historic, Architectural, and Non-Archaeological Cultural Resources (HI) Section 3.18		
HI-01 DEIS Section 3.18.5	Potential effects to historical resources during construction	<ul style="list-style-type: none"> ▪ Document the historic property before construction. This may include preparation of Historic American Building Survey or Historic American Engineering Record documentation, NRHP nominations, and/or historic property management and treatment plans. ▪ Use sound barriers, vegetative screening, and landscaping ▪ Develop and disseminate educational materials throughout the Project Area
Archaeological Sites (AS) Section 3.19		
AS-01 DEIS Section 3.19.5	Construction effects on archaeological resources	<ul style="list-style-type: none"> ▪ Coordinate development of a Memorandum of Agreement with Oklahoma and Texas State Historic Preservation Offices (SHPOs), Native American tribes, and other interested parties, as appropriate ▪ Coordinate development of a Programmatic Agreement with the FRA, TxDOT, ODOT, and Oklahoma and Texas SHPOs ▪ Develop an Archaeological Sites Monitoring and Treatment Plan or an Unanticipated Discovery Plan that would guide archaeological monitoring work during construction

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
Travel Demand and Transportation (TDT) Section 3.20		
TDT-01 DEIS Section 3.20.5	Transportation effects during construction	<p>Preparation and implementation of a TMP in accordance with the Manual on Uniform Traffic Control Devices (Federal Highway Administration 2009) and all applicable requirements of the local reviewing agency, as appropriate. The TMP could include, but would not be limited to, the following measures:</p> <ul style="list-style-type: none"> ▪ Prepare temporary traffic control plans for each construction area. The temporary traffic control plans will identify the need for full or partial lane closures, detours, flaggers for directing traffic, temporary signage, lighting, traffic control devices, and other measures, if required. ▪ Identify oversize and overweight load haul routes. Transporters must comply with state and county regulations for transportation of oversized and overweight loads on all state, county, and city roads. Such regulations typically include provisions for time of day, pilot cars, law enforcement escorts, speed limits, flaggers, and warning lights. All material hauling activities shall comply with applicable state and local regulations. ▪ Schedule deliveries of heavy equipment and construction materials during periods of minimum traffic flow and determine the need for construction work hours and arrival and departure times outside peak traffic periods. ▪ Post the approved hours of construction activity at the construction site in a place and manner that can be easily viewed by any interested member of the public. ▪ Identify vehicle safety procedures for entering and exiting site access roads. ▪ Notify and coordinate with emergency responders regarding potential road closures prior to construction. ▪ Provide access for emergency vehicles to and around the project sites.

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
		<ul style="list-style-type: none"> ▪ Maintain access to adjacent properties and transit, bicycle, and pedestrian facilities along project routes. ▪ Notify residential and commercial occupants of property adjacent to the construction sites of the hours of construction activity which may impact the area. ▪ Notify and coordinate with school systems regarding potential road closures prior to construction. ▪ Notify and coordinate with transit operators regarding potential road closures prior to construction. ▪ Notify and coordinate with mail service and waste haulers regarding potential road closures prior to construction. ▪ Provide a construction-parking plan that minimizes the effect of construction worker parking in the area. Include an estimate of the number of workers that will be present on the site during the various phases of construction, indicate where sufficient off-street parking will be used, and identify all locations for offsite material deliveries. ▪ Distribute public information using local news television and radio broadcasts, informational flyers and mailers, websites, and other outreach options. Install signs and distribute public notices regarding construction work before disruptions occur to identify detours to maintain access.
Public Health (PH) Section 3.21		
PH-01 DEIS Section 3.21.5	Construction effects on air quality	<ul style="list-style-type: none"> ▪ Use low-emission vehicles during construction ▪ Use newer and well-maintained equipment ▪ Reduce traffic congestion emissions, for example by using site-specific traffic management plans
PH-02 DEIS Section 3.21.5	Operations effects on air quality	<ul style="list-style-type: none"> ▪ Use Tier 4 locomotive engines ▪ Implement additional measures to reduce diesel locomotive idling times ▪ Locate the tracks, stations, and other supporting facilities away from populated areas and sensitive receptors

Mitigation ID and Reference	Potential Effect	Avoidance, Minimization, and Mitigation Measures for Consideration and Further Development at the Project Level
PH-03 DEIS Section 3.21.5	Construction effects on water quality	<ul style="list-style-type: none"> Use runoff diversion measures, level spreaders, and subsurface drains
PH-04 DEIS Section 3.21.5	Operations effects on water quality	<ul style="list-style-type: none"> Use wet and dry retention/detention ponds, vegetated swales, and conveyance systems Create adequate buffers around or adjacent to groundwater recharge areas Use most up-to-date industry standards for addressing water quality (e.g., porous surfacing and pavement)
PH-05 DEIS Section 3.21.5	Public health effects related to hazardous materials	<ul style="list-style-type: none"> Use construction safety procedures, equipment stockpiling methods, material handling plans, and solid waste management procedures that protect human health and minimize hazardous materials releases during construction Develop specific environmental health and safety plans and procedures that protect construction workers and surrounding communities Use personal protection, workplace monitoring, alternative designs, and evaluation of construction methods that limit the effect from contaminated materials Follow applicable federal and state regulations for removal and disposal of hazardous materials, such as asbestos or lead-based paint, if such materials are encountered during building or structure renovation or demolition

Note: The responsible party for each avoidance, minimization, and mitigation measure for consideration and further development will be determined at the project level.

Sources:

Association of State Floodplain Managers:

(<http://www.floods.org/index.asp?menuID=333&firstlevelmenuID=187&siteID=1>). Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards. FEMA. January 2013BNSF/UPRR. 2007. Guidelines for Railroad Separation Projects. January.

Oklahoma Department of Transportation (ODOT). 2009. Roadway Design Specifications.

Texas Department of Transportation (TxDOT). 2004. Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges. June.

2.6 *Monitoring and Enforcement*

Transportation projects must comply with federal, state, and local environmental laws and regulations, permits, reviews, notifications, consultation, and other approvals. Table ROD-5 lists the permits, notifications, or concurrences that may be required for construction of the Program. The specific permits and approvals that could be required for construction of any of the NEPA Selected Alternatives would be identified during the project-level evaluation of that alternative.

Table ROD-5: Anticipated Permits and Approvals

Agency	Permit
FEDERAL	
Bureau of Land Management	<ul style="list-style-type: none"> ▪ ROW Permit
Department of the Interior – Bureau of Indian Affairs	<ul style="list-style-type: none"> ▪ Consultation and Coordination with Indian Tribal Governments (Executive Order 11375)
Federal Aviation Administration	<ul style="list-style-type: none"> ▪ Airport Layout Plan Modification Approval
Federal Emergency Management Agency	<ul style="list-style-type: none"> ▪ Conditional Letter of Map Revision or Letter of Map Revision for changes in flood elevation
Federal Highway Administration	<ul style="list-style-type: none"> ▪ Concurrence for Highway ROW Occupancy and/or Disposal ▪ Access Justification Report or Access Modification Report ▪ Concurrence on Project Design Elements Related to Highway Operations
National Marine Fisheries Service	<ul style="list-style-type: none"> ▪ Section 7 Consultation and Biological Opinion
National Surface Transportation Board	<ul style="list-style-type: none"> ▪ NEPA Consultation
Surface Transportation Board	<ul style="list-style-type: none"> ▪ Authority to Construct and Operate Railroad
U.S. Advisory Council on Historic Preservation	<ul style="list-style-type: none"> ▪ National Historic Preservation Act Section 106 consultation, administered by the Texas and Oklahoma SHPOs
U.S. Army Corps of Engineers	<ul style="list-style-type: none"> ▪ Clean Water Act Section 404 Permit for discharge of dredged or fill materials into waters of the U.S., including wetlands ▪ Clean Water Act Section 401 Certification – Water Quality, administered by the Texas Commission on Environmental Quality and the

Agency	Permit
	<p>Oklahoma Department of Environmental Quality</p> <ul style="list-style-type: none"> ▪ Rivers and Harbors Act Section 10 Permit for construction of any structure in or over any navigable waters of the U.S. ▪ Rivers and Harbors Act Section 408 Permit for construction of new levee crossings
U.S. Coast Guard	<ul style="list-style-type: none"> ▪ General Bridge Act Section 9 Permit for construction of new bridge structures over waterways considered navigable by the U.S. Coast Guard
U.S. Department of Transportation/Federal Railroad Administration	<ul style="list-style-type: none"> ▪ U.S. Department of Transportation Act Section 4(f) evaluation and approval
U.S. Environmental Protection Agency	<ul style="list-style-type: none"> ▪ Section 309 – Clean Air Act - Review of Draft Environmental Impact Statements ▪ Review of Environmental Justice Conclusions ▪ General Air Quality Conformity Determination ▪ Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) Permit, administered by the Texas Commission on Environmental Quality and the Oklahoma Department of Environmental Quality
U.S. Fish and Wildlife Service	<ul style="list-style-type: none"> ▪ Section 7 Consultation and Biological Opinion
STATE	
Texas Commission of Environmental Quality	<ul style="list-style-type: none"> ▪ Clean Water Act Section 401 Certification – Water Quality ▪ Clean Water Act Section 402 NPDES Permit, implemented by the Texas Pollutant Discharge Elimination System Program ▪ Notice of Intent to use General Permit TXR150000 for Stormwater Discharges Associated with Construction Activity ▪ Surface Water Use Permit ▪ Transportation Conformity Determination

Agency	Permit
Texas Department of Transportation	<ul style="list-style-type: none"> ▪ Occupancy and Use Permit ▪ ROW Permit
Texas General Land Office	<ul style="list-style-type: none"> ▪ Texas Coastal Management Program Coastal Coordination Council Consistency Determination
Texas Parks and Wildlife Department	<ul style="list-style-type: none"> ▪ Scientific Collecting Permit for relocation of state-listed threatened and endangered species ▪ Marl, Sand, Gravel, Shell, or Mudshell Permit for disturbance or take of streambed materials
Texas State Historic Preservation Office	<ul style="list-style-type: none"> ▪ National Historic Preservation Act Section 106 Consultation
Oklahoma Department of Environmental Quality	<ul style="list-style-type: none"> ▪ Clean Water Act Section 401 Certification – Water Quality ▪ Clean Water Act Section 402 NPDES Permit, implemented by the Oklahoma Pollutant Discharge Elimination System Program ▪ Notice of Intent to use General Permit OKR10 for Stormwater Discharges from Construction Activities
Oklahoma Department of Transportation	<ul style="list-style-type: none"> ▪ Occupancy and Use Permit ▪ ROW Permit
Oklahoma State Historic Preservation Office	<ul style="list-style-type: none"> ▪ National Historic Preservation Act Section 106 Consultation
LOCAL	
Local agencies	<ul style="list-style-type: none"> ▪ Construction Noise Permit (if construction violates city or county noise ordinance)

2.7 Determinations and Findings Regarding Other Laws

2.7.1 Section 4(f)/6(f)

Section 4(f) of the Department of Transportation Act of 1966, 49 U.S.C. § 303 and 23 U.S.C. § 138, is a federal law that protects publicly owned parks, recreation areas, wildlife and/or waterfowl refuges, and significant historic sites, whether publicly or privately owned. Section 4(f) requirements apply to all transportation projects that require funding or other approvals

by the USDOT. As a USDOT agency, FRA must comply with Section 4(f). The Federal Transit Administration's Section 4(f) implementing regulations are at 23 CFR Part 774.

FRA cannot approve a transportation project that uses a Section 4(f) property, as defined in 23 CFR § 774.17, unless FRA determines that:

- There is no feasible and prudent avoidance alternative, as defined in 23 CFR § 774.17, to the use of land from the Section 4(f) property, and the action includes all possible planning, as defined in 23 CFR § 774.14, to minimize harm to the property resulting from such use (23 CFT § 774.3(a)) or
- The use of the Section 4(f) property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant will have a *de minimis* use, as defined in 23 CFR § 774.17, on the property (23 CFR § 774.3(b)).

The term Section 4(f) "potential use" acknowledges that the detail available at the service-level EIS phase is not adequate for a "use" determination for two reasons:

1. The design level is not detailed enough to determine property acquisition needs.
2. Surveys to validate parks, recreation resources, and properties eligible for Section 106 protection are not sufficiently complete to verify that all Section 4(f) properties have been considered in this evaluation. As with "potential Section 4(f) properties," the term "potential uses" reflects an inclusive approach at this level. Any publicly available recreational resource, or any property identified as eligible or potentially eligible for the NRHP within the 500-foot-wide EIS Study Area, is considered protected under Section 4(f) and may result in a "potential use" for that alternative.

FRA cannot make a Section 4(f) determination at this service-level analysis because the information available at this time is not sufficiently detailed. This evaluation only indicates those resources where there may be a Section 4(f) use; however, in many situations, where the alternative's alignment is removed from an existing railway, there is not enough design development to determine whether the use would be permanent, temporary, or constructive, and the evaluation does not identify uses that may be classified as *de minimis* impacts.

The discussion of impacts under Section 6(f) of the Land and Water Conservation Fund (36 CFR 59.3) addresses conversion of Section 6(f) properties from outdoor recreational use to a use other than outdoor recreational use, which would occur through ROW acquisition or creation of permanent easements.

Table ROD-6: Number of Section 4(f)- and Section 6(f)-Protected Properties by Alternative (in the 500-foot EIS Study Area)

Protected Property Type	Alternatives					
	N4A CONV	C4A HSR	C4B HSR	C4C HSR	S4 HrSR	S6 HrSR/HSR
<i>Section 4(f)-Protected Parks</i>	27	24	16	27	20	1
<i>Section 4(f)-Protected Refuges</i>	0	0	0	0	1	0
<i>Section 4(f)-Protected Recreation Areas</i>	12	16	16	17	11	0
<i>Section 4(f)-Protected Cultural Resources</i>	26	24	18	28	30	0
<i>Section 6(f)-Protected Properties</i>	3	3	3	3	2	0
<i>Total Section 4(f)- and/or 6(f)-Protected Properties^a</i>	65	64	50	72	62	1
^a Because all Section 6(f) properties are also protected under Section 4(f), the Section 6(f) properties were not included in the Total Section 4(f) and/or Section 6(f) Protected Properties row to avoid counting the Section 6(f) properties twice.						

Additional Section 4(f) and Section 6(f) properties would likely be identified at the project level when detailed field surveys and evaluations would be conducted.

Although several Section 4(f)-protected properties were identified within the EIS Study Area in both the Northern and Southern Sections, new facilities associated with alternatives in these sections would likely use existing railroad infrastructure, be built directly adjacent to existing railroad facilities and tracks, or, in the case of the Southern Section, be constructed in rural areas where there are limited 4(f) and 6(f) properties. Even expansion of existing

stations and construction of new stations within urban and suburban areas can avoid an adverse effect under Section 106 by adhering to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (National Park Service 1995) or, when possible, avoid effects on the urban or suburban properties altogether. Avoiding an adverse effect on historic resources allows some “use” but can result in a *de minimis* use classification. However, all of the Central Section alternatives would likely result in a potential use of Section 4(f) resources.

2.8 FRA Decision

This ROD documents the FRA’s NEPA Selected Alternatives and FRA’s decision-making process. This ROD does not grant approval for construction, funding, or permitting within the decision-making steps; instead, it provides for further detailed planning and potential project-level analysis of the NEPA Selected Alternatives. Based upon the consideration of the data presented in the DEIS, FEIS, and this ROD, FRA has made its decision that the service-level NEPA Preferred Alternatives as presented in the DEIS and FEIS, and as described in the above sections of this ROD, are selected for further consideration at the project-level.

The environmental record for this decision includes the following documents:

- The Service-Level DEIS
- The Service-Level Combined FEIS/ROD
- All technical reports, white papers, Title VI analysis (DEIS Sections 3.15.3 Public Involvement and 8.2 Public Coordination and Outreach), and supporting documentation incorporated by reference into the DEIS and FEIS/ROD

These documents, incorporated herein by reference, constitute the statements required by NEPA and Title 23 of the U.S.C. on:

- The environmental effects of the proposed alternatives
- The adverse environmental effects that cannot be avoided should the proposed alternatives be implemented
- Alternatives to the proposed alternatives
- Irreversible and irretrievable impacts on the environment that may be involved with the proposed alternatives should they be implemented

Having carefully considered the environmental record noted above, the mitigation measure strategies as required herein, the written and oral comments offered by agencies and the public on this record and the written responses to the comments, the FRA has determined that the following NEPA Selected Alternatives represent the best service-level options along the Program Corridor to be considered for future project-level evaluation:

- Alternative N4A CONV from Oklahoma City to Fort Worth with service extending to Dallas. Alternative N4A CONV would provide enhanced opportunities and improvements over the existing service, with faster service and more frequent connections.
- Alternative C4A HSR from Dallas and Fort Worth to San Antonio. Service would operate between Fort Worth and Dallas with a stop at DFW International Airport and extend south from Dallas to San Antonio. This service would provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel mode options. It would also help alleviate congestion along IH-35 and provide connecting service to hubs for major regional air carrier services such as AUS and DFW.
- Alternative C4B HSR from Dallas and Fort Worth to San Antonio. Service would operate between Fort Worth and Dallas with a stop in Arlington then continue south from Arlington to San Antonio. This service would provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel mode options. It would also help alleviate congestion along IH-35 and provide connecting service to hubs for major regional air carrier services such as AUS and DFW.
- Alternative C4C HSR from Dallas and Fort Worth to San Antonio. Service on this route would operate in a clockwise direction, running from Hillsboro to Fort Worth, east to Dallas, with a stop at DFW International Airport, back to Hillsboro, and south to San Antonio. This service would provide efficient and reliable intercity passenger rail service along the corridor from Dallas and Fort Worth to San Antonio that is time-competitive with other travel mode options. It would also help alleviate congestion along IH-35 and provide connecting service to hubs for major regional air carrier services such as AUS and DFW International Airport.
- Alternative S4 HrSR from San Antonio to Brownsville with an east-west leg from Laredo to Corpus Christi intersecting the north-south service in Alice. This alternative introduces intercity passenger rail service as a new alternative to transportation modes for the region and would provide an equitable and affordable intercity travel alternative to automobile, bus, and air service.
- Alternative S6 HrSR and Alternative S6 HSR from San Antonio to Laredo, extending to Monterrey, Mexico. These alternatives are selected only if the Monterrey, Mexico, connection is built. Alternative S6 HSR would be more compatible with the Selected Alternatives in the Central Section (Alternatives C4A, C4B, and C4C), which are all high-speed alternatives; however, if higher-speed rail is more compatible with the infrastructure in Mexico, S6 HrSR could be selected. These alternatives introduce intercity passenger rail service as a new alternative to transportation modes for the region and would provide an equitable and affordable intercity travel alternative to

automobile, bus, and air service. With the extension to Monterrey, they would provide opportunity for efficient international cross-border travel.

FRA finds that all practicable measures to minimize environmental harm at the service-level of analysis have been incorporated into the NEPA Selected Alternatives. The FRA also determines that this decision is in the best overall public interest.

